

A. BOWSER.
METER.

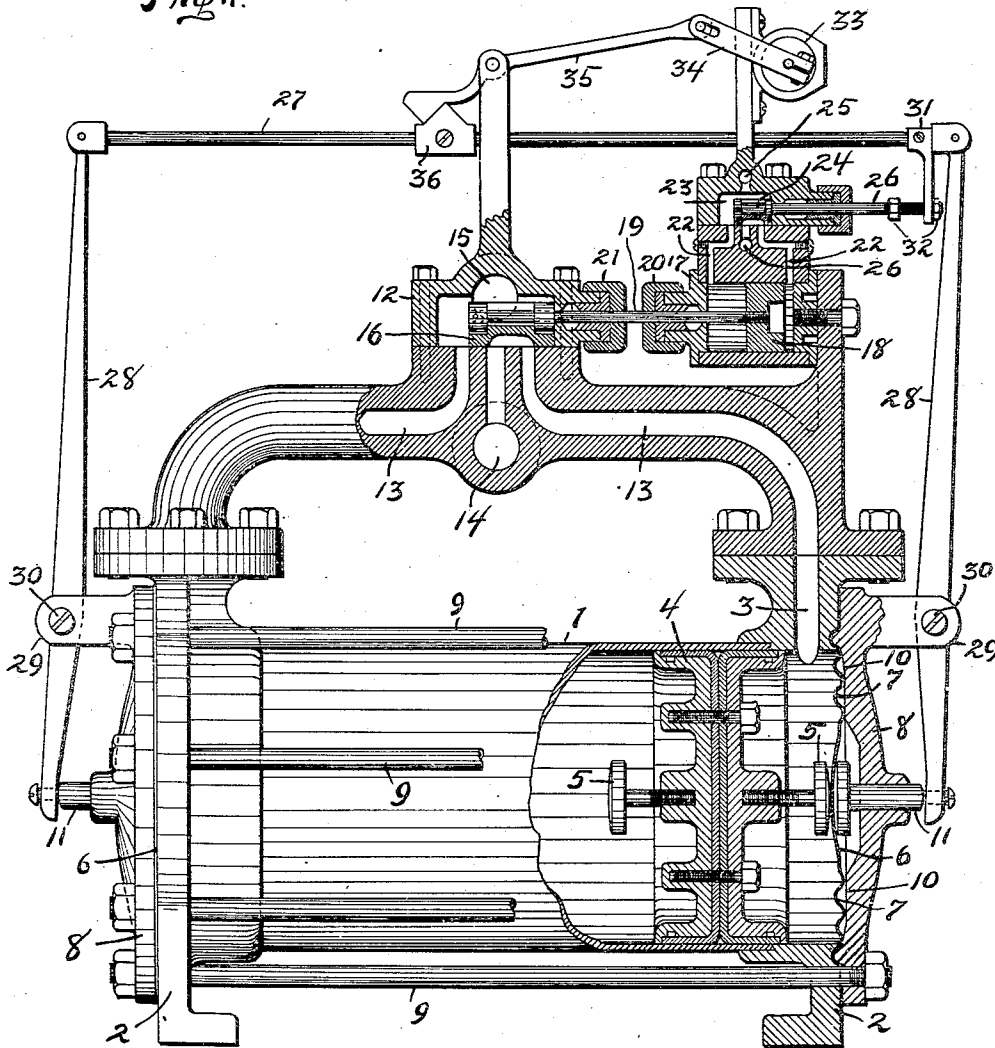
APPLICATION FILED APR. 19, 1915.

1,199,526.

Patented Sept. 26, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Edw. S. Lubmann.
Mathilde Mittler.

Augustus Bowser INVENTOR.

