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R. S. ROTH

MOTOR POWER REVERSE GEAR

Filed July 21, 1925

Fig. 1.

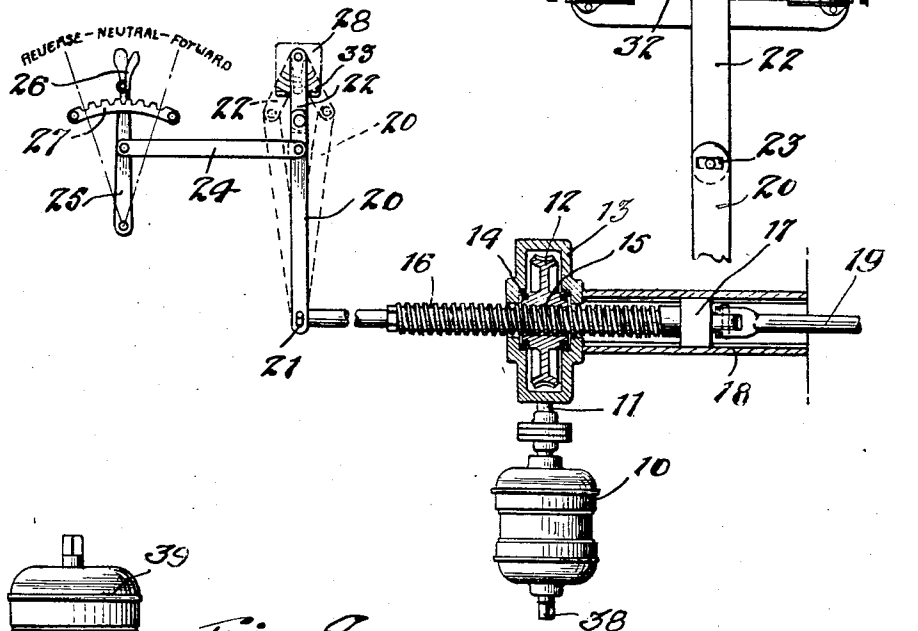


Fig. 2.

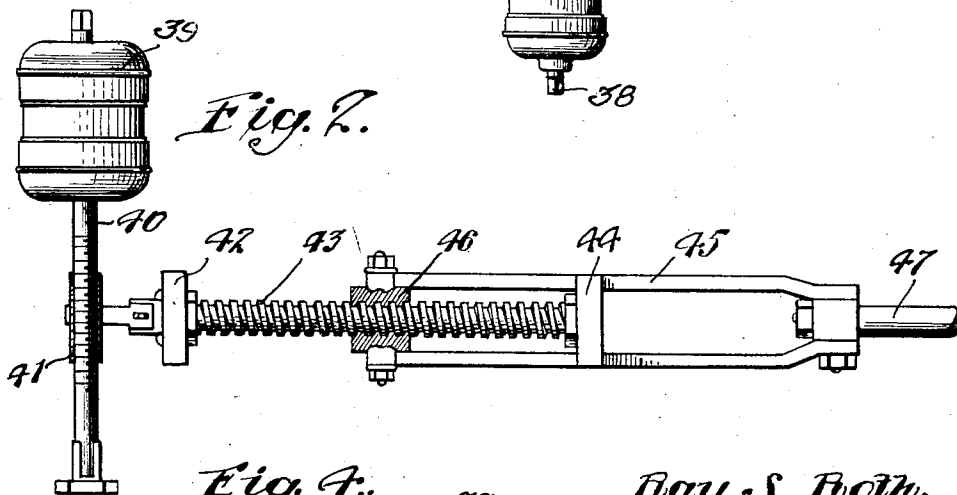
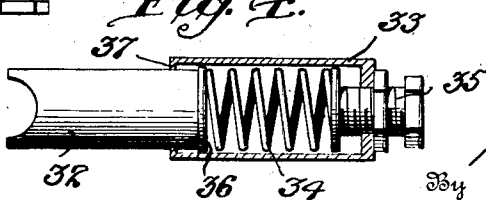


Fig. 3.



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MOTOR-POWER REVERSE GEAR.

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My invention relates to improvements in power operated mechanism and more especially to power operated reverse gear for locomotives, although not necessarily restricted to this use.

An important object of my invention is the provision of a device of the above mentioned character which is capable of movement forward or backward, and which is absolutely positive in operation.

Another object of my invention is to provide a device of this character with an automatic control device.

A further object of my invention is to provide means for properly centering the switch lever.

Yet another object of my invention is the provision of a device of this character which is simply constructed, inexpensive to manufacture, and strong, durable and reliable in use.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings which form a part of this specification and wherein like characters of reference denote like or corresponding parts throughout the same,

Figure 1 is a side elevation of a device embodying my invention, parts being in section,

Figure 2 is a similar view of another form of my invention,

Figure 3 is a detail view of the switch and switch centering device, and,

Figure 4 is a detail view of one of the spring plungers.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a reversible motor, having an armature shaft 11 upon which is mounted any suitable power transmission device as a worm or the like, which engages a worm gear 12 to rotate the same. The gear 12 is mounted in a casing 13 by means of raceways and bearings 14 which take up radial thrust. The worm gear has an internally threaded central bore 15 through which passes a screw shaft 16 having one end provided with a cross head 17 which engages a suitable guide casing 18 attached to the casing 13. A reach rod 19 is pivotally connected to the cross head at one end and is connected at its other end to the tumbling shaft of the valve gear of a locomotive, not

shown. It will be seen that as the motor rotates the worm gear, the screw will move to cause valve gear to reverse.

