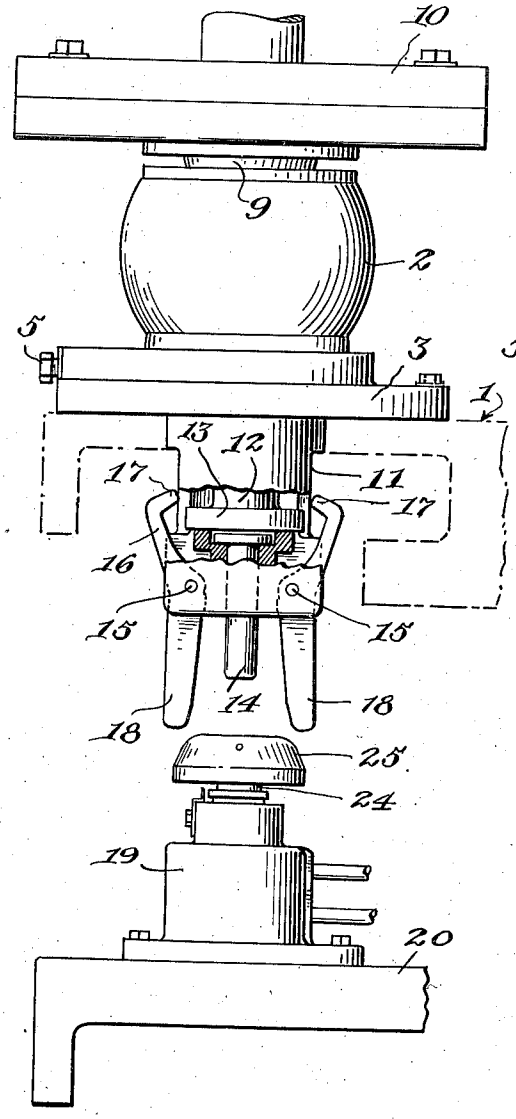
April 13, 1937. W. R. RUCK 2,077,013

GLASS FORMING MACHINE

Filed Feb. 17, 1936

Fig. 1.



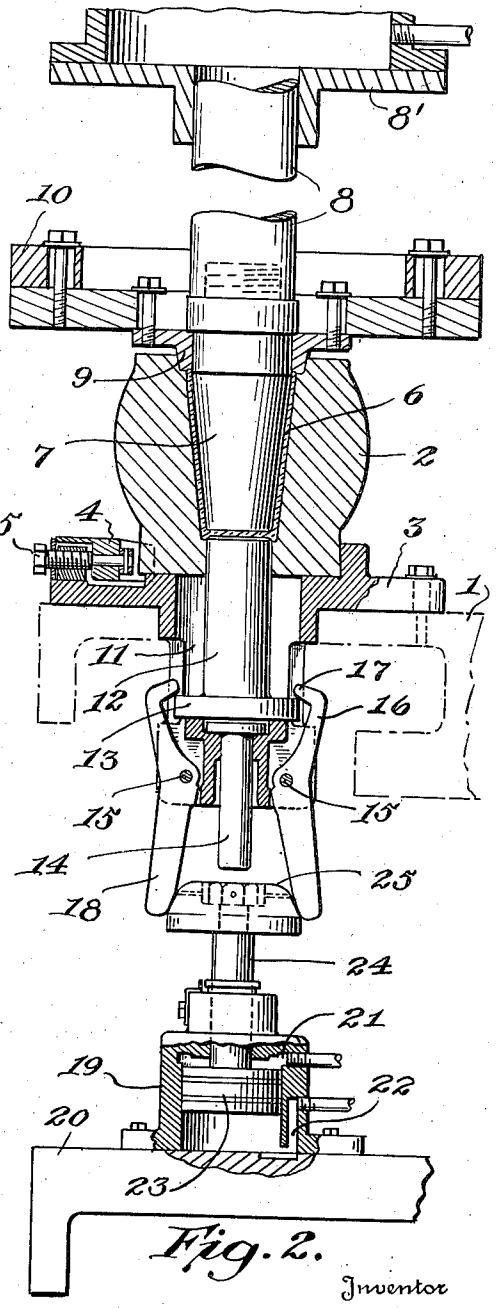


Fig. 2.

