W. J. PHELPS.

CAN FILLING APPARATUS.

APPLICATION FILED AUG. 13, 1910.

1,032,768.

Patented July 16, 1912.

3 SHEETS—SHEET 1.

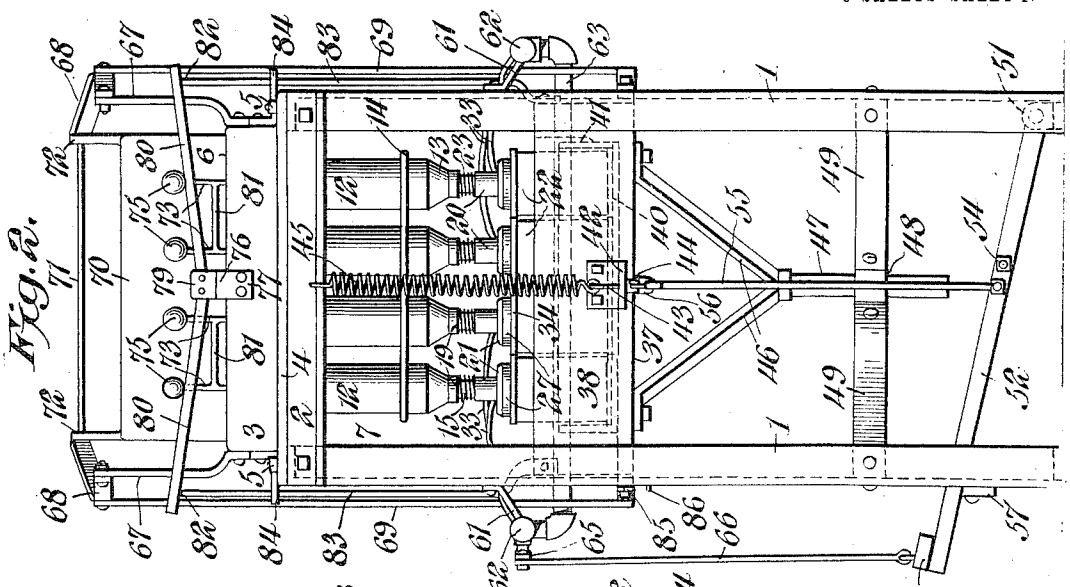

Fig. 2.

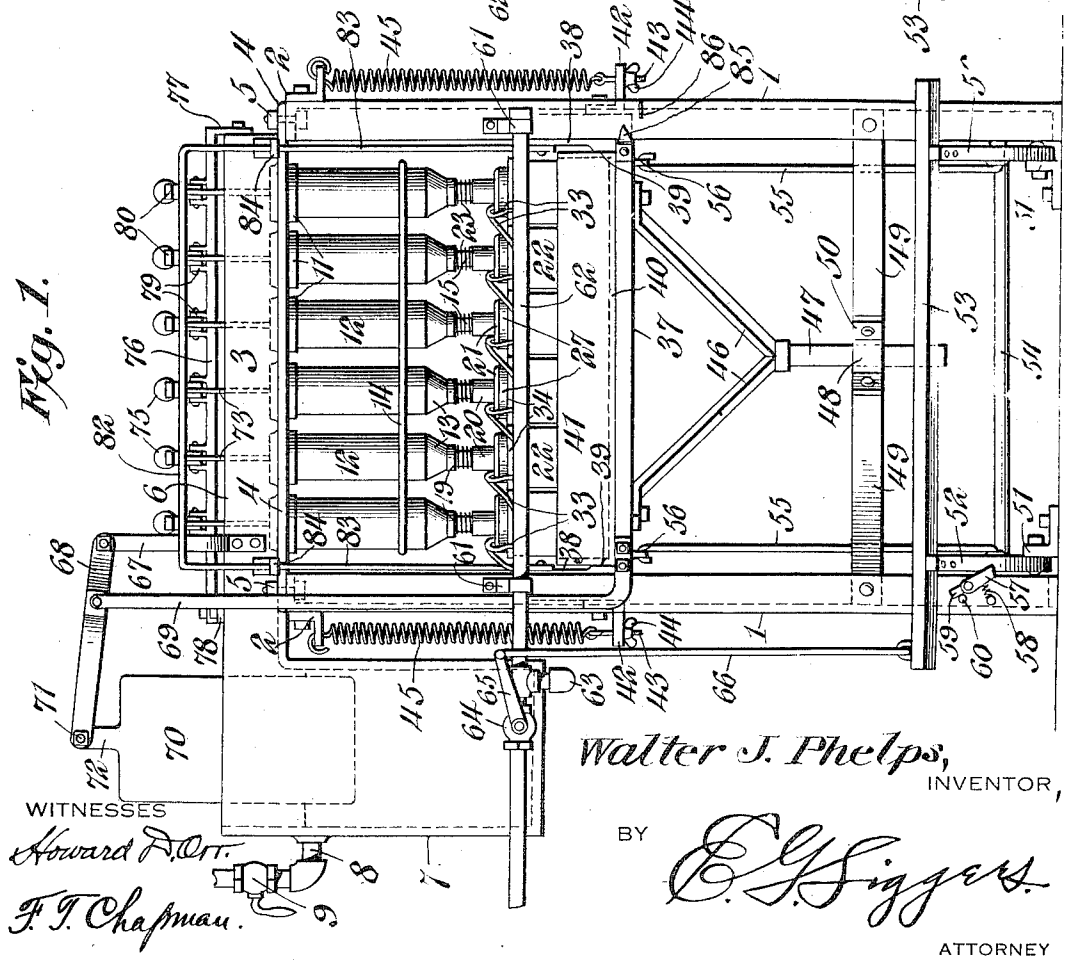

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 4.

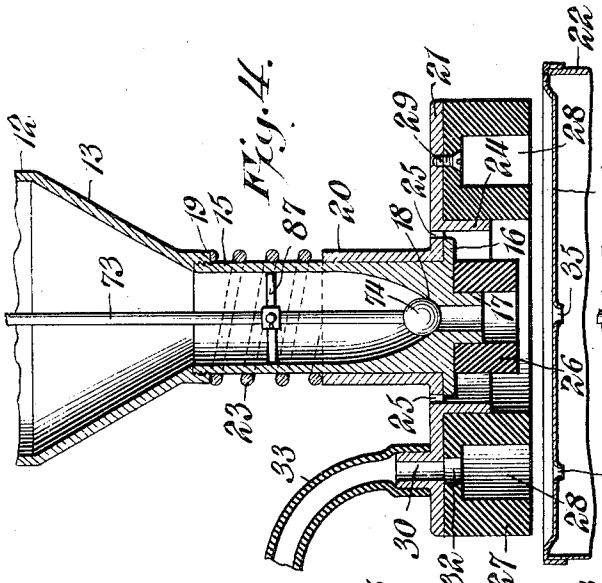


Fig. 5.

