Nov. 10, 1953 P. R. FECHHEIMER 2,658,657

MACHINE FOR FILLING CONTAINERS

Filed Feb. 17, 1948 4 Sheets-Sheet 1

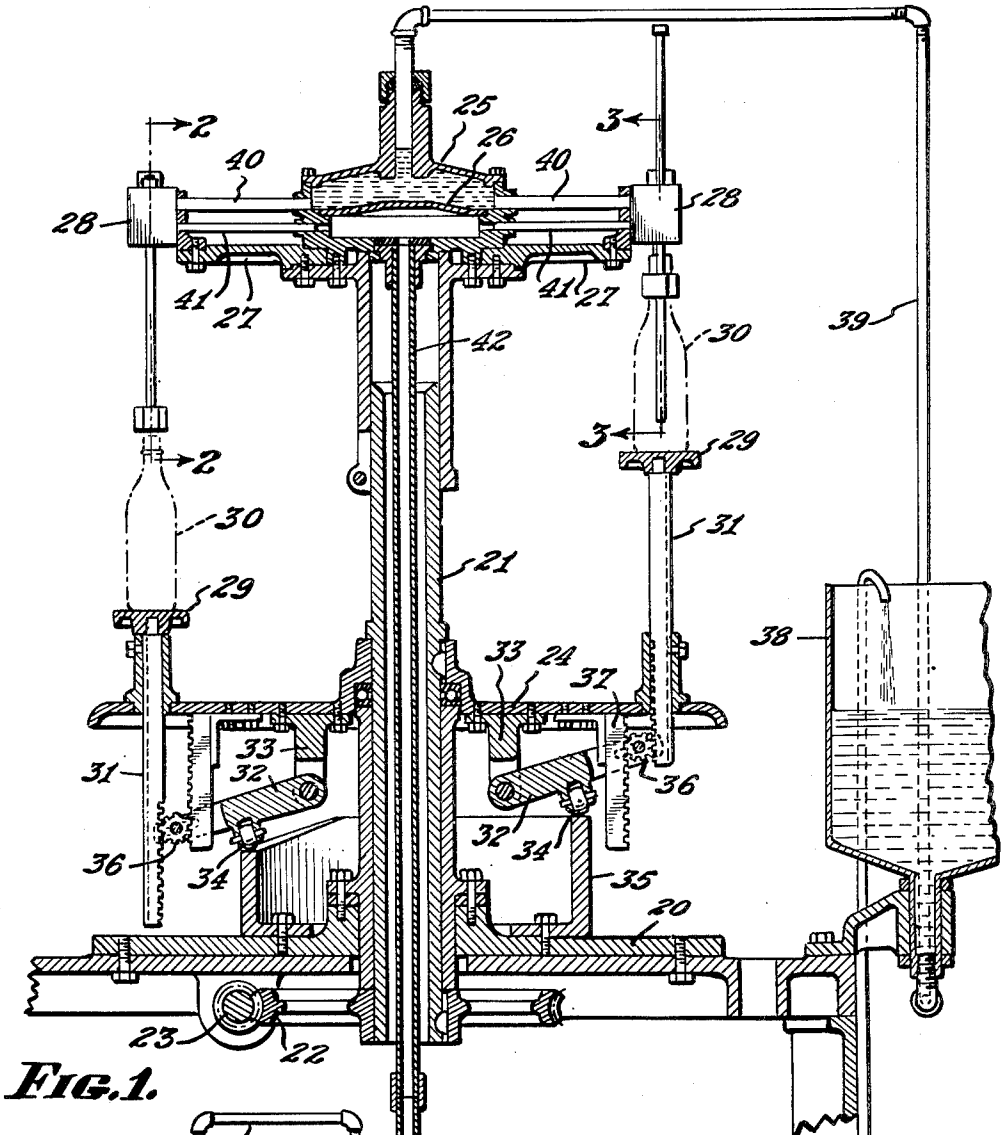

FIG. 1.

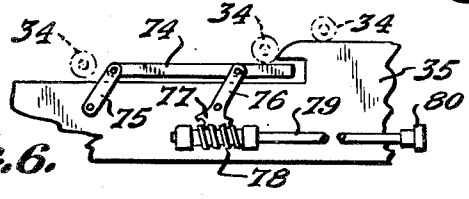

FIG. 6.

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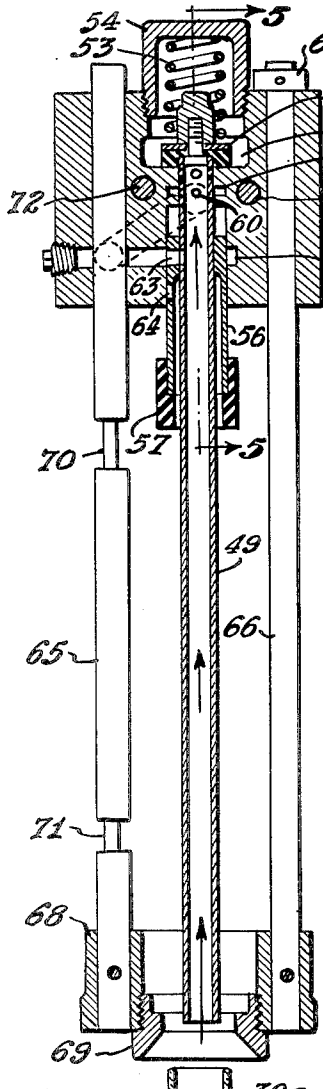

FIG. 2.