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GLASS FORMING MACHINE

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11 Claims. (Cl. 49—35)

The invention relates particularly to forming machines of the press type, although it could be used with other types of forming machines. In the manufacture of pressed tumblers and other pressed glass articles, the molten glass in the mold is subjected to very great pressure by the pressing plunger; and when the plunger starts its upward movement, relieving the glass of the pressure, there is a tendency for the usual valve in the mold bottom to rise with the plunger.

This slight movement of the mold valve causes, as I have discovered, a minute crack to often appear in the glass tumbler or other pressed article. Accordingly, the object of the present invention is to prevent the presence of these cracks, which results in considerable loss of finished ware, by the provision of mechanical means for positively and rigidly maintaining the mold valves in their seated position during the pressing operation.

The invention will be clearly understood from the following detailed description, when taken in connection with the accompanying drawing, in which,

Figure 1 is a side elevational view of the apparatus, with the mold valve released; and

Figure 2 is a vertical sectional view of the apparatus, with the mold valve locked in seated position.

Referring to the drawing in more detail, numeral 1 refers to the ordinary mold table which carries the desired number of press molds 2. The molds are removably mounted on the table by any desired means, as by a plate 3 in which the mold rests, and a wedge 4 which clamps the mold in position; the wedge being operated by a screw 5.

The mold table is rotated step by step, in the usual manner, and brings the molds successively to the feeding station, where a glass charge is fed to each mold, and thence to the pressing station, where a pressing plunger enters the mold and forces the molten glass into the shape of the desired article, such as a tumbler 6.

In the drawing the mold is shown at the pressing station, and the pressing plunger 7 has descended into the mold and forced the glass charge into the shape of the tumbler. In accordance with the conventional practice the shaping or pressing plunger is removably attached to the lower end of a piston rod 8, which rod is operated at the desired time by a cylinder 8'. The usual neck ring 9 is attached to the lower spring plate 10. Of course various sizes and shapes of plungers and molds are employed as desired, depending upon the particular work at hand. This structure is old and well known in the art, and no detailed description thereof is necessary.

The mold plate 3 carries a downwardly extending cage 11 in which is mounted for vertical sliding movement a mold bottom valve 12. The upper end of the valve extends into the mold to assist in the formation of the molded article, and the lower end of the valve is provided with a flange 13. Slidably mounted in the cage, directly beneath the valve flange 13, is a plug 14 which extends downwardly below the cage.

Pivotally mounted at 15 on the cage are two clamp levers 16 having inwardly extending fingers 17 at their upper ends, and the lower portions 18 of these levers normally hang vertically downward. The construction of the levers is such that when they are hanging freely the fingers 17 are free of the valve flange 13; but at the desired moment the fingers are caused to engage over the valve flange and lock the valve firmly in its down position. The preferred mechanism for locking the valve will now be described.

Numeral 19 refers to a cylinder mounted on the machine base plate 20. At the proper instant, compressed air is admitted through the port 22 to the lower end of cylinder 19, to lift the piston 23 and its piston rod 24. Mounted on the upper end of the piston rod is a wedge member 25. The surface of this wedge member is preferably curved, as shown, or inclined, so that it will engage the lower portions 18 of the levers 16, and thereby force the fingers 17 into engagement with the mold valve flange 13, thereby positively and rigidly maintaining the mold valve in its lowered position.

Compressed air may be admitted to the lower end of cylinder 19, to lock the mold valve in its lowered position, as soon as the mold comes to the pressing station, but in any event this operation occurs before the pressing or shaping plunger 7 starts its upward movement, after having shaped the molten glass charge in the desired form.

