

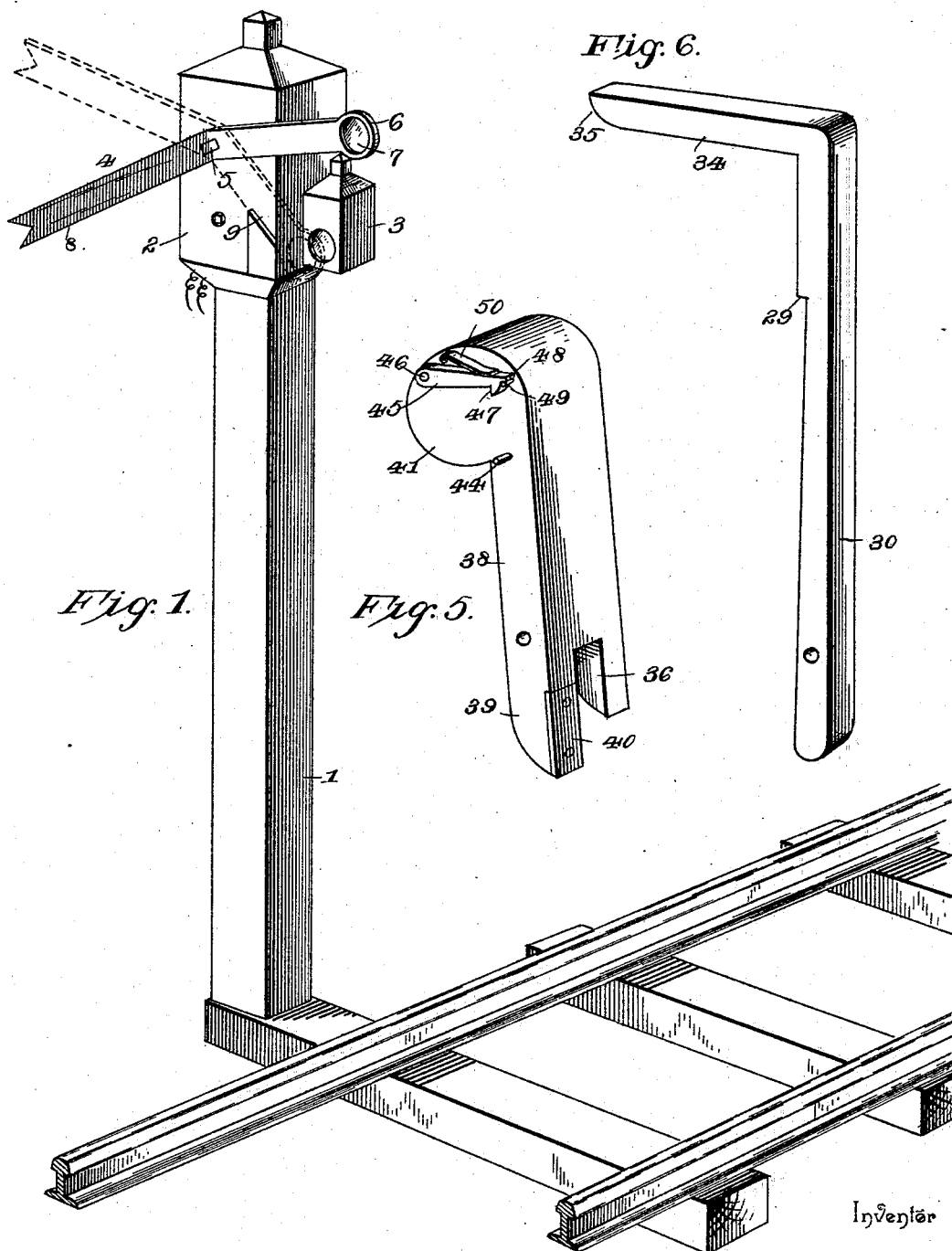
(No Model.)

2 Sheets—Sheet 1.

L. DORNBERGER.
ELECTRICAL RAILWAY SIGNAL.

No. 524,758.

Patented Aug. 21, 1894.



Witnesses
C. A. Ford.
S. P. Haupt.

By his Attorneys.

Lawrence Dornberger,

C. A. Snow & Co.

(No Model.)

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Fig. 4.

