

[54] LIQUID GRAVITY FEED SYSTEM

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[22] Filed: Apr. 24, 1974  
[21] Appl. No.: 463,535

[52] U.S. Cl. .... 222/529; 141/279; 251/7;  
251/9  
[51] Int. Cl. .... B67c 3/28; F16l 55/14  
[58] Field of Search ..... 222/529; 141/279; 251/4,  
251/7, 9

[56] References Cited  
UNITED STATES PATENTS

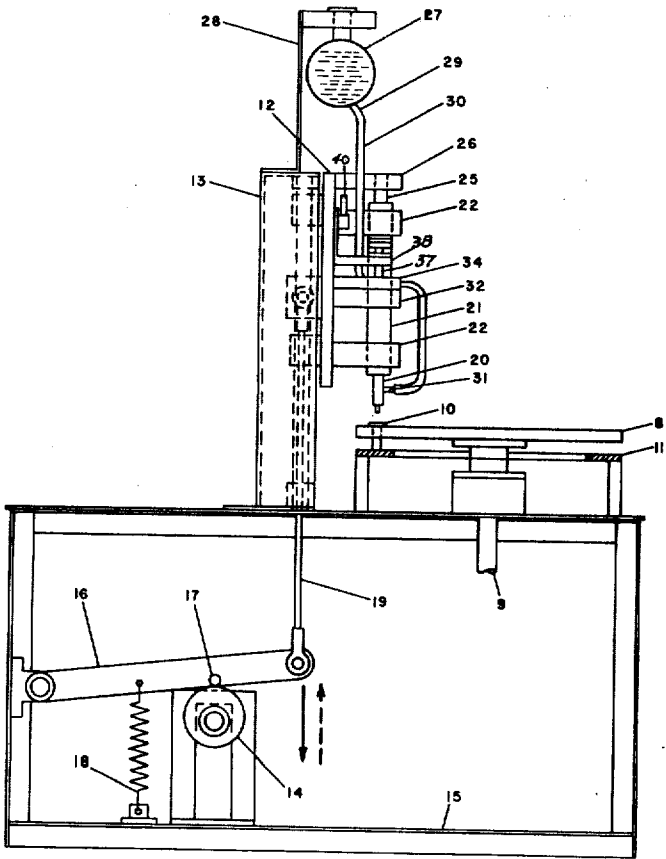
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Assistant Examiner—Frederick R. Handren

[57] ABSTRACT

A liquid gravity feed system consisting of a nozzle connected to a liquid reservoir and carrying a clamping member to normally shut-off the flow of liquid to the nozzle. Contact between said nozzle and a syringe barrel will move the clamping member to permit the flow of liquid to the nozzle. Means are provided to regulate the rate of flow of the liquid to the nozzle when the clamping member is moved to permit the flow of liquid to the nozzle. The regulating means is adjusted out of regulating position when it is desired to replace or sterilize the connection between the reservoir and the nozzle.

