(No Model.) 2 Sheets—Sheet 1.

O. GASSETT.

RAILWAY SIGNAL.

No. 294,030. Patented Feb. 26, 1884.

Fig. 1.

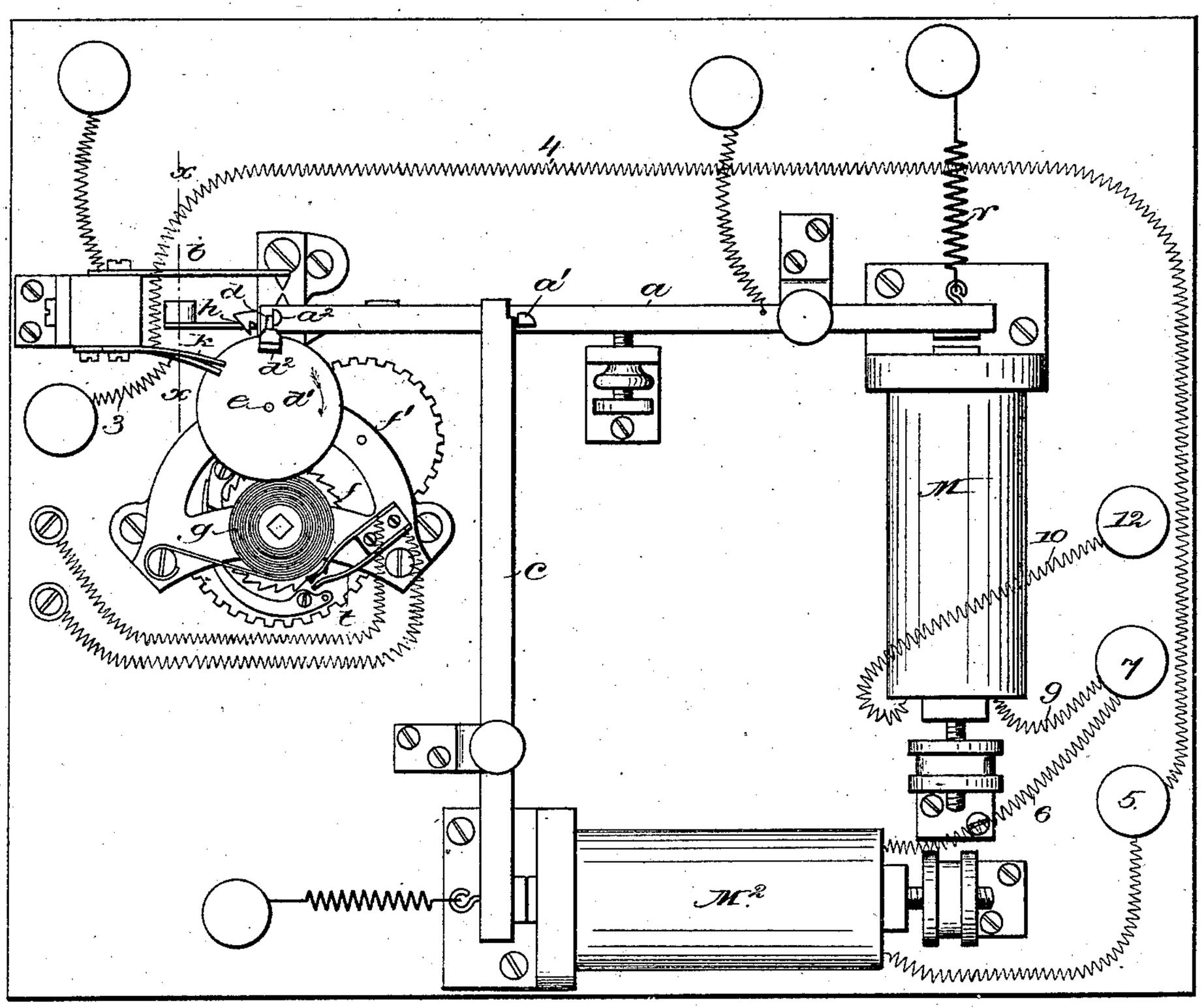
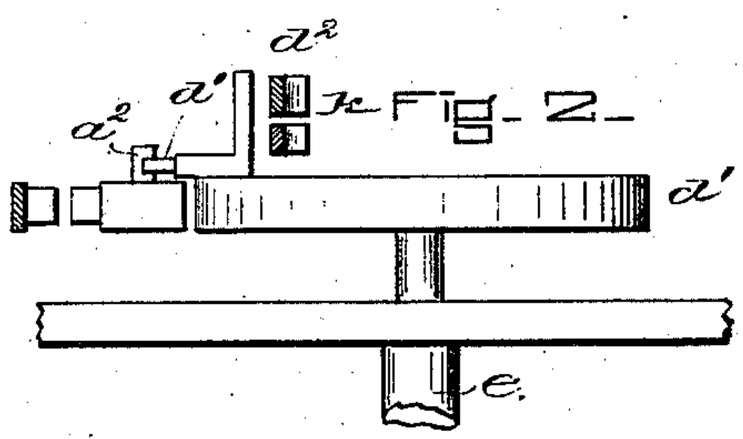


