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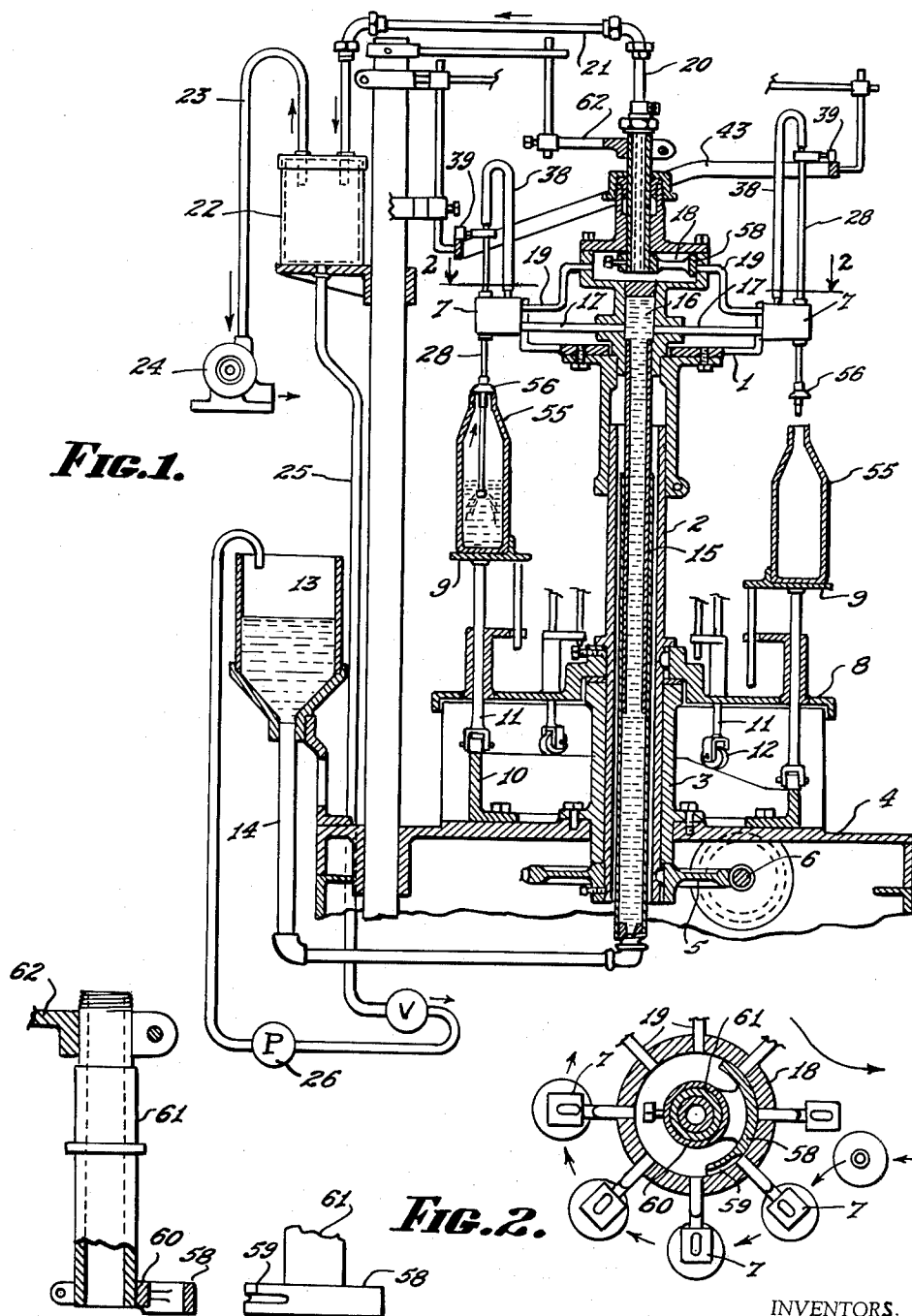
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3,056,436

