(No Model.) 3 Sheets—Sheet 1.

W. F. BROWNE.

PREPAYMENT COIN CONTROLLED MECHANISM FOR ELECTRIC METERS.

No. 596,012. Patented Dec. 21, 1897.

Fig. 2.

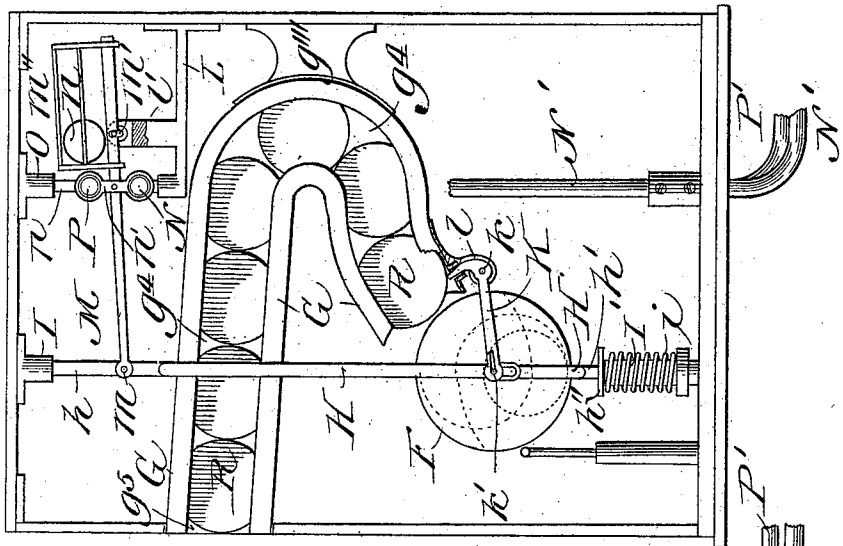
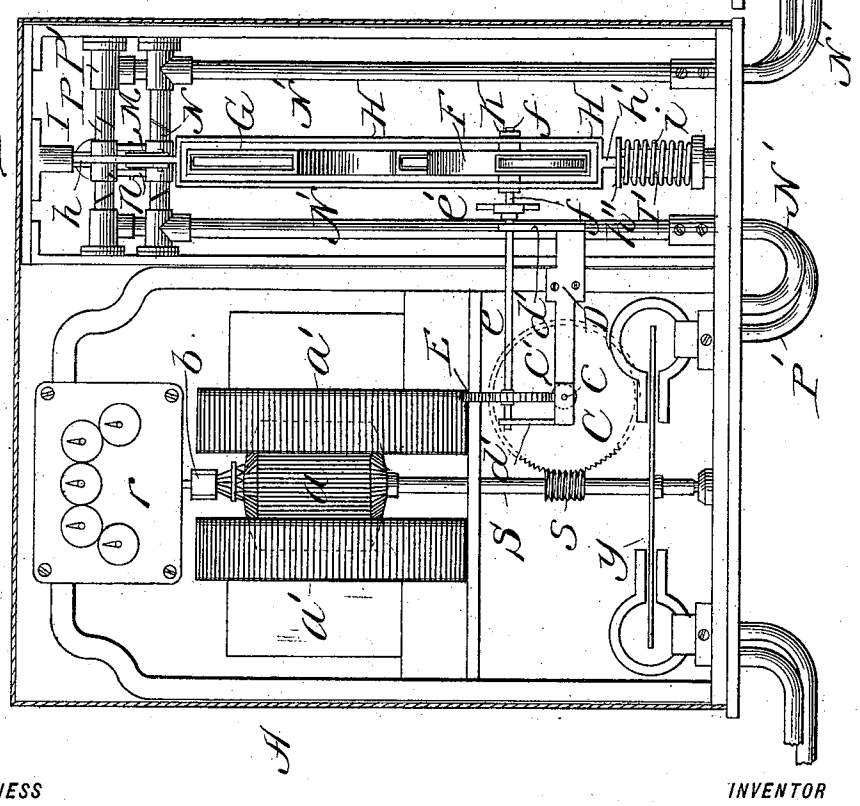


Fig. 1.



