

Nov. 20, 1962

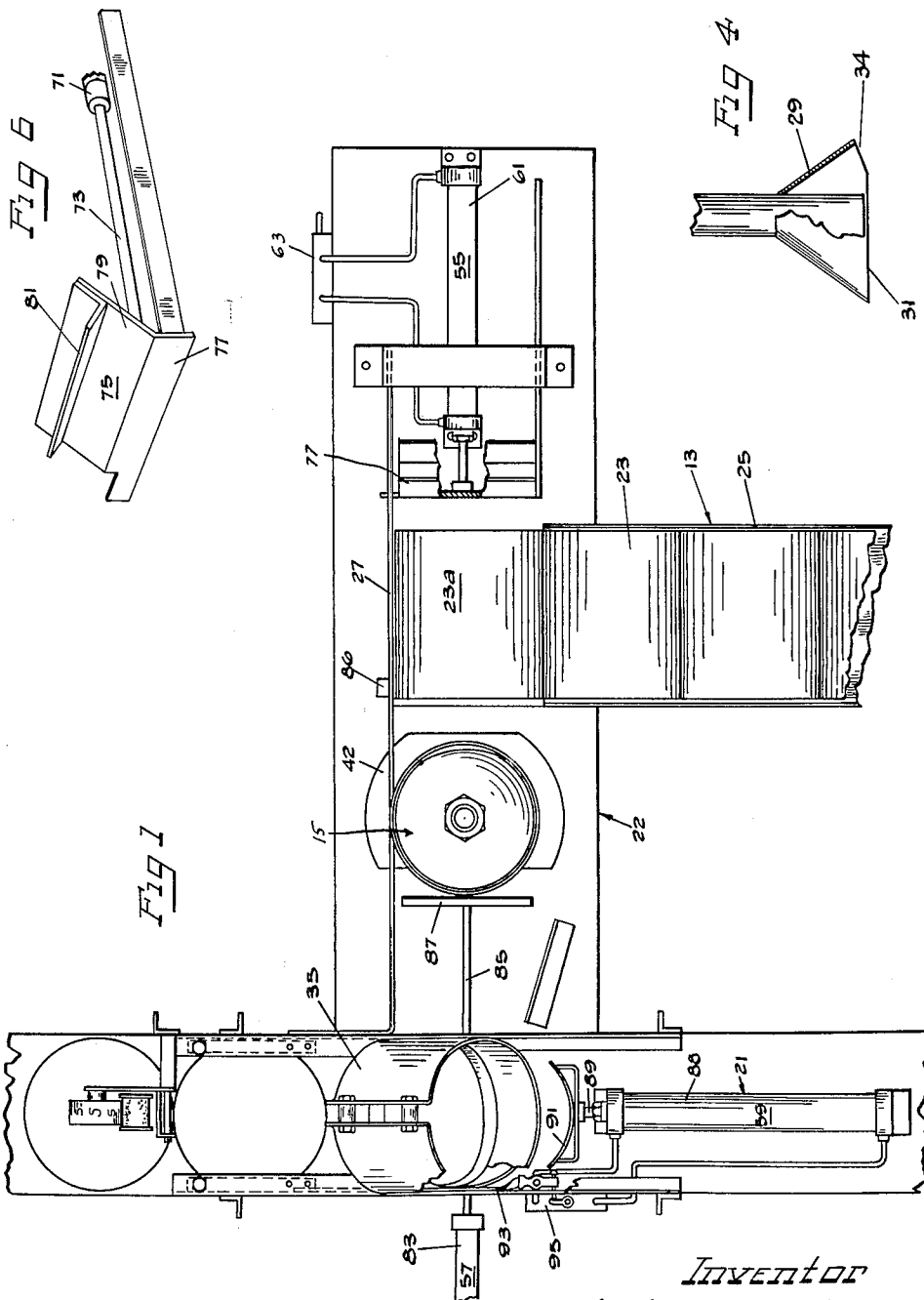
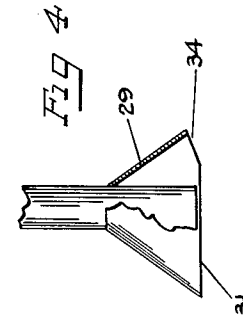
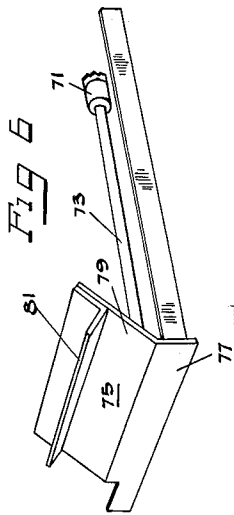
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3,064,697

