

Feb. 8, 1955

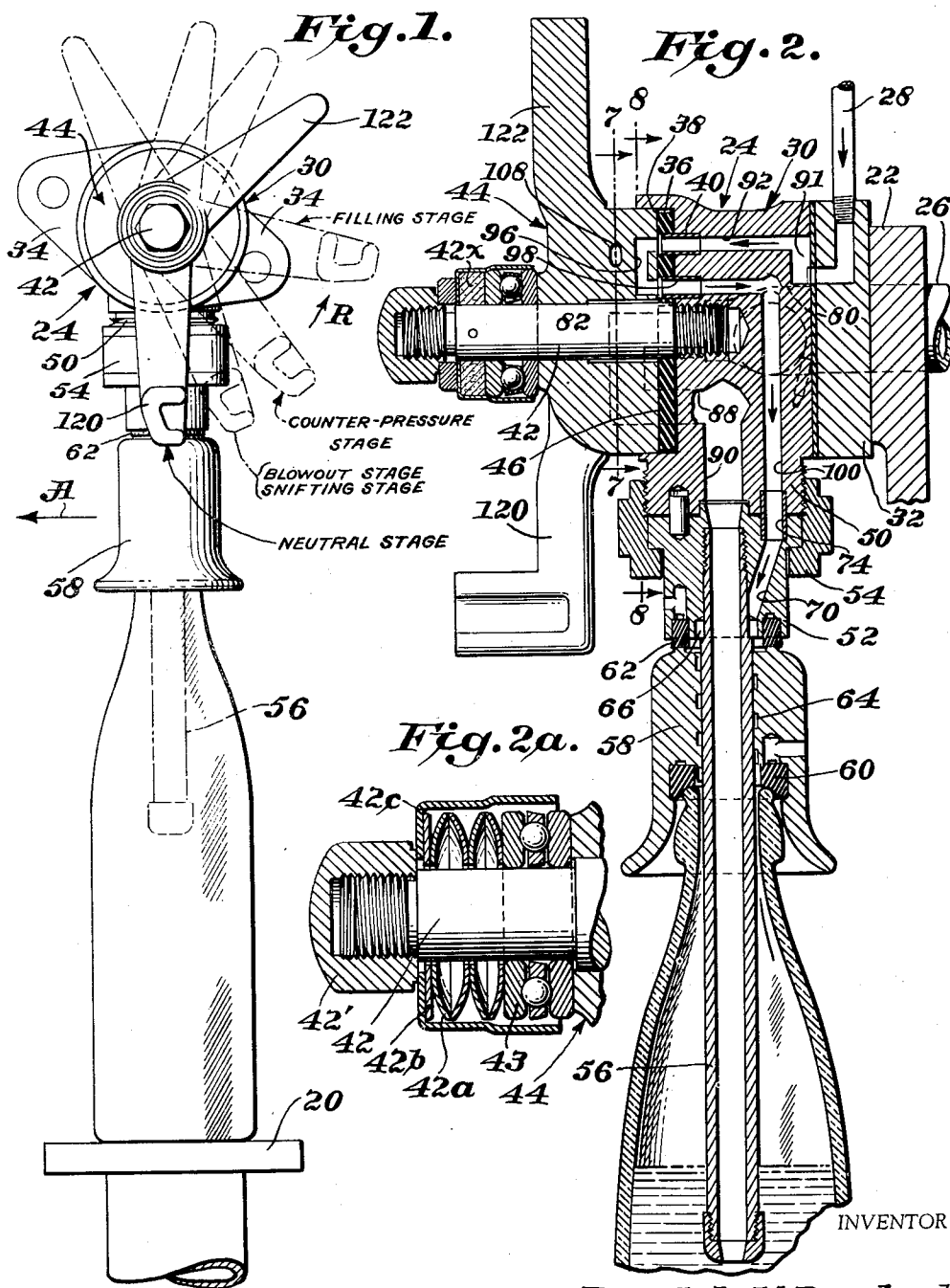
R. H. BREEBACK

2,701,675

FILLING HEAD

Filed March 5, 1951

6 Sheets-Sheet 1



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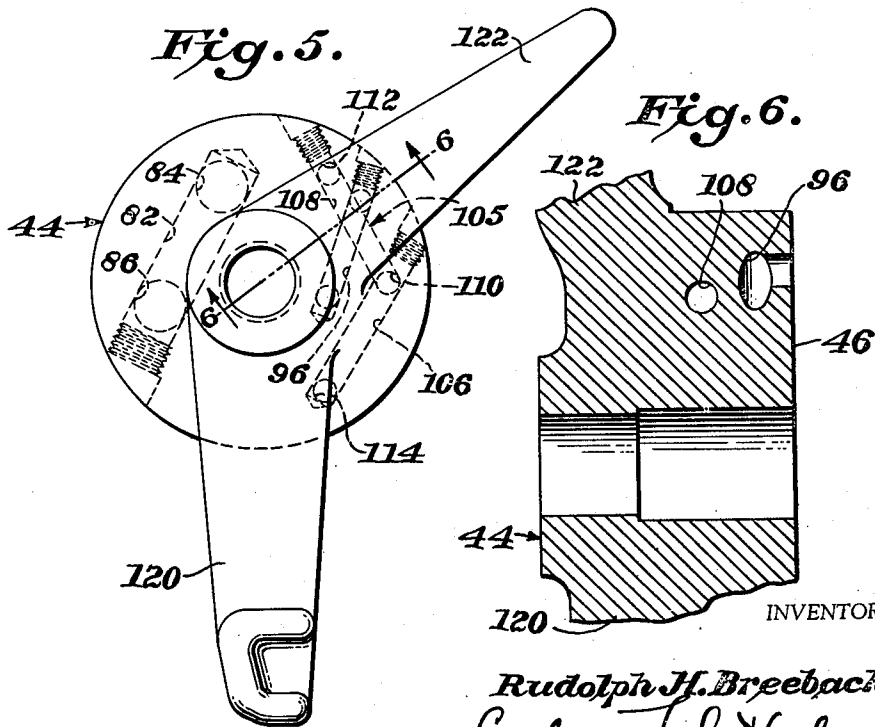
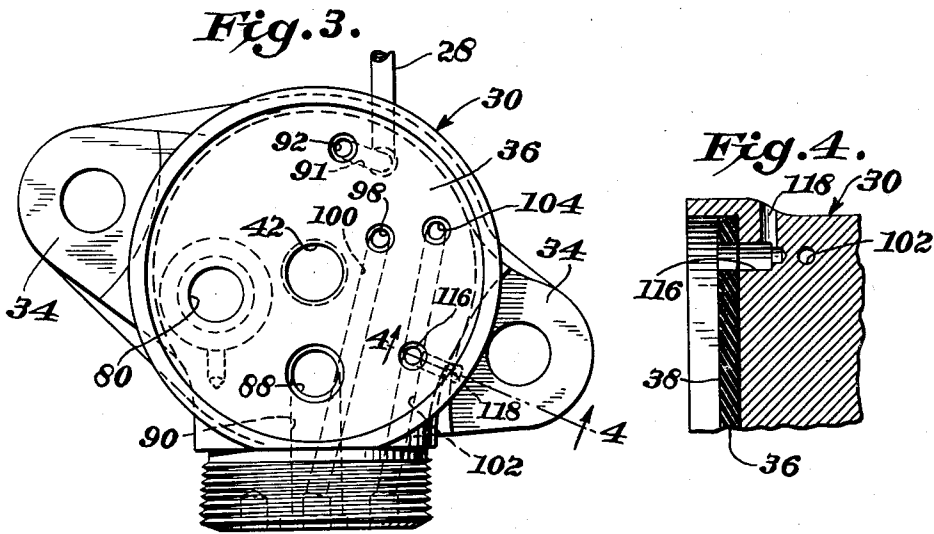
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FILLING HEAD