3 Claims, 6 Drawing Figures



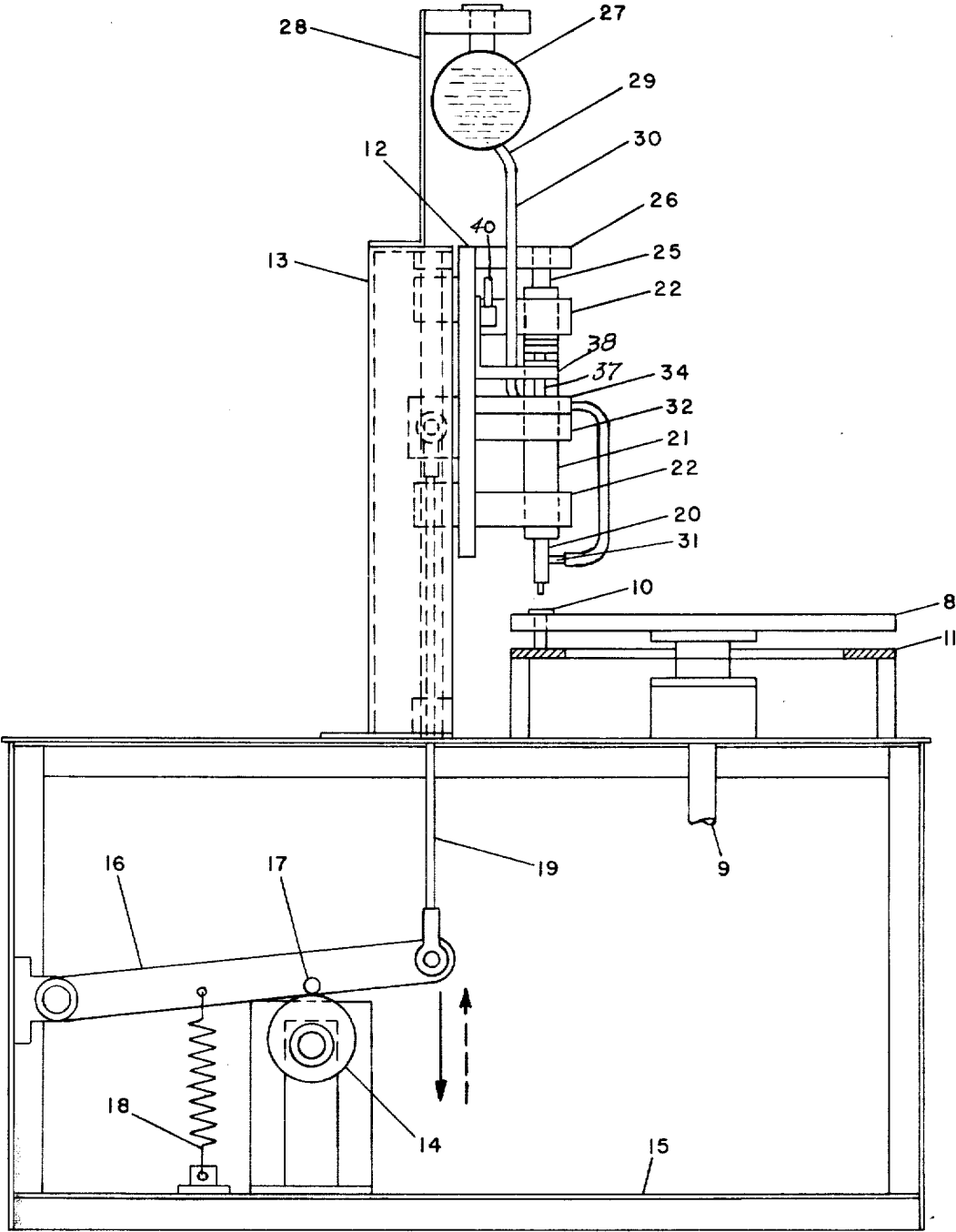


FIG. 1.

