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Patented Apr. 2, 1901.

H. SHOEMAKER.

ELECTRIC BLOCK SIGNAL SYSTEM FOR RAILWAYS.

(Application filed Nov. 26, 1900.)

(No Model.)

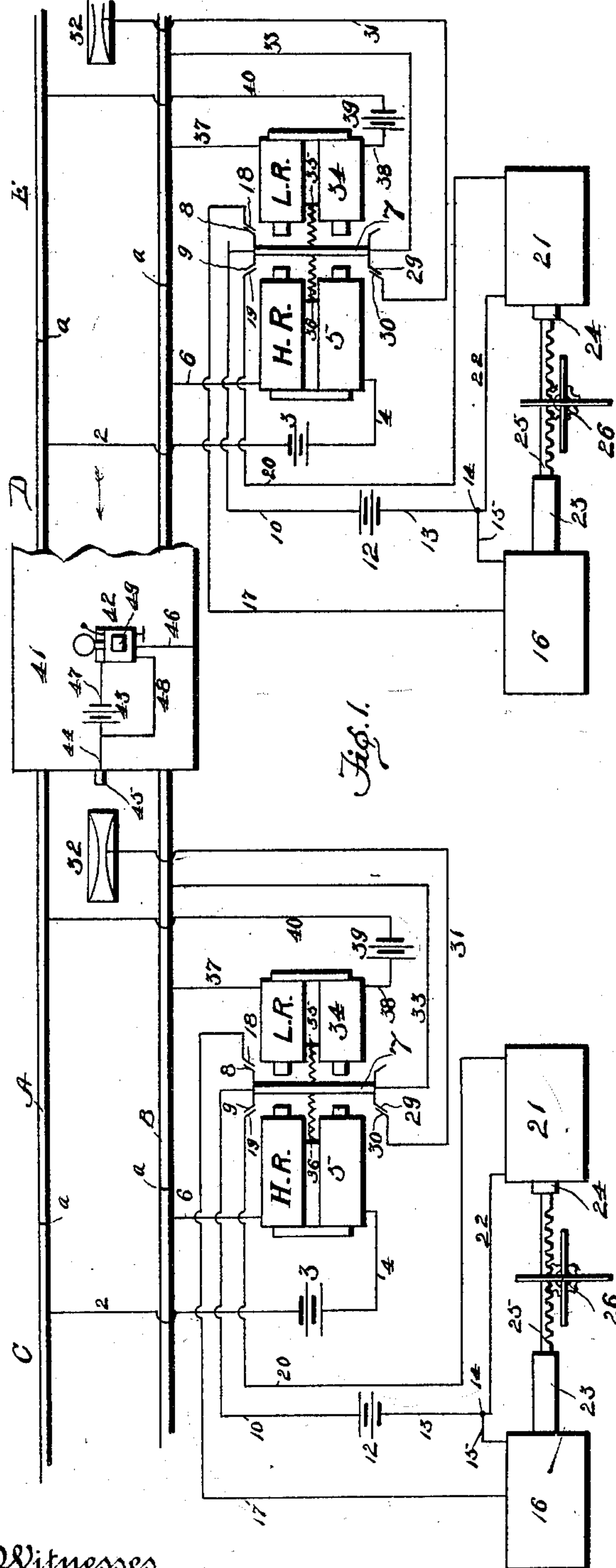


Fig. 1.

