No. 611,943. Patented Oct. 4, 1898.

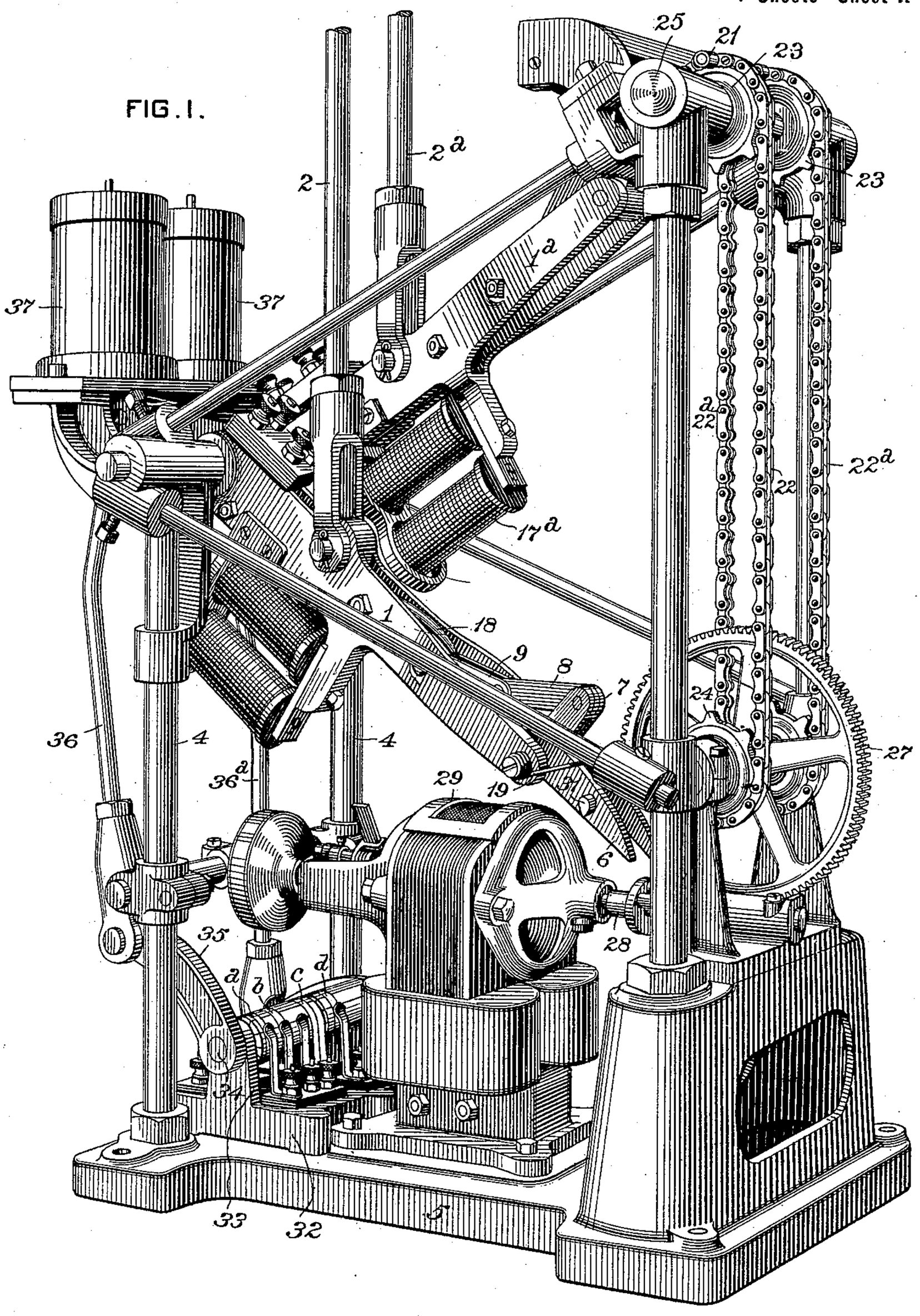
J. G. SCHREUDER.

RAILWAY SIGNALING.

(Application filed Jan. 3, 1898.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1.



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4 Sheets—Sheet 3.

FIG. 3.

