J. DERBY.

ELECTRIC SIGNAL BOX.

APPLICATION FILED SEPT. 1, 1910.

1,060,539. Patented Apr. 29, 1913.

Fig. 1.

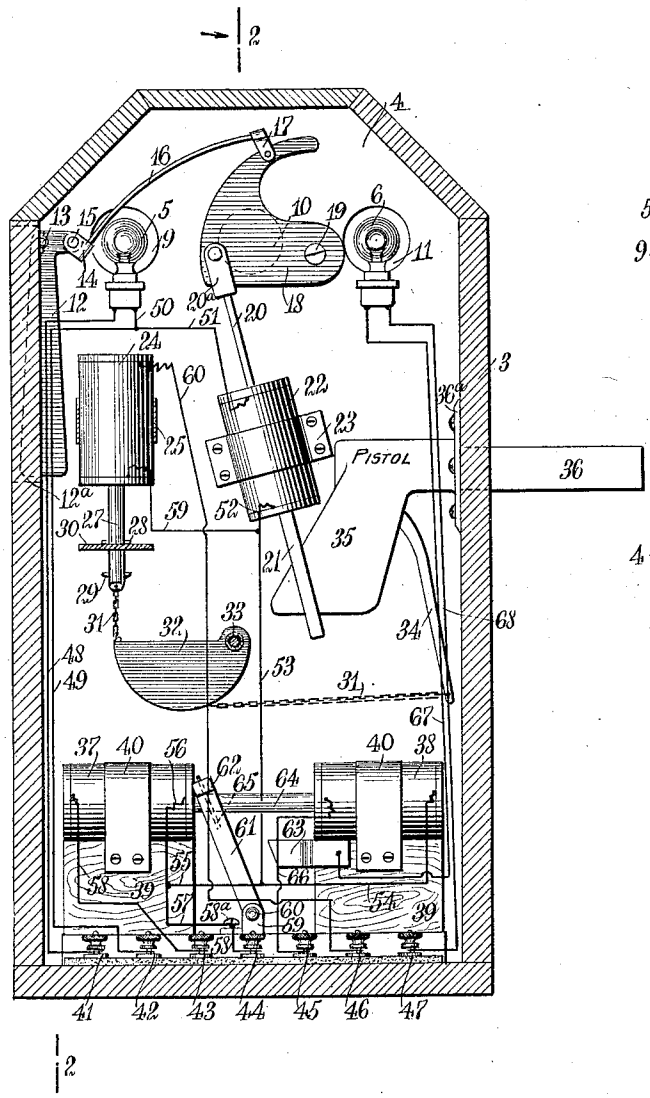
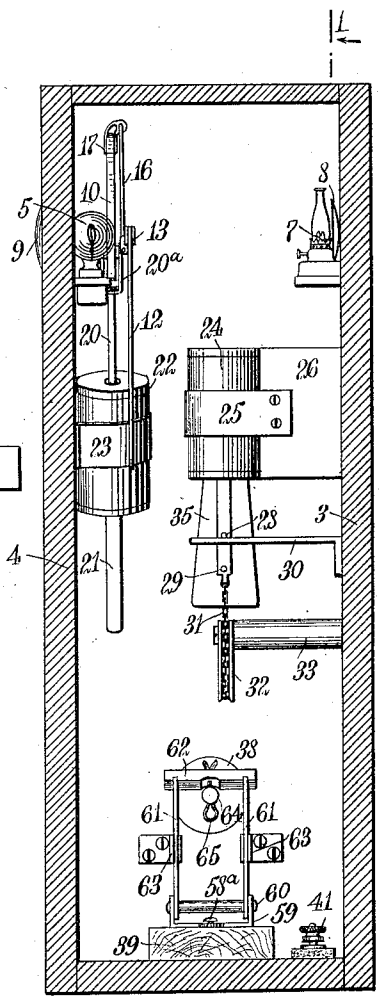


Fig. 2.



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ELECTRIC SIGNAL-BOX.

1,060,539. Specification of Letters Patent. Patented Apr. 29, 1913.

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To all whom it may concern:

Be it known that I, JOHN DERBY, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Electric Signal-Box, of which the following is a full, clear, and exact description.

