No. 676,231. Patented June 11, 1901.

J. HAWKYARD & J. BRADDOCK.

PREPAYMENT GAS METER.

(Application filed Mar. 25, 1899.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

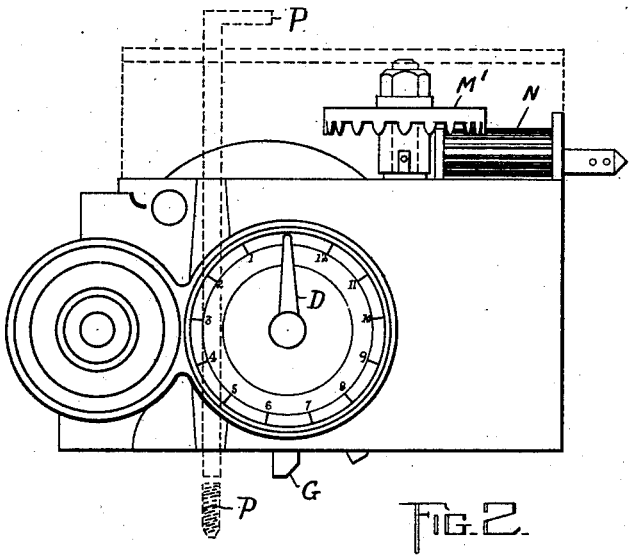


FIG. 5.

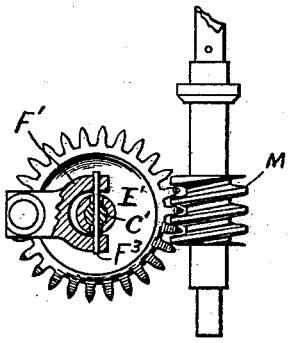
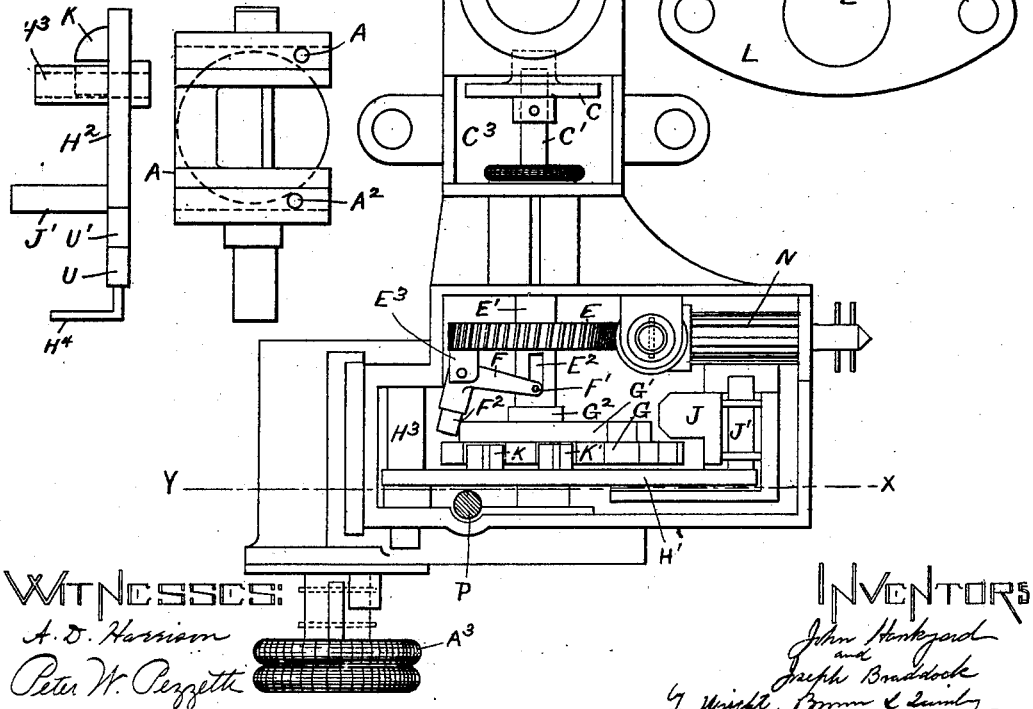


FIG. 2.

FIG. 6.

FIG. 8. FIG. 7.



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3 Sheets—Sheet 2.

FIG. 7.