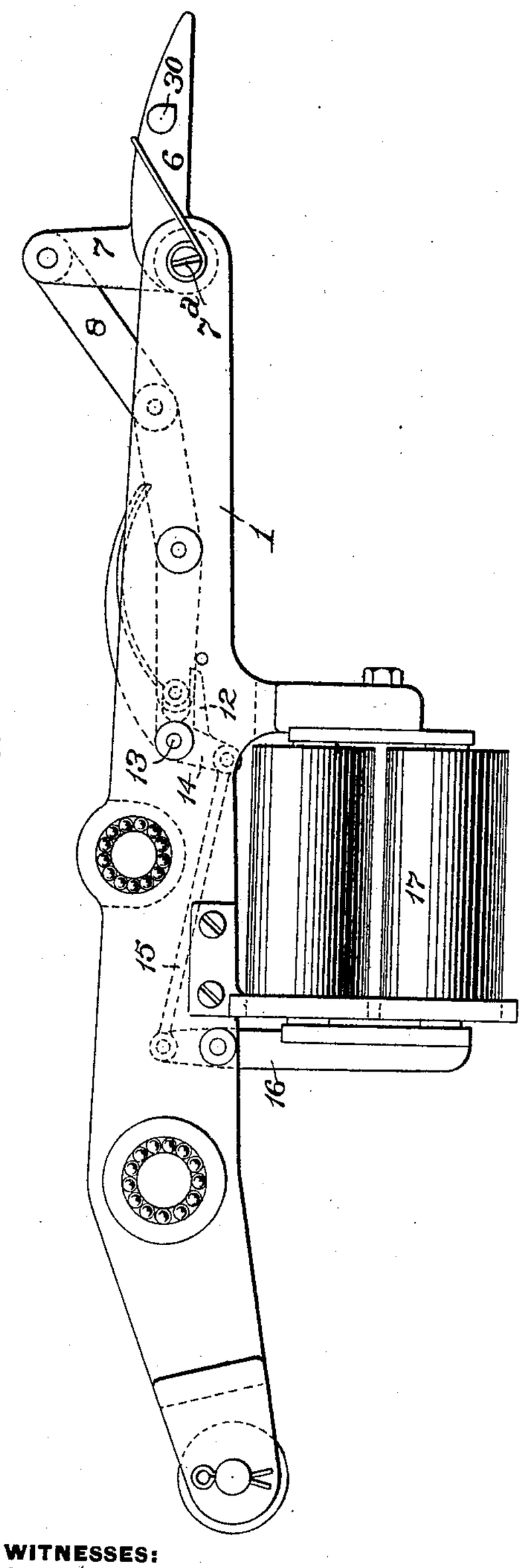
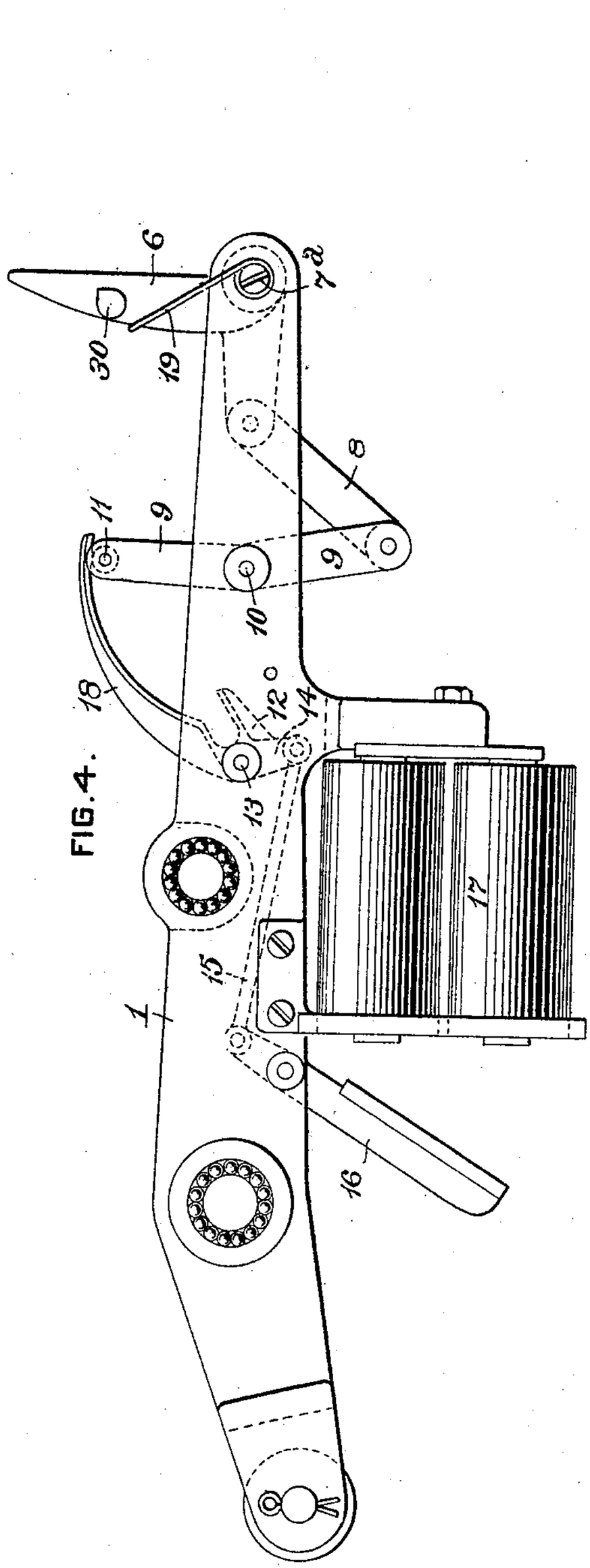


