(No Model.) 4 Sheets—Sheet 1.

J. P. COLEMAN.

SIGNALING APPARATUS.

No. 590,301. Patented Sept. 21, 1897.

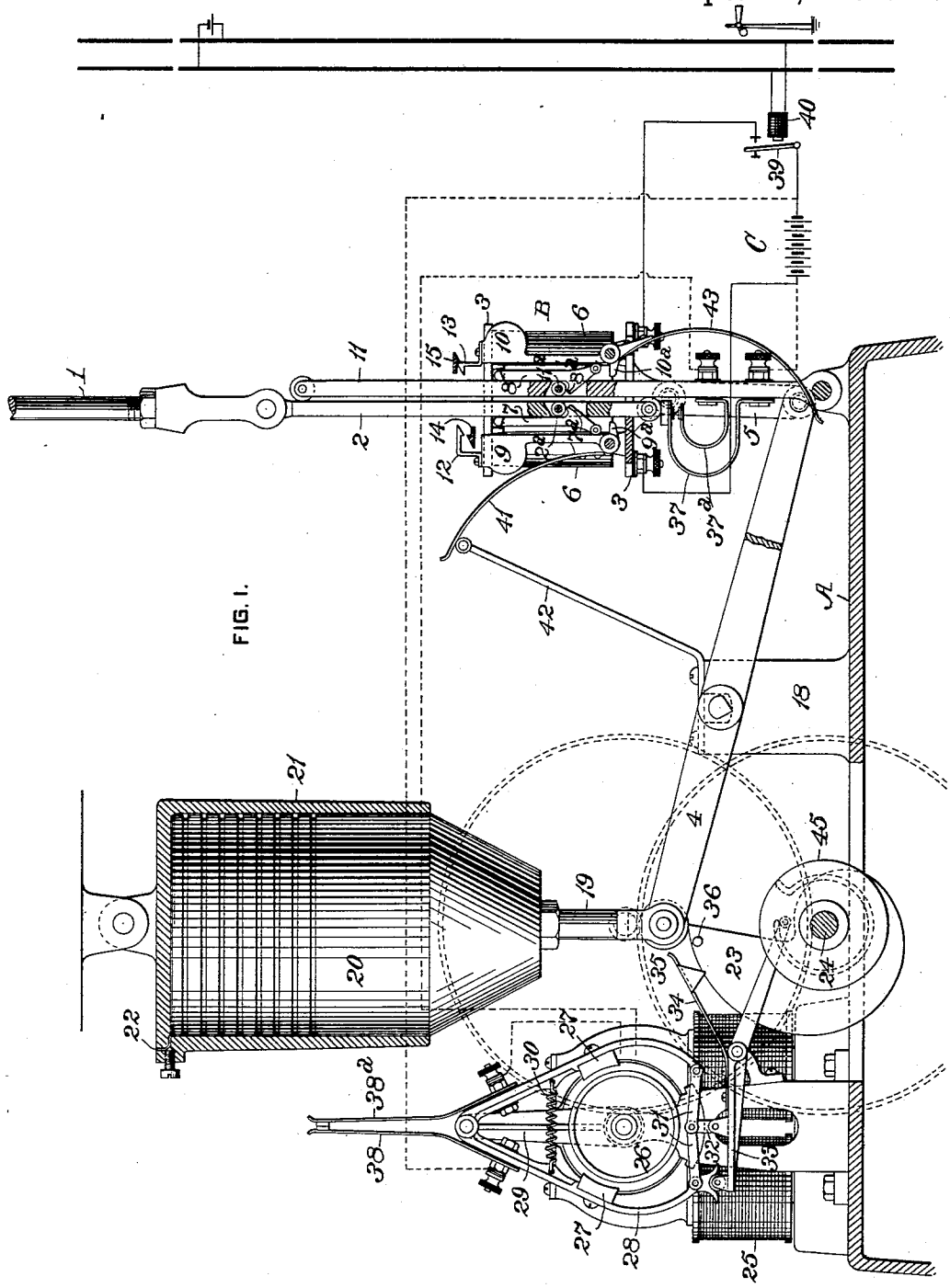


FIG. 1.

WITNESSES:

Chas. F. Miller.

F. E. Gaither

INVENTOR.

