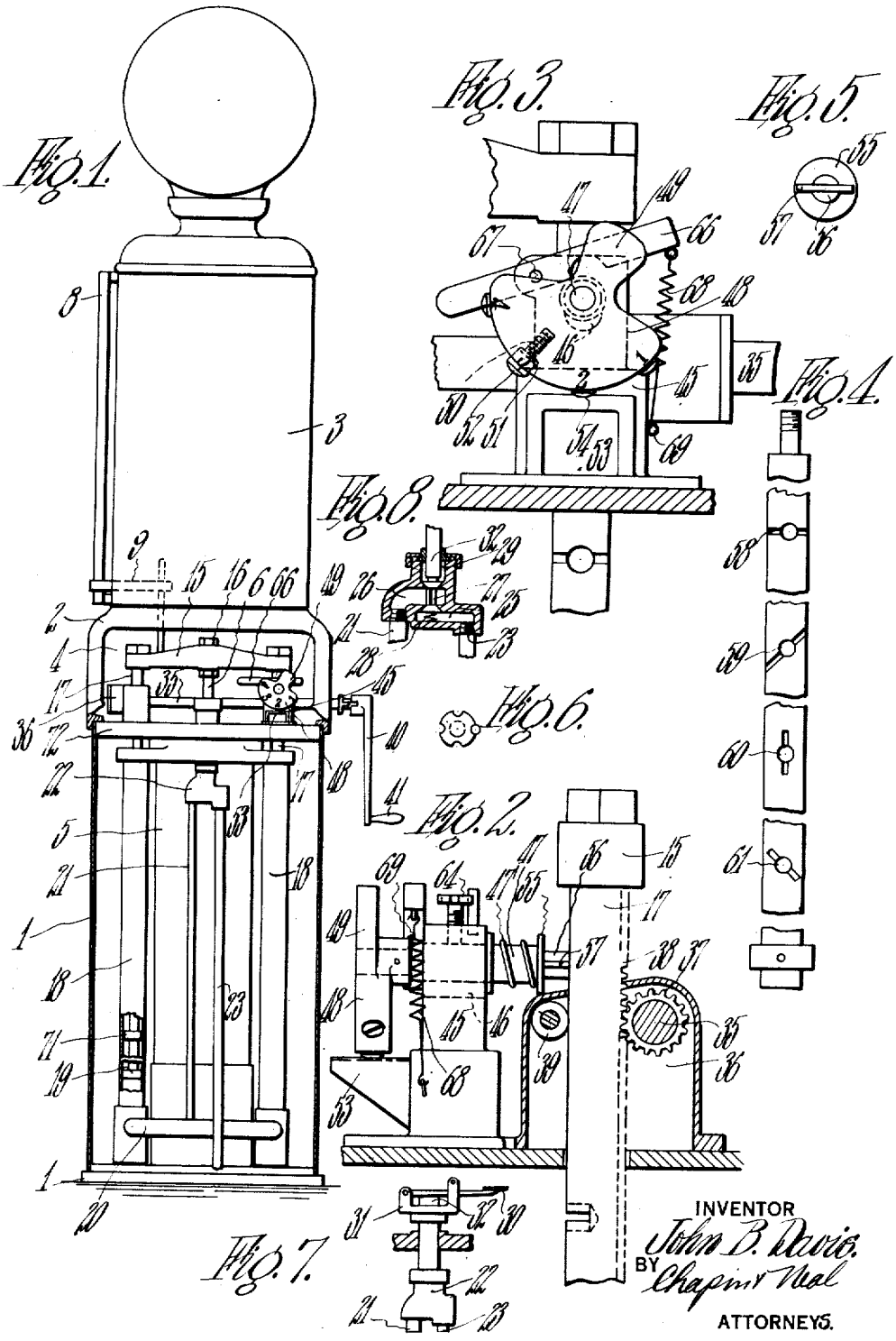
Mar. 6, 1923. 1,447,511

J. B. DAVIS

LIQUID DISPENSING APPARATUS

Filed Aug. 7, 1920



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UNITED STATES PATENT OFFICE.

JOHN B. DAVIS, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO GILBERT & BARKER MANUFACTURING COMPANY, OF WEST SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

LIQUID DISPENSING APPARATUS.

Application filed August 7, 1920. Serial No. 401,966.

To all whom it may concern:

Be it known that I, JOHN B. DAVIS, citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Liquid Dispensing Apparatus, of which the following is a specification.

