

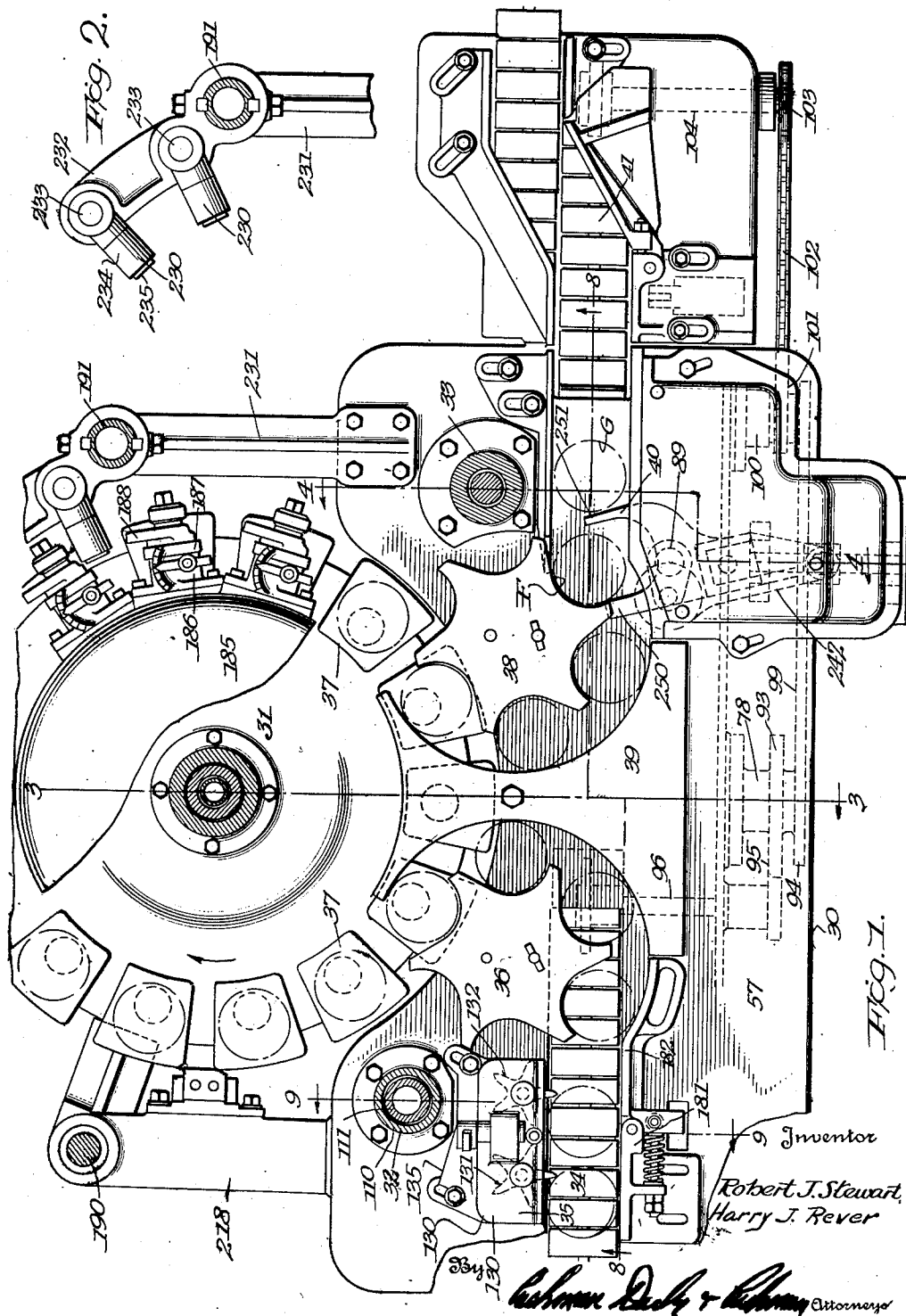
July 11, 1944.

R. J. STEWART ET AL

2,353,523

FILLING MACHINE

Original Filed Dec. 17, 1936 10 Sheets-Sheet 1



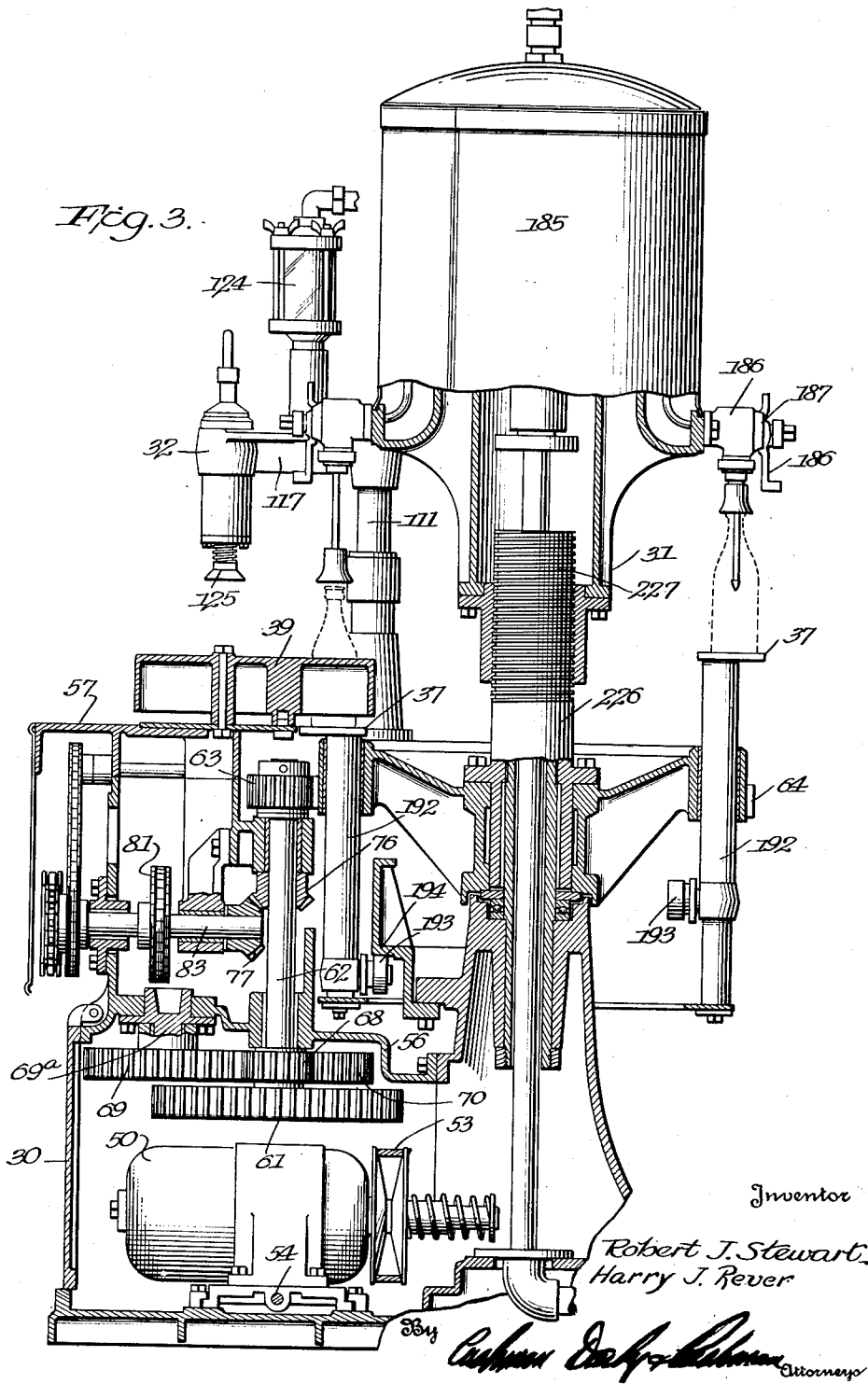
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FILLING MACHINE

Original Filed Dec. 17, 1936 10 Sheets-Sheet 2



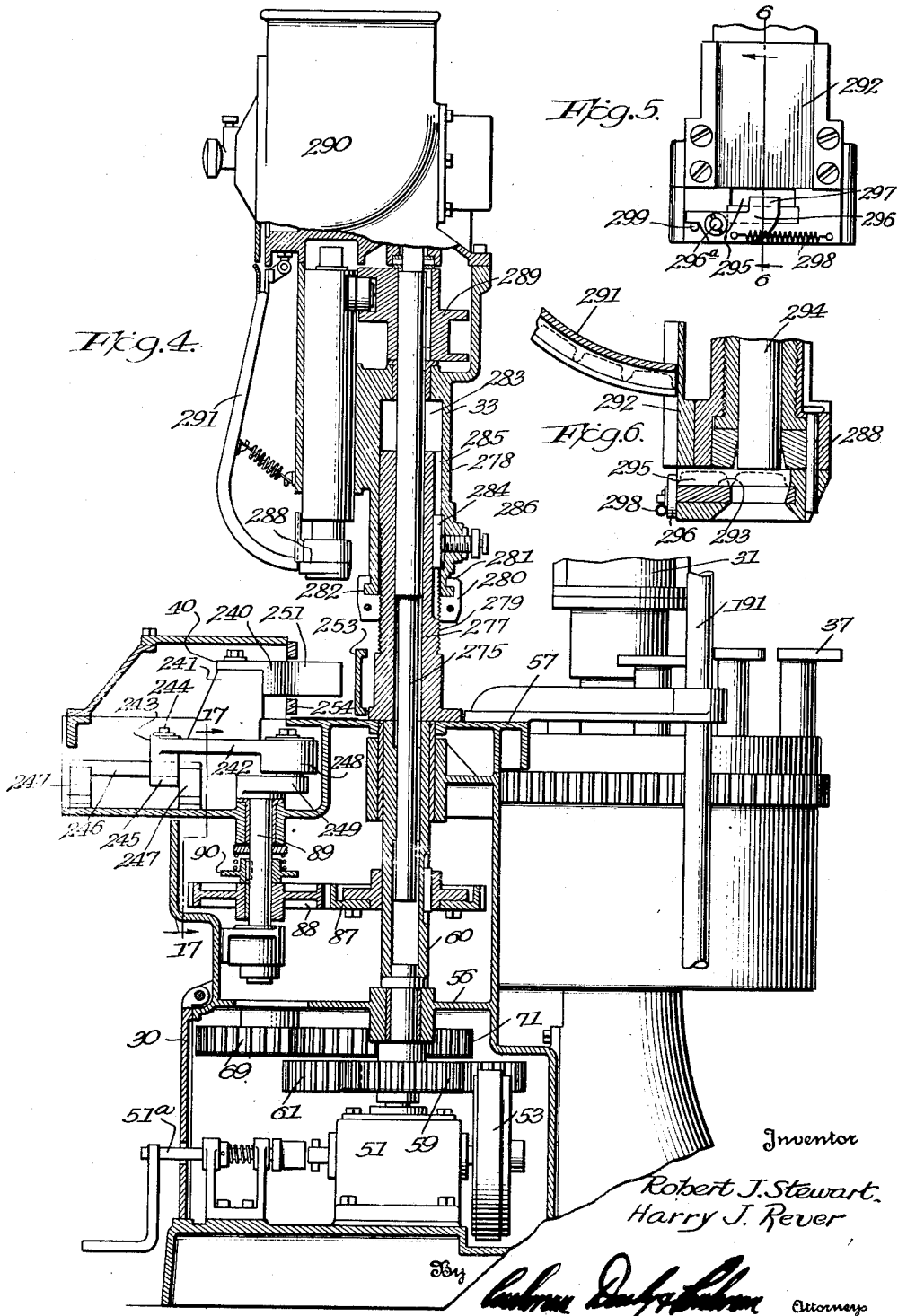
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FILLING MACHINE