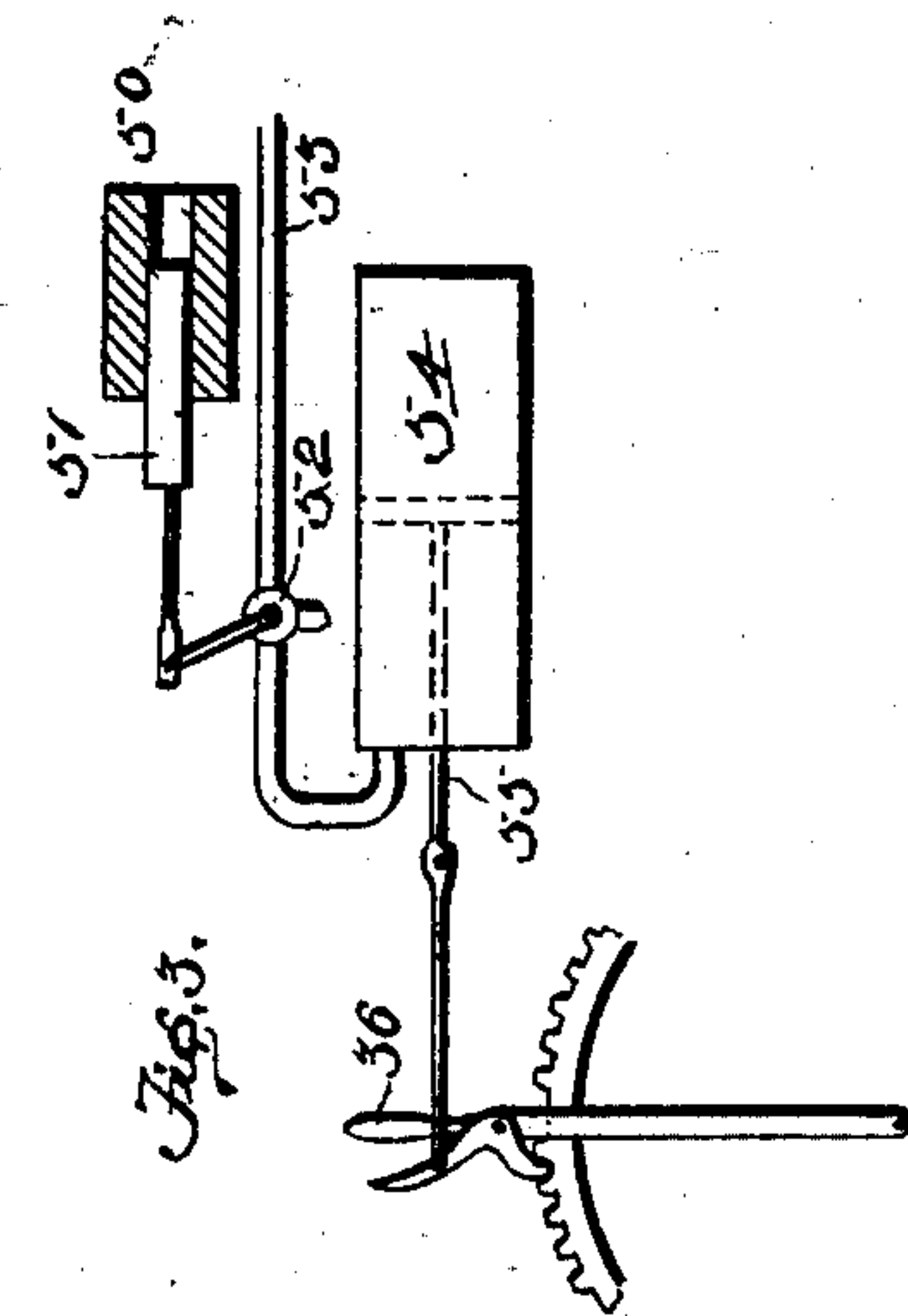


Fig. 3.

