

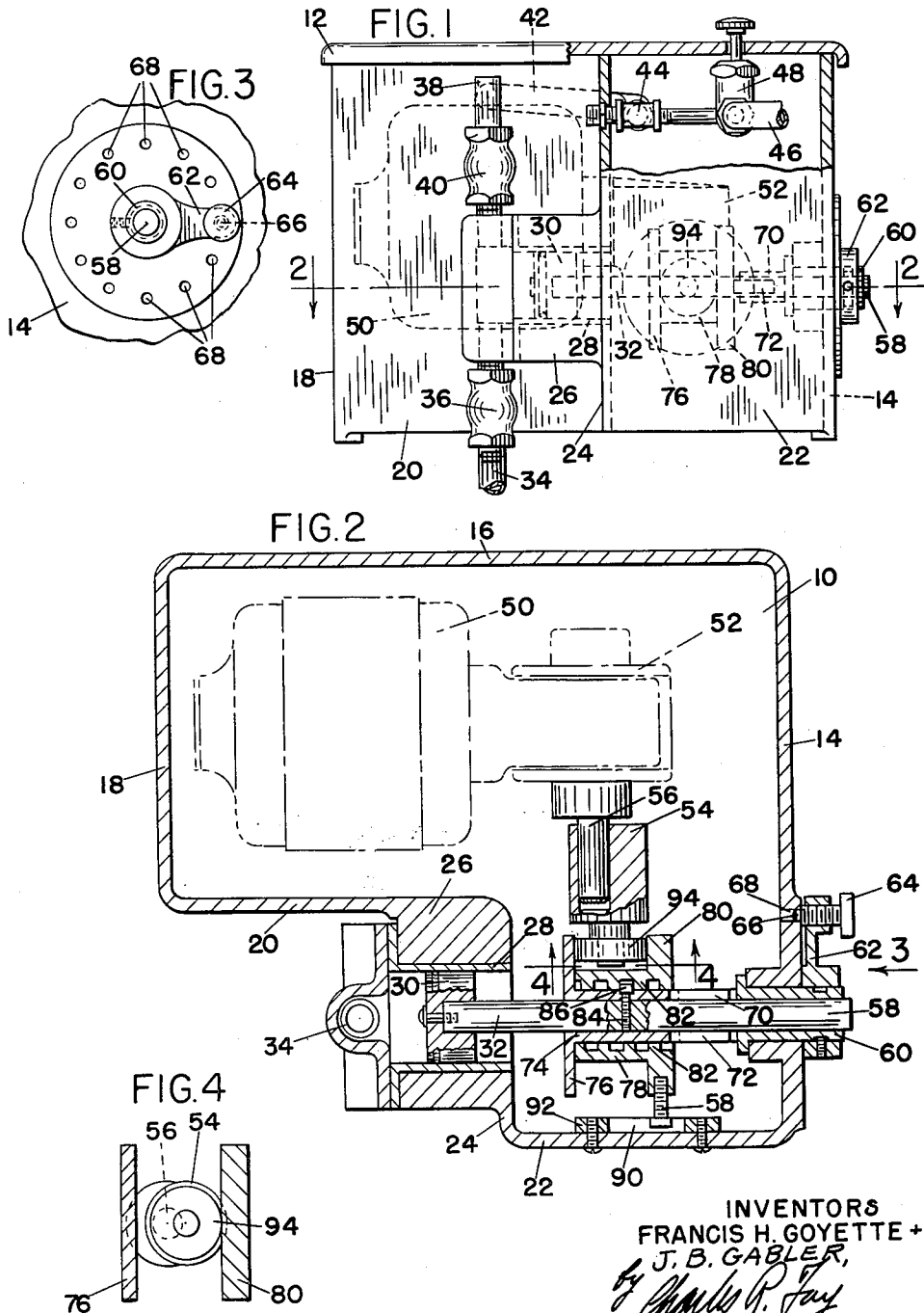
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PROPORTIONING PUMP

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PROPORTIONING PUMP

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This invention relates to a new and improved proportioning pump for providing a very accurately metered amount of the fluid or paste material being pumped. Among the objects of the invention, there is the provision of a relatively simple but very accurate pump which comprises but few parts and is reliable in operation for long periods of time while providing for accurately measuring the pumped material in metered amounts; the provision of a pump as above described including a very simple and accurate means for adjusting the amount of material being pumped; the provision of such adjusting means operated from the exterior of the pump casing, the pump itself being entirely enclosed; and the provision of an adjusting means as above described which is easily, quickly and accurately actuatable by the operator from the outside of the housing while the pump is still in operation, so that the pump need not be stopped or even slowed down in order to provide for a change in the metered amount of material being pumped.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which:

