(No Model.)

F. LANE.

CIRCUIT CONTROLLING INSTRUMENT.

No. 306,932. Patented Oct. 21, 1884.

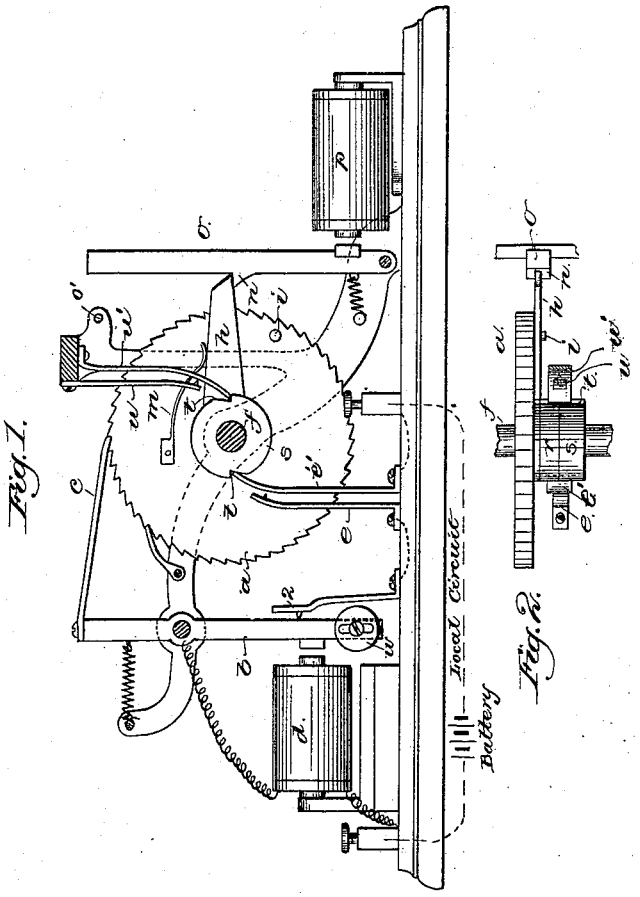

Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

FRED LANE, OF BOSTON, MASSACHUSETTS.

CIRCUIT-CONTROLLING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 306,932, dated October 21, 1884.

Application filed October 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRED LANE, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Circuit-Controlling Instruments, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a circuit-controlling instrument which may be employed in connection with railway-signals, and for other purposes where it is desired to control one electric circuit by another.

The invention consists, essentially, in an electromotor and a stop-arm and detent therefor, combined with circuit-controlling instruments operated by the said motor, whereby the said motor is retained in operation and the circuits controlled by it in a definite condition during a definite period of time after the release of the said motor by its detent, and also for a definite period after its re-engagement by the said detent.

The invention also consists in various details of construction hereinafter specified.

Figure 1 is a side elevation of a circuit-controlling device embodying this invention, a portion of the frame-work being omitted for greater clearness of illustration; and Fig. 2, a plan view of a portion thereof.

The motor by which the circuits are to be controlled consists, essentially, of a ratchet-toothed disk, *a*, adapted to be actuated by an armature-lever, *b*, provided with a spring-pawl, *c*, adapted to successively engage the teeth of the said ratchet and rotate the same as the said armature-lever is vibrated by successive impulses of the electro-magnet *d*, caused by the said lever automatically opening and closing at 2 the circuit of the said magnet, which includes a circuit-closer, *e e'*, controlled by the motor itself, as will be described. The disk *a* is shown as fixed on an arbor or shaft, *f*, which has loose upon it the stop-arm *h*, adapted to have a limited movement on the shaft independent of the disk, but to be engaged with the said shaft or disk at the end of the said movement, it being shown as striking a pin, *i*, on the disk *a*. A spring, *m*, tends to move the arm *h* forward in the direction of rotation of the disk *a* as far as permitted by the pin *i*, and when free from external restraint the said arm *h* will be rotated with the disk *a*, maintaining its forward position under the action of the spring *m*. The end of the arm *h* is adapted to be engaged by a detent, *n*, (shown as a shoulder on the armature-lever *o*) of a releasing electro-magnet, *p*, the circuit of which may be controlled in any suitable manner. The arm *h* has connected with it a hub, *r*, and the disk *a* or shaft *f* has connected with it a similar hub, *s*, which hubs have the same relative movement as the disk and arm, and are each provided with one or more notches, *t*, which coincide in the two hubs when the arm *h* is moved backward from engagement with the pin *i* a certain definite distance in the direction opposite to the rotation of the disk *a*. The said arm and disk are brought into such position with relation to one another by the continued rotation of the disk *a* after the arm *h* is arrested by the detent *n*. The circuit-closer *e e'*, controlling the circuit of the actuating-magnet *d* of the motor, and the circuit-controlling instruments *u u'*, of any desired number, for governing the circuits to be controlled by the apparatus, each have a spring *e'* or *u'* bearing on the surface of both hubs *r* and *s*, and adapted to fall into the notches of the said hubs when in coincidence with one another at the point where they are held by the engagement of the arm *h* with the detent *n*. The circuit-closers *e e'* and *u u'* are in one condition when the spring *e'* or *u'* falls into the coinciding notches of the hubs *r s*, and in the opposite condition when resting on the unnotched portion of the periphery of either of the said hubs, the instrument *e e'* being open in the former condition and closed when in the latter condition, while the other instruments, *u u'*, may be arranged to open or close the circuit controlled by them, as may be desired, it being shown in this instance as adapted to keep the circuit controlled by it open while the motor is in operation and closed while the motor is at rest. The normal condition of the instrument will be with the arm *h* arrested, the disk *a* moved forward with relation thereto, so as to bring the notches of the hubs *r* and *s* into coincidence, and springs *e' u'* of the instrument *e e'* and *u u'* in the said notches, the former then keeping the circuit of the

