No. 771,474. PATENTED OCT. 4, 1904.

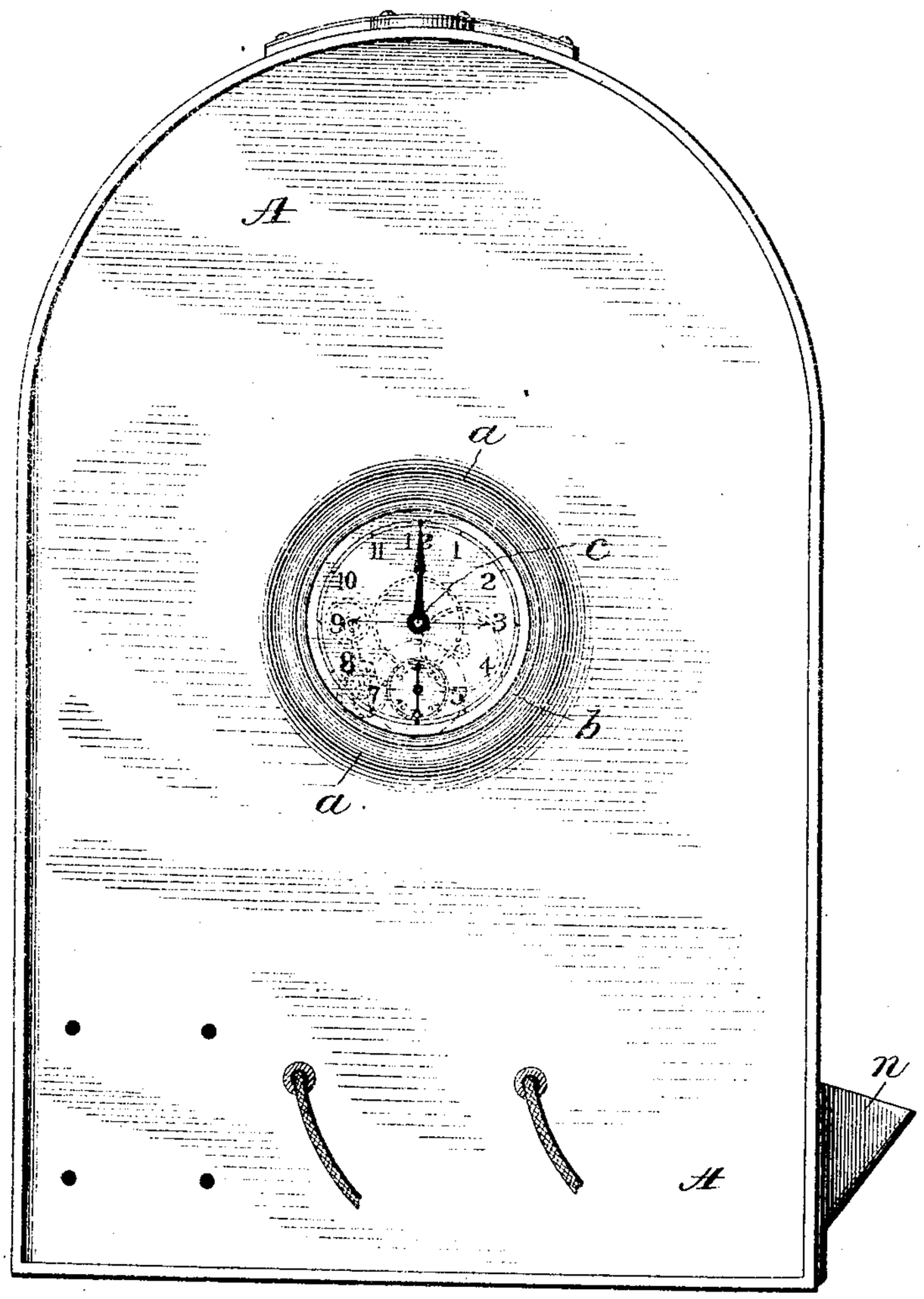
T. D. INGRAM.

COMBINED COIN DRIVEN CLOCK AND CIRCUIT CONTROLLER.

APPLICATION FILED JAN. 25, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Jas. E. Hutchinson.
E. C. Schuermann.

Inventor.
Thomas D. Ingram,
by Dennis & Goldsborough,
Attorneys.

No. 771,474. PATENTED OCT. 4, 1904.

T. D. INGRAM.

COMBINED COIN DRIVEN CLOCK AND CIRCUIT CONTROLLER.

APPLICATION FILED JAN. 25, 1904.

NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.