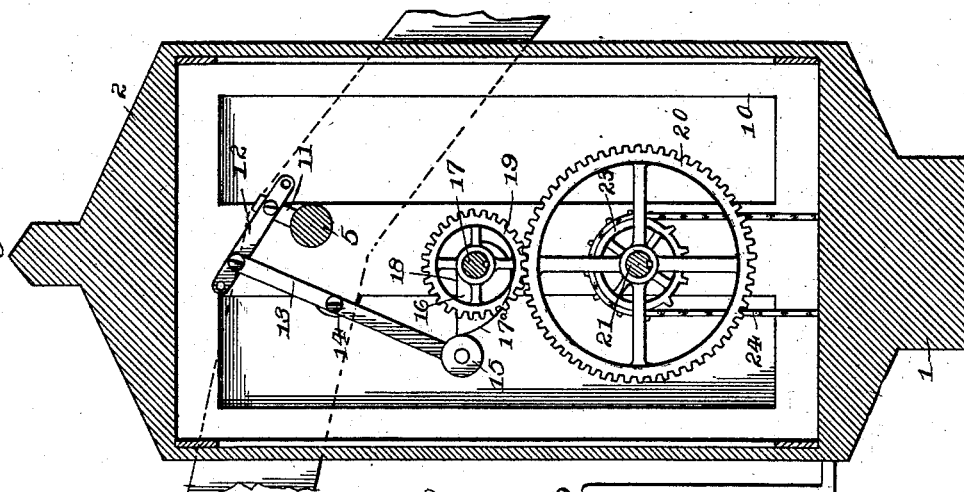


Fig. 3.

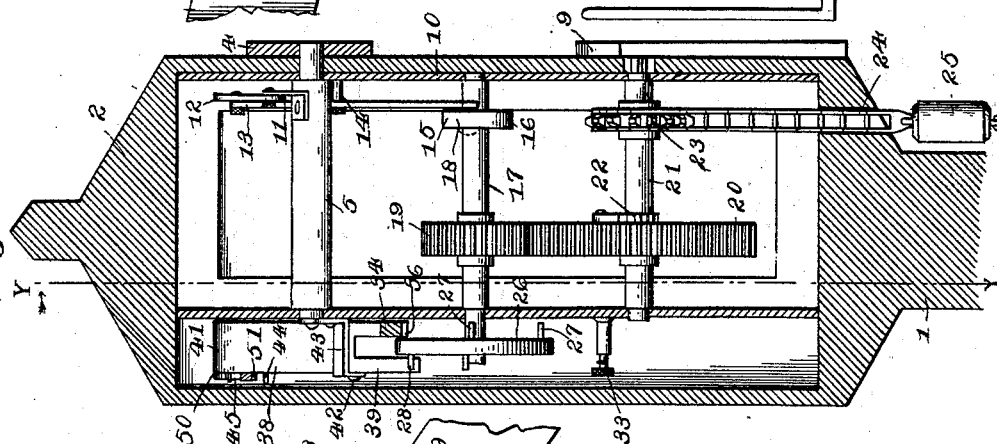
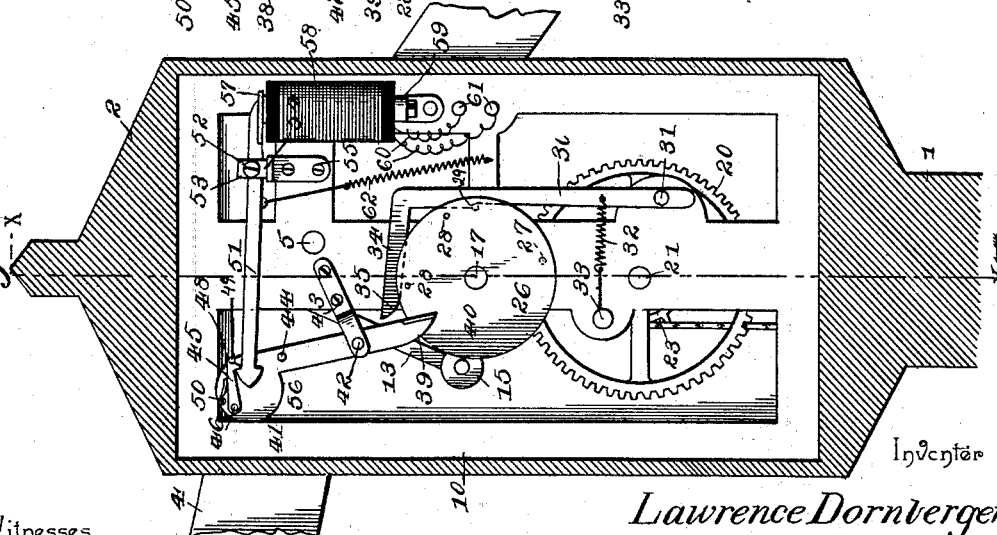


Fig. 2.



