

No. 667,068.

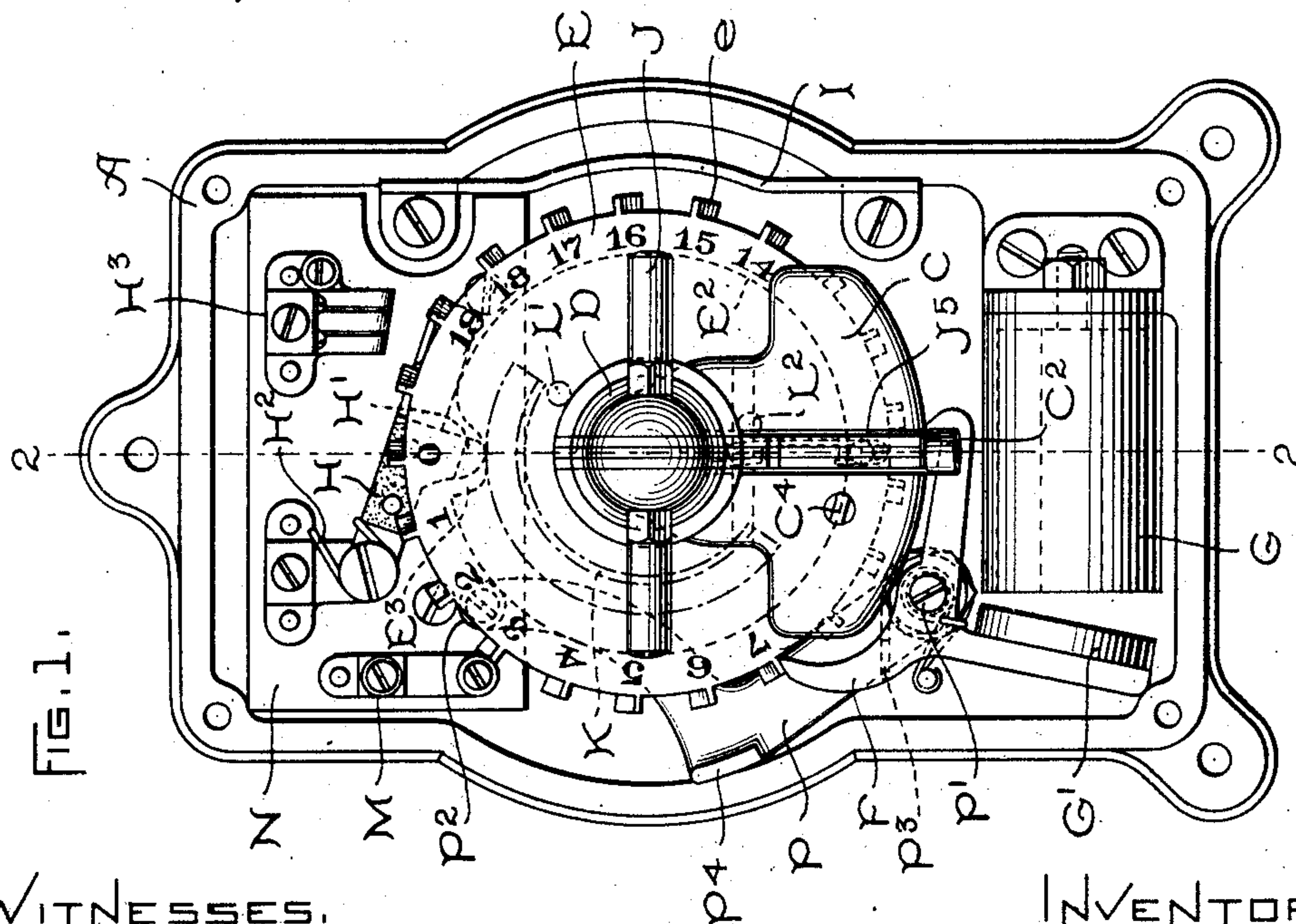
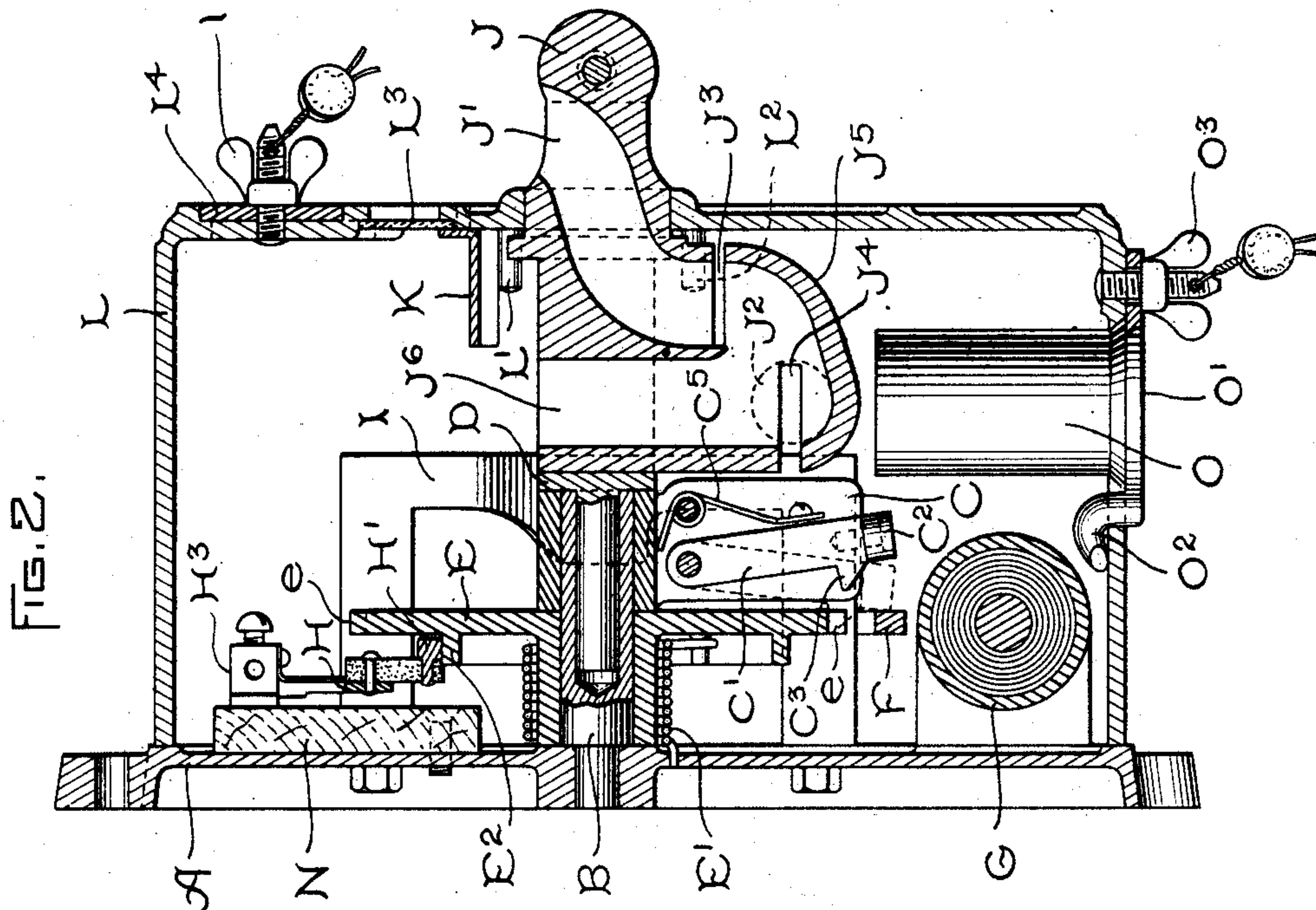
Patented Jan. 29, 1901.