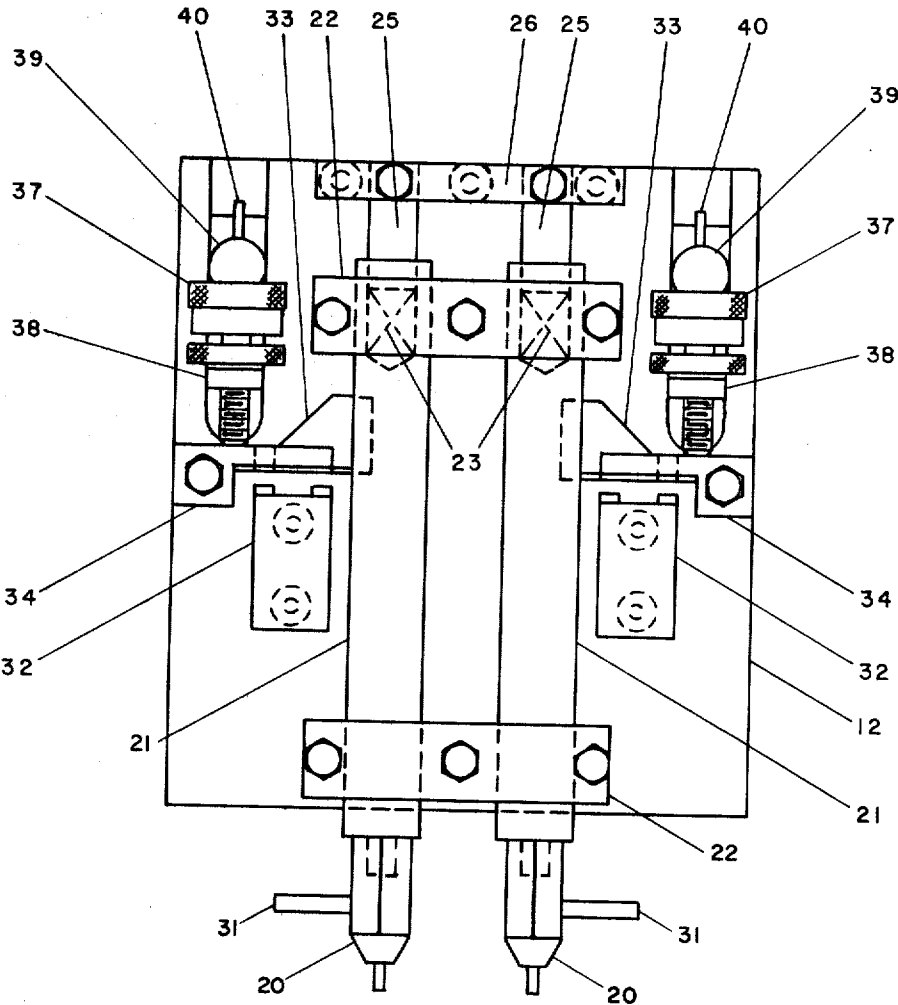


FIG. 2.

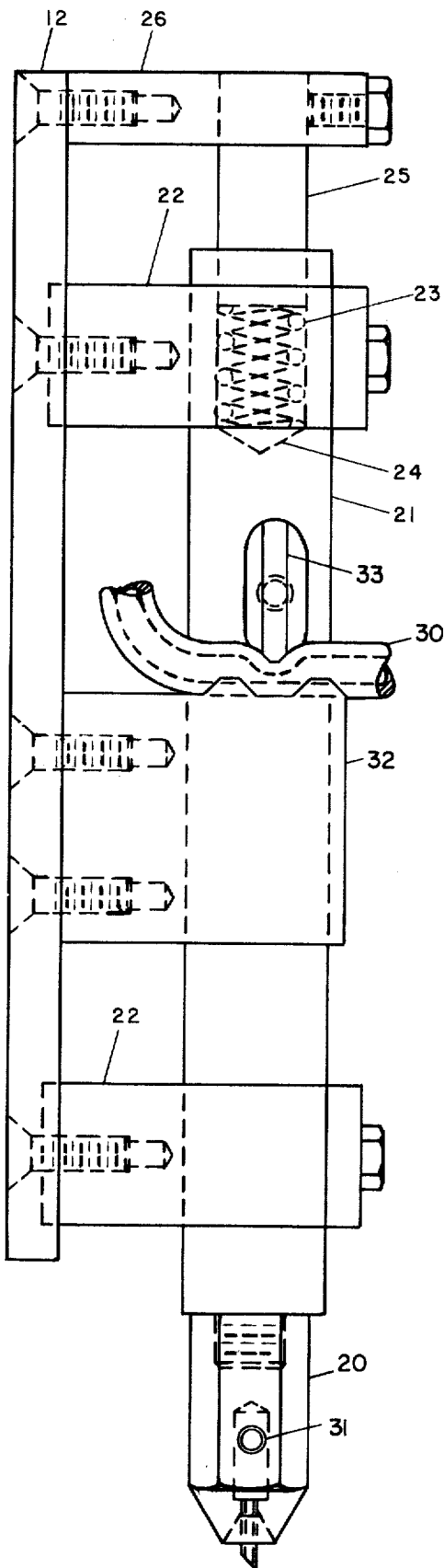


FIG. 3.

