

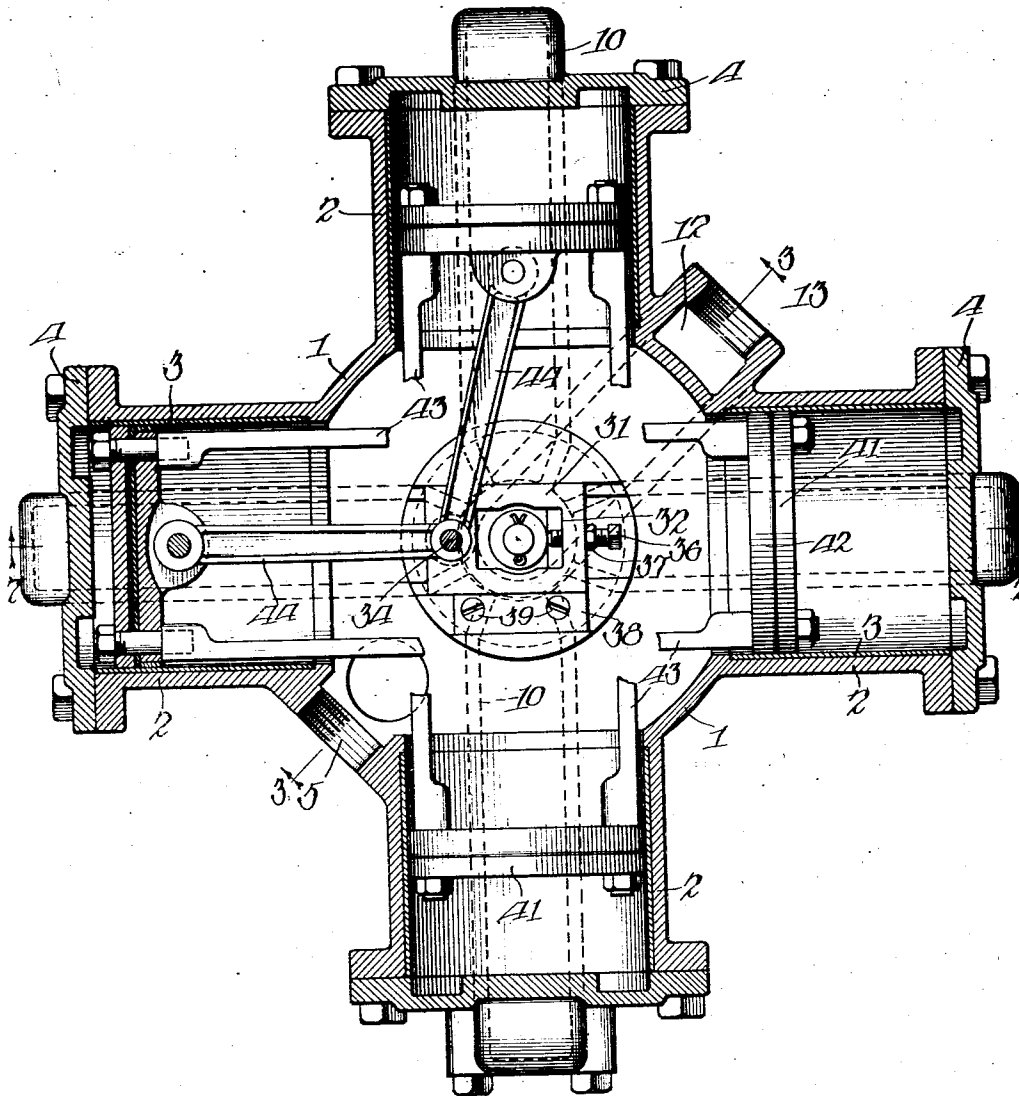
A. A. BOWSER.
 MULTIPLE PISTON REGISTERING MEASURE.
 APPLICATION FILED MAY 19, 1917.

1,270,002.

Patented June 18, 1918.

- 3 SHEETS—SHEET 1.

Fig. 1.