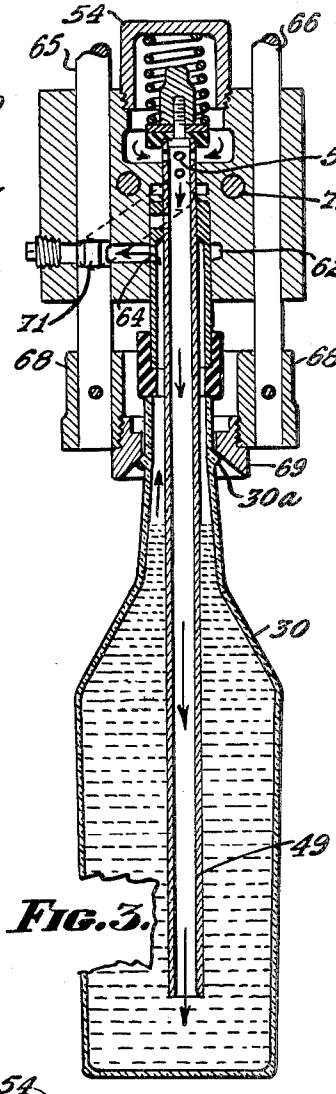

FIG. 3.

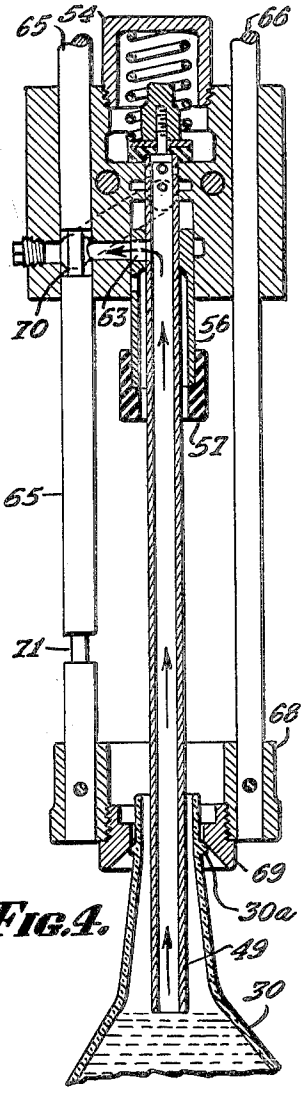

FIG. 4.

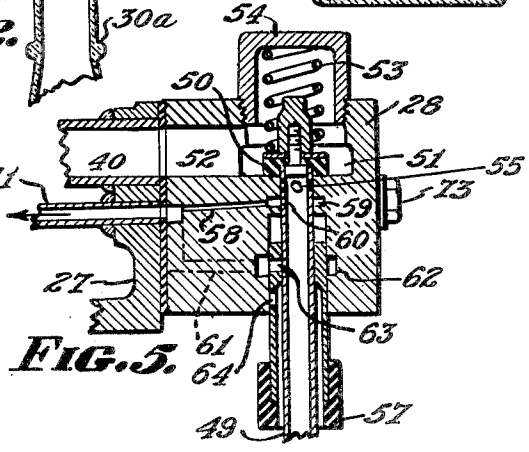

FIG. 5.

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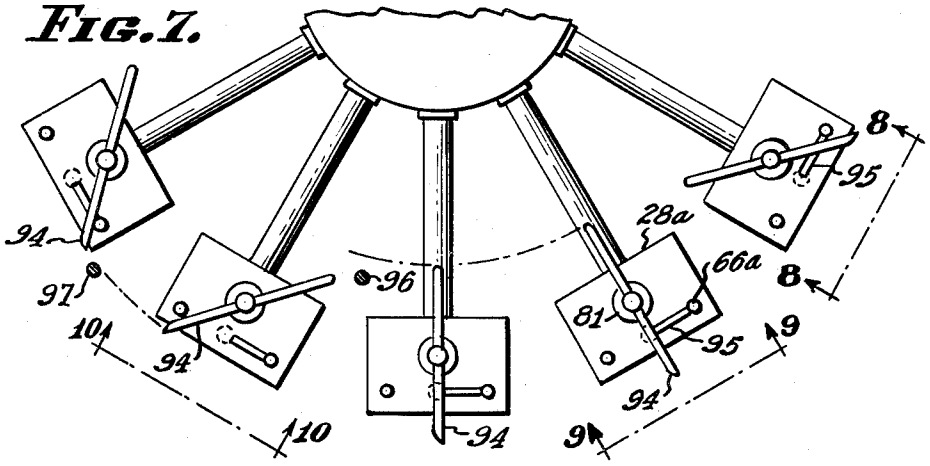
FIG. 7.



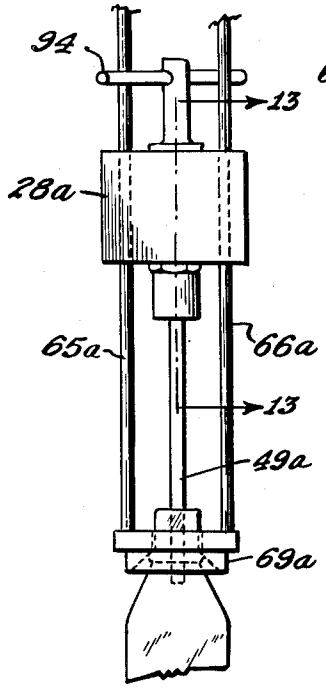


FIG. 10.