Fig. 2.



WITNESSES
A. O. Orne
John F. C. Pfünkert

INVENTOR
Oscar Gassett.
By Crosby & Gregory
Attys

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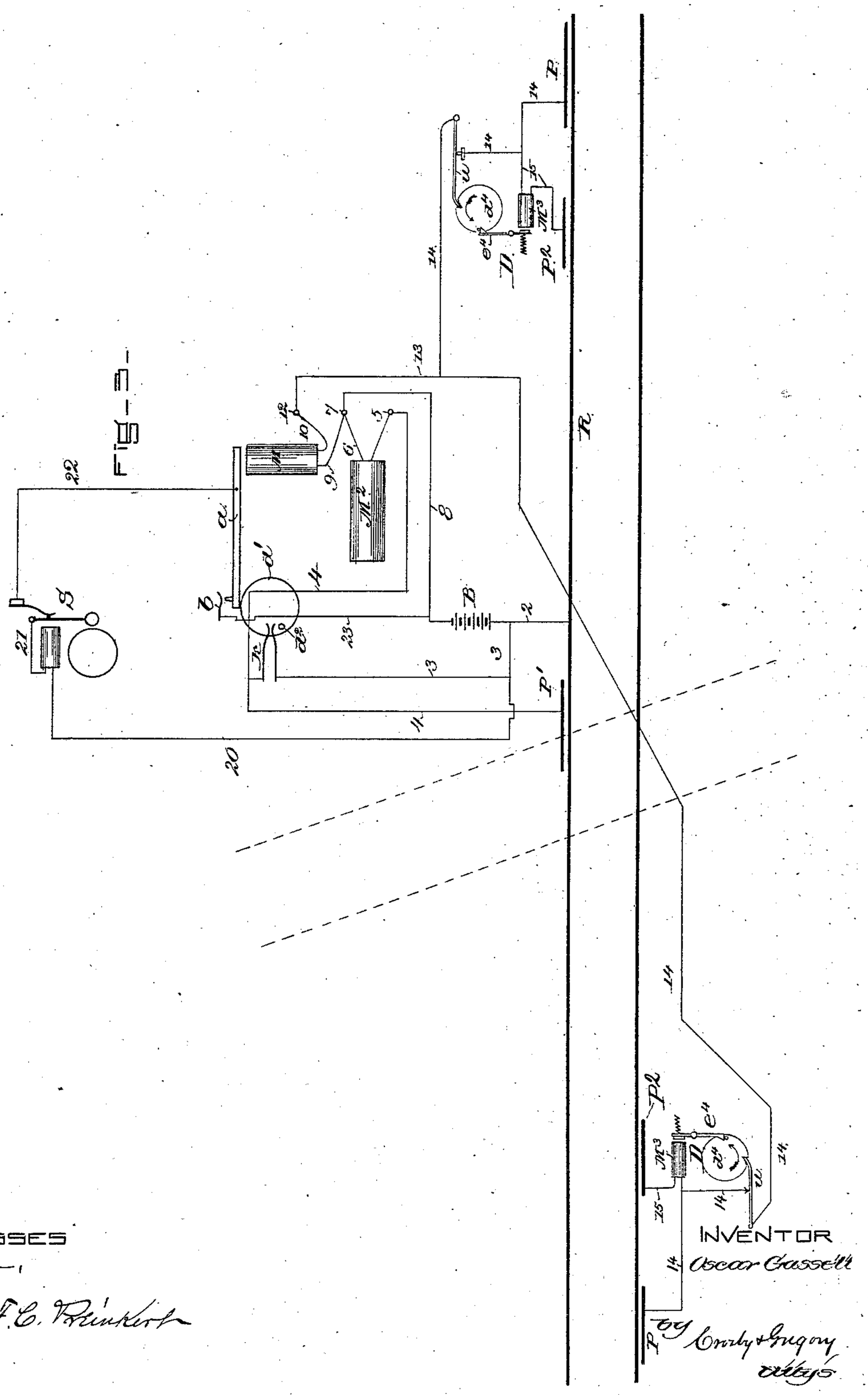