My invention relates to electric switch boxes, my more particular idea being to produce a switch box having parts actuated electrically and also having connections whereby the box and its various electrically-operated parts can be connected up as a portion of a block signal system.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a vertical section on the line 1—1 of Fig. 2, looking in the direction of the arrow and showing the electric switch box mechanism complete; and Fig. 2 is a vertical section substantially on the line 2—2 of Fig. 1, looking in the direction of the arrow.

At 3 is a casing which is provided with a door 4 adapted to be opened and closed. This door has mounted directly upon it various parts, as hereinafter described, and including a telltale lamp 5 and a danger signal lamp 6. At 7 is another lamp which is supported directly by the wall of the casing 3 and is provided with a reflector 8.

At 9, 10, 11 are three windows with which the door 4 of the casing is provided.

A semaphore arm is shown at 12 and is mounted upon a pivot pin 13, this arm being free to swing outwardly from the casing which is provided with a slot 12^a for this purpose. A shackle 14 is connected with the arm 12 by aid of a pivot pin 15 and is mounted rigidly upon one end of a rod 16. The opposite end of this rod is provided with a shackle 17 secured rigidly upon it.

At 18 is a rocking shield mounted upon a fixed pivot 19 and serving as a blinder. The shackle 17 is pivotally connected with a portion of the blinder 18.

At 20 is a rod carrying at its upper end a fork 20^a, this fork being pivotally connected with the shield 18. This shield is used as an emergency signal, to be operated only by loss of power in the solenoid 22, whether such loss of power be caused by accident, such as breaking a wire, or otherwise. The lower end of the rod 20 is secured to a core 21 of soft iron or other magnetic material.

At 22 is a solenoid relatively to which the core 21 serves as an armature. The solenoid 22 is held in position by aid of a strap 23, the latter being secured directly upon the inside of the door 4. Another solenoid is shown at 24 and is, by aid of a strap 25, mounted rigidly upon a block 26, the latter being secured to the back of the casing 3.

At 27 is an armature for the solenoid 24, this armature having generally the form of a core movable in the general direction of its own length. Extending diametrically through the armature 27 are stop pins 28, 29. The armature 27 extends through a hole in a shelf 30, the latter being secured upon the back of the casing. The core 27 has a limited play representing the proximate distance between the stop pins 28, 29.

At 31 is a chain which engages a sprocket arm 32 which is mounted upon a pintle 33, the latter being secured upon the back of the casing. The chain 31 is connected with a trigger 34 forming part of a firearm 35 provided with a barrel 36. This firearm may conveniently be an ordinary self-action revolver loaded with blank cartridges. Any sort of a gun, however, can be employed instead. The firearm is supported by aid of a plate 36^a secured to the wall of the casing. Two solenoids 37, 38 have their axes in alinement and are supported by blocks 39, being secured to the latter by aid of straps 40.

At 41, 42, 43, 44, 45, 46, 47 are binding posts mounted conveniently within the bottom of the casing and used for placing various parts in electrical communication with each other, as hereinafter described. Connected with the binding posts 41, 42 are wires 48, 49, the wire 49 being connected with a wire 50 which, with the wire 48, is connected with the incandescent lamp 5. A wire 51 is connected with the wires 49, 50 and with the solenoid 22. A wire 52 is connected with this solenoid and also with a wire 53. Connected with the latter is a wire 54 which leads to the solenoid 38. A wire 55 is connected with the wires 53, 54 and is also connected with a wire 56, the latter leading to the solenoid 37. A wire

57 is connected with the wires 55, 56 and also with a binding post 58a. A wire 58 is also connected with the binding post 58a, the latter being in communication with a metallic fork 59. This fork carries a pivot 60 and also a pair of switch knives 61, the latter carrying a cross bar 62. The wire 58 is connected to a binding post 44. A wire 58b extends from the solenoid 37 to the binding post 43. A wire 59a is connected to the solenoid 24 and to the two wires 52, 53. A wire 60a is connected with the solenoid 24 and with the binding post 46.

At 63 are contacts which are disposed partially within the path of travel of the knives 61 and adapted to be engaged by these knives when the latter are thrown to the right according to Fig. 1.

