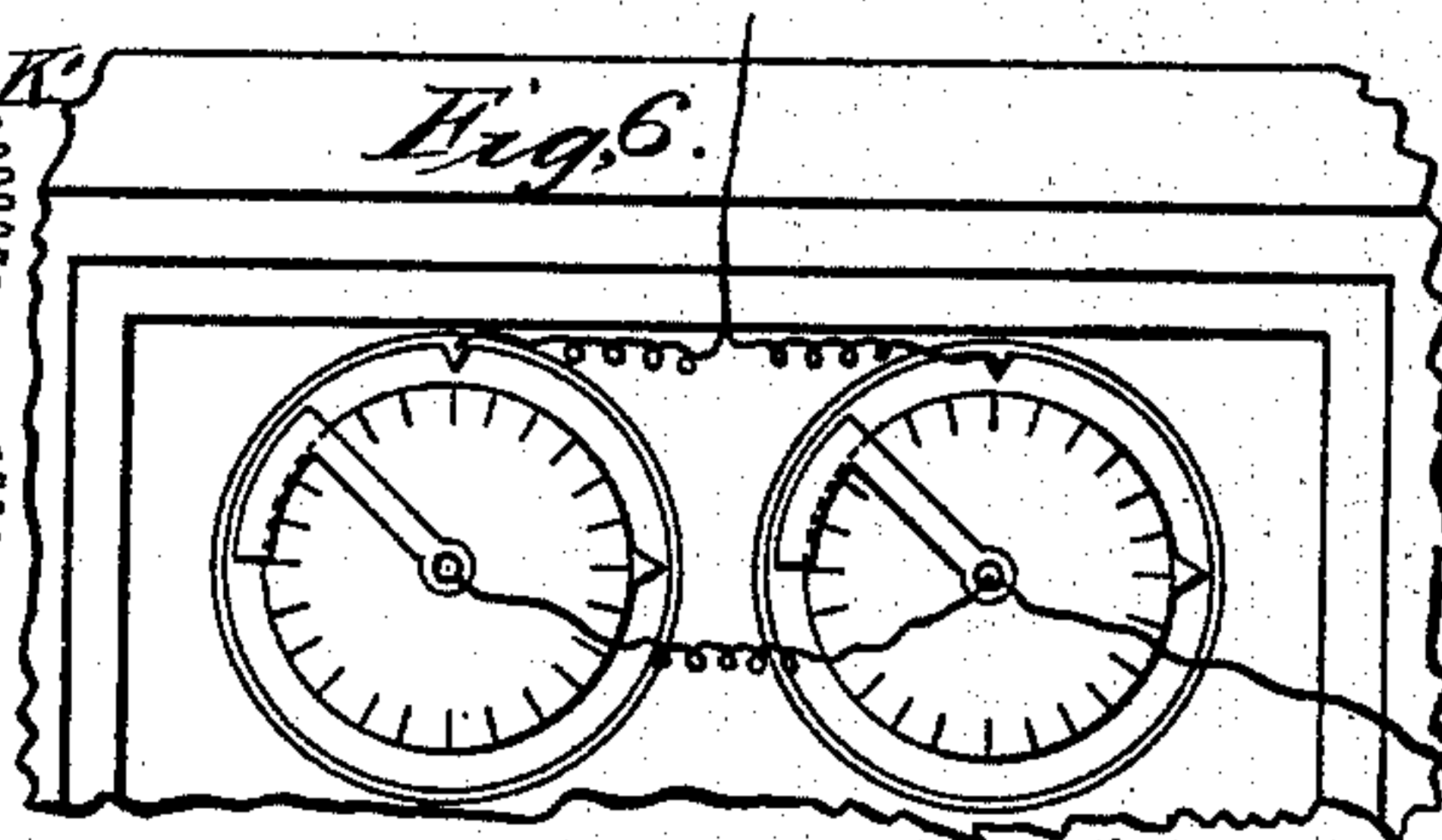