Witnesses

C. A. Ford

D. P. M. H. H. H. H.

By his Attorneys.

Lawrence Dornberger,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

LAWRENCE DORNBERGER, OF HIGHLAND FALLS, NEW YORK.

ELECTRICAL RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 524,758, dated August 21, 1894.

Application filed April 17, 1894. Serial No. 507,917. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE DORNBERGER, a citizen of the United States, residing at Highland Falls, in the county of Orange and State of New York, have invented a new and useful Electrical Railway-Signal, of which the following is a specification.

This invention relates to electrical railway signals; and it has for its object to effect certain improvements in apparatus of this character whereby a signal arm may be automatically operated by the movement of passing trains to indicate "safety" or "danger" in the customary manner.

To this end the main and primary object of the present invention is to provide new and useful mechanical means operated by the passing trains closing the electric circuit in any suitable manner to shift the position of the signal arm to give the proper signal.

With these and other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a perspective view of an electrically controlled signal constructed in accordance with this invention mounted in operative position and showing the two positions of the signal arm. Fig. 2 is a side elevation of the gear controlling devices of the signal operating mechanism. Fig. 3 is a vertical transverse sectional view on the line $x-x$ of Fig. 2. Fig. 4 is a similar view on the line $y-y$ of Fig. 3. Fig. 5 is a detail in perspective of the weighted trip lever. Fig. 6 is a similar view of the spring-drawn catch pawl or arm.

Referring to the accompanying drawings, 1 designates a signal pole or tower that is adapted to be arranged alongside of a railway track in the usual position where it is customary to exhibit signals, and on the upper end of said signal pole is supported the signal box 2, in front of which is adapted to be supported a signal lantern 3, at one side of which is arranged to work the signal arm 4. The signal arm 4, works outside of the signal box 2, and is mounted on one end of the signal arm or shaft 5, and said signal arm is provided with a weighted lens end 6, at the

outer extremity of which is mounted the colored lens 7, that is adapted to be aligned with the lantern 3, when the danger signal is given, and is adapted to be raised above the lantern when the arm is set to give a safety signal. The weight lens end 6, is disposed at an angle to the other end portion of the arm which forms a signal board 8, designed to be painted with the usual color so as to give the same signal in the day time that is given at night by the lens 7, and said lens end 6, is sufficiently heavy to normally elevate the signal board end 8, to a horizontal signal position and to bring the lens 7, opposite the lantern, and in this normal position the said weighted lens end 6, is adapted to rest on the stop 9, secured to one side of the signal box 2, below the signal arm.

The arm shaft 5, extends through the signal box 2, and is journaled transversely within the mechanism frame 10, arranged inside of the signal box 2, and said signal shaft 5, has attached thereto within the frame 10, the off-standng rock arm 11, to which is adjustably connected one end of the link arm 12, the other end of which is adjustably and pivotally connected to the upper end of the oscillating lever 13. The oscillating lever 13, is pivoted at a point intermediate of its ends 14, to the inner side of the frame 10 and carries at its lower end the contact roller 15, that is adapted to engage at one side of the operating cam 16, mounted on the transverse cam shaft 17, that is journaled in the frame 10 and projects beyond one side thereof.

The operating cam 16 is provided with a rounded cam side 17 and the straight or flat side 18, so that when the shaft 17 moves in one direction the rounded side of the cam moves the lower end of the oscillating lever 13 in a direction that causes the arm shaft 5, to rock and elevate the lens end of the signal arm to a "safety" position, but when the cam reaches a position in which the straight or flat side thereof is disposed at one side of the lower end of the lever 13, said lever will assume a substantially vertical position so as to allow the signal arm to automatically lower to the danger position, owing to the weight of the lens end 6.