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FILLING MACHINE

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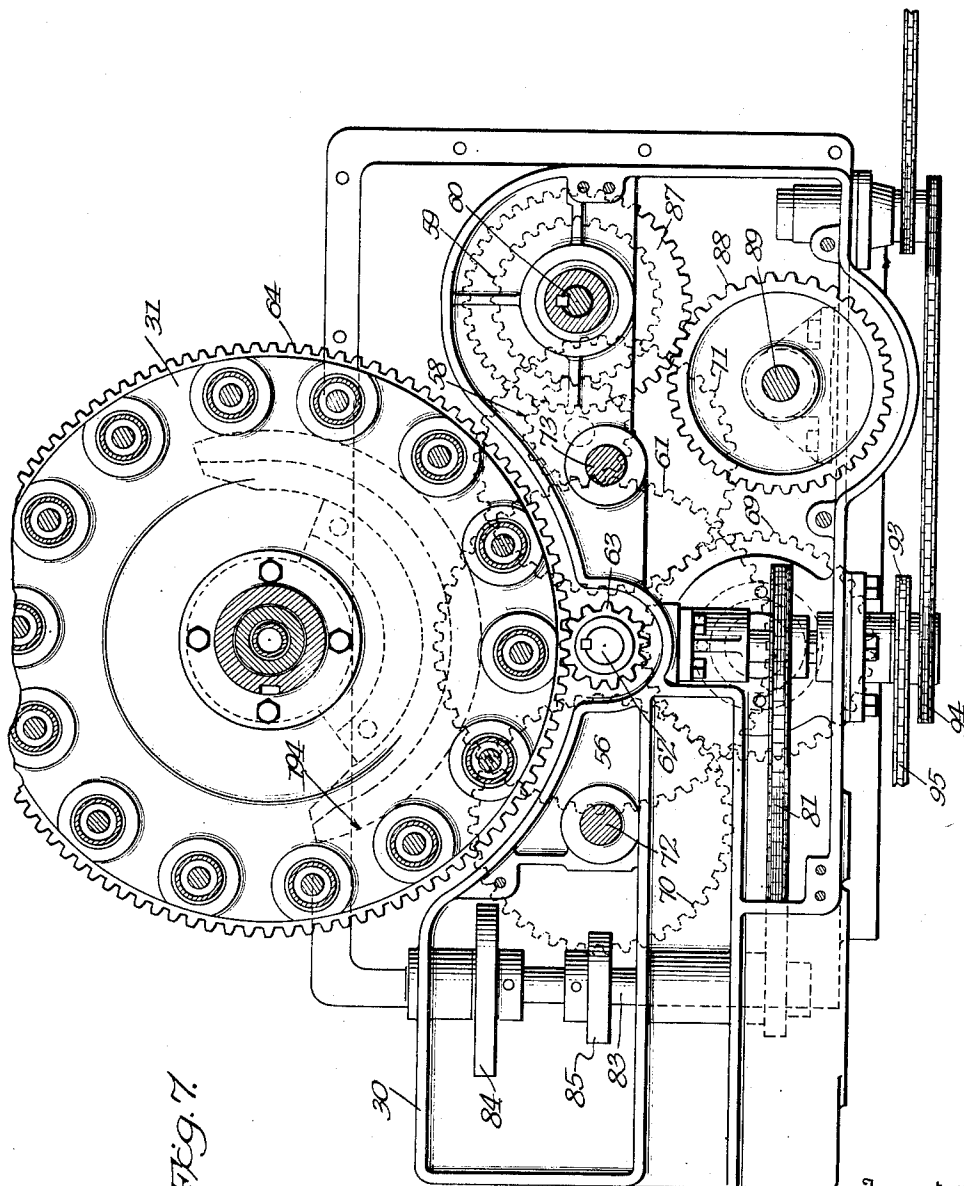


Fig. 7.

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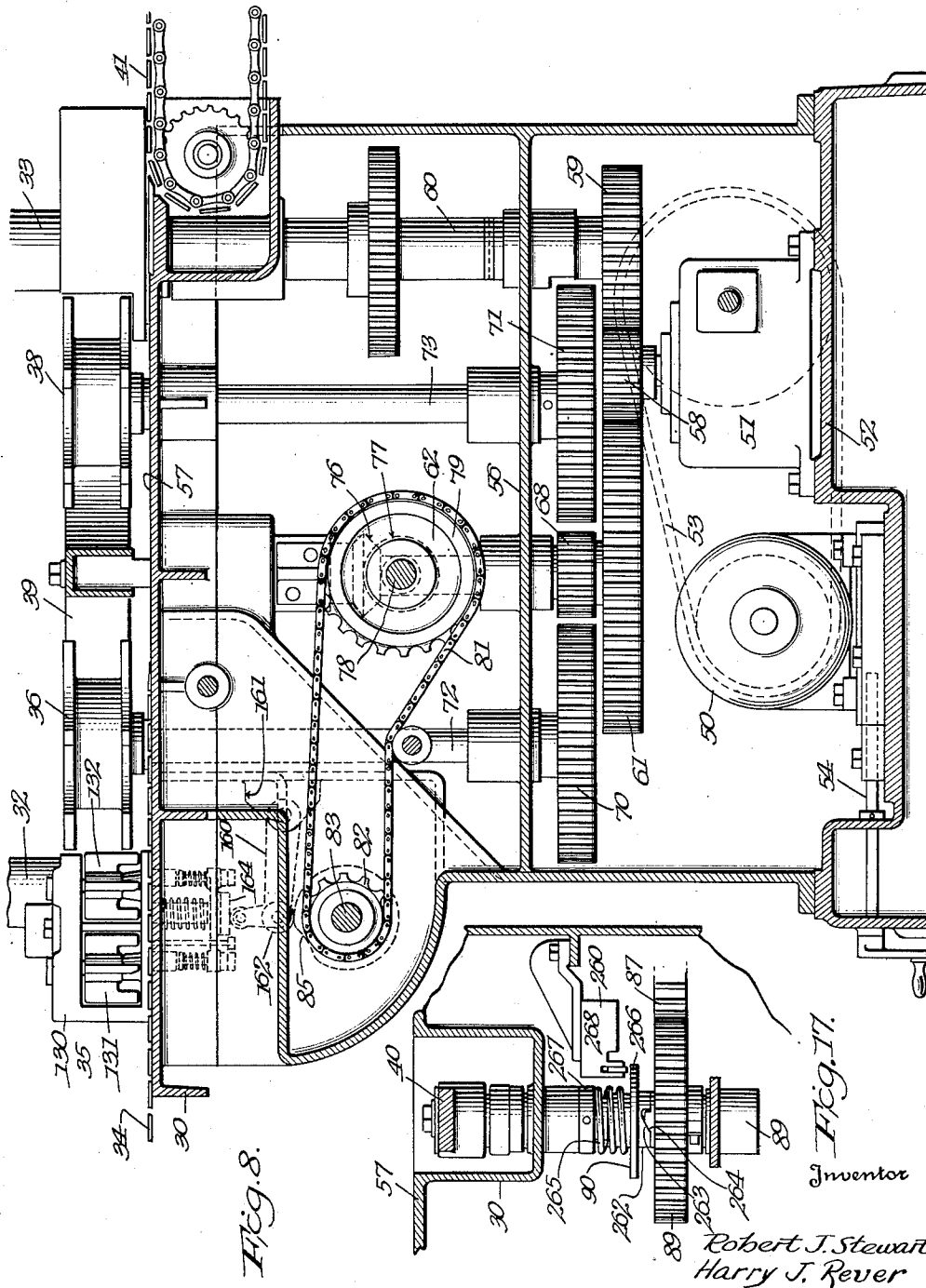
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FILLING MACHINE

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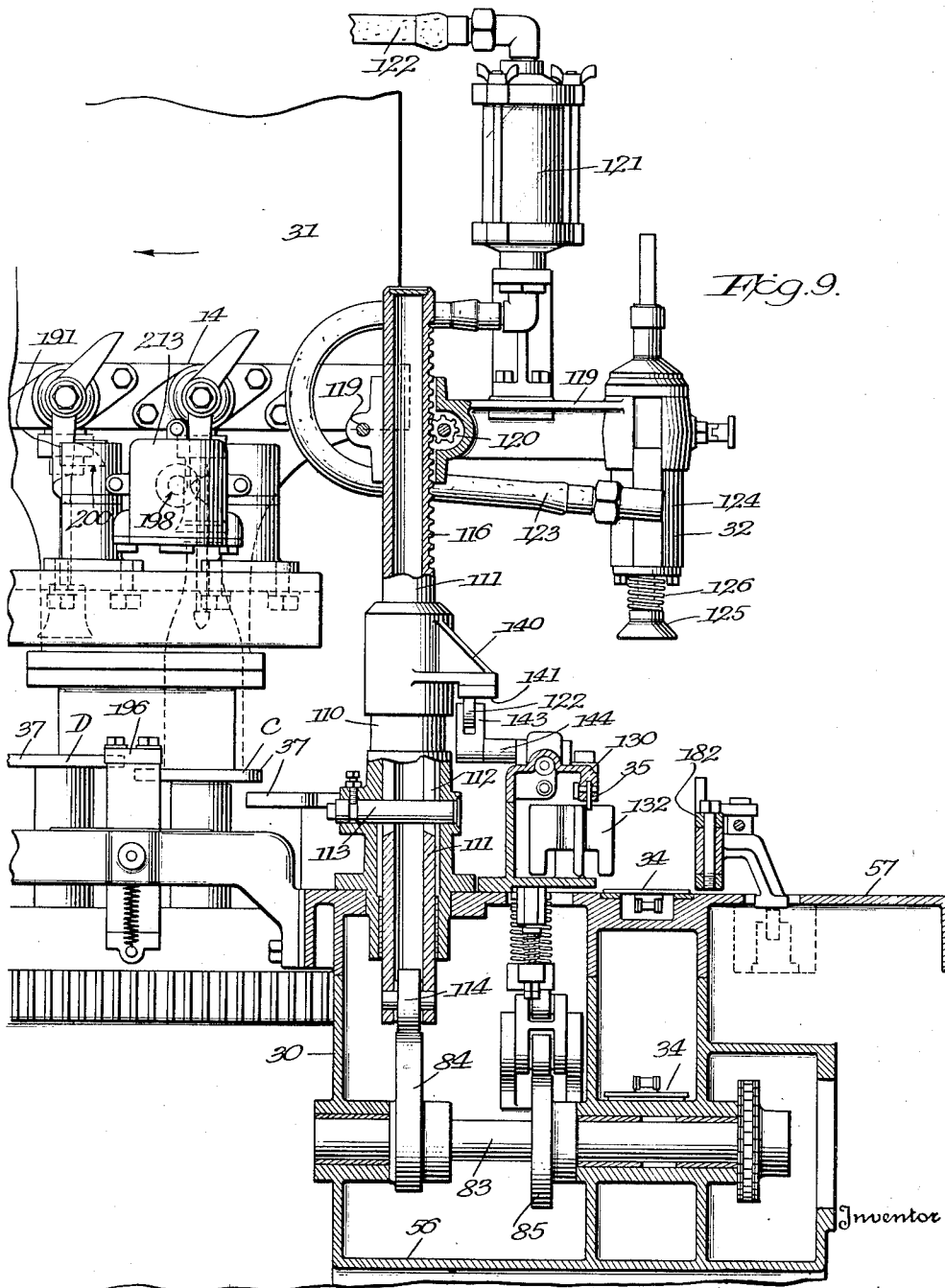
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FILLING MACHINE

