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PATENTED DEC. 18, 1906.

J. S. CUNNINGHAM.

SIGNAL DEVICE.

APPLICATION FILED OCT. 26, 1905.

3 SHEETS—SHEET 1.

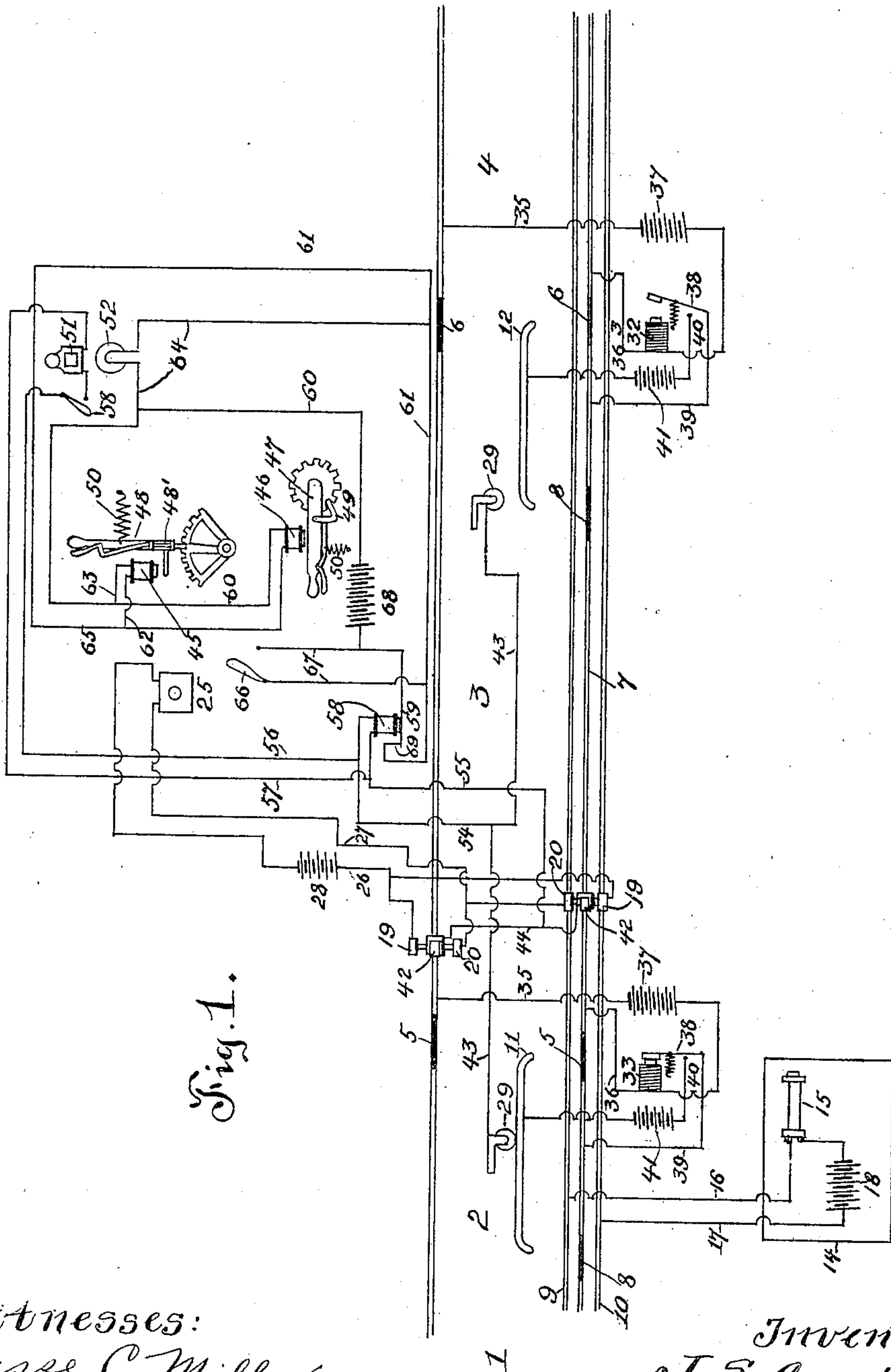


Fig. 1.