John Pressley Coleman

by Dennis S. Wolcott

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

4 Sheets—Sheet 2.

J. P. COLEMAN.

SIGNALING APPARATUS.

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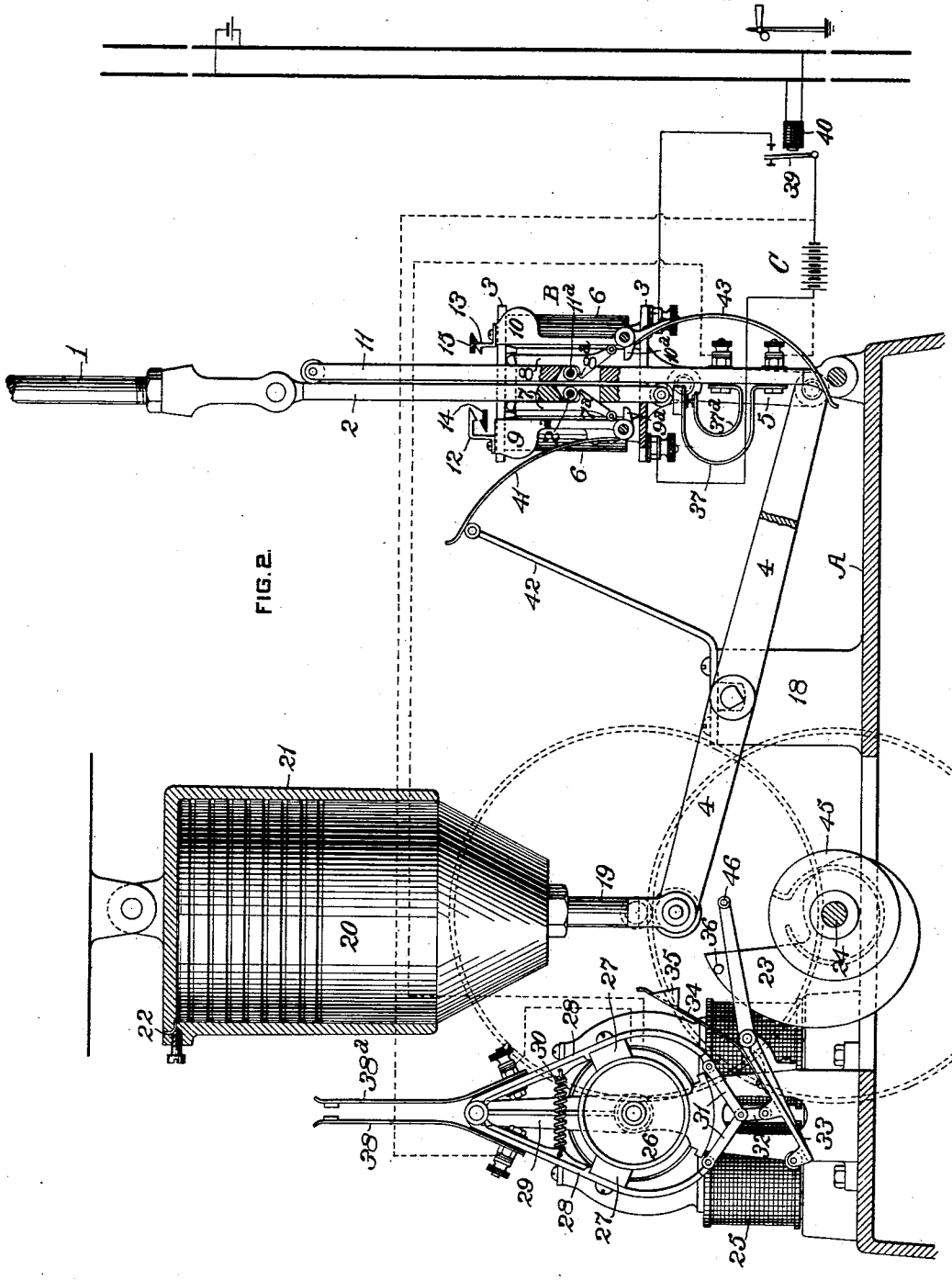


FIG. 2.

WITNESSES:

Chas. F. Miller.

F. E. Gaither

INVENTOR.

