This invention relates to multiple filling machines more particularly of the type by which unit quantities of a liquid product are measured and dispensed into containers that automatically are brought into registry with the filling needles.

A primary aim of the invention is the construction of a straight-line filler that will dispense precisely measured amounts of the product into containers that are moved single-file into and away from the filling zone. The invention comprehends, preferably, a machine having a continuously moving conveyor upon which the containers are placed at spaced intervals timed to arrive in groups at the filling zone and to become registered with the filling needles at the start of each filling cycle. A further aim of the invention is to provide a bank of vertically and laterally movable filling needles whose forward travel coincides with the rate of movement of the containers and whose vertical movements coincide in general with the starting and ending of the filling cycle. The construction and purpose is to have the filling needles enter the moving containers prior to the start of the fill, move laterally with the containers during the fill, leave the containers after completing the fill, and then back travel at an accelerated rate to their starting point at which time another bank or group of containers will have arrived at the filling zone.

Still another aim of the invention is the construction of a practical machine by which two or more measured units-of-fill may be dispensed into each bank of moving containers. The aim and purpose being to produce a machine capable of dispensing two different products into the containers successively, or of dispensing two measured quantities or dosages of the same product into the containers successively. By way of example, a machine arranged to fill eight containers at a time on each filling cycle may in accordance with this invention be re-arranged to fill four containers at a time but with two shots of measured quantities of the product or products in each bank. In the latter case the products may be different and/or for different purposes. The flexibility of a filler of this character renders it most suitable for high or medium production rates of the same product or for the packaging of at least two different products in each container.

Still a further aim of the invention is the construction of a multiple-line filler for which provision is made for varying the extent of needle penetration into the vials or containers and/or its rate of withdrawal from the container. The aim being to provide for the delivery of the product into the container from a constant height as in such cases where the product has little tendency to foam or from a variable height, as in example a bottom-up-fill as for a foamy product, where the needle should move upwardly during the filling cycle.

By way of further refinement the invention aims to provide a line-filler that not only will dispense accurately measured quantities of the liquid product but in one in which the flow of the product from the needles is sharply cut off at the end of the filling stroke so that there is no drip or dripping from the needles on their return travel over empty containers as the latter move into the filling area.

Another aim of the invention is the provision of means for stopping the fill should a blank occur in the line of containers. Preferably the blank-detecting means is located ahead of the bank of containers in the filling zone so that a stopping of the filling operation during a fill can occur only when a full bank of containers is in position and so that on the restarting of operations the remaining portion of the fill occurs in the same bank of containers.

In carrying forward the objectives of the invention it is proposed to provide a main frame unit that houses the transmission elements and which supports on one side a conveyor structure and on another side one or more banks of measuring units of the piston-and-cylinder type. Cyclically operated valve means associated with the filling units are provided to conduct the liquid product to and from the cylinders. The valves are connected by flexible tubing to filling needles or nozzles that are mounted over the conveyor to a vertically and laterally movable carriage. Both conveyor and filling units are driven from a common source and are timed so that the conveyor moves the distance of one full bank of containers while the filling units make one complete intake and discharge cycle. Inasmuch as the filling units are crank operated they disperse liquid during one half of a cycle (180°) and take in liquid on the other half cycle (180°). Allowing approximately 30° part of a cycle for the needles to descend, 180° for dispensing, and 30° for elevating, the total forward movement of the needles while in registry with the containers is 240° (1/4 cycle). The remaining 120° is for the return travel and which if moved at twice the speed of the forward travel, brings the needles back to their starting point ready for forward movement by the time the previously filled bank of containers move out of the filling area and a next succeeding new bank of containers move in.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawings.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:

FIGURE 1 of the drawings is a front view of a filling machine embodying the invention with a portion of the conveyor broken away.

FIG. 2 is a plan view of the machine shown in FIG. 1.

FIG. 3 is an end view on an enlarged scale showing portions of the drive mechanisms.

FIG. 4 is a rear view showing a number of the variable-displacement, positive-delivery, measuring units with their associated valves and actuating means.

FIG. 5 is a plan view of the final portions of the conveyor drive means.

FIG. 6 is an end view of a container-registering coupling in the conveyor drive.

FIG. 7 is a detail view of the needle elevating cams.

FIG. 8 is a detail view of the blank detecting cam with alternate notches blanked off for a double-fill setup.

