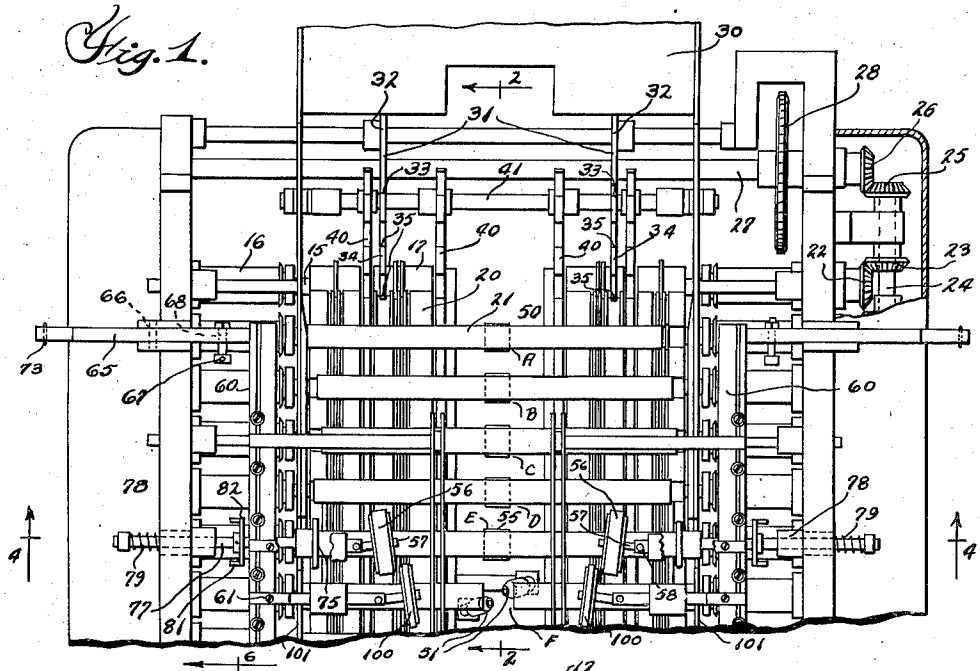
Oct. 27, 1936. F. MEYER 2,058,812

GLASS BODY FORMING MACHINE

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Fig. 1.



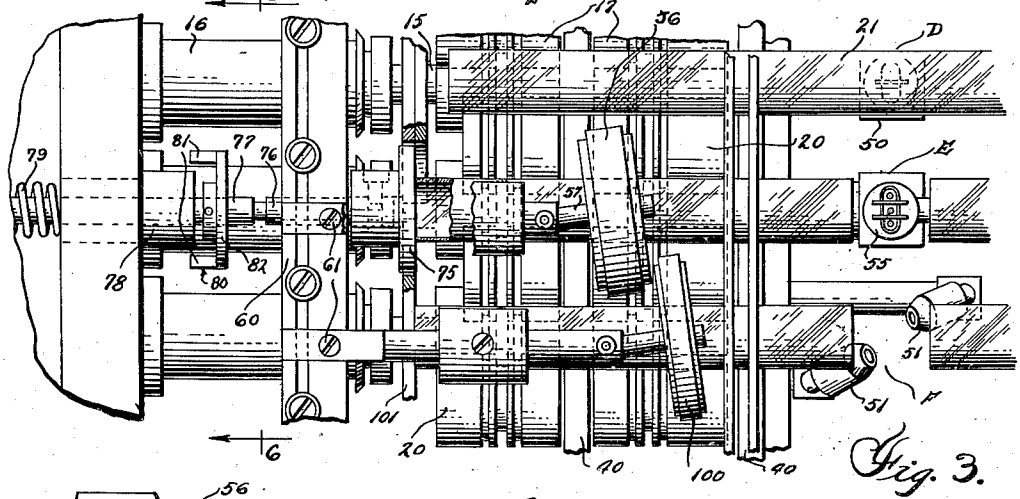


Fig. 3.

