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DISPENSING AND MEASURING PUMP.

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1,320,845. Patented Nov. 4, 1919.

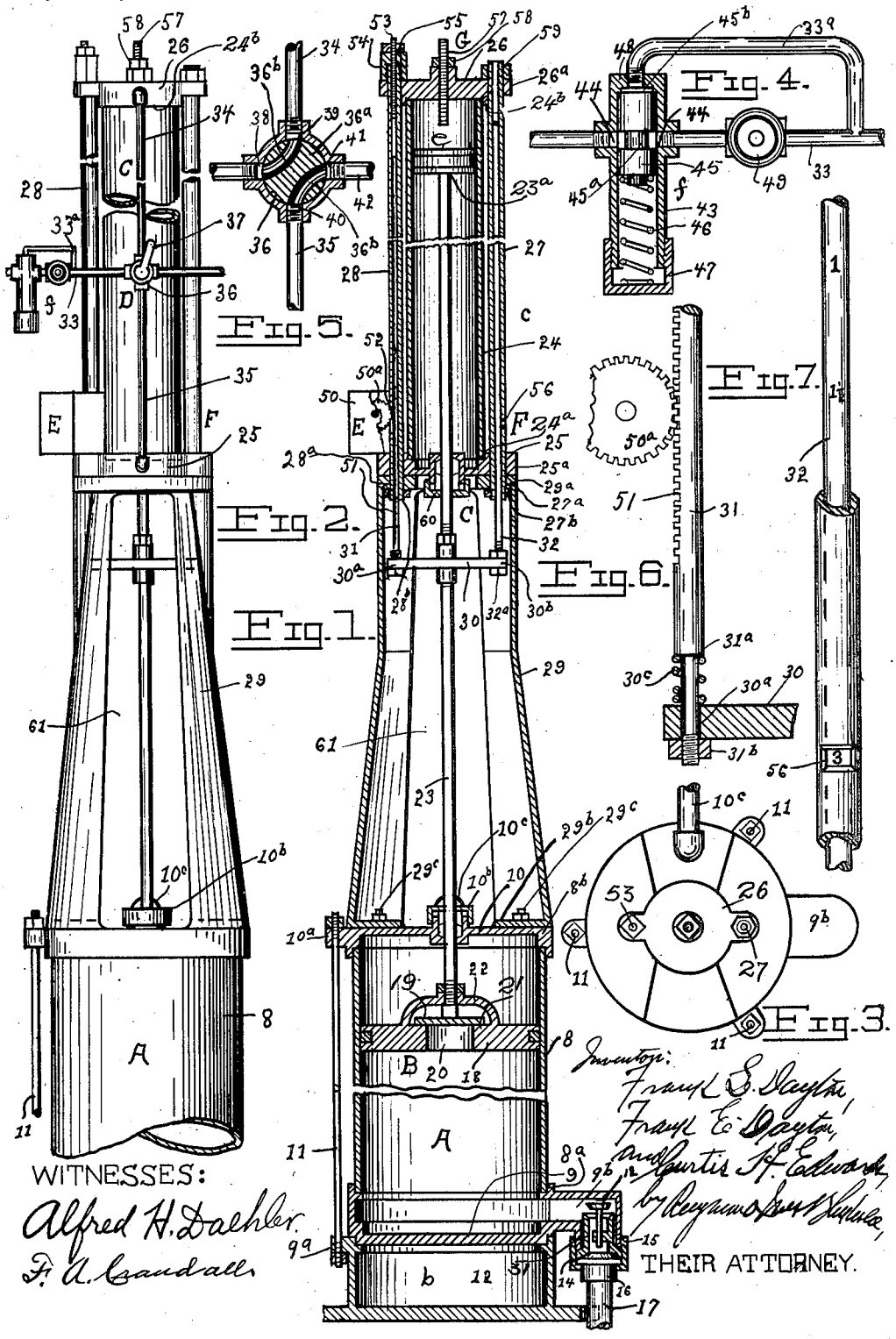


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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DISPENSING AND MEASURING PUMP.

1,320,845. Specification of Letters Patent. Patented Nov. 4, 1919.

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To all whom it may concern:

Be it known that we, FRANK L. DAYTON, FRANK E. DAYTON, and CURTIS H. EDWARDS, all citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have jointly invented new and useful Improvements in Dispensing and Measuring Pumps, of which the following is a specification.