FIGS. 9 and 10 are schematic views of an eight-fill and a four-fill set up respectively, to illustrate the relation and distances of needle travel to conveyor travel in each case.

Referring more particularly to FIGS. 1 and 2 the filling machine illustrated comprises, essentially, a main frame structure A that supports along its upper edge a conveyor structure C. The rear side of the main frame structure supports a series of filling units F in this instance eight, that deliver predetermined quantities of the
product to needles \( N \) that are carried by a vertically movable and laterally shiftable needle carriage \( B \). The dash lines 20 in FIGS. 1 and 3 represent flexible hose connections between the filling-unit valves \( V \) and the filling needles \( N \).

It is a further object of the present invention to provide for actuating the filling units and for driving the conveyor in synchronism starts with a suitable motor \( M \) that drives a speed reducer 30 through \( \text{V-belts} \) 31 and a variable speed mechanism \( VS \). The output shaft of the reducer connects by means of a chain and sprocket \( 32 \) with a sprocket \( 33 \) on a horizontal crank shaft \( 34 \). Bevel gears \( 35 \) transmit the power to a vertical shaft \( 36 \) which in turn transmits the power through another set of bevel gears \( 37 \) to a horizontal shaft \( 38 \) that carries a number of cams and also provides power to drive the conveyor. The various shafts mentioned are all journalled in suitable bearings as will be later stated.

The rear end of the crank-shaft \( 34 \) has a combined crank-and-valve cam \( 40 \) fixed thereto. A crank rod \( 41 \) pivoted to the crank-cam \( 40 \) at one end and to a curved pivoted arm \( 42 \) at its other end causes the pivoted arm to oscillate as the crank revolves. As illustrated more clearly in FIG. 4, the curved arm \( 42 \) is pivoted to one end to a support \( 43 \) and carries a radially adjustable yoke \( 44 \). The yoke \( 44 \) in turn pivotally connects with a slide connecting rod \( 45 \) whose upper end pivotally connects with a vertically movable slide \( 46 \). The inside of the slide \( 46 \) is provided with bearings \( 47 \) that slide on guide posts \( 48 \). Normally the yoke piece \( 44 \) is clamped as at \( 49 \) to the curved arm \( 42 \) in a selected position toward or away from the pivot \( 43 \). As will be seen in FIG. 4, the curved arm has a constant stroke responsive to the throw of the crank-cam \( 40 \). However, by shifting the yoke piece along the curved arm \( 42 \) from one position to another the resulting reciprocatory movement imparted through rod \( 45 \) to the slide \( 46 \) may be varied from zero stroke to maximum stroke.

As illustrated more clearly in FIGS. 3 and 4 each filling unit includes a piston \( 50 \) and a cylinder \( 51 \). The lower end of the cylinder has a pivot connection \( 52 \) with the slide \( 46 \) whereas the piston element is screw threaded into the stationary body of the valve \( V \). The valve body contains a shiftable valve element \( 53 \) having through ports \( 54 \) and diagonal ports \( 55 \). When the valve element is in one position of its shift the through port places the interior of the piston \( 50 \) in communication with the discharge port \( 56 \) and when in the other position of its shift places the interior of the piston in communication with a supply port \( 57 \). Each valve piston is keyed as at \( 58 \) to a shiftable bar \( 59 \) and the latter is connected by means of a link \( 60 \) to the upper end of a pivoted lever \( 61 \). The lower end of lever \( 61 \) pivotally connects with the yoke \( 62 \) that has a fixed cam follower \( 63 \) and a circumferentially movable follower \( 64 \) oppositely related and lying in the plane of the valve portion of the crank cam \( 40 \). The valve portion of the crank cam is provided with symmetrically opposed high and low portions with connecting ascending and descending portions. Accordingly, as the cam revolves the followers \( 63 \) and \( 64 \) are actuated laterally, first in one direction and then in the other and this motion is transmitted through the yoke \( 62 \), lever \( 61 \), link \( 60 \), bar \( 57 \) to the valve pistons \( 53 \). The relationship of the valve and crank is such that as the slide \( 46 \) is actuated downwardly for a filling unit intake stroke the valve is shifted to connect the cylinder with the intake port \( 57 \) and supply port \( 56 \). At the end of the intake stroke the valve is shifted to its other position to connect the cylinder with the discharge port \( 56 \) that connects with the filling needles \( N \).