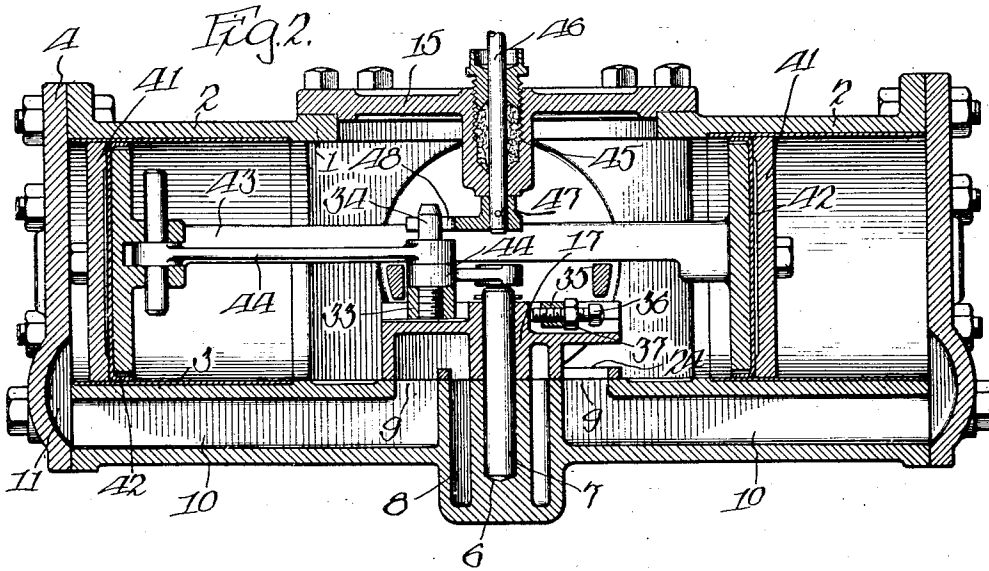
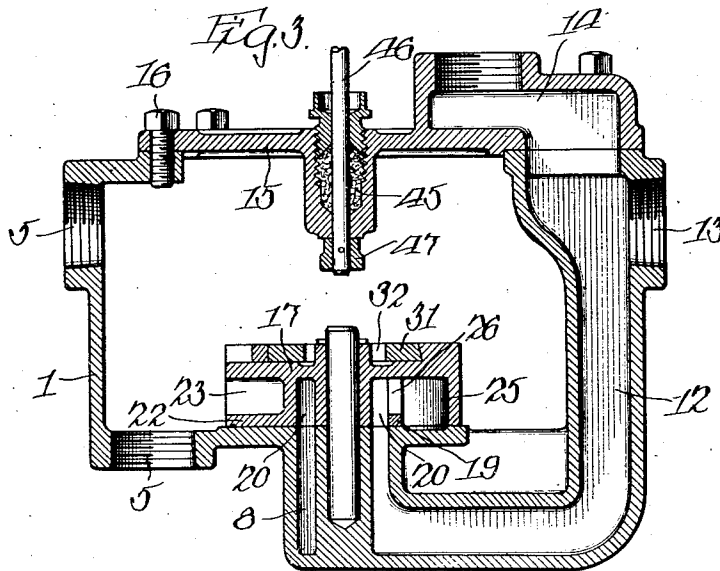
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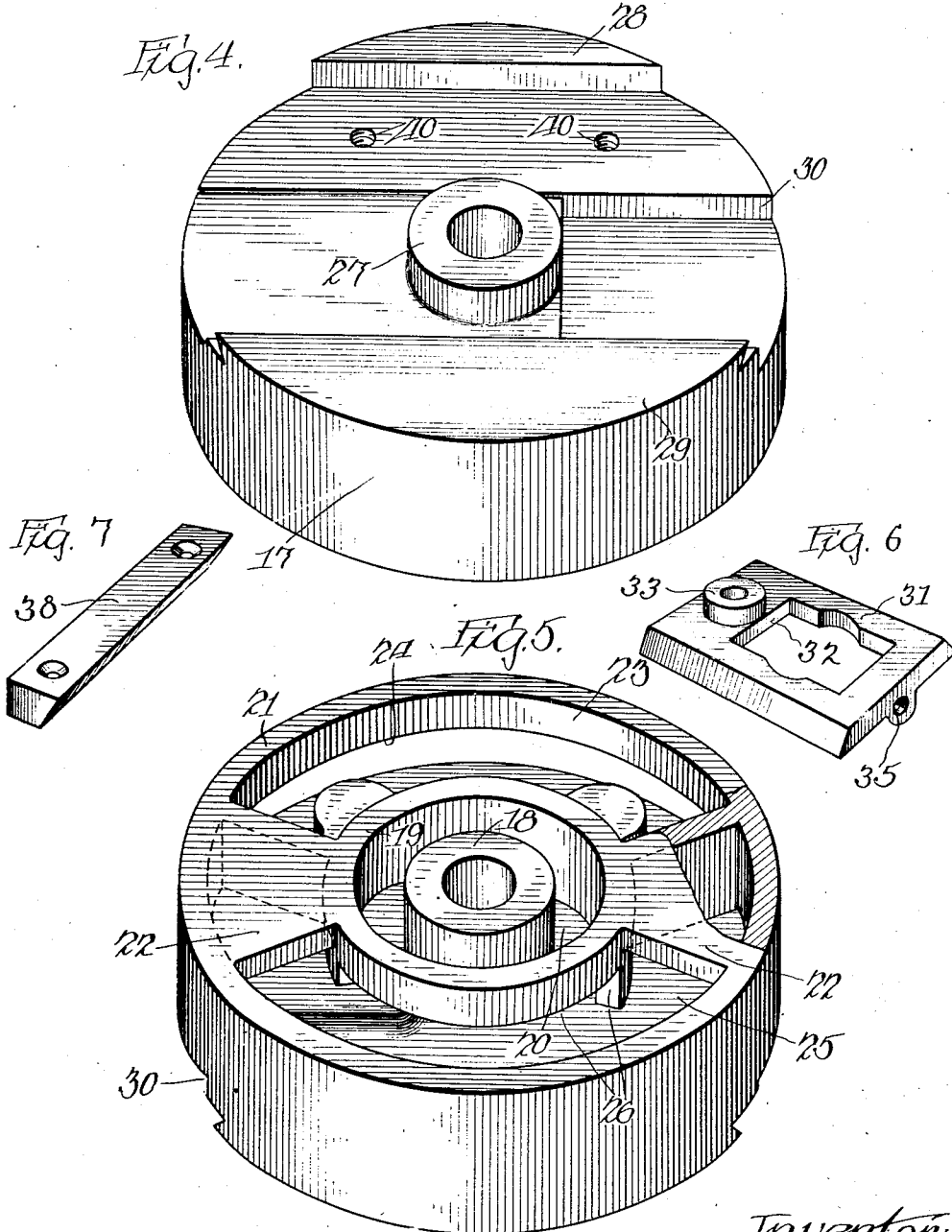
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 3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ALLEN A. BOWSER, OF FORT WAYNE, INDIANA.

