May 27, 1930. W. V. DERBY 1,760,482

PACKAGING MACHINE

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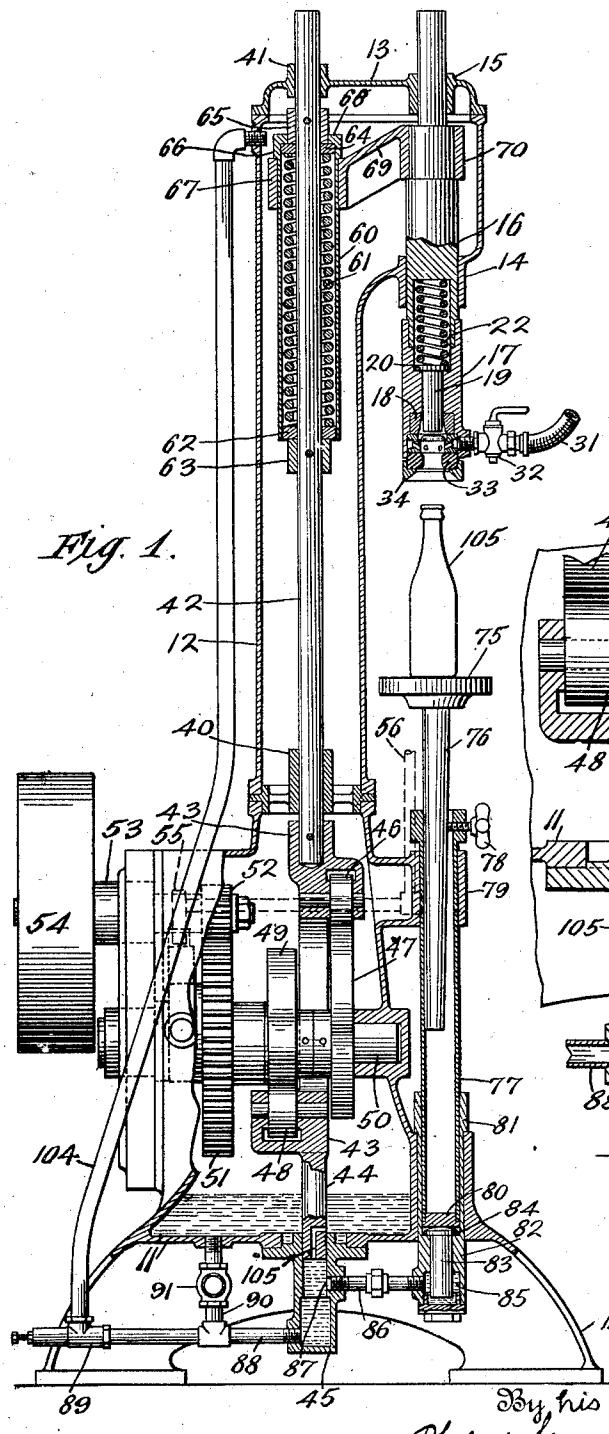


Fig. 1.

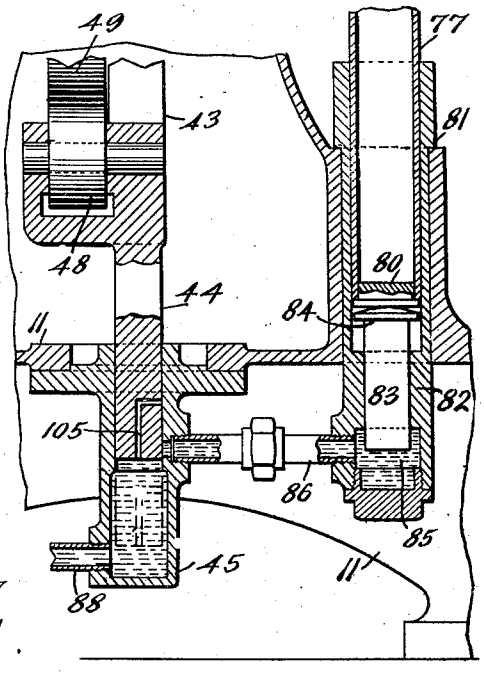


Fig. 2.

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Fig. 3.