FIG. 1 is a view in side elevation illustrating the invention, parts being in section, and parts being removed for clarity of illustration;

FIG. 2 is a sectional view on an enlarged scale taken on line 2-2 of FIG. 1;

FIG. 3 is a view in elevation looking in the direction of arrow 3 in FIG. 2; and

FIG. 4 is a section on line 4-4 of FIG. 2.

As an illustration of the present invention, the same is in this case fully enclosed in a housing which may take any form but has a floor 10, a top removable cover 12, and several side walls as at 14, 16, 18, 20 and 22. There is also a wall at 24 which forms a jog between wall 20 and wall 22.

As clearly shown in FIGS. 1 and 2, the wall 24 mounts the pump which is conveniently situated in an enlargement or boss 26. This enlargement or boss may be conveniently lined by a cylindrical sleeve 28 forming the cylinder of the pump and the pump itself comprises a gasketed piston or the like 30 mounted on the end of a piston rod 32 and creating suction in the cylinder at the left-hand side thereof in FIG. 2 as well as providing for forcing the fluid after this volume of the piston has been filled under the suction stroke.

An inlet pipe is indicated at 34 and a conventional check valve is located in the fitting 36. The outlet is indicated at 38 and this is provided with a fitting 40 containing another check valve. Thus the fluid is sucked into the chamber in the cylinder 28 to the left-hand side of the piston 30 and is forced outwardly and upwardly through the check valve 40, pipe 38 to whatever position or destination is desired. In the present case, the fluid passes through a pipe indicated at 42 through a relief and pressure valve 44 and into a pipe 46. The reference numeral 48 discloses an inlet valve for another fluid or another material with which the metered material may be mixed if desired.

In this case, the housing contains a motor 50, a gear reduction contained in a housing 52 driven by the motor, and an eccentric 54 driven by the shaft 56 of the motor. This is for the purpose of driving or reciprocating the

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piston rod 32, but of course any other means may be used for accomplishing this reciprocation.

The rod 32 projects through the wall 14 as at 58 and is adapted to be mounted in a sleeve 60 or the like. The sleeve 60 is secured in fixed relation to a rotary adjusting handle 62 which has a releasable knob 64 thereon. This knob is provided with an inner end or point 66 adapted to register with any one of a series of apertures 68 arranged on the arc of a circle, see FIG. 3. This arrangement is for adjustment of the volume of material pumped as will be explained more in detail below.

At its inner end, sleeve 60 is provided with a series of circumferentially spaced elongated longitudinally extending fingers 70 which intermesh with a complementary series of spaced fingers 72 extending in the opposite direction from the right-hand end of a sleeve 74 having an end flange 76. Thus sleeve 74 is longitudinally movable relative to sleeve 60.

Another sleeve 78 is concentrically mounted directly on sleeve 74 and sleeve 78 has an opposite end flange 80. Sleeve 78 is provided with internal square screw-threads 82 and a transverse radially arranged member 84 fixed to the rod 32 extends through sleeve 74 and has an outer end thereon as at 86 engaged with threads 82.

The flange 80 is provided with means maintaining sleeve 78 against rotation, and in this case this comprises a radially-extending member 88 lodged in a slot 90 in a member 92 mounted on the inner side of wall 22. Slot 90 is parallel to rod 32. Thus it will be seen that when handle 64 is properly manipulated and arm 62 is turned from one aperture 68 to another, sleeve 60 is turned, this in turn rotating sleeve 74, and member 84 causes longitudinal displacement of sleeve 78 with its flange 80 relative to sleeve 74 and flange 76. Therefore the flanges 76 and 80 are relatively adjustable longitudinally toward and away from each other.