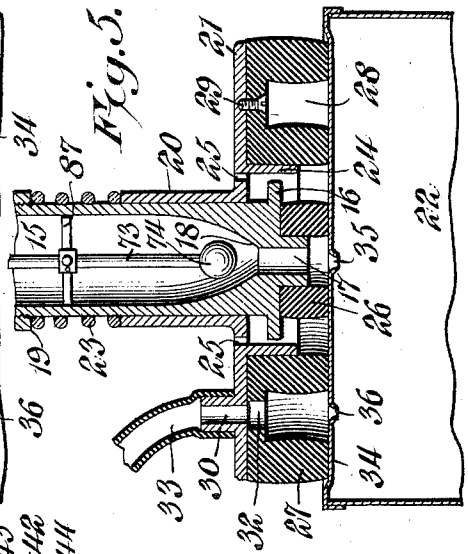
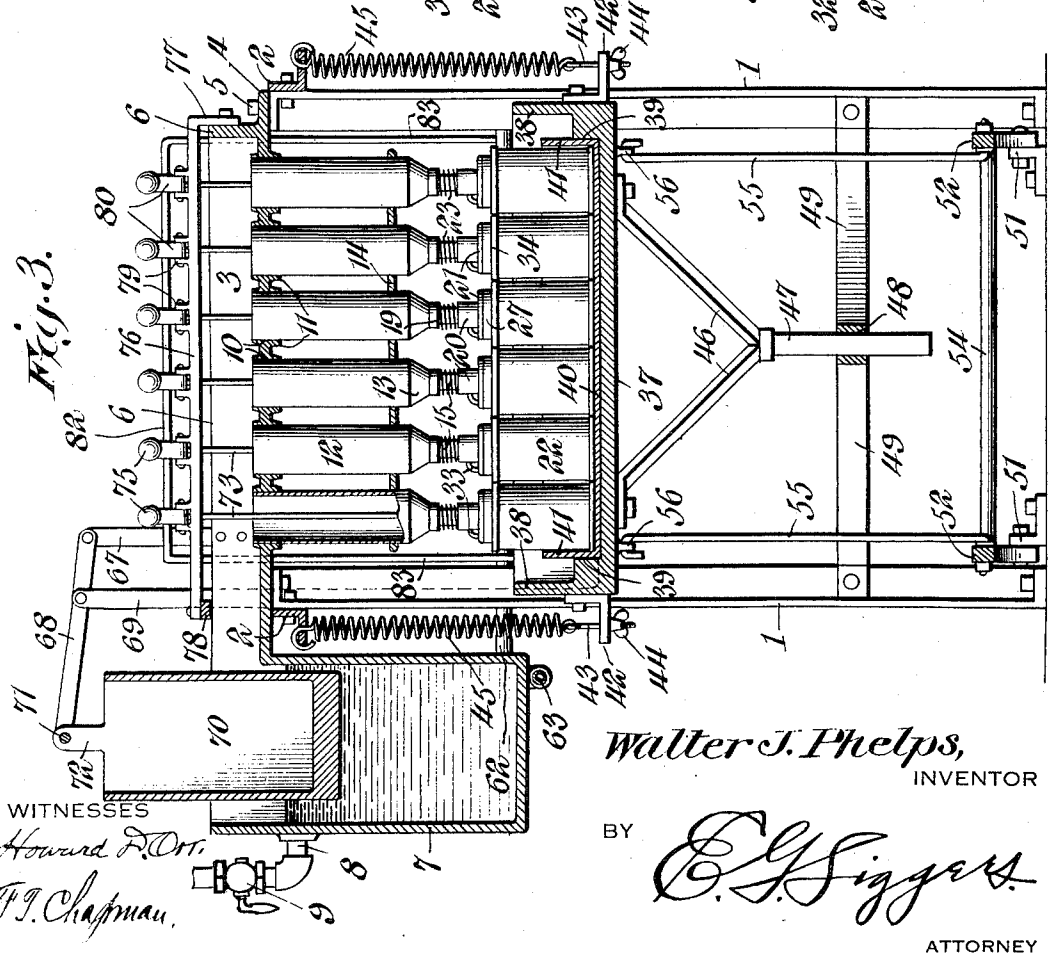


Fig. 3.



WITNESSES

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3 SHEETS—SHEET 3.

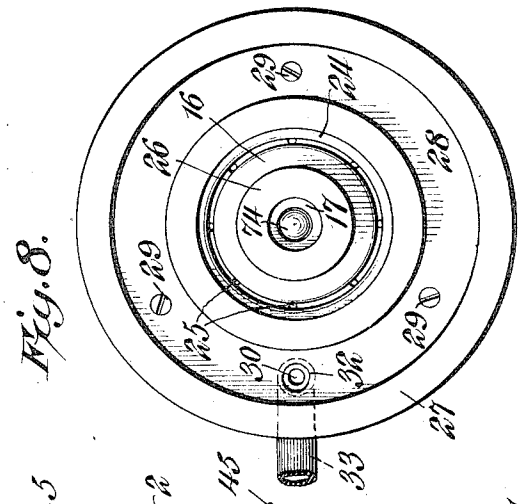

Fig. 8.

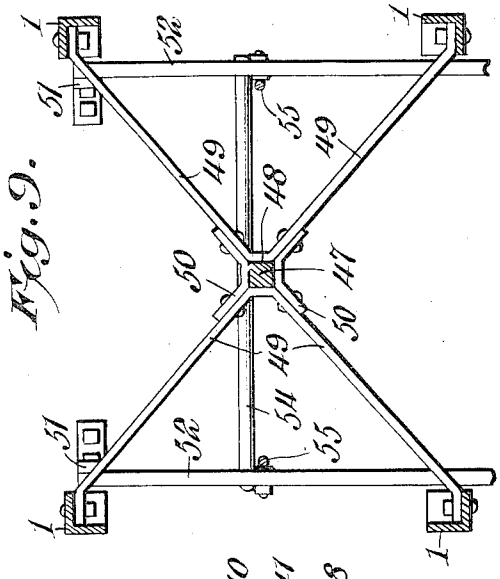

Fig. 9.