APPARATUS FOR FILLING CONTAINERS

Filed Feb. 3, 1960

4 Sheets-Sheet 1



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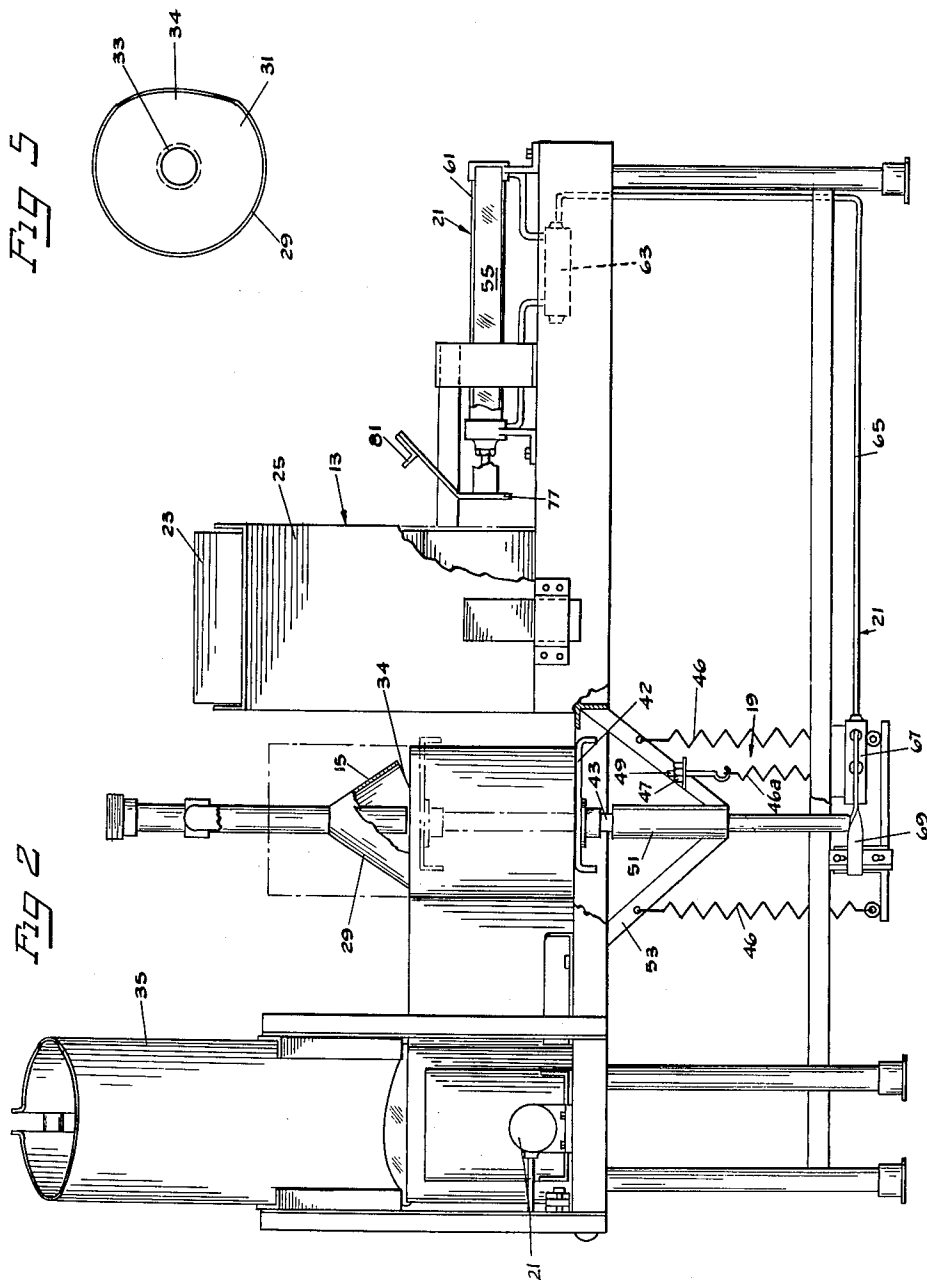
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APPARATUS FOR FILLING CONTAINERS

