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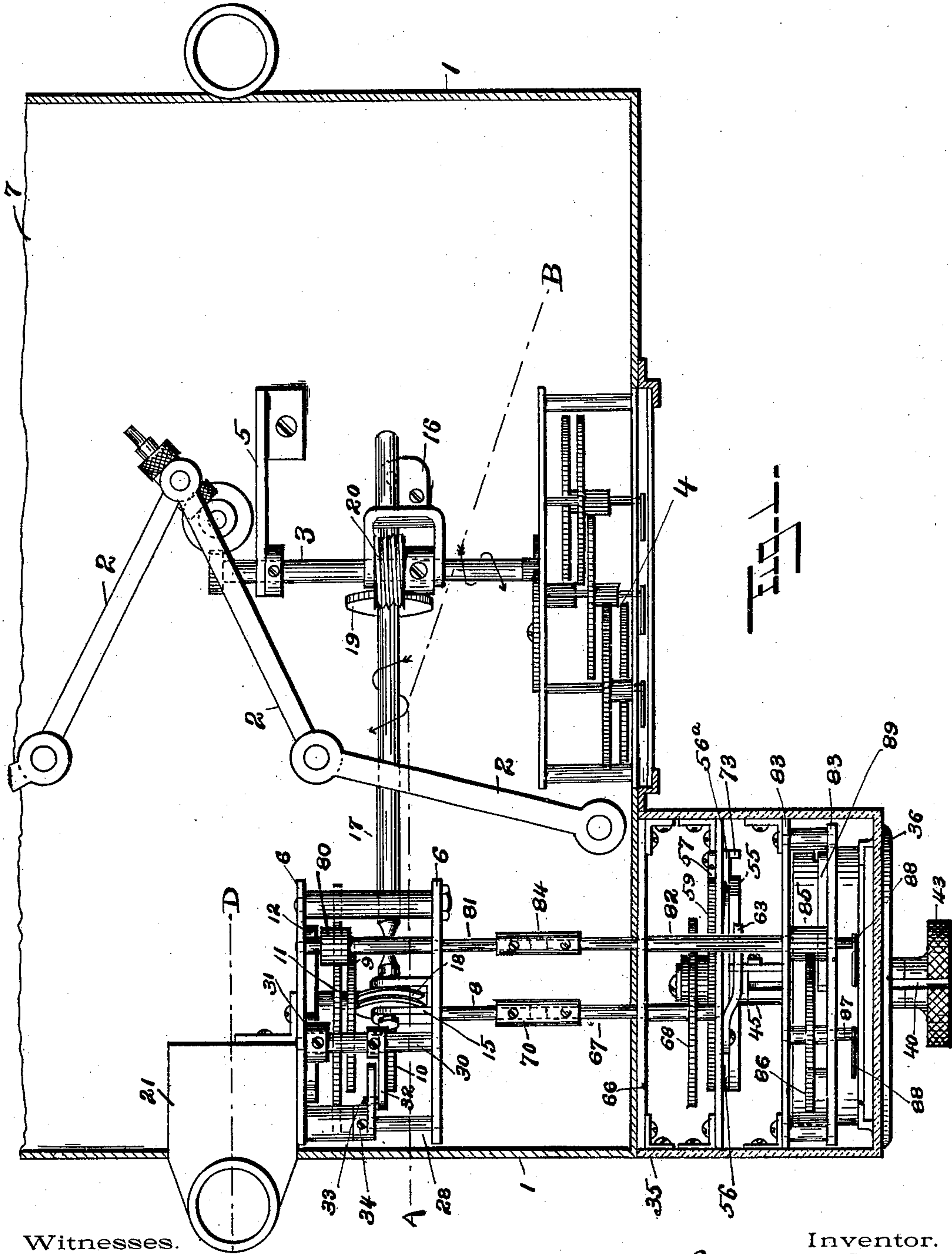
Patented Oct. 28, 1902.

E. A. REEVES.
PREPAYMENT ATTACHMENT.

(Application filed Dec. 16, 1901.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses.

J. P. Lejon
Frederic H. Monk

Inventor.

Edwin A. Reeves
by George A. Hall
Attorney.