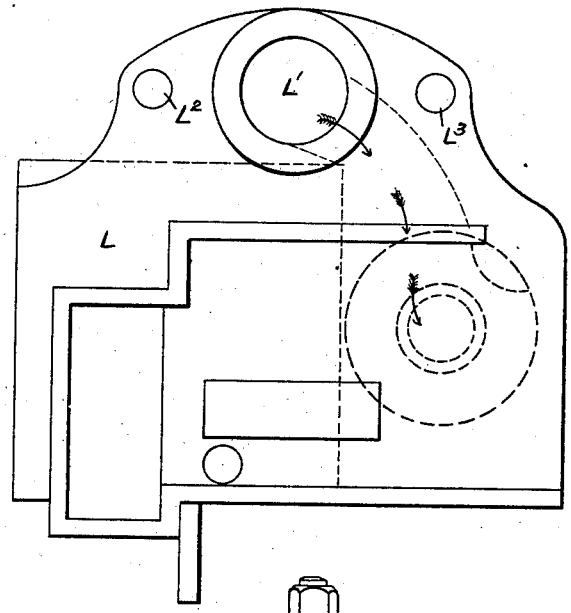


FIG. 3.

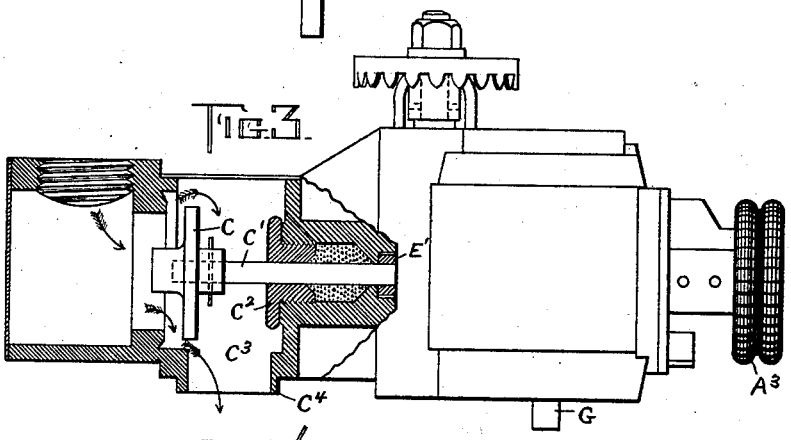
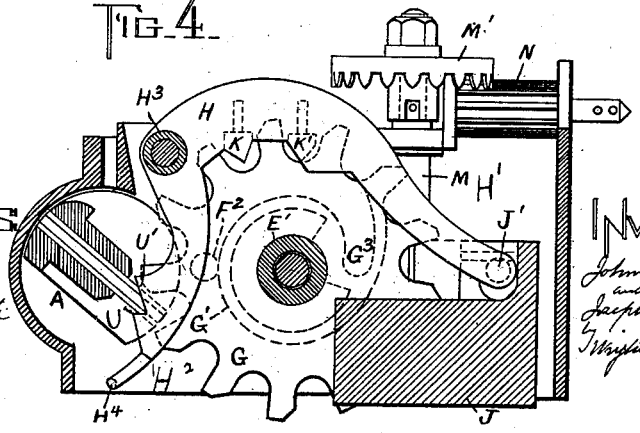


FIG. 4.



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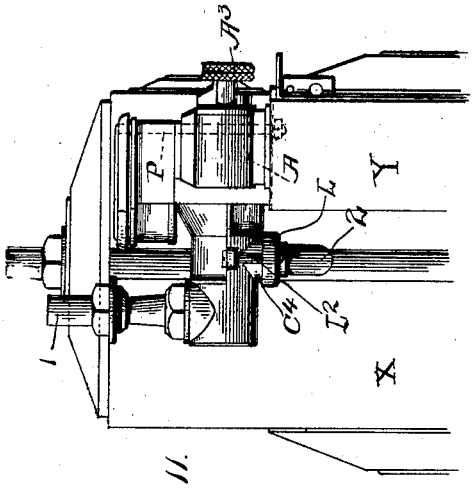

Fig. 11.

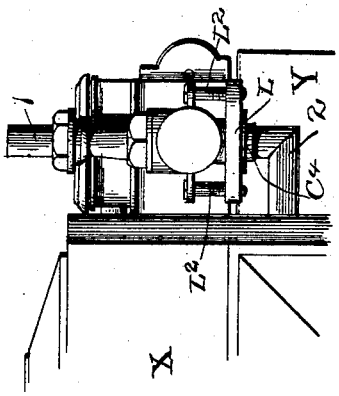

Fig. 12.