F. P. COX.
PREPAYMENT MECHANISM.

(Application filed Oct. 8, 1898.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

A. H. Abell.

C. F. Macdonald.

INVENTOR.

Frank P. Cox,

by *Albert G. Davis*
Atty.

F. P. COX.
PREPAYMENT MECHANISM.

(Application filed Oct. 8, 1898.)

(No Model.)

2 Sheets—Sheet 2.

FIG. 3.

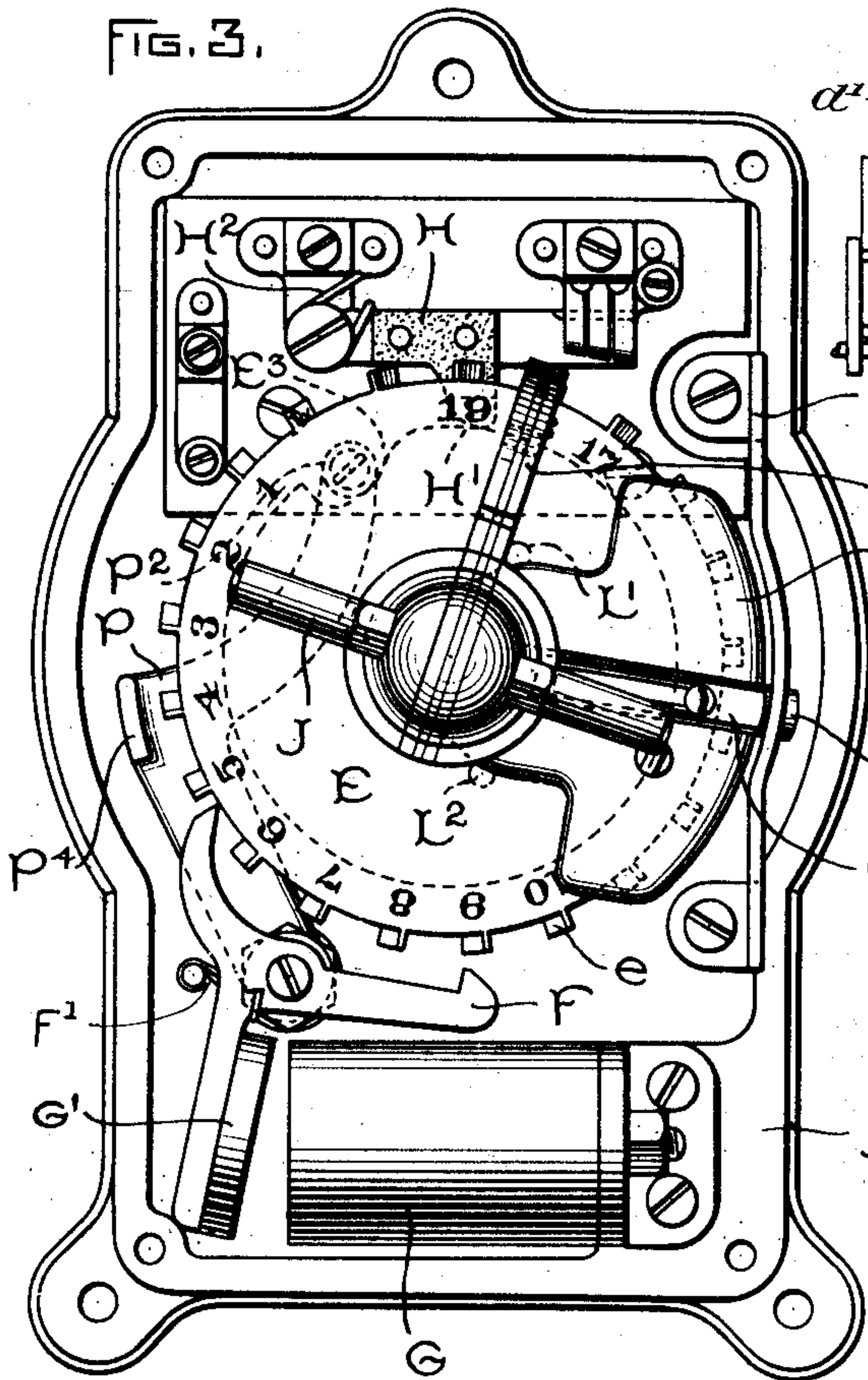


FIG. 4.