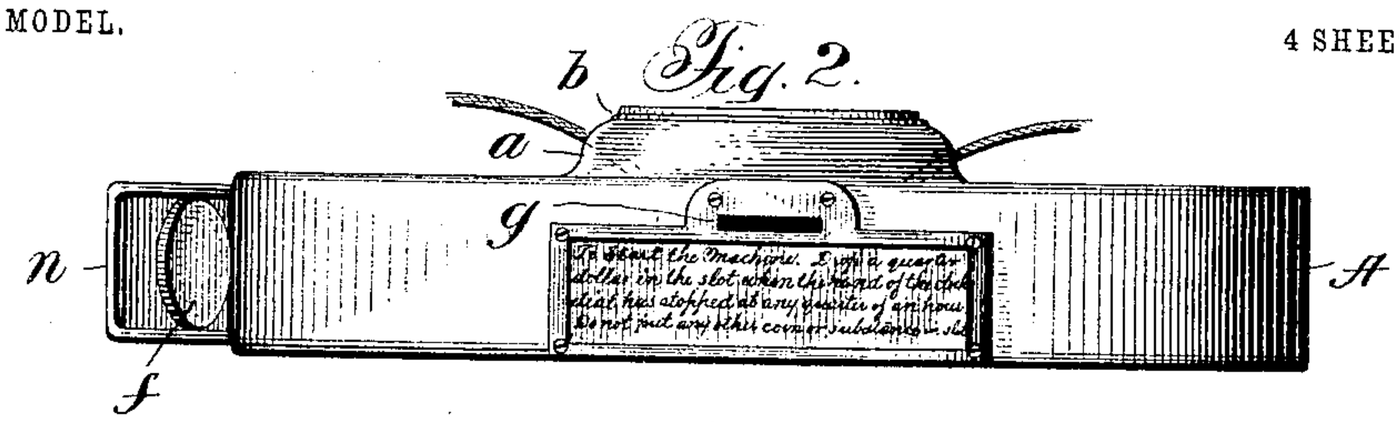


Fig. 3

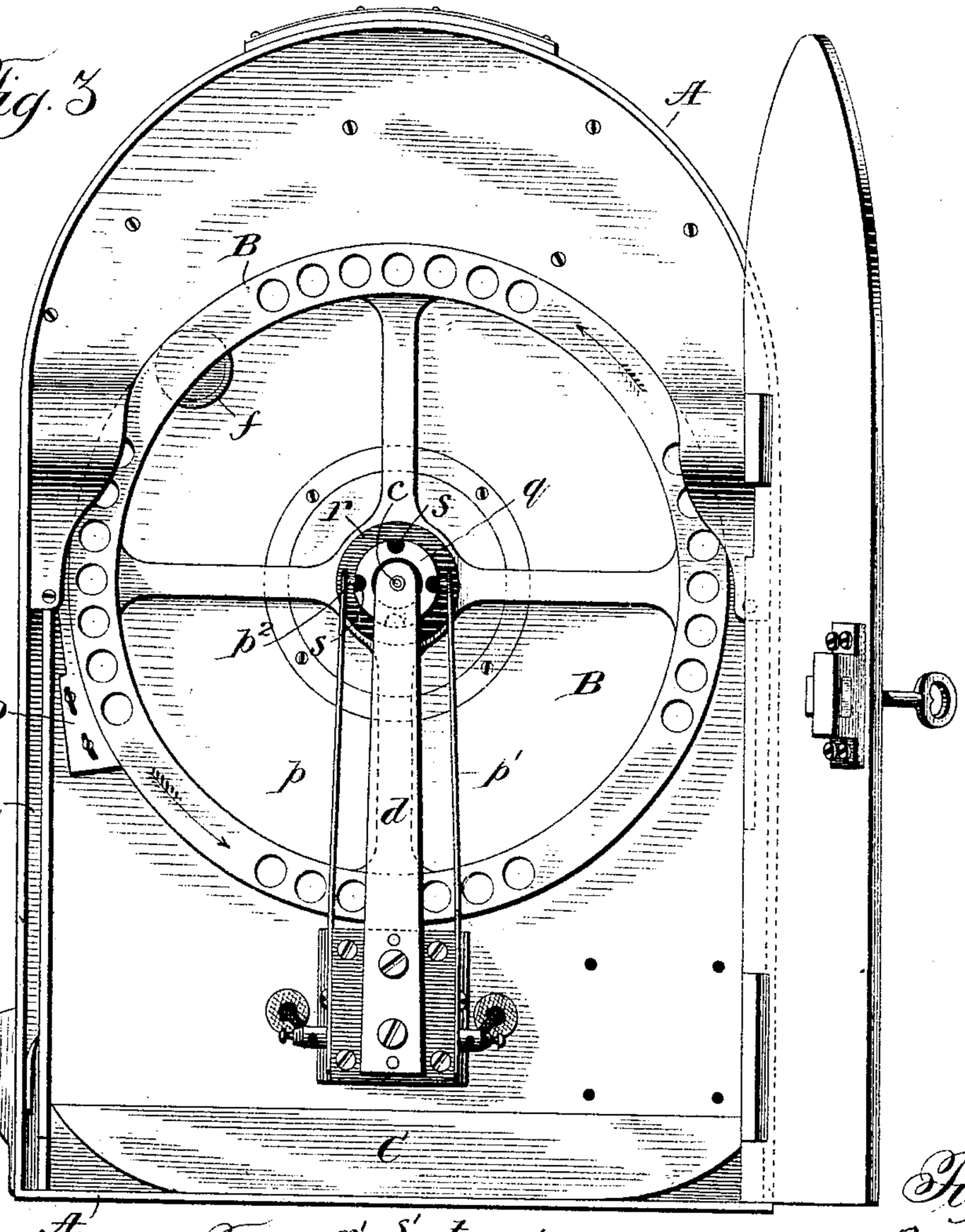


Fig. 6.