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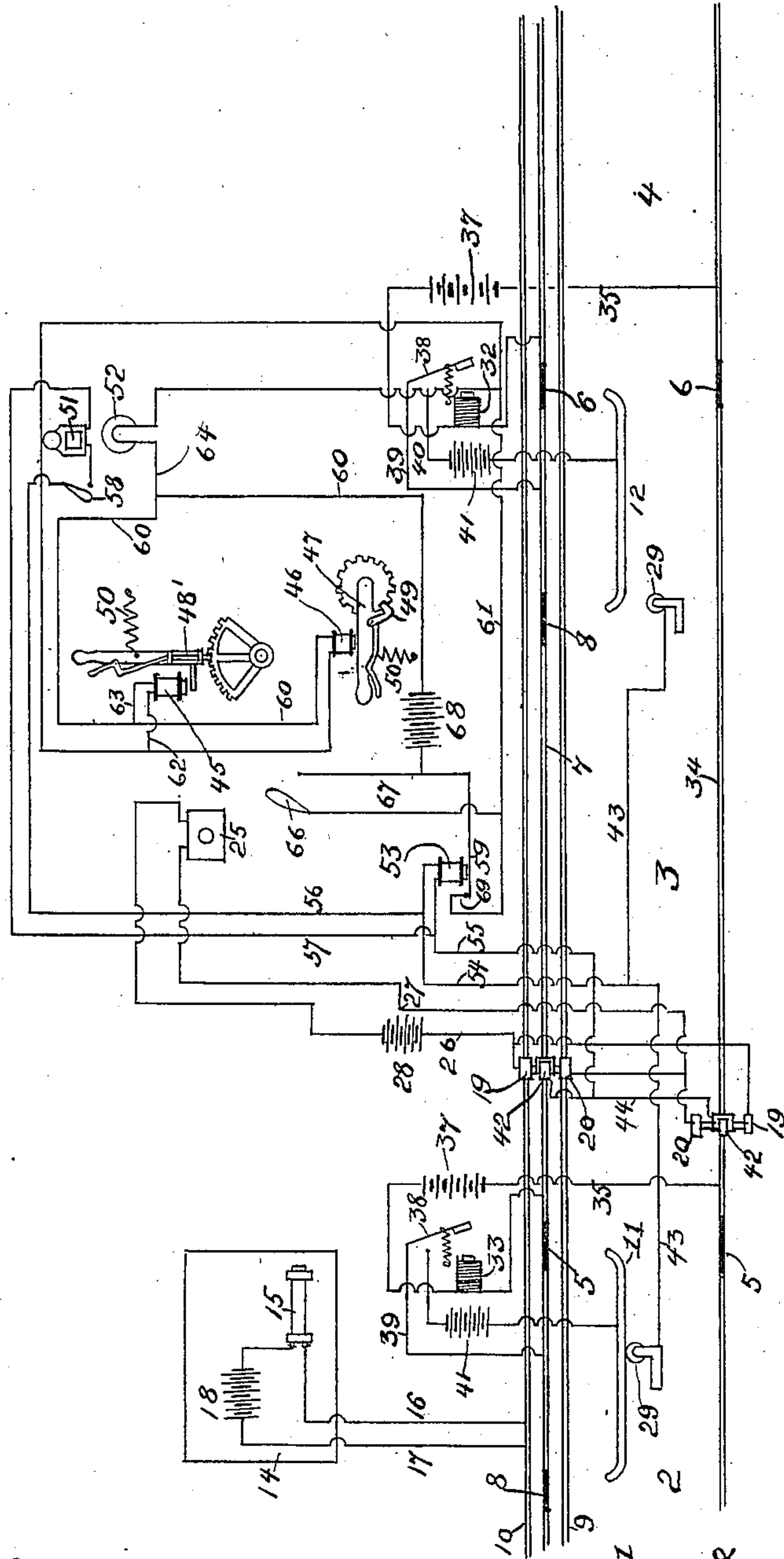
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3 SHEETS—SHEET 2.

