

WARNER & ODELL.

Improvement in Electric Railway-Signals.

No. 130,612.

Patented Aug. 20, 1872.

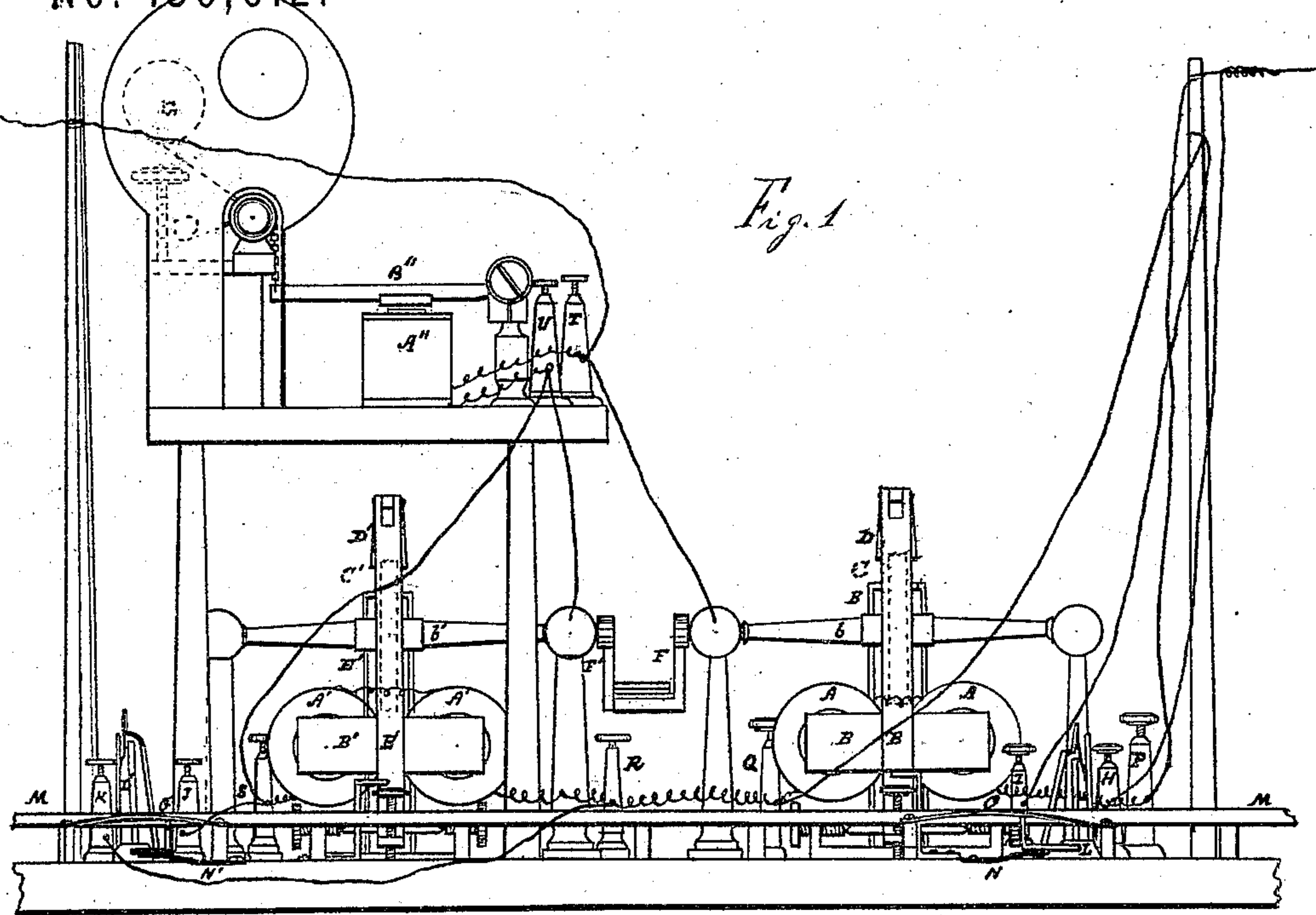