WITNESSES
A. O. Orme,
John F. C. Rinkerhoff

INVENTOR
Oscar Gassett
by Crosby & Gregory
Attys

UNITED STATES PATENT OFFICE.

OSCAR GASSETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF PITTSBURG, PENNSYLVANIA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 294,030, dated February 26, 1884.

Application filed June 6, 1883. (No model.)

To all whom it may concern:

Be it known that I, OSCAR GASSETT, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Railway-Signals, 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 railway-signal apparatus by which a signal is automatically displayed or sounded at a highway-crossing on the approach of a train. In automatic crossing-signals, when the signal is set in operation by a train at a distance from the crossing, it sometimes happens that the train stops before reaching the crossing or turns aside upon a branch track, and this might leave the signal in continuous operation, as the said train would not arrive at the crossing or point where the signal is usually automatically stopped by the passage of the train.

The present invention consists, mainly, in the combination of a signal and means to automatically set it in operation by an approaching train with a mechanically-operated signal-stopping device, by which the signal is automatically stopped after a definite interval of time, without regard to the further movements of the train by which the signal was set in operation. The signal is also stopped automatically by the train upon arriving at the crossing, and the mechanical stopping device is arranged to run a longer time than is usually occupied by the train in passing from the point where it sets the signal in operation to the crossing, so that the signal will generally not be stopped until the train arrives. The signal is shown in this instance as a vibrating gong, the circuit of which is closed by an electro-magnet or relay, which will be called the "starting-magnet," and which is itself controlled by instruments operated by the train approaching the crossing when at a considerable distance therefrom, so as to afford a sufficient warning. The signal-circuit, when closed by the movement of the armature of the relay when the circuit of the latter is momentarily changed from its normal condition, is retained closed by the armature of a second magnet—which will be called the "signal-stopping magnet"—engaging the armature of the starting-magnet and retaining it in the position in which it was placed by the momentary change of condition of its magnet. As herein shown, the circuits of both magnets are normally open, and when the armature of the starting-magnet is attracted the armature-lever of the stopping-magnet is moved by its retracting-spring to engage and hold the armature-lever of the starting-magnet in its attracted position. The starting-magnet, besides closing the signal-circuit and setting it in operation, also releases a mechanical motor or clock-work adapted to run with regulated speed, which, after a definite interval of time, closes the circuit of the stopping-magnet, causing it to release the armature-lever of the starting-magnet, which is then moved by its retractor to break the circuit of the signal and cause it to cease operating, or, if a visual signal is employed, to be concealed or assume the safety position. The circuit of the stopping-magnet also contains a circuit-closer operated by the train arriving at the crossing, causing it to stop the signal, as before described, and this operation usually takes place before the motor operates to stop the signal.

The apparatus is shown as applied to a single-track road, and devices are placed in the circuit of the starting-magnet between the point at which the train closes the said circuit and the crossing, the said devices being adapted to keep the circuit open for a definite interval of time, and being controlled by the trains, so that a train moving away from the crossing first operates the said device, which will then keep the circuit open until the train passes the closing-point, so that the train moving away from the crossing will not affect the starting-magnet to set the signal in operation.

