

Feb. 26, 1935.

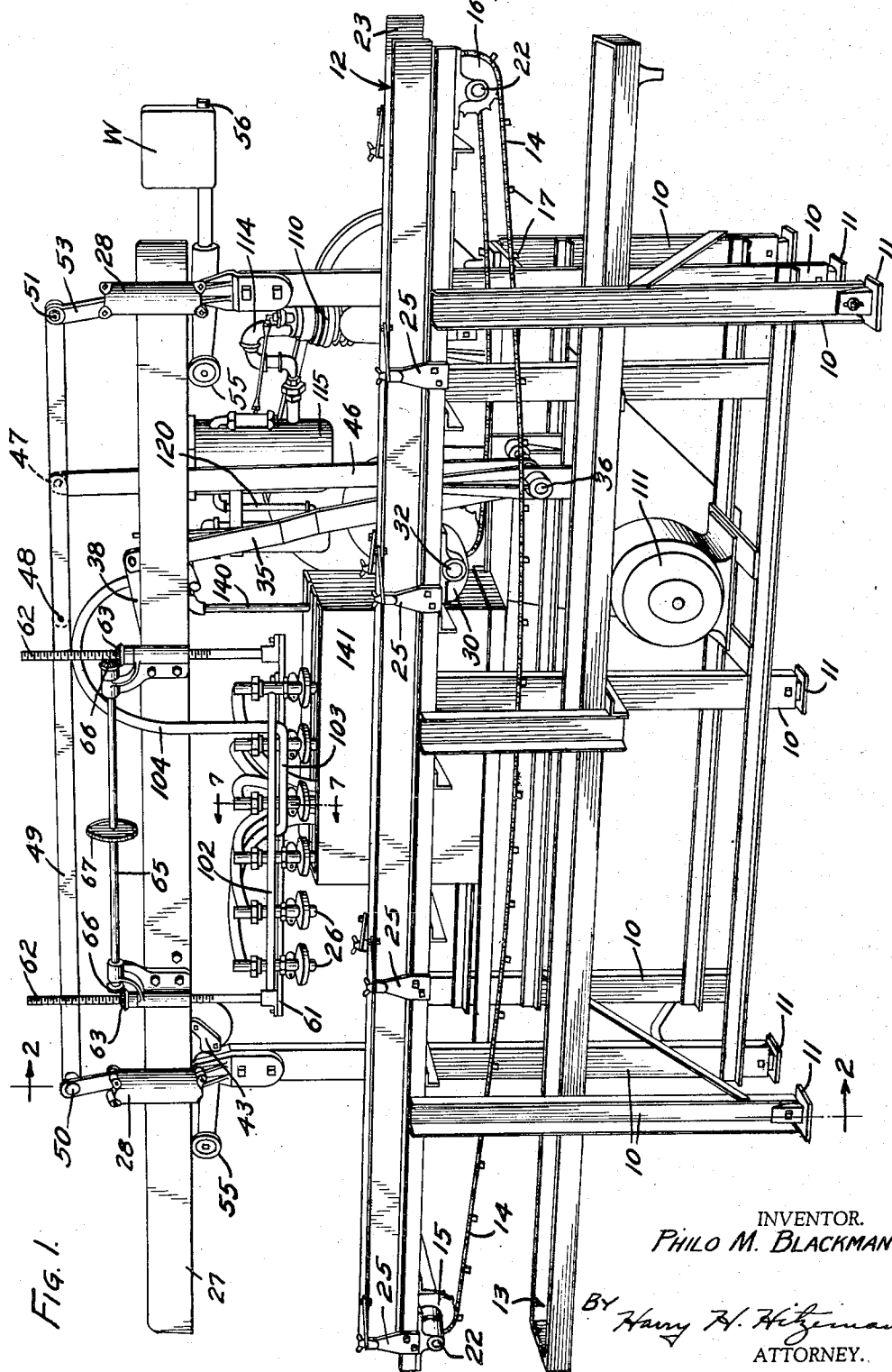
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1,992,464

STRAIGHT LINE MULTIPLE FILLING MACHINE

Filed Oct. 6, 1933

8 Sheets-Sheet 1



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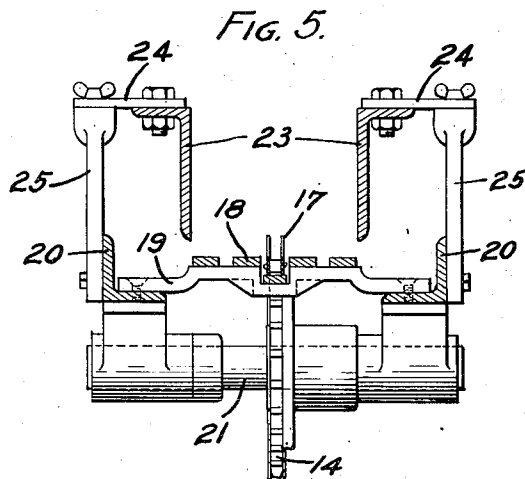
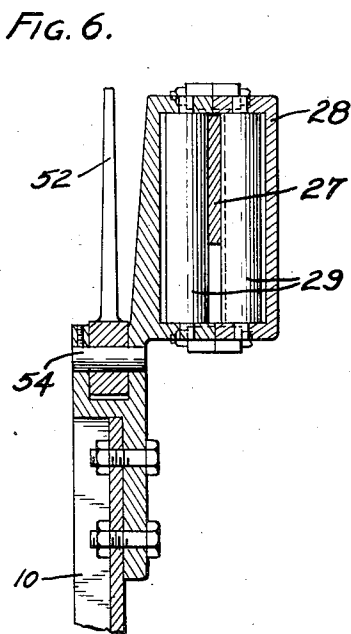
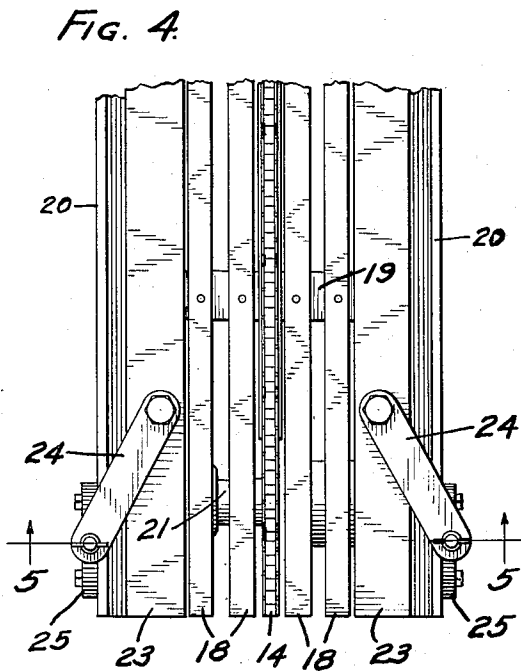
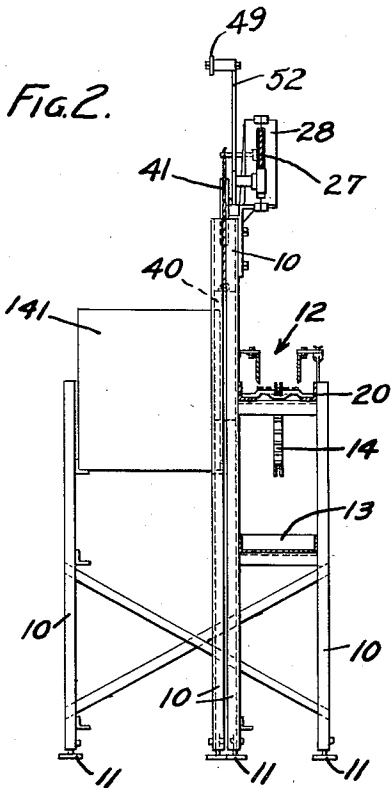
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STRAIGHT LINE MULTIPLE FILLING MACHINE