Fig. 1

Fig. 3

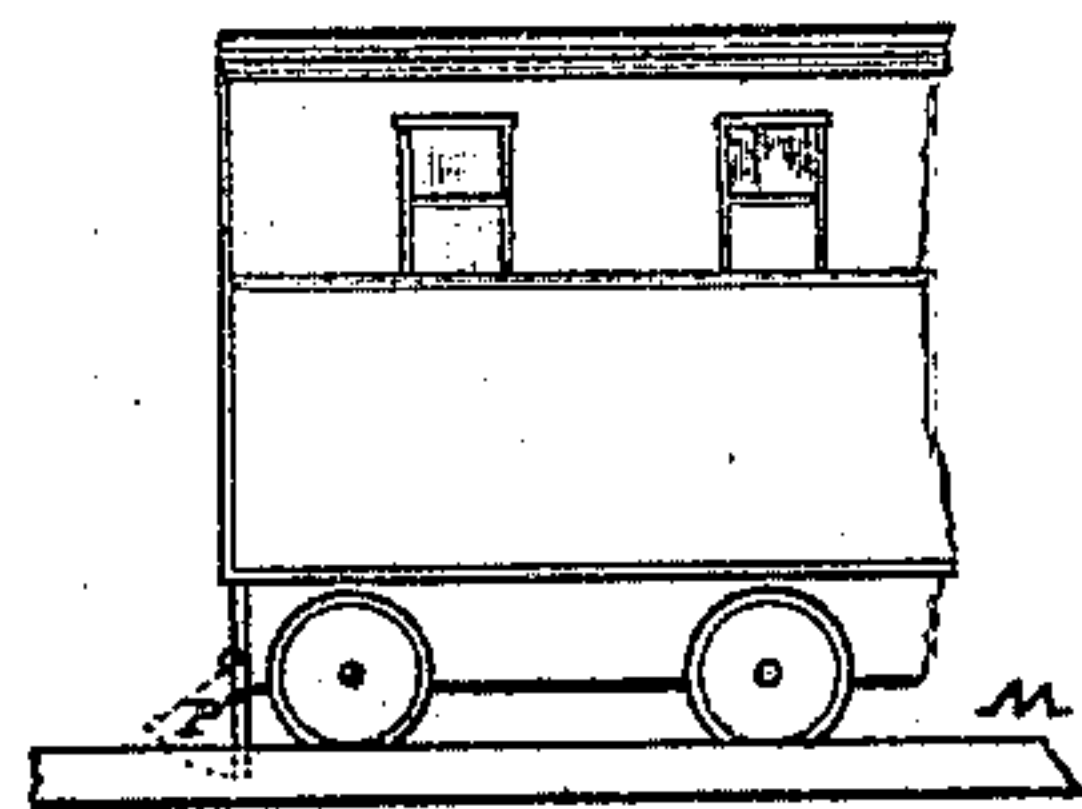
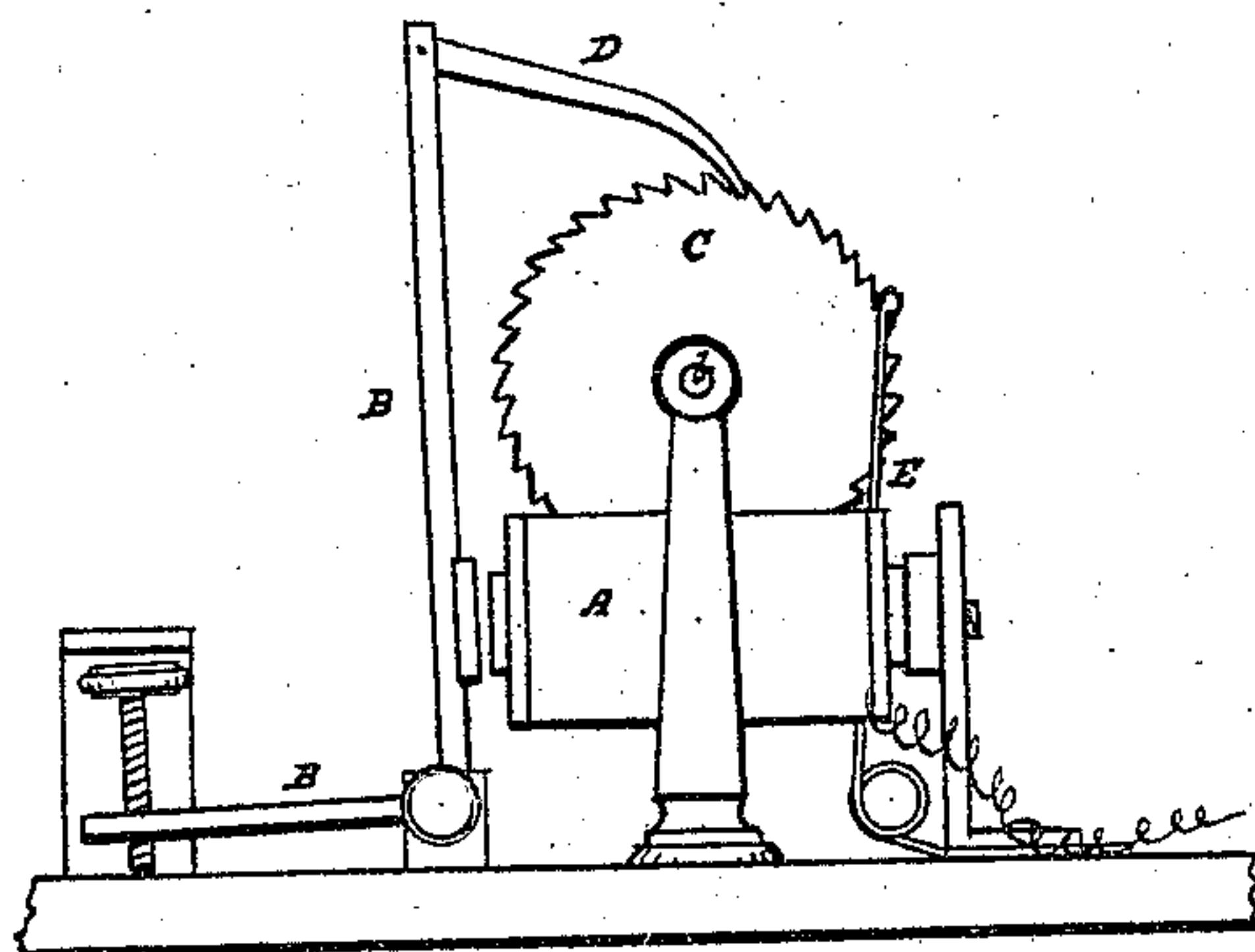