This invention relates to dispensing and measuring pumps such as are usually employed for vending gasolene, oil or other fluids from a suitable storage receptacle in such measured quantities as may be required by the customer, a particular extensive use for such pumps being the vending of fuel and other oils to motor car operators, although they are useful as well for many other purposes; pumps of this general nature are usually manually operated, a crank or other operating means being employed to work the plunger or piston to cause the same to lift and force the liquid being dispensed to its place of deposit, as for instance, to the tank of an automobile, and in pumps of the plunger type a reverse movement of the crank or other operating means is necessary to return the plunger after each lifting or working stroke of the same, a definite quantity of liquid being transferred from the storage tank to its place of deposit at each such working stroke.

In accordance with the present invention, a plunger operated by pneumatic or other pressure is caused to lift, transfer or convey the fluid from the storage receptacle to the place of deposit, a definite quantity being transferred at each working stroke, the pressure medium being controlled through manually operated means, such control permitting the plunger to execute a partial stroke, full stroke, or a plurality of strokes, thus permitting the transfer of any desired quantity of liquid commensurate with the supply, and all without exertion on the part of the operator. The plunger is operated on its return stroke, as well as on its working stroke, by the pressure medium, through suitable mechanism and is always, at any point in its travel, subject to manual control through the control of the pressure medium applied; furthermore, the invention provides recording means whereby the operator may at any time determine the quantity of fluid that has been transferred and means for measuring the fluid during its transfer, that is, as to the quantity transferred by a fractional portion of the working stroke, that the operator may cut off the pressure medium and thereby suspend or cause the cessation of the operation of the pump when the desired quantity of fluid has been transferred.

With the above and other objects in view, the invention consists in the novel and useful provision, construction, formation, combination, association and interrelation of parts, members and features, all as hereinafter described, shown in the drawing and finally pointed out in claims.

In the drawing:

Figure 1 is a central vertical sectional view of a dispensing and measuring pump organized in accordance with the invention, parts being shown in elevation for clearness of illustration;

Fig. 2 is a fragmentary front elevation of the same;

Fig. 3 is a fragmentary plan view of the same;

Fig. 4 is an enlarged central vertical sectional view of pressure medium regulating means shown in Fig. 2.

Fig. 5 is an enlarged vertical sectional view through the manually operated pressure medium controlling means shown in Fig. 2.

Fig. 6 is an enlarged fragmentary sectional detail view of the means for operating the registering device; and,

Fig. 7 is an enlarged fragmentary front elevation of the indicating means.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawing, in the embodiment of the invention shown therein, A designates a pump cylinder, B designates a pump piston, C designates operating means for the pump piston B, D designates controlling means for the operating means, E designates registering means, F designates indicating means and G designates pump stroke adjusting means.

The pump cylinder A preferably comprises a tubular portion 8, one end of which is seated as at 8^a in a cylinder head 9, and the other end of which is seated as at 8^b in a cylinder head 10, suitable bolts 11 passing through lugs 9^a and 10^a formed on a base

member *b* on which the cylinder head 9 is seated, and the cylinder head 10, respectively, serving to hold the cylinder A and its heads in assemblage. The cylinder head 9 is provided with a hollow overhanging extension 9^b in which is provided a check valve 12 adapted to seat on a removable bushing 13 held to the extension 9^b by means of a collar 14 threaded onto the downwardly extending terminus of the extension 9^b as at 15, a reducing bushing 16 being interposed between the collar 14 and the bushing 13 to form a suitable connecting means for a liquid supply pipe 17 which may lead to any suitable source of liquid supply, as for instance, an under-ground storage tank or the like, not shown. The cylinder head 10 is provided with a centrally disposed stuffing box 10^b and a discharge pipe 10^c which may be threaded into a suitable orifice in the cylinder head at any desired point, and lead to the place of deposit of the liquid pumped.

The pump piston B preferably comprises a piston head 18 and a check valve 19 disposed over an orifice 20 provided preferably centrally in the piston head 18. The check valve seats on the piston head as at 21 and may be guided in its play by a spider 22 which may be integral with the piston head 18. A piston rod 23 is secured in the spider 22 and extends through the stuffing box 10^b in the cylinder head 10 to the operating means C.

