

THOMAS S. HALL.

Improvement in Electro-Magnetic Signals for Switches and Draw-Bridges.

No. 119,137.

Patented Sep. 19, 1871.

Fig. 1.

Witnesses.  
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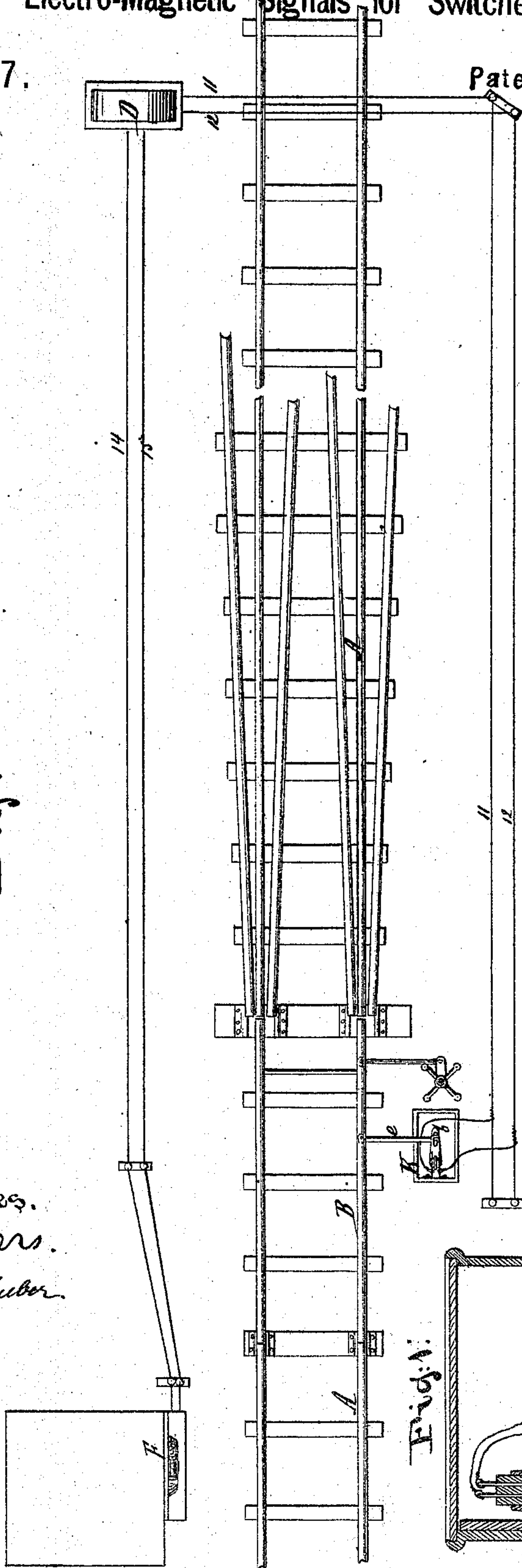
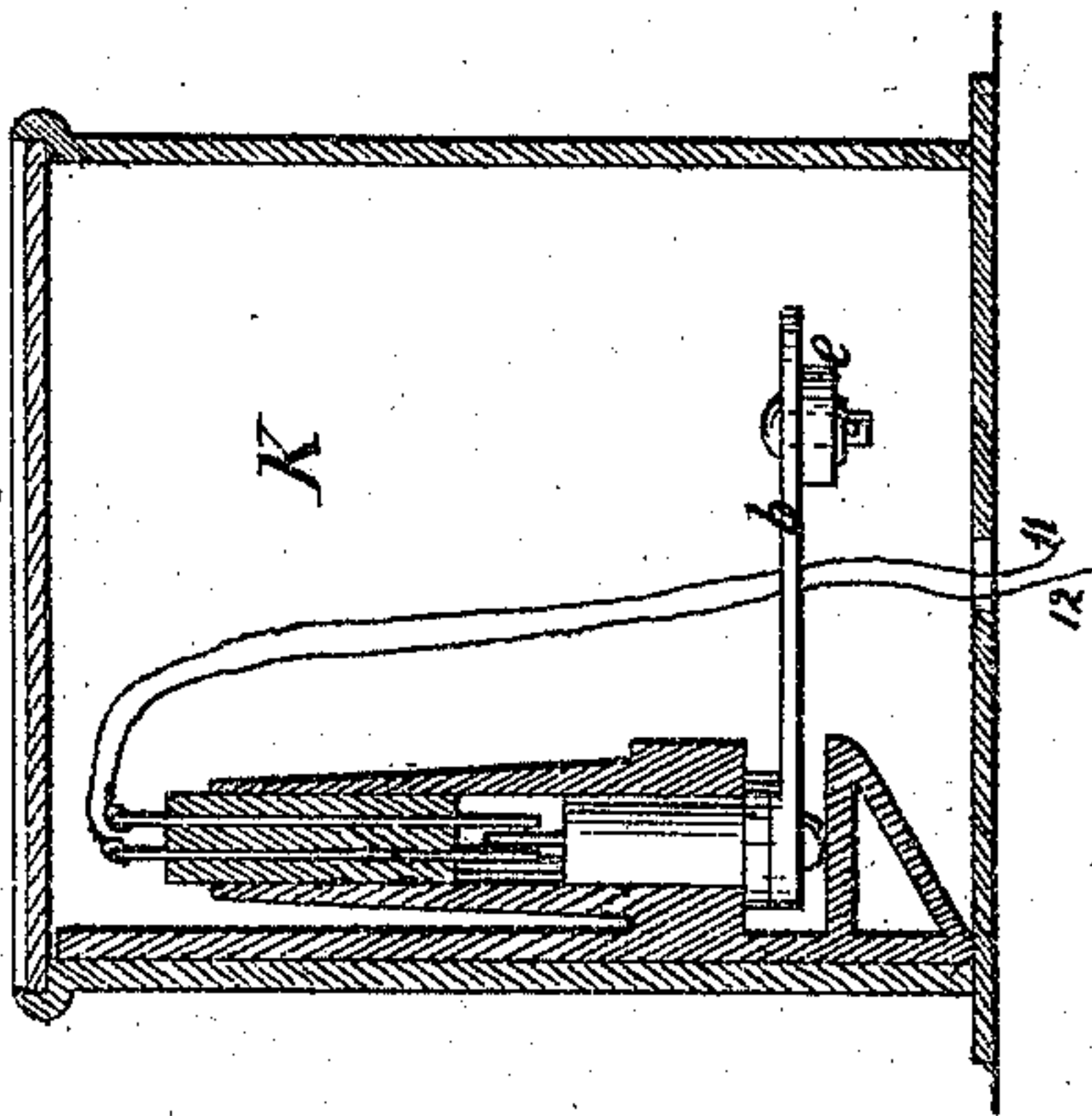