FILLING HEAD FOR FILLING MACHINES

Filed June 24, 1959

5 Sheets-Sheet 1



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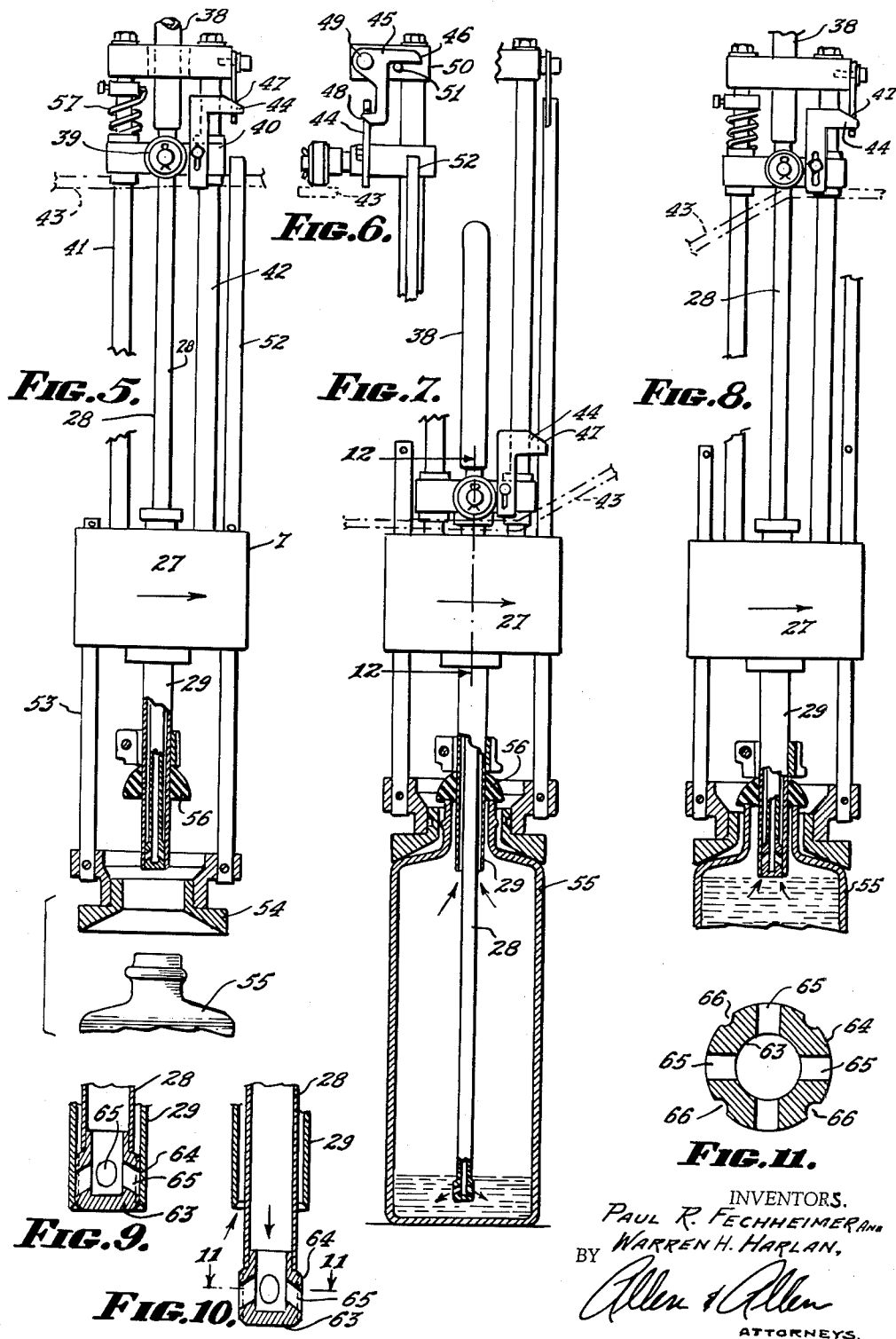
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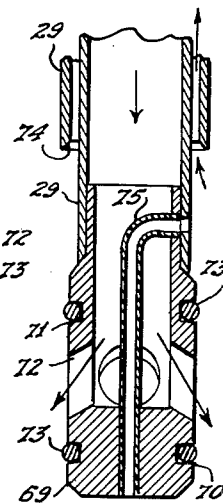
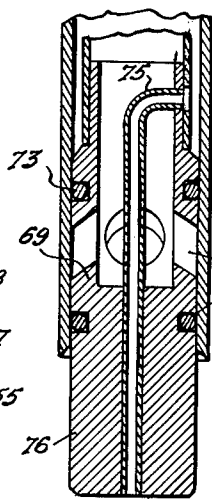
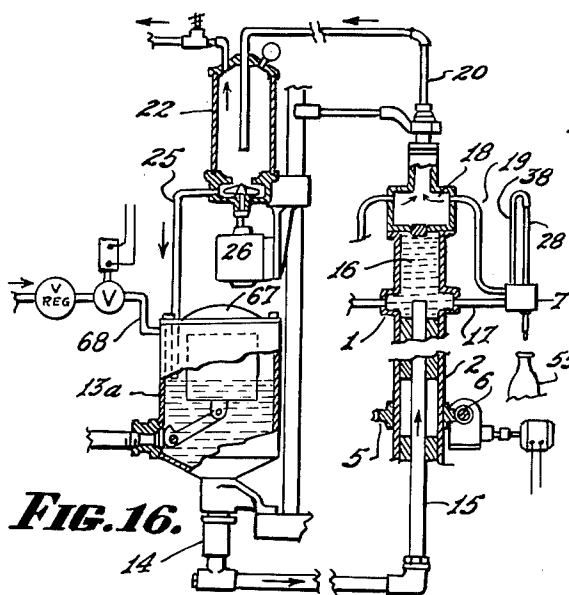
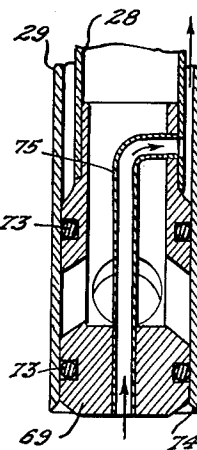
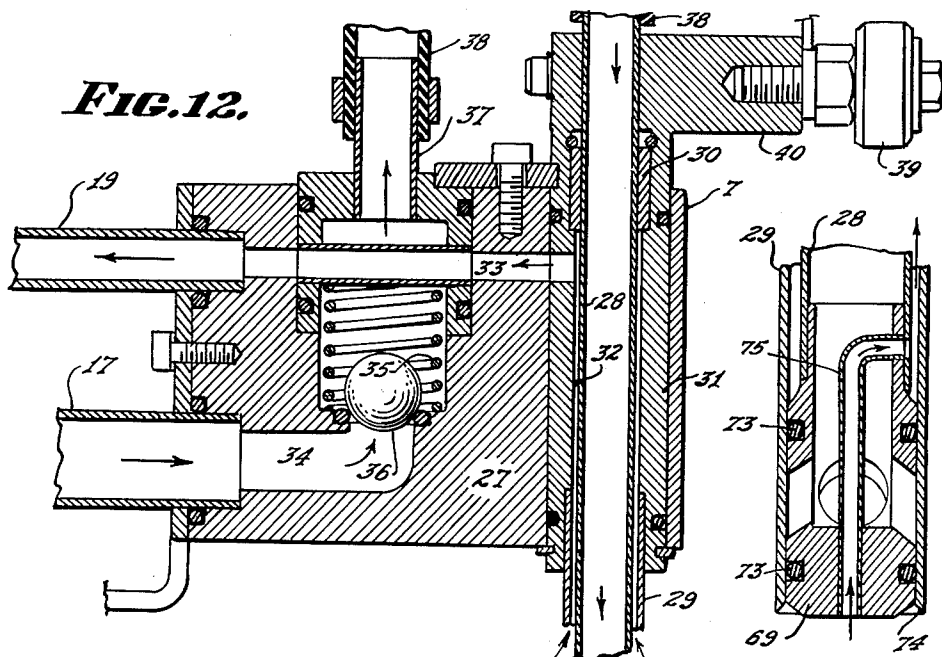
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5 Sheets-Sheet 3