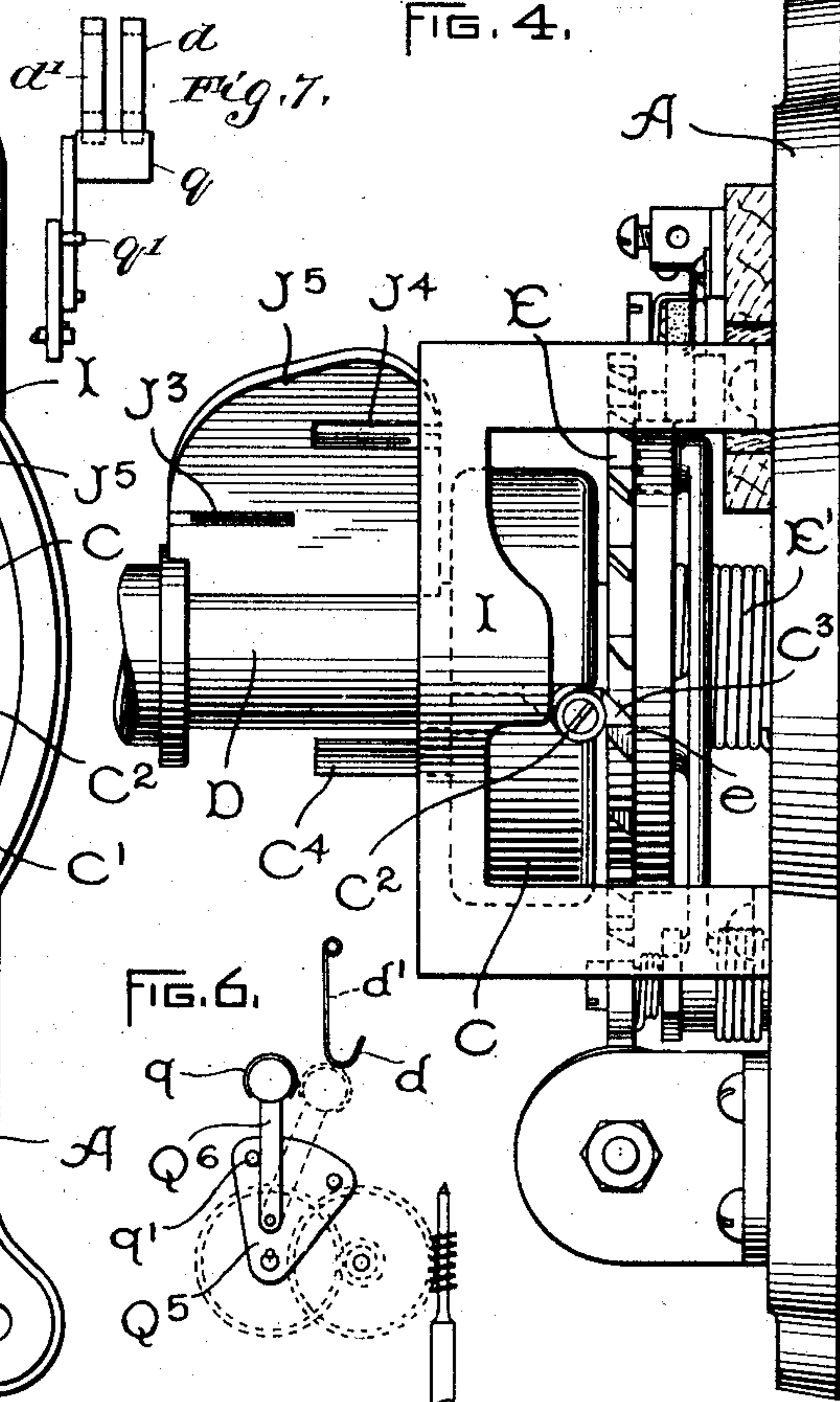


FIG. 6.

