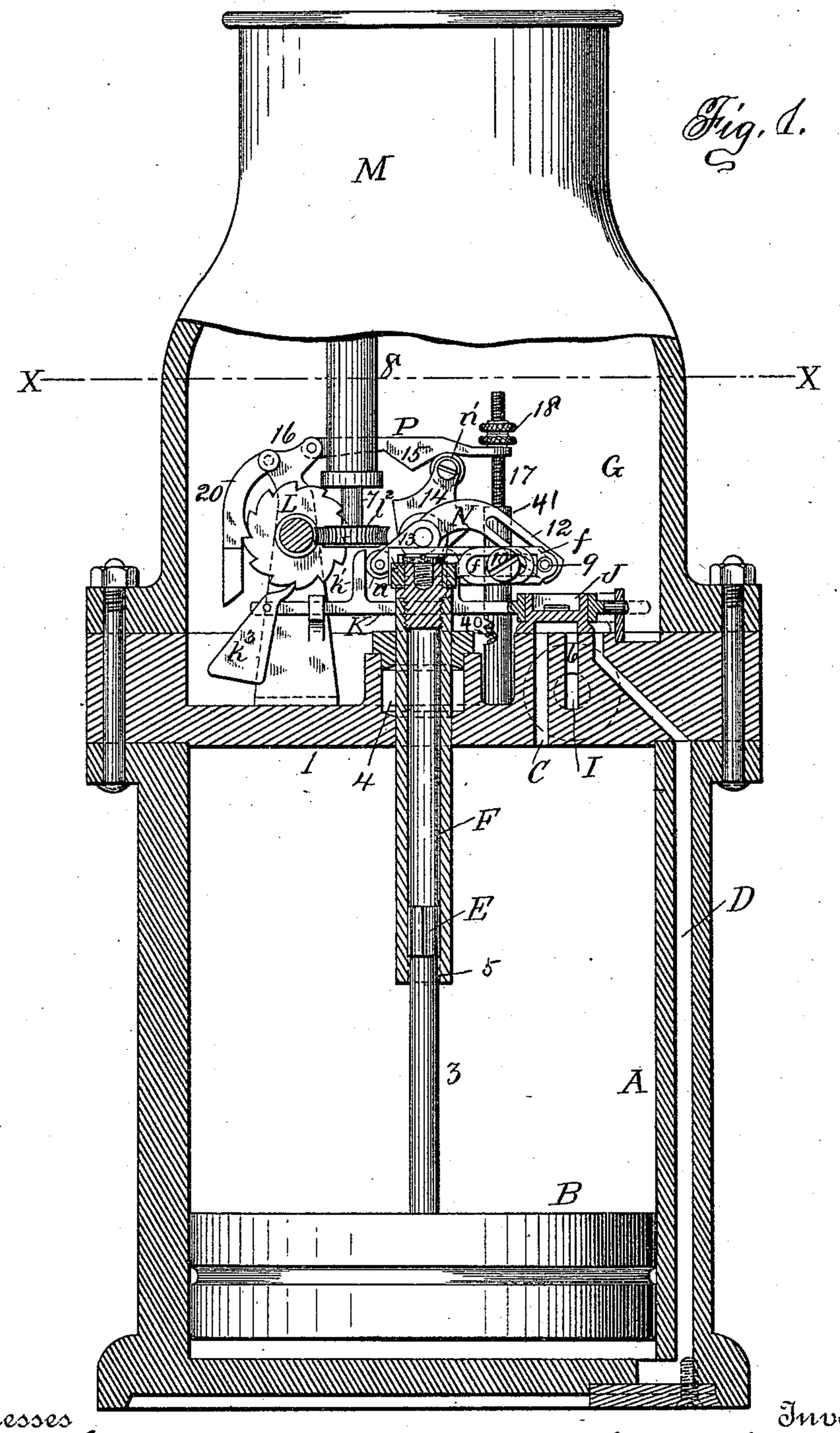
(No Model.) 2 Sheets—Sheet 1.

H. C. AHRBECKER.

PISTON METER.

No. 455,244. Patented June 30, 1891.

Fig. 1.



Witnesses
John G. Lepper.
F. B. Brock

Inventor
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By his Attorney
Wm. A. Barrett

(No Model.)