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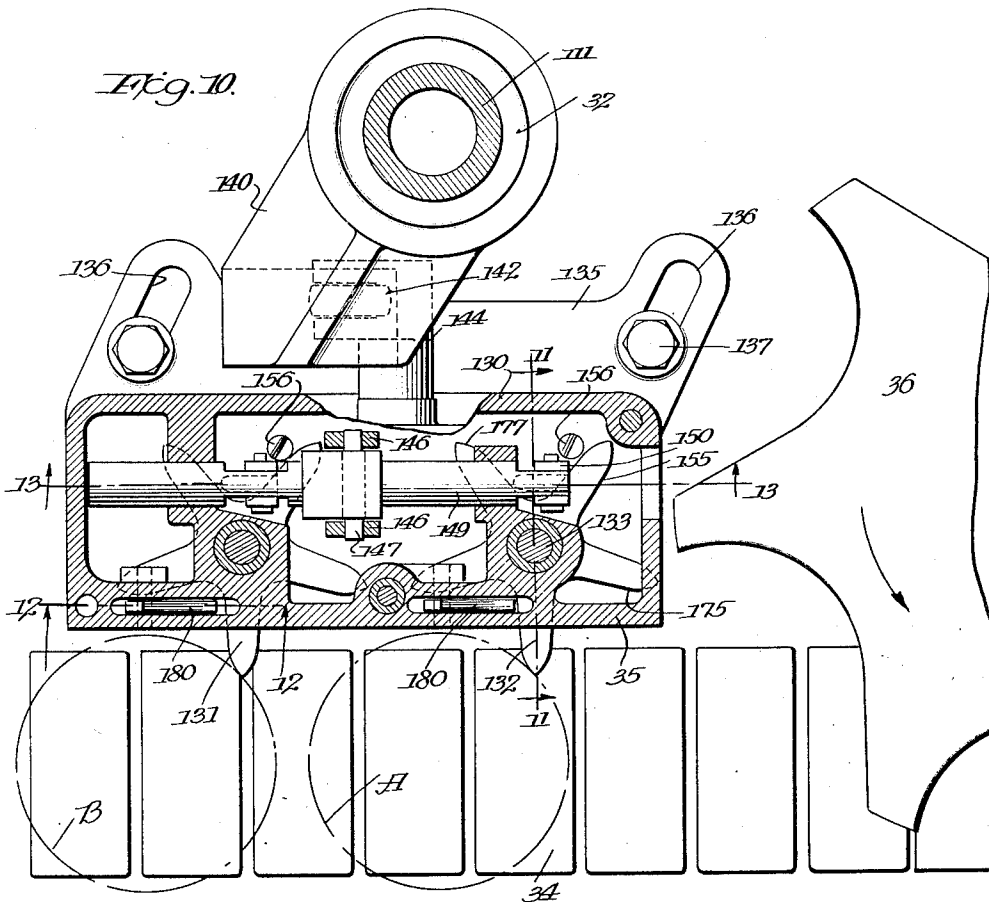
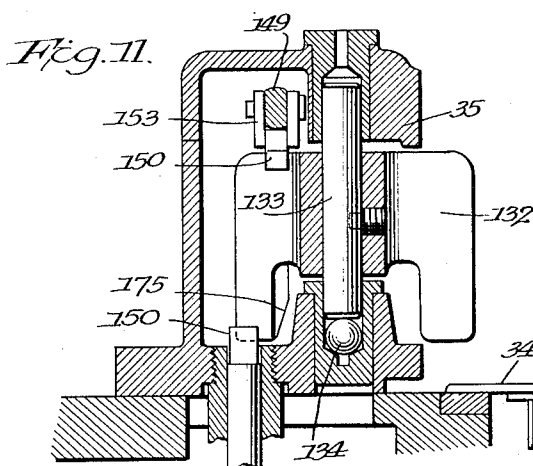
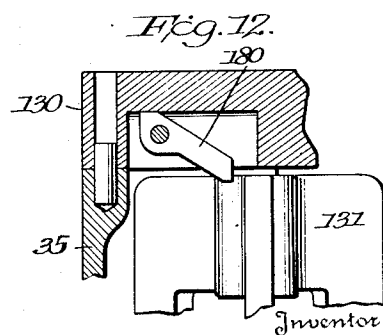
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FILLING MACHINE

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FILLING MACHINE

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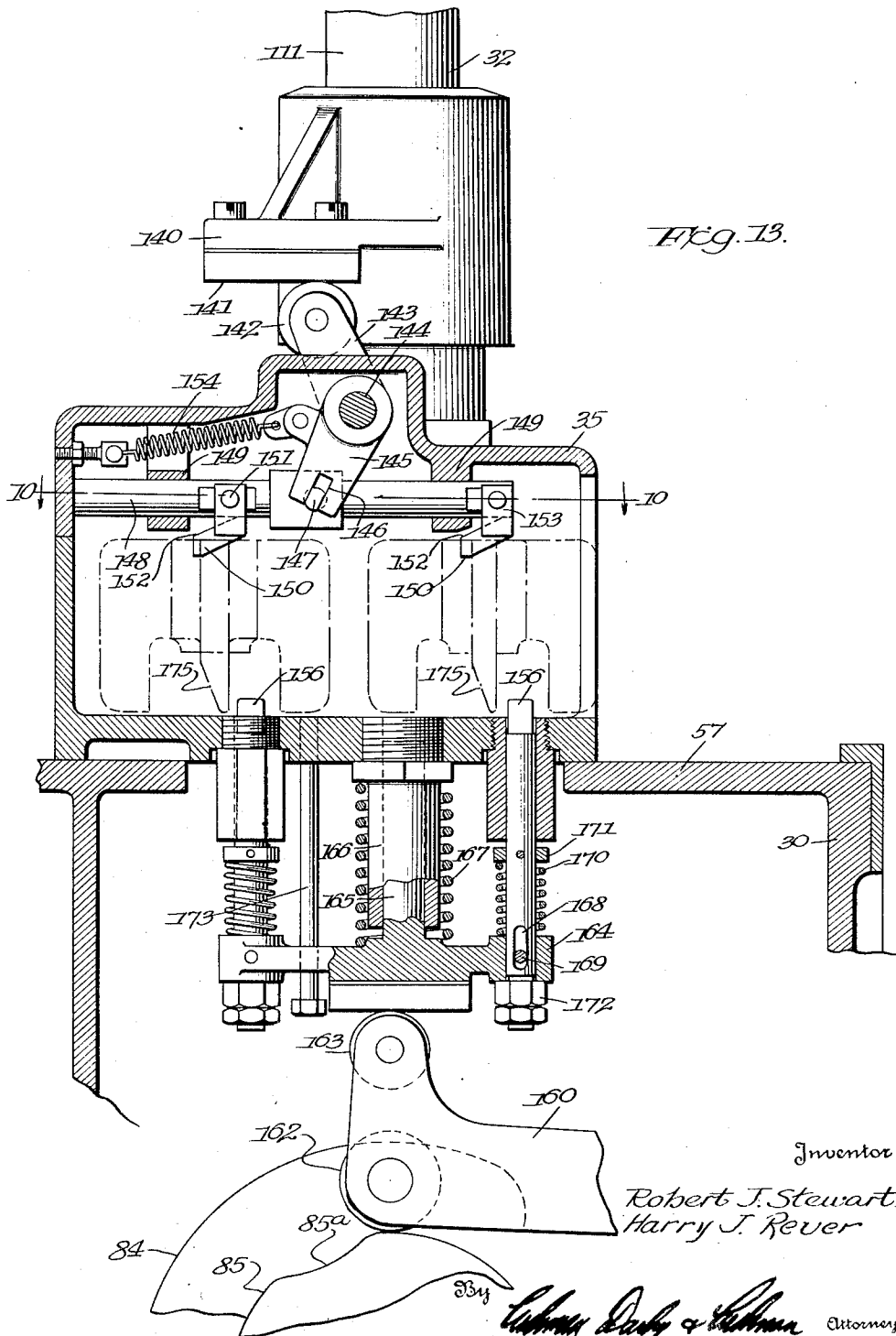


Fig. 13.

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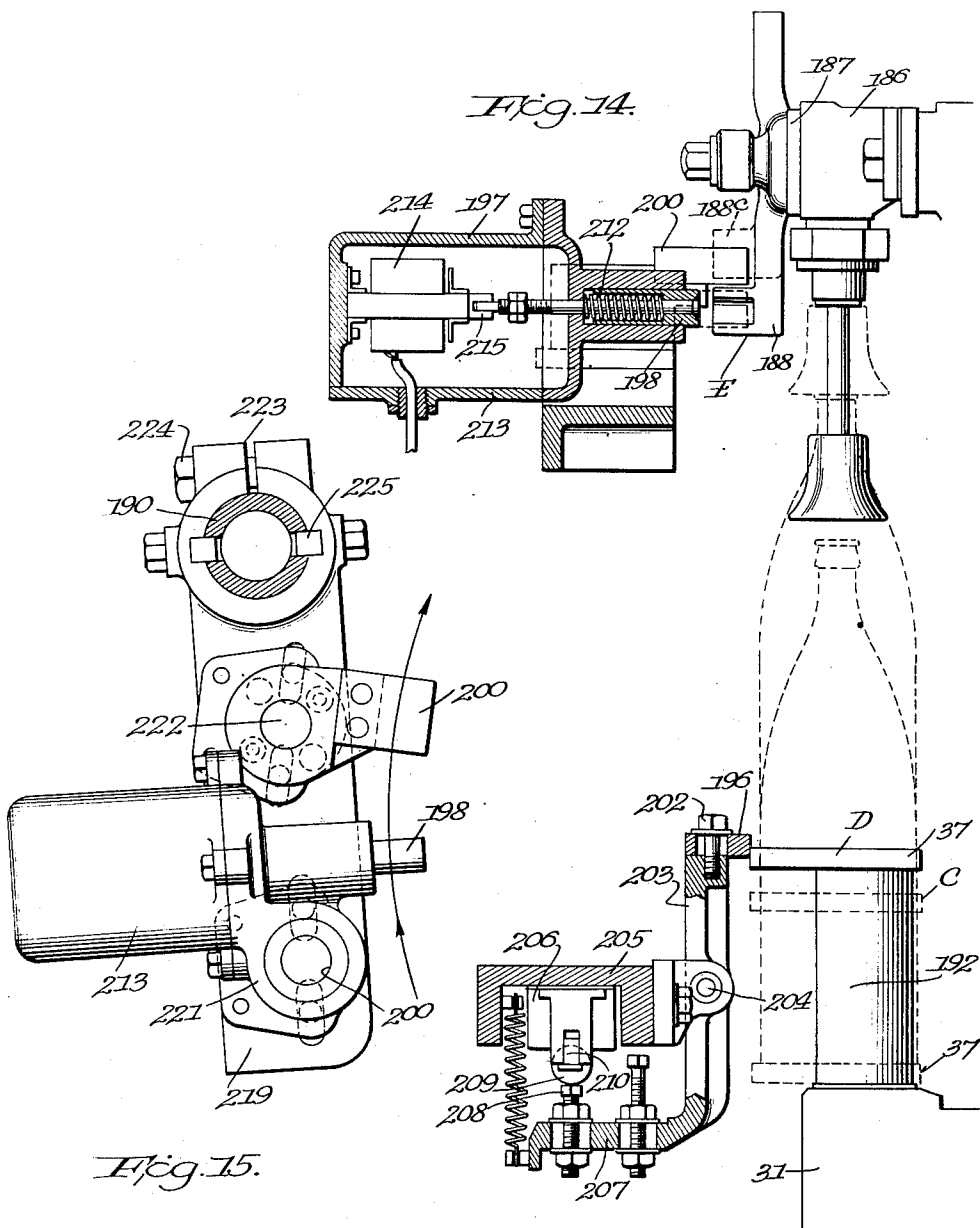
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FILLING MACHINE