MULTIPLE-PISTON REGISTERING-MEASURE.

1,270,002.

Specification of Letters Patent.

Patented June 18, 1918.

Application filed May 19, 1917. Serial No. 169,691.

To all whom it may concern:

Be it known that I, ALLEN A. BOWSER, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Multiple-Piston Registering-Measures, of which the following is a specification.

This invention relates to a multi-cylinder metering device from which the discharge is continuous, and the principal object of the invention is to provide a new and improved construction of this kind to accomplish the desired result. The invention consists in the novel construction, combination and arrangement of the several parts.

In the accompanying drawings—

Figure 1 is a sectional plan view of a device constructed in accordance with the principles of this invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a perspective of one side of the controlling valve.

Fig. 5 is a perspective of the other side of the controlling valve.

Fig. 6 is a perspective of the adjustment block; and

Fig. 7 is a perspective of a clamping block.

This invention relates generally to a meter for measuring liquid, particularly for gasoline, or oils of various kinds. Rotary and reciprocating meters of different kinds are used, but in the reciprocating type of registering measures it is difficult to provide one of simple construction which is in reality a continuous measure so that the liquid to be metered can be continuously pumped to and discharged therefrom. In the present invention the liquid to be metered is introduced into a casing from which extend radial cylinders, with connected pistons in opposite pairs of cylinders connected to rotate a single valve which is operative to admit liquid from the common chamber at the inside to the outer side of a piston, and at the same time opening the space at the outer side of the opposite piston to discharge liquid therefrom due to the pressure applied to the outside of its connected piston.