Figure 1 is a plan view of the signal-controlling apparatus; Fig. 2, a detail showing a portion thereof in end elevation and partial vertical section, on a larger scale; and Fig. 3, a diagram illustrating the circuits.

The operation of the signal shown in Fig. 3 at S (it being located near the highway-crossing or other point at which it is desired to in-

dicate that a train is approaching) is controlled by the armature-lever *a* and co-operating contact-point *b* of the signal-starting electric magnet M, shown in this instance as in a normally-open circuit, provided with a circuit-closer, shown in Fig. 3 as consisting of a bar or plate, P, placed at the side of the rail, and adapted to be connected with the rail by the wheels of the train. The said armature-lever *a* is provided with a projection, *a'*, (see Fig. 1,) adapted to be engaged by the armature-lever *c* of the stopping-magnet M^2, which thus mechanically retains the said armature-lever *a* in its attracted position, keeping the circuit of the signal closed between it and the contact-point *b*. The said armature-lever *a* also constitutes or is provided with a stop, a^2, which, when the said lever is retracted, engages a projection, *d*, of a disk, *d'*, connected with the arbor *e* of one of the wheels of a motor or train of wheel-work, *f f'*, actuated by a spring, *g*, and controlled by a fly or pendulum, *h*, the said motor being released and beginning to operate when the armature-lever *a* is attracted by the magnet M. The said disk *d'* is also provided with a lateral projection, d^2, which, in the rotation of the said disk in the direction of the arrow caused by the motor, operates a circuit-closer, *k*, in the circuit of the magnet M^2, the said circuit-closer consisting of two springs insulated from one another, except when electrical connection is made between them by the projection d^2.

The circuits are as follows: One pole of the battery B is connected by wire 2 with one of the rails R of the track, and is also connected by wire 3 with one of the springs of the circuit-closer *k*, the other of which is connected by wire 4 with the binding-screw 5, connected with one terminal of the magnet M^2, the said wire 4 being also connected with the contact-plate P' at the side of one of the rails R of the track, near the crossing. (Indicated in dotted lines, Fig. 3.) The other terminal of the magnet, M^2, is connected by wire 6 with the binding-screw 7, connected by wire 8 with the other pole of the battery, and also by wire 9 with one terminal of the magnet M, the other terminal of which is connected by wire 10 with the binding-screw 12, itself connected by wire 13 and branches 14 therefrom with the plates P at the side of the track and at a distance from the crossing sufficient to give ample warning of an approaching train. One pole of the battery B is also connected by wire 20 with one terminal of the magnet of the signal S, the other terminal of which is connected by wires 21 and 22 with the armature-lever *a*, the co-operating contact-point *b* of which is connected by wire 23 with the other pole of the battery B.

In operation, the wheels of a train approaching the crossing, upon arriving at one of the plates P, completes the circuit R 2 B 8 7 9 M 10 12 13 14 P, causing the current of the battery B to pass through the magnet M, making it attract its armature, which thus closes the circuit *a* 22 21 20 B 23 *b* of the signal S, causing the said signal—which is in this instance shown as a vibrating gong—to sound, or it might cause a visual signal to be displayed, or both. The same movement of the armature-lever *a* which sets the signal in operation also releases the motor and permits the disk *d* to revolve, as before described. If the train continues onward to the crossing in the usual manner, it will, on arriving at the plate P', close the circuit R 2 B 8 7 6 M^2 5 4 P' of the stopping-magnet M^2, causing the latter to attract its armature, and by the movement of the armature-lever *c* to release the armature-lever *a* of the starting-magnet M, which will be moved by its retractor, shown as a spring, *r*, to the position shown in Fig. 1, thus breaking the circuit of the signal S at *a b*, and also bringing the stop projection a^2 into position to arrest the movement of the disk *d'* after it has made one revolution.

In case the train should stop or leave the track R to enter upon a branch before arriving at the crossing, the disk *d'* will, in its rotation caused by the motor, close at *k* the circuit B 3 4 5 M^2 6 7 8 of the stopping-magnet M^2, causing it to attract its armature-lever *c*, to thus release the armature-lever *a* and stop the signal, as before described; and it will be seen that either the circuit-closer *k* or the circuit-closer P' R, with the wheels of the train, will cause the signal to stop, so that it can never operate longer than the time occupied by the projection d^2 in reaching the circuit-closer *k*, or after the train has arrived at and passed the crossing.