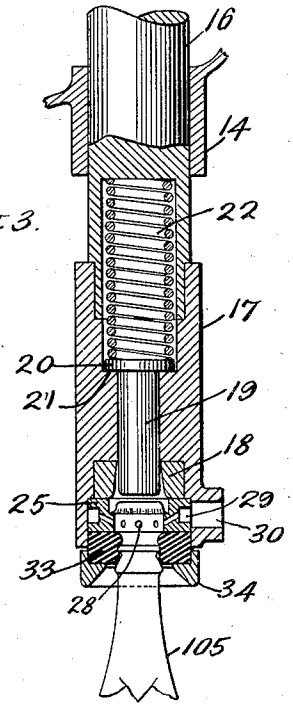


Fig. 4.

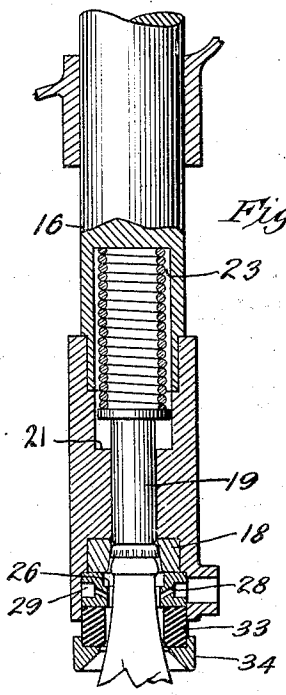


Fig. 5.

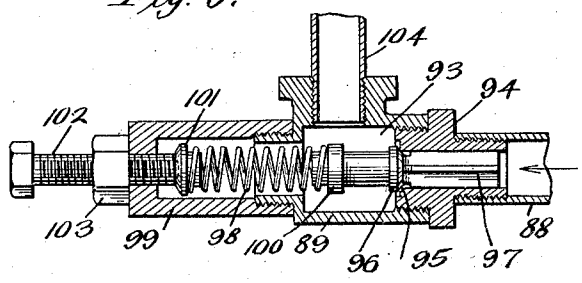
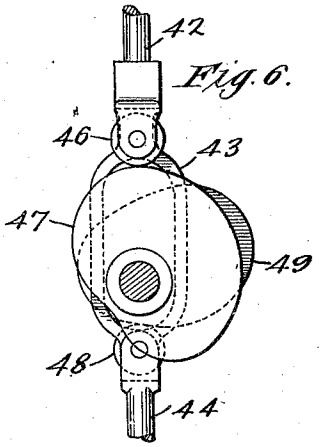


Fig. 6.



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UNITED STATES PATENT OFFICE

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PACKAGING MACHINE

Application filed June 13, 1924. Serial No. 719,867.

This invention relates to packaging machines. More particularly the invention relates to machines for filling bottles with a carbonated liquid and capping the same. In known machines of the type mentioned, a bottle is sealed in a packaging head by means of a compressible gasket, the bottle is filled, and the cap is applied while the bottle is still sealed.

As is well known in the bottling art, bottles of a stardard size, e. g. pints, vary somewhat in height. Various so-called compensating devices have been used for taking care of this variation in bottle height and in machines for capping only, a considerable variation can be taken care of by these compensating devices. In the case of certain types of filling and capping machines, however, in which the bottle neck is sealed in the head by a gasket, the extent of variation which the machine is adapted to take care of is limited to an amount less than the variation often encountered. For example, in machines in which the packaging head moves up and down with respect to the bottle, the head first moves to a filling position and then further, to a capping position. Assuming a setting for the shortest bottle of a standard size, as the head takes filling position, it wedges the gasket over the bottle mouth sufficiently to form a seal. Should the next bottle be considerably oversize it would be forced further into the gasket, and perhaps so far that proper sealing would not take place. Further, in the case of machines in which the crown is suspended in line with the bottle above filling ports, this excess penetration of the bottle interferes with the filling operation. While an additional variation can be taken care of in some cases by an increase in the thickness of the gasket, this increase is limited, because too thick gaskets are not practicable with short necked bottles.

It is the principal object of the present invention to provide a packaging apparatus capable of effectively filling and capping bottles of various kinds and regardless of the variations in standard sizes.