Filed Feb. 3, 1960

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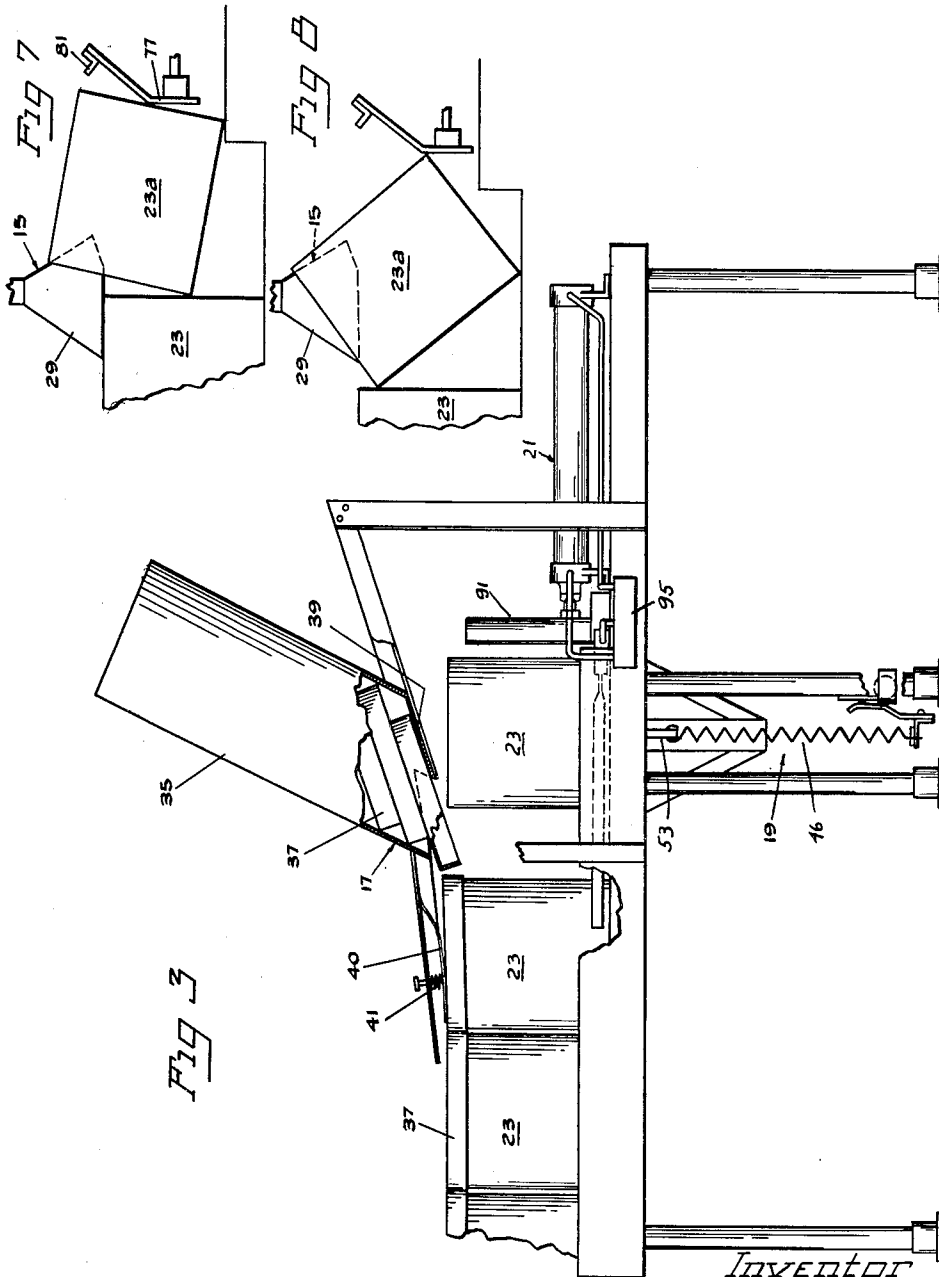
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3,064,697