FIG. 4.



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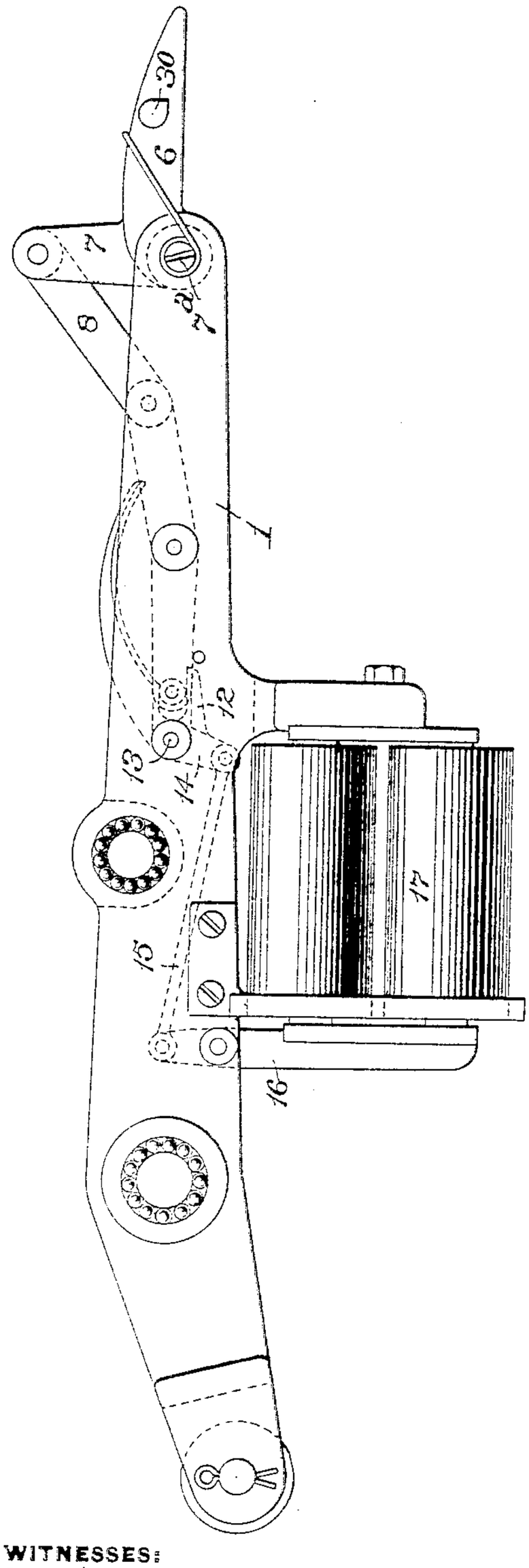