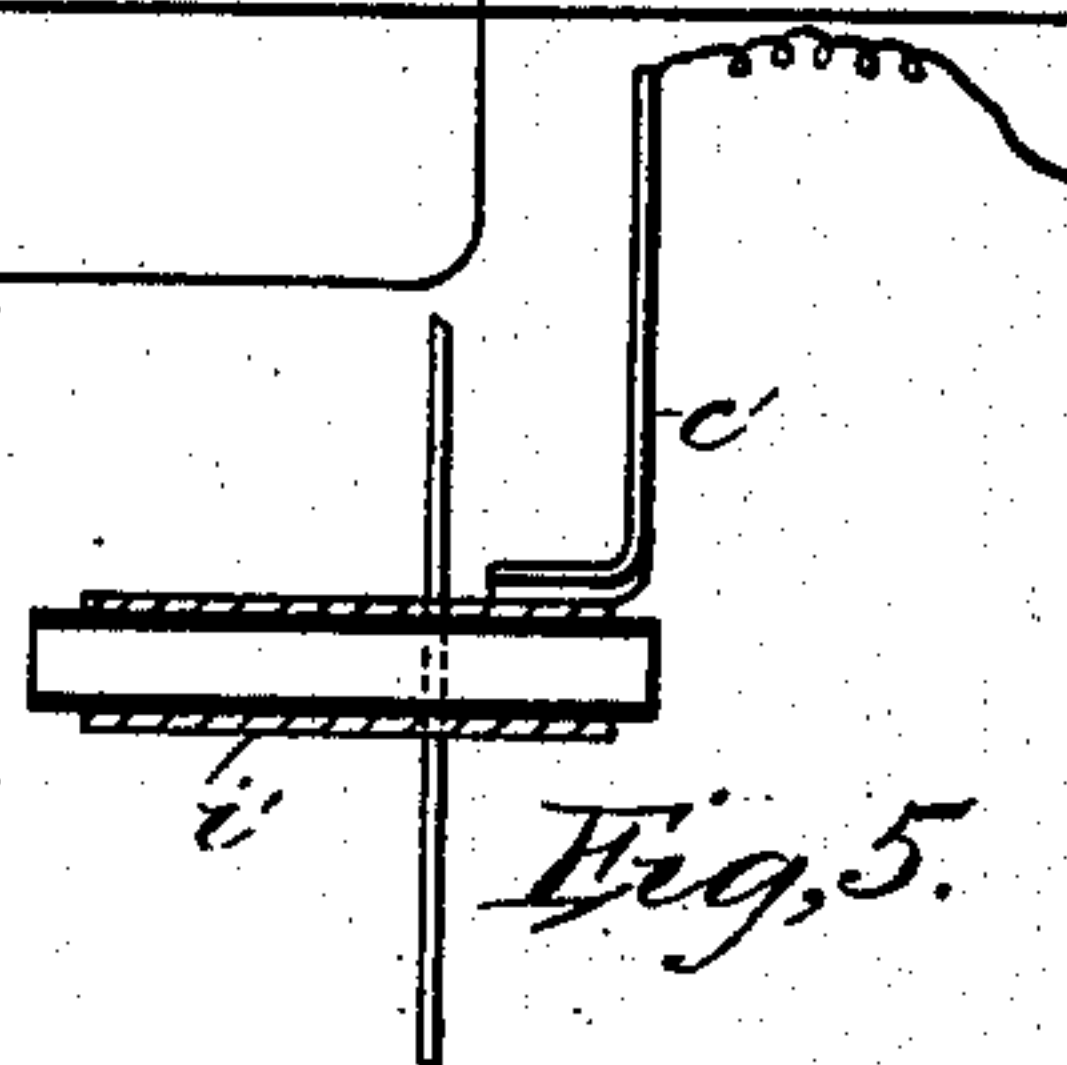
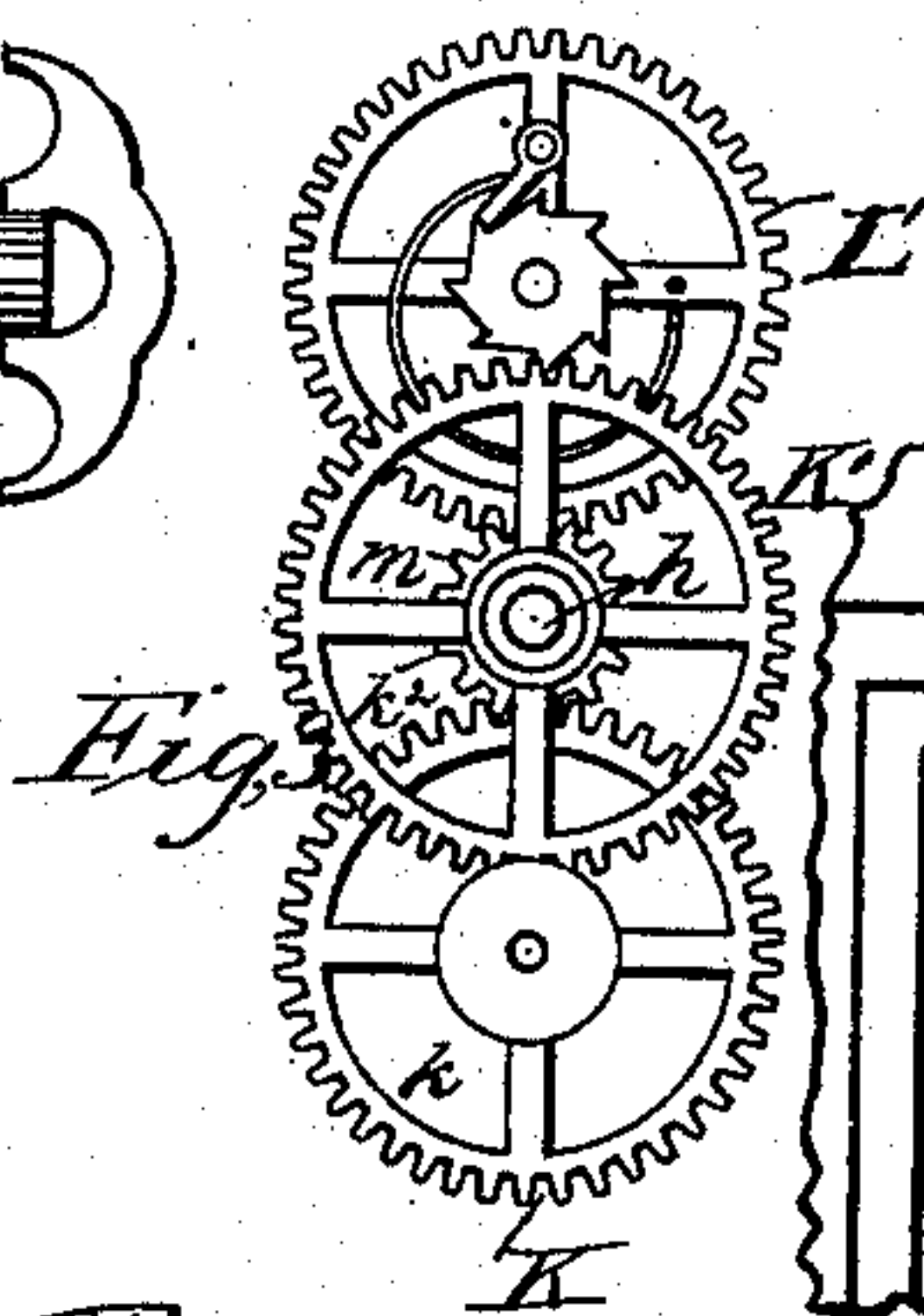