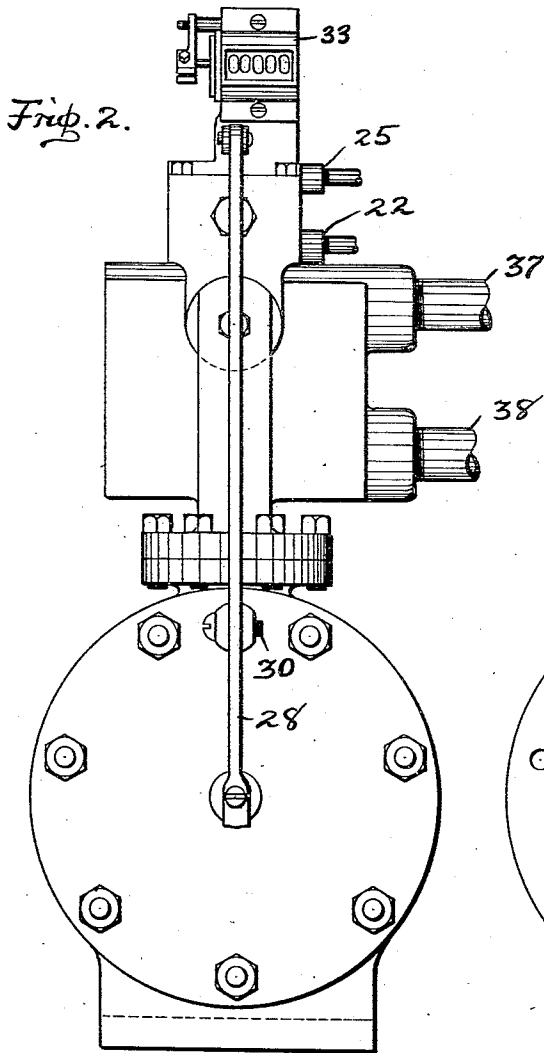
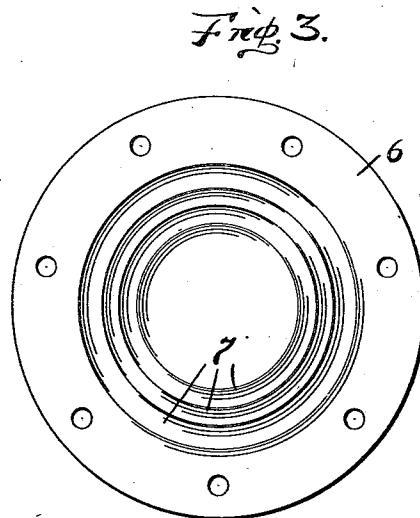
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WITNESSES:

Otto F. Liebmann.
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UNITED STATES PATENT OFFICE.

AUGUSTUS BOWSER, OF FORT WAYNE, INDIANA.

METER.

1,199,526.

Specification of Letters Patent. Patented Sept. 26, 1916.

Application filed April 19, 1915. Serial No. 22,290.

To all whom it may concern:

Be it known that I, AUGUSTUS BOWSER, a citizen of the United States of America, and a resident of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Meters, of which the following is a specification.

This invention relates to improvements in meters for fluids and the object thereof is to provide a device for accurately measuring fluid that is passed through a conveying pipe, and to so construct the device as to prevent leakage occurring at points where the actuating mechanism extends to the exterior.

The above objects are accomplished by the construction illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of the device shown partly broken away and in section; Fig. 2 is an exterior end elevation of the meter; and Fig. 3 is a detail view showing a plan of one of the flexible, inner heads.

Similar characters of reference indicate corresponding parts throughout the several views and referring now to the same: (1) is a cylinder at each end of which is a flange (2) and port opening (3). Within the cylinder is a piston (4) adapted to be moved longitudinally in the cylinder, and upon each side of the piston is an adjustable contact bearing (5) adapted to be carried with the piston. At each end of the cylinder is a flexible internal head (6) consisting of a thin sheet of metal formed with a series of convolute corrugations (7). The said heads are held against the corresponding ends of the cylinder by means of external non-flexible heads (8) that are clamped in place by means of through-bolts (9) so as to hold the flexible internal heads between the corresponding ends of the cylinder and the non-flexible external heads. Each of the heads (8) has upon its interior surface an annular face (10) against which the convolute corrugations of the flexible inner head may rest when pressure within the cylinder bears against the head. A reciprocating contact bearing (11) extends through each of the non-flexible outer heads (8) and bears against the outer face of the corresponding flexible head (6) at the center thereof. A valve-case (12) is mounted