2 Sheets—Sheet 2.

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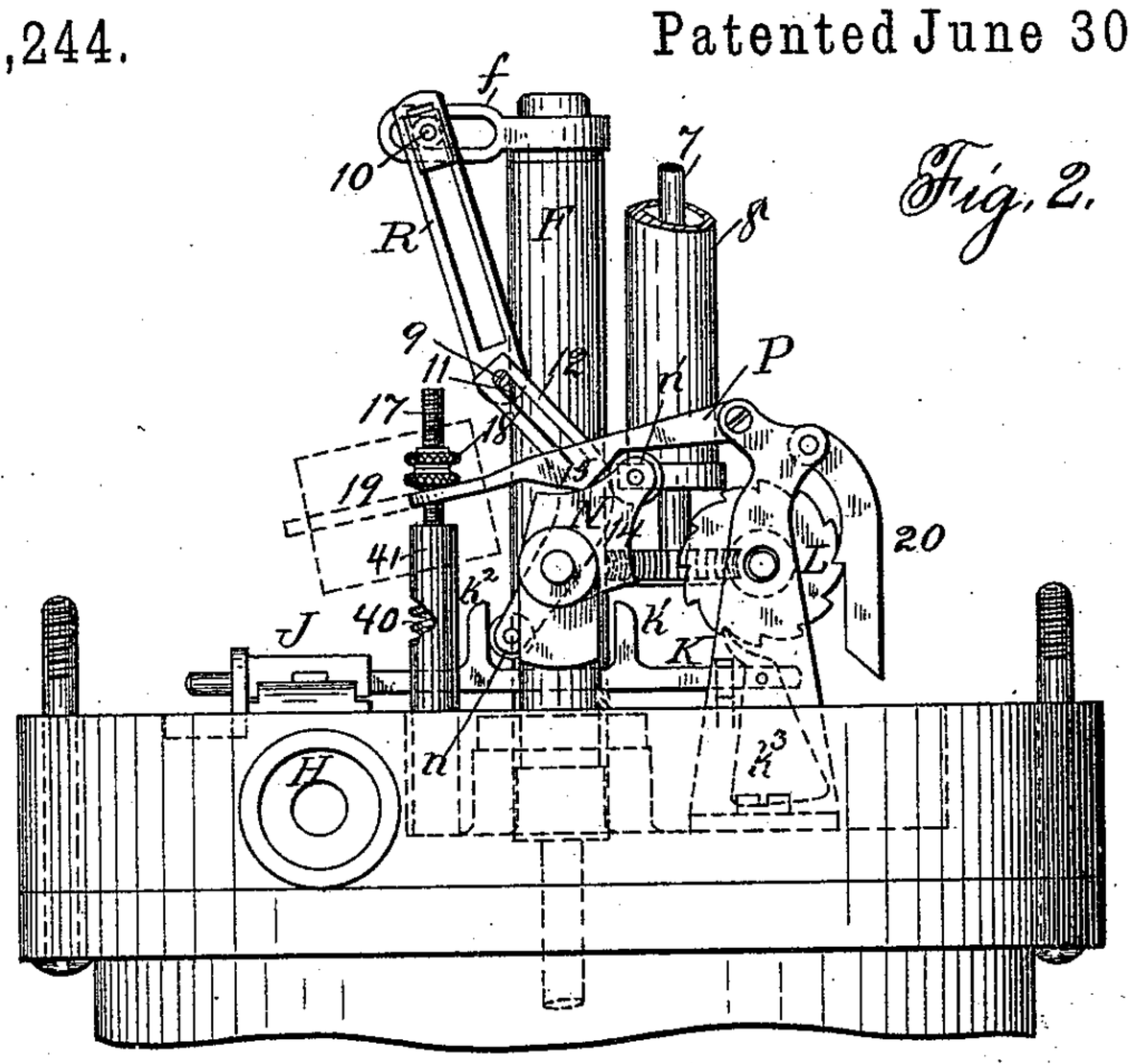

Fig. 2.