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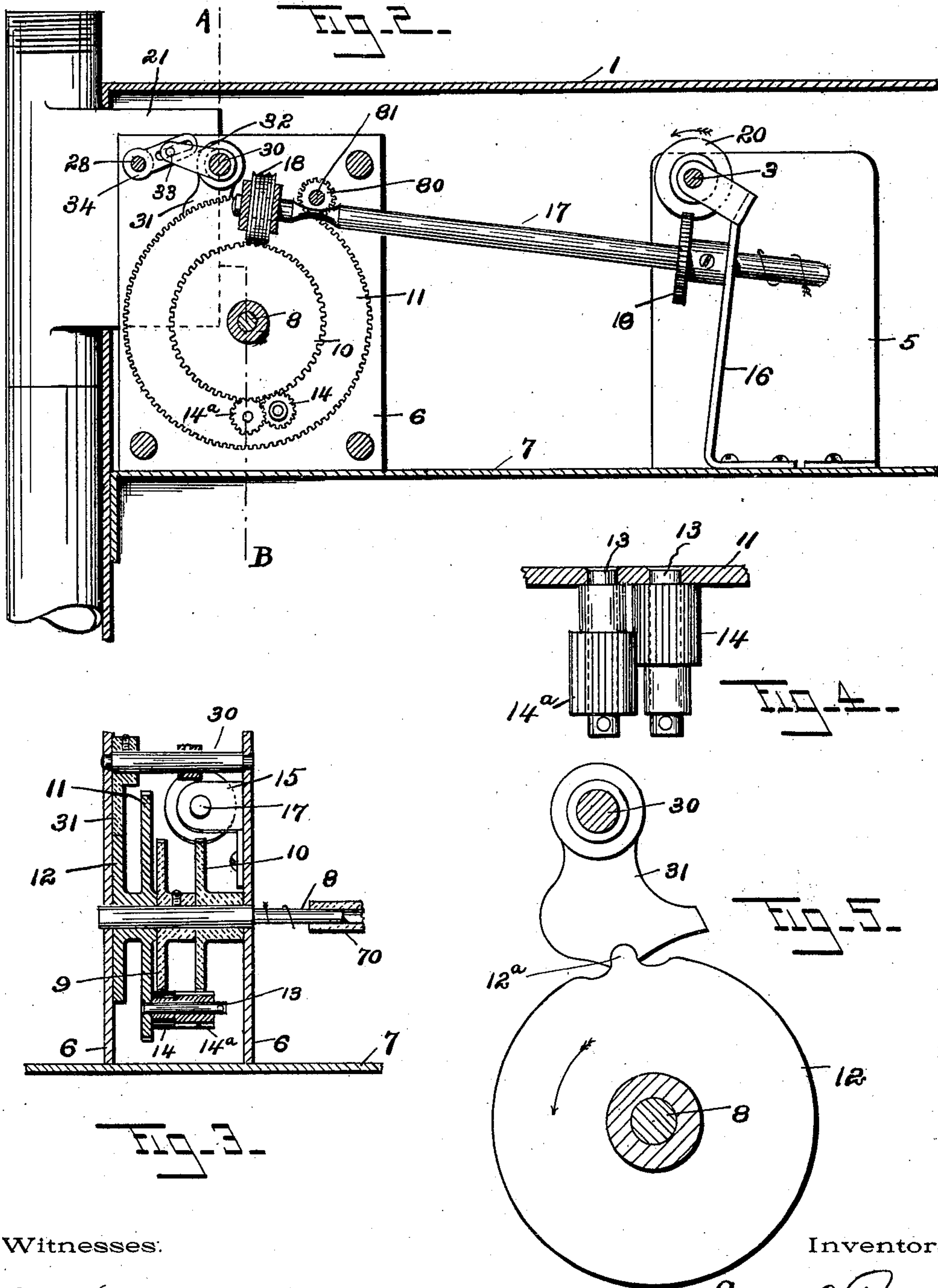
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4 Sheets—Sheet 2.



Witnesses:

J. P. Sejon
Florence H. Monk.

Inventor.

Edwin A. Reeves
by George E. Hall
Attorney.