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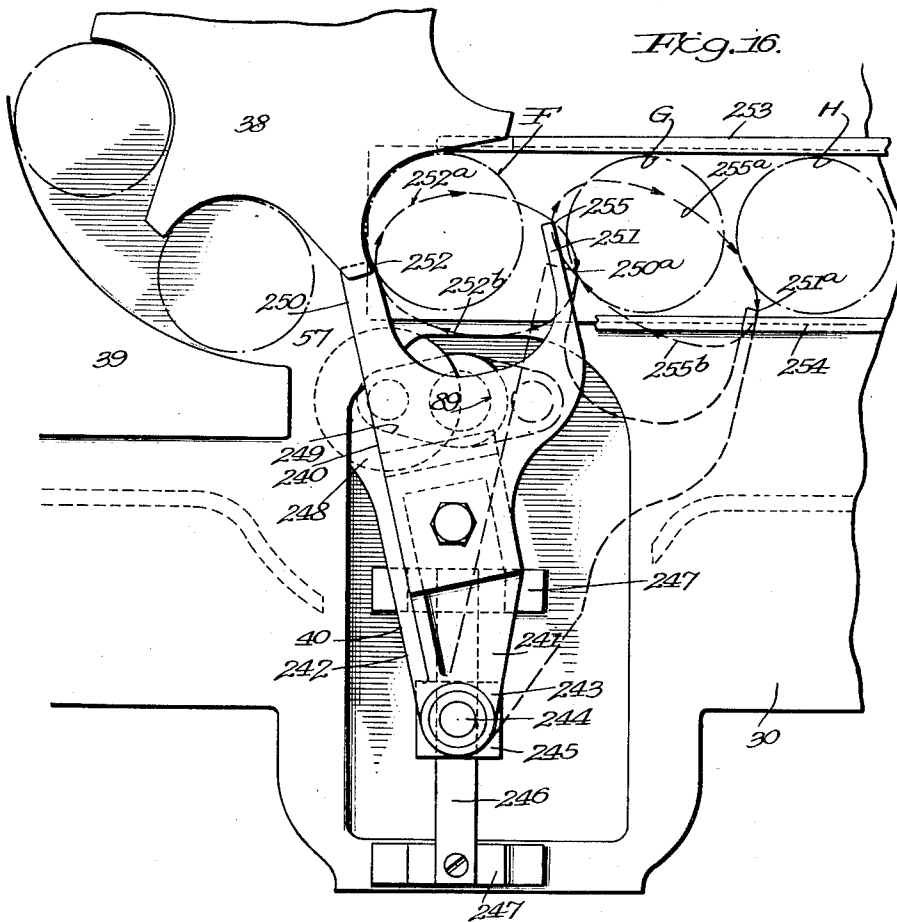
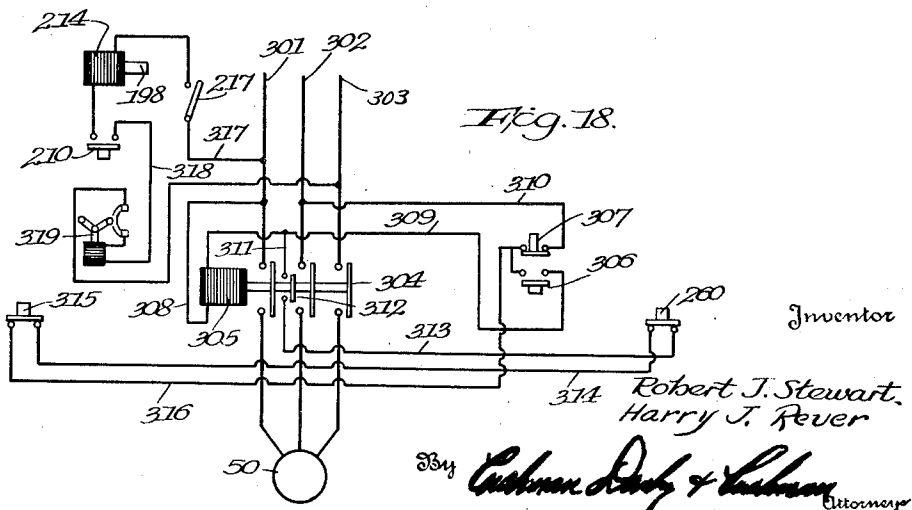
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FILLING MACHINE

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UNITED STATES PATENT OFFICE

2,353,523

FILLING MACHINE

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Original application December 17, 1936, Serial No. 116,426. Divided and this application May 6, 1940, Serial No. 333,700

14 Claims. (Cl. 226—75)

The present invention relates to filling machines. This application is a division of our application for Filling machine, Serial No. 116,426, filed December 17, 1936, issued December 17, 1940, Patent No. 2,225,022.

The principal object of the invention is to provide a filling machine of moderate capacity, but which will have a degree of efficiency comparable to larger and more expensive machines.

In all filling machines, it is desirable that the bottles or other containers be so moved between the various mechanisms, for example, the syringing mechanism, filling mechanism and crowning mechanism, that they will follow the shortest path of travel, but with the bottles always so moving that as they pass from one mechanism to another, their linear speed will not be suddenly varied nor their direction of movement sharply changed. Any sudden change of speed or any quick stopping or starting, or any sharp change of direction, may result in foaming of liquid contents of the containers. Also, such changes in speed cause sudden contact of one bottle with another or permit moving elements of the machine to sharply contact with the bottles, resulting in chipping and breakage.

Filling machines of the most efficient design are so arranged that incoming empty bottles will be received at one side of a stationary table and outgoing filled and crowned bottles will leave the table at the opposite side. The syringing and crowning mechanisms are carried on the stationary table and the filling mechanism is in the form of a rotating table positioned adjacent the rear edge of the stationary table. The incoming bottles initially follow a straight path and then move about a curvilinear path of such form that the direction of travel of the bottles when moving from the stationary table to the filling table will be substantially the reverse of the path they followed when originally received upon the stationary table. Also, bottles leaving the filling table will have their movement again substantially reversed in passing about a curvilinear path after returning to the stationary table from the filling mechanism. Subsequently, they move along a straight outgoing path to leave the stationary table and machine. In large capacity machines, the syringing and crowning mechanisms are rotary and their heads operate above portions of the curvilinear paths and serve to move bottles through a portion of such paths.

In filling machines of large capacity and selling at a relatively high price, it is practicable to include a relatively large number of guiding ele-

ments which will serve to move the bottles smoothly and in the path of optimum efficiency described above. However, since smaller filling machines must sell at a correspondingly lower price, it has not heretofore been possible to provide in such machines all of the guiding elements used in the larger machines, since the only substantial difference in the cost of manufacture would then be due only to a reduction in the number of syringing, filling and crowning heads, machines comparable to that of the present invention being provided with but one syringing head, one crowning head, and a correspondingly reduced number of filling heads.

Heretofore, in filling machines of moderate price and capacity, endeavors have been made to reduce manufacturing costs by centralizing the position of the single syringing head and the single crowning head by locating them at a point where the curvilinear paths of the bottles approach each other, and to have the bottles stopped beneath these heads. This has necessitated that the relatively heavy dials and spiders which move and guide the bottles through these paths be intermittently stopped to position the bottles seriatim beneath the syringing and crowning head, respectively. The result is that a number of larger elements of the machine are operated with a stop and start movement which obviously is not a desirable mechanical arrangement. Furthermore, any endeavor to centralize the syringing and crowning heads requires that portions of the curvilinear paths be modified from the most desirable form, so as to bring them more closely adjacent.

An important object of the present invention is to provide a filling machine of low cost wherein the bottles are moved through a path of the most efficient form, and in which the bottles are not stopped while moving through any portion of the curvilinear path, and none of the heavy mechanical elements of the machine operate with a stop and start motion.

In accordance with this object, in the preferred form of the machine of this invention, the bottles move along a path closely approximating that followed in larger and more expensive machines and, as is the case in the most efficient larger machines, the bottles, at the time of movement from the stationary table to the rotating filling table, and vice versa, will follow courses so arranged that the direction of movement will not be sharply changed. Also, the syringing head and crowning head are positioned above the straight portions of the path of the bottles, the

bottles being momentarily stopped beneath these heads. However, the members controlling this intermittent stopping either themselves move continuously, or are extremely light, and hence, impose no intermittent loads upon the machine.

Another important object of the invention is the provision of means to intermittently present bottles to a head which will perform an operation on the bottle, and which means will hold the bottle momentarily stationary beneath such a head and then move the bottle from beneath the head, all without undue jarring of the bottle.

In the present machine, the construction referred to in the above object, as used in connection with a syringing head, is as follows: The syringing head is positioned above an endless straight line conveyor which moves incoming bottles to the machine. This conveyor is continuously moved, but a bottle positioning mechanism, controlled by a continuously moving device, holds each bottle momentarily stationary beneath the syringing head while the endless conveyor continues to move beneath the bottle. After syringing, the bottle is moved from beneath the syringing head by the continuously moving conveyor and by the action of the positioning mechanism. It is found that this mechanism is entirely practicable for use with a syringing head because the syringing operation does not impose any great downward pressure upon a bottle, such as would exert a drag upon the continuously moving conveyor.

Another object of the invention is to provide means to stop operation of a filling machine in the event that a bottle is broken during passage therethrough.

With reference to the machine of the present application, the stopping means is used in connection with the mechanism for positioning bottles beneath the crowning head. Because of flaws in their glass, bottles are occasionally broken during the operation of any crowning mechanism and if large sections of a broken bottle remain beneath the crowning head, the succeeding bottle moved beneath the head by the crowner positioning means may be upset upon coming into contact with such large fragments. To overcome this difficulty, the crowner positioning means is provided with means to cause operation of the entire machine to be stopped when its forwarding movement of a bottle is impeded, as would be the case when a bottle comes into contact with a large fragment of a broken bottle.

Another object of the invention is to provide a syringing mechanism which is extremely simple in construction and operation, and readily adjustable for operation upon containers of different heights.

Another important object of the invention is to provide a filling machine in which all of the mechanisms are electrically controlled.

In most filling machines heretofore provided, it has been necessary that air pressure be used to control certain mechanisms of the machine. This has increased the cost of installation and operation, because of the fact that a source of compressed air has thus been required for operation of the apparatus.

Another object of the invention is to provide an improved arrangement for causing an individual filling head to be rendered inoperative in the event that no bottle is positioned beneath that filling head, thereby preventing the waste of filling water, as well as unnecessary wetting of the machine.

