226-95

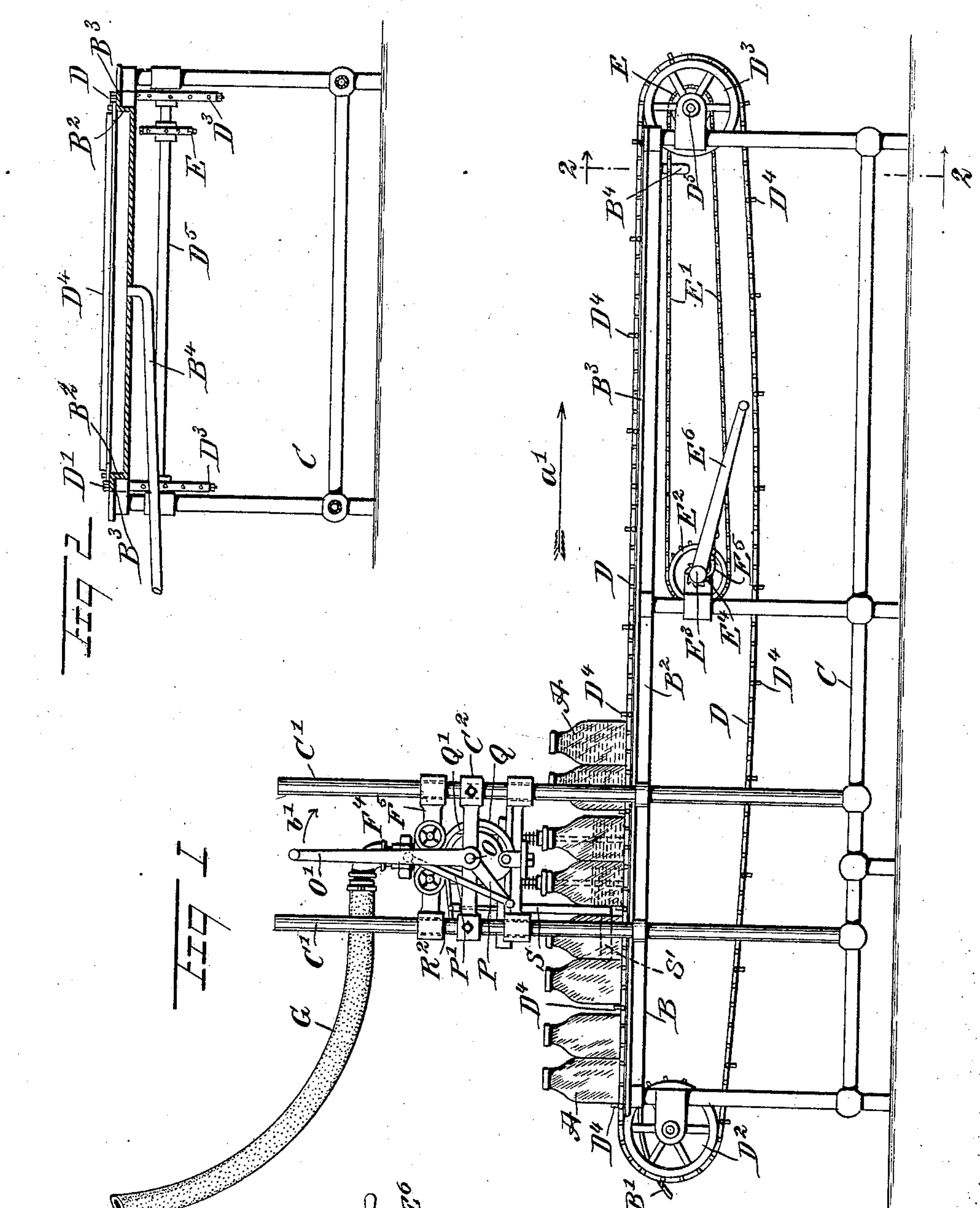
No. 833,637. PATENTED OCT. 16, 1906.