This invention relates to an improved dispensing pump of the type wherein the plunger piston is adapted to discharge a measured quantity of liquid proportionate to the desired degree of movement of the plunger piston during each stroke.

Pumps of this character as heretofore constructed, have frequently been provided with a plurality of adjustable stops, any one of which can be set to limit the outward movement of the plunger piston, but these stops are effective only for the purpose of limiting the outward movement of the piston. The piston is free to move inwardly away from the selected stop and on this account considerable annoyance is frequently experienced. Thus, the operator wishing to deliver a greater quantity than that previously delivered, may fail to reset the stops after the first operation and thus the plunger will be effective only to the extent of delivering the amount previously discharged. This is annoying and makes it necessary to perform several operations for discharging the desired amount.

One object of the present invention is to overcome this difficulty by providing a stop of such a nature that the plunger is incapable of being moved in either direction after it has once been moved to the limit of its movement, as controlled by the stop until the operator has released the stop.

A further object of the invention is to provide in a measuring pump, manually adjustable means which may be set to automatically arrest the piston and hold it in various predetermined positions previous to the end of its delivery stroke, such means being manually movable to release the piston, and means operable on release of the first named means to render the latter ineffective to arrest the piston on succeeding strokes until the first named means is intentionally reset.

A further object of the invention is to provide a novel form of selective stop mechanism for limiting the movement of the plunger.

A further object of the invention is to provide means whereby separate and independent operating mechanisms may be employed for actuating the plunger.

A further object of the invention is to provide a liquid dispensing apparatus of this character which is of simple construction and is efficient in operation.

Further objects of the invention relate to details of construction and improved methods of operation, as will be more fully set forth in the detailed description to follow.

In the accompanying drawings:

Fig. 1 is an elevational view of the improved dispensing apparatus, certain of the parts being broken away to more clearly disclose certain parts of the operating mechanism;

Fig. 2 is a side elevational view partially in section, of a portion of the operating mechanism illustrating the relative position of the stop mechanism relative thereto;

Fig. 3 is a fragmentary elevational view of the means employed for setting the stop mechanism;

Fig. 4 is a side elevational view of one of the rack members illustrating the construction of the same, whereby it cooperates with the stop mechanism to limit the movement of the plunger;

Fig. 5 is an elevational view of the end portion of the stop showing the construction of the same, whereby it is permitted to cooperate with the rack member to limit the movement of the plunger;

Fig. 6 is a top plan view of the mechanism employed for adjusting the position of the stop;

Fig. 7 is a side elevational view of the valve operating mechanism for admitting compressed air or other fluid pressure means to the cylinders; and

Fig. 8 is a sectional view of the controlling valve mechanism for the fluid operating means.

Referring to the drawings, there has been shown, by way of illustrative example, a measuring pump and liquid dispensing apparatus of the general type disclosed in my prior Patent #1,302,014 granted August 29,

1919. Since the present invention is independent of the particular pump structure and enclosing casings, detailed description of such structure and casings is unnecessary to an understanding of the invention, reference being made to said patent for a complete disclosure. For the present purposes, it will suffice to state that 5 is a reciprocating piston pump of usual form, which in this instance is housed within a cylindrical casing 1, and that 6 is the piston rod of the pump. Above the pump 5 is a casing 2 and upon the latter a casing 3 which is intended to house the piston rod 6, and parts connected therewith, during their reciprocating movement. The casing 2 has an opening 4 to permit access to the stop mechanism to be described. The pump is so constructed that a fixed and measured quantity of liquid is discharged upon each upward stroke of the piston and other smaller measured quantities are obtained by moving the piston fractional parts of its stroke. The movement of the piston and thus the quantities discharged may be indicated on a properly positioned graduated scale 8 by means of a pointer 9.

The operating mechanism for reciprocating the piston rod 6 may, so far as the stop mechanism is concerned, be variously constructed as desired. As shown, however, the upper end of rod 6 is suitably connected to a cross head 15 by means of nuts 16, as illustrated in Fig. 1 of the drawings, and from this cross head, a pair of rack bars 17 extend downwardly in substantially parallel relation with the piston rod. Within the casing 1 and, on opposite sides of pump 5, are a pair of vertically positioned cylinders 18 within which the rack bars 17 extend. Each of such rack bars is provided at its lower end with a piston 19 fitting closely within the interior surface of the corresponding cylinder. The base portions of the cylinders 18 are suitably connected to each other at points beneath the pistons 19 by pipe 20 to which is connected an upwardly extending pipe 21 communicating with a valve casing 22. A supply pipe 23 also communicates with the valve casing and the arrangement of these pipes is such as to permit compressed air or other fluid to be admitted to the lower portions of the cylinders 18 beneath the pistons 19 upon suitable manipulation of the valve carried by the valve casing 22.