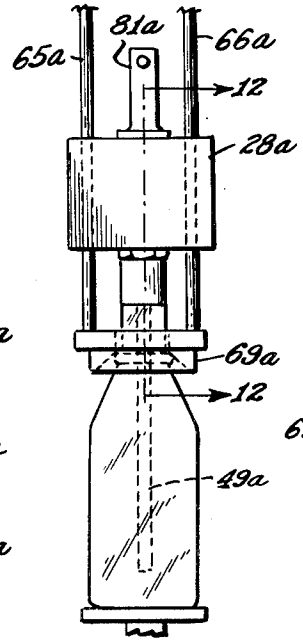


FIG. 9.

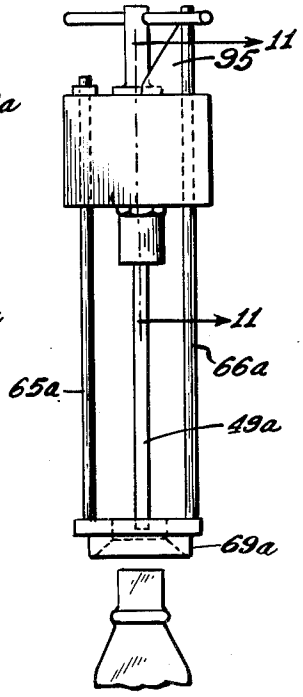


FIG. 8.

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MACHINE FOR FILLING CONTAINERS

Filed Feb. 17, 1948 4 Sheets-Sheet 4

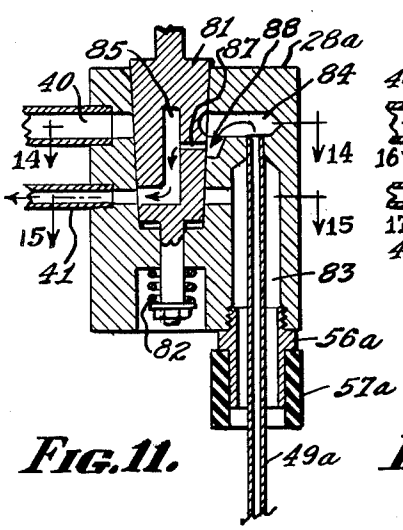

FIG. 11.

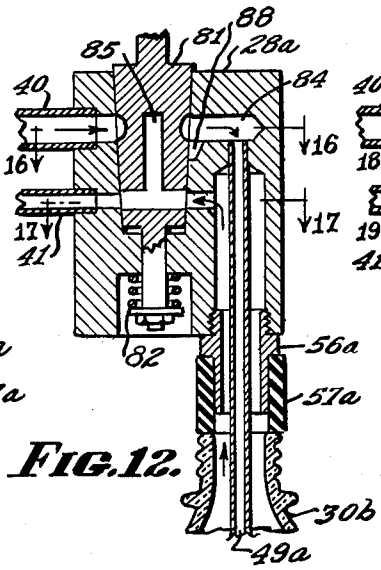

FIG. 12.

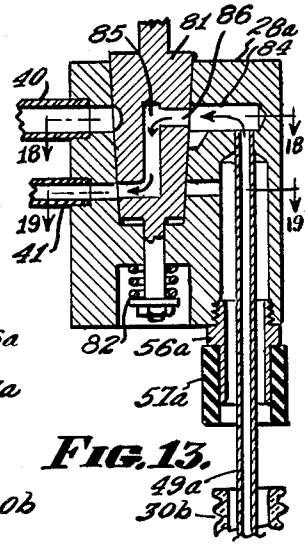

FIG. 13.

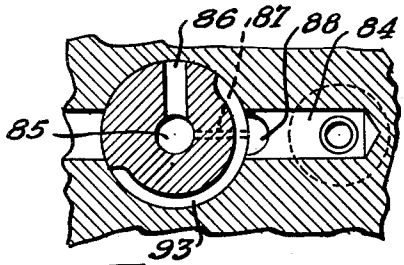

FIG. 14.

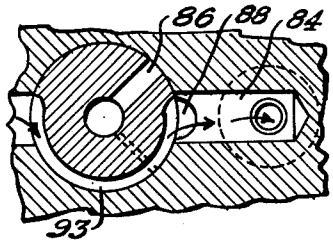

FIG. 16.

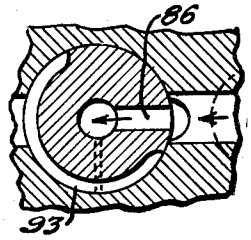

FIG. 18.

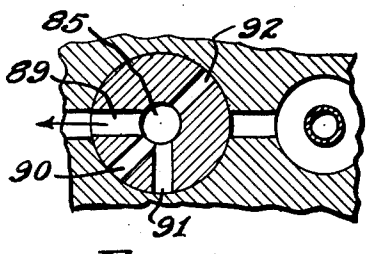

FIG. 15.

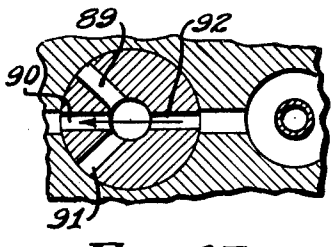

FIG. 17.

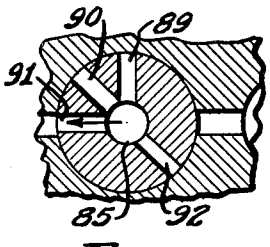

FIG. 19.