magnet *d* open, so that it will have no tendency to actuate the motor. When the detent *n* is disengaged by the attraction of the magnet *p*, or otherwise, the arm *h* is immediately thrown forward by the spring *m*, bringing the unnotched portion of the periphery of the hub *r* under the springs *e' w'*, lifting the said springs and reversing the condition of the circuit-controlling instruments *e e'* and *w w'*, and throwing the notches of the hub *r* out of coincidence with those of the hub *s*. The closure of the instrument *e e'* will set the magnet *d* and its armature in operation, causing the disk *a* and arm *h* to rotate, maintaining the same relative position under the action of the spring *m*, and maintaining the said instruments *e' w'* in their reversed condition so long as the said rotation continues.

The armature-lever *o* of the releasing-magnet is shown as adapted to fall back against the stop *o'*, after the arm *h* is released by it, a sufficient distance to move its armature from the range of the attractive force of its magnet, so that it will not be vibrated in case the circuit of the magnet *p* is broken and closed during the operation of the motor. The arm *h*, in its rotation, will first engage the armature-lever *o* above the shoulder *n* and move it up within the range of attractive influence of the magnet *p*, when, if the armature is unattracted, the said arm *h* will be engaged and held by the detent *n*, the notches of the hub *r* being in proper position to receive the springs *e' w'*, but the notches of the hubs *s* not yet being brought to such position, so that the circuit of the magnet *d* will remain closed and its armature will continue to rotate the disk *a* until the said notches are brought into coincidence. If, during this further rotation of the disk *a*, after the arm *h* has been engaged, the detent *n* is again disengaged therefrom, the said arm will spring forward again and will continue turning with the disk *a* for another revolution without restoring the springs *e' w'* to their normal position, and it will be seen that the restoration of the said instruments *e e'* and *w w'* to their normal condition cannot take place until after an interval of time after the engagement of the detent and arm *h*, occupied by the further rotation of the disk *a*, necessary to bring the notches of the hubs *r* and *s* into coincidence. The notches that receive the spring *e'* of the circuit-closer for the motor-actuating magnet will be adjusted to receive the said spring a little later in the rotation of the disk *a* than the other notch or notches receive the springs controlled by them, so as to insure that the rotation of the disk may not be stopped until after it has properly operated all the circuit-controlling instruments governed by it.

The armature-lever *b* may be provided with a weight, *w*, which may be adjustable on it, as shown, to regulate the rapidity of its vibration, and as a consequence the length of time occupied by the rotation of the disk *a*.

I claim—

1. The electromotor comprising a rotary shaft and a stop-arm having a limited movement with relation to the said shaft, combined with a detent for the said arm, and a circuit-closer controlled by the movement of the said arm relative to the said shaft governing the circuit of the motor, substantially as described.

2. The electromotor comprising a rotary shaft and a spring-pressed stop-arm having a limited movement relative thereto, combined with the notched hubs connected with the said shaft and arm, and circuit-controlling instruments operated by the said hubs, substantially as described.

3. The electromotor having a rotary shaft and a stop-arm thereon, combined with the releasing electro-magnet and its armature, constituting a detent for the said arm, the said armature, after releasing the stop-arm, falling out of the magnetic field of its magnet and being restored thereto by the stop-arm, substantially as described.

4. The electromotor comprising a rotary shaft and stop-arm having a limited movement relative thereto and a detent therefor, combined with the notched hubs connected with the said arm and shaft, and the circuit-controlling instrument for the circuit of the motor, operated by the said hubs, as described, whereby the motor is stopped at the end of a definite amount of movement after the stop-arm has been arrested by its detent, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRED LANE.

Witnesses:
JOS. P. LIVERMORE,
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