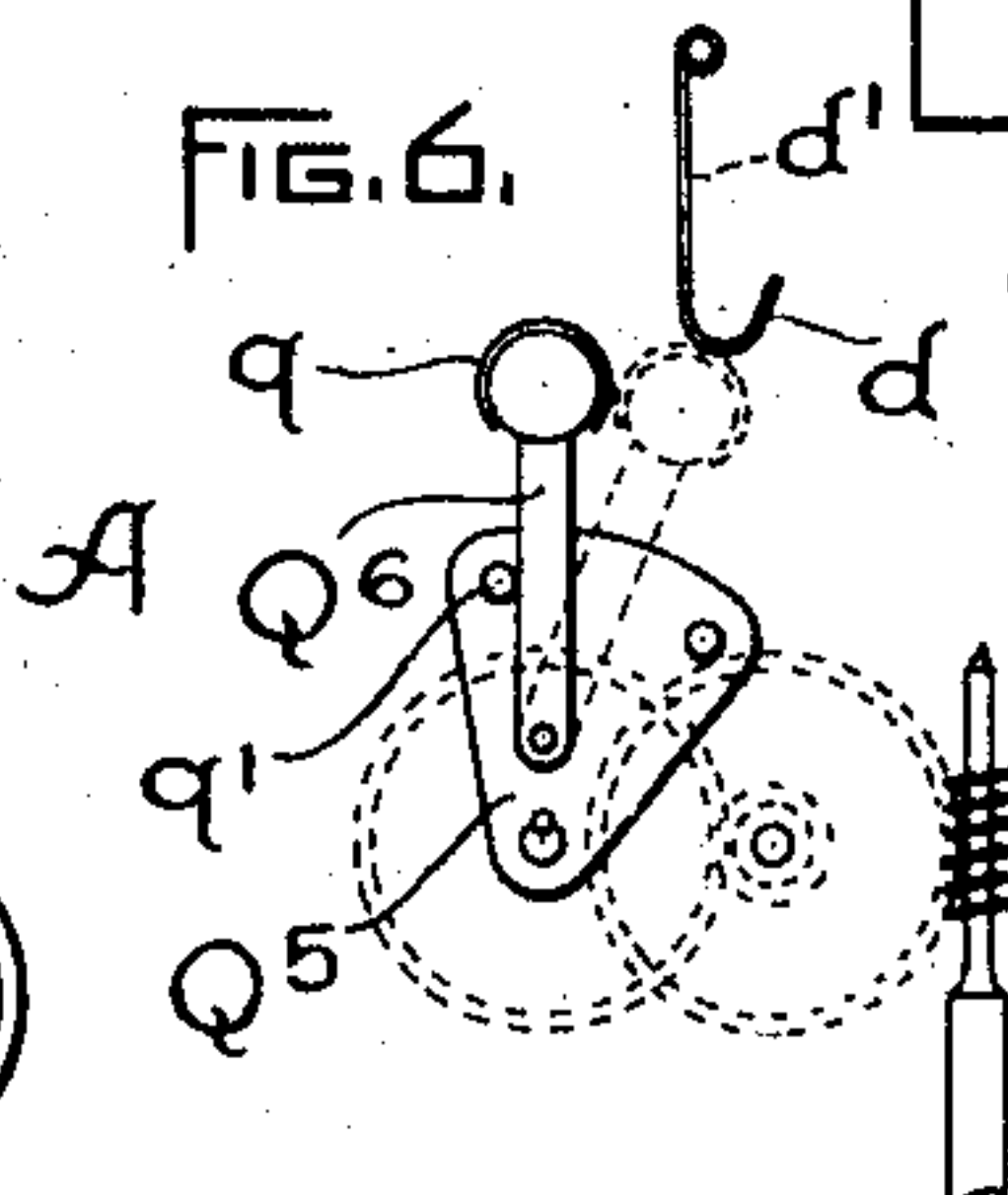
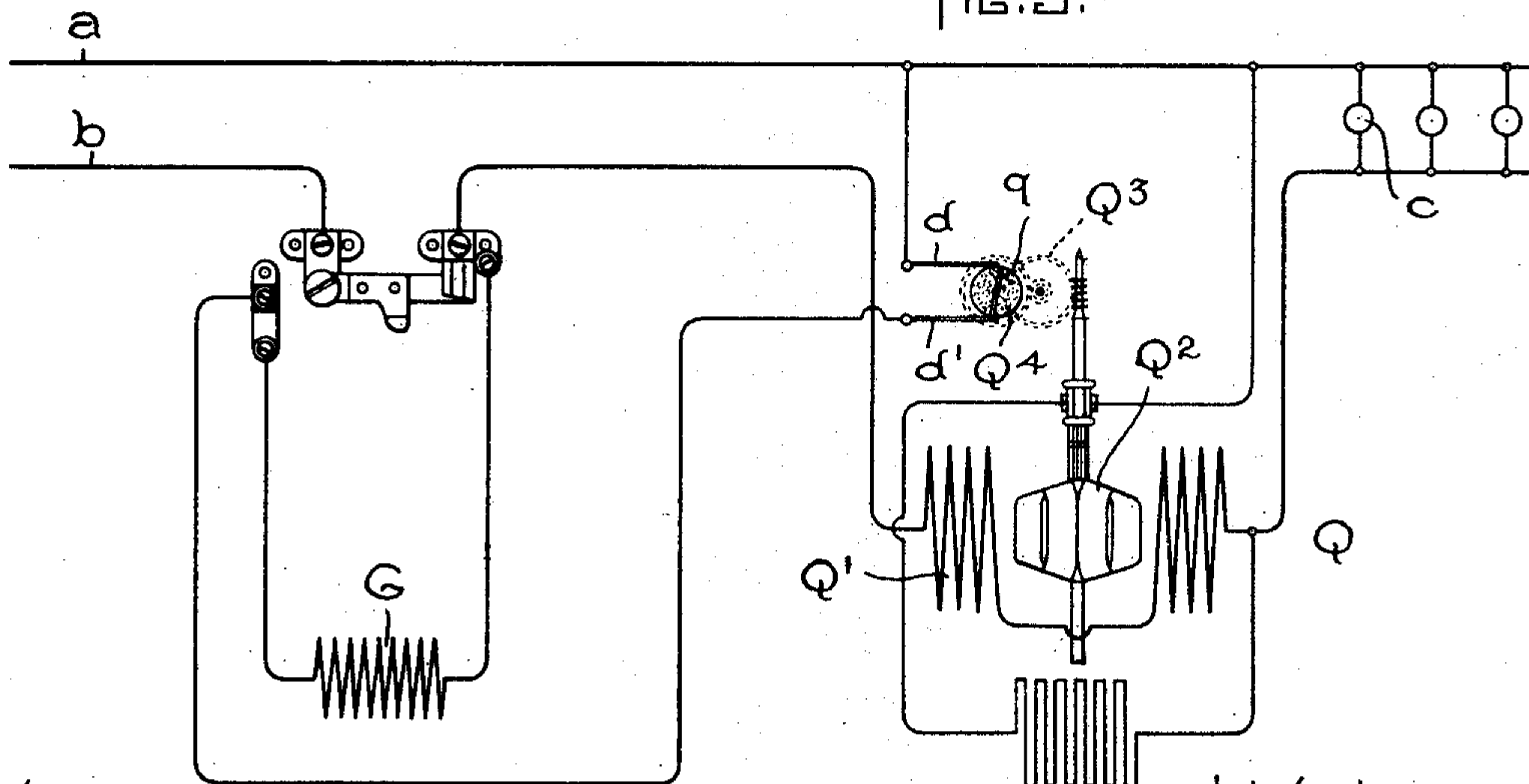


FIG. 5.



WITNESSES.

A. H. Abell.

A. F. Macdonald.

INVENTOR.

