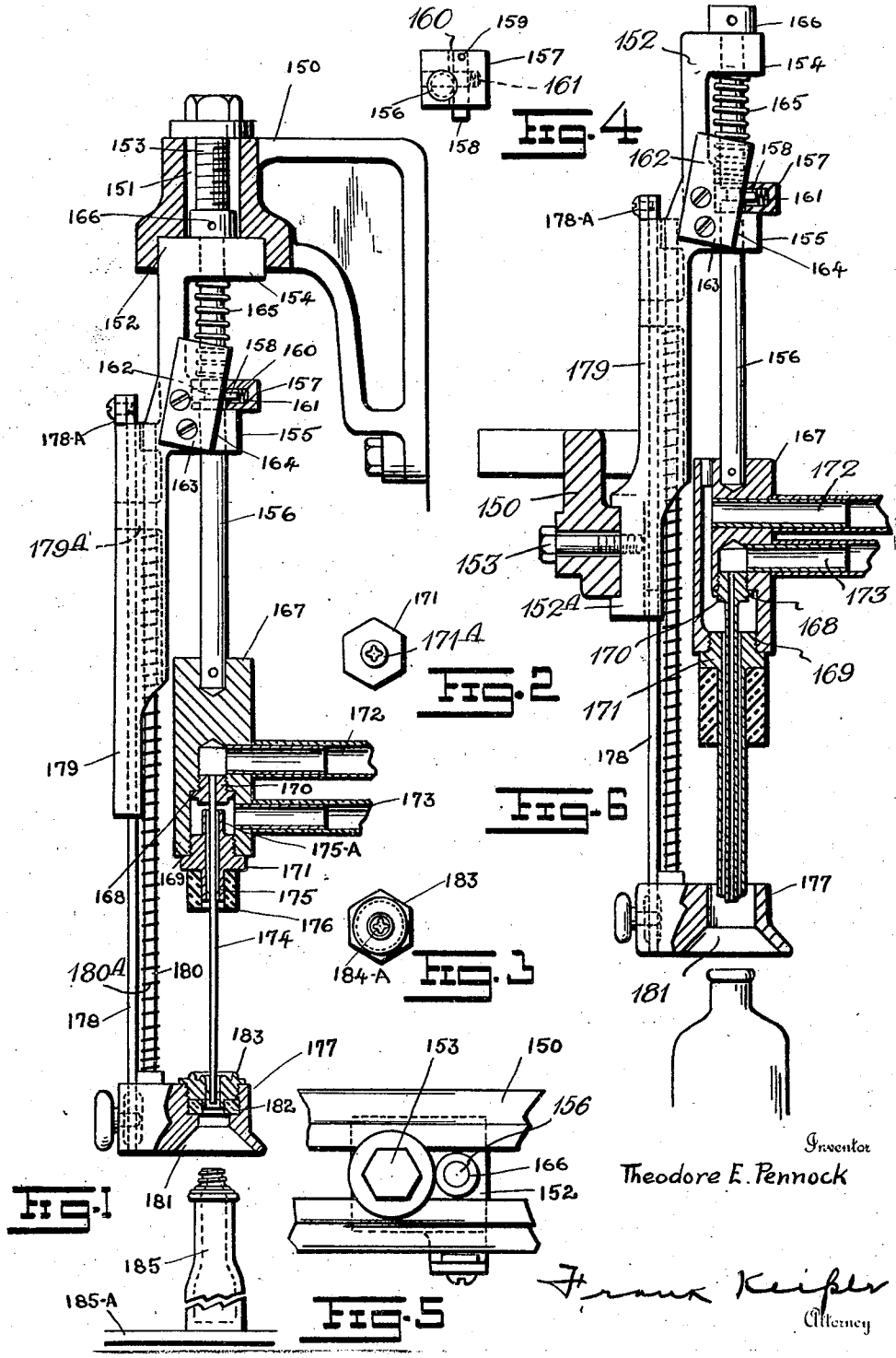
Oct. 8, 1929. T. E. PENNOCK 1,730,381

BOTTLE FILLING MACHINE NOZZLE AND SUPPORT

Filed April 6, 1925



Patented Oct. 8, 1929 1,730,381

UNITED STATES PATENT OFFICE

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BOTTLE-FILLING-MACHINE NOZZLE AND SUPPORT

Application filed April 6, 1925. Serial No. 20,972.

This invention relates to bottle filling machines, and particularly to bottle filling machines of the type operating by vacuum.

The object of the invention is to provide a novel and improved construction of filling machine, and particularly vacuum filling machine.

Another object is to provide an improved vacuum filling machine in which the nozzle is mounted in such a manner that when a bottle is brought into engagement with the sealing member to move it upwardly, a yielding resistance to said movement is provided so as to form an air-tight seal between said bottle and sealing member without danger of injury to the bottle.