John Pressley Coleman

by Dennis S. Wolcott

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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J. P. COLEMAN.

SIGNALING APPARATUS.

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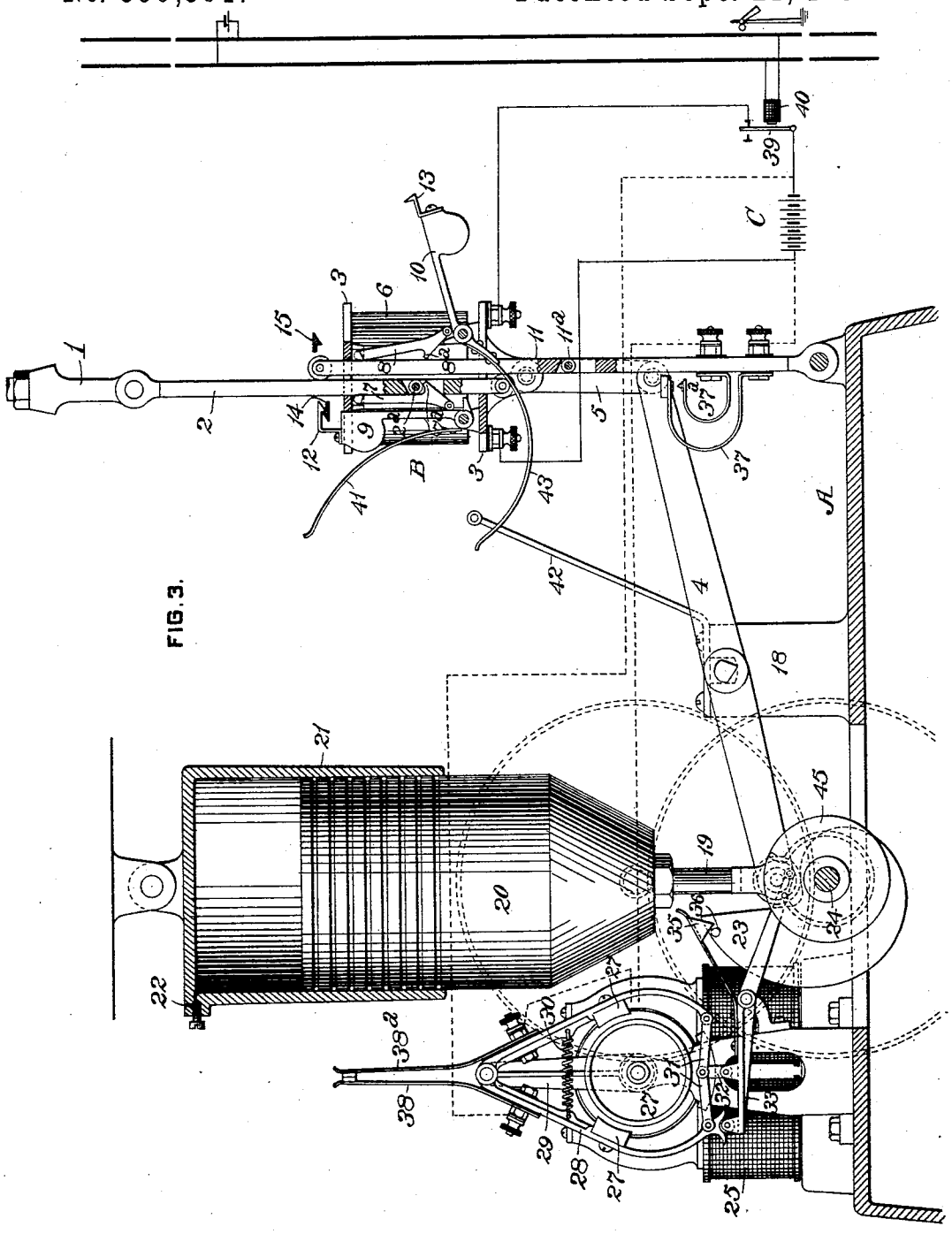


FIG. 3.

WITNESSES:

Chas. F. Miller.

F. E. Gaither.

INVENTOR.

