
 REPORTS OF PATENT, DESIGN, AND TRADE MARK CASES.

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NOVEMBER 2ND, 1932.

[No 13

 IN THE HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Before MR. JUSTICE LUXMOORE.

March 12th, 13th, 16th, 17th, 18th, 19th, 20th, 24th, 25th, 26th, 27th, 31st, April 1st,
22nd, 23rd, 24th, 27th, 28th, 29th, 30th, May 1st, 4th, 5th, 6th, 7th, 1931, and
5 January 21st, 1932.

 IN THE COURT OF APPEAL.

Before THE MASTER OF THE ROLLS AND LORDS JUSTICES SLESSER AND ROMER.
March 21st, 1932.

Before LORDS JUSTICES LAWRENCE AND ROMER AND MR. JUSTICE FARWELL.

10 April 12th, 13th, 14th, 15th, 18th, 19th, 20th, 21st, 22nd, 25th, 26th, 27th, 28th
and 29th, May 2nd, 3rd, 4th, 5th and 6th and 27th of June, 1932.

THE BRITISH HARTFORD-FAIRMONT SYNDICATE LD. v. JACKSON BROS.

(KNOTTINGLEY), LD.

15 *Patent—Action for Infringement—Counterclaim for Revocation—Novelty—
Subject-matter—Prior Grant—Infringement—Patent held invalid—Action
dismissed with costs—Order for Revocation—Appeal to the Court of Appeal—
Motion by Plaintiffs for an order that a witness called by the Defendants
might be further cross-examined—Motion and Appeal dismissed with costs.*

20 *Letters Patent were granted in 1919 in respect of "Improvements in methods
"of and apparatus for feeding molten glass." Claim 1 was, as follows:—
"Method of feeding molten glass wherein successive masses or gathers are sus-
"pended beneath an outlet and mold charges are separated therefrom while
"suspended, whilst the shape of the masses or gathers is controlled by variation
"of the movement of a movable controlling member adapted to act as a piston
25 "in the outlet, or by the means for separating the mold charges, or by the
"variation of the location of the controlling member or of the said separating
"means relatively to the outlet." The Plaintiffs commenced an action for
infringement. The Defendants denied infringement and counterclaimed for
the revocation of the Patent on the grounds that it lacked novelty, subject-matter
30 and utility and that the Specification was ambiguous and insufficient.*

*Held, that the Patent was invalid on the grounds that it had been anticipated
and lacked subject-matter in that it merely used an old method for controlling
the weight of gathers for the new purpose of controlling their shape; but defences*

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of prior grant, inutility and insufficiency failed; and that, if the Patent had been valid, the Defendants would have infringed it. The action was dismissed and an order for revocation of the Patent was made, the order to lie in the Office for one month and, if the Plaintiffs appealed and prosecuted the appeal with due diligence, until after the appeal. The Plaintiffs were ordered to pay the costs 5 of the action and counterclaim, a Certificate for certain of the Particulars of Objections being granted.

The Plaintiffs appealed to the Court of Appeal and moved for an order that the expert witness called on behalf of the Defendants at the trial might be called before the Court of Appeal for further cross-examination or alternatively 10 that the witness' evidence given in another case might be read as part of the evidence in the case.

Held, that the Patent was invalid on the grounds that it had been anticipated and lacked subject-matter, and for ambiguity and uncertainty. The appeal was dismissed with costs and a stay of the order for revocation pending an 15 appeal to the House of Lords was refused. The motion for leave to further cross-examine the Defendants' expert witness was dismissed with costs.

Letters Patent No. 142,785* were granted to *Hartford Fairmont Company* and *Karl Ernst Peiler* in respect of "Improvements in methods of and apparatus 20 for feeding molten glass," the Convention Date (United States) being the 5th of May, 1919. The Complete Specification, as amended by order of the Assistant-Comptroller of Patents dated the 8th of June, 1922, was, so far as material for the purpose of this report, as follows, the amendments being printed in italic and erased type:—

"This invention relates to the segregation and separation of molten glass into 25
"mold charges. It refers more particularly to the production of gathers discharged through and suspended in compact masses beneath the outlet of a
"furnace or container, and its object is to pre-form the gathers, and the mold
"charges severed therefrom, without the use of extraneous supporting means and
"in such manner as to adapt said charges to be most advantageously used in 30
"glass shaping machines.

"When a charge of molten glass is delivered to a mold any folding or lapping
"of the glass or trapping of air by the glass will cause defects in the article
"being made, besides heating the mold unevenly, and it has long been recognised
"that these defects might be avoided if the mold charges could be pre-formed 35
"to fit the interior contour of the mold walls before delivering them to the
"molds. It is known that, other conditions being equal, definite relations
"necessarily exist between the cross-section of a gather and that of the outlet
"through which it is discharged, and between the weight of the gather and the
"rate of discharge of the glass. It has been heretofore proposed to regulate the 40
"weight or size of the resultant gathers in accordance with the weight of the
"articles of glassware to be produced, by means of a reciprocating plunger or
"plug moving in the glass toward and away from a flow outlet, and to intermit
"the flow while a charged mold is being removed and replaced by an empty
"mold. These known devices, however, are incapable of controlling and 45

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"varying at will the shape or contour of each individual gather during its discharge, so as to impart the desired cross sectional dimensions to any selected portions of the length of the gather. A change in the length of the plunger stroke or ~~However, serious difficulties are encountered when it is desired~~
5 ~~to give different diameters to different portions of a gather as a~~
change in the size of the discharge outlet would influence the entire gather and not only a particular portion thereof. Therefore, predetermined variations in the shape of the gathers have heretofore been confined within very narrow limits, owing to the fact that no means were available
10 "for controlling the shape of the gather to vary its contour during the entire formation thereof.

"In accordance with the present invention the molten glass is discharged from the outlet of a melting furnace, or other container and is suspended beneath the outlet in compact masses or 'gathers,' under the control of a movable
15 "impelling and regulating member, herein termed an impeller, which projects into the glass from above. The lower end of the impeller projects into the outlet and is considerably smaller than the outlet, leaving an annular space of considerable width between the outside of the impeller and the inner wall of the outlet, this space being at all times filled with the glass, and being wide
20 "enough to allow the glass to flow in the space with the desired freedom. The glass seals the annular space between the impeller and the inner wall of the outlet, thus in a sense forming a mobile and flexible packing, which on account of the inherent viscosity of the glass enables the impeller to operate within the outlet as a piston. The vertical movements of the impeller operate partly by
25 "adhesion and partly by displacement to accelerate the flow of the glass by downward movement and to retard or reverse the flow by upward movement. The shape or size, or both, the shape and size of the gathers both generally and locally is ~~are~~ controlled and varied by suitably varying the position and movements of the impeller relative to the outlet, including the time of those
30 "movements. The impeller is mounted for movement in axial alignment with the outlet, but out of contact therewith, and is moved toward and from, and for some purposes its end is projected through and beyond the outlet, in which cases it also aids in supporting the suspended gathers. When the lower portion and main body of a gather has been formed to the size and shape desired
35 "for a mold charge the latter is severed by shears or other suitable severing means which are also variable as to position and movement, including time of movement, so as to complete the desired form of that mold charge, and also in some cases to pre-form the lower end of the succeeding charge. These variations in the positions, movements, and times of movement of the impeller
40 "and severing means are effected while the machine continues in full operation. This keeps the glass under the uniform normal conditions of temperature and plasticity needed for satisfactory operation and not only avoids the delays and abnormal conditions which would result from stopping the machine to make the adjustments, but also enables the effects of the adjustments to be observed
45 "at once, under such normal conditions of the glass. The certainty and accuracy of control thus obtained enables the different elements of this machine to be set and timed by reference to printed tables or schedules, according to the size and form of the mold charges desired, this being regularly done in the commercial operation of the machine.

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"The present invention is based on observation of the conditions attending the formation of the successive portions of a suspended gather, and, in accordance with the new method, the discharge of the glass through the outlet is controlled in such a manner that the cross-sectional dimensions of any or each portion of the suspended gather can be varied by varying the rate of discharge of the glass while such portion is being formed. Predetermined variations in the diameter of successive portions of the gather are thus obtainable by influencing the discharge of the glass to the desired extent and at the desired time. 5

"An important feature of the invention consists in periodically producing an impulse or a succession of impulses within the glass as it is being discharged, and controlling the formation of any portion of a gather by varying such impulse or succession of impulses. 10

"Another feature consists in providing a movable support adapted at times to co-operate with the outlet to support the suspended gathers, and in varying the relative amounts of support furnished by the outlet and the moveable support. 15

"By applying internal impulses to the glass as it is being discharged and accumulated in gathers and by controlling the conditions of support of the suspended gathers, it is possible to keep the formation of each gather under permanent control and to act on any desired portion of the gather, when required, without affecting the formation of other portions. 20

"A further feature consists in flowing the glass down and around the end of an impeller and operating the impeller to control the formation of gather accumulated below and around it. Such impeller affords a convenient means for producing impulses within the glass being discharged and for co-acting with the outlet in supporting the gathers during their formation. 25

"According to further features of the invention the various factors affecting the character of the controlling impulses, as the extent, the strength, the duration and the time of occurrence of such impulses, may be varied either singly or concurrently, preferably without interrupting the operation of the apparatus. 30

"The invention also contemplates severing a mold charge from each suspended gather while the downward movement of the glass is being retarded or reversed, for the purpose of pre-forming the lower end of the succeeding gather. The effect of this combined action of the severing means and of the impeller may be varied in different ways, as by varying the time relation between the impulses and the severing operations, the speed of the retarded or reversed flow of glass, and the speed of the severing movements. 35

"Surprisingly wide variations in the shape of the gathers and of the mold charges severed therefrom may thus be obtained with great accuracy and this result is attained, as more fully explained hereafter, without resorting to any adjustment requiring an interruption in the successive delivery of the mold charges. 40

"In the apparatus according to the invention, periodic impulses are produced within the glass being discharged, by automatically operated means. Furthermore, a movable support co-acts with the discharge outlet to suspend successive accumulations of the glass beneath the outlet. In the embodiment of 45

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"the invention to be hereafter described, both actions are performed by an impeller which is mounted for automatic movements into and out of the outlet without coming into contact therewith.

5 "The application of impulses within the discharging glass may advantageously be governed by a cam, the contour of which may be varied while the apparatus is in operation.

"In addition to impelling means which assist, counteract or correct the influence of gravity on the formation of the suspended gathers, suitable severing means are also employed and convenient adjustments provided to allow
10 "independent control of the impelling means and severing means as to relative time of operation, speed and position. These adjustments, which permit of varying any of the factors controlling the discharge of the glass, are adapted to be made while the machine is in operation thus allowing the maintenance of the flow of glass and the uniform heat conditions which are
15 "essential in proper operation of glass feeding apparatus.

"In the drawings:

"Figure 1 is a general front elevation of the apparatus with the lower part or base omitted.

20 "Figure 2 is a side elevation of the machine, shown partly in section, made approximately along line 2—2 of Figure 1, with the shear mechanism omitted, and showing the glass furnace and its conduit for the molten glass." . . .

After references to Figures 3 to 51 the Specification continued as follows:—

"The invention is herein shown embodied in a machine having the necessary mechanical movements and adjustments, and co-operating with a conduit
25 "projecting from a glass furnace, from which the molten glass is thus delivered in mold charges to an associated molding or shaping machine.

"The molten glass flows from the glass furnace 1 through a channel or conduit 2 (Fig. 2) to an outlet 3. It is there acted upon by an impeller 13
30 "mounted for vertical movement, and provided with various adjustments. As it issues periodically in regular cycles from the outlet, it forms successive gathers from which mold charges are severed by shear blades 4 reciprocating below the outlet. The separated mold charges fall upon a moistened chute 5 and slide upon it to the molds 6 mounted on the table 7 of the associated shaping machine (Fig. 5).

35 "The channel 2 is made of refractory material surrounded on the bottom and sides by heat insulation 11. At the outer end of the channel is an outlet spout 12, the interior of which is shaped so as to coact with the impeller 13. This spout is held in an iron frame or case 14, which also serves as a retainer for the insulation 11, the spout being surrounded with insulation, except at
40 "the outlet 3. . . .

"Clamped against the outlet block or spout 12 is an outlet ring 52 (Figs. 6 and 7) made of refractory material. This ring is carried in a metal holder 53 hinged by an open sided bearing 54 to allow ready removal, on a pivot 55 and is drawn up against an abutment by screws 56. Between the outlet ring and
45 "the spout is a packing 57 of refractory clay. The object of this construction is to allow the size of the outlet to be changed at will by easy and rapid change of the outlet rings. In practice an outlet ring of the size desired is placed in the holder and covered with sufficient plastic clay to form the packing
"57. . . .

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"The impeller 13 for timing and controlling the extrusion and formation of the gathers is made of refractory clay and is guided for vertical movement into or through the outlet ring in a line concentric with this ring by the guide shafts 116 and 117 sliding in bearings 120 and 121 respectively which are formed in the spout case (Figs. 2, 6 and 7). The guide shaft 117 carries an arm 122 to which a split holder 123 carrying the impeller is detachably and adjustably secured by clamp screws 124 which pass through elongated holes in the holder 123 to allow it to be slid in and out on the arm 122. This arm 122 is clamped to the shaft 117 by a screw 125 allowing it to be swung about the shaft. In this way the impeller holder 123 may be slid radially in and out from the shaft 117 or swung about it and clamped in position to bring the point of the impeller into alignment with the outlet, thus compensating for warping of the impeller or for variation in different impellers. The shaft 117 also carries an arm in which the guide shaft 116 is fastened. The lower end of this shaft comes opposite the scale 127 fastened to the spout case. This scale is graduated to indicate the position of the lower end of the impeller relative to the lower side of the outlet ring. The impeller is clamped in its holder 123 by screws 128, and may be quickly exchanged for another impeller of any desired shape. Various shapes of impellers for different effects are shown in Figs. 46 to 49 inclusive.

"The impeller and its carrier are suspended by the connecting rod 130 and its pivots 131 and 132 from the lever 133 pivoted at its hub 134 on the shaft 135. This lever carries an adjusting screw 136 bearing a hand wheel 137. The end of this adjusting screw bears against another lever 138 also pivoted at its hub 140 on the shaft 135, so that both levers are guided side by side between fixed collars. The lever 138 has at its upper end a stud 141 carrying a cam roller 142 which is held against the impeller cam shown in outline at 143 in Fig. 7 by the weight of the impeller and its carrier. The impeller cam thus governs the rise and fall of the impeller. By turning the hand wheel 137 and revolving the adjusting screw 136 the relative angular position of the two levers 133 and 138 may be varied. The effect of this is to raise and lower the working range of the impeller movements. The impeller may also be held inactive in its upper position by turning the latch 144 carried by the lever 133 over the projection 145 carried by the shaft 146.

"The impeller 13 may be held inactive at lower positions projecting into the glass at the outlet, or even through the outlet, by adjusting the connecting rod 130, which connects the impeller 13 with the lever 133 and operating the latch 144. By thus holding the impeller inactive at its lower positions and adjacent the outlet, the gravity outflow the glass can be timed and shaped for various forms of gathers by operating the severing means only.

"In operation the gate 41 is raised to the proper point to maintain the desired head of glass over the outlet and the machine is set in motion, reciprocating the impeller and the shears. The molten glass issues from the outlet under the combined influence of gravity and the action of the impeller, which times and controls its accumulation in gathers which are successively suspended from the outlet ring and from the impeller end. For each complete reciprocation of the impeller there is a reciprocation of the shears which sever a mold charge from each suspended gather. After each severing operation the freshly cut end or stub remaining below the outlet and forming the

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- " lower end of the succeeding gather, is moved upwardly or its downward movement is retarded by the action of the impeller.
- " By using appropriate sizes of outlet ring and impeller and by proper setting of the various adjustments, the shape of the top, body, and lower end of the
- 5 " mold charge may be varied separately at will as hereinafter described.
- " The size of the outlet ring is chosen with relation to the general shape of the body of the mold charge, a smaller diameter outlet being used for a long mold charge than for a short charge. For a nearly spherical charge a larger diameter outlet is used than for a longer cylindrical charge. The relation of
- 10 " the diameter of the gather to the outlet size depends partly on the speed of the machine and viscosity of the glass, as these influence the elongation and consequent reduction in diameter of the glass column issuing from the outlet. In general a higher speed requires a larger outlet than a slower speed does, while greater viscosity requires a larger outlet than a lower viscosity would.
- 15 " The size of the impeller end depends to a certain extent on the size of the outlet used, since the impeller and outlet coact to produce effects hereinafter described. The larger the outlet, the blunter the end of the impeller may be, other conditions being equal. The size of the impeller end also depends on the general shape of the mold charge desired. For a short compact charge
- 20 " a blunter ended impeller is preferably used, while for a more elongated charge a more pointed impeller is preferred.
- " The weight or quantity of the mold charge may be regulated by the gate, which determines the depth of glass over the outlet. Raising the gate gives a heavier charge and lowering it decreases the weight of the charge.
- 25 " The impeller acts upon the glass partly by displacement and partly by adhesion of the glass to it. Consequently as the impeller moves downward it gives a downward or extrusion impulse to the glass issuing from the outlet. This extrusion impulse aids the gravity head at the outlet and increases the rate of discharge of the glass. As the impeller moves upward it gives an
- 30 " upward or intrusion impulse to the glass within and below the outlet. The intrusion impulse opposes the gravity head at the outlet, tending to retard the discharge of glass from the outlet, and may be made to reverse the motion of the glass within and below the outlet, raising it up to an extent depending on the extent and strength of the impulse. The impeller also furnishes part
- 35 " of the support for the glass below outlet, this support being greatest when the impeller protrudes below the outlet and less for higher positions of the impeller. As the impeller rises it gradually withdraws this support transferring more of the weight of the suspended glass to the outlet. Another effect of projecting the impeller below the outlet is to enlarge the neck of
- 40 " the suspended gather by the displacement. This also increases the amount of support. . . .
- " The downward or extrusion impulse of the impeller may be used to control the shape of the body and upper end of the gather and its resulting mold charge. This impulse tends to increase the diameter of the suspended and
- 45 " elongating glass, in proportion to the extent and strength of the impulse.
- " The up stroke of the impeller and its resulting intrusion impulse may also be used to vary the shape of the gather above the part formed by the severing operation. The initial formation of the stub by cooperation between the intrusion impulse and the shears has already been described. The further
- 50 " elongation, due to its weight, of the stub and of the portion of the gather

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"above the stub may be varied or its effect may be compensated for by varying
 "the character of that part of the up stroke taking place after severing. For
 "instance, by retarding the discharge of the glass the lower part of the gather
 "may be allowed to elongate before the remainder of the gather is allowed to
 "form. This elongation decreases the diameter of the elongated part. By 5
 "diminishing the retardation and allowing a greater discharge of the glass,
 "the lower part of the gather may be increased in diameter. Increasing the
 "length of the impeller stroke increases the extent of the intrusion impulse.
 "The strength of this impulse may also be increased by lowering the working
 "position of the impeller. The character and duration of the stroke may also 10
 "be varied by changing the cam lobe 156. A faster up stroke increases the
 "strength of the intrusion impulse but applies it to a more limited portion of
 "the gather by shortening its duration. By forming the cam lobe to change
 "the relative speeds at different portions of the up stroke, various effects may
 "be secured. For instance, the first part of the up stroke may be made fast 15
 "enough to secure the proper shape of stub while the remainder of the stroke
 "may be made to give any desired retardation to the glass. Thus the impeller
 "might be held stationary for a certain period, before completing the remainder
 "of the up stroke. This gives a varied control over the shape of the gather,
 "and especially over the shape of its lower portion. 20

"One effect of raising the glass below the outlet during and immediately
 "after the severing operation is to keep it out of contact with all parts of
 "the shear blades except the immediate cutting edges. This minimizes the
 "chilling of the glass from the relatively colder shear blades and also aids in
 "keeping the blades cooler. It is therefore preferable to operate this device 25
 "with such adjustments as will allow the cut surface of the glass to be raised
 "clear of the shear blades during and after severing.

"By raising or lowering the shears they may be made to sever the glass at a
 "higher or lower level, leaving a shorter or longer stub respectively. This
 "length of stub has an influence on the length of the gather. A longer stub 30
 "tends to elongate the gather and a shorter stub tends to produce a shorter
 "gather. This influence extends to the lower part of the gather especially.

"By properly combining all the variable adjustments and allowing for or
 "making use of the elongation and decrease of diameter of the gather during
 "its accumulation and suspension, the shape of the gather and its resulting 35
 "mold charge may be varied to suit various types of molds to which the mold
 "charge is to be delivered. . . .

"The organised machine shown and described herein as a preferred
 "embodiment of this invention is only one of many possible embodiments of
 "the invention. It should be understood that the various features of the inven- 40
 "tion may be modified, both in structure, combination, and arrangement to
 "adapt the invention to different uses of different conditions of service."

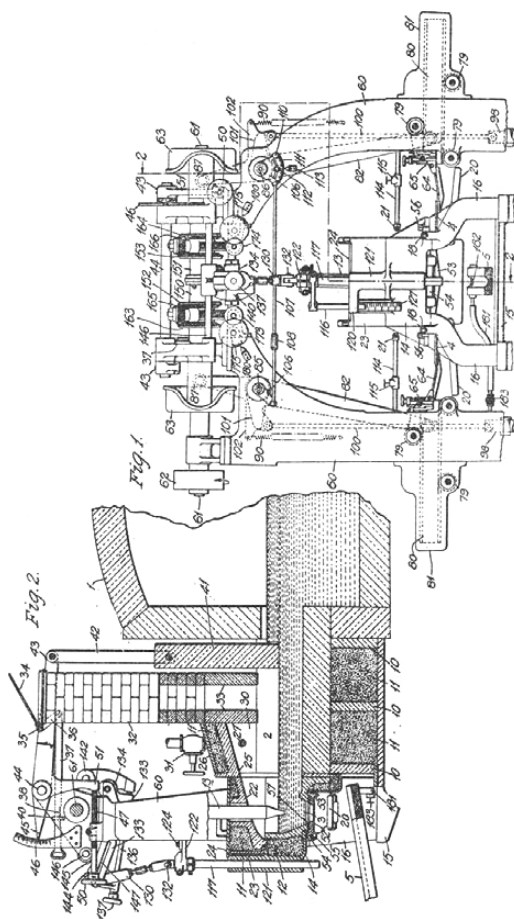
The Patentees claimed:—

"1. Method of feeding molten glass wherein successive masses or gathers are
 "suspended beneath an outlet and mold charges are separated therefrom while 45
 "suspended, whilst the shape or size of the masses or gathers is controlled by
 "variation of the movement of a movable controlling member adapted to act
 "as a piston in the outlet, or by the means for separating the mold charges,
 "or by variation of the location of the controlling member or of the said
 "separating means relatively to the outlet. 50

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- “ 2. Method of feeding molten glass wherein the discharge of the glass through
“ an outlet is so controlled that the cross-sectional dimensions of any portion
“ of a gather suspended from said outlet can be varied by operating a movable
“ member so as to vary the rate of discharge of the glass while such portion is
5 “ being formed.
- “ 3. Method of feeding molten glass, wherein a movable member periodically
“ produces extrusion or intrusion impulses or a succession of such impulses
“ within the glass as it is being discharged from an outlet, and determines the
“ diameter of each portion of a gather by varying such impulses or successive
10 “ impulses.
- “ 4. Method according to Claim 3, wherein the impulses for increasing or
“ decreasing the diameter of any particular portion of a gather are produced,
“ by causing the movable member to move within the mass of glass being dis-
“ charged to accelerate or retard its flow.
- 15 “ 5. Method according to Claim 4 wherein the shape, the size, or both the
“ shape and the size, of the gathers is or are varied by varying the extent
“ the strength, the duration, or the time of occurrence of the acceleration or the
“ retardation, or by varying a plurality of these factors.
- “ 6. Method according to Claim 4, wherein an extrusion impulse is applied
20 “ to the glass during the formation of each gather and may be regulated to
“ control the formation of a large diameter of the gather, whilst an intrusion
“ impulse is applied and regulated to control the formation of a small diameter
“ of the gather.
- “ 7. Method according to Claim 4, wherein a mold charge is severed from
25 “ each gather while retarding or reversing the downward movement of the
“ glass for the purpose of preforming the lower end of the succeeding gather.
- “ 8. Method according to Claim 1, wherein the movable member projects
“ through the outlet and aids in supporting the suspended gather.
- “ 9. Method of feeding molten glass *through an outlet*, which consists in flow-
30 “ ing the glass down and around the end of an impeller *acting as a piston in the*
“ *outlet*, accumulating a desired ~~mass~~ gather of the glass below ~~and around the~~
“ ~~impeller: the outlet~~, and raising and reversing the flow of glass by movements
“ of the impeller to pre-shape the *accumulated* gather.
- “ 10. Apparatus for carrying out the method according to Claims 1 to 3, in
35 “ which the movable controlling member is mounted for automatic movement
“ into and out of the outlet without coming into contact therewith.
- “ 11. Apparatus according to Claim 10, where the length of stroke of the im-
“ peller may be varied by moving the pivot of a connecting rod from which the
“ impeller is suspended.
- 40 “ 21. An impeller for use in feeding molten glass according to the method
“ specified, substantially as hereinbefore described and illustrated, for example,
“ in Figs. 46 to 49 of the accompanying drawings.”
- “ Reference has been directed, in pursuance of Section 8, Sub-section 2, of the
“ Patents and Designs Acts, 1907 and 1919, to the Specification of Letters Patent
45 “ 157,159 applied for in the United Kingdom on the 8th January, 1921, and
“ granted subject to an exception in favour of such persons as may have been
“ *bona fide* in possession of the invention forming the subject of the patent
“ before the date of application in this country.”