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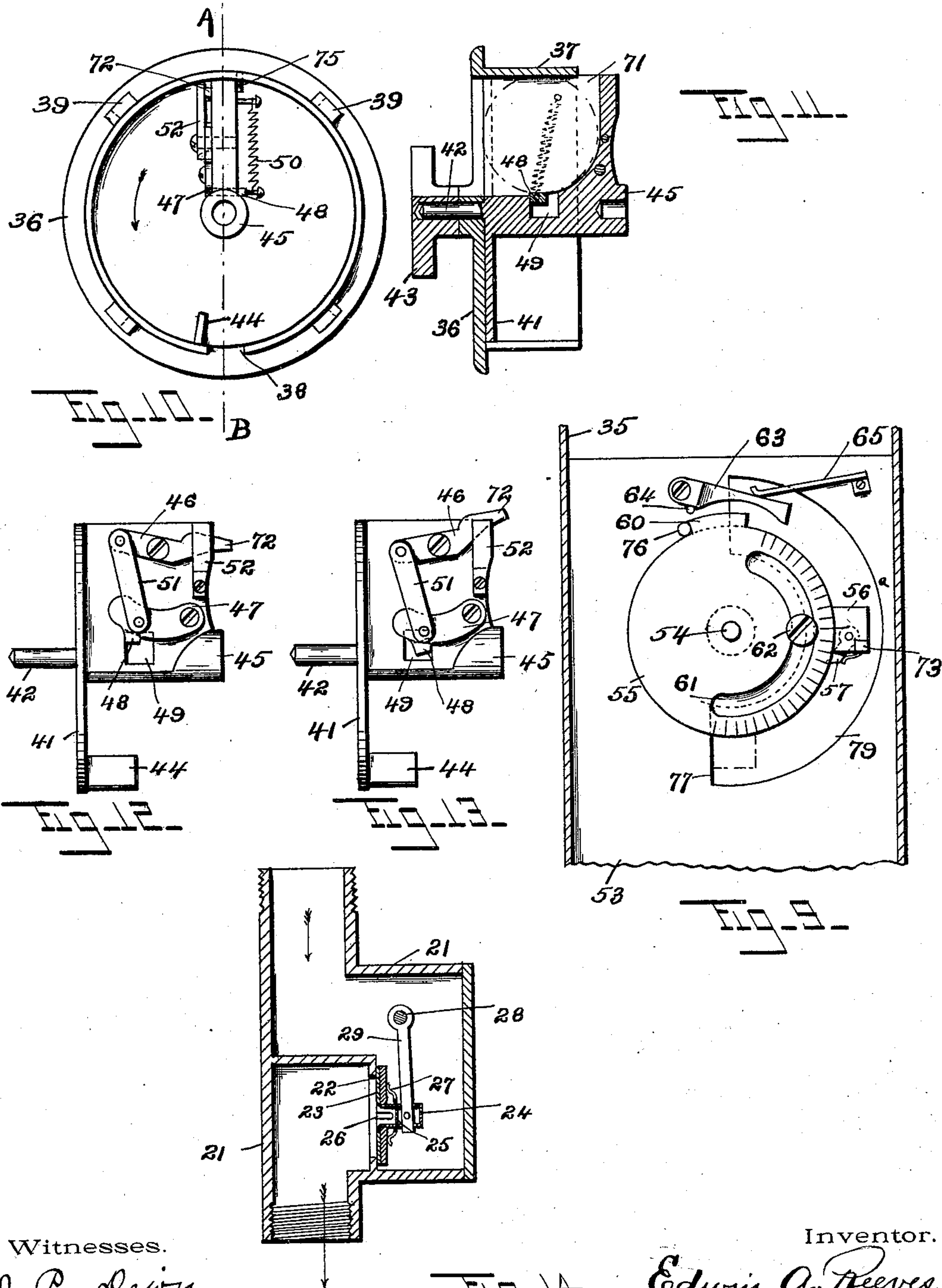
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(No Model.)

4 Sheets—Sheet 4.



Witnesses.

J. P. Lejon
Florence H. Monk

Inventor.

Edwin A. Reeves
by George E. Haas
Attorney.

UNITED STATES PATENT OFFICE.

EDWIN A. REEVES, OF NEW HAVEN, CONNECTICUT, ASSIGNOR OF ONE-THIRD TO WILLIAM REEVES, OF NEW HAVEN, CONNECTICUT.

PREPAYMENT ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 712,004, dated October 28, 1902.

Application filed December 16, 1901. Serial No. 86,109. (No model.)

To all whom it may concern:

Be it known that I, EDWIN A. REEVES, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Prepayment Attachments, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in prepayment attachments, and refers especially to devices of that class which are attached to a meter and by the insertion of a coin therein the inlet-valve or other like device is operated in one direction.

It is the object of my invention, among other things, to provide a device of this character which can be readily attached to any ordinary meter and in which the inlet-valve can be opened only through a coin connection, to provide means whereby the last few feet of gas to pass through the meter will be greatly diminished in volume, and thereby a much reduced flame will result and serve as a warning as to the condition of the meter, and, further, to construct the device of the fewest possible parts so designed as to be readily constructed and manufactured at the minimum cost.

To these and other ends my invention consists in the prepayment attachment having certain details of construction and combination of parts, as will be hereinafter described, and more particularly pointed out in the claims.

As illustrated and described herein, the device is attached to a gas-meter; but of course I do not limit myself thereto, as the mechanism is equally applicable to any other class of devices having a prepayment mechanism and in which a valve is automatically closed by a substance passing through the meter, and my invention does not relate to the recording mechanism which registers the amount of gas or fluid which passes through the meter, which mechanism is one of the essential parts of every meter.

