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W. W. SALMON.

SIGNALING SYSTEM.

APPLICATION FILED MAY 22, 1905.

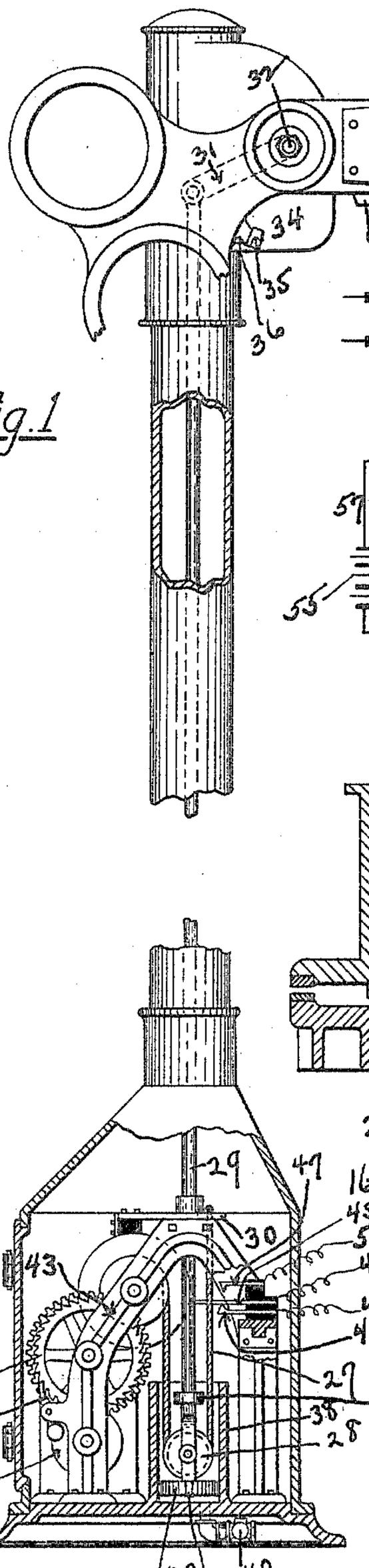

Fig. 1

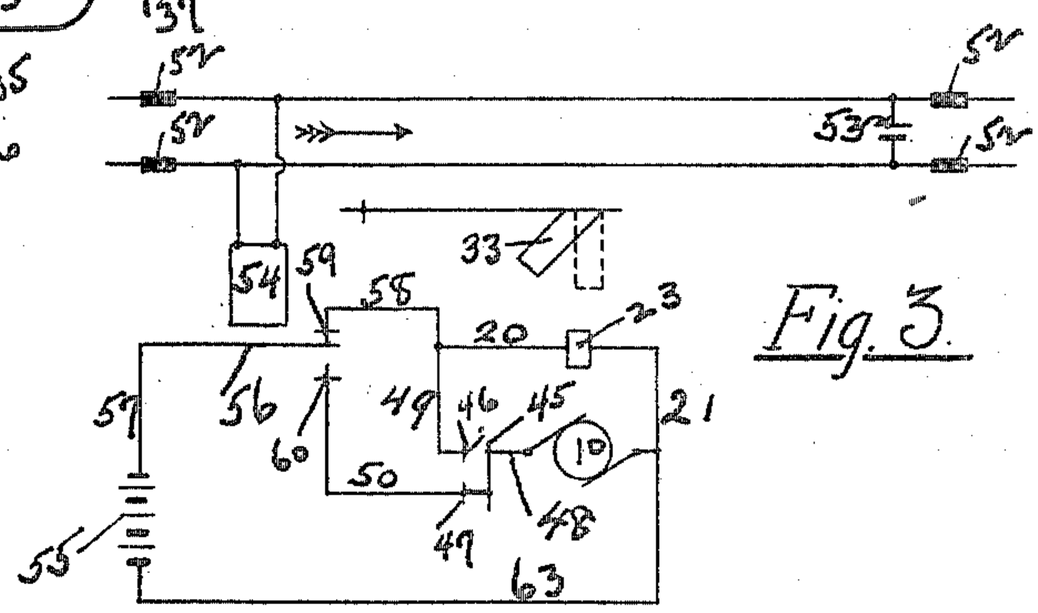

Fig. 3.

Fig. 4.