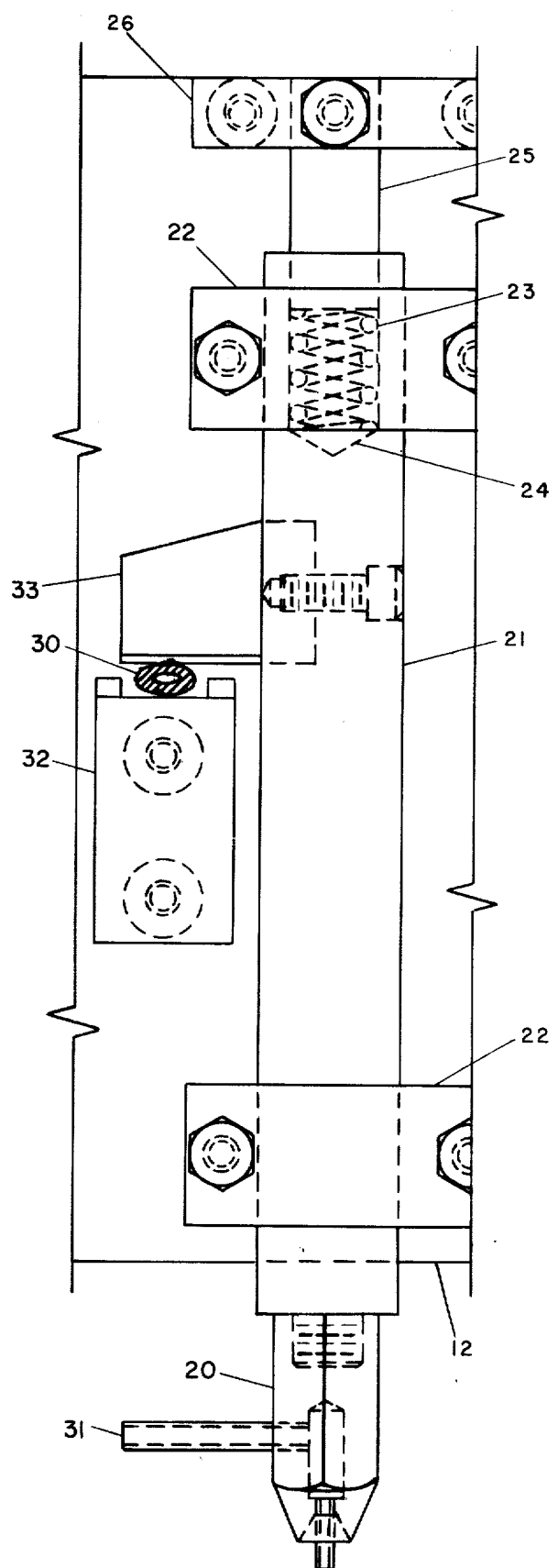


FIG. 4.