John Pressley Coleman

by Dennis S. Wolcott

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

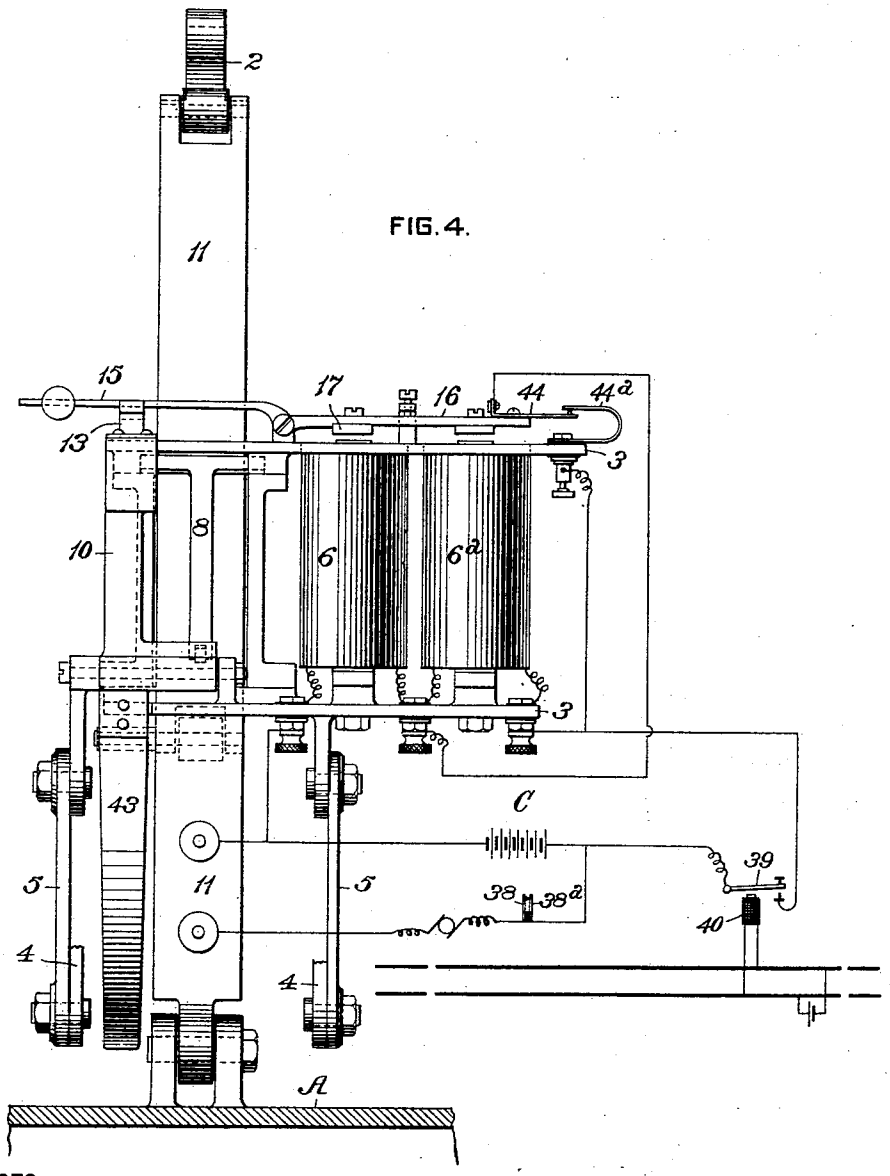
(No Model.) 4 Sheets—Sheet 4.

J. P. COLEMAN.

SIGNALING APPARATUS.

No. 590,301. Patented Sept. 21, 1897.

FIG. 4.



WITNESSES:

Chas. F. Miller.

F. C. Gaither

INVENTOR.

John Prestley Coleman

by Dannis & Wolcott

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN PRESSLEY COLEMAN, OF SWISSVALE, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SAME PLACE.

SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 590,301, dated September 21, 1897.

Application filed May 3, 1897. Serial No. 634,827. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRESSLEY COLEMAN, a citizen of the United States, residing at Swissvale, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Signal Apparatus, of which improvements the following is a specification.

The invention described herein relates to certain improvements in automatic railway-signals. As this class of signals is usually constructed and operated considerable time usually elapses between the passage of the train off of a track-section and the clearing of the signal controlling such section. This lapse of time is objectionable where the traffic is frequent and trains are running at close intervals to each other.