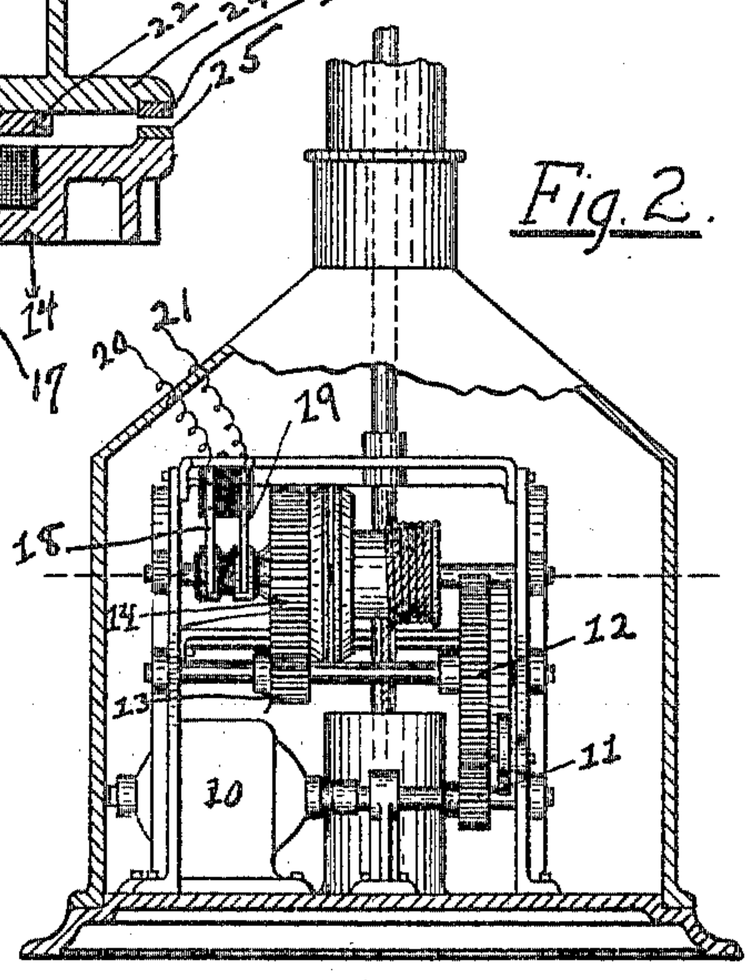

Fig. 2.

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UNITED STATES PATENT OFFICE.

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SIGNALING SYSTEM.

No. 821,381. Specification of Letters Patent. Patented May 22, 1906.

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To all whom it may concern:

Be it known that I, WILMER W. SALMON, a citizen of the United States, residing at Buffalo, county of Erie, State of New York, have invented a new and useful Signaling System, of which the following is a specification.

This invention relates to signaling, and more especially to automatic block-signaling; and its chief object is to provide means whereby in case the signal is improperly in the "safety" position because the clutch-magnet fails to break from its armature at the proper time, the power, whatever it may be, that is used to operate the signal may be applied in such a way as to force the breaking of the armature from the magnet, permitting the signal to assume its "danger" position.

For the purpose of illustrating the invention I have shown it as applied to an electrically-operated signal.

Referring now to the drawings herewith, consisting of one sheet, in which like reference characters refer to like parts throughout the various views, Figure 1 is a front elevation of my signal mechanism, part of the casing being broken away. Fig. 2 is a side elevation of part of the signal mechanism shown in Fig. 1. Fig. 3 is a diagrammatic view of my invention as applied to a signal-circuit. Fig. 4 is a longitudinal sectional view of my clutch-magnet.

The signal-operating mechanism comprises a motor 10, which drives, through gears 11, 12, and 13, a gear 14, upon which is mounted an electromagnet 23. The gear 14 is rigidly secured to a motor-driven shaft 15. The terminals from clutch-magnet 23 run to collars or contact-strips 16 and 17 on the shaft 15 and rotate with it. The collars are of course insulated from the shaft and from each other. On the frame of the operating mechanism and suitably insulated therefrom are two contact-springs 18 and 19, which make constant contact with the collars 16 and 17 and are connected, respectively, to the wires 20 and 21. Supported on the shaft 15 is the other member of the clutch or slot mechanism, consisting of an armature 22 and a clutch member 24, which has a surface 24^a, corresponding to the clutch-surface 25 of the gear 14, so that when the armature 22 is attracted by current flowing through the magnet 23 the clutch-faces engage and the clutch member 24 is driven with the gear 14. To the clutch member 24 is attached a drum 26, on which is wound a flexible strap, cable, or chain 27. The cable 27 passes around a pulley 28 on the foot of the signal-operating rod 29, and thence upwardly to a stationary attachment 30 on the frame of the mechanism. From the description it will be evident that when the drum 26 is rotated counter-clockwise, the signal-operating rod 29 will thereby be moved upwardly.