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On the 4th of July, 1929, *The British Hartford-Fairmont Syndicate Ltd.*, commenced an action for infringement of the Patent against *Jackson Bros. (Knottingley), Ltd.*, claiming the usual relief.

The Plaintiffs, by their Statement of Claim, alleged as follows:—(1) The Plaintiffs were and had at all material times been the registered legal owners of the Patent. (2) The Patent was and had at all material times been valid and subsisting. (3) The Specification of the Patent had been amended on the 8th of June, 1922, in accordance with the decision of the *Assistant-Comptroller of Patents*. As originally drawn the Claims of the Patent had been framed in good faith and with reasonable skill and knowledge. (4) The Defendants had infringed and threatened and intended to continue to infringe the Patent. By their Particulars of Breaches they alleged:—(1) The Defendants had, subsequent to the date of the Patent and prior to the issue of the Writ, employed a method of feeding molten glass and had manufactured and used apparatus substantially

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as described in the Specification of the Patent in infringement of all the Claims thereof. (2) In particular the Plaintiffs would rely upon the use during the months of May and June, 1929, by the Defendants of a glass feeding machine manufactured by *Pearson Glass Machines, Ltd.*, of Pontefract, Yorkshire, and
5 the feeding of molten glass with the said machine in infringement of all the Claims of the Patent.

The Defendants, by their amended Defence and Counter-claim, alleged as follows:—(1) The Defendants did not admit any of the allegations in paragraph (1) of the Statement of Claim. (2) The Defendants denied that the Claims of the
10 Patent as originally drawn had been framed in good faith or with reasonable skill or knowledge. (3) The Defendants had not infringed or threatened, nor did they intend to infringe, the Patent. (4) The Patent was and always had been invalid. (5) The Defendants were entitled to present a Petition to the Court for the revocation of the Patent by reason that they had obtained the fiat of
15 the *Attorney-General* authorising them so to do, and the Defendants counter-claimed for the revocation of the Patent. By their Particulars of Objections, the Defendants alleged as follows:—(1) The alleged invention was not new by reason of (a) prior publication. (b) Prior common general knowledge. Particulars of (a) were as follows:—The alleged invention had been published prior
20 to the date of the Patent by the deposit in the Patent Office Library of the following Patent Specifications:—British, *Howard* (No. 120744); United States, *Hitchcock* (No. 805068), *Morrison* (No. 810167), *Brookfield* (No. 883779), *Cleveland* (No. 901881), *Hulbert* (No. 1, 118204), *Bridges* (No. 1, 121608), *Harding* (No. 1,150,030), *Bowman* (No. 1,166,576), *Peiler* (Nos. 1,234,934;
25 1,264,328; 1,277,254 and 1,277,255), and *Rau* (No. 1,151,393), and Great Britain, *Wilzin* (No. 7183 of 1912), *Tucker & Reeves* (Nos. 105564 and 109702) in the form laid open to public inspection under Section 91 of the Patents and Designs Acts, 1907-1919, *McCawley* (Nos. 113665 and 114583) and *Drey* (No. 15793 of 1915). The
30 whole of each of the above Specifications was relied upon as against all the Claims of the Specification of the Patent. (2) The alleged invention was not proper subject-matter for the grant of a valid Patent. Hereunder the Defendants would rely upon the matters set forth in paragraph (1) hereof and upon the common general knowledge in the art. (3) The alleged invention was not useful. Without prejudice to the generality of this plea, the Defendants
35 would rely hereunder on all the several matters set out in paragraph (4) hereof as particular instances of the inutility of the alleged invention. (4) The Specification of the Patent was insufficient and misleading. Hereunder the Plaintiffs would say (a) no sufficiently precise and definite information was given as to the shape, size, construction and relative disposition of the outlet
40 ring impeller shearing means or gate or of the relative movements or variations of movements or time of movements of the impeller or shearing means as to enable the advantages or results described *ante* page 496 lines 26 to 36 and page 497 lines 27 to 50 to be obtained. (b) Contrary to the allegations contained *ante* page 498 line 27, page 497 lines 30 to 40, page 493 lines 40 to
45 44 and page 499 lines 4 to 6 it was not possible by following the directions given to vary the characteristics of the impeller stroke while the machine continued in full operation or without interruption in the successive delivery of the mold charges. (c) The variations in the shape of the masses or gathers obtainable by following the directions set out in the Specification differed
50 in no way from the variations in shape obtainable by methods known

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at the date of the Patent. The passage *ante* on page 496 line 40 to page 497 line 12 was accordingly misleading. (d) No definition or alternatively no sufficient definition was given of the expressions "adapted to act as a piston in the outlet" *ante* page 502 lines 46, 47, "considerably smaller", page 497 line 17, "considerable width", page 497 line 18 and "controlled" *ante* page 497 line 28 and page 498 line 3 and page 502 line 45. (e) No directions or no sufficient directions were given whereby the size or weight of the individual gathers and/or mold charges could be predetermined and/or controlled. (f) No directions or no sufficient directions were given whereby the size or weight of the individual gathers and/or mold charges could be pre-determined and/or controlled whilst varying the shape of the individual gathers and/or mold charges in the manner and/or by the means described in the Specification. (g) Contrary to the allegations contained *ante* page 501 lines 22 to 24 it was not possible by raising or lowering the gate to regulate the weight or quantity of the mold charges and/or to effect such regulation of the weight or quantity of the mold charges as was necessary to adapt the said charges to be most advantageously used in glass shaping machines. (h) Contrary to the allegations contained *ante* page 500 lines 35 to 40 it was not possible to time and/or shape the gravity outflow of the glass for various forms of gathers by operating the severing means only. (j) Contrary to the allegations contained in the Specification the means disclosed would not produce any, or alternatively any useful variations in the shape of the individual gathers and/or mold charges. (k) Contrary to the allegations contained in the Specification it was not possible to employ the chute described or any form of chute without appreciable deformation of the falling mold charge, and it was not possible, nor were any methods or other means shown whereby with the apparatus described it could be made possible, to dispense with the use of a chute and employ other means for transferring the mold charges into a parison mold. (5) the Specification was ambiguous in that it did not sufficiently distinguish between what was new and what was old and the Claims did not sufficiently define the ambit of the monopoly claimed. (6) The alleged invention was the subject of a prior grant of Letters Patent to *Hartford Fairmont Co.* (No. 157159) and to *John Forster* (No. 129822).

The Plaintiffs joined issue upon the Defence and denied each and every allegation contained in paragraph (4) of the amended Defence and Counterclaim.

The action came on for hearing on the 12th of March, 1931, before Mr. Justice LUXMOORE.

Sir Arthur Colefax, K.C., R. Moritz, K.C. and K. E. Shelley (instructed by Hyman, Isaacs, Lewis & Mills) appeared for the Plaintiffs; J. Whitehead, K.C. and R. Burrell (instructed by Redfern & Co.) appeared for the Defendants.

Sir Arthur Colefax, K.C., for the Plaintiffs:—The subject-matter of the Patent is the automatic feeding of glass from the furnace. Glass articles are made either by pressing or blowing in a mould, and the Patent is concerned in getting a charge of glass suitable to be received by the mould. Prior to the Patent there were two automatic methods of doing this, (1) stream feeding, controlled by opening or closing an orifice in the glass furnace and (2) gob or suspended gather method, in which a lump or gob of glass is severed when necessary. Stream feeding results in inevitable folding of the glass, which leaves a mark in the finished article and it can only be carried out at a

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- temperature that is too high for the moulding process. In the gob method, it is necessary to get a gob of appropriate size and shape, as glass cools rapidly on exposed surfaces, forming a skin which is substantially harder than the glass inside. It is important to be able to control the shape of the different parts of the gather relative to each other so that it may approximately fit the mould. The prior Specifications pleaded show that although there was a wealth of effort of inventors who appreciated the desirability of shaping the gathers, the problem had not been solved. They show that for many years there had been methods of supporting the gather by compressed air or a flame.
- 10 The Plaintiffs' invention is for controlling the shape of the gather by a reciprocating plunger in the forehearth of the furnace co-acting with the severance means without any extraneous support being given to the gather. As the plunger or impeller descends it assists gravity in dispelling molten glass through the orifice, while on its upward stroke the force of gravity is
- 15 checked and the flow of the glass may even be reversed. The following variations may be made in the working of the impeller, (1) the position of the working stroke relative to the outlet, (2) the length of the working stroke, (3) the speed of the stroke, and (4) the strength of the stroke may all be altered. All these variations are possible in the Defendants' machine; there is, however,
- 20 one refinement present in the Plaintiffs' and absent in the Defendants' machines, and that is the power to vary the speed of the stroke during different positions of the stroke. As regards the severance means, the height of the shears relative to the outlet and the actual time of severance are variable in both the Plaintiffs' and Defendants' machines. In the Plaintiffs' machine the control for the weight
- 25 of the gather consists of a tube which may be raised or lowered and thus controls the amount of glass flowing, and this does not in any way affect or fetter the shape control. The Defendants have also an entirely independent weight control, again consisting of a tube, with an adjustable slot instead of means for lifting, but the results are indistinguishable from the Plaintiffs.
- 30 (A cinematograph film showing the construction and working of the Plaintiffs' machine was then exhibited.)
- [Luxmoore J.:—"The demonstration has left a very clear impression in my mind of how the machine works. I think it is one of the most useful things I have seen done in a patent case and, if the making of the film is not very
- 35 expensive, the saving of cost must be considerable.] In some cases the impeller may extrude through the orifice; the molten glass acts as a flexible packing and seals the outlet. The impeller is not used as a valve, as is the case in some of the prior Specifications, in which case the impeller is not reciprocating in the outlet. I only allege infringement of Claims 1 to 10, though the others
- 40 may have to be considered on the issue of the Counterclaim for revocation. The Defendants' machine is worked by compressed air instead of mechanically, but it has the same variations and attains the same objects. Claim 8 may not be infringed, in so far as the Defendants' impeller cannot be projected through the outlet. The prior Specifications show many methods of both stream and
- 45 suspended gather feeding, but not one has the features of the Plaintiffs' invention. When a plunger is used, it serves either the purpose of a valve or a weight control, but never a shape control. There is never a suggestion of co-acting the plunger and severance means. The Specification of *Howard* states that any impeller such as the Plaintiffs' is impracticable since (1) the force applied
- 50 is only partially available, as same tends to force the glass back into the

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furnace, (2) checking the rate of flow causes clogging, (3) the cut-off mark never becomes incorporated in the glass but remains on the lower surface and causes cracks, and (4) the accelerating and retarding forces balance one another and the average flow is unaltered. The prior grants cannot be regarded as publications, but the only question is whether the monopoly claimed by them 5 is the same as that purported to be granted to the Patentees. Insufficiencies have been pleaded, but it is always a dangerous plea to the Defendants, since unless they really go to the root of the matter, they strongly establish subject-matter and utility.

Evidence was given on behalf of the Plaintiffs by *J. Swinburne*, F.R.S., 10 *G. H. Baillie* (consulting engineer), *T. Wardley*, *G. L. Kite*, *E. Meigh*, M.Sc. (engineers employed by the Plaintiffs) and *J. Currie*.

During the hearing of the Plaintiffs' evidence, the evidence of *E. H. Schwarz* (consulting engineer) was interposed on behalf of the Defendants.

Moritz, K.C. summed up:—There is no plea of prior user in this case, the 15 alleged anticipations are mere paper documents. An attempt has been made to show that commercial embodiments of these documents have been successfully operated, but this attempt has wholly failed. The criteria to be observed when considering paper anticipations are clearly laid down in a line of cases (*Hills v. Evans* 31 L.J. Ch. 457, *Otto v. Linford* 46 L.T. (N.S.) 35, *Flour Oxidising Co., Ltd., v. Carr & Co., Ltd.*, (1908) 25 R.P.C. 428, *Armstrong, Whitworth & Co., Ltd. v. Hardcastle*, (1925) 42 R.P.C. 543 and *Metropolitan-Vickers Electrical Co., Ltd., v. British Thomson-Houston Co., Ltd.*, (1928) 45 R.P.C. 1 were referred to.) Not one of the prior documents cited satisfies the least exacting 20 of the criteria as laid down by these cases, and only one of them even appreciates the problem that has to be solved. The Patent claims a method and apparatus for shaping gobs wherein the result is obtained in all cases within the monopoly by a reciprocating plunger acting as a piston within a mobile elastic packing of glass in a restricted throat, coacting with shearing means, control over shape being attained by variation of the movements and positions 25 of either or both. There has been some confusion between stream feeding and gob feeding; stream feeding is where glass hot enough to flow in a thin stream is fed, the stream being broken either by shears or some form of tap, gob feeding is where glass too viscous to flow freely is suspended beneath the orifice until separated. Some of the prior documents show gob-feeders and with the 30 Plaintiffs' invention in mind it is admittedly possible to modify these feeders so as to obtain some restricted degree of shaping, but this is a long way from satisfying the criteria of the cases.

Howard is the only prior inventor who directed his attention at all to the shape of the gob. The Defendants submit that it contains an apt description of 40 the Plaintiffs' invention; even if it did, it must also contain a statement that it will produce the Plaintiffs' result before it can be relied on as an anticipation, whereas in fact it says that this method is useless. The most that *Howard* was striving to achieve was to convert a pear-shaped gob into one having a more cylindrical form. Evidence has been given of the working of three 45 machines in the U.S.A. which the Defendants allege were exact models of the machines described in *Hitchcock*, *Brookfield* and *Wilzin*, and ware made by these machines has been produced. This ware is all of the wide-mouthed variety, in which shaping of the gob is unimportant, and it is clear that all three machines contained material variations from the descriptions of them in the 50

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respective Specifications and that they were operated in the light of the Plaintiffs' invention. For instance, the plunger in *Brookfield*, which is clearly meant to operate solely as a tap, and the cam governing its movements, were so altered that the plunger acted as a piston. The Defendants have said that the success of the Plaintiffs' machine is solely due to the mechanical excellence of the commercial embodiment, which comprises features not described in the Specification, e.g. a tube surrounding the impeller for controlling the weight of the gob. This attack has failed entirely, as it has been proved that machines constructed exactly as described in the Specification have worked for years commercially with complete success. The added features are mere refinements. Upon the plain construction of the Specification there are the following features, (1.) Suspension of gathers beneath the outlet (2) under the control of a moving impeller, (3) the impeller must operate as a piston in a narrow annular space, (4) it must be surrounded with a mobile flexible packing in that space and (5) there must be shearing means capable of varied adjustment. Two physical integers are postulated and certain functions of those integers, some of which, must be present, but not all need be. The two postulated integers are A the reciprocating impeller adapted to work in the outlet and B severing means coacting with the impeller in timed relation; the permissible adjustments are those enumerated before. I submit Claim 1 covers any method of feeding wherein gathers are suspended and severed during suspension which uses A and B with such settings of the varied adjustments of either or both as will give a desired commercial shape. In fact there are 4 or 5 such shapes, but the Claim would be infringed by a machine which would give only one if there were power to vary its dimensions. The Defendants' case is that control of weight is the important factor and that shape is immaterial, a sausage-shaped gob being suitable for all purposes. The evidence is that a sausage is used in about half the ware made, and other shapes are used for the other half of the ware. In the Defendants' machine the impeller works in a tube resting on bushing which in turn rests on the outlet ring; the bushing is markedly conical, and when the impeller moves it enters a rapidly narrowing space, where it is surrounded by a mobile flexible packing of glass. There are shears coacting with the impeller and all the adjustments possible in the Plaintiffs' machine are present save that for variations of the speeds of both integers during their strokes. I submit that the Defendants infringe Claims 1 to 5 inclusive and 9 and 10.

Whitehead K.C. for the Defendants.—It is admitted that the mechanism of the alleged infringement is very different from that described and illustrated in the Plaintiffs' Specification. There is not a word about mobile elastic packing in any one of the Claims, and it was first mentioned by Mr. *Moritz* during his summing up. The invention is defined by the Claims; the real invention may be novel and useful, but, if one of the Claims is drawn so widely as to cover something that has been disclosed before, it is invalid. The first nine Claims are for method and the next for apparatus, and a method Claim is anticipated if the method is shown to be old, notwithstanding that an entirely different apparatus was used. Similarly, if any document shows an apparatus which can be used to obtain the Plaintiffs' results, it anticipates the apparatus Claims. There is in this case a Counterclaim for revocation of the Patent, and I submit that, if it is proved that one Claim is anticipated, the whole

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Patent is invalid and must be revoked. (Patents and Designs Acts, 1907-1928, Sections 25, 32 and 32A were referred to.) By Section 21 of the Patents and Designs Acts, it is not open to the Defendants to impeach the amendments that have been made in the Specification, but one may look to the unamended Specification for the purposes of construction, i.e., to whether features which are now said to be essential were introduced by amendment. The Plaintiffs say that a reciprocating plunger is essential but on page 500 lines 35 to 40 *ante* there is described a method which does not use a reciprocating plunger, but in which shaping is achieved solely by the use of the shears, which is within the invention and claimed. The true construction of Claim 1 is for a method, not apparatus, with four independent ways of controlling the shape of the gathers by (a) variation of the movement of a movable controlling member, (b) by the means for separating the mold charges, (c) variation of the location of the controlling member, (d) variation of the location of the separating means relatively to the outlet. It is in effect four separate Claims. Originally the Claim covered control of size as well as shape; how can there be subject-matter in a Claim which originally covered both and is now limited to control of shape, the method being exactly the same? The Plaintiffs seek to limit the Claim by importing passages from the Specification, but this is not permissible. (*Ingersoll Sergeant Drill Co. v. Consolidated Pneumatic Tool Co., Ltd.*, (1908) 25 R.P.C. 61, and *Natural Colour, etc., Ltd. v. Bioschemes, Ltd.*, (1915) 32 R.P.C. 256, were referred to.) I submit there is no limitation to gob-feeding in the Specification, it is only more particularly relating to gathers suspended without extraneous support, and just before the end of the Specification there is reference to the glass issuing in a more or less elongated column, and Figures 41 to 45 show stream feeding. In the acknowledgment of the prior art, the Plaintiff admits that there has been control of weight and a limited control of shape by means of an impeller, but he claims broadly and not for the control of shape of any desired portion of the gather. Even if statements in the Specification are to be read into the Claims, how much of them is to be? The mobile, flexible packing, which the Plaintiffs now put in the forefront of their case, is only described as "thus, in a sense, forming a mobile flexible packing," and the feature of the piston acting as a piston in the outlet was only added on amendment. The Plaintiffs contend that "outlet" means the confine volume of glass in which the piston acts; I submit that it means the actual exit hole and there is no use of it in the Specification inconsistent with this meaning, and there are many uses consistent only with it. What the Plaintiffs mean is always referred to as the "spout." In Claim 2 the method is exhausted in forming the gob and would cover a case where it is cut off by hand. Claim 3 covers stream feeding, and since Claim 4 is identical except for the limitation that the movable member moves within the mass of the glass, includes the case where the movable member is not in the glass, such as *Hitchcock*. The apparatus Claims are for ordinary mechanical details, and Claim 21 is for the impeller by itself, without any reference to its use. If the apparatus is old, the Claim is not saved because words have been put in limiting it for use in carrying out the method. If all methods of carrying out a principle are claimed, it is tantamount to claiming the principle itself, which is not permissible, and the method Claims are attempting to do this. (*Dredge v. Parnell*, (1899) 16 R.P.C. 625, was referred to.) Mere analogous user cannot amount to invention and

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- all that the Patentee has done is to make the discovery that the same method that was used for controlling weight can be used for controlling shape. *Harding, Drey and Wilzin* show control of shape by operating the severing means and therefore anticipates (b) and (d) of my construction of Claim 1. *Morrison, Cleveland and Bridges* show a plunger working in a mobile, flexible packing of glass. *Howard*, I submit, anticipates all the method Claims: it is true he disparages the Plaintiffs' method, but he nevertheless discloses it. *Bowman* does not show every feature of the Plaintiffs' invention, but all the Claims cover it, and are therefore anticipated. Having regard to the prior general knowledge, and of the prior documents read in the light of such knowledge, the Patent has no subject-matter. At most it is a mere discovery, not that shape could be controlled generally, but that control could be so complete as to be over variations in diameter. When gobs were made by the old method of controlling weight, their shape was also necessarily controlled to some extent. The rule in *Hill v. Evans* (*ubi supra*) has been greatly modified. (King, Brown & Co. v. Anglo-American Brush Co., (1892) 9 R.P.C. 313, Lane-Fox v. Kensington, etc., Electric Lighting Co., (1892) 9 R.P.C. 413, Gadd & Mason v. Mayor of Manchester, (1892) 9 R.P.C. 576 and Savage v. Harris & Sons, (1896) 13 R.P.C. 364 were referred to.) The alleged prior grant of *Hartford Fairmont* I submit claims the same monopoly because it claims the same method, although it earmarks this method to the control of weight, whereas the Patent in suit earmarks it to the control of shape. I submit this makes no difference, as it would be no answer to an action of infringement of it to say you were using the method to control shape. The same words need not be used to define the monopoly. The Defendants say that there is no utility in shaping beyond obtaining a sausage, because (1) you cannot shape to the contour of the mould since the maximum diameter of the gob must be less than that of the entrance to the mould, (2) the chute used by the Plaintiffs distorts the shape, and (3) the gob in any event settles down and fits the mould perfectly. The insufficiencies pleaded are, in my submission, all borne out by the evidence. As to infringement, the Plaintiffs have had evidence as to what the machine complained of can do now; this cannot be admissible evidence as to what the machine actually did at the relevant dates. The method of working the Defendants' machine is indistinguishable from that of *Howard's* (*Gillett Safety Razor Co., Ltd. v. Anglo-American Trading Co., Ltd.*, (1913) 30 R.P.C. 465 was referred to). If the variation of movement of the movable member in Claim 1 means that the speed of the member varies during the formation of a single gob, the Defendants cannot infringe, since their impeller moves at a fixed speed. Nor does their impeller pass through the outlet if "outlet" in Claim means the outlet ring, as I submit; again there is no infringement. Claims 2 and 3 cannot be infringed, since there is no variation in the Defendants' impulse.

Further evidence was given on behalf of the Defendants by *H. A. Gill* (Patent Agent), *A. E. Evans* (works engineer) and *F. Redfern* (Defendants' solicitor).

- 45 *Burrell* summed up:—The Plaintiffs' case was opened as being a revolutionary problem, but it now appears that the problem it solved was not that of controlling the shape of a gob, but of making narrow-necked bottles. (*Longbottom v. Shaw*, (1891) 8 R.P.C. 333, was referred to.) The question is whether there was a problem to be solved at all, since the Defendants say that it is

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only necessary to have a gob that will pass easily into the mould and that contains the appropriate amount of glass. It is clear that at the date of the Patent a large variety of shapes could be obtained by other machines. The first issue is as to the ambit of the monopoly. I submit it is clear that Claim 1 should be read disjunctively as four separate Claims. The Plaintiffs seek to limit it by reading into it the paragraph about the moving impeller, but it is not easy to see why, if anything is to be read into it, it should be this one paragraph; why should not the variation during the stroke be read as well, in which case there would be no infringement? The Claims are not merely concerned with gathers but with a stream as well; this is clear since some of the Claims refer to "masses or gathers" and others to "gathers" only, showing that "masses" are distinct from "gathers". The amendments cannot extend the meaning of the Specification and I submit in the unamended form "outlet" is clearly referable to the outlet ring only. For the purposes of proving infringement the Plaintiffs give "outlet" a wide meaning and say that it means such a part as will cause the impeller moving in it to cause an intrusive and extrusive effect; it is not clear where this part begins or ends and it certainly admits *Bowman, Howard* and other prior documents as anticipations. Each of the prior documents may be read in the light of the common general knowledge at the date of the Patent. The disclaimer in the Specification gives rise to six submissions. (1) Definite relations necessarily exist between the cross-section of the gather and that of the outlet. (2) Definite relations necessarily exist between the weight of the gather and the rate of discharge. (3) It is admitted that the weight or size could be regulated by the use of the reciprocating plug or plunger moving in the glass toward or away from the outlet. This involves that (4) it was known that a reciprocating plug or plunger moving in glass to or away from an outlet would affect the rate of discharge of the glass. (5) It was known that the movement of the plug or plunger could be varied so as to vary the rate of discharge and so produce the correct weight in accordance with the weight of the ware to be produced. (6) It is admitted that one way of varying the discharge would be to vary the plunger stroke. If one assumes that change of weight necessarily involves change of shape, the Patentee has by conceding all varieties of weight conceded variations of shape. The Plaintiffs' expert witnesses both admitted that the disclaimer in *Howard* described the operation of both the Plaintiffs' and Defendants' machines and it therefore completely anticipates the Plaintiffs' invention so far as the plunger Claims are concerned. *Howard* clearly states that the effect of the plunger is to accelerate the glass and is therefore a piston movement. It being old to use a plunger for pre-shaping, there can be no subject matter in any variation of the stroke or co-operation of the shears.

