

J. G. O. & I. D. COMBS.
ELECTRIC BLOCK SIGNAL.
APPLICATION FILED MAR. 5, 1908.

908,748.

Patented Jan. 5, 1909.

3 SHEETS—SHEET 1.

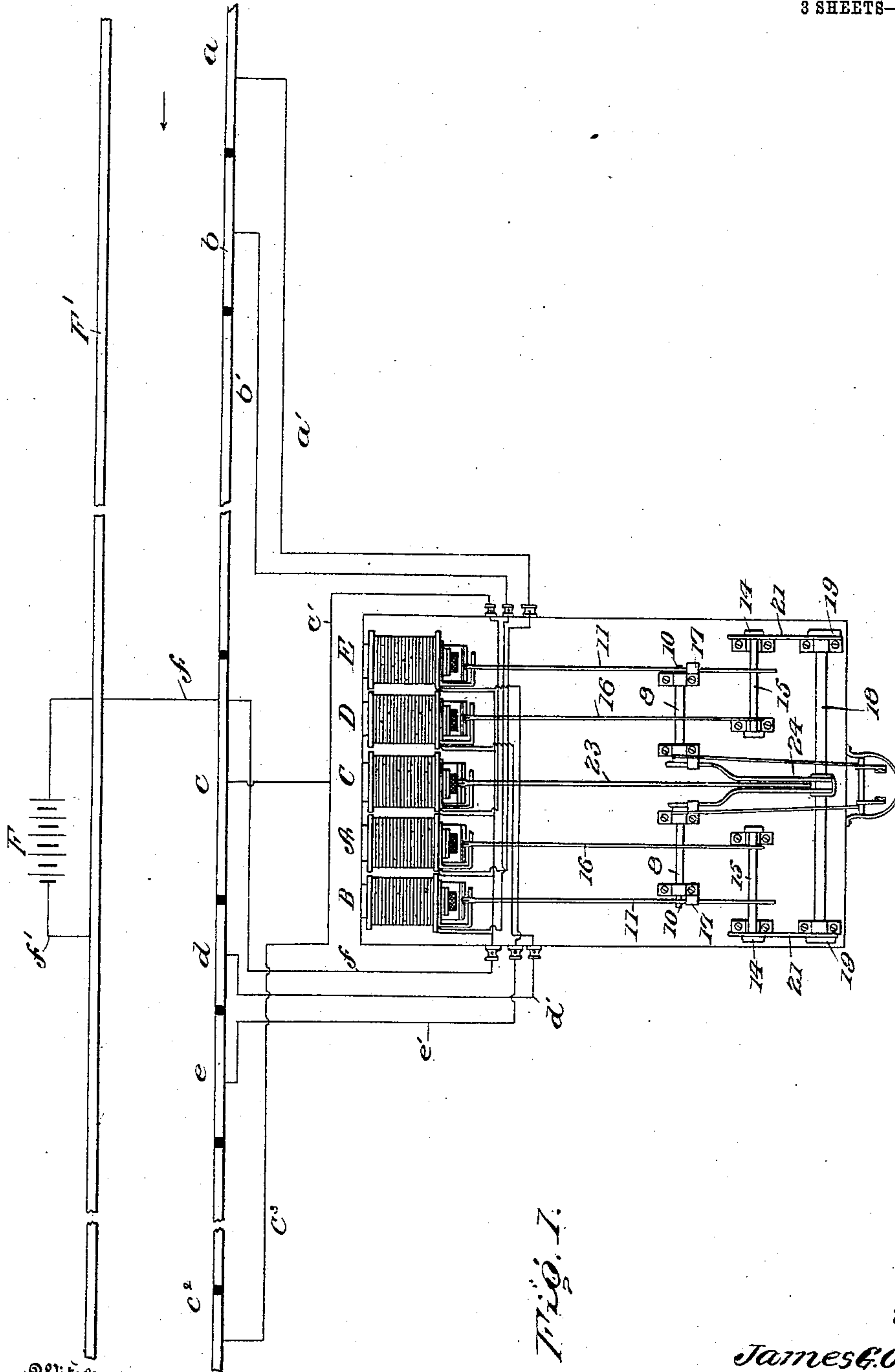


Fig. 1.