In the drawings:—

Fig 1 is a view partly in vertical section and partly in elevation, of a packaging apparatus constructed in accordance with the invention;

Fig 2 is an enlarged view, in vertical section, of part of the apparatus in a different position;

Fig 3 is an enlarged view of the packaging head shown in Fig 1 moved into filling position;

Fig 4 is a similar view of the same in capping position;

Fig 5 is a detail view showing the relief valve in section and enlarged; and

Fig 6 is a detail face view of the cams

Referring to the drawings, there is provided a packaging head having a capping die and liquid delivery means, and a bottle support. In the exemplification here illustrated, mounted on a plunger 16 is a packaging head 17 carrying a conical throat ring or capping die 18 of well known construction Extending into the capping die is the end of a presser foot 19 movable in the head and normally positioned by the engagement of a flange or collar 20 with a shoulder 21 in the head. Bearing against the presser foot is a coil spring 22, confined within the head and a recess 23 formed in the end of the plunger 16, the other end of the spring bearing against the end of the recess. The spring 22 is arranged to have its coils close solidly so as to limit the relative displacement of the presser foot and to cause the presser foot to act as a knockout after capping, as hereinafter more fully described. The head here shown as an example, has, below the capping die 18, and embraced by the head 17, a crown platform ring 25 having an internal ledge 26. This ledge is arranged to support a closure, such, for example, as the well known crown cork (Fig. 3). Below this ledge, the ring 25 has a number of radial bores or passages 28 leading to a peripheral channel 29. This channel communicates with a passageway 30 in the head which receives the end of a liquid supply pipe 31 having a control valve 32. Pipe 31 is designed for connection with a source of liquid supply (not shown) and when valve 32 is opened the liquid flows into

channel 29 and so into passages 28 where it can pass to a bottle as later described.

There is provided, in connection with the head, a bottle sealing gasket capable of alternate compression and release. As here shown as an example, below the ring 25 is a bottle sealing gasket 33 carried by a movable annular cup 34. When the cup is moved upwardly the gasket is pressed against the ring 25 and compressed inwardly as later referred to. Any suitable means may be employed for compressing the gasket, it being here noted that the gasket is compressed when the head takes filling position and is released only to pass the capped bottle.

While the bottle support may vary in construction, as here shown as an example, the support comprises a table 75 mounted on a wedge-shaped pillar 76 telescoping within a tubular slide 77 later referred to. The pillar 76 is adjustably positioned in the slide by means of a set screw 78. This adjustment is for setting the support for bottles of different standard sizes, e. g., quarts or pints. For a given standard size, e. g. pints, the pillar remains fixed with respect to the slide; and table, pillar and slide may be considered a unitary support. This support is mounted as hereinafter described.

The invention in its entirety includes means for (*a*) tending to cause a given relative movement between head and support to place these elements in a filling position, (*b*) automatically regulating this relative movement, whereby the head and support have a filling position dependent on the height of the supported bottle, and (*c*) causing further relative movement for the capping operation. This may be accomplished, for example, by moving one element to a given filling position, permitting the other element to adjust itself in filling position in accordance with the height of the bottle presented, and then causing relative movement for the capping operation. While variable within a wide range, in structures embodying the invention to what is now considered the best advantage, the head is moved into a given filling position and the bottle support is self-adjusting.

Although the head-moving means is capable of various constructions, in that here shown as an example, a base 11 supports a vertical standard 12 having a cover 13. The standard and its cover have bearings 14, 15, in which the head-carrying plunger 16 is slidable. The standard and its cover also have bearings 40, 41 in which is slidable a pull rod 42 stepped in a yoke 43. This yoke is guided in its movement by a plunger 44 which slides in a cylinder 45 carried by the base 11 and which performs other functions hereinafter described. The yoke has an upper roller 46 running on a cam 47 and a lower roller 48 running on a cam 49, the two cams being rotated by shaft 50 extending through the yoke and journaled in the base 11. Associated with shaft 50 is a gear 51 meshing with a pinion 52 on a shaft 53 driven by a pulley 54 to which power may be applied in any suitable manner. Between gear 51 and shaft 50 is a clutch indicated at 55 and actuated by a control handle 56. This clutch connection is of a type that causes, for each operation of the handle 56, a half revolution of shaft 50. Such a connection may be of any suitable construction.