As shown in the drawings, a casing 1 has a central common chamber from which ex-

tend a number of radial cylinders 2, each provided with an inner sleeve 3, and having a removable head 4 at the outer end. The cylinders are arranged in opposite pairs, 60 and between two adjacent cylinders at one side of the casing are inlet openings 5 at the side and bottom thereof, one of which may be plugged if desired. In the bottom of the casing is a recess 6 for containing a bearing pin 7, and surrounding this recess is an annular recess 8. Outside of the annular recess are a number of ports 9 corresponding in number to the cylinders, and leading from each port is a passage 10 70 which is connected with the outer end of the cylinder by means of a depression 11 in the head 4. In the casing, preferably opposite the inlet, is a passage 12 communicating with the annular recess 8 at the bottom of the casing which constitutes the discharge passage for the meter. This passage has two outlets, one a threaded opening 13 in the casing, and the other a passage 14 formed in a removable cover 15 80 which is attachable in a central aperture at the top of the casing by means of bolts 16. Either the discharge opening through the cover, or the discharge opening 13 may be plugged when desired, and it will be observed (see Fig. 3) that the horizontal opening 5 and the discharge opening 13 are in line with each other, while the other inlet and discharge openings are parallel, but offset with respect to each other.

Mounted on the bearing pin 7 is a rotatable valve sufficient in diameter to cover the port openings 9. This valve, as shown more clearly in Figs. 4 and 5, has a central hub 18, with an annular partition 19 spaced 95 therefrom forming an annular chamber 20 and with an outer rim 21 connected on the bottom to the partition 19 by opposite portions 22, each of sufficient angular extent to substantially cover one of the port openings 100 9. Between these portions 22 are a chamber 23 having an opening 24 in the rim 21, and a chamber 25 communicating with the interior chamber 20 through an opening 26 in the partition 19. The top of the valve is 105 entirely closed, as shown in Fig. 4, and the top is formed with a bearing hub 27, upward extensions 28 and 29, and a depression 30. A stroke adjusting block 31 has a central perforation 32 which fits over the hub 27, and at one end is a threaded projection 33 in which a crank pin 34 is mount-

ed, and at the other end is a threaded portion 35 through which an adjusting bolt 36 extends and bears against the hub portion 27 with a locking nut 37 for holding the bolt in place. This block 31 bears on one side against an undercut side of the projection 29, and the other side of the block is beveled and held in place in any adjusted position by means of a clamping block 38 which is held in place on the top of the valve by means of screws 39 which extend into threaded openings 40 in the valve.

Slidable in each cylinder is a piston 41 which includes a packing 42 for making a fluid-tight joint, and connecting two opposite pistons for simultaneous movement are bars 43. Pivoted to one of each pair of the connected pistons is a piston rod 44 which engages the crank pin 34 attached to the stroke adjusting block 31.

Extending through a packing gland 45 in the cover 15 is a rod 46, at the lower end of which is connected an arm 47 with a forked extremity 48 which engages the upper end of the crank pin 34 so that the rotation of the valve 17 is directly communicated to the rod 46 by means of the arm 47, the forked extremity permitting the adjustment of the crank pin with respect thereto to vary the length of strokes of the pairs of connected pistons, thus varying the quantity of liquid pumped upon the operation thereof. The length of stroke is varied because of the fact that the adjustment of block 31 moves the crank pin 34 toward or from the axis of bearing pin 7 upon which the valve is rotated. Of course, the quantity pumped or passed through the measure by each reciprocation of the pairs of pistons depends upon the size of the cylinders and the length of stroke of the pistons therein. Therefore, by connecting the rod 46 to a registering device, the number of gallons, or other units of volumes will be directly and accurately registered.

In operation the fluid to be metered is admitted through either of the openings 5 to the interior or center portion of the casing where it bears equally upon the insides of all of the pistons, and if there were no valve action, or if the valve were entirely closed there would be no movement of the pistons. However, the ports and passages in the valves are so disposed and proportioned that when one pair of pistons are at one end of their stroke, as shown in Figs. 1 and 2, the valve 17 is in position to admit fluid through the opening 24 and through chamber 23 to that passage 10 which leads to the outer side of one of the pistons 41, and at the same time the chamber at the outer side of the opposite piston is connected through the valve chambers 20 and 25 and by means of the passage 10 and port 9 with the annular recess 8, which is connect-

