No. 862,589. PATENTED AUG. 6, 1907.

A. J. ROY.

AUTOMATIC ELECTRIC SIGNALING DEVICE.

APPLICATION FILED MAR. 9, 1906.

4 SHEETS—SHEET 1.

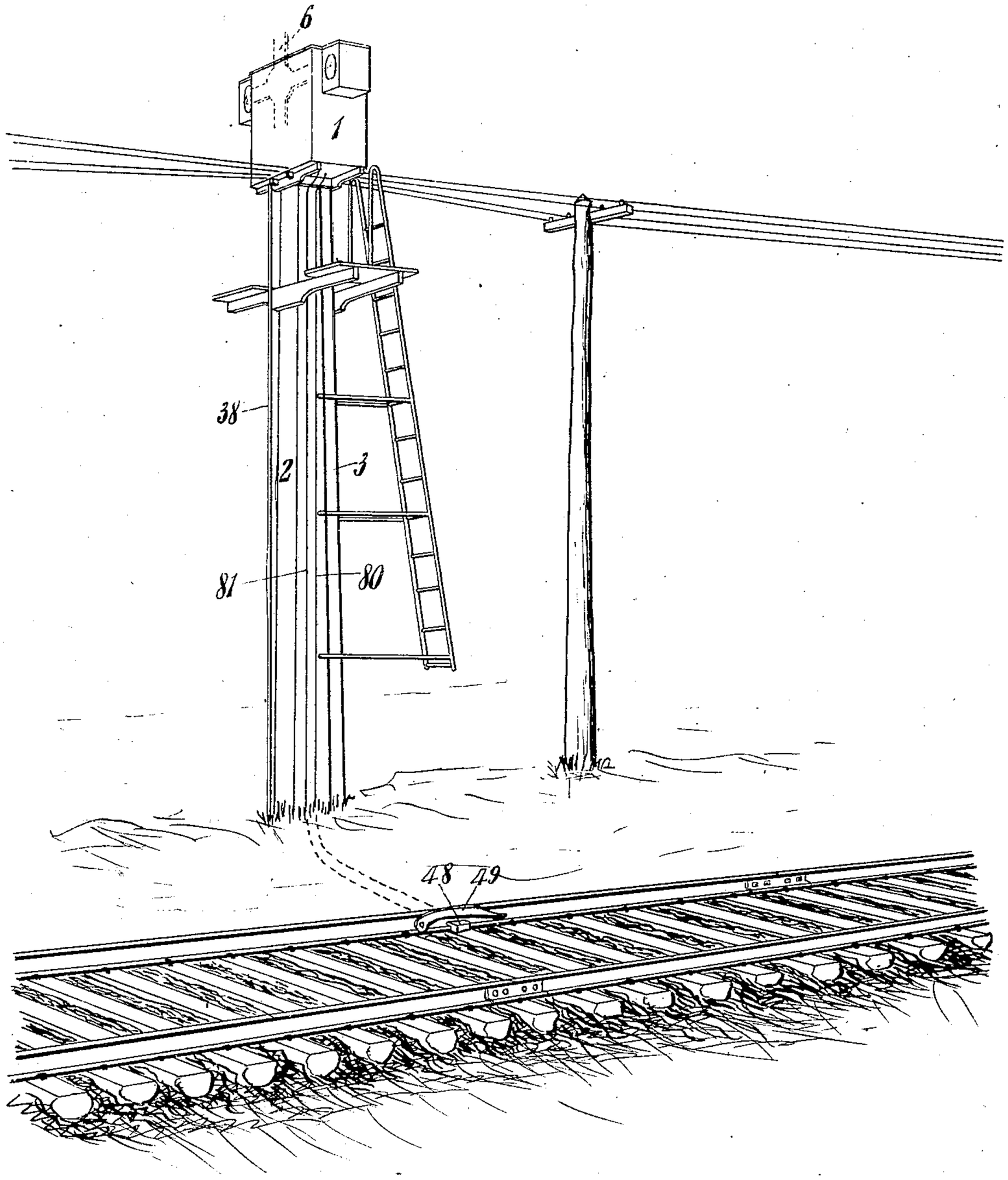

Fig. 1.

Witnesses
Stuart H. Allen.
Williams G. Armstrong.