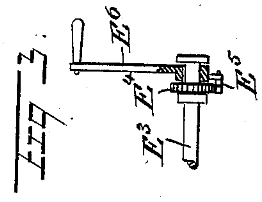
W. H. SHEFFIELD.

FILLING APPARATUS.

APPLICATION FILED AUG. 13, 1904.

3 SHEETS—SHEET 1.





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[illegible]

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3 SHEETS—SHEET 2.

Fig 4

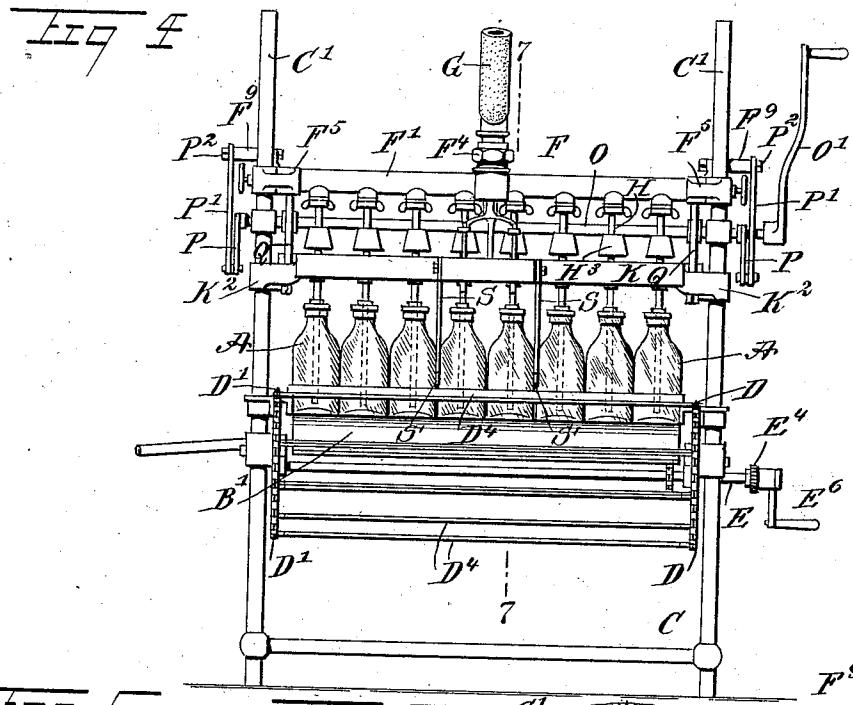


Fig 6

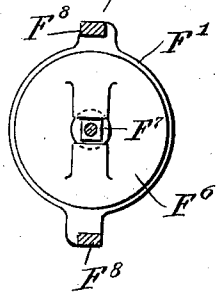
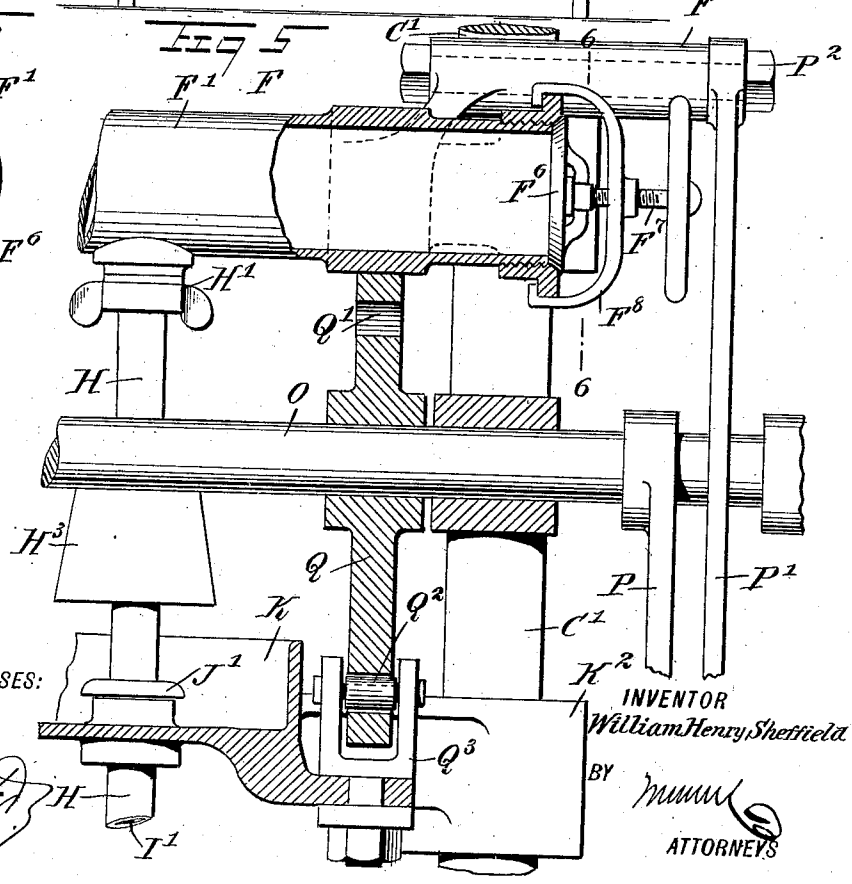