A further object is to provide an improved vacuum filling machine in which provision is made for mounting the nozzle in such a manner that when a bottle is brought into engagement with the nozzle without being properly aligned therewith, the yielding resistance shall be rendered inoperative after a predetermined upward movement of said nozzle to thereafter allow said nozzle to rise freely in order to prevent injury to said bottle or nozzle.

With these and such other objects in view as shall hereinafter appear, the invention consists in the bottle filling machine and in the structures, arrangements and combinations of parts hereinafter shown and described and particularly pointed out in the claims at the end of the specification.

Referring to the drawings:

Fig. 1 is a sectional view showing one form of support for the nozzle block, said nozzle block having attached thereto a nozzle adapted to be used in the filling of bottles having a relatively small opening in the neck thereof.

Figure 2 is a bottom plan view of the part 171.

Figure 3 is a bottom plan view of the part 183.

Figure 4 is a top plan view of the collar 157.

Figure 5 is a top plan view of the bridge partly broken away showing the nozzle block supported thereon.

Fig. 6 is a sectional view showing a nozzle block supported in the manner disclosed in my United States Patent No. 1,418,203, said nozzle block having attached thereto a nozzle adapted to be used in the filling of bottles having larger openings in the necks thereof than those shown in Fig. 1.

In Figure 1 I have shown one form of support for the nozzle block, which will be described as follows:

In the drawing reference numeral 150 represents the bridge which has a vertical slot 151 therein. On this bridge are mounted a series of brackets 152 each of which is clamped in place on the bridge by a bolt 153. At the top of each bracket are provided the two lugs 154, 155 having a wide opening between them. These lugs are perforated so as to receive the rod 156 which is free to slide therein. Surrounding this rod is the collar 157 which is provided with a latch 158 pivoted at 159 therein. This collar is slotted at 160 to receive the latch and the spring 161 by which the latch is held in position. The rod 156 is provided with an annular groove 162 with which the latch 158 normally engages with some lost motion between them so that the collar and rod are joined together thereby. This causes the collar to rise and fall with the rod. Fastened to the bracket 152 is the stationary cam plate 163, the forward edge 164 of which is slightly inclined from the vertical and engages with the latch 158. When the rod 156 is pushed up for any reason it carries the latch 158 and collar 157 with it. As the latch and collar rise, the latch rides against the edge 164 of the cam plate 163 and is moved outward out of engagement with the groove 162. As soon as the latch has been completely disengaged from the rod, the rod 156 is free to move up independently of the latch and collar. A compression spring 165 surrounds the rod 156 and presses with its lower end against the collar 157 and with its upper end against the lug 154. This spring normally holds the collar 157 and rod 156 down. When the rod and collar ascend the collar 157 compresses the spring 165 as long as the latch 158 remains in engagement with the recess 162. As soon as the latch has been

pushed out from the recess by the stationary cam 164, the spring 165 pushes the collar 157 back against the lug 155 and holds it there while the rod 156 rises without the resistance of the spring. The rod 156 carries a collar 166 on its upper end which engages with the lug 154 and limits its downward movement. At its lower end the rod 156 supports the nozzle block 167, which is machined out with two seats 168 and 169 of different diameters which are provided to receive the nozzle bases 170 and 171 which form part of the air and liquid nozzles. The opening in the nozzle block is suitably threaded adjacent to these seats so that the bases 170 and 171 of the nozzles may be screwed therein. Tubes 172 and 173 lead laterally from the openings which communicate with the nozzles.

As shown in the figure, a nozzle 174 leads from the base 170 which nozzle in this case, is shown to be of a very small diameter and somewhat smaller than the opening in the bottle. This nozzle is adapted to be used in the filling of bottles having very small openings therein. The base 171 is provided with a downwardly extending tube 175 which is surrounded by a rubber seal 176. It is also provided with an upwardly extending sleeve 175A which may be omitted. All these parts from 168 to 174 inclusive are carried on the block 167.

A nozzle and bottle guide 177 is provided which is carried on a bar 178 which is free to rise and fall in a suitable guide 179 provided in the bracket 152. This bar 178 carries a block 178A on its upper end which acts as an abutment on the guide 179 to limit the downward movement of the bar 178 and guide 177 at its lowest position. In order to normally retain the bottle guide 177 in the position shown in Fig. 1 while permitting it to move upwardly when engaged by a bottle, a coil spring 180—A surrounding a rod 180 secured at its lower end in the bottle guide 177 and slidably mounted in the guide 179, is interposed between a lug 179—A formed in the guide 179 and the bottle guide 177. The guide 177 is provided with a converging throat 181 which leads to a rubber packing or seal 182 which is held in place by a cap 183 suitably threaded in the guide block 177. The cap 183 is provided with four small ribs 184—A which hold the end of the nozzle 174 centered therein, when the guide block 177 is in its lowest position. These ribs have passages between them through which the liquid can flow into the bottle as presently described.