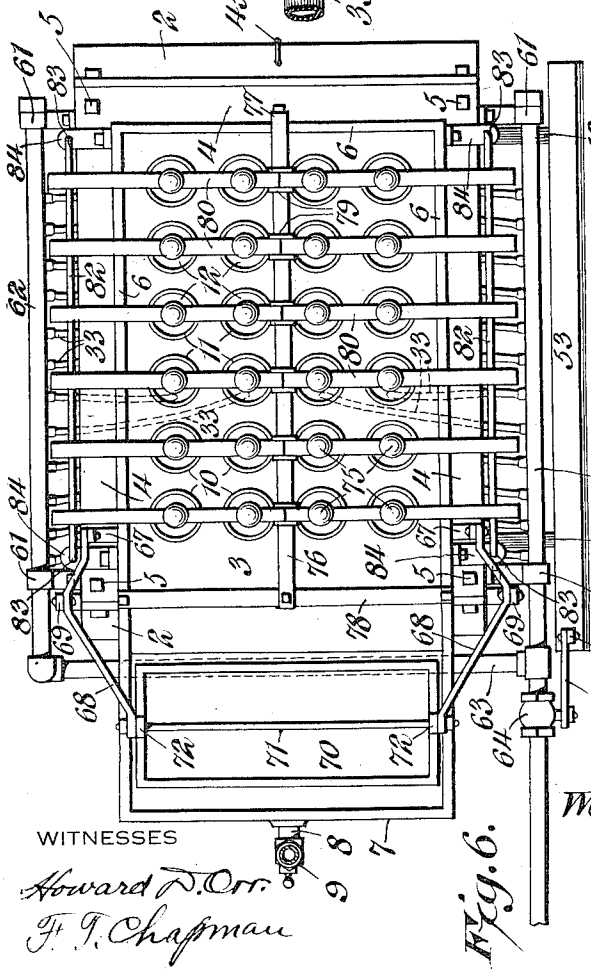

Fig. 6.

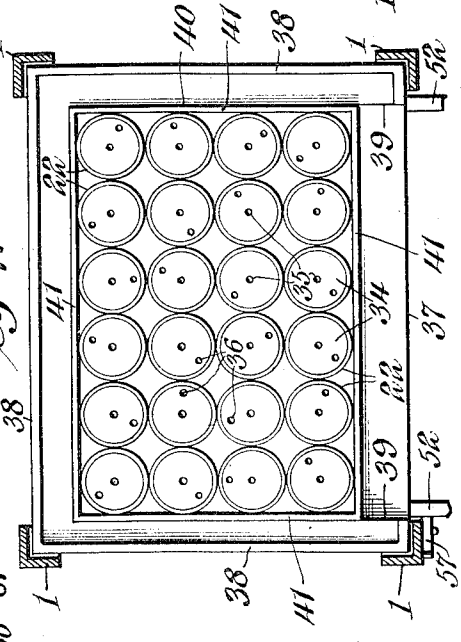

Fig. 7.

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UNITED STATES PATENT OFFICE.

WALTER J. PHELPS, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO FRANK GEBBIE, OF ROCHESTER, NEW YORK.

CAN-FILLING APPARATUS.

1,032,768. Specification of Letters Patent. Patented July 16, 1912.

Application filed August 13, 1910. Serial No. 577,120.

To all whom it may concern:

Be it known that I, WALTER J. PHELPS, a citizen of the United States, residing in Baltimore and State of Maryland, have invented a new and useful Can-Filling Apparatus, of which the following is a specification.

This invention has reference to improvements in can filling apparatus, and is designed to provide a means for filling cans with liquids through a small opening in one end of the can, these openings being subsequently sealed. The small opening referred to is in the nature of a perforation, usually in the center of the head of the can, which perforation is to be distinguished from the large filling openings usually employed, which openings are afterward closed by a suitable cap soldered in place.

In the present invention a second perforation is employed near the periphery of the head of the can in which the first named perforation is formed, and by means of apparatus forming the subject matter of the present invention the liquid is caused to flow into the can through the central perforation by the force of gravity augmented by atmospheric pressure caused by withdrawing the air from within the can through the eccentric perforation which is provided for this purpose, the air being withdrawn by a suction apparatus producing sub-atmospheric pressure within the can.

The inlet perforation, which for convenience may be called the central perforation, although it is not necessary that this perforation should be exactly in the center of the can head, is purposely of circumscribed area, and the mouth of the conduit through which the liquid is directed to the central perforation of the can head is made of sufficiently larger area so that the end of the conduit may be brought into air tight relation to the head of the can in surrounding relation to the filling perforation. Where gravity alone is utilized for causing the flow of liquid into the can, there remains, at the completion of the filling operation, a globule of the liquid on the surface of the can about the filling perforation, which liquid will not gravitate through the perforation, and when the conduit is removed such liquid spreads out on the head of the can about such perforation to a considerable distance. This also is the case where the attempt is made to fill the can through a small perforation by gravity aided by super-atmospheric pressure, the displaced air in the can escaping through the second perforation. The formation of a globule of the fluid introduced into the can at the filling perforation is very objectionable because of the necessity of removing this globule of liquid before the perforation may be sealed, and also because of the waste material.

By the present invention the cans are not only expeditiously filled but when the filling is completed there is produced a condition whereby there is caused an inrush of air at the filling perforation which will draw into the can the final globule of material which otherwise would remain on the surface of the can and spread about the filling perforation. Such perforation is therefore left in a sufficiently clean condition to permit of sealing by the usual drop of solder, the other perforation being also sealed at the same time.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that while the structure illustrated is well adapted to the purposes of the invention, such structure is susceptible of various modifications which retain the salient features of the invention.

In the drawings:—Figure 1 is an elevation of one side of the machine. Fig. 2 is an elevation of one end of the machine at right angles to the showing of Fig. 1. Fig. 3 is a vertical section through the machine taken in a plane substantially median to the showing of Fig. 2, and, also, showing some parts broken away. Fig. 4 is a section through one of the measuring cups and the means carried thereby for causing the introduction of the filling liquid into a can, the latter being shown in section and in operative relation to the other structure. Fig. 5 is a view similar to Fig. 4, but showing a different phase of the operation of the structure. Fig. 6 is a top plan view of the machine. Fig. 7 is a plan view of the can carrier with a tray of cans therein, adjacent parts being shown in cross section. Fig. 8 is a bottom plan view of the can engaging

means at the lower end of each measuring cup. Fig. 9 is a cross section through the framework immediately above a guiding brace connecting the legs of the machine.