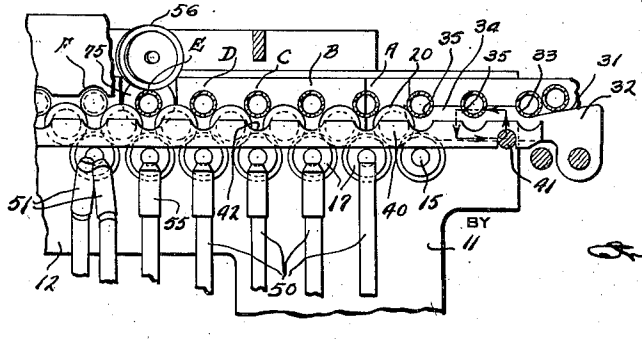


Fig. 2.

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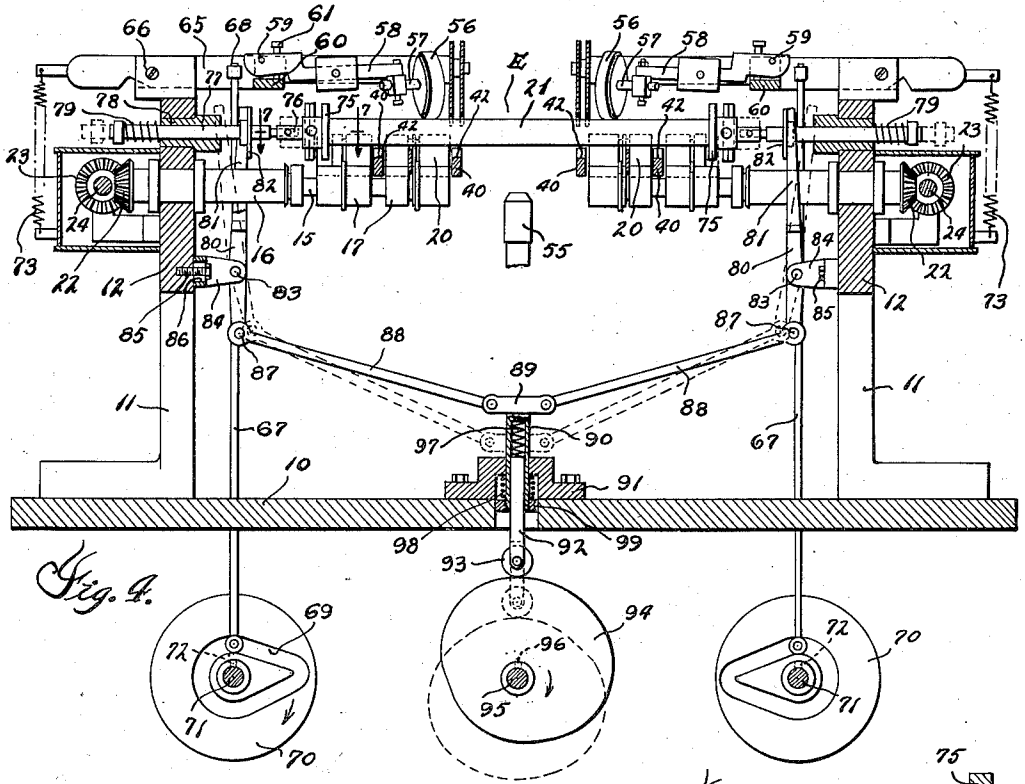


Fig. 4.

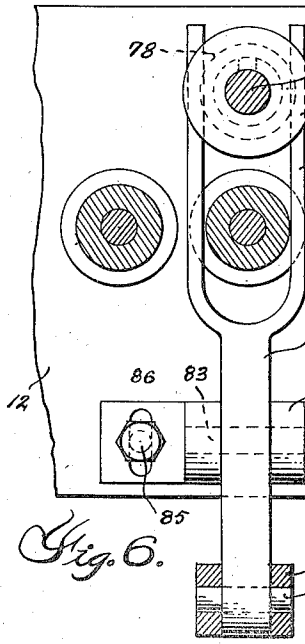


Fig. 6.