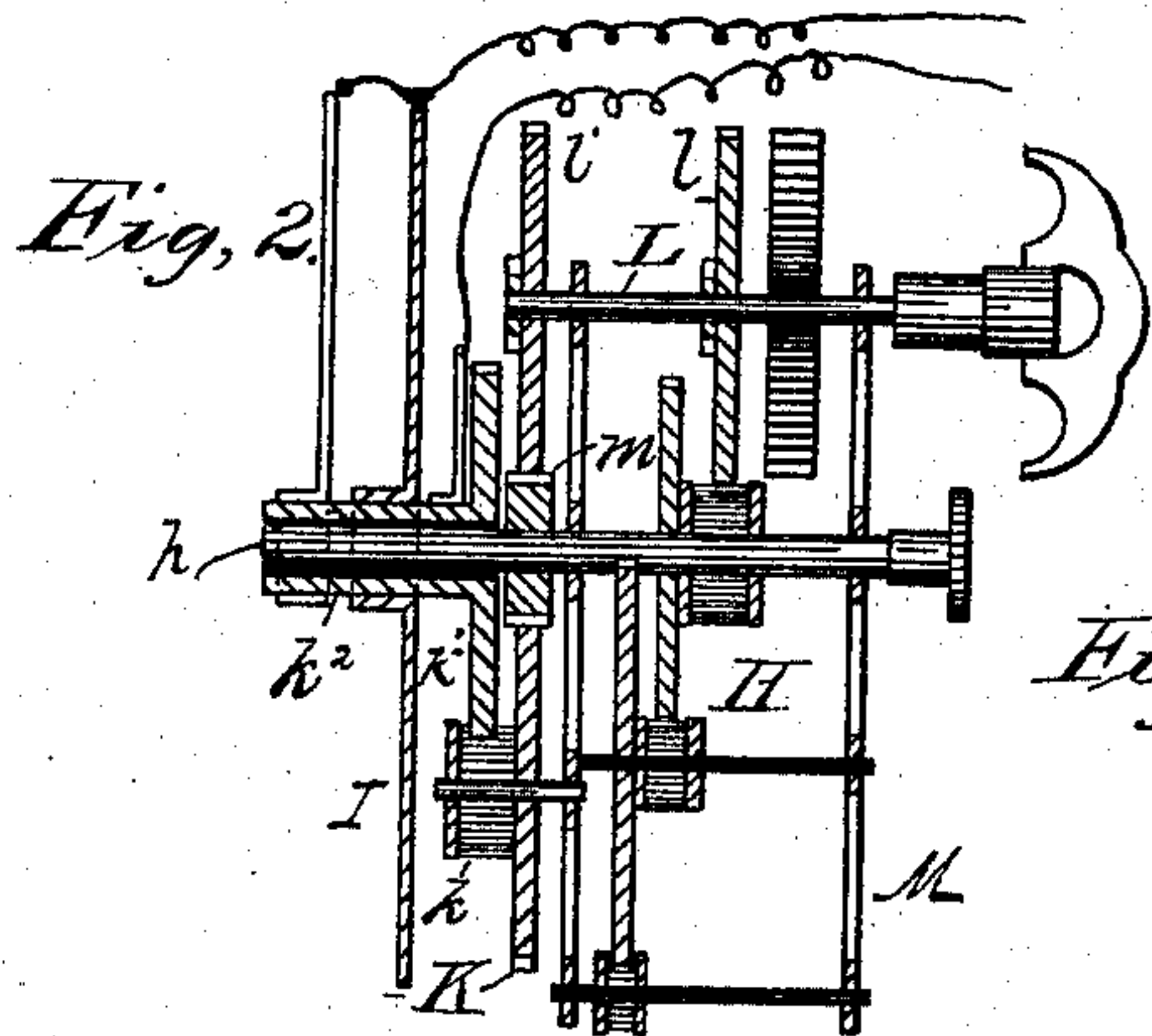