Fig 5



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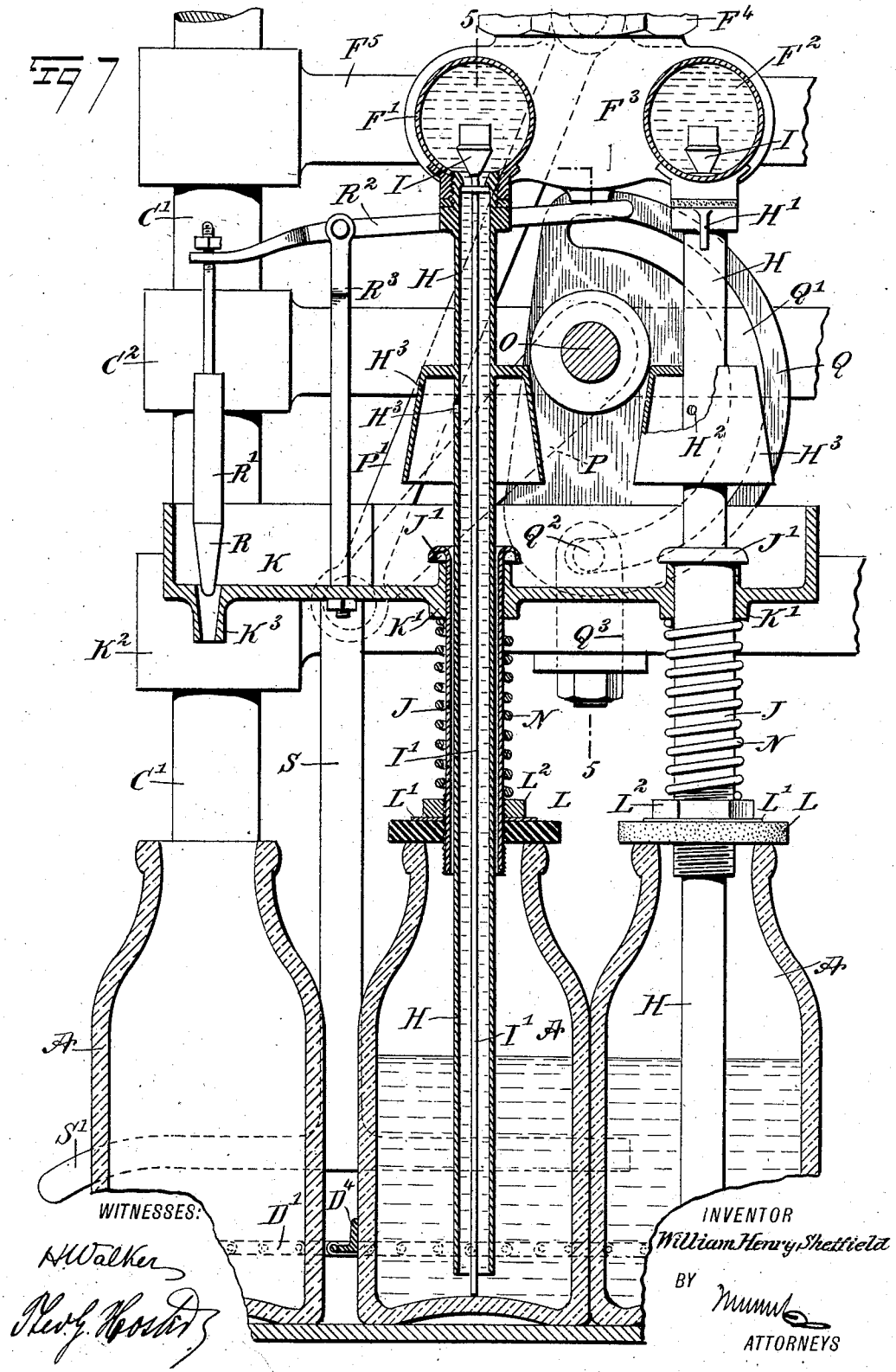
3 SHEETS—SHEET 3.