Surrounding the upper part of the pull rod 42, in the present embodiment, is a cylindrical spring cage 60 enclosing a compensating spring 61. The bottom of the spring bears against a washer plug 62 secured in the end of the cage 60 and engaging a collar 63 pinned to the pull rod. The upper end of the spring bears against a washer 64 slidable in the cage 60 and engaged from above by a collar 65 pinned to the pull rod. At the top, the cage 60 has an enlarged head 66, the shoulder of which engages a hub 67 pinned or otherwise secured to the cage 60. The head 66 has a flange 68 turned in above the washer 64 and embracing the collar 65. Hub 67 is connected by an arm 69 with hub 70 pinned or otherwise secured to the plunger 16. When the pull rod 42 is moved down, and assuming for the present that the bottle is stationary, the movement of collar 65, through spring 61, pulls down the cage 60, thus lowering arm 69 and plunger 16 carrying the packaging head 17. Consequently pull rod and packaging head move down as a unit. This unitary movement continues as long as a predetermined resistance to the head is not encountered. This resistance is the predetermined capping pressure and may be encountered during the capping stroke. Should this occur, the force of the spring 61 is overcome. The continued movement of the collar 65 against washer 64 moves the washer downwardly inside the cage, compressing the spring, the cage, plunger 16 and the head remaining stationary during the remainder of the fixed stroke of the pull rod. On the movement of the head into filling position, however, this compensating action may be disregarded, the parts all moving down as a unit.

The cams are so arranged that upon half a revolution of shaft 50 the head 17 is moved down toward the bottle with a fixed stroke into a given filling position and there rests. On the next half revolution of the shaft following actuation of the clutch, the head makes its further downward stroke for capping and then returns upwardly to initial position.

While the self-adjusting arrangement of the bottle support may vary, this may be accomplished, for example, by tending to give the support a position having a given separation from the bottle but permitting it to

take a position controlled by the height of the supported bottle. In constructions embodying the invention to what is now considered the best advantage, the support is suspended on a body of non-compressible fluid. Pressure is applied to this fluid tending to cause a given elevation of the support, relief means permitting the support to recede from the head when the head engages the bottle. By confining the body of fluid at the proper time, the support is thereafter locked in its adjusted position. Although capable of various constructions, in the present embodiment, the slide 77 is movable in a guide bearing 79 and its lower end, which is closed by a plug 80, is slidable in the upper part of a cylinder 81. This cylinder has a narrowed portion 82 in which a plunger 83 has a tight sliding fit. The upper end of this plunger has a head 84 which engages the plug 80 and which limits the downward movement of the plunger. The lower end of the plunger extends into an enlarged chamber 85 in the bottom of the cylinder which contains a non-compressible fluid, such as oil. The chamber 85 is connected by a pipe 86 with a port 87 opening into the cylinder 45. From the bottom of cylinder 45, a pipe 88 leads to an adjustable relief valve (to be described) and has a branch pipe 90 leading through a check valve 91 to an oil reservoir which, in the present embodiment, is the base 11. The check valve 91 is set to permit a flow from but not to the reservoir and may be of any suitable construction.

The relief valve, hereinafter described in detail, is constructed to open only upon a predetermined pressure. Within this limit, therefore, if pressure is applied to the oil in the system the plunger 83, and consequently the bottle support, will be elevated. As a result the supported bottle is raised toward the packaging head. While the pressure may be applied to the oil in various ways, in the present embodiment, this is accomplished by piston 44 descending in cylinder 45. As soon, therefore, as the pull rod starts down to lower the packaging head, the force stroke of piston 44 causes the bottle support to start upward toward the approaching head, thus tending to give the support a given separation from the head, dependent on the stroke of piston 44. The extent of its upward movement, however, is controlled by the particular bottle presented. When the descending head encounters the mouth of the supported bottle the resistance to the upward movement of the support causes the relief valve to open. Thereafter, as the piston 44 continues its force stroke, the oil passes out through the relief valve thus permitting the bottle support to float or yield. This allows the bottle and its support to recede as the head continues downward.

