No. 863,046. PATENTED AUG. 13, 1907.

E. SCHATTNER.

PREPAYMENT MECHANISM.

APPLICATION FILED AUG. 24, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

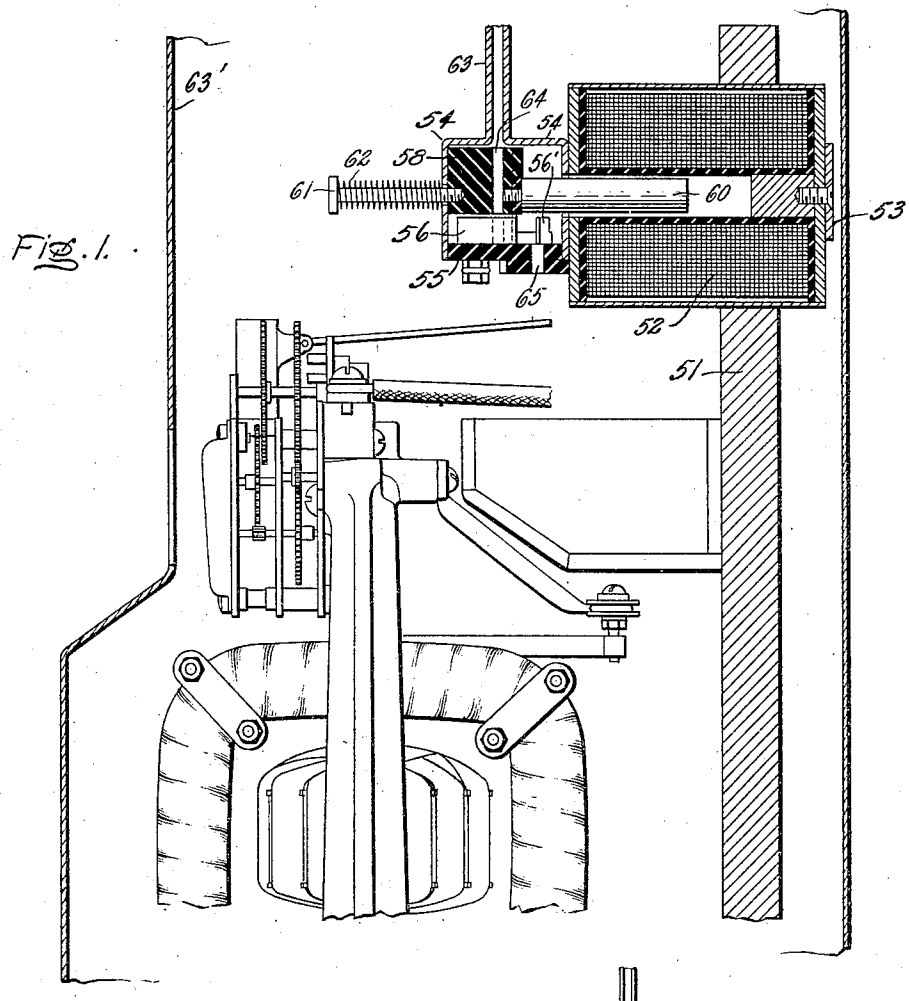


Fig. 2.

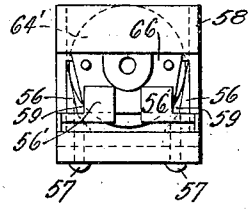


Fig. 4.

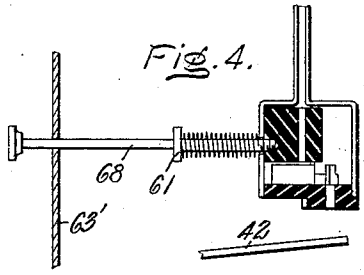
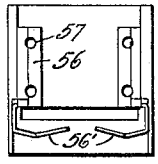


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 6.