Fig 7



UNITED STATES PATENT OFFICE.

WILLIAM HENRY SHEFFIELD, OF HOBART, NEW YORK.

FILLING APPARATUS.

No. 833,637. Specification of Letters Patent. Patented Oct. 16, 1906.

Application filed August 13, 1904. Serial No. 220,655.

To all whom it may concern:

Be it known that I, WILLIAM HENRY SHEFFIELD, a citizen of the United States, and a resident of Hobart, in the county of Delaware and State of New York, have invented a new and Improved Filling Apparatus, of which the following is a full, clear, and exact description.

The invention relates to filling apparatus such as shown and described in the Letters Patent of the United States No. 724,341, granted to me March 31, 1903.

The object of the present invention is to provide a new and improved filling apparatus more especially designed for filling milk and other liquids into a number of bottles or receptacles moved intermittently over a stationary table, the arrangement being such that the waste or loss of the liquid is reduced to a minimum and the receptacles are accurately and uniformly filled to the desired height.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement. Fig. 2 is a cross-section of the same on the line 2 2 of Fig. 1. Fig. 3 is a cross-section of the device for imparting an intermittent traveling motion to the receptacle-pushing device. Fig. 4 is a rear end elevation of the improvement. Fig. 5 is an enlarged cross-section of the improvement on the line 5 5 of Fig. 7. Fig. 6 is a sectional side elevation of the closing-head for the end of one of the supply-tubes, the section being on the line 6 6 of Fig. 5; and Fig. 7 is an enlarged longitudinal sectional elevation of the improvement on the line 7 7 of Fig. 4.

The bottles or receptacles A to be filled are set in transverse rows on the rear end of a table B, fixed on a suitable frame C, the rear end of the said table terminating in a downwardly-extending apron B′ to facilitate passing the bottles over the apron onto the rear end of the table. The bottles A are pushed forward over the table in the direction of the arrow *a′* by the use of a pushing device consisting, essentially, of endless sprocket-chains D D′, passing over sprocket-wheels D^2 D^3, journaled on the rear and front ends of the frame C, and the said endless sprocket-chains are connected with each other by cross-bars D^4, spaced apart to embrace two transverse rows of receptacles between adjacent bars D^4, as plainly indicated in Fig. 1.

The table B is provided with rising sides B^2, formed with outwardly-extending integral flanges B^3, (see Figs. 1 and 2,) on which rest and travel the upper runs of the sprocket-chains D D′ and the outer portions of the cross-bars D^4, employed for pushing the bottles over the table. By the arrangement described the sides B^2 of the table prevent the bottles from scattering transversely, and the bars D^4 prevent the bottles from scattering lengthwise, so that the bottles are at all times in proper alinement to permit their convenient filling and to facilitate the pushing of the bottles over the table B. As indicated in the drawings, two rows of bottles are filled simultaneously, it being understood that the rear row of bottles is pushed by a bar D^4 and the front row of bottles is pushed upon by the rear row, as will be readily understood by reference to Fig. 1.