While the means for locking the support in its final position may vary, in the present embodiment this is accomplished by so locating port 87 and so dimensioning piston 44 that the piston covers port 87 at the proper time. When this occurs, the oil in the container 85 is confined and as none can escape the bottle support is locked against further receding movement. That is, the bottle support has automatically adjusted itself, depending on the height of the bottle, to give the bottle mouth a given position with respect to the packaging head.

While the relief valve may vary in construction, that here shown as an example comprises a valve casing 89 enclosing a valve chamber 93, into which is threaded a coupling 94 to which pipe 88 is connected. The coupling provides a valve seat 95 against which seats a conical valve 96, the valve having a fluted extension 97 which fits freely in the coupling and acts as a guide. The direction of oil pressure is indicated by the arrow in Fig. 5. The valve is normally held to its seat by a coil spring 98 enclosed by a spring cage 99 secured to the valve casing. This spring is compressed between a shouldered valve stem 100 and a shouldered button 101. Bearing against the latter is the end of an adjusting screw 102 which is threaded through the end of the spring cage 99. The spring tension may be adjusted by manipulation of the screw 102 to regulate the force necessary to open the valve. A check nut 103 serves to lock the adjusting screw in its adjusted position. Communicating with the valve chamber 93 is a relief pipe 104, which in the present embodiment, leads to the top of the standard 12.

In operation, assuming that a bottle 105 of intermediate height for the standard size being filled is placed on the table 75 and assuming the system filled with oil, Fig. 1 shows the packaging head in raised position with the sealing gasket compressed and a cap in place on the ledge 26. Handle 56 is operated to cause a half revolution of shaft 50, thereby to lower the head to filling position as above described. Moving in unison with the pull rod, the piston 44 moves down in the cylinder 45 against the oil contained therein. The check valve 91 is closed, as is the relief valve 96 and consequently the oil flows through pipe 86 into chamber 85 and raises plunger 83. The engagement of plunger head 84 with plug 80 raises the slide 77, which forms part of the bottle support, and thereby carries the bottle on the table 75 upward toward the descending head. When the gasket 33 engages the bottle mouth, the resulting resistance to the movement of the bottle support causes the relief valve 96 to open, thus permitting the oil under pressure by piston 44 to flow into pipe 104 and back into the reservoir. The bottle support may now be said to "float" and as the head 17 continues

downward the bottle and its support are permitted to make a reverse downward movement under the force of the descending head, the oil flowing through the relief valve into the reservoir, thereby lubricating the moving parts enclosed in the base. This receding movement of the bottle and its support continues until piston 44 has covered port 87 (Fig. 2). Thereafter, the support is locked in position, being supported on a confined body of oil. In the present embodiment the parts are so arranged that there is a slight overthrow of the piston 44 beyond port 87 before the shaft 50 completes its first half revolution and the head takes filling position. This overthrow is sufficient to permit the head to descend against the locked bottle enough for the compressed gasket to be wedged into sealing engagement with the bottle mouth, as shown in Fig. 3.

With the construction described the support is locked against further receding movement at a fixed point with relation to the movement of the head into filling position. But this downward movement of the support starts at varying times, dependent on the height of the bottle. Thus, if the bottle is above the average size, the head and bottle mouth will meet earlier in the cycle and the support will start to recede earlier. If, on the other hand, the bottle is shorter than average, the engagement with the head will take place later and there will be less receding downward movement before the support is locked. That is, the support adjusts itself in final position according to the height of the then supported bottle. As a result, successive bottles are so placed that the mouths have a uniform position with respect to the head, this postion being such as to enable the gasket to be wedged with proper sealing engagement with the mouth as illustrated in Fig. 3 and also such as to position the bottle properly for the packaging operations.

At this stage in the cycle of operations the shaft 50 has completed a half revolution and ceased to rotate. The head, therefore, pauses in its given filling position with the mouth of the locked bottle sealed in the head by the gasket. To fill the bottle, the operator opens valve 32 thereby admitting the liquid being packaged to passages 28, whence it flows into the bottle. When the bottle is filled to a proper height the valve 32 is closed.