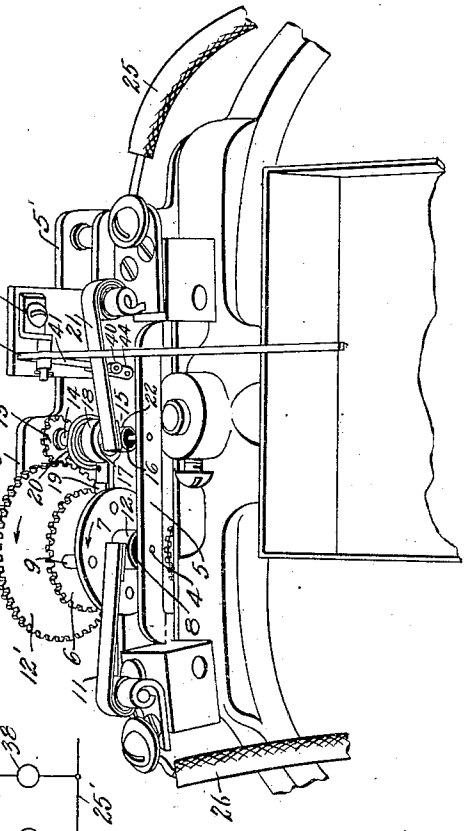


Fig. 7.

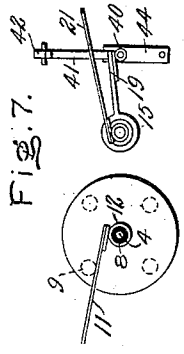


Fig. 9.

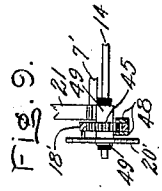


Fig. 8.

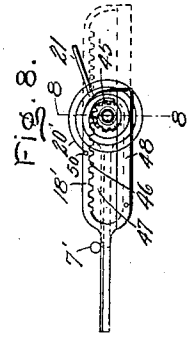
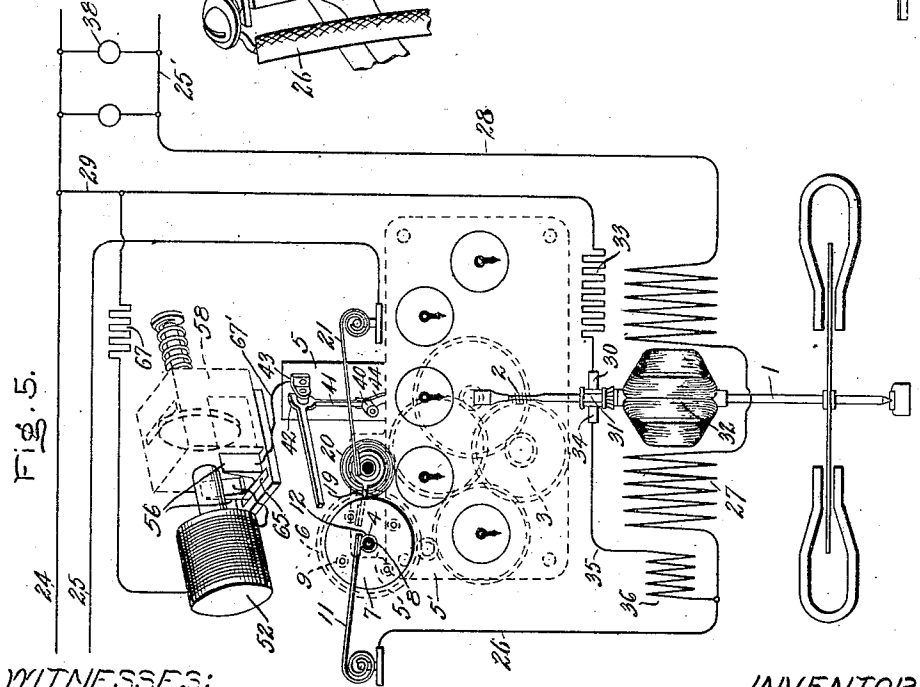


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PREPAYMENT MECHANISM.

No. 863,046. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed August 24, 1905. Serial No. 275,568.

To all whom it may concern:

Be it known that I, ERNEST SCHATTNER, a subject of the King of Great Britain, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Prepayment Mechanisms, of which the following is a specification.

My present invention relates to prepayment mechanisms particularly adapted for the control of electric circuits.

In carrying out my invention, I have arranged a movable contact device which is connected to an operating member by a spring or other elastic means. The contact device is moved by the elastic means connecting it to its operating member into engagement with a second contact device or member by a coin inserted in the mechanism. The engagement of the two contact devices serves to close an electrical circuit. While the two contact devices are in engagement a relative movement between the first contact device and its operating member occurs which puts the elastic connecting means under tension sufficient after the engagement between the contact device is broken to move the first-mentioned contact device first into an inoperative position and other coins inserted in the apparatus cause the operation described to be repeated.