Inventor
Avila J. Roy.
By Fred B. Fahnestock Att'y

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4 SHEETS—SHEET 2.

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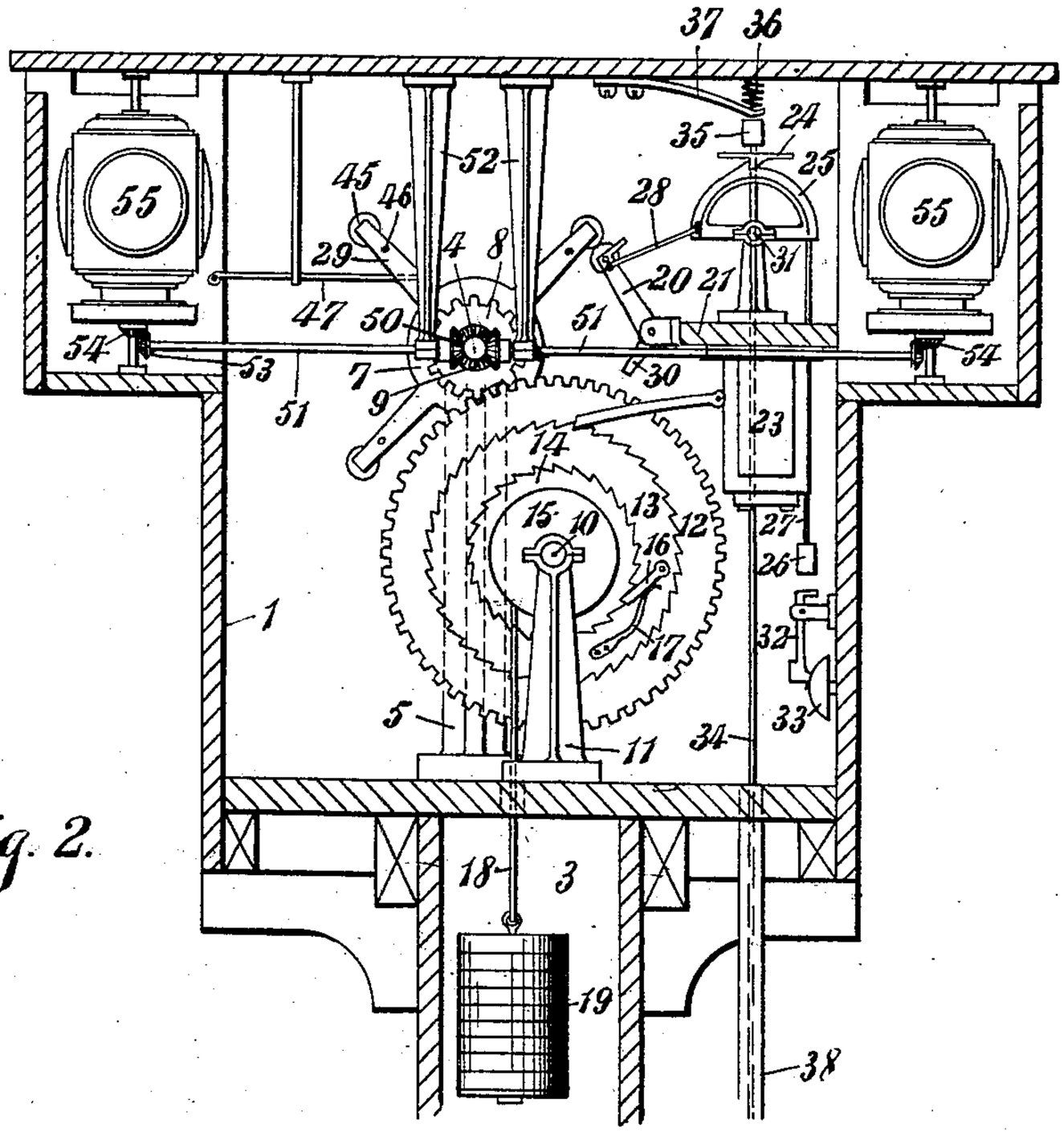

Fig. 2.