Fig. 1.





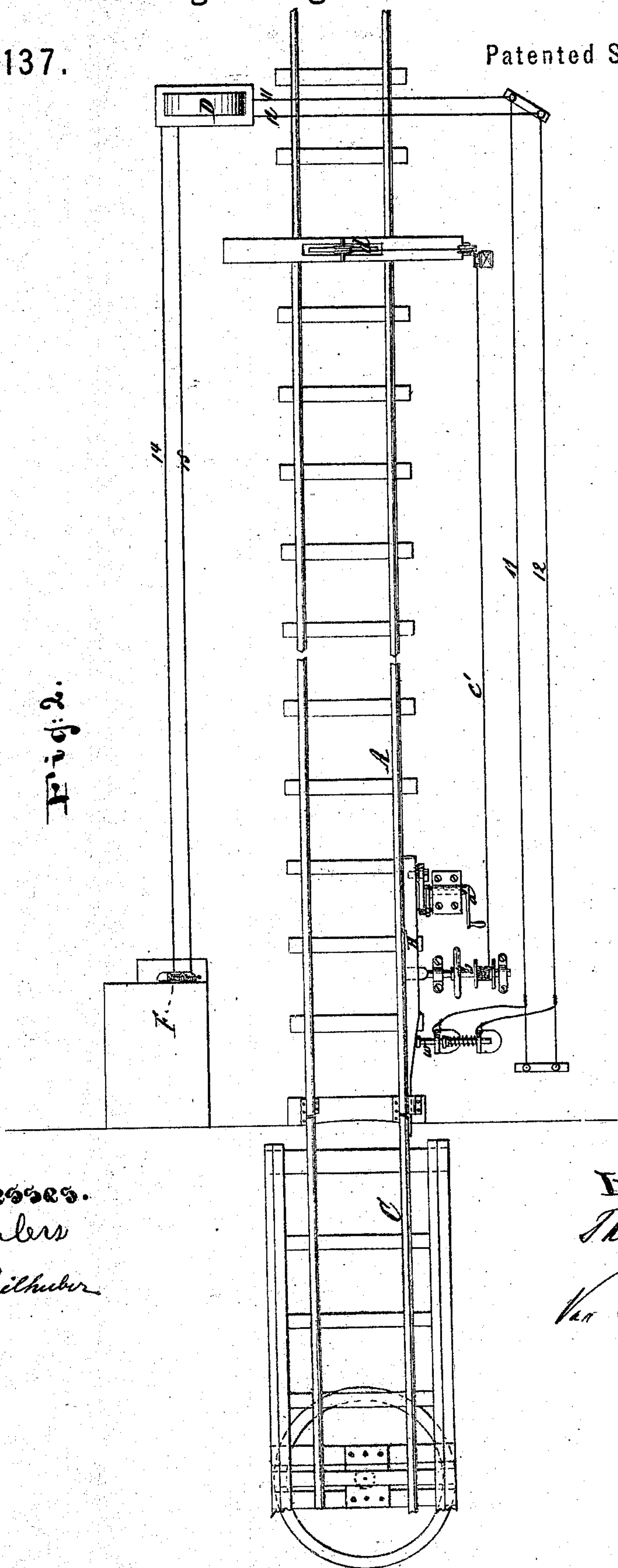
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Fig. 2.