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5 Sheets-Sheet 4

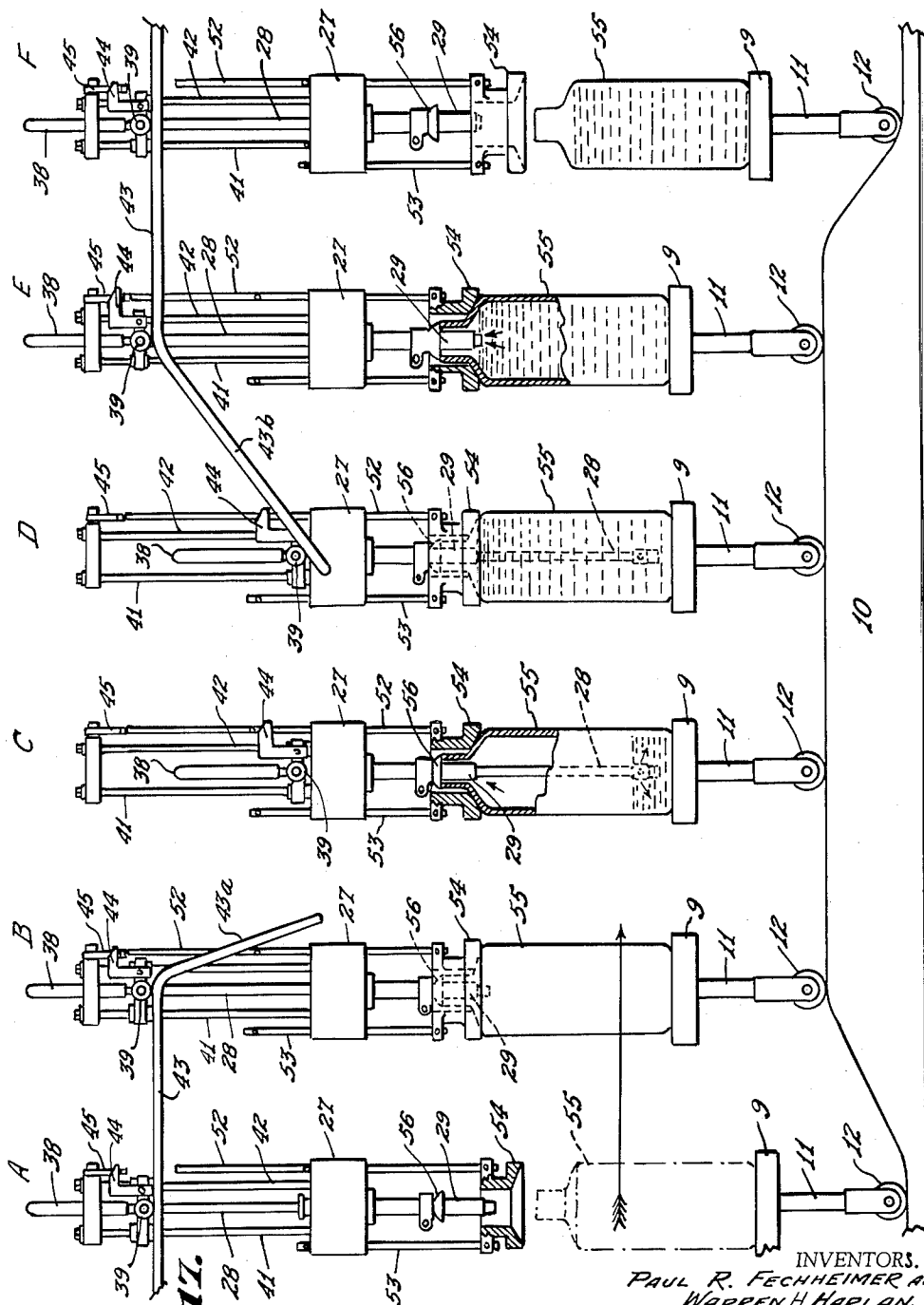


FIG. 11.

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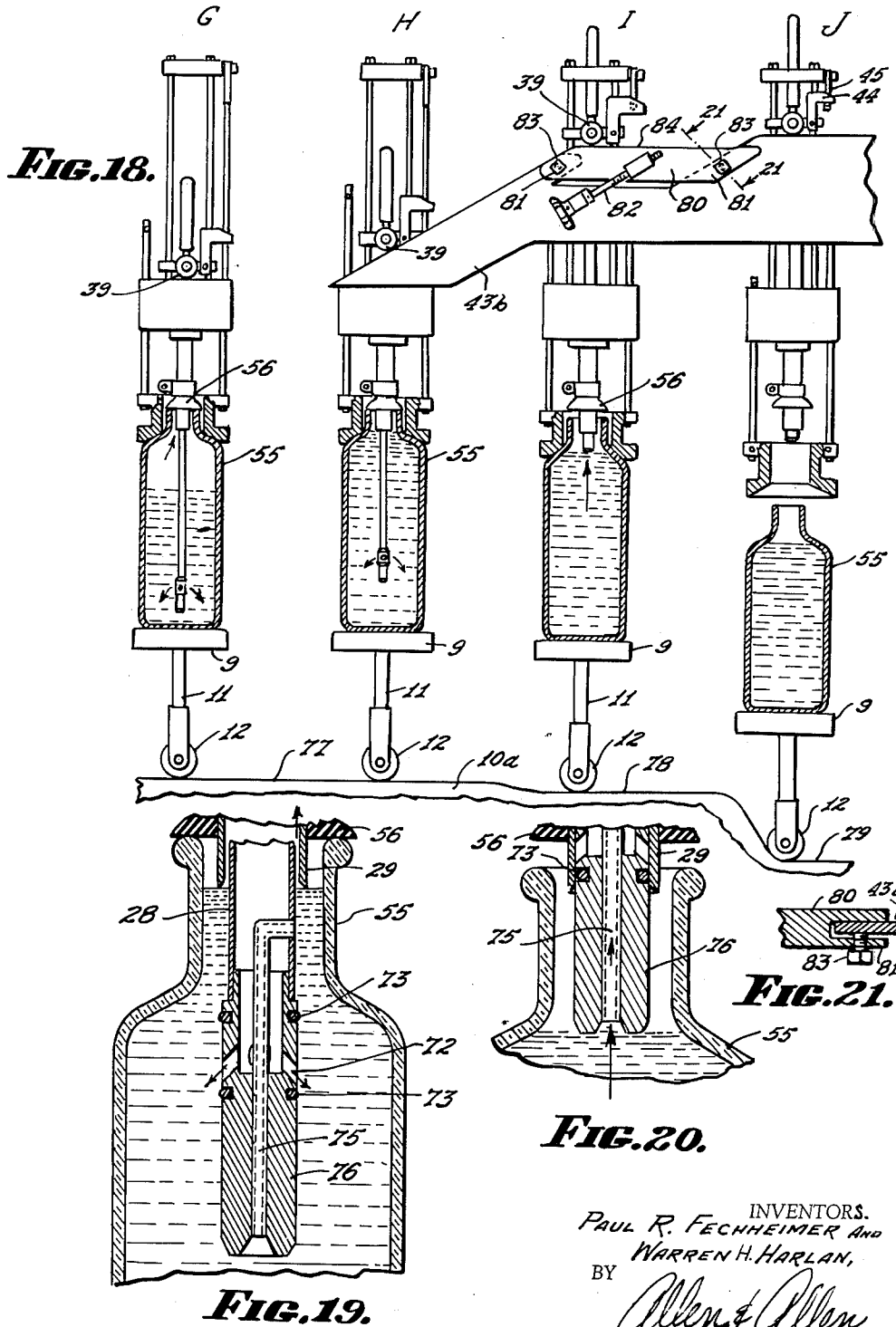
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5 Sheets-Sheet 5