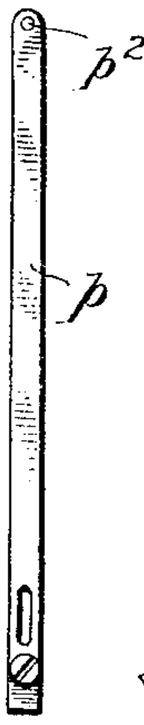


Fig. 11

Fig. 8.

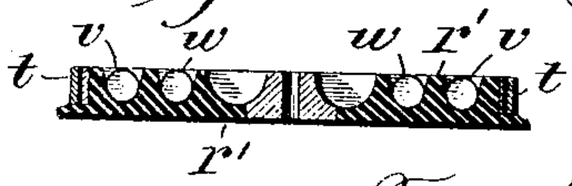


Fig. 7.

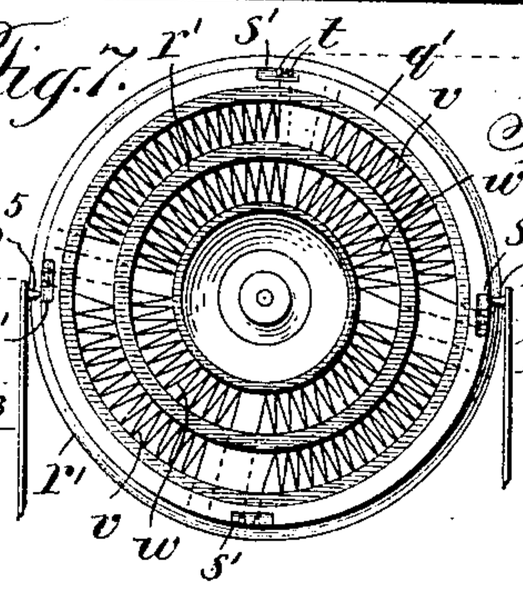
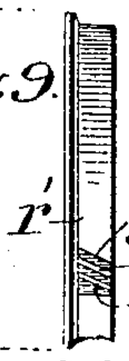


Fig. 9.



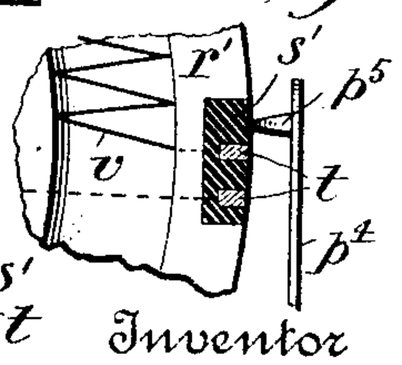
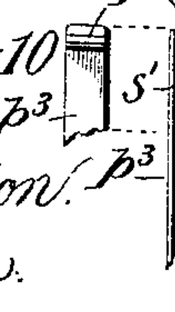


Fig. 10



Witnesses:

Jas. E. Hutchinson.

E. C. Schuermann.

Inventor

Thomas D. Ingram,

by Lemuel W. Serrell & Son

Attorneys

No. 771,474.

PATENTED OCT. 4, 1904.

T. D. INGRAM.

COMBINED COIN DRIVEN CLOCK AND CIRCUIT CONTROLLER.

APPLICATION FILED JAN. 25, 1904.

NO MODEL.

4 SHEETS—SHEET 3.

Fig. 4.

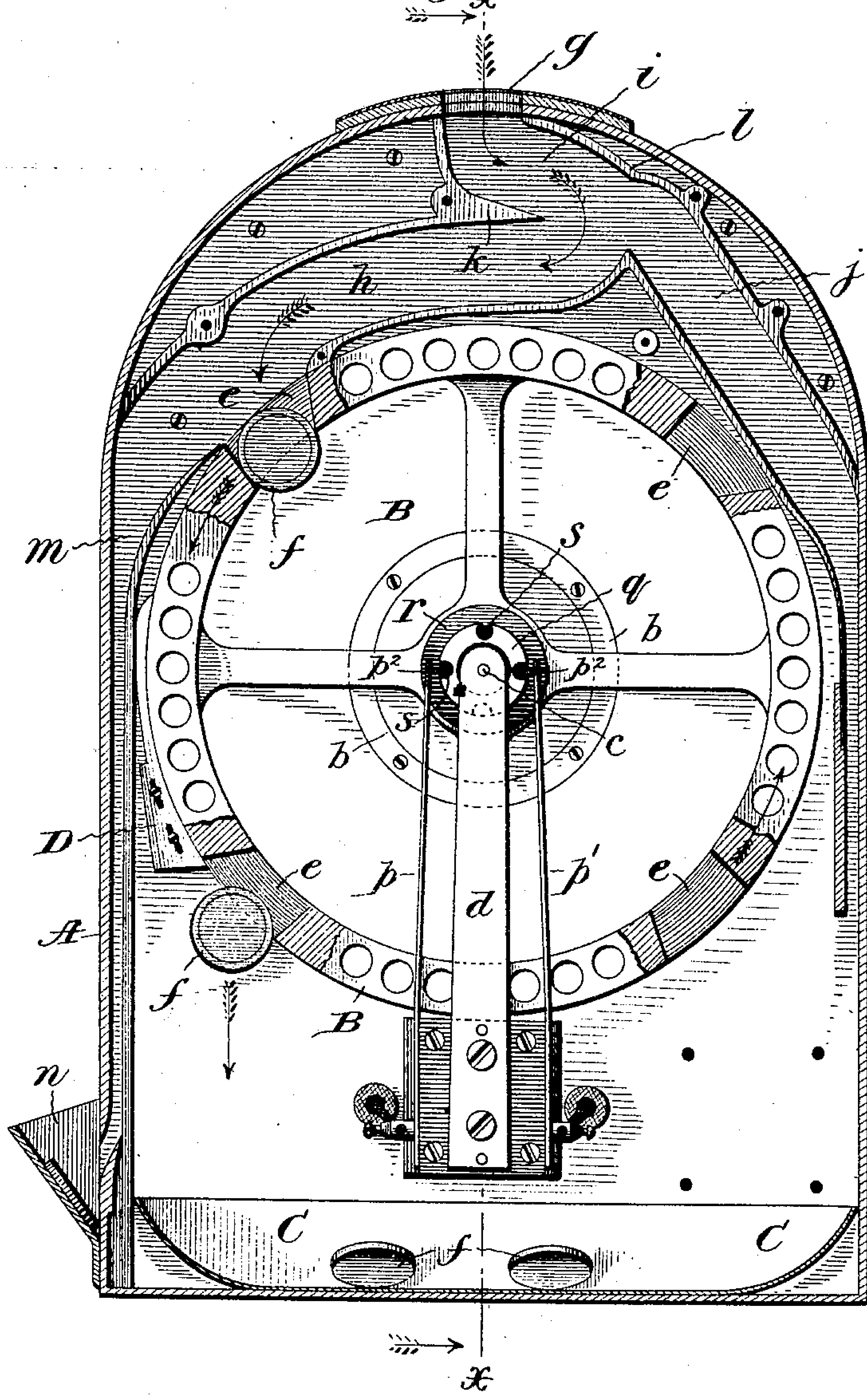
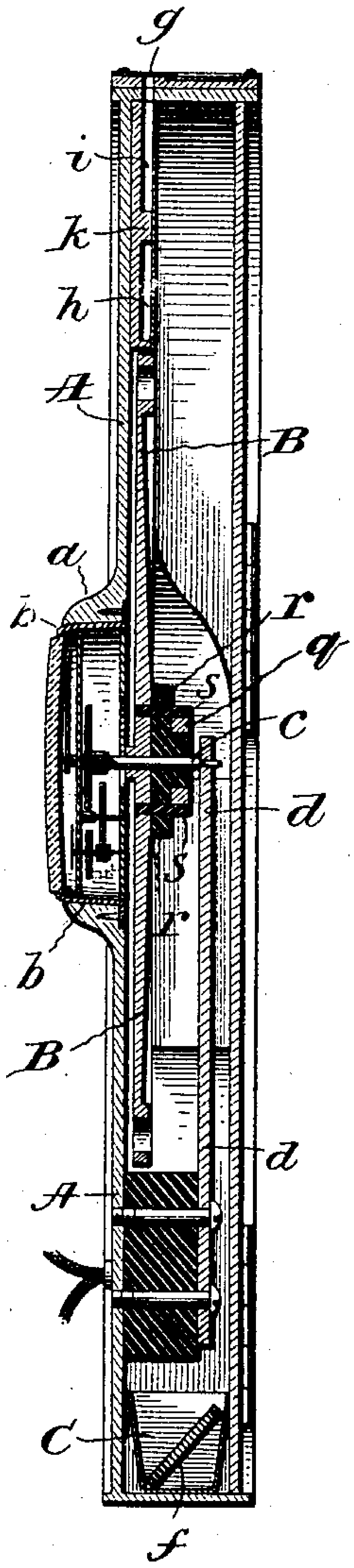


Fig. 5.



Witnesses:

Jas E Hutchinson.

E. C. Schuermann.

Inventor:

Thomas D. Ingram,

by Pennie & Goldsborough,

Attorneys.

No. 771,474. PATENTED OCT. 4, 1904.

T. D. INGRAM.

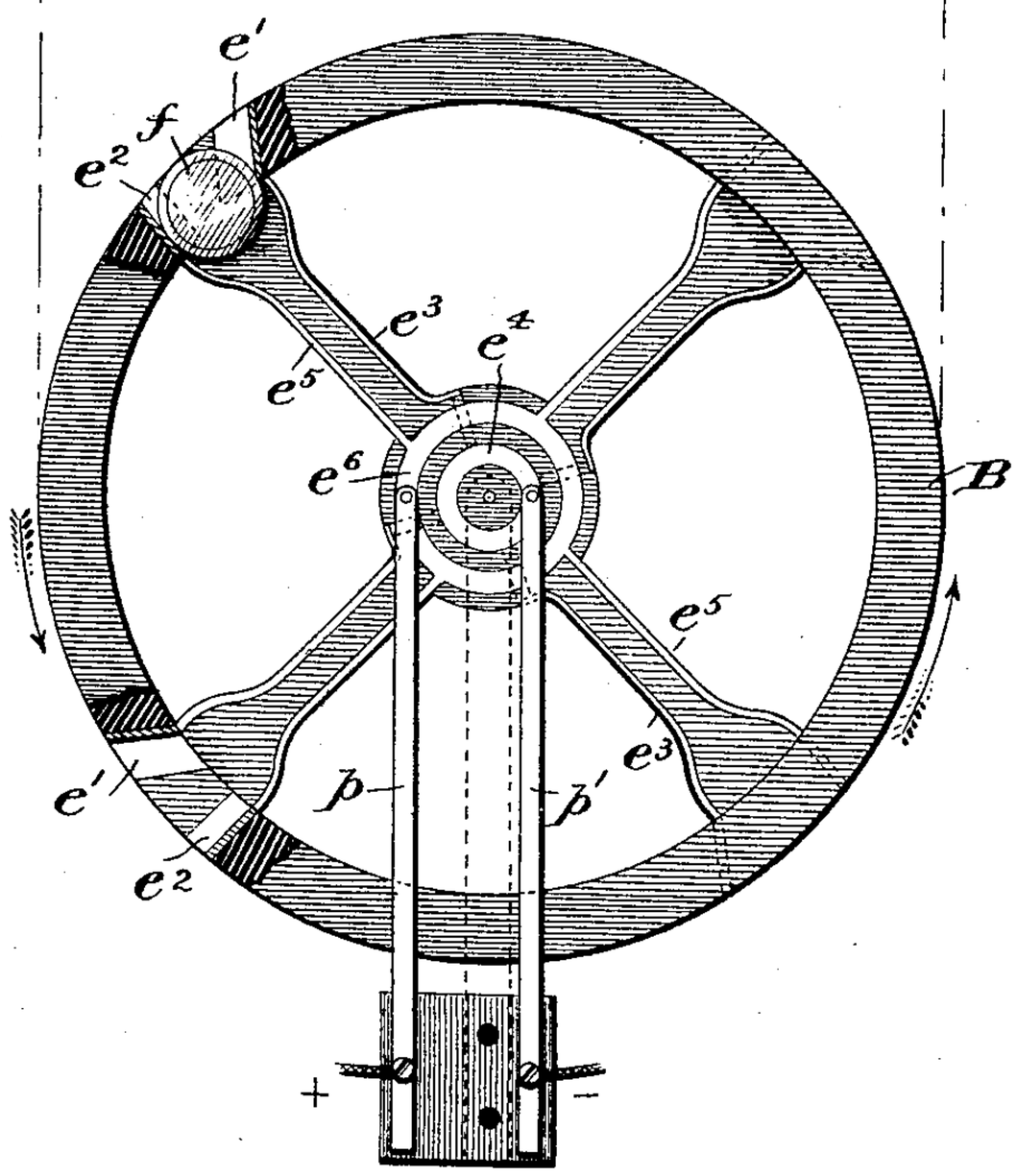
COMBINED COIN DRIVEN CLOCK AND CIRCUIT CONTROLLER.

APPLICATION FILED JAN. 25, 1904.

NO MODEL. 4 SHEETS—SHEET 4.

Fig 12.

Fig. 13.



Witnesses:
Jas. E. Hutchinson.
E. C. Schuermann.

Inventor:
Thomas D. Ingram,
by Lennie & Goldsborough,
Attorneys.

No. 771,474. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

THOMAS DARLINGTON INGRAM, OF WASHINGTON, DISTRICT OF COLUMBIA.

COMBINED COIN-DRIVEN CLOCK AND CIRCUIT-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 771,474, dated October 4, 1904.

Application filed January 25, 1904. Serial No. 190,548. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DARLINGTON INGRAM, a citizen of the United States, residing in the city of Washington, District of Columbia, have invented certain new and useful Improvements in a Combined Coin-Driven Clock and Circuit-Controller; 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.

Generally stated, my invention relates to the actuation for a predetermined interval of time and by means of a coin or the like serving as the driving power of a clockwork-train of gears provided with a suitable escapement. At the end of the predetermined period referred to the mechanism is brought to rest by the release or disengagement of the driving-coin, the arrangement being such that the mechanism is thereupon in such adjustment as to be adapted to be driven for another predetermined interval by the driving action of another coin.

For the practical utilization of this coin-driven clock-train I contemplate its employment as the actuating mechanism of a driven shaft, which shaft may constitute, for example, the movable element of a circuit maker and breaker or starting-box interposed in an electric circuit containing an electric motor, a magnet, an electric lamp, or other translating device in such manner that the actuation of the clock-train for the predetermined time interval contemplated will bring into service for the same predetermined period of time the motor, magnet, electric lamp, or the like interposed in the governed circuit. By a special arrangement I have provided a circuit maker and breaker or starting-box with rheostat-coils, so that the strength of the current in the governed circuit upon starting may gradually rise to the desired potential, thereby obviating the danger of burning out the motor or other translating device which might ensue should the current be abruptly applied at this maximum potential. In one modification of my invention I make use of the coin itself to make and break the governed circuit, as will hereinafter more fully appear.

I inclose the clockwork-train, its driven shaft, and circuit making and breaking mechanism within a securely-locked casing bearing such a relation to the inclosed mechanism that the insertion of a coin of the proper denomination will result in the actuation of the mechanism for the predetermined time interval, whereas the insertion of a coin of a lower denomination will fail to actuate it. I also make provision for the return of a coin of the proper denomination to the patron of the apparatus should he inadvertently insert such coin while the mechanism is in actual operation, whereas in general the insertion of coins of smaller denominations will result in their forfeiture by causing them to drop to the bottom of the casing into the receiving-till thereof without actuating the mechanism.

In the accompanying drawings, Figure 1 represents a front elevation of apparatus embodying my invention. Fig. 2 represents a top plan view thereof. Fig. 3 represents a rear elevation or interior view with the casing-door swung back on its hinges. Fig. 4 represents a like view to Fig. 3, but partly in section and with the locking-door removed. Fig. 5 represents a vertical central section of the apparatus. Fig. 6 represents in detail one of the contact springs or brushes of the circuit maker and breaker shown in Figs. 3 and 4. Figs. 7 to 11, inclusive, represent detail views of a modified form of circuit maker and breaker or starting-box intended especially for use in connection with heavier currents. Figs. 12 and 13 represent, respectively, a top plan view and a rear elevation, partly in section, of a form of circuit maker and breaker partly adapted to the handling of currents of very moderate strength.

Similar letters of reference indicate similar parts throughout the several views.

Referring to the drawings, it will be noted that the front plate A of the casing, which is preferably of metal, is provided with a projecting annular flange *a*, surrounding a tapering aperture of suitable depth to receive the casing *b* of a clock-movement in such manner that said casing is adapted to be inserted from the rear of the plate A and to be secured in place within the opening by means of screws

or the like, as indicated. The front plate of the casing shows to the observer, therefore, the usual indicating-dial and hands of a watch or clock; but the clock cannot be removed or disturbed, for the reason that it only can be dissociated from the casing by removing it rearwardly from the opening in which it is secured, its basal flange as well as the tapering character of the opening preventing it from being removed through the front of the plate A. It will be understood that the clock-train is provided with the usual time-indicating hands and pinions, preferably including the hour-hand, minute-hand, and seconds-hand and their pinions and that it is provided with the usual escapement.

The minute shaft or arbor *c* of the clock-train is supported at its inner end in an upright standard or bearing *d*, secured to the front wall of the casing. Upon this minute-shaft is secured a wheel B, which itself constitutes one of the wheels of the clock-train and serves as the driving element therefor, the clock-train being devoid of a driving-spring. Disposed at equal distances about the rim of the wheel are a series of pockets *e* in the wheel rim or periphery, these pockets, as indicated in Fig. 4, being adapted to receive the coin or check *f* when in the receiving position and to discharge it into the tray C after it has exerted its function as a propelling force.

The casing is provided in its top with a receiving-slot *g* for the reception of the coin or check and with a raceway *h*, which leads the coin of the proper denomination to the appropriate receiving-pocket, as indicated by the arrows. Before reaching the raceway *h* the coin traverses the introductory channel *i*. It first strikes the abutment *k* and rebounds therefrom. If it is of a lower denomination and smaller size than the coin intended to operate the machine, it passes at once through the by-pass raceway *j* and drops thence into the till C without operating the mechanism. If it is of the proper denomination, however, in rebounding it strikes the abutment *l* and is thereby caused to drop into the raceway *h*. Should the insertion of the proper coin occur inadvertently at a time when the apparatus is already in operation, there will be no pocket in position for its reception, and it will therefore pass on through the overflow-raceway *m* and will issue from the casing into the trough *n*, from which it can be at once recovered by the patron of the machine. It will be noted that the pockets *e* are open at their lower ends. The size of this lower opening is such that if an improper coin inserted should be of a size almost as large but not quite as large as the coin for which the machine is intended said improper coin, even though it should enter the raceway *h* and a receiving-pocket *e*, would fall through the open pocket into the casing without actuating the clockwork. For instance, I have found in practice that a machine adapted to be operated by a quarter of a dollar of United States currency will not be operated by a quarter of a dollar of the currency of the Dominion of Canada. The Canadian coin being slightly smaller than the United States coin, even though it may enter a receiving-pocket *e*, will pass through the opening in the bottom of the pocket and drop into the till.

As illustrated in Figs. 12 and 13, the metallic coin or check may itself be utilized as a means for closing and subsequently breaking after a predetermined time interval the electric current to be controlled. To this end in the construction shown in said figures the pockets may be provided with plates e' e^2, of metal, normally insulated from each other by the expedient of making the wheel itself of insulating material. From the plates e' suitable conductors e^3 lead to a metallic ring e^4, and from the plates e^2 similar conductors e^5 lead to a metallic ring e^6. These rings are likewise insulated from each other and with them, respectively, make contact with the brushes or springs p p', so that when a coin is contained in the receiving-pocket electric connection will be established from the brush or spring p, ring e^6, a conductor e^5, a plate e^2, the metallic coin or check *f*, a plate e', a conductor e^3, the ring e^4, and the brush or spring p', and consequently the circuit in which said brushes are included will be closed until the coin as a consequence of the continued revolution of the wheel is discharged from its pocket. This form of contact maker and breaker I contemplate using where the current to be handled is of quite moderate strength—as, for instance, that required to energize a magnet to actuate a valve controlling the supply of a fluid or the like.

Where the current to be handled is of moderate volume—such, for instance, as would suffice to energize an electric motor of, say, one-fourth of the horse-power—I may employ a switch or circuit maker and breaker of the type illustrated in Figs. 3 to 6, wherein the springs or brushes p p' make contact with a make-and-break wheel consisting of a metallic ring *q*, mounted upon a hub-like projection of a disk *r*, of insulating material, said disk being mounted upon the driven wheel B, as shown. The metallic ring *q* is thus insulated from the driven wheel B and from the shaft or arbor *c*. The periphery of the ring *q* is recessed, as shown, for the reception of insulation preferably in the form of pins of vulcanite or the like *s*, spaced at equal intervals apart and of the same number as the number of pockets *e* in the driven wheel. These insulating-pins may be utilized, as indicated in Fig. 5, as the means for securing the disk *r* to the driven wheel. It will be understood that when the driven wheel B is in the proper adjustment for the admission of a coin to one of the pockets

e, as shown in Fig. 4, the springs or brushes *p p'* will rest with their contact-pins p^2 upon insulation and the clockwork will be so adjusted that, as indicated in Fig. 1, the minute-hand will point at one of the quarter-hours into which the dial may be supposed to be divided if a current of one-quarter of an hour's duration is to be dispensed. Upon the admission of a proper driving-coin into the appropriate receiving-pocket *e* therefor the wheel B will, under the influence of the weight of the coin, commence to rotate in the direction indicated by the arrows on said wheel. The clock-train will immediately commence to operate, and the seconds-hand will advise the patron that the machine is in operation—a fact that he would not so readily perceive by the action of the much more slowly moving minute-hand. The movement of the minute-hand will advise him of the amount of current still at his disposal at any stage of the machine's operation and will assure him that he is receiving the full time allowance guaranteed by the usual inscription appearing upon the outside of the casing indicated in Fig. 2. The hour-hand has the function of serving as a cash-register. For instance, if when the machine is originally installed the indicator-hands show twelve o'clock (see Fig. 1) a subsequent indication of one o'clock would show the actuation of the machine for four of the predetermined periods, and consequently the presence of four of the driving-coins of the appropriate dimensions in the casing-till, and so on.

As soon as the driven wheel B commences to rotate the receiving-pocket containing the driving-coin moves with it, and the coin continuing its driving action remains in the pocket in this particular instance for one-quarter of a period of the wheel's revolution and for one-quarter of an hour, the revolution of the wheel being restrained by the clockwork-escapement. To prevent the coin from falling out of the pocket after passing the horizontal plane, an adjustable guard D is provided, which may be accurately set by means of the slot-and-pin connection shown, so that in passing the guard the outer opening of the pocket will be closed, thereby retaining the coin in position until, finally, after passing the guard the coin drops from the pocket, as indicated in Fig. 4, and enters the till-tray C, whereupon the mechanism comes to rest. At the same time the springs or brushes *p p'* pass from the conducting-ring *q* and rest with their contact-points against insulated sections, as before. The current is therefore again broken and will not be reëstablished until the machine is again set into actuation by the entrance of a proper driving-coin into the next succeeding pocket which in the meantime has come into receptive position.

Where the current to be dispensed is of such large volume or intensity as might tend to burn out the electric motor or other translating device if the current were to be applied too abruptly, I construct the rotating element of the circuit maker and breaker in such manner that the starting-sections thereof should act as rheostats. For instance, as shown in Figs. 8 to 11, inclusive, the contact-terminals p^5 of the springs or brushes p^3 p^4 make contact when the machine is in the starting position with starting-sections *s'* set in the periphery of the conducting-ring *q'*, which ring is mounted upon the insulated disk *r'*, adapted for adjustment to the driven wheel in the same manner as the disk *r* of Figs. 3, 4, and 5.

As shown more fully in Figs. 9 and 11, these starting-sections *s'* have embedded within them transverse cross-bars *t*, set at an incline in such manner that as the contact p^5 passes from one to the other and finally to the main periphery of the ring *q'* there will be no discontinuity of electric contact, although at the outside the contact p^5 will, as indicated in Fig. 7, rest upon insulation alone. From that one of the cross-bars *t* with which the contact p^5 first comes into electrical connection as the clockwork begins to operate there extends a resistance-coil *v*, of platinum wire or the like, which is of higher resistance than that of a corresponding coil *w*, which passes from the adjacent bar *t*. The opposite ends of these coils are electrically connected to the ring *q*, and for convenience they may be suitably nested in grooves made in the face of the disk *r'*, as fully indicated in Figs. 7, 8, and 11. It will be apparent, therefore, that when the clockwork is brought into operation the contacts p^5, which are normally upon insulation, come into electrical connection in the first instance with one of the incline-bars *t*, thereby closing the circuit, but graduating the amount of current admitted thereto in accordance with the resistance interposed by two of the coils *v*. Thereupon the contacts p^5 make electrical connection with the second incline-bar *t*, but without leaving the first incline. The effect of this second contact is to cut down the resistance in the circuit by affording an additional path through two of the coils of lower resistance *w*. Finally the continued rotation of the wheel brings the contacts p^5 into electrical connection with the main periphery of the ring *q'*, whereupon the full potential of the current is received in the circuit. The passage of the contacts from one incline-bar to the other and from the last incline-bar to the periphery of the ring *q'* without interruption of the current obviates sparking and the subsequent burning or oxidation of the conducting-surfaces.

Having thus described my invention, what I claim is—

1. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, the weight of the coin

or check constituting the driving means; substantially as described.

2. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, the weight of the coin or check constituting the driving means; and an electric switch or circuit-breaker in operative connection with said train; substantially as described.

3. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, and an electric switch or circuit-breaker consisting of a make-and-break wheel mounted on a driven shaft of the train, and brushes making contact with said wheel; substantially as described.

4. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, and an electric switch or circuit-breaker, consisting of a make-and-break wheel and coöperating brushes, the starting-sections of the wheel constituting rheostats for graduating the rise of current strength in the circuit; substantially as described.

5. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, and an electric switch or circuit-breaker, consisting of a make-and-break wheel and coöperating brushes, the starting-sections of the wheel consisting of insulating material traversed by inclined transverse conducting-strips severally connected by resistance-coils to an adjoining conducting-section of the wheel; substantially as described.

6. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, and an electric switch or circuit-breaker, consisting of a make-and-break wheel and coöperating brushes, the starting-sections of the wheel consisting of insulating material traversed by inclined transverse conducting-strips severally connected by resistance-coils to an adjoining conducting-section of the wheel, the coil connected to the first strip being of higher resistance than the coil connected to its successor; substantially as described.

7. A clockwork-train, one of whose members is provided with means for receiving, temporarily retaining, and thereafter discharging a driving coin or check, and an electric switch or circuit-breaker, consisting of a make-and-break wheel and coöperating brushes, the starting-sections of the wheel consisting of insulating material traversed by inclined transverse conducting-strips severally connected by resistance-coils to an adjoining conducting-section of the wheel, the coil connected to the first strip being of higher resistance than the coil connected to its successor, and the strips overlapping with respect to the brushes so that continuity of the circuit may not be interrupted as the brushes contact successively with the strips and finally with the adjoining conducting-sections; substantially as described.

8. A clockwork-train, an inclosing casing therefor, a raceway in the casing adjacent to the periphery of a wheel of the train, a coin or check receiving recess in the said wheel's periphery, the weight of the coin or check constituting the driving means, and a guard to retain the coin or check in the recess during a predetermined period of the wheel's rotation; substantially as described.

9. A clockwork-train, an inlosing casing therefor, a raceway in the casing adjacent to the periphery of a wheel of the train, a coin or check receiving recess in the said wheel's periphery, and an overflow-raceway beyond the receiving position of the recess said overflow-raceway discharging into a pocket outside the casing; substantially as described.

10. A clockwork-train, an inclosing casing therefor, a raceway in the casing adjacent to the periphery of a wheel of the train, a coin or check receiving recess in the said wheel's periphery, an overflow-raceway beyond the receiving position of the recess, and discharging outside the casing, and a by-pass raceway of smaller dimensions than the former and in a direct continuation of the initial path of projection of the coin or check; substantially as described.

11. A clockwork-train, provided with an indicating-dial and time-indicating hands, a casing having a recess within which the indicating mechanism of the train is contained, and a driving-wheel for the train said driving-wheel being of relatively large diameter and located in the main body portion of the casing, said driving-wheel having in its periphery a recess for the reception of a driving coin or check, the weight of the coin or check constituting the driving means; substantially as described.

12. A clockwork-train, an inclosing casing therefor, a raceway in the casing adjacent to the periphery of a wheel of the train, and a coin or check receiving recess in said wheel's periphery, the weight of the coin or check constituting the driving means, and said recess constituting a pocket open at its lower end for the free passage of coins of less denomination than those intended to operate the clock-train; substantially as described.

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

THOMAS DARLINGTON INGRAM.

Witnesses:

JOHN C. PENNIE,

J. MOSES HENSEN.