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Fig. 4.

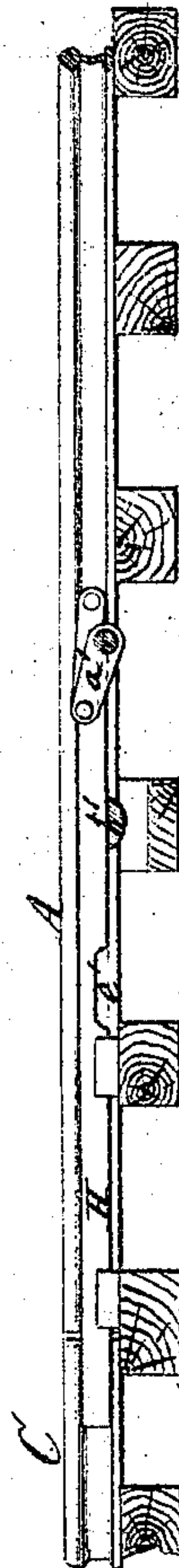
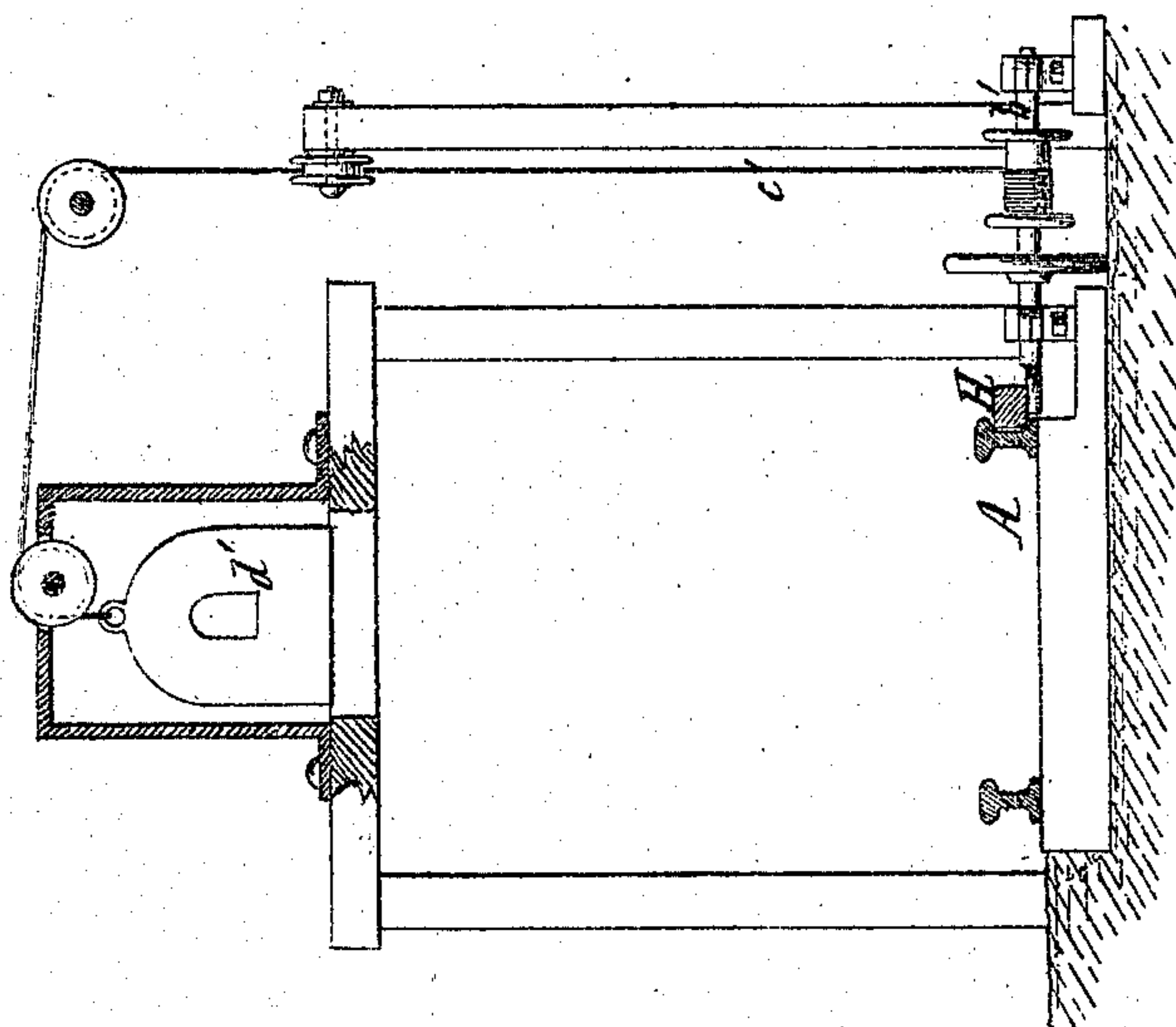