Frank P. Cox,

by *Albert G. Davis,*
Atty.

UNITED STATES PATENT OFFICE.

FRANK P. COX, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

PREPAYMENT MECHANISM.

SPECIFICATION forming part of Letters Patent No. 667,068, dated January 29, 1901.

Application filed October 8, 1898. Serial No. 692,989. (No model.)

To all whom it may concern:

Be it known that I, FRANK P. COX, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have
5 invented certain new and useful Improvements in Prepayment Mechanisms, (Case No. 771,) of which the following is a specification.

My invention relates to mechanisms which operate through the insertion of a proper coin
10 or token and which permit a delivery which is the equivalent of the coin or token deposited.

One of the objects of my invention is to provide a prepayment system which is so arranged that the prepayment device can be
15 located at one point and the main apparatus which it controls located at a distant point.

A further object of my invention is to provide a simple prepayment mechanism; and
20 to that end it consists of the parts and combination of parts more fully described and claimed hereinafter.

In the accompanying drawings, which illustrate one form of my invention as arranged
25 for use in connection with an electric motor, Figure 1 is a front elevation of the coin or token controlled mechanism with the cover removed. Fig. 2 is a sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a front elevation similar to Fig. 1, but showing the parts
30 in a different position. Fig. 4 is a side elevation of the same. Fig. 5 is a diagram of the circuit connections. Fig. 6 is a modification of the contact device for closing the circuit of the releasing-magnet, and Fig. 7 is
35 an end view of the contact device shown in Fig. 6.

A represents the back or base, which is arranged to be secured to the wall or any suitable support. Secured to the front side of
40 the base is a fixed stud B, about which certain of the operating parts of the mechanism move. Mounted for rotary movement on the stud B is a weighted actuator C. This
45 actuator is prevented from moving toward the front by means of a shoulder formed on the slotted shaft D, which is mounted in the stud B. Lateral movement of the weighted actuator toward the back is prevented by the
50 disk E, which is sleeved on the stud B and arranged to be moved in a clockwise direction

by the weighted actuator C, in a manner to be hereinafter described, and in an anti-clockwise direction by the spiral spring E'. One end of this spiral spring is connected to
55 the base A and the other end to the disk E and at all times tends to move the disk E in an anticlockwise direction. Situated below the disk E and controlling its movement is an escapement F, which is controlled by the iron-clad magnet G, suitably supported on the
60 base or back A. The escapement F is provided with two arms arranged to alternately engage with the teeth *e* on the disk E, as is usual in an ordinary escapement, and mounted
65 on a third arm is an armature G', arranged to be attracted by the magnet G, the arrangement between the escapement and the disk being such that the latter is permitted to
70 move one-half of a step, which is equal to one-half of the pitch distance of the teeth, each time the magnet is energized and the balance of the step each time the circuit of the magnet is interrupted. A coil-spring F'
75 is employed to normally hold the escapement in the position shown in the drawings. Formed on the back of the disk E is a cam-surface E², arranged to close the switch H, situated on the upper part of the base A, and
80 also to control the action of the locking device. The cam and switch are so arranged that the switch is held closed during the major portion of the movement of the disk E. When, however, the groove E³, formed in the
85 cam, arrives at a position opposite the projection H' on the switch H, (shown in dotted lines in Figs. 1 and 3,) the switch H opens under the action of the coiled spring H². The spring H² tends at all times to open the
90 switch, but is prevented from doing so except when the projection H' is opposite the groove E³, the cam-surface being sufficiently high to maintain the switch in engagement with the stationary contacts. In Figs. 1 and
95 2 I have shown the switch in the open position and in Figs. 3, 4, and 5 in the closed position.

Mounted on the weighted actuator C is an arm C', the said arm being normally retained in the position shown in Fig. 2 by the spring
100 C⁵ and being employed to actuate the disk E by engaging with the teeth *e*, formed on its

periphery. Carried by the outer end of the arm C' is a cam-roller C², which rolls along the under side of a fixed cam I, secured to the right-hand side of the base. Formed integral with the arm C' is a projection C³, which when the arm C is forced toward the base by the stationary cam I engages one of the teeth *e* on the disk E and advances the latter in a step-by-step manner.

The slotted shaft D extends through to the front of the casing and there terminates in a manual actuator J. Rigidly mounted in the slot is a coin-receiver J⁵, comprising three flat plates, (best shown in Figs. 1 and 3,) and formed therein is a groove J' to receive the coin or token J². (Shown in dotted lines at the bottom of the groove, Fig. 2.) Slots J³ and J⁴ are provided in the receiver, the former acting, together with the circular plate K, carried by the cover L, to form a cutter to cut any string or wire which may be attached to the coin or token for the purpose of withdrawing it after the apparatus has been actuated. The slot J⁴ is designed to receive the pin C⁴, mounted on the weighted actuator C, and to permit it to engage with the coin or token J² for the purpose of actuating the apparatus. The coin or token enters the groove J' above the center of motion and passes downward to a point where its center is below the center of movement of the actuator. The greater the distance between the center of movement of the actuator and the center of the coin or token the greater will be the leverage exerted by the actuator. By combining the coin-receiver and the actuator into a single moving element the number of parts is greatly reduced and the construction of the apparatus simplified.

Surrounding the moving parts is a casing L, and mounted on the casing are two pins L' and L², acting as stops to limit the movement of the manual actuator J. The casing also carries the circular cutting-plate K. Located in the front of the casing is a piece of glass L³, which permits the customer to examine the figures on the plates E and determine how much remains to his credit. Located in the upper part of the casing is a removable plate L⁴, permitting access to the binding-post M and the stationary switch-contacts H³ (all of which are mounted on the insulating-support N) without removing the casing from the apparatus. In ordinary commercial service the wing-nut *l*, which secures the removable plate, is sealed in place to prevent tampering with the apparatus.