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3,056,436

FILLING HEAD FOR FILLING MACHINES

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15 Claims. (Cl. 141-59)

This invention relates to machines for filling containers with a liquid, and relates more particularly to the provision of improved filling spout structures which facilitate the rapid filling of containers with liquids which tend to foam.

A principal object of the invention is the provision of a filling spout structure having a retractable filling stem adapted, upon the presentation of a container to be filled to the filling spout structure, to enter the container and assume a lowermost position in which the bottom or free end of the stem lies in close proximity to the bottom of the container being filled, whereupon as the liquid product is introduced into the container the filling stem will automatically retract.

A further object of the invention is the provision of a retractable filling stem of the character described which coacts with a vacuum tube forming a part of the filling spout structure, the vacuum tube serving to establish a predetermined height of fill for the container.

A further object of the invention is the provision of a filling spout structure having a retractable filling stem adapted to be locked in retracted position, the filling spout structure incorporating means responsive to the presentation of a container thereto for releasing the locking means so as to permit the filling stem to enter the container therebeneath.

Yet a further object of the invention is the provision of a filling spout structure of the character described which may be utilized with a filling machine of the vacuum type or, alternatively, the provision of a modified filling spout structure for use with a filling machine utilizing both pressure and vacuum.

The foregoing together with other objects of the invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading these specifications, are accomplished by those constructions and arrangements of parts of which certain exemplary embodiments shall now be described, reference being made to the accompanying drawings wherein:

FIGURE 1 is a side elevational view with parts in section of a conventional rotary filling machine of the vacuum type.

FIGURE 2 is a sectional view taken along the line 2-2 of FIGURE 1.

FIGURE 3 is an enlarged fragmentary view of the valve element for controlling vacuum drawn on the filling spout structures.

FIGURE 4 is an enlarged fragmentary view illustrating a restricted flow passage in the valve element.

FIGURE 5 is a side elevational view with parts broken away of a filling spout structure in accordance with the invention.

FIGURE 6 is a fragmentary elevational view of the filling stem locking mechanism.

FIGURE 7 is a side elevational view with parts in section similar to FIGURE 5 but illustrating the filling stem in its extended or lowermost position.

FIGURE 8 is a fragmentary elevational view with parts in section similar to FIGURE 7 but illustrating the filling stem in retracted position.

FIGURE 9 is an enlarged fragmentary sectional view of the tip of the filling stem, illustrating the manner in which the tip retracts into the surrounding vacuum tube.

FIGURE 10 is a fragmentary sectional view similar to

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FIGURE 9 but with the tip of the filling stem extended beyond the vacuum tube.

FIGURE 11 is an enlarged sectional view taken along the line 11-11 of FIGURE 10.

FIGURE 12 is an enlarged sectional view taken along the line 12-12 of FIGURE 7.

FIGURE 13 is an enlarged fragmentary sectional view of a modified form of filling stem tip.

FIGURE 14 illustrates the tip of FIGURE 13 in retracted position.

FIGURE 15 is a fragmentary sectional view similar to FIGURE 14 but illustrating a modified form of filling stem tip in the retracted position.

FIGURE 16 is a fragmentary side elevational view with parts in section of a pressure-vacuum filling machine incorporating the filling spout structures of the instant invention.

FIGURE 17 is a schematic drawing illustrating the various positions assumed by the filling spout structure during the filling cycle.

FIGURE 18 is a schematic drawing illustrating a modified operating cycle incorporating a modified form of cam mechanism for retracting the filling stem.

FIGURE 19 is an enlarged fragmentary sectional view illustrating the filling stem tip of FIGURE 15 in a filled container.

FIGURE 20 is a fragmentary sectional view similar to FIGURE 19 illustrating the tip of the filling stem in fully retracted position.

FIGURE 21 is a sectional view taken along the line 21-21 of FIGURE 18.

Briefly, the invention contemplates the provision of a filling spout structure having a body through which passes an axially movable filling stem, the stem being movable from an extended or filling position to a retracted or non-filling position by means of a cam follower engageable with an inclined cam track positioned to be contacted as the filling head mounting the spout structure is rotated. When the filling stem reaches its uppermost or fully retracted position, a latch which forms a part of the filling spout structure acts to lock the filling stem in the retracted position. The filling spout structure also mounts a centering bell which, upon the presentation of a container to the structure, acts to release the latch and permit the filling stem to move downwardly into the container. The latch means thus serves to prevent the filling stem from assuming its lowermost or filling position in the event no container is presented to the spout structure. The invention also contemplates the provision of a vacuum tube surrounding the filling stem and acting to establish the desired height of fill for the liquid introduced into the container, the lowermost end of the filling stem being provided with a tip or nose co-operating with the vacuum tube for this purpose and also to prevent dripping of excess liquid from the end of the filling stem between filling operations.

