Sept. 8, 1936. A. H. LE MARE 2,053,402

GLASS PRESSING MACHINE

Filed April 28, 1934

Fig. 1.

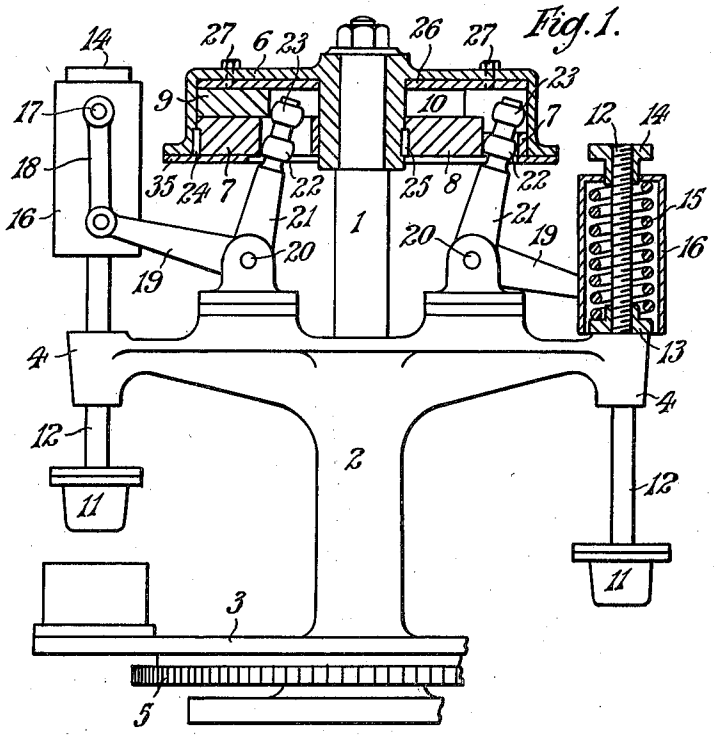
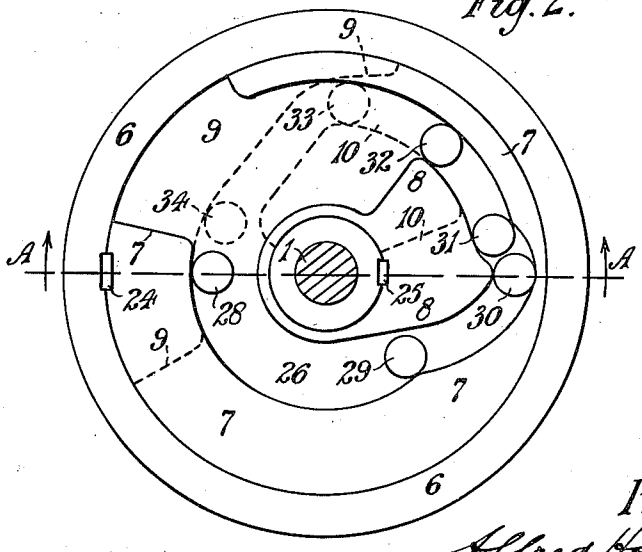


Fig. 2.



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GLASS PRESSING MACHINE

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In Germany May 15, 1933

1 Claim. (Cl. 49—37)

This invention relates to glass forming machines of the type in which a forming plunger is mechanically forced into the molten glass and has for its object an improved apparatus for actuation of the plunger.

According to the invention the forming plunger is actuated by a cam so formed that after the plunger has been forced into the molten glass to the point at which the desired form has been given to the glass, it is withdrawn to a very slight extent. It is then held stationary in this slightly withdrawn position for a certain time and is then withdrawn completely. Preferably the cam is formed in two portions, of which one is adjustable relatively to the other, so as to adjust the time during which the plunger is held in its slightly withdrawn position.

When a plunger is maintained in the position to which it has been forced into the glass, it is liable to adhere to the glass, this liability depending on the shape of the plunger and the degree to which it becomes heated. On the other hand, if the plunger be immediately withdrawn, the glass, which is then still very soft, is liable to deform.

By means of the present invention, the advantage is secured of avoiding adherence of the glass to the plunger, since this adherence does not occur with incomplete contact between glass and plunger, and at the same time of maintaining accuracy of form of the glass.

The time during which the plunger should be held in the slightly withdrawn position to avoid deformation of the glass, depends on the shape and mass of the glass pressing. By means of the above described adjustable cam device, this time can be adjusted to that best adapted to any article being pressed.

In the accompanying drawing:—

Figure 1 is a side elevation of the main portions of a pressing machine with two plungers, the cam device and upper portion of one plunger rod being shown in section, and

Figure 2 is an approximate plan view from below of the cam device.