Fig. 1a



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3 SHEETS—SHEET 3.

Fig. 2.

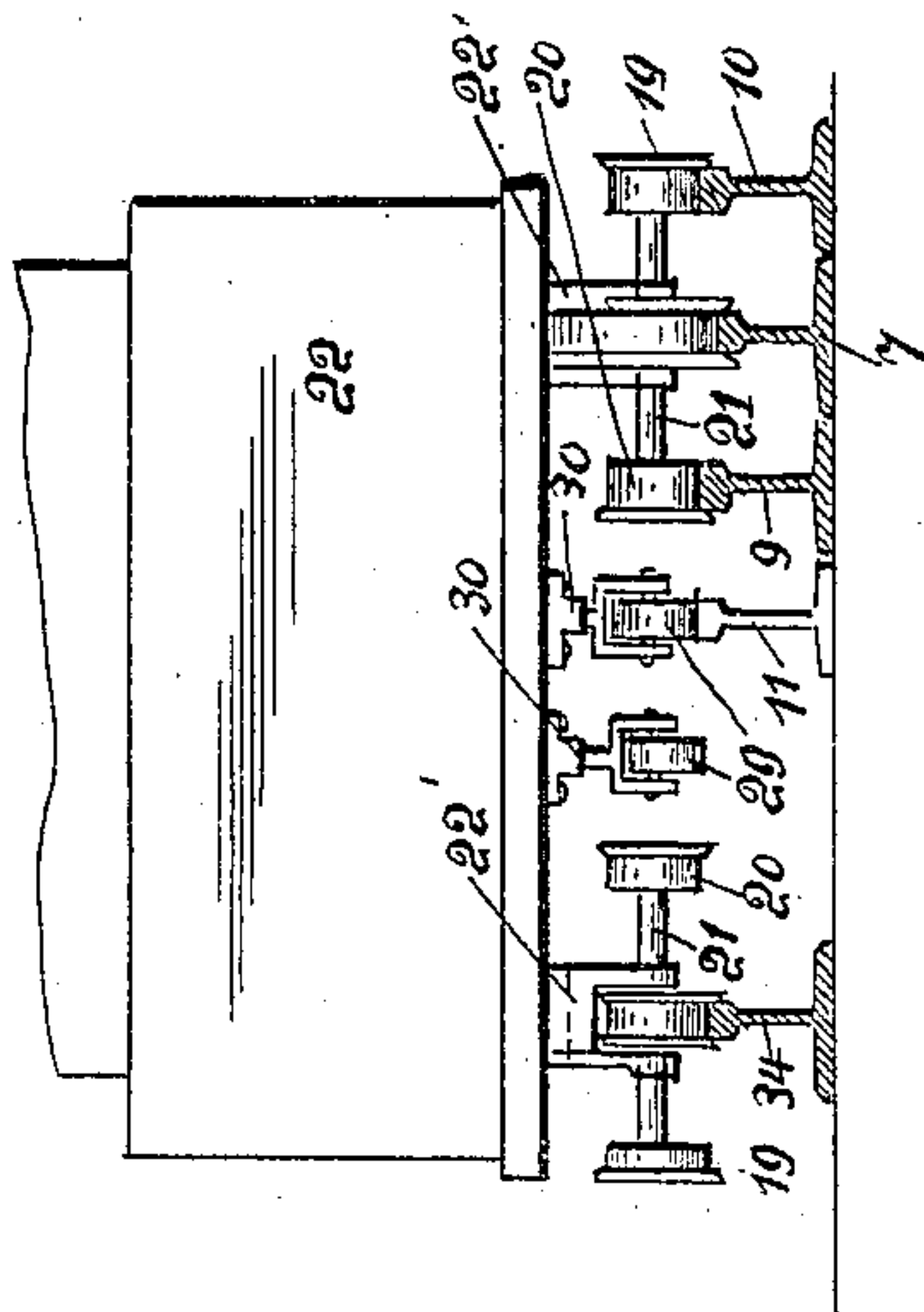
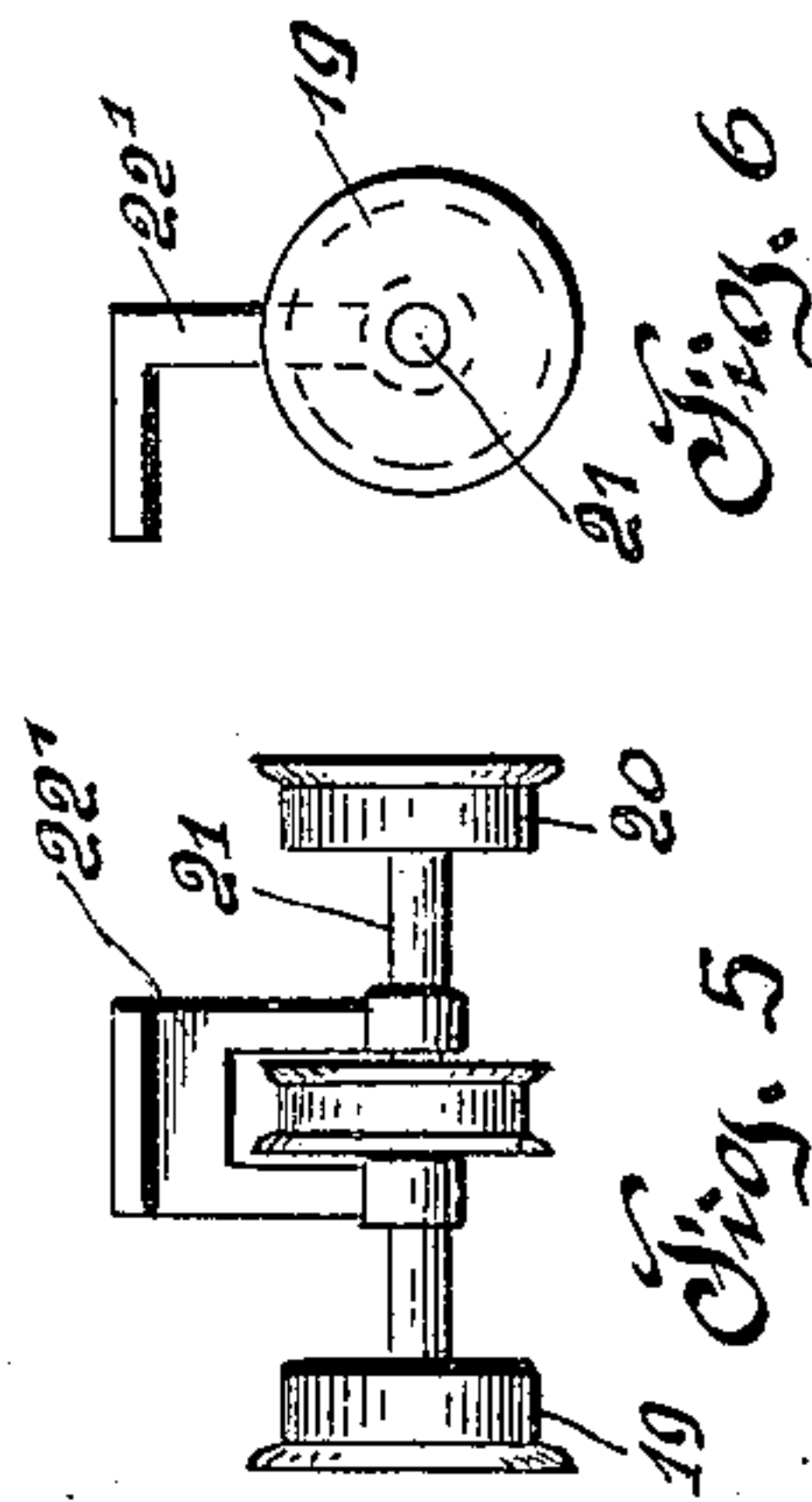
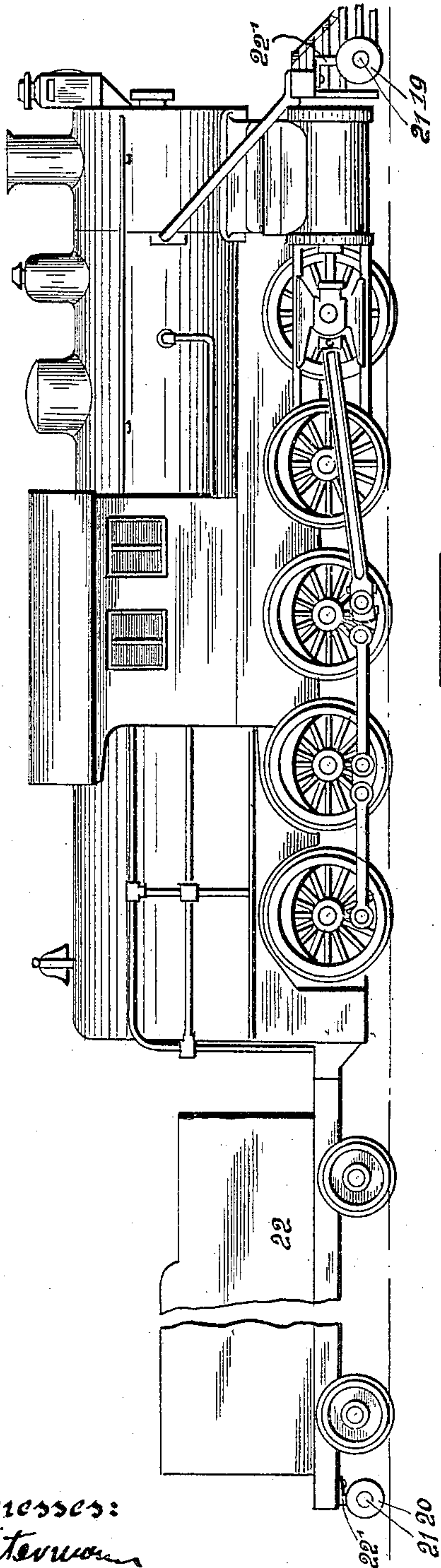