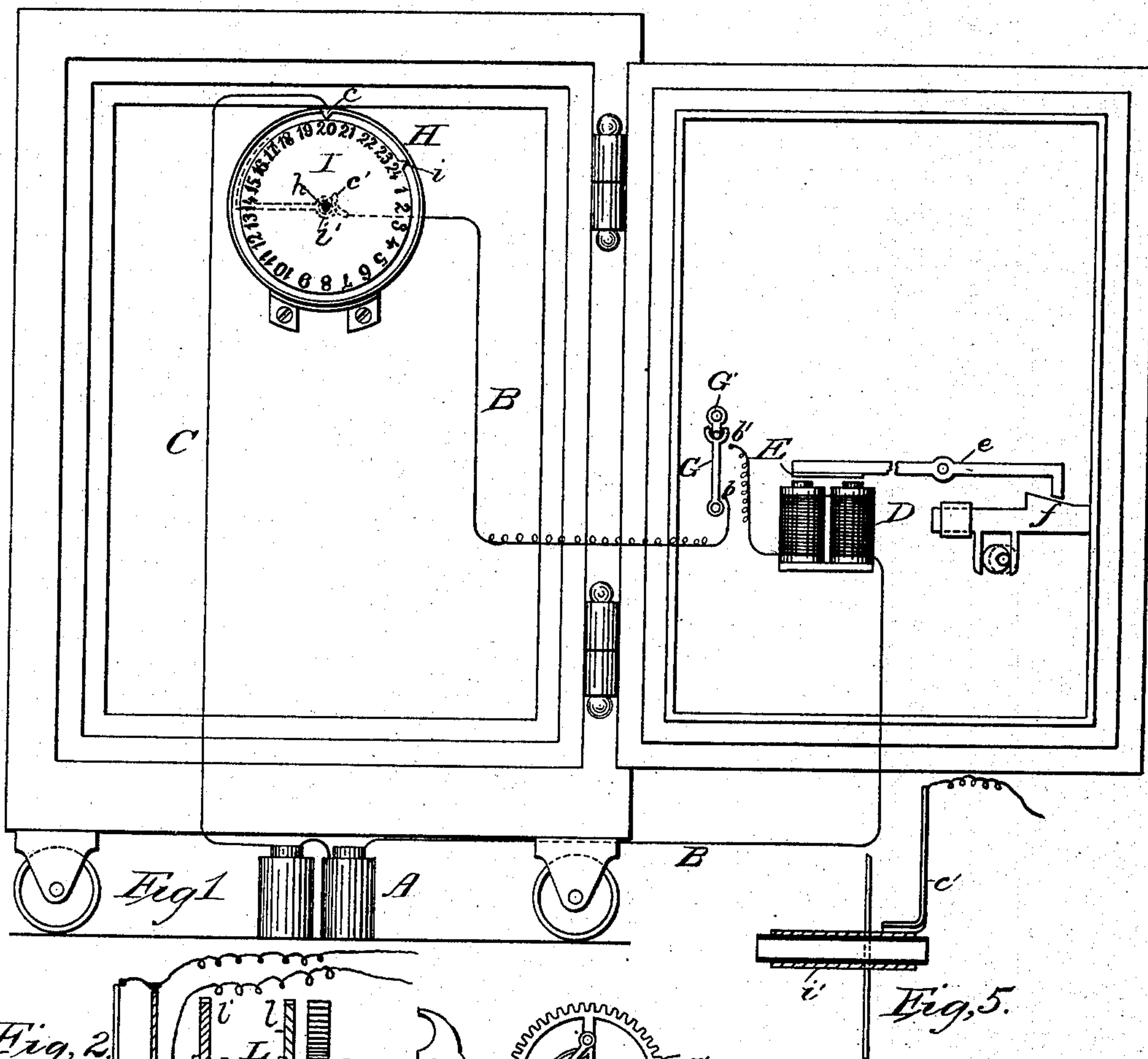