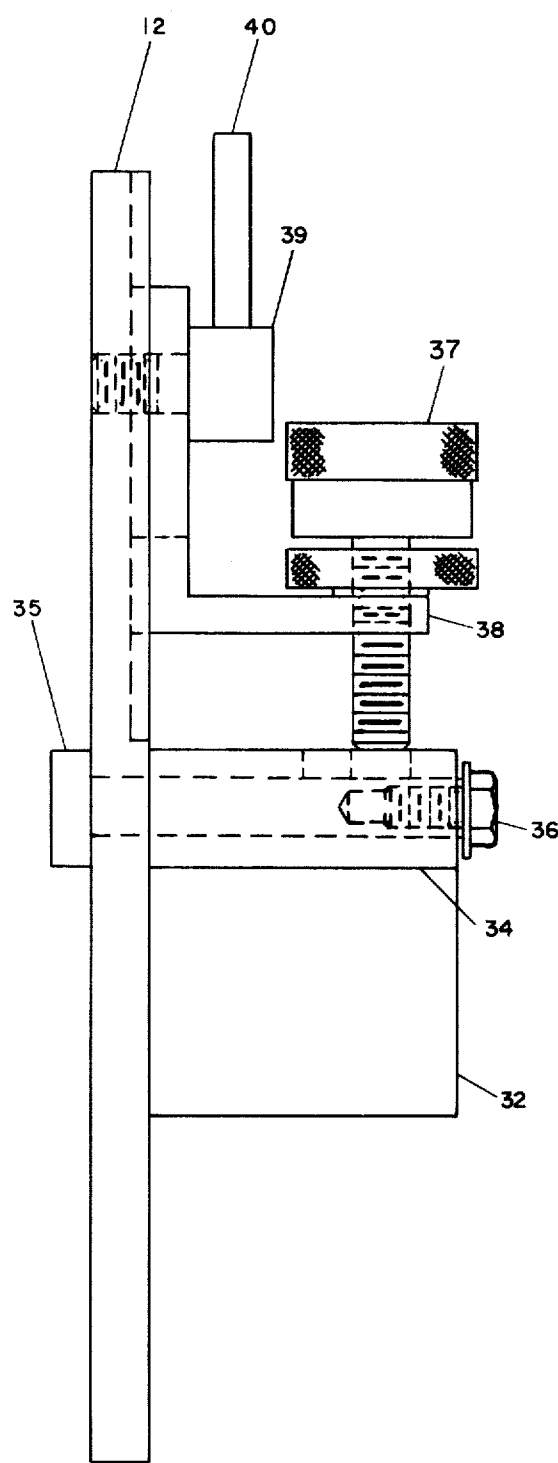


FIG. 5.

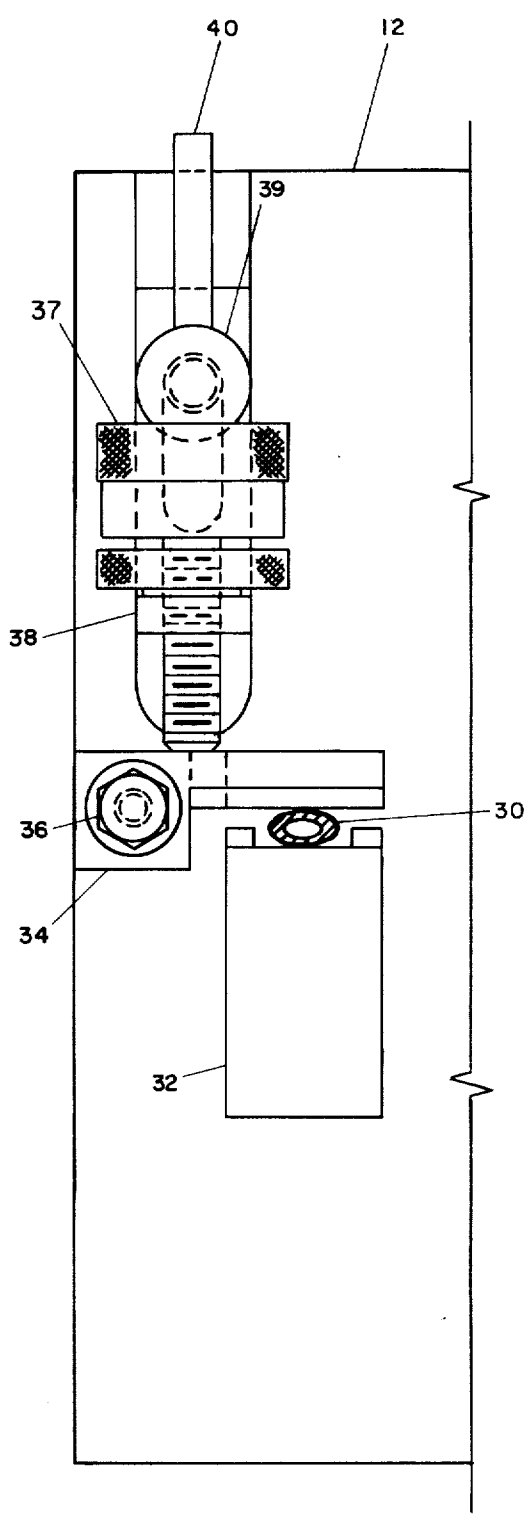


FIG. 6.