Shortly after the pressing or shaping plunger has started its upward movement, compressed air is admitted to the upper end of cylinder 19, through port 21, to move piston 23, piston rod 24 and wedge member 25 downwardly, thereby releasing the clamping levers and permitting the lower portions to fall by gravity to withdraw the locking fingers from engagement with the mold valve flange 13. The parts are now in the position shown in Figure 1 and the mold table is now free to rotate another step. The forma-

tion of the article having been completed, the mold with the completed article is carried forward to the delivery station, and a cam or other means is provided to engage the lower end of the plug 14 and lift it, thereby elevating the finished piece of ware to a position where it can be engaged by hand or by a take-out device, for removal. As shown in the drawing the plug 14 is slidably mounted in the cage 11 beneath the lower end of the mold valve. The means for elevating the plug is old and well known, and hence illustration thereof is unnecessary. It will be understood, of course, that a cage with its locking levers is provided for each mold, and that a cylinder and wedge member operated thereby are provided only at the pressing station, to which station the molds are successively brought, step by step.

The operation of the apparatus is extremely simple, and has been fully described above in connection with the description of the apparatus. While the apparatus is simple in construction and operation yet it performs a new and highly desirable function in rigidly maintaining the mold valve in lowered position while the pressing plunger is being withdrawn, particularly during the initial part of the plunger withdrawal. And as stated hereinbefore this initial withdrawal movement of the pressing plunger tends to lift the mold valve, which results in the formation of minute cracks in the finished articles, as I have discovered.

While I have shown and described the preferred embodiment of my invention, it will be at once apparent, to those skilled in the art, that many changes and modifications may be made in the particular apparatus disclosed without departing from the spirit of the invention, and all such changes and modifications are intended to be included within the scope of the appended claims.

What I claim is:

1. A glass forming machine including a mold, a pressing plunger, a valve arranged in the bottom of the mold, said valve being upwardly movable to lift a finished article from the mold, and means adapted to be periodically interlocked with the valve for maintaining the valve in lowered position during part of the pressing operation.

2. A glass forming machine including a mold, a pressing plunger, a valve arranged in the bottom of the mold, said valve being upwardly movable to lift a finished article from the mold, and means adapted to be temporarily interlocked with the valve in lowered position, said means rendered operative before the pressing plunger starts its upward movement.

3. A glass forming machine including a mold, a pressing plunger, a cylinder for moving the plunger into and out of the mold, an upwardly movable valve in the bottom of the mold, and cylinder operated means for maintaining the valve in lowered position at the desired time.

4. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, and mechanical means for temporarily engaging the valve and preventing upward movement thereof.

5. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, a flange formed on the valve, and a finger adapted to engage over the flange to prevent upward movement thereof.

6. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, fingers mounted adjacent the valve, and means for moving the fingers into engagement with the valve to prevent upward movement thereof.

7. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, levers pivotally mounted adjacent the valve, fingers provided on the upper ends of said levers, and means for engaging the lower portions of the levers to force the fingers into engagement with the valve.

8. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, levers pivotally mounted adjacent the valve, fingers provided on the upper ends of said levers, and cylinder operated means for moving the fingers into engagement with the valve, said fingers being withdrawn by gravity.

9. A glass forming machine including a mold, a pressing plunger, a cage depending beneath the mold, a valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, levers pivotally mounted adjacent the valve, fingers provided on the upper ends of said levers, and a wedge for engaging the lower portions of the levers to force the fingers into locking position with respect to the valve.

10. A glass forming machine including a mold, a pressing plunger, means for moving the plunger into and out of the mold, a cage depending beneath the mold, an upwardly movable valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, means for locking the valve in lowered position before the pressing plunger starts its upward movement, and means beneath the valve adapted to be operated to lift the valve after the pressing operation.

11. A glass forming machine including a mold, a pressing plunger, means for moving the plunger into and out of the mold, a cage depending beneath the mold, an upwardly movable valve arranged in the bottom of the mold and mounted for vertical sliding movement in the cage, means for locking the valve in lowered position before the pressing plunger starts its upward movement, and a plug mounted in the cage beneath the valve, said plug adapted to be lifted to lift the valve after the pressing operation.

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