APPARATUS FOR FILLING CONTAINERS

Filed Feb. 3, 1960

4 Sheets-Sheet 3



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APPARATUS FOR FILLING CONTAINERS

Filed Feb. 3, 1960

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Fig. 9

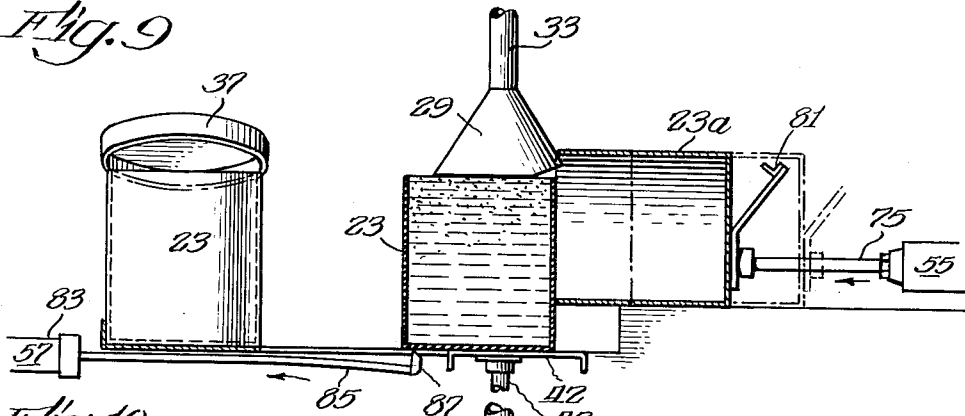


Fig. 10

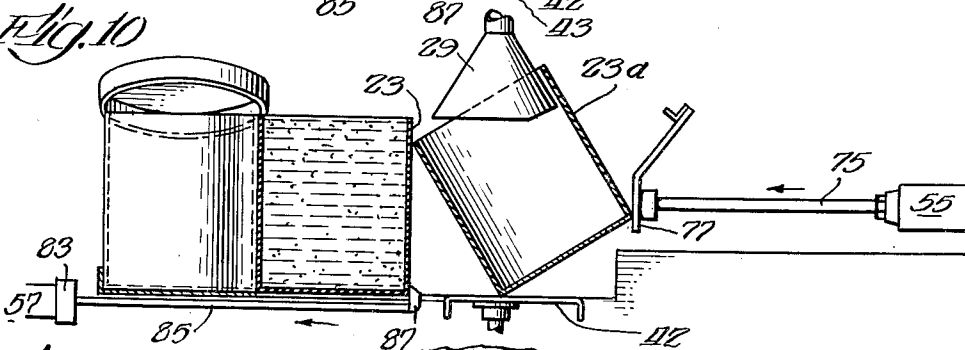


Fig. 11

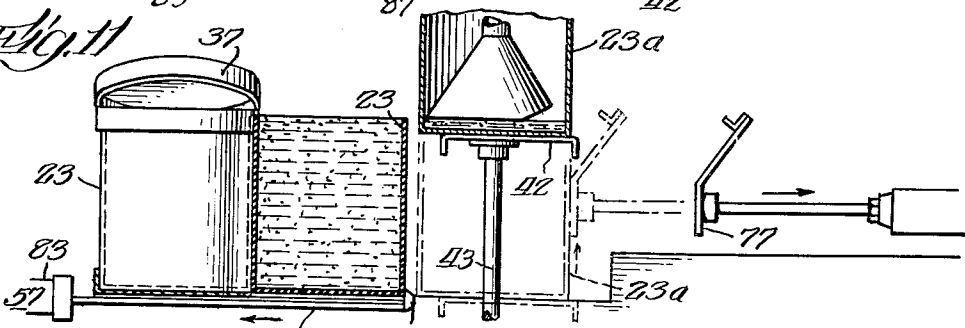
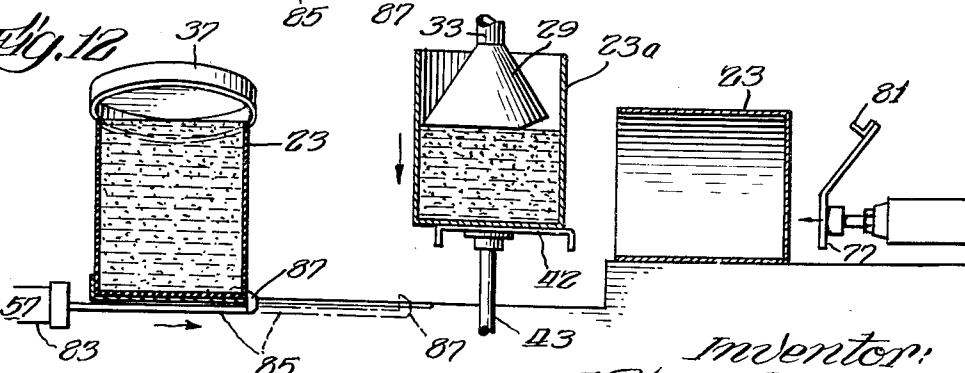


Fig. 12



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1

3,064,697

APPARATUS FOR FILLING CONTAINERS

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Filed Feb. 3, 1960, Ser. No. 6,470

5 Claims. (Cl. 141—83)

The present invention relates generally to improved means for filling containers with viscous material and, more particularly, it relates to improved apparatus for automatically filling containers with such material.

The present practice in respect of the filling of ice cream containers for storage and shipping involves, in many instances, hand filling of the containers, thereby requiring labor and a substantial degree of manual handling of the containers. Furthermore, such hand filling of containers often results in inaccuracy in the filling of the containers and occasionally results in necessary re-filling of the containers.

The main object of this invention is, therefore, to provide improved apparatus for the filling of viscous material, such as ice cream. A further object of this invention is the provision of such apparatus for automatically filling containers with ice cream. A still further object of this invention is the provision of apparatus for automatically filling containers and, thereafter, lidding the containers.

An additional object of this invention is the provision of apparatus for automatically feeding empty containers to filling means and, upon filling with the desired amount of material, actuating the apparatus to lid the containers.

Various features of the invention are shown in the accompanying drawing, in which:

FIGURE 1 is a plan view, partially in section of apparatus in accordance with this invention;

FIGURE 2 is a front elevational view, also partially in section, of the apparatus shown in FIGURE 1;

FIGURE 3 is a partial side view of the apparatus shown in FIGURE 1, portions of the apparatus being broken away;

FIGURE 4 is an elevational view of the filling nozzle, the nozzle being broken away;

FIGURE 5 is a top view of the nozzle shown in FIGURE 4;

FIGURE 6 is an isometric view of a pusher unit utilized in the apparatus of the invention;

FIGURE 7 is a view illustrating the manner of engagement of a container with the nozzle just prior to filling of the container;

FIGURE 8 is a view similar to FIGURE 7 illustrating the container at a later time in the operation; and

FIGURES 9, 10, 11, and 12 are schematic views illustrating the successive operations of the pusher unit and of the pulling unit of the present invention, and illustrating the manner of engagement of a container by the pulling unit.