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Patented Nov. 10, 1953 2,658,657

UNITED STATES PATENT OFFICE

2,658,657

MACHINE FOR FILLING CONTAINERS

Paul R. Fechheimer, Cincinnati, Ohio, assignor to The Karl Kiefer Machine Company, Cincinnati, Ohio, a corporation of Ohio

Application February 17, 1948, Serial No. 8,885

12 Claims. (Cl. 226—116)

1

My invention relates to machines for filling containers of various forms with flowable materials; and one of its principal objects is the provision of improvements in such machines to enable them to fill the containers at substantially higher speeds.

Another object of the invention is the provision of means to prevent dripping from the nozzle and related parts in the intervals between filling operations.

Yet another object of my invention is the provision of simplified and automatically acting valving means for the accomplishment of the objects set forth above.

In one aspect, my invention has for its object the combination of the advantages of both the vacuum and pressure filling principles while substantially eliminating the disadvantages of both.

These and other objects of the invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that structure and arrangement of parts of which I shall now describe certain exemplary embodiments. Reference is made to the accompanying drawings wherein:

Figure 1 is a vertical sectional view of the filling machine with parts eliminated for the sake of clearness.

Figure 2 is a vertical sectional view of a filling stem assembly shown in the off position.

Figure 3 is a sectional view of the same assembly in the filling position.

Figure 4 is a sectional view of the same assembly shown in the leveling position.

Figure 5 is a sectional view of a filling stem assembly taken along the section line 5—5 of Figure 2.

Figure 6 is a side elevational view of an adjustable means for fixing the position of a portion of the tray-lifting cam shown in Figure 1.

Figure 7 is a plan view of a portion of a cam actuated group of filling stem assemblies of modified form for accomplishing the purposes of this invention.

Figure 8 is a front elevation of one of the filling stem assemblies shown in the scavenging position, taken along the line 8—8 of Figure 7.

Figure 9 is a front elevation of the same assembly shown in the filling position, taken along the line 9—9 of Figure 7.

Figure 10 is a front elevation of the same assembly shown in the leveling position, taken along the line 10—10 of Figure 7.

Figure 11 is a vertical elevation of the assembly in the scavenging position.

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Figure 12 is a vertical section of the same assembly in filling position.

Figure 13 is a vertical section of the same assembly in the leveling position.

Figure 14 is a sectional view of the assembly shown in Figure 11 taken along the section line 14—14 of that figure.

Figure 15 is a sectional view of the same assembly taken along the section line 15—15 of Figure 11.

Figure 16 is a horizontal sectional view of the apparatus of Figure 12 taken along the section line 16—16 of that figure.

Figure 17 is a horizontal sectional view of the apparatus of Figure 12 taken along the section line 17—17 of that figure.

Figure 18 is a sectional view of the apparatus of Figure 13 taken along the section line 18—18 of that figure.

Figure 19 is a horizontal sectional view of the apparatus of Figure 13 taken along the section line 19—19 of that figure.

The machine of this invention is an adaptation of and improvement upon the machine shown in United States Letters Patent No. 1,763,240 dated June 10, 1930 and issued to Karl Kiefer. When filling containers with a machine such as is described in that patent, the turbulence of the liquid entering the container causes the entrainment of a certain amount of air. With foamy liquids a substantial amount of time is required to draw off the resultant foam, especially at high speed. Even when filling relatively non-foamy products such as water or alcohol solutions, a substantial portion of the total filling time is required to permit the entrained air to rise to the top of the liquid in the container and be drawn off by the vacuum mechanism in order to stabilize the fill and obtain a uniform filling height. This also is especially true when filling at high speeds.

Various expedients have been used to overcome this condition. It is possible to insert the filling tube to a point near the bottom of the container so that, after the liquid level in the container has risen to a point where the orifice of the tube is covered, no more air can be entrained in the entering stream. The air vent or vacuum tube is located at the desired fill height nearer to the top of the container, with allowance being made for the displacement of the filling tube when it is withdrawn from the container. This expedient is effective, but the material which adheres to the outer walls of the filling tube below the vacuum tube will tend, after the tube has been with-

drawn from the container, to run down the outer walls of the tube and drip off. The drippage soils the machine and sometimes the containers being filled; and it also represents a loss of product.

Another expedient to reduce air entrainment is so to locate and shape the filling orifice as to direct the incoming liquid along the inner wall surfaces of the container being filled. Under optimum conditions, this can be quite effective and may prevent foaming to a great degree, while drippage may be overcome by suitable valving. However, the shape of the inner walls of the container may not lend itself to such an arrangement. For example in a bottle of square or rectangular cross section and with substantially square shoulders the expedient is not usually effective. Furthermore, even when the orifices of the tube are carefully located and shaped so as to give good results, a change in filling height may alter condiions so as to nullify the advantages obtained.

Again, the filling tubes in machines of the class described in Patent 1,763,240 must have filling orifices of sufficiently small size to prevent, at the conclusion of the filling operation, the outflow of liquid held in the tubes by surface tension.

Yet again, in machines of the class described in Patent 1,763,240, it is necessary to insert both the vacuum and the filling tubes into the container through its restricted neck opening. This reduces the area available for introducing liquid. In filling bottles of the type known as "sprinkler top" or "shaker top" it has been a practice to insert a single tube. This tube however was connected to the vacuum source, and the liquid was introduced through a larger tube, surrounding the vacuum tube and carrying a resilient sealing member at its lower end. This tube and seal did not enter the container being filled. Such a procedure and apparatus is particularly disadvantageous when handling products such as shampoos having high foaming characteristics since, after the liquid level in the container rises to the lower extremity of the vacuum tube and liquid begins to flow out of the vacuum tube there is a tendency for the liquid flowing in around the vacuum tube to prevent the foam from being drawn off.