Witnesses

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By

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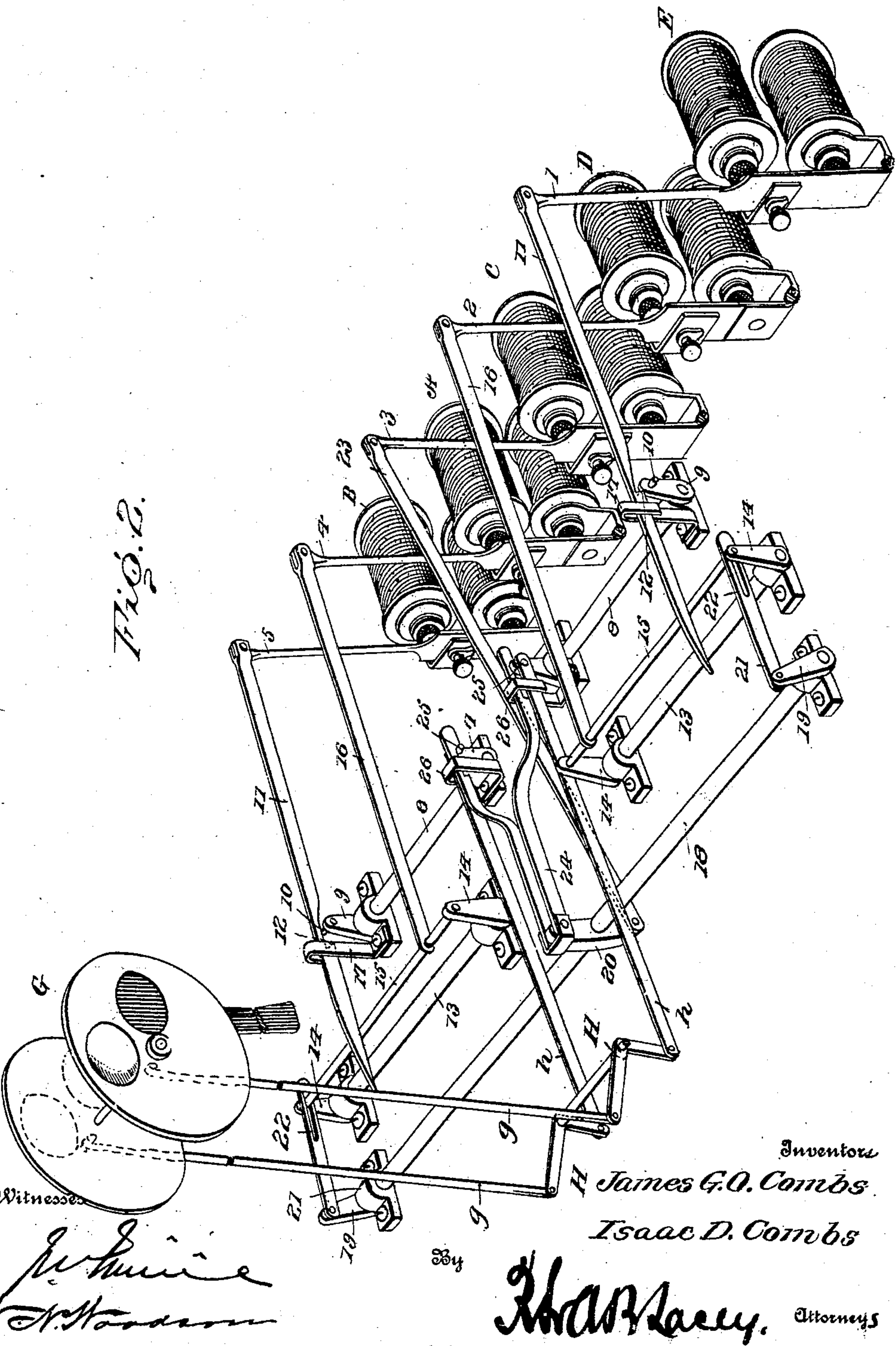
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