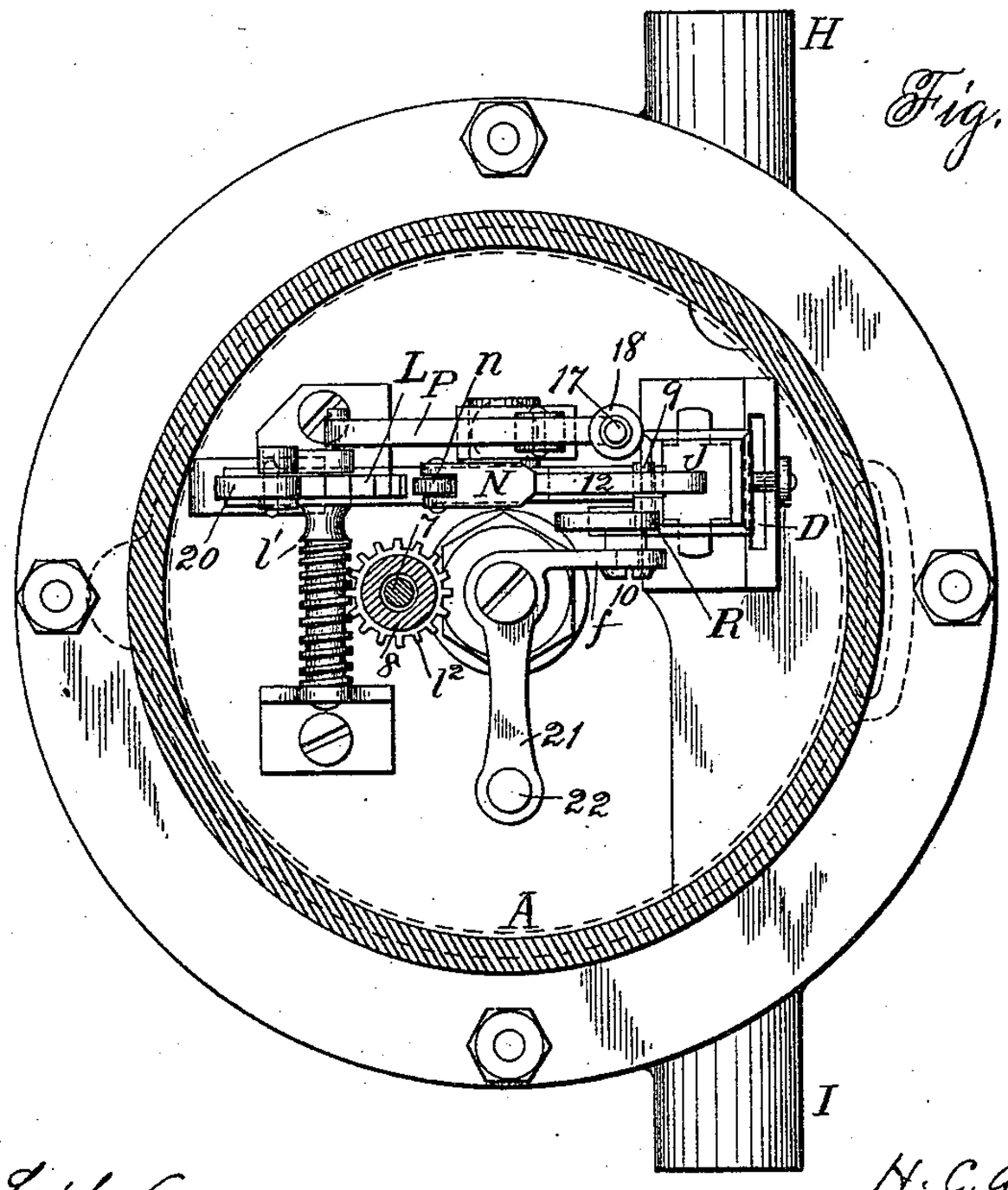

Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY CONRAD AHRBECKER, OF LONDON, ENGLAND.

PISTON METER.

SPECIFICATION forming part of Letters Patent No. 455,244, dated June 30, 1891.

Application filed April 8, 1890. Serial No. 347,066. (No model.) Patented in England February 23, 1889, No. 3,293, and in Belgium January 16, 1890, No. 89,196.

To all whom it may concern:

Be it known that I, HENRY CONRAD AHRBECKER, residing at 35 Waterloo Bridge Road, London, in the county of Surrey, England, have invented certain new and useful Improvements in Liquid-Meters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention was patented in Belgium, No. 89,196, dated January 16, 1890, and in Great Britain, No. 3,293, dated February 23, 1889.

This invention relates to meters for liquids, and especially to the variety known as "piston meters."

The principal object of the invention is to work the valves which alternate the pressure on the piston in such manner that the stroke of the piston shall be reversed with certainty, whether the piston movement be quick or slow.

A further object is to generally improve the construction of the piston meters.

Figure 1 is a central section, partly in elevation, of a meter made according to this invention. Fig. 2 is a rear elevation of the valve-gear connected to the piston-rod. Fig. 3 is a a plan on the line $x\ x$, Fig. 1.