In the present invention, only one tube is inserted into the bottle or other container, and this during the filling portion of the cycle is the filling tube so that the maximum area is available for the flow of the liquid. Since the vacuum tube, which is a larger diameter tube surrounding the filling tube and carrying a resilient sealing member at its lower extremity, is located wholly outside the container, the container will be filled level full excepting for the lowering of the liquid due to the displacement of the filling tube when it is withdrawn. In order to reduce turbulence and foaming, the filling tube may, if desired, be inserted to a point near the bottom of the container being filled. After the container is filled level full as described, the container is moved away from the filling tube and the seal is broken between the resilient sealing member and the top of the bottle. The bottle may then be lowered so that the lower extremity of the filling tube is located exactly at the desired fill height.

When the container has been lowered as above described, the filling tube which has been shut off from the supply source of filling material is now connected to the vacuum line and the excess material is withdrawn from the container so that the fill height is brought to the desired level. During this procedure any excess liquid in the container is withdrawn, and thereafter any liquid remaining in the filling tube will be withdrawn upwardly and carried into the vacuum tube line. There may, however, be some residual material which will adhere to the inner wall surfaces of the filling tube.

When the bottle or other container is brought to its lowest position it can be removed from the machine and replaced by an empty container. At this time there may be a tendency for the residual material adhering to the inner wall surfaces of the filling tube to drip. To prevent this I scavenge the tube by permitting a small upward flow of air to continue through the filling tube, even though the final lowering of the bottle has shut off the vacuum in order to conserve it.

It will be noted that the fill height can be controlled accurately and can also be adjusted within reasonable limits by adjusting the particular position of intermediate dwell of the container. This can be accomplished in various ways.

In Figure 1, I have shown the operating parts of an exemplary machine having a base or frame **20**, a central rotating column **21** journaled on the frame and provided with a worm wheel **22** engaging a worm **23** by means of which the column may be rotated, and a table **24** fixed to the rotating column so as to move with it.

At the top of the column I provide a hollow head **25** divided into two parts by a membrane or diaphragm member **26**. A spider element **27** at the top of the column bears various filling spout assemblies **28** at the ends of its arms. Provision is made for raising and lowering the head and spider to accommodate bottles or other containers of various sizes.

The rotating table **24** is provided with trays **29** to accept bottles **30** or other containers. These trays have an up and down movement of considerable extent for reasons hereinafter made clear. In the exemplary embodiment they are mounted on rods **31** vertically slidable through the table **24**, and having teeth at their lower ends. Bifurcated lever arms **32** are pivoted at one end in brackets **33** beneath the table. Intermediate their length these lever arms carry cam following rollers **34** engaging a cam **35** on the frame of the machine. At their opposite ends the lever arms contain pinions **36** which not only mesh with the teeth on the vertically reciprocable rods **31** but also with teeth of rack members **37** depending from the table **24** and fixed thereto. In this way the movement of the outer ends of the lever arms **32** is multiplied in producing up and down movement of the tray carrying rods **31**.

At one side of the machine I have indicated at **38** a reservoir for the filling material. This reservoir is connected by means of a conduit or pipe **39** to the upper part of the head **25**, and this part is connected by tubes **40** to the filling spout assemblies **28**. The lower part of the head **25**, i. e., that part below the diaphragm **26** is connected by tubes **41** to the filling spout assemblies, and is also connected by a conduit **42** to a trap **43** shown below the column. A vacuum pump **44** is connected by a conduit **45** to this trap. Another conduit **46**, having a check valve **47** and provided with a pump **48** connects the trap **43** with the reservoir **38**. The conduits **39** and **42** may be made adjustable as to length in known

ways to permit the head to be raised and lowered on the column.

It will be understood from what has been said above that the mode of filling preferably involves drawing a vacuum on the containers 30, which causes the liquid filling material to be withdrawn from the reservoir 38 and introduced into the containers. The pump 44 is effective in creating this vacuum. Any excess material from the containers is withdrawn through the vacuum line including the conduit 42 and collects in the trap 43 from which it is withdrawn by the pump 46 and carried back to the reservoir 38.

As shown in Figures 2 to 5 inclusive each filling head in one embodiment of my invention comprises a body 28 affixed to a bracket-like end of the spider arm 27. A filling tube 49 is slidably mounted in a vertical bore in the body and is connected to or lies against a valve element 50 located in a liquid chamber 51 in the body. This chamber is connected by a lateral passageway (52 Figure 5) to the liquid conduit 40. The valve 50 is urged to closing position by a spring 53 engaged beneath a cap 54 threaded into the upper end of the body. The upper end of the filling tube 49 is provided with holes or passageways 55, so that when the filling tube is in its upper position as illustrated in Figure 3 liquid from the liquid chamber 51 can enter the filling tube and flow therethrough downwardly into the container 30. The tube 49 is preferably made long enough, as shown, to go down into the container 30 to a point near the bottom thereof.

Affixed to the tube 49 there is an outer tube 56, also slidable in the body 28, and bearing at its lower end a sealing element 57.

The vacuum line 41 is connected to the body 28 through the end of the spider arm 27 as shown in Figure 5. It is coupled by a small passageway 58 to an upper vacuum chamber 59. In the lowermost position of the filling tube 49 this upper vacuum chamber is connected to the interior of the tube through one or more small holes 60 in the tube. The vacuum line 41 is also connected by a passageway 61 to a lower vacuum chamber 62. With the inner and outer tubes 49 and 56 in their lowermost positions as illustrated in Figures 4 and 5, the lower vacuum chamber 62 will be connected to the interior of the filling tube 49 through a hole 63 in both tubes. When both tubes are in their uppermost position as shown in Figure 3, the lower vacuum chamber 62 will be connected to the interior only of the outer tube 56 through a hole 64.