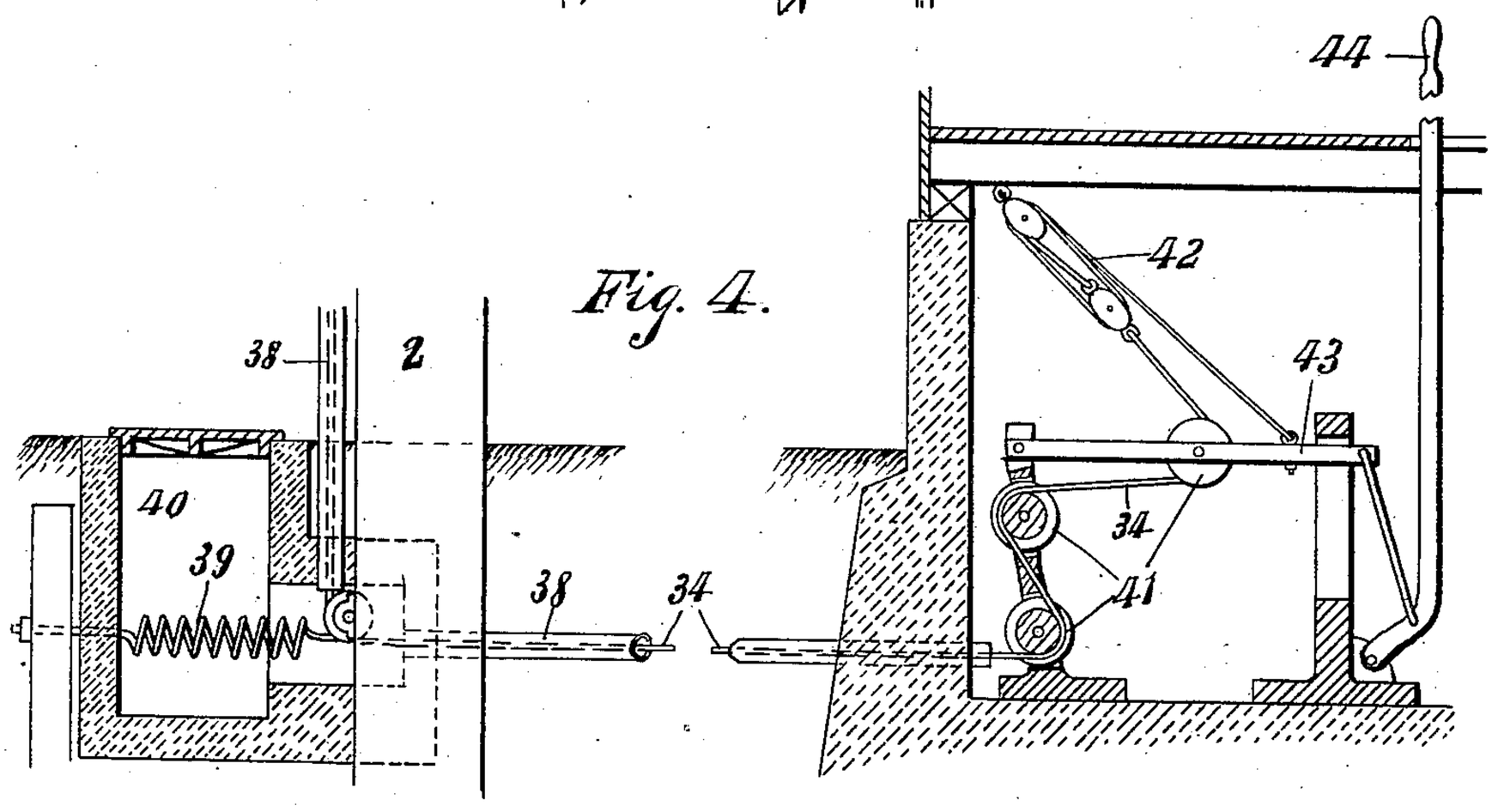

Fig. 4.

Witnesses
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4 SHEETS—SHEET 3.