The apparatus of the present invention comprises container feeding means 13, filling and tilting means 15, and lidding means 17. The apparatus additionally comprises a weighing means 19 which is associated with a container moving means 21. These various means are carried on a frame 22 which will not be fully described herein, since its construction and arrangement are within the skill of the art.

In the operation of the apparatus of the invention, cylindrical containers 23 are placed in the feeding means 13 and are introduced into the tilting and filling means 15. After proper filling of the container 23, as determined by the weighing means 19, the moving means 21 is actuated, causing the containers to move towards the

2

lidding means 17. After lidding of the containers 13, they may be removed from the apparatus for storage or shipping.

In the illustrated embodiment of the invention, the feeding means comprises an inclined chute 25 which is formed from suitable sheet metal material. The containers 23 are laid on their side and rolled down the chute toward the tilting and filling means 15. The containers 23 are charged into the chute 25 with their open ends extending toward the tilting and filling means 15. Since the illustrated machine is particularly adapted for filling ice cream containers, the containers will be made of fiberboard, but it will be understood that more rigid material may also be used.

At the lower end of the chute 25 there is provided a stop 27 which holds the lower most container 23a in position for engagement by the moving means 21.

The tilting and filling means 15 comprises a generally conically shaped nozzle 29 which flares downwardly (FIGURE 4). The nozzle communicates with a source of material which is to be filled into the containers 23, and in the illustrated embodiment, the nozzle communicates with an ice cream machine.

The form and shape and of the nozzle 29 is particularly important in connection with this invention. In this connection, the underside of the nozzle is provided with an annular plate 31 which has a centrally disposed opening 33 (FIGURE 5). The annular plate 31 serves to wipe the top of the material in the container 23 to provide desired leveling of the surface and to prevent an extending tip of ice cream from the container. The conical shape of the nozzle is also important to aid in tilting the containers and to properly position for filling with the nozzle.

It is important that the annular ring on the bottom of the nozzle extend over at least about fifty percent (50%) of the area of the container to provide the desired leveling of the upper space of material.

The rearward edge of the nozzle 29 is provided with a beveled edge 34 which permits feeding of the containers without catching on the edge of the nozzle 29.

The lidding means 17 comprises an upwardly extending, generally elliptically shaped tube 35. Lids 37 for the containers 23 are introduced into this tube 35 and, by gravity, feed downwardly through the tube 35.

At the bottom of the tube 35, the rearward edge of the tube is provided with a lip 39 which tends to hold the lids 37 in the tube 35. The forward edge of the tube 35 is open to permit the lids to extend out for engagement with the containers 23 (FIGURE 3).

The lidding means 17 further includes inclined rails 39 which carry biasing means 40 for pressing the lids onto the top of the containers. These rails extend forwardly from the tube 35, and, as indicated, press the lids 39 onto the container. An adjustable tensioning means 41 is provided for urging the biasing means 40 against the lids.

The weighing means 19 is disposed immediately below the nozzle 29 and comprises a plate 42 which receives the containers 23 from the feeding means 13. The plate 42 is carried on a rod 43 which is urged by means of springs 46 toward an upper position. The force exerted on the plate 42 by the springs is adjusted so that when a container 23 contains the proper amount of material, the container is in position to be moved from the nozzle 29. On the other hand, when the container 23 is empty, it surrounds the nozzle 29. Filling of the container causes the plate 42 to move downwardly and, when the container is full, the filled container may be moved from under the nozzle to the lidding means 17.

The force of the springs 46 on the plate 42 is adjusted by means of an adjustable spring 46a to provide accuracy in weighing and adjustment of the weighing means 19 to

different materials which may be filled into the containers 23. Adjustment of the spring 46a may be effected by means of the nut 47 on the threaded hook 49. It will be apparent that various other means for adjusting the tension on the spring 46a may be provided, as well as various other means for adjusting the force of the spring 46.