Filed March 5, 1951

6 Sheets-Sheet 2



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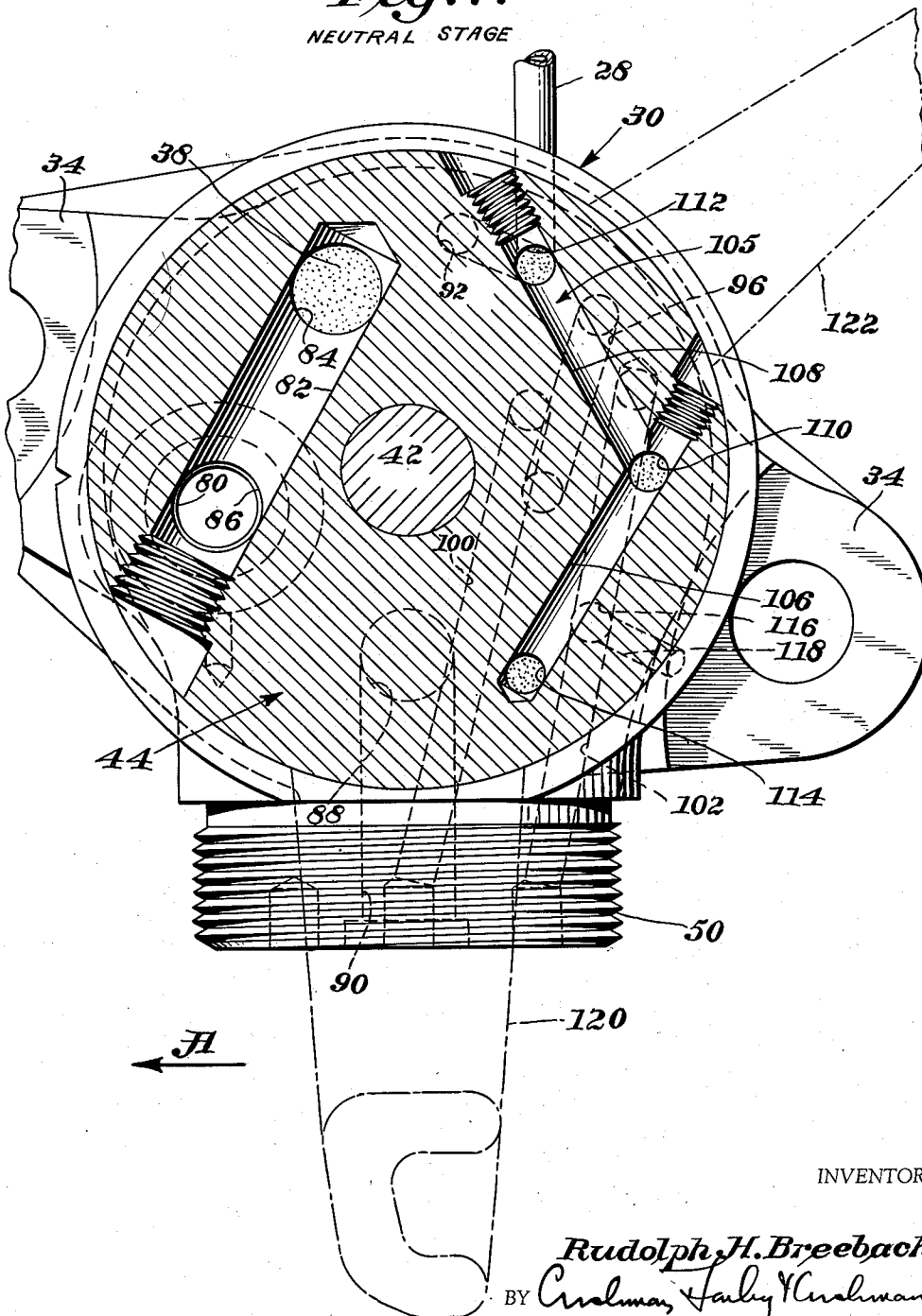
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FILLING HEAD