Sir *Arthur Colefax*, K.C., replied:—There is no appreciable controversy on any material facts; there are only questions of law and construction to be considered. In order to see what is the inventive step, it is necessary to appreciate the state of the prior art, and here it is vital to distinguish between prior users and paper documents. In substance, at the date of the Patent, except for Owens machines, there was no automatic glass feeding at all being practised as part of the art; there were one or two *McCauley* machines, but no machine where a plunger was reciprocated in any way for any purpose or which could shape a gather so as to make it best adapted for the purpose of manufacture. Often cases deal with something seemingly very small added

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to an old machine, and it is always said that it is trifling and obvious, but the Courts have always held this to be wrong as one is not to view the position in the light of what the invention is but of what was the prior art. *Hills v. Evans* (*ubi supra*) is good law to-day; the knowledge imparted by the prior document must be equal to that found in Specification in all material points. It is admitted that every feeder at present in use in England embodies the Plaintiffs' invention and this is the best test of its value. Nobody questions that various shapes can be produced by the Plaintiffs' machine, though the precise value of this shaping may be a matter of opinion. It is important to appreciate that the action of the plunger is not the same in its effect as a mere increase of head; it is fundamental that there should be increasing resistance to flow as the plunger descends and a final push, which is essential for stuffing the tail of the gather. You have taken the invention if you form the gather of the shape desired under the control of an impeller reciprocating in the glass in the outlet in time relation to the severance of the gather. *Howard's* disclaimer is not evidence of fact and is not a disclosure of the precise use of a plunger as used by the Plaintiffs. The Defendants have failed to prove the insufficiencies. The evidence is that the chute is an advantage, not a disadvantage, and that the gate forms no part of the invention; it may not give so nice an adjustment as the tube embodied in the commercial mode, but that is far from saying that it is not satisfactory. The essence of the invention is that the plunger acts piston-like in the mass of glass in the outlet, and, if one finds a prominent feature in the body of the Specification, it must be kept so in the Claims unless one is driven to a contrary view. This feature completely overrides the disclaimer which the Defendants allege is covered by the Claims. "Outlet" has not always the same meaning in the Specification, but common sense will always show the true meaning on each occasion, and, where there is reference to piston-like action in the outlet, there must be a sufficient quantity of glass for this piston-like action to take place. Claim 1 must be governed by the dominant feature of a piston moving in the outlet (*Ingersoll Sergeant Drill Co. v. Consolidated Pneumatic Tool Co. Ltd.* (*ubi supra*) and *British Thomson Houston Co. Ltd. v. Corona Lamp Works Ltd.* (1922) 39 R.P.C. 49, were referred to), and this completely excludes the Defendants' construction of Claim 1 by which shaping may be effected by the severance means alone. On such a construction there could be no co-action of the severance means with the impeller and many passages in the Specification would be rendered meaningless. [*Luxmoore J.*:—There is no limitation to a moving impeller, since the Specification states that it may be stationary.] I submit it does not say so; it merely says that for some purposes you can time and shape the gravity flow, not that you can shape the gather. The passage is not put in to show another way how to operate the invention, but how to operate the machine, which is totally different; it has nothing to do with gathers, which are of the essence of the invention. Apart from the specific embodiment, there is no mention of control of shape that does not import a moving plunger. A stationary plunger or plug was not disclaimed because, I submit, on a fair reading of the Specification it would not occur to anyone that a stationary plug fell within the invention. If there is careless wording in a Claim, the Court will enquire whether there has been deliberate claiming of something

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outside the monopoly, but where there is a clear description of the invention, the Court will have to give full effect to it in construing the Claims. The Defendants suggested that *Otto v. Linford* (*ubi supra*) and subsequent cases are only applicable to Claims for method and not for apparatus, but I submit they were dealing with a principle and are exactly in point with this case. (*Metro-* 5
politan Vickers Electrical Co. Ltd. v. British Thomson Houston Co. Ltd., (1926) 43 R.P.C. 26 and (1928) 45 R.P.C. 1, *Pope Appliance Co. v. Spanish River Pulp, etc., Co.*, (1929) 46 R.P.C. 23, and *Lyon v. Goddard*, (1893) 10 R.P.C. 121, 334, were referred to.) [*Luxmoore J.* :—In *Lyon v. Goddard* the Claims ended with the words “substantially as described.”] These words make no difference. 10
[*Whitehead, K.C.* :—They were discussed in *British United Shoe Machinery Co. Ltd. v. Simon Collier Ltd.* (1909) 26 R.P.C. 21.] They were held to have no meaning in *Westinghouse v. Lancashire and Yorkshire Railway Co.* (1884) 1 R.P.C. 229 at p. 241.) It is impossible to read Claim 2 except as importing as of necessity a reciprocating impeller moving in the glass. Claim 21 imports 15
“in feeding glass according to the method described” and adds nothing to the monopoly. (*Natural Colour, etc. Ltd. v. Bioschemes Ltd.* (*ubi supra*) was referred to.) We know the Defendants’ machine is one by which you can obtain a sausage shaped gob of the dimensions required; could you have obtained their machine and operate it as they do upon the mere perusal of any of the prior 20
documents? (*Gillette Safety Razor Co. Ltd. v. Anglo-American Trading Co. Ltd.* (*ubi supra*) was referred to.) The whole argument as to the non-infringement of Claim 1 depends on the meaning of “outlet.” The tube in the Defendants’ machine rests on its bushing, which compensates for the lack of piston action in not penetrating the bushing. None of the prior documents is anywhere 25
near the invention. (*Gadd & Mason v. Mayor of Manchester and Lane-Fox v. Kensington etc. Electric Lighting Ltd.* (*ubi supra*) were referred to.) *Howard* carries you no further than the disclaimer in the Specification of the Patent in suit. (*Flour Oxidising Co. Ltd. v. Carr & Co. Ltd.* (*ubi supra*) was referred to.) The rejection of the plunger action because it was suggested that it would 30
not work leaves ample scope for invention. *Howard* is only considering a plunger acting in the main body of the glass, where it would act merely as an increase of head and could not give any shaping. I rely upon *Howard* as showing that at his date the need for shaping a gob was recognised. *Bowman* is merely that which is described in the disclaimer of *Howard*, there is no 35
means of accelerating the plunger during its downward stroke. In *Brookfield* the plunger is merely a valve. The Defendants admit that the alleged prior grant makes no claim to shaping, and that completely disposes of it.

Whitehead, K.C., replying on the cases, cited *Lyon v. Goddard*, *British Thomson Houston Co. Ltd. v. Corona Lamp Works Ltd.*, *Pope Appliance Co.* 40
v. Spanish River Pulp & Co. Co. and *British United Shoe Machinery Co. Ltd. v. Simon Collier Ltd.* (*ubi supra*) and *Badische Anilin und Soda Fabrik v. La Société Chimique des Usines du Rhône*, (1897) 14 R.P.C. 875.

Judgment was reserved and was delivered on the 21st of January, 1932.

Luxmoore J.—*The British Hartford-Fairmont Syndicate, Ltd.*, is the registered 45
owner of Letters Patent No. 142,785* of 1919. The Letters Patent relate to an invention in respect of improvements in methods of and apparatus for feeding molten glass in the manufacture of glassware.

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On the 4th of July, 1929, this Company issued the writ in this action against *Jackson Brothers (Knottingley), Ltd.*, a company engaged in the manufacture of glassware.

In the months of May and June, 1929, the Defendant Company had used in its factory at Pontefract in Yorkshire a machine manufactured by *Pearson Glass Machines, Ltd.* This machine was a glass feeding machine. The Plaintiff Company alleges that the user of this machine by the Defendant Company constituted an infringement of the Letters Patent No. 142,785* of 1919, and it claims relief by way of injunction and damages.

The Defendant Company admitted at the Bar the user of the machine of which complaint is made, but denied that such user infringed the Patent in suit. The Defendant Company further contended that the alleged invention was not novel by reason of prior publication and prior common general knowledge, that the Letters Patent did not disclose proper subject-matter for the grant of a valid patent at the date of the grant; that the alleged invention is not useful; that the Specification is insufficient and misleading; and finally that the alleged invention is the subject-matter of a prior grant.

The Defendant Company also counterclaimed for revocation of the Letters Patent, and for this counterclaim obtained the fiat of His Majesty's *Attorney-General* in accordance with the requirements of the Consolidated Patents & Designs Acts, 1907 and 1919.

The first problem to be solved is: What is the invention claimed by the Plaintiff Company in the Letters Patent in suit? For this purpose it is necessary to determine what is the true construction of the Specification. The Specification contains 21 Claims. The first nine are for methods of feeding molten glass, and the remaining 12 Claims are for apparatus designed to carry out the various methods set out in the first nine Claims.

Before attempting to construe the Specification I think I ought to make these general observations. First it is necessary to remember that there are no special canons of construction applicable to patent specifications as distinguished from any other documents. It is, of course, necessary to read and consider the whole document. In cases like the present, where the Specification has been amended, it is permissible under the provisions of Section 21, subsection (7), of the Consolidated Acts to refer to the Specification as originally accepted and published. Further, in construing a patent specification, it may be necessary to have the assistance of persons skilled in the particular art to explain the meaning of technical terms, and the state of the art, so far as it may be material to an understanding of the language used.

The claim is the most important part of the specification, for its object is to set out what is the invention for which protection is sought and has been granted. Unless there is something in the specification which is inconsistent with the ordinary grammatical construction of the claim, there is no ground for the adoption of any construction other than the ordinary grammatical one.

At the date when the application for the grant was made there were three known methods of feeding molten glass to the moulds used in the manufacture of glassware. The first and oldest method was the feeding by hand. An iron rod called a "punty" was used. It was inserted into the molten glass and, when a sufficient mass had been accumulated at its point, the punty was withdrawn with the mass attached, and this mass was transferred to the mould. The other two methods of feeding were by machine. The one was and is known

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as "stream-feeding," the other as "gob-feeding." In the first-mentioned method the molten glass is allowed to emerge from the receptacle in which it is contained under the force of gravity through an orifice or hole in the bottom of the receptacle. When sufficient molten glass has been accumulated in the mould placed under the orifice, the stream is cut by shears or other severance means operated either by hand or by machinery. In the method known as gob-feeding the molten glass is extruded from the receptacle containing in it masses or gobs of the desired size or weight, size and weight being really interchangeable terms. The masses or gobs so extruded are conveyed to the glassmaking moulds.

Having made these introductory remarks, let me approach the Specification with a view to ascertaining the precise nature of the invention claimed. The Specification starts with a general statement of the nature and object of the invention, and this is followed by an acknowledgement of the state of the art of feeding molten glass at the date of the application. It is, I think, material to read this part of the Specification in full. The material passage begins at line 15 on page 1: "This invention relates to the segregation and separation of molten glass into mould charges." That is, the invention relates to the method of feeding molten glass to which I have referred as "gob-feeding". The Specification continues: "It refers more particularly to the production of gathers discharged through and suspended in compact masses beneath the outlet of a furnace or container, and its object is to pre-form the gathers, and the mould charges"—obviously "gathers" and "mould charges" are interchangeable terms—"severed therefrom, without the use of extraneous supporting means and in such manner as to adapt said charges to be most advantageously used in glass-shaping machines."

This general description of the objects of the invention is followed by what I think is obviously intended to be an acknowledgment of the existing state of the art and the objections to it and the improvements sought to be attained in it by the invention which is claimed, for the Specification continues: "When a charge of molten glass is delivered to a mould any folding or lapping of the glass or trapping of air by the glass will cause defects in the article being made, besides heating the mould unevenly, and it has long been recognised that these defects might be avoided if the mould charges could be pre-formed to fit the interior contour of the mould walls before delivering them to the moulds"; and now follows the acknowledgment of the existing state of the art, "It is known that, other conditions being equal, definite relations necessarily exist between the cross-section of a gather and that of the outlet through which it is discharged"—that is, the cross-section of the gather increases or decreases with the increase or decrease, as the case may be, of the size of the outlet; and the Specification goes on to point out that it is also known that definite relations necessarily exist "between the weight of the gather and the rate of discharge of the glass. It has heretofore been proposed to regulate the weight or size"—here again it is obvious weight and size are used as interchangeable terms—"of the resultant gathers in accordance with the weight of the articles of glass-ware to be produced, by means of a reciprocating plunger or plug moving in the glass toward and away from a flow outlet, and to intermit the flow while a charged mould is being removed and replaced by an empty mould." This is the description of the existing state of the art: the most important features being (1) the description of the means for the regulation of the weight or size of the gather, namely, the plunger or plug

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- which moves backwards and forwards in the molten glass toward and away from the outlet, and (2) the intermission of the flow of the molten glass while the mould just charged is being removed. The description then proceeds to point out the shortcomings of the acknowledged state of the art as compared with the
- 5 advantages of the invention claimed. "These known devices," the Specification continues, "however, are incapable of controlling and varying at will the "shape or countour" again these two words are used as descriptive of the same thing and consequently as being interchangeable—"of each individual
- 10 "gather during its discharge, so as to impart the desired cross-sectional dimensions to any selected portion of the length of the gather." Once more the Specification reverts to the state of the existing art. "A change in the length "of the plunger stroke or change in the size of the discharge outlet would "influence the entire gather and not only a particular portion thereof. There-
- 15 "fore, predetermined variations in the shape of the gathers have heretofore "been confined within very narrow limits, owing to the fact that no means "were available for controlling the shape of the gather to vary its contour "during the entire formation thereof." Down to this point there is no description of the Plaintiffs' invention but only of the result to be attained by its user, namely, the control of the shape of any selected portion of the gather during
- 20 its formation. The invention is described on page 2, beginning at line 7. "In "accordance with the present invention the molten glass is discharged from the "outlet of a melting furnace, and is suspended beneath the outlet in compact "masses or 'gathers,' under the control of a movable impelling and regulating "member, herein termed an impeller, which project into the glass from above."
- 25 The description of the "impeller" as defined appears to me to be similar to that of "the reciprocating plunger or plug moving in the glass toward and away "from the outlet" referred to in the earlier part of the Specification acknowledging the state of the existing art except in so far as its action is described in the succeeding lines. "The lower end of the impeller projects into the outlet
- 30 "and is considerably smaller than the outlet, leaving an annular space of "considerable width between the outside of the impeller and the inner wall of "the outlet, this space being at all times filled with the glass, and being wide "enough to allow the glass to flow in the space with the desired freedom. The "glass seals the annular space between the impeller and the inner wall of the
- 35 "outlet, thus in a sense forming a mobile and flexible packing, which on account "of the inherent viscosity of the glass enables the impeller to operate within the "outlet as a piston. The vertical movements of the impeller operate partly by "adhesion and partly by displacement, to accelerate the flow of the glass by "downward movement and to retard or reverse the flow by upward movement."
- 40 It would appear from this statement that the only difference in the description of the functions of the reciprocating plunger referred to in the acknowledgment of the existing state of the art and of the impeller in the Patent in suit is that the latter projects into the outlet, whatever that phrase may mean, while the former does not so project and also that the impeller must be smaller in
- 45 diameter than the outlet. The Specification continues: "The shape of the "gathers both generally and locally is controlled and varied by suitably varying the position and movements of the impeller relative to the outlet, including "the time of those movements. The impeller is mounted for movement in axial "alignment with the outlet, but out of contact therewith, and is moved toward
- 50 "and from"—it is to be noticed that this is the same movement as is described

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in the acknowledgment of the state of the art—"and for some purposes"—and here the movement is a different one—"its end is projected through and beyond the outlet, in which cases it also aids in supporting the suspended gathers." Up to this point the invention described would appear to consist, not, of course, in the provision of what is called "an impeller," but in the control and variation of its movement in respect of direction and time; subject to this, that its lower end must project into the outlet, and may also project through and beyond it. This leaves open to determination the meaning of the word "outlet." The next few lines of the Specification bring into notice the action of the means of severance. "When the lower portion and main body of a gather has been formed to the size and shape desired"—and it is to be noted the invention is not claimed as regulating size apart from shape—"for a mould charge the latter is severed by shears or other suitable severing means which are also variable as to position and movement, so as to complete the desired form of that mould charge, and also in some cases to preform the lower end of the succeeding charge."

It therefore appears that the invention as described up to this point embraces not only the impeller acting in the way I have described, but also the means of severance acting in conjunction with the impeller. The next part of the Specification describes the possibilities of the apparatus, and I need not consider it in connection with the method Claims.

The description of the method continues in line 80 of page 2:*

"The present invention is based on observation of the conditions attending the formation of the successive portions of a suspended gather, and, in accordance with the new method, the discharge of the glass through the outlet is controlled in such a manner that the cross-sectional dimensions of any or each portion of the suspended gather can be varied by varying the rate of discharge of the glass while such portion is being formed." That seems to point quite clearly to the variation of the discharge as being the pith and marrow of the invention. The Specification proceeds to explain how such variation is to be obtained, for it continues thus: "An important feature of the invention consists in periodically producing an impulse or a succession of impulses within the glass as it is being discharged, and controlling the formation of any portion of a gather by varying such impulse or succession of impulses. Another feature consists in providing a moveable support adapted at times to co-operate with the outlet to support the suspended gathers, and in varying the relative amounts of support furnished by the outlet and the moveable support. By applying internal impulses to the glass as it is being discharged and accumulated in gathers and by controlling the conditions of support of the suspended gathers, it is possible to keep the formation of each gather under permanent control and to act on any desired portion of the gather, when required, without affecting the formation of other portions. A further feature consists in flowing the glass down and around the end of an impeller and operating the impeller to control the formation of the gathers accumulated below and around it. Such impeller affords a convenient means for producing impulses within the glass being discharged and for co-acting with the outlet in supporting the gathers during their formation." This seems to me to amount to nothing more than the variation of the movement of the impeller

* *Ante*, page 498, line 1.

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with regard to the length of stroke and time occupied in effecting it. If it means anything else, I am unable to appreciate what that meaning may be. "According to further features of the invention the various factors affecting the character of the controlling impulses, as the extent, the strength, the duration and the time of occurrence of such impulses, may be varied either singly or concurrently, preferably without interrupting the operation of the apparatus." The last part of the last sentence relates to the apparatus and not to the methods claimed. So far as the earlier part of the paragraph is concerned it is really nothing more than a re-statement of the description of the varying methods of using the impeller. "The invention also contemplates severing a mould charge from each suspended gather while the downward movement of the glass is being retarded or reversed, for the purpose of pre-forming the lower end of the succeeding gather." This is a specific example of the co-operation of the impeller and severance means, and the Specification goes on to state the possibility of variation of the combined action of the impeller and severance means. Any further reference to this appears to me to be unnecessary.

The Specification then turns to the description of the apparatus. I need not refer to this in great detail, but it is necessary to call attention to such passages as describe the impeller, the severance means, the outlet and their general functions. The description starts with some generalisations. "In the apparatus according to the invention, periodic impulses are produced within the glass being discharged, by automatically operated means. Furthermore, a moveable support co-acts with the discharge outlet to suspend successive accumulations of the glass beneath the outlet"—this is explained by the words that follow—"In the embodiment of the invention to be hereinafter described,"—this refers to the apparatus—"both actions are performed by an impeller which is mounted for automatic movement into and out of the outlet with out coming into contact therewith." In other words, the impeller provides the impulses and the means of support.

The description of the apparatus provides that in addition to the impeller there are to be suitable severance means affording control independent of the impeller (see lines 45 to 61 on page 3*). The description contains references to the drawings. On figure 2 is shown what is described in the body of the Specification as "an outlet 3." The Specification is in these terms: "The molten glass flows from the glass-furnace through a channel or conduit 2 to an outlet 3. It is there"—that is at the outlet—"acted upon by an impeller mounted for vertical movement and provided with various adjustments. As it"—and I suppose this means the 'molten glass'—"issues periodically in regular cycles from the outlet it forms successive gathers from which mould charges are severed by shear blades reciprocating below the outlet." In this passage "outlet" would appear to refer to the actual orifice through which the molten glass emerges, and this construction seems to be made quite clear by the words that follow: "At the outer end of the channel is an outlet spout the interior of which is shaped so as to co-act with the impeller. This spout is held in an iron frame which also serves as a retainer for the insulation, the spout being surrounded with insulation except at the outlet." This emphasises the distinction between the outlet spout and the outlet, and seems to me to show that by

* *Ante*, page 499, lines 7 to 15.

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"outlet" the actual place of emergence of the molten glass is intended. This outlet is referred to, I think, in later parts of the Specification as the outlet ring. (See page 4, lines 114 to 129 inclusive*).

The Specification continues with a description of the severance means and the method of their adjustment, both with regard to position and speed of severance. I need not refer to this part of the Specification more fully. The Specification describes the functions of the impeller on page 6 at line 53,† in these terms: "The impeller for timing and controlling the extrusion and formation of the gathers is made of refractory clay and is guided for vertical movement into or through the outlet ring." The words "outlet ring" must, I think, mean the same thing as has been formerly described as the outlet used in the sense of what I have called previously "the orifice." The Specification then continues by describing the means for indicating the position of the impeller relative to what is again described as the outlet ring and by showing how the working range of the impeller can be controlled. At line 116‡ on page 6 the Specification provides: "The impeller may be held inactive at lower positions projecting into the glass at the outlet or even through the outlet." Again, it seems to me "outlet" here must necessarily mean the orifice, and the Specification continues: "By thus holding the impeller inactive at its lower positions and adjacent the outlet the gravity outflow of the glass can be timed and shaped for various forms of gathers by operating the severance means only." This seems to me to mean that the shape of the gather can be controlled by the severance means alone without the co-operation of the moveable impeller.

The Specification next deals with the variation of the length and duration of the impeller stroke by means of cams with various characteristics. After describing the apparatus in part the Specification returns to a general description of its working. It is, I think, material to read it from line 39 on page 8.§ "The molten glass issues from the outlet under the combined influence of gravity and the action of the impeller which times and controls its accumulation in gathers which are successively suspended from the outlet ring and from the impeller end. For each complete reciprocation of the impeller there is a reciprocation of the shears which sever a mould charge from each suspended gather." This refers to and describes the co-operation of the impeller and the severance means. The Specification continues at line 56: "By using appropriate sizes of outlet ring and impeller and by proper setting of the various adjustments, the shape of the top, body, and lower end of the mould charge may be varied separately at will as hereinafter described. The size of the outlet ring is chosen with relation to the general shape of the body of the mould charge, a smaller diameter outlet being used for a long mould charge than for a short charge." Quite obviously in this passage "outlet ring" means the orifice, for the Specification is only setting out the effect attained by changing the size of the actual hole from which the molten glass emerges, for the change of the "outlet ring" is the only thing which is there being considered. The passage immediately following the passage I last read emphasises this point, and I need not read it. Then follows the description of the operation of the impeller with regard to the downward or extrusion

* Ante, page 499, lines 41 to 49.

† Ante, page 500, line 35.

‡ Ante, page 500, line 35.