Fig. 2



Witnesses
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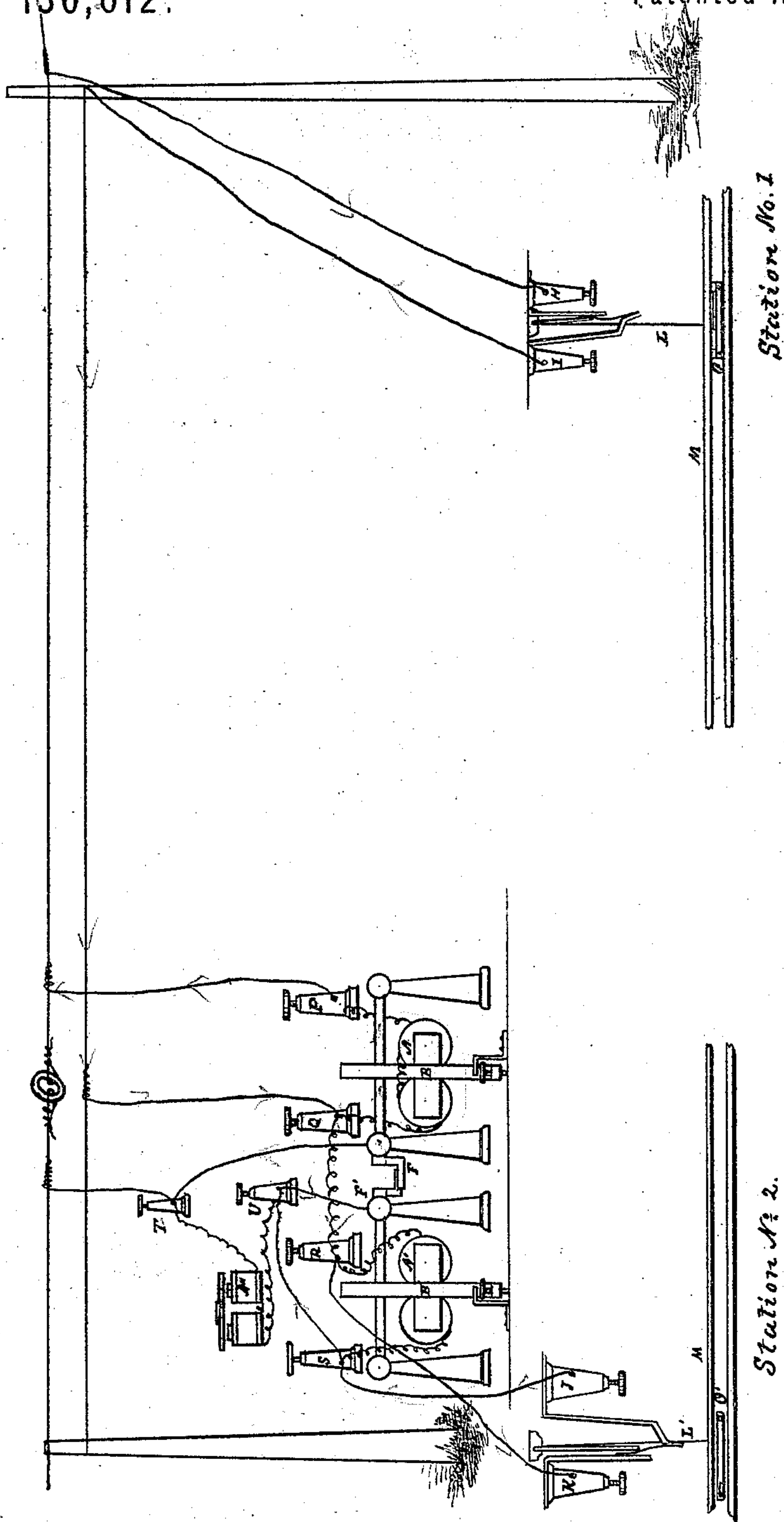
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UNITED STATES PATENT OFFICE.