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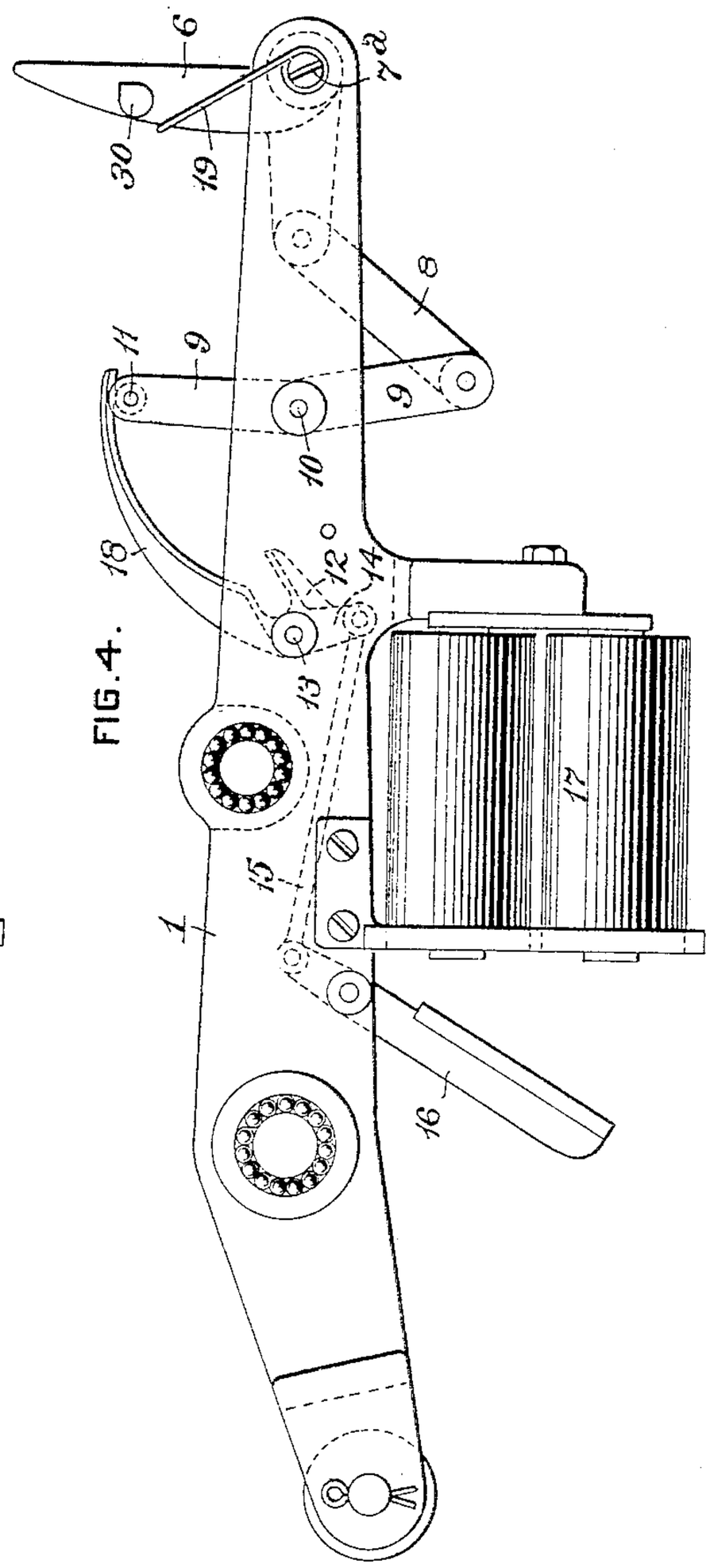