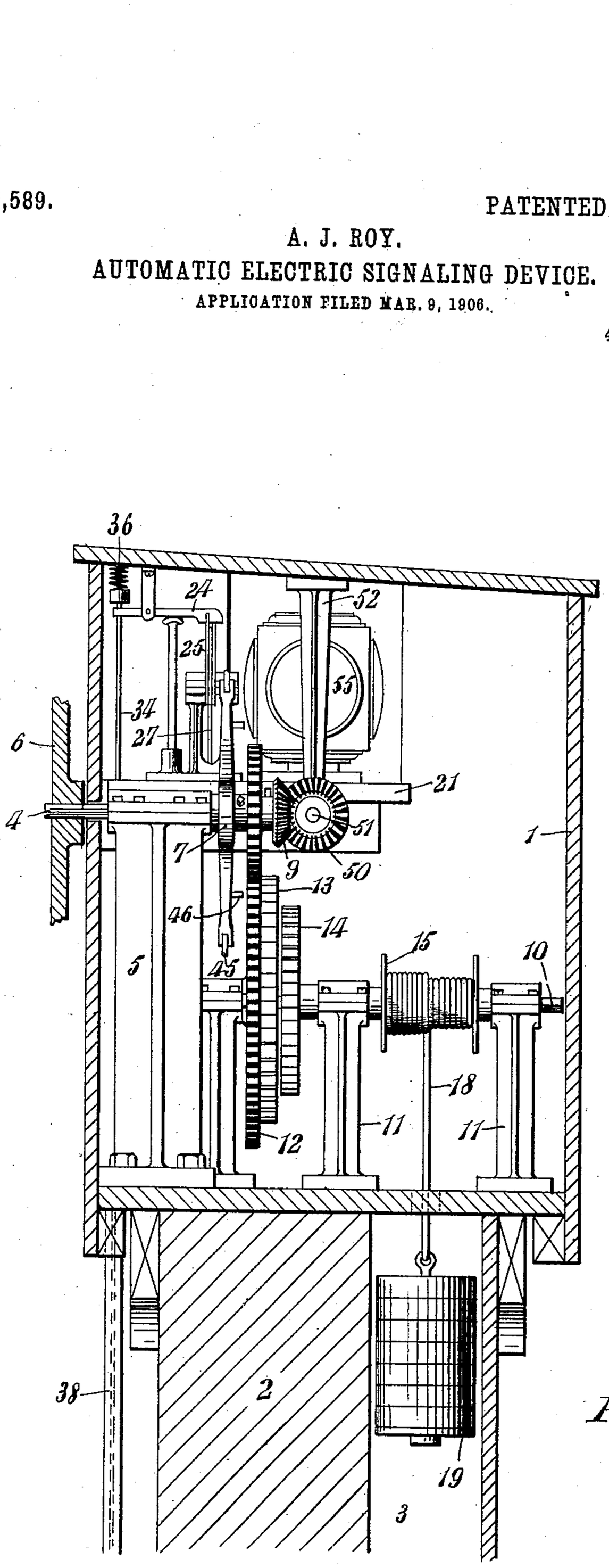

Fig. 3.

Witnesses
Stuart H. Allen
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Inventor
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By Fred B. Fahnestock Atty.