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Fig. 7.
NEUTRAL STAGE



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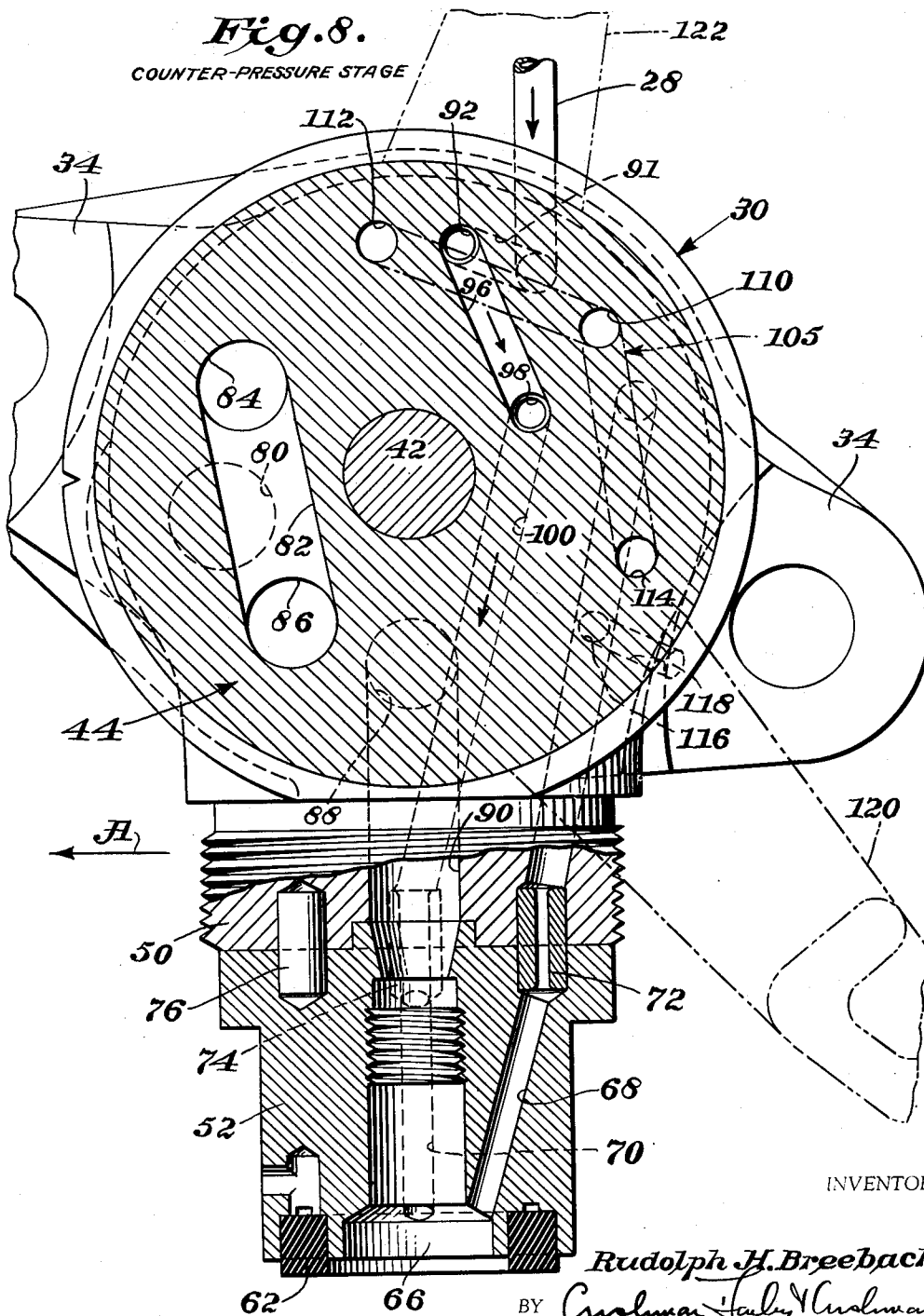
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FILLING HEAD

Filed March 5, 1951

6 Sheets-Sheet 4



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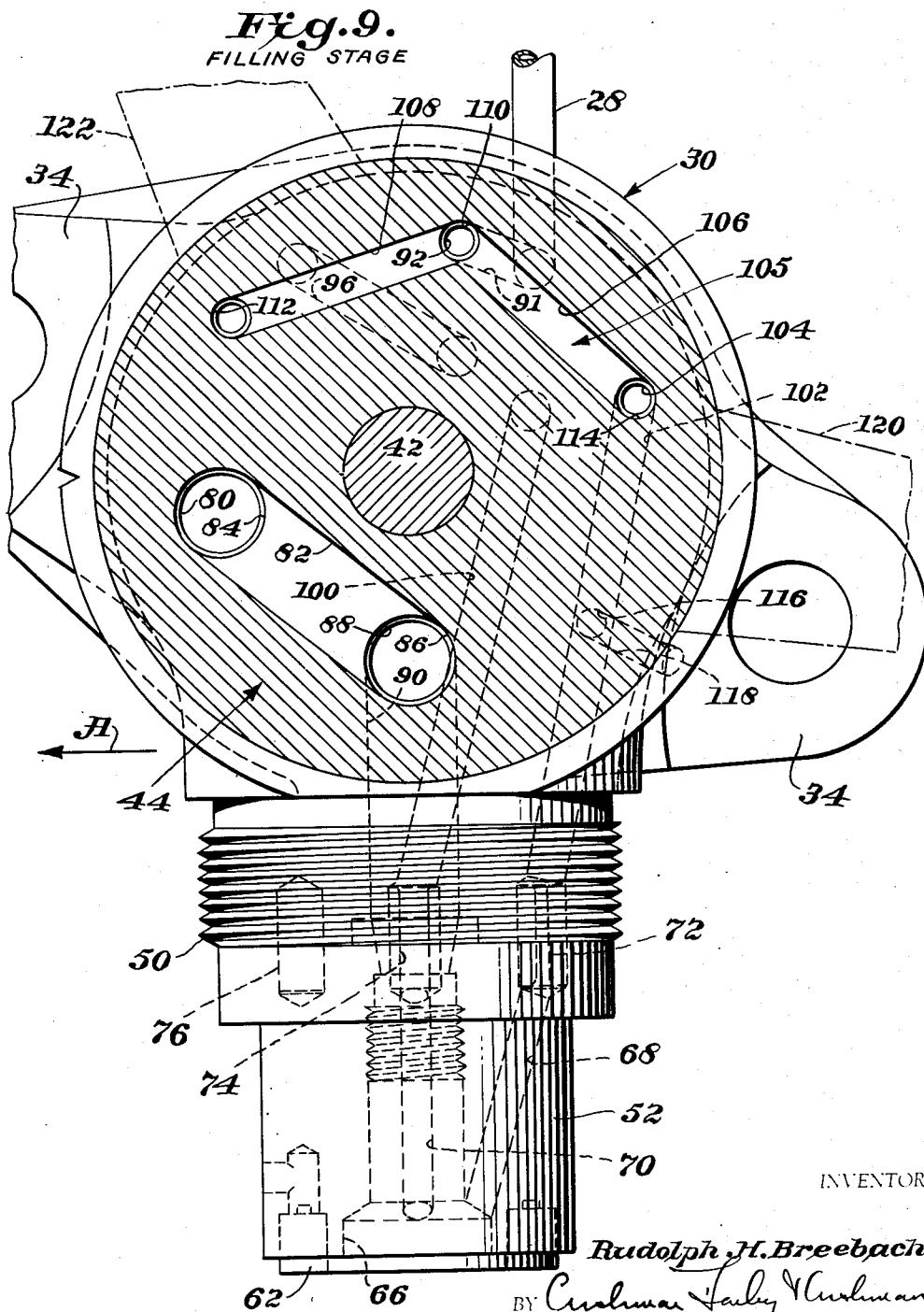
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FILLING HEAD

