No. 618,604. Patented Jan. 31, 1899.

E. A. HOLLAWAY.

SIGNAL CONTROLLING TRACK INSTRUMENT.

(Application filed Apr. 14, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

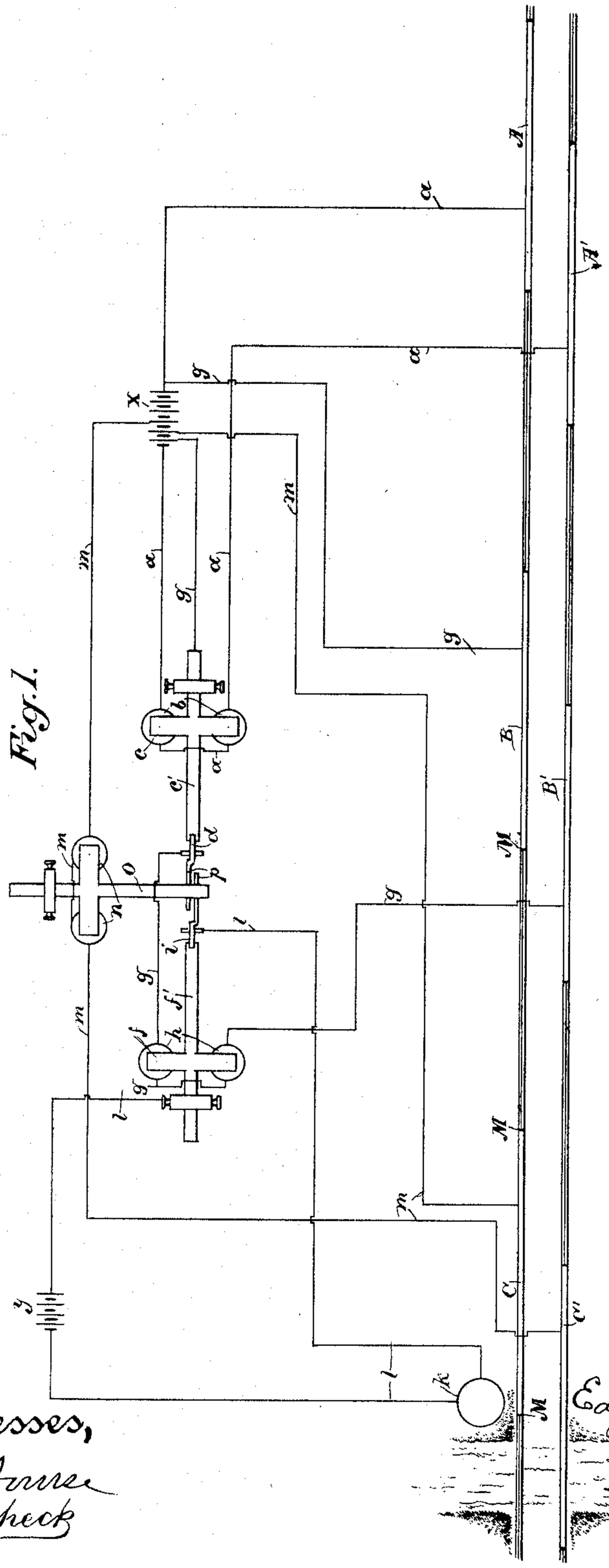

Fig. 2.