ed by means of the passage 12 to the discharge. Thus it will be evident that the fluid under pressure is admitted to the outer side of one of the connected pairs of pistons, while the chamber at the outer side of the opposite piston is connected to the discharge, thereby unbalancing the pressure acting upon each pair of connected pistons and causing the movement of these pistons to force the liquid from the discharge. The ports of the valve are of greater angular width than the ports 9 for the separate cylinders, and therefore they overlap the ports 9 so that in the case of four radial cylinders, as shown, the ports 9 of two adjacent cylinders may be connected at the same time through one of the ports of the valve. This overlapping function presents the valve and the measure from being stopped on dead center and makes it easily operable with a very slight pressure. In fact, this is one of the advantages of the construction, as very little reduction in pressure is needed to effect the operation of the measure. Also as there is very little reduction in pressure, the difference in pressure on the two sides of the pistons at any time is very small, so that there is very little tendency for leakage of the liquid past the pistons, and therefore it is an accurate measure which does not readily get out of order and does not become inaccurate in use. Furthermore, as previously set forth, the accuracy may be easily maintained by the adjustment of block 31 which is accessible by simply removing the cover 15.

I claim:—

1. A metering device having an inlet chamber and opposite cylinders extending therefrom with a passage from the outer end of each cylinder to the chamber and means forming a discharge passage, of a rotary valve for controlling the said passages, an adjustable crank pin carried by the valve, pistons connected in pairs and to said crank pin for rotating the valve by their reciprocation, and a register-operating shaft having a forked arm engageable with said crank pin for rotating the shaft when the valve is rotated.

2. In a metering device, the combination with a casing having opposite cylinders and admission and discharge openings, pistons for said cylinders connected in opposite pairs, means comprising a rotary valve for controlling the admission and discharge of fluid to and from the device, an adjustable crank pin carried by the valve and connected with each pair of pistons, and a shaft having means for variable engagement with said crank pin to rotate the shaft when the valve is rotated.

3. In a metering device of the class described, a cylinder and piston, a rotary valve, a stroke varying block for the piston ad-

justable on the valve and having a projecting crank pin, a register shaft, and an arm connected to the register shaft and having a forked extremity to engage the end of the crank pin permitting the adjustment of the said block carried by the valve.

4. In a metering device of the class described, the combination with a casing having opposite cylinders and inlet and outlet discharge passages and ports, of pistons of which the opposite ones are connected in pairs, a single rotary valve for controlling the inlet and outlet ports, means comprising an adjustable crank pin carried by the valve for varying the length of strokes of the connected pairs of pistons, and a register shaft having an arm with a forked extremity for engaging the crank pin permitting the adjustment of the crank pin but rotating in accordance with the valve.

5. A metering device having opposite cylinders, a rotatable valve, and connected pistons reciprocating in the cylinders and which are adjustably connected to the valve for varying the piston strokes and for rotating the valve by their reciprocation.

6. A metering device having radial cylinders, pistons movable in the cylinders, a centrally located rotary valve, and means for adjustably connecting the pistons to the valve for correspondingly varying the strokes of all of the pistons simultaneously.

7. The combination with a casing having a common admission chamber with opposite radial cylinders and passages leading from the chamber to the outer ends of the cylinders, of pistons movable in the cylinders and connected in opposite pairs for simultaneous movement, a rotary valve for controlling said passages, and an adjustable member carried by the valve and connected with each of said pairs of connected pistons.

8. In a metering device, a casing having a common admission chamber with opposite

cylinders and passages leading from the chamber to the outer end of each cylinder, means forming a discharge passage from said chamber, pistons movable in the cylinders, a rotary valve operated by the pistons and having ports to open the passage from the common chamber to the outer side of one piston and at the same time to open the chamber at the outer side of another piston reversely through the passage connected thereto to the discharge passage, and means forming an adjustable connection between the valve and said pistons whereby the strokes of said pistons can be varied for causing the circulation of different quantities of liquid in the said passages.

9. In a metering device, the combination with a rotary valve, of a block adjustable on the valve and having a projecting crank pin, a cylinder and a piston therefor connected to said pin, a register shaft with a projecting forked arm for engaging the crank pin, and means for adjusting and holding the block on the valve in any adjusted position to vary the stroke of the piston.

10. In a metering device, a rotary valve, a block slidable on the valve and having an opening through which the hub extends, means for clamping the block on the valve, a set screw for adjusting the position of the block with respect to the valve, a crank pin projecting from the block, a cylinder with a piston connected to said pin, and means for engaging the crank pin in different adjusted positions to vary the length of the piston stroke.

In testimony whereof I have signed my name to this specification, on this 15th day of May A. D. 1917.

ALLEN A. BOWSER.

Witnesses:

J. R. MATLACK,
A. H. MOHR.