above the cylinder and has communicating ports (13) with the corresponding ports (3) at the ends of the cylinder, and also a discharge port (14), and inlet port (15). A valve (16) is arranged within the valve-case (12) and is adapted to be reciprocated so as to effect communication between one or the other of the ports (13) with the discharge port (14) accordingly as shifted from one of its positions to the other. The valve shown is of the type commonly known and used in steam engine constructions wherein a "slide valve" is employed. The inlet port (15) has at all times communication with the interior of the valve-case (12) and there-through has communication with the ends of the cylinder through the ports (13) and (3) when not obstructed by the valve (16).

As a means for actuating the valve a cylinder (17) is mounted adjacent the valve casing and has therein a reciprocating piston (18) that is connected with the valve by means of a connecting rod (19), stuffing boxes (20) and (21) being provided respectively for the cylinder and valve-case through which the connecting rod operates. The piston (18) is driven by means of air under pressure, introduced alternately in the ends of the cylinder (17) through ports (22) that lead thereinto and also at their opposite extremities into an air-chest (23). A valve (24) is arranged within the air-chest and is adapted to control the admission and exhaust of air to and from the ends of the cylinder (17). The introduction of air into the air-chest is through a port (25) leading thereinto and an exhaust port (26) admits of the outward passage of air from one end of the cylinder or the other accordingly as the valve (24) is shifted. The valve (24) is actuated by means of its stem (26) which is connected with a reciprocating rod (27) and the latter is supported at its ends upon levers (28) that extend respectively from the ends of the cylinder (1) and have connection at their opposite ends with the corresponding reciprocating contact bearings (11). The levers (28) are pivoted in brackets (29), screws (30) extending there-through and forming fulcrum therefor.

An arm (31) fixed upon the rod (27) has loose connection with the valve-stem (26) and nuts (32) on said valve-stem placed respectively upon opposite sides of

the arm, afford the latter more or less play between the nuts accordingly as the latter are adjusted upon the stem.

A counter (33) of any well known type, adapted to register cycles of mechanical movement, is arranged in connection with the device. The actuating arm (34) of the counter is connected with a lever (35) and a lug (36) is fixed upon the rod (27) so as to move therewith and engage one end of the lever (35) and actuate the same as the rod is moved.

In the operation of the invention fluid is introduced into the valve chamber (12) through the intake port (15) and feed pipe (37) connected therewith that is supplied with the fluid under pressure. The fluid enters one end of the cylinder and owing to its pressure drives the piston (4) toward the opposite end of the cylinder with the result that as the piston reaches the end of the cylinder the corresponding contact bearing (5) is forced against the flexible head (6), the central portion of which yields to the pressure thus bearing against it and the reciprocating bearing (11) that contacts with its opposite side is thereupon forced outwardly with the result that the lever (28) attached thereto is actuated. The rod (27) attached to the top of the levers (28) is reciprocated by said levers in one direction or the other accordingly as said levers become actuated. The movement of the piston (4) which is caused by the supply of fluid under pressure to one end of the cylinder, causes the fluid contained in the other end of the cylinder to pass therefrom through the corresponding port and to be directed by the valve (16) into the discharge port (14) whence it is conveyed to the desired point of delivery through a discharge pipe (38). The movement of the rod (27) and lug (36) fixed thereon has the effect of actuating the lever (35) so as to swing the arm (34) on the counter, thus registering one cycle of movement of the apparatus. The movement of the rod (27) has also the effect of actuating the valve-stem (26) through the arm (31), and the valve (24) is thereby shifted so that air introduced through the port (25) into the air-chest will enter the cylinder (17) at one end or the other accordingly as the valve is shifted, so that the piston (18) in the cylinder will be actuated with the effect that the valve (16) in the casing (12) is shifted to its opposite position with the result that the fluid becomes directed into the opposite end of the cylinder, driving the piston (4) in the opposite direction so that the fluid previously introduced into the cylinder becomes expelled. The effect of the pressure of the bearing (5) against the flexible inner head is that the corresponding reciprocating bearing (11) is