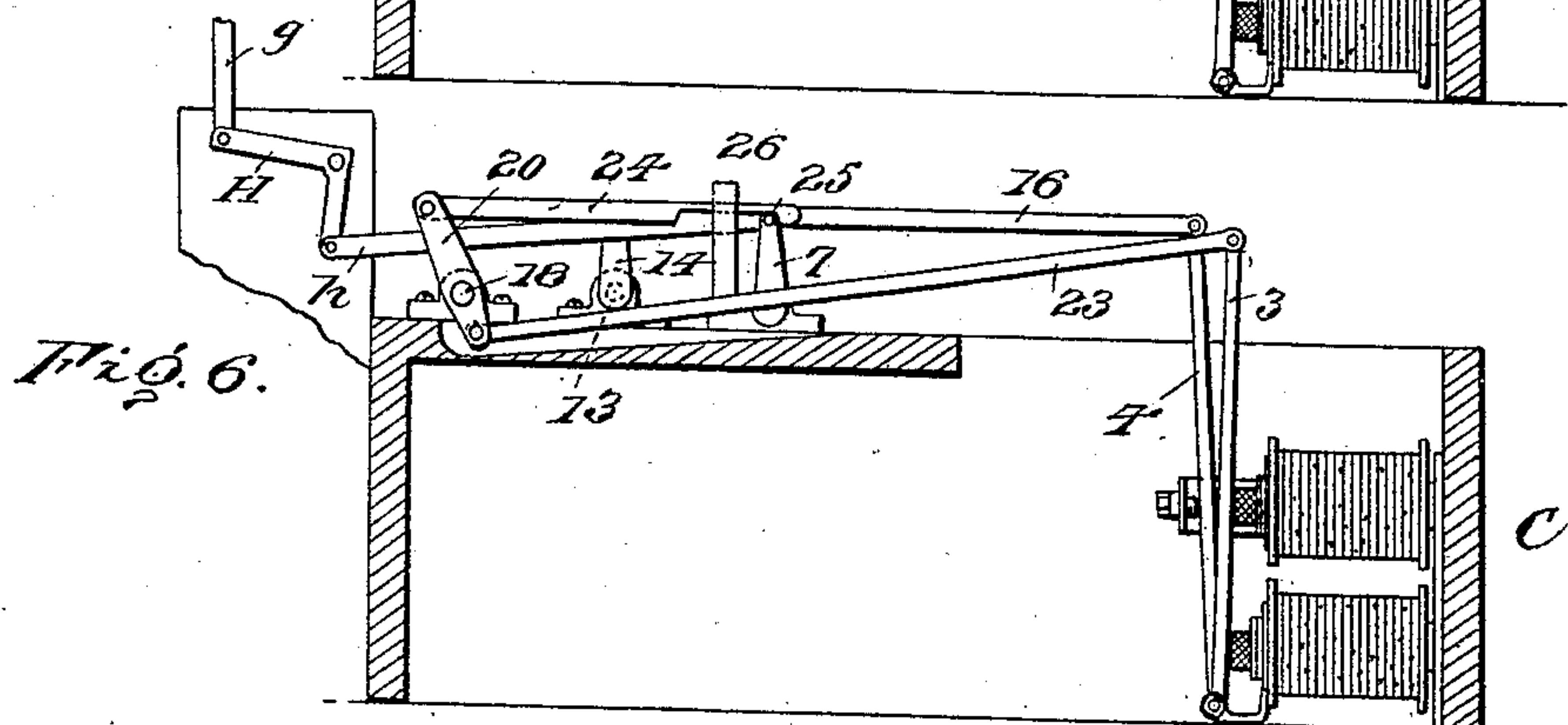
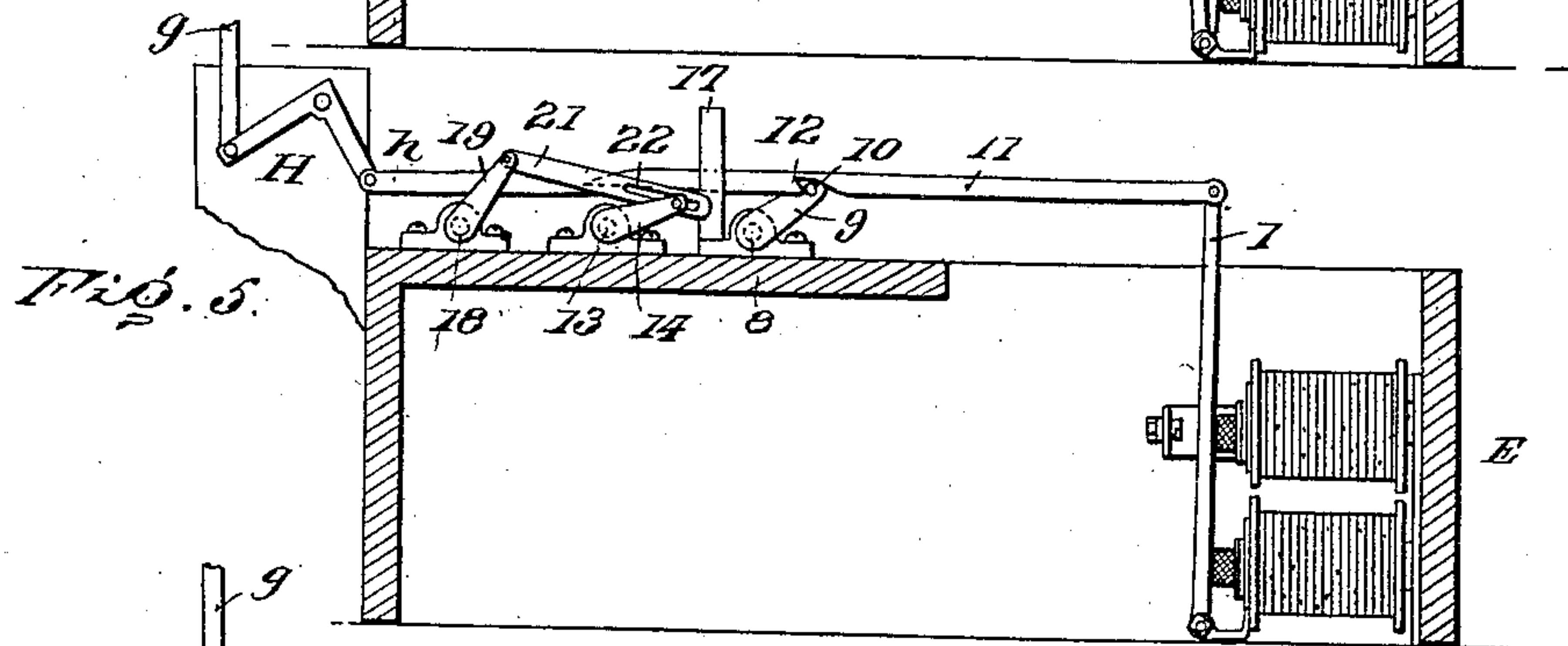