Filed Oct. 6, 1933

8 Sheets-Sheet 2



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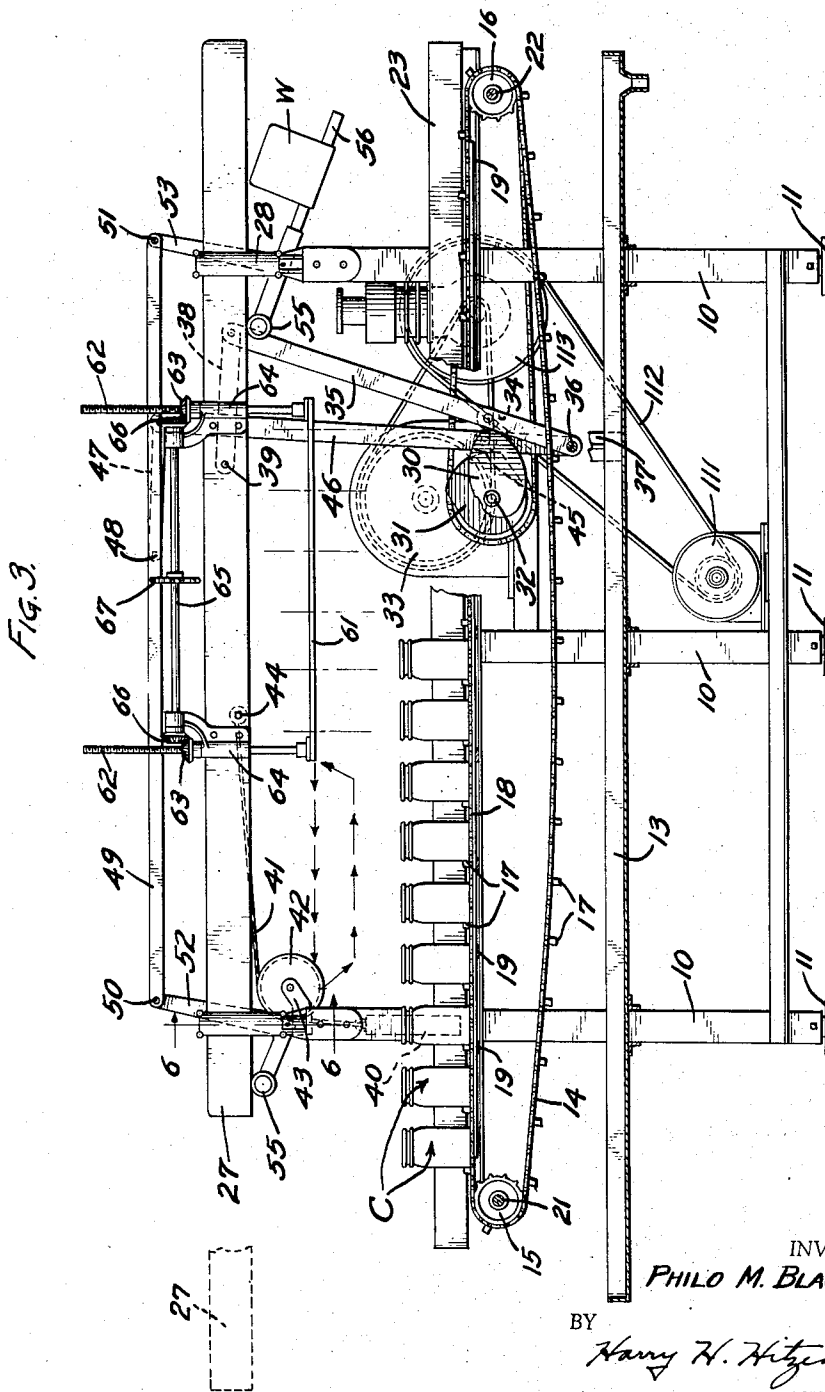
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STRAIGHT LINE MULTIPLE FILLING MACHINE

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8. Sheets-Sheet 3



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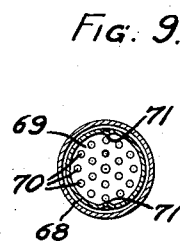
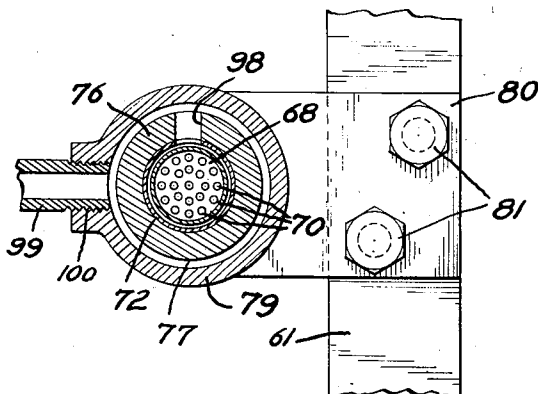
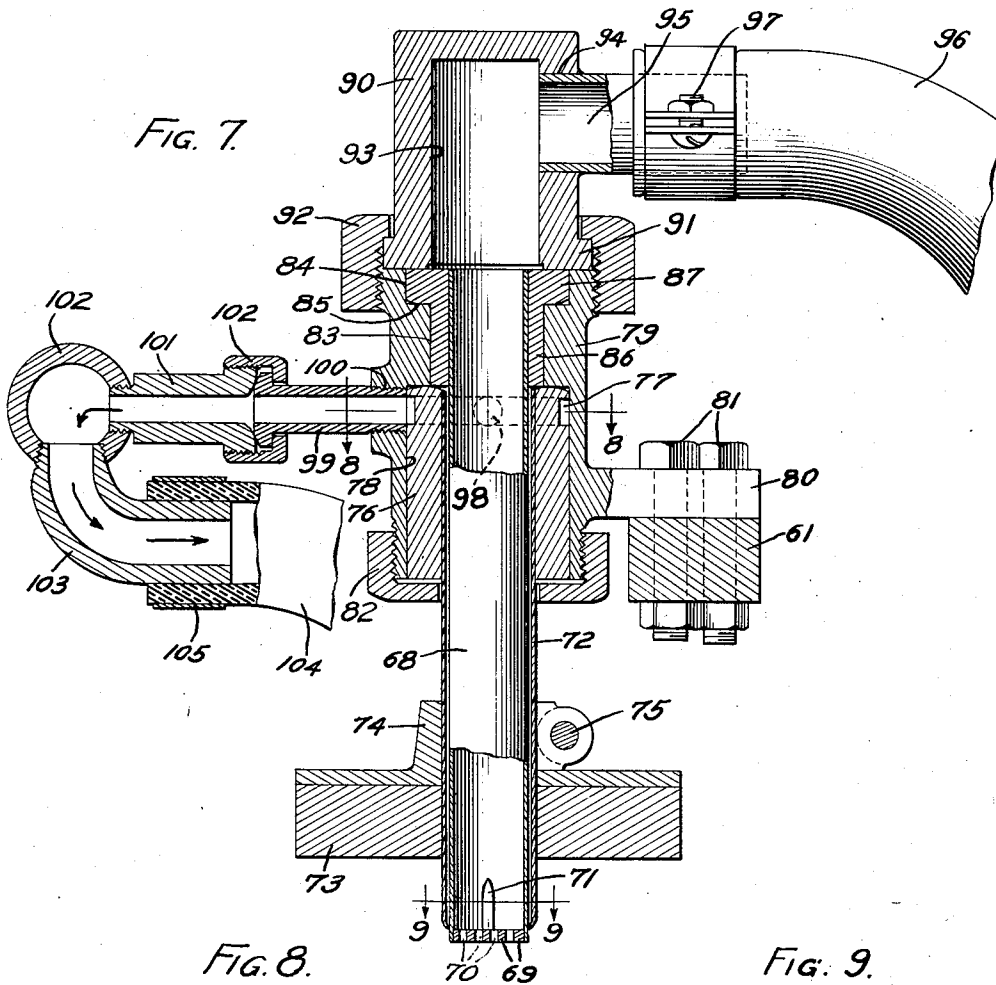
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STRAIGHT LINE MULTIPLE FILLING MACHINE