In the operation of my invention a coin is placed within a rotatably-mounted coin-carrier and operates a lever which is thrown outwardly and engages a projecting part carry-

ing a pawl, and the connection between the coin and valve mechanism is completed through a train of gears. As the coin-carrier is rotated the valve-controlling mechanism is also rotated through the train of gears, and the inlet-valve is opened a predetermined distance, which is regulated by the amount of rotation that is imparted to the train mechanism. This valve is automatically closed by a connection between the valve-closing mechanism and the two-foot shaft, which is in every gas-meter, and so connected therewith that a predetermined number of revolutions of the two-foot shaft will automatically return the valve to its original position, thus closing the gas-inlet and shutting off the supply of gas. The valve mechanism is so designed, however, that by means of a closable aperture therethrough a small amount of gas is permitted to pass through the valve for a long time after the valve itself has closed, which supply is sufficient to keep the lights burning, though very dim, and to warn the consumer that the meter has practically run down and another coin is required.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures, Figure 1 is a plan view of the attic of a meter with my improved mechanism attached thereto, the shell of said meter being shown in section. Fig. 2 is a sectional elevation of the valve-operating mechanism and its connection with the two-foot shaft, taken upon line A B of Fig. 1. Fig. 3 is a sectional view of the valve-operating mechanism, taken upon line A B of Fig. 2. Fig. 4 is a plan view of the epicyclic train. Fig. 5 is an elevation of the valve-disk and the valve rock-lever. Fig. 6 is an interior view of the coin-case looking from the rear with the case in section. Fig. 7 is a partial longitudinal sectional elevation thereof upon line A B of Fig. 6. Fig. 8 is a front view of the upper portion of the coin-case. Fig. 9 is a fragmentary view of the coin-case, showing the graduated disk and its adjacent parts. Fig. 10 is a rear view of the coin drum and carrier. Fig. 11 is a sectional view thereof upon line A B of Fig. 10. Fig. 12 is a detailed view of the coin-carrier with the levers in the relative positions occupied by them when the

said carrier is empty. Fig. 13 is a similar view with the levers in the relative positions occupied by them when the carrier is loaded, and Fig. 14 is a sectional view of the valve-case and valve upon line C D of Fig. 1.

In the drawings the numeral 1 designates the body of the meter; 2, the levers, which form part of every gas-meter and require no further description here; 3, the two-foot shaft, which is also common to all meters and is shown herein as being supported by the standards 5 and 16, which are both fastened to the attic-floor 7, and 4 is the recording mechanism. The two-foot shaft 3 is rotated from the levers 2 and makes one complete revolution upon the consumption of two feet of gas and operates the recording mechanism 4, which registers the amount of gas consumed by means of the usual indicator-dials upon the face of the meter.

Attached to the floor 7 are the two vertical plates 6 6, and journaled in these plates is the spindle 8, having fixed thereon a gear 9, and adjacent thereto and loosely mounted upon said spindle is a gear 10 of the same diameter and pitch as the gear 9. Upon the opposite side of the gear 9 from that of the gear 10 and loosely mounted upon the spindle 8 is the gear 11, having formed integral therewith the valve-disk 12, provided with a single tooth 12^a thereon, and rotatably mounted upon the pintles 13, fixed within the said gear 11, is the epicycloidal train, comprising the pinions 14 and 14^a, which mesh into each other, and the pinion 14, having engagement also with the gear 9, and the pinion 14^a, having engagement with the gear 10.

The bracket 15 is fastened to one of the plates 6, and journaled therein at one end and to the standard 16 at the other end is the shaft 17, carrying a worm-wheel 18 between the ears of the bracket 15, which engages with the teeth of the gear 10, and fixed near the opposite end of said shaft is the gear 19, the teeth of which engage the teeth of the worm-wheel 20, fixed upon the shaft 3 between the arms of the yoke end of the standard 16.

The valve-casing 21 can be made of any desired form, but as herein shown consists of a rectangular box having means connected therewith whereby the inlet-pipe from the gas-main can be connected thereto at one end and the pipe into the meter be connected at the other end. Within the interior of this casing is mounted the valve itself, which comprises a valve-disk 22, having, preferably, a leather or other yielding facing 23 and through the center of which is a tube 24, closed midway of its length by a wall 25 and having a slot 26 through one side thereof, and surrounding the tube 24 is the spring-plate 27, which normally holds the valve-disk against that end of the tube adjacent to the valve-seat. Journaled in said casing and the plates 6 6 is the valve-shaft 28, and fixed thereon within the said valve-casing is a valve-lever 29, which is pivotally connected at one end to the tube

24. The shaft 30 is also journaled in the plates 6 and has fixed thereon the rock-lever 31, having a single notch therein in its lower end corresponding in size and shape and adapted to be engaged by the tooth 12^a upon the disk 12, and the rock-arm 32, having a laterally-projecting pin 33 at its outer end, which enters a slot in the rock-arm 34, fixed to the valve-shaft 28.