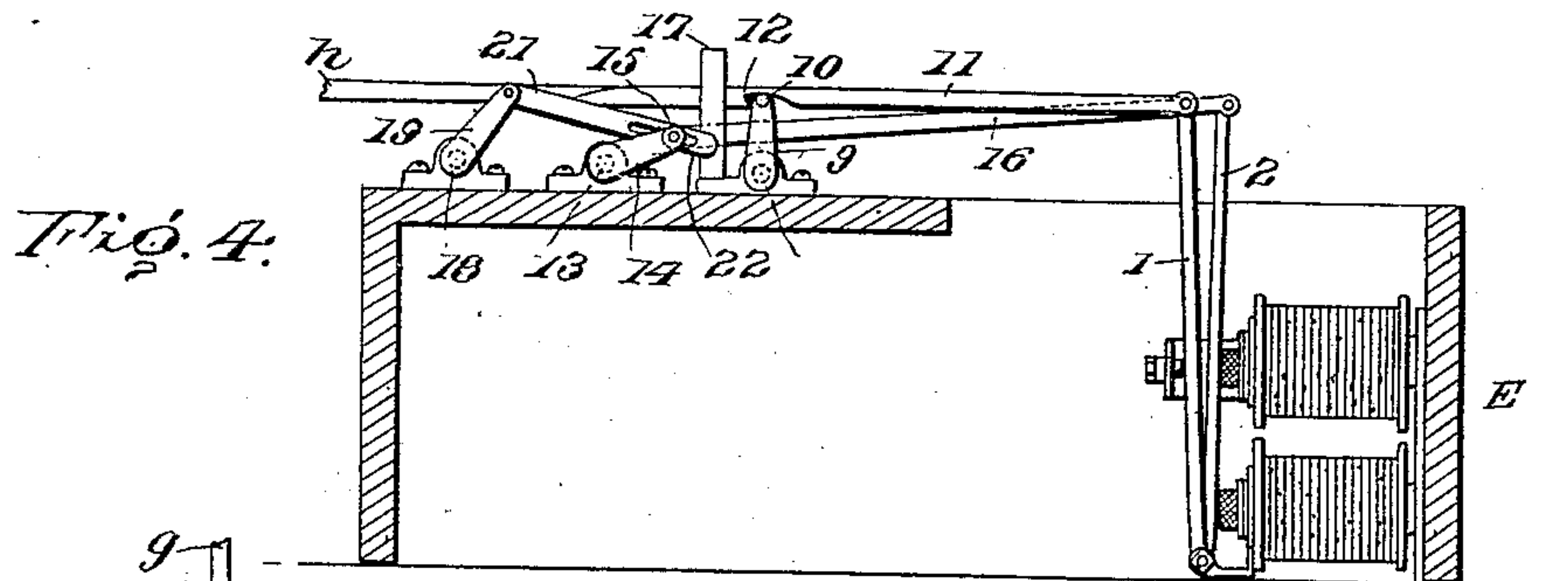
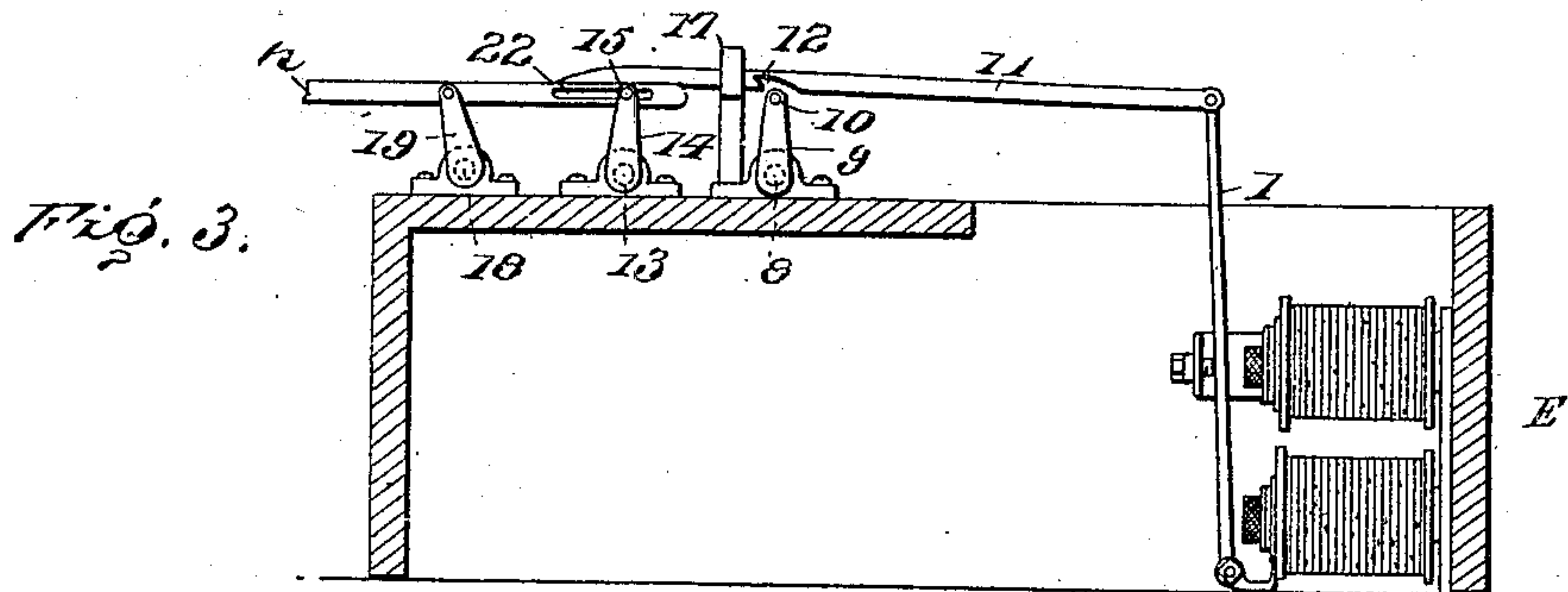


