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J. WAYLAND & H. B. TAYLOR.

RAILWAY SIGNAL.

(No Model.) (Application filed Aug. 5, 1899.)

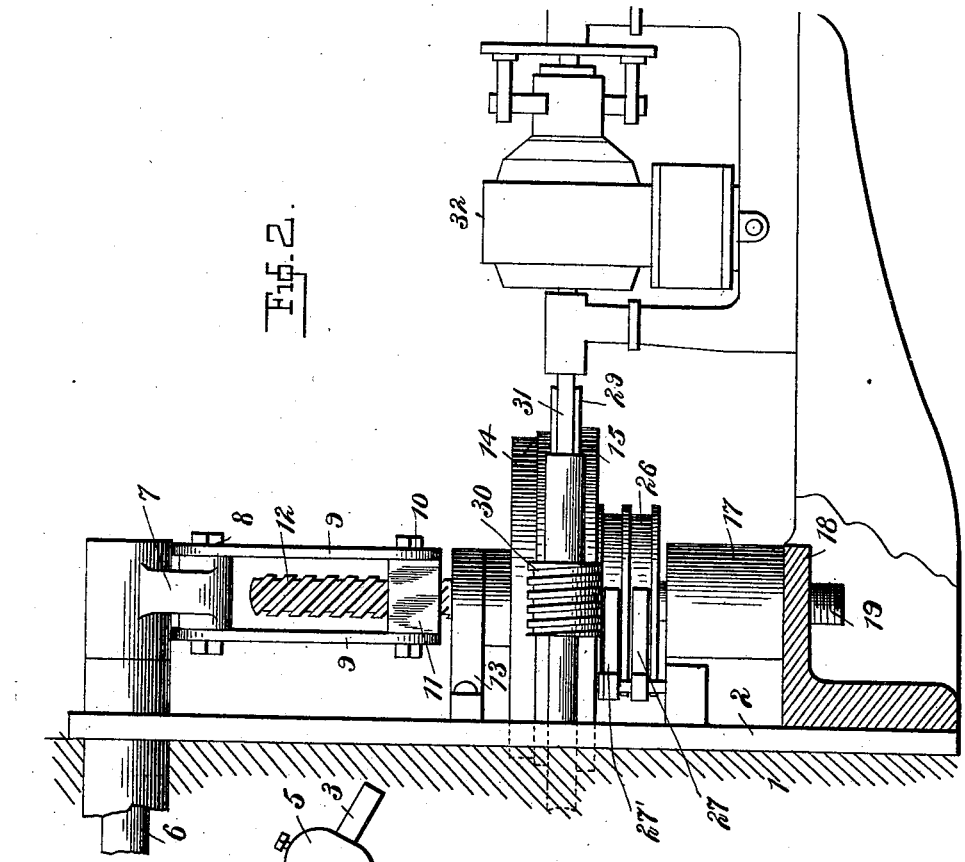

FIG. 2.