§ Ante, page 500, line 43

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stroke and also with regard to the upward or intrusion stroke. I will read from line 99 on page 8: * "The impeller acts upon the glass partly by displacement and partly by adhesion of the glass to it. Consequently as the impeller moves downward it gives a downward or extrusion impulse to the glass issuing from the outlet. This extrusion impulse aids the gravity head at the outlet and increases the rate of discharge of the glass. As the impeller moves upward it gives an upward or intrusion impulse to the glass within and below the outlet. This intrusion impulse opposes the gravity head at the outlet, tending to retard the discharge of glass from the outlet, and may be made to reverse the motion of the glass within and below the outlet, raising it up to an extent depending on the extent and strength of the impulse. The impeller also furnishes part of the support for the glass below the outlet, this support being greatest when the impeller protrudes below the outlet and less for higher positions of the impeller. As the impeller rises it gradually withdraws this support, transferring more of the weight of the suspended glass to the outlet. Another effect of projecting the impeller below the outlet is to enlarge the neck of the suspended gather by the displacement. This also increases the amount of support. The downward or extrusion impulse of the impeller may be used to control the shape of the body and upper end of the gather and its resulting mould charge. This impulse tends to increase the diameter of the suspended and elongated glass in proportion to the extent and strength of the impulse." The Specification goes on to explain certain adjustments of the apparatus, to which I need not refer. At line 89 on page 9 the upstroke of the impeller is dealt with. It reads as follows: "The upstroke of the impeller and its resulting intrusion impulse may also be used to vary the shape of the gather above the part formed by the severing operation. The initial formation of the stub by co-operation between the intrusion impulse and the shears has already been described." This refers to the passage on page 9 at lines 49 to 88. † The Specification goes on to describe how various effects may be secured by changing the relative speeds of the impeller stroke, and a specific instance is given at line 125: "For instance, the first part of the upstroke may be made fast enough to secure the proper shape of stub while the remainder of the stroke may be made to give any desired retardation to the glass. Thus the impeller might be held stationary for a certain period, before completing the remainder of the upstroke. This gives a varied control over the shape of the gather, and especially over the shape of its lower portion. One effect of raising the glass below the outlet during and immediately after the severing operation is to keep it out of contact with all parts of the shear blades except the immediate cutting edges." At line 19 on page 10‡ there is a paragraph which deals with the adjustment of the shears, and the Specification continues: "By properly combining all the variable adjustments and allowing for or making use of the elongation and decrease of diameter of the gather during its accumulation and suspension, the shape of the gather and its resulting mould charge may be varied to suit various types of moulds." This passage refers to the possible combinations of all the adjustments of the impeller on its upward as well as on its downward stroke and of the shears both with regard to position and time of cutting.

* Ante, page 501, line 25.

† Ante, page 501, line 46.

‡ Ante, page 502, line 28.

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I need not read any part of the Specification which refers to specific examples of variation of these adjustments, but, having dealt with these, the Specification continues at line 91 on page 11*: "The organised machine shown and described herein as a preferred embodiment of this invention is only one of many possible embodiments of the invention. It should be understood that the various features of the invention may be modified, both in structure, combination, and arrangement, to adapt the invention to different uses or different conditions of service." This last paragraph to which I have referred cannot, I think, be read in any sense as showing any intention of limiting the Claims which are to be preferred by this incorporation into any particular Claim of any particular part of the Specification. The only meaning and object of this paragraph must be to indicate that the Claims to be preferred are to be read in their widest sense.

Now having gone through the Specification, it is necessary to consider the Claims made. Claim 1 is a claim for a method; it is in these terms: "Method of feeding molten glass wherein successive masses or gathers are suspended beneath an outlet and mould charges are separated therefrom while suspended, whilst the shape of the masses or gathers is controlled by variation of the movement of a movable controlling member adapted to act as a piston in the outlet, or by the means for separating the mould charges, or by variation of the location of the controlling member or of the said separating means relatively to the outlet." There could be no question, if this Claim stood alone, that the grammatical sense of the words used covers a claim for four separate methods of controlling the shape of the masses or gathers. This construction is made quite clear if there are inserted in the appropriate places the numbers (1) to (4) inclusive, Claim 1 then being read in the following manner: Method of feeding molten glass wherein successive masses or gathers are suspended beneath an outlet and mould charges are separated therefrom while suspended whilst the shape of the masses or gathers is controlled (1) by variation of the movement of a movable controlling member adapted to act as a piston in the outlet, or (2) by the means for separating the mould charges, or (3) by variation of the location of the controlling member relatively to the outlet, or (4) by the variation of the location of the separating means relatively to the outlet. There is nothing in the words of the Claim to suggest that the four means for controlling shape are to be used in conjunction. Indeed, the presence of the disjunctive "or" between the description of each of the four means of controlling shape suggests that each of the means described constitutes a separate method which is itself the subject-matter of a separate claim. This is the construction relied on by the Defendant Company. It has, however, been argued on behalf of the Plaintiff Company that this Claim must be construed, after a consideration of the Specification, as if expanded into four sub-heads. The expanded sub-heads submitted on behalf of the Plaintiff Company are as follows:—Sub-head (1): "Method of feeding molten glass wherein successive masses or gathers are suspended beneath an outlet and mould charges are separated therefrom while suspended whilst the shape of the masses or gathers is controlled by variation of the movement of a movable controlling member adapted to act as a piston in the outlet." This is identical with the con-

* Ante, page 502, line 37.

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struction of what I may call the first of the four alternative methods submitted by the Defendant Company.

- Sub-head (2): "Method of feeding molten glass wherein successive masses or
"gathers are separated therefrom while suspended whilst the shape of the
5 "masses or gathers is controlled." This introduction is the same as in the first
sub-head and for the words "by the means for separating the mould charges"
are substituted the words "without variation of the movement of a movable
"controlling member by the means for separating the mould charges co-acting
"with the movement of a controlling member." A comparison of the two sub-
10 missions shows that the Plaintiff Company seeks to read into the second sub-
head the two phrases "without variation of the movement of a movable con-
trolling member" and "co-acting with the movement of a controlling
member." It is argued that these two phrases must necessarily be imported
because of the words to be found on page 2, lines 49 to 59, of the Specification.
15 I have already read this passage, but for convenience I will read it again:
"When the lower portion and main body of a gather has been formed to the
"size and shape desired for a mould charge"—this, from the context, is to be
effected by means of the impeller—"the latter"—that is the mould charge—
"is severed by shears or other suitable severing means which are also variable
20 "as to position and movement, including time of movement, so as to complete
"the desired form of that mould charge, and also in some cases to preform the
"lower end of the succeeding charge."

- I can see no justification for so construing the Specification, even if the
passage I have referred to was the only reference to the means for separating
25 the mould charges contained in the Specification, but this is not the case, for
on page 6 at line 114 it is stated that the impeller can be thrown out of action
and that, when it is entirely inactive "the gravity outflow of the glass can be
"timed and shaped for various forms of gathers by operating the severing
"means only." In my judgment, this really precludes any possibility of adopt-
30 ing the construction suggested by the Plaintiff Company.

- Sub-head (3) reads as follows: "Method of feeding molten glass wherein
"successive masses or gathers are suspended beneath an outlet and mould
"charges are separated therefrom while suspended whilst the shape of the
"masses or gathers is controlled." Down to this point the introduction is the
35 same as in the case of the other two sub-heads, but the Plaintiff Company's
construction continues "(without variation of the movement of a movable
"controlling member)" by variation of the location of the controlling member.
The phrase "without variation of the movement of a movable controlling
"member" is sought to be imported into this part of the Claim by reason of
40 the words in the Specification at page 2, lines 36 to 42: "The shape is con-
trolled and varied by suitably varying the position and movements of the
"impeller relative to the outlet, including the time of those movements." There
is, in my judgment, nothing in the Specification to show that this part of the
Specification has greater importance than other parts of it where the variation
45 of location of the impeller is described, and again I see no justification for
the construction put forward on behalf of the Plaintiff Company.

- The fourth sub-head submitted on behalf of the Plaintiff Company reads as
follows: "Method of feeding molten glass wherein successive masses or gathers
"are suspended beneath an outlet and mould charges are separated therefrom
50 "while suspended whilst the shape of the masses or gathers is controlled"—

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this again is the common introduction for each of the preceding sub-heads—
 “(without variation of the movement of a movable controlling member) by
 “variation of the location of the said separating means relatively to the outlet
 “(co-acting with the movement of a controlling member).” Again the Plain-
 tiff Company seeks to read in two phrases, (1) “without variation of the
 “movement of a movable controlling member,” and (2) “co-acting with the
 “movement of a controlling member.” The justification for this is said to be
 the passage on page 2, lines 49 to 59, which I have just read. Again I am
 unable to accept the view that this part of the Specification overrides the other
 portions of it which describe the shaping of the gather by the variation of
 the location of the separating means alone. I am satisfied that the construction
 of Claim 1 put forward on behalf of the Defendant Company is the construction
 to be preferred, for it is the *prima facie* grammatical construction of the words
 actually used.

I therefore construe Claim 1 as a claim for a method of feeding molten glass
 of the “gob-feeding” class in which the shape of the gather is controlled by any
 one of four different means, two of these means being effected by operations
 of what is called the “movable member” and the other two by operations of
 the severance means. I will consider later the meaning of the phrases “movable
 “member” and “adapted to act as a piston in the outlet.”

I now pass to Claim 2. It is for a “Method of feeding molten glass wherein
 “the discharge of the glass through an outlet is so controlled that the cross-
 “sectional dimensions of any portion of a gather suspended from said outlet
 “can be varied by operating a movable member so as to vary the rate of
 “discharge of the glass while such portion is being formed.” This Claim
 seems to me on its true construction to be for a method of gob-feeding in which
 the cross-sectional dimensions of any portion of a gather can be varied as the
 result of the variation of the rate of discharge of the molten glass by the opera-
 tion of a movable member. Again I will consider later the meaning of the
 phrase “movable member.” This method can have no concern with severance
 means or anything of that sort, for it cannot matter how the gather is cut off.
 The gather must necessarily be formed before the severance takes place; in other
 words, the method is exhausted by the formation of the gather. The width
 of the Claim is obvious. There is no suggested limitation on the operation of
 the movable member nor of the speed at which the operation takes place, or
 how the actual movement of the movable member is controlled. Every possible
 movement and variation of movement and every method of effecting the move-
 ment and the variation is within the claim.

Claim 3 is again quite separate from Claims 1 and 2. It is for a separate
 method. “Method of feeding molten glass, wherein a movable member periodi-
 “cally produces extrusion or intrusion impulses or a succession of such impulses
 “within the glass as it is being discharged from an outlet, and determines the
 “diameter of each portion of a gather by varying such impulses or successive
 “impulses.” It will be noticed that the description of this method contains
 no reference to suspension, and is quite consistent with a method of operation
 in which the molten glass issues or is discharged in a stream. The feature of
 the method as claimed is the production by a movable member of periodic
 extrusion or intrusion impulses or a succession of impulses within the glass
 without any limitation as to the place where the impulses are to be produced:

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certainly there is no suggestion that the movable member is to operate at or in the outlet. The width of this Claim is, I think, emphasised by a consideration of the succeeding Claim which is tied to it. Claim 4 reads: "Method according
5 "to Claim 3, wherein the impulses for increasing or decreasing the diameter
"of any particular portion of a gather are produced, by causing the movable
"member to move within the mass of glass being discharged to accelerate or
"retard its flow." The point of difference between Claims 3 and 4 which it
seems is being stressed in Claim 4 is that the movement of "the movable
"member" is to take place within the particular gather of glass which is being
10 discharged, while in Claim 3 that movement may take place within the body
of the molten glass as distinguished from the particular gather.

Claim 5 is for a method tied to Claim 4, and is for a method "wherein the
"shape of the gathers is varied by varying the extent, the strength, the duration,
"or the time of occurrence of the acceleration or the retardation, or by varying
15 "a plurality of these factors"—a very wide claim, for it covers any variation
in any of the factors mentioned so long as the method is according to that
claimed in Claim 4.

I need not refer to the method claimed in Claims 6 and 7, for no infringement
of either of those is claimed.

20 Infringement is not claimed in respect of Claim 8, but I think I ought to
refer to it because it certainly lends point to the construction of Claim 1.
Claim 8 is for a method according to Claim 1 "wherein the movable member
"projects through the outlet and aids in supporting the suspended gather."
This is the only Claim which in express terms mentions the actual projection
25 of the movable member through the outlet. It is tied to Claim 1, and, there-
fore, it seems to support the wide construction I have already placed on Claim 1,
and this notwithstanding the fact that Claim 8 also contains an express refer-
ence to the movable member constituting an aid in the support of the
suspended gather.

30 Claim 9 is an independent claim. It reads: "Method of feeding molten
"glass through an outlet, which consists in flowing the glass down and around
"the end of an impeller acting as a piston in the outlet, accumulating a desired
"gather of the glass below the outlet, and raising and reversing the flow of
"glass by movements of the impeller to pre-shape the accumulated gather."

35 It is to be noticed that this is the first Claim in which the term "impeller"
is used: in each of the earlier Claims the term used is "movable member." The
object of the method described in Claim 9 is stated to be "to pre-shape the
"accumulated gather." This phrase by itself is really meaningless: it must,
I think, have been used elliptically, and I think the phrase should be expanded
40 so as to read "to pre-determine the shape of the gather which is accumulated as
"the result of employing this particular method." In this case, as throughout
the other Claims, I think "outlet" must mean the actual orifice. Indeed, in
my judgment, on the true construction of this Specification, the word "outlet"
wherever it is used must be construed as meaning the actual orifice. It is plain
45 from a consideration of the unamended Specification that this was the only sense
in which the word was originally used. It would be wrong to construe the
amended Specification so as to enlarge the patent monopoly claimed, and it is
only by reason of the insertion of the amendments that in two or perhaps
three instances doubts arise as to whether the word "outlet" is used in a
50 wider sense as covering what is termed "the outlet spout." Now what is the

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meaning of the phrase "movable member"? I do not think it is intended in this Specification to be used as interchangeable with the word "impeller." I think it is used as being a wider term which itself includes an impeller. The latter term is, as I have already mentioned, defined in the Specification as meaning a "movable impelling and regulating member," but there is no definition of the phrase "movable member." The term "impeller" is only used in one of the method claims, namely, Claim 9: in all the other Claims the phrase "movable member" appears. It is worthy of note that, where the capacity of action of the movable member with regard to the outlet is referred to in the Specification, the phrase used is "adapted to act as a piston in the outlet," and that, when the like capacity of the impeller is referred to, the phrase used is "acting as a piston in the outlet." In my judgment, this points clearly to a difference between what is described as a "movable member" and an impeller. I think the former is a wider phrase and is used to cover every kind of movable member. An impeller is obviously not the only form of movable member. There are other movable members which will accelerate or retard the rate of discharge of glass through an orifice. One example of such is to be found in the specification of *Hitchcock*, to whom Patent No. 805,068 was granted in the United States of America in the year 1905. Such a movable member need not be physically in the outlet, provided it has the effect of increasing or decreasing the flow of glass through the outlet; and, if it has that effect, then, to use the actual words of Claim 1, it is adapted to act as a piston in the outlet and performs the function of a piston at that point.

The only other Claim I need mention, so far as construction is concerned, is Claim 10, which is an apparatus Claim. It is: "Apparatus for carrying out the method according to Claims 1 to 3, in which the movable controlling member is mounted for automatic movement into and out of the outlet without coming into contact therewith." This Claim is, of course, separate from the method Claim: it is for a particular form of apparatus to be used in carrying out the method Claims. The terms "movable controlling member" and "outlet" used in the Claim must have the same meaning as in the other Claims.

I need not refer to the remaining Claims except to point out that, in my judgment, some at any rate appear to cover ordinary mechanical devices; for example, Claim 11 is for "Apparatus according to Claim 10, where the length of stroke of the impeller may be varied by moving the pivot of a connecting rod from which the impeller is suspended," while in Claim 21 there is a claim for "an impeller."

Now having dealt with the question of construction of the Claims and ascertained the nature and extent of the invention claimed, it is necessary to consider the various defences put forward. I will deal first with anticipation. The Defendant Company relies on common general knowledge, and a number of Letters Patent granted prior to the date of the Patent in suit. As I have already stated, the Patent in suit contains an acknowledgment of the state of knowledge of the art at the date of the invention. I need not read again the passages to which I have already referred: they are to be found on page 1, line 36, to page 2, line 6*. The chief features which are admitted to be known before the invention claimed by the Patent in suit are (1) the relationship between the cross-section of a gather and the cross-section of the outlet through which the gather is discharged; (2) the relationship between the weight of the gather and the rate of the discharge; and (3) the use of a reciprocating

* *Ante*, page 496, line 37 to page 497 line 11.

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plunger moving in the glass toward and away from the outlet as the means for regulating the weight of the gather. The objection to the use of such a reciprocating plunger is stated to be the inability to control or vary the shape or contour of the gather during its discharge so as to insure that the diameter
 5 of any particular portion of the gather is of the required dimension. In other words, while the known method will give a constant diameter for the whole gather it will not do so for a particular portion of it. But, even with the known method, it is admitted that some variation of shape could be obtained. The reason why the known method is stated to be inefficient is that a change in
 10 the length of the plunger stroke or in the size of the discharge outlet must influence the entire gather; that is to say, the shape of the entire gather and not of a particular portion there of the gather.

One of the earlier Patents relied on by the Defendant Company, namely, No. 120,744, granted to one *Howard*, the application for it being dated the
 15 10th of August, 1917, also contains an acknowledgment of the then state of knowledge in the art. *Howard's* invention relates to gob feeding. Its avowed object is "to provide a method of feeding glass in masses of predetermined quantity and of suitable shape, to control the shape of the mass without checking the flow in the reservoir or at the orifice." The relevant part of
 20 *Howard's* Specification is on page 2, beginning at line 28, where it says this: "At temperatures necessary for working, molten glass is a stiff viscous fluid tenaciously adhering to any hot material. The flow starts by forming a half globular drop at the orifice of the vessel, next its cohesion to the edge of the orifice causes the drop to move forward at the centre, the upper end of which
 25 adheres to the orifice and the centre pulls away to a small stream or thread and this attenuated condition remains constant. Glass resembles all other viscous fluids in this respect, but shows a very great contraction in area of stream. If the head or level of the glass in the supply reservoir be increased or more pressure applied to the surface of the glass, this contraction below
 30 the orifice will be reduced. This is due to the fact that the adherence to the edge of the orifice is much greater than the tension of the glass particles to each other, and greater pressure forces more glass through the centre of the drop without increasing to any great degree the flow at the edges or outer sides of the drop. Conversely, by decreasing pressure on the head or level
 35 of the glass, contraction of the stream is increased, and by varying the rate of flow, it is possible to so expand or contract the section of stream near the orifice as to make it resemble within narrow limits, a predetermined form. Also by cutting off the globule of glass close to the orifice the contracted section (or the tail part above the shears) will be drawn up into the half-globular
 40 drop at the orifice by reason of the law that a drop of any fluid tends to assume a globular form up to the disrupting point, and corrects any deviation of form by drawing to it the distorted part by molecular attraction of its particles. This forms independent masses without supporting the stream on the shears or other cold members. Various methods have been proposed and
 45 some embodied this principle of intermittent flow caused by variation of pressure in the glass within the supply reservoir. In one of these old methods, there is a plunger within the body of the glass in the supply reservoir just above the orifice. By moving this plunger down, flow of glass through the orifice is accelerated and tends to fill up the central portion of the globule
 50 and prevent contraction or attenuation of the stream from the globule. When,

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"in using this method, it is desired to contract the globule near the orifice in order to cut it off through its narrowest portion, this plunger is raised or retracted from the orifice thus decreasing the pressure of the glass at the orifice and checking the flow. There are four practical objections inherent in this principle of operation, and consequently inherent in any particular method using this principle. First, the force applied is only partially available for the reason that the reservoir is open at its source of supply, and the pressure tends to partly dissipate itself or expand itself in backing the glass into the tank or other containing vessel, and thus the force spends itself largely in inertia. Second, checking rate of flow and even in some cases reversing it in the orifice tends to cause clogging. Third, owing to the very imperfect action of forces applied to the mass of glass, the cut-off mark never becomes incorporated in the mass of glass forming the next drop, but remains on the lower surface and causes cracks and unfinished parts to the finished ware. Fourth, the forces accelerating the flow at one time are balanced by an equal checking force, and thus the average flow is not different from the normal flow when these actions are suspended. This leaves no provision for changing the flow to equalise any changes in the general level of supply source or change in the temperature or viscosity of the glass, both of which cause great changes in the normal flow." The method specifically referred to in the passage I have read (at line 53 on page 2) is that described in the Specification of Letters Patent No. 113,665 granted to one *McCauley* in 1917. This passage quite clearly contains an acknowledgment of the fact that the idea of a moveable plunger moving toward and away from the outlet was known at the time of *Howard's* application. The expert evidence which was given before me has satisfied me that the acknowledgment of the state of the art contained in *Howard's* Specification is in fact in accordance with the actual knowledge at that time. My attention was also called to certain Letters Patent in which methods for the shaping of the gather of glass in the gob feeding method by the severance means were disclosed.

In my judgment, the Claim in the Patent in suit to control the shape of the gather by the means for separating the gathers, namely, the second alternative of Claim 1, is anticipated by each of the following Letters Patent, namely, Letters Patent No. 1,150,030, granted in the United States of America to one *Harding* on the 17th of August, 1915; Letters Patent No. 15793 of 1915, granted in this country to one *Drey*; Letters Patent No. 7183 of 1912 granted to one *Wilzin*; Letters Patent No. 1,166,576, granted in the United States of America on the 4th of January, 1916, to one *Bowman*. I think the second alternative of Claim 1 is also anticipated by the Specification No. 109,782 of *Tuckers and Reeves* dated 16th of September, 1916, in the form laid open for public inspection under Section 91 of the Consolidated Acts.

The fourth alternative of Claim 1 is, in my judgment, anticipated by each of the Letters Patent to which I have already referred as anticipating the second alternative of Claim 1, except *Wilzin's* Patent.

With regard to the Claims in the Patent in suit to control shape by the use of the movable member, having regard to the construction I have decided is to be placed on such Claims, I am of opinion that each of such Claims is anticipated by the Letters Patent granted to *Howard*, to which I have already referred, the Letters Patent No. 805,068 granted in the United States of America to one *Hitchcock* on the 21st of November, 1905, the Letters Patent No. 883,779

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- granted in the United States of America to one *Brookfield* on the 7th of April, 1908, the Letters Patent Nos. 113,665 and 114,583 granted in this country to *McCauley* on the 2nd of March and 20th of October, 1917, respectively, and also the Letters Patent granted to *Bowman*, which I have already mentioned. By what
- 5 I have said with regard to anticipation I do not of course intend to suggest that each of the Letters Patent to which I have referred anticipates every feature coming within the particular Claims of the Patent in suit. What I mean by saying that the Plaintiffs' Claims are anticipated is that the Plaintiffs' particular Claims are wide enough to cover the subject-matter of the respective
- 10 Letters Patent. I should perhaps also make it clear that in coming to this conclusion I have not in any sense of the word attempted to piece together any of the anticipating Letters Patent in the sense of attempting to create out of them a mosaic. I have dealt with each of such Letters Patent by itself and without reference to the other Letters Patent referred to.
- 15 In the result, I hold that the Patent in suit is invalid because it has been anticipated.