The transverse cam shaft 17, has mounted thereon within the frame 10, a gear wheel 19,

that meshes with a drive spur wheel 20, mounted on the lower weight shaft 21, journaled transversely in the frame 10, below the shaft 17, and provided at a point alongside of the wheel 20, with a pawl and ratchet device 22 to admit of the winding of the said shaft when necessary, and mounted on the shaft 21, at a convenient point is a sprocket or chain wheel 23, over which passes the upper portion of the endless weight chain 24, to which is attached the operating weight 25, that is adapted to lower from the upper to the lower portion of said chain to provide means for turning the shaft 21 at the proper time, and said weight after having been lowered is easily raised again by means of winding up the shaft 21, and these means substantially complete the mechanism that is employed for communicating motion to the gearing for operating the signal arm 4.

A stop wheel 26, is mounted on one end of the cam shaft 17, at one side of the frame 10, and said stop wheel is provided on its inner side with regularly spaced stop pins 27, and upon its outer side with similarly spaced strike pins 28, the inner pins 27, being adapted to engage against the catch shoulder 29, formed at an intermediate point in one side of the catch pawl or lever 30. The catch pawl or lever 30, is pivoted at its lower end at 31 to one side of the frame 10, and is normally held in position for engagement by the pins 27, by means of the retractile spring 32, connected at one end to the said catch pawl and at its other end to a fixed point of attachment 33 at one side of the frame 10. Normally, the catch pawl or lever 30, is held loosely in rear of the stop wheel 26, so that the catch shoulder 29 will normally be engaged by one of the pins 27, and thereby check the rotation of the cam shaft 17, that is always induced by the weight 25.

The catch pawl or lever 30, is provided at its upper end with the off-standing trip arm 34, having an outer rounded end 35, that is adapted to be struck or engaged by the inner trip foot 36, formed at one side of a bifurcation at the lower end of the weighted trip lever 38, which is provided at the outside of the bifurcation in its lower end with an outer strike foot 39, that is somewhat longer than the foot 36, and is provided with a metal wear plate 40, at one side, adapted to be struck by the outer strike pins 28, of the stop wheel 26, for the purpose of readjusting the trip lever 38, as will be more particularly referred to.

The weighted trip lever 38, is provided with an upper weighted end 41, that normally tends to move the lower end of the lever toward the catch pawl 30, and said weighted lever is pivotally mounted at a point at one side of its center on the pivot pin or bolt 42, arranged in the outer end of the off-standing pivot bracket 43, secured to one side of the frame 10. The weighted trip lever 38, is provided at its upper weighted end with an off-standing catch pin or stud 44, and immediately

above this catch pin or stud 44, with a catch dog 45. The catch dog 45, is pivoted at one end as at 46, to the weighted end of the trip lever and is provided at its other free end with a catch shoulder 47, and a stop flange 48, the latter of which is normally held on the stop pin 49 by the tension of the spring 50, connected to the pivoted end of said dog and to the said trip lever.

Arranged to play between the shouldered catch end of the dog 45, and the catch pin 44 is one end of the armature lever 51. The armature lever 51, is pivotally supported near one end between the oppositely disposed pivot screws or pins 52, that are arranged to work through the lugs 53, at opposite ends of the pivot bracket 54, that is supported in a horizontal position at one side of the frame 10, by the flanged supporting bracket 55, attached to one side of the frame 10. The said armature lever 51, is provided at the extremity of its long arm with a double shouldered head 56, that is adapted to engage at different times the catch pin 44, and the dog 45, and at the extremity of its short arm, the said armature lever is provided with the armature plate 57, that is arranged to work over the upper end of the core of the electro-magnet 58, supported at one side of the frame 10, in position, by the magnet supporting bracket 59, attached to said frame, and the magnet wires 60, are connected to the binding posts 61, to which binding posts 61, are adapted to be connected the circuit wires of any suitable track circuit closer such as is commonly employed in connection with railways, and which are adapted to be operated by the wheels of a passing train. By this means a passing train will close the circuit through the magnet 58, so as to attract one end of the armature lever and thereby set the gearing in motion for adjusting the position of the signal arm.