Referring to the drawings there is shown a frame comprising legs 1 which may be, and preferably are, made of structural steel, being illustrated as angle strips, and at the upper ends these legs are connected together in pairs by other angle strips 2. These pairs of legs support a trough 3, which may be a casting of suitable size and shape with edge flanges 4 bolted at the corners to the upper ends of the legs 1, as indicated at 5. In the particular structure of the drawings, the trough 3 is a rectangular structure of comparatively shallow depth with surrounding side walls 6, and this trough extends beyond one pair of legs 1, and is there formed with a depending portion 7 constituting a reservoir for the liquid to be ultimately filled into cans, this reservoir receiving the liquid from a supply pipe 8 having in it a valve 9, whereby the inflow of liquid to the reservoir 7 may be controlled at will.

The machine is designed especially for the filling of evaporated milk of commerce into cans, and in the following description the liquid will be designated as milk, with the understanding, however, that other liquids may be used, whether of the same or thicker or thinner consistency than the evaporated milk employed.

The floor of the trough 6 is formed with numerous passages 10 therethrough, these passages being customarily circular and provided with marginal flanges 11. The passages 10 are designed to receive the ends of elongated cups 12, each of a capacity to hold a sufficient quantity of milk to fill a can of predetermined size to the desired extent, the cans being usually filled to within one-eighth inch or three-sixteenths inch of the inner wall of the top or head of the can. The flange 11 formed about each passage 10 in the bottom of the trough 3 forms an upstanding wall around the upper edge of the corresponding cup 12, which latter is made to fit tightly in the opening 10, so that no leakage may occur between the cup and the flange, and no lodgment may be provided for any material directed into the trough 3. The lower ends of the cups 12 are contracted, as indicated at 13, and at any convenient point the several cups may pass through suitable perforations in a plate 14 suspended by the cups and serving to position their lower ends with relation to each other.

Each cup is continued beyond the contracted end 13 in the form of a neck 15 substantially cylindrical in shape with a terminal outstanding flange 16 at the lower end, and with an axial nipple 17 projecting beyond the plane of the lower end of the neck 15. The neck 15 has an internal bore which is substantially cylindrical for a portion of its length below the contracted end 13, and then this bore is gradually contracted into a valve seat 18 merging into the bore of the nipple 17.

Where the neck 15 joins the contracted end 13 of the cup 12, there is formed a shoulder 19, and between this shoulder and the flange 16 the outer wall of the neck is cylindrical. Surrounding the neck 15 is a collar 20 of less length than the neck, and this collar is provided at one end with a radially disposed flange or plate 21 of an extent which may be somewhat less than the diameter of the cans to be employed, these cans being shown at 22. The collar 20 is of less length than the cylindrical portion of the neck 15, and between the shoulder 19 and the corresponding end of the collar 20, the neck 15 is surrounded by a spring 23 having a normal tendency to maintain the collar 20 against the flange 16, but yielding to a superior force tending to move the collar or sleeve 20 toward the shoulder 19 and away from the flange 16. Formed on the face of the flange or plate 21 remote from the collar 20 is an axially directed flange 24 of greater diameter than the radial extent of the flange 16, so that there is an annular space left between the inner wall of the flange 24 and the periphery of the flange 16, and through the plate 21 coincident with this space is a circular series of perforations 25.

Applied to the nipple 17 is a cylindrical gasket 26, preferably of soft vulcanized rubber, and applied to the face of the plate 21 from which projects the flange 24, and exterior to and concentric with said flange, is a gasket in the form of a ring 27 with an annular channel 28 formed therein, the channel 28 being concentric to the longitudinal axis of the neck 15 and cup 12. The gasket 27 may be secured to the plate 21 in any suitable manner, screws 29 being indicated in the particular structure shown in the drawings, but it will be understood, of course, that any other suitable means for the purpose may be employed.

The plate 21 is formed with a nipple 30 in position to have its bore which extends through the plate 21 opening through a passage 32 in the gasket 27, so that the nipple 30 is in constant communication with the channel 28. To the nipple 30 there is applied a flexible tube 33 which may be of rubber composition. It will be observed that the under edge of the gasket 26 stops short of the under edge of the gasket 27, so that a plane surface engaged by the gasket 27 will not at the same time be engaged by the gasket 26, and the gasket 27, which is preferably made of soft vulcanized rubber, must yield or be compressed before the

gasket 26 can be brought into engagement with the same plane surface.

Each can 22 has one head 34 provided with a perforation 35 at, or substantially at the center of the head, and another perforation 36 near the periphery of the head, these two perforations being so located that when the can engaging member made up of the two gaskets 26 and 27 and the parts carrying the same are brought into engagement with the head 34, the gasket 26 will surround the perforation 35 and the channel 28 will be brought against the head 34 in communicating relation with the perforation 36. The perforations 35 and 36 may be quite small and may be formed at the same time with the head 34, these perforations being caused by simply punching through the metal of the head at the appropriate points without removing any of the metal of the head.

Confined within the space defined by the legs 1 is a carrier 37 having marginal walls 38 around three sides, and extending for a short distance on the fourth side, while this carrier is provided with a cut away portion 39 adapted to receive and guide a tray 40 having marginal walls 41, the tray being of a size to receive a number of cans 22 corresponding to the number of cups 12, so that when the tray 40 is in position on the carrier 37, the latter may be moved until all the cans 22 are brought into engagement with the gaskets 26 and 27, the parts being related to permit this action.

The angle form of the legs 1 admits of a guiding function of these legs for the carrier 37, which may be fitted at the corners sufficiently close to move smoothly up and down between the legs 1 without any material side motion. The carrier 37 has secured thereto on opposite sides brackets 42, each perforated for the passage of an eye bolt 43 threaded on one end for the reception of a wing nut 44, and at the eye end secured to one end of a spring 45, the other end of which is secured to the angle bar 2 connecting a respective pair of legs 1. The springs 45 are sufficiently strong to uphold the carrier 37 with a load of cans 22 thereon when filled with milk, with the head of each can so firmly seated against the gaskets 26 and 27 that these gaskets are in air tight relation to the outer surface of the head of the can.