The operating means C preferably comprises a cylinder *c* and a piston *e* therein, such piston *e* being secured to the end 23^a of the piston rod 23. The cylinder *c* preferably comprises a tubular member 24 having one end fitted into a cylinder head 25, as at 24^a, and its other end fitted into a cylinder head 26, as at 24^b, such cylinder heads 25 and 26 being united by means of tubular rods 27 and 28 disposed at diametrically opposite points externally of the tubular member 24, and passing through projecting bosses 25^a and 26^a provided on the cylinder heads 25 and 26, respectively. These tubular rods 27 and 28 further pass through suitable apertures 27^a and 28^a, respectively, provided in a flange 29^a provided at one end of a spacing member 29, where they are secured by means of nuts 27^b and 28^b respectively. The other end of the spacing member 29 is provided with inwardly projecting flanges 29^b through which are passed studs or bolts 29^c which secure the member to the cylinder head 10 of the pump cylinder A. A cross-head 30 is provided on the piston rod 23 and accommodated within the spacing member 29, such cross-head carrying at its one end 30^a a registering operating rod 31 and at its other end 30^b a rod 32 comprised within the indicating means F. The rod 31 extends into the tubular rod 28, and the rod 32 extends into the tubular rod 27.

Pressure medium is supplied to the cylinder *c* to operate the piston *e* therein through a supply pipe 33 which may lead from any suitable source of pressure supply. The pipe 33 leads to the controlling means D, a branch pipe 34 leading from such control means to the cylinder head 26 so as to supply pressure medium to the cylinder at one side of the piston *e*, and a branch pipe 35 leads from the controlling means D to the cylinder head 25 so as to supply pressure medium to the other side of the piston *e*, subject to regulation and control, as will be presently described

The controlling means D preferably comprises a four-way cock 36, the plug or key 36^a of which is preferably provided with a manipulating handle 37. The pipe 33 leading from the pressure supply terminates at a port 38 of the controlling means, the pipe 34 leads from a port 39 of the controlling means to the cylinder head 26, and the pipe 35 leads from a port 40 of the controlling means to the cylinder head 25, an exhaust port 41 being provided in the controlling means from which a pipe 42 may convey the exhausted pressure medium to any suitable point of discharge. A pressure regulator *f* may be installed in the supply pipe 33 at any desired point, and such pressure regulator may comprise a cylinder 43 which the supply pipe 33 is interrupted to receive diametrically opposite ports 44 being provided in the cylinder 43, to permit the crossing of the cylinder by the working medium, subject, however, to the control of a piston 45 provided in the cylinder and normally held in one end of the cylinder by a compression spring 46 which may be adjusted by a threaded cylinder head 47. The piston 45 is provided with a circumferential groove or channel 45^a which normally registers with the ports 44 in the cylinder 43, permitting the working medium to freely pass through the regulator when the piston is held in the end of the cylinder by the spring 46. A branch pipe 33^a springs from the pipe 33 between the regulator *f* and the operating means of the pump, such branch pipe 33^a terminating in the head 48 of the cylinder 43 to admit pressure medium to the face 45^b of the piston 45, excessive pressure causing the piston 45 to move against its spring 46, cutting off or cutting down the supply of pressure medium according to the requirements of the operating means C. A shut-off valve 49 is provided in the pipe 33 and by means of this shut-off valve operation of the pump may be entirely suspended.

The registering means E preferably comprises a standard registering device 50 and operating means therefor, which may comprise a toothed rack 51 formed on the rod 31 and adapted to mesh with a pinion 50^a of the register means E, a slot 52 being

provided in the tubular rod 28 so that the pinion 50^a may mesh with the rack portion 51 on the rod 31, the rod 31 as before stated extending into the tubular rod 28 which serves as a housing therefor. The rod 31 is provided near its lower end with an abutment 31^a and passes through a bore 30^a in the cross-head 30, a nut 31^b being provided to hold the rod 31 in place. A compression spring 30^c acts between the abutment 31^a and the cross-head 30 to move the rod longitudinally and hold the nut 31^b against the cross-head 30. Adjustment of the registering means E to make the same conform to pump adjustment if it registers too much may be made by means of a threaded stud 53 passed through a nut 54 threaded onto the tubular rod 28, and suitably formed to assist in holding the cylinder head 26 in place, as well as furnishing support for the stud 53. A lock nut 55 may be applied to hold the stud in any position of adjustment.