Numerous arrangements have been provided in prior art machines for preventing the waste of filling water when no bottle is positioned beneath a filling head. In some of these arrangements, the entire machine has been stopped upon the failure to position a bottle beneath the filling head. By other constructions, the filling head valve has been rendered inoperative for the filling step, but no provision has been made to prevent the operation of the valve in other steps of the filling cycle. In still other machines, separate devices have been provided at each of the filling trips to successively prevent the operation of each of the trips to actuate the filling valve.

In the arrangement embodied in our machine, the trips which cooperate with the filling head valve to successively move the latter to the various steps of the filling cycle are spaced about the filling table in the usual manner, but electrical means is provided to render the counter-pressure trip inoperative with respect to a filling head if no bottle is positioned beneath that head. Also, the counter-pressure trip, filling trip and filling valve are so designed with respect to each other that if the counter-pressure trip is rendered inoperative and fails to actuate the valve to counter-pressure position, the valve will subsequently fail to make contact with the filling trip. It will be noted that by this construction, wherein the counter-pressure trip is rendered inoperative, counter-pressure gas as well as filling water will be conserved.

Our mechanism to render a filling head inoperative when no bottle is positioned beneath the head is so designed that it will properly coact with each succeeding filling head to operate or fail to operate the latter, according to whether the head has a bottle presented thereto for filling.

Another important object of the invention is to provide filling valve trips which are readily adjustable with regard to the periphery of the filling table and which will also eliminate wear between the filling trips and the valve arms of the filling heads, respectively.

Another object of the invention is to provide filling trips which will swing from the path of a filling head valve arm if the valve should be seized against movement.

Frequent breakage of filling head valve arms and filling trips has resulted from the fact that a filling head valve will occasionally become locked on its seat. When a valve in this condition comes in contact with an immovable trip, breakage of one of the two elements occurs and it is therefore desirable to provide a trip which will swing from the path of a seized valve arm, but which will ordinarily be maintained in tripping position to properly operate the valves.

Another object of the invention is to provide a crowning mechanism which is simple in construction and operation and which may be readily adjusted to operate upon containers of different heights.

Other objects and advantages of the invention will be apparent from the following specification and drawings, wherein:

Figure 1 is a plan view of the machine, portions being shown in horizontal section;

Figure 2 is a detail plan view of one of the filling trips of the machine;

Figure 3 is a transverse vertical sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a transverse vertical sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a detail front elevation of the cap

stop mechanism provided on the crowning head;

Figure 6 is a vertical sectional view taken on the line 6—6 of Figure 5;

Figure 7 is a plan view of the driving mechanism of the machine, the top plate of the stationary table and the upper portion of the filling table being removed;

Figure 8 is a longitudinal vertical sectional view taken on the line 8—8 of Figure 1;

Figure 9 is a transverse vertical sectional view showing the syringing mechanism and the counter-pressure and filling trips, the view being taken on the line 9—9 of Figure 1;

Figure 10 is a view of the container positioning means provided beneath the syringing mechanism, the view of the positioning means being in horizontal section and taken on the line 10—10 of Figure 13;

Fig. 11 is a fragmentary vertical sectional view taken on the line 11—11 of Figure 10;

Figure 12 is a fragmentary vertical sectional view taken on the line 12—12 of Figure 10;

Figure 13 is a longitudinal vertical sectional view taken on the line 13—13 of Figure 10;

Figure 14 is a vertical sectional view through the counter-pressure trip mechanism and showing the control means therefor; the view being taken substantially on the line 14—14 of Figure 9;

Figure 15 is a plan view of the counter-pressure and filling trips;

Figure 16 is a plan view of the container positioning means provided beneath the crowning mechanism;

Figure 17 is a detail vertical sectional view taken on the line 17—17 of Figure 4 and showing the means associated with the crowner positioning means to stop the machine in case of a bottle being broken beneath the crowner; and

Figure 18 is a diagrammatic showing of the electric control circuits of the machine.

The machine of the present invention and its operation as an entirety may be described as follows:

A stationary table 30 is provided which encloses the drive mechanism of the machine and which has a rotating filling mechanism 31 positioned adjacent its rear edge. Upon the infeed side of the stationary table, the left-hand side in Figure 1, there is positioned a syringing mechanism 32, and a crowning mechanism 33 is positioned adjacent the outfeed side of the table. Bottles or other containers are moved into the machine upon an infeed straight line conveyor 34 and each bottle is positioned or held stationary beneath the syringing mechanism or syrupe 32 by a syrupe positioning device 35, the infeed conveyor 34 continuing its movement beneath the bottle during the syringing. After the bottle has been syrupe, it is released by the positioning device 35 and resumes movement with the conveyor, being removed from the latter by a rotary infeed dial 36 which places each bottle upon one of the bottle supporting platforms 37 of the filling mechanism 31. After the bottle has been filled, it is removed from the rotating filling mechanism by a rotary outfeed dial 38, its movement with this dial as well as with the infeed dial 36 being directed by a guide plate 39 positioned above the surface of the stationary table and having its edges formed to define a path of movement for the bottle. The bottles are removed from the outfeed dial 38 by a crowner positioning means 40 which moves each bottle beneath the crowning mechanism 33, the bottle

remaining stationary in this position until it has been crowned, whereupon the positioning means 40 moves it upon or toward a straight line outfeed conveyor 41 which conducts the bottle from the machine.

The various mechanisms of the machine and their operations are hereinafter described in detail.

Drive and gearing

The driving mechanism for the present machine comprises a motor 50, (Fig. 8) which drives a gear reduction unit 51, both of which are mounted upon the base 52 of the stationary table or housing 30. As shown in Figure 3, the drive to the unit 31 is accomplished through a belt 53 moving between two opposed dish-shaped drums on the motor shaft and pressed toward each other by spring tension. The position of the motor 50 with respect to the unit 51 may be varied by a screw-shaft operated slide mechanism generally indicated by the numeral 54, operation of the latter mechanism causing the position of the belt with respect to the axis of the motor shaft to be varied in the well known manner so that the drive ratio will be changed. Figure 4 shows a hand-crank operated shaft 51a aligned with the reduction unit, which shaft may be moved inwardly and clutched to a shaft of the unit to permit the mechanism of the machine to be turned by hand.

The housing 30 includes side, front and rear walls and is provided with a horizontally extending partition wall 56 intermediate its height in which are provided bearings for the various drive shafts. The upper portions of the shafts are journaled in bearings provided in the upper wall of the housing, which wall forms the working surface 57 of the stationary table or housing. As best shown in Figure 8, a vertical shaft extends upwards from the gear reduction unit 51, this shaft being provided with a pinion 58 which meshes with a pinion 59 carried at the lower end of the crowner drive shaft 60. On its opposite side, the pinion 58 meshes with a large gear 61 fixed to a vertical shaft 62 which is provided adjacent its upper end with a pinion 63 meshing with the ring gear 64 on the table of the filling mechanism 31. The shaft 62 is provided immediately above the large gear 61 with a pinion 68 meshing with a larger pinion 69 on a stub-shaft 69a, pinion 69 driving pinions 70 and 71 arranged on each side thereof. The pinion 70 is fixed to a shaft 72 which carries the infeed dial 36 at its upper end and the pinion 71 is fixed to a shaft 73 on the upper end of which is mounted the outfeed dial 38.

The vertical shaft 62 has a beveled pinion 76 fixed thereto which meshes with a bevel pinion 77 on a horizontal and transversely extending shaft 78 which carries a sprocket 79. A chain 81 passes about the sprocket 79 and also about a smaller sprocket 82 on a horizontal and transverse shaft 83. As shown in Figure 9, shaft 83 has a cam 84 fixed thereto which actuates the syringing mechanism and also carries a cam 85 which controls the positioning means operating beneath the syringing mechanism.

As illustrated in Figure 4, the positioning means beneath the crowning mechanism is actuated through a gear 87 fixed to the crowner shaft 60, gear 87 meshing with a gear 88 free on a shaft 89 and driving the positioning means through a clutch 90 subsequently described.

Referring to Figure 1, the straight line con-

veyors 34 and 41 are driven from sprockets 93 and 94 fixed to the horizontal shaft 78. A sprocket chain 95 driven by sprocket 93 meshes with a sprocket on a horizontal shaft 96 which is provided at its inner end with a drive sprocket for the infeed conveyor element 34 while sprocket 94 drives a chain 99 extending about a sprocket on a shaft 100, the latter shaft also carrying a sprocket 101 which, through a chain 102, drives a sprocket 103 on a shaft 104 having a drive sprocket on its inner end engaging the outfeed conveyor belt or chain 41.

It will be understood that in numerous instances, the outfeed conveyor 41 may be replaced by a straight-line conveyor driven by an apparatus to which the present filling machine delivers the bottles.

The syringing mechanism

As best shown in Figure 9, the syringing mechanism is mounted to reciprocate in a sleeve 110 extending upwardly from the surface 57 of the stationary table 30 adjacent the infeed end thereof. A post 111, preferably also hollow, slides in bearings within the sleeve 110, post 111 being slotted as indicated at 112 intermediate its length and a pin 113 extending through the slots 112 and through apertures in the walls of the sleeve 110 to prevent the post 111 from rotating. At its lower end, the reciprocable post 111 carries a roller 114 which engages the syrupeur cam 84, the roller 114 being held in engagement with cam 84 by reason of the weight of the post 111. The upper portion of post 111 is provided with rack teeth 116 on one face thereof and an arm 117 is carried by the upper portion of the post opposite the teeth 116, the arm 117 being provided with a bore 118 which encircles the post, the arm being split at the bore and arranged to be tightly clamped upon the post by means of a transverse bolt 119. A gear 120 is journaled in the arm 117 to engage the rack teeth 116, rotation of the gear 120 when the bolt 119 is loosened causing the arm to be moved upwardly or downwardly along the post.

The arm 117 supports a small syrupeur tank 121, which may receive syrup from a storage tank, not shown, through a pipe line 122. A flexible pipe line 123 extends from the lower portion of tank 121 to a syringing head 124 including a reciprocable syringing nozzle 125. The syringing head 124 is generally similar to that disclosed in the Filling head application of George J. Huntley and Robert J. Stewart, Serial No. 5,720, filed February 15, 1935, being so constructed that downward movement of the syringing head will cause the syringing nozzle 125 to be moved upwardly against the action of a spring 126 to shift a valve within the syringing head and permit syrup to flow from the nozzle 125 into the bottle. When the syringing head is lifted, the spring 126 will cause the nozzle 125 to be forced downwardly to the position shown in Figure 9, permitting syrup to flow through the line 123 into a measuring chamber within the syringing head, all as described in the application referred to.

In the operation of the syringing mechanism, at the moment that a bottle is positioned beneath the syringing nozzle 125, the rotation of cam 84 will permit the reciprocable post 111 to lower, causing the bottle to be syrupeur. Continued rotation of the cam 84 will raise the syringing head and arm 117 to the position shown in Figure 9, when the syrupeur bottle will be moved from beneath the syringing head as hereinafter described and another bottle placed in position for receiving a charge of syrup.

Bottle positioning means for syringing mechanism

Figures 9 to 13 illustrate in detail the mechanism for positioning bottles beneath the syringing mechanism, which mechanism is generally indicated by the numeral 35 and comprises a box-like housing 130 in which are journaled two star wheels 131 and 132, the star wheels being secured upon pins 133 (Figure 11) journaled at their upward ends in the upper wall of the housing 130 and having their lower ends preferably resting upon balls 134 for easy rotation.