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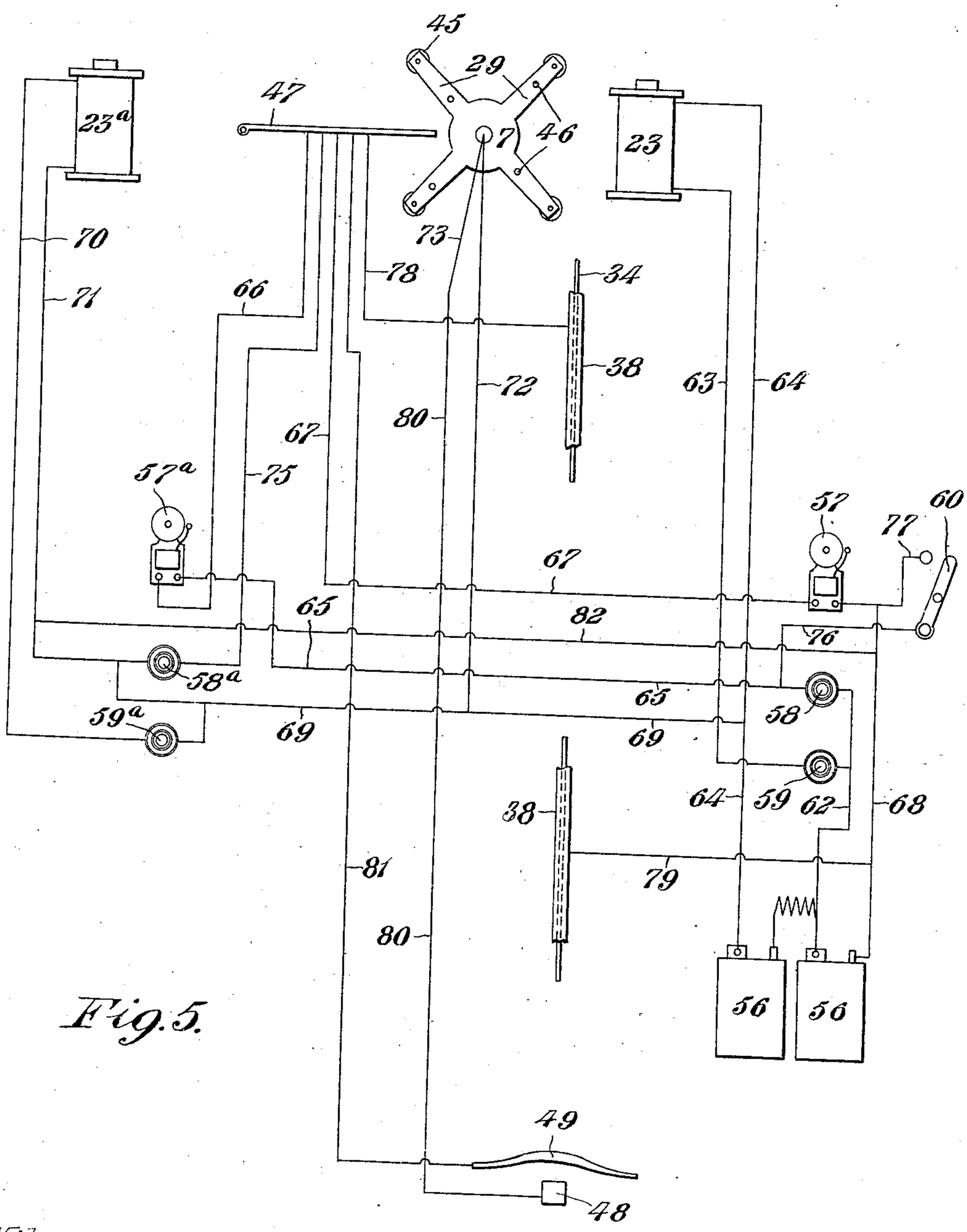

Fig. 5.

Witnesses
Stuart C. Wallace.
William G. Armstrong.

Inventor
Avila J. Roy.
By Fred B. Fahnestock Atty.

UNITED STATES PATENT OFFICE.

AVILA JOSEPH ROY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO AUGUSTE ZENON TRACHY, OF PROVIDENCE, RHODE ISLAND.

AUTOMATIC ELECTRIC SIGNALING DEVICE.

No. 862,589. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed March 9, 1906. Serial No. 305,016.

To all whom it may concern:

Be it known that I, AVILA JOSEPH ROY, of the city of Providence, in the State of Rhode Island, United States of America, have invented certain new and useful Improvements in Automatic Electric Signaling Devices, of which the following is a full, clear, and exact description.

My invention relates to electrically controlled semaphores and is designed as an improvement on U. S. Patent, No. 757,722, granted April 19th, 1904, to Dona Boisvert.

The main object of my invention is to provide a semaphore having positive means for rotating the semaphore arms and lamps, and electrically actuated means for controlling said rotating means.

A further object is to provide means for automatically operating the semaphore from a distant station, notifying the operator of the position of the semaphore, notifying the operator of the passage of a train, and further for communicating from station to station; or from the station to a lineman at the semaphore.

To accomplish these objects, I employ an elevated casing containing a weight actuated mechanism for rotating the semaphore arms, an electric controlling apparatus, and a pair of revoluble lamps having differently colored glasses in their sides. The source of the electric current is located in the operating station which is so connected to the semaphore that notice of each shift of the arms or lamps is conveyed to the operator. Each operating station is also connected to the next station along the line so that intercommunication is established. An attachment adjacent the rails and actuated by the train wheels notifies the operator of the passage of every train at the semaphore. A manually operated lever is provided for the signaling mechanism in case of accident to the electric circuit.