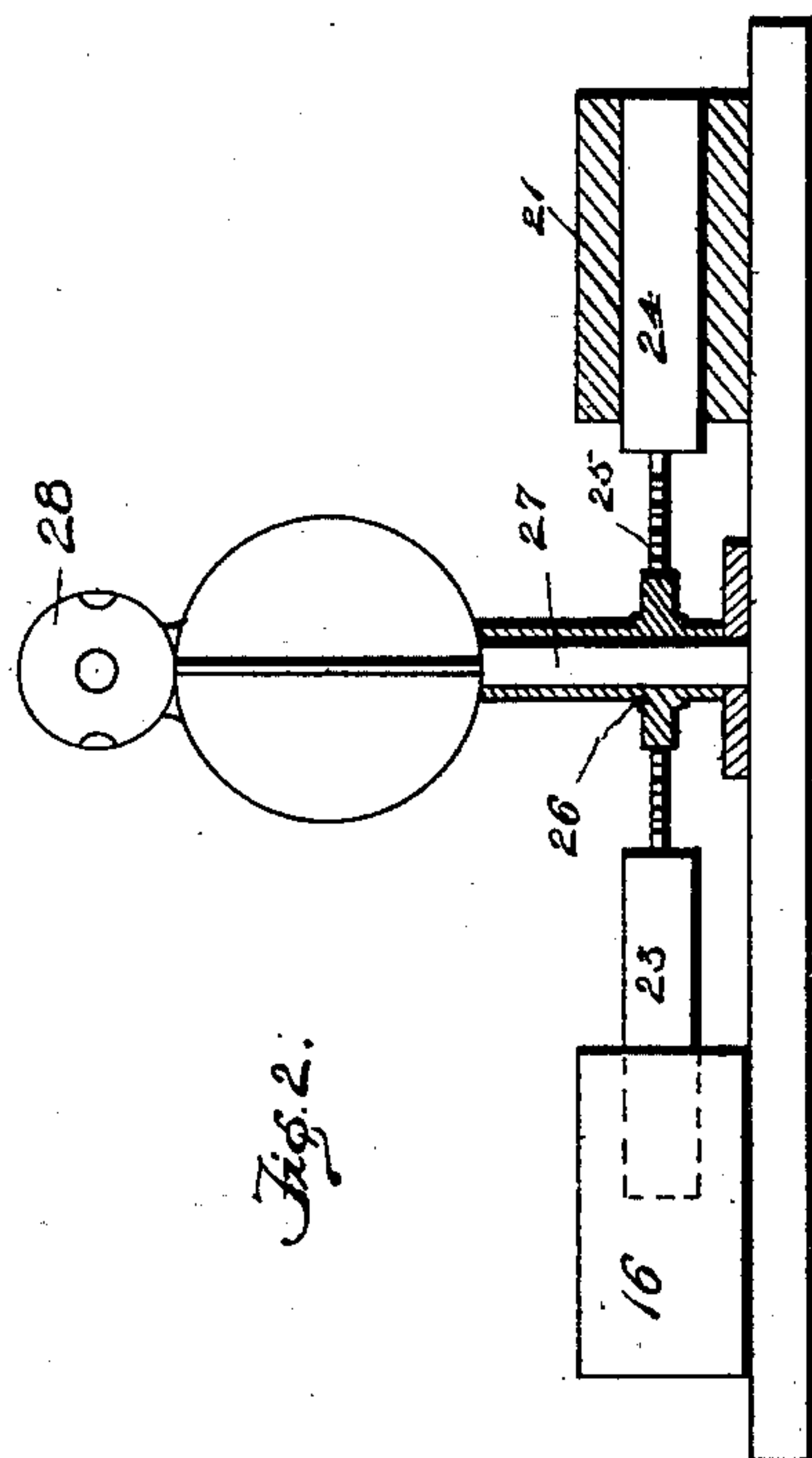


Fig. 2.

Witnesses

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ELECTRIC BLOCK-SIGNAL SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 671,404, dated April 2, 1901.

Application filed November 26, 1900. Serial No. 37,822. (No model.)

To all whom it may concern:

Be it known that I, HARRY SHOEMAKER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Block-Signal Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain novel improvements in electric block-signal systems for railways; and the object is to simplify the construction, increase the efficiency, and provide as nearly perfect an autosignal system of this character as it is possible for human ingenuity to attain by electromechanical means.

To this end my invention consists in the construction, combination, and arrangement of the several elements of the system, as will be hereinafter more fully described, and particularly pointed out in the claims.