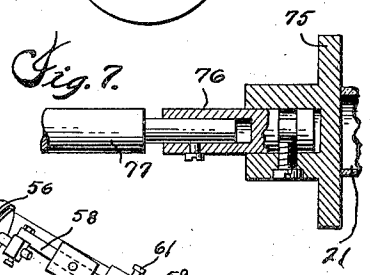


Fig. 7.

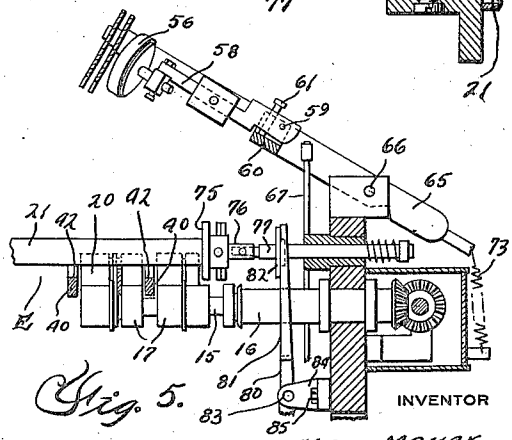


Fig. 5.

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Patented Oct. 27, 1936

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UNITED STATES PATENT OFFICE

2,058,812

GLASS BODY FORMING MACHINE

Felix Meyer, Aachen, Germany, assignor to Kimble Glass Company, Vineland, N. J., a corporation of Illinois

Application January 26, 1934, Serial No. 708,462
In Germany February 17, 1933

4 Claims. (Cl. 49—7)

This invention relates generally to a forming machine adapted for use in the production of formed glass bodies and the like.

More particularly, the invention relates to a means in a machine of the above mentioned character for locating a blank to be formed with reference to the portion or portions of the machine which perform the forming operation.

One of the primary objects of this invention is to provide a locating means of the above mentioned character which will function to accurately position the blank regardless of slight irregularities or the like in the size of the blank.

A further object of this invention is to provide a locating means of the above mentioned character which may be adjusted as to its speed of operation and which may also be adjusted to operate on blanks differing substantially in size.

Numerous other objects and advantages of this invention will become more apparent as the following description proceeds particularly when reference is had to the accompanying drawings wherein like reference characters designate corresponding parts throughout all views and wherein

Fig. 1 is a fragmentary semi-diagrammatic plan view of a machine in which the invention may be embodied;

Fig. 2 is a longitudinal sectional view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged plan view of a portion of the machine shown in Fig. 1;

Fig. 4 is a transverse sectional view taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary view similar to Fig. 4 showing the parts of the machine in a slightly different position;

Fig. 6 is a longitudinal sectional view taken on the line 6—6 of Fig. 3; and

Fig. 7 is an enlarged longitudinal sectional view through a portion of the structure shown in Figure 5.

For the purposes of illustration, the invention will be described as being embodied in a machine adapted to separate a tubular glass blank into two separate tubes. In a machine of this character, the locating means functions to accurately position the glass blank with reference to the sharp fire to which the blank is exposed during the separating operation. It is to be understood however, that the invention will find equal utility in any forming machine where it is desired to accurately locate a blank with reference to a means for operating on the blank.

The machine disclosed in the drawings is of the general character disclosed in my co-pending application, Serial Number 694,731 filed October 23, 1933, and entitled "Method of and apparatus for forming glass bodies".

The machine is diagrammatically shown as comprising a platform or bed plate 10 which is suitably supported in any desired manner (not shown) in spaced relation to the floor. Much of the actuating mechanism of the machine, which forms no part of the present invention and which therefore is neither illustrated nor described, is located below this platform.

Mounted on the platform are uprights 11 which support longitudinally extending frame members 12. These frame members are spaced from each other throughout their length and constitute the sides of the machine.