The signal-operating rod 29 is pivotally connected to the crank 31, which in turn is rigidly connected to the shaft 32. To the shaft 32 is rigidly secured the ordinary semaphore-blade 33. The shaft 32 is mounted on a suitable bearing 34, and on this bearing is a stop 35. On the semaphore casting is a lug 36, which normally rests against the left-hand side of the stop 35. Another lug 37 on the semaphore-blade 33 is so arranged that when the signal-blade is thrown from "danger" to "safety" the lug 37 will strike against the right-hand side of the stop 35.

At the bottom of the signal-operating rod 29 is arranged the dash-pot 38, having a piston 39. The check-valve 40 is connected with the dash-pot 38 and allows air to freely enter the dash-pot when the signal-operating rod 29 is raised. When the signal-operating rod 29 moves downwardly, and thereby carries with it the piston 39, the air cannot pass through the check-valve 40, but is obliged to pass through the very small opening 41, and thus the movement of the semaphore-blade is so regulated that it is kept free from sudden shocks and jerks.

Rigidly attached to the gear 12 is the ratchet-wheel 42, and attached suitably to the frame 43 is the ratchet-dog 44. These two members are so arranged that they prevent the movement of the gear 12 counter-clockwise, and thus the gear 14 is prevented from a clockwise movement. Attached to the frame 43 and insulated therefrom are the contact-springs 45, 46, and 47, and to these springs are attached the wires 48, 49, and 50, respectively. In the normal position the arrangement of these springs is such that contact is made between springs 45 and 46. On the signal-operating rod 29 is a collar 51, so arranged that when the signal has reached the clear position the contact between springs 45 and 46 is broken and contact made between springs 45 and 47.

Having thus described the several parts of my signal-operating mechanism, I will now describe its method of operation.

When current is applied to the motor 10 and at the same time to the clutch-magnet 23, the drum 26 will be rotated counter-clockwise, thus winding on itself the cable 27, and thereby raising the signal-operating rod 29. The motor-circuit includes the springs 45 and 46, and therefore when the collar 51 reaches and raises the spring 45 into contact with the spring 47 the motor-circuit is broken and the upward movement of the signal-operating-rod 29 ceases; but as long as current flows through and energizes the clutch-magnet 23 the drum 26 is rigidly held to the gear 14. The gear 14 is locked from movement by the ratchet 42 and the dog 44. It will thus be evident that as long as the clutch-magnet 23 is energized the drum 26 is prevented from a clockwise movement. As soon as the clutch-magnet 23 is deënergized the drum 26 is free from engagement with the gear 14, and the drum is free to move clockwise as the weight of the signal-operating rod 29 and the counterweight of the semaphore-blade 33 force this movement of the drum 26, and the cable 27 is unwound from the drum, and the several parts assume their normal positions. It will be noted that in the very first part of this movement the collar 51 allows the spring 45 to break contact with the spring 47 and to reëstablish its contact with spring 46.