Secured to the under side of the carrier 37 are arms 46 converging to a bar 47 capable of longitudinal movement in a guide 48 formed by oppositely directed converging braces 49, and connecting straps 50 for these braces, the arrangement being such that the eye formed by the adjacent portions of these parts is of square contour and the bar 47 is of like contour. The braces 49 at their terminal ends are secured to respective legs 1 in a manner to stiffen the legs, so that any tendency of these legs to separate or draw together is obviated.

Made fast to the support for the legs 1, this support usually being the floor of the room in which the machine is located, are brackets 51, adjacent two of the legs 1, which legs, because of the position of the operator with relation to the machine, may be termed the rear legs. Pivoted to each bracket 51 is a bar 52, and these bars extend beyond the front legs of the machine and are there connected by a strip 53 designed to receive the foot of the operator, so that the two bars 52 and strip 53 constitute a treadle, a brace rod 54 connecting the bars 52 at an intermediate point to stiffen the structure. Each bar 52 is connected by a link 55 to an eye 56 fast on the under side of the carrier 37 at an appropriate point. The normal tendency of the springs 45 to lift the carrier 37 also causes an up-lifting of the treadle, so that the foot member 53 is normally in the elevated position. When it is desired to lower the carrier 37, the operator presses upon the foot member 53 of the treadle, and so lowers the carrier against the tendency of the springs 45, the legs 1 and eye 48 serving to guide the carrier and prevent it deviating from the proper path. It is desirable in the operation of the machine that the treadle with the parts controlled thereby should be locked in the depressed position, and for this purpose there is mounted on one of the legs 1 a pawl 57, constrained in one direction by a spring 58 and provided with a lug 59 in the path of which is a pin 60 on the leg 1 carrying the pawl, so that the movement of the pawl under the action of the spring 58 is limited by the engagement of the lug 59 with the pin 60. Under normal conditions with the treadle in the raised position, the free end of the pawl 57 is in the path of one of the bars 52, but the pawl will yield to the downward movement of the bar 52 until the pawl has been passed, and then the spring 58 will cause the pawl to snap over the bar 52, so that when pressure of the foot member 53 of the treadle is released, the bar 52 will be engaged by the pawl 57, and be thereby held in the lowered position against the action of the springs 45. When it is desired to elevate the carrier 37, the operator may with the foot move the pawl 57 out of the path of the bar 52 and by releasing the pressure of the foot on the treadle allow the treadle and the parts controlled thereby to rise under the action of the springs 45.

Fast to the legs 1 by brackets 61 or otherwise, are pipes 62 extending on opposite sides of the machine in position to have the tubes 33 connected to these pipes. The pipe 62 on one side of the machine is connected to the pipe 62 on the other side of the ma-

chine by a branch pipe 63, and the first named pipe 62 may be continued to an air pump or other suitable means for exhausting air from these pipes. In the first named pipe 62 on the side of the branch pipe 63 toward the exhausting means, there is included a valve 64 to the stem of which is made fast an arm 65 connected by a link 66 to the treadle member 53, the arrangement being such that when the treadle is in the uppermost position the valve 64 is open, so that the pipes 62 are in communication with the exhausting means but when the treadle is depressed the valve 64 is closed.

Erected on the side walls of the trough 3 are standards 67 to each of which there is pivoted an arm 68, connected by a strap 69 to an appropriate part of the carrier 37, this strap being fixedly connected to the carrier 37 and pivotally connected to the arm 68. The ends of the arms 68 remote from the standards 67 are pivoted to opposite sides of a plunger 70 adapted to the reservoir 7, this plunger 70 being heavy enough to sink to the proper distance in the fluid in said reservoir 7. The pivotal connection between the arms 68 and the plunger 70 is by a rod 71 extending through ears 72 on the sides of the plunger, but it will be understood that other connecting means may be employed.

When the carrier 37 is in the upper position, the plunger 70 is withdrawn to the desired extent from the reservoir 7 and when the carrier is lowered, the plunger 70 participates in this movement and enters correspondingly into the reservoir 7, displacing the milk therein to a commensurate extent. This causes a rising of the level of the milk within the reservoir 7 until it is above the floor of the trough 3, and therefore flows over the floor or bottom of the trough, the parts being so proportioned that the milk will rise above the top of the cups 12 and flow into them until they are all filled. As soon as the carrier 37 rises, the plunger rises with it, and that part of the milk not already lodged in the cups 12 will flow back into the reservoir 7, the cups remaining brimful.

Extending through each cup is a rod 73 formed at the lower end into a valve 74, shown in the particular disclosure of the drawings as a globular valve, and this valve is adapted to the seat 18. Each rod 73 is continued above the top of the trough 3 and terminates in a ball 75 designed to impart weight to the valve stem or rod 73 and valve 74, and this ball 75 may, therefore, be replaced by any other shaped structure acting as a weight.

Extending along the top of the trough 3 is a bar 76 having one end formed with an angular extension 77 riveted or otherwise made fast to the end wall of the trough 3, while at the other end the bar 76 is made fast to a cross bar 78 in any appropriate manner, this bar being supported at its ends on the side walls of the trough 3. The bar 76 is formed on its upper edge with pairs of ears 79, each carrying one end of a lever 80 through which corresponding valve rods 73 extend, each lever 80 controlling two valve rods 73 in the particular disclosure of the drawings, and since the lever, because of its pivotal support, moves through an arc, the two valve rods controlled by a lever are connected by a cross piece 81, so as to move together. The levers 80 are arranged in two series projecting oppositely from the center line of the trough, and the free ends of each series of levers are engaged by a rod 82 having ends 83 at an angle to the central portion of the rod, these ends 83 passing through eyes in guiding brackets 84 on appropriate portions of the flanges 4 and continued to the carrier 37, being made fast to appropriate portions of the side walls of the carrier, so that the rods 82 will participate in the up and down movements of the carrier 37.