Fig. 3.



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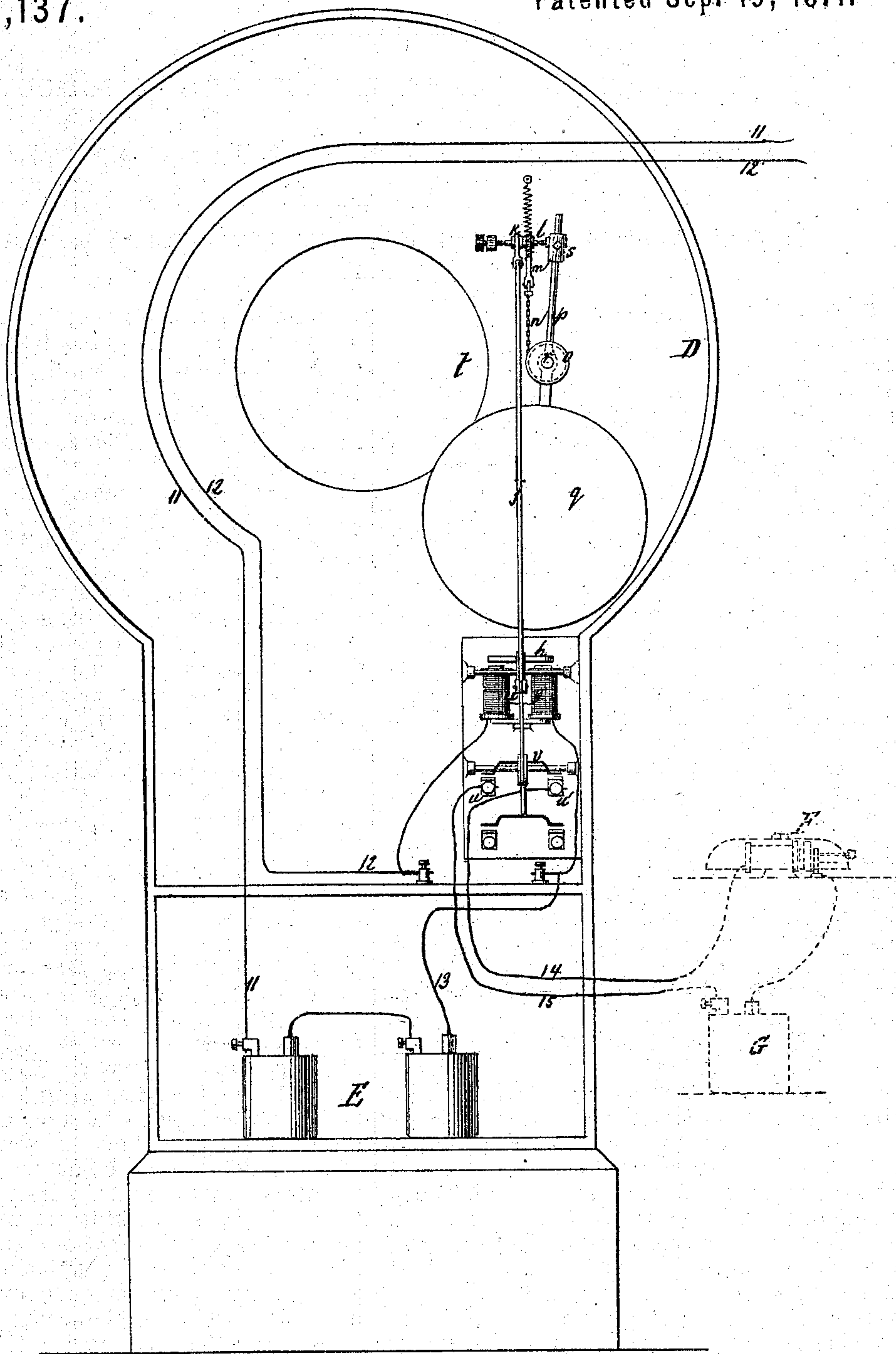