In order to give the desired intermittent motion to the pushing device, a shaft D^5, carrying the front sprocket-wheels D^3, is provided with a sprocket-wheel E, over which passes a sprocket-chain E′, also passing over a sprocket-wheel E^2, having its shaft E^3 journaled in suitable bearings on the frame C. A ratchet-wheel E^4 is secured on the shaft E^3 and is engaged by a spring-pressed pawl E^5, fulcrumed on a hand-lever E^6, loosely fulcrumed on the shaft E^3, so that when the operator swings the hand-lever E^6 upward the pawl E^5 glides over the teeth of the ratchet-wheel E^4, and when the operator swings the hand-lever E^6 downward then the pawl E^5 turns the ratchet-wheel E^4 and with it the shaft E^3, so that the rotary motion of the latter is transmitted to the shaft D^5 by the sprocket-wheels E^2 E and the sprocket-chain E′. The rotary motion of the shaft D^5 causes a traveling of the sprocket-chains D D′ and their cross-bars D^4 to push the bottles over the table B in the direction of the arrow *a′*, as previously explained.

The liquid-supply F is preferably in the form of two transversely-extending tubes F′

and F^2, rigidly connected with each other at or near their middle by a saddle F^3, connected by a coupling F^4 with a flexible tube G, leading from an overhead tank or other suitable liquid-supply, so that the liquid flows by its own gravity through the tube G and the hollow saddle F^3 into the tubes F′ and F^2 to keep the same constantly filled with the liquid. The ends of the tubes F′ and F^2 are attached to cross-heads F^5, mounted to slide up and down on vertically-disposed guide-rods C′, forming part of the main frame C.

On the under side of each of the liquid-supply tubes F′ and F^2 is secured a transverse row of filling-tubes H, adapted to pass into the corresponding row of bottles A, the lower ends of the said filling-tubes *h* reaching within a short distance of the bottoms of the bottles A at the time the liquid-supply F is in a lowermost position. (See Fig. 7.) Now the liquid flowing from a tube F′ or F^2 by way of a filling-tube H into the corresponding receptacle A does not foam or froth, and consequently proper filling of the receptacle is the result. The upper ends of the filling-tubes H are screwed into the tubes F′ or F^2, said tubes H having suitable wings H′ for convenient turning of the tubes by the operator to allow of removing a filling-tube whenever it is desired to do so.

The upper terminals of the filling-tubes H within the supply-tubes F′ and F^2 are normally closed by valves I, having valve-stems I′ extending down through the filling-tubes H to engage the bottoms of the receptacles A at the time the liquid-supply F moves into a lowermost position, so that the valves I are lifted off their seats to open the filling-tubes H to the liquid to allow the latter to flow through the filling-tubes H into the receptacles A to fill the same.

On each of the filling-tubes H is arranged a tubular air-vent J, mounted to slide vertically in a bearing K′, formed on a drip-pan K, having cross-heads K^2 mounted to slide up and down on the guide-rods C′, previously mentioned. On the lower end of each air-vent J screws a seat L, engaged on top by a metallic washer L′, against which screws a nut L^2, screwing on the lower threaded end of the tubular air-vent J, and on the said nut L^2 presses one end of a spring N, coiled on the air-vent J and abutting with its free end on the bearing K′. (See Fig. 7.) The seat L is preferably made of rubber and is adapted to be seated on the top of the corresponding receptacle A, so as to close the mouth thereof and direct the air escaping from the receptacle A during the filling operation into the air-vent J and through the same, the air-vent also serving as an overflow in case the supply F is not raised by the operator after the receptacles are filled to the desired height. Now such liquid rising in the air-vent J flows over the upper end thereof and down an inclined flange J′ into the drip-pan K to accumulate therein.