For a more detailed understanding of the invention, reference is first made to FIGURE 1 of the drawings wherein a typical rotary filling machine of the vacuum or suction type is illustrated. As seen therein, the device has a filling head 1 secured to a tubular shaft or column 2 rotatably journaled in a bearing 3 fixedly secured to the base 4 of the machine. The tubular column 2 is adapted to be rotated by means of a gear 5 secured to the lowermost end thereof, the gear being driven from a drive shaft 6 operatively connected to a suitable source of power (not shown). The filling head mounts a plurality of filling spout structures 7 which rotate with the head; and positioned beneath the filling head is a table 8 which is secured to the column 2 for rotation therewith, the table mounting a plurality of lift platforms 9 positioned immediately beneath the filling spout structures 7. Each of the lift plat-

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forms is movable from a lowermost or inoperative position (as seen to the right in FIGURE 1) to an elevated or operative position (as seen to the left in FIGURE 1) in which position a container thereon is presented to the filling spout structure. The lift platforms may be conveniently raised and lowered by means of a cam track 10, each of the lift platforms having a depending shaft 11 mounting a cam follower 12. With this arrangement, a container may be positioned on a given lift platform, elevated to filling position, and subsequently lowered for discharge during each rotative cycle of the machine.

Product to be introduced into the containers is fed from a supply tank 13, through conduit 14 to a vertically disposed conduit 15 contained within the column 2, the conduit 15 terminating in a filling chamber 16 forming a part of the filling head. From the filling head the product is delivered to the individual filling spout structures through conduits 17. The filling head also incorporates a vacuum chamber 18 connected by conduit 19 to each of the filling spout structures, the vacuum chamber serving to draw a vacuum on each container during filling. The vacuum chamber 18 is connected through conduits 20 and 21 to a vacuum chamber and trap 22, the chamber and trap being connected by a conduit 23 to a vacuum pump 24. Any increments of product coming over into the chamber and trap 22 will be separated from the air stream therein, and will be returned to the supply tank 13 through conduit 25 and pump 26.

Referring now to FIGURES 5, 7 and 8, each of the filling spout structures comprises a body block 27 mounting a vertically movable filling stem 28 extending there-through the body block also mounting a depending vacuum tube 29 surrounding the filling stem in spaced relation thereto. The manner in which the filling stem and vacuum tube are mounted to the head can be best understood by reference to FIGURE 12 wherein it will be seen that the filling stem 28 is slidable in a bearing 30, and the vacuum tube 29 is secured to the lower end of a hollow plug 31 the arrangement being such that an annular passageway 32 connects the vacuum tube to a passageway 33 in the body which communicates with vacuum conduit 19. The filling material or product, on the other hand, is introduced from conduit 17 into a passageway 34 which leads to a chamber 35 having a one-way ball valve 36, the chamber in turn opening into a conduit 37 connected by a flexible tube 38 to the upper end of the filling stem 28. It will be understood that the flexible tube 38 will be of a length sufficient to permit free movement of the filling stem from its uppermost to lowermost position.

The filling stem is adapted to be raised and lowered by means of a cam follower 39 secured to a cross member 40 fixedly secured to the filling stem and slidably mounted on a pair of vertically disposed rods 41 and 42 projecting upwardly from the body block 27, the guide rods 41, 42 serving to guide the filling stem as it is raised and lowered. The cam track for raising the filling stem is indicated at 43.

When the filling stem has reached its uppermost, i.e., fully retracted, position, it will be locked in such position by means of the latch plate 44 mounted on the cross member 40 which is engaged by a pivoted latch arm 45 pivotally secured to a bar 46 fixedly secured to the upper ends of rods 41, 42. As the latch plate 44 moves upwardly, its inclined surface 47 will contact the inclined surface 48 of the latch arm, causing it to rotate about its pivot 49 in a counter clockwise direction (as seen in FIGURE 6), thereby permitting the projecting portion of the arm 49 to engage beneath the latch plate 44. The arm 49 also has a rearward projection 50 which, when the arm is in latch plate engaging position, rests on a stop 51. The latch arm 45 is actuated to release the plate 44 and hence the filling stem by means of a vertically disposed axially movable rod 52 which, in its uppermost position, contacts the projection 50 and causes the arm 45 to pivot in a counter clockwise direction. The rod 52 is slidably received in the

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body block 27 and projects downwardly from the block where it coacts with a second movable rod 53 to mount a centering bell 54 positioned to be contacted by a container 55 as the container is presented to the spout structure for filling.

As a container positioned on one of the lift platforms 9 is elevated to filling position, it will contact and raise the centering bell from the position illustrated in FIGURE 5 to the position illustrated in FIGURE 7, wherein it will be seen that the lower end of the vacuum tube enters the mouth of the container and the mouth of the container is seated against a sealing member 56 secured to the vacuum tube, thereby closing the mouth of the container to the outside atmosphere. As the centering bell is raised, the rods 52, 53 move upwardly through the body block 27 and the rod 52 is thus brought into contact with the projection 50 and hence serves to trip the latch arm, which releases the filling stem 28 for downward movement. A spring 57 (FIGURE 5) secured adjacent the upper end of rod 41 supplies initial impetus for downward movement of the filling stem by overcoming the frictional engagement of the tip of the filling stem with the vacuum tube. In addition, the spring 57 will bias the cross member 40 downwardly so as to hold the latch plate 44 and latch arm 45 in firm contact so they will not become accidentally disengaged.

The operation of the device can be best understood by reference to FIGURE 17 of the drawings wherein successive steps in the filling operation are illustrated in a series of diagrams, the leftmost diagram A illustrating the relationship of the parts as an empty container 55 is placed on the lift platform 9, which is in its lowermost position. The filling stem 28 is in its uppermost or fully retracted position and locked in such position by the latch arm 45. Cam follower 39 is in contact with cam track 43; and the centering bell 54 is in its lowermost position.