WITNESS

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 4.

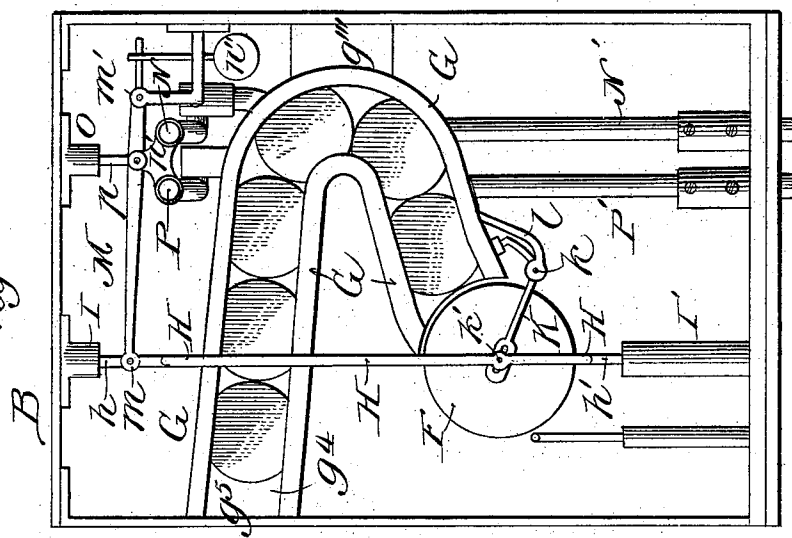

Fig. 3.

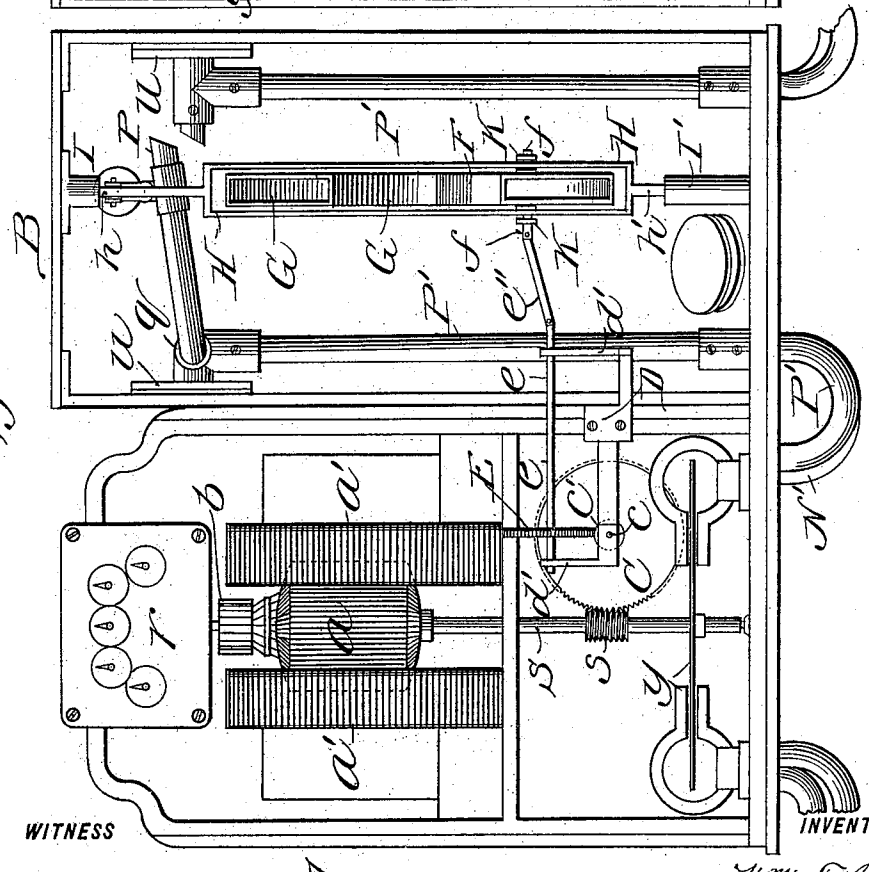

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Fig. 5.