The indicating means F comprises a sight opening 56 provided in the tubular rod 27 and suitable calibrations or indicia are provided on the rod 32 which slides in the tubular rod 27. The rod 32 is suitably fixed to the cross-head 30, as by nuts 32^a, which permit proper adjustment of the rod 32.

The pump stroke adjusting means G comprises a threaded stud 57 threaded into and passed through the cylinder head 26, and securing means 58 for the stud 57. The securing means 58 may comprise merely a lock nut such as the lock nut 55 of the indicator adjustment means, although it is manifest that any other securing, locking or sealing means may be readily attached. The stud 57 may be adjusted to stop the piston *e* at the proper point in its travel in one direction to insure the delivery of a definite quantity of liquid at each stroke of the pump, this control of the piston *e*, of course, also controlling the pump piston B, such pistons being limited in their travel in the direction away from the stud 57 by the cylinder head 25 or by any other fixed stop.

A stuffing box 60 is provided on the cylinder head 25^a and is accessible for adjustment through open portions 61 of the spacer member 29, as are also the stuffing box 10^b and the nuts 31^b and 32^a.

The operation, method of use and advantages of the improved dispensing and measuring pump will be readily understood from the foregoing description taken in connection with the accompanying drawing and the following statement.

The pipe 17 leading from any suitable source of fluid supply will convey to the pump cylinder A a definite quantity of fluid at each full stroke of the piston B in a direction away from the cylinder head 9, the inlet check valve 12 rising from its seat to permit the entrance of the fluid to the cylinder, a definite quantity of the fluid ahead of the piston being forced through the discharge pipe 10^c in this movement of the piston. When the piston comes to rest at the end of its stroke the inlet check valve 12 falls to its seat and on return of the piston toward the cylinder head 9 the fluid in the cylinder A will be transferred past the check valve 19 on the piston to be forced through the discharge pipe 10^c on the next working stroke of the piston B. To cause the movement of the piston on its working stroke, the key 36^a of the cock 36 is moved by means of the handle 37 to connect by means of one of the passages 36^b provided in the key 36^a the ports 38 and 40, admitting air to that side of the piston *e* adjacent to the cylinder head 25, and the cock key 36^a allowed to remain in this position until the pistons B and *e* have completed their working strokes when the cock key is turned to the position shown in Fig. 5, admitting pressure medium through one of the passages from the port 38 to the port 39 through the pipe 34 and through the cylinder head 26 to the upper side of the piston *e*, the pressure medium forcing the piston *e* and the pump plunger B in a direction opposite that taken on the working stroke, the pipe 35 meanwhile being connected with the exhaust pipe 42 through the ports 40 and 41 and one of the passage ways 36 of the key 36^a, permitting exhaust of the used working medium beneath the piston *e*, and causing the transfer of the new charge of fluid being pumped to the upper face of the pump plunger B, through the port 20 and past the check valve 19. To cause the charge of fluid just transferred past the check valve 19 to be forced from the pump cylinder, the handle 37 of the control means D is again manipulated to turn the key 36^a to the position first described, whereupon working medium will be admitted to the under side of the piston *e*, and the upper portion of the cylinder *c* will be connected with the exhaust pipe 42. On the working stroke of the pump the calibrated rod 32 will be moved upwardly, bringing the indicia thereon successively into registration with the sight opening 56 in the tubular rod 27 that the operator may, if he so desires, suspend the operation of the pump when a fractional portion of the working stroke has been completed, the quantity of liquid transferred during such fractional portion of the working stroke being indicated at the sight opening 56. After any fractional portion of a stroke has been made by the pump plunger

B, the reversal of the key 36[a] of the four-way cock 36 will return the piston to its starting position.

The registering means E being connected with and operated by the rod 31 may register the total number of strokes as well as any fractional portion of a stroke executed by the plunger B, and such indicating or registering means may be so organized that the reading thereof may be in units of fluid measure instead of strokes of the plunger B. Adjustment of the registering device, if it registers too much, may be made as before mentioned through the stud 53, which will limit the upward travel of the rod 31, the spring 30[c] permitting the cross-head 30 to further rise after the rod 31 has been stopped in its travel by the adjusting stud 53.