As the filling machine starts through its cycle of operation, the lift platform will be elevated by cam track 10 to the position illustrated in diagram B, thereby juxtaposing the mouth of the container to the seal 56, the vacuum tube entering the mouth of the container. At the same time, the shoulders of the container contact and lift the centering bell so that the rod 52 contacts and disengages the latch arm 45, thereby freeing the filling stem 28 for downward movement, which will occur as the cam follower 39 reaches the downwardly inclined portion 43a of cam track 43. It will be apparent that should no container be present on the platform 9, the centering bell 54 will remain in its lowermost position and hence the latch arm 45 will maintain the filling stem 28 in its retracted position even though the cam follower 39 is no longer supported by the horizontal portion of cam track 43. Assuming, however, that a container is present on the platform 9, the filling stem will assume the position illustrated in diagram C wherein the lowermost end or tip of the filling stem lies in close proximity to the bottom of the container, whereupon the liquid product will be introduced into the container through the filling stem.

In the vacuum type filling machine illustrated in FIGURE 1, the discharge of product from the filling stem is initiated by the creation of a partial vacuum in the container being filled. That is, upon the sealing of the mouth of the container by the sealing member 56, vacuum drawn on the container by means of vacuum tube 29 will initiate flow of product which, by reason of the open supply tank 13, is under atmospheric pressure.

While normally filling would be initiated immediately upon the sealing of the container mouth, it is preferred to initially delay or at least retard the flow of product into the container until the valve stem 28 has reached its lowermost position, and to this end a valve element 58 is interposed in the vacuum chamber 18. This element is in the form of a shoe adapted to bear against the inner annular surface of the chamber 18 as the latter is rotated, thereby effectively closing the vacuum conduits 19 during a por-

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tion of the rotative cycle of the machine. The shoe 53 will be so positioned that the vacuum will be cut-off at least during that portion of the rotative cycle when the parts approach the position illustrated in diagram B of FIGURE 17 until the filling stem has reached its lowermost position, as illustrated in diagram C. It is also preferred to initially reduce the rate of flow of product into the container to reduce initial foaming; and to this end, the shoe 53 is provided with a restricted flow passageway or groove 59 which restricts the initial vacuum drawn on the container and hence initiates product flow at a slow rate. Of course, just as soon as the passageways 19 pass beyond the shoe 58, full vacuum will be drawn on the containers and the rate of flow of the product will be increased.

The shoe 53 may be conveniently mounted in chamber 18 by means of collar 60 which secures the shoe to conduit 61 which, in turn, is fixedly secured to mounting bracket 62 secured to the machine frame.

Referring again to FIGURE 17 of the drawings, diagram D illustrates the position of the parts as the filling of the container nears completion. As seen therein, the cam follower 39 has engaged the upwardly extending portion 43b of the cam track, thereby initiating upward or retracting movement. In the embodiment illustrated, the filling stem 28 is maintained in its lowermost position until the container has been substantially filled, whereupon as the filling stem is retracted the continued flow of product will serve to compensate for product displaced by the filling stem. Alternatively, the upwardly inclined portion of the cam track may be so placed as to effect a gradual withdrawal of the filling stem as the product level rises in the container. In either event, any overfill will be withdrawn through vacuum tube 29 and returned to the supply tank through chamber and trap 22. As will be explained more fully hereinafter, the height of fill may be controlled either by the position of the vacuum tube 29 alone, or by means of the tip of the filling stem when the latter reaches its retracted position.

When the parts reach the position illustrated in diagram E, the filling stem will have been fully retracted and the fill height of the container established, whereupon the lift platform 9 will pass off the rise of cam track 10, thereby lowering the container 55 which in turn permits the centering bell 54 to return to its lowermost position, thereby causing locking arm 45 to reengage locking plate 44. The parts now assume the position illustrated in diagram F, whereupon the filled container may be removed from the lift platform 9 for subsequent capping. The spout structure is then ready to receive a new container, whereupon the filling cycle is repeated.

Product flow through the filling stem will be cut-off when the stem is fully retracted. Where the filling machine is of the vacuum type, this may be accomplished by means of the filling stem tip 63 best seen in FIGURES 9-11 of the drawing. The tip is in the form of a plug received in the lower end of the filling stem 28, the plug having an exposed annular wall 64 adapted to be slidably received within the lower end of vacuum tube 29. A plurality of ports 65 extend through the annular wall of the tip, the arrangement being such that when the tip is drawn into the vacuum tube, the ports will be closed, thereby preventing or minimizing the withdrawal of product from the filling stem by the action of the vacuum. Preferably, the tip 63 will be formed from nylon or similar material in order to produce the desired close fit within the vacuum tube. If the tip and vacuum tube were both formed from metal, such as stainless steel, the resultant rubbing action would result in galling or scoring.

It is preferred to provide the tip 63 with one or more vertical grooves 66 formed in the annular face of the tip between the product ports, thereby providing a connection to the vacuum source when the filling tube is fully retracted in order to prevent drip from the bottom of the tip.

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As indicated earlier herein, the filling spout structures of the instant invention are also applicable to pressure-vacuum filling machines such as that illustrated in FIGURE 16. Since many of the components of a pressure-vacuum filling machine are comparable to the components of the vacuum machine illustrated in FIGURE 1, like parts have been given like reference numerals for the purpose of simplicity. The basic difference between the two machines lies in the fact that the product is introduced into the containers being filled under positive pressure. To this end, the supply tank 13a is provided with a sealed cover 67 which is pressurized through conduit 68 connected to a source of pressure (not shown).

Where this type of filling equipment is employed, it is preferred to alter the tip of the filling stem in the manner illustrated in FIGURES 13 and 14. As seen therein, the tip 69 is provided with a pair of annular grooves 70 and 71 lying on each side of the ports 72, the grooves each receiving a sealing ring 73 for making sealing contact with the inner surface of vacuum tube 29, thereby providing for positive cut-off of product flow when the filling stem is in fully retracted position and the tip drawn into the lower end of the vacuum tube. With this arrangement, the tip need not contact the walls of the vacuum tube and hence the tip may be formed from stainless steel or the like. Where this arrangement is employed, it is necessary to bevel the bottom of the vacuum tube, as at 74, to avoid cutting the sealing rings during the sliding action. In addition, in order to avoid drip at the bottom of the tip, a tubular connection 75 can be provided between the lowermost end of the tip and the vacuum tube which will provide a flow of air upwardly toward the vacuum source when the filling stem is in its fully retracted position.