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8 Sheets-Sheet 4



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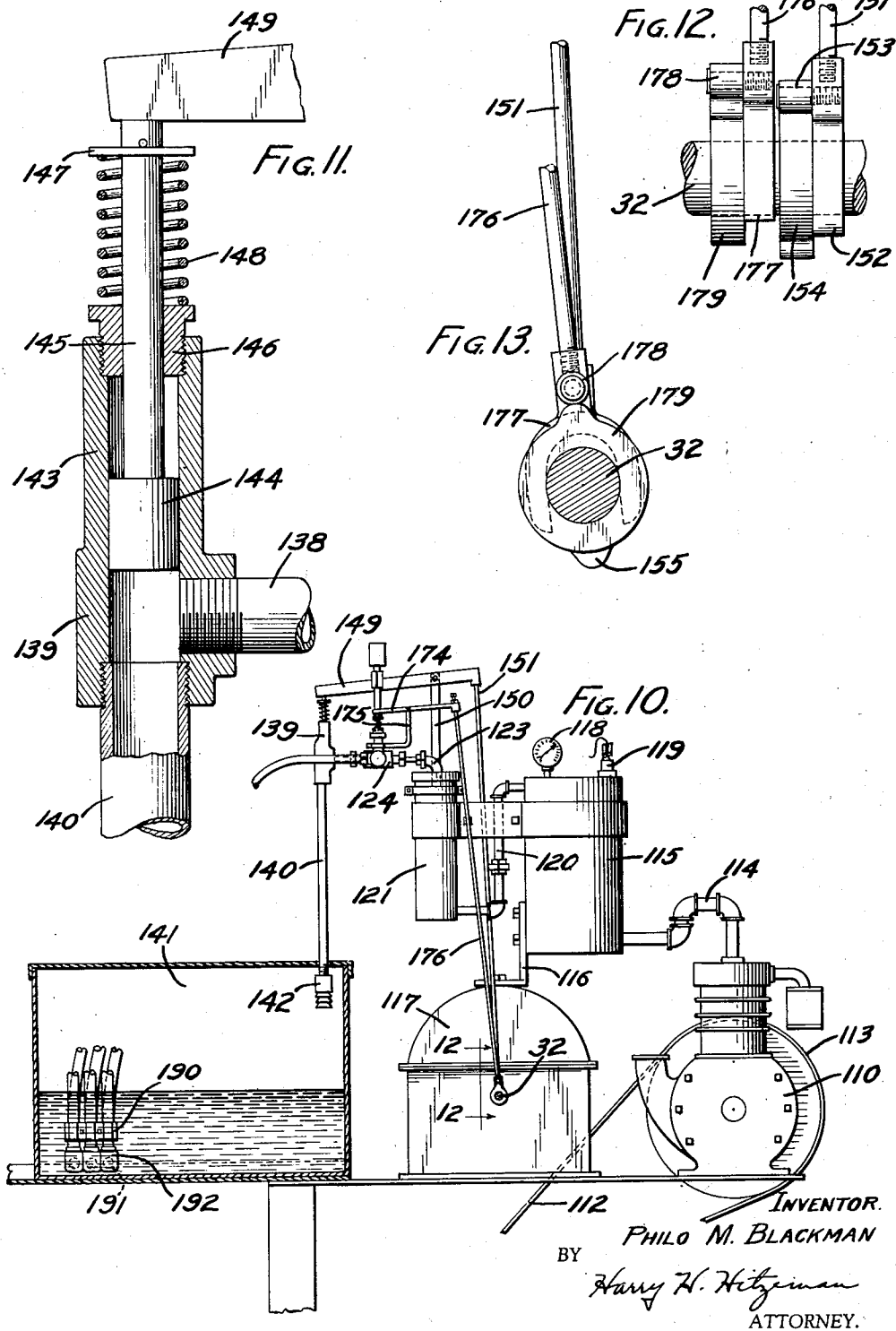
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STRAIGHT LINE MULTIPLE FILLING MACHINE

Filed Oct. 6, 1933

8 Sheets-Sheet 5



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STRAIGHT LINE MULTIPLE FILLING MACHINE

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FIG. 14.

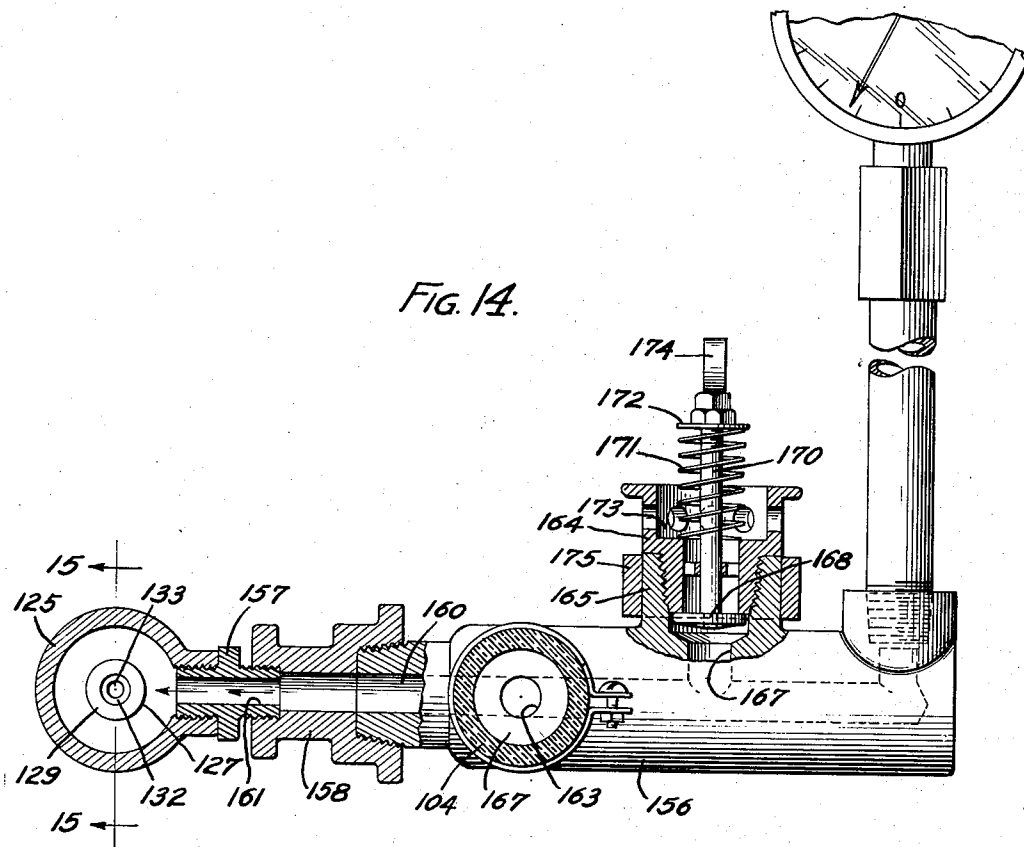
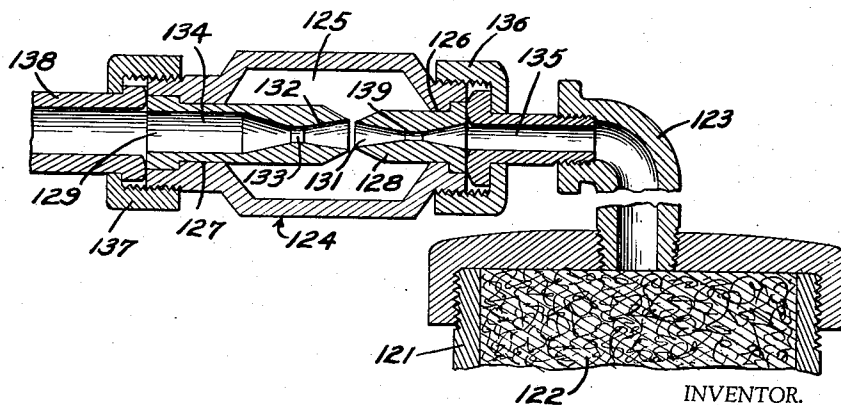


FIG. 15.