A pair of long rods 65 and 66 are journaled so as to be vertically slidable in the body 28 as shown. One or both of these rods may be provided with a collar 67 to fix their lowermost positions. At their lower ends the rods 65 and 66 are provided with an annulus 68 which carries a container engaging element 69. This element is so arranged as to engage some portion of the container other than the upper edge thereof, for example the ridge 30a on the container neck. The bore which accepts and mounts the rod 65 in its vertically sliding movement coincides with a portion of the passageway 61 by which the vacuum line 41 is connected to the lower vacuum chamber 62, and the rod closes this passageway. In order to open the passageway up as desired, I provide in the rod 65 two reduced portions 70 and 71. The body 28 is mounted to the end of the spider arm 27 by means of bolts 72, 73.

The operation of this structure can now be described. When relative movement between the container 30 and the body 28 is produced, as by raising of the tray element 29, the ridge 30a on the bottle neck first contacts the element 69; the filling tube 49 moves downwardly into the bottle, and the rods 65 and 66 move upwardly. Finally the sealing member 57 on the end of the outer tube 56 contacts the top of the bottle neck as shown in Figure 3. This figure illustrates the filling position. The reduced portion 71 has moved into such a position that the passageway 61 is opened up. The vacuum line, through the lower vacuum chamber 62 and the hole 64 in the outer tube 56 is connected directly to the outer tube, and a vacuum is pulled on the container 30. It will be noted that the inner and outer tubes 49 and 57 have moved upwardly until this connection has been made. This breaks any connection between the filling tube 49 and the upper vacuum chamber 59. The valve 50 also has been opened by this upward movement, and the pulling of the vacuum on the container 30 causes the filling liquid to enter the tube 49 and flow down it into the container. This action continues rapidly until the container has been filled to the top, excess fluid leaving the system through the outer tube 56 and returning to the trap via the vacuum line 41.

Next the container and the head are moved relatively away from each other. The sealing element 57 leaves the end of the bottle neck; the seal is broken and no more filling material enters the container. While the tubes 49 and 56 now move downwardly so that the vacuum passageway 61 through the lower vacuum chamber 62 is connected to the filling tube 49 through the common hole 63, the downward movement of the rod 65 will have closed the vacuum passageway so that there is no tendency for liquid to be withdrawn from the container. As the container moves downwardly the liquid level in it will fall somewhat because of the displacement of the tube 49.

As shown in Figure 4 however if the downward movement of the container is halted at a certain position, the reduced portion 70 of the rod 65 will again open up the vacuum passageway 61. The apparatus is so adjusted that at this point the lower end of the filling tube 49 is exactly at the desired fill height. When the vacuum connection is made as aforesaid to the filling tube 49 any overfill in the container 30 will be withdrawn upwardly through the tube 49 which is now in the vacuum line and will be returned to the reservoir through the vacuum system. The liquid level in the container will be rapidly reduced to the desired fill height. When this is reached no further liquid will be withdrawn from the container because the liquid level has become below the end of the tube 49. But the continued connection of this tube to the vacuum line will insure the withdrawal from it of any liquid it contains. Although a reduction in the height of the liquid in the container 30 to the desired fill height occurs rapidly because of the large effective diameter of the tube 49, a pause or dwell in the tube's movement at this point is desirable.

As the container moves still further away from the head 28 the rods 65 and 66 will move further downwardly, and the reduced portion 70 will move away from the passage 61. This closes the vacuum line connection to the lower vacuum chamber 62. It will be noted however from Figures 2 and 5 that the tube 49 remains connected to the vacuum line through the passage-

way 58 and the hole 60. This is a reduced connection and is not wasteful of the power of the vacuum pump. However there will be sufficient continued movement of air upwardly in the tube 49 to exert a scavenging action and not only to prevent any liquid clinging to the inner surfaces of the walls of this tube from dripping from its end, but also sufficient to draw inwardly into the tube any filling material clinging to the outer surfaces of its walls in sufficient quantity to flow downwardly to its end. Finally the container moves entirely away from the element 69 as shown in Figure 2, and the filled container may then be removed. In the interval between the filling of one container and the filling of the next the scavenging action continues to prevent drip.

In the filling of materials into bottles where the filling must be very accurate volumetrically, it is desirable to provide some adjustment for the fill height. This may be accomplished, with my apparatus, by any means which serves to adjust the exact position of the pause or dwell which has been mentioned above. It will be noted that the reduced area 70 of the rod 65 is made of sufficient length to permit such adjustment while keeping the vacuum passageway 61 open. Any means for controlling the relative position of the body 28 and container 30 at the dwell period may be employed. One such means is illustrated in Figure 6 where the cam element 35 has an adjustable section 74 connected with the main body of the cam by links 75 and 76 so that the adjustable portion can move up and down but will remain in parallelism with the main portion of the cam. One of the lengths 76 has a toothed segment 77 at its lower end. This segment meshes with a worm 78 on a shaft 79 suitably journaled in bearings on the cam or elsewhere so as to be rotatable but incapable of axial movement. A knob, hand wheel or the like 80 is provided on the end of the shaft 79 for adjustment purposes.