By screwing the nut L^2 up or down on the air-vent tube J and moving the washer L′ and the seat L correspondingly with the nut L^2, I am enabled to regulate the distance the lower end of the air-vent tube J is to extend into the receptacle A to fill the latter up to the lower edge of the said vent-tube J. The extent to which the vent-tube J is entered into the receptacle determines the amount of liquid to be filled into the receptacle.

In order to permit the free flow of the liquid down each filling-tube H, the latter is provided above the drip-pan K with a vent-aperture H^2, surrounded by a hood or deflector H^3, secured to or forming part of the filling-tube H and serving to deflect any liquid that passes out of the said aperture H^2 down into the drip-pan K and also any liquid that passes out of the vent J, and thus prevent spurting of the liquid.

The drip-pan K and the liquid-supply F are moved simultaneously up and down on the guide-rods C′, but at a different rate of speed, and for this purpose the following device is provided: A transverse shaft O is journaled in suitable bearings carried by arms C^2, attached to the guide-rods C′ between the cross-heads F^5 and K^2, as plainly shown in Fig. 1 of the drawings. On one outer end of the shaft O is secured a handle O′ (see Fig. 4) under the control of the operator for imparting a rocking motion to the said shaft O on moving the handle up and down. On the shaft O are secured arms P, connected by pitmen P′ with pins P^2, secured on brackets F^9, forming part of the cross-heads F^5, so that when the shaft O is turned in one direction by swinging the handle O′ downward in the direction of the arrow *b*′ then the arms P and pitmen P′ impart an upward sliding motion to the liquid-supply F, and when the handle O′ is swung in the reverse direction of the arrow *b*′ then the liquid-supply F is moved downwardly on the guide-rods C′. On the shaft O are also secured cams Q, having cam-grooves Q′, in which are mounted to travel friction-rollers Q^2, (see Figs. 5 and 7,) journaled on brackets Q^3, secured to the cross-heads K^2 of the drip-pan, so that when the shaft O is turned on swinging the hand-lever O′ downward then the drip-pan K is raised by the action of the said cams Q and the friction-rollers Q^2, journaled in the brackets Q^3, attached to the drip-pan, and when the handle O′ is swung in the reverse direction of the arrow *b*′ the drip-pan K is lowered; but by reference to Fig. 7 it will be seen that the upward sliding motion of the drip-pan K is considerably slower than the upward movement of the liquid-supply F, and consequently the seat L remains seated on a bottle A until after the valve I for the corresponding filling-tube H has moved into a closed position, and

thereby shut off the filling-tube H from the liquid contained in the corresponding tube F′ or F². In a like manner when the drip-pan K and the liquid-supply F move downward the seat L moves in engagement with the bottle A previous to the stem I′ striking the bottom of the bottle, so that the bottle A is closed on top at the time the valve I is lifted off its seat and the liquid begins to flow from the corresponding tube F′ or F² into the bottle.

The drip-pan K is provided on its bottom with discharge-spouts K³, preferably two in number, for delivering the liquid accumulated in the drip-pan K into two of the bottles A held in the row immediately in the rear of the rear row of bottles to be filled at the time, as will be readily understood by reference to Figs. 4 and 7, it being understood that the said discharge-spouts K³ are in vertical alinement with the mouths of the corresponding bottles A. The spouts K³ are adapted to be closed by valves R, having their stems R′ attached to a lever R², fulcrumed on a bar R³, fastened to the drip-pan K and moving with the same, and the lever R² is adapted to be engaged at its free end by the hollow saddle F³, so that when the liquid-supply F moves into a lowermost position the said saddle F³ imparts a swinging motion to the lever R² to lift the valves R off their seats and allow the liquid contained in the drip-pan K at the time to flow down the spouts K³ into the two corresponding bottles A below. In order to bring these two bottles which receive the liquid from the drip-pan K into proper alinement with the spouts K³ and to center the receptacles to the filling-tubes H, I prefer to employ two guide-arms S, one of which is shown in Fig. 7, secured to the drip-pan K and moving with the same and adapted to engage the bottles at their outer sides, so as to push the same close together, and consequently into alinement with the spouts K³. The lower ends of the guide-arms S are preferably provided with longitudinal arms S′, as plainly indicated in Fig. 7, to gradually push the two bottles close together previous to the bottles reaching their final position for receiving the drip liquid. When the liquid-supply F and the drip-pan K rise, but with the liquid-supply traveling faster than the drip-pan K, then the lever R² is released by the saddle F³, and the valves R by their own weight now close the discharge-spouts K³.