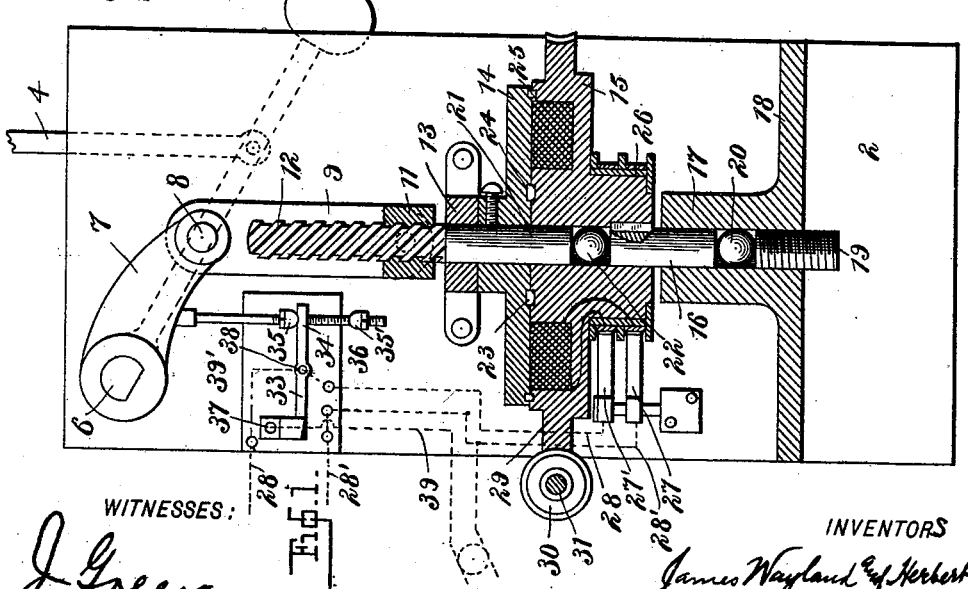

FIG. 1.

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RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 646,719, dated April 3, 1900.

Application filed August 5, 1899. Serial No. 726,234. (No model.)

To all whom it may concern:

Be it known that we, JAMES WAYLAND and HERBERT B. TAYLOR, citizens of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Railway-Signals, (Case C,) of which the following is a specification.

This invention relates to improvements in railway-signals, and particularly to means for operating the signal and for releasing same to enable it to return automatically to the position from which it was moved by the operating means; and the object of the invention is to provide operating and releasing means which shall be rapid and certain in operation.

The invention consists in the combination of devices for this purpose, as hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a vertical section of the apparatus. Fig. 2 is a side elevation of same.

The semaphore or signal proper is not shown, as it may be of any usual construction, and our invention relates only to means for operating same.

1 represents the post of the signal, to which is secured the frame 2, which serves as the support for the devices hereinafter described. On this support is pivoted the signal-operating lever 3, which operates the semaphore through a rod 4, pivotally connected thereto, said lever being provided with a weight 5 for returning the signal to danger position. The pivot-shaft 6 of lever 3 also carries an arm 7, pivoted at 8 to links 9, which are pivotally connected at 10 to a nut 11, surrounding and engaging a vertical screw-pin 12, which is mounted to turn in a fixed bracket 13 and carries fastened to its lower end a disk armature 14. An annular electromagnet 15, arranged below said armature, is mounted by its pivot-pin 16 to turn on a bearing 17 in a fixed bracket 18, an adjusting-screw 19 being preferably provided for this pivot-pin bearing to give an adjustable end bearing and a ball 20 being interposed between the pivot-pin and the adjusting-screw to diminish friction. The lower end of screw-pin 12, below armature 14, engages in a socket 21 in the annular electromagnet 15, a ball 22 being interposed between the pin 12 and the bottom of this socket. The armature 14 and annular electromagnet 15 are adapted to engage frictionally when attracted, as by means of bearing-rings 23 of non-magnetic material on the armature engaging in annular grooves 24 in the poles of the magnet. The coil 25 of electromagnet 15 is connected through a collector 26, attached to and rotating with said magnet, and fixed brushes 27 27′ to the wires 28 28′ of a controlling-circuit. Attached to or formed integrally with the annular electromagnet 15 is a worm-gear 29, which surrounds the shell of said electromagnet and is engaged by a worm 30 on the shaft 31 of an electric motor 32. The circuit of this motor is controlled by a switch 33, mounted on but insulated from the frame 2 and having a tail 34, engaged by nuts 35 35′ on a rod 36, pivoted to the arm 7 of the signal-operating lever, so that as the said lever ascends in moving the signal to "safety" it will open the switch. This switch has terminals 37 38, connected, respectively, by wires 39 39′ to one side of the motor and to a wire 28 of the controlling-circuit, the other side of the motor being connected to the other wire 28′ of said controlling-circuit, so that the opening of said switch breaks the motor connection.