- I will next deal with the issue of subject-matter, namely that the invention claimed by the Patent in suit was not proper subject-matter at the date of grant for a valid monopoly grant. The Defendant Company claims that there is no
- 20 subject-matter in the Patent in suit, first, having regard to the common knowledge at its date; secondly, assuming the several Specifications to which I have already referred on the issue of anticipation do not in fact constitute absolute anticipations, yet the information disclosed by those Specifications is sufficient to deprive the Patent in suit of patentable subject-matter; and, thirdly, the
- 25 Patent in suit in fact provides for nothing more than the application of an old method for a new purpose. In other words, the method claimed to obtain control by means of the movable member of the shape of gobs of molten glass in a glass feeding machine is in fact the old method of obtaining control of the weight of such gobs. Indeed, it is said that the use for the purpose of controlling shape is not novel, for some control of shape was of necessity obtained with the control of weight. I can deal with the first and second grounds on which it is claimed that there is no subject-matter together. The evidence has
- 30 satisfied me that at the date of the Patent in suit it was common knowledge in the art (1) that gobs of molten glass could be fed to the moulds by mechanical means; (2) that the weight of such gobs could be controlled; (3) that different shapes of gobs could be produced in different machines, namely, pear-shaped gobs, sausage-shaped gobs and globular gobs. The expert evidence in fact accords with what I have referred to as to disclaimer in *Howard's* Specification read in conjunction with *McCauley's* Specification, which is referred to in it, and
- 40 with the other Specifications to which I have already referred. With regard to the third ground on which the submission that the Patent in suit lacks subject-matter is based, I am of opinion that this also is correct. To point out that an old method may be used for a new purpose is not an invention and at most is nothing more than a discovery. Discovery is not the same thing as invention, as Lord *Lindley*
- 45 said in *Lane-Fox v. The Kensington and Knightsbridge Electric Lighting Company, Limited.*, reported in 9, Reports of Patent Cases, page 413, at page 416: "A man who discovers that a known machine can produce effects which no one knew could be produced by it before may make a great and useful discovery, but if he does no more his discovery is not a patentable invention,
- 50 "He has added nothing but knowledge to what previously existed. A patentee

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" must do something more: he must make some addition, not only to knowledge,
 " but to previously known inventions, and must use his knowledge and in-
 " genuity so as to produce either a new and useful thing or result, or a new
 " method of producing an old thing or result." There is a passage a little
 lower on the same page which I ought also to read: " On the one hand, the 5
 " discovery that a known thing—such, for example, as a *Plante* battery—can
 " be used for a useful purpose for which it has never been used before is not
 " alone a patentable invention, but on the other hand, the discovery how to use
 " such a thing for such a purpose will be a patentable invention if there is
 " novelty in the mode of using it as distinguished from novelty of purpose, or 10
 " if any new modification of the thing, or any new appliance is necessary for
 " using it for its new purpose, and if such mode of user, or modification, or
 " appliance involves any appreciable merit. It is often extremely difficult to
 " draw the line between patentable inventions and non-patentable discoveries;
 " but I have endeavoured to state the distinction as I understand it, and so far 15
 " as is necessary for the purposes of the present case. I have, of course, been
 " guided by the previous decisions on the subject, and especially by *Harwood v.*
Great Northern Railway Company which is the most instructive of them all.
 " I have been induced to make these observations in order to apply them to the
 " question whether the plaintiff's invention is anything more than a discovery 20
 " that *Plante's* cells can be usefully employed for incandescent lighting; if it is
 " not, his invention will not be the subject-matter of a patent." Lord *Lindley*
 put the position even more succinctly in the case of *Gadd and Mason v. The*
Mayor, etc., of Manchester, reported in the same volume, 9 Reports of Patent
 Cases, at page 524. After referring to a number of decisions he says this at 25
 line 15: " These cases, and many others which might be cited, establish the
 " following propositions applicable to the present case, namely: (1) A patent
 " for the mere new use of a known contrivance, without any additional in-
 " genuity in overcoming fresh difficulties, is bad, and cannot be supported. If
 " the new use involves no ingenuity, but is in manner and purpose analogous to 30
 " the old use, although not quite the same, there is no invention; no manner
 " of new manufacture within the meaning of the Statute of James. (2) On the
 " other hand, a patent for a new use of a known contrivance is good and can
 " be supported if the new use involves practical difficulties which the patentee
 " has been the first to see and overcome by some ingenuity of his own. An 35
 " improved thing produced by a new and ingenious application of a known
 " contrivance to an old thing, is a manner of new manufacture within the
 " meaning of the Statute." Let me apply those tests to the present case. I
 am satisfied by the evidence that the method for controlling the weight of gobs
 in the mechanical gob feeding of molten glass is old; to apply that method for 40
 the purpose of controlling shape is not a new purpose; indeed, on the evidence
 you cannot control weight without to some extent controlling shape. The
 purpose itself is therefore not even a new purpose. The Patentee does not in
 the Patent in suit even claim it as a new purpose. What he says in effect is:
 " I have discovered that you can get more control of shape than has been 45
 " realised in the past."

In my judgment, on the construction I have placed on the Patent in suit, it is
 invalid for want of subject-matter. It may be that the Claims might have been
 confined to a much narrower limit, namely, to a machine with an impeller work

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ing in and through the actual orifice, and such a claim might be valid: but I have not to consider this point.

The next defence to be dealt with is that the invention claimed to be covered by the Patent in suit is in fact the subject of a prior grant, namely, a Specification No. 157,159 granted to the Plaintiff Company. This defence is, of course, quite different from the defence of anticipation and falls within a much narrower compass. The question to be asked in arriving at a decision on the point is: Is the invention described in the Patent in suit substantially described in an earlier grant as the subject-matter of that grant? No question of prior common knowledge arises. All that have to be considered are the Patent in suit and the Patent which is alleged to constitute the prior grant: do they in substance describe the same invention? In the Patent in suit the thing claimed is the ability to control shape; in the Patent relied on as constituting the prior grant there is no mention of shape; what is claimed is constancy of weight. In my judgment this defence fails.

The next defence with which I have to deal is that of insufficiency and inutility. It is argued that the Patent in suit is invalid because no sufficient, precise and definite information is given as to shape, size, construction and relative disposition of the outlet, the impeller, the shearing means or the gate or of the relative movements of the impeller or shearing means so as to obtain the results claimed from the invention in the Patent in suit; and also because there is no sufficient definition of the expressions "adapted to act as a piston in the "outlet," "considerably smaller," "considerable width" and "controlled": further, that there are no sufficient directions to enable the size of the gathers to be pre-determined or controlled. It is also alleged that it is not possible by the raising or lowering of the gate to regulate the weight of the gathers, and that it is impossible to convey the gathers to the mould by means of the chute without deformation. Having carefully considered the evidence given in relation to these matters, I am satisfied that the Defendant Company has failed to prove that the Patent in suit is invalid either on the ground of inutility or of insufficiency, notwithstanding the fact that the apparatus which has been used by the Plaintiff Company for carrying out the methods of glass feeding described in the Specification has not been constructed entirely in accordance with the description of the apparatus set out in the Specification.

The remaining defence is non-infringement. On the construction I have placed on the Patent in suit there could be no doubt but that the user by the Defendant Company of the machine complained of would constitute an infringement; but, as I have held that the Patent in suit has been anticipated and is invalid on this among other grounds, this is immaterial. If, however, I am wrong in construing the Patent in suit as I have done, and on its true construction the claim should be read as confining the working of the impeller to the orifice and out of it, then the user by the Defendant Company of the machine complained of would not constitute an infringement, for it has been proved to my satisfaction that in the last-mentioned machine the impeller does not in its working actually enter the orifice and certainly does not penetrate beyond it.

In the result, for the reasons I have stated, I hold that the Letters Patent No. 142,758* of 1919, are invalid, and therefore the action must be dismissed: and on the Counterclaim I order that the Letters Patent be revoked.

In these circumstances the Plaintiff Company must pay the costs of the Action and Counterclaim.

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Sir *Arthur Colefax K.C.*—My Lord, I would apply to your Lordship for a stay in respect of any order on the counterclaim.

Luxmoore J.—(After discussion.)—If Notice of Appeal is given within one month and the Plaintiffs undertake to prosecute that appeal with due diligence and not to make any application pending the appeal for the amendment of the Specification, I will direct the order for revocation to lie in the Office until after the appeal. 5

A Certificate for the Particulars of Objections was granted as to paragraphs 1 (except the Specification of *Hulbert*), 2, 3 and 4 (except sub-paragraph J).

The Plaintiffs appealed to the Court of Appeal.

On the 21st of March, 1932, the Appellants moved the Court of Appeal before the MASTER OF THE ROLLS and Lords Justices GREER and ROMER for an order that Mr. *Hubert Alexander Gill* (who had been the chief expert witness called at the trial of the action on behalf of the Defendants) might be called before the Court of Appeal upon the hearing of the appeal for further cross-examination or alternatively that the evidence of Mr. *Gill* in the action of *N. V. Hollandsche Glas en Metaalbank v. The Rockware Glass Syndicate Ltd.* (reported ante, page 288) might be read as part of the evidence in the case. 10 15

The same Counsel, instructed as before, appeared for the respective parties.

Sir *Arthur Colefax K.C.* for the Appellants.—After the trial of this action, another action of *N. V. Hollandsche Glas en Metaalbank v. The Rockware Glass Syndicate Ltd.* was tried before Mr. Justice *Clawson*, the subject-matter of the two actions being very similar and many of the same Specifications being pleaded as prior publications in both actions. In the second action Mr. *Gill*, who gave expert evidence for the Plaintiffs in that action, modified, amplified and qualified the evidence that he had given in this action, and I am asking for leave that the Appellants might have leave to cross-examine Mr. *Gill* on the evidence that he gave in the second action, or alternatively that his evidence in the second action be read as part of the evidence in this appeal. [Greer L.J.:—Have you power to ask your opponents to produce their witness for further cross-examination?] I submit that R.S.C., O.58, r.4, is wide enough to include such a case. The circumstances are similar to those in *R. v. Cope-stake (ex parte Wilkinson)* L.R. (1927) 1 K.B.468. 20 25 30

Whitehead K.C. for the Respondents.—The parties, the issues and the Patents are different in the two cases. Mr. *Gill* was fully cross-examined at the trial of this case and there is no suggestion that further information has arisen. 35

Lord Hanworth M.R.: *Prima facie* it would appear that the application should not be granted, but we may not be in a position to understand it without going fully into the facts of the case. The application will therefore stand over to the hearing of the appeal, strictly without prejudice to the Respondents' right to submit that the application does not fall within the rule. The costs to be reserved. 40

The appeal came on for hearing on the 12th of April, 1932, before Lords Justices LAWRENCE and ROMER and Mr. Justice FARWELL.

Sir *Arthur Colefax K.C.* for the Appellants.—The object of the Patent is to obtain control of the shape of the gather independently of its weight, and the essential feature is that the control should be by a movable member reciprocating as a piston in the outlet. The learned Judge failed to distinguish between the Plaintiffs' plunger and that which was disclaimed in the Specification, save that the former was of smaller diameter than the outlet and 50

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actually moved into it. No previous plunger had ever controlled the shape of a gather, save that, if the weight were changed, there was inevitably some change of shape. The learned Judge did not appreciate that the object of the Patent in suit was to obtain change of shape independently of change of weight. The learned Judge wrongly interpreted "outlet" as meaning the actual plane of emergence of the glass on the grounds that this view is supported by all the passages in the unamended Specification. Even the unamended Specification refers to the impeller being in axial alignment with the outlet, which of itself connotes depth, but it is clearly so when one refers to the amended Specification to which one is compelled to look by Section 21 (7) of the Patents and Designs Acts, 1907-1928. The amendments have only clarified, not altered, the meaning of "outlet." The learned Judge was wrong in drawing a distinction between "impeller" and "movable member"; "movable member" as used in the Specification has no reference to such a device as *Hitchcock*. The whole Specification makes it clear that shape is to be varied by variations in the movements of a movable impeller and it is wrong to read Claim 1 disjunctively so as to include the case of a stationary impeller. Claim 1 is for a method of controlling shape by variations of the movements of a movable member, or, without varying the movements of the movable member (but still having it in position and moving) by the other variations set out in the Claim. If one discovers a principle and describes a method of applying it, one may claim the principle broadly. (*Jupe v. Pratt* 1 Web. P.C. 144 was referred to.) The principle of control by a movable member acting as a piston in the outlet governs all the Claims. The Defendants have taken the principle and their machine can do everything, with two unimportant exceptions, that the Plaintiffs can. None of the prior documents approaches anticipation. The Judge held that the Plaintiffs had merely used an old method for an old purpose, but the evidence is that both the means and the purpose are new, giving a degree of control of shape never before contemplated.

After further argument, the motion for leave to further cross-examine Mr. Gill was dismissed with costs.

Moritz K.C. followed.—The following propositions of fact were established:—

- (1) In 1919, the industry was demanding gathers of constant weight within narrow limits, and, while preserving that capacity, enabling a wide variety of shapes to be produced.
- (2) No such machine existed.
- (3) The only other machines would give constant weight, but no control over shape at all. If the weight were altered, some change of shape unavoidably occurred, but it was not the shape desired.
- (4) Except *Howard*, none of the prior documents was concerned with choice of shape. The most they aimed at was a compact lump and it is doubtful whether any obtained it.
- (5) The Plaintiffs' machine gives complete and independent choice of weight and shape.
- (6) The Defendants' machine has exactly the same capacity except that the choice of shape is more limited.
- (7) It is impossible to get the control of shape desired by the use of air pressure on the surface of the glass.
- (8) A mere plug is no use.
- (9) One must accelerate the glass in the outlet so that it accelerates the normal gravity flow to the desired extent.
- (10) To attain that acceleration the piston principle is necessary.
- (11) It was quite novel and not obvious. The invention consists in shaping divorced from weight and by means of a pistonlike reciprocating impeller with variations of its movements and positions and/or of the position and movements of the severance means. None of the prior Specifications shows

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this. (*Hills v. Evans*, (1862) 31 L.J. Ch. 463, *Otto v. Linford*, (1881) 46 L.T. 35, *British Thomson-Houston Co. Ltd. v. Metropolitan Vickers Ltd.*, (1926) 43 R.P.C. 76, (1928) 45 R.P.C. 1 and *Pope Appliance Corporation v. Spanish River Pulp Co.*, (1929) 46 R.P.C. 26 were referred to.) If there is a problem to be solved and an inventor solves it by the discovery of a novel principle, he need only show one method of carrying it into effect in order to claim all means of carrying out that principle (*Jupe v. Pratt* (*ubi supra*), *Chamberlain & Hookham Ltd. v. Mayor, etc. of Bradford*, (1903) 20 R.P.C. 673, and *Hickton's Patent Syndicate v. Patents & Machines Improvements Co. Ltd.*, (1909) 26 R.P.C. 339, were referred to.) Claim 1 shows four alternative methods of varying the shape of the gutter, but it is governed by the principle of the moving impeller. The Claim opens with the words "severing in suspension" which limits it to gob-feeding and shows that it cannot cover stream-feeding, as was held by the learned Judge.

Whitehead K.C. for the Respondents:—The Plaintiffs say that they have discovered an entirely new principle by which they can control shape divorced from weight. Shape and weight are indissolubly related; any change of adjustment to alter shape necessarily affects the weight. A claim to the Plaintiffs' machine, as opposed to the principle they now put forward, would have been consonant with their invention. The Plaintiffs submit that the paragraph in the Specification referring to the piston-like action of the plunger should be read into all the Claims; if this is so, why should Claims 1 and 9 have been amended, whereas the others have not? I submit the principle underlying the Plaintiffs' invention is the method of varying the rate of discharge of glass while the gather is being formed, which is not novel. "Outlet" must refer to a specific part of the machine and not to a general position, otherwise a phrase such as "the gravity head at the outlet" would be quite indeterminate. (*Ingersoll Sergeant Drill Co. Ltd. v. Consolidated Pneumatic Tool Co. Ltd.*, (1908) 25 R.P.C. 61 was referred to.) Claim 1 is in effect four separate Claims. In considering prior documents, one must first clearly ascertain the invention which is alleged to be anticipated. If the invention is for a process, the anticipating document must clearly show that process; if for an apparatus, the anticipating documents has to show merely that apparatus. At the date of *Hills v. Evans* (*ubi supra*) there were no claims to a specification. (*Flour Oxidizing Co. Ltd. v. Carr & Co. Ltd.*, (1908) 25 R.P.C. 428 and *British Thomson Houston Co. Ltd. v. Metropolitan Vickers Ltd.* (*ubi supra*) were referred to.) A prior document which does not give all the advantages of the Plaintiffs' machine may nevertheless disclose the principle. Anyone using *Bowman's* apparatus must affect shape and so come within the Plaintiffs' Claims; it is a question for the Court to decide whether *Bowman* does in fact control shape. A mere discovery that a machine has some hidden virtue is not patentable subject-matter (*Pope Appliance Corporation v. Spanish River Pulp Co.* (*ubi supra*) was referred to.) The Plaintiffs' have stressed the importance of obtaining accurate shaping, but I submit that the evidence proves that all is required is that the gob should enter the mould without touching the sides, and that a sausage is the only shape ever used. I submit there is no subject-matter first, in the light of the prior documents and secondly in relation to what is stated in the Specification itself. It is clearly acknowledged that it is old to control the rate of discharge in order to regulate the weight by reciprocating the plunger to and away from an outlet, and also that one method of varying

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the rate of discharge was to alter the length of the plunger stroke; this is precisely the method of Claim 5. All that the Plaintiffs' have discovered is that the same methods that could be used for controlling weight and a certain degree of shape can be used for controlling shape to a greater degree. The Defendants have not infringed the Patent (*Automatic Weighing Machine Co. v. Knight*, (1889) 6 R.P.C. 297 and *Nobel's Explosive Co. Ltd. v. Anderson*, (1894) 11 R.P.C. 519 were referred to.) I submit that the Specification is ambiguous. (*Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.*, (1915) 32 R.P.C. 256 and *Cincinnati Grinders (Inc.) v. B.S.A. Tools Ltd.*, (1931) 48 R.P.C. 33 were referred to.) The Plaintiffs have sought to incorporate some passages from the body of the Specification into the Claims; where is such incorporation to begin and end?

Burrell followed:—The Plaintiffs have submitted that there was a long-standing problem that was not solved until the Patent. This is not borne out by the Specification, which states that it was possible to vary and even predetermine shape. Mr. *Meigh* who gave evidence on behalf of the Plaintiffs, stated that the problem was not so much shaping as such but obtaining shapes adapted to making narrow necked bottles; there is no such limitation in the Claims. Evidence of commercial success by itself is no evidence that an inventive step was necessary (*Longbottom v. Shaw*, (1891) 8 R.P.C. 333 was referred to.) The alleged new principle of the pistonlike action of the plunger was only introduced into the Specification by amendment, and there is no reference at all to the special action of overtaking the normal gravity flow. It is not clear whether "mass" and "gather" are synonymous in the Specification, since "gather" was substituted for "mass" on amendment in Claim 9. There is no indication of the advantage of using a restricted throat, and therefore there is no limitation to the use of a piston in a restricted outlet. The Plaintiffs are attempting to prevent the use of a method of controlling shape that had previously been used for controlling weight.

Sir *Arthur Colefax* K.C. replied.—The Defendants have not distinguished between an adventitious change in shape and producing a gob of the weight and shape required. The amendments of the Specification are purely explanatory. I admit that different words are employed to describe the same thing, and the same word to describe different things. "Outlet" in some passages clearly means the actual opening in the outlet ring, but in others it as clearly means something of substantial depth of which the outlet ring forms part. The passage referring to the stationary plunger is not set forth as being for control of shape and forms no part of the invention. Claim 21 is for an old article put to a new use and I do not attempt to support it. In Claim 10, however, the introductory words are used adjectivally and direct one to apparatus not described in the Claim, i.e., apparatus that is capable of performing all the methods described in Claims 1 to 3. Section 32A of the Patents and Designs Acts, 1907-1928, does not apply to a counterclaim for revocation, but such a counterclaim cannot be permitted to defeat the object of the Statute. In the event of the Court holding one or more Claims valid and infringed, either judgment on the counterclaim should be left undelivered until after the Plaintiffs have had opportunity to apply for amendment of the Specification, or the order for revocation should be suspended for a period sufficient to permit of the amendments being effected [*Lawrence L. J.*:—How could that be consistent with the Court granting an injunction?] If the Patent were revoked,

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the injunction would be automatically dissolved (*Douglas Packing Co. Inc. v. William Evans etc. Ltd.*, (1929) 46 R.P.C. 493 was referred to.) The Court has absolute discretion as to the amendments it may demand as conditional upon its granting relief. (Section 22 of the Patents and Designs Acts, 1907-1928 was referred to.) The prior documents do not approach the Patent and I pray *British Thomson Houston Co. Ltd. v. Metropolitan Vickers Ltd.* (*ubi supra*) strongly in aid. Utility is unquestioned and therefore, unless it is really obvious, the Patent has subject-matter. It is clear that there was a problem requiring solution and that it was solved by the Patent. The Specification may present some difficulties in construction, but that is no reason for applying the considerations in *Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.* (*ubi supra*). There is nothing to show lack of *bona fides* in the inventor and there is no difficulty in determining what is the invention. All I ask is that "movable member" be interpreted in the light of the document. It is said that Claim 16 means that a stationary impeller is necessarily included in Claim 1. Claim 16 adds to Claim 10 a feature that is not in Claim 10, that does not mean that Claim 10 includes this feature, still less does Claim 10 transfer this feature back to Claim 1. The dominant feature of Claim 10 is that the member is mounted for automatic movement, which excludes a stationary impeller. The amendment of the feature of a piston acting in the cutlet was introduced to Claims 1 and 9 because these Claims do not express functions by results, whereas the other Claims do so.

Judgments were reserved and were delivered on the 27th of June, 1932.

Lawrence L.J.: The Plaintiffs, who are the registered owners of Letters Patent No. 142,785 granted in respect of improvements in methods and apparatus for feeding molten glass, have brought this action against the Defendants who they allege have infringed their Patent by using a glass feeding machine manufactured by *Pearson Glass Machines Ltd.*, of Pontefract, Yorkshire. The Defendants besides denying the alleged infringement plead that the Letters Patent are invalid and counterclaim for their revocation. The grounds mainly relied upon in support of the plea of invalidity are want of novelty, want of subject-matter, want of utility and ambiguity of the Specification. Mr. Justice *Luxmoore* has decided that the Patent is invalid and has made an Order for its revocation; hence the present appeal.

The broad contention in support of the appeal was that the decision of the learned Judge was wrong on the ground that the invention in respect of which the Patent was granted was a new method for attaining a new result and that the invention, besides being novel and proper subject-matter, was useful and had achieved a great commercial success.

In order to explain the nature of the alleged invention it is necessary to give some account of the art and of the state of public knowledge at the relevant date. The Patent in suit deals with the feeding of molten glass into a receptacle called the parison mould, which is the mould into which the molten glass is first introduced from the furnace. The two main methods of effecting this introduction at the date of the Patent were (1) by stream feeding, a process whereby the required quantity of the molten glass was allowed to flow by the action of gravity alone through an outlet in the bottom of the furnace into a parison mould placed immediately beneath the outlet and (2) by gob-feeding, a process whereby a gob or gather of molten glass of the desired weight and size was separated from the general mass in the furnace

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and was then transferred to the parison mould. The second of these methods was sub-divided into (a) hand-feeding and (b) automatic feeding. The present case is concerned solely with automatic gob-feeding. The physical properties of molten glass render its automatic transfer from the furnace into the parison mould extremely complicated. In a paper on Automatic Glass Feeding Devices written by Messrs. *Dowse* and *Meigh* and read at a meeting of the Society of Glass Technology on the 20th of April, 1921, the authors state (*inter alia*) that such physical properties as density, thermal conductivity, viscosity and surface tension and their respective relations to temperature all enter into the problem; that the hand-worker in fabricating glass-ware from the molten glass can study these factors in the case of each individual glass article and suitably manipulate his material and vary his operations to meet the changes in physical conditions; that the inventors of mechanical substitutes for the skilled gatherer have had to develop their methods recognising these underlying factors; and that the problem has in consequence been worked out slowly and laboriously. Stream feeding was found to be unsatisfactory as the attenuated stream which flowed out of the furnace coiled upon itself in the mould and owing to the chilled surfaces of the coils caused what is known as folding or lapping in the parison mould resulting in blemishes in the finished article. Owing to these inherent defects in stream feeding, glass engineers directed their attention to devising some method of automatically controlling the stream, rendering it intermittent and separating it into gobs or gathers suitable for entering the parison mould. This led to the discovery and development of a new principle in the automatic feeding of molten glass whereby the glass instead of being allowed to flow from the furnace by gravity was driven or forced from an extension of the furnace known as the fore-hearth or boot by some agency such as air pressure or a movable member. By this method the quantity of molten glass required for each mould-charge was driven or forced from the fore-hearth and was then severed by some cutting means and transferred to the parison mould. The object of having a fore-hearth was to maintain the molten glass at a uniform temperature as it was being drawn forward by the feeder irrespective of the varying temperatures of the mass in the furnace.

How far public knowledge of the art had progressed at the date of the Patent in suit is best shown by referring to the more relevant prior publications relied upon by the Defendants in this action. Of the 14 Patents granted during the period from 1901 to 1914 one was granted to a French engineer (*Wilzin*) and the rest to American engineers, including three Patents granted in 1912 to *Peiler*, the inventor of the alleged invention the subject-matter of the Patent in suit.

The first of these pre-war Patents in order of date was Patent No. 883,779 granted to *Brookfield*, which was originally applied for in the year 1901. The application was afterwards divided and a further application was filed in 1903. The object of this invention was stated to be to provide devices for automatically feeding molten glass from the furnace whereby such feeding should be rendered certain and accurate and to provide means for adjusting such devices to vary the amount of feed as required and also automatically to measure the glass. The invention consisted in having a bevelled orifice in the floor of the boot and a reciprocating plug with bevelled surfaces which alternately opened and closed the orifice; by changing the speed of the driving parts or by adjusting the gearing the amount of discharge could be accurately adjusted.

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The next Patent for a device of this type was Patent No. 7183 of 1912 granted to *Wilzin*. In Fig. 11 of the drawings *Wilzin* depicts a machine which has a conical aperture in the floor of the fore-hearth and a reciprocating plug (which he calls a piston) so made as to leave an annular space between it and the walls of the aperture. In the Specification *Wilzin* describes how the apparatus is intended to work, namely, at the time of gathering the piston ascends and uncovers the aperture (which he calls the tap-hole) to a certain extent; the glass falls into the parison mould; at the proper moment the piston descends and closes the tap-hole; the glass which remains adhering to the piston is severed by shears; the cross-section for the passage of the glass is regulated by causing the amplitude of the life of the piston to vary.