One of the needles is shown in FIG. 3 and comprises a tubular stem \( 70 \) whose interior communicates with hose line \( 20 \) and the valve \( V \) and a centering cone unit \( 71 \) that is vertically slidable on the exterior of the needle. The centering cone of each needle is suspended from a needle carrying bar \( 72 \) by means of a pair of guide rods

73. The purpose of the centering cone units is to bring the tops of the containers into registry with the ends of the filling needles as they enter the containers.

To avoid drip on the return travel of the needles, the adjustable cam follower \( 64 \) (FIG. 4) may be moved angularly with relation to cam \( 40 \) from a position where at valve shift occurs coincidently with the change in stroke from discharge to intake, to a position slightly later in time so that the filling needles remain connected with the interior of the filling units during the initial portion of their intake strokes. Such an adjustment has the effect of pulling back from the needle ends the final drop of product that would otherwise adhere thereto.

For this reason the follower \( 64 \) is carried on an angularly adjustable arm \( 65 \) whose outer end carries a pivotal nut \( 66 \) threaded on rod \( 67 \) that is journalled in the yoke \( 62 \). As the follower rolls journalled with the rod \( 67 \) and with a hand knob \( 69 \) at the front of the machine is provided to make the adjustment.

**Needle Carriage (FIGS. 1 and 3)**

As indicated above the filling needles \( N \) are mounted to a vertically movable and laterally shiftable carriage \( B \). The needle bar \( 72 \) projects from a plate \( 75 \) that is vertically adjustable on the roller-carriage frame \( 76 \). Roller bearings \( 77 \) at the top and bottom and front and rear and at each end of the carriage support and guide the carriage on a traverse rail \( 78 \). The rail \( 78 \) is mounted at each end to vertically movable posts \( 79 \) that is journalled for vertical movement in bearings \( 80 \) provided by the main frame. Within the frame, each post carries a block \( 61 \) against which a follower roller \( 82 \) at lever \( 83 \) operates. The levers \( 83 \) are pivoted at \( 84 \) and carry intermediate followers \( 85 \) that track the surface of elevating cams \( 86 \). The cams \( 86 \) are provided at each end of the horizontal shaft \( 38 \) and include master cams \( 86 \) contoured to give the maximum stroke, and removable plate cams \( 86 e, 86 f, 86 c \) (indicated by dotted lines in FIG. 7) that when attached to the master cams provide selected shorter strokes. The master cams are pinned to the horizontal shaft in angular phase relation with the strokes of the filling units so that the up and down movements of the needles are coordinated with the filling cycle.

**Needle Traverse**

Mounted on the main crank shaft \( 34 \) is a box cam \( 90 \) having a groove \( 91 \) that is tracked by a roller \( 92 \) mounted on a connecting rod structure \( 93 \). The connecting rod \( 93 \) straddles the crank shaft \( 34 \) and is provided at its outer end with a pair of flanges \( 94 \) that in turn straddle a needle-carriage traverse lever \( 95 \). The lower end of the traverse lever is pivotally supported in a bearing \( 96 \) in the lower portion of the main frame and its upper end carries a roller \( 97 \) that tracks a vertical groove \( 98 \) in an extension \( 99 \) of the needle carriage \( B \). The flanged end of the connecting rod structure \( 93 \) contains two pivot-pin holes \( 100 e \) and \( 100 b \), one above the other and spaced equal unit distances from the lever pivot \( 96 \). Correspondingly located holes are provided in the traverse lever \( 98 \), and by inserting a single pivot pin \( 101 \) in one of the sets of holes the stroke of the traverse lever in response to the fixed throw of the box cam \( 90 \) may be selectively varied from a full stroke (NF, FIG. 9) to one-half stroke (NF', FIG. 10). The box cam \( 90 \) is pinned to the main crank shaft in phase relation with the cycle of the filling units so that the needle carriage moves forward during the container-filling portion of the cycle and recoils during the intake portion of the filling cycle.

**Container Conveyor (FIGS. 1, 2, and 5)**

The container conveyor \( C \) includes a framing which supports a flat-top chain \( 105 \) that tracks chain sprockets at each end. (The loading end of the conveyor is not shown for the reason it may extend ahead of the main
machine any convenient distance as may be desired.) The plate-top chain is, however, provided with container drive lugs 106 at uniformly spaced intervals throughout its length, against which the containers to be filled are placed either manually or automatically. Power to move the container drive is taken from the countershaft of the horizontal shaft 38 through selectively operable drive chains 107 and 108.