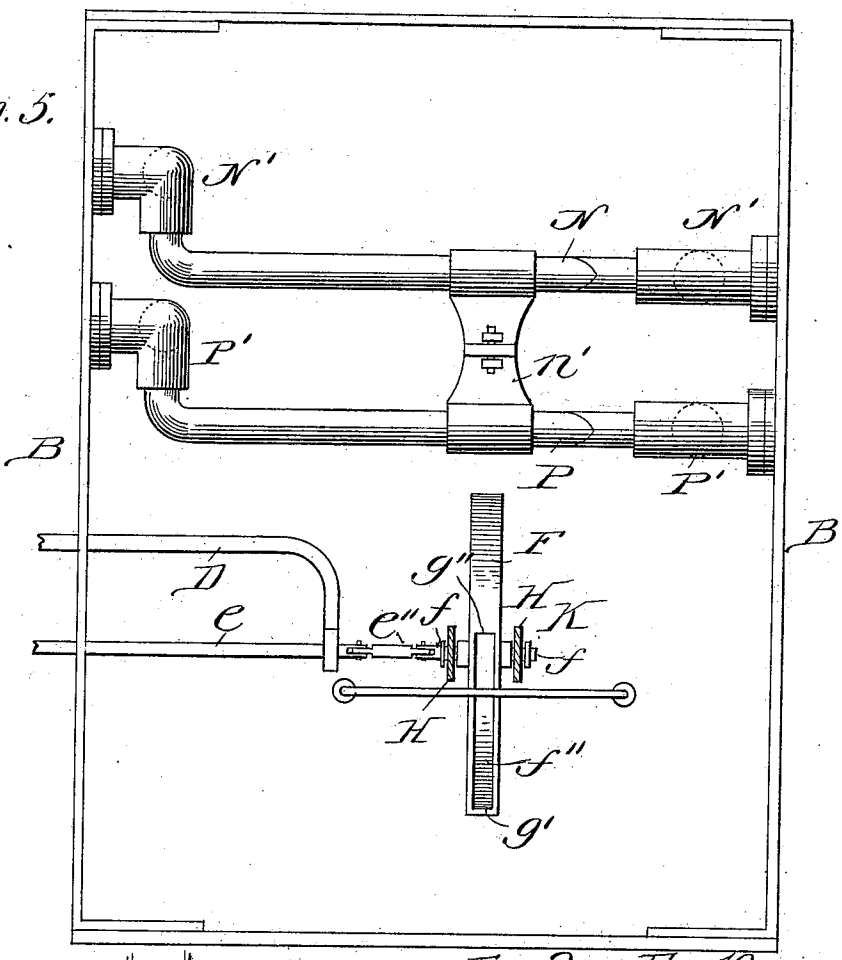


Fig. 6.

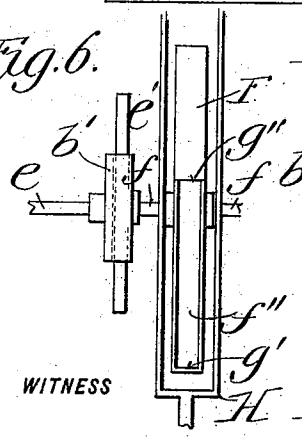


Fig. 7.

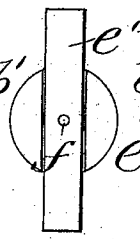


Fig. 8.

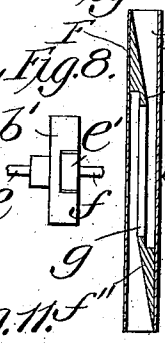


Fig. 9.