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES S. CUNNINGHAM, OF ALLEGHENY, PENNSYLVANIA.

SIGNAL DEVICE.

No. 838,848.

Specification of Letters Patent.

Patented Dec. 18, 1906.

Application filed October 26, 1905. Serial No. 284,549.

To all whom it may concern:

Be it known that I, JAMES S. CUNNINGHAM, a citizen of the United States of America, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Signal Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain improvements in signal devices; and the invention has for its primary object the provision of novel means for preventing collisions upon railways.

15 The invention aims to provide positive and reliable means for stopping a train upon the block of a railway should another train be detained in the preceding block. In this connection the invention is adapted to be used in connection with a railway that is divided into a plurality of blocks or sections, and in connection with these blocks or sections I employ means to establish a communication between said blocks or sections, also
25 between the stations or block-houses along the route.

To this end the invention comprises certain mechanisms which are electrically controlled from a suitable source of energy, these mechanisms being actuated by trains operating in connection with a railway. The mechanisms are adapted to automatically cut off the supply of steam to locomotives and set the brakes, also causing an audible or visible
35 signal to be given.

The construction of my improved signal device will be presently more fully described, and reference will now be had to the accompanying drawings, wherein like characters of reference designate corresponding parts throughout the several views, in which—

40 Figure 1 is a diagrammatic view of a portion of a railway equipped with my improved signaling device. Fig. 1^a is a similar view to Fig. 1, but showing the relative position of parts when the rolling-stock is on a companion track to that shown in Fig. 1—that is to say, Fig. 1 shows the rolling-stock on the right-hand track and Fig. 1^a on the left-hand
45 track of a double-track railway. Fig. 2 is a side elevation of a locomotive constructed to actuate my improved signaling device. Fig. 3 is a rear end view of the same, partly broken away. Fig. 4 is a detail sectional
50 view, partly in side elevation, of one of the

signal-wheels carried by the locomotive. Fig. 5 is a detail view of one of the signal-wheels and telephone-wheels carried by the locomotive, and Fig. 6 is a side elevation of the same.