The object of the present invention is to provide a signal and its operating mechanism so constructed and arranged that the signal will go automatically to "danger" on the entrance of a train into its section, and while the train is in such section the operating mechanism will be so shifted or adjusted that the signal will be automatically cleared instantly upon the passage of the train out of the section controlled by such signal.

In general terms, the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view, partly in section and partly in elevation, of my improved signal-operating mechanism, the several parts being shown in the position which they occupy after the signal has gone to "danger" and the operating mechanism has been adjusted approximately to a point at which the signal can be cleared by the passage of the train from its section. Fig. 2 is a similar view showing the parts in the position they occupy when ready for operation on the passage of the train from the section. Fig. 3 is a like view showing the position of the several parts when the signal has been cleared; and Fig. 4 is a side elevation, looking in the direction of the narrow *a*, of the parts directly controlling the movements of the signal and the circuits therefor.

In the practice of my invention the signal-rod 1 has its lower end connected to a bar 2, extending down through suitable guide-openings in the plates or platforms 3, which are connected together, forming a frame B, which is connected to a lever 4 by a link 5. The magnets 6 and 6^a, the catches 7 and 8, and the releasing-dogs 9 and 10 are carried by the frame B. The catches 7 and 8 are loosely mounted in suitable bearings on the under side of the upper plate 3, and the dogs 9 and 10 are loosely pivoted in suitable bearings on the upper side of the lower plate 3. The catch 7 and dog 9 are mounted and arranged in such relation to each other that when the dog 9 drops or swings outwardly, as hereinafter described, the toe 9^a therein will strike against the lower end of the catch 7, forcing the latter outwardly, so as to remove the shoulder 7^a thereon from under the pin or projection 2^a on the bar 2, thereby permitting the latter to drop. The catch 8 and dog 10 are similarly arranged with relation to each other, so that on the outward swing of the dog 10 a toe 10^a thereon will strike against the lower end of the catch 8 and force its shoulder 8^a out from under a pin or projection 11^a on the rod 11. This rod 11, which passes through the frame B, has its lower end pivotally connected or attached to the base-plate A or other stationary part of the mechanism.

On the upper ends of the dogs 9 and 10 are secured studs 12 and 13, which are adapted to be engaged by prongs 14 and 15, formed on one end of the lever 16, which is pivotally mounted upon the top plate 3 of the frame and has secured thereto the armature 17 of the magnets 6 6^a. These prongs 14 and 15 are provided with hooks and are so constructed that when the magnets 6 6^a are excited and their armatures attracted thereto the prong 14 will engage the stud 12, and when the magnets are deënergized and the lever 16 shifted by weight or spring the hook on the prong 15 will engage the stud 13. As shown in the drawings, the dogs 9 and 10 are so weighted that when free to move they will drop outwardly and dislodge the catches 7 and 8, as hereinbefore described.

As shown in the drawings, the lever 4 is

pivotally mounted upon a standard or support 18, and one end thereof is connected by a link 19 to the lower end of a weight 20, which is preferably constructed in the form of a piston or plunger arranged within a cylinder 21, which is suspended, as shown, from any suitable support. The upper end of the cylinder is provided with a valved port 22 for the inflow and escape of air, so that the cylinder and weight will together form a cushion for checking the movement of the weight. The weight is raised by means of a cam 23, secured on the shaft 24, which is rotated through any suitable arrangement of gearing by an electric motor 25. The armature-shaft of the motor is provided with a brake-drum 26, and rotation of the armature is checked by the shoes 27, bearing upon the drum. These shoes are secured to arms 28, which are pivotally mounted upon a post or block 29 and are drawn together to force the shoes into contact with the drum by means of a spring 30. The lower ends of the arms 28 are connected to the outer ends of links 31, having their inner ends pivotally connected to one end of a link 32, the opposite end of which is connected to a lever 33. As will be readily understood, an upward movement of the lever will force the links 31 into line with each other, thereby spreading the arms 28 against the tension of the spring 30. When the lever 33 is forced down, as will be hereinafter described, so that the links 31 will be moved down out of line with each other, the spring 30 will draw the arms toward each other, pressing the shoe against the brake-drum. On the lever 33 is secured a spring-arm 34, provided with a cam projection 35, said parts being so arranged and constructed that when the parts of the brake mechanism are in release position, as shown in Figs. 1 and 3, the projection 35 will lie in the path of a pin 36 on the cam 23. When this pin strikes against the cam projection, the lever 33 will be so shifted as to draw the links 31 out of line with each other, permitting the operation of the brake mechanism by the spring 30.