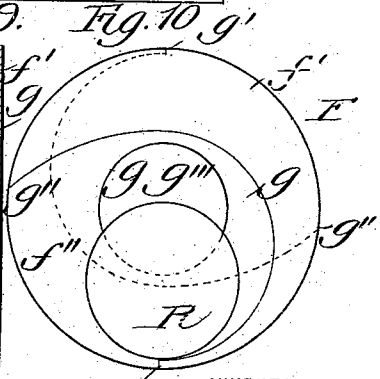
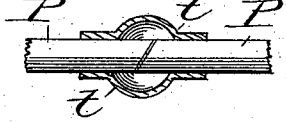


Fig. 10

Fig. 11.



WITNESS

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UNITED STATES PATENT OFFICE.

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PREPAYMENT COIN-CONTROLLED MECHANISM FOR ELECTRIC METERS.

SPECIFICATION forming part of Letters Patent No. 596,012, dated December 21, 1897.

Application filed October 2, 1897. Serial No. 653,798. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM FRANK BROWNE, a citizen of the United States, residing at New York city, in the county and State of New York, have invented certain new and useful Improvements in Prepayment Coin-Controlled Mechanism for Electric and other Meters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a prepayment coin-controlled mechanism connecting with and operated by the rotary shaft or other moving part of any suitable meter—such as an electric-light meter, a gas-meter, water-meter, or other meter—for securing payment in advance for a certain quantity or volume of the substance or fluid being metered and delivered to the consumer or customer.

The object of my invention is to provide simple, accurate, and effective devices for automatically starting the meter into operation for supplying the desired fluid or stopping the same to cut off the flow of fluid by means of a suitable coin, said coin acting by its weight or gravity to start the mechanism and keep it in operation till its value in fluid has been metered, and then by its discharge permitting the mechanism to automatically shut off the flow of fluid to the meter and customer.

My invention is herein illustrated in connection with an electric-light meter, and the mechanism, as shown, is adapted (by the weight of a coin) for starting the meter and permitting it to operate till a predetermined number of watt hours of electric current have been metered to the customer; also for stopping the flow of current when the value of the prepayment coin in watt hours has been metered or consumed. For example, electric-light current is now sold at the rate of one cent per hour for each sixteen-candle-power lamp, or one dollar for one hundred hours. At this rate two lamps could be run fifty hours, or ten lamps ten hours, &c. Now I proportion the system of toothed wheels in my mechanism so that the last wheel of the series, when but one lamp is on, will revolve once in one hundred hours, or one-half around in fifty hours, the one-half turn measuring current equal to the value of fifty cents for fifty hours, while one revolution of the wheel measures current equal to the value of one hundred cents for one hundred hours. The shaft of the meter revolves once in thirty seconds when a sixteen-candle-power incandescent lamp is turned on, or twice in one minute, while with two sixteen-candle-power lamps, or one thirty-two-candle-power lamp, it revolves four times in one minute. It will show a corresponding increase for each lamp turned on.

The above principles of construction and operation are embodied in my mechanism.

The matter constituting my invention will be defined in the claims.

I will now describe the details of construction and operation of my invention by reference to the accompanying drawings, in which—

Figure 1 represents a front elevation of my device in connection with an electric meter, the casing being in section. Fig. 2 represents a side elevation thereof. Fig. 3 represents a modification in front elevation similar to Fig. 1. Fig. 4 represents a side elevation thereof. Fig. 5 represents a top plan view showing part of my devices on enlarged scale. Fig. 6 represents a front or edge view of the coin-pocket wheel. Figs. 7 and 8 represent detail views of a coupling-joint. Fig. 9 represents a vertical section of the coin-pocket wheel. Fig. 10 represents a side elevation of the coin-pocket wheel. Fig. 11 represents a detail of the electrical conductor-joint with flexible protector.