Each star wheel is provided with five vanes forming five pockets and the housing 130 is intended to be so mounted with respect to the straight line infeed conveyor 34 that a vane projecting from the housing as shown in Figure 10, will be in the path of bottles moving with the conveyor. The housing 130 includes a projecting base 135 having slots 136 therein through which extend bolts 137 threaded in the upper surface 57 of the work table. The slots 136 are arranged at such an angle that movement of the housing 130 with respect to the infeed conveyor 34 will always maintain the outwardly projecting vane of the star wheel 132 in such position that a bottle contacting against the same as at A in Figure 10 will be in alignment with the vertical axis of the syringing nozzle 125.

Referring to Figure 9, the reciprocating post 111 of the syrupeur mechanism has a cam block 140 adjustably secured thereto at a point well above the upper surface 57 of the stationary table 30. The flat working face 141 of the cam block is of hardened steel and is arranged to contact with a roller 142 carried at the upper end of an arm 143 extending upwardly from a short shaft 144 journaled in the upper portion of the housing 130. Shaft 144 is provided with a downwardly extending and bifurcated arm 145 within the housing 130, the lower end of arm 145 being slotted as at 146 to engage a horizontally projecting pin 147 carried by a rod 148 slidably mounted in trunnions 149 projecting downwardly from the upper wall of the housing.

The rod 148 has a pair of pawls 150 pivotally connected thereto by pins 151, the pawls being so spaced upon the rod that they may respectively cooperate with the star wheels 131 and 132 in a manner hereinafter described. It will be noted that the pawls 150 each comprises a depending pawl portion 152 having upwardly extending side arms 153 formed integrally therewith and which engage the pins 151, the upper end of each pawl portion being adapted to bear against the underside of rod 148 to limit counter-clockwise swinging movement of the pawl on its pin 151.

A coil spring 154 extends from the left hand or outer end wall of the housing 130, and is connected to the arm 145 of shaft 144 to tend the same to the position shown in Figure 13.

By the arrangement described above, the coil spring 154 will normally draw the arm 145 of shaft 144 to the left and to the position shown in Figure 13, thereby holding rod 148 and its pawls 150 to the left. However, descent of the reciprocating post 111 of the syringing mechanism will bring the working face 141 of cam block 140 into contact with the roller 142 of arm 143, rotating the shaft 144 in a counter-clockwise direction (Figure 13) to move arm 145 and rod 148 to the right. On the right hand movement of rod 148 resulting from the descent of the syringing head 32 and cam block 141, the

pawls 150 will ride over the upper edges of the vanes designated 155 in Figure 10 and while the star wheels are held stationary by latches 156 described below. As soon as a bottle has been syruiped, the cam block 140, moving upwardly with the syruiping head, will release arm 143, permitting the spring 154 to draw rod 148 to the position shown in Figures 10 and 13. In moving to this position, the pawls 150, unable to swing in a counter-clockwise direction, will contact with the right hand or rearward faces of the vanes designated 155, and since the latches 156 will then be momentarily released, the star wheels 131 and 132 will be turned a distance corresponding to the space between two adjacent vanes.

The star wheels 131 and 132 are alternately held stationary and free to rotate by means of a latching mechanism controlled by the cam 85 carried on shaft 83 and best shown in Figure 13 and in dotted lines in Figure 8. As is illustrated in Figure 8, a cam operated lever 160 pivotally mounted in a fixed bracket 161 is provided with a roller 162 intermediate its length and adapted to contact with the cam 85. A second roller 163 journaled at the outer end of the lever is arranged to bear against or support a plate 164, the roller 163 directly contacting with a hardened steel member secured to the underside of the plate 164. Plate 164 includes an integral upstanding post 165 which is slidable in the bore of a sleeve 166 projecting downwardly from the lower wall of the housing 130. A spring 167 surrounds the sleeve 166 and has its lower end bearing against the upper surface of the plate 164 so that the latter will be tended downwardly and always held in contact with the roller 163.

The latches 156 are operatively connected to the plate 164, the lower ends of the latches being slotted as indicated at 168 to accommodate cross-pins 169 secured in the plates and passing through the latches 156 to prevent turning of the same and to also limit movement of the latches with respect to the plate. Relatively light springs 170 surround the lower portions of the latches 156, the lower ends of the springs bearing on the plate 164 and their upper ends bearing on washers 171 fixed to each latch intermediate its length. The springs 170 serve to hold the latches upwardly with respect to the plate, upward movement of each latch being further prevented by lock nuts 172 positioned at its extreme lower end and bearing against the underside of the plate.

Since the plate 164 and the latches associated therewith are only retained in the housing by the contact of the cam roller 163 therewith, a bolt 173 is provided which extends downward from the lower wall of the housing and through an aperture in the plate, this bolt being merely provided for the purpose of preventing the plate from falling away from the housing should the cam lever 160 be removed from the machine for adjustment or the like.

The operation of the latching mechanism described above is as follows: The latches 156 are normally held in the position shown in Figure 13 by contact of the roller 163 with plate 164 and because the cam 85 which controls the position of the cam 160 is of uniform diameter throughout the greater area of its peripheral surface as shown in Figure 8. During the time that the latches are held upwardly the star wheels will be held stationary so that the bottle at position A and beneath the syruiping head may be

syruiped. However, at the moment that the syruiping head begins to rise, the low portion 85a of cam 85 will come opposite the roller 162 on cam lever 160, permitting this lever to momentarily drop. The dropping of cam lever 160 will permit the spring 167 to force the plate 164 downwardly and the latches 156 will therefore be moved downwardly, the springs 170 being of insufficient strength to retain the latches 156 in upward position when plate 164 moves down.

As the latches are dropped from the path of the vanes at 155, the rod 148 will move to the left with its pawls 150 bearing against the rear surface of the vanes 155, moving these vanes to the position indicated at 177 in Figure 10. The timing of cam 85 is such that as soon as the vanes have passed over the latches 156, the latches will be permitted to rise, preventing the vanes from being moved past position 177.

Pivoted gravity latches 180 are provided in the upper wall of the housing 130, the purpose of these latches being to prevent the star wheels from turning backwardly in a clockwise direction with reference to Figure 10 when they have passed these latches.

The lower and trailing of rearward edge of each vane of star wheels 131 and 132 is beveled as indicated at 175 and the left hand upper ends of the latches 156 are correspondingly beveled. By this arrangement, should a star wheel be moved rearwardly, that is, turned clockwise with reference to Figure 10, before it moves past to latch 180, it will be free to force its latch 156 downwardly and pass over the same, avoiding breakage of parts.

The operation of the syruiper positioning mechanism described above is such that a bottle will always be held at position A by a vane of star wheel 132 which projects outwardly and over the infeed conveyor 34. A second bottle will be held at position B by the outwardly projecting vane of star wheel 131, and all of the succeeding bottles on the conveyor will be likewise held stationary behind the bottle at position B. When the syruiping head descends to syruip the bottle at A, it will move the rod 148 to the right to bring its pawls 150 into position to turn the star wheels forwardly but rod 148 will remain in right hand position until the syruiping head rises after the bottle has been syruiped. At the moment when the syruiping head rises, the latches 156 will move downwardly to release the star wheels 131 and 132 as the rod 148 moves back to the left by the action of the spring 154. The counter-clockwise rotation of the star wheels 131 and 132 (Figure 10), together with the movement of the conveyor 34, will cause the bottle at position A to be moved into a pocket of the spider 36 and the bottle at position B will move to position A to be syruiped, its place at position B being then occupied by the next bottle in the line on conveyor 34.

It will be understood that conveyor 34 is continuously moving but may move freely beneath the stationary bottles, there being no drag imposed either on the conveyor or on the bottle being syruiped at position A due to the fact that the syruiping head does not impose a heavy downward pressure upon the bottle while syruiping the same.

It will be noted that the working face of the cam block 140 is sufficiently wide that any possible adjustment of the housing 130 will always leave the roller 142 beneath the path of movement of the block. The plate 164 is also suf-

ficiently wide to always be in contact with the roller 163, regardless of adjustment of the housing.

As is best shown in Figure 1, an upstanding guide member 181 is suitably supported on the working surface 57 of the table 30 adjacent the forward side of the infeed conveyor 34. The guide member 181 may be adjusted to various positions with respect to the infeed conveyor, and since the housing 130 is similarly adjustable, the two may be so spaced that they will accommodate bottles of various sizes between them, housing 130 being movable on a diagonal line in the manner described above so that the bottle which will be held at A by star wheel 132 will always be in axial alignment with the syringing head. A gate member 182 of the construction disclosed in the patent of Wiltie I. Gladfelter, 2,013,144, September 3, 1935, Bottle handling machine and control therefor is positioned between guide members 181 and 39, member 182 being arranged to swing outwardly to actuate a switch hereinafter described to stop the machine should bottles become jammed adjacent the infeed dial 36.

Bottles moving with the infeed spider 36 will move upon the upper surface 57 of the work table, and in the path defined by the guide plate 39, to be positioned upon the bottle supporting platforms 37 of the filling table 31. The infeed spider 36 and also the outfeed spider 38 are removably mounted upon the shafts 72 and 73, respectively, so that spiders having pockets of other sizes may be used for bottles of different sizes or conformations than those shown in the drawings.

The filling table 31 is rotated by the gearing which has already been described and includes a filling reservoir 185 to which are connected filling heads 186 provided with rotating disk valves 187 including valve arms 188. The reservoir, filling valves and filling valve trip arms are substantially the same type as disclosed in Patent No. 2,145,765 issued to George J. Huntley and Robert J. Stewart for Filling machine on January 31, 1939, and the entire filling table construction is substantially as disclosed in that patent.

As is the case in the structure of the patent issued to George J. Huntley and Robert J. Stewart referred to above, when a bottle is positioned upon a bottle supporting platform 37 and beneath the corresponding filling head 186, the rotation of the filling table in a clockwise direction (Figure 1) will cause the trip arm 188 of that filling head to successively contact with a counter pressure trip, a filling trip and a sniffing trip. The counter pressure trip and the filling trip are supported from the post 190 shown in the upper left hand portion of Figure 1 and the sniffing trip is supported on the post 191 in the upper right hand portion of the same figure. The counter pressure and sniffing trips are best illustrated in their relation to each other in Figures 9, 14 and 15. The bottle supporting platforms 37 are carried by reciprocable plungers 192 mounted in the filling table 31, the plungers being tended upwardly by coil springs, not shown, and being provided with rollers 193 (Figure 3) which, during the portion of their traveling movement when they are adjacent the stationary table 30 are in contact with a cam track 194 fixed to the base of the machine. The cam track 194 is of such configuration that almost immediately after a bottle has been sniffed, the platform 37 carrying that bottle will be moved downwardly to a position level with the upper surface 57 of

the work table so that the filled bottle may be removed by the outfeed spider 38 and a syringed bottle positioned on the platform by the infeed spider 36, the platform 37 then being permitted to rise again.

Counterpressure trip control mechanism

When a bottle is positioned upon a bottle supporting platform 37, and the platform is subsequently permitted to move upwardly from the position shown in dotted lines at C in Figure 14 by reason of the upward inclination of the cam track 194, and by the action of its coil spring, the upward movement of the platform will be limited to the position indicated at C in Figures 9 and 14 because of the fact that the mouth of the bottle will come into contact with the filling head 186 as the platform rises. In this position, as shown at C in Figure 9, and also at C in Figure 14, the platform 37 will be beneath a striker 196 of a counter-pressure trip control mechanism 197 arranged beneath the counter-pressure trip 198 so that the platform will not contact with the striker. The striker 196 controls the position of the counter-pressure trip 198 and since the striker is thus not actuated by the bottle supporting platform, the counter-pressure trip 198 will remain outwardly in the position shown in dotted lines in Figure 14 so that the valve arm 188 of the filling head will be turned backwardly and upward by the trip 198 to the position indicated at 188c in dotted lines in Figure 14. A very slight continued rotation of the filling table will cause the valve arm 188, raised to position 188c, to contact with the filling trip 200, further turning the valve arm 188 to operate the filling valve to filling position.