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3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES G. O. COMBS AND ISAAC D. COMBS, OF WALNUT GROVE, MISSOURI.

ELECTRIC BLOCK-SIGNAL.

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Specification of Letters Patent.

Patented Jan. 5, 1909.

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To all whom it may concern:

Be it known that we, JAMES G. O. COMBS and ISAAC D. COMBS, citizens of the United States, residing at Walnut Grove, in the county of Greene and State of Missouri, have invented certain new and useful Improvements in Electric Block-Signals, of which the following is a specification.

This invention appertains to means for apprising engineers of moving trains of impending danger so that head-on or rear-end collisions may be avoided, the purpose being to provide novel means for actuating a signal at a station or given point, the arrangement being such that a train upon entering a block throws the signal actuating means into operative position to be actuated after the train has entered the block a short distance so as to set the signal to indicate danger, said signal being returned to safety when the train reaches the station and again set after the train leaves the station to warn a train that may be following, said signal being returned to safety as the train emerges from the block.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment is shown in the accompanying drawings, in which:

Figure 1 is a plan view of a block or section of a railway track provided with safety appliances embodying the invention. Fig. 2 is a perspective view of the signal actuating means located at the station or place selected for placing the signal. Fig. 3 is an end view of the signal actuating means, showing the normal position of the parts. Fig. 4 is a view similar to Fig. 3, showing the relative position of the parts after the same have been initially actuated to throw the signal operating mechanism into active position. Fig. 5 is a view of the parts shown in Figs. 3 and 4, illustrating the arrangement of the elements after the signal has been set. Fig. 6 is a view of the parts illustrated in Figs. 3, 4 and 5, showing the restoration of the operating means to normal position by actuation of the resetting mechanism.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

At the station or place selected for displaying a warning, a signal device of any type is located, the same embodying an arm for giving warning by day and a lamp for displaying danger or safety at night or when the signal arm may not be seen at a safe distance. The signal is indicated at G and consists of a disk or plate having an arm and colored glasses for displaying a red or a white light. The signal G may be of any design or construction and is arranged so as to be seen from either approach of the railway to the station or place where the signal is set. The signal illustrated is provided in duplicate and a rod or bar *g* connects each with an arm of a bell crank H. A rod or bar *h* connects the other arm of the bell cranks H with a crank arm 7 at the inner end of a rock shaft 8. Both members of the signal move together and the construction is such that the signal remains set in either position until positively moved by the actuating means.