The rod 43 extends through a suitable guide 51 which is carried on the frame 22 by means of a bracket 53. In operation of the weighing means 19, the rod 43 moves vertically and, in its lowermost position, actuates the moving means 21. It will be apparent that upon filling of container 23 by the nozzle 29 the plate 42 is lowered into position for receipt of a new container 23 from the feeding means 13.

The weighing means may actuate a valve, through suitable mechanisms, to open the nozzle 29 and fill the container. In this connection, when the plate 42 of the weighing means is in its uppermost position, it may effectively open a valve to commence filling of the container and, when it is in its lowermost position, it may effectively close the valve. However, other arrangements for actuating such a valve are within the skill of the art.

The moving means 21 is, in the illustrated embodiment, actuated by compressed air which is supplied to the system from a suitable source. The various units operated by the compressed air may also be operated by various other means, such as an electrical system, and, therefore, the details of the over-all compressed air system are not described herein. It will be understood by those skilled in the art that the various units operated by the compressed air may also be actuated by other means.

The moving means 21 of this invention includes three basic units, one unit being a pusher unit 55 for pushing the containers from the feeding means 13 towards the tilting and filling means 15. The moving means also comprises a pulling unit 57 which is operable to pull a filled container 23, immediately after removal from the weighing means 19 into position for being fed into the lidding means 17. The moving means 21 further includes a lid actuating unit 59 which moves a filled container through the lidding means 17.

The pusher unit 55 comprises a double-acting cylinder 61 which is actuated through a double-acting valve 63. The valve 63 is connected to an air line 65 which communicates with a valve 67 operated by the weighing means 19. In this connection rod 43 of the weighing means 19 moves an arm 69 on the valve thereby actuating the valve 67.

In the double-acting cylinder is located a piston 71 (FIGURE 6) which connects to a rod 73, on which is mounted a pusher plate 75. The pusher plate comprises a vertical section 77 and an angularly extending section 79. The vertical section 77 and the pusher plate 75 first engage the container 23a (FIGURE 7) in the feeding means 13 and pushes it towards the tilting and filling means 15. In order to prevent the container 23a from sliding up on the pusher plate, a stop 81 is attached to the upper edge of the pusher plate 75.

The pulling unit 57 also includes a double-acting cylinder 83 which operates a rod 85 connected to a cross bar 87 which, in the operation of the apparatus pulls a filled container toward the lidding means 17, as illustrated in FIGURES 9 through 12. The pulling unit 57 may be actuated by the pusher plate 75 contacting a valve 86, at the forward end of its movement, thereby causing the pulling unit 57 to operate. The air connections between the valve 86 and the cylinder 83 are conventional and are not shown.

The lid actuating unit 59 further includes a double-acting cylinder 88 having the usual piston disposed therein connected to a rod 89. The rod is connected to a plate 91 having a curved surface for engaging the side of a container 23. The double-acting cylinder is actuated by means of an arm 93 which is operated by a filled container when moved into the lidding means 17 by means

of the pulling unit 57. The arm 93 connects to a valve 95 which, as before indicated, operates the double-acting cylinder 88 causing a container pulled into the lidding means 17 to be shoved through the lidding means 17, thereby engaging a lid 37 and being thereupon shoved through the biasing means 40. In the biasing means, the lid is pressed onto the container.

From the foregoing description, it will be seen that in the operation of the moving means 21, the pusher unit 55 is actuated by the filling of container 23 which causes the rod 47 to actuate the arm 69 on the valve 67. Thereupon, the container 23a is pushed by means of the plate 75 and an edge of the container 23a engages the nozzle 29 of the filling and tilting means 15. This causes the container 23a to be rotated into an upright position, in the manner generally shown in FIGURES 7 and 8. It will be noted that the edge of the container 23a operates to push the filled container 23 from below the nozzle 29. Thus, the container 23a is positioned on the plate 42 of the weighing means which by action of the springs 46, is moved upwardly to the position shown in the dotted lines in FIGURE 2. In this position, the container 23 surrounds the nozzle 29, thereby minimizing splashing of the material being filled into the container.