Mounted in the lower part of the casing is a removable box O for receiving the coins or tokens after they have been employed to actuate the apparatus. This box is retained in place by a flat plate O', having a hooked end O², which rests on the lower part of the casing L, the opposite end being retained by the wing-nut O³, which is sealed against removal by the inspector or person employed to collect the money from the various boxes. This

particular piece of apparatus is designed to receive and place to the credit of the customer from one to nineteen coins or tokens either in succession or at intervals, and to prevent the insertion of more than nineteen coins a stop P is provided, which is pivoted at P' and carries at its outer end a roller P², engaging with the cam-surface E² on the back side of the disk E. The roller is normally pressed against the cam by the spiral spring P³. After nineteen coins or tokens have been employed and the disk E advanced one step for each of such coins or tokens the cam will advance to a point where the groove E³ is opposite the roller P², as shown in dotted lines in Fig. 3, and the projection P⁴ on the stop will arrive at a point where it will engage with the roller C² of the weighted actuator C and prevent further movement. It is to be understood that an unlimited number of coins or tokens may be employed, providing the equivalent is consumed by the customer between insertions.

The operation of the apparatus will now be described. A coin or token J² is dropped into the coin-groove J' in the actuator and assumes the position shown in dotted lines in Fig. 2. The manual actuator is then moved in a clockwise direction, and the coin or token will engage with the pin C⁴ and rotate the weighted actuator C in a clockwise direction. As soon as the weighted actuator C passes the vertical center and the manual actuator strikes the pin L' the coin or token J² is spilled through the slot J⁶ into the coin-receiver O, and the weighted actuator C continues its rotary onward movement under the action of gravity. As soon as the roller C² on the arm C' engages the cam I it is forced toward the base into engagement with the teeth *e* on the disk E, as shown in Fig. 4, and for each rotation of the weighted actuator the disk E is advanced one step, the escapement F preventing the disk from moving backward after the arm C' has been released by the cam.

It will be seen that the apparatus is actuated by a certain definite force irrespective of the pressure applied to the manual actuator J. This is a particularly desirable arrangement, for it prevents abuse of the apparatus and at the same time insures the proper amount of force being applied to actuate the parts. It will also be seen that the work of moving the disk is done after the coin has been spilled through the groove J⁶ into the coin-box O. By reason of this construction the operation of the parts other than the raising of the weight or gravity-actuator C is taken out of the hands of the depositor.

Referring to Fig. 5, the mode of releasing the switch H and interrupting the circuit will be described. The two conductors *a* and *b* supply current to the lamps or other translating devices *c* through the meter Q, which may be of any suitable type, that shown being one of the well-known Thomson motor-meters, comprising field-coils Q' and a rotary

armature Q^2 for driving a suitable registering mechanism Q^3 . In addition to the usual registering mechanism a disk Q^4 is mounted on a suitable support and connected by gearing to the shaft of the armature Q^2 . Engaging with the periphery of the disk are brushes d d' , which are arranged to be connected by the contact-piece q , carried by the disk. The brush d is connected to the main a and the brush d' is connected to the main b through the coil of magnet G . In the present instance the disk Q^4 is arranged to make one-half of a turn for every five hundred revolutions of the armature Q^2 , and each time the disk makes one half-revolution and the connecting-piece q connects the brushes d and d' current flows through the magnet G from the main a to the main b . This causes the magnet to attract its armature G' . The escapement F then permits the disk E to move a portion of a step in an anticlockwise direction, and as soon as the contact-piece q passes out from under the brushes d d' the circuit through the magnet is opened, which permits the escapement F to assume its normal position, and the disk will move the balance of the step.

If it happens that no coins or tokens remain to the credit of the depositor, as soon as the armature G' is attracted and the disk E released the groove E^3 will move to a point opposite the under side of the projection H' of the switch and the switch will open under the action of the spring H^2 . If, however, the equivalent of more than one coin or token remains to the credit of the depositor, the switch H will still remain closed, as the cam on the back of the disk E will not have arrived at a point where the groove E^3 and the projection H' coincide.

In Fig. 6 is shown a slight modification of the contact device for closing the circuit of the escapement-magnet G . Mounted on a shaft which is geared to the registry-train is a sector Q^5 , and carried thereby is a pivoted arm Q^6 , having a contact q at its outer end. The arm is weighted at the contact end and is free to move between the pins q' in the sector. Mounted on a suitable support are contacts d and d' . The contact d' is placed directly behind contact d , and the contact q is arranged to bridge them as the sector Q^5 moves around its center. This feature is best shown in Fig. 7. With the arrangement shown the sector travels in a clockwise direction, and as soon as the contact q passes the center it falls forward and in its passage closes momentarily the circuit between d and d' , as indicated by the dotted-line position. After the contact q passes the center and falls forward it travels at a rate of speed which is different from that of the shaft carrying the sector Q^5 . With this arrangement the action of the escapement is practically instantaneous instead of in two definite periods, as before. With the first arrangement, if it so happens that during the time the brushes d and d' are bridged by the connector q the

circuit of the mains a and b is interrupted for any cause, the magnet is deenergized and the escapement F permits the disk to move the remainder of the step, thereby canceling a certain amount of energy which was due the consumer. The arrangement shown in Fig. 6 entirely obviates this objection, since the making and breaking of the circuit of the magnet is practically instantaneous and the disk moves a complete step instead of two half-steps.

I have shown my invention as located in a box or casing which is separate from the meter or other apparatus to be controlled; but it is evident that, if desired, I can place the casing containing the prepayment mechanism on or in the casing of the main apparatus to be controlled. I have shown my invention in connection with an electric meter; but I do not desire to be understood as limiting myself to such a combination, as the prepayment mechanism can be employed in connection with any type of apparatus wherein it is desired to permit the prepaid delivery of a commodity.

My invention contemplates placing the meter in one room and the prepayment mechanism in another; but, if desired, the two may be in separate buildings located at any distance apart.