A suitable motor-meter A and my prepayment coin-controlled mechanism B are inclosed in a suitable case, or each device may be inclosed in a separate case placed adjacent one to the other. The principal parts of the meter are well known and consist of the armature *a* on shaft S, coils *a'*, commutator *b*, register *r*, and retarder *y*. Upon the armature-shaft S is secured or formed a suitable worm *s*, adapted to engage a toothed wheel C. In the device here shown the wheel C is

made with one hundred and twenty teeth and is mounted on a shaft c, supported in journals in the bracket-frame D. To shaft c is secured the worm c' for engaging the toothed wheel E, which is secured to shaft e, supported in journals in uprights d' of bracket D. The gear-wheel E is made with one hundred teeth, and its shaft e is coupled by a yielding coupling device e' or e'' directly to the axle of the revolving coin-pocket wheel F, journaled in the yielding frame H. The yielding coupling may consist of the sliding coupling device b' e', Figs. 1, 6, 7, and 8, the disk d' of which connects with shaft e and the sliding bar e' of which connects to the axle f of wheel F. The disk b' is provided in one face with a transverse groove, into which is fitted to slide freely the bar e', so that the parts shall remain coupled while permitting the frame H and its coin-pocket wheel F to be lowered when a coin is deposited in the wheel and to be raised when the coin is discharged therefrom. The yielding coupling may also consist of link e'', pivotally connected to shaft e and to axle f, as shown in Figs. 3 and 5.

The coin-pocket wheel F is provided with axles f, journaled on each side in the frame H, so that the wheel is free to rotate. The wheel F is preferably constructed with two coin-pockets f' and f'', one on each side of a central partition g, and such pockets have interior curved walls. (Shown by the full and the dotted lines in Fig. 10.) These curved walls (the bottoms of the pockets) extend from the periphery of the wheel, at the points g' and g'', inward beyond the center a distance equal to about one-half of the diameter of the coin R, so that the coin shall rest centrally in the wheel and therefore exert no leverage on the same during its revolution. By virtue of this interior curved wall also the coin is retained in the pocket till the wheel has made one-half a revolution.

During the one-half revolution of wheel F the coin in the upper pocket descends in a vertical line till it is discharged at the bottom, when the pocket f'' is at or near the position shown by full lines in Fig. 10.

The partition-wall g may be made solid, but preferably has the center turned or cut out, as shown at the opening g''', to make the wheel lighter.

The opening of the pocket extends between the points g' g'' and is long enough to readily receive the coin from the conduit and to let it roll out at the end of the one-half revolution of the wheel. The pockets overlap each other, and the interior wall of each is beveled from the periphery inward, as shown in Fig. 10, so as to leave the opening wide enough to readily receive the coin.

The yieldingly-supported frame H is constructed with two side bars and with guide-rods h h' at the upper and lower ends, the upper rod sliding in the guide pocket or bearing I and the lower rod sliding in the bearing I'. A plate h'' is secured to the lower rod h' as a bearing for the coiled spring i around the socket I', as shown in Figs. 1 and 2. The spring i acts to keep the frame and coin-wheel in a raised position when there is no coin in the wheels. The coin-conduit G extends from the slot g^5 in the wall of the case to the wheel F and is supported by the bracket g''', secured to the case or other convenient means. One side of the conduit, as g^4, may be open for removing foreign substances. The lower end of the conduit G is provided with a hanger l, to which is pivotally connected at k the coin-detent K, having a curved end projecting through an opening in the conduit, Fig. 2, to hold the coin in the conduit till the previous coin drops from the pocket. The other end of detent K is pivotally connected by pin k' or by axle f to the frame H, so that it is operated by the rise and fall of the frame.

In Figs. 1 and 2 the frame and coin-pocket wheel (containing a coin) are represented in the lowered position with the electric circuit closed, while in Figs. 3 and 4 the same parts are shown in the raised position with the electric circuit broken.

A lifting-lever M is pivotally connected at pin m to the upper guide-rod h of frame H and is supported on a fulcrum m' on post l' of the bracket L and is connected by a pin to the link n', which connects the wire-sections P and N of the positive and negative conductors P' and N'. The rear end of lever M is provided with a cage m'', Fig. 2, for holding the counterweight-ball n. Instead of a cage and ball a counterweight n'' may be suspended from the rear end of lever M, as shown in Fig. 4. The link n' may have an upwardly-projecting guide rod or pin p, sliding in a guide-bearing o, secured to the top of the case, as shown.