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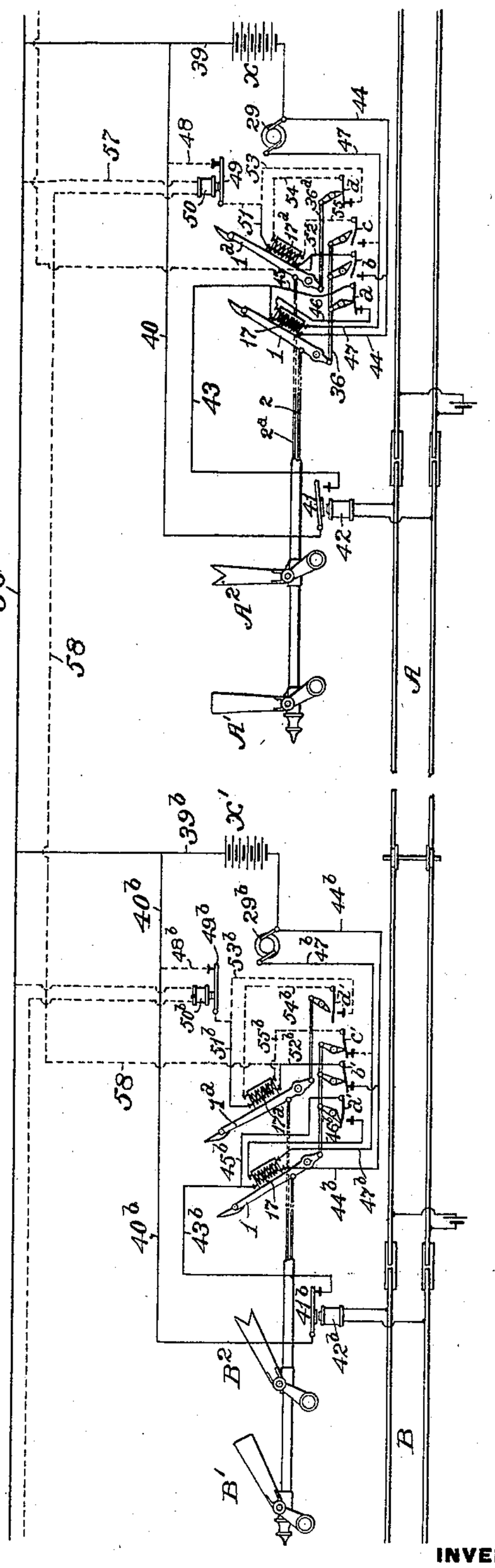
FIG. 5.



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UNITED STATES PATENT OFFICE.

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RAILWAY SIGNALING.

SPECIFICATION forming part of Letters Patent No. 611,943, dated October 4, 1898.

Application filed January 3, 1898. Serial No. 665,326. (No model.)

To all whom it may concern:

Be it known that I, JENS G. SCHREUDER, a subject of the King of Sweden and Norway, residing at Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Railway Signaling, of which improvements the following is a specification.

The invention described herein relates to certain improvements in automatic signal apparatus of the class or kind forming the subject-matter of Letters Patent No. 600,384, of March 8, 1898, and consists, generally stated, of electrically controlled and operated signal mechanism whereby a signal is set to "danger" and again cleared by and in accordance with train movements.

The object of the present invention is to provide for the setting of the home and distant signal to clear position by the operation of an electric motor, itself controlled by train movements.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a perspective view of my improved signal-operating mechanism. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are detail views, on an enlarged scale, of the signal-lever, showing the parts of the same in normal and release positions, respectively; and Fig. 5 is a diagrammatic view illustrating a portion of a railway-track and the circuits controlling the signals and motor.

In the practice of my invention the levers 1 and 1ª, which are connected, respectively, to the home and distant signal-blades by the rods 2 2ª, are pivotally mounted loosely on the shaft 3, secured to the upper ends of the standards 4, projecting upwardly from the bed-plates 5. At one end these levers are provided with fingers 6 6ª, which are secured on a pin 7ª, mounted in bearings near the outer ends of the levers and provided with arms 7. These arms are connected by links 8 to one end of levers 9, which are mounted on pins 10, and are provided at their opposite ends with pins 11, adapted to engage with forks 12. These forks are loosely mounted on pins 13 and are provided with arms 14, which are connected by links 15 to the levers 16 of the armatures of the electric magnets 17 17ª, secured on the signal-levers 1 and 1ª. One of the prongs of each of the forks 12 is provided with a curved extension 18, held upon the pins 11 when the latter are disengaged from the fork by the weight of the armature, and is guided by such extension into engagement with the forks. Springs 19 are so secured on the levers 1 1ª as to bear upon the fingers 6 6ª and press them into alinement with the levers 1 1ª, and through the connections described to cause the pins to engage the forks 12, thereby permitting the armature-levers to drop toward the poles of the magnets 17 17ª, which when excited will hold the fingers 6 6ª in alinement with levers 1 1ª, as shown in Fig. 3.

The fingers 6 6ª when held in alinement with the levers 1 and 1ª and when the signals are at danger position project into the path of movement of studs or projections 21 on the sprocket-chains 22 22ª, which are arranged around sprocket-wheels 23 and 24, secured on the shafts 25 and 26, respectively. The shaft 26 has secured thereto a gear-wheel 27, intermeshing with a worm on the shaft 28 of the motor 29. As the levers 1 and 1ª are raised to clear the signals by the chains 22 22ª pins 30 on the fingers 6 6ª will engage spring-actuated hooks 31 just as the studs 21 pass out from under the fingers 6 6ª, thereby holding the levers 1 1ª raised and the signals in clear position, so long as the fingers are held in alinement with the levers, by the magnets 17 17ª.