A pair of drive sprockets 109 and 110 are loosely mounted on shaft 38 but either may be connected with the shaft by means of a shiftable pin 111 that is contained in a clutch spool 112. The spool is tight on shaft 38 between the two sprockets. The pin can be held in place and recessed as at 113 to receive the head and shank of a clamp screw that is carried by the clutch pin 111. When the head of the screw is backed out of the recess in the spool, the clutch pin may be shifted to the left or right into clutch-pin holes provided in the sprockets whereby one or the other is locked with the drive shaft 38.

The drive chains 107 and 108 drive sprockets 113 and 114 on a shaft 116 that connects with one-half of a coupling 117. The other half of the coupling connects with a bevel-gear shaft 118 and bevel gears 119 transmit the power to the conveyor-sprocket drive shaft 120. Drive sprockets 109 and 110 have, in this instance, a change-speed ratio of 1 to 2 so that if sprocket 109 is clutched to the driving shaft the conveyor moves a distance equal to a full bank (8) of containers per cycle, whereas if sprocket 110 is clutched to the driving shaft the conveyor moves a distance equal to one-half bank (4) of containers per cycle.

It has been mentioned above that the drive lugs 106 on the conveyor chain serve to maintain the containers uniformly spaced, which spacing is equivalent to the fixed spacing of the needles on the needle carriage. However, as containers to be filled may vary in size from one run to another, the position of the drive lugs relative to the needles must change whenever the container diameter is changed so that the axis of the open mouths of the containers coincide with the filling needle axis. The two-part coupling unit 117 between shafts 116 and 118 provide convenient means for advancing or retracting the position of the conveyor drive lugs, and which includes clamping screws 117a that pass through arcuate slots in one member of the coupling and are threaded into the other. If desired one of the coupling members may be graduated as at 117b to facilitate obtaining the necessary adjustment.

**Blank Detector (FIGS. 3 and 8)**

Should one omit to place a container against the drive lug on the conveyor, blank detecting means is provided ahead of the filling zone to stop the filling. In this instance the detector comprises a roller 125 carried at the end of a reciprocable guide rod 126. The rod 126 carries an adjustable spool 127 that is engaged by a pin on the free end of the lever 128. The lever 128 is fixed to a rock shaft 129 that mounts at its inner end another lever 130. The free end of lever 130 carries a follower 131 that tracks a notched cam 132 mounted on the horizontal shaft 38. The lever 130 is spring loaded by a pull-spring 133 against the cam. The master detector cam 132 is provided, in this instance, with eight recesses or depressions 132a (FIG. 8) related to the follower 131 and with detector roller 125 so as to cause the detector roller (and the needle conveyor) as each container passes and to move out as the space between containers is passing. When containers to be filled are present on the conveyor the inward movement of the detector roller 125 is obstructed by the containers whereas if a container is absent the detector roller moves all the time a distance 130b on the follower lever 130 engages and actuates a cut-out switch 134 connected in the control circuit of the main drive motor M to stop the machine. Restarting of the machine is accomplished by placing a container in position in front of the detector roller 125 and pressing the Start button.

To adapt the detecting mechanism to containers of a different size the detector rod spool 127 is unclamped from the rod 126 and the rod and roller 125 adjusted inwardly or outwardly according to container diameter. Adjustable guide rails 135 are provided along each side of the conveyor to maintain the straight-line formation as the containers are moved through the filling zone.

When the machine is changed over from an eight-filler-per-cycle operation to a four-filler-per-cycle operation (double fill) a part blanking cam 136 is applied to the master detector cam 132. The blanking cam is formed with four recesses and four high portions that register with the four recesses of the master cam and it is the four high portions that cyclically hold the detector follower roller 131 out of alternate pockets of the master cam (to prevent switch operation). Due to the geared relation of 1 to 2 ratio of the horizontal shaft 38 with the main crank shaft 34 each shaft turns one complete revolution per filling cycle. Hence, on an eight-filler setup the detector mechanism must detect eight incoming containers per cycle, and on a four-filler setup the detector must detect on four incoming containers per cycle. In the latter case the blanking cams 132a are applied to the master cam to blank-off the intermediate notches.