To put my invention into practice, I divide a railway-track 1 into blocks or sections 2, 3, and 4, these sections being suitably insulated from one another, as at 5 and 6. The outer rail 7 of the track 1 is also insulated, as at 8 8, and in connection with this outer rail I employ two rails 9 and 10, which I will hereinafter term "telephone-rails," these rails being mounted on each side of the main rail 7.

The blocks or sections of the track 1 are provided with sectional rails 11 and 12, these rails serving functionally as signal-rails—that is, for actuating, in conjunction with the main track, the signal mechanism to be hereinafter described.

Reference will first be had to a signal-telephone system which I employ in connection with the railway 1, the telephone system being adapted to establish communication between each one of the blocks or sections of the main track, also stations and block or signal houses *en route*. I have illustrated a station or signal house 14, situated adjacent to the block 2 and the telephone-rails 9 and 10 of this block, and consequently the blocks 3 and 4, as connected with a telephone
85 15 within the station by wires 16 and 17. A suitable source of electrical energy, such as a battery 18, is located in the station 14 to be used in connection with the telephone of the station.

In order that the engineer of a locomotive or any official upon a train passing over the track 1 may communicate with the station 14 or a train in the next block, each locomotive is equipped with two telephone contact-wheels 19 and 20, these wheels being adapted to travel upon the telephone-rails 9 and 10, respectively. The contact-wheels 19 and 20 are journaled upon a shaft 21, mounted in a bracket 22', carried at each end of the locomotive, the wheels 19 and 20 being carried upon the right-hand side of the forward part of the locomotive, while they are mounted upon the left-hand side at the rear end of the tender
105 22, this being clearly shown in Figs. 2 and 3 of the drawings, wherein I have illustrated a conventional form of locomotive equipped to actuate my improved signal mechanism. The contact-wheels 19 and 20, which I have
110

illustrated in Fig. 1 of the drawings as connected with the rails 9 and 10, are connected with a telephone 25, mounted upon the train by wires 26 and 27. The wire 26 is also connected to a suitable source of electrical energy, such as a battery 28, carried by the train or locomotive.

The operation of the telephone system just described is as follows: When a train passes upon the block 2 at any time during its travel, it can communicate with the station 14 through the medium of the telephone-rails 9 and 10, the circuit from the telephone 25 being through wire 27 to wire 23, through wire 23 and wheel 20, through telephone-rail 9, wire 16, to the telephone 15, from said telephone through the battery 18, wire 17, to rail 10, and from this rail to wheel 19 and from said wheel 19 by way of wire 24 and wire 26 to the telephone 25, the circuit passing through the wheels 19 and 20 as the train passes upon a block. It is also possible to establish communication with a train in either block upon each side of the block 2 or possible for one station to communicate with another.

The signal system which I employ in connection with the telephone system just described consists of providing the locomotive or train with two contact-wheels 29, which are resiliently mounted in casings 30, carried by the locomotive, the contact-wheels being adapted to engage, respectively, the sectional rails 11 and 12 and be normally held in contact with said rails by a spring 31, mounted in the casing 30. Each one of the blocks 2, 3, and 4 are provided with relays 32 and 33, these relays connecting with the rails 34 and 7 of the track 1 by wires 35 and 36. Each relay is in communication with a suitable source of electrical energy, such as a battery 37. Mounted adjacent to each relay is a contact-arm 38, this contact-arm controlling the circuit of the third rails 11 and 12 and the rail 7 through the medium of wires 39 40 and a battery 41.