In the drawings which illustrate my invention, and throughout all the figures of which like reference numerals designate corresponding parts:—Figure 1 is a perspective view of the semaphore in operative position on a line of railway. Fig. 2 is an interior view of the tower showing the front of the operating mechanism. Fig. 3 is a view similar to Fig. 2 showing the side of the mechanism. Fig. 4 is a vertical sectional view of the base of the tower and the basement of the station, showing the emergency mechanism for controlling the semaphore in case of accident to the electric circuit. Fig. 5 is a wiring diagram showing the connections between the operating station, semaphore, and the next station on the line.

In the above defined figures, 1 designates the casing supported on a post 2 having a weight shaft 3 at one side thereof. A shaft 4 is journaled in a bracket 5 attached to the casing 1 and supports on its outer end the semaphore arms 6, and toward the inner end, a pallet wheel 7, pinion 8, and bevel gear 9. A second shaft 10, journaled in brackets 11 similar to the brackets 5, carries a large loose gear wheel 12 meshing with the pinion 8, a ratchet wheel 13 fixed to said gear wheel, a fixed ratchet wheel 14, and a fixed drum 15. A pawl 16 on the ratchet wheel 13 is held in engagement with the teeth of the wheel 14 by a spring 17, thus allowing the drum 15 and wheel 14 to be rotated independently of the wheel 13 in one direction only. A rope 18 is wound on the drum 15, and a heavy weight 19 is attached to the free end of said rope. This weight is adapted to descend the shaft 3, thereby unwinding the rope 18 and rotating the drum 15 towards the left, as seen in Fig. 2. By reason of the pawl 16, the wheel 13 and gear wheel 12 will be rotated likewise, thus rotating the pallet wheel 7. The arc of revolution of the pallet wheel 7 is governed by the pallet 20, which is pivoted to a shelf 21 within the casing 1. When it is desired to shift the semaphore, a button 59, in the distant station, is pressed, which closes a circuit energizing the electric solenoid 23 in the casing. The solenoid 23 operates to raise a pivoted catch 24 which releases the segment 25, allowing it to travel through a portion of a revolution by reason of the weight 26 depending from the cord 27, which cord is attached to one corner of the segment and passes around the curved portion of its circumference. Through the agency of the link 28, the movement of the segment is utilized to withdraw the pallet 20 from engagement with the arms 29 of the pallet wheel 7. This allows said wheel to rotate as described until its arms come in contact with the foot 30 of the pallet which is prevented from passing out of the path of the arms 29 by the link 28 bringing up against the shaft 31 on which the segment 25 rotates. When the arms 29 of the pallet wheel 7 strike the foot 30, they force the foot out of their path, thus returning the segment to its original position. The pallet 20 is also forced into the path of the next arm 29, and the catch 24 is allowed to fall by its own weight into engagement with the segment, as shown in Fig. 2. As the weight 26 falls, on the release of the segment, it strikes a gravity actuated hammer 32, and causes it to strike a gong 33, thus giving notice to anyone near that the semaphore is changing, preparatory to the passage of a train. In case the electric controlling apparatus should become disabled, I provide a weight 35, which is normally held out of engagement with the catch 24 by the springs 36 and 37, but which may be actuated to raise the catch 24 and release the segment 25 by means of a wire 34, which passes through the underground tube 38 from the semaphore to the operating station. A spring 39, in a manhole 40 at the base of the semaphore tower, serves to keep the wire 34 always

taut. The station end of the wire is led over guide pulleys 41 to a block tackle 42 operated by a lever 43 whose motion is controlled by the lever 44 in the operating room of the station.

To reduce the friction of operation, the extremities of the pallet wheel arms, or the pallet itself, are provided with anti-friction rollers 45, or both may be so provided, as shown in Fig. 2.