Let it be assumed that an appropriate supply of milk is lodged within the reservoir 7, and that this supply is replenished from time to time by an appropriate operation of the valve 9, admitting suitable quantities of milk to the reservoir 7 from a larger source of supply, not shown in the drawing, the valve 9 being readily accessible to an operator in position to control the treadle by the treadle member 53. Let it also be assumed that an air exhausting means is connected to the pipes 62 and is in operation. If the treadle be in the lowermost position, being there locked by the pawl 57, the carrier 37 is also in the lowered position and the rods 82 have likewise been lowered and the weight of the several valves 74 with their stems 73 and weighted ends 75 has caused the closing of all the valves 74 in the respective seats 18. Simultaneously the lowering of the plunger 70 has caused the filling of all the cups 12 in the manner already described, the contents of these cups being maintained therein by the valves 74 now in the closed position. Furthermore the springs 23 have caused all the collars 18 and plates 21 to assume the lowermost position with the lower edge of the gaskets 27 below the lower edges of the gaskets 26. A tray 40 full of cans 22 is placed on the carrier 37, being positioned by the cut away portion 39 of the carrier. The operator now releases the treadle and permits the carrier to move upwardly until ultimately the tops of the cans engage the gaskets 27, and the continued upward movement of the carrier causes a compression of these gaskets as well as of the spring 23 until ultimately the gaskets 28 are brought into engagement

with the tops of the cans, and the resistance of the springs 23 is sufficient to cause a compression of these last named gaskets, so that the engagement of the gaskets and the top of the cans is an air tight engagement sufficient for the degree of sub-atmospheric pressure employed. The rising of the carrier 37 causes the elevation of the plunger 70 and the removal of the surplus milk from the trough 3 and also the opening of the valves 74 by the engagement of the rods 83 with the several levers 80, thus lifting the valves 74 from the seats 18. The rising of the treadle also causes the opening of the valve 64 and this results in the production of sub-atmospheric pressure in the pipes 62, thus exhausting the air from the tubes 33 and the channels 28 of the gaskets 27. Air pressure on the surface of the milk in the cups 12 causes a flow of the milk through the nipples 16 into the interior of the gaskets 26 and so through the perforations 35 surrounded by these gaskets into the interior of the cans, the air within the cans exhausting through the perforations 36 into the channels 28 and through the tubes 33 to the pipes 62, and from the latter to the air exhausting means. This operation continues until the milk within the cups 12 has passed into the respective cans, the cups being so proportioned that when all of the contents have passed into the cans the latter will be filled to the desired level. The completion of the filling of the cans is made evident to the operator by the noise produced by the passage of air into the cans through the lower ends of the cups and the perforations 35 and the operator may then depress the treadle and cause the cans to move away from the can engaging devices at the lower ends of the cups. As the carrier 37 drops, the gaskets 27 follow the cans for a distance determined by the length of the necks 15, each gasket 27 being arrested by engagement of its plate 21 with the respective flange 16 of the lower end of the neck 15. The gasket 27, however, is incapable of such following up movement, and as soon as the movement of the can 22 away from the gasket is greater than the extension of the gasket from its compressed position to its normal position, the can leaves the gasket 26 a short period of time before the can is drawn away from the gasket 27. Because of the sub-atmospheric pressure within the can at this time, there is a quick inrush of air through the perforations 25 between the gasket 26 and the head of the can, the parts being so timed in operation that the valve 74 has closed before the can has moved away from the gasket 26. This results in an inrush of air toward the perforation 35 in the form of a thin sheet beneath the gasket 26 and between the same and the head 34 of the can, this in-rushing film of air sweeping before it all accumulations of milk lodged on the surface of the head of the can within the area circumscribed by the gasket 26, and preventing any outward spread of this accumulation or mass of milk which would otherwise form a thin and quite extensive film of milk about the perforation 35. The inrush of air through the perforation 35 because of the maintenance of sub-atmospheric pressure within the can after the gasket 26 has separated therefrom, is sufficiently prolonged to sweep into the can through the perforation 35 all the milk which finds lodgment on top of the can about the perforation 35, so that when the air pump is shut off from the pipes 62 and atmospheric pressure is again restored within the can, the top of the can is free from any milk about the perforation 35, and this milk heretofore wasted is not only saved, but the can is in condition to have the perforations 35, 36 stopped with solder in the usual manner without the necessity of a preliminary cleaning to remove deposits of milk thereon. As soon as the treadle has been again depressed, the tray of cans now filled with milk may be removed and another tray full of empty cans may be placed upon the carrier ready for a repetition of the operation just described.

Should the operator be too precipitate in the lowering of the carrier, the in-rush of air designed to carry the last trace of milk into the can through the perforation 35 may prove at times to be of too short duration for the purpose. To avoid such contingencies there is provided on the carrier an indicator 85 and a companion index mark 86 on one of the legs 1, the indicator and index marking being in position to be readily visible to the operator, and so positioned that when the indicator 85 is brought into coincidence with the index marking 86, in the downward movement of the carrier, the gasket 26 will have separated from the head 34 of the respective can, while the gasket 27 is still in operative engagement therewith. By a slight pause of the parts in this position, ample time is given for the indrawing of any milk on the can about the perforation 35, and then the operator continues the downward movement of the carrier to the final position.

While the converging walls of the interior of the neck 15 will guide the corresponding valve 74 to its seat 18, said valve may be positively guided by a spider 87 made fast to the valve stem 73 so as to slide but always remain in the interior cylindrical portion of the neck 15.

It will be observed that the exhausting gasket is annular so that it is immaterial how the cans are placed in the tray carrying them, since the exhaust perforation 36 will always be covered by the gasket 27, and the

central or filling perforation 35 will, because of the position of the gasket 26, be always included by the latter.

The present invention is particularly adapted for introducing liquids into cans and effects a great saving in both labor and material because the only subsequent operation is the sealing of two small perforations in the top of the can, this being done with great facility by a skilled operator with the expenditure of far less solder than is necessary for the sealing of a can by means of a cap of considerable area on the head of the can, and, furthermore, a very material saving is brought about by avoiding the waste of material as has heretofore been the case in the attempt to fill cans through a small perforation, and the labor incident to cleaning the waste material from the top of the can before the soldering of the perforation.

If it be desirable to utilize the machine for filling smaller cans than those for which the machine is initially adapted, this may be readily accomplished by using measuring cups of smaller capacity, or the capacity of the cups may be reduced without the necessity of replacing those already on the machine. The degree of sub-atmospheric pressure which may be produced within the cans will depend upon the capability of the cans to withstand the excess of external atmosphere pressure and the inflow of liquid will be the more rapid the greater the difference between the external atmospheric pressure and the subatmospheric pressure within the can. Usually the degree of exhaustion of the air may be such as to cause the filling of the cans in the case of milk in one half (or less) time than though gravity alone were utilized, the operation of the machine being thereby accelerated with corresponding saving in time and labor.

What is claimed is:—

1. In an apparatus for filling cans with liquid, means for conducting the liquid to the can, means for causing within the can sub-atmospheric pressure to force the liquid into the can, and means for causing the maintenance of sub-atmospheric pressure in the can subsequent to the separation of the can and the first named means.