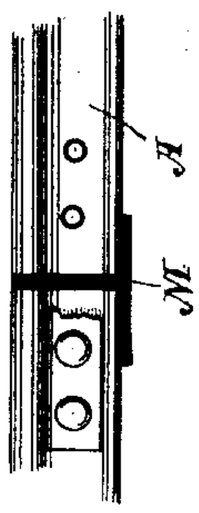

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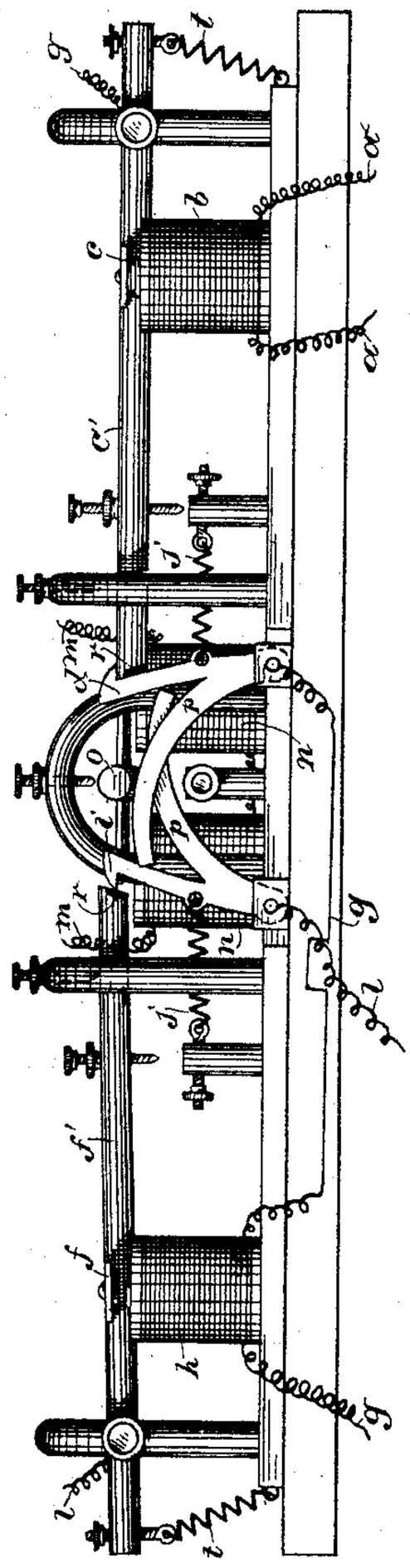
Fig. 3.



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UNITED STATES PATENT OFFICE.

EDGAR A. HOLLAWAY, OF GILROY, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRANK U. REEVE, OF SAN JOSÉ, CALIFORNIA.

SIGNAL-CONTROLLING TRACK INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 618,604, dated January 31, 1899.

Application filed April 14, 1898. Serial No. 677,588. (No model.)

To all whom it may concern:

Be it known that I, EDGAR A. HOLLAWAY, a citizen of the United States, residing at Gilroy, county of Santa Clara, State of California, have invented an Improvement in Signal-Controlling Track Instruments; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus which is designed to signal the approach of trains at any desired point by the action of the approaching train; and it consists in the parts and the constructions, arrangements, and combinations of parts hereinafter described and claimed.

Figure 1 is a diagrammatic plan view of my device. Fig. 2 is a detail of the rail-insulating means. Fig. 3 is a front elevation of the instrument used in connection with the device.

The object of this device is to provide a means for giving a signal such as is required when trains approach railroad-crossings or other points where it is desirable to notify a distant point of the approach of the train. The instrument by which this object is accomplished may be set at any desired point with relation to the point where the signal is to be operated, and the connections are made by wires from the instrument to the signal and also to the point in the line of the track which corresponds with the position of the train when the signal is to be operated. The track is divided into insulated sections A A′ B B′ C C′. The insulation between the ends of the rails is accomplished by any suitable or well-known method, such as is shown at M in the enlarged figure, showing the meeting ends of two rails. These joints in the track stand with such relation to each other that when the train is approaching it will contact with the sections A and A′ simultaneously, thus making the connection between these two rails through the wheels and axles of the train. It will again produce the same connection when it arrives at the rails B B′ and again when it arrives at the rails C C′, thus making three successive contacts, each of which produces a certain result, as will be hereinafter described.