Having thus disclosed our invention, we claim and desire to secure by Letters Patent:

1. In a device of the character described, the combination with a reciprocating pump piston together with its piston rod and operating means therefor, of a cross head applied to the piston rod, a slide connected to the cross head and arranged parallel to the piston rod, and a register operatively connected to the slide for actuation thereby.

2. In a device of the character described, the combination with a reciprocating pump piston together with its piston rod and operating means therefor, of a cross head applied to the piston rod, a pair of slides connected to the cross head and arranged parallel to the piston rod, a register operatively connected to one of the slides for actuation thereby, and indicating means controlled by the other slide.

3. In a device of the character described, the combination with a reciprocating pump piston together with its piston rod and operating means therefor including guide sleeves holding parts of the said mechanism in assembled relation, of a cross head applied to the piston rod, a pair of slides connected to the cross head and arranged paralled to the piston rod, said slides operating in the before mentioned guide sleeves, a register operatively connected to one of the slides for operation thereby, and indicating means controlled by the other slide.

4. In a device of the character described, the combination with a reciprocating pump piston and operating means therefor, of a register, a yieldably mounted register operating member carried by the piston rod, and adjustable stop means arranged in the path of the said member to limit the travel thereof and prevent overrunning of the register.

5. In a device of the character described, the combination with a reciprocating pump piston and operating means therefor, of a register, a reciprocating member operatively connected to the register and movable with the piston rod, said reciprocating member being yieldably mounted, and adjustable stop means for limiting the travel of said reciprocating member to regulate the operation of the register.

6. In a device of the character described, the combination with a reciprocating pump piston and operating means therefor, of a register, a reciprocating rack bar having a yieldable connection to the piston rod and operatively connected to the register, and an adjustable stop in the path of the rack bar to limit the travel thereof and prevent overrunning of the register.

7. In a device of the character described, the combination of a reciprocating rack bar, means for yieldably connecting the rack bar to the piston of a measuring pump, a register arranged to be driven by the rack bar, and an adjustable stop in the path of the rack bar to limit the travel thereof and prevent overrunning of the register.

8. The combination with a reciprocating pump piston and operating means therefor including a cylinder formed with cylinder heads connected by a tubular bolt, a rod slidable within the tubular bolt and operatively connected to the pump piston to reciprocate therewith, and a register arranged to be driven by the rod.

9. The combination with a reciprocating pump piston and operating means therefor including a cylinder formed with cylinder heads connected by a tubular bolt having a slot in one side thereof, a rack slidably mounted within the tubular bolt and operatively connected to the pump piston to reciprocate therewith, a pinion extending through the slotted side of the tubular bolt and into mesh with the rack, and a register driven by the pinion.

10. The combination with a reciprocating pump piston and operating means therefor including a cylinder formed with cylinder heads connected by a tubular bolt, a rack bar slidable within the tubular bolt, a yieldable connection between the rack bar and the pump piston, a register mounted to be driven by the rack bar, and an adjustable stop arranged within the tubular bolt for engagement with the rack bar to limit the travel thereof and prevent overrunning of the register.

11. The combination with a reciprocating pump piston and operating means therefor including a cylinder formed with cylinder heads connected by tubular bolts, rods slidably mounted within the tubular bolts and operatively connected to the pump piston to move therewith, a register arranged to be actuated by one of the rods, and indicating means controlled by the other rod.

12. In a device of the character described, the combination with a cylinder having the

heads thereof connected by a tubular bolt, of a slide mounted within the tubular bolt and operatively connected to the piston to reciprocate therewith, and a register arranged to be actuated by the reciprocating movement of the slide.

13. In a device of the character described, the combination with a cylinder including cylinder heads connected by tubular bolts, of a cross head movable with the piston, slides connected to the cross head and operating within the tubular bolts as guides, a register actuated by one of the slides, and indicating means controlled by the other slide.

14. In a device of the character described, the combination with a pump mechanism including a piston and a motor element including a tubular bolt for holding parts thereof in assembled relation, of a slide mounted to reciprocate within the tubular bolt and operatively connected to the piston to move therewith, and a register actuated by the movements of the slide.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANK L. DAYTON.
FRANK E. DAYTON.
CURTIS H. EDWARDS.

Witnesses:
ALFRED H. DAEHLER,
FRANCIS L. ISGRIGG.