The engagement between the two contact devices is broken by reason of relative movement between them which may be produced in any suitable manner dependent on the nature of the organization of which they form a part. In the construction which I have hereinafter illustrated and described in detail this relative movement is produced by the flow of current through the circuit controlled by said contact devices. The relative movement may, however, be produced in other ways.

The mechanism described above insures a quick making and breaking of the engagement between the two contact devices and consequently of the circuit controlled by them. Moreover, the novel mechanism which I have devised for the purpose is simple and reliable, and is such as to require a very small amount of power to accomplish the operation described.

In order to avoid the necessity for inserting a coin in the apparatus whenever electricity of the amount purchased by the insertion of a single coin is consumed, I have provided means whereby a plurality of coins may be inserted in the apparatus at one time and have arranged a coin feeding mechanism for automatically causing the coins to operate the contact device when necessary until the electricity consumed equals in value the value of all the previously inserted coins.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, reference may be had to the accompanying drawings and description in which I have illustrated and described one of the forms in which my invention may be embodied.

Of the drawings, Figure 1 is an elevation with parts broken away and in section showing my invention employed in conjunction with a motor meter to control the consumption of energy in an electric circuit; Fig. 2 is an elevation, and Fig. 3 is a plan illustrating details of construction of the coin introducing mechanism, Fig. 4 is a view taken similarly to Fig. 1 showing a modified construction; Fig. 5 is a view partially in sectional elevation and partially in diagram showing the circuit arrangement employed; Fig. 6 is a perspective view showing a portion of the mechanism of Figs. 1 and 4; Fig. 7 is a sectional elevation taken similarly to Fig. 5 showing the mechanism in a different position; Fig. 8 is an elevation showing a portion of the modified construction; and Fig. 9 is a section on the line 8 8 of Fig. 8.

In the drawings, 1 represents the shaft of a motor meter of the well known Thomson recording watt-meter type. The upper end of this shaft carries a worm 2 which meshes with one of the wheels of the ordinary counting train 3 employed in meters of this character. A shaft 4 is journaled in plates 5 which may be either parts of the frame-work 5′ used for supporting the ordinary counting frame or be secured thereto. The shaft 4 has rigidly secured to it a gear wheel 6 which meshes with one of the wheels of the train 3. A contact device in the form of a metal disk 7 secured to the shaft 4 but insulated therefrom by a bushing 8 of insulating material is provided with a number of metal pins 9 which project from one side of the disk and are equally spaced about the shaft 4. A contact brush 11 fixed at one end to the frame work of the meter, bears yieldingly against the hub 12 of the disk 7.

The shaft 4 has secured to it a gear wheel 12′. The gear wheel 12′ meshes with a gear wheel 13 rigidly secured to the shaft 14 which may also be mounted in the supports 5. A collar 15 is rigidly secured to the shaft 14 but is insulated therefrom by a bushing 16 of insulating material. On a portion 17 of this collar is loosely mounted a contact member 18 provided with an extending arm 19. A spiral spring 20 has its inner end secured to the collar 15 and its outer end secured to the arm 19. A contact spring or brush 21, similar to the contact ring or brush 11, having one end secured to a fixed support on the frame-work of the meter, bears against a reduced portion 22 of the collar 15.

Referring particularly to Fig. 5, 24 and 25 represent conductors which supply electric energy from a suitable source. The conductor 25 is connected to the brush 21. A conductor 26 connects the brush 11 to one terminal of the main field coil or winding 27 of the meter. The other terminal of the field coils 27 is connected by a conductor 28 to the conductor 25′. A conductor 29 connects the conductor 24 to one of the brushes 30 engaging the commutator 31 connected to the armature 32 carried by the shaft 1. The conductor 29 may include a suitable regulating resistance 33. The other brush 34 engaging the commutator 31 is connected to the conductor 26 by a conductor 35. The conductor 35 may include the winding of the auxiliary field coil or starting coil 36 of the meter.