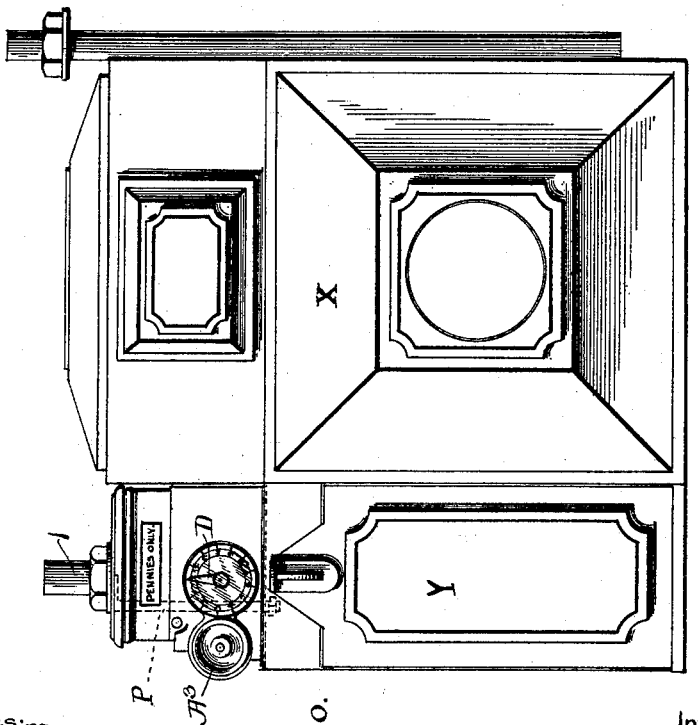

Fig. 10.

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UNITED STATES PATENT OFFICE.

JOHN HAWKYARD AND JOSEPH BRADDOCK, OF OLDHAM, ENGLAND, ASSIGNORS TO METERS, LIMITED, OF DEANSGATE, MANCHESTER, ENGLAND.

PREPAYMENT GAS-METER.

SPECIFICATION forming part of Letters Patent No. 676,231, dated June 11, 1901.

Application filed March 25, 1899. Serial No. 710,453. (No model.)

To all whom it may concern:

Be it known that we, JOHN HAWKYARD and JOSEPH BRADDOCK, of Oldham, in the county of Lancaster, England, have invented certain new and useful Improvements in Apparatus for Supplying Gas or other Fluid on Prepayment, of which the following is a specification.

Our invention relates to an improved form of prepayment mechanism for application to gas or other fluid meters, and has for its object the simplification of the said apparatus, so as to render it more direct in its action and less liable to fraudulent use. We also construct our said mechanism so that it is readily applicable to any form of meter and is capable of being easily removed when it is desired to do so for any purpose without necessitating the removal of the meter.

The method of carrying our said invention into effect is shown in the accompanying drawings, whereof—

Figure 1 is a front elevation; Fig. 2, a plan view; Fig. 3, a side elevation, partly in section, showing the valve and its seat. Fig. 4 is a section through the line X Y in Fig. 2. Fig. 5 is a detailed view of meter-driven wheel and its attached forked lever. Fig. 6 is a plan view of the gas connection for a dry meter. Fig. 7 is a plan view of the gas connection for a wet meter; Fig. 8, a side view of the bell-crank detent-lever H, and Fig. 9 a separate view of the coin-carrier. Figs. 10, 11, and 12 represent a front view and partial or detail side and rear elevations, respectively, of a gas-meter having our prepayment mechanism connected therewith.

We employ a coin carrier or receiver A, which rotates on a spindle borne in the framing and provided with a through-slit for the reception of the coin. The coin is prevented from going too far by two stops A' A^2, which are set at correct distance to sustain a coin of the required size, but will permit any smaller coin to pass through. The coin, which is introduced in the ordinary way through a slit in the framing, enters the coin-receiver and is discharged therefrom at the same side. The coin-receiver A is rotated from without by the milled wheel A^3 or by any convenient thumb-piece, and we preferably limit the rotation of the receiver to about half a revolution. The receiver is so formed that the coin when carried by the receiver projects into the spaces in the wheel G.

The valve C, which is supplementary to the valves usually employed in gas-meters, is mounted on the end of a spindle C′, which is capable of both endwise and rotary movement, and is carried in bearings formed in the framing passing through a stuffing-box C^2, whereby the escape of gas from chamber C^3 is prevented when the valve is open. The said chamber is, when the mechanism is in working position, connected with the passage communicating with the ordinary gas-passages in the meter by making a joint at C^4 with two screws. The chamber C^3 is closed at its upper portion by a jointed cover which can be removed to obtain access to the stuffing-box C^2 when the latter requires packing.