ELERY P. WARNER AND JOHN B. ODELL, OF GALESBURG, ILLINOIS, ASSIGN-
ORS OF ONE-THIRD THEIR RIGHT TO F. H. TUBBS, OF SAME PLACE.

IMPROVEMENT IN ELECTRIC RAILWAY-SIGNALS.

Specification forming part of Letters Patent No. 130,612, dated August 20, 1872.

SPECIFICATION.

To whom it may concern:

Be it known that we, ELERY P. WARNER and JOHN B. ODELL, both of Galesburg, in the county of Knox and State of Illinois, have invented certain new and useful Improvements in Electro-Mechanical Railway-Signals, of which the following is a full, clear, and exact description, which will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawing and chart forming a part of this specification, and in which—

Figure 1 represents a front elevation of the electro-mechanical apparatus employed for the purpose of raising and controlling the signal; Fig. 2, a side elevation of a portion of the same; and Fig. 3, a side elevation of the hinged post. Plate 2 is a plan view, representing the course of the circuits before, during, and after the passage of the cars at each station.

The object of our invention is to indicate the departure of cars from a distant station at a station toward which the cars are moving, by means of an electro-mechanical signal, operated either by the cars or engine; and it consists in the mechanism by means of which the current is shifted by the cars for the purpose of obscuring and displaying the signal, and in the mechanism by means of which the signal remains displayed so long as there are any cars between the stations.

In the drawing, A, A', and A'' are ordinary electro-magnets, and B B' B'' are pivoted arms or levers, having suitable bearings, and to which the armatures of the magnets are attached. C C' are ratchet-wheels, rigidly attached to arbors b b', and D D' are pawls hinged to the free ends of the levers B B', and engaging with the ratchets C C' so as to move the latter forward step by step as the armatures are alternately and repeatedly attracted and released. E E' are catches, riding in the ratchets C C' so as to prevent the latter from moving except in one direction. The levers B B' are bent rearward, as shown in Fig. 2, so that the attraction of gravitation will carry them from the poles of the magnets A A' when the latter are demagnetized; and in order to limit and adjust the movement of the levers B B' the free end of their horizontal parts are