In the position of the parts shown in Figs. 5 and 6 in which the arm 19 engages one of the pins 9, the brushes 11 and 21 are electrically connected through the collar 15, collar 18, arm 19, pins 9, disk 7, and hub 12, and when so connected suitable electrical energy is supplied to the translating devices 38 by the conductors 24 and 25′, and the energy consumption is measured by the revolutions of the armature shaft 1 in the usual manner. In order to make good electrical connections the under side of the tips of the brushes 11 and 21 and the upper side of the arm 19, the pins 9, the hub 12 and the collar 15, may be formed of or plated with some good conducting metal such as silver.

The revolutions of the armature shaft 1 through the gearing 3 cause the gear wheels 13 and 12′ to revolve in the direction indicated by the arrows shown in Fig. 6. Upon a sufficient relative movement between the wheels 12′ and 13 the member 19 will be released by the pin 9 with which it is shown in engagement and will be moved by the spring 20 into the position shown in Fig. 7, where its outer end is shown in engagement with a coin-controlled stop or lock in the form of a projection 40 carried by the lower end of the short arm 41 of a bell-crank 42 pivoted to a projection 43 from one of the supports 5. A spring 44 normally holds the projection 40 in a position in which it prevents further angular movement of the arm 19. When, however, the outer end of the long arm of the bell-crank lever 42 is depressed by the impingement against it of a suitable coin, the arm 19 moves into engagement with the pin 9 immediately to the right (having reference to the direction of rotation of the shaft 4) of the pin previously engaged, thus again establishing electrical circuit between the brushes 11 and 21 which had been broken by the preceding disengagement between the arm 19 and the pin 9.

It will, of course, be understood that the angular movement of the pin 9 between the instant at which it is first engaged by the arm 19 and the moment of disengagement corresponds to the revolutions of the armature shaft sufficient to measure the consumption of the energy purchased by the insertion of a coin. It will also be understood that the teeth on the gears 12′ and 13 are so proportioned that the shaft 14 makes one complete revolution while the arm 19 is in engagement with one of the pins 9.

In the form of my invention shown in Figs. 8 and 9 of the drawings, the movable contact device 7 is replaced by a stationary contact device 7′ which may be permanently connected to one terminal of the conductor 26. A spur gear 45 is carried by and insulated from the shaft 14. The teeth of the gear 45 mesh with gear teeth 46 formed at one side of a slot 47 in a contact member 18′ corresponding in function to the contact member 18 of the construction described above. Guide pieces 48 secured to sides of the member 18′ and engaging cylindrical extensions 49 from the spur gear 45 serve to properly position the member 18′ with the teeth of the spur gear 45 meshing with the teeth 46. It will be observed that the member 18′ is insulated from the shaft 14. A helical spring 20′ similar to the spring 20 has one end secured to the member 18′ at the point 50. The other end of the spring is secured to one of the extensions 49. The spring or brush 21 bears against the other extension 49.

In the position of the apparatus shown in Fig. 9 the arm 18′ has just been released by the coin-controlled lock which may be identical in construction with that of the construction shown in Figs. 5 and 6, and has been moved into engagement with the contact device 7′ under the action of the spring 20′. As the shaft 14 rotates under the action of the meter the spring 20′ will be put under tension and the arm 18′ will be moved to the right by reason of the engagement between the teeth of the gear 45 and the teeth 46. The movement of the member 18′ to the right is continued until the member reaches the dotted line position when it is no longer retained by the contact device 7′ and will turn about the shaft 14 under the action of the spring 20′ until it engages the coin-controlled stop. When it is again released from the coin-controlled stop it will again move into engagement with the contact device 7′. The rotation of the member 18′ about the shaft 14 in the manner described will, by reason of the engagement between the teeth of the spur gear and the teeth of the member, cause the member to be moved again into the position shown in full lines in Fig. 9.

With the mechanism constructed and operated as hereinbefore described any suitable means may be employed for introducing a coin from without the casing and discharging it against the end of the long arm of the bell-crank lever 42. In order to render the apparatus capable of receiving and properly disposing of a plurality of coins which may be inserted at one time, however, I have devised a novel and effective coin introducing mechanism which automatically discharges against the lever 42, one at a time as needed, each of a plurality of coins which may have been inserted in the apparatus at one time. In carrying out this feature of my invention I mount upon the back support 51 of the meter a solenoid coil 52. As shown, the solenoid coil is passed through a hole formed to receive it in the support 51 and is secured firmly in place in this hole by means of a yoke member 53. To the front end member of the coil 52 is secured a box-like member 54. The sides of the box-like member 54 may be formed of metal, the bottom wall 55, however, is preferably formed of insulating material. A pair of contact plates 56 are secured to the bottom wall 55 by means of screws 57. As shown, the contact plates 56 are placed with edges to each other and the axis of the coil 52. The plates are inclined to each other so that their upper edges are