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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN ELECTRO-MAGNETIC SIGNALS FOR SWITCHES AND DRAW-BRIDGES.

Specification forming part of Letters Patent No. 119,137, dated September 19, 1871.

*To all whom it may concern:*

Be it known that I, THOMAS S. HALL, of West Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Electro-Magnetic Signals for Switches and Draw-Bridges; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a plan or top view of my signal apparatus as applied to a railroad switch. Fig. 2 is a similar view of the same as applied to a draw-bridge. Fig. 3 is a sectional face view of a signal connected to the key of the draw-bridge and operated by mechanical means. Fig. 4 is a side view of the draw-bridge at the point of its connection. Fig. 5 is an inside view of the electro-magnetic signal-house, illustrating the connections of the signal with the battery and line-wires.

Similar letters indicate corresponding parts.

This invention consists in the arrangement of a raising-key in combination with the switch-rail of a switch, and with line-wires connecting said key with a visible and with an audible signal in such a manner that whenever the switch is turned from the main line the circuit through the magnets operating the visible and audible signals are closed, and the visible signal is displayed and the audible signal set in motion; and as soon as the switch is turned back to the main line the signals are taken off or stopped. It consists further in the arrangement of a key which connects, by means of suitable line-wires, with a visible and an audible signal, in combination with the lock-bolt of a draw-bridge, in such a manner that whenever the lock-bolt is pushed back the circuit through the signal-magnet is closed, and the signals are put on and kept on until the lock-bolt is returned to its locking position.

In the drawing, A designates the main line of a railroad track, which is interrupted either by switch-rails B, as shown in Fig. 1 of the drawing, or by a draw-bridge, C, as shown in Fig. 2. The switch-rails B, Fig. 1, connect by a rod, *a*, with a key, K, composed of a lever, *b*, that turns on a pivot, *c*, (see Fig. 1\*,) and from which rises a plug, *d*, carrying a metallic projection, *e*,