When the signal is to be used with a double-track road, one of the plates, P, will be used with each track, and a plate, P', with both tracks. When the apparatus is employed with a single-track road, a branch, 15, from the wires 14, forming a portion of the circuit of the starting-magnet, will include a magnet, M^3, of a circuit-controlling device, D, controlled by the wheels of the passing train, and adapted to keep the circuit open after the train has passed for a definite interval of time more than sufficient to enable the train to pass the plate P, so that, although the plate P and rail R will be connected, the circuit of the magnet M will not be completed.

The device D consists, essentially, of a circuit-breaker, *u*, in the circuit-wire 14 of the magnet M, the said circuit-breaker being controlled by a disk, d^4, operated by a mechanical motor or clock-work, (not shown,) the said disk being stopped by the armature-lever e^4 of magnet M^3 in the branch 15 from the wire 14, that is connected with a plate, P^2, at the side of the track, between the plates P P' and within a short distance of the former. Thus, when a train moves from the plate P' toward the plate P, in moving away from the crossing it first closes at P^2 the circuit from the battery B through the wires 8, 9, 10, 13, 14, 15, and 2,

through both magnets M and M³, and the resistance of the said magnets to the current strength of the battery B is so proportioned that the current passing through both the said magnets will attract only the armature of the magnet M³, releasing the disk d^4, which begins to be rotated by the motor, and immediately raises the spring *u*, breaking the circuit in the wire 14, so that the train, on proceeding over the plate P, does not affect the closure of the circuit of the magnet M.

The motor that operates the disk d^4 will cause the said disk to occupy a greater time in making one rotation, so as to permit the spring *u* to again drop, than is occupied by any train in passing from the plate P² over and beyond the plate P.

As only a momentary impulse is required to operate the armature-lever *a*, the circuit-controlling device D will have no effect on the signal when trains are moving toward the crossing.

It is obvious that, if desired, both the magnets M M² might be in a normally-closed circuit, they being operated in any case by momentary changes in the condition of the circuit.

The frame-work of the signal-stopping motor is shown as provided with a circuit-closer, *t*, operated by the coils of the main spring *g* to close a local circuit, and thus indicate when the spring of the said motor needs rewinding.

I claim—

1. The starting-magnet and its armature, combined with the stopping-magnet and its armature controlling the said starting-magnet armature, and the mechanical motor controlled by the starting-magnet, and adapted to operate a circuit-controlling instrument in the circuit of the stopping-magnet, substantially as described.

2. The starting electro-magnet and armature and the stopping electro-magnet and its armature controlling the armature of the starting-magnet, combined with a mechanical motor controlled by the starting-magnet, and circuit-controlling instruments for the starting-magnet operated by passing trains, and circuit-controlling instruments for the stopping-magnet operated by the trains and by the said motor, substantially as described.

3. The signal and its co-operating starting and stopping electro-magnets operated by a momentary change in the condition of the circuit, combined with circuit-controlling instruments for the said magnets and an independent intermediate circuit-controlling device for the starting-magnet, all controlled by passing trains, substantially as and for the purpose described.

4. The starting electro-magnet and armature and signal controlled thereby, combined with the mechanical motor having a regulated time-movement when in operation, controlled by the said magnet, and adapted to cause the signal to cease operating at the end of a definite interval of time after it is started by the said magnet, substantially as described.

5. The signal and its starting electro-magnet and circuit thereof, containing a circuit-controlling track-instrument, and a circuit-controlling instrument and mechanical motor for actuating it, combined with an electro-magnet and its armature controlling the said motor, and provided with a circuit-controlling track-instrument near that of the starting-magnet, whereby trains moving in one direction will cause the release of the said motor, which will remove the starting-magnet and signal from the control of its track-instrument while the motor remains in operation, substantially as described.

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

OSCAR GASSETT.

Witnesses:
JOS. P. LIVERMORE,
W. H. SIGSTON.