Referring to the accompanying drawings, in which similar characters of reference are used to denote similar parts in each of the several views, Figure 1 is a top plan or diagrammatic view of my improved electric block-signal system. Fig. 2 is an enlarged sectional detail view of the visible-signal stand. Fig. 3 is a detail view of the automatic throttling device.

A and B denote the usual railway-rails, which are insulated and divided into sections, as C, D, and E, by means of the non-conducting plates *a a*, interposed between the abutting ends of the rails of the contiguous sections.

Referring to section C, the numeral 2 denotes a conductor extending from the rail A to the positive pole of the battery 3, and from the negative pole of said battery 3 a conductor 4 extends to the relay 5, and from thence a conductor 6 extends to the rail B, the arrangement being such that when the rails A and B are electrically connected—as, for example, by the passage of a car or train over them—the relay 5 will be energized through the medium of the battery 3, the effect of which will be to attract the armature 7, one

end of which is provided with a duplex contact-point 8 9, from which a conductor 10 extends to the battery 12, and from thence a conductor 13 extends to a binding-post 14, from which a conductor 15 extends to the solenoid 16, and whence a conductor 17 extends to the stationary contact-point 18, fixed in the path of the contact-point 8, carried by the armature 7, and from the stationary contact-point 19, fixed in the path of the armature contact-point 9, a conductor 20 extends to the solenoid 21, from whence a conductor 22 extends to the binding-post 14, so that when the contact-points 8 18 are closed the solenoid 16 will be energized through the medium of the battery 12, setting the visual track-signal to “white” or “safety,” and when the contact-points 9 19 are closed the solenoid 21 will be energized through the medium of said battery 12, moving the visual signal to “danger.” The solenoids 16 and 21 are provided, respectively, with plunger-cores 23 24, which are connected by a rack-bridge or yoke 25, which meshes with a pinion-sleeve 26, revolvably mounted on a standard 27, and the sleeve 26 carries the usual red and white wings or vanes, as shown, and above these vanes is mounted an opaque globe 28, in which are fixed the usual red and white or clear lenses for night signaling and which correspond to the vanes beneath. The opposite end of the armature 7 is also provided with a contact-point 29, in the path of which is fixed a contact-point 30, a conductor 31 extending from the latter to an insulated spring contact-point 32, fixed midway between the rails A B of the block-section D, and from the armature contact-point 29 a conductor 33 extends to the rail B of said section D.

34 designates a second relay fixed in the path of the armature 7 and oppositely opposed to the relay 5, the said relay 34 being approximately about one-half the pulling force of the relay 5, and the common armature 7 is provided with retractile springs 35 36, which are adjusted to retain the armature in a normal position midway between said relays when neither is in circuit. The relay 34 is provided with a conductor 37, which connects with the rail B of block-section D, and with a conductor 38, which extends to

the positive pole of the battery 39, from which a conductor 40 extends to the rail A of said section D.

41 designates the locomotive, the cab of which carries a drop-signal vibrating bell 42 in circuit with a local battery 43, one of the conductors 44 of which extends to a contact-plow 45, which is arranged to connect with the stationary spring-contact 32, fixed in its path between the rails, and the other conductor 46 extends to the framework of the locomotive, so as to be in contact with the rails A and B.

47 and 48 denote the conductors which form the short circuit for the bell 42 and battery 43, and 49 designates the setback which is used to break this short circuit when the engineer has noted the signal.

Attention may be called to the fact that when a train is on block-section C the relay 5 is energized, as heretofore described, and the visual track-signal set to show "red." At the same time the armature 7 closes the contact-points 29 30, so that when the plow 45 of a succeeding train comes in contact with the contact-point 32 between the rails the circuit 31 33 is completed through the battery 43, bell 42, and conductors 44, 46, and 48 to energize the cab-alarm 42, which when once started is short-circuited by the conductors 47 48 and continues to sound an alarm until the said short circuit is interrupted by the setback 49. On the other hand, if there be no train on said section C the circuit including the relay 5 remains open. Consequently the cab-alarm circuit 31 33 is broken between the contact-points 29 30, and thus the plow 45, coming in contact with the contact-point 32, produces no effect on the bell 42, the silence of which indicates that the section ahead is "clear."