A indicates the measuring-cylinder of the meter. This cylinder contains a reciprocating piston B, which is suitably packed to fit the cylinder. The cylinder head or cover 1 has a port C, opening from chamber G above the measuring-cylinder into said cylinder above the piston. A passage D leads from the chamber G through the wall of the cylinder to the chamber of said cylinder below the piston. The piston-rod 3 has a head E, which works within a tubular rod F. The rod F passes through a stuffing-box 4 or other suitable packing in the cover 1 of the cylinder. The head E of the piston-rod 3 is notched, so as to allow the free passage of fluid into the interior of the tubular rod F. The lower end of the tubular rod F is turned in at 5, so that head E will engage with said inturned end as the piston-rod is drawn downward. Chamber G contains the valve-gear and is supplied from an inlet-pipe H, so that the chamber G is subject to the pressure of the fluid-supply. The outlet-pipe I communicates with a central exhaust-port 6, which is between the ports or passages C and D, and port 6 is in communication with one or the other passage C D, according to the position of the slide-valve J, which valve J is operated in usual manner to open one passage and close the other. The slide-valve J has a valve-rod K, and this rod has two projecting tappets k' and k^2 and carries also a pivoted pawl k^3, which pawl engages teeth of ratchet-wheel L. The ratchet-wheel L is mounted on a worm-shaft l', and the worm engages a worm-wheel l^2 on a spindle 7, that passes through a suitable packing in bearing 8 into compartment M and actuates suitable gearing to move an indicator or pointer to indicate the amount of fluid which passes through the meter. The rod F bears a rigid arm f, which arm is slotted, and a stud 10 passes through the slot and is adjustable therein. Stud 10 enters a slotted link R, which link has a stud 9, which enters a slot 12 in arm 11 of a three-armed lever N. This lever or tumbler N has an arm 13, which carries a roller n in the space between the tappets k' and k^2 of valve-rod K, hereinbefore referred to. The third arm 14 of the tumbler N has a roller n', which rides under a double incline 15 of lever P. The lever P is pivoted to a suitable bracket or support 16, and its end opposite the pivot is connected to a spring-actuated rod 17 by nut 18, or a weight 19 (dotted lines, Fig. 2) may be substituted for the spring-actuated rod 17 to draw down the free end of the lever P. A spring 40 may be inserted in casing 41, so as to draw on rod 17. The lever P, with its actuating spring or weight and its double incline 15, bearing on the roller n' of tumbler N, may be termed the "actuator." The pawl 20 serves as a check against backward movement of the ratchet L. The rod F may have an arm 21, which slides on a guiding-stud 22 to prevent rotation of said rod F.

When the parts are in the position shown in full lines in Fig. 1, the piston being at the lower end of its stroke, fluid will be admitted by passage D to the chamber below the piston, thus raising said piston. The fluid above the piston will flow through passages C and 6 and out through the outlet-pipe I. The piston-rod 3 will telescope into rod F until the piston B bears against said rod, when the rods

3 and F will continue the movement together. The piston-rod, being telescopic or extensible, as described, will permit a piston movement of one-half the length of the cylinder without causing any movement of the valve-gear. The meter of the proportions shown will thus register twice the quantity of fluid with a given number of valve movements, as if the rod were not extensible. Rod F carries arm *f* with it by means of link R. The tumbler N is shifted as the arm *f* nears the end of its upstroke, moving roller *n'* under the incline 15 of the actuator. When the roller 15 has passed the center of this incline, the power of the spring 40 or weight 19 will tend to quickly shift the tumbler, and with it the slide-valve J, by means of the roller *n* on the tumbler engaging tappets *k'* and *k²* on the valve-rod K.

The shifting of valve J opens passage C to the fluid-pressure from chamber G and puts passage D into communication with outlet I. The movement of the piston will be reversed, but piston-rod 3 will be drawn out from rod F until the head E reaches the end 5 of rod F, when rod F will move with the piston. The reverse movement of arm *f* and link R causes a reversal of the movement of roller *n'* across the incline 15 of the actuator-lever P, and having passed the center of this incline the actuator will serve to shift the valve in reverse direction, thus reversing all the movements.

The shifting of valve in one direction serves to move the ratchet L the distance of one tooth, and this ratchet through the worm and a suitable train actuates the indicator. The fluid contents of the cylinder being known, the meter will indicate the quantity of fluid passed through it. The rod F might be made integral with the piston-rod; but by making the rod telescopic the valve-gear can be made compact, however long the piston-stroke may be.

By means of the actuator and tumbler the slide-valve is moved quickly at about the time of the completion of the stroke of the piston, and is not moved at all until the piston has substantially completed its stroke, the final movement of the valve being effected by the actuator and being independent of the final piston movement. By thus making the final movement of the slide-valve independent of the final piston movement, increased certainty of action is secured.

What I claim is—

1. The combination, in a piston meter, of a cylinder, a reciprocating piston therein, a piston-rod and link connecting the same to a three-armed tumbler, a valve actuated by the tumbler, and a spring-pressed lever having a double-inclined bearing on one arm of the tumbler, substantially as described.

2. The combination of the cylinder, piston, shifting-valve having a pawl engaging the registering-train, a tumbler acting on the valve to shift the same, and a link connecting the piston-rod and tumbler, and a mechanical actuator engaging the tumbler to move the same independently of the final piston movement, substantially as described.

3. The combination of a cylinder, piston, telescopic piston-rod, three-armed tumbler, and link connecting the same to the piston-rod, with the slide-valve engaging one arm of the tumbler, the ratchet connected to the registering-train, and a pawl connected to the valve and acting on said ratchet, substantially as described.

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

HENRY CONRAD AHRBECKER.

Witnesses:
JOHN F. S. CRIDLAND,
H. A. BRADY.