forced outwardly so as to actuate the lever attached thereto. The flexible heads prevent leakage of fluid through the openings in the non-flexible outer heads through which the reciprocating bearings extend. It will be understood that the corrugated portion of each of the flexible heads rests against the face (10) of the corresponding non-flexible head so that the pressure of fluid in the cylinder (1), while being effective in driving the piston throughout its entire area upon one side, is only effective in moving the central portion of the flexible head that extends within the corrugations. The force of the piston in bearing against the opposite flexible head is therefore greater than the pressure of driving fluid against the movable portion of the other flexible head. Thus when the movement of the piston results in the outward thrust of one of the reciprocating bearings, the other reciprocating bearing and adjacent flexible head are forced inwardly against the pressure of the driving fluid.

As the piston moves from one end of the cylinder to the other a definite quantity of fluid is expelled from the latter end, and the counter is thereupon actuated so that the discharge of fluid is registered thereby. It is the intention that the cylinder (1) shall be of a size so proportioned that the discharge therefrom with each stroke of the piston shall be in conformity with a standard unit of measurement. The stems of the contact bearings (5) are threaded in their connection with the piston so that they may be adjusted therein and thus limit more or less the movement of the piston. The quantity of fluid discharged from the cylinder at each stroke of the piston, can therefore be altered as may be required.

What I claim is:—

1. In apparatus of the class described, a cylinder having a port at each of its ends; a piston mounted in the cylinder and adapted to reciprocate therein; a valve-case having inlet and discharge ports and also ports communicating respectively with the ports at the ends of the cylinder; a valve in the valve-case for controlling the flow of fluid from the latter into and from the communicating ports; a fluid pressure actuated mechanism having connection with said valve to drive the same; a flexible inner head at each end of the cylinder; an inflexible head for securing each of the former heads to the corresponding end of the cylinder; a reciprocating contact bearing extending through each of the inflexible heads and bearing against the adjacent face of the corresponding flexible head; a contact bearing extending from each side of the piston adapted to bear against the flexible heads correspondingly at the ends of its strokes; and a lever mechanism in connection with

the reciprocating bearings and the fluid actuated mechanism for operating the latter.

2. In mechanism of the class described, a cylinder having controlling means in connection therewith for the alternate supply and discharge of fluid to and from the ends of the cylinder; a movable piston in the cylinder having contact bearings extending respectively from its ends; a flexible head at each end of the cylinder; an inflexible outer head at each end of the cylinder adapted to hold the corresponding flexible head in position; a movable bearing adapted to contact with the respective flexible heads upon the exterior thereof; and means in connection with the movable bearings and the controlling means for actuating the latter.

3. In mechanism of the class described, a cylinder having means in connection with its ends for directing fluid to and from the same; a mechanism for controlling said means; a reciprocating piston in the cylinder; a flexible head at each end of the cylinder closing the same; an external head having an annular bearing face adapted to support the outer portion of the adjacent flexible head; a contact bearing extending

through each of the outer heads and bearing against the adjacent face of the corresponding flexible head; a bearing extending from each side of the piston adapted to contact with said flexible heads at the center thereof; and means in connection with the former bearings and the controlling mechanism for actuating the latter.

4. In mechanism of the class described, a cylinder; a piston therein having a contact bearing extending from each of its ends; a flexible head closing each end of the cylinder; a supporting head for each of the flexible heads affording a bearing for the outer portion of the latter; contact bearings adapted to be actuated respectively by the outward movement of said flexible heads; means for directing fluid into and from the respective ends of the cylinder; and means actuated by said bearings for operating said directing means.

In testimony whereof I affix my signature, in presence of two witnesses.

AUGUSTUS BOWSER.

Witnesses:

MATHILDA METTLER,
WALTER G. BURNS.