Fixedly secured to the stub shafts 15 journalled in bushings 16 at spaced points longitudinally of the frame members 12, are rollers 17. These rollers extend inwardly toward the center of the machine but terminate short of the center of the machine as clearly illustrated in Figure 4 of the drawings. The rollers 17 are arranged in rows with their axes parallel and each roller supported from one frame member 12, has its axis aligned with the corresponding roller supported in the opposite frame member.

Supported on the rollers 17 and in the angles between the same are auxiliary rollers 20. These latter rollers are frictionally driven by the rollers 17 and constitute supports for blanks 21, these blanks being shown as glass tubes. For rotatively driving the rollers 17, each shaft 15 has fixed thereto a beveled pinion 22, these beveled pinions being engaged by pinions 23 carried by shafts 24, one shaft being rotatively supported on the outer side of each frame member. The shafts 24 may be driven in any desired manner as, for example, through the beveled pinions 25 and 26, the latter being mounted on a shaft 27 to which a sprocket 28 driven in any desired manner is secured.

It will be noted by reference to Figs. 1 and 2 that the rollers 20 cooperate to provide a plurality of stations or temporary supports for blanks to be formed during the passage of the blanks through the machine. In the fragment of the machine illustrated, six stations are shown, these stations being designated by the reference characters A, B, C, D, E and F. The blanks remain temporarily in each station and are rotated while in each station by virtue of the rotation of the rollers 20, these latter rollers being in turn driven by the rollers 17.

For feeding the blanks into the machine, there is provided an inclined channel 30 which is of sufficient width to readily receive the blanks. From this channel the blanks roll onto the upper inclined edges 31 of plates 32 as clearly illustrated in Fig. 2 of the drawings. The inclined edge 31 of each plate 32 terminates at its forward end in a shoulder 33 which constitutes a stop for the blanks lying on the edge 31. Beyond the shoulder 33 each plate is extended to form an arm

34, these arms being provided with recesses 35 for temporarily supporting the blanks during their entrance into the machine.

For moving the blanks longitudinally of the machine, transport rails 40 are provided. Four of these rails are illustrated in the drawings although it is to be understood that any number of these rails may be provided depending entirely upon the size of the blanks to be moved.

The transport rails are supported at their ends on actuating shafts 41 and these shafts are moved by suitable means (not shown) to impart an oscillating movement to the transport bars. This movement is diagrammatically illustrated by the arrows in Fig. 2 of the drawings and it will be noted by reference to this figure that blanks supported in the recesses 42 in the tops of the transport bars will be moved periodically from one station to the next throughout the length of the machine.

As brought out before, the machine in which the invention is shown as being embodied, is adapted to separate a tubular glass blank into two separate tubes. In a machine of this character, the blanks are subjected at stations A to D inclusive, to the action of warming burners 50, while at station E the blanks are subjected to the action of a sharp flame and to the action of skew rollers which draw the sections of the blank apart. At station F the sections of the tube are shown as being separated from each other and burners 51 are shown for heating the adjacent closed ends of the sections. It will be understood that during the remainder of their travel through the machine the sections of the tubes may be subjected to various forming and annealing operations which, however, are not illustrated since the present invention is shown as being applied to the machine at station E.

Referring then particularly to Fig. 4 of the drawings, which is a section through the machine at station E, it will be noted that there is provided a burner 55 so arranged as to direct a sharp flame on the glass blank. The blank being rotated at this station, the sharp flame tends to constrict and burn through that portion of the blank which is immediately over the burner or which is contacted by the flame. It therefore is important that at this station the blank be properly located with reference to the burner 55 in order that the division of the tube will occur at the desired point which is usually the center thereof.

For the purpose of drawing apart the sections of the blank when the center of the blank has been softened by the sharp flame 55, the skew rollers 56 are provided. These rollers are rotatively supported on stub shafts 57 which are adjustably secured to the ends of arms 58. Each arm 58 is pivotally mounted as at 59 on a carrier bar 60, there being preferably provided a set screw 61 for each arm for vertically adjusting the same with respect to the carrier bar. Each carrier bar is supported by arms 65 pivotally mounted as at 66 on the frame 12 of the machine, whereby these arms may be rocked to raise the carrier bars and thus the rollers 56 during the movement of the blanks from one processing station to the next. The raised position of the rollers 56 is clearly illustrated in Fig. 5 of the drawings.