Filed March 5, 1951

6 Sheets-Sheet 5



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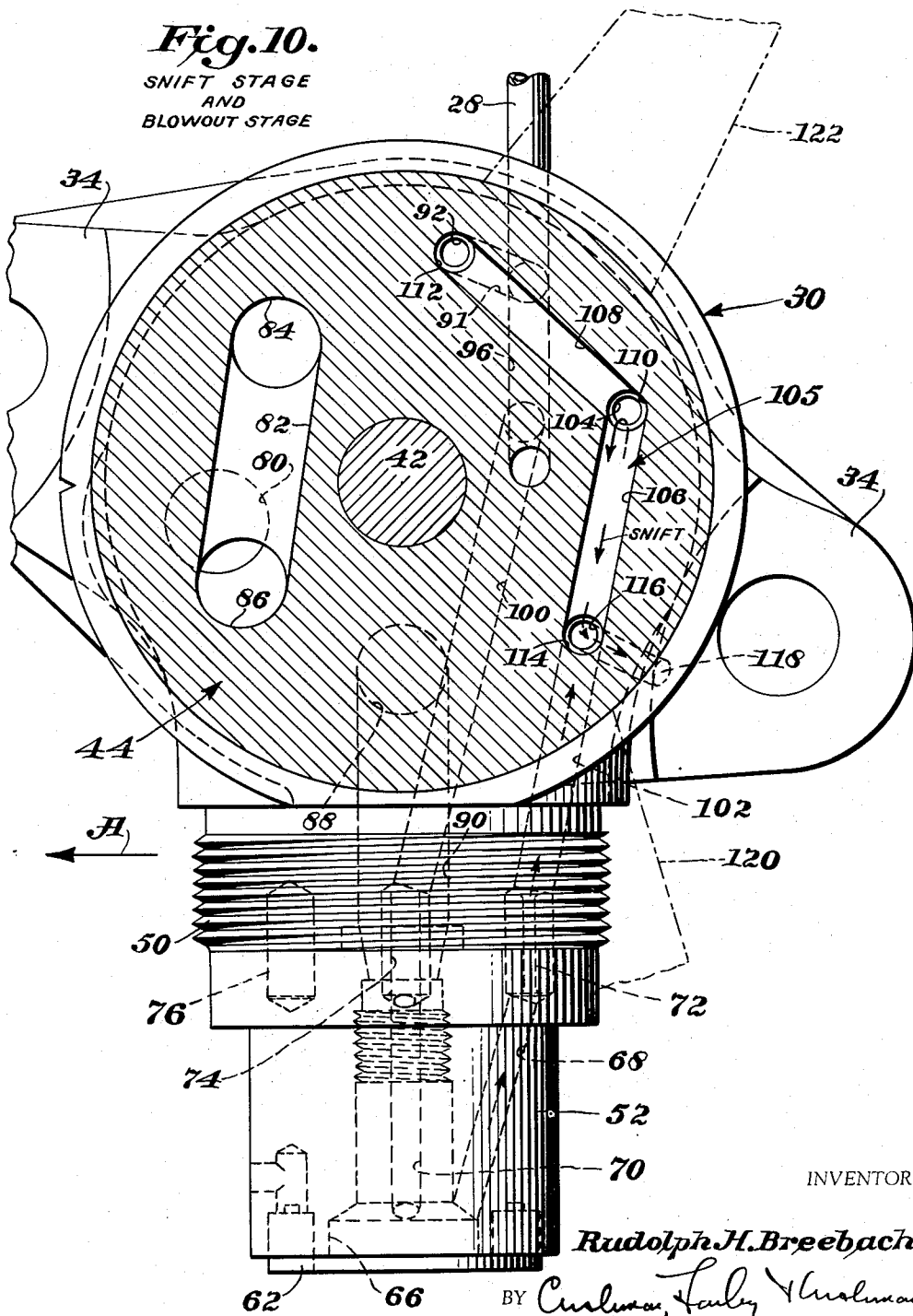
R. H. BREEBACK

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FILLING HEAD

Filed March 5, 1951

6 Sheets-Sheet 6



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2,701,675

FILLING HEAD

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Application March 5, 1951, Serial No. 213,950

7 Claims. (Cl. 226—115)

The present invention relates to filling heads for use in bottling carbonated beverages.

In the bottling of beer and other carbonated beverages, the liquid is delivered to the bottle or other container from a reservoir or filling tank containing a body of the liquid and a superposed body of gas, the gas being under pressure sufficient to hold the liquid-contained gas in solution. The customary cycle of operation of a filling head includes the initial step of positioning the container in sealed relation with a filling head including a filling valve, for example, a valve of disk form which is rotatable with respect to the body element of the filling head. The second step involves rotating the filling valve upon the filling head to place the container in communication with the gas containing portion of the reservoir so that a pressure will be established in the container corresponding to the pressure of the gas in the upper portion of the reservoir. This stage of the filling cycle is termed the counterpressure stage and usually is relatively brief. The next stage of the cycle is the filling stage and involves further rotating the filling valve so that liquid will flow from the lower portion of the reservoir to the container and, at the same time, the air and gas in the container will flow to the upper and gas containing portion of the reservoir. Because the flow of liquid into the container is solely due to the fact that the reservoir is positioned slightly above the container, the liquid will flow quietly and foaming will be minimized. The flow of liquid is stopped after a predetermined time or flow. Then the upper portion or headspace of the container may be placed in restricted communication with the atmosphere to enable at least a part of the gas in the headspace to be released before the container is lowered from the filling head. This operation is termed sniffling. According to customary practice, after the container has been lowered from the filling head, gas is flowed from the upper portion of the reservoir through gas flow passages of the filling head so as to blow from those passages any liquid or foam which may have moved up into them during the filling stage or the sniffling stage.

A beverage filling machine provided with a rotary filling table including fifty filling heads and a corresponding number of container supporting platforms is provided with an infeed dial to position the containers upon the supporting platforms. Such a machine also includes an outfeed dial to remove the filled containers from the platforms. With the infeed and outfeed dials positioned as close as practicable to each other, the space required for the infeed and outfeed of containers will consume at least 35° of the 360° travel of the filling table. Hence, not more than 325° is available for the actual filling operations. Under normal practice, even the relatively brief counterpressure stage will require about 30° and if the bottle is snifted to atmosphere before it is lowered from the filling head, another 30° will be consumed. Therefore, only about 265° remains for the flow of liquid into the container. It is this interval which primarily determines the output of filled containers.