In order to allow periodical cleaning of the tubes F′ and F², each of the latter is provided at each end with a removable cover F⁶, fastened in place by a screw-rod F⁷, screwing in a yoke F⁸, removably held on the corresponding end of the tube F′ or F². (See Figs. 5 and 6.)

Any liquid that drips onto the table B is pushed forward thereon by the forwardly-moving bottles A and is finally discharged from the table by a discharge-pipe B⁴, leading from the bottom of the table to one side of the apparatus, as plainly indicated in Figs. 1 and 2.

The operation is as follows: When the handle O′ is down, then the liquid-supply F and the drip-pan K are in an uppermost position, and the lower ends of the filling-tubes H and the valve-stems I′, as well as the seats L, are above the tops of the receptacles A, so that the operator can now conveniently manipulate the hand-lever E⁶ to impart a traveling motion to the pushing device for pushing the bottles along on the table B to bring two rows of bottles to be filled in alinement with two rows of filling-tubes H, depending from the tubes F′ and F² of the liquid-supply F. When the bottles have reached the desired position, then the operator moves the handle O′ upward to move the liquid-supply F and the drip-pan K simultaneously downward for the seats L to engage the upper ends of the bottles A and for the filling-tubes H and the stems I′ to pass into the bottles. The valves I are finally opened, as previously explained, so that the liquid can flow from the supply-tubes F′ and F² into the bottles A to fill the same. As soon as the receptacles are filled to the desired height the operator in charge of the machine swings the handle O′ downward, so as to cause an upward movement of the liquid-supply F and the drip-pan K, as previously explained, to cause the valves I to automatically seat themselves, and thereby prevent further outflow of the liquid from the supply-tubes F′ and F². It is understood that when the liquid-supply F moves into its lowermost position, the valves R are lifted off their seats on the discharge-spouts K³ to allow any liquid that may pass into the drip-pan K during the filling operation to readily flow through the said discharge-spouts into the two receptacles in the following first row of empty receptacles to be filled.

Although I have shown the mechanism for imparting an intermittent motion to the pushing device and the mechanism for imparting an up-and-down movement to the liquid-supply F and the drip-pan K as being operated manually, it is evident that the said devices may be actuated automatically in proper succession by power.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A filling apparatus comprising a vertically-movable liquid-supply for containing the liquid to be filled into receptacles, a filling-tube leading from the bottom of the said liquid-supply and adapted to be passed into a receptacle to be filled, the said filling-tube having an air-vent in its side, a vertically-

movable drip-pan, a spring-pressed tubular air-vent through which extends the filling-tube, a seat on the air-vent for engaging the top of the receptacle to be filled, a valve controlling the inlet to the filling-tube within the liquid-supply, the said valve having a valve-stem extending through the filling-tube, to engage the bottom of the receptacle to be filled at the time the liquid-supply moves into a lowermost position, and means for simultaneously operating the liquid-supply and the drip-pan at different rates of speed.

2. A filling apparatus comprising a liquid-supply for containing the liquid to be filled into receptacles, means for moving the liquid-supply up and down, a vertically-movable drip-pan, means for moving the drip-pan simultaneously with the liquid-supply but at a slower rate of speed, a filling-tube leading from the liquid-supply and adapted to pass into the receptacle to be filled, a spring-pressed tube forming an air-vent and an overflow, the tube extending through the drip-pan and through which extends loosely a filling-tube, which latter is provided in its side, above the drip-pan, with an air-vent, and a seat on the said tube, adapted to be seated on the receptacle.