As long as a train is on a particular section the red or danger signal is shown from the signal-stand for that particular section, and as the train leaves that particular section the rail-contact is broken between the conductors 2 and 6, which demagnetizes the relay 5, but still leaves the signal set "red," so that when a following train enters the next rear block-section D it immediately closes the rail-contact circuit 37 and 40, which energizes the relay 34 and in attracting the armature 7 closes the contact-points 8 18, completing the circuit 10, 12, 13, 14, 15, and 17, which includes and energizes the solenoid 16, which reverses the position of the visible signal, withdrawing the red and showing the white to indicate that the preceding block-section is clear. If, however, the preceding section is not clear by reason of a train being within its bounds, the rail-circuit 2 6 remains closed by the train connecting the rails, the relay 5 and solenoid 21 continue energized, and the red signal remains set, and at the same time the alarm-circuit is connected at the points 29 30. In this condition of affairs the following train on entering the succeeding section D will

simultaneously set the red signal for that section and close the rail-circuit 37, 38, 39, and 40, thereby energizing the relay 34; but as the latter is so wound as to have only about one-half the pulling capacity of the relay 5 the armature 7 does not respond to the influence of the relay 34. Consequently the apparatus at section C remains *in statu quo*, and when the locomotive arrives at the spring contact-point 32 the cab-alarm circuit is closed, thereby sounding the alarm 42, as heretofore described, and causing the train to come to a full stop on the section D. As soon as the preceding train on section C has left said section the rail-contact circuit 2 6 is broken by the fact of the train passing out of said section C, which demagnetizes the relay 5, thereby permitting the armature 7 to respond to the influence of the charged relay 34, the effect of the movement of said armature being to break the solenoid 21 circuit at the contact-points 9 19 and at the same time close the solenoid 16 circuit at the points 8 18, which causes the said solenoid 16 to reverse the position of the visual signal by withdrawing red and exposing the white, and thereby inform the engineer of the succeeding train that the section ahead, C, is clear.

In Fig. 3 I have included a solenoid 50 in the locomotive-cab-alarm circuit 44 48, and this solenoid 50 is provided with a plunger-core 51, operatively connected to the lever or handle of a three-way plug-cock 52 in a compressed-air-supply pipe 53, which communicates with a cylinder 54, provided with the usual piston and rod 55, the latter being connected to the throttle-lever 56 and the reversing-lever 57, so that when said cab-alarm circuit is closed the solenoid 50 is energized, which operates the plug-cock 52, so that the throttle is automatically operated to shut down and reverse the engines should an accident prevent the engineer from attending to this duty.

In the accompanying drawings I have shown my invention in the best form now known to me; but various changes in the details may be made within the skill of a good mechanic without departing from the spirit of my invention as set forth in the claims.

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

1. In an electric signaling system for railways the combination of a track divided into sections, relays bridging the rails of adjacent track-sections, an armature common to both relays, a track-signal, electromagnets controlling said track-signal, circuits for said electromagnets controlled by the respective relays.

2. In an electric signaling system for railways, the combination of a track divided into sections, relays of different strengths bridging the rails of adjacent track-sections, an armature common to both relays, a track-signal, electromagnets controlling said track-

signal, circuits for said electromagnets controlled by the respective relays.

3. In an electric signaling system for railways the combination of a track divided into
5 sections, relays bridging the rails of adjacent track-sections, an armature common to both relays, a track-signal provided with electromagnetic means controlled by said armature to move said track-signal to "clear" and to
10 "danger," a signal in the engine-cab and a

circuit for said cab-signal adapted to be closed by the engine and the relay-armature when said track-signal stands at "danger."

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 15

HARRY SHOEMAKER.

Witnesses:

G. P. GEHRING,
J. N. FORT, Jr.