The last Patent of this type granted during this period is Patent No. 1,166,576 granted to *Bowman* the application for which was filed on the 1st day of August, 1914. This invention is stated to relate to improvements in the means for regulating the delivery of molten glass and severing pre-determined quantities intermittently to be transferred to moulds. In this invention the inventor described an orifice or throat in the bottom of the fore-hearth and a hollow water-cooled reciprocating metal plug of smaller diameter than the orifice. The object of cooling the plug is stated to be to chill the surrounding glass and cause the glass to adhere to the plug and gather thereon to a degree sufficient to form practically a glass plug. By this means the inventor states that the metal of the plug will be prevented from being burned away and from streaking into the molten glass. The description of the apparatus contains a statement that the plug is forced down into or towards the throat and then raised out of the throat. The severing means consist of a rotating knife which acts in co-ordination with the reciprocating plug and besides severing the gob closes the orifice of the throat and operates to suspend the flow of glass until it is retracted and placed in position ready for severing the next gob. The Specification, in addition to pointing out that the plug may be operated so as to control the amount of glass to be delivered to the action of the knife or so as to cut off the flow for any definite time, states that it will be obvious that by reason of the plug being kept partially submerged in the molten glass the downward movement when it is used to close or partially close the throat temporarily will tend to give an impulse to the downward flow of the glass. The Specification then goes on to explain that the plug may be held stationary in a fixed position leaving the rotating knife to sever the stream and suspend the flow.

The three Patents to which I have referred (*Brookfield*, *Wilzin* and *Bowman*) disclose a method whereby a reciprocating plug may be made to operate within the molten glass in a fore-hearth periodically opening and closing or partially opening and closing an outlet in the floor of the fore-hearth alternately permitting the stream to flow and then stopping or checking it. In the paper of Messrs. *Douse* and *Meigh*, to which I have referred, it is stated that it is quite obvious that the increased flow of metal to be observed on the descent of the reciprocating plug led inventors to develop another type of apparatus in which an impulse was designedly given to the molten glass in order to drive it out of the fore-hearth instead of merely allowing it to flow from the tank by gravity. Although *Bowman* stated that such an impulse was given by his method of using the plug he does not seem to have attached much importance to that fact nor to have realised that it could be used not only to produce gobs of pre-determined weight and size but also gobs of predetermined shape.

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Still dealing only with the pre-war period, several of the other Patents granted during this period have embodied this propulsion principle. These Patents may be divided into two categories, namely, first those in which the impulse is given by air pressure on the surface of the glass and, secondly, those in which the impulse is given by a reciprocating plunger operating within the molten glass.

The Patent No. 805,068 granted to *Hitchcock*, the application for which was filed in 1904, is an example of an invention in which the required impulse is produced by air pressure. This Specification states (*inter alia*) that molten glass resembles liquids in the manner of movement through and from an orifice, i.e. it is dependent with a given fluidity upon the pressure on the supply body and the size of the orifice. By suitably regulating these the molten glass can be made to discharge drop by drop, and from a given orifice with a given fluidity of glass the quantity of glass in the drops can be varied within certain limits by varying the supply pressure on the supply body, i.e. the greater the pressure the larger the drops. The Specification states that the invention has for its object a construction whereby it is possible to effect a drop-by-drop feed of the glass each drop containing any desired quantity of glass and to provide for the remelting of partially solidified portions of glass formed in or adjacent to the discharge orifice between adjacent drops or during any interruption of the feed of the glass from the tank or containing vessel. The Specification then contains a description of the apparatus proposed in order to bring about the result aimed at from which it appears that it is contemplated that the air pressure should be provided by operating a flexible diaphragm secured to a metal concave-convex shell and thereby creating and destroying a partial vacuum in the discharge chamber. Means are provided for co-ordinating the operation of the shears with the movement of the diaphragm. It is claimed by the Patentee that by his method the pressure on the glass will cause the formation of drops or globular bodies of the required size and at the desired rate and he states that the shape which the glass assumes in the practice of his method is similar to that assumed from a punty, i.e. a pear shape. It is also claimed that, if the diaphragm is operated to reduce the pressure at the time of severing the drop, the glass at the orifice is drawn up into the zone of heat so that cooler portions are reheated and that upon a reverse movement of the diaphragm the pressure in the discharge chamber is increased resulting in a rapid expulsion of the glass, thereby causing the formation of a drop large or small depending on the rapidity of the movement of the diaphragm.

Of the reciprocating plunger type there were two Patents amongst the 14 pre-war Patents which will serve as examples of this propulsion principle. The first of these is Patent No. 810,167 granted to *Morrison*, the application for which was filed in 1904. This invention "relates to improvements in apparatus for manufacturing glass articles and pertains particularly to means for segregating a predetermined quantity of molten glass from the melting pot and delivering in plastic condition to the moulds." In this invention the inventor proposes to have a circular revolving table provided with a series of radially disposed pockets and placed so that the top fits closely up against the orifice of the outlet in the floor of the fore-hearth. A reciprocating plunger operates in the molten glass co-ordinately with the intermittent movement of the revolving table in order to assist in more rapidly filling the pockets. The plunger has a movement from a point above the mouth of the opening down into the opening

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and is of less diameter than the opening so that, while it will assist to crowd down a charge into a pocket, it will allow any excess to escape round the sides of the plunger back into the fore-hearth. The length of stroke of the plunger can be varied as therein indicated. The top of the table acts as a temporary closure of the opening and, as soon as the table stops with a pocket below the opening, the plunger makes a rapid descent and fills the pocket, the contents of which are then discharged into the parison mould. 5

The second of the Patents of the reciprocating plunger type is a Patent No. 901,881 granted to *Cleveland* the application for which was filed in 1907. The primary object of this invention is to provide a novel feeding device for ejecting a predetermined quantity of molten glass into a suitable mould. There is an opening in the floor of the fore-hearth into which a plunger operating in the molten glass is allowed to descend by gravity at the right moment when the mould is beneath the opening and thus forces the glass into the mould and the molten material is then severed by shearing knives which serve the dual purpose of closing the opening in the fore-hearth and shearing the molten glass after the required quantity has passed into the mould. Immediately upon the material being ejected into the mould the plunger recedes. The Specification also states that the plunger can be used in the tank proper for forcing a quantity of the contents thereof through an opening in the bottom of that tank and that the quantity of molten glass so forced into a mould can be governed by the stroke of the plunger. 10 15 20

The cessation of the importation of glass-ware from abroad owing to the war soon brought about an acute shortage of glass-ware of all sorts in this country and this shortage caused the Ministry of Munitions in 1916 to investigate the condition of the English glass industry. Mr. *Meigh* who had joined the staff of that Ministry was instructed to visit all the glass works in the United Kingdom and to report fully upon each factory. Mr. *Meigh* accordingly visited about 60 factories and found that in most of them there was no machine production, the glass making being done by hand. In some few works there were forming machines in use but the glass was being gathered by hand and the machinery for forming the articles was also operated by hand. The facts ascertained by Mr. *Meigh* on his inspection show that in 1916 none of the inventions described in the pre-war Patents to which I have referred had been put into practical use by English glass manufacturers. The encouragement given by the Government to the glass industry in this country during the war no doubt stimulated the activity of the American glass engineers in the direction of trying to invent some practical and efficient method of automatic gob-feeding which could successfully be introduced into this country. 25 30 35 40

Of the eight Patents granted after the outbreak of the war (seven of which were granted to American engineers and one to an English glass manufacturer) it is only necessary to mention the following six: the first of these is Patent No. 15793 granted to *Drey* the application for which was filed in November, 1915. The main object of this invention was to provide a heated chamber below the outlet but above the cutting knives in which chamber the gob should be formed by means of a plunger and be supported at its bottom end by the knives. This Patent is only of interest in the present case in that the plug or plunger (it is called indifferently the one or the other) is stated in the Specification to be "operable in a common manner to regulate 45 50

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"the flow of glass through the orifice." In the drawings the lower end of the plunger which is in the shape of an inverted truncated cone is shown as having entered the outlet. The resultant gob is stated to be pear-shaped.

The next of these Patents is No. 113,665 granted to *McCauley* the application for which was filed in March, 1917. In this invention the Patentee describes a hollow cylinder suspended in the molten glass above the outlet and by means of suction in this cylinder the Patentee proposes not only to stop the flow of the glass without closing the outlet but also to suck up the stub left after the gob has been severed and to reheat that stub in the furnace and then by air pressure in the cylinder to eject the next gob from the outlet. This may be said to be a variation in the method of forming a gob by air pressure.

The next of these Patents is No. 109,782 granted to *Tucker & Reeves* the application for which was filed in April, 1917. This invention proposes to form a measured gob by means of a combustion cup beneath the outlet. It is unnecessary to describe this method further, as the only purpose for which this Patent has been referred to is that the Specification contains a recital of the state of the art and incidentally describes cutting knives which can be adjusted vertically and can be tilted from the horizontal and further lays stress on the shape of the gob produced by adopting the invention, which shape is stated to be such that the gob will settle in the mould without folding or lapping. It is also pointed out in this Specification that by operating the combustion cup in the manner directed the glass is forced up into the forehearth with the result that during its return it gathers impetus and extrudes a gob of greater diameter than it would otherwise have done, which is stated to be extremely desirable in varying the form of the gob.

The next of these Patents is Patent No. 120,744 granted to *Howard* the application for which was filed in August, 1917. This Patent is important not so much for the invention in respect of which it was granted but for the statement in the Specification describing the state of public knowledge of the art at that time. It is unnecessary to quote at length the passage which commences at line 28 on page 2 of the Specification and ends at line 35 on page 3, it has been read several times during the hearing of this appeal. It is obvious and not disputed that this passage and indeed the invention itself shows that *Howard* appreciated and was endeavouring to solve the problem of producing gobs of predetermined shapes by accelerating the flow of glass after the gob had passed through the outlet and before it was severed. The Specification, after referring to the physical properties of molten glass and to the result of having a greater head of glass in the furnace or of applying more pressure to the surface of the glass, states that by increasing or decreasing the pressure and by thus varying the rate of flow it is possible so to expand or contract the section of stream near the orifice as to make it resemble within narrow limits a predetermined form. It also points out that by cutting off the gob close to the orifice the tail part above the shears will be drawn up into the next gob to be extruded and that thus independent gobs are formed without supporting the streams on the shears. The Specification then contains the following passage which has been much relied upon by the Defendants: "Various methods have been proposed and some have embodied this principle of intermittent flow caused by variation of pressure in the glass within the supply reservoir. In one of these old methods there is a

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"plunger within the body of the glass in the supply reservoir just above the
"orifice. By moving this plunger down the flow of glass through the orifice is
"accelerated and tends to fill up the central portion of the globule and prevent
"contraction or attenuation of the stream from the globule. When in using
"this method it is desired to contract the globule near the orifice in order to
"cut it off through its narrowest portion this plunger is raised or retracted
"from the orifice thus decreasing the pressure of the glass at the orifice and
"checking the flow." The Specification then enumerates four practical objec-
tions inherent in this method of operation which stated shortly are (1) in-
sufficient pressure which tends to expend itself in backing the glass into the
tank, (2) clogging in the orifice owing to checking and reversing the flow,
(3) non-incorporation into the mass of the cut off mark owing to insufficient
pressure, and (4) no provision for changing the flow to equalise any change
in the level in the tank or in the temperature or viscosity of the molten glass.
The Patentee then describes his invention, pointing out that by his method
the force of varying pressure is made to act upon the glass at or beyond the
orifice and that acceleration at this point acts so as to shape the gob after it
has passed through the orifice.

The next of these patents is a further Patent (No. 114,583) granted to
McCauley, the application for which was filed in October, 1917. In this inven-
tion the entrance to the outlet is raised above the level of the glass in the
fore-hearth and the glass is sucked up into a cylinder placed above the outlet
and then discharged through the outlet either by gravity or by air pressure.
This invention is only a modification of the invention described in *McCauley's*
earlier Patent No. 113,665.

The last of the Patents granted during this period is Patent No. 129,822
granted to *Forster* (an English glass manufacturer) the application for which
was made in July, 1918. This invention consists in operating a reciprocating
plunger (which is larger in circumference at its lower end than the outlet)
in the mass of glass in the fore-hearth immediately above the outlet. This
Patent calls for no special comment.

With the single exception of the first *McCauley* Patent No. 113,665, none of
the inventions described in the above-mentioned Patents granted after the
outbreak of the war were put into practical operation by English glass manu-
facturers. From Messrs. *Dowse and Meigh's* paper it would appear that the
writers consider that the reason why automatic gob-feeding machines did not
gain a footing in the United Kingdom was because of the lack of any adequately
trained glass engineers in this country, but it is not necessary to determine
whether this is the true explanation or whether there was any other operating
cause.

As regards *McCauley's* Patent No. 113,665, a machine constructed in accord-
ance with this Patent was installed in November, 1917, at the Queensborough
Glass Bottle Works, the owners of which works are stated to be the first glass
manufacturers in England to use an automatic gob-feeding machine. Sub-
sequently these manufacturers acquired several more of these machines and
operated them for a time at their works.

There is a conflict of evidence as to whether the *McCauley* Feeders were satis-
factory or not. The witness *Kite* (called on behalf of the Plaintiffs) said that
they were unsatisfactory, whilst the witness *Evans* (called on behalf of the
Defendants) stated the contrary. The learned trial Judge has not found which

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of these witnesses is to be believed and I do not intend to pursue the issue of fact thus raised, because in my opinion it is not material for the purpose of deciding the present case.

In addition to the *McCauley* Feeders installed at the Queensborough Glass Bottle Works there were two other types of automatic glass feeding machines in operation in the United Kingdom at the date of the Patent in suit, namely, *Owen* Feeders and *Paddle* Feeders. The former were machines which caused the mouth of each parison mould to be dipped into the mass of molten glass in the furnace and the mould to be filled with glass by suction and the latter were machines which caused a paddle moving in the mass of molten glass to sweep the required quantity of glass over a lip constructed in the rim of the fore-hearth and the resultant gob was allowed to drop into or was transferred to the mould. Neither of these machines was of the propulsion type and therefore need not be further considered.

From my review of the relevant prior publications it will be seen that the field of invention in the art of automatic gob-feeding had become considerably narrowed at the date of the application for the Patent in suit and particularly as regards the propulsion type of machines. It was public knowledge that a gob of predetermined weight and size could be extruded from the furnace through an outlet in the floor of the fore-hearth by means of an adjustable reciprocating plunger operating within the molten glass so as to accelerate the rate of discharge of the glass and further that the gob so extruded could be severed by adjustable cutting knives operating below the outlet.

Turning now to the invention the subject-matter of the Patent in suit, it is claimed by Counsel on behalf of the Plaintiffs that it consists of a new method of automatic gob-feeding whereby not only the weight and size of the gobs but also their shape is controlled. According to the invention this control is effected by operating a reciprocating plunger acting as a piston within the outlet so as to produce an acceleration in the flow of the molten glass in the outlet at the desired moment whilst the gob is being formed. It was clearly stated by Counsel for the Plaintiffs that the fundamental and controlling principle of the invention is the piston-like action of the plunger within the outlet. It is said on behalf of the Plaintiffs that (with the exception of *Howard* and *Tucker & Reeves*) all the prior inventors had confined their attention solely to obtaining gobs of predetermined weights and sizes and had given no consideration to obtaining gobs of predetermined shapes suitable for the differently shaped forming moulds required in the manufacture of the various kinds of glass-ware demanded by the public. It is said further that the ordinary gob (when its formation is not controlled according to the method described in the Specification of the Patent in suit) is pear-shaped, a shape which is not well adapted to fit into moulds used for manufacturing many of the articles required by the public, especially thin-necked bottles, whereas by adopting the Plaintiffs' invention at least five different shapes suitable for the manufacture of different kinds of glass-ware can be produced. It is admitted that *Howard* and, to a lesser degree, *Tucker & Reeves* appreciated the advantage of controlling shape as well as weight and size, but it is said that neither of these inventors hit upon a practical solution of the problem or, at all events, upon the solution described in the Specification of the Patent in suit.

In these circumstances the Plaintiffs claim that the invention as described by their Counsel, besides being novel and useful, was not obvious and required an exercise of the inventive faculty and that therefore it constituted proper

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subject-matter for Letters Patent. Before considering the questions of novelty, utility and subject-matter however it is, first of all, necessary to ascertain whether the invention asserted by Counsel to have been made has been properly described in and claimed by the Specification of the Patent in suit.

The canons governing the construction of specifications are well established 5 and there is no need to refer to the cases which have been cited to us upon this point. One of the cardinal rules is that a patentee must mark out the territory intended to be covered by his monopoly in clear and unambiguous language. I confess that it strikes me as strange that, if the Patentees in the present case had intended to confine their claim to an invention which Counsel 10 were able to describe to the Court in a few clear and simple words, it should have required eleven closely printed pages containing upwards of 1,300 lines to explain it and twenty-one separate Claims to claim it; and further that the Specification as originally framed should not have mentioned at all what is now said to be the essence of the invention, namely, that an impeller should act 15 as a piston within the outlet but that this operation of the impeller should only have been introduced into the Specification by amendment.

The construction of the amended Specification has been one of the principal matters discussed at the hearing of this appeal and much time has been taken up in an endeavour to ascertain the real nature of the invention thereby disclosed 20 and the true scope of the Claims thereby made. In the first place, the Specification states that the invention refers to the production of gathers and that its object is to "pre-form" the gathers without the use of extraneous supporting means so as to adapt them to be most advantageously used in glass shaping machines. It then states that it has long been recognised that folding 25 or lapping could be avoided if the gathers could be "pre-formed" to fit the moulds; and that it had theretofore been proposed to regulate the weight or size of the gathers by means of a reciprocating plunger or plug moving in the glass towards and away from a flow outlet and to intermit the flow while a charged mould is being moved away and replaced by an empty mould. It 30 then points out that these devices are incapable of controlling the shape of the gob during its formation. Pausing there, it is to be noted that, while the Patentee has acknowledged that a reciprocating plunger moving towards and away from the outlet (such as the plunger described in *Forster*) was a matter of public knowledge, he has ignored the fact that a reciprocating plunger moving 35 into and out of the outlet (such as the plungers described in *Wilzin* and *Bowman*) was equally a matter of public knowledge. The Specification then states that in accordance with the invention the gather is suspended under the outlet under the control of a movable impelling and regulating member, therein called an impeller, which projects into the glass from above; that the lower 40 end of the impeller projects into the outlet and is considerably smaller than the outlet leaving an annular space round the impeller, which space will be sealed by the glass and form a mobile and flexible packing and thus enable the impeller to operate within the outlet as a piston and thereby accelerate the flow of glass by downward movement and retard or reverse the flow by 45 upward movement; that the shape of the gather is controlled and varied by suitably varying the position and movement of the impeller, including the time of the movements; and that for some purpose the impeller is projected through and beyond the outlet, in which case it also aids in supporting the gathers. In passing, it is to be noticed that the latter statement indicates that the 50 Patentees did not intend to confine the invention to an impeller operating

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merely as a piston within the outlet, but contemplated that the impeller might penetrate through the outlet and operate beyond it.

So far the Specification has, I think, fairly plainly indicated that the impeller is intended to act mainly as a piston in the throat of the outlet reciprocating
5 within the limits of that throat, the length of which would ordinarily be governed by the thickness of the floor of the fore-hearth and the inner walls of which would form the cylinder in which the piston was to operate.

A minor point to be noticed here is that nothing is said as to the shape of the outlet which, as it was intended to serve as a cylinder, would presumably
10 be constructed in cylindrical form such as, for example, the outlet shown in Fig. 1 of *Bowman*. Admittedly an outlet so constructed would not achieve the object of the invention. The outlet in order to be effective must be cone-shaped as shown in Fig. 1 of the drawings accompanying the Patent in suit.

The Specification then states that the gather must be severed by shears or
15 other suitable severing means which are also variable as to position and movement including time of movement so as to complete the desired form of that gather and also in some cases to "pre-form" the lower end of the succeeding gather. The Specification then states that in accordance with the new method the discharge of glass through the outlet is controlled in such a manner that
20 the cross-sectional dimensions of any or each portion of the suspended gob can be varied by varying the rate of discharge of the glass while such portion is being formed. The Specification (after enumerating several features of the invention which call for no special comment) further states that the invention also contemplates severing a mould charge from each suspended gather while
25 the downward movement of the glass is being retarded or reversed for the purpose of "pre-forming" the lower end of the succeeding gather. The Specification then states that in the apparatus according to the invention periodic impulses are produced within the glass being discharged by automatically operated means; furthermore, that a movable support co-acts with the discharge
30 outlet to suspend successive accumulations of the glass beneath the outlet; and that in the embodiment of the invention to be thereafter described both actions are performed by an impeller which is mounted for automatic movements "into and out of" the outlet without coming into contact therewith. These last mentioned statements do not seem to fit in with the Plaintiffs' contention
35 that the invention is confined to the piston-like action of an impeller operating entirely within the outlet, especially when read in conjunction with the statement towards the end of the Specification that the embodiment therein described is only one of many possible embodiments of the invention and that it should be understood that the various features of the invention may be modified both
40 in structure, combination and arrangement to adapt the invention to different uses or different conditions of service.

Before coming to that part of the Specification which deals with the apparatus the reader has been led to expect that the invention consisted in shaping the
45 gathers by means of a reciprocating plunger operating as a piston within the outlet, but now he is told that in the apparatus according to the invention the periodic impulses within the glass may be produced apparently by any automatically operated means: further that in the preferred embodiment of the invention the impulses are to be produced by an impeller automatically moving "into and out of" the outlet, and consequently it would seem that the Patentee
50 prefers an apparatus in which the desired impulses are produced by the movements of an impeller moving out of as well as into the outlet and therefore not

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reciprocating solely within the outlet. The statements which I am now commenting upon stand unamended as originally drawn and it would seem as if the inventor, when amending his Specification by inserting on page 2 the statement that the impeller was to operate within the outlet as a piston, had either omitted to notice that the statements on page 3 required amendment or had deliberately left them unamended so as to be able, if the occasion should arise, to contend that the invention was not limited to the piston-like action of an impeller operating entirely within the outlet. In this connection it is also to be noted that in the drawings illustrating the apparatus (which were left unamended) the impeller is shown above and clear of the outlet, which hardly seems consistent with the idea that the essence of the invention was that the impeller should operate entirely within the outlet. 5 10

The Specification then goes on to describe in great detail the apparatus which, as I have already mentioned, is only to be taken as one of many possible forms embodying the invention. I do not propose to go through the description of this apparatus but on page 6* there is a statement which I think has a bearing on the construction of Claims 1 and 16. It is there stated that the impeller may be held inactive at lower positions projecting into the glass at the outlet or even through the outlet and that by thus holding the impeller the gravity outflow of the glass can be timed and shaped for various forms of gathers by operating the severing means only. Thus the inventor contemplates that his apparatus may be used with a stationary impeller acting as a throttle in the outlet and that various shapes may be obtained by allowing the glass to flow by gravitation through the outlet and by operating the shears only. The statement that the impeller may be held inactive at lower positions projecting into the glass at the outlet obviously leads to the inference that the higher positions of the impeller when operating and not held inactive will be above the glass in the outlet which is in accordance with the description of an impeller automatically moving into and out of the outlet contained in the earlier part of the Specification. 15 20 25

I now come to the crucial question of the construction of the Claims. 30

As to Claim 1: From the simple and clear statement made to the Court by both Sir *Arthur Colefax* and Mr. *Moritz* describing what they asserted to be the method which constituted the pith and marrow of the invention I confess that I should have expected to find an equally simple and clear description of that method in the first (and presumably the most important) Claim made by the Patentees. But, instead of that, the first Claim is framed in a most unusual and confusing way. The preamble which governs the whole of this Claim consists of a description of the general nature of the method with which the Claim is concerned, namely, a method of feeding molten glass wherein the gathers are suspended beneath an outlet, and mould charges are separated therefrom while suspended, whilst the shape of the gathers is controlled, in other words, it describes a method of gob-feeding wherein the gobs are severed in suspension and their shapes are controlled. Then follow four alternative ways in which this control of shape is to be effected, namely: (1) by variation of the movement of a movable controlling member adapted to act as a piston in the outlet, or (2) by the means for separating the mould charges, or (3) by variation of the location of the controlling member relatively to the outlet or (4) by variation of the location of the separating means relatively to the outlet. I can hardly conceive a 35 40 45 50

* *Ante*, page 500, line 36.