To continue the cycle of automatic operations, the handle 56 is operated to cause another half revolution of the shaft 50. During the first part of this movement, the cams cause the pull rod 42 to make a further descent to lower the head for its capping stroke. As the head moves down, the gasket slides down over the neck of the bottle and the bottle mouth picks up the waiting cap. The presser foot 19 is forced back against its spring 22 until the coils close, thus controlling the relative position of the bottle and the die. The pressure of the presser foot on the bottle and its cap effect a seal between the cap and bottle and the capping die causes the skirt of the cap to be crimped about the bottle neck in the usual well known manner. During this capping stroke of the head, compensation may or may not take place, depending on the effective height of the bottle. Under ideal conditions compensation is unnecessary. That is to say, the pull rod completes its down stroke before the predetermined capping pressure between the head and bottle is exceeded. In the event that the bottle mouth should, for some reason, be higher than the predetermined position, the capping pressure is exceeded before the pull rod completes its stroke. As a result, the head can yield and remain stationary, spring 61 being compressed during the remainder of the pull rod stroke. At or about the end of the capping stroke, the gasket 33 is released so as to open to clear the capped bottle mouth. Fig. 4 shows the head at the end of its capping stroke with the cap attached to the bottle and the gasket released, just prior to the return upward movement of the head.

In the meantime, during this capping operation, the piston 44 has moved down the cylinder 45 to the broken line position of Fig. 2. Port 87 having been covered during such movement, the bottle support has been locked. The oil impelled by this piston movement passes through the relief valve chamber into and up pipe 104 and is delivered to the top of the standard 12. From there it flows down within the standard and base, thus serving to lubricate the moving parts enclosed therein, and so reaches the reservoir in the lower part of the base.

Following the end of the capping operation, continued rotation of the cams causes a return upward movement of the pull rod 42, thus carrying the head back to its initial position. As the head rises, the presser foot 19 remains held against the capped bottle until spring 22 reexpands, thus serving as a knockout to prevent the bottle being carried up by the head. Near the end of this upward movement of the head the gasket is recompressed. As the piston 44 moves upwardly it performs a suction stroke. The relief valve 96 closes under the force of its spring and the check valve 91 opens to admit new oil from the reservoir to take the place of that previously delivered thereto. As soon as the piston 44 again uncovers port 87, oil is withdrawn from chamber 85, thus permitting the plunger 83 to descend by gravity, whereby the bottle support may return to its initial position.

In order to prevent air from interfering with the action of the fluid pressure system the piston 44 has, as here shown as an example, an internal bore 105 of the shape of an in-

verted L. As appears in Fig. 1, when the parts are at the top of the upstroke, the bore 105 opens into the oil reservoir and any air in the system can pass out. It will be apparent that on the downward stroke, the piston cannot pump until bore 105 is closed, but it is positioned so that only a very slight movement of the piston is required to close it, the parts being arranged to compensate for this lost motion.

At the end of this half revolution of the shaft 50 the parts have been returned to initial position where they rest until the clutch is again operated for the next bottle.

What I claim is:

1. In a packaging apparatus, and in combination, a packaging head having a capping die and fluid delivery means, a bottle support, means for moving the head toward the support with a given stroke for filling position and for thereafter causing relative movement between head and support for the capping operation, and means tending to move the support toward the head during part of the movement of the head into filling position, but permitting the support to yield, whereby the head and support are spaced, during filling, a distance governed by the height of the supported bottle.

2. In a packaging machine, and in combination, a packaging head having a capping die and liquid delivery means, a normally compressed sealing gasket carried by the head, a slidably mounted bottle support, a container for containing a substantially non-compressible fluid, a plunger in said container having operative relation with said support, a cylinder having a port therein, a connection from said port to the container, a reservoir for a supply of the fluid, a connection between said reservoir and the cylinder, a check valve in said last named connection permitting flow of fluid from but not to the reservoir, a relief valve, a connection from the relief valve to the reservoir, means, including a reciprocating element, for moving the head toward the support into a given position for filling and further for the capping operation and thereafter back to initial position, and a pump piston reciprocating in said cylinder and connected with said reciprocating element, said port and piston being so arranged that the piston covers the port just prior to the end of the stroke of the head into filling position.