Upon the valve-spindle C′ is loosely mounted a wheel E, formed with a long boss E′, which is borne, as shown, by the frame of the apparatus and projecting at the front sufficiently far to carry the finger D, traversing a dial, showing the number of coins which have been placed in the apparatus and for which no gas has been supplied. In the said boss E′ of the wheel E a slot E^2 is formed, and the valve-spindle C′ terminates a little beyond the front end of the slot E^2. Four of the teeth of the wheel E are projected forward at E^3, so that a small L-lever F can be pivoted to them. One end F′ of the lever F is forked so as to pass over the boss E′. A pin F^3 is fixed in the forked end of F and passes through the valve-spindle C′, thus making an operative connection between it and the boss E′. The other end, F^2, of the lever F carries a small antifriction-roller which presses against a cam-face G′, formed on the inner face of the sprocket-wheel G.

The wheel G is loosely mounted upon the boss E′ and is kept in position by a collar G^2, fixed into E′ by a pin. As the wheel G has on the side opposite the collar a boss in contact with a face on the front frame, it is prevented from having a longitudinal movement. The cam-face G′ is formed so as to be for the greater part of its length concentric with the axis of the wheel; but at the point G^3 it is

formed spirally thereto and in the form of a cam-course. The sprocket-wheel G has thirteen equal gaps in it.

A lever H, having two arms H′ H², is pivoted at the point H³. The horizontal arm H′ of the said lever carries on a pivot J′ a weight J, the object of which is to keep in position in two of gaps G two detent-catches K K′, which normally lock the mechanism. The vertical arm H² of the lever H has formed upon its face next the coin-receiver two inclines U U′ and at its lower end is bent at right angles, so as to form a pin or detent H⁴, passing across the face of the sprocket-wheel G.

We gear the wheel E to be rotated by the mechanism within the meter-casing X by any suitable means; but we prefer to employ a vertical worm-spindle M, which has fixed upon its upper end a readily-changeable crown-wheel M′ by means of a nut. The downwardly-projecting boss of M′ has a slot formed in it which engages with a pin passing through M and projecting on each side of it. A shoulder is formed on the spindle M, which fixes the vertical position of M′, thus insuring it being in correct gear with the long pinion N, which is suitably borne. The pinion N can be connected to the meter-index mechanism in many well-known ways. We may dispense with the wheel M′ and pinion N and connect the spindle M in any convenient method.

The action of the above mechanism is as follows: Before the introduction of a coin the valve C is pressed onto its seat and prevents the inflow of gas to the meter-passages. The end F² of the lever F rests in the eccentric portion G³ of the cam-face G′, thus pressing the valve onto its seat. The coin-receiver is turned up and the coin is introduced. The receiver A is then turned from right to left and presses against the first incline, U, on the vertical arm H² of the lever H. This causes the lever H to rock sufficiently to permit the edge of the coin to pass over U, when the lever H falls back, so that the coin-receiver cannot be turned back. The movement of H is not sufficient to lift the catches K K′ out of the wheel G, so that the latter cannot be rotated at this time. The continued rotation of the coin-receiver causes the coin to press against the second incline, U′, on H² and rock the lever H to such an extent that the catches K K′ are nearly free from the wheel G. The coin now presses against one of the teeth of the wheel G and begins to rotate it, and as the movement is continued the teeth of G acting against K K′ still further raise the lever H and cause the pin H⁴ to enter the next corresponding space in the wheel G at the under side, so preventing any excessive movement of G. The construction of the lever H with the two inclines or cams U U′ results in the formation of a detent between said inclines which serves to prevent return movement of the coin after it has partially actuated the lever. Therefore it would be impossible for any person to give a quick movement to the receiver A, so as to cause the coin to actuate the lever to raise the catches K K′, and to then cause the coin to quickly actuate the wheel G, and then reverse the movement of the receiver before the lever H could drop back to position. An attempt to impart such a quick movement to the receiver A as to actuate both the lever H and the wheel G would simply result in causing the coin to catch, so that the receiver could not be reversed. A continuance of the rotation of A completes the partial revolution of G and releases the lever H and the coin, which latter falls out of the slit in the receiver as soon as the pressure is off. The wheel G having been rotated, the cam-surface moves so that the pin F² is lifted up the eccentric portion G³, and in consequence the lever F is rocked on its pivot. Owing to its connection with the valve-spindle, the latter is moved endwise so as to draw the valve away from its seat. Additional coins can be used up to twelve; but after that number have successively been introduced the mechanism is locked until a retractive movement has taken place. The effect of the introduction of additional coins is that the pin F² traverses the concentric portion of the cam-face G′ without producing further effect upon the valve. Owing to the opening of the valve C gas begins to flow from the supply-pipe 1 (see Figs. 10, 11, and 12) through the chamber C³, as shown by the arrows in Fig. 3, and through the pipe 2, (see Figs. 11 and 12,) and the meter begins to work. The result is that the pinion N is rotated and drives, by the crown-wheel M′ and the worm-spindle M, the wheel E. As the lever F is pivoted to the wheel E, as described, the rotation of E retracts the pin F² and gradually brings it into the eccentric portion G³ of the cam, thus rocking the lever F and closing the valve. The rate at which the retraction takes place depends on the ratio between M′ and N and as M′ can be easily changed can be varied as desired.