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more illdrawn or puzzling claim if it was meant to express the essence of the invention as described by the Plaintiffs' Counsel. As framed it is a single claim embodying four different methods and, whatever its ambit may be, I think it is clear that it is not limited to a method of shaping gathers by means of a plunger acting as a piston in the outlet. As originally framed and when read with the earlier part of the Specification before it was amended, this Claim was no doubt intended to be a wide claim embracing each of the four alternative methods therein mentioned. As in view of the state of public knowledge at the date of the Patent in suit and especially in view of *Bowman's* Specification a claim for controlling the shapes of gathers merely by the means for separating them was clearly bad, it follows that the whole Claim is bad unless it bears the construction contended for by Counsel for the Plaintiffs'. The words added to this Claim by way of amendment, although said to have been intended to narrow the whole Claim, seem to me to have had no such effect, but at most to have narrowed the second alternative method of the Claim. Counsel for the Plaintiffs however strenuously contended that Claim 1 when read with reference to the passages inserted by way of amendment on pages 1 and 2 of the Specification ought to be construed as if in the preamble there had been inserted after the word "outlet" in line 108, on page 11,* the words "in which there is a movable member acting as a piston within the outlet" and after the word "controlled" in line 111, the words "by one or other or all of the following means," and as if in line 112† the definite article had been substituted for the indefinite article. In other words, Counsel have invited the Court to treat the Claim as entirely redrafted so as to make it conform to what they now contend is the essence of the invention. This the Court is not at liberty to do; the Claim must be construed as it stands. The inventor was an engineer who had already obtained no less than five patents in connection with automatic glass-feeding devices in this country; it may therefore be taken that he was skilled in the art and knew what he was about when stating his claim to a monopoly. Bearing in mind that on page 6‡ of the Specification it is pointed out that the impeller may be held inactive and that the gravity outflow of the glass can be timed and shaped for various forms of gathers by operating the severing means only, and further bearing in mind that Claim 16 is a claim for an apparatus wherein the movable controlling member may be held inactive by a latch and the connecting rod to which the movable member is attached is adjustable in length to permit of the regulation of the action of the latched controlling member on the gravity outflow of the glass, I am unable to accede to the argument that when in Claim 1 the inventor claims a method of shaping a gather in suspension either by an impeller adapted to act as a piston in the outlet or by the means for separating the mould charges, he did not mean what he said. For the same reasons I think that the contention that Claim 1 and all the other Claims ought to be construed as dominated by and impliedly incorporating the alleged fundamental principle of a reciprocating impeller acting as a piston within the outlet is ill-founded. In this connection it is significant to observe, first, the actual place where the amendment was introduced into Claim 1; secondly, the use of the indefinite article; and, thirdly, the expression "adapted to act" instead of the

* *Ante*, page 502, line 45.

† *Ante*, page 502, line 46.

‡ *Ante*, page 502, line 47.

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word "acting." The irresistible inference is that, when making the amendment, the inventor had not intended to give up his alternative claim for a method of shaping the gathers by operating the severing means only. Moreover, when in the third alternative method claimed in Claim 1 the shape of the gather is to be controlled by varying the location of the movable member (which, as previously described, is a member only "adapted to act" and not a member "acting" as a piston in the outlet) it would seem as if the Patentees contemplated that the movable member might be shifted so as to act wholly or partially outside the outlet. It is not disputed by the Plaintiff's Counsel that, unless this Claim can be construed as limited throughout to what in this action has been called the piston principle, its validity cannot be upheld. As I am clearly of opinion that this Claim, according to the plain meaning of the language employed to express it, is not so limited it follows that it is invalid. I therefore pass on to the next Claim.

Claim 2 is a broad claim to a method of so controlling the shape of the gather that the cross-sectional dimensions of any portion of a suspended gather can be varied by operating a movable member so as to vary the rate of discharge of the glass while such portion is being formed. The public is not told what kind of movable member is contemplated nor where or how it is to be operated so as to produce the variation of the rate of discharge. The Claim apparently covers every sort of movable member wherever operated whether in the outlet or above or below it and whether in the mass of molten glass in the furnace or outside it. As already stated it was public knowledge at the date of the Patent in suit that a reciprocating plug or plunger operating in the glass at the outlet would by its downward stroke accelerate the rate of discharge of the glass and it was realised by *Howard* that this acceleration would to some extent control the shape and vary the cross-sectional dimensions of a portion of the suspended gather. In fact, the method claimed in this Claim is wider than (although it embraces) the method which *Howard* described as being an old method having certain inherent defects. As framed this Claim, in my opinion, is far too wide and vague; it covers most, if not all, the reciprocating plunger type of machines described in the prior documents and possibly some of the other types as well and is invalid on the ground of want of novelty and ambiguity. The only ground upon which the Plaintiffs sought to uphold this Claim, as I understood the argument addressed to us, was that, if this Claim be read in light of the amended Specification, the expression "a movable member" therein contained ought to be construed as meaning "an impeller acting as a piston within the outlet", and consequently that this Claim is a narrow claim limited to the so-called piston principle. In my opinion it is impossible to place any such limited construction on this Claim; when the Specification was amended the words "adapted to act" as a piston in the outlet" and "acting as a piston in the outlet" were added to Claims 1 and 9 respectively but were not added to Claim 2, leading to the inference that "the movable member" referred to in the latter Claim was not intended to be confined to an impeller acting as a piston in the outlet but was intended to include any movable member which might operate to vary the rate of discharge of the glass while the gather was being formed and thereby vary the cross-sectional dimensions of the gather. If this view be right it was not seriously disputed that this Claim could not be upheld.

The observations I have made and the opinion I have expressed with regard to Claim 2 apply with equal force to Claim 3 and its dependent Claims 4 to 7, none of which are, in my judgment, confined to a method wherein an impeller

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operating as a piston in the outlet is employed, although Claim 4 is confined to a movable member moving within the mass of glass being discharged and would therefore not cover a movable member operating outside the furnace such as, for instance, the diaphragm in *Hitchcock's* Patent and the suction pump in
5 *McCauley*. Unless these Claims are construed as being confined to the so-called piston principle, it was not seriously suggested that they are valid.

Claim 8 depends for its validity entirely upon the validity of Claim 1. If Claim 1 be invalid (as I think it is) it is not suggested that Claim 8 can stand. I need therefore say no more about it than that it shows that, although in
10 accordance with the first method in Claim 1 the impeller had to be adapted to act as a piston within the outlet, yet it was contemplated that the impeller should also be adapted to project beyond and act outside the outlet.

Claim 9 is the last of the method Claims and is the only one which can plausibly be said to be limited to a method of shaping a gob by means of an
15 impeller acting as a piston within the outlet. This Claim, however, does not claim a method of shaping a gob by the extrusion impulses produced by such an impeller; it merely claims a method of "pre-shaping" the accumulated gather after the glass has flowed down and around the end of an impeller acting as a piston in the outlet by raising and reversing the flow of glass. This raising
20 and reversing of the flow can only be brought about by the upward stroke of the impeller, but the Specification does not explain how this upward stroke can control the shape of the suspended gob except possibly in so far as it might operate to intermit or check the flow of glass and thus enable the cutting knives to operate more efficiently. Possibly the word "accumulated" in the last line
25 of this Claim was inserted by mistake for the word "succeeding" and this Claim was intended as a claim to "pre-shape" the bottom of the next gob to be extruded; but this is merely guess work. Moreover it was a matter of public knowledge that the upward movement of a reciprocating plug or plunger when operating in such a viscous substance as molten glass would check and might
30 even reverse the flow of the glass in the outlet, and *Howard* in his Specification points out that one of the practical objections to a reciprocating plunger is that "checking the rate of flow and in some cases reversing it in the orifice tends "to cause clogging". In my judgment it would not call for an exercise of the inventive faculty to discover that the upward stroke of an impeller acting as a
35 piston in the outlet would have much the same effect in this respect as a reciprocating plug or plunger which enters the outlet on its downward stroke. This Claim, in my opinion, is invalid on the ground of vagueness and want of novelty and subject-matter.

I now come to the apparatus claims. Claim 10 is a general claim for an
40 apparatus for carrying out the method according to Claims 1 to 3 in which the movable controlling member is mounted for automatic movement into and out of the outlet without coming into contact therewith. As, in my opinion, Claims 1 to 3 are invalid for the reasons which I have stated, it follows that this apparatus claim is invalid for the same reasons unless it is saved by the limita-
45 tion as to the manner in which the movable member is to be mounted. In my judgment it is not saved by this limitation. The Claim is a wide claim for every kind of apparatus capable of carrying out any of the methods claimed in Claims 1 to 3 however designed and constructed, provided only it has a movable controlling member mounted so that it will move into and out of the outlet. This
50 Claim (which was left unamended) is not for an impeller mounted so as to act

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as a piston entirely within the outlet; on the contrary it clearly contemplates that the movable member will move out of the outlet and, as already pointed out, Fig. 1 shows the plunger well above the outlet. It was suggested that Fig. 1 was intended to show the impeller when held inactive by a latch, but the drawing does not bear this out as apparently it shows the latch open. Moreover according to the description on page 10 of the Specification, the impeller is to be latched with its end projecting into or through the outlet and not above it. In my judgment this Claim is altogether too wide; it would cover most of the plunger type of machines described in the prior publications.

It is admitted that Claims 11 to 19 which are dependent upon Claim 10 stand or fall with the latter Claim as they only add certain well known mechanical devices to the apparatus claimed in Claim 10 but do not otherwise operate to restrict the generality of that Claim. I have already referred to Claim 16 as having a bearing on the construction of Claim 1, but otherwise this Claim calls for no special comment except as showing how widely the inventor was casting his net.

Claim 20 is a claim for the machine as described in the drawings. This Claim has not been seriously discussed as it was not suggested that it had been infringed. I therefore refrain from expressing any opinion as to its validity. It is admitted on all hands that the design of the Plaintiffs' machine as described in the Specification is admirable and that, when equipped with certain further improvements (the subject matter of a later Patent), it is well adapted to carry out the principle of shaping gobs by means of an impeller acting as a piston within the outlet.

Claim 21 is admittedly bad, as at the most it is a claim for using a known device for a new purpose.

This concludes my examination of the Specification, and the general impression left on my mind, after having carefully studied it and having read the relevant evidence and considered the arguments addressed to us upon it, is that *Peiler* anticipating that his machine would achieve commercial success, realised that his claim to a monopoly as framed in his original Specification might be held to be too wide and therefore thought it advisable to introduce some amendments tending to limit that claim, but at the same time was unwilling to abandon altogether the hope of being able to establish the validity of the wide claim which he had originally made. In fact he has done what Lord *Loreburn* said in the *Ingersoll Case* (1908) 25 R.P.C. at page 83) is wholly inadmissible, that is, he has used general language in the Claims and now seeks to restrict or qualify what is therein expressed by borrowing a gloss from other parts of the Specification. Glaring instances of the width of the Claims made by *Peiler* are to be found in Claim 21 and in the alternative method of shaping gobs by the action of the severing means in Claim 1 followed by Claim 16 for an apparatus in which a movable member may be held inactive and allow the glass to flow out of the furnace by gravity. The Plaintiffs have not sought to justify any of these Claims.

If *Peiler* had intended that the invention should be what Counsel for the Plaintiffs now allege it to be, nothing would have been easier than to express it in plain language. Instead of doing so *Peiler* has employed roundabout language which has led to much argument and taken up much time. The alleged invention was not difficult to explain and Counsel has had no difficulty in describing it in clear and terse language. In these circumstances the following passage from Lord *Loreburn's* judgment in the *Natural Colour Kinematograph* case

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- (1915) 32 R.P.C. at page 266) is peculiarly apposite; "It is the duty of a patentee to state clearly and distinctly, either in direct words or by clear and distinct reference, the nature and limits of what he claims. If he uses language which, when fairly read, is avoidably obscure or ambiguous, the patent is invalid, whether the defect be due to design, or to carelessness or to want of skill. Where the invention is difficult to explain, due allowance will, of course, be made for any resulting difficulty in the language. But nothing can excuse the use of ambiguous language when simple language can easily be employed, and the only safe way is for the patentee to do his best to be clear and intelligible. It is necessary to emphasise this warning. To my mind, this is a very plain case of offence against the rule to which I have referred. I cannot see what purpose there could have been for using the roundabout language here employed, which has provoked so much argumentative subtlety and taken up so much time, unless the object was to hold in reserve a variety of construction for use if the patent should be called in question, and in the meantime to frighten off those who might be disposed to challenge the patent".

- Having come to the conclusion, for the reasons stated, that all the Claims alleged to have been infringed are invalid, it is unnecessary to pursue the enquiry whether the Defendants have been guilty of infringement. Nor is it necessary to enquire whether, if the Claims had been limited to the invention described by Counsel for the Plaintiffs, such Claims would have been valid or would have been bad on the ground of anticipation or for want of subject-matter, novelty or utility.

- I would only add that had the Patentees been content to confine their Claims to the method and apparatus for shaping gobs by means of a reciprocating plunger operating entirely within a suitable shaped outlet as a piston, I think there would have been a good deal to say in favour of the validity of such Claims. Although many of the prior Specifications appear to have approached more or less closely to the solution of the problem upon which Peiler was engaged, yet in no one of them is there a clear and unmistakable direction to use a plunger as a piston within the limits of a suitably shaped outlet for the purpose of producing gobs of predetermined shapes.

- On this branch of the law the following propositions may be treated as well established, namely: That where prior specifications have been deposited in the Patent Office Library and have thus been accessible to the public, their contents have become part of public knowledge, but where there is nothing to show that their contents were part of common knowledge or that there has ever been any user of the inventions therein described either in this country or elsewhere, any anticipation by these specifications is a mere paper anticipation within the meaning of the cases and must satisfy a very severe test if it is to prevail (see per Lord Justice Sargant in *Metropolitan Vickers Co. Ltd. v. British Thomson Houston Co. Ltd.* (1925), 43 R.P.C. at page 93); that the later invention must be described in the earlier publication that is held to anticipate it; it is not sufficient that, if a machine had been made according to such description, it would have produced a result not to be gathered from the description which would have disclosed such invention (*Otto v. Linford*, 46 Law Times, page 35); and that where the question is solely a question of prior publication it is not enough to prove that an apparatus described in an earlier specification could have been used to produce this or that result; it must be shown that the specification contains clear and unmistakable directions so to use it (per Lord

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Parker in Flour Oxidising Co. Ltd. v. Carr & Co. Ltd., (1908) 25 R.P.C., at page 457). I think that the Plaintiffs might with much force have invoked these propositions in favour of the validity of a claim confined to the so-called piston principle on the ground that the discovery of this principle was a definite and not obvious step forward in the art of automatic gob-feeding and was both novel and useful. 5

Too much weight, however, ought not in the circumstances to be attributed to the commercial success achieved by the Plaintiffs' machine. Such success was no doubt largely due to the fact that it was the first really good automatic gob-feeding machine introduced into England. Before its introduction the only machines in use in this country, as already mentioned, were *Owens* suction machines and the few *McCauley* machines at the Queensborough Works. Although the *Owens* machines were a success, there is no doubt that the Plaintiffs' machine (especially as perfected by substituting a sleeve or tube for the gate and by lengthening the outlet passage so as to give more scope for the variation of the extrusion impulses of the impeller) was far superior to the *McCauley* machine and made a strong appeal to glass manufacturers. Both this Court and the Court below have had the advantage of watching a cinematograph exhibition of the working of the Plaintiffs' and Defendants' machine and from such exhibition it is plain that the Plaintiffs' machine accomplishes all that the Plaintiffs have claimed for it. Further I think that the evidence establishes that the Defendants have adopted the piston principle in their machine and would therefore have infringed the Patent in suit if it had been confined to that principle and its validity had been upheld. The utility of being able to produce gobs of a predetermined shape and weight is not seriously disputed. It is admitted that the sausage shape is useful, but it is said that the utility of the other shapes which can be produced by the Plaintiffs' machine is much exaggerated. The evidence has satisfied me that, had the Claims been confined as already mentioned, they would not have been bad for want of utility. 10
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Having arrived at the conclusion as before stated that all the Claims (with the possible exception of Claim 20) are bad, I am clearly of opinion that the learned Judge was right in making an order for revocation of the Patent on the Counterclaim.

In the result the appeal fails and will be dismissed with costs. 35

Romer L.J.—The hearing of this case occupied some six weeks before Mr. Justice *Luxmoore*, and the greater part of nineteen days in the Court of Appeal. A considerable part of this expenditure of judicial time has been caused by the obscurity of the language that the Patentee has thought fit to employ in the Specification of the Patent in suit. It has been said more than once that the same canons of construction should be applied to a specification as are applied to any other document that comes before the Court for consideration. I wish that it were more generally borne in mind by those responsible for specifications that the same remark applies to the canons of good drafting. It is the duty of a Patentee to describe his invention in unambiguous language and to define with precision the limits of the monopoly that he claims. In the present case he has failed to do either the one or the other. The material parts of the Specification have been read and re-read to us, and since the hearing I have again considered them with care. But, even now, I cannot feel confident that I know what is the invention 40
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he really intended to describe, and what are the limits within which he really intended to confine his monopoly.

- Let me now consider the Specification in detail. On page 1, lines 15 to 21*, the Patentee, as I understand him, tells us that his invention relates to that particular branch of glass feeding that is known as gob-feeding, though, even at this early stage, the words "more particularly" in line 17 are calculated to create a doubt whether he intends to exclude stream feeding from the ambit of his invention. The words that follow, however, and that contain the earliest statement of what is the object of his invention, state that that object is to pre-form the gathers. This for the time being removes the doubt, or rather would remove the doubt if I did not remember the passage that is coming on page 4, lines 4 to 6†. To return, however, to the statement of the object of the invention, it appears that the gathers are to be pre-formed without the use of extraneous supporting means. The Patentee does not explain what extraneous supporting means are, but they must be something different from the supporting means referred to on page 2, lines 103 to 108†, which are there said to constitute another feature of the invention. The object is, however, further stated to be the pre-formation of the gathers in such manner as to adapt them to be used most advantageously in glass-making machines, and according to the next few lines of the Specification this means that they ought to be of such a shape as to fit the interior contour of the mould walls before they are delivered to the moulds. None of the gobs that I have seen illustrated would ever exactly fit the interior of any mould to which my attention has been called, and in many cases could not get into the mould if they did. But it is, I suppose, desirable that the shape of the gob and the interior contour of the mould should bear some sort of relation to one another, and to this, no doubt, the Patentee is referring. The Patentee then goes on to refer to the state of public general knowledge existing at the date of his Specification, and does so in terms that seem to draw a distinction between the shape and the weight of a gob that, to me at any rate, is incomprehensible. It is not only the cross-section (by which, presumably, he means any particular cross-section) of the gob that necessarily bears a definite relation to the cross-section of the outlet. The weight of the gob must necessarily do so also. Again, it is not only the weight of the gob that must necessarily bear a definite relation to the rate of discharge of the glass. The shape of the gob must necessarily do so also. The Patentee is indeed at pains to point out later on that the shape can be controlled by varying the rate of discharge. The fact that it can lies at the root of his alleged invention. I doubt, therefore, whether in the passage to which I have just referred the Patentee really intended to draw any distinction between weight and shape. But, however this may be, he goes on to refer to the proposals that had theretofore been made to regulate the weight or size of the gathers, and, grammatically at any rate, he divides these proposals into two categories. In one category he places proposals to effect the end in question by a reciprocating plunger or plug moving in the glass toward and away from a flow outlet. In the other are proposals to intermit the flow while a charged mould is being removed and replaced by an empty mould. He does not in terms refer to any proposals to regulate the size or weight by means of changing

* *Ante* page 496, line 25.

† This passage spoke of glass issuing as a stream.

‡ *Ante*, page 498, line 14.

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the diameter of the outlet as one would have expected after his statement as to the public general knowledge, though this is not of much importance. What does seem to me to be important is the fact that the proposals he refers to in the first category would seem to be proposals to accelerate and possibly retard the rate of discharge, while those in the second would seem to relate to the period of discharge of a gravity outflow, though he does not indicate by what means the outflow was to be intermitted. For the plunger or plug is only referred to in relation to the first category. Now it is perfectly obvious that a plunger moving in the glass toward the outlet must necessarily accelerate the rate of discharge of the glass to some extent. When the head of the plunger is some little way from the outlet, this acceleration will no doubt be almost negligible. But as the head moves nearer to the outlet the acceleration will increase. The amount of this acceleration and the time at which it takes effect will, of course, depend upon the way in which the plunger is operated. It seems to me that the Patentee must have been intending to refer to proposals to bring about acceleration of discharge in this way; otherwise I cannot understand why he refers in addition to proposals to intermit the flow. The Patentee then goes on to refer to "these known devices." Whether by these words he intended to refer to known machines is doubtful. Probably he is still referring to the "proposals." If so, I do not know what justification he had for saying that they were incapable of controlling and varying at will the shape or contour of each individual gather during its discharge. The way in which he has previously referred to the proposals suggests to me that they were not. It may well be, however, that the proposed control was by no means perfect and that, as he states in lines 56 to 58, the proposals would not give the "desired" cross-sectional dimensions to any "selected" portion of the gather. This is perhaps what he means when he says on line 66, page 1, that predetermined variations in the shape of the gathers had theretofore been confined within very narrow limits owing to the fact that no means were available for varying the contour of the gather during its entire formation. Having thus introduced his readers to the prior general knowledge and the prior proposals, the Patentee at line 7, page 2, begins to describe his invention, and in the unamended Specification did so, down to line 42, in terms that in no way distinguished it from the earlier proposals contained in the first category which I have mentioned. In line 44, however, he referred to his impeller as being in axial alignment with, but out of contact with, the outlet, and in line 46 stated that for some purposes its end was to be projected through and beyond the outlet. This, no doubt, would suggest that the end of the impeller was to be smaller than the outlet, and apparently it was to develop this point that the important amendment contained in lines 15 to 36 on the second page* was introduced. The Patentee then states that by varying the position and movements of the impeller the shape of the gathers is controlled both generally and locally, and says that by means of a variation in the position and movement of the severing means the desired shape of the gather will be completed. All these variations are to be effected, he says, while "the machine" is in operation. "The machine" may mean, no doubt, the particular machine in which what on line 84 he calls his new method is being made use of. In other words, he may be intending merely to describe a method and not a machine, as was suggested on behalf of the Defendants. But his reference to "this machine"

* Ante, page 497, line 16.

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in line 74 and the commercial operation of the machine in line 79 make it in my view impossible to arrive at this conclusion. If, then, he has so far been describing an improved apparatus for feeding molten glass, he has yet to deal with his invention so far as it consists of an improvement in the method of

5 feeding molten glass as distinct from apparatus, and this he apparently proceeds to do in the passage contained between line 80 on page 2 and line 26 on page 3*. Now in this passage the new method is described in much more general terms than was the apparatus. It seems to embrace (1) the controlling by any means of the discharge of glass through the outlet in such a manner that the

10 cross-sectional dimensions of any or each portion of the suspended gather can be varied by varying the rate of discharge of the glass while such portion is being formed (lines 84 to 90); (2) the producing by any means of an impulse or a succession of impulses within the glass as it is being discharged, and the controlling by means of the formation of any portion of a gather by varying

15 such impulses or succession of impulses (lines 96 to 102), an impeller being apparently referred to merely as a convenient means for producing such impulses and for co-acting with the outlet in supporting the gathers (lines 118 to 127); and (3) the variation of the factors affecting the character of the impulses as to extent, strength, duration and time of occurrence both singly and con-

20 currently, and either with or without interruption of the operation of the apparatus, the Patentee merely stating that the variation without such interruption is preferable. In the case of the new apparatus it had been stipulated that the variations should be effected while the machine continued in full operation. The new method also contemplates a combined action of the sever-

25 ing means and a retracting impeller. The use of this word "contemplates" seems to suggest that the combined action is merely optional, though perhaps preferable. It is further to be observed that it does not necessarily include a power of varying the position of the severing means as well as their movement, as had been stipulated in the case of the new apparatus. On page 2, lines 27 to

30 61†, the Patentee, as I understand him, returns once more to this apparatus, and at line 62 he begins to describe a particular embodiment of his invention. The description continues from this point to line 90 on page 11. It is unnecessary to go through it at length inasmuch as the Patentee expressly states on page 11 that the organised machine so shown and described as a preferred embodiment

35 of his invention is only one of many possible embodiments, and that it should be understood that the various features of the invention may be modified both in structure, combination and arrangement to adapt the invention to different uses or different conditions of service. It is sufficient to say that in spite of certain minor criticisms on the part of the Defendants there is nothing to

40 lead me to suppose that the machine so described is not a novel and useful machine capable of producing the results claimed for it by the Patentee. It is, however, to be noticed that the machine contains means for holding the impeller inactive either in the outlet or actually through the outlet. When the impeller is so held the glass will, of course, pass through the outlet under the

45 force of gravity alone, the quantity of such flow being determined by the particular position in which the impeller may be fixed. The Patentee states in effect on page 6, lines 122 to 127‡, that in such case the duration of the outflow

* *Ante*, page 498, lines 1 to 44.