A battery or source of electrical energy is represented at X, and it may be situated at any suitable or desired point with relation to the remainder of the apparatus, the connection by wires allowing of such location as may be preferred. The instrument employed consists of a base-plate or support of any description having mounted upon it the independent electromagnets *b*, *h*, and *n*. The wires *a* lead from the track-section A to the battery X, thence to the electromagnet *b*, thence returning to the track A′, so that whenever the train passes over these two parts A and A′ of the track the circuit will be completed through the wheels and axles of the train, as before described, and at other times the circuit will be broken. An electromagnet *b* has an armature *c*, which is attracted by the magnet whenever the latter is energized. This armature *c* is connected with a fulcrum bar or lever *c*′. This arm extends across the line of the attraction of the magnet, being fulcrumed at one end and having the other end so formed as to engage with a latch *d*, so that when the bar is drawn down to engage with this latch a metallic contact is produced through the fulcrum-standard of the bar, the bar itself, and the latch *b*, for a purpose to be hereinafter described. As soon as the train reaches the section B B′ another connection is completed through the wheels of the train and through the wires *g*. One of these wires connects with one of the rails B, extends thence to the battery X, thence through connections, hereinafter described, to the electromagnet *h*, which may be fixed upon the same base or support with the magnet *b*, thence returning through the latch, lever, and standard of the magnet by reason of the metallic circuit previously established by the energizing of the said magnet *b*, and to the opposite rail B′, so that when the train passes over this section subsequent to passing over the section A A′ the circuit will be completed through the magnet *h*. This magnet has an armature *f*, mounted upon a fulcrum-bar *f*′ in the same manner as is described for the bar *c*′. This bar has its movable end adapted to engage a latch *i*, similar to the latch *d*, previously described. When this is

done, there will be a metallic connection through the fulcrum-standard of the bar f', and thence through the bar and through the latch i. This completes this portion of a circuit, the remainder of which is completed by the wires l, extending from the latch i, which engages the bar f either to a battery X, previously described, or to another battery y, as here shown, thence to the electrically-actuated bell or signal k, and thence returning to connect with the fulcrum-standard of the lever-arm f'. The signal thus set in operation will continue to sound until the train reaches the insulated section C C′ of the track, which has connections for the purpose of stopping the signal. This consists of an electromagnet m, having an armature mounted upon a bar o, which is fulcrumed in a standard, so that this bar extends transversely across above the magnet m, and when the magnet is energized the armature will be drawn down and with it the bar o. The free and movable end of this bar projects transversely across between the two latches d and i. Each of these latches has an arm p, projecting so that they cross each other at an angle, and the bar o normally stands just above this angle of crossing. When the magnet m is energized and the bar o is drawn down, it presses upon these angular crossing bars p, and thus simultaneously draws the latches d and i inwardly until the bars c' and f' are disengaged from the lever-arms c and f. As the magnets are no longer energized these bars and the armatures are then thrown upward by the action of springs t, connected with the bars in any suitable or desired manner.

The latches d and i have springs j connected with them, which when the bars with which they are to engage are depressed will pull the latches into engagement with the bars. The tension of these springs is light, and when the bar o is drawn down across the angular bars p it overcomes the tension of these springs and draws the latches backward simultaneously, so as to disengage them from the bars c f, as previously described. When the bars have risen to the limit of their movement, which is not great, the points of the latches d and i then rest against an insulated section r, which is fixed into the end of each of the bars c' f', so that the latches will rest against these insulated pieces and will thus prevent any current of electricity passing through the apparatus while the parts remain in this position. The magnet n is energized, as before stated, when the train crosses the track-sections C C′. One of these track-sections has the wire m connected with it, passing thence to the battery X, thence through the magnet n, and thence returning to the track C′, through which the circuit is completed by the passing train.