Normally when the circuit is not closed through the magnet 58, the armature 51 is held down in normal engagement with the catch pin 44, of the lever 38 by the spring 62 and in this position of the parts, the cam 16, is disposed in a position that permits the signal arm 4, to assume its normal danger position with the weighted lens end 6, lowered. Immediately upon the closing of the circuit through the magnet 58 by a passing train, the armature plate 57, is attracted and lifts up the armature lever 51 out of engagement with the catch pin 44 of the weighted trip lever 38. The weighted trip lever in response to the weight at its upper end tilts and throws the lower trip foot 36, thereof against one end of the trip arm 34, of the catch pawl or lever 30. This movement disengages the shoulder 29, of the catch pawl or lever from the inner stop pin 27, in engagement therewith, and thereby releases the wheel 26, so that the cam shaft 17, will be free to turn in response to the pull of the weight 25, and the cam 16, is thereby carried around against the lower end of the oscillating lever 13, and rocks the shaft

5, so as to lift the signal arm to a "safety" position. In the meantime the pawl or lever 30, has assumed its normal position and the shoulder thereof has been engaged by another stop pin which checks the further movement of the gearing and serves to lock the signal arm in its "safety" position. Immediately after the weighted trip lever 38, has fallen to effect the operation described, the outer strike foot 39, thereof, has been engaged by one of the outer strike pins 28 of the stop-wheel, which causes the said lever to be thrown back to an upright position and causes the spring-actuated catch dog 45, to engage with the upper part of the shouldered head 56 of the armature lever 51.

The parts of the apparatus remain in the position noted with the magnet energized until the circuit is opened through the magnet which allows the armature lever to fall and again release the stop wheel which allows the gearing to carry the cam to a position so that the signal arm, yielding to the weighted end thereof, will normally assume its danger position. In this operation the weighted trip lever 38, is thrown upward to bring the lower catch pin 44, thereof into engagement with the shouldered head of the unattracted armature lever.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a railway signal of the class described, the frame, weight actuated gearing mounted within said frame and one of the shafts of which is provided with an operating cam, having a rounded and a flat side, a rock or arm shaft journaled in said frame and carrying a signal arm at one end, an oscillating lever arranged in the frame and provided at its lower end with a contact roller engaged by said cam, a link arm adjustably connected to the upper end of said oscillating lever and to the rock or arm shaft, and electrically operated gear controlling devices mounted at one side of the frame and connected with said gearing, substantially as set forth.

2. In a railway signal of the class described, the frame, a rock or arm shaft journaled in said frame and carrying a signal arm at one end and provided with an off-standing rock arm, a vibrating lever mounted within said frame and carrying a contact roller at its lower end, a link arm pivotally and adjustably connected to the upper end of said lever and to said rock arm, a cam-shaft carrying a gear wheel, an operating cam mounted on said cam shaft and provided with a rounded and a straight or flat side to engage with said contact roller, a weight shaft carrying a drive

spur wheel meshing with the gear wheel of the cam shaft, and a sprocket or chain wheel, an endless weight chain arranged on said sprocket or chain wheel and carrying a weight, and electrically operated gear controlling devices for the gearing, substantially as set forth.

3. In a railway signal, the combination with the signal arm; of automatically operated gear devices connected with said signal arm for adjusting the same, a stop wheel mounted on one of the shafts of the gearing, a catch pawl for said stop wheel, a trip lever to disengage said pawl from the stop wheel, and an electrically controlled catch for said trip lever, substantially as set forth.

4. In a railway signal of the class described, the combination with a weighted signal arm; of weight-actuated gearing connected with the signal arm for adjusting the same, a stop wheel mounted on one of the shafts of the gearing, a spring actuated catch pawl for said stop wheel, a weighted trip lever having catch devices and adapted to engage with said catch pawl to trip the same, an electro magnet, and a spring retracted armature lever pivotally supported with one end playing over the electro magnet and adapted to have its other end engaged with the catch devices of said trip lever, substantially as set forth.

5. In a railway signal, the combination with a weighted signal arm; of weight-actuated gearing connected with the signal arm for adjusting the same, a stop wheel mounted on one of the shafts of the gearing and provided with a series of inner spaced stop pins and outer spaced strike pins, a spring retracted catch pawl having a shoulder for engagement with said stop pins and provided at its upper end with an off-standing trip arm, a weighted trip lever pivotally supported above the stop wheel and provided with a lower bifurcated end having an inner trip foot for engagement with the trip arm of the catch pawl, and an outer strike foot adapted to be engaged by the strike pins of the stop wheel, said weighted trip lever being provided at its upper end with a catch pin and a reversely disposed spring actuated catch dog above the pin, a suitably arranged electro-magnet, and a spring retracted armature lever pivotally supported and provided at one end with an armature plate arranged to play over the electro magnet, and at its other end with a shouldered head adapted to engage in different positions the catch pin and catch dog of the weighted trip lever, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LAWRENCE DORNBERGER.

Witnesses:

JOHN I. MONAGHAN,
DANIEL F. MESKIL.