(No Model.)

W. E. PEIRCE.
ELECTRIC TIME LOCK.

No. 322,317.

Patented July 14, 1885.



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UNITED STATES PATENT OFFICE.

WILLIAM EDGAR PEIRCE, OF NEWARK, NEW JERSEY.

ELECTRIC TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 322,317, dated July 14, 1885.

Application filed June 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDGAR PEIRCE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electric Time-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a front elevation of a safe with my invention applied thereto. Fig. 2 is a vertical transverse section of clock mechanism or gearing, dial, and shunt. Fig. 3 is a front elevation of detail of clock mechanism or gearing. Fig. 4 is front elevation of shunt-hand. Fig. 5 is a detail vertical section. Fig. 6 is a front elevation, partly broken away, of a modification.

My invention has relation to that class of time-locks in which the bolt is dogged by a device that is moved out of the way by electro-magnetic appliances which depend for their operation upon the closure of two breaks in an electric circuit, one of said closures being effected automatically at a predetermined period by the time-mechanism or clock-work and the other by a manual switch or make-lever.

My improvements relate to certain details of construction and combinations, hereinafter fully set forth, having reference particularly to the following points or features: first, to the provision of an auxiliary hand or shunt contact-maker which serves to make a temporary contact and closure of one of the breaks in the electric circuit, for a purpose hereinafter more fully described, said hand being adjustable to vary the duration of the temporary shunt; second, to the combination, with the winding mechanism of the clock-work and the dial or setting device, of an intermediate wheel whereby the act of winding also sets the time-dial, or, conversely, the act of setting the dial effects a winding of the clock.