As the spindle 8 is rotated, by means hereinafter to be described, in the direction of the arrow shown in Fig. 3 the gear 9 thereon is rotated and causes the gear 11 and valve-disk 12 to rotate in the direction of the arrow shown in Fig. 5 through the pinion 14, and the engagement of the tooth 12^a with the notch in the rock-lever 31 rocks the shaft 30, rock-arm 32, rock-arm 34 through the pin 33 and the valve-shaft 28, and through the lever 29 the valve 22 is drawn off its seat, and the gas which enters the said valve-chamber from the main gas-supply in the direction of the arrow shown therein passes through the valve down through the outlet into the meter. This valve is automatically closed by the following operation:

As the two-foot shaft 3 is rotated the shaft 17 is also rotated through the worm 20 and worm-gear 19 and the gear 10 through the worm-gear 18 and the valve-disk 12 through the pinion 14^a. The valve-disk 12 is thus caused to rotate in the reverse direction than when being rotated from the spindle 8 and in its rotation by engaging the notch in the rock-lever 31 returns the said lever to its original position, and the valve-disk 22 is forced and held upon its seat through the rock-shaft 30 and the valve-shaft 28 and valve-lever 29. It is apparent that any movement of the rock-lever 31 in either direction will open or close the valve 22, according to the direction of its movement, and to open the valve the lever is rocked by means of coin mechanism hereinafter to be described and is closed automatically by mechanism operated by the passage of gas through the meter. The action of the valve-lever 29 is so arranged that after the valve-disk 22 is upon its seat there is still some movement in the said lever, which pushes the tube 24 through the valve-disk against the spring-fingers 27 until the slot 26 is entirely covered by the valve-disk. By this construction the forcing of the valve-disk against its seat does not entirely shut off the gas-supply, for a small quantity still continues to pass through the slot 26 and is sufficient to furnish enough gas to keep the burners lighted for a long time with a very much diminished flame; but, however, this supply is cut off when the whole length of the slot 26 has been pushed inside of the valve-disk above described.

I will now describe the coin mechanism which is contained within the coin-case 35, attached to the front of the meter in any convenient or well-known manner.

The carrier-drum 36 is constructed with a

solid face, through the front of which is a radial coin-slot 40 and an integral rearwardly-projecting flange 37, which is annular in form and slotted near its bottom end to form an open throat 38. This drum is inserted through the front of the case 35 and is held rigidly therein by means of a plurality of bayonet-joints 39. Rotatably mounted within this drum is the coin-carrier, which is constructed with a circular disk 41, having an outside diameter of the same size as the interior diameter of the flange 37; a stud 42 thereon, which passes through the hub of the drum 36 and has a knurled finger-button 43 fixed thereon, whereby the same may be rotated, said button having a radial slot therethrough of the same width as the slot 40; a stop 44; a body portion 45, having a chamber 71 therein of substantially the same width as the radial slot 40; a lever 46, pivotally connected with the body 45; a spring-lever 47, also pivotally secured to the body 45 and having a laterally-projecting arm 48 integral therewith and passing through an opening 49 through the body 45; a coil-spring 50, connected at one end with the arm 48 and at the other end to a fixed part; a link 51, joining the said levers 46 and 47, and a plate 52, fixed to the said carrier-body and so arranged as to prevent lateral displacement of the lever 46.

Fixed rigidly within the coin-case 35 is a vertical plate 53, and fixed within said plate and projecting upon either side thereof is the stud 54, and mounted upon the said stud, upon the front side of the said plate, is a graduated plate 55, having an integral radial lug 60 projecting from the periphery thereof, and upon the hub of said plate is a pawl-plate 56, which is circular in form and of substantially the same diameter as the plate 55, but having a radial pawl-arm 56^a upon one side thereof carrying a pawl 57, which is held by the spring 58 against the periphery of the ratchet-disk 59 upon the rear side of the plate 53. The stud 54 projects far enough in front of the plate 53 to form a support for the coin-carrier. (See Fig. 7.) Through the graduated plate 55 is a circular recess 61, and passing through said recess is a screw 62, which is threaded into the pawl-plate 56 and secures both of the said plates rigidly together. These plates are adjusted circumferentially in relation to each other by means of the screw 62 and the slot 61, and the graduations upon the plate 59, Fig. 9, are brought into register with the single graduation upon the lug 56^a to adjust the plates at predetermined places.