3. In a packaging machine, and in combination, a packaging head having a capping die and fluid delivery means, a normally compressed sealing gasket carried by the head, a slidably mounted bottle support, an enclosed base and standard for supporting and housing parts of the machine and serving as an oil reservoir, means, including a reciprocating pull rod connected with the head and housed in said base and standard, for moving the head toward the support into a given position for filling and further for the capping operation and thereafter back to initial position, a container for containing a substantially non-compressible fluid, a plunger in said container having operative relation with the support, a cylinder having a port therein, a connection from the port to the container, a connection between the cylinder and said reservoir, a check valve in said last named connection, permitting flow from but not to the reservoir, a relief valve, a connection between the cylinder and the relief valve, a connection between the relief valve and the upper part of the standard, a pump piston operating in said cylinder and connected with said pull rod, the piston and port being so arranged that the piston covers the port just prior to the end of the stroke of the head into filling position.

4. In a packaging machine, and in combination, a packaging head element having a capping die and liquid delivery means, a bottle supporting element, means for causing one of said elements to approach the other element a given distance to place the head and supported bottle in filling relation and to approach further the approached element for the capping operation, and means for giving the approached element a displacement toward the approaching element that is, in extent, dependent on the height of the supported bottle.

5. In a packaging machine, and in combination, a packaging head element having a capping die and fluid delivery means, a bottle supporting element, means for causing one of said elements to approach the other with a given stroke for filling position and to approach further the approached element for the capping operation, and means tending to move the approached element toward the approaching element during part of the feeding stroke of the latter but permitting said approached element to yield and, just prior to the end of such stroke, causing the approached element to be held against movement in a direction away from the approaching element.

6. In a packaging machine, and in combination, a packaging head having a capping die and fluid delivery means, a bottle support, means for moving the head toward the support into a given position for filling, container means for containing a substantially non-compressible liquid with relation to which the bottle support is suspended, and means for applying pressure to the fluid to tend to cause the support to be moved a given distance toward the head during part of the head movement and for relieving the support from the pressure of the liquid while the pressure on the liquid is maintained, whereby the support may yield and so recede with

the head upon engagement of the head with the supported bottle.

7. In a packaging machine, and in combination, a packaging head, a bottle sealing gasket carried thereby, a bottle support, means for moving the head toward the support into a given position for filling, container means for containing a substantially non-compressible liquid with relation to which the bottle support is suspended, a cylinder having a port communicating with said container means, a pump piston working in said cylinder and operated by said head-moving means, whereby pressure is applied to said liquid to tend to cause the support to move toward the head as the head moves toward the support, and a relief valve for permitting escape of the liquid under said pressure upon a predetermined resistance to the support, whereby the support can yield with respect to and recede with the head upon engagement of the head with the supported bottle, said piston and said port, being so arranged that the piston covers the port and confines the liquid in the container means just prior to the end of the head movement to hold the support against receding from the head, whereby said gasket may be wedged into sealing engagement with the bottle during the final part of the head movement.

8. In a packaging machine, and in combination, a packaging head having a capping die and liquid delivery means, a bottle supporting element, means, operating with a given stroke, for lowering the head into filling position with respect to a supported bottle and further lowering the head for the capping operation, means for moving the bottle support with respect to the descending head, and for causing the bottle support to take a position, when the head is in filling position, and retain such position during the capping stroke of the head, that is automatically controlled by the height of the supported bottle.

9. In a packaging machine, and in combination, a packaging head having a capping die, a bottle sealing gasket and liquid delivery means, a bottle support, means for moving the head toward the support into a given position for the filling operation and further for the capping operation, means for mounting the support to float during the first part of the movement of the head, whereby the support can yield and so recede with the head upon engagement between the head and the supported bottle, whereby the support can take a position dependent on the height of the supported bottle, and means for thereafter locking the support against movement in a direction away from the head, said locking means being arranged to take effect shortly before the end of the stroke of the head into filling position, whereby the sealing gasket is wedged onto the bottle mouth.

10. In a packaging machine, and in combination, a packaging head, a bottle support, means for moving the head toward the support into a given position, and means operated by said head-moving means for (*a*) moving said support toward said head but permitting the support to recede with the head upon engagement of the head and supported bottle, and (*b*) causing the support to be locked against further receding movement at a predetermined point in the stroke of the head.