The valve casing, above described, is provided with an inlet passage 25, communicating with the fluid supply pipe 23 and adapted to be placed in communication with a passage 26, which communicates with a pipe 21, upon depression of a valve 27, which in turn is mounted within the valve casing and normally held in its upper closed position by means of a coil spring 28. The valve 27 is of the double acting type, being adapted, when in its upper position, to close communication between the passages 25 and 26 and at the same time open communication between the passage 26 and the exhaust chamber 29 formed in the upper portion of the valve casing. When the valve 27 is depressed, it opens communication between the passages 25 and 26 to admit compressed air or other fluid to the base of the cylinders and at the same time closes communication between the passage 26 and the exhaust passage above referred to. A suitable hand lever 30 is pivotally mounted upon the bracket 31 and is adapted to engage the upper end portion of a plunger 32 for forcing the valve downwardly against the tension of the spring 28 while the force of the spring is sufficient to close the valve upon release of the pressure upon the plunger 32.

From the foregoing description, it will be understood that suitable means are provided for operating the piston rod 6 by admitting compressed air or other suitable fluid under pressure to the base portions of the cylinders 18 whereby the racks 17 will be forced upwardly to lift the pump plunger and discharge a measured quantity of liquid proportionate to the degree of travel of the pump plunger.

In addition to the operating mechanism above described, there is also provided suitable means for operating the pump plunger. Such means comprises a shaft 35 suitably mounted in bearings 36 carried by the lower casing portion and upon which is fixedly secured pinions 37 so arranged as to mesh with the racks 38 formed upon one side of the rack bars 17. Rollers 39 are suitably mounted in the bearings 36, being positioned upon the opposite sides of the rack bars from the pinions 37, whereby movement of the rack bars in the direction of their longitudinal axes is permitted and any wedging or jamming of the bars is prevented. The shaft 35 projects outwardly a short distance beyond one side of the casing and has loosely mounted thereon a crank 40 which is provided with a handle 41 and is adapted in any suitable manner to be clutched at will to the shaft to enable the pump to be operated by the turning of the crank.

The stop mechanism is preferably so positioned as to cooperate with one of the rack bars 17, as shown in Fig. 1, and comprises a supporting block 45 mounted upon, and supported by the upper portion of the lower casing. This block is provided with an upwardly extending portion having a vertical slot 46 formed therein for the reception of a rotatable and slidable bar 47. The bar 47 has affixed to one end thereof, a fan shaped member 48 provided with a handle portion 49. A plurality of threaded openings 50 are formed in the periphery of the fan shaped

sector portion 48 and screws 51, having cone shaped head portions 52, are adapted to thread in the openings thus formed. The block 45 is also provided with an offset bracket 53 having a groove 54 formed in the upper face thereof. This bracket is positioned beneath the fan shaped member 48 and so arranged relatively thereto that anyone of the cone shaped heads of the screw 51 may engage the groove 54. Thus fan shaped member 48 and shaft 47 may be releasably held in various positions of angular adjustment.

The shaft 47 is provided upon the end adjacent the rack bar 17 with a circular shoulder 55 and from the latter there extends a member, which may be given a desired cross sectional configuration. In the present instance such member consists of a cylindrical shaped portion 56, the axis of which is substantially in alignment with the shaft 47, and diametrically extending wings 57 projecting outwardly in either direction from the periphery of this cylindrical shaped portion. As clearly indicated in Fig. 4, the rack bar 17, which is located adjacent the rotating mechanism above described, is provided upon that face opposite from the rack teeth, with a plurality of spaced depressions 58, 59, 60 and 61. Each of these depressions is so formed as to be capable of receiving the cylindrical portion 56 and the diametrically extending wings 57, when the shaft 47 is in alignment with the centers of these depressions and is rotated to such a position as to permit the particular form of the stop member to slide within the corresponding depression, when forced in an axial direction under the influence of the spring 47'. It will be seen upon reference to the structure shown in Fig. 4, that these depressions are arranged at different angles relative to the rack bar, thus insuring that the stop member will not engage in more than one of the depressions, and will only engage in that particular depression which at the time it is adjusted to fit. Any desired number of these depressions may be formed in the rack bar depending upon particular requirements of the trade.