Pivotally connected to the plate 53 above the plate 55 is a stop-lever 63, which in its normal position is held against the pin 64 by the spring 65.

Journaled in the plate 66, fastened to the interior of the coin-case 35, and in the plate 53 is the spindle 67, having a gear 68 fixed thereon which meshes into the pinion 69, integral with the ratchet-disk 59, and the spin-

dle 67 is connected with the spindle 8 by the coupling 70.

When the coin-carrier is unloaded—that is, when the chamber thereof is empty and no coin has been placed therein—the then position of the levers is shown in Fig. 12, and the forward end 72 of the lever 46 projects over the periphery of the graduated plate 55 and is rotatable in the same circular path as that of the lug 60 and in which position it will pass beneath the lever 63. To operate the coin mechanism, a coin is passed through the coin-slot 40 into the chamber 71 of the coin-carrier and while entering said chamber engages the arm 48 of the lever 47 and depresses the same against the pull of the spring 50 and by means of the link 51 throws the lever 46 from the position shown in Fig. 12 to that shown in Fig. 13. The end 72 of the lever 46 has now been moved out of the path of the lug 60 and into the path of the lug 73 upon the pawl-arm 56^a, and the spring-pressed lever 63 is thrown upwardly by the said coin-lever until it has passed under the end thereof, when it is returned to its original position by the spring 65. The coin-carrier is now rotated by grasping the button 43 between the fingers and turning the same toward the right or in the direction shown by the arrow in Fig. 8, and when the end 72 of the lever 46 engages the lug 73 the connection between the coin and valve mechanism is complete and the graduated plate 55, ratchet-plate 56, and ratchet-disk 59 are rotated therewith by means of the pawl 57, which engages the teeth of said ratchet-disk, and all of these parts now rotate together as a unit until the said coin-carrier has been turned substantially one-half of a revolution, when the chamber 71 therein registers with the open throat 38 of the flange 37, and the coin is released and drops from the said coin-carrier into the box or drawer 74. As the chamber registers with the slot 38 the stop 44 engages the stop-pins 75, fixed in the flange 37 and projecting into the interior thereof, which engagement prevents further rotation of the said coin-carrier in the same direction, and at substantially the same time one edge of the pawl-arm 56^a engages the end 77 of the semicircular slot 79 through the plate 53 and prevents further rotation of the pawl-disk 56.

Immediately upon the release of the coin the lever 46 is returned to the position shown in Fig. 12 by means of the spring 50, and the end 72 thereof is moved out of the path of the lug 73 into the path of the lug 60, and when the carrier is being returned to its original upright position the said end 72 engages the said lug 60 and returns the plate 55 and pawl-plate 56 to their original positions, the pawl 57 dragging over the teeth of the ratchet-disk 59 without imparting movement thereto.

When the chamber in the coin-carrier is brought into register with the slot 40, the

body 45 of the coin-carrier engages the pin 75 and prevents further rotation of the said coin-carrier in one direction, and at the same time the lug 60 engages the stop-pin 76, fixed within the plate 53, and prevents further rotation of the graduated plate 55. After the coin is placed within the coin-carrier and given a partial rotation the coin-carrier cannot be returned to a position wherein it will register with the coin-slot 40 until after the chamber 71 has been emptied and the coin deposited in the box or tray 74, because the end 72 of the lever 46 is now movable only in the path of the lug 73 and the end of the lever 63, and if it is attempted to return the coin-carrier without first releasing the coin the end 72 of the lever engages the end of the lever 63 and prevents the return of the coin-carrier to its original position in register with the coin-slot; but as soon as the coin is released the lever is brought into the path of the lug 60 and passes beneath the end of the lever 63. The amount of rotation that can be imparted to the ratchet-disk 59 can be varied, so that a greater or less number of operations of the coin-carrier will be necessary to impart a complete revolution thereto, and this adjustment is obtained through the adjustable connection between the plates 55 and 56. If it is desired to impart the maximum rotation to the ratchet-disk, the space between the lugs 60 and 73 should be as small as possible, and vice versa for the minimum rotation. This can be readily understood from the fact that the travel of the lever 46 between the lugs 60 and 73 is lost motion and that by bringing the lug 73 nearer the lug 60 there is less lost motion, and consequently the engagement of the pawl with the ratchet-disk 59 will be longer when the open space is shorter than when it is of greater length, and for convenience and accuracy in adjustment and to accommodate the machine for various-priced gases or fluids the plate 55 is graduated, as shown in Fig. 9.