Stated another way, under the prior practice, if a filling machine included fifty filling heads and filling platforms, not more than forty-four of the platforms can support containers at any given moment, and liquid will be flowing into only thirty-six of these.

Beer or other carbonated liquids cannot be flowed too rapidly into a container. Therefore, it is not possible to increase the speed of rotary travel of the filling table

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to any substantial degree and simultaneously increase the rate of flow of the beer into the containers to thereby increase the output of filled containers. Because of this, in designing beverage filling machines of increased output, the design trend has been to increase the number of filling heads so that a greater number of containers will be filling at a given moment. However, any increase in the number of filling heads increases the cost of the machine as well as the diameter of the filling table. Furthermore, any increase in the size of the filling table results in installation difficulties at plants wherein the floor space area and the layout of other equipment has been established to accommodate a filling machine of a given size.

An object of the present invention is to enable the output of filled containers to be increased without increasing the rate of liquid flow, the speed of travel of the filling table, or the diameter of the table.

As has been indicated above, the time required for the counterpressure stage is relatively brief as compared to the time required for the stage during which liquid is flowed into the container. Most efforts heretofore made toward reducing the entire time for the filling operation have been directed toward somehow reducing the period consumed by the liquid flow. In other words, little attention has been directed toward reducing the already brief period required for counterpressure, and for all practical purposes, that period has been regarded as established.

An object of the present invention is to increase the output of filled containers by reducing the time required for the counterpressure stage.

I have discovered that the counterpressure stage can be shortened without changing other factors if the flow of counterpressure gas is directed through passages of adequate size and so arranged that they will not be blocked by foam or liquid.

In accordance with previous design, it has been usual to direct counterpressure gas flow to the container through the same passages used for the return flow of gas from the container to the reservoir during the filling stage. Even under ideal conditions, including provision of the blow-out stage mentioned above, some liquid or foam may remain in the return flow passage. The presence of such foam or liquid retards the flow of counterpressure gas to the container during the counterpressure stage. Also, if only a single passage is provided for all gas flow, it usually has been the practice to restrict the size of at least a portion of this passage to thereby reduce the rate of flow of gas from the container during the filling stage and thereby retard flow of liquid to the container. If the same passage is used for counterpressure flow, such a restriction in the passage will retard establishment of counterpressure in the container.

An additional object is to provide a filling head wherein the counterpressure passageway is of uniform and adequate size throughout its length.

Another object of the invention is to provide a filling head of such design that at least the major length of the passage used for counterpressure flow is entirely separate from the passages used for other gas flow.

By having the major length of the counterpressure passage, and particularly its portion nearest the container, entirely independent of all other passages, the counterpressure passage can be of optimum size and minimum restriction. Therefore, full counterpressure can be established within a minimum period of time so that the space required for counterpressure can be reduced from the arc of 30° usually allotted for that purpose.

A further object of the invention is to provide a filling head including a disk-type valve equipped with a system of passages including a separate counterpressure passage which are so designed that the rotation of the disk valve with respect to the filling head will not be increased beyond ordinary practice.

A filling head including a disk valve of the rotary type usually is operated to its various positions by means of trips spaced about the path of travel of the filling table. Some of these trips rotate the valve in one direction and the others rotate it in a reverse direction. Any design of flow passages which requires too great a rotation of the

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filling valve in one direction may result in positioning the valve at a difficult angle for operation by the trips. By the present invention, an extra passage is provided in the filling head without increasing the travel and without having the layout of the passages of such character as to complicate manufacture.

Another object of the invention is to provide a filling system of such character that liquid will not fall any great distance from the filling nozzle before contacting with the bottom of the container. As a result, possibility of foaming of the beverage at this point will be avoided.

A still further object of the invention is to provide a novel arrangement for mounting a disk valve of the rotary type upon a filling head.

Other objects and advantages of the invention will be apparent from the following specification and accompanying drawings.

In the drawings,

Figure 1 is a front elevation of a filling head having a bottle sealed thereto. Figure 1 views Figure 2 from the left.

Figure 2 is a sectional view of the filling head, the portion of the section which shows the gas flow passages being taken on a line so angled as to show the counter-pressure flow passageway in axial section.

Figure 2a is an axial section showing a modified arrangement for mounting a rotary disk valve upon a filling head.

Figure 3 is a seat face elevation of the filling head body element.

Figure 4 is a detail section on the line 4—4 of Figure 3.

Figure 5 is an elevation of the outer or non-seat face of the filling valve, the view showing the valve passages in dotted lines.

Figure 6 is a radial section on the line 6—6 of Figure 5.

Figure 7 is a fragmental view showing the disk valve in transverse section substantially on the line 7—7 of Figure 2. The view shows the disk valve in neutral or closed position.

Figure 8 is a view similar to Figure 7 taken on the line 8—8 of Figure 2. Figure 8 shows the disk valve in counterpressure stage position and omits some structural details illustrated in previous figures.

Figure 9 is a view taken on the line 7—7 of Figure 2 but showing the disk valve in filling stage position, and

Figure 10 is a view taken on the line 7—7 of Figure 2 but showing the disk valve in the position it occupies during snifting of a container to atmosphere, as well as when passages of the head are to be blown out.

The filling head of the present invention is adapted for use upon a beverage filling machine of the general type disclosed in the patents of Robert J. Stewart and Willie I. Gladfelter Nos. 2,097,107 and 2,202,033 for Filling Machine issued October 26, 1937, and May 28, 1940, respectively. Such machines include a rotary filling table having vertically reciprocable container supporting platforms such as 20 of Figure 1 spaced about its periphery. In addition, such machines include a filling reservoir generally coaxial with the filling table. A horizontal skirt extends outwardly from the reservoir and a circumferential flange 22 at the periphery of the skirt supports the filling heads 24 as indicated in Figure 2.

As is also shown in Figure 2, a liquid tube 26 and a gas tube 28 extend from each filling head to the filling reservoir. As also is disclosed in said patents, valve mechanism is provided in the reservoir to maintain a proper height of liquid under suitable pressure within the reservoir, and the liquid tubes such as 26 extend to the lower and liquid containing portion of the reservoir while the gas tubes 28 open to the upper and gas containing portion of the reservoir.