The movable electric contact-sections N and P may be made entirely detachable from the conductors N' and P', as shown in Fig. 1, where they are shown in contact, or such sections may be made each with one contact end and one end loosely connected to turn in a bearing q of conductor P', as shown in Fig. 3. Either construction and arrangement will give good results in practice. The conductor-wires N' and P' are suitably insulated where they pass through the case and are held in place by flanged elbows u, secured to the frame in the case.

The movable and stationary ends of the conductor P P' or N N', where contact is made and broken, Fig. 11, are preferably protected by a flexible covering or envelop t, composed of light flexible material, as silk, for excluding dust. Instead of make-and-break contact-sections in both the positive and negative conductors a single make-and-break contact-section may be provided in either the positive or negative circuit and produce the same result.

The meter and my coin-controlled mechan-

ism being set in position with the usual electrical connections, the frame H and wheel F will be normally in the raised position, with the movable contact section or sections P N open and the circuit broken. Now if a coin, as a silver half-dollar, be deposited in pocket-wheel F, the frame and wheel will be depressed, thereby causing the movable sections to make contact with the stationary conductors and admit current to the meter. A lamp being turned on, the operation of the meter-motor turns shaft S, with worm *s*, thus transmitting motion through the gearing to the coin-pocket wheel F, which will continue to revolve so long as the lamp or lamps remain turned on. When current has been used to the extent of one sixteen-candle-power lamp for fifty hours, the wheel F will have revolved one-half around and the coin will roll out, permitting the frame H to rise and break the circuit, thereby extinguishing the light. When light is again desired, another coin must be deposited in the upper pocket of wheel F. Should there be a coin in the conduit G at the time the preceding coin drops from the lower pocket, it will be released by reason of the outer end of detent K being retracted by means of the rise of frame H. It will be remembered that frame H is automatically raised by means of spring *i* or the counterweighted lifting-lever M so soon as the coin rolls out of the pocket at the end of a half-revolution of wheel F. Obviously two or more coins R may be in the conduit at one time and will roll down to the discharge end thereof as required. Whenever a coin is in a pocket of wheel F, the circuit is closed and current is passed through the meter to the lamps for illumination, and whenever the pocket is empty the circuit is open or contact broken, current is shut off, and no light is obtainable.

In practice a suitable door will be fitted to the case and provided with a lock for removal of coin by the holder of the key.

In case current is sold at a rate or price different from that above described, then my gear-wheels, coin-pocket wheel, connections, &c., will be so proportioned and constructed as to correctly operate with coins of different denominations according to the value of the fluid or current for a sixteen-candle-power lamp per hour.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an electric meter, of a rotary coin-pocket wheel and suitable gearing connecting said wheel with a rotary part of the meter, whereby said wheel will be rotated by the operation of the meter and a predetermined quantity or volume of current metered to a customer by insertion of a suitable coin in said pocket-wheel.

2. The combination with the armature-shaft of an electric meter, of a rotary coin-pocket wheel and suitable gearing and connections between said shaft and wheel for rotating the latter for the purpose described.

3. The combination with the rotary shaft of a meter, of a coin-pocket wheel yieldingly supported so that it may rise and fall to make and break electrical contacts in a circuit, and suitable gearing and connections between said moving part of the meter and the coin-wheel for rotating the latter by operation of the meter, substantially as described.

4. The combination with a meter, of a rotary coin-pocket wheel in a yielding support, means connecting said support with a conductor of electricity to be metered for shutting off or admitting current to the meter, and suitable gearing connecting said wheel with a moving part of the meter, whereby current may be metered to a customer by the insertion of a coin in the coin-wheel, substantially as described.

5. The combination with the armature-shaft of an electric meter, of a yieldingly-supported frame, adapted to automatically rise and fall, means connecting said frame to a movable contact or switch in an electric circuit, a rotary coin-pocket in said frame and means connecting with said shaft for rotating said coin-pocket to discharge a coin therefrom.

6. The combination with a meter, of a yieldingly-supported frame, a rotary coin-pocket wheel in said frame, an electric circuit having a movable contact or switch, means connecting said frame to said contact or switch for opening or closing the circuit, and gearing connecting the shaft of the meter to said coin-pocket wheel for rotating it, whereby a coin, inserted in the wheel, will close the circuit, admitting current to the meter, and cause the coin-pocket wheel to rotate, substantially as described.