As shown in Figs. 1, 2, and 3, the circuit from the battery C or other generator to the motor is formed in part by springs 37 37ª, secured on but insulated from the rod 11 in such manner as to normally stand apart, and also by springs 38 and 38ª, secured to but insulated from the brake-arms 28. The magnets 6 are also included in a circuit from battery C, a portion of such circuit being formed in part by the armature 39 of the track-relay 40.

In describing the operation of my improved mechanism it will be supposed that the signal is at "danger" and the parts of the mechanism are in position to clear the signal as soon as the train has passed off the section. On the movement of the train off the section relay 40 will become energized, thereby shifting armature 39, so as to close the circuit through magnet 6. At the energizing of magnet 6 lever 16 will be so shifted as to free projection 13 on dog 10 and to cause prong 14 to engage projection 12 on dog 9. As soon as the projection 13 is freed dog 10 will drop and shift catch 8 out of engagement with the projection 11ª on rod 11, thereby permitting the frame to be raised by the dropping of the weight 20, and as the rod 2 is locked to the frame by the catch 7 it will be lifted and clear the signal.

As soon as another train enters on the track-section the circuit of the magnet 6 will be broken at make-and-break mechanism 39, thereby permitting the armature-lever 16 to drop, so as to disengage prongs 14 from projection 12, thereby releasing dog 9, which will drop outward, tripping the check 7 and permitting the bar 2 to drop and the signal to go to "danger." A spring 41 is secured to the dog 9 in such manner that when the dog drops from the position shown in Fig. 3 the spring 41 will rest upon an arm 42, secured on the standard 18 or other suitable support. A spring-arm 43 is secured to the dog 10 in such manner that when the dog drops to the position shown in Fig. 3 the arm will lie in the path of the lower end of the bar 2, so that when said bar drops it will strike the spring-arm and force the dog and catch 8 to normal position, where they will be held by the engagement of prong 15 with projection 13, the magnet 6 being deënergized and its armature-lever 16 having been shifted by weight or spring to effect such engagement.

By downward movement of the rod 2 the springs 37 37ª are forced into contact with each other, closing the motor-circuit at that point, and by the downward movement of the weight 20 the lever 33 is so shifted, its outer end being struck by the lever 4 or projection therefrom as to move the links 31 into line with each other, thereby forcing the arms 28 apart and also closing the motor-circuit by the contact on the springs 38 and 38ª, so that on the closing of the circuit-breaker formed by springs 37 and 37ª the motor will be set into operation to rotate the cam 23. By the rotation of the cam 23 the weighted end of the lever 4 is raised, thereby drawing down the frame B to the position shown in Figs. 1 and 2. The frame is held in this lowered position with the weight 20 correspondingly lifted by the engagement of the catch 8 on the frame with the projection 11ª on the rod 11. The same downward movement of the frame also permits of the engagement of the catch 7 with the pin or projection 2ª on the rod 2. By comparison of Figs. 1, 2, and 3 it will be seen that in the downward movement of the frame B the spring 41 strikes against the arm 42, so as to restore the dog 9 to normal position, and will hold it in such position until the magnets 6 are again excited, so that the frame B will be raised in the manner above stated to restore the signal to "safety"

on the passage of a train off the section. The excitation of the magnet 6, which effects in the manner hereinbefore described the release of the frame B from the rod 11, also effects the locking of the dog 9 in normal position by the engagement of the hook on the prong 14 with the projection 12 on the dog.

As will be readily understood by reference to Figs. 1 and 2, the rotation of the cam 23 will be checked by the shifting of spring 34 by the pin 36 on the cam. The movement of this spring 34 so shifts the lever 33 as to draw down the links 31, thereby permitting the spring 30 to operate to apply the brake mechanism and open the motor-circuit by the separation of the springs 38 and 38^a.