For the purpose of rocking the arms 65 there are provided rods 67 which are pivotally secured to the arms 65 as at 68 and which carry at their lower ends rollers which travel in cam grooves 69 formed in cam members 70. The members 70 are preferably adjustably secured to their shafts 71 by set screws 72. If desired, springs 73 may be provided to partially counterbalance the weight of the rollers 56.

While it has been the practice to utilize skew rollers such as those above described for separating a glass tube into two sections, it has been found that these rollers do not always operate to exert equal pulls on both sections of the tubing. This results sometimes from the fact that the rollers are not equally proportioned and sometimes from the fact that the tube to be separated is not uniform throughout its length, the result in each case being that one part of the tube is pulled more strongly than the other. When this occurs, the tube is shifted as a unit from one side to the other of the machine so that the heated portion becomes wider than that necessary and sections of equal length are not obtained.

In the machine disclosed therefore, the present invention has particular utility in that it functions not only to accurately position the portion of the tube to be heated with reference to the burner 55 but functions further to control the movement of the separated sections of the blank or tube so that one section will not be moved away from the center of the machine with greater force than the other. Thus when the present invention is incorporated in a machine such as that disclosed, the obtaining of sections of uniform length is assured.

The means for accomplishing the above results comprises stops or abutment plates 75 arranged to engage the ends of the blank at the station E. Each plate 75 is journalled on a stub shaft 76 and each stub shaft is clearly illustrated in Fig. 7 of the drawings secured to and adjustable longitudinally of a stem 77. Each stem 77 is mounted for longitudinal movement in a bushing 78 mounted in the adjacent frame member 12 and each stem 77 is normally urged outwardly away from the center of the machine by a spring 79.

For moving the abutment plates inwardly, there are provided arms 80 having bifurcated ends 81 adapted to extend on opposite sides of the stem 77 and to engage collars 82 fixed to these stems. Each arm is pivotally mounted as at 83 on a bracket 84 and each bracket is secured to the adjacent frame member 12 for vertical adjustment with respect thereto by bolts or the like 85 passing through elongated openings 86 in the bracket member.

The arms 80 have their lower ends pivotally connected as at 87 to links 88 and these links have their adjacent ends pivotally secured to a cross head 89.

The cross head 89 is provided with a tubular stem 90 mounted for vertical reciprocation in a suitable bearing 91 secured to the platform 10 and projecting into the tubular stem 90 is a stem 92 which carries at its lower end a roller 93 which rides on a cam 94. This cam is adjustably secured to a shaft 95 by a set screw 96 so that the cam may be either rotatively adjusted or may be removed and a new cam substituted therefor. A spring 97 within the bore of the stem 90 engages the upper end of the rod 92 to urge the roller 93 into engagement with cam 94, while a second spring 98 engages the bearing 91 and a collar 99 on stem 90 for urging the latter stem downwardly.

With this construction it will be apparent that as the shaft 95 is rotated, the cam 94 will vertically reciprocate the cross head 89 and this

vertical reciprocation of the cross head will, by means of links **88** and arms **80**, effect a reciprocation of the abutments **75**. The speed of reciprocation of the abutments **75** may be adjusted by vertically adjusting the brackets **84**, while the extent of movement of the abutments toward the center of the machine may be adjusted by adjusting the shafts **76** longitudinally of the shafts **77**. The shaft **95** and the shafts **71** are rotated in unison by any suitable means (not shown) and the timing is such that the abutments are moved to their innermost position prior to lowering of the skew rollers as clearly illustrated in Fig. 5 of the drawings.

The operation of the invention in the machine illustrated is as follows. The blanks are fed into the machine in the manner previously described and are preheated at the stations A to D inclusive. From station D the blank is moved by the transport rails to station E and immediately after the blank is deposited on the rollers at station E, the abutments **75** are moved inwardly and engage the ends of the blank to accurately center the same with reference to the sharp flame from the burner **55**. As brought out before, this movement occurs while the skew rollers are still elevated so that the blank may be readily moved and thus accurately positioned.