The valving action which has been described above may be accomplished by other means; and in Figures 7 to 19 inclusive I have illustrated a type of apparatus in which the bodies 28*a* of the filler assemblies are provided with plug valve elements 81 which are urged by means of springs 82 to a tapered seat. In this embodiment the vacuum line 41 is connected through the plug valve directly to a chamber 83 in communication with the outer tube 56*a*. The filling liquid line 40 is connected through the valve directly to a vacuum chamber 84 in communication with the filler tube 49*a*. The valve plug 81 has a central vertical passageway 85, which at the top is connected in one radial position with the vacuum chamber 84 by a transverse passageway 86. In a different radial position there is a smaller passageway 87 by which it may be connected to a depressed portion 88 of the vacuum chamber.

A lower end of the central passageway 85 is connectable by a series of radial passageways 89, 90 and 91 to the vacuum line 41 and by yet another passageway 92 to the vacuum chamber 83. At the level of the filling chamber 84, the plug valve element 81 is provided with an annular passageway 93 extending about approximately half the circumference of the valve plug and serving as a means for connecting the filling line 40 with the filling chamber 84.

Starting first with the filling position of the apparatus as illustrated in Figures 12, 16 and 17, it will be noted that the filling tube 49*a* extends downwardly into the container 30*b*. The upper end of the container is in contact with the sealing element 57*a*. The vacuum line is directly connected with vacuum chamber 83 through valve plug passageways 90 and 92 and air is exhausted from the container 30*b*. The filling chamber 84 is directly connected to the filling line 40 by the annular passageway 93, and the vacuum line has no connection with the filling chamber 84. Hence the filling material delivered by the filling line 40 will flow into the container through the filling tube 49*a* until the container is completely filled, excess filling material leaving the system through the chamber 83 and the vacuum line 41.

As the container is moved away from the body 28*a* it comes to and is stopped at that position where the end of the filling tube 49*a* marks accurately the desired height of fill in the container. The plug valve element 81 will have moved as shown in Figures 13, 18 and 19 to such position that the filling chamber 84 is disconnected from the filling line 41. At the same time the chamber 83 is disconnected by the valve from the vacuum line 41. But the vacuum line is connected through passageways 91, 85 and 86 directly to the filling chamber 84. Liquid is rapidly withdrawn from the container upwardly through the filling tube 49*a* until the liquid level in the container comes below the end of the filling tube. Thereafter any liquid in the filling tube is withdrawn upwardly, the liquid so withdrawn in both instances entering the vacuum line and going to the trap. As the container is moved further downwardly the valve plug element 81 is turned to the off position as illustrated in Figures 11, 14 and 15. Here the vacuum line is disconnected from the vacuum chamber 83, the filling line is disconnected from the filling chamber 84, and the previously described connection between the vacuum line and the filling chamber has been broken. A much smaller effective connection between the vacuum line and the filling chamber 84 is however effected through the passageway 87, and the flow of air through this passageway is enough for the scavenging action and prevention of drippage hereinabove described while being insufficient to destroy the general vacuum in the vacuum system.

As will be evident from Figures 7 to 10 inclusive, the valve plug element 81 has an upwardly extending operating shaft 81*a* provided with a transverse operating member 94. Again I provide a member 69*a* to be contacted by the bottles and moved upwardly by them. This element is mounted on rods 65*a* and 66*a* which are slidable vertically in the body 28*a*. At the extreme right of Figure 7 one of the bodies is shown with the valve-operating element 94 in the off position. The rod 66*a* is provided with a cam element 95 which acts to set the valve-operating element 94 to the filling position shown next to the left in Figure 7 as the bottle and the element 69*a* are moved upwardly. It will be understood that in a straight vacuum system no filling can occur until the top end of the container 30*a* contacts the sealing element 57*a*. Two "filling" positions are shown in Figure 7, and it will be understood that the bodies 28*a* are moving in a clockwise direction in that figure. At the conclusion of the filling operation, and in consequence of this motion, the valve plug element 81 is turned to the withdrawal position hereinabove described by a fixed stop element 96 on the machine frame which engages the valve operating element 94. The return of the valve plug to the off position is accomplished by yet another fixed stop ele-

ment 97 on the machine frame engaging the opposite end of the valve operating element 94.

It will be appreciated that in the embodiment of Figures 7 to 19 inclusive, since I have provided for an initial movement of the valve plug to the filling position by means of a cam 95, such movement will not take place unless a container be present on the tray so as to move the element 69a. This is a safety feature preventing the operation of the mechanism in the absence of a container to be filled. In the off position, the operating element 94 of the valve plug will not strike either of the stops 96 or 97. In the embodiment of Figures 2 to 5 inclusive, no valving action will occur in the absence of a container because in this event the rods 65 and 66 will not be moved.

In my mechanism the filling stems can readily be changed by removing the cap 54 covering the spring in the stem casing and also removing the nut which holds the filling valve seat in place, in the embodiment of Figures 2 to 5. The entire filling stem can then be removed downwardly. In the embodiment of Figures 7 to 19, the filling stem or tube can be removed by unscrewing it from the body 28a. If it is desired to fill under circumstances where the end of the filling stem or tube approaches the bottom of the container closely, different length filling tubes will be required for different heights of container. Also by adjusting the length of the filler tube or stem the fill height may be adjusted. This may be accomplished also by adding or removing end sections of the stem.

The outer annular vacuum tube 56 in the assembly shown in Figures 2 to 5 inclusive is an integral part of the filling stem and, preferably, is soldered or brazed to the filling tube. Filler tubes or stems can be changed also to vary the diameter of the tube to be inserted into the bottle or other container.