As the semaphore revolves, pins 46 on the pallet wheel arms engage the spring terminal 47 and close an electric circuit which rings a bell in the station, as shown in Fig. 5, thus notifying the operator that the semaphore has moved. The pallet wheel 7 has two safety and two danger arms arranged alternately. The pins 46 on the safety arms are placed towards the inner ends of said arms so as to make only a passing contact with the tip of the terminal 47, while the pins on the danger arms are placed farther out so as to engage the terminal 47, deflecting it from its normal position and remaining in contact with it when the semaphore is at rest at danger. The position of the pins 46 is clearly shown in Fig. 5. The next move of the semaphore withdraws the pin and breaks the circuit.

A further device, consisting of a fixed contact 48 between the rails and a spring contact 49 depressible by a passing train, is adapted to notify the operator that the train has passed the semaphore and that the same may be reset. The bevel gear 9, fixed to the pallet wheel shaft 4, engages with a pair of bevel gears 50 mounted on the extremities of shafts 51, supported in brackets 52. The opposite extremities of the shafts 51 are also provided with bevel gears 53 adapted to engage bevel gears 54 fixed to the revoluble lamps 55. These lamps revolve through the same arc as the semaphore arms 6.

A series of batteries 56 are located in the operating station for supplying current to the solenoids 23 and 23[a] and the bells 57 and 57[a]. 58 and 58[a] designate the semaphore operating buttons in two stations, and 59 and 59[a] the signaling buttons. 60 is the reversing switch in the operating station. On pressing the button 59, a circuit is made through wires 62 and 63, solenoid 23 in first semaphore, and wire 64, thus withdrawing the pallet 20 and allowing the pallet wheel 7 to rotate one quarter revolution and set the signal. On pressing the button 58, a circuit is made through the wires 62 and 65, bell 57[a], wire 66, terminal 47, wire 67, bell 57, and wire 68. The bell in the sending station on the return circuit, rings and thus notifies the operator that the bell in the receiving station has rung. By means of this and all other inter-station bell circuits, communication may be carried on by means of pre-arranged signals. On pressing the button 59[a], a circuit is made through wires 64, 69, and 70, solenoid 23[a] in second semaphore, and wires 71, 82, and 68, thus operating the second semaphore exactly as the first is operated.

On pressing the button 58[a], a circuit is made through wires 64, 69, and 75, terminal 47, wire 67, bell 57, and wire 68, ringing the bell in the first station as a call to establish communication. The operator answers on 58 and closes the switch 60. Then on pressing the button 58[a] in the second station, a circuit is made through wires 64, 69, and 75, terminal 47, wire 66, bell 57[a], wires 65 and 76, switch 60, wires 77 and 68. A second return circuit is made simultaneously from the terminal 47, wire 67, bell 57, and wire 68. It will be seen that with the switch 60 closed both the bells will ring when the button 58[a] is pressed, whereas only the bell 57 rings when it is open. This gives the operator at 58[a] the advantage of hearing his message repeated on his own bell as is always the case at 58.

When the pins 46 in the pallet wheel arms contact with the terminal 47, current passes through the wires 64, 69, and 72, pallet wheel 7, terminal 47, wire 78, underground pipe 38, and wires 79 and 68, and simultaneously from the terminal 47 through the wire 67, bell 57, and wire 68. The object of the return circuit through the pipe 38 is that a second bell may be inserted in the wire 79, for instance, thus guarding against the danger of disablement due to the possible failure of the bell 57 to ring. A further object is that the pipe 38 may be used as a means to prevent the burning out of the coils of the bell 57 due to unforeseen overloading of the wires. When a passing train depresses the contact 49 to touch the contact 48, current passes through the wires 64, 69, and 72, pallet wheel 7, wires 73 and 80, contacts 48 and 49, wire 81, terminal 47, wire 67, bell 57, and wire 68, thus ringing the bell in the operating station and notifying the operator that a train has passed the semaphore and that the same may be reset.

From the foregoing description it will be apparent that the operation consists, briefly, of pressing a button in a distant station to close the circuit of the controller in the semaphore, said controller allowing the mechanism to rotate the semaphore arms and lamps and set the signal. The movement of said mechanism rings a bell in the station to indicate that the desired signal has been set. From Fig. 5 it will be seen that current generated for the controller is also used for signaling from station to station, and for notifying the operator of the passage of trains at the semaphore.