2. In an apparatus for filling cans with liquid through small perforations in said cans comprising means for producing sub-atmospheric pressure within the can to be filled, means for carrying a suitable quantity of the liquid into the can through the filling perforation therein, and means for causing the withdrawal from the can of the liquid conducting means prior to the re-establishment of atmospheric pressure within the can.

3. In an apparatus for filling cans, a holder for a liquid to be introduced into a can, said holder being provided with means engageable in air tight relation with one end of a can to direct liquid from the holder to said can, and means also carried by the liquid holder in position to engage and act on the can and the first named means in air tight relation to such can end, said last named means being adapted for the exhaustion of air from the can.

4. In an apparatus for filling cans, a holder for liquid to be filled into a can, an engaging means carried by said holder for directing liquid therefrom to the can and another engaging means carried by the holder and adapted for exhausting air from the can, said last named means being in yielding relation to the liquid container.

5. In an apparatus for filling cans, a can engaging member provided with air seals one movable relative to and adapted to remain in engagement with a can for a longer time period than the other.

6. In an apparatus for filling cans having a central perforation and another perforation eccentric thereto, a conduit adapted to the central perforation, and an annular conduit surrounding the first named conduit and adapted to communicate with the eccentrically located perforation.

7. In an apparatus for filling cans having each a central perforation and another perforation eccentric thereto, a can engaging member having a central conduit and another conduit concentric therewith, the conduits being adapted to the respective central and eccentric perforations in the can, the concentric conduit having a range of movement with relation to the centrally located conduit.

8. In an apparatus for filling cans, a liquid container provided at its discharge end with means for forming an air seal with a can, and other means for forming an air seal with the can, said last named air seal being adapted to engage the can prior to the engagement with the can of the first named air sealing means and to maintain engagement with the can after the first named air sealing means has left the can.

9. In an apparatus for filling cans with liquid, a measuring cup having one end formed into a neck, means at the discharge end of the neck for forming an air seal with a can, and another air sealing means carried by and movable along the neck.

10. In an apparatus for filling cans, a measuring cup provided at the discharge end with a neck, a gasket carried by the discharge end of the neck and adapted to engage a can in air tight relation thereto, an annular gasket surrounding the first named gasket and adapted to engage a can in air sealing relation thereto, and a carrier for the last named gasket movable longitudinally of the neck.

11. In an apparatus for filling cans, a

measuring cup provided at the discharge end with a neck, a gasket carried by the discharge end of the neck and adapted to engage a can in air tight relation thereto, an annular gasket surrounding the first named gasket and adapted to engage a can in air sealing relation thereto, a carrier for the last named gasket movable longitudinally of the neck, and means for constraining the second gasket toward the discharge end of the neck.

12. In an apparatus for filling cans with liquid, a filler head having a liquid conduit provided with means for establishing air tight relation to a can, another conduit carried by the head and provided with means for establishing air tight relation to a can, said second named conduit having a range of movement with relation to the first named conduit, and means for admitting air between the can and the first named conduit while the second named conduit is in air tight relation to the can.

13. In an apparatus for filling cans, a filler head provided with a central gasket constituting a means for establishing air tight relation to the can to be filled, and a movable member carrying an annular gasket surrounding the first named gasket and constituting means for establishing air tight relation with the can to be filled, the second named gasket normally projecting to a greater extent than the first named gasket and yieldably constrained to such position.

14. In an apparatus for filling cans, a filler head provided with a central gasket constituting a means for establishing air tight relation to the can to be filled, and a movable member carrying an annular gasket surrounding the first named gasket and constituting means for establishing air tight relation with the can to be filled, the second named gasket normally projecting to a greater extent than the first named gasket and yieldably constrained to such position, the filler head being also provided with means for the admission of air to the space between the two gaskets.

15. In an apparatus for filling cans, a measuring cup provided at its discharge end with an elongated neck, a gasket at the discharge end of the neck for establishing air tight relation with the can to be filled, a collar mounted on the neck and having a limited movement axially thereof, said collar being provided with a radial flange, an annular gasket carried by the collar in concentric relation to the first named gasket, said annular gasket being provided with an annular channel and adapted to make air tight connection with the can to be filled, the two gaskets being spaced apart, the space between the gaskets being open to the atmosphere through the flange, and the outer gasket having its engaging end projecting to a greater extent than the first named gasket, and a spring surrounding the neck and tending to maintain the flanged collar with the gasket carried thereby beyond the discharge end of the neck.

16. In an apparatus for filling cans, a measuring cup provided at its discharge end with an elongated neck, a gasket at the discharge end of the neck for establishing air tight relation with the can to be filled, a collar mounted on the neck and having a limited movement axially thereof, said collar being provided with a radial flange, an annular gasket carried by the collar in concentric relation to the first named gasket, said annular gasket being provided with an annular channel and adapted to make air tight connection with the can to be filled, the two gaskets being spaced apart, the space between the gaskets being open to the atmosphere through the flange and the outer gasket having its engaging end projecting to a greater extent than the first named gasket, a spring surrounding the neck and tending to maintain the flanged collar with the gasket carried thereby beyond the discharge end of the neck, and means for closing the discharge end of the cup interior to the first named gasket.

17. In a machine for filling cans with liquid, a measuring cup, a tapered bottom terminating in an elongated neck formed at one end with a valve seat, a gasket carried by the outer end of the neck beyond the valve, a flanged collar carried by the neck, a ring shaped gasket provided with an annular channel and carried by the flange of the neck in concentric relation to the first named gasket, a conduit communicating with the channel in the second gasket for permitting the exhaustion of air therethrough, and a spring on the neck tending to maintain the collar with the gasket carried thereby toward the discharge end of the neck.

18. In a machine for filling cans with liquid, a measuring cup having the discharge end contracted and formed into an elongated neck with a valve seat adjacent to the discharge end thereof, a gasket at the discharge end of the neck adapted to form an air tight connection with the can to be filled, a collar carried by the neck and having a limited longitudinal movement thereon, said collar being provided with a radial flange with passages therethrough adjacent the neck, a ring-shaped gasket carried by the flange in concentric relation to the first named gasket and provided with an annular channel, a conduit leading to the interior of the channel in the second gasket, a spring on the neck tending to maintain the collar with the parts carried thereby toward the discharge end of the neck, and a valve adapted to the valve seat in the neck.