However, in the event that the bottle supporting platform 37 does not receive a bottle as it passes the infeed spider 36, the spring of that bottle supporting platform can move the platform to the full extent permitted by the resiliency of the spring, which position is indicated in solid lines at D in Figure 14 and also at D in Figure 9. With the platform 37 at position D, its outer edge will contact with the striker 196 of the counter-pressure trip control mechanism 197.

The striker 196 is adjustably secured by bolts 202 to a lever 203 pivoted at 204 to a bracket 205 fixed to the stationary table of the machine. The bracket 205 carries on its under side an electrical switch 206 which is normally in open contact position. The lever 203 includes a horizontally extending portion 207 provided with an upstanding and adjustable set screw 208 which normally bears against a roller 209 carried by the movable contact supporting member 210 of the switch 206. When the striker 196 carried at the upper end of the lever 203 is positioned inwardly (or to the right in Figure 14), the position to which it is tended by a spring 211, the horizontal portion 207 of the lever will be in upward position, holding the roller 209 and the contact supporting member 210 upon which it is carried in upward and non-circuit closing position. With the switch 206 in open position, the counter-pressure trip 198 will be in the outward position indicated in dotted lines in Figure 14, the trip being tended to this position by a coil spring 212 within the housing 213 in which the counter-pressure trip is mounted. With the trip 198 in outward position, when the lower portion of a valve arm 188 of a filling head 186 comes opposite the same, the valve arm will be swung to a position to per-

mit flow of counter-pressure fluid to the bottle beneath the same.

However, as stated above, when no bottle is upon the platform element 37 beneath a filling head, the entire bottle supporting platform 37 moves to the higher position indicated at D so that when the platform comes opposite the striker 196, the lever 203 will be swung to the position shown in Figure 13, thereby moving the horizontal portion 207 of the lever downwardly. This movement will permit the roller 209 and the contact supporting member 210 which carries the same to move downwardly to close the circuit controlled by the switch 206, thereby energizing an electro-magnet 214 to draw inwardly an armature 215 which is connected to the inner end of the counter-pressure trip 198.

With the counter-pressure trip 198 thus retracted, the valve arm 188 of the filling head will move past the counter-pressure trip 198 without being moved to counter-pressure flow position and, as a result, the valve arm 188 will move beneath and past the filling trip 200 as indicated at E in Figures 9 and 14 and thus will not strike or be operated by the filling trip, and no liquid will flow from the filling head 186.

Immediately the empty bottle supporting platform has passed the striker 196, the lever 203 will be moved to outward position by the action of the spring 211 so that the circuit to electro-magnet 214 will be broken and the counter-pressure trip 198 moved to operative and outward position in readiness for actuating the succeeding bottle platform, if that platform carries a bottle.

As best shown in Figure 18, the circuit including the electro-magnet 214 includes a manual switch 217. This switch is preferably mounted at the front of the machine and by operation of the same, the release control circuit can be rendered ineffective entirely separately from the circuits controlled by the hereinafter described switches actuated when jamming of bottles occurs. The provision of a separate manual switch for the counter-pressure trip release control mechanism enables the filling table to be rotated for adjustments preliminary to the running of the machine for filling operations and in which preliminary operations, bottles may not necessarily be present upon the platforms but actuation of the filling valves to test the latter is nevertheless desirable.

The bracket 205 which carries the striker 196 and switch 206 is secured to an arm 218 projecting from the stationary table 30. The counter-pressure trip 198 and its housing 213 are mounted on an arm 219 projecting from the post 190, which post is supported in the above mentioned arm 218. The filling trip 200 is also supported on the arm 219. The housing 213 carrying the counter-pressure trip 198 is carried on a boss 220, the housing including a projecting sleeve 221 which surrounds boss 220 and suitable means of the type disclosed in said Huntley and Stewart patent is provided between these two elements to tend to hold the housing in proper position with respect to the valve arms and filling table, but which will permit the housing to swing out of the path of movement of a seized valve arm. The filling trip 200 is similarly mounted upon a boss 222 carried on the arm 219. As in the last-mentioned Huntley and Stewart application, arm 219 is vertically adjustable upon the post 190, the inner end of the arm being split as indicated at 223 and a bolt 224 joining the split portion to

enable the arm to be locked in any desired position upon the post. Keys and keyways indicated at 225 prevent the arm from rotating with respect to the post.

As best shown in Figure 3, the filling reservoir 185 carrying the filling heads 186 is vertically adjustable by rotation upon the post 226 of the filling table, this post being threaded as indicated at 227 to permit of adjustment of these two elements so as to enable the filling heads to be raised or lowered to accommodate bottles of various sizes.

The post 191 which supports the sniffing trips 230 is supported in an arm 231 projecting from the stationary table 30 of the machine. Post 191 is provided with an arm 232 adjacent its upper end which is provided with a pair of spaced bosses 233, each of which rotatably supports a sniffing trip 230. The connection between the bosses and trips is similar to that described above in connection with the counter-pressure and filling trips in that the trips will be tended to a position in the path of the valve arms 188 but will be free to swing from the path of the arms in the event that a seized arm strikes the trip. Two trips are provided, either of which may be selectively used according to whether or not it is desired to lengthen or shorten the filling period. The sniffing trips 230 are each in the form of a roller 234 mounted by anti-frictional means upon an arm 235, the rollers 234 being designed to turn upon the arms 235 when a valve arm 188 comes in contact therewith. By this arrangement, unnecessary friction between the valve arms and the sniffing trip is avoided.

The trip supporting arm 232 is connected to the post 191 in the manner described above as being used to connect the arm 219 on post 190, thereby permitting of vertical adjustment of the sniffing trips.

The means for positioning bottles beneath the crowner

The filled bottles are removed from the bottle supporting platforms 37 of the filling table by the cooperation of the outfeed spider 38 and the guide plate 39, the rotation of the spider 38 causing the bottles to slide upon the upper surface 57 of the stationary table 30 to the point indicated at F in Figures 1 and 16. From this position to the moment when the bottle is moved from beneath the crowning mechanism 33, its movement is controlled by the crowner positioning means 40 disclosed in our said original application Serial No. 116,426.

The crowner positioning means 40 comprises a double armed pusher member 240 removably secured to an upstanding element 241 formed on a slide member 242 having its outer end 243 pivotally mounted at 244 on a collar 245 slidably mounted on a slide bar 246 supported upon fixed uprights 247. The inner end 248 of the slide member 242 is rotatably connected to a crank 249 secured to the rotatable shaft 89. By this arrangement, the bottle contacting arms 250 and 251 at the inner end of the pusher member 240 will follow orbital paths.

As the pusher member 240 moves from the solid line position shown in Figure 16 to the dotted line position of the same figure, the inner and bottle contacting point 252 of arm 250 will move along the curved dotted line 252a to the position shown in dotted lines at 250a. Because of this movement, the bottle at position F will be moved to position G, the movement of the bottle

being guided by spaced guide bars 253 and 254 provided on the stationary table and extending between the spider 38 and the outfeed conveyor 41, or to the edge of the table. At the same time, the bottle contacting point 255 of arm 251 will be moved along the curved line 255a from the solid line position shown in Figure 16 to the dotted line position shown at 251a, and during such movement, the bottle at position G will be moved to position H, from which it may be moved by contact therewith of the next bottle moved from position G. Continuing their orbital movement from the dotted line positions 250a and 251a, respectively, the arms 250 and 251 will respectively move back along the curved lines 252b and 255b to the solid line positions of Figure 16, with the result that arm 251 will now be behind the bottle at position G and arm 250 will be in a position to contact with and move the bottle which has now been placed at position F by the rotation of the outfeed spider 38.

The operation of the pusher member 240 is so timed with respect to the spider 38 that the arm 250 will contact with the bottle moved to position F by the spider 38 at the proper moment to remove the bottle from the spider at a linear speed which is substantially the same as the linear speed at which the bottle has moved from the filling table, so that the bottle will move smoothly and without any sudden acceleration or deceleration. As the arm 250 is retracted from point 250a, just before it positions the bottle at position G, it will cause the bottle to be gradually brought to a stop at that position so that no jarring of the contents of the bottle will result.

In order to permit the positioning means to handle bottles of different sizes, the pusher member 240 may be disconnected from the element 241 and replaced by a pusher member having arms of suitable thickness to handle the size bottles being operated upon. For example, the pusher member 240 illustrated is of a size suited for relatively large bottles and if smaller bottles were operated upon, the pusher member then used would have its arms 250 and 251 of increased thickness at their bottle contacting sides so that the bottle placed at position F, for instance, would be pushed to a point concentric with position G so that its vertical axis will be in alignment with the vertical axis of the crowning head.

A bottle is occasionally broken beneath a crowning head due to defects in the glass of the bottle and a resultant inability to withstand crowning pressure. When a bottle is thus broken, large fragments may fall to the surface of the table 57 and be so arranged with respect to the guide members 253 and 254 that when the succeeding bottle is moved from position F in Figure 16 to position G, this bottle, upon contacting with such fragments, may fall over, resulting in further jamming of succeeding bottles.

Means is provided associated with the crowner positioning mechanism 40 to stop the operation of the entire machine whenever the movement of a bottle by this mechanism is resisted to any extent as would be the case if fragments impeded the movement of a bottle, this means comprising a cut-out switch 260 best shown in Figure 17. The switch 260 is normally in circuit closing position, but is moved to open circuit position by a spring clutch mechanism 90 associated with the shaft 89 and illustrated in Figures 4 and 17. The spring clutch 90 comprises a collar 262 keyed to

the shaft 89, the collar being axially slidable on the shaft along the key. The collar is provided on its lower edge with a cut-out or depression 263, the forward edge of the cut-out being inclined as indicated in Figure 17. The cut-out 263 is normally held over and about a tooth 264 on an axial flange secured to or formed with the driving gear 88 of the positioning mechanism 40, the forward edge of the tooth 264 also being beveled to contact with the inclined surface of the cut-out 263. As has been set forth above, the gear 88 is not keyed to shaft 89.

The collar 262 is normally held in the position described by a coil spring 265 having its lower end bearing upon a flange 266 extending about the collar 262, the upper end of the spring bearing on a washer 267 secured to the shaft 89. When the collar 262 is in the position described, the flange 266 will be below and spaced from the operating element 268 of switch 260, as shown in Figure 17. The contacting member 268 is preferably in the form of a roller.