A fulcrum lever 20 is connected to the free end of the screw shaft by means of an elongated longitudinal slot 21 which engages a suitable pin or the like on the end of the screw shaft. The lever is connected at its upper end to a switch lever 22 by means of a transverse slot 23 which engages a suitable pin or the like on the end of the switch lever.

A link 24 is pivotally connected at one end to the fulcrum lever a short distance below its connection with the switch lever and connects at its other end with a hand lever 25 which has a latch 26 for engaging the notches of a quadrant 27. The switch lever 22 is pivotally connected to a switch box 28 and has a contact 29 which is adapted to engage reverse contacts 30 and forward contacts 31. In order to insure that the switch lever will be properly centered, I provide a pair of plungers 32 sliding in casings 33 and pressed by springs 34 within the casing, the tension of the springs being regulated by adjusting screws 35. Flanges 36 on the end of the plungers engage flanges 37 on the casing to prevent displacement of the plungers from the casings which are rigidly secured to the switch box. If desired, the ends of the plungers may be notched so as to get a good grip on the switch lever.

In operation, if the hand lever is moved one notch to left, the switch lever contact will engage the contacts 30 and start the motor. As the screw is moved, the fulcrum lever will pivot about its connection with the link 24 and disengage the contacts so as to stop the motor. The farther to the left the hand lever is moved, the longer the motor will operate the screw before being stopped. If the hand lever is moved in the opposite direction, the movement of the screw will be in the opposite direction. The spring plungers 32 will always return the switch to its inoperative position, this being made possible by the slot 23. The motor armature shaft is provided with a crank engaging end 38 in order that the device may be operated by hand in times of emergency.

In the form shown in Figure 2, the motor 39 has a shaft 40 which operates a worm gear 41 which is flexibly connected to the screw shaft 43 which is carried by the screw

bearing 42. The other end of the screw 43 engages a screw bearing 44 which is in the nature of a cross head, and engages the guide 45 which has its end provided with a cross head block 46 which is internally threaded and engages the screw shaft which passes therethrough. The other end of the guide is connected to the tumbling shaft of a locomotive or the like by means of the reach rod 47.

When the motor is turned on, the screw will move the guide 45 and so operate the reach rod.

The action of these devices is positive and the worm gearing acts as a brake on the screw shaft. If other types of gearing are preferred, it is necessary to apply suitable braking mechanism for the motor or the screw.

While I have shown and described the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A device of the character described comprising an electric motor, a worm gear adapted to be actuated thereby, a shaft adapted to be moved longitudinally by the worm gear, a switch adapted when moved into operative position to start the motor and move the shaft, means operated by the longitudinal movement of the shaft to move the switch to its inoperative position, to stop the motor, means to determine the distance the shaft can move before being stopped and means to insure that the switch will assume its inoperative position when released.

2. A device of the character described comprising an electric motor, a worm gear actuated thereby, a screw shaft adapted to be moved longitudinally by said worm gear, a switch for starting said motor, a lever connecting said switch and said screw shaft, an actuating lever for moving said switch and

a link connecting the levers, whereby when the actuating lever is moved, the switch will be moved a proportionate distance to start the motor and move the screw shaft, the screw shaft causing the first named lever to fulcrum about the connecting link and release the switch.

3. A device of the character described comprising a reversible electric motor, a worm gear actuated thereby, a screw shaft adapted to be moved longitudinally by said worm gear, a switch pivoted at one end and adapted to move over two sets of contacts, but adapted to normally rest between said sets of contacts, said switch being adapted to start the motor, a fulcrum lever connecting the screw shaft and switch lever, there being a small amount of play in each connection, a hand lever, a link connecting said fulcrum lever with the hand lever, whereby movement of the hand lever will start the motor and move the screw shaft which will cause the fulcrum lever to fulcrum about the connecting link and release the switch, and a spring plunger engaging the switch lever for centering the same.

4. A motor control device comprising an electric motor, a shaft adapted to be moved longitudinally by the motor, a motor control switch comprising a pair of spaced contacts, a contact arm pivoted to move over the contacts to start the motor and normally arranged therebetween, a fulcrum lever connecting the shaft and the contact arm, there being a small amount of play in each connection, a hand lever, a link connecting the said fulcrum lever with the hand lever, whereby movement of the hand lever will move the contact arm to close the motor circuit and start the motor and move the shaft, the movement of said shaft causing the fulcrum lever to pivot about the connecting link and move the contact to its intermediate and inoperative position, and means for insuring proper centering of the contact arm between the contacts.

In testimony whereof I affix my signature.

RAY S. ROTH.