19. In a machine for filling cans, a meas-

uring cup having one end contracted into an elongated neck having a shoulder at one end and a flange at the other, and a discharge opening with a nipple continued therefrom, a gasket carried by the nipple, a collar on the neck between the shoulder and flange and capable of moving along said neck, said collar being provided at one end with a radial flange having a cylindrical flange projecting therefrom and perforated between the neck and the cylindrical flange, an annular gasket carried by the radial flange exterior to the cylindrical flange and provided with a circular channel, said gasket in normal position projecting to a greater extent beyond the discharge end of the neck than the first named gasket, an air duct leading to the channel in the second gasket, and a spring on the neck between the collar and the shoulder of said neck and tending normally to maintain the collar against the flange at the end of the neck.

20. In a machine for filling cans, a measuring cup having one end contracted into an elongated neck having a shoulder at one end and a flange at the other, and a discharge opening with a nipple continued therefrom, a gasket carried by the nipple, a collar on the neck between the shoulder and flange and capable of moving along said neck, said collar being provided at one end with a radial flange having a cylindrical flange projecting therefrom and perforated between the neck and the cylindrical flange, an annular gasket carried by the radial flange exterior to the cylindrical flange and provided with a circular channel, said gasket in normal position projecting to a greater extent beyond the discharge end of the neck than the first named gasket, an air duct leading to the channel in the second gasket, a spring on the neck between the collar and the shoulder on said neck and tending normally to maintain the collar against the flange at the end of the neck, and a valve in the neck near the discharge end thereof.

21. In a machine for filling cans, a measuring cup having one end contracted into an elongated neck having a shoulder at one end and a flange at the other, and a discharge opening with a nipple continued therefrom, a gasket carried by the nipple, a collar on the neck between the shoulder and flange and capable of moving along said neck, said collar being provided at one end with a radial flange having a cylindrical flange projecting therefrom and perforated between the neck and the cylindrical flange, an annular gasket carried by the radial flange exterior to the cylindrical flange and provided with a circular channel, said gasket in normal position projecting to a greater extent beyond the discharge end of the neck than the first named gasket, an air duct leading to the channel in the second gasket, a spring on the neck between the collar and the shoulder of said neck and tending normally to maintain the collar against the flange at the end of the neck, and a valve in the neck near the discharge end thereof, said neck having its interior contracted to form a seat for the valve.

22. In an apparatus for filling cans with liquid, each provided with an inlet opening for the liquid and an outlet opening for the air, a series of measuring cups for the liquid, means at the discharge end of each cup for forming an air tight seal about the inlet to the can and an air tight seal about the outlet of the can, the second named seal having a range of movement and timed in movement to engage the can before the first named seal and to remain in engagement with the can after the second named seal is separated therefrom, a valve for each cup, an air exhaust conduit communicating with the air sealing means for the air outlet of the can, a carrier for the cans movable to bring the cans into and out of operative relation with the air seals, and operating means for the valves controlled by the carrier and timed in movement to open the valves after the cans have been brought into operative relation to the cups and to close the valves prior to the withdrawing of the cans from the cups.

23. In an apparatus for filling cans with liquid, a series of measuring cups, gravity valves each comprising a valve stem with a valve at one end, said valve stem extending beyond the filling ends of the cups, a series of levers engaging the valves to move them to the open position against the action of gravity, a carrier for cans for conveying the latter into and out of operative relation to the discharge ends of the cups, and a bar common to a series of levers controlling the cup valves and connected to the carrier for movement therewith.

24. In an apparatus for filling cans with liquid, a series of measuring cups, gravity valves each comprising a valve stem with a valve at one end, said valve stem extending beyond the filling ends of the cups, a series of levers engaging the valves to move them to the open position against the action of gravity, a carrier for the cans for conveying the latter into and out of operative relation to the discharge ends of the cups, and a bar common to a series of levers controlling the cup valves and connected to the carrier for movement therewith, the operating bar for the levers engaging the latter during the terminal movement of the carrier toward active relation to the cups.

25. In a machine for filling cans, containers for the material to be placed in the cans, a support for the containers, a carrier for cans movable in said support, the support

having corner members of angle material constituting guides for the carrier, sustaining springs for the carrier having the ends remote from the carrier secured to the support, said springs tending normally to maintain the carrier and its load in operative relation to the containers, and a guiding means for the carrier co-acting with the corner members, said guiding means comprising converging braces connected at the outer ends to the corner members and where connected forming a guiding eye, and a centralized bar adapted to said eye and having connecting members extending to separated points on the carrier.

26. In an apparatus for filling cans each provided with a liquid inlet and an air outlet perforation, a series of pendently arranged measuring cups, a trough carrying the cups and into which the upper ends of the cups extend above the floor of the trough, a reservoir for the liquid in depressed relation to the floor of the trough, a displacement member movable into said reservoir, filler heads, one for the discharge end of each cup and provided with separated air seals one connected to the interior of the cup, means for the exhaustion of air through the other seal, the sealing means for the exhaust side of the filler head having a range of movement holding it in engagement with the can in overlapping timed relation to the engagement of the filling side of the filler, a valve for each cup, a carrier for the cans to be filled having a normal tendency toward the filler heads, operating means for the valves controlled by the carrier, operating means for the displacement member also controlled by the carrier, and operating means for the carrier under the control of an operator for moving the carrier in opposition to its normal tendency.

27. In an apparatus for filling cans each provided with a liquid inlet and an air outlet perforation, a series of pendently arranged measuring cups, a trough carrying the cups and into which the upper ends of the cups extend above the floor of the trough, a reservoir for the liquid in depressed relation to the floor of the trough, a displacement member movable into said reservoir, filler heads, one for the discharge end of each cup and provided with separated air seals one connected to the interior of the cup, means for the exhaustion of air through the other seal, the sealing means for the exhaust side of the filler head having a range of movement holding it in engagement with the can in overlapping timed relation to the engagement of the filling side of the filler, a valve for each cup, a carrier for the cans to be filled having a normal tendency toward the valve heads, operating means for the valves controlled by the carrier, operating means for the displacement member also controlled by the carrier, operating means for the carrier under the control of an operator for moving the carrier in opposition to its normal tendency, and an indicator for showing the position of the carrier where the air seal about the inlet opening of the can has broken, while the air seal on the exhaust side of the can is still maintained.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WALTER J. PHELPS.

Witnesses:
JOHN H. SIGGERS,
LEWIS EBERLY.