After the container is filled, it moves downwardly against the action of the springs 46 until the rod 47 actuates the arm 69 of the valve 67, at which time the container is below the lower edge of the nozzle 29.

The filled container moves over the cross bar 87 of the pulling unit. As before indicated, the forward movement of the pusher unit 55 operates the valve 86, causing the filled container to be pulled toward the lidding means 17. When the filled container touches the arm 93, the lid actuating unit cylinder 87 is operated, causing the filled cylinder to pick up a lid from the lidding unit 35, which lid is suitably placed on to the container 23. At the same time that the lid actuating unit is operated, a container disposed rearwardly of the unit being lidded is pushed forward and into a cold room, or other storage place.

The apparatus of this invention, it will be seen from the foregoing, is wholly automatic and fills the containers with the desired amount of material in a quite sanitary manner so that it is readily usable in connection with the filling of ice cream and like food products. It will be apparent that various sized containers can be used while enjoying the features of this invention. It will also be apparent that the apparatus of the invention can be used with containers having different degrees of rigidity, but a particular advantage of this apparatus is its ability to handle containers having fiberboard walls which are subject to distortion under pressure.

The various features of this invention which are believed to be new are set forth in the following claims.

I claim:

1. Apparatus for filling viscous material into containers comprising, in combination, container feeding means, open ended cylindrical containers laid on their sides in said feeding means, filling and tilting means positioned to receive containers from said feeding means, a downwardly flaring surface on said filling and tilting means positioned to engage the open end of a container, moving means engageable with the container to move the container into contact with the downwardly flaring surface on said filling and tilting means, thereby rotating the container into an upright position.

2. Apparatus for filling viscous material into containers comprising, in combination, container feeding means, open ended cylindrical containers laid on their sides in said feeding means, filling and tilting means positioned to receive containers from said feeding means, a downwardly flaring surface on said filling and tilting means positioned to engage the open end of a container, moving means engageable with the container to move the container into contact with said downwardly flaring sur-

5

faces on said filling and tilting means, whereby the open end of the container is tilted upwardly along said downwardly flaring surface to rotate the container into an upright position.

3. Apparatus for filling viscous material into containers comprising, in combination, inclined container feeding means, open ended cylindrical containers laid on their sides in said feeding means, filling and tilting means positioned to receive containers from said feeding means, a downwardly flaring surface on said filling and tilting means positioned to engage the open end of the containers, moving means engageable with a container to move the container into contact with said downwardly flaring surface on said filling and tilting means, whereby the open end of the container is tilted upwardly along said downwardly flaring surface to rotate the container into an upright position in surrounding relation to said filling and tilting means.

4. Apparatus for filling material into containers comprising, in combination, container feeding means, filling means positioned to receive containers from said feeding means, pushing means positioned to move containers from said feeding means into said filling means, and weighing means positioned below said filling means, said weighing means comprising a plate and spring means connected to said plate urging said plate toward said filling means, to cause an empty container to surround the filling means, and tension adjusting means on said

6

spring means adjusted to continuously lower the container as it is filled so that the filled container is positioned below the lowermost edge of said filling means.

5. Apparatus for filling material into containers comprising, in combination, container feeding means, filling means positioned to receive containers from said feeding means, pushing means positioned to move containers from said feeding means into said filling means, weighing means positioned below said filling means, said weighing means comprising a plate and spring means connected to said plate urging said plate toward said filling means, to cause an empty container to surround the filling means, tension adjusting means on said spring means adjusted to continuously lower the container as it is filled so that the filled container is positioned below the lowermost edge of said filling means, pulling means disposed adjacent said filling means, said pulling means having a container engaging means thereon.

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