To those skilled in the art to which this invention relates, it will be obvious that a semaphore having an electric controlling means for setting signals in connection with means for indicating that such signals have been successfully set, will eliminate all uncertainty regarding the position of the semaphore where the same is out of the operator's sight, thereby minimizing the danger of accidents. A further advantage will be found in the train actuated device for notifying the operator that the semaphore has been passed, thus giving him warning to clear the line.

It will be obvious that telephones or similar instruments may be inserted in the bell circuits, for communication between stations.

Should it be necessary for a lineman to communicate with a station, the bell circuit can be established from the semaphore, by connecting the pallet wheel to the terminal and signaling by means of a predetermined code.

Having thus described my invention so that the same may be readily understood by those skilled in the art to which it appertains, what I claim and desire to secure by Letters Patent, is:—

1. In a device of the class described, the combination of swinging arms, a plurality of revoluble lamps, a motor driving said arms and lamps, a pallet wheel, a pallet engaging said wheel, electrically actuated means for withdrawing the pallet to cause the rotation of the semaphore arms, and a depressible contact actuated by a train passing the semaphore to close the circuit of a bell located in a distant station.

2. In a device of the class described, the combination of a revoluble visual signal, an axle upon which said signal is carried, a motor for actuating said axle, a pallet wheel having projecting arms provided with anti-friction rollers, a pallet engaging said arms, electrically actuated means for withdrawing said pallet, means actuated independently of said electrical means for withdrawing said pallet, and a depressible contact member actuated by a train to close a bell signaling circuit to notify the operator that the train has passed the semaphore.

3. In a signaling system, the combination of swinging arms mounted on an axle, revoluble lamps geared to said axle, a pallet wheel on said axle, a motor driving the axle, a pallet engaging the pallet wheel, electrically actuated means for withdrawing the pallet to allow the rotation of the arms and lamps, pins on the arms of said pallet wheel, a spring terminal in the path of the pins adapted to close the circuit of a bell, located in a distant station, at each partial revolution of the pallet wheel, and a depressible contact actuated by a train passing the semaphore for closing the circuit of said bell.

4. In a signaling system, a despatching station, a receiving station, a semaphore for each station, an electric circuit between each station and its semaphore, closable at the stations, for controlling the setting of the semaphores, a second circuit between the stations and semaphores closed by the setting of said semaphores, a bell circuit closed by a train passing the semaphore, and a double circuit between the stations whereby intercommunication may be established.

5. In a signaling system, a despatching and generating station, a receiving station, a primary semaphore controlled from the despatching station, and a secondary semaphore controlled from the receiving station, a circuit closer for the semaphore, and a bell circuit closer in each station, a reversing switch in the despatching station and a spring terminal in the primary semaphore, a circuit through both bells closed by the signal button of the despatching station, a circuit through the bell in the despatching station closed by the signal button in the receiving station when the switch in the despatching station is open, circuits through both bells closed by the signal button, in the receiving station when the switch in the despatching station is closed, and a circuit through the bell in the despatching station closable by a lineman at the primary semaphore.

6. In a signaling device, the combination of a revoluble visual signal, an axle upon which said signal is carried, driving means for said axle, a pallet wheel having projecting arms provided with anti-friction rollers, a pallet, provided with similar anti-friction rollers, engaging said arms, electrically actuated means for withdrawing said pallet to release said arms, manually operated means independent of said electrical means for withdrawing said pallet, a gravity actuated bell adapted to be rung by said pallet withdrawing means, means for notifying the operator that the signal has been set, and means for notifying the operator that a train has passed over the semaphore.

7. In a semaphore, the combination of swinging arms, an axle carrying said arms, a pallet wheel mounted on said axle, a motor driving said axle, a pallet engaging the arms of said pallet wheel, a pivoted segment, a radial tooth, on said segment, a pivoted catch engaging said tooth to lock the segment, electrically actuated means for raising the catch to unlock the segment, a weight for partially rotating the segment, a link connecting the segment and the pallet and adapting the latter to be withdrawn from the pallet wheel, a foot on the pallet in the path of the pallet wheel for returning the pallet and segment to their original positions, and means for raising the catch independently of said electrical means.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

AVILA JOSEPH ROY.

Witnesses:
C. W. TAYLOR,
P. GORMAN.