The shaft 67 being connected with the spindle 8, the motion imparted to the ratchet-disk 59 is imparted to the spindle 8 through the gear 68 and pinion 69, and the valve mechanism is operated from the spindle 8, as heretofore described.

I have provided means in my invention for indicating the quantity of gas that has already been paid for and not consumed, so that the consumer can tell by a glance at his meter just how much gas there is still due him. These dials I have placed for convenience in the front of the coin-case 35 and are designated by the numerals 78, and the mechanism for operating the dial-pointers consists of a pinion 80, which meshes into the gear 11 and fixed upon a spindle 81, which is connected by the coupling 84 with the spindle 82, journaled in plates 83, fixed within the coin-case 35, and upon said spindle 82, be-

tween the said plates, is fixed a pinion 85, meshing into a gear 86, fixed on a spindle 87, rotatably mounted in the said plates 83, and upon the forward end of the spindles 82 and 87 are the pointers 88 of the usual construction.

As the gear 11 is rotated through the coin mechanism heretofore described the spindle 82 is rotated through the gear 80 and the pointer 88 is rotated, and the dials are so graduated that when the coin is released from the coin-carrier the pointer will indicate the full amount of gas that has been paid for, and while the gas is being consumed the gear 11 and spindle 82 are rotated in the opposite direction and the pointers 88 are returned to zero.

The gear 86 is five times the diameter of the pinion 85 and makes one revolution to five of the pinion and registers the thousands, while the indicator upon the spindle 82 registers the hundred feet.

To prevent an unlimited number of coins being inserted in the machine and beyond the capacity of the parts, I have provided a stop-lever 89, which is pivotally secured to a downwardly-projecting lug 90 upon the forward plate 83, which lever is provided with a hook 91 upon one end and the other end of which is within the path of a pin 92, fixed within the gear 86. This lever is normally held out of engagement with the coin-carrier against the pin 93 by a spring 94; but when the maximum number of coins have been inserted within the carrier and the maximum amount of gas that can be paid for in advance before any consumption takes place the gear 86 has been carried into such a position that the pin 92 therein engages the end of the lever 89 and throws the hook 91 therein through a hole 96 in the flange 37 into the path of the coin-carrier and prevents the operation of the said carrier until some gas has been consumed and the pin 92 disengaged from the said lever, when the same will be moved out of the path of the coin-carrier by the action of the spring 94.

There are many minor changes and alterations that can be made within my invention, and I would therefore have it understood that I do not limit myself to the exact description herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with a rotary coin-holder having a radial coin-chamber therein upon one side of the axis thereof; of a valve; a rotary plate; a radially-shiftable connection between said coin-carrier and said rotary plate; a pawl-plate connected with said rotary plate so as to be movable therewith as a unit; a ratchet-disk; a pawl connection between said pawl-plate and said ratchet-disk; and a train

of gears connecting said ratchet-disk with said valve.

2. In a device of the character described, the combination with a rotary coin-carrier; a valve; a rotary plate having a lug thereon; a pawl-plate provided with a lug and connected with said rotary plate; and means, as ratchet-and-gear mechanisms, forming an operative connection between said pawl-plate and said valve, the said coin-carrier having a lever pivotally secured thereto with the end thereof adapted to be moved into the path of either of the aforesaid lugs.

3. In a device of the character described, the combination with a rotary coin-carrier; of a valve; a rotary plate having a lug thereon; a pawl-plate rigidly connected with said rotary plate so as to move therewith as a unit, said pawl-plate having a lug thereon movable in a path different from the lug upon said rotary plate; means for adjusting the peripheral distance between said lugs, and rigidly securing the said plates together in such adjustable positions; means actuated by said coin-carrier for actuating said rotary plate; and means for operating said valve from said pawl-plate, substantially as described.

4. In a device of the character described, the combination with a rotary carrier; of a valve; a rotary plate having a lug thereon; a pawl-plate having a separable connection with said rotary plate and having a lug thereon movable in a path different from that of the lug upon said rotary plate; means for operating said valve from said pawl-plate; and a lever movably connected with said coin-carrier and adapted to be shifted from the path of the lug upon the said rotary plate to that of the path of the lug upon said pawl-plate and vice versa.

5. In a device of the character described, the combination with a coin-carrier; of a rotary pawl-carrier; a rotary plate concentric thereto having a lug thereon; and separably secured to said pawl-carrier; a valve; means for operatively connecting said pawl-carrier with said valve; and a lever movably connected with said coin-carrier and adapted to be moved into the path of the lug upon said rotary plate when said coin-carrier is unloaded and to be shifted into the path of the lug upon said pawl-carrier when a coin has been inserted therein; all constructed and operating substantially as described.