The machine in the embodiments shown by me has been described as a vacuum filler, that is, a machine with a liquid supply source located so that its level is substantially below that of the containers being filled. The liquid is introduced into the containers solely by drawing a vacuum thereon so that atmospheric pressure operating against the weight of the liquid in the system forces the liquid into the container. However it is possible to raise the liquid supply source or to bring the liquid into the machine under pressure since in both embodiments of my machine there can be no flow of the liquid from the filling assembly except when a bottle is properly in position on a raised tray. By increasing the inlet pressure faster filling can be obtained. Increasing the inlet pressure does not eliminate with this arrangement, any of the advantages of vacuum filling with one exception. This exception is, that in the event a cracked or chipped neck container is brought into filling position it will be filled in a pressure system whereas it will not in a vacuum filler, since a vacuum cannot be drawn on the container.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention in certain exemplary embodiments, what I claim as new and desire to secure by Letters Patent is:

1. In a filling device an elongated filling tube, for entering a container, a vacuum tube having sealing means for contacting the top of the container, a source of filling material, a vacuum source, valve means acting alternatively to connect said sealing tube to said source of filling material and said vacuum tube to said vacuum source, and to effect an interruption of said connections and connect said filling tube to said vacuum source, means for positioning a container relative to said filling tube in a filling position in which said end of said tube is near the bottom of said container, and in a leveling position in which the end of said tube coincides with a desired height of fill of said container, whereby the connection of said tube to said vacuum source will result in the withdrawal of material filled into said container above said desired height of fill, two alternative connections controlled by said valve means between said filling tube and said vacuum source, one of said connections being of relatively large diameter and effective during the withdrawal of material as aforesaid, the other of said connections being of relatively smaller diameter and effective to prevent drip during the intervals between filling without depleting said vacuum source, an operative means adapted to be engaged and moved by a container presented for filling, and an operating connection between said operative means and said valve means, said operative means being mounted upon rods slidable in a body containing said valve means, one of said rods acting as part of said valve means in closing and opening a connection to said vacuum source.

2. The structure claimed in claim 1 in which said vacuum tube is a short tube concentric with one end of said filling tube, in which said filling tube and said vacuum tube are reciprocable together in said body, in which valve means for said source of filling material is operated by said slidable tubes, and in which the position of said tubes determines the connection of both to said vacuum source.

3. The structure claimed in claim 1 wherein said valve means includes a plug valve in a body, wherein said operative element is mounted on rods slidable in said body, wherein one of said rods has means for moving said valve plug to a filling position, wherein said body and the container move together in a machine, and wherein fixed stops are provided in said machine to determine other positions of said valve plug.

4. A filling device comprising an elongated tube adapted to enter a container, a source of filling material to be filled into the container, a source of vacuum, a valve having a first position connecting said tube to said source of filling material, and a second position connecting said tube to said source of vacuum and disconnecting it from said source of filling material, valve actuating means operable upon the insertion of said tube into a container to move said valve to said first position to fill the container, means for effecting a relative positioning of the container and said tube such that the end of the tube determines a desired height of fill in the container, and means acting to move said valve to said second position as the relative positioning of the container and tube is effected whereby to withdraw excess material in the container down to the desired height of fill.

5. The structure claimed in claim 4 including tubular means for effecting a seal against the top of the container, said valve acting in said first position to connect said tubular means to said source of vacuum.

6. The structure claimed in claim 4 wherein said valve actuating means includes a member actuated by the presentation of a container thereto.

7. The structure claimed in claim 4 wherein sadi valve actuating means comprises a member mounted upon rods slidable in a body containing said valve and wherein one of said rods acts to change the position of said valve.

8. In a filling device, a single elongated filling tube adapted to enter a container, a vacuum tube having a sealing means for contacting the top of the container, a source of filling material, a source of vacuum, and a valve having a first position in which said filling tube is connected to said source of filling material and said vacuum tube is connected to said source of vacuum, and a second position in which said filling tube is connected to said source of vacuum, operating means for said valve adapted to be engaged and moved by a container presented thereto, and means for positioning the container relative to said operating means in a filling position in which the end of said filling tube is near the bottom of the container and the valve is moved to said first position, and in a leveling position in which the end of the filling tube coincides with a desired height of fill of the container and said valve means is moved to the second position.

9. In a filling device, a single elongated filling tube adapted to enter a container, a vacuum tube having sealing means for contacting the top of the container, a source of filling material, a source of vacuum, and a valve having a first position in which said filling tube is connected to said source of filling material and said vacuum tube is connected to said vacuum source, a second position in which said filling tube is connected to said source of vacuum by a connection of relatively large area, and a third position in which said filling tube is connected to said source of vacuum by a connection of relatively smaller area, an operating means for said valve adapted to be engaged and moved by a container presented for filling, means for positioning the container relative to said operating means in a filling position in which the end of said filling tube is near the bottom of the container and the valve is moved to said first position, in a leveling position in which the end of the filling tube coincides with a desired height of fill of the container and said valve is moved to the second position, and in a scavenging position in which the filling stem is removed from the container and the valve is moved to the third position.

10. The structure claimed in claim 9 within said operating means is mounted upon rods slidable in a body containing said valve, and wherein one of said rods acts as a part of said valve.

11. The structure claimed in claim 10 wherein said vacuum tube and said filling tube are reciprocable together in a body containing said valve, and wherein the three positions of said valve are determined by the positions of said sliding rods and said tubes.

12. The structure claimed in claim 9 wherein said vacuum tube and said filling tube are reciprocable together in a body containing said valve, and wherein movement of said tubes effects a change in position of said valve.

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