The signal actuating means embodies a series of electro-magnets A, B, C, D and E with their coöperating electro-magnets which have connection with working parts of the mechanism as hereinafter more particularly set forth. The several electro-magnets are included in circuits which latter also include sections of the track which are electrically insulated to enable the various circuits to be closed and broken in successive order.

It is to be understood that the several circuits may be closed by any means usually adopted in signal apparatus of the character aforesaid, but for simplicity of disclosure one rail F' constitutes a return and the other rail of the block or section of railway track is subdivided into sections *a*, *b*, *c*, *d*, *e* and *c*² which are electrically insulated from one another. The section *a* is connected by wire *a'* to the electro-magnet A. The section *b* is connected by wire *b'* to the electro-magnet B. The section *c* is connected by wire *c'* to the electro-magnet C. The section *d* is connected by wire *d'* to the electro-magnet D. The section *e* is connected by wire *e'* to the electro-magnet E. The section *c*² is connected by wires *c*³ and *c'* to the electro-magnet C. The several electro-magnets are connected with a wire *f* which is connected with one pole of a battery or generator F, the other

pole of said generator or battery being connected by wire f' to the rail F' . The several circuits are closed through the wheels and axle of the engine or car or by other means bridging the several insulated track sections and the return rail F' .

The mechanism for operating the signal is duplicated so as to set the signal to indicate danger both upon entering the block and upon leaving the station. The means for returning the signal to safety is the same for resetting when the train reaches the station, as it is about to pass from the block. Inasmuch as the signal operating means is the same for each half of the block, a detail description of one will suffice for a clear understanding of both, corresponding parts being indicated by like reference characters. The rock shafts 8 are provided at their inner ends with crank arms 7 and at their outer ends with crank arms 9 from which crank pins 10 project laterally. The crank arms 7 are connected by bars or rods h with the bell cranks H for transmitting motion to the signal device. Rods or bars 11 are connected at one end with extensions of the armature 1 and 5 of the electro-magnets E and B and are provided near their free ends with hooks or stops 12, which are adapted to engage with the crank ends 10 to operate the rock shafts 8 and throw the signal to indicate danger. The connecting means 11 are normally held out of operative position by means of lifting devices, thereby preventing setting of the signal even though either one of the electro-magnets B or E should be energized.

The lifting devices consist of pivoted frames, each embodying a rock shaft 13 provided at opposite ends with crank arms 14, and a rod 15 connecting the outer ends of the crank arms 14. Normally, the crank arms 14 stand vertically, thereby holding the rods or bars 15 at the highest point, with the result that the hooks or stops 12 of the parts 11 are held out of the path of the crank pins 10. The free ends of the connections 11 rest upon the rods or bars 15 of the pivoted frames, hence the electro-magnets B or E may be energized without setting the signal. A rod or bar 16 connects each pivoted frame with an extension of the armature of the respective electro-magnets A and D. Upon energizing either electro-magnet A or D the pivoted frame is operated, thereby permitting the free end of the corresponding connection 11 to drop so that upon subsequently energizing either electro-magnet B or E, the signal will be set to a point of danger. A guide 17 prevents lateral displacement of the free end of the connection 11 so as to insure the stop thereof engaging with a crank pin 10 when it is required to set the signal.

The resetting mechanism for restoring the signal to safety consists of a rock shaft 18

provided with terminal crank arms 19 and an intermediate arm 20 projected from opposite sides thereof. Links 21 are pivotally connected at one end to the crank arms 19 and each is provided with a longitudinal slot 22 to receive the rod or bar 15 of the respective pivoted lifter frames. A rod or bar 23 connects the lower bar of the intermediate member 20 with an extension of the armature of the electro-magnet C. Rods or bars 24 are pivoted at one end to the upper member of the arm 20 and are adapted to engage with crank pins 25 of the crank arms 7 so as to restore the signal to normal or safety position when the electro-magnet C is energized. Guides 26 prevent lateral displacement of the connecting means h and 24.