separated by a distance greater than that separating their lower edges. A block 58 of insulating material is formed with slots or grooves 59 in its under side, which receive the contacts 56, upon which the block is slidingly mounted. The block 58 has secured to its rear end a core 60 of magnetic material which is arranged to be sucked axially into the bore of the solenoid 52 when the latter is energized. A bolt 61 passing through a hole formed for the purpose in the front wall of the member 54 is tapped into the front end of the block 58. A helical spring 62 surrounding the bolt 61 and extending between its head and the wall of the member 54 normally holds the block in the position shown in Fig. 1. A coin chute 63 which may be supported from the casing 63′ of the meter has its lower discharge end terminating immediately above a slot 64 formed in the block 58 when the latter is in the position shown in the drawings. The slot 64 extends transversely to the direction of the contacts 56. A suitable coin 64′ inserted in the slot 64 rests against the contact plates 56. When the block is moved to the right from the position shown in Fig. 1 until it engages the rear wall of the member 54, a coin which may have been located in the slot 64 is discharged through a slot 65 formed for the purpose in the bottom wall 55. The coin thus discharged drops on the end of the long arm of the lever 42 and operates the mechanism in a manner hereinbefore described.

As shown spring contact members or extensions 56′ are secured to each contact member 56. A metallic plate 66 secured to the block 58 serves as a means for connecting the contact extensions 56′ when the block is pulled against the back wall of the member 54.

Referring to Fig. 5, it will be observed that one of the contact members 56 is connected to the line 29 through solenoid 52 and a suitable resistance 67. The other contact 56 is connected to the bracket 43 and thereby to the lever 42 by a conductor 67′. Assuming that a coin has been inserted in the slot in the block 58 when the latter is in the position shown in Figs. 1 and 5, and the arm 19 then or thereafter engages the projection 40 in the manner hereinbefore described. Current will then flow between the lines 24 and 25 through the conductor 29, resistances 67, solenoid 52, contacts 56 and the bridging coin, conductor 67′, bracket 43, lever 42, arm 19 and brush 21. The passage of this current will cause the solenoid 52 to become operatively energized whereupon the block 58 will be moved to the right from the position shown in Fig. 1 until the coin passes off of the contacts 56 and drops through the slot 65. Before the coin passes beyond the ends of the contacts 56 the spring extensions 56′ are engaged by the metallic plate 66 so that the discharge of the coin does not directly open the circuit through the winding of the solenoid 52. As soon as the coin discharged tilts the lever 42 and releases the arm 19 the circuit through the coil is broken by the disengagement of the arm 19 and projection 40 whereupon the block 58 is returned to the position shown in the drawings by the action of the spring 52. The chute is arranged to hold as many coins as it is desired or convenient to have inserted in the apparatus at one time. The block 58 is deep enough, however, to receive only one coin at a time. When the block is moved against the rear wall of the box 54 by the energization of the coil 52 the p of the block prevents any coins which may be located in the chute from downward movement. As soon as the block is returned to its initial position after discharging a coin, however, if the chute contains a coin or a plurality of coins, the coin or the lower coin of the plurality of coins will drop into the slots 64. After the proper energy consumption, the meter again causes the arm 19 to engage the projection 40 and thus causes current to be supplied to the circuit containing the contacts 56 and the winding of the magnet 52 for causing the coin, if any, in the carrier to set in operation the coin-controlled means for closing the consumption circuit in the manner hereinbefore described. This operation will be repeated whenever necessary provided the necessary coins are deposited from time to time in the carrier.

While with the mechanism described the consumers circuit is interrupted after the consumption of each coin's worth of energy, I have found that with the mechanism described the breaking of the circuit and its subsequent closure by the apparatus when the chute contains one or more coins is so rapid as to be scarcely noticeable, even in the case of incandescent lamps connected in the consumers circuit.