A set screw 64 is threaded through the upper portion of the block 45 and is capable of adjustment for the purpose of limiting the upward movement of the shaft 47, whereby the position of the same may be changed slightly and consequently the point in the movement of the rack bar, where it is engaged by the stop, may be varied slightly for the purpose of adjustment. As is clearly disclosed in Fig. 2, the shaft 47 is both rotatably and slidably mounted in the bracket 45, the shaft being adapted to be rotatably moved by the handle 49, whereby the stop member may be turned into such a position as to be engaged with the desired depression upon the rack bar 17. The fan shaped sector portion of the plate 48 may be provided with numerations located adjacent the several screws 51 located in the periphery thereof, whereby the operator is enabled to properly locate the stop member to cause it to engage with the desired depression in the rack bar for discharging a given quantity of liquid. It will be understood that the cone shaped heads 52 of the screws 51 releasably engage the depression 54 whereby the shaft may be readily located to cause one or another of the cone shaped heads to engage the depression as may be desired.

The shaft 47 is constantly urged toward the rack bar under the influence of the coil spring 47'. The peculiar shape of the stop member enables the same to slide readily over any of the depressions of the rack bar except the particular depression which the same is set to engage. A lever 66 is pivotally secured to a portion of the bracket 45 as at 67 and is so positioned as to be located adjacent the inner edge of the fan shaped sector portion 48. A spring 68 is preferably secured to one end of the lever 66 as indicated in Fig. 3 and has its opposite end secured to a fixed portion of the bracket, as at 69. The lever 66 permits free movement of the shaft 47 axially outwards but prevents a return movement and holds the stop out of engagement with the rack member. Thus, when the shaft 47 is drawn outwardly away from the rack, the spring 68 moves the lever 66 downwardly behind a shoulder 69' formed upon the fan shaped member, whereby the stop is continuously held away from the rack member and engagement of the tube therewith is positively prevented until the lever 66 is released.

It will be seen from the foregoing description, that the construction shown and described herewith provides a simple and efficient form of liquid dispensing apparatus wherein the mechanism may be readily operated either by manual means or from compressed air, or other suitable fluid under pressure, to produce longitudinal movement of the pump plunger within the cylinder, whereby a measured quantity of liquid may be discharged. Moreover, simple and efficient mechanism is provided for limiting the movement of the plunger piston whereby a fixed amount of liquid may be discharged during the given movement of the piston and this stop mechanism is of such a nature as to make it necessary for the operator to release the same before the piston can be returned to its initial position and a given quantity of liquid discharged from the pump.

The operation of the apparatus will now be described, assuming that the pump piston is in its lower position and that it is

desired to discharge a certain quantity of liquid as, for example, 3 gallons; the operator first rotates the fan shaped sector member 48 until the cone shaped head of the screw 51, which is located in said sector member beneath the numeral 3 thereon, engages with the slot 54 in the bracket member 53. This so locates the stop member that it is in position to engage the proper depression formed in the rack bar 17, and arrest the latter as soon as three gallons has been discharged. The operator then may operate the pump either by rotating the crank 40 to raise the rack members through the action of the pinions 37 or he may depress the lever 30, associated with the compressed air valve mechanism. A depression of the lever 30 forces the valve 27 downwardly and admits compressed air to the lower portions of the cylinders 18 beneath the pistons 19 thus raising the cross head 15 together with the pump plunger connected thereto. In either event, the rack 17 is eventually raised to such an extent as to permit the depression, which corresponds to the position of the shaft 47, to register with the stop carried by said shaft. Therefore, the shaft is forced inwardly under the influence of the coil spring 47′ and the stop engages with the depression in the rack bar to prevent further movement of the same and the pump piston in either direction. The pump piston, having travelled a sufficient distance to discharge the required quantity of liquid, is held in this position until the stop is released by the operator grasping the handle 49 and moving the shaft 47 in an axial direction to withdraw the stop from engagement with the rack bar. Immediately that the stop is thus released, lever 66 is drawn downwardly to prevent return movement of the stop, whereby the stop mechanism is rendered ineffective until again set. Thus, upon a subsequent operation of the pump the piston may be given a full stroke until collar 71 engages flange 72 to discharge its maximum quantity, as five gallons, without interference due to failure to reset the stop. If the compressed air mechanism is employed for the purpose of actuating the pump, it will be understood that immediately upon release of the lever 30, the coil spring 28 will force the valve 27 upwardly, thus closing communication between the source of compressed air supply and the lower ends of the cylinders 18 and at the same time opening communication between the lower ends of the cylinders 18 and the exhaust chamber 29, whereby the compressed air, in the lower ends of the cylinders, may be exhausted as the weight of the pump piston returns the pump mechanism to its initial position.