A block or section of railway equipped with safety appliances in accordance with the present invention has the parts arranged substantially as indicated in the plan view, Fig. 1. A train approaching the station from the right closes the circuit including the electro-magnet A, thereby attracting its armature and rocking the lifter frame through the connection 16 and permitting the free end of the connection 11 to trip. As the train continues to advance, the circuit including the electro-magnet B is closed, thereby with the result that said electro-magnet B is energized and attracting its armature sets the signal to danger, thereby giving warning ahead that the block is occupied so as to prevent head-on collision. When the train reaches the station, the circuit including the electro-magnet C is closed and said electro-magnet C being energized attracts its armature and rocks the shaft 18 and returns all parts to normal position. As the train moves away from the station, the circuit including the electro-magnet D is closed, and said electro-magnet being energized attracts its armature and moves the lifter frame to permit the free end of the connection 11 to drop so that when the train closes the circuit including the electro-magnet E, movement of the armature by being attracted by the magnetic forces of the vitalized electro-magnet E serves to set the signal and thereby prevent rear-end collision. As the train reaches the end of the block and is about to pass thereover, the circuit is closed through the rail section c^2 and energizes the electro-magnet C which restores the parts to normal position and resets the signal to safety.

Having thus described the invention, what is claimed as new is:

1. In an electrically operated signal for a block or section of railway, the combination of a signal, electro-magnets, means operated by said electro-magnets for throwing the signal operating means into active position when the train enters the block to prevent head-on collision or when said train leaves

the station so as to prevent rear-end collision, other electro-magnets, signal actuating means operated by the last mentioned electro-magnets to set the signal to danger either
 5 when the train continues its movement either towards the station or away therefrom, a fourth electro-magnet, and resetting means actuated thereby to return the signal to safety and to restore the working parts to
 10 normal position either when the train approaches the station or is about to leave the block.

2. In an electrically operated block signal for railways, the combination of a signal, a
 15 crank arm having connection with said signal, a second crank arm having connection with the first mentioned crank arm, actuating means for the second crank arm normally held out of engagement therewith,
 20 electrically operated means for throwing the crank arm into operative position with its actuating means, electrically operated means for actuating the said crank arms to set the signal to danger, and electrically operated re-
 25 setting means for returning the signal to safety and restoring the working parts to normal position.

3. In an electrically operated block signal for railways, the combination of a signal, a
 30 rock shaft having crank arms, connecting means between one of said crank arms and the signal, operating means adapted to cooperate with the other crank arm and normally held out of the path thereof, a support for
 35 said operating means, electrically operating means for moving said support to permit the operating means to make engagement with the crank arm, and actuating means for said operating means to set the signal to danger.

4. In an electrically operated block signal 40
 for railways, the combination of a signal, a rock shaft having crank arms 7 and 9, connecting means between the crank arm 7 and the signal, operating means 11 normally disen-
 gaged from the crank arm 9, a lifter supporting 45
 the operating means 11, means for moving said lifter to permit the operating means 11 to move to an operative position, actuating
 means for the part 11 to effect a rocking 50
 movement of the shaft 8 to set the signal to danger, and a resetting means for simulta-
 neously moving both the lifter and the rock shaft to restore the parts to normal position.

5. In electrically operated means for a block signal, the combination of rock shaft 8 55
 having crank arms 7 and 9, a pivoted lifter frame, operating means 11 normally held out of engagement with the crank arm 9 by
 means of the said lifter frame, means for mov- 60
 ing the lifter frame to permit the part 11 to make engagement with the crank arm 9, op-
 erating means for the part 11 to set the sig- 65
 nal to danger, a rock shaft 18, connecting means between said rock shafts 18 and 8,
 other connecting means between the rock 65
 shaft 18 and the aforementioned lifter frame, and means for actuating the rock shaft 18 for
 restoring the working parts to normal posi-
 tion and at the same time to return the sig- 70
 nal to safety.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES G. O. COMBS. [L. S.]
 ISAAC D. COMBS. [L. S.]

Witnesses:

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 JAMES G. TURPIN.