The guide block 177 is normally in its lowest position. When the platen 185—A rises it carries the bottle 185 up against the guide block which is shaped so that the bottle will be centered thereby and the top of the bottle will press against the rubber seal 182. As the bottle continues to rise it carries the guide block 177 with it until the block 183 makes contact with the rubber seal 176. If the bottle rises further it pushes the nozzle block 167 up and carries up the collar 157. In the regular filling operation the collar 157 will remain in engagement with the rod 156 so that the pressure of the spring 165 will be exerted to hold the block and the packing down on the top of the bottle. If, however, the nozzle 174 should strike the top of the bottle, the rod 156 will rise abnormally so that the collar 157 will be disengaged from the rod 156 in which case the rod 156 will be free to travel up until the block 167 abuts against the lug 155. As shown in Figure 5 the rod 156 when lifted passes through the slot in the bridge that supports the bracket. When the platen descends with the bottle, the block 167 drops of its own weight to the bottom of its travel, at which point the latch 158 again engages with the groove 162 so that the collar and rod are again joined together.

In the normal operation when the block 183 is raised to make sealing contact with the seal 176 the liquid begins to flow into the bottle. It will be understood that the air is being continually sucked up through the nozzle 174, and air is being sucked idly out of the bottle after the nozzle engages therewith until the bottle and block 183 are brought into close contact with each other and with the rubber seal 176. Then the vacuum in the bottle will cause the liquid to flow through the fluid line down into the bottle.

As soon as the bottle is filled to the lower end of the air nozzle, the excess liquid thereafter entering the bottle will be drawn off through the air suction line and removed from the bottle as soon as it enters it. It will be understood that the apparatus shown here is intended for use in connection with the well known type of all glass sprinkler top bottles which have a very small opening therein or any other type of bottle provided with a very small opening where it is preferable to have but one tube enter the bottle. It will also be understood that these bottles are usually provided with long necks and it is not desirable to fill such bottles to within several inches of the top, but it is desirable to leave considerable air in the neck of the bottle, to facilitate the shaking of the contents out of such bottles.

In Figure 2 I have shown a bottom plan view of the part 171 showing an opening therein provided with ribs 171—A which center the air nozzle 174 in said opening and at the same time provide passages through which the liquid may flow into the bottles. In Figure 3 I have shown a similar view of the part 183 in which similar ribs 184—A are also formed.

In Figure 4 I have shown a plan view of the collar 157 and the latch 158 showing how it engages with the rod 156.

In Figure 6 I have shown a sectional elevation of my improved nozzle block and support as arranged to be used in connection with the machine shown in my U. S. Patent 1,418,203 in which case the slot in the bridge 150 extends horizontally therethrough and a portion 152—A of the bracket 152 engages the side of the bridge and is fastened thereto by the bolt 153, the parts otherwise being the same as shown in Figure 1.

The collar 157, spring 161, latch 158, spring 165 and cam 163, pin 159 are not needed except in certain cases and may be omitted if the weight of the nozzle block is heavy enough to make a seal. It will also be understood that the bracket 152 can be interchangeably used in connection with either of the filling heads and nozzles as shown in Figures 1 and 6 and with any other of the well known types of filler heads.

I claim:

1. In a bottle filling machine, in combination, a fixed bracket, a stem slidably mounted therein, a nozzle secured to said stem, means for moving a bottle upwardly into engagement with said nozzle to impart an upward movement to said nozzle and stem, means for yieldingly holding said stem down during the first part of its upward movement, and means for releasing said stem therefrom after it has risen a predetermined distance and thereafter permitting it to rise freely.

2. In a bottle filling machine, in combination, a fixed bracket, a stem slidably mounted therein, a nozzle secured to said stem, means for moving a bottle upwardly into engagement with said nozzle to impart an upward movement to said nozzle and stem, a collar mounted on said stem and arranged to engage therewith, a spring pressing down on said collar, and means for disengaging said collar from said stem after they have been raised a predetermined distance to permit said stem to rise freely thereafter.

3. In a bottle filling machine, in combination, a fixed bracket, a stem slidably mounted therein, a nozzle secured to said stem, means for moving a bottle upwardly into engagement with said nozzle to impart an upward movement to said nozzle, a collar mounted on said stem, a latch on said collar arranged to engage a recess in said stem, a spring pressing downwardly on said collar, a cam on said bracket arranged to engage said latch to disengage it from said stem after a predetermined amount of movement thereof to thereafter permit said stem to rise freely.

4. In a bottle filling machine, a bracket, a rod slidably mounted therein, a collar mounted on said rod, a latch on said collar arranged to hold said collar in engagement with said rod, means for positively limiting the movement of said rod and collar in one direction, means for yieldingly resisting the initial movement of said collar in the opposite direction, means for disengaging said latch from said rod at the end of said initial movement to thereafter allow said rod to continue its movement without resistance.

In testimony whereof I affix my signature.

THEODORE E. PENNOCK.