The handle J is so mounted that it only has a limited movement. No matter how rapidly this handle is moved after a coin is deposited it is impossible to advance the disk E more than one tooth at a time. It is true that by operating the primary actuator or handle suddenly the weight or secondary actuator C would tend to move somewhat more rapidly than would be the case if the handle were turned slowly; but the arrangement of the parts is such that as soon as the actuator C passes off the cam I the disk will stop its movement. Each time the secondary actuator C makes a revolution it advances the disk E one tooth, which advance is made against the action of the coil-spring E' . As soon as the arm C' passes off the cam I the spring C^5 moves it out of engagement with the teeth on the disk, which prevents further movement of the disk. The coil-spring F' moves the escapement to the position shown, and the coil-spring E' holds one of the teeth of the disk against one arm of the escapement. It will be seen that forward movement of the disk ceases when the arm C' leaves the cam and that a return or anticlockwise movement of the secondary actuator can have no effect on the apparatus, for the reason that the cam I and arm C' are not in operative relation. In other words, the parts are so arranged that the disk is moved forward each time the handle is actuated by a force which is practically independent of that which is supplied to the actuating-handle J . This is a very desirable arrangement, since it prevents the depositor of a coin or token from receiving more current than he is entitled to.

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

1. In a mechanism controlled by a coin or token, the combination of a device controlling the delivery of that for which the deposit was made, an actuator assisting to set the mechanism in operative relation, means for moving the controlling device after the coin or token has been discharged with a force which is practically independent of the pressure applied to the actuator, and means distinct from the coin or token controlled mechanism, controlled by the delivery of that for which the coin or token was deposited, for canceling the value of the coin or token.

2. In a mechanism operated through an inserted coin or token, the combination of a gravity-actuator which assists to set the mechanism in operative relation, but which performs no part of the operation after having so set the mechanism, with a two-part means, the parts of which are connected by a deposited coin or token, for imparting an initial movement to the gravity-actuator.

3. In a mechanism operated through an inserted coin or token, the combination of a gravity-actuator assisting to set the apparatus in operative condition, but which performs no part of the operation of the apparatus after it is so set, a manually-operated means for imparting an initial movement to the gravity-actuator, controlled by the inserted coin or token, and means operated by the gravity-actuator after the coin or token has been discharged, for setting the mechanism in operative relation.

4. In a prepayment mechanism, the combination of means for setting the parts in operative relation, a manual actuator, a second actuator arranged to work on the said means with a force which is practically independent of the pressure applied to the manual actuator, and electrically-controlled means located at a distance for controlling the returning of the parts to their initial position.

5. In a prepayment mechanism which is remote from the apparatus controlled thereby, the means for setting the prepayment mechanism in operative relation, comprising a member mounted for rotary movement, a weighted actuator operating by gravity to move the member after the coin has been discharged, and a manual actuator for moving the weighted actuator through the medium of a coin.

6. In a prepayment system, the combination of the delivery apparatus, a coin or token controlled mechanism for regulating the action of the apparatus, comprising manual and gravity actuators arranged to be operatively connected by the coin or token, and electric means controlled by the apparatus for canceling the value of the inserted coin or token.

7. In a prepayment mechanism, the combination of a moving element for controlling the delivery of the prepayment apparatus, a

spring for moving the said element in one direction, after a certain delivery has been made, a manual rotary actuator assisting to set the mechanism in operative relation, and a rotary coin or token controlled means for actuating the moving element after the coin has been discharged with a force which is practically independent of the force applied to the manual actuator.

8. In a prepayment mechanism, the combination of an element mounted for movement, an actuator for moving the element in a step-by-step manner in a forward direction each movement taking place after the coin or token has been discharged, and a spring for moving the element in a step-by-step manner in the opposite direction.

9. In a prepayment mechanism, the combination of a manual and a gravity actuator, the two actuators being arranged to be connected by the deposited coin or token, means operated by the gravity-actuator for placing the mechanism in operative condition, and means connected by electrical conductors with the prepayment mechanism for canceling the value of the deposited coin or token.

10. In a prepayment mechanism, the combination of a delivery-controlling mechanism, with a means operative only after the coin is discharged for actuating the said mechanism one step at a time for each revolution.

11. In a prepayment mechanism, the combination of an element mounted for rotary step-by-step movement, a second element mounted for rotary movement, and means permanently secured to the second element for advancing the first-mentioned element one step at a time for each complete or substantially complete rotation of the second element.

12. In a prepayment mechanism, the combination of an actuator actuating by its gravity during a portion of its forward stroke a moving part of a mechanism, a manual actuator, and means dependent upon the inserted coin or token for transmitting an initial movement to the gravity-actuator.

13. In a prepayment mechanism, the combination of a disk mounted for rotary movement, a cam actuated by the disk for closing an electric circuit, means for actuating the disk, and a stop for preventing the said means from actuating the disk after the maximum number of coins or tokens have been placed to the credit of the customer.

14. In a prepayment mechanism, the combination of a toothed disk, an actuator for advancing the disk in a step-by-step manner, manual means working through a coin for moving the actuator, a projection secured to the actuator for engaging with a tooth on the disk under certain conditions for advancing the disk, and an escapement for controlling the action of the disk.

15. In a prepayment system, the combination of a coin or token controlled apparatus, a manual actuator for setting the apparatus

in operative condition, a delivery apparatus remote from the coin or token controlled apparatus, an electrical connection between the coin or token controlled and delivery apparatuses, and means on the delivery apparatus for canceling the value of a coin or token inserted in the first-named apparatus.

16. In a prepayment system, the combination of a mechanism the parts of which are manually actuated through the medium of an inserted coin or token, a piece of apparatus remote therefrom, and electrical means connecting the apparatus and the said mechanism controlled by the apparatus for regulating certain actions of the said mechanism.

17. In a prepayment mechanism, the combination of a moving element, an actuator arranged to advance the moving element a certain amount for each rotation or substantial rotation, and a manual actuator arranged to set the first-named actuator in operative position and spill the coin or token prior to the actuation of the moving element.