## LIQUID GRAVITY FEED SYSTEM

The invention comprises a slide reciprocated between a reservoir for liquid and a conveyor for syringe barrels. A pair of nozzles are reciprocally supported by the slide to engage the syringe barrels equidistantly spaced on the conveyor and during the movement of the slide toward the conveyor. Said engagement of the nozzles with the syringe barrels will move the nozzles from the conveyor independently of the slide. Clamping members are carried by the nozzles and yieldingly urged toward anvils mounted on the slide and arranged to support intermediate portions of flexible conduits connected to outlets of the reservoir and to the nozzles. The yielding force of the clamping members will squeeze the intermediate portions of the conduits against the anvils and shut-off the flow of liquid to the nozzles. The engagement of the nozzles with the syringe barrels will move the clamping members from the flexible conduits and permit the flow of liquid to the nozzles and the filling of the syringe barrels. The rate of flow of liquid to the syringe barrels is regulated by levers adjustably mounted on the slide and extended over the portions of the flexible conduits supported by the anvils. Adjustment screws are carried by brackets adjustably supported by the slide. The adjustment screws are normally positioned by the brackets to contact the levers and position the levers on the flexible conduits to regulate the flow of liquid to the nozzles. The brackets are adjusted on the slide to position the adjustment screws out of contact with the levers to permit replacement or sterilization of the flexible conduits.

In the drawings accompanying this application:

FIG. 1 is an elevational view of the system;

FIG. 2 is a front view of the slide, nozzles, clamping members, anvils, levers, adjustment screws and brackets;

FIG. 3 is a side view, on an enlarged scale, of the slide, a nozzle, clamping member, anvil and intermediate portion of a flexible conduit;

FIG. 4 is a front view looking at the right hand side of FIG. 3;

FIG. 5 is a side view, on an enlarged scale, of the slide, a lever, adjustment screw and bracket; and

FIG. 6 is a front view looking at the right hand side of FIG. 5.

The embodiment of the invention, as shown in FIG. 1, is supported on a table relative to a turret 8 secured on a shaft 9 rotatably supported by the table and intermittently rotated by suitable means, not shown. The turret 8 is arranged to be engaged by equidistantly spaced syringe barrels 10 supported by an annular platform 11 mounted on the table.

A slide 12 is reciprocally supported in a vertical standard 13 mounted on the table and said slide 12 is reciprocated toward and away from the table by a cam disc 14 rotatably supported by a base 15 of the table and continuously rotated by a suitable source of power, not shown. Rotation of the cam disc 14 is transformed into reciprocation of the slide 12 by an arm 16 pivotally supported at one end by the table and having a follower 17 intermediate its ends and maintained in engagement with the cam disc 14 by a spring 18. The opposite end of the arm 16 is pivotally connected to the slide 12 by a rod 19.

A pair of nozzles 20 are carried by rods 21 slidingly supported in brackets 22 mounted on the slide 12 in vertical alignment of the path of travel of the syringe

barrels 10 on the platform 11. The nozzles 20 are yieldingly urged toward the syringe barrels 10 by springs 23 retained in recesses 24 in the upper ends of the rods 21 by plugs 25 suspended from a bracket 26 projecting from the front of the slide 12, as shown in FIGS. 2, 3 and 4. The slide 12 is actuated toward the syringe barrels 10 during the period of rest of the turret 8 and said actuation of the slide 12 will engage the nozzles 20 with adjacent syringe barrels 10 and move the rods 21 against the force of the springs 23.