provided with a thumb-screw, arranged beneath a stop, as shown. F F' are crank devices, rigidly attached to one end of the arbors b b', respectively, and so arranged that the horizontal arms of the cranks will move in the same circle and in the same direction as the arbors to which they are attached are revolved. The correspondence of the cranks F and F' and the mechanism by which they are operated is such that when the ratchet C moves forward any number of steps, thereby separating the cranks, the same number of steps of the ratchet C' will bring the cranks together. In order to insure the electrical contact of the cranks F and F' against any mechanical inaccuracies a light spring may be interposed between them, as shown by dotted lines in Fig. 1, and attached to either crank. G is an oscillating signal, within a suitable case, provided with an opening for displaying the signal. The rear end of the arm to which the signal is attached is connected to the free end of the lever B'', so that the signal will be displayed when the armature on this lever is attracted to the magnet A''. The signal is so balanced as not to wholly resist the force of the magnet A'', and so as to move away from the opening when the armature is not attracted. The movement of the signal is also limited so as to be alternately displayed and obscured when the armature of magnet A'' is attracted and released. H I J K are binding-posts. The binding-posts H and K are provided with posts or shoulders, and the posts I and J are provided with springs, which rest against the shoulders of the posts H and K, respectively. L L' are cranks or bent levers, one end of which rest against the springs of the posts I and J, so as to press the springs against the shoulders of the post H and K, respectively. M is the track, and N N' are springs between or near the rails of the track, and having an upward pressure. One end of the levers L and L' rest upon the springs N and N', respectively, as shown. O and O' are arched springs, arranged over that end of the levers L L' which extend to the track. The springs O and O' are fastened on posts or suitable supports, and are provided with a slot in one end so that the screw or other fastening, by passing through this slot, will admit of a

downward and upward movement of the central part of the springs. P' is a post suspended from and hinged to either the engine or car, and so arranged thereon as to strike and compress the springs O O' as the train moves over them. When the train is backing over the springs O and O' the post P' yields so as not to compress them. When the springs O O' are thus compressed the levers L L' are carried away from the springs of the posts I and J, and these springs then move from the shoulders of the posts H and K, leaving the latter disconnected. As soon as the cars have passed the springs O and O' the action of the springs N and N' is such as to connect the posts which were disconnected by the action of the posts P'. P Q R S T U are also binding-posts. The posts H and I are arranged at or near one station, and the remaining parts of the mechanism are arranged at or near another station.

Each terminal station is provided with a battery, and the circuits are as follows: When there are no cars neither at nor between the stations, the circuit passes from the battery at station No. 1 to post H; from thence to post I, over the shoulder and spring, connecting the latter post with the former; from thence to a supporting-pole and over the line to post Q; from thence to post R; from thence to post K; from thence to post J; from thence to post S; from thence to post U; from thence to the bearing of the arbor b'; from thence over the cranks F' and F to the bearing of the arbor b; from thence to post P; and from thence to the battery at station No. 2. When the post P' compresses the spring O, the posts H and I being disconnected, the current shifts to the post P and passes through the magnets A, which then attract their armature and thereby throw the crank F one step forward and from the crank F'. The circuit passes from the magnets A to post Q, and continues from thence, as before described, to post U, and the cranks F' and F being disconnected, it passes from the post U through the magnets A'', which then attract their armature, thereby displaying the signal and announcing at station No. 2 that a train has departed from station No. 1. From the magnets A'' the circuit proceeds to posts T, and from thence to the battery at station No. 2. When the wires which connect posts T and P to the main line are attached to the latter, in the manner shown in Plate 3, the line should be broken by a break-glass in

the manner there represented. When the train leaves station No. 1 the circuit is the same as first described until it reaches post U, and from thence it proceeds through the magnets A'' to the battery at station No. 2, as last described, and, being thus shifted from the magnets A', the pawl D falls into a succeeding notch of the ratchet C'. When the cars arrive at station No. 2 the posts J and K are disconnected in the same manner that the posts H and I were. The circuit then passes, as first described, to post R; and from thence through the magnets A' to the post S; and from thence over the circuit first described by reason of the contact of the cranks F' and F caused by the passage of the current through the magnets A'. This shifts the current from the magnets A'' and the signal is obscured. As soon as the cars leave station No. 2 the posts J and K are again connected, and the pawl D' falls into a succeeding notch of the ratchet C' by reason of the current being shifted from the magnets A' over its original circuit.

It will be observed that the signal will remain displayed at station No. 2 so long as there are any trains between the stations and approaching station No. 2; for each train that leaves station No. 1 sets the crank F one step forward, or ahead of the crank F', and the same number of trains must arrive at station No. 2 in order to set the crank F' forward sufficiently to overtake the crank F.

It will also be observed that our invention is applicable to a single track, and that it may be duplicated for a double track.

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

1. In combination, the spring O, spring N, bent lever L, and post P, attached to the engine or to a car, all substantially as and for the purpose set forth.

2. The circuit breakers and closers F F', arranged upon the arbors b b' so as to be moved in the same direction by a step-by-step movement, by means of alternately-vibrating armature-levers B B', pawls D D', and ratchets C C', substantially as specified.

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Witnesses:

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