**Operation**

Having explained the structure and operation of the individual components of the invention i.e. the main drive, the filling units and valves, drop drawback, vertical and lateral traverse of the filling needles, conveyor drive and container registering means, blank detecting, and adjustments for fill quality and container size, eight-filler and four-filler setups it is appropriate to refer to FIGS. 9 and 10 and summarize the cooperation of the more important features. These figures are diagrammatic, however, FIG. 9 represents an eight-filler setup in which the traverse cam connecting rod 93 is pivotally connected to traverse lever 95 in the lower pin hole 96. The climbing side of the box cam 99 is approximately 25° revolution and the descending side 25° revolution on every filling cycle. During the climb (approx. 240°) portion of the traverse cam the needle carriage will be moved forward a linear distance CP between which time the filling crank 40 is moving through 240° of which only 180° is discharged. Hence, the forward movement of the needle carriage is greater in angular degrees than the discharge stroke of the filling units which provides time at each end of the filling stroke to lower and raise the filling needles. By the time forward movement of the needle carriage ceases it will have been raised until the needles are out of the containers and the filling units will have started on their intake strokes.

During the remaining 25° turn of the traverse cam 90 the needle carriage is retracted to its starting position. Meanwhile, the container conveyor 105 will have moved the containers forward a distance CP and a new bank of containers will have been brought into registry with the filling needles by the time the needle carriage starts its next forward movement.

FIG. 10 represents a four-filler setup, for which the pivot pin of the connecting rod 93 is removed from the lower hole and inserted in the upper hole 101 of the traverse lever 95. When so positioned the needle carriage and its bank of eight needles N will move forward a linear distance NF, during the 240° climb portion of the cam 90 and the remaining 120° of the cam will retract the carriage to the point of starting. The filling units will have been operated exactly as before explained and the containers will have been moved a distance CP'. To shorten the conveyor travel for the four-filler setup the upper cam 111 is shifted from the large sprocket 109 to the small sprocket 110, as previously explained.
vantage to this convertibility feature lies in the fact that four containers receive product from the first group of four needles of the eight-needle-bank in one cycle and the same four containers receive product from the second group of four needles on the next succeeding cycle. Hence, after the system is operating, such as four containers, each container will receive two fills. The two fills may, of course, be fractional quantities of the same product or each may be a different product depending upon the solutions supplied to the respective banks of four filling units.

Upon further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adopt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention, and therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, we claim as new and desire to secure the following procedural combinations, elements, or equivalents thereof, by Letters Patent of the United States:

1. A filling machine comprising a main frame, a conveyor structure means mounted to one side of the frame for supporting containers arranged in a file for filling and for moving them in the direction of the file during the filling operation, a plurality of filling units mounted to the frame opposite the conveyor, each of said filling units comprising a piston and a reciprocable operating cylinder and valve means operative to direct fluid to be dispensed alternately to and from the cylinder, a series of filling needles mounted in single file spaced relation over the conveyor for movement vertically and laterally in relation to the conveyor, flexible tubing connections between the valve means of the filling units and the needles of a length sufficient to permit the needles to move laterally and vertically on each operating cycle, means for actuating each of said filling units to cause a measured quantity of liquid medium to be dispensed on each operating cycle, means for driving the conveyor continuously at a rate such that it travels a constant unit distance during each operating cycle of the filling units, and means for moving the filling needles vertically and laterally with the conveyor in the direction of the file and to elevate and retract to their starting point during the remaining fraction of said unit distance that the conveyor travels per filling cycle, the relative distances that the filling needles move forward and the conveyor travels per filling cycle being on the order of 2 to 3, respectively, so that the filling needles will have returned to their starting points in time for a repeat filling cycle on a next succeeding group of containers carried on the conveyor.

2. The combination of claim 1 in which a master-cam means and cooperating follower effect the vertical movement of the filling needles through a normally fixed stroke, and including replaceable auxiliary-cam means adapted for attachment to the master-cam means for reducing the stroke normally effected by the master-cam means, and in which a second cam means and a cooperating follower effect the lateral movement, said last mentioned follower being mounted upon a pivoted lever whose free end has a pin-and-slot connection with the filling needles, the said slot being vertically arranged so that a change in the vertical stroke imparted to the needles has no effect upon the rate of their lateral travel.

3. The combination of claim 1 including means for changing the distance the filling needles move laterally with the conveyor and means for changing the unit distance the conveyor travels per filling cycle so as to cause a portion of the filling units and filling needles to dispense fluid medium into a bank of containers on each operating cycle and the remaining portion of the filling units to dispense fluid medium into the same bank of containers on the next succeeding operation cycle of the filling units.