I will premise my description of the construction and operation of my improvements by suggesting that I propose to employ an open-circuit battery for energizing the electro-magnet, and that said improvements have therefore in view the keeping open of the

electric-circuit, except for the momentary or short period during which the lock-bolt is being withdrawn.

Referring to the accompanying drawings, A represents an electric battery or generator the circuit of which is made through wires or conductors B C. D is an electro-magnet in said circuit, and E the armature thereof, which latter is connected in any suitable manner with a latch, bar, or lever *e*, which, when said armature is not attracted, serves to dog or prevent the opening or movement of a lock-bolt, *f*, and which, when said armature is attracted, clears said bolt and permits the latter to be opened or withdrawn. At any convenient point in said electric circuit there are two breaks or separated terminals, one of which is designed to be closed automatically by time mechanism or clock-work, and the other by a manual-switch or contact-maker.

G represents a switch-lever, movable by hand, and serving to complete connection between the terminals *b b'* of wire B. As the time-lock herein described is particularly intended for safes, said lever may appropriately and should be located within the safe, and duly connected with the spindle *G'* of a knob outside the safe, so that by moving said knob the lever will be operated or shifted.

H represents a clock or time mechanism by means of which one of the breaks in the electric circuit is closed.

I is the dial of said clock, carrying an index or pointer, *i*, which, in the revolution of said dial, impinges upon a contact-piece, *c*, which forms one of the terminals of wire C. The other terminal of said wire is a metallic brush or rubber, *c'*, which contacts with the metallic hub *i'* of dial I, the latter being of conducting material and insulated from the clock-work by suitable means. The circuit, when closed, is accordingly as follows: from one of the battery electrodes by wire B to magnet D, to terminal *b'*, thence by lever or switch G to terminal *b*, thence to brush *c'*, through dial and its index to contact-point *c*, and thence by wire C to the other electrode. The two breaks in said circuit exist when the dial-index *i* is away from contact-piece *c* and when lever G does not touch contacts *b b'*. Said dial is connected with and run by the clock-work or gearing H, which may be of any suitable

character, and need not be herein specifically described. The dial is mounted upon the central arbor, *h*, of said clock work or gearing, and is held thereon either rigidly or by a friction tube or clamp, or equivalent means, so that it will turn with said arbor when the latter revolves, and may be moved either backward or forward thereon for setting purposes like the hand of a clock.

Said dial has figures or numbers on its face indicative of its time of revolution. For convenience of illustration, I have shown said dial as having only twenty-four numbers; but in practice I should probably have ninety-six, and arrange the gearing so that the time of travel for the dial would be one hour from one number to the next under a stationary index pointing over said numbers; or, what amounts to the same thing, the dial will make a single revolution in ninety-six hours, the numbers being spaced at uniform distances apart.

The stationary index may be, and in fact is, the terminal *c*. In operation the dial is set back until said stationary index points to the number of hours thereon corresponding to or indicating the time it is desired to have elapse before the automatic circuit shall close, and on the lapse of such period the index-finger *i* on the dial will, by the forward movement of the latter due to the clock-work, come in contact with the terminal *c*, and so close said circuit at this point. Thus, for example, say the safe to which the lock is attached is to be closed at four p. m. of one day, not to be opened until ten a. m. of the next day, or eighteen hours after closing. The dial is set back until the stationary index *c* points to the number 18 on the dial. In eighteen hours' time thereafter the clock-work will have moved the dial forward sufficiently to bring its index *i* into contact with terminal *c*, thus automatically closing one of the breaks in the electric circuit, which remains closed until reset. To close the circuit now, the switch-lever *G* should be moved to close the other break. This completes the electric circuit and causes the magnet to be energized, whereupon its armature is attracted and the latch or dog *e* lifted clear of interference with the bolt *f*, when the latter can be shot back by hand in the usual or any suitable manner.