Referring to Figure 2, each filling head 24 includes a body element 30 closed at its inner side by a plate 32. The body element includes laterally extending ears 34 indicated in Figure 1 and bolts extend through these ears and the plate 32 into the flange 22 to thereby secure the body elements 30 to flange 22.

Each body element 30 includes a planar face having a gasket 36 positioned thereon. The outer face 38 of the gasket actually forms the seat face of the body element. As is hereinafter described, various passages open to the seat face 38 and nipples 40 fitted in the body element portions of these passages extend to the outer face of the gasket to hold the latter in proper position.

A stud 42 projects from the central portion of the

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seat face of body element 30 and a disk valve 44 is rotatable upon stud 42, the disk valve including a seat face 46 to which various passages within the disk valve open as hereinafter described, these passages being adapted to bridge various passages of body element 30 to control flow of gas and liquid through the filling head 24.

Figure 2a shows a preferred arrangement for urging the disk valve 44 into firm contact with the gasket 36. As is illustrated in this figure, an anti-friction bearing 43 is mounted on the stud 42 immediately outwardly of the valve disk 44. Beyond bearing 43, the stud 42 carries one or more pairs of Belleville washers 42a, the washers being positioned together with their concave faces opposed in accordance with usual practice. A flat washer 42b is positioned outwardly of the Belleville washers and a shield 42c surrounds the washers and bearing, the in-turned flange of the shield being positioned between washer 42b and the nut 42'.

The anti-friction bearing 43 permits the valve disk 44 to turn freely on gasket 36 and, at the same time, the Belleville washers have a resilient effect in maintaining the disk valve in firm sealing contact with the gasket. Any shrinkage or expansion of the gasket 36 will be compensated for by the Belleville washers.

In the arrangement of Figure 2, a rubber gasket 42x is used instead of the Belleville washers.

In accordance with usual practice, a threaded boss 50 extends downwardly from body element 30, and an adapter collar 52 is secured to the lower end of the boss by a ring nut 54. The liquid delivery tube or nozzle 56 of the filling head is centrally supported in adapter 52 to project toward the corresponding container supporting or filling platform 20. A container centering bell 58 is slidable upon tube or nozzle 56, the bell being provided with the usual sealing gasket 60 adapted to form a seal with the mouth of a container. When the centering bell 58 is lifted by a container to the position illustrated in Figures 1 and 2, its upper portion will be in sealing contact with a downwardly facing gasket 62 fixed in the lower portion of the adapter 52.

As shown in Figure 2, the bore of centering bell 58 has a spiral passage 64 formed therein, this passage surrounding the liquid tube 56. The lower end of passage 64 opens within the sealing ring 60, and when the bell is engaged with adapter 52, the upper end of spiral passage 64 will open to a recess or chamber 66 formed in the lower face of adapter collar 52 within gasket 62, the chamber thereby surrounding the liquid tube 56.

As is indicated in Figures 8 to 10, two passages 68 and 70 extend diagonally outwardly and upwardly from chamber 66, the passages lying in planes which are radial of adapter 52, and at right angles to each other. A sleeve 72 extends upwardly from passage 68 and a sleeve 74 extends vertically upwardly from passage 70. The two sleeves lie parallel to the axis of collar 52. Sleeve 72 has a relatively restricted bore; for example, one-thirty-second of an inch in diameter, but the bore of sleeve 74 is of the same diameter as the bore of passage 70, viz., about one-eighth of an inch in diameter. It will be noted that the sleeves 72 and 74 fit in bores in the lower end of boss 50 to thereby co-act with a pin 76 in properly locating adapter 52 with respect to boss 50.

The various passages of the filling head are described below under headings indicative of the purpose of the passages.

Liquid passageway

As is best indicated in dotted lines in Figure 2, a relatively large bore 80 extends horizontally from the rear face of body element 30 to its seat face 38. Liquid supply tube 26 opens to the rear end of bore 80 and, as usual, a ball valve and seat is provided in the bore. The bore 80 appears in front elevation in Figures 3 and 9. As also appears in Figure 2, in disk valve element 44, the liquid passage is of U-shaped form and is designated by the numeral 82. The two legs of the passage open to the seat face 46 of valve element 44. In Figure 7, the two legs of U-shaped liquid passage 82 are designated 84 and 86, respectively. As is illustrated in Figures 2 and 3, the lower portion of the body element seat face has a relatively large bore 88 opening therefrom. At its inner end, bore 88 opens to a vertical bore 90 which extends downwardly in the body element and opens to the liquid nozzle or tube 56.

Counterpressure gas passageway

Referring to the upper right-hand portion of Figure 2, gas tube 28 leading to the reservoir opens to a groove 91 in the rear face of the body element. As best shown in the upper portion of Figure 3, groove 91 extends diagonally upwardly and the bore 92 extends forwardly therefrom to the seat face 38 as also shown in Figure 2.

The portion 96 of the counterpressure passageway in disk valve 44 is of U-shaped form as indicated in Figure 2. As appears in that figure and also in Figure 6, this passage lies relatively close to the seat face 46 of the disk valve.

The remainder of the counterpressure passageway within body element 30 comprises a bore 98 extending from seat face 38 and which joins a downwardly extending bore 100 which opens to the diagonally extending passage 70 of adapter 52 leading to chamber 66. It will be observed that all of the counterpressure passages are of at least as great diameter as passage 70 and the bore of nipple 74, and that these latter are of the order of one-eighth inch in diameter.

Gas return and snift passageway

As is hereinafter described, the tube 28, bore 92 and groove 91 of the counterpressure passage in the upper portion of the body element 30 are used for return of gas to the filling reservoir. However, the remainder of the passages used for gas return, sniffling and blow-out, are entirely separate from passages used for counterpressure flow. Referring to Figure 9, the diagonal passage 68 extending upwardly from the gas chamber 66 and the restricted bore of nipple 72 form the lower portion of the gas return and snift passage. From nipple 72, a passage 102 extends upwardly in the body element 30. As is indicated in Figure 4, this passage is spaced a substantial distance inwardly from the seat face 38 of body element 30. Referring again to Figure 9, at its upper end, passage 102 joins an axially extending bore 104 which opens to the body element seat face 38 as also indicated in Figure 3. As is best indicated in Figure 9, the portion 105 of the gas return passage provided in the disk valve is of V-shaped form in vertical section in that it comprises two legs 106 and 108. An axially extending bore 110 is provided at the apex of the V and axially extending passages 112 and 114 are provided at the respective opposite ends of the passage.

As is indicated in Figures 5 and 7, the drill entry ends of passages may be closed by threaded plugs.