The mechanism is fixed in position by placing it above the coin-box Y, allowing a passage for the coins to fall after discharge. The gas-inlet L′ in the base-plate L is fixed on the meter and the gasway of the attachment fixed to it by two screws at L² and L², so as to make a gas-tight joint. A hook-headed screw P is passed through the apparatus and through a hole in the top of coin-box chamber. By passing the hook over the top of the frame and screwing up a nut inside the coin-box the apparatus is by the aid of the gas-joint named held in position, but can be readily removed without uncoupling the meter.

We have thus provided a casing having a gas-passage, a valve for controlling said passage, coin-controlled mechanism connected with said valve to operate it, and means for attaching said casing to a meter with the gas-passage in connection with the gas-passage

of the meter. Said valve is indicated at C carried by the spindle C′, which extends through the stuffing-box C^2 of the casing into that chamber of the casing which contains the coin-controlled mechanism. The joint with the ordinary gas-passages of the meter is made at C^4. The said casing, carrying both the controlling-valve and the coin-controlled mechanism, is bodily removable from the meter by opening the coin-box and removing the nut from the hook-headed screw P, and therefore said casing can only be removed by the proper person having the key to the coin-box.

We claim—

1. In a prepayment gas-meter, a valve, a notched wheel controlling the same, and a coin-actuated locking-lever having provisions for engaging the notches in said wheel to lock the wheel, said lever having means for preventing the return movement of the coin after partially actuating the lever.

2. In a prepayment gas-meter, a valve, a valve-controlling wheel, and a locking-lever having provisions for engaging and locking said wheel both before and during a portion of the action of the coin, for preventing a return movement of the coin.

3. In a prepayment gas-meter, a valve, a wheel controlling the same and having notches to be engaged by the coin, a coin-holder constructed and arranged to bring the coin into engagement with the notches in said wheel, and a member normally locking said wheel and adapted to be engaged by the coin, and having means for preventing a return movement of the coin after partially actuating the lever.

4. In a device of the character described, the combination with a casing having a gas-passage, of a valve for controlling said passage, coin-controlled mechanism connected with said valve to operate it, a coin-box, and means for attaching said casing to a meter with the gas-passage in connection with the gas-passage of the meter, a movable part of said attaching means being accessible only within the coin-box to enable the casing and coin-controlled mechanism to be removed after opening the coin-box.

5. In a prepayment gas-meter, the combination of a valve having a stem, a meter-operated wheel loosely mounted on said stem and having a hollow sleeve extension or boss surrounding the same and formed with a slot, a coin-operated wheel having a cam, a lever pivoted to the meter-operated wheel and adapted to be engaged by said cam, and a pivotal connection between the valve-stem and said lever, passing through said slot.

6. In a prepayment gas-meter, the combination of a coin-operated wheel, a cam mounted thereon and having a portion concentric with the axis of said wheel and a portion eccentric thereto, the latter portion having the construction of a course or path, a meter-operated wheel, and a valve-operating lever pivoted to the latter and adapted to be engaged by the concentric and eccentric portions of said cam.

7. In a prepayment gas-meter, the combination of a toothed valve-controlling wheel, a coin-receiver mounted in proximity to said wheel and adapted to bring a coin into connection therewith to positively rotate the wheel, and a two-armed lever pivotally mounted alongside of said wheel in position to be engaged by a coin in the coin-receiver, and having provisions on each arm for engaging said toothed wheel, whereby the said wheel is locked both before and during a portion of the action of the coin on said wheel.

8. In a prepayment gas-meter, the combination with the meter-case and the coin-box, of a casing having a gas-passage, a valve for controlling said passage, coin-controlled mechanism connected with said valve to operate it, and a bolt engaged with said casing and extending into the coin-box and having means within said coin-box for securing said casing in place with the gas-passage in connection with the gas-passage of the meter.

In testimony whereof we have affixed our signatures in presence of two witnesses.

JOHN HAWKYARD.
JOSEPH BRADDOCK.

Witnesses:
JOHN P. PARRISH,
JOSEPH NASMITH.