A liquid reservoir 27 is supported above the bracket 26 by a post 28 mounted on the standard 13, as shown in FIG. 1. The reservoir 27 is provided with outlets 29 connected to one end of flexible conduits, such as hoses 30, and the opposite ends of the hoses 30 are connected to the nozzles 20, as at 31. Intermediate portions of the hoses 30 are supported by anvils 32 mounted on the slide 12 to cooperate with clamping members 33 carried by the nozzle rods 21 whereby said intermediate portions of the hoses 30 are squeezed against the anvils 32 by the clamping members 33 under the influence of the springs 23 and the flow of liquid is shut-off from the nozzles 20 with the slide 12 positioned from the syringe barrels 10. When the slide 12 is actuated toward the syringe barrels 10 and the rods 21 are moved against the springs 23 by the engagement of the nozzles 20 with said syringe barrels 10, the clamping members 33 are lifted from the hoses 30 to permit a flow of liquid to the nozzles 20 and the filling of the syringe barrels 10 positioned below said nozzles 20.

Downward movement of the rods 21 is limited by the hoses 30 and when the hoses 30 are removed to be sterilized, downward movement of the rods 21 is limited by the clamping members 33 abutting the anvils 32.

The rate of flow of liquid to the nozzles 20 is regulated by levers 34 pivotally mounted on bolts 35 supported by the slide 12 and said levers 34 are retained in adjusted position by screws 36 threaded in the bolts 35. The levers 34 are laterally extended from the bolts 35 over the portions of the hoses 30 on the anvils 32 and said levers 34 are adjusted toward and away from the anvils 32 to vary the degree of compression of the hoses 30 by the levers 34 and the rate of flow of liquid to the nozzles 20. This adjustment of the levers 34 is accomplished by screws 37 adjustably mounted on brackets 38 adjustably mounted on the slide 12 by screws 39 threaded in the slide 12 and provided with manipulating members 40.

To remove the hoses 30 for renewal or sterilization, the screws 39 are loosened to permit swinging of the brackets 38 to position the screws 37 out of contact with the levers 34.

The number of nozzles and their component parts may vary according to the manner of conveying the syringe barrels 10.

Having thus described my invention, I claim:

1. In a liquid gravity feed system, a liquid reservoir having an outlet, a nozzle reciprocally supported below the reservoir, a flexible conduit connecting the reservoir outlet to the nozzle, an anvil reciprocally mounted between the reservoir and the nozzle and supporting an intermediate portion of the flexible conduit, and a clamping member carried by the nozzle above the anvil and yieldingly urged to squeeze the conduit against the anvil and close said conduit, whereby reciprocal movement of the nozzle toward the reservoir will move the

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clamping member from the anvil and permit the flow of liquid through the conduit from the reservoir to the nozzle.

2. A liquid gravity feed system as claimed in claim 1, wherein the means to adjust the lever to vary the space between the lever and the anvil comprises a bracket mounted on the slide above the lever, and a screw adjustably carried by the bracket to contact the lever and

vary the space between the lever and the anvil by the adjustment of the screw.

3. A liquid gravity feed system as claimed in claim 2, wherein the bracket is adjustably mounted on the slide to have adjustment toward and away from the lever and position the screw out of contact with the lever to permit the removal of the conduit.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,893,600 Dated July 8, 1975

Inventor(s) Walter A. Shields

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Columns 2 and 3, Claim 1 should read as follows:

- 1. In a liquid gravity feed system, a liquid reservoir having an outlet, a nozzle reciprocally supported below the reservoir, a flexible conduit connecting the reservoir outlet to the nozzle, an anvil reciprocally mounted between the reservoir and the nozzle and supporting an intermediate portion of the flexible conduit, and a clamping member carried by the nozzle above the anvil and yieldingly urged to squeeze the conduit against the anvil and the close the conduit, whereby reciprocal movement of the nozzle toward the reservoir will move the clamping member from the anvil and permit the flow of liquid through the conduit from the reservoir to the nozzle, a lever pivotally mounted and extended above the anvil in contact with the portion of the conduit supported by the anvil, and means to adjust said lever to vary the space between the lever and the anvil and regulate the rate of flow of liquid through the conduit. -

Signed and Sealed this

Fourteenth Day of September 1976

[SEAL]

Attest:

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C. MARSHALL DANN  
Commissioner of Patents and Trademarks