Each one of the contact-wheels 29 is in circuit with the truck-wheels 42 42 of the locomotive or train, this being accomplished by connecting the wheels 29 29 by a wire 43 and the wheels 42 42 by a wire 44. Electromagnets 45 and 46 are mounted adjacent to the air-brake lever 47 and the throttle-lever 48 of the locomotive, these electromagnets when energized being adapted to release the lock-pawls 48' 49, respectively, of the air-brake lever 47 and the throttle 48 and permit of the lever and throttle-lever being moved by springs 50 to shut off the steam of the locomotive and apply the brakes. An audible signal 51 and a visible signal 52 are also mounted in the locomotive to give an alarm at a predetermined time, and the circuits employed to accomplish this result are as follows: A relay 53 is mounted on the loco-

motive or train, and this relay is connected by wires 54 and 55 to the wires 43 and 44, respectively. Cut in upon these wires by wires 56 and 57 is the audible signal 51, the operation of this signal being controlled by a conventional form of switch 58, which when closed will establish a circuit from the wires 54 and 55. A contact-arm 59 is mounted adjacent to the relay, and this contact-arm is connected by wires 60 and 61 with the electromagnet 46, the electromagnet 45 being cut in upon the wires 60 and 61 by wires 62 and 63. The visible signal 52 is cut in upon the wires 60 and 61 by wire 64, and the circuit over these wires is also controlled by a test-switch 66, which is cut in upon the wires 60 and 61 by wires 67 67. The wires 60 and 61 are in communication with a suitable source of electrical energy 68. When a train is traveling over the track 1, the contact-arm 59 of the relay 53 is normally held out of engagement with the contact-point 69 of the wire 61 when traveling over that section of the block designated A, the track-battery 41 serving to energize the relay 53 of the train. Should a train be in the block 4, a circuit is established between the rails 34 and 7, which energizes the relay 32, attracting the contact-arm 38 and closing the circuit through the relay 53, and when this circuit is closed the contact-arm 59, engaging the contact-point 69, completes a circuit through the wires 60 and 61 and battery 68, which energizes the electromagnets 45 and 46 and applies the brakes and shuts off the steam of the locomotive, at the same time giving a signal. This operation notifies the engineer or operator of the train or locomotive that a train is in the next block, and the operation also stops the train until the circuit of the relay 32 is broken and the relay 69 resumes its normal condition.

By referring to Fig. 3 of the drawings it will be observed that the signal-rail and the telephone-rails are elevated above the ordinary rails of the railroad, this being essential when one track crosses another, and in some instances the signal and telephone rails may be so constructed as to permit the wheels of a car passing over the same without causing any damage or interfering with the general movement of a train.

When two trains are held up on two separate blocks, they may readily communicate with one another by the telephone system, which is entirely independent of the signal system, and it is thought from the foregoing that the construction, operation, and advantages of the herein-described signal device will be apparent without further description, and various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

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

1. In a signal device, the combination with railway-blocks and a locomotive, of telephone-rails extending from one block to another, a signal-rail mounted in each block, two wheels carried by said locomotive and adapted to engage said telephone-rails, a telephone carried by said locomotive, and in closed circuit with said two wheels, another wheel carried by the locomotive and contacting with one of the railway-rails, sectional signal-rails disposed along the track, audible and visible signals carried by said locomotive, and in circuit with said last-named wheel, a fourth wheel carried by the locomotive and in circuit with said signals and adapted to contact with said signal-rail, electromagnets mounted adjacent to the operating-levers of said locomotive, and adapted to be energized by said wheels engaging the railway-rail and the signal-track to release said levers, and means to normally establish communication between said blocks and lo-

comotives in said blocks, substantially as described. 25

2. In a signal device the combination with railway-rails divided into blocks and a locomotive of telephone-rails extending from one block to another, a signal-rail mounted in each block, said telephone-rails and said signal-rail being elevated above the railway-rails, wheels carried by said locomotive and adapted to engage said telephone and signal rails, a telephone carried by said locomotive, signals carried by said locomotive, electromagnets mounted adjacent to the operating-levers of the locomotive and adapted to be energized by said wheels engaging the signal-tracks to release said levers and means to normally establish communication between said blocks and locomotives in said blocks. 30 35 40

In testimony whereof I affix my signature in the presence of two witnesses.

JAMES S. CUNNINGHAM.

Witnesses:

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