The eccentric 54 has mounted thereon a concentric roller at 94 and as the eccentric 54 moves in an orbital path, roller 94 engages flange 76 and flange 80 alternately, thus causing rod 32 to reciprocate due to the connection 84 which is engaged with both of the sleeves 78 and 74. However, upon separation of the flanges 76 and 80, the degree of engagement of the roller 94 with the flanges is lessened. The condition shown in FIG. 2 is of that of almost maximum throw of rod 32 and piston 30 entailing nearly maximum pumping action. Any further separation of flanges 76 and 80 results in a lesser flow, and this machine can be adjusted to a point where the flow is almost non-existent but still present. Furthermore, this entire adjustment may be made completely externally of the machine by means of arm 62.

It will be seen that this invention provides a relatively simple metering pump which is extremely accurate in operation, and is simple, reliable and rugged in construction. It is completely self-contained and may be easily connected to a source of supply through inlet pipe 34 and to whatever device or container is to be supplied with the metered material. Also, as illustrated in the present case, another fluid or another material may be proportionately and evenly mixed by use of the valve 48. The entire device may be set in place or removed and replaced, and any adjustment from maximum to minimum may be made without stopping the action of the pump.

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. A device of the class described comprising a casing, a cylinder therein, a piston in the cylinder, a piston rod connected to the piston, means for reciprocating the piston rod, said means comprising a pair of radially arranged elements on said piston rod, adjusting means for causing

separation or advance of said elements to and from each other, means mounted on the casing to actuate the adjusting means, one of said elements being non-rotatably connected to said piston rod, and means between said elements to impinge upon the same to cause reciprocation of said piston rod, said means impinging upon said elements to a greater or lesser degree depending upon the relative axial adjustment of said elements.

2. The device of claim 1 wherein said elements comprise flanges mounted on the piston rod and surrounding the same.

3. The device of claim 1 including actuating means for said adjusting means located exteriorly of the casing.

4. The device of claim 1 wherein said elements comprise flanges mounted on the piston rod and surrounding the same, said adjusting means being capable of actuation while the rod is reciprocating.

5. A device of the class described comprising a casing, a cylinder, a piston in the cylinder, a piston rod connected to the piston, a sleeve on the piston rod, said sleeve being fixed thereto, a second sleeve on and slidably connected with relation to the first sleeve, a flange on each sleeve, said flanges being located radially with respect to said piston rod, means for adjusting the outer sleeve axially relative to the inner sleeve, and rotary means between the flanges to reciprocate the rod by impinging on the flanges.

6. Device of the class described comprising a casing, a cylinder, a piston in the cylinder, a piston rod connected to the piston, a sleeve on the piston rod, said sleeve being fixed thereto, a second sleeve on and slidably connected with relation to the first sleeve, a flange on each sleeve, said flanges being located radially with respect to said piston rod, means for adjusting the outer sleeve axially relative to the inner sleeve, a radial element on said piston rod extending through the first sleeve, internal screw threads on the outer sleeve, said element extending into engagement with said screw threads, means to rotate the inner sleeve, and rotary means between the flanges to reciprocate the rod by impinging on the flanges.

7. Device of the class described comprising a casing, a cylinder, a piston in the cylinder, a piston rod connected to the piston, a sleeve on the piston rod, said sleeve being fixed thereto, a second sleeve on and slidably connected with relation to the first sleeve, a flange

on each sleeve, said flanges being located radially with respect to said piston rod, means for adjusting the outer sleeve axially relative to the inner sleeve, a radial element on said piston rod extending through the first sleeve, internal screw threads on the outer sleeve, said element extending into engagement with said screw threads, means to rotate the inner sleeve, and rotary means between the flanges to reciprocate the rod by impinging on the flanges, and means located at the exterior of the casing for rotating said inner sleeve, said last-named means being in the form of a sleeve and having interfitting non-rotary connection with said inner sleeve.

8. A device of the class described comprising a casing, a cylinder and piston therein, a piston rod for the piston, a radially arranged element on said piston rod extending transversely therefrom, a sleeve on the rod, said element extending through and beyond said sleeve, a second sleeve slidably mounted on the first sleeve and having internal threads therein, said element extending into engagement with said threads, flanges on the sleeves, and means located between the flanges for reciprocating the same and therefore the piston rod, means for rotating the inner sleeve, said means comprising a sleeve mounted on the piston rod at a point remote from the first-named sleeve, slidably interengaging means between the last-named sleeve and the first-named sleeve, means at the exterior of the casing for rotating the last-named sleeve whereby said element in engagement with the threads on the outer sleeve causes the same to be axially translated, and means holding said outer sleeve against rotation.

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