The operation of the apparatus is as follows: Assuming the parts to be in the position shown, corresponding to danger position of the signal, the nut 11 is near the lower end of the screw-pin 12 and the switch 33 is closed. If now the controlling-circuit be in operative condition, the motor 32 and electromagnet 15 will both be energized, the motor driving the worm and worm-gear and rotating the electromagnet, and the electromagnet attracting its armature with sufficient force to cause it to rotate with the magnet. The resultant rotation of the screw-pin 12 will cause the nut 11 and links 9 to rise, turning the arm 7 and lever 3 and moving the signal to safety. As this movement is being completed the nut 35′ on rod 36 opens the switch 33 and the motor comes to rest, leaving the apparatus under the control of the controlling-circuit through magnet 18, which prevents the rotation of the armature as long as said circuit is operative. On cessation of current in such circuit the armature is released and the nut 11 descends, im-

pelled by the weight of the signal apparatus, the screw-pin 12 turning in said nut. To insure the return movement, it is necessary to make the screw on this screw-pin of comparatively-steep pitch—say about forty-five degrees. As the signal-operating lever reaches the lower limit of its movement it closes the switch 33, putting the motor again in circuit ready for another operation. The upward movement of the nut results, of course, in considerable end pressure in the screw-pin; but this is provided for by the antifriction end-thrust bearings constituted by balls 20 and 22. The pitch of the screw can be adapted to give an even steady descent without undue acceleration or shock.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a signal-operating mechanism, the combination with a signal-operating lever weighted to return to danger position, of a screw-pin, a device engaging with said screw-pin and connected with said lever so that rotation of said screw-pin raises said lever and descent of said lever turns said screw-pin, a disk armature on said screw-pin, an annular electromagnet mounted on a vertical pivot, and adapted to engage frictionally with said armature, a worm-gear fast on said annular magnet, a worm engaging with said worm-gear, a motor adapted to drive said worm, an electric connection from said magnet to a controlling-circuit.

2. In a signal-operating mechanism, the combination with a signal-operating lever weighted to return to danger position, of a rotatably-mounted steep-pitched screw-pin, a nut engaging with said screw-pin, links connecting said nut with said lever, electrically-controlled means for releasing the connection between the screw-pin and its rotating means, and electrically-controlled means for rotating said screw-pin.

3. In a signal-operating mechanism, the combination with a signal-operating lever weighted to return to danger position, of an annular electromagnet mounted to turn on a vertical pivot, a screw-pin engaging in a bearing in said annular magnet, and mounted to rotate in a fixed bearing, a disk armature for said magnet carried by said screw-pin and adapted to engage frictionally with said electromagnet, means engaging with said screw-pin and connected to the signal-operating lever to operate same, an electric motor adapted to rotate said annular electromagnet and an electric controlling-circuit connected to said motor and to the said annular electromagnet.

4. In a signal-operating mechanism, the combination with a signal-operating lever weighted to return to danger position, of an annular electromagnet mounted to turn on a vertical pivot, a screw-pin engaging in a bearing in said annular magnet, and mounted to rotate in a fixed bearing, a disk armature for said magnet carried by said screw-pin and adapted to engage frictionally with said electromagnet means engaging with said screw-pin and connected to the signal-operating lever to operate same, an electric motor adapted to rotate said annular electromagnet and an electric controlling-circuit connected to said motor and to the said annular electromagnet.

5. In a signal-operating mechanism, the combination with an annular electromagnet and a disk armature mounted to rotate and to engage frictionally when attracted, a motor for rotating one of such parts and a screw-pin connected to the other of such parts, a device engaged by said screw-pin, a signal-operating lever weighted to return to danger position, and connected to said screw-engaging device, and controlling electric-circuit connections for said electromagnet.

6. In a signal-operating mechanism, the combination with an annular magnet and a disk armature mounted to rotate and to engage frictionally when attracted, an electric motor for rotating one of such parts, a screw-pin connected to the other of such parts, a device engaging with said screw-pin, a signal-operating lever weighted to return to danger position, and connected to said screw-engaging device, controlling electric-circuit connections for said electromagnet, and a switch connected to said controlling electric connections and to the motor, and mechanically connected to the signal-operating lever to break the motor-circuit on the operation of said lever.

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