On the bed-plate of the apparatus is secured the block 32, provided with upwardly-projecting standards 33, provided with bearings for the shafts 34, on which are secured arms 35 35ª. These arms are connected by rods 36 36ª to the signal-levers 1 1ª, as shown in Figs. 1 and 2. The shafts 34 are surrounded with insulating material on which are secured metallic strips adapted in certain positions of the shafts to form electrical connections with springs secured on but insulated from the blocks 32. These strips and

springs form make-and-break mechanisms *a*, *b*, *c*, and *d* in circuits to be hereinafter described, three of such make-and-break mechanisms being on the shaft which is actuated by the home signal-lever 1, while the fourth make-and-break mechanism *d* is on the shaft actuated by the distant signal-lever 1[a].

Pneumatic cushions, consisting of cylinders 37 and pistons 38, projecting through the open lower ends of the cylinders are so secured on the posts 4 as to receive the impact of the short ends of the levers 1 1[a] when the opposite ends thereof drop to set the signals to danger position.

The circuits for controlling and operating the signals and motor are clearly shown in Fig. 5. The circuit for holding the finger 6 of lever 1 of home-signal A′ in operative position consists, starting from the battery X, of wires 39 and 40, armature 41, and contact-point of track-relay 42, wire 43, high-resistance coil of magnet 17, and wire 44 to battery. The circuit for shifting the lever 1, so as to clear the signal A′, consists of wires 39 and 40, armature 41, and contact-point of relay 42, wire 43, branch wire 45, make-and-break mechanism *a*, wire 46, low-resistance coil of magnet 17, and wire 47 to and through motor 29 to battery. The circuit for holding the finger 6[a] of lever 1[a], connected to distant signal A[2], consists of wires 39, 40, and 48, contact-point and armature 49 of relay 50, wire 51 to high-resistance coil of magnet 17[a], wire 52, make-and-break mechanism *b*, and wire 44 to battery. The circuit for shifting the lever 1[a] to clear the distant signal A[2] consists of wires 39, 40, and 48, contact-point and armature 49 of relay 50, wires 51 and 53, make-and-break mechanism *d*, wire 54, low-resistance coil of magnet 17[a], wire 55, make-and-break mechanism *c*, and wire 47 to and through motor 29 to battery. The circuit for relay 50, starting from battery X′, consists of wire 39[b], common wire 56 to preceding station, wire 57, relay 50, wires 58, make-and-break mechanism *b*′, and wire 44[b] to battery.

It will be observed that the magnets 17 and 17[a] consist of two coils, one of high resistance and the other of a low resistance, and that the latter is in series with the motor. The function of the low-resistance coils of these magnets is to hold the fingers 6 6[a] in operative position while the signals are being shifted to clear position, while the high-resistance coils become operative to hold the fingers in operative position when the motor-circuit is cut out.

In describing the operation of my improved apparatus it will be supposed that a train is on section A, and that the succeeding sections B, &c., are clear, and that the signals controlling such sections are in corresponding positions, as shown in Fig. 5. By the entrance of the train upon section 8 track-relay 42 is cut out and its armature will be shifted to break the holding-circuit of magnet 17 of home-signal A′. On the release of the armature of magnet 17 the finger 6 is free to be turned on its pivot by the weight of signal-lever 1, thereby disengaging the finger from the catch 31 and permitting the lever 1 and its signal A′ to drop to "danger." This movement of the signal-lever 1 will operate through the medium of rod 36 and arm 35 to open the make-and-break mechanisms *b* and *c* and to close the make-and-break mechanism *a*. The closing of the make-and-break mechanism *a*, which is in the shifting-circuit of signal A′, is only a preparatory step, as the circuit will remain open until track-relay is energized and to shift armature 41 against its contact-point, said armature and contact-point forming part of the shifting-circut of signal A′. The opening of make-and-break mechanisms *b* and *c* by the movement of signal A′ to "danger" will break the holding and shifting circuits through magnet 17[a]. The deënergizing of magnet 17[a] will permit finger 6[a] of distant signal-lever 1[a] to free itself from catch 31[a], whereupon the distant signal A[2] will go to "danger." The movement of the lever 1[a] by the dropping of the distant signal to "danger" will close the make-and-break mechanism *d*; but this is merely preparatory, as the shifting and holding circuits for clearing the distant signal cannot be completed except by the closing of make-and-break mechanisms *b* and *c*, which can be effected only by the clearing of home-signal A′. As heretofore stated, this signal A′ cannot be cleared while relay 42 is held open by the presence of a train on section A.