11. In a packaging machine, and in combination, a packaging head, a bottle support, means for moving the head toward the support into a given position for filling, and further for the capping operation, means operated by said head-moving means for (*a*) moving the support toward the head during the stroke of the head into filling position but permitting the support to recede with head upon engagement of the head and the supported bottle, and (*b*) causing the support to be locked against further receding movement after said head has made at least part of its first stroke and during the capping stroke of the head.

12. In a packaging machine, and in combination, a packaging head having a capping die and liquid delivery means, a normally constricted sealing gasket carried by the head, a bottle support, means for moving the head toward the support into a given position for filling and further for the capping operation, and means operating in synchronism with said last head-moving means for (*a*) moving the support toward the head during the stroke of the head into filling position but permitting the support to recede with the head upon engagement of the head and the supported bottle, and (*b*) causing the support to be locked against further receding movement enough prior to the end of the stroke of the head into filling position to permit the gasket to be wedged into sealing engagement with the mouth of the supported bottle and during the capping stroke of the head.

13. In a packaging machine, and in combination, a packaging head, a bottle support, means for moving the head toward the support into a given position for filling, container means for containing a substantially non-compressible liquid with relation to which the bottle support is suspended, means operating in synchronism with said head-moving means for applying pressure to the fluid during the movement of the head toward the support to tend to cause the support to be moved toward the head a given distance, and means whereby the support is relieved from pressure whereby the support can yield and so recede with the head upon engagement of the head with the supported bottle.

14. In a packaging machine, and in com-

bination, a packaging head, a bottle support, means for moving the head toward the support, including a pull rod operating with a fixed stroke, thereby to place the head in a given filling position, and for further moving the head for the capping operation, container means for containing a substantially non-compressible fluid with relation to which the bottle support is suspended, a cylinder connected with said container means, a piston in said cylinder connected and moving with said pull rod for applying pressure to the fluid to tend to cause the support to be moved toward the descending head, means whereby the support is relieved from said pressure and can yield and so recede with the head upon engagement of the head and supported bottle, and a port between the cylinder and container means and located to be covered by said piston prior to the end of its force stroke, thereby to confine a portion of the fluid and hold the support against receding movement.

15. In a packaging machine, and in combination, a packaging head, a bottle support, means for moving the head toward the support into a given position for filling, container means for containing a substantially non-compressible fluid with relation to which the bottle support is suspended, means for applying pressure to the liquid to tend to cause the support to be moved toward the head, and a relief valve for permitting escape of fluid, thereby to relieve the support from pressure upon engagement of the head and supported bottle, whereby the support can yield and so recede with the head.

16. In a packaging machine, and in combination, a packaging head, a bottle support, an oil reservoir, means including parts operating in said oil reservoir for moving the head toward the support into a given position for filling and further for the capping operation and then back to initial position, pump means, having communication with the oil in said reservoir and operating in synchronism with said head-moving means, tending, on the force stroke, to cause the bottle support to be raised toward the head, and, on the suction stroke drawing oil from the reservoir, a relief valve between the pump means and reservoir for the escape of oil upon a predetermined pressure, whereby, upon engagement of the head and a supported bottle, the support is relieved from pump pressure and can yield and so recede with the head, and a connection for conducting oil from the relief valve to the reservoir.

17. In a packaging machine, and in combination, a packaging head, a bottle support, means including a reciprocating element, for moving the head toward the support into a given position for filling and further for the capping operation and thereafter back to initial position, means, including a cylinder and a piston connected with said reciprocating element, for pumping a fluid against said support to tend to move the latter toward the head, a relief valve for passing fluid upon predetermined pressure whereby the support, upon engagement of the head and supported bottle, can yield and so recede with the head, a port in the cylinder arranged to be covered by the piston, thereby to confine a body of the fluid and hold the support against receding movement, said piston having an L-shaped bore therein for permitting the escape of air, when the piston is at the end of its suction stroke.

18. In a packaging machine, and in combination, a packaging head having a capping die and fluid delivery means, a bottle support, means for moving one of said elements toward the other with a given stroke for the filling operation, and further for the capping operation, and means for (*a*) moving the other of said elements toward the first element, whereby the latter may take a position determined by the height of the supported bottle, and (*b*) thereafter holding the element so positioned against movement in a direction away from the other element.

In testimony whereof, I have hereunto set my hand.

WILLIAM VAUGHAN DERBY.