that extends up between the metal plates *ff'*. These plates are insulated from each other, and they connect one, with the line-wire 11 and the other with the line-wire 12. If the switch-rails are in line with the main track, the projection *e* is in such a position that it does not touch either of the plates *ff'*; but if the switch-rails are turned off from the main line, the plug *d* turns on its center by the action of the lever *b*, and the projection *e* is brought in metallic contact with both plates *ff'*, as described in my patent No. 90,744, dated June 1, 1869. It must be remarked, however, that other devices might be made to effect this purpose of closing the circuit through the wires 11 and 12, and I do not confine myself to the device above described. The line-wires 11 and 12 extend into the signal-house D, Fig. 5, and the wire 11 connects with one pole of a battery, E, situated in said signal-house. The wire 12 connects with one end of the helix of an electro-magnet, *g*, and the other end of this helix connects, by wire 13, with the second pole of the battery E, so that as soon as the wires 11 and 12 are brought in metallic contact with each other by means of the projection *e* and plates *ff'*, or otherwise, the circuit through the electro-magnet *g* is closed. The armature *h* of this electro-magnet connects, by a lever, *i*, and rod *j*, with a lever, *k*, mounted on a rock-shaft, *l*, from which extends an arm, *m*, that connects, by a chain, *n*, with a pulley, *o*. This pulley is firmly connected to the lever *p*, which carries the signal *q*, and both the lever and the pulley turn on the same fulcrum-pin *r*. A weight, *s*, serves to counterbalance the signal *q*. As soon as the armature *h* is attracted by its magnet *g* the signal *q* is caused to swing up to a position opposite the aperture *t* in the signal-house D, and it is retained in this position until the circuit through the electro-magnet *g* is broken, which takes place whenever the switch-rails are brought in line with the main track.

The signal-house is intended to be situated at the distance of half a mile, more or less, from the switch, so that an approaching train on passing the signal-house can be readily stopped before it reaches the switch if the position of the signal indicates that the switch is not in a correct position. From the signal-house extend wires 14 and 15 to the alarm-bell F, which is situated close to the switch, and serves to call the



attention of the switch-tender to the fact that his switch is not in line with the main track. The wires 14 and 15 extend from metallic abutments *w w'*, situated in the signal-house D, and these abutments are brought in metallic contact with each other by a key, *v*, which connects with the armature-lever of the electro-magnet *g* and is pressed up against said abutments whenever the armature *h* is attracted. When the wires 14 and 15 are thus brought in metallic contact the circuit of the battery G through the alarm-bell magnet, Fig. 5, is closed, and the alarm-bell keeps ringing until the armature *h* falls back from its electro-magnet *g*. By these means all accidents by the wrong position of a switch can be avoided provided the signals are properly observed.

In applying my signal apparatus to a draw-bridge C, (see Fig. 2,) I use the same wires, 11 and 12, and 14, and 15 and also the same signal-house D and alarm-bell F, as previously described. The circuit through the wires 11 and 12 is closed by a key, *w*, Fig. 2, the head of which is pressed up against the lock-bolt H of the draw-bridge by means of a spring, *x*. If the lock-bolt is drawn back so as to release the draw-bridge, the key *w* is pressed in and the circuit through the wires 11 and 12 is closed. It is obvious that the construction of this key can be modified in various ways, and I do not wish to confine myself to any specific construction.

I have used with advantage a key such as described in my patent No. 90,743, dated June 1, 1869. It consists of a plain rod provided with a collar of metal and sliding in two standards, one of which is in metallic contact with the body of the rod, while the other is insulated therefrom as long as the collar is not allowed to come in contact with it. But if the lock-bolt of the draw-bridge is drawn back, the collar of the key is pressed up against the inner standard and me-

tallic contact is established between the two standards and the wires 11 and 12 which connect with the same. The lock-bolt H is operated by a hand-crank, *a'*, and it forms a stop for a shaft, *b'*, from which extends a rope, *c'*, to a signal, *d'*, set right over the track, (see Figs. 3 and 4.) The end of the shaft *b'* is flat, and as long as it bears against the lock-bolt the signal *d'* is kept up. In the under edge of the lock-bolt H is a notch, *e'*, (see Fig. 4,) and if said lock-bolt is moved clear back this notch comes opposite the flat end of this shaft *b'*, and thereby said shaft is released and the signal *d'* descends. By this purely mechanical attachment the safety of my apparatus is materially increased, since the signal *d'* will not stay up unless the lock-bolt is brought in its locking position. But the electro-magnetic signals themselves are a good safeguard against danger, since the signal in the house D will be kept displayed and the alarm-bell kept ringing until the lock-bolt has been thrown forward in its locking position, and it can hardly be supposed that the draw-tender would throw the lock-bolt in this position unless the draw-bridge is closed.

What I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of a key, K, connected by a rod, *b*, to the switch-rails, and by wires 11, 12, 14, and 15 to the signal-house D and alarm-bell F, substantially in the manner herein shown and described.

2. The arrangement of a key, *w*, controlled by the lock-bolt H of a draw-bridge, and connected by wires 11, 12, 14, and 15 with a signal-house D and alarm-bell F, substantially as herein set forth.

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Witnesses:

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