As the train enters section B the signals B′ and B[2] will be caused to go to "danger" by the breaking of the circuits controlled by track-relay 42[b]. The movement of the home-signal B′ to "danger" will open the make-and-break mechanisms *b*′ and *c*′, whereupon the distant signal B′ will also drop to "danger."

The passage of the train off section A will permit the energizing of relay 42 and the consequent closing of the holding and shifting circuits of signal A′ through magnet 17 and the motor 29, whereby the signal A′ will be shifted to clear position. As this signal reaches clear position make-and-break mechanism *a* will be opened and make-and-break mechanisms *b* and *c* will be closed. The opening of make-and-break mechanism *a* will break the shifting-circuit through the motor and low-resistance coil of magnet 17, but will not affect the circuit through the high-resistance coil of the same magnet. The closing of make-and-break mechanisms *b* and *c* is a second step preparatory to the clearing of the distant signal A[2], which is an indicator of home-signal B′, as the holding and shifting circuits of said signal A[2] were broken by the opening of the circuit through relay 50 when the make-and-break mechanism *b*′ was opened by the dropping of home-signal B′ to "danger." As soon as the train passes off track-section B and home-signal B′ cleared, thereby closing make-and-break mechanism *b*′, relay

50 will become energized, so as to pull its armature 49 against its contact-point, thereby completing the holding and shifting circuits through magnet 17^a and the motor. As the signal A^2 is cleared by the motor make-and-break mechanism *d* is opened, thereby breaking the shifting-circuit through the motor and low-resistance coil of magnet 17^a, but without affecting the holding-circuit through the high-resistance coil of said magnet.

I claim herein as my invention—

1. In a signaling apparatus, the combination of signals, a motor for shifting said signals, independent connections from the signals to the motor, a lock for holding each signal in clear position, a magnet controlling each signal connection and lock and a track-circuit controlling the circuits of the motor and of the controlling-magnets, substantially as set forth.

2. In a signal apparatus, the combination of an electric motor, two signals, independent electrically-controlled connections from the signals to the motor, two shifting-circuits each having the motor and one of the magnets of the connections between the signals and motor arranged in series in said circuits, and a make-and-break mechanism controlling said circuits and controlled by train movements, substantially as set forth.

3. In a signal apparatus, the combination of a motor, two signals, independent electrically-controlled connections from the signals to the motor, two holding-circuits controlling the signal connections, a train-controlled make-and-break mechanism included in said circuits, and a second make-and-break mechanism in one of the circuits controlled by one of the signals, substantially as set forth.

4. In a signal apparatus, the combination of an electric motor, two signals, independent electrically-controlled connections from the signals to the motor, two shifting-circuits each having the motor and the magnets of one of the signal connections arranged in series therein, make-and-break mechanisms included in said circuits and controlled by the signals, and a train-controlled make-and-break mechanism controlling both signals, substantially as set forth.

5. In a signal apparatus, the combination of an electric motor, two signals, independent connections from the signals to the motor, magnets having high and low resistance coils controlling said connections, shifting-circuits including the low-resistance coils and the motor, holding-circuits including the high-resistance coils, and a train-controlled make-and-break mechanism controlling said circuits, substantially as set forth.

6. In a signal apparatus, the combination of an electric motor, two signals, independent connections from the signals to the motor, magnets having high and low resistance coils controlling said connections, shifting-circuits including the low-resistance coils and the motor and controlled by the signals holding-circuits including the high-resistance coils, the holding-circuit of one signal being controlled by the other signal, and a train-controlled make-and-break mechanism controlling the holding and shifting circuits, substantially as set forth.

7. In a signal apparatus, the combination of two track-circuits, an electric motor, two signals having independent connections to the motor, two locks for holding the signals in clear position two magnets controlling the locks and the connections between the signals and motor, two shifting-circuits one including the motor and one of the controlling-magnets and the other including the motor and the other controlling-magnet, a make-and-break mechanism controlling the shifting and holding circuits of both signals and controlled by one track-section and a second make-and-break mechanism in the shifting and holding circuits of one of the signals and controlled by the other track-circuit, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JENS G. SCHREUDER.

Witnesses:

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F. E. GAITHER.