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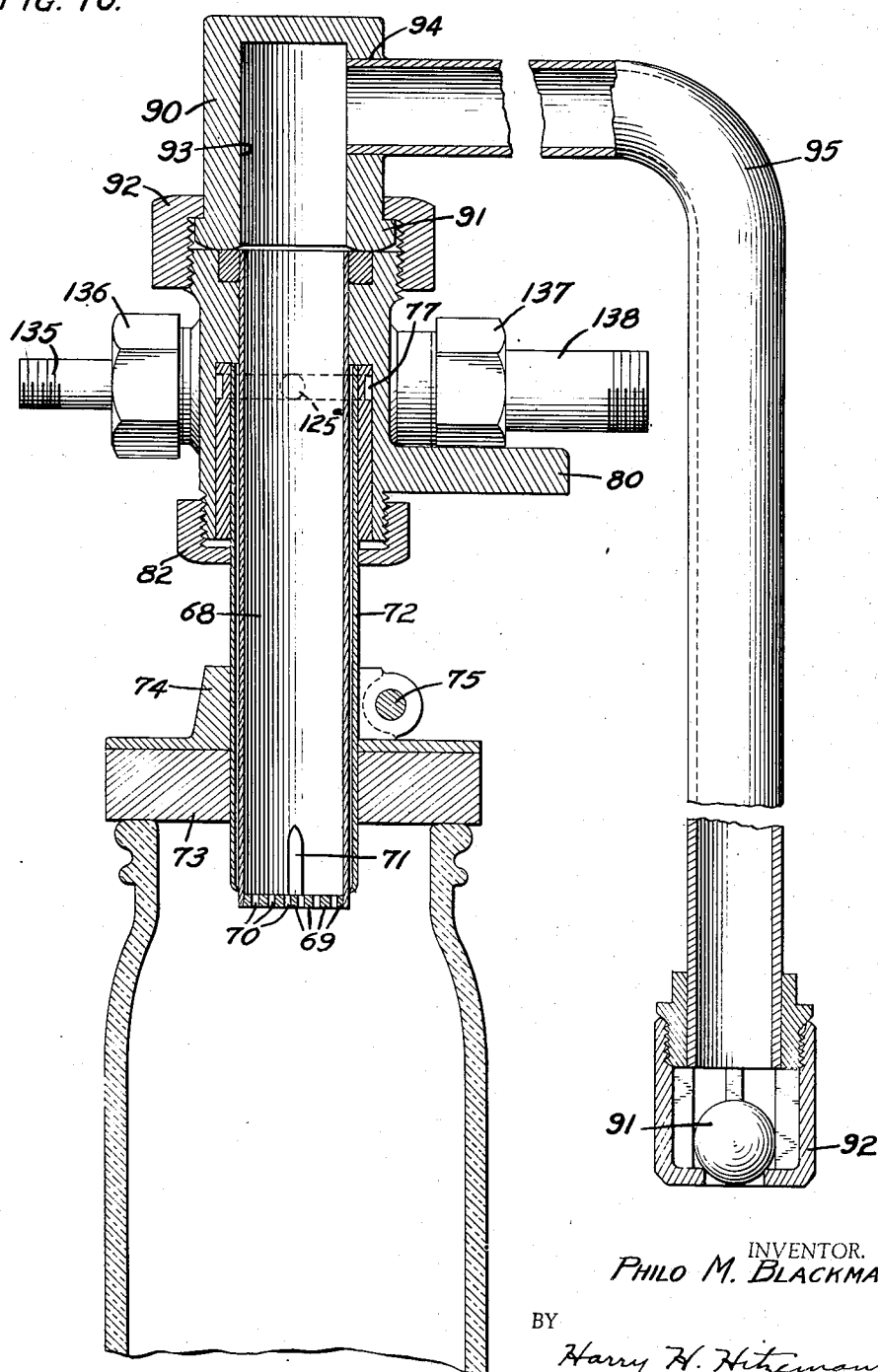
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STRAIGHT LINE MULTIPLE FILLING MACHINE

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Fig. 16.



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STRAIGHT LINE MULTIPLE FILLING MACHINE

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8 Sheets-Sheet 8

FIG. 18.

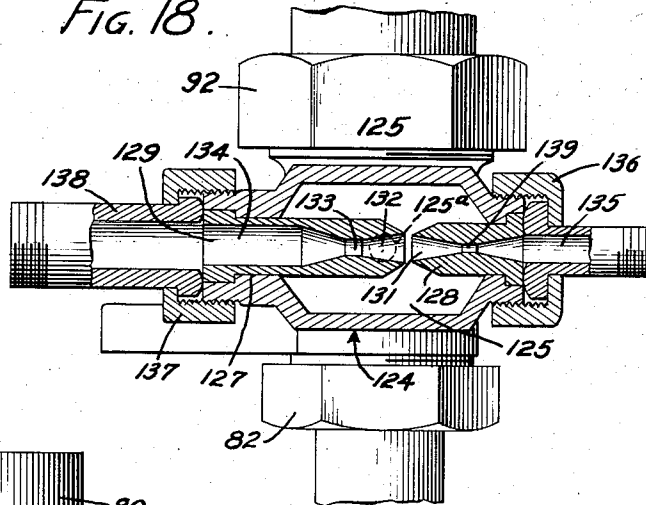
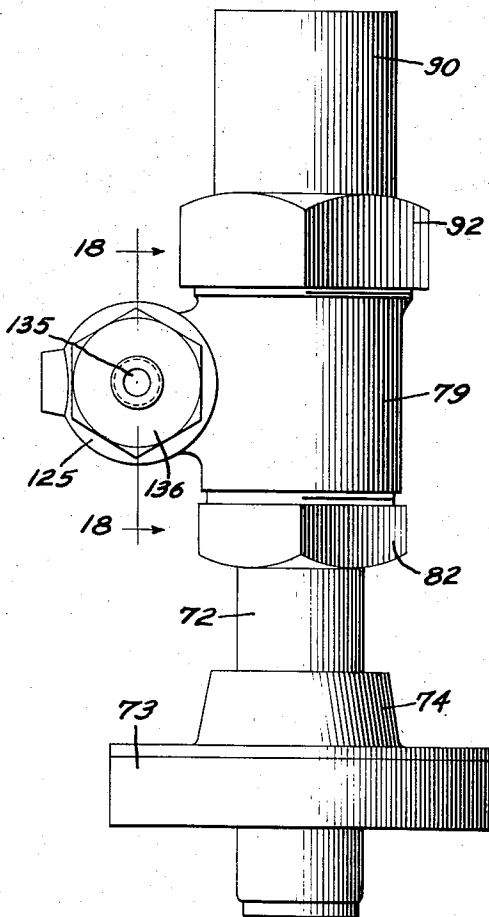


FIG. 17.