7. The combination with the rotary shaft of a meter having a worm-gear, of a yieldingly-supported rotary coin-pocket wheel, which is adapted to be raised and lowered, connections from said wheel to a movable contact or switch in an electric circuit, connecting with the meter, suitable gearing connecting with said worm and having a shaft provided with a yielding coupling device, connecting with the rotary coin-wheel, whereby said wheel may be rotated and permitted to rise and fall for the purpose described.

8. In an electric meter, the armature-shaft having a worm-gear and motor, in combination with a coin-pocket wheel and intermediate operating-gearing and shafts connecting them, whereby said wheel may be rotated by the operation of the meter, substantially as described.

9. In coin-controlled mechanism, the coin-pocket wheel centrally mounted on a motor-operated shaft and having a pocket made with a curved interior wall or bottom extending,

from points in the periphery, inwardly beyond the center of the wheel, the depth being such that the coin may be deposited at the center of the wheel and will descend, during the half-revolution of the wheel, in a vertical line, and therefore exert no leverage on said shaft, substantially as described.

10. In coin-controlled mechanism, the coin-pocket wheel having two adjacent overlapping pockets with opposite circumferential openings and extending inwardly beyond the center of the wheel for receiving and discharging coins.

11. In coin-controlled mechanism, the coin-pocket wheel having two pockets extending from the periphery inward beyond the center of the wheel and provided, each with an interior wall beveled from the periphery inwardly for guiding a coin from the coin-conduit to the bottom of the pocket, substantially as described.

12. In coin-controlled mechanism a yieldingly-supported frame containing a coin-pocket wheel and having guide rods and bearings, means, for automatically raising said frame, and means connecting it to a movable contact or switch in an electric circuit, substantially as described.

13. In coin-controlled mechanism the yieldingly-supported frame, and the coin-pocket wheel therein, in combination with the coin-conduit and a detent projecting at one end into the conduit for retaining the coin, and pivotally connected to the frame so as to be operated thereby to release a coin when the parts are in the proper position substantially as described.

14. The combination with the meter, of a rotary coin-pocket wheel in a yielding support, means connecting said support with an electric conductor or switch for opening and closing the circuit to the meter, suitable gearing connecting said wheel with the moving part of the meter, and means for automatically raising said yielding support, whereby a coin inserted in the wheel will, by its weight, operate said yielding support to close the circuit, and thereby meter current to the customer, substantially as described.

15. The motor-shaft of a meter having a worm-gear and motor, in combination with a yieldingly-supported coin-pocket wheel adapted to be raised and lowered, intermediate operating-gearing, a shaft provided with a yielding coupling connecting said motor-shaft and wheel, whereby said wheel may be rotated by the operation of the meter, substantially as described.

16. In coin-controlled mechanism, the yieldingly-supported coin-pocket wheel, having a suitable coin-pocket and adapted to be moved upward and downward in combination with suitable operating mechanism, substantially as described.

17. In a coin-controlled mechanism the coin-wheel provided with a pocket made with an eccentric edge wall or floor extending beyond the center, and having a steep pitch or incline at the receiving side and a long curved slight pitch or incline at the delivery side for retaining the coin till the wheel has revolved to the proper point of discharge for the coin, substantially as described.

18. In coin-controlled mechanism the coin-wheel provided with an eccentric pocket extending beyond the center, the peripheral opening of the same extending circumferentially from the receiving-lip to the discharge-lip to receive the desired coin, and the interior edge wall or floor having a deep pitch or incline at the receiving side and a long curved slight pitch or incline at the delivery side, whereby the coin may be deposited at the center of the wheel, and will descend, during the half-revolution of the wheel in a vertical line, and therefore exert no leverage around the axis, substantially as described.

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

WILLIAM FRANK BROWNE.

Witnesses:
M. R. M. FRAYSER,
FRANK D. BLACKISTONE.