As soon as the blank has been accurately positioned, the skew rollers are lowered and by their engagement with the blank tend to draw apart the portions thereof on opposite sides of the heated center portion. During this drawing apart of the sections of the blank, the abutments move backwardly, the backward movement of these abutments however, being accurately controlled and limited by the configuration of the cam **94**. Thus the ends of the sections will be kept an equal distance from the flame of the burner **55** despite slight differences in the proportions of the skew rollers and despite slight variations in the diameter or wall thickness of the blank throughout the length thereof. Thus it will be apparent that the cam controlled abutment or stop plates function not only to accurately locate the blank so that the portion thereof to be heated will be subjected to the flame **55** but function further to definitely limit and control the movement of the sections of the blank away from each other.

As brought out before, for blanks of different lengths, the shafts **76** may be adjusted longitudinally of the shafts **77**, while for varying the speed of reciprocation of the abutment plates the brackets **84** may be vertically adjusted. The springs **79** and **98** act to maintain the roller **93** in engagement with cam **94** while the spring **97** provides a yieldable operating connection between the cam and the abutments which functions only to prevent breaking of the glass blank in the event that the blank is slightly longer than the blanks for which the machine is set to form. After the blanks are separated, additional skew rollers **100** similar to the skew rollers **56** are provided for maintaining the separated sections of the blank against suitable guide rails **101** carried by the frame work of the machine. It will be noted by reference to Figs. 3 and 4 that the auxiliary supporting rollers **20** are cut away at station E to permit the desired inward movement of the abutments **75**. It will be noted further that the abutment plates are journaled on the shafts **76** so that they will not retard rotation of the blanks at the station E.

While the invention has been described as being incorporated in a machine for separating a glass blank into two sections and while as brought out before the invention will find particular utility when incorporated in such a machine, it is to be understood that the invention will find utility in other types of forming machines. Thus, if desired, the abutment plates might be located at the point where the blanks are first introduced into a forming machine to function to immediately center or locate the blanks for their passage through the machine. The description therefore, is to be understood as not definitive of the limits of the inventive idea, the right being reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

What I claim as my invention is:

1. In a machine of the class described, means for supporting a glass blank, abutments engageable with the ends of said blank, means mounting said abutments for movement toward and away from each other and means controlling the movement of said abutments, said last mentioned means including a pivotally mounted arm associated with each abutment for moving the same, a cross head mounted for reciprocation, means for reciprocating said cross head, and links connecting said cross head and said arm for actuating the latter upon movement of the former.

2. In a machine of the class described, means for supporting a glass blank, abutments engageable with the ends of said blank, means mounting said abutments for movement toward and away from each other and means controlling the movement of said abutments, said last mentioned means including an arm associated with each abutment and arranged to move the same, a bracket pivotally mounting each arm, means providing for adjustment of said brackets toward and away from said abutments, a cross head mounted for reciprocation, cam means for reciprocating said cross head, and links pivotally connecting said cross head to said arms.

3. In a machine of the class described, means for supporting a glass blank, abutments engageable with the ends of said blank, means mounting said abutments for movement toward and away from each other, and means controlling the movement of said abutments, said last mentioned means including a shaft mounting each abutment, a substantially vertically disposed arm associated with each shaft, each arm having its upper end bifurcated to embrace its respective shaft and arranged to impart movement to its respective shaft, means mounting said arms for pivotal movement, a cross head mounted for vertical reciprocation, a cam arranged to reciprocate said cross head, and links pivotally connecting said cross head to the lower ends of said arms.

4. In a machine of the class described, means for rotatably supporting a glass blank, abutments engageable with the ends of said blank for centering the same on said supporting means, means including pivotally mounted levers for moving said abutments into engagement with the ends of the blank, and means for adjusting the effective leverage of said levers to control the speed of movement of said abutments.

FELIX MEYER.