FIGURE 15 illustrates a modified form of tip structure having an elongated lower body portion 76 which may be utilized to establish the desired height of fill for the container. In this event, the cam tracks which control the lift platforms 9 and the movement of the filling stems 28 will be modified in the manner illustrated in FIGURE 18 wherein the diagrams G through J illustrate successive stages in the filling cycle.

As seen in FIGURE 18, the cam track 10a for the lift platforms has an uppermost level 77 which, as seen in diagrams G and H, maintain the container 55 in elevated position with the mouth of the container in sealing contact with the sealing member 56. The cam track 10a also has an intermediate level 78 which is slightly lower than the level 77 and serves to lower the container just enough to break its seal with sealing member 56, as illustrated in diagram I. The cam track also has a lower level 79 which lowers the lift platforms to discharge position, such position being shown in diagram J.

The cam track 43b for retracting the filling stem is provided with an adjustable segment 80 having bifurcated ends 81, one of which is shown in FIGURE 21, the segment being adjustable relative to the track by means of adjustable screw 82 and secured in adjusted position by means of set screws 83. The segment 80 provides an intermediate level 84 for the cam track corresponding in position to the intermediate level 78 of the cam track 10a controlling the lift platforms.

In operation, the container will be filled with the parts in the position illustrated in diagram G, and as the cam roller 39 engages the upwardly inclined portion of cam track 43b, the filling stem 28 will be withdrawn. It is contemplated that the position of the cam track 43b will be such that the filling stem will be withdrawn rather slowly to allow time to compensate for the reduced volume occasioned by the withdrawal of the stem. As best seen in FIGURE 19, the position of the lower end of vacuum tube 29 will be such that an overfill will be created extending, for example, up the neck of the container. When the cam follower reaches the level 84, the filling stem will have been retracted to the point where the product flow has been shut-off by the engagement of the lowermost sealing ring

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73 with the vacuum tube, but the elongated lower body portion of the tip will remain exposed, extending downwardly with the neck of the container in the manner seen in FIGURE 20. The overflow produced in the neck of the container will be drawn off through the tubular connection 75 between the lowermost end of the tip and the vacuum tube 29. This arrangement provides for uniform fill of each container, and as will be evident the height of fill can be accurately controlled by adjusting the vertical position of the cam segment 80.

Following the withdrawal of the overflow, the slight rise in cam track 43b, as seen in diagram J, will fully retract the filling stem, whereupon it will be locked in the retracted position by the locking arm 45, as before. At the same time the filled and leveled container will be lowered to discharge position, the cam follower 12 for the lift platform passing downwardly onto the lower level 79 of cam track 10a.

It will be apparent from the foregoing description that the invention provides a simple and yet effective retractable filling spout structure, and at the same time provides means for rendering the stem inoperative in the event no container is presented for filling. The tip structures, which coact with the vacuum tubes, prevent undesirable drip from the ends of the filling stems and permit the use of larger diameter filling stem orifices. In a conventional filling spout structure incorporating a filling stem and a vacuum tube, the filling stem orifices are sized sufficiently small, according to the surface tension of the liquid being filled, so that product cannot drain from the stem since air cannot enter behind the column of liquid. In accordance with the instant invention, these orifices are sealed when the stem is in the retracted position and, consequently, the orifices do not have to be sized so small. By being able to use larger orifices, the flow velocity is reduced with consequent reduction in turbulence and air entrainment.

Modifications may, of course, be made in the invention without departing from the spirit of it. The invention having, however, been described in certain exemplary embodiments, what is desired to be secured and protected by Letters Patent is:

1. In container filling apparatus, a filling spout structure, means mounting said filling spout structure for movement in a predetermined path of travel, means traveling with said spout structure for presenting a container to be filled to said spout structure, said spout structure including a body part mounting a vertically disposed axially movable filling stem and a vertically disposed vacuum tube surrounding a portion at least of said filling stem and projecting downwardly from said body part, means for moving said filling stem relative to said vacuum tube from an extended position in which it projects downwardly beyond the free end of said vacuum tube to a retracted position in which the lower portion of said filling stem is contained within said vacuum tube, sealing means on the lower end of said filling stem for making sealing contact with said vacuum tube when said filling stem is in its retracted position, said sealing means acting when in the retracted position, to close said filling stem to the flow of product therethrough, a vacuum passageway extending from the free end of said sealing means to an outlet point which is in communication with said vacuum tube when said filling stem is in the retracted position, means other than said filling stem moving means for releasably securing said filling stem in the retracted position, means operative upon the presentation of a container to said spout structure for releasing said stem securing means, means connecting said filling stem to a source of product, means connecting said vacuum tube to a source of vacuum, and valve means operative in conjunction with said last named means for breaking the connection between said vacuum tube and the source of vacuum during passage of said spout structure through a predetermined portion of its path of travel.

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2. The apparatus claimed in claim 1 wherein the means mounting said spout structure for movement in a path of travel comprises a rotating head, wherein the means connecting said vacuum tube to a source of vacuum comprises a chamber in said head, and wherein said valve means comprises a segmental valve element in said vacuum chamber occupying a part only of said chamber and controlling the connection to said vacuum tube incident to the rotation of said head.

3. The apparatus claimed in claim 2 wherein said vacuum chamber includes an annular wall having a port therein, which port is in communication with said vacuum tube, wherein said segmental valve has a surface adapted to make sealing contact with said annular wall, whereby to close said port when said port is juxtaposed to said surface of said segmental valve, and wherein said valve element has a restricted flow passageway therein for communication with said port, whereby to partially open said port while said valve element is juxtaposed thereto.

4. The apparatus claimed in claim 3 wherein said restricted flow passageway comprises a groove of limited extent in the surface of said valve element juxtaposed to the annular wall of said chamber.

5. In a filling spout structure, a body part having a vertical bore extending therethrough, a vacuum tube fixedly secured to the lowermost end of said bore and projecting downwardly from said body part, a passageway in said body part in communication with said bore for connecting said vacuum tube to a source of vacuum, a vertically disposed axially movable filling stem extending centrally through said bore and lying within and in spaced relation to said vacuum tube, said filling stem being movable relative to said vacuum tube from an extended position in which it projects downwardly beyond the free end of said vacuum tube to a retracted position in which the lowermost end of said filling tube is contained within said vacuum tube, a flexible connection at the upper end of said filling tube connecting it to a source of product, an elongated tip on the lower end of said filling stem, said tip having an annular wall surface, at least one port in said annular wall surface through which product flowing through said filling tube is discharged, the annular wall surface of said tip being of a size, when said filling stem is retracted, to make sealing contact with the interior wall surface of said vacuum tube, a vacuum passageway extending from the free end of said tip to an outlet point in communication with said vacuum tube when said filling stem is in the retracted position, and means in connection with said filling spout structure for releasably securing said filling stem in the retracted position.