At 64 is a core serving as an armature for the solenoids 37, 38 and connected by a pin 65 with the cross bar 62. A wire 66 is connected with the solenoid 38 and with the binding post 45. One of the contacts 63 is connected with a wire 67 which leads to the incandescent lamp 6. A wire 68 is connected with this incandescent lamp and also with the binding post 47. When the solenoid 37 is energized the switch knives 61 are rocked to the left, according to Fig. 1, as indicated in said figure. This pulls the switch knives out of engagement with the contacts 63. When, however, the solenoid 38 is energized, the switch knives 61 are brought into engagement with the contact members 63.

The mechanism shown in the drawings and above described, is used in a variety of relations, one of the commonest of which is to connect up the various binding posts 41, 42, 43, 44, 45, 46, 47 with the wires of a block signal system, in such manner that current is supplied to the middle post 44 and distributed thence to various parts shown and described, to some one of the other binding posts 41, 42, 43, 45, 46, 47, thereby actuating the proper parts to be affected. When thus used, it is desirable that there be a source of electricity and contact mechanism in electrical communication with the binding post 44, the source of electricity being, by aid of the contact mechanism, thrown into electrical communication with the various binding posts 41, 42, 43, 45, 46, 47, preferably in a definite order of succession beginning, I will say, with the post 41. Suppose, now, that the source of electricity is through the contact mechanism connected with both of the posts 41 and 44. The following circuit is thus completed: binding post 44, wire 58, binding post 58a, wires 57, 55, 53, 52, solenoid 22, wires 21, 50, incandescent lamp 5, wire 48, binding post 41, to contact mechanism and battery. This lights the incandescent lamp 5, and also energizes the solenoid 22, causing the blinder 18 to swing into its uppermost position, thus cutting off the light of the lamp 7 from passing through the window 10 and assuming the position indicated in Fig. 1. The binding post 42 being similarly in communication with the binding post 44 through the contact mechanism, the following circuit is completed: source of electricity, binding post 44, wires 58, binding post 58a, wires 57, 55, 53, solenoid 22, wires 51, 59, binding post 42, thence to contact mechanism and back to source of electricity. This energizes the solenoid 22 but has no effect upon the incandescent lamp 5. Communication being now established from the binding post 43 through contact mechanism and source of electricity, the following circuit is completed: source of electricity, binding post 44, wire 58, binding post 58a, wires 57, 56, solenoid 37, wire 58, binding post 43, contact mechanism and thence to source of electricity. This energizes the solenoid 37, and, by causing the armature 64 to move to the left according to Fig. 1, throws the switch knives 61 to the left and consequently out of engagement with the contacts 63. Communication being established from the source of electricity and contact mechanism to the binding posts 44, 45, the following circuit is completed: source of electricity, binding post 44, wire 58, binding post 58a, wires 57, 55, 54, solenoid 38, wire 66, binding post 45, contact mechanism, and thence to source of electricity. This energizes the solenoid 39 and causes it to draw the armature 64 to the right according to Fig. 1. This brings the switch knives 61 into engagement with the contacts 63. If, now, it happens that the binding post 47 is, through the contact mechanism, in communication with the source of electricity, the following circuit is complete: source of electricity, binding post 44, forks 59, switch knives 61, contacts 63, wire 67, incandescent lamp 6, wire 68, binding post 47, contact mechanism and source of electricity. The binding post 44 being now placed in communication with the binding post 46 by aid of the contact mechanism, the following circuit is thus completed: binding post 44, wire 58, binding post 58a, wires 57, 55, 53, 59, solenoid 24, wire 60, binding post 46, contact mechanism, thence to source of electricity. This energizes the solenoid 24, and by causing it to lift its armature 27 causes the sprocket arm 32 to rock, and by drawing the chain 31 pulls the trigger 34 of the firearm 35, thereby discharging the firearm.

A number of electric switch boxes of the type above described are connected with appropriate wiring and so arranged that when the various circuits above traced are closed one at a time in successive order by movements of the rolling stock, the various mechanical parts are actuated as described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In an electric switch box, the combination of a casing, a fire-arm supported by said casing, said fire-arm being provided with a trigger whereby it may be discharged in order to produce an alarm, a sprocket-arm journaled upon said casing, a sprocket-chain connected with said trigger and engaging said sprocket-arm, an electro magnetic member, an armature movable relatively to said electro magnetic member and controllable thereby, said armature being connected with said sprocket chain.

2. In an electric