In addition to the foregoing passages, and as best shown in Figures 4 and 10, the body element 30 includes a shallow bore 116 opening from the seat face to join a horizontal passage 118 which opens to the exterior of the body element.

It will be observed from Figure 5 that the portion 96 of the counter-return passage within the valve disk lies across the leg 108 of the gas return passage 105. Figure 6 makes it clear that these passages are spaced from each other in a direction normal to the seat face 46. However, the fact that the two passages cross without joining each other permits them to lie within a minimum area of the seat face.

Operation

Figures 7 to 10 show the disk valve 44 in the position it occupies during various stages of the filling cycle. In these figures, Figure 7 is a true section through disk valve 44 in a vertical plane whereas Figures 8 to 10 omit some structural details. In each of Figures 7 to 10, whenever a port passage of disk valve 44 is in registration with a port or bore of body element 30, the body element port is diagrammatically indicated by a circle of reduced size so that the alignment of the two ports will be more apparent. The various passages of the body element 30 are best illustrated in detail in Figures 3 and 4, while the passages of disk valve 44 are illustrated in detail in Figures 5 and 6.

NEUTRAL STAGE

Referring to Figure 7, during the neutral or closed stage of the filling cycle, the passages of the disk valve element 44 are so positioned that no flow of gas or liquid can occur. In more detail, as appears in Figure 7, while one end of the disk valve liquid passage 82 is in alignment with liquid supply bore 80, the opposite end 84 of liquid passage 82 will be open to a non-ported portion of the body element seat face 38. All of the

ports of gas passage 105 in the disk valve element are opposite blank portions of seat face 38.

As is illustrated in Figures 1 and 2, the disk valve 44 is provided with two radially extending arms 120 and 122. The position of these arms during neutral stage is shown in solid lines in Figure 2, and it will be observed that arm 120 extends vertically downwardly while arm 122 extends upwardly at an angle to the vertical.

While the disk valve is in the neutral stage position, a container to be filled will be placed upon the corresponding container platform 20 by the infeed dial and the container support then will rise to cause the container to move upwardly about the liquid tube 56, thereby lifting the center of the bell 58 to the position shown in Figure 2, all as described in said Stewart and Gladfelter patents. In this position, the container will be sealed to the filling head.

COUNTERPRESSURE STAGE

With the filling table and reservoir of the machine rotating in the direction indicated by the arrow A of Figure 1, the lower arm 120 of a valve disk 44 will contact with a counterpressure trip as described in said patents so that the disk valve will rotate in the direction of the arrow R of Figure 1, viz., in a counterclockwise direction about stud 42, to the dotted line position designated "Counterpressure Stage" in Figure 1. Figure 8 shows the position of the disk valve passages with respect to the body element passages during counterpressure stage.

With the elements in the position illustrated in Figure 8, counterpressure gas will flow from the upper portion of the reservoir as indicated by the arrows of Figure 8. That is, the gas will flow downwardly in tube 28 to enter groove 91 and bore 92, and thence into the disk valve passage 96 to the bore 98 in the body element and then downwardly through bore 100 and passage 70 in adapter collar 52 to the gas chamber 66. The above alignment of the passages and bores forming the counterpressure gas passageway also is shown in Figure 2. From chamber 66, the gas will flow downwardly through the spiral passage 64 into the container.

The above described counterpressure gas flow will exist for only a very brief interval of time. Except for the bore 92, groove 91 and tube 28, the passageway just described is not used for any purpose other than counterpressure flow to the container. Therefore, no liquid or foam can enter the passage at any time to block the same. This permits the interval allowed for counterpressure to be reduced to an even shorter extent than is customary. For example, with a fifty head filling machine, the arc of table rotation allotted for counterpressure can be of the order of 10°. The travel and time thus saved on the counterpressure stage can be used for the liquid flow stage. Stated another way, the speed of rotation of the machine filling table can be increased to move containers through a longer filling stage arc of travel at a higher linear speed than heretofore, so that a greater output of containers will be obtained in a given period of time without any increase in the rate of flow of liquid into the containers.

LIQUID FLOW STAGE

At the end of the counterpressure travel, the lower arm 120 of disk valve 44 will contact the usual filling trip and thereby be moved in the direction of the arrow R of Figure 1 from "Counterpressure Stage" to "Filling Stage."

Figure 9 illustrates the position which the disk valve passages occupy with respect to the body element passages during this stage. As is indicated in that figure, and as is also shown in dotted lines in Figure 2, the water passage 82 of the disk valve now bridges the body element bores or passages 80 and 83. Therefore, the liquid in the lower portion of the reservoir will be free to flow by gravity from the liquid supply tube 26 into the bore 80, and by passages 82 and 90 to the liquid tube 56 of the filling head. During this flow of liquid, any air originally in the container, as well as the counterpressure gas placed in the container during the counterpressure stage, will flow upwardly through the spiral passage 64 to the chamber 66 and then by passage 68 through the restricted-bore sleeve 72 to the passage 102 in the body element, then through aligned bores 104 and 114 to the leg 106 of passage 105 in the valve disk. The port 110 provided midway of passage 105 will be aligned with the bore 92 of body element 30 so that the gas may flow through bore 92 and groove 91 to the gas tube 28.

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It will be noted that the only portion of the counterpressure passageway used for gas return to the reservoir involves the bore 92, groove 91, and tube 28.

Liquid will flow into the container and gas will move from the container to the reservoir until the container is filled with liquid. Some liquid may move upwardly in the gas return passages, but such liquid will be disposed of an hereinafter described. It is extremely unusual for liquid or foam to rise as high as the passage 92 or any portion of tube 28. Therefore, these portions of the counterpressure passageway may be used for gas return.

SNIFTING STAGE

After a filling head has moved approximately 325° with the rotating filling table and reservoir, the upper arm 122 of disk valve 44 will contact with a closing trip, causing the valve to rotate, as viewed in Figure 1, in a direction opposite to the arrow R. This movement of the disk valve eventually will restore all of the passages to the non-flow position illustrated in Figure 7. However, during this rotation of the disk valve about the stud 42, the passages momentarily will be aligned as indicated in Figure 10 so that some pressure may be snifted or released to atmosphere.