Referring to the drawing which shows a pressing machine to which the invention is applied, a central fixed shaft 1 is the support for all portions of the machine. The framework 2 comprising the mould table 3 and the plunger guides 4, is rotated about the shaft 1 by means of the gear wheel 5. The cam casing 6 is fixed to the shaft 1, and contains the fixed cam 7, 8 and the movable cam 9, 10. The plungers 11 are attached to rods 12 passing through guides 4. On the upper ends of each of the rods 12 are two nuts 13, 14, the lower nuts 13 serving as adjustable abutments for the springs 15. The upper ends of the springs 15 bear against sleeves 16 to which are pivoted at 17 links 18, connecting the sleeves to arms 19 of two-armed levers 19, 21 pivoted at 20 to the framework 2. The other arms 21 of the levers carry each two rollers 22, 23 engaging the fixed and movable cams 7, 8 and 9, 10 respectively.

At the left hand side of Figure 1, the plunger 11 is shown in its fully withdrawn position and at the right hand side in the lowest position to which it is forced.

By rotation of the framework 2 relatively to the fixed cam casing 6, the levers 19, 21 are actuated, first to depress the sleeves 16, the pressure thereon being transmitted through the springs 15 to the nuts 13 on the plunger rods 12. The springs 15 are stiff enough to transmit the pressure without relative movement of the sleeves 16 and the rods 12, except at the end of the stroke, when the sleeves make a small movement relatively to the rods, whereby the final pressure applied to the plungers is determined by the stiffness of the springs 15. This small movement is indicated at the right hand side of Figure 1 by the gap between the upper end of the sleeve 16 and the nut 14.

Immediately after the plungers have reached their lowest position, the levers 19, 21 are moved by the cams sufficiently to raise the sleeves 16 into contact with the nuts 14 and a very small further distance, so as to withdraw the plungers by a very small extent.

The levers then remain in this position to hold the plungers in their slightly withdrawn position for the time determined by the cams and then are moved to raise the plungers into the fully withdrawn position as shown on the left hand of Figure 1.

Figure 2 is an approximate plan view from below of the cam casing 6 with the cams, to a scale one-third larger than that of Figure 1. It departs from an accurate plan view in showing the cam surfaces of the fixed and movable cams coincident when both hold the lever arms 21 in the same position, thus showing the action of the cam surfaces more clearly. Actually the cam surfaces are not so coincident by reason of the angular positions of the lever arms 21. The fixed cam members 7, 8 and the roller 22 engaging them, are shown in full lines and the movable cam members 9, 10 and the roller 23 engaging them in dotted lines. In this figure,

therefore, a dotted line does not necessarily indicate a part that is covered by another part. Subject to the above, the cam casing in Figure 1 is a section along the line A—A of Figure 2.

The two members **7**, **8** of the fixed cam are keyed at **24** and **25** respectively to the casing **6**, and are retained therein by the plate **35** (omitted in Figure 2). The two members **9**, **10** of the movable cam are fixed to the plate **26**, which is held to the casing **6** by bolts **27** (Figure 1) passing through circular slots in the casing, whereby the plate **26** with the cam members **9**, **10** can be rotated and fixed in any desired angular position relatively to the casing.

The action of the cam surfaces is as follows:—Starting with the roller **22** in the position of **28** (Figure 2) corresponding to the fully withdrawn position of the plunger as on the left hand side of Figure 1, the roller moves (counter-clockwise in Figure 2) in a circular path to the position **29**. From here to the position **30** it is moved by the fixed cam member **8** to give the downward stroke of the plunger, this reaching its lowest position at **30**, corresponding to the position shown at the right hand side of Figure 1. Immediately after, it is moved to the position at **31** to effect the very slight withdrawal of the plunger. It then moves in a circular path between the fixed cam members **7**, **8** maintaining the plunger in its slightly withdrawn position, as far as the position at **32**. This length of circular path from **31** to **32** corresponds to the minimum length of time during which the plunger is to be held in the slightly withdrawn position for any article to be pressed. As shown in Figure 2, however, this circular path is continued by the movable cam member **10** as far as the position **33** of the roller **23**. From this position the movable cam member **9** moves the roller **23** to the position **34** to withdraw the plunger fully.

From the above it will be seen that, by rotating the movable cam members **9**, **10** relatively to the fixed cam members, the length of the circular path, during which the plunger is held in its slightly withdrawn position, may be varied from the minimum length between positions **31** and **32**, determined by the fixed cam members, to a length approximately double.

Having described my invention, I declare that what I claim and desire to secure by Letters Patent is:—

Apparatus for pressing glass articles comprising in combination a forming plunger, a cam surface adapted to press the plunger downwards to form the article, a second cam surface adapted to withdraw the plunger slightly, a third cam surface adapted to hold the plunger in the slightly withdrawn position and a fourth cam surface adapted to withdraw the plunger fully.

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