In the normal operation of the machine, the collar 262 will be in the downward position shown in Figure 17 and the drive to the crowner positioning means 40 will be from the gear 87 to gear 88 and through the tooth 264 and cut-out 263 to the collar 262 keyed to the shaft 89, the contacting inclined portions of the tooth 264 and cut-out 263 being at such an angle with respect to each other that the positioning means will be properly driven. However, should the movement of the pusher member in moving a bottle from position F (Figure 16) to position G be resisted to even a very slight extent, as would occur in the event that a bottle came in contact with a fragment of a broken bottle, the drag thus imposed upon the pusher member 240 would retard its movement with respect to the constantly rotating pinion 88. As a result, the collar 262 will be forced upwardly on the shaft 89 as the inclined forward face of tooth 264 rides from beneath the inclined face of the cut-out 263 of collar 262. Collar 262 will thus move upwardly along the shaft 89 and against the action of the spring 265, bringing its flange 266 in contact with the circuit controlling element 268 of switch 260, so that switch 260 will be opened. As is hereinafter described, the switch 260 is so arranged with respect to the wiring circuit of the machine that the movement of the same to open circuit position will cause the machine to be stopped, so that the attendant may remove the broken fragments of bottle from beneath the crowner 33. The upward movement of collar 262 required to open the switch 260 is so slight that the machine, suitably braked against over-travel, will stop before cut-out 263 entirely rides off the tooth 264 and when the obstacle holding pusher arm 240 is cleared, the spring 265 will tend the collar 262 to proper position with respect to the tooth 264. Because of this, the elements will always be properly timed with respect to each other.

The crowning mechanism

The crowning mechanism is best illustrated in Figures 4 to 6. As shown in Figure 4, the crowner drive shaft 60 is hollow and terminates at approximately the level of the working surface 57 of table 40. A shaft 275 extends upwardly from the hollow shaft 60, shaft 275 being slidably keyed in the shaft 60 and the upper portion of shaft 275 extending through the standard 277 which forms part of the supporting structure of the crowning mechanism. The upper portion 278 of the

supporting structure of the crowning mechanism is vertically adjustable with respect to the lower portion or standard 277, being connected to the standard by means of a threaded connection comprising threads 279 on the standard 277 which are engaged by a split collar 280 having its bore threaded and which collar is provided with an upwardly extending and in-turned flange 281 which engages above a projecting flange 282 on the lower end of the upper element 278 of the crowner supporting structure.

The standard 277 extends upwardly into a chamber 283 in the upper member 278, the two being keyed together by a key block 284 carried by the upper member 278 and projecting into a longitudinal key-way 285 in the standard 277. The key block 284 may be held firmly in the key-way 285 by a threaded holding bolt 286. The solid shaft 275 is suitably channeled in the upper portion of upper supporting member 278. By the above arrangement, the upper supporting member 278 of the crowner, carrying the crowning head 288, may be raised or lowered with respect to the supporting standard 277 merely by loosening the split collar 280 and rotating it upon the threads 279 so that the upper member will be moved either upwardly or downwardly, rotation of the upper supporting member 278 being prevented by the key 284 during this operation. The key 284 will be slightly loosened during adjustment of the crowning mechanism, and when it is again tightened after adjustment, it will hold the two elements of the supporting structure firmly together so that there will be no vibration. The shaft 275 being journaled in the upper portion 278 of the crowner supporting structure will move upwardly or downwardly with that portion, a driving connection being maintained between the hollow shaft 60 and the shaft 275 through the key connection 276.

The crowning head 288 is reciprocable in the casting 278, being reciprocated by rotation of an annular cam 289 on the upper portion of the shaft 275.

Caps for use in the crowning operation are supplied to the crowning head 288 from the crown hopper 290 through a chute 291 of well known type. As best shown in Figure 6, the chute 291 is kept filled with caps and when the crowning head 288 is in lowered position, the end of the chute 291 will be closed by the side wall 292 of the crowning head. When the crowning head rises upon the completion of a crowning operation and after using the cap shown beneath the crowning plunger 294, the crowning chamber 293, which opens to the side wall 292 of the head, will be opposite the lower end of the chute 291 so that the lowermost cap in the chute may slide into the space 295 in the crowning chamber, moving the cap already there over beneath the crowning plunger. It will thus be observed that the crowning chamber will preferably hold two caps, one directly beneath the crowning plunger 294 and the other resting in the space 295 between the center of the crowning chamber and the outside wall 292.

In order to prevent the cap in the space 295 from being jarred from the crowning head during the crowning operation, and as disclosed in our said original application, the present head is provided with a closure plate 296 pivoted to the side wall 292 of the crowning head on a pin 296a. The plate 296 includes an upwardly projecting portion 297 which is normally held opposite the open end of the crowning chamber 293 by a

spring 298, the movement of the plate 296 by spring 298 being limited by a stop 299. The plate 296 will thus keep the open end of the crowning chamber space 295 closed. However, when the crowning head rises to position the space 295 opposite the chute 291, the chute will strike the plate 296, swinging it downwardly on its pivot 296a and against the action of the light spring 298. Another cap may thus slide into the space 295 and the caps in the chamber will be prevented from falling therefrom by the immediate rise of the plate 296.

It will be understood that if one of the caps should fall from the chamber, the cap which should be beneath the crowning plunger 294 may slide along the chamber so that it will not be centered beneath the plunger, with the result that when the crowning head descends upon a bottle, the cap will not be properly positioned upon the bottle. The provision of means to maintain the caps in the crowning head so that one cap will be directly in the alignment with the plunger is therefore of considerable importance.

Figure 18 shows the electric circuits for controlling the operation of the machine. As illustrated in these figures, power is supplied to the motor 50 through lines 301, 302 and 303, the flow of current to the motor through these lines being controlled by a three contact electric switch 304 controlled by an electro-magnet 305.

The electro-magnet 305 is controlled by a normally open "start" switch 306 and a "stop" switch 307 through the following leads: One side of the electro-magnet is connected to line 301 through a lead 308, the other side being connected to a contact for switch 306 through a lead 309, the other contact of switch 306 being connected to line 302 by a lead 310 including normally closed "stop" switch 307. Thus, when "start" switch 306 is closed, current will flow through electro-magnet 305 to close the main switch 304, and such closing of switch 304 will close the following circuit to hold the main power circuit closed: From 301 to lead 308 through the electro-magnet 305, through lead 309 to lead 311, through the auxiliary blade 312 of main switch 304, to lead 313, through the normally closed trip switch 260 (Figure 17) controlled by the crowner positioning means 40, through lead 314 to a trip switch 315 controlled by the gate member 182 (Figure 1) positioned adjacent the infeed spider 36, and thence through a lead 316 to lead 310 and through "stop" switch 307 to line 302.

It will be observed from the above that so long as "stop" switch 307 and trip switches 260 and 315 are closed, the electro-magnet 305 will hold the main switch 304 closed and the motor 50 will be operated. However, if a jam of bottles should occur at gate 182, or a bottle break beneath the crowner 33 to hinder operation of the crowner positioning means 40, trip switch 315 or 260, respectively, would be opened to de-energize the electro-magnet 305 and thereby stop the motor 50. Or if the manual "stop" switch 307 should be operated, namely, moved to open position, the machine would be stopped in the same manner.

The electro-magnet 214 which actuates the counter-pressure trip (Figure 14) is connected to line 301 through a lead 317 in which is included the manual switch 217 for rendering electro-magnet 214 ineffective during preliminary operation of the machine as hereinbefore described. The other side of the electro-magnet 214 is connected to line 303 by a lead 318 in which is included the normally open switch 210 actuated by

the bottle platforms 37. A circuit-breaker 319 is also included in this lead to protect the electromagnet 214.

It will be understood that the invention is not limited to the details of construction shown in the drawings and that the examples of the use of the machine and mechanisms which have been given do not include all of the uses of which they are capable; and that the phraseology employed in the specification is for the purposes of description and not of limitation.

We claim:

1. The combination in a filling machine, of means to define a path of travel for containers, means to stop movement of containers with their axes at a predetermined point in said path of travel, said last-named means being movable obliquely to the path of travel of the container to vary the width of said path of travel and arranged to maintain the axes of the containers of different sizes always in alignment with said predetermined point, and means having operative driving connection with said last named means throughout the adjustable movement of the latter.

2. The combination in a filling machine, of means to position containers comprising a star wheel, a pusher member engaging said star wheel to rotate the latter step by step, and means to hold said star wheel stationary between advancing movements of said pusher member.

3. In a filling machine, a reciprocable head, a star wheel to position the containers beneath said head, means actuated by movement of said head to rotate said star wheel step by step, and means to hold said star wheel stationary between its movements.

4. The combination in a filling machine, of a star wheel to position bottles, means to intermittently rotate said star wheel, and means to hold said star wheel alternately stationary comprising a plate mounted for reciprocation, cam means to move said plate, and a latch member carried by said plate and arranged to engage the star wheel to prevent movement thereof.

5. The combination in a filling machine, of a filling head reciprocable to engage containers, a continuously moving conveyor, a rotatable star wheel to position containers moving on said conveyor beneath said filling head for engagement by the latter, and means actuated by said filling head to intermittently rotate said star wheel.

6. The combination in a filling machine, of a filling head reciprocable to engage containers, a continuously moving conveyor to support containers, means to position the first of a row of containers beneath said filling head and to hold the succeeding containers in the row spaced from said first container comprising a pair of rotatable dials, and means actuated by said filling head to intermittently rotate said dials.

7. The combination in a filling machine, of means to position containers comprising a star wheel, a pusher member to rotate said star wheel, means to hold said pusher member in driving contact with said star wheel, means to periodically move said pusher member in the opposite direction, and means to hold said star wheel stationary during the last mentioned movement of said pusher.

8. The combination in a filling machine, of means to position containers comprising a star wheel, a pusher member to rotate said star wheel, means to hold said pusher member in driving contact with said star wheel, means to hold said

star-wheel stationary at such time, and means to periodically move said pusher member in the opposite direction.

9. The combination in a filling machine, of means to position containers comprising a star wheel, a reciprocably mounted pusher adapted to engage said star wheel, a pivoted lever having one arm thereof operatively connected to said pusher member, means to normally hold said pusher member in engagement with said star wheel, reciprocable means engaging said lever to move said pusher member in the opposite direction, and means to hold said star wheel stationary between movements of said pusher member.

10. The combination in a filling machine, of reciprocable means to engage and perform an operation upon a container, a continuously moving container supporting conveyor, and means actuated by said reciprocable means to cooperate with said conveyor to move a container to said reciprocable means, hold the container stationary on said conveyor, and then release the container for movement with said conveyor.

11. In combination, means to perform an operation upon a container, intermittently movable means and continuously moving means to simultaneously engage a container to move it into position beneath said operation performing means, and means to then hold said intermittently movable means against movement to hold the container stationary beneath said operation performing means while said continuously moving means moves relatively to the container.

12. In combination, means to perform an operation upon a container, intermittently driven rotatable means and a continuously movable conveyor to simultaneously engage a container to move it into position beneath said operation performing means, and means to then hold said rotatable means against movement to hold the container stationary beneath said operation performing means while said continuously moving conveyor moves relatively to the container.

13. In combination, means to perform an operation upon a container, a continuously moving container supporting conveyor, intermittently moving container engaging means, said conveyor and intermittently moving means simultaneously engaging a container to move it to said operation performing means, and means to then hold said intermittently moving means against movement to hold the container stationary beneath said operation performing means.

14. The combination in a filling machine, of a support, a horizontally arranged container conveyor continuously movable across said support, a filling head vertically reciprocable with respect to said support and conveyor, a pair of rotatable dials spaced upon said support alongside said conveyor, one of said dials being positioned to contact with a container supported on said conveyor in alignment with said filling head and the other dial being positioned to contact with a container supported on said conveyor in spaced relation to the first-mentioned container, a horizontally reciprocable dial rotating element, means moving with said filling head to move said element in one direction, means to move said element in the opposite direction, and cam actuated means to hold said dials stationary during movement of said element in one direction.

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