Referring now to Fig. 3, in this figure I have shown but a single track-section and the application of my invention thereto. Traffic is supposed to travel in the direction of the arrow. This track is provided with the usual insulations 52, a track-battery 53, a track-relay 54, and the signal 33, which governs the track-section. The motor 10 operates the signal 33, as shown in Fig. 1 and as heretofore described. 23 is a clutch-magnet. 45, 46, and 47 are the contact-springs, which are operated by the signal-operating mechanism, as heretofore described. 55 is a battery or other suitable source of energy. 56 is a circuit-controller and is controlled by the track-relay 54 in such a manner that when the track-relay is energized the circuit-controller establishes circuit between the wires 57 and 58, and when the track-relay 54 is deenergized the circuit-controller 56 establishes circuit between the wires 57 and 50. The normal condition of the signal-blade 33 is "clear" and stands in that position as long as no traffic is moving over the section. When the signal-blade 33 is in a clear position and circuit is established, it flows from the battery 55 and includes the wire 57, circuit-controller 56, front contact 59, wires 58 and 20, clutch-magnet 23, and wires 21 and 63 back to the battery 55. This circuit energizes the clutch-magnet 23, and thereby holds the signal in a clear position in the manner heretofore described. As soon as a train enters the track-section the current from the battery 53 is shunted away from the relay 54, and thereby the relay 54 is deënergized and the circuit-controller 56 makes contact with the back contact 60 and breaks contact with the front contact 59. This breaks the circuit last above described and deënergizes the clutch-magnet 23, and thereby, as heretofore described, allows the semaphore-blade 33 to assume its normal position of "danger." As soon as the semaphore-blade 33 moves from a clear position the contact between the springs 45 and 47 is broken. If, however, for any reason the clutch-magnet 23 should not become disengaged from its armature 22, so that the semaphore-blade 33 could start from the clear position, it may be forced from that position by means of a new circuit, which is immediately established and which flows from the battery 55 and includes the wire 57, the circuit-controller 56, the back contact 60, the wire 50, the springs 47 and 45, the wire 48, the motor 10, and the wire 63 back to the battery. This circuit provides current to the motor, which causes it to rotate in the same direction as it first rotated when it moved the signal from "danger" to "safety." If this movement continued, the lug 37 on the semaphore-blade 33 would be forced against the stop 35 on the support or bearing 34, thus preventing further upward movement of the signal-operating rod 29. This also stops further movement of the drum 26 and the armature 22. The motor, however, is tending to rotate the gear 14 and the clutch-magnet 23. Thus on account of the relation of the parts, as heretofore described, the power of the motor is exerted to compel the disengagement of the clutch-magnet 23 and its armature 22, whereby the drum 26 is free to rotate and unwind the cable 27 wound upon it and allows the semaphore-blade 33 to assume its normal danger position. Thus even though the clutch and its armature fail to become disengaged when the circuit which energizes the magnet is broken the new circuit last above described being established will compel the disengagement of the clutch-magnet and its armature, and thereby insure the return of the semaphore-blade to its normal danger position. It is evident that as soon as the clutch-magnet is disengaged the circuit last above described will be broken, as heretofore stated. As soon as the train leaves the track-section the track-relay 54 is again energized, and the circuit-controller 56 is thereby drawn into contact with front contact 59, thereby reestablishing the circuit first described, which energizes the clutch-magnet 23 and also makes a circuit from the motor 10 by way of the wires 57 and 58, springs 46 and 45, and wires 48 and 63 to battery. When the signal has reached a clear position, the contact between the springs 45 and 46 is broken and motor and mechanism come to rest, and the

signal is held in the clear position by the energized clutch-magnet 23.

Having thus described my invention and its method of operation, what I claim, and desire to secure by Letters Patent, is—

1. In a signaling system, the combination with a signal and a suitable source of energy, of a motor, a controller, motor-driven means for moving the signal from "danger" to "safety," a clutch mechanism for holding the signal in a "safety" position, and motor-driven means for releasing said clutch mechanism when the controller is moved to a position which deënergizes the said clutch mechanism.

2. In a signaling system the combination with a signal and a suitable source of energy of a motor, a controller, motor-driven means for moving the signal from "danger" to "safety," means for establishing circuit through the controller and the motor when the controller is in one position and the signal is at "danger," means for establishing a circuit through the controller and the motor when the controller is in its opposite position and the signal is in the "safety" position, and means for breaking said circuits when the position of the signal corresponds to the position of the controller.

3. In a signaling system, the combination with a signal and a suitable source of energy, of a motor, a clutch mechanism and magnet for holding the signal in a "safety" position, motor-driven means for moving the signal from a "danger" to a "safety" position, a stop placed in the path of the signal-blade, lugs on the signal-blade and its counterweight for engaging said stop and motor-driven means for forcing into engagement said stop and one of said lugs when the said clutch-magnet is deënergized.

In testimony whereof I have signed my name in the presence of two witnesses.

WILMER W. SALMON.

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