† *Ante*, page 498, line 45.

‡ *Ante*, page 503, line 48.

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and the shape of the gathers can be controlled by operating the severing means only. He does not disclaim any inventive step in this method of glass-feeding, and seems to treat it as forming part of his invention.

I must now pass to the Claims, of which the Plaintiffs allege that Nos. 1 to 5 inclusive and Nos. 9 and 10 have been infringed. There was considerable discussion before us as to the proper construction to be placed upon Claim 1, and yet, looking at the Claim by itself, the matter seems plain enough. Here, at any rate, the Patentee has used reasonably clear language. The only criticism to be made upon it is that, inasmuch as it is a method and not an apparatus claim, the words "adapted to act as a piston in the outlet" do not demand that the movable controlling member should so act. But reading those words, as I am prepared to do, as meaning "acting as a piston in the outlet", the Claim seems clearly to cover each of the four following methods of controlling the shape of the gobs: (1) By variation of the movement of the controlling member, (2) by the severing means, (3) by variation of the location of the controlling member relatively to the outlet, (4) by variation of the location of the separating means relatively to the outlet. This construction of the Claim is, however, strenuously opposed by the Plaintiffs. I am not sure even now that I appreciate exactly the one for which they contend, but, so far as I can gather, it is as follows: "Method of feeding molten glass wherein successive masses or gathers are suspended beneath an outlet in which a movable controlling member acts as a piston and wherein the shape of the masses or gathers is controlled by variation of the movement of the controlling member either with or without variation of its location relatively to the outlet and by the means for separating the mould charges either with or without variation of the location of such separating means relatively to the outlet". What justification there can be for altering the language of the Claim in this or in some similar manner I am at a loss to conceive. One may, and one ought to, refer to the body of the Specification for the purpose of ascertaining the meaning of words and phrases used in the Claims or for the purpose of resolving difficulties of construction occasioned by the Claims when read by themselves. But where the construction of a Claim when read by itself is plain, it is not in my opinion legitimate to diminish the ambit of the monopoly claimed merely because in the body of the Specification the Patentee has described his invention in more restricted terms than in the Claim itself. The difference may well have been intentional, and created with the object—to use the words of Lord Loreburn in the *Natural Colour Kinematograph case*—of holding in reserve a variety of constructions for use if the patent should be called in question, and in the meantime to frighten off those who might be disposed to challenge the patent.

It is said on behalf of the Plaintiffs that the Patentee cannot be supposed to have claimed a monopoly of controlling the shape of a gob solely by the means for separating the mould charges. But, as I have already pointed out, the Patentee on page 6 seems to have regarded such control as a novel feature of his described machine, and though in that machine an impeller adapted to act as a piston in the outlet forms an essential feature, nevertheless in relation to a method claim an impeller held inactive may be regarded as non-existent. It can do no more than would be effected by a change in the size of the outlet. Besides, such an argument seems hardly applicable in the case of the author of Claim 21. A man who could make that Claim is capable of claiming anything.

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I can now pass to Claim 2. Its language is confused and vague, but it clearly covers every method of feeding molten glass through an outlet in which the diameter of any particular cross-section of a gob can be controlled during the formation of the gob by varying the rate of discharge of the
 5 glass by operating a movable member. This again is denied by the Plaintiffs, who seek to read into the Claim a condition that the movable member should be an impeller working as a piston in the outlet. This, in my opinion, is inadmissible, for the reasons I have already given when considering Claim 1. In this case, however, there are additional reasons for not departing from
 10 the language of the Claim itself. In the first place, the Patentee, when amending the Specification, added the words "adapted to act as a piston in the outlet" to Claims 1 and 9 and refrained from adding such words to Claim 2. In the next place, as I have already pointed out, the Patentee, when describing his new method as distinct from his new machine on page 2 of the
 15 Specification, only refers to an impeller as a "convenient" means for producing impulses within the glass being discharged, and treats his new method as covering all means of varying the rate of discharge.

Claim 3 differs little in substance from Claim 2. The extrusion or intrusion impulses within the glass as it is being discharged will, of course, affect the
 20 rate of discharge. If and so far as it is possible to vary that rate by operating a movable member without creating impulses within the glass as it is being discharged, the method of doing so would come within Claim 2 and not Claim 3. Otherwise the two methods seem indistinguishable. For in order to create impulses within the glass, the movable member need not act as a piston in
 25 the outlet. It need not even move within the glass. Pressure applied intermittently to the surface of the glass must obviously create impulses as it is being discharged from the outlet, differing only in degree from the impulses produced by a member moving within the glass. This fact, indeed, is recognised by the Patentee himself, who, in Claim 4, specifies a method accord-
 30 ing to Claim 3 wherein the impulses are produced by such a member. But here, again, the impeller need not be acting as a piston within the outlet in order to produce the impulses. Such impulses obviously do not occur merely at the end of the impeller. The end of the impeller causes them, but they will be felt from that point down to the point of actual discharge. It is
 35 again merely a question of degree, and the Patentee has apparently thought fit to claim impulses of every degree. To get the full control of shapes obtained by the Plaintiffs' machine as used commercially, I do not doubt that the impulses must be produced by an impeller acting as a piston in the outlet. But any variation in the rate of discharge of the glass must affect the shape
 40 of the gob. If Claim 4 be valid, I cannot see how a man who, even to a small degree, varied the shape of his gobs by means of a member moving in the glass up to and away from the entrance to the outlet, but without actually moving into it, could escape a charge of infringing the Claim.

As to Claim 5, I find some difficulty in ascertaining in what substantial
 45 respect it is intended to differ from Claim 4. If the extrusion and intrusion impulses periodically produced within the glass are to be varied by the movement of a member within the glass so as to control the rate of discharge of the glass at the time of the formation of any particular portion of the gob, I do not know how it could be done otherwise than as indicated in Claim 5,
 50 that is, by varying the strength, the duration, or the time of occurrence of

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the acceleration and retardation. How the "extent" of an acceleration or retardation can be varied without varying its strength or duration is not a thing that I readily understand. But those engaged in the art may be more fortunate, and perhaps the addition of this word serves to distinguish Claim 5 from Claim 4.

Claim 8 is only important because of the light it is alleged to throw on Claim 1. It is said on behalf of the Plaintiffs that it indicates that only one method is comprised in Claim 1, and that a movable member acting within the glass is a necessary feature of that method. But the words "The method according to Claim 1" are capable of being read as meaning that particular one of the methods according to Claim 1 in which a movable member is used, and, in view of what appears to me to be the plain language of that Claim, this is the meaning that in my opinion should be attached to the words in question.

I may now turn to Claim 9. This, again, is a method claim, and is not an easy one to construe. It begins as follows: "Method of feeding molten glass through an outlet which consists in flowing the glass down and around the end of an impeller acting as a piston in the outlet, accumulating a desired gather of the glass below the outlet." Pausing there, the method would not seem to differ from the first method mentioned in Claim 1, the "desired" gather being presumably a gather of the desired shape. It must, therefore, be to the concluding words of the Claim that one has to look for the purpose of differentiating it from the earlier one. Those words are "and raising and reversing the flow of glass by movements of the impeller to pre-shape the accumulated gather." I feel great doubt as to the meaning of these words. If a "desired" gather has already been accumulated before the flow of glass is reversed, I cannot understand how this reversal can "pre-shape" it. Were it not for the fact that in the fifth line of the Claim the word "mass" has been altered by amendment to the word "gather" and that in the last line the word "accumulated" has been inserted by amendment before the word "gather," it might have been thought that the Patentee had by mistake omitted the word "succeeding" where he has now inserted the word "accumulated"; in other words, that he was intending to make this Claim cover the method that he had said on page 3, lines 6 to 18, was "contemplated" by his invention, with the added stipulation that the impeller must act as a piston in the outlet. Such a construction is not, however, admissible since these amendments. The accumulated gather must be the desired gather already referred to, and cannot mean the succeeding gather. I really do not know what the Claim means, and there for the moment I must leave it.

I can now turn to Claim 10, which is the first of the apparatus claims. It is not very easy to understand, but one thing about it is quite clear. It does not cover every "apparatus for carrying out the method according to Claims 1 to 3," and what that means will have to be considered in a moment, but only an apparatus for that purpose in which the movable controlling member is mounted for automatic movement into and out of the outlet without coming into contact therewith. In other words, it indicates that the method does not demand that the movable controlling member should have such a movement. This by itself is sufficient to dispose of the Plaintiffs' contention that in Claims 2 and 3 the movable member acts as a piston in the outlet. For a like

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- reason the Claim does not even enable it to be asserted that all the Claims numbered 1 to 3 involve the use of a movable member situate within the glass. Nor, for the reasons already given in considering Claim 8, does it necessarily indicate that all the Claims comprised in Claim 1 involve the use of a movable member. But what is meant by "the method according to Claims 1 to 3"? It is impossible to suppose that the Patentee considered each of these three Claims to describe one and the same method, and in face of the language used it is difficult to suppose that he meant "any one of the methods described in "Claims 1 to 3." The only other meaning of the words that I can think of is "the method common to Claims 1 to 3." Now the only method that complies with this description is that of gob feeding of molten glass through an outlet, for in my opinion each of the Claims is confined to gob feeding by reason of the references to the gathers, and the fact that in each Claim either the discharge of the glass is described as being through or from an outlet, or the gather is described as being suspended beneath an outlet. So read, the Claim would cover every conceivable apparatus for feeding gobs of molten glass through an outlet in which a movable controlling member is mounted for automatic movement into and out of the outlet without coming into contact therewith.
- 20 I may now leave the Specification and consider the question of the validity of the Claims alleged to have been infringed. But, before doing so, I ought to say something about the words "acting as a piston in the outlet." I do not myself find much difficulty in understanding them. It is true that the Patentee does not always use the word "outlet" as meaning the same thing. For some-
- 25 times he uses it as indicating some particular portion of the outlet, as, for instance, when he says that definite relations exist between the cross-section of a gather and that of the outlet. Here he is referring to the cross-section of the lowest part of the outlet. So, too, when he says that a change in the size of the discharge outlet would influence the entire gather, he is not referring
- 30 to a change in the depth of the outlet, for example, but to a change in the diameter of the outlet on the plane of actual emergence. Subject, however, to this, the word "outlet" in the Specification seems naturally to mean the hole in the bottom of the vessel containing the glass, provided for the purpose of letting the glass be discharged therefrom. The depth of this outlet would
- 35 normally be the thickness of the bottom of the vessel. Normally, too, its shape would be that of a cylinder or a truncated cone tapering towards the plane of actual emergence. In certain cases, however, the depth of the outlet may be greater or less than the thickness of the bottom of the vessel. In the particular embodiment of the invention shown in the drawings attached to the
- 40 Specification in the present case the depth of the outlet numbered 3 on Fig. 2 is much less than the thickness of the bottom of the vessel to the right of the outlet. So, too, the outlet may consist of something more than the hole in the bottom of the vessel. In the particular embodiment, for instance, the Patentee provides for an outlet ring 52 clamped against the bottom of the outlet 3, the
- 45 object of which he says (page 4, line 123) is to allow the size of the outlet to be changed at will. Now this ring can only change the size of the outlet if it forms part of the outlet itself. The outlet after the ring is fixed is of greater depth than it was before, and the smallest diameter of the outlet will now be the diameter of the lowest section of the ring. Now if a movable member is
- 50 to be capable of acting as a piston in every part of the outlet, it must of

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necessity have a diameter not greater than the least diameter of the outlet, and therefore in the case of the preferred embodiment a diameter not greater than the least diameter of the ring. It is also to be observed that the member may also act as a piston in the outlet without doing so during the whole of its stroke. A movable member that at the beginning of the stroke is above the entrance to the outlet but in the course of it enters the outlet is, in my opinion, acting as a piston in the outlet. 5

With this preliminary observation, I will now consider the question of the validity of the Claims alleged to have been infringed by the Defendants. Construed as I have felt bound to construe Claim 1, that Claim is admittedly invalid, and need not be further considered. But in order to decide as to the validity of the other Claims it is necessary to consider one or two of the earlier Specifications; and first I will deal with *Hitchcock's*. The objects that this inventor had in mind were apparently two, but only one of them need be referred to here. Realising that with a given fluidity of glass and a given orifice, the quantity of glass in the gobs could be varied within certain limits by varying the pressure on the supply body of glass, his object was to provide means for varying that pressure from time to time. He proposed to do this by means of a diaphragm that would alter the air pressure on the surface of the glass above the orifice. When this pressure was reduced below atmospheric pressure the flow of glass at the orifice would be reversed and the glass drawn back into the passage 3 shown on Fig. 2 of his drawings. Upon a reverse movement of the diaphragm, however, the air pressure on the surface of the glass in the passage will be increased and a rapid expulsion of that glass will occur, "thereby causing," as he says on page 2, line 94, of his Specification, "the formation of a drop, large or small, depending upon the rapidity of the movement of the diaphragm at the orifice." He had previously said on the same page, line 44, that the quantity of glass required to form any desired article having been determined, the pressure regulating mechanism is adjusted so that the normal pressure on the glass will cause the formation of drops or globular bodies of the required size. He does not appear to have been concerned with the shape of the gob except in so far as an alteration of size would necessarily result in an alteration of shape, because he explains that the shape the glass will assume in the practice of his method is similar to that assumed by glass dropping from a punty which would be pear-shaped. He does, however, in my opinion provide for the control of the discharge of glass through an outlet by operating a movable member so as to vary the rate of discharge of the glass while the gather is being formed. The movable member, moreover, must necessarily produce extrusion or intrusion impulses within the glass as it is being discharged from the outlet. Further, the cross-sectional dimensions, or the diameter (which means the same thing), of any and each portion of the gather will be varied or determined by the operation of the movable member. The more rapidly it moves the greater the impulses and the quicker the flow of glass through the orifice and the larger the diameter of any one and each portion of the gather. *Hitchcock's* method would not, of course, give the same control or produce the same variations in shape as would the machine described and illustrated in the Specification of the Patent in suit. But if anyone were to put into operation the method described by *Hitchcock*, even for the limited purpose indicated by him, I cannot see how he could fail to infringe Claims 2 and 3 in that Specification. For in controlling the quantity 50

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of the glass in the gather by adjusting the pressure regulating mechanism he would necessarily control the shape at the same time. That being so, those Claims are invalid on the ground of anticipation.

- The next Specification that I find it necessary to consider is that of *Bowman*.
- 5 In this Specification the inventor is concerned solely with obtaining predetermined quantities of glass, all that is said about shape being that the glass will be delivered in a lump or approximately so. In order, however, to obtain this predetermined quantity, means are provided that include a movable member that moves within the mass of glass being discharged. In the body of the
- 10 Specification, *Bowman* seems to be concerned chiefly with the means of severing the glass after it has emerged from the outlet, and the movable member plays a minor role. It is used primarily for the purpose of closing the outlet when it is desired to suspend the flow of glass altogether for a time. The Specification, however, adds that it will, of course, be understood that it may be operated to control the amount of glass to be delivered. How it will do this is explained
- 15 on page 2 of the Specification, lines 78 to 85. It will, he says, be obvious that, by reason of the plug being kept partially submerged in the molten glass, the downward movement, when it is used to close or partially close the throat temporarily, will tend to give an impulse to the downward flow of the glass.
- 20 Now the words that follow indicate that this extraneous impulse is only to be used when the temperature and condition of the molten glass require it. Nevertheless, when it is brought into play it must necessarily increase the flow of the glass to some degree, and must therefore necessarily affect the shape of the lump of glass delivered through the outlet. In other words, anyone who constructed and used a *Bowman* machine would, if he used the movable member in
- 25 the way and for the purpose indicated, necessarily make use of the methods described in Claims 2, 3 and 4 of the Patent in suit. *Bowman* does not refer in terms to the fact that the movable member can be used to retard the flow of glass, but he provides means for causing it to be raised out of the throat on
- 30 page 1, lines 101 to 104, and if those means are employed the flow must to some degree be retarded. The matter does not, however, rest there. In the Claims appended to the Specification the plug assumes a much more prominent position. It is stipulated in Claim 1 that the plug shall have a diameter less than that of the delivery opening for a length from its lower end greater than the
- 35 thickness of the opening. Claim 2 provides for an extension of the delivery opening downwards, and Claim 3 for its extension upwards, its upper end in such case being flared. In each case a similar stipulation is made as to the diameter of the plug. Now this can only mean that the plug is to be capable of acting as a piston in every part of the outlet. The stipulation as to the
- 40 length of the plug that is to be of a diameter less than that of the outlet is otherwise unintelligible. The object must be to enable the plug with its film of chilled glass to reach the bottom of the outlet. The thickness of that film will, as explained on page 2, lines 66 to 68, depend upon the temperature maintained in the plug by the cooling means. If it is sufficiently thick it will come
- 45 into contact with the sides of the outlet, and might, of course, be prevented from entering the outlet altogether, though in the latter case the idea that *Bowman* must have had in his mind when imposing his condition as to the plug's diameter would be defeated. If, however, the film were not sufficiently thick to come into contact with the sides of the outlet, the movable member
- 50 would act in precisely the same way as the impeller described in the passage

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introduced by way of amendment into the Plaintiffs' Specification on page 2, lines 16 to 36. A machine made in accordance with *Bowman's* Specification would, as it seems to me, plainly be an infringement of Claim 10 of the Patent in suit, however "the method according to Claims 1 to 3" be construed. When made it could not be used in the way indicated by *Bowman* without using the methods of Claims 2, 3, 4 and 5 of the Patent in suit, or the method described in the first six lines of Claim 9. Anyone using it would also necessarily produce an intrusion impulse, but whether he would then be using the method described in the latter part of Claim 9 I cannot say, as I do not profess to understand what that method is. For these reasons I am of opinion that Claims 2 to 5 of the Patent in suit are anticipated by *Bowman*. Claim 10 is also anticipated by him, though that Claim is in my judgment invalidated in any case by the obscurity and ambiguity of its language. Claim 9 may or may not have been anticipated by *Bowman*. But this Claim also is in my opinion invalidated by its obscurity and ambiguity.

I will now turn to *Howard's* Specification, the importance of which lies in what is there said about the prior art, as it existed in August, 1917. It deserves careful consideration. "At temperatures necessary for working," he says; "molten glass is a stiff viscous liquid tenaciously adhering to any hot material. The flow starts by forming a half globular drop at the orifice of the vessel, next its cohesion to the edge of the orifice causes the drop to move forward at the center, the upper end of which adheres to the orifice and the center pulls away to a small stream or thread and this attenuated condition remains constant. Glass resembles all other viscous fluids in this respect, but shows a very great contraction in area of stream. If the head or level of the glass in the supply reservoir be increased or more pressure applied to the surface of the glass, this contraction below the orifice will be reduced. This is due to the fact that the adherence to the edge of the orifice is much greater than the tension of the glass particles to each other, and greater pressure forces more glass through the center of the drop without increasing to any great degree the flow at the edges or outer sides of the drop. Conversely, by decreasing pressure on the head or level of the glass, contraction of the stream is increased, and by varying the rate of flow, it is possible to so expand or contract the section of stream near the orifice as to make it resemble within narrow limits, a predetermined form." The principle stated in this passage is without any question the principle that is called into play when use is made of the Plaintiffs' impeller. The Plaintiffs, however, allege that by means of their impeller acting as a piston in the outlet the limits within which a predetermined form of gather can be obtained are by no means narrow, but that they can get any form that is of practical use in the art. This impeller acting as a piston within the outlet is indeed the pith and marrow of their invention as claimed at the Bar on their behalf, and as embodied in the machine particularly described and illustrated in the Specification, though for reasons best known to the Patentee he has thought fit to extend many of his Claims far beyond this. But in face of the passage I have just read from *Howard's* Specification such Claims as Claims 2 and 3 must be devoid of subject-matter. The subsequent passages to which I must now refer give rise, however, to the question whether there be any subject-matter in the use of an impeller acting as a piston in the outlet. For *Howard* goes on to refer to various methods that he says have been proposed for putting into effect the

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principle that he has referred to. "In one of them," he says, "there is a
"plunger within the body of glass in the supply reservoir just above the orifice.
"By moving this plunger down, flow of glass through the orifice is accelerated
"and tends to fill up the central portion of the globule and prevent contraction
5 "or attenuation of the stream from the globule. When in using this method
"it is desired to contract the globule near the orifice in order to cut it off
"through its narrowest portion, this plunger is raised or retracted from the
"orifice thus decreasing the pressure of the glass at the orifice and checking
"the flow." It is not material to enquire what particular proposal *Howard*
10 had in his mind, though it may have been *Bowman's*. What is important is
to observe that, if a plunger that is just above the orifice moves downwards,
it is reasonable to suppose that it moves into the orifice. That he was referring
to such a movement seems clear from his description of the first of the four
practical objections that he says are inherent in this principle of operation.
15 He says that the pressure tends to partly dissipate itself or expend itself in
backing the glass into the tank or other containing vessel. This must be the
supply reservoir from which the orifice opens and which he has referred to on
page 2 at line 35 and line 52. He seems to make this clear at line 23 on page 3,
where he refers to the "tank or other source of supply," and when he states at
20 line 38 of the same page that in each of his figures 1 represents the vessel con-
taining the glass. This being so, if glass is to be "backed" into the tank by
the downward movement of the plunger, it must come from the orifice.
Howard, therefore, as I read his Specification, is referring to a plunger acting
as a piston in the outlet. It is true, as I have already mentioned, that he
25 purports to point out four practical objections to such a method. For the most
part these objections are unintelligible. So far as they are intelligible they
do not exist, or do not constitute objections. Take the fourth objection, for
instance. It is no objection to the principle, even if it were always the case,
that the acceleration of the glass at one stage of the formation of the gather is
30 exactly balanced by the retardations at another stage, so that the average flow
of the glass during the formation is the same as it would have been without
either. For it is predetermined form and not predetermined weight that
Howard is dealing with. The Plaintiffs, however, lay much stress upon these
four practical objections of *Howard's*. By reason of them they contend that
35 *Howard's* Specification, so far from suggesting the use of an impeller acting
as a piston in the outlet, would be calculated to deter anyone who was seeking
means of obtaining control of shape beyond narrow limits from adopting any
such device. Mr. *Gill* did not agree that this would have been so. He said
that the passages in the Specification to which I have referred would have led
40 him to say that the best way of obtaining the best control over the shape of
glass gobs was to use a reciprocating impeller working in the outlet, and that
he would have rejected *Howard's* conclusions. But, supposing that it could
only be discovered by actual trial and experiment that the method referred to
by *Howard* would in fact give the desired control of shape, and that it did not
45 really possess the practical objections *Howard* mentions, can the discoverer
thereupon claim a monopoly for that method? I cannot think so. There would,
in my opinion, be no subject-matter in such a Claim, which would really be a
claim to the discovery and nothing more. This is not to say that there was no
inventive step in designing the Plaintiffs' machine. But I think that *Howard's*

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Specification deprives of all subject-matter the broad claim to the use of an impeller acting as a piston in the outlet.

In my opinion the Claims in the Plaintiffs' Specification alleged to have been infringed by the Defendants are invalid for the reasons I have given. In these circumstances, I do not think that any useful object would be gained 5 by considering the other documents relied upon by the Defendants, or the other matters urged by them in opposition to the validity of those Claims.

The conclusion come to by Mr. Justice *Luxmoore* was, in my judgment, the right one, and I agree that the appeal should be dismissed with costs.

Farwell J.: I have had the advantage of reading both the Judgments which 10 have just been delivered, with which I agree and to which I cannot usefully add anything, except that I share to the full the difficulty which both the other members of the Court have felt of construing the Specification. I have read it many times, both with and without the assistance of Counsel, and I find it impossible to satisfy myself what exactly the invention is for which a monopoly 15 is claimed by that document, or what are the limits of that claim. In my judgment, apart from any other reasons, the Patent is invalid for uncertainty.

Sir Arthur Colefax K.C.: I ask that the Order for revocation be stayed for a reasonable time to give my clients adequate opportunity to consider what course they should take. If the decision of my clients were that they should 20 appeal to the House of Lords, and the House of Lords reversed the Judgment of this Court, then if the Patent were revoked, as your Lordship sees, there would be considerable difficulty.

Lawrence L.J.—You would not be in any difficulty if the House of Lords should reverse our judgment and that of *Luxmoore J.* The order for revocation would 25 then be set aside and the Patent would stand unrevoked. Applications for stay pending an Appeal to the House of Lords are frequently made to this Court but are rarely granted and then only in very exceptional circumstances. Application refused.