When for any reason it is thought to be undesirable or unnecessary to employ mechanism such as that just described for automatically discharging coins against the long arm of the bell-crank lever as before stated any suitable means may be employed for introducing coins; for instance, the chute 63 may be arranged to convey coins from without the casing directly against the end of the lever or the bolt 61 may be provided with an extension 68 projecting through the front wall of the casing 63′ as shown in Fig. 4. This extension forms an operating handle by means of which the coin carrier may be manually reciprocated. In some cases it may be desirable, as shown in Fig. 4, to detachably connect the handle 68 to the mechanism shown in Fig. 1. In this case the carrier may be reciprocated either manually or automatically. When no provisions for automatically reciprocating the coin carrier is desired it will of course be understood that the box 54 may be supported directly from the meter frame portion 55 in any suitable manner without the use of the solenoid coil.

While the mechanism described above is simple, efficient and reliable, it will be readily understood by all those skilled in the art that many changes may be made in the form of the invention disclosed without departing from the spirit of my invention, and that certain features of my invention may sometimes be advantageously employed without a corresponding use of other features of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. In combination, a movable coin-carrier, electromagnetic means for moving the carrier when energized, a circuit for energizing said electromagnetic means, a pair of separated contacts in the circuit for energizing said electromagnetic means connected through a coin in said carrier when the carrier is in one position and contains a coin, and an auxiliary device controlled by the carrier for connecting said contacts when the carrier is in another position.

2. In combination, a coin-carrier, an electromagnetic means which when energized moves said carrier from a coin-receiving to a coin-discharging position, a pair of separated contacts in the energizing circuit of said electromagnetic means connected by a coin in said carrier when the latter is in the coin-receiving position and contains a coin, and separate means for connecting said contacts when the coin-carrier is in another position.

3. In combination, a coin-carrier, electromagnetic means which when energized moves said carrier from a coin-receiving to a coin-discharging position, a pair of separated contacts in the energizing circuit of said electromagnetic means connected by the coin in said carrier when the latter is in the coin-receiving position and contains a coin, separate means for connecting said contacts when the coin-carrier is in another position, a consumption circuit, means dependent upon the movement of said carrier for closing said circuit, a meter in said consumption circuit, and means controlled by it for supplying current to said energizing circuit.

4. In combination, an electric consumption circuit, a meter in operative relation thereto, coin-controlled means for closing said circuit, means controlled by the meter for opening the circuit after a predetermined consumption subsequent to the closure of the circuit, means for receiving one or more inserted coins, and means dependent upon the presence of one or more coins in said receiving means for automatically bringing a coin into operative relation with said coin-controlled means to cause said circuit to be closed whenever the meter may open the circuit.

5. In combination, an electric consumption circuit, a meter for measuring the consumption in said circuit and for opening said circuit after a predetermined consumption therein, a chute, a coin-carrier, means for causing said carrier to move into position in which a coin in said chute will pass into said carrier, contacts electrically connected by a coin in said carrier, electromagnetic means which when energized moves said carrier to bring about a closure of said circuit, and means controlled by the meter and the presence of the coin in said carrier for automatically energizing said electromagnetic means when energy purchased by the insertion of previous coins has been consumed.

6. In an electric prepayment mechanism, a consumption circuit, an auxiliary circuit including an electromagnetic device, a switch member for alternately opening one circuit and closing the other, said auxiliary circuit including a pair of separated contacts adapted to be connected together by an inserted coin, and means controlled by the electromagnetic device for causing the switch member to close the consumption circuit whenever open and the contacts are bridged by a coin.

7. In an electric prepayment mechanism, a pair of contacts bridged by an inserted coin, a consumption circuit, coin-controlled means for closing said circuit, a meter and means controlled by the meter for opening the circuit when energy to the value of the previously inserted coins has been consumed, and automatic means rendered operative when said contacts are connected by a coin for causing said coin to operate said coin-controlled means whenever said consumption circuit is open.

8. In an electric prepayment mechanism, a coin-carrier, a consumption circuit, means controlled by the discharge of a coin through said carrier to close said circuit, a meter, means controlled by the meter for opening said circuit when energy purchased by previously discharged coins has been consumed, and means for automatically causing a coin contained in said carrier to be discharged whenever the consumption circuit is opened.

In witness whereof, I have hereunto set my hand this 10th day of August, 1905.

ERNEST SCHATTNER.

Witnesses:
EDWARD WILLIAMS, Jr.,
BENJAMIN B. HULL.