The detailed operation of the devices is substantially as follows: When the train reaches the section A A′ of the track, the circuit through the wires a and the battery X is closed, thus energizing the magnet b and attracting its armature, and the bar c' is drawn down and its end engaged with the latch or hook d. Any train which has passed in the opposite direction will have left this bar c' latched in the same manner, as will be hereinafter described. When the train reaches the section B B′ of the track, it closes the circuit through the wires g, battery X g, the bar c' and the hook d, magnet h, and wire g to B′, and this energizes the magnet h, and its armature f, acting upon the bar f', draws it downward until its end engages with the hook i, and thus closes the circuit through the wires l to the signal k, through the battery y, back through the other wire l to the post of the bar f', and thence back through the hook i, and the circuit thus completed will operate the signal at k. When the section C C′ is reached by the train, the circuit is closed through the wire m to the magnet n, through m to the battery X, and thence through the wire m to the opposite rail. The energizing of the magnet n causes the bar o to be drawn down by the action of the armature of this magnet, and its outer end pressing upon the curved extensions p of the hooks d i will act to draw the hooks toward each other, and thus the hooks or latches are disengaged from the bars c' and f'. This action breaks the circuit through the wires l by the releasing of the bar f' from the hook i. Through the releasing of the bar c' the magnet h is deënergized, and so all the parts are returned to their normal condition. After the train has left the rails C C′ the circuit through the magnet n is again opened. The bar o will be thrown up by the action of its spring, thus allowing the hooks d i to be pulled outwardly by their springs i, and as the bars c' and f' have already been raised until the non-conducting part r is in line with the hooks these hooks will contact with these non-conducting portions, as shown by the position of the hook i in Fig. 3. When a train from the opposite direction reaches C C′, it will only energize the magnet n, and its bar o will be drawn down by the action of the armature; but as the hooks d and i are already withdrawn the action of the bar o upon the curved arms p will not be such as to affect these parts. When this train reaches the sections B B′ of the rails, the circuit will be closed through the wires g and the battery X, thence to the post of the bar c'; but as c' is not now in metallic contact with the hook d the circuit will be interrupted. When the train reaches the sections A A′ of the track, the magnet b is energized and will pull the bar c' down and cause it to interlock with its hook d. In this position when the next train arrives, so as to first contact with the rails A A′, the bar c' will already be in position to close the circuit through the wires g g' and the magnet h.

This apparatus is designed to signal trains approaching from one side of the crossing; but it will be obvious that it may be dupli-

cated to signal trains approaching from the other side by using the same instrument and batteries, as may be desired.

Whenever a train leaves a crossing, passing away from it, it will not sound the signal, because it is necessary in order to make the complete connection for the signal that the train first pass over the sections A A′ to energize the magnet *b* and complete a metallic connection through its lever arm and latch and then over the section B B′ of the track to energize the magnet *h* and produce a like connection for the signal-circuit.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a signaling apparatus for trains, a device for actuating and controlling signals consisting of electromagnets, insulated sections of track, a battery and wires connecting the insulated sections successively with the two magnets, armatures mounted upon fulcrum lever-arms so that said arms are drawn downward when the magnets are energized, latches adapted to engage said bars when they are drawn downward and to form a metallic communication through them, a bell or signal with wires connecting it with the standard and the latch of the second of the two magnets whereby the signal is sounded when the second magnet is energized and the latch connection made.

2. In a device for signaling the approach of trains, the electromagnets having armatures, fulcrumed bars to which said armatures are fixed, spring-pressed latches adapted to engage the ends of said bars and form a metallic connection therewith when the magnets are energized, so as to draw said bars into engagement with the latches, a signal and electrical connections whereby it is operated, said connections being completed when the two armature-carrying bars have been latched, insulated track-sections over which the train passes successively so that the first electromagnet is energized and its bar latched to produce a connection through which the second electromagnet is energized when the train passes over the subsequent insulated track-section.

3. An apparatus for signaling the approach of trains consisting of electromagnets with armatures, latches, and latch-bars, insulated track-sections, battery and connecting wires as described, and a means for restoring the parts to their normal position after the train has passed, consisting of an electromagnet with an armature mounted upon a fulcrumed movable bar, disengaging-arms connecting with the latches of the first-named magnets, said arms being acted upon by the movable bar of the disengaging-magnet, and wires connecting with independent insulated track-sections and a battery whereby the disengaging-magnet is energized.

4. In an apparatus of the character described, insulated track-sections over which the train passes successively, wires connecting said track-sections with a battery and with electromagnets which are successively energized by the passage of the train, latches whereby metallic connection is made through said magnets, one after the other, an electrically-controlled signal apparatus which is energized after the second electromagnet has been energized and its connections made, a third electromagnet and a disengaging-bar actuated thereby, wires connecting said magnet through a battery with a third set of insulated track-sections so that a train passing over said track-section will energize the magnet, said bar acting to disengage the latches of the two first-named magnets and restore the parts to their normal condition.

In witness whereof I have hereunto set my hand.

EDGAR A. HOLLAWAY.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.