As is indicated by the arrows appearing in Figure 10, when the passages are in the relation of that figure, pressure can be relieved from the gas chamber 66 or any lower portion of the filling head and container by movement upwardly through the passage 68 and the restricted sleeve 72 into the passage 102. Furthermore, because at this instant the bore 110 provided midway of the passage 105 will be in alignment with the bore 104 at the upper end of passage 102, gas may move into the leg 106 of passage 105 and downwardly to bore 114 and aligned bore 116 and to atmosphere through port 118. Therefore, some of the pressure in the container will be released to atmosphere. Such release of pressure will reduce the pressure within the container sufficiently that when the container subsequently moves downwardly from the filling head to open its mouth to atmosphere the container contents will not foam.

It will be observed from Figure 10 that at the moment the container is thus opened to atmosphere through port 118, the upper leg 108 of passage 105 will have its port 112 aligned with the bore 92 which is open to the tube 28 leading to the filling reservoir. However, the relatively large volume of gas in the filling reservoir will not be reduced to any substantial extent by this brief registration.

The rotation of disk valve 44 about stud 42 will continue until the passages reach the neutral position of Figure 7. Then the filling head and container will move approximately 30° with the filling table while the container is lowered from the filling head and entirely removed from the filling platform 20. The interval of time between the snifting of Figure 10 and the lowering of the container from the filling head will permit the container contents to rest, thereby further reducing the possibility of foaming when the container is lowered from the filling head.

When the container lowers from the filling nozzle 56, the level of the liquid in the container will drop by reason of removal of the nozzle from the container, thereby establishing the final filling height. The liquid present in the passages 90 and 88 and the filling nozzle bore at the instant the valve moves from the Figure 9 position will remain there until the filling nozzle 56 is placed in the next container delivered to it. When the filling head is then operated to Liquid Flow Stage, the liquid in nozzle 56 and passages 90 and 88 will flow down into the container. Because the tip of the nozzle 56 will be close to the bottom of the container before the valve turns to Liquid Flow Stage position, and because the nozzle will be filled with liquid entirely down to its tip, liquid will not have to drop very far before striking the bottom of the container. Therefore, no foaming will be caused by such contact.

If the nozzle 56 contained no liquid at the beginning of the liquid flow stage, the first liquid flowing from the nozzle would have to flow or drop a substantial vertical distance before striking the container bottom and foaming would occur. Hence, the present arrangement avoids that possibility and quiet filling will be assured.

BLOW-OUT STAGE

After a filling head has had a filled container removed

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therefrom and before a second container is again positioned beneath the filling head, the disk valve 24 may be momentarily rotated in the direction of arrow R of Figure 1 to the "Blow-Out Stage" position, viz., the same stage as the "Snifting Stage." This stage also is illustrated in Figure 10. With the passages in that position, gas from the upper portion of the reservoir can flow downwardly through tube 28, groove 91 and bore 92 into the disk valve passage 105. Thus, gas will move through the bore 110 midway of passage 105 and down through passage 102 through restricted nipple 72 and the chamber 66 which is now open to atmosphere because the centering bell will be lowered. Some gas will move entirely down through passage 105 to the bores 114 and 116 and to atmosphere by port 118. The total result will be that all foam or liquid which may have moved into these passages during filling or snifting will be expelled to atmosphere. Therefore, the passages will be entirely clear for the handling of the next container.

The Blow-Out Stage will be very brief so that no substantial quantity of gas will be lost from the filling reservoir. In other words, shortly after the lower arm 120 has contacted the blow-out trip, the upper arm 122 will contact with a second trip which will rotate the disk valve in a clockwise direction as viewed in Figure 1 to restore the passages to the neutral or closed position of Figure 7.

Continued rotation of the filling table will bring the filling head and platform under discussion into alignment with the infed dial so that another container to be filled will be placed on the platform 20 and the above-described filling cycle repeated.

The terminology used in the specification is for the purpose of description and not of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a filling head for carbonated liquids, a body element provided with a filling nozzle and a planar seat face, a disk valve rotatable on said seat face, the body element including a single gas passage and a liquid passage arranged to lead from said seat face to the gas and liquid containing portion of a reservoir, respectively, said disk valve being provided with a liquid passage and first and second gas passages open to its seat face, a gas outlet chamber surrounding said filling nozzle and arranged to be open to a container sealed to said nozzle, said body element including first and second gas passages extending from said seat face to said chamber and a liquid passage extending from said seat face to said nozzle, said disk valve being arranged for rotation on said body element to a first and counterpressure flow position to open said first disk valve gas passage to communication with said body element gas passage leading to the gas containing portion of the reservoir and with said first gas passage extending to said gas outlet chamber, and is then rotatable to a second position to place said disk valve liquid passage in communication with both of said body element liquid passages and simultaneously place said second gas passage of said disk valve in communication with said body element gas passage leading to the reservoir and with said body element second gas passage extending to said gas outlet chamber.

2. A filling head of the character described in claim 1 wherein the two gas passages of the disk valve are arranged in crossing relation with respect to each other.

3. A filling head of the character described in claim 1 wherein the body element is provided with a port extending from its seat face to atmosphere adapted to communicate with said second gas passage of the disk valve.

4. A filling head of the character described in claim 1 wherein said second gas passage of the body element extending to the gas outlet chamber is more restricted than said first gas passage leading to said gas outlet chamber.

5. A filling head of the character described in claim 1 wherein each of said gas passages of said disk valve includes a portion lying in a plane radial of the disk valve, and the two portions lie in different radial planes.

6. A filling head of the character described in claim 1 wherein said second gas passage of said disk valve includes an extended portion provided with first and second end ports and an intermediate port, the intermediate port being open to said gas passage leading to the gas containing portion of said reservoir and the first end port being open to said first gas passage extending to said gas outlet chamber in said second flow position of said disk valve, and

said disk valve is rotatable to a third position wherein said second end port is open to said gas passage leading to the gas containing portion of said reservoir and said intermediate port is open to said first gas passage extending to said gas outlet chamber.

7. In a filling head for carbonated liquids, a body element provided with a planar seat face, a disk valve rotatable on said seat face, the body element including a gas passage and a liquid passage arranged to lead from said seat face to the gas and liquid containing portion of a reservoir, respectively, said disk valve being provided with a liquid passage and a gas passage open to its seat face, said body element including a filling nozzle and liquid and gas passages extending therefrom to said seat face, said disk valve gas passage including first and second end ports and an intermediate port, said disk valve being arranged for rotation on said body element to a position wherein the disk valve gas passage intermediate port is open to said gas passage leading to the gas containing portion of said reservoir, and the first end port is open

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to the filling nozzle gas passage, and said disk valve being rotatable to a second position wherein said second end port is open to said gas passage leading to the gas containing portion of said reservoir and said intermediate port is open to the filling nozzle gas passage.

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