The invention has been disclosed herein for illustrative purposes, in an embodiment at present preferred, but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is—

1. A liquid dispensing apparatus comprising, a reciprocating piston pump, means for reciprocating the piston, and means for selectively locking the piston in any of a plurality of advanced positions, whereby it is held against movement in either direction from said position until released.

2. A liquid dispensing apparatus comprising, a reciprocating piston pump, and means for limiting the stroke of the piston, said means including means for locking the piston against movement in either direction from the limit thus set.

3. A liquid dispensing apparatus comprising, a reciprocating piston pump, a reciprocable member connected with the pump piston and provided upon one face thereof with spaced depressions, a stop adapted to be set for engagement with one only of said depressions, and means for bringing the stop into engagement with the depression for which it is set when the reciprocable member is moved a sufficient amount to bring the depression into registry therewith.

4. A liquid dispensing apparatus comprising, a reciprocating piston pump, a member connected with the pump piston and movable therewith, said member being provided with a plurality of depressions formed upon one face thereof, and positioned at different angles relative thereto, and means adapted to selectively engage any one of said depressions for holding said member in any one of a plurality of adjusted positions.

5. A liquid-dispensing apparatus comprising a reciprocating piston pump, a member connected with the pump piston and movable therewith, a stop, a spring constantly urging the stop toward said member, and cooperating means on said top and member rendered operable by said spring for selectively interengaging said stop and member to limit the stroke of the piston.

6. A liquid dispensing apparatus comprising, a reciprocating piston pump, the piston of which is normally movable to a fixed limit, manually operable means movable to selectively arrest and lock the piston before it reaches such limit, said locking means being releasable to permit return of the piston to its original position, and means automatically operable upon release of said first named means to render the latter inoperative to control the movement of the piston until the same is again manually operated.

7. A liquid dispensing apparatus, comprising a reciprocating piston pump, the piston of which is normally movable to a fixed limit to discharge a fixed and measured quantity of liquid, manually operable means movable to selectively arrest and lock

the piston in any one of a variety of operative positions before it reaches said limit, whereby the apparatus may be set to discharge any one of a plurality of fixed and measured quantities of liquid of less volume than that discharged when the piston moves to its fixed limit before mentioned, said locking means being operative to prevent movement of the piston in either direction from its locked position and being releasable to permit return of the piston to its original position, and means automatically operable upon release of said first named means to render the latter inoperative to control the movement of the piston until the same is again manually operated.

8. A liquid-dispensing apparatus comprising a reciprocating pump, a member connected with the pump piston and movable therewith, a stop, and means including cooperating devices on said member and stop for selectively interlocking them to limit the stroke of the piston.

9. A liquid dispensing apparatus comprising a reciprocating piston pump, a member connected with the pump piston and movable therewith, a rotatable and slidable stop, and means on said member and stop constructed and arranged to be relatively positioned by rotation of said stop to enable the latter to slide into interengaging relation with said member.

10. A liquid-dispensing apparatus, comprising, a pump, selective means capable of being manually set to arrest the movement of the pump piston and hold it against movement in either direction until released, and means automatically operable on release of the first-named means to render the latter ineffective to control the movement of the piston until the first-named means is again set.

11. The combination with the movable pumping element of a pump, of means for selectively locking such element in any of a plurality of advanced positions, whereby it is held against movement in either direction until released.

12. The combination with the movable pumping element of a pump, of a member connected thereto and movable therewith, a plurality of depressions formed in said member and arranged each at a different angle relatively thereto, a stop shaped to fit said depressions, and means urging the stop toward said member, said stop being angularly adjustable to position it to enter any desired one of said depressions on movement of said member.

13. The combination with the movable pumping element of a pump, of a member connected thereto and movable therewith, a member angularly movable with respect to the first-named member, means urging said members toward one another, and cooperating tongue and socket means provided on said members to permit them to be interengaged and locked in any one of a plurality of advanced positions of the first-named member, depending on the angular setting of the second member.

In testimony whereof I have affixed my signature.

JOHN B. DAVIS.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,447,511, granted March 6, 1923, upon the application of John B. Davis, of Springfield, Massachusetts, for an improvement in "Liquid-Dispensing Apparatus," errors appear in the printed specification requiring correction as follows: Page 3, lines 104 and 105, strike out the words "the tube therewith" and insert instead *said stop and member;* page 4, line 109, claim 5, for the word "top" read *stop;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of May, A. D., 1923.

[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.