18. In a prepayment-meter system, the combination of a prepayment mechanism situated at any desired point and containing means manually actuated through a deposited coin or token for closing an electric circuit, a meter mechanism remote from the prepayment mechanism, and means controlled by the meter for canceling the value of a coin or token which has been deposited in the prepayment mechanism.

19. In a prepayment-meter system, the combination of a prepayment mechanism situated at any desired point, a manually-actuated switch the operation of which is controlled by the prepayment mechanism for closing the circuit of the meter and also that of the consumer, a magnet controlling the release of the switch, a meter mechanism for recording the consumption of energy in an electric circuit which is connected electrically with the prepayment mechanism, and a contact actuated by a moving part of the meter for closing the circuit of the magnet when the prepaid amount of energy has been consumed.

20. In a prepayment mechanism, the combination of a device for performing a certain result, a primary actuator arranged to work through a deposited coin, a rotary secondary actuator for moving the said device after the coin has been discharged a certain distance for each rotation or substantial rotation, the secondary actuator being moved by the primary actuator through the deposited coin or token.

21. The combination of a movable shaft, a disk mounted on the shaft, a movable contact carried thereby, a lost-motion connection between the shaft and the disk, a fixed contact situated in the path of travel of the moving contact and arranged to establish connection therewith during an interval that the movable contact is moving independent of the shaft, and a coin-controlled means for driving the shaft.

22. The combination of a rotary shaft, a disk mounted on the shaft, a movable contact carried thereby, a lost-motion connection between the shaft and the disk, a pair of fixed contacts situated in the path of travel of the movable contact and arranged to be bridged by the movable contact during the interval that it is moving independent of the shaft, and a coin-controlled means for regulating the action of the contacts.

23. The combination of a horizontal driving-shaft, a coin-controlled device for regulating the movements of the shaft, a contact pivotally mounted on the shaft and capable of a certain freedom of movement independent thereof, and a contact located in the path of the moving contact arranged to make connection therewith only during the interval that the moving contact is moving independent of the shaft.

24. In combination, a driving-shaft, a circuit-maker pivotally mounted on the shaft and capable of a certain freedom of movement independent thereof, whereby it may move at the same or a different rate of speed, a contact located in the path of travel of the circuit-maker and arranged to engage with the circuit-maker only during an interval in the rotation of the shaft that said circuit-maker is moving at a rate of speed which differs from that of the shaft, and coin-controlled means for controlling the action of the contacts.

25. In a prepayment mechanism, the combination of an actuator, a lock, and means for moving the lock into the path of the actuator to prevent its further operation after the maximum number of coins or tokens designed to be received by the mechanism have been received and stand to the credit of the customer.

26. In a prepayment mechanism, the combination of an element mounted for movement about a center, a rotary actuator therefor, means mounted on the actuator for engaging with and moving the said element about its center, and a cam for controlling the action of said means.

27. In a prepayment mechanism, the combination of a toothed disk mounted for movement about a center, a weight or gravity actuator therefor, a spring-pressed arm carried by the actuator and normally out of engagement with the toothed disk, and a cam for moving the arm into engagement with the toothed disk.

28. In a mechanism controlled by a coin or other token, the combination of a casing with a manual actuator mounted for movement about a center, and provided with a closed bottom groove therein for receiving the coin, the groove extending from a point above the center of movement of the actuator outside of the casing to a point below the center inside the casing.

29. In a mechanism controlled by a coin or token, the combination of a slotted actuator mounted for movement about a center, flat metal plates mounted in the slot, a coin-groove

formed in the plates, which extends from a point above the center of motion to a point below, whereby the leverage of the actuator is increased, and an extension or discharge
 5 portion for said groove which is so arranged that the coin again passes the center of motion before being discharged.

30. In a mechanism controlled by the insertion of a coin or other token, the combination of a switch having a spring normally
 10 tending to open it, a cam for holding the switch closed so long as the coin or token remains to the credit of the depositor and an electrically-controlled escapement for regu-
 15 lating the action of the cam.

31. In a prepayment mechanism, the combination of a rotatable member, an actuator, a finger pivotally secured to the actuator, and
 20 a cam for forcing the finger into engagement with the rotatable member.

32. In a prepayment mechanism, the combination of a switch, a device for preventing the insertion of more than a certain number
 25 of coins, and a cam which controls the action of the switch and said device.

33. In a prepayment mechanism, the combination of a switch, a pivoted stop for limiting the insertion of more than a certain number
 30 of coins at any one time, a grooved cam, which groove is so arranged that it controls the opening of the switch and the setting of the pivoted stop.

34. In a prepayment mechanism, the combination of a primary actuator, a slotted rotatable shaft into which the actuator is fitted,
 35 and a bearing for the rotatable shaft.

35. In a prepayment mechanism, the combination of a fixed stud having a central opening, a slotted shaft having one end located

within the opening, and a member mounted
 40 for rotation on the stud.

36. In a coin or token controlled mechanism, the combination of a manual actuator, a rotatable disk controlling a circuit-maker,
 45 a circuit-maker, and a coin-controlled actuator, the centers of the manual actuator, disk, and coin-controlled actuator coinciding.

37. In a coin or token controlled mechanism, the combination of a device for controlling the opening and closing of an electric
 50 circuit, an electromagnet having a single winding, and means actuated by the magnet for permitting the said device to move a definite distance when the magnet is energized,
 55 and to move a second definite distance when the magnet is deenergized.

38. In a coin or token controlled mechanism, the combination of a rotatable toothed wheel, an electromagnet, an escapement en-
 60 gaging with the toothed wheel and arranged to permit it to move a certain distance when the magnet is energized, and a certain other distance when the magnet is deenergized, and means for controlling the circuit of the mag-
 65 net.

39. In a prepayment mechanism, the combination of a switch, a cam for closing the switch, means tending at all times to open
 70 the switch, and means under the control of the prepayment mechanism for actuating the cam.

In witness whereof I have hereunto set my hand this 5th day of October, 1898.

FRANK P. COX.

Witnesses:

DUGALD MCKILLOP,
 HENRY O. WESTENDARP.