3. A filling apparatus comprising a liquid-supply for containing the liquid to be filled into receptacles, means for moving the liquid-supply up and down, a drip-pan mounted to travel with the liquid-supply during part of the latter's movement, a filling-tube leading from the liquid-supply and adapted to pass into the receptacle to be filled, a spring-pressed tube forming an air-vent and an overflow, the tube extending through the drip-pan and through which extends loosely a filling-tube, which latter is provided in its side, above the drip-pan, with an air-vent, a deflector on the said filling-tube, around the air-vent, to deflect any liquid escaping through the vent-opening down into the drip-pan and prevent spurting of the liquid, and a seat on the said tube, adapted to be seated on the receptacle.

4. A filling apparatus provided with a filling-tube for conducting the liquid into the vessel to be filled, the said tube having a vent-opening in its side, a drip-pan through which passes the filling-tube, and a hood-shaped deflector secured to the filling-tube above the vent-opening and serving to deflect any liquid passing through the vent-opening down into the drip-pan.

5. A filling apparatus comprising a liquid-supply, a filling-tube thereon, an air-vent through which passes the said filling-tube, a support carrying the said air-vent, a rock-shaft having a cam directly connected with the said support, to positively raise or lower the latter, and a connection between the rock-shaft and the said liquid-supply, to raise and lower the latter.

6. A filling apparatus comprising a liquid-supply mounted to move up and down, a valved filling-tube on the said supply and moving with the same, an air-vent through which extends the filling-tube loosely, a support for the air-vent, said support being free to move downward, and a mechanism connected with the said liquid-supply and the said support, to move the two positively and simultaneously up and down at a different rate of speed.

7. A filling apparatus comprising a liquid-supply mounted to move up and down, a valved filling-tube on the said supply and moving with the same, an air-vent through which extends the filling-tube loosely, a support for the air-vent, a rock-shaft, a cam thereon, means on the said support engaging the cam, an arm on the said shaft, and a link connecting the arm with the said liquid-supply.

8. A filling apparatus provided with a filling device for filling-receptacles, a drip-pan for receiving the overflow liquid from the filling device, a valved outlet from the said drip-pan, to direct the overflow liquid from the said pan into a receptacle to be subsequently filled by the filling device, the said valved outlet being controlled from the said filling device, and means carried by the drip-pan for bringing the receptacle into alinement with the said valved outlet, for the latter, when opened, to discharge into the receptacle.

9. A filling apparatus provided with a filling device for filling receptacles, a drip-pan for receiving the overflow liquid from the filling device and provided with a discharge-spout, a valve for controlling the passage of liquid through said spout, means controlled by the filling device for operating said valve, and means on the drip-pan for bringing the receptacles into alinement with the said valved outlet, for the latter, when opened, to discharge into the receptacle, and for centering the receptacle to the filling-tube.

10. In a filling apparatus, a vertically-movable liquid-supply, a vertically-movable drip-pan, a rock-shaft provided with arms, cams on the shaft and provided with cam-grooves, rollers carried by the drip-pan and engaging the grooves of the cams, and pitmen pivotally connected to the arms of the shaft and the liquid-supply.

11. In a filling apparatus, a supply mounted to move up and down, a drip-pan free to move up and down, a filling-tube carried by the supply and extending through the drip-pan, and means for moving the supply and drip-tank simultaneously but at different speeds.

12. In a filling apparatus, a supply mount-

ed to move up and down, a drip-pan and also movable up and down, a filling-tube carried by the supply and extending through the drip-pan, a vent surrounding the filling-tube and having its upper end extending into the drip-pan, and means for simultaneously moving the supply and drip-pan at different speeds.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM HENRY SHEFFIELD.

Witnesses:
F. W. HANAFORD,
WALTON HARRISON.