L represents the winding-arbor of the clock-work, which carries the usual gear-wheel, *l*, meshing with another wheel of the train. I provide this arbor with an additional wheel, *l'*, gearing with a pinion, *m*, on the central arbor, *h*, and meshing with a gear-wheel, *K*, mounted on the frame *M*, and carrying a pinion, *k*, meshing with a wheel, *K'*, on the hub *K*², on which the dial *I* is carried, so that when the clock is wound the dial will be moved backwardly; or, to set the dial, turn the winding-arbor until the stationary index *c* comes over the desired number on the dial. The rotation of said arbor to thus set the dial at the same time winds up the clock-work.

It may be sometimes desirable to open a

safe or to have the opportunity of opening it within a brief period after its regular closing. To effect this, it is necessary to provide means for temporarily closing the break at the terminal *c*, and for this purpose I provide a hand, *N*, held by a friction-tube, like an ordinary clock-hand, on and traveling with the central arbor and in the main electric circuit or forming a temporary shunt thereof. This hand carries at its outer extremity a segmental piece, *n*, of such length that it will take a considerable time—say, several hours—for it to pass a fixed point, such as the contact-piece *c*. On this segment are numbers in arithmetical progression or series from 1 up, rising in value from the left to the right. When the segment *n* is in contact with index *c*, the circuit is closed by way of the latter, the break, however, between terminals *b b'* being still left to be closed by switch-lever *G*. The extent of duration of closure of the shunt-circuit at *c* will depend upon the initial adjustment of the shunt-hand *N*. Thus, if the time desired is one hour, the hand *N* will be set so that the index or contact-piece *c* will point to and rest upon the segment *n* at the number 1. In just one hour's time thereafter the segment will have moved clear of the contact-piece *c*, and circuit will be open by way of or a break will exist at latter, and which will not be closed until the dial-index *i* meets said contact-piece *c*. The distance from one number to another on the segment is that which it will take an hour to pass under the stationary index *c*. Hence, a temporary closure for any period of time in hours corresponding to any number on the segment may be accomplished by setting the shunt-finger *N* with the index *c* pointing to the desired number on the segment.

The battery may be located either inside or outside the safe to the door of which the time-lock is applied. Preferably, it should be placed outside, the conducting-wires leading over the top of the door.

The clock-work may be at any convenient place inside the safe—for example, against the back of the safe.

The most convenient place for the magnet will probably be on the safe-door, on the inside face thereof, and in such convenient relation to the bolt that its armature may have as much movement as it will require to lift the latch or dog *e*.

If desired, two clocks or time mechanisms may be employed, to guard against danger of one stopping, the same and the circuits therefor being shown in Fig. 6.

What I claim as my invention is as follows:

1. In a time-lock having a movable numbered dial for setting the period during which the mechanism is to run before making an electric contact, the combination therewith and with the winding-arbor of the clock-work of an intermediate wheel whereby the act of winding will set the dial, or, conversely, the setting of the dial will cause the clock-work to be wound, substantially as set forth.

2. In time-lock mechanism comprising a rotary or movable electrode, and a fixed or stationary electrode adapted and designed to form contact and close an electric circuit at a predetermined time, the combination therewith of a hand connected with the clock mechanism and movable therewith, said hand being in a shunt of the main circuit, and adapted and designed to form a temporary contact with the fixed or stationary electrode, whereby the circuit may be closed at starting for a temporary or brief period, and automatically opened, substantially as hereinbefore set forth.

3. In time-lock mechanism comprising a rotary numbered dial carrying an electrode or terminal, and a fixed electrode or terminal with which said dial electrode or terminal makes contact at a predetermined time, the combination therewith of a hand in a shunt of the circuit and movable with said dial, and adapted and designed to form contact with said fixed electrode, whereby the circuit may be closed at starting for a period, and be opened automatically at the expiration of such period

by the movement of the shunt-hand away from the fixed electrode, substantially as shown and described.

4. In time-lock mechanism in which an electric circuit is closed at a predetermined period by the contact of two electrodes, one stationary and the other movable, the combination, with the fixed electrode, of an adjustable movable hand in a shunt of the circuit and movable along with the moving electrode in the main circuit, said movable hand having a numbered segment adapted and designed to form temporary contact with said fixed electrode, the duration of such temporary contact being indicated by the numbers on the segment, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of June, 1884.

WM. EDGAR PEIRCE.

Witnesses:

M. D. CONNOLLY,
LISLE STOKES.