4. In a multiple filling machine of the character described comprising a vertically movable ram member, a needle carriage movable laterally along the said ram member, a lever member pivotably connected to a relatively stationary part of the machine and having a pin-and-slot connection at its free end with said needle carriage, constant-throat cam means including a connecting rod operatively connected between the cam and said pivot member for actuating said lever about its pivot point to cause said carriage to move laterally on the rail, said connecting rod having ratio-changing points of connection with said pivot member so that the stroke of lateral movement imparted to the pivot member and to the needle carriage in response to the fixed throw of the cam may be varied in proportion to the change in lever-ratio incident to change in the point of connection of the connecting rod with said lever.

5. A multiple filling machine of the character described having a continuously moving conveyor on which containers to be filled are placed single-file in uniformly spaced relation over the conveyor in a filling zone for filling in groups of a preselected number of containers on each filling cycle, blank detecting means upstream from the filling zone operative in timed relation with the filling cycle and with the rate of movement of the conveyor to sense the passing of each of the containers in said group and to suspend the operation of the filling cycle should be blank occur in the file of containers, means for changing the rate of travel of the conveyor per filling cycle and therefore the linear distance the conveyor and the containers move on each filling cycle, so that a lesser number of containers move into the filling zone on each filling cycle, and means for synchronizing the effective action of the detecting means in accordance with the reduced number of containers that are caused to pass per filling cycle.

6. Container-filling apparatus comprising, a main frame and a conveyor for movement of the conveyor and in time with the movement of the conveyor and in time with the operation of the filling units so as to cause the filling needles to descend and move laterally with the conveyor for a fraction of the unit distance the conveyor travels per filling cycle so that containers are filled as they move in the direction of the file and to elevate and retract to their starting point during the remaining fraction of said unit distance that the conveyor travels per filling cycle, the relative distances that the filling needles move forward and the conveyor travels per filling cycle being on the order of 2 to 3, respectively, so that the filling needles will have returned to their starting points in time for a repeat filling cycle on a next succeeding group of containers carried on the conveyor.

7. The combination of claim 1 in which a master-cam means and cooperating follower effect the vertical movement of the filling needles through a normally fixed stroke, and including replaceable auxiliary-cam means adapted for attachment to the master-cam means for reducing the stroke normally effected by the master-cam means, and in which a second cam means and a cooperating follower effect the lateral movement, said last mentioned follower being mounted upon a pivoted lever whose free end has a pin-and-slot connection with the filling needles, the said slot being vertically arranged so that a change in the vertical stroke imparted to the needles has no effect upon the rate of their lateral travel.

8. The combination of claim 1 including means for changing the distance the filling needles move laterally with the conveyor and means for changing the unit distance the conveyor travels per filling cycle so as to cause a portion of the filling units and filling needles to dispense fluid medium into a bank of containers on each operating cycle and the remaining portion of the filling units to dispense fluid medium into the same bank of containers on the next succeeding operation cycle of the filling units.
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containers and ready to move therewith on the next filling cycle.

7. The combination of claim 6 in which the filling needles are mounted for vertical movement toward and away from the conveyor structure means and in which the said power means includes additional operative connections with the needles for causing the needles to move vertically toward the conveyor structure means prior to the start of the filling cycle and and vertically away from the conveyor structure means on completion of the filling cycle.

8. A container filling machine comprising, a main frame member, a conveyor structure means mounted to said frame member for supporting and moving containers in single-file relation into and out of a filling zone, a relatively stationary bank of at least two filling units of the positive-displacement type mounted to said frame member, container filling needles mounted above the conveyor for movement in timed relation therewith, flexible tubing connections between said filling units and said needles of a length sufficient to permit the needles to move with the containers during a filling cycle, power means for cyclically actuating said filling units at a constant rate, said power means having connections with said conveyor structure means for continuously moving the conveyor a given linear distance during each cycle of the filling units, and said power means also having operative connections with said filling needles to cause the needles to move with the conveyor in the discharge cycle of the filling units and contra to the movement of the conveyor on the intake cycle of the filling units, and means for shortening the linear distance the conveyor moves and the linear distance the said filling needles are caused to move per cycle of operation of the filling units so that a portion of the filling units and filling needles dispense fluid medium into a group of containers on an operating cycle and another portion of the filling units and filling needles dispense fluid medium into the same group of containers on the next succeeding operating cycle.

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