In lieu of employing a compound-wound magnet when the motor and the controlling-magnet 6 are arranged in the same circuit or energized by a common generator, as described in application, Serial No. 633,621, filed by me April 24, 1897, two magnets 6 and 6^a, one having a high resistance and the other a low resistance, can be employed, as shown in Fig. 4, but in such case a shunt-circuit is formed around the high-resistance magnet, said shunt including a circuit-breaker controlled by the armature-lever 16 and consisting of springs 44 and 44^a. These springs are so constructed and arranged that the shunt-circuit will not be broken on the first movement of the armature, as the drop of potential in the magnets when both are thrown into circuit might be so great that they would not have sufficient attractive force to cause the shifting of the lever 16. The integrity of the circuit during the preliminary movement of the armature may be maintained by so shaping the spring 44^a that it will follow the spring 44 during a portion of its movement. By this arrangement a drop in electromotive force on the operation of the motor is compensated for. In other words, I employ two magnets—the high-resistance magnet for drawing down the armature and the other for assisting in holding down the armature controlling the clearing and setting of the signal to "danger."

In order to prevent any accidental application of the brakes during the operation of the motor, I provide a lock for holding the lever 33 in a position where the brakes are released. This lock consists of a disk 45, secured on the shaft 24 and provided with a groove or projecting rib, as shown in dotted lines, having a gap therein which will come into line with a pin 46 on the lever 33 when the latter is shifted to apply the brakes. When the outer end of the lever 33 is forced down by the dropping of the weight 20, as hereinbefore described, the pin 46 will enter the gap, and as the shaft is rotated the rib on the inner face of the disk will pass over the pin on the lever, and thereby hold the same from being shifted until the cam has reached a point when its pin 36 is about to operate upon the spring 34.

Within the scope of the invention as defined by the claims are included such modifications and changes in the construction and arrangement of parts of the mechanism as will readily suggest themselves to the skilled mechanic.

I claim herein as my invention—

1. In a signal apparatus, the combination of a signal having a bias to "danger," a weight for shifting the signal to clear position, a separable clutch mechanism connecting the signal and weight, an electromagnet for holding the parts of the clutch mechanism in engagement, and means for raising the weight, substantially as set forth.

2. In a signal apparatus, the combination of a signal having a bias to "danger," a weight for shifting the signal to clear position, a separable clutch mechanism connecting the signal and weight, an electromagnet for holding the parts of the clutch mechanism in engagement, means for raising the weight and an electrically-controlled catch for holding the weight in its raised position, substantially as set forth.

3. In a signal apparatus, the combination of a signal having a bias to "danger," a movable frame provided with a catch adapted to engage the signal-rod, an electrically-controlled dog for shifting said catch, a weight for lifting said frame, and an electrically-controlled catch for holding the frame when lowered against the lifting action of the weight, substantially as set forth.

4. In a signal apparatus, the combination of a signal having a bias to "danger," a movable frame, a weight for raising said frame, a rod for holding the frame from upward movement by the action of the weight, catches for locking the signal-rod and the holding-rod to the frame and electrically-controlled dogs for shifting said catches, substantially as set forth.

5. In a signal apparatus, the combination of a signal having a bias to "danger," a weight for clearing said signal, an electrically-controlled connection between the signal and weight, an electric motor for raising the weight, brake mechanism for checking the rotation of the motor, and a lock for preventing an application of the brakes intermediate of the completion of the upward movement of the weight, substantially as set forth.

6. In a signal apparatus, the combination of a signal having a bias to "danger," a weight for clearing said signal, a separable connection between the weight and signal, two magnets one having a low and the other a high resistance for controlling such connection, an electric motor for raising the weight and a generator common to the magnets and motor, substantially as set forth.

7. In a signal apparatus, the combination of a signal having a bias to "danger," a weight for clearing the signal, a separable connection between the weight and signal, two magnets one having a low and the other a high resistance for controlling such connection, an electric motor for raising the weight, a generator common to the magnets and motor, a normally open shunt-circuit around the high-resistance magnet, and a circuit-closer operated by the armature of the low-resistance magnet for closing the shunt-circuit, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN PRESSLEY COLEMAN.

Witnesses:
DARWIN S. WOLCOTT,
F. E. GAITHER.