6. The combination with a coin-carrier; of a rotary plate having a lug upon the periphery thereof and a concentric slot therethrough; of a pawl-plate having a lug thereon; a threaded connection between said plates, whereby the same may be adjusted circumferentially in relation to each other and when fastened move together as a unit; and a radially-movable connection between the said coin-carrier and said rotary plate actuated by the insertion of a coin into the coin-carrier.

7. The combination with the rotary plate having a lug projecting from the periphery

thereof; and a pawl-plate separably secured to said rotary plate and having a radial arm with a laterally-projecting lug thereon movable in the same vertical plane as the lug upon said rotary plate; all constructed and operating substantially as described.

8. In a device of the character described, the combination with a rotary coin-carrier; of a connecting-lever mounted on said coin-carrier; a rotary plate having a lug thereon; a pawl-plate separably secured thereto; and a stop-lever yieldingly secured in the path of the lug upon the said pawl-plate; all constructed and operating substantially as described.

9. The combination with a coin-drum having a flange thereon with a radial open throat therethrough; of a coin-carrier rotatably mounted within said coin-drum and having a radial coin-chamber therein which registers with the coin-slot through the face of said drum; a connecting-lever pivotally secured to said coin-carrier and movable in a plane parallel with said coin-chamber with one end thereof projecting beyond the end of said coin-carrier; a spring-lever having a link connection with said connecting-lever, movably secured to said coin-carrier and having a laterally-projecting arm which passes through said coin-chamber and is engaged by a coin inserted therein.

10. The combination with a coin-drum having a radial coin-slot through the face thereof and provided with a circular flange having an open throat therethrough; of a coin-carrier rotatably mounted within said coin-drum and having a radial body member provided with a coin-chamber therein; a connecting-lever 46 and a spring-lever 47 pivotally secured to said body member and movable in a plane parallel to said coin-chamber, said spring-lever having an arm 48 projecting laterally through said body member and said coin-chamber; and a link 51 connecting the aforesaid levers; all constructed and operating substantially as described.

11. In a device of the character described, the combination with a coin-drum having a radial slot therethrough; of a coin-carrier rotatably mounted within said coin-drum and having a coin-chamber therein; a stop adapted to limit the movement of said coin-carrier in one direction when the said coin-chamber is in register with said coin-slot; of a rotary plate having a lug thereon; a pawl-plate having a lug thereon and separably secured to said rotary plate; a lever movably connected with said coin-carrier and so arranged that when said coin-chamber is empty the said lever will move in the path of the lug upon said rotary plate and when a coin is within said coin-chamber, said lever will move in the path of the lug upon said pawl-plate.

12. In a device of the character described, the combination with a coin-drum having a radial coin-slot therethrough; of a coin-carrier rotatably mounted within said coin-drum

and having a coin-chamber therein; of a stop adapted to limit the movement of said coin-carrier in one direction when said coin-chamber is in register with said coin-slot; a rotary
5 plate having a lug thereon; a pawl-plate having a lug thereon and separably secured to said rotary plate; a lever movably secured to said coin-carrier and actuated by the insertion of a coin within said coin-chamber; and
10 means for preventing the return of the said coin-carrier to a position where it will register with the said coin-slot after a partial rotation has been imparted thereto, said means comprising a yieldingly-movable lever in the
15 path of said movable lever on said coin-carrier.

13. The combination with a coin-drum; of a coin-carrier rotatably mounted within said coin-drum; a valve; means for operating said
20 valve from said coin-carrier if the said coin-carrier is loaded and moved in one direction; and means for preventing the operation of said valve after a predetermined number of successive operations, said means comprising
25 a pivotally-mounted lever normally held out of the path of movement of said coin-carrier; a rotary stop-pin actuated through the said

means for operating said valve which stop-pin during its rotation engages said lever and moves the same through an aperture in said
30 coin-drum into the path of said coin-carrier and thereby prevents rotation thereof, all constructed and operating substantially as described.

14. The combination with a valve; of means
35 for actuating the same, said means comprising a rotary valve-disk having a single tooth thereon; a rotary valve-lever mounted upon a rock-shaft and having a notch therein, which is adapted to be engaged by the said tooth
40 and to positively rotate said valve-lever in either direction; a rock-arm between said rock-shaft and said valve; a rotary spindle actuated by coin mechanism and having a gear fixed thereon; and an epicycloidal-gear-
45 train connection between said gear and valve-disk, substantially as described.

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

EDWIN A. REEVES.

Witnesses:

GEORGE E. HALL,
J. P. DEJON.