6. The filling spout structure claimed in claim 5 wherein said filling stem is adapted to be raised and lowered by means of a cam follower secured to a cross member fixedly secured to the upper end of said filling stem and slidably mounted on a pair of vertically disposed rods projecting upwardly from said body part, and wherein the means for releasably securing said filling stem in the retracted position comprises a latch plate connected to said cross member and a latch arm pivotally secured to a fixed support mounted at the upper ends of said vertically disposed rods, said pivoted latch arm being positioned to engage said latch plate when said filling stem is in the retracted position.

7. The filling spout structure claimed in claim 6 wherein said body part mounts a centering bell positioned to be contacted and raised by a container presented to said spout structure, and wherein a vertically movable arm is connected at one end to said centering bell and operative, as said centering bell is moved upwardly, to contact and disengage said latch arm from said latch plate, whereby to release said filling stem for downward movement.

8. In a filling spout structure, a body part mounting a vertically disposed axially movable filling stem and a vertically disposed vacuum tube surrounding a portion

of said filling stem and projecting downwardly from said body part, a passageway in said body connecting said vacuum tube to a source of vacuum, a flexible connection at the upper end of said filling stem for connecting it to a source of product, said filling stem being movable relative to said vacuum tube from an extended position in which it projects downwardly beyond the free end of said vacuum tube to a retracted position in which the lower portion of said filling stem is contained within said vacuum tube, an elongated tip on the lower end of said filling stem, said tip having an annular wall surface, at least one port in said annular wall surface through which product flowing through said filling stem is discharged, the annular wall surface of said tip being of a size, when said filling stem is retracted, to make sealing contact with the inner wall surface of said vacuum tube, and a vacuum passageway extending from the free end of said tip to outlet point in communication with said vacuum tube when said filling stem is in the retracted position.

9. The filling spout structure claimed in claim 8 wherein said vacuum passageway comprises a vertical groove in the annular wall surface of said tip lying in spaced relation to the port therein, and wherein the annular wall surface of said tip makes direct sealing contact with the inner wall surface of said vacuum tube.

10. The filling spout structure claimed in claim 8 wherein the annular wall surface of said tip has a spaced apart pair of annular grooves therein lying one above and one below the port therein, wherein an annular sealing ring is mounted in each of said grooves for making sealing contact with the inner wall surface of said vacuum tube, and wherein the vacuum passageway in said tip comprises a tube within said tip projecting upwardly from the free end thereof to an outlet opening communicating with said vacuum tube at a point above the uppermost of said sealing rings.

11. The filling spout structure claimed in claim 10 wherein said tip has an elongated lower body portion adapted to project downwardly beyond said vacuum tube when said sealing rings are in sealing contact with the lowermost end of said vacuum tube, and wherein said vacuum passageway extends downwardly to the free end of said elongated lower body portion, whereby said lower body portion may be utilized to establish the desired height of fill in a container being filled by said spout structure.

12. In container filling apparatus, a filling spout structure, means mounting said spout structure for movement in a predetermined path of travel, means traveling with said spout structure for presenting a container to be filled to said spout structure, said spout structure including a body part mounting a vertically disposed axially movable filling stem and a vertically disposed vacuum tube fixedly secured to said body part and surrounding a portion at least of said filling tube and projecting downwardly from said body part, a passageway in said body part connecting said vacuum tube to a source of vacuum, a flexible connection on the upper end of said filling stem connecting it to a source of product, an elongated tip on the lower end of said filling stem, said tip having an annular wall surface, at least one port in said annular wall surface through which product flowing through said filling stem is discharged, the annular wall surface of said tip being of a size, when said filling stem is retracted, to make sealing contact with the inner wall surface of said vacuum tube, a vacuum passageway in said tip extending from the free end of said tip to an outlet point in communication with said vacuum tube when

said filling stem is in the retracted position, a cam follower connected to said filling stem, a cam track positioned to be contacted by said cam follower as said spout structure is advanced in its path of travel, said cam track acting to move said filling stem to the retracted position, a latch arm carried by said spout structure and positioned to engage a coacting latch member carried by said filling stem when said stem is moved to the retracted position, a centering bell suspended from said body part and positioned to be contacted and raised by a container presented to said spout structure, a vertically movable arm connected at one end to said centering bell and operative, as said centering bell is moved upwardly, to contact and disengage said latch arm from said coacting latch member, said cam track terminating at a point such that said filling stem will be released for downward movement upon the disengagement of said latch arm.

13. The container filling apparatus claimed in claim 12 wherein said cam track includes an adjustable segment by means of which said filling stem may be made to assume a position intermediate its extended and retracted positions, wherein said container presenting means is movable from a lower non-filling position to an upper filling position in which the mouth of the container is juxtaposed to a sealing ring surrounding said vacuum tube, wherein said container presenting means also has an intermediate position in which the container is lowered slightly from its upper position so as to break the seal between the mouth of the container and said sealing ring, and wherein said container presenting means is arranged to move to its said intermediate position upon movement of said filling stem to its said intermediate position, the port in the elongated tip of said filling stem being so positioned that it will lie in sealing contact with the inner wall surface of said vacuum tube when said filling stem is in its intermediate position, whereby the flow of product through said filling stem will be shut off and the passageway in said tip may be utilized to establish a predetermined desired height of fill in the container.

14. The container filling apparatus claimed in claim 12 including valve means operative upon the release of said filling stem for movement from the retracted to the extended position for initially reducing the velocity of product flow through said filling stem until said filling stem has reached its fully extended position.

15. The container filling apparatus claimed in claim 14 wherein said valve means is operatively connected to said vacuum tube, said valve means having an open position, a closed position and an intermediate position in which the flow of air through said vacuum tube is restricted.

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