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UNITED STATES PATENT OFFICE

1,992,464

STRAIGHT LINE MULTIPLE FILLING
MACHINEPhilo M. Blackman, Elgin, Ill., assignor to Elgin
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Application October 6, 1933, Serial No. 692,496

25 Claims. (Cl. 226—116)

My invention relates to filling machinery and like devices.

The invention relates more particularly to devices of this type utilized for the purpose of filling jars or other containers with liquid or similar material, and also with semi-liquid, plastic, or viscous material.

An object of the present invention is to provide apparatus of the type described for filling a plurality of cans, jars or containers in a continuous process.

A further object of the present invention is to provide mechanism of this type for filling a plurality of containers in each operation with mechanism arranged to operate upon a single line of containers moving through the machine in a straight line.

A further object of the present invention is to provide improved vacuum-actuated means for filling the containers.

A further object of the present invention is to provide an improved vacuum jet construction for apparatus of the type described.

A further object is to provide improved nozzle mechanism for use in connection with the containers that are to be filled.

A further object of the invention is to provide improved mechanism for actuating the nozzles to co-operate with a row of containers moving through the machine in a continuous movement.

A further object is to provide improved container conveyor means, adjusting means for the conveyor, and an improved method of actuating said conveyor.

A further object is to provide improved means for creating a vacuum filling of the containers, a vacuum release when the containers are filled, improved means for cleaning out the nozzles and timing means for operating said mechanisms in accordance with the filling of the containers.

These and other objects will be more apparent from the following description wherein reference may be had to the accompanying eight sheets of drawings, upon which

Fig. 1 is a front perspective view of my improved mechanism;

Fig. 2 is a vertical sectional view taken generally on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a somewhat diagrammatic sectional front view taken on a plane at the middle of the container conveyor illustrating above other things the driving mechanism for the entire apparatus;

Fig. 4 is an enlarged fragmentary plan view,

showing the conveyor trough at the receiving end thereof;

Fig. 5 is a sectional view of the parts shown in Fig. 4, and is taken generally on the line 5—5 of Fig. 4;

Fig. 6 is a vertical sectional view of the support 4 and the moving valve bar taken generally on the line 6—6 of Fig. 3;

Fig. 7 is a vertical sectional view of one of the filler valves carried by the valve bar and is taken generally on the line 7—7 of Fig. 1;

Fig. 8 is a plan sectional view of the valve taken on the line 8—8 of Fig. 7;

Fig. 9 is a plan sectional view through the filling tube taken generally on the line 9—9 of Fig. 7;

Fig. 10 is a somewhat diagrammatic view of the fluid container, compressor, air jet mechanism, and associated parts;

Fig. 11 is a full size detail of the air release valve for clearing the nozzles;

Fig. 12 is an enlarged view of the cam mechanism shown in Fig. 10 for operating release valves, and is a view taken generally on the line 12—12 of Fig. 10;

Fig. 13 is a side elevational view of the parts shown in Fig. 12;

Fig. 14 is a full size view in section of the air jet mechanism and associated parts to show the hose extending to the manifold vacuum release valve and vacuum gauge;

Fig. 15 is a cross-sectional view of the air jet mechanism and is taken generally on the line 15—15 of Fig. 14;

Fig. 16 is a vertical sectional view of a modified form of a filler valve showing the air jet mechanism positioned adjacent thereto;

Fig. 17 is a side elevational view thereof; and

Fig. 18 is a vertical sectional view showing the air jet mechanism which is a portion of said valve.

The apparatus will be described with particular reference to its employment in connection with putting brine or similar liquid upon jars of pickles or similar products.

In the embodiment of the invention shown in the drawings, I provide a frame constructed of upright channel members 10 which are provided with the feet portions 11 that are adjustably attached thereto. Pairs of the uprights 10 may be placed at the two ends of the machine with intermediate uprights as desired. The end uprights are spaced apart, as shown in Fig. 2, and provide support for the conveying mechanism 12 and a trough 13 positioned therebelow

to catch any spillage or overflow caused during the filling operation.

In the embodiment of the machine, as previously intimated, containers are adapted to be fed through the machine in a continuous straight line, and for this purpose a container-driving chain 14 is provided, trained about the sprockets 15 and 16 at the opposite ends of the machine. The conveyor chain 14 is provided with a plurality of spaced lugs 17 which, in operation, bear against the rear of a container C and move the same forward upon a plurality of slats 18 supported by spaced cross-members 19. As more clearly shown in Figs. 2 and 5, the slats 18 with their supports 19 are mounted upon angles 20 which are supported between the uprights 10. The sprocket wheels 15 and 16 are mounted upon cross-shafts 21 and 22 which are carried in suitable bearings secured to the lower side of the angles 20.

A pair of movable guide members 23 are positioned adjacent the conveyor chain 14 upon arms 24, carried by side brackets 25 from the angle irons 20. The guides 23 define a path of a predetermined width, which path may be narrowed or widened as desired to meet conditions, by adjustment of the arms 24 upon the brackets 25.

In order to co-operate with the containers moving in a continuous straight line through the machine as described, the filling nozzles 26 are arranged to be moved in unison with the containers as shown by the arrows in the diagrammatic rectangle shown in Fig. 3. To accomplish this, I provide a moving bar 27 from which the same are supported. This bar, as shown in Figs. 1, 2, 3 and 6, may be mounted in a pair of housings 28 within which vertical rollers 29 are mounted to co-operate with the bar as it moves back and forth. The housings 28 are mounted at the upper ends of two of the uprights 10 which extend upward beyond the conveyor and are to the rear of the conveyor. Movement of the bar in the rectangular direction shown, guided by the rollers 29, is accomplished by the action of cams 30 and 31 mounted on a driven shaft 32 extending from speed reducer 33.

The cam 30 engages a roller 34 mounted upon a cam bar 35 pivoted at its lower end 36 in a fixed bracket 37 and connected at its upper end to a link 38 pivotally mounted at 39 on the valve bar 27. As the cam 30 revolves in a clockwise direction, it can be seen that the bar 27 will be drawn to its extreme forward position, illustrated in Fig. 3 of the drawings. To return the bar to its rearward position, a counter-weight 40 is employed. The counter-weight has a cord 41 trained over a pulley 42 mounted on a bracket 43 at the upper end of an upright 10. The cord 41 is fixedly connected to the valve bar 27 by any suitable fastening means 44. With the mechanism as thus described, as the cam 30 rotates in a clockwise direction, the weight of counter-weight 40 will draw the bar to its rearward position, as shown by the diagrammatic arrows in the fragmentary dotted line showing of the bar 27.

The cam 31 operates generally to provide the vertical movement necessary to release the vacuum after the containers are filled and to withdraw the nozzle and move the same downwardly to engage the next containers to be filled. The cam 31 acts upon the roller 45 which is attached to cam lever 46, pivotally mounted at its lower end upon the pivot 36 and attached at its upper

end to a link 47 fixedly connected at 48 to a cross-link 49. The link 49 is connected at its opposite ends 50 and 51 to a pair of bell crank levers 52 and 53 pivotally mounted in housing 28 upon pins 54. The mounting of bell crank lever 52 is shown in Fig. 6.

Each of the bell cranks carries at the end of its short lever arm a roller 55 upon which the moving valve bar 27 normally rests. The bell crank lever 53 may have an extended arm 56 upon which counter-weight W is adapted to be positioned in any desired manner. The action of cam 31 as it revolves is as follows: The lever 46 is moved outwardly upon the travel of the cam, and the counter-weight W, together with the power exerted by rotation of cam 31 against roller 45 mounted on lever 46—said power being transmitted to bell cranks 52 and 53—causes the moving bar 27 to lift the fillers from the containers to the position shown in Fig. 3. As the cam revolves, the cam arm 46 moves slightly to the left on its pivot 36, allowing the rollers 55 to be lowered to allow the nozzles to enter the containers and the filling valve to lie over the top thereof. It is of course understood that the actions of the two cams are so timed that the movement of the filler nozzles 26 will be such that they will come down, engage the container, move forward with the same for a sufficient distance to fill the same, and then move upward from the containers and back and down, engaging a new group of containers all to the effect that a continuous movement of containers through the filling machine is accomplished.

Means for adjusting the support bar 61 are provided. The support bar 61 is carried at opposite ends by vertical supports 62 which are mounted in bevel gears 63 supported by brackets 64 carried by the moving valve bar 27. The brackets also support a cross-shaft 65 and a pair of bevel gears 66 mounted at opposite ends thereof. With the arrangement shown, by turning the handwheel 67, keyed to the shaft 65, the vertical support members 62 are raised or lowered as desired, thus providing a simple and effective adjusting means for the valve support bar.

A plurality of filling valves and nozzles are adapted to be mounted upon the support bar 61. These are so spaced that they coincide with the spacing of containers moved through the machine by the conveyor chain 14. As shown in Fig. 7, each of these members may comprise a filling tube 68 provided at its lower end with a closure member 69 having a plurality of minute openings 70 therein. The purpose of having the minute openings is to act as a strainer for the liquid passing through. The tube 68 is further formed with a pair of milled slots 71 in opposite sides thereof for a purpose which will presently be described.

The tube 68 is surrounded by a vacuum tube member 72 which has its lower end spun in as shown, to provide an effective seal around the exterior of the tube 68, except at the slots 71. A sealing member 73, preferably of resilient material, is attached to the vacuum tube 72 and is mounted upon a bracket 74 which is secured to the tube 72 by means of a bolt member 75. With this construction, the sealing member may be raised or lowered as desired, and then fixedly secured in position.

The upper end of vacuum tube 72 may have a body portion 76 formed adjacent its upper end with an annular groove 77. The portion 76 is 75

positioned in the internal bore 78 of a valve body member 79 which has a lug portion 80 through which the fastening bolts 81 pass to secure the same upon the valve support bar 61. A nut member 82 is securely fastened to the lower end of body 79 to support the vacuum tube 72 in position therein. The upper end of body 79 has a reduced bore 83 and an enlarged bore 84 forming a shoulder 85 thereupon.

and becomes a cylindrical opening to the end thereof.

A union 135, positioned adjacent the inlet nozzle 128, is held in place by means of a nut member 136, which screw-threadedly engages an exterior threaded portion of the air jet body 126. The extended end of the union 135 screw-threadedly engages the elbow 123 to affect a passageway from the air strainer 121 to the air jet assembly. The opposite end of the air jet body is formed with a screw-threaded portion which is engaged by a nut member 137, which supports adjacent the end of the overflow nozzle a tubular conduit 138, which extends from the air jet assembly to an air release valve 139, which has a pipe member 140 extending downwardly into the liquid reservoir 141. A silencer 142 of any usual type may be secured to the lower end of pipe 140 to muffle the sound of air passing therethrough.

The air release valve 139 is shown in detail in Fig. 11 and comprises the vertical cylindrical housing member 143 within which a movable valve member 144 is mounted. The valve has a stem 145 which is guided vertically in a bushing nut 146 screw-threadedly mounted in the upper end of the valve body. The valve stem carries a washer 147 adjacent its upper end, holding a spring member 148 in compression between the bushing nut 146 and the washer. This spring member thus normally tends to hold the valve 144 in an upper position, thus allowing a clear passageway through the conduits 138 and 140. Means for actuating valve 144 to close said passageway momentarily during a filling operation are provided and comprise the valve lever 149 pivotally mounted upon a support bracket 150, which is fastened to the air strainer 121.

The valve lever has an end which bears on the valve stem 145 and an opposite end within which an operating rod 151 is mounted.

This rod extends downwardly as shown on the drawings and carries with its lower end a collar member 152, upon the side of which a cam roller 153 is mounted. Movement of lever 149 in a rocking manner is provided by a cam 154 which has a rise 155 thereon that engages the roller 153 once during each revolution of the cam shaft 32, thus affecting a momentary closure of valve 139 once during each rotation of the cam shaft 32.

Referring now to Fig. 14, I have shown a vacuum gauge fitting 156, which is connected to the air jet assembly 124, by means of a union 157 and a pipe fitting 158. The gauge fitting 156 has a passageway 160 therein, which connects, by means of the passageway 161 in union 157, with the air jet assembly. A boss 162 with a passageway 163 therein extends outwardly from one side of the fitting, and has connected to it the hose member 104 which extends forward to the filler nozzles 26.

A vacuum breaking valve 164 is positioned in a boss 165 upon one side of fitting 156, which has a passageway 167 communicating with the bore 160. The valve 164 may comprise generally a valve member 168 having valve stem 170 thereon, which supports in a compressed position the spring 171 between a washer 172 at the upper end thereof and a shoulder 173 formed in the body of the valve member 164.

From the drawings, it is believed to be clear that downward pressure upon the upper end of valve stem 170 will open a passageway to at-

The upper end of filling tube 68 is provided with a body portion 86 formed with a collar 87 which rests upon the shoulder 85. A cap member 90, formed with a flange 91, rests upon the upper end of valve body 79 and is arranged to be held in fixed position thereon by a turret nut 92 which screw-threadedly engages the upper end of valve body 79. The cap member 90 is formed with an internal bore 93 and an opening 94 in one of its side walls within which a tubular member 95 is adapted to be fixedly secured by welding or any other suitable manner. A supply hose 96, which extends from a liquid supply tank, further to be described, may have its end passed over the tube 95 and be securely fixed thereto by a suitable clamp member 97. The vacuum tube body 76 is formed with a side opening 98 which communicates with the passageway formed by the annular groove 77. An inlet union 99 is screw-threadedly mounted in an opening 100 in valve body 79 and communicates with the passageway formed by the annular groove 77. The union 99 is connected to a suitable pipe nipple 101 by a nut member 102. The nipple 101 has a passageway therein in line with the passageway in the union 99. This union is screw-threadedly mounted in a manifold member 102 which is connected with an air jet mechanism by means of the elbow 103 and the hose connection 104. The hose 104 is connected to the elbow 103 by a suitable clamp means 105.

Referring now to Figs. 10 to 15, the air jet mechanism for creating a vacuum in the tube 72 will now be described.

In Fig. 10, I have illustrated somewhat diagrammatically the elements which are necessary for this purpose. I provide a compressor 110 mounted in any suitable manner upon the rear portion of the frame. The compressor is adapted to be driven by the motor 111 by means of the belt 112 and pulley 113. The compressor may be of any suitable or desired manufacture and is connected, by means of the piping 114, with an expansion tank 115, which is supported by a bracket 116 mounted upon the casing of a speed reducer 117.

The expansion tank is provided with the usual pressure gauge 118 to indicate the air pressure therein, and a safety valve 119 to guard against abnormal pressures. Suitable piping 120 extends from the upper end of the expansion tank 115 to a strainer unit 121, which is filled with suitable strainer material, such as layers of excelsior and felt 122.

An elbow 123 extends from the upper end of strainer unit 121 to the air jet assembly 124. The air jet member may comprise a body 125 formed with a reduced inlet 126 and a reduced outlet 127. An inlet nozzle 128 may be mounted in opening 126, and an overflow nozzle 129 may be mounted in the outlet opening 127. The inlet nozzle is formed with the reduced orifice 130 and a flared mouth 131. The overflow nozzle has a similar flared mouth 132 facing the inlet nozzle and a reduced portion 133, as shown. The passageway 134 in the overflow nozzle then flares outwardly

mosphere, by means of bore 167, thus serving to break the vacuum in hose 104 when desired.

Means for affecting this action include a lever arm 174 pivotally supported by a bracket 175 which is mounted on the boss 165 of the gauge fitting. The outer end of lever 174 is connected by a rod 176 with a collar 177, which rests upon cam shaft 32. The collar 177 carries a roller 178 to engage a cam 179 formed similar to cam 154. This mechanism is adapted to tilt lever 174 to break the vacuum in the hose 104 to release the containers from the filler nozzles at the instant the container is filled with liquid.

The reservoir 141, which contains the liquid which it is desired to move through the filler nozzles into the containers passing through the machine, is positioned upon the frame directly behind the filling nozzle mechanism. Each of the hose members 96, which extend from the turret of the valve nozzles back and downwardly into the reservoir, is adapted to be fixedly connected to a support member 190 which is carried by the support bar 61. Each of the conduits 96 has a ball check valve 191 in a fitting 192 carried at the lower end of the support 190. This valve is for the purpose of preventing a return flow of liquid to the reservoir.

The operation of the machine will now be described.

Containers, such as those shown in Fig. 3 of the drawings, are first filled with pickles, pickled pigs' feet, lambs' tongue, or any other desirable product, and then fed onto the conveyor 14 from the left-hand side of the machine. As the containers pass below the filler nozzles 26, the drive for the cams 30 and 31 is so timed that the filler heads will come down and engage the tops of the containers, the sealing member 73 resting on the top of the containers and affecting the seal over the container. A continuous suction is being created in the vacuum tube 72 by the air jet mechanism 125. This suction is accomplished in the following manner.

The compressor 110 operating constantly is building up pressure in the expansion tank 115, which is in communication with the air jet body 125 through the piping 120, filter tank 121, and elbow 123. The air rushing through connection 135 and inlet nozzle 130 blows into the enlarged mouth 132 of the member 129, thus creating suction in the interior of jet body 125. This suction draws air through the connection 157 and hose 104, which are connected to the vacuum tube 72 by means of the manifold 102, fitting 101, and connector nipple 99. Thus, when the sealing member 73 is resting upon the top of a container, a vacuum is created in said container.

The valve discharge nozzle 68, which is positioned in the center of the sealing member 73 thus has a suction created therein by the action of the air jet, and causes brine, or other liquid which it is desired to place in the containers, to be drawn from the supply tank or reservoir 141.

The check valves 191 close off the supply of brine or liquid the instant the vacuum is broken. As the brine or liquid is drawn into the containers, it gradually rises to fill the same, until the openings 71 in the vacuum tube are submerged in the liquid. Thus, when the level of the liquid in the containers reaches and closes the series of air escape slots 71, the excess liquid being drawn into the valve chamber passes through the vacuum orifice, is taken up by the air stream, and returned to reservoir 141 through

the pipe 140. When the valve is raised sufficiently to break the seal on the container, the vacuum is also broken and the liquid ceases to flow.

At this point in the operation of the machine, however, the cam 179 will have revolved upon cam shaft 32 to bring the rise on the cam to an operating position to open the vacuum release valve 164 to break the vacuum in the conduit to the filler nozzles. At the same instant, cam 31 operates to raise the support bar 61, upon which all of the filler nozzles are mounted, away from the containers; and the filler nozzles are carried back to duplicate the operation as previously described. When the filler nozzles are moved to the left of the machine, the cam 154 operates through lever 149 to shut off the air discharge through the pipe 140, thus momentarily causing all of the air being pumped through the jet body under pressure to flow forward through hose 104 and blow out particles of food stuffs or other particles which may have lodged in the passageway 71, thus effectively cleaning them and preparing the device for the next operation.

In Figs. 16, 17 and 18, I have illustrated a modified form of valve or air jet mechanism, wherein the valve body 79 and the air jet body 125 are formed integrally. The turret head 90, is also formed with a rigid L-shaped pipe member 95, which may extend downwardly into a reservoir and have mounted at its lower end the check valve 91 mounted in the cage 92.

It will be noted that, by this construction, only a single valve is utilized in connection with an air jet assembly. The valve will be found particularly useful in any automatic filling machine for drawing liquids into containers of any size or shape. The device operates on the principle of drawing the liquid into the valve by the vacuum created in the valve through the use of air under pressure flowing through the air jet assembly 125, which is connected directly to the valve, and which has an opening 125a connecting the interior of the valve and the air jet housing.

While I have illustrated and described a preferred form of general machine, and a preferred and a modified form of the valve assembly, it will be understood that changes and variations may be made in the particular arrangement of parts or construction, and I do not wish to be limited in any detail; rather, what I desire to secure and protect by Letters Patent of the United States is:

1. Apparatus of the type described comprising in combination a horizontal conveyor for containers to be filled, spaced lugs on said conveyor, guide means on both sides of said conveyor, means for moving said conveyor forward in a straight line at a continuous rate of speed, means associated with said conveyor for filling said containers during their forward movement, said means including vacuum producing means for drawing a filling liquid into said containers, and automatic means for releasing the vacuum when said containers are filled.

2. Apparatus of the type described comprising in combination a horizontal conveyor for containers to be filled, spaced lugs on said conveyor, guide means on both sides of said conveyor, means for driving said conveyor at a continuous rate of speed to carry the containers forward in a straight line, means associated with said conveyor for filling said containers during their

forward movement, said means including a reservoir, a conduit to said filling means, vacuum producing means for drawing a filling liquid from said reservoir into said container, and automatic means for releasing the vacuum when said containers are filled.

3. Apparatus of the type described comprising a rectangular base member, a pair of sprocket wheels mounted in opposite ends of said base, a horizontal conveyor chain trained over said sprockets, spaced lugs on said chain, means for driving said chain in a continuous forward movement to convey containers to be filled, adjustable guide means adjacent said conveyor for guiding containers passing therethrough in a straight line, a liquid reservoir on said base, and vacuum filling means associated with said reservoir, said means adapted to engage the tops of said containers during their forward travel, fill the same with liquid from said reservoir, and disengage said containers when they are filled.

4. Apparatus of the type described comprising a rectangular base member, a pair of sprocket wheels mounted in opposite ends of said base, a horizontal conveyor chain trained over said sprockets, spaced lugs on said chain, means for driving said chain in a continuous forward movement, adjustable guide means adjacent said conveyor for guiding containers passing there- through in a straight line, a liquid reservoir on said base, and vacuum filling means associated with said reservoir, said means including nozzle members adapted to engage the tops of said containers during their forward travel, fill the same with liquid from said reservoir, and disengage said containers when they are filled.

5. Apparatus of the type described comprising a base member, horizontal conveyor means mounted on said base, said conveyor adapted to move containers to be filled in a straight line through said machine in a continuous movement, a reservoir, means comprising vacuum fillers associated with said reservoir, said fillers adapted to be lowered to engage the tops of said containers, move forward therewith, and fill the same with liquid from said reservoir, raised from said containers and returned to their original position to engage further containers.

6. The combination of a base member, a horizontal conveyor mounted thereon adapted to move containers forward in a straight line, vacuum means for filling said containers during said movement, said means comprising a liquid reservoir, a plurality of filler heads adapted to engage the tops of said containers during their forward movement and fill the same with liquid from said reservoir, means for moving said filler heads comprising a moving support bar, said filler heads mounted on said bar, and cam operated means for moving said bar forward, up, backward, and down, in a continuous operation.

7. A straight line filling machine comprising a base, a horizontal conveyor mounted thereon, guide means associated therewith, said guide means forming a trough for a plurality of containers moving forward on said conveyor, a liquid reservoir, a moving support bar, a plurality of filling nozzles mounted on said bar, said nozzles adapted to engage the tops of said containers during their forward movement, means for drawing liquid from said reservoir through said filling nozzles comprising an air jet member, and means for forcing air under pressure past said jet member for creating a vacuum to draw liquid from said reservoir to said filling nozzles.

8. A straight line filling machine comprising a base, a horizontal conveyor mounted thereon, guide means associated therewith, said guide means forming a trough for a plurality of containers moving forward on said conveyor, a liquid reservoir, a moving support bar, a plurality of filling nozzles mounted on said bar, said nozzles adapted to engage the tops of said containers during their forward movement, means for drawing liquid from said reservoir through said filling nozzles comprising an air jet member, means for forcing air under pressure past said jet member for creating a vacuum to draw liquid from said reservoir to said filling nozzles, means for breaking said vacuum when said containers are filled, and means for controlling the flow of air for clearing said filler nozzles after each filling operation.

9. A straight line filling machine comprising a base, a horizontal conveyor mounted thereon, guide means associated therewith, said guide means forming a trough for a plurality of containers moving forward on said conveyor, a liquid reservoir, a moving support bar, a plurality of filling nozzles mounted on said bar, cam means for actuating said bar, said bar moved so that said nozzles engage the tops of said containers during their forward movement, air jet means for drawing liquid from said reservoir through said filling nozzles, means for forcing air under pressure past said jet member and creating a vacuum to draw liquid from said reservoir to said filling nozzles, means for breaking said vacuum when said containers are filled, and means for controlling the flow of air for clearing said filler nozzles after each filler operation.

10. The combination of a base member, a horizontal conveyor mounted thereon adapted to move containers carried thereby forward in a straight line, vacuum means for filling said containers during said movement, said means comprising a liquid reservoir, a plurality of filler heads adapted to engage the tops of said containers during their forward movement and fill the same with liquid from said reservoir, an air jet member for creating said vacuum, means for moving said filler heads according to the movement of said containers comprising a moving support bar, said filler heads mounted on said bar, and cam operated means for moving said bar forward, up, backward, and down, in a continuous operation.

11. A straight line filling machine comprising a base, a horizontal conveyor mounted thereon, guide means associated therewith, said guide means forming a trough for a plurality of containers moving forward on said conveyor, a liquid reservoir, a moving support bar, a plurality of filling nozzles mounted on said bar, said nozzles adapted to engage the tops of said containers during their forward movement, means for drawing liquid from said reservoir through said filling nozzles comprising an air jet member, and means for forcing air under pressure past said jet member causing a vacuum to draw liquid from said reservoir to said filling nozzles, said means including a compressor, an expansion tank and conduits extending therefrom to the air jet member.

12. A straight line filling machine comprising a base, a horizontal conveyor mounted thereon, guide means associated therewith, said guide means forming a trough for a plurality of containers adapted to be moved forward on said conveyor, a liquid reservoir, a moving support bar, a plurality of filling nozzles mounted thereon, 75

said nozzles adapted to engage the tops of said containers during their said movement, and means for drawing liquid from said reservoir to said filling nozzles, said means including an air jet member, a compressor, an expansion tank and conduits extending therefrom to said air jet member, means for breaking a vacuum caused by directing air under pressure past said jet member when said containers are filled, and means for controlling the flow of air for clearing said filler nozzles after each filling operation.

13. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir and fastening means on the upper and lower ends of said body member for securing the parts thereof together.

14. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a filler body member within which both said tubes are mounted, a conduit extending from said body to a suction mechanism, a cap member thereabove, a conduit from said cap member to a reservoir and fastening means on the upper and lower ends of said filler body for securing the parts thereof together.

15. A filler head comprising a filling tube, said filling tube formed with a plurality of minute openings at its lower end and a pair of grooves in the side walls thereof, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a filler body member within which both said tubes are mounted, a conduit extending from said body to a suction mechanism, a cap member thereabove, a conduit from said cap member to a reservoir and fastening means on the upper and lower ends of said filler body member for securing the parts thereof together.

16. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a filler body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber and an air jet assembly secured therein.

17. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber, an air jet assembly secured therein,

and a passageway between said chamber and said body member.

18. Apparatus of the type described for moving a continuous row of containers forward in a straight line comprising in combination a base member, a pair of sprocket wheels mounted in opposite ends of said base member, a horizontal conveyor chain trained over said sprockets, equally spaced upwardly projecting lugs on said chain, a pair of parallel guide members, one on each side of said chain comprising vertical continuous wall members, means for driving said conveyor at a continuous rate of speed, means associated with said conveyor for filling said containers during their forward movement, said means including a reservoir, a conduit to said filling means, vacuum producing means for drawing a filling liquid from said reservoir into said container, and automatic means for releasing the vacuum when said containers are filled.

19. Apparatus of the type described for moving a continuous row of containers forward in a straight line comprising in combination a base member, a pair of sprocket wheels mounted in opposite ends of said base member, a horizontal conveyor chain trained over said sprockets, equally spaced upwardly projecting lugs on said chain, a pair of parallel guide members, one on each side of said chain comprising vertical continuous wall members, means for driving said conveyor at a continuous rate of speed, a liquid reservoir on said base, and vacuum filling means associated with said reservoir, said means adapted to engage the tops of said containers during their forward travel, fill the same with liquid from said reservoir, and disengage said containers when they are filled.

20. Apparatus of the type described for moving a continuous row of containers forward in a straight line comprising in combination a base member, a pair of sprocket wheels mounted in opposite ends of said base member, a horizontal conveyor chain trained over said sprockets, equally spaced upwardly projecting lugs on said chain, a pair of parallel guide members, one on each side of said chain comprising vertical continuous wall members, means for driving said conveyor at a continuous rate of speed, a liquid reservoir on said base, and a vacuum filling means associated with said reservoir, said means including nozzle members adapted to engage the tops of said containers during their forward travel, fill the same with liquid from said reservoir, and disengage said containers when they are filled.

21. Apparatus of the type described comprising a rectangular base member, a pair of sprocket wheels mounted to opposite ends of said base, a horizontal conveyor chain trained over said sprockets, spaced lugs on said chain, means for driving said chain in a continuous forward movement, adjustable guide means adjacent said conveyor for guiding containers passing therethrough in a straight line, said means comprising a pair of parallel continuous vertical wall members spaced on both sides of said chain, a liquid reservoir on said base, and vacuum filling means associated with said reservoir, said means including nozzle members adapted to engage the tops of said containers during their forward travel, fill the same with liquid from said reservoir, and disengage said containers when they are filled.

22. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container

adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means comprising nut members screw-threadedly mounted on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber, an air jet assembly secured therein, and a passageway between said chamber and said body member.

23. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber, an air jet assembly secured therein, a passageway between said chamber and said body member, said air jet assembly including a body having a reduced inlet and a reduced outlet, an inlet nozzle mounted in said inlet, an overflow nozzle mounted in said outlet, and a passageway from said inlet to a source of air pressure.

24. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body mem-

ber within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber, an air jet assembly secured therein, a passageway between said chamber and said body member, said air jet assembly including a body having a reduced inlet and a reduced outlet, an inlet nozzle mounted in said inlet, an overflow nozzle mounted in said outlet, said nozzles axially aligned in said body, and a passageway from said inlet to a source of air pressure.

25. A filler head comprising a filling tube, a vacuum tube telescopically mounted thereon, a sealing member for engagement with a container adjustably mounted on said vacuum tube, a body portion at the upper end of said vacuum tube having an annular groove therein, a body member within which both said tubes are mounted, a cap member thereabove, a conduit from said cap member to a reservoir, fastening means on the upper and lower ends of said body member for securing the parts thereof together, said body member having an integral part thereof forming a chamber, an air jet assembly secured therein, a passageway between said chamber and said body member, said air jet assembly including a body having a reduced inlet and a reduced outlet, an inlet nozzle mounted in said inlet, an overflow nozzle mounted in said outlet, said nozzles axially aligned in said body and having adjacent flared openings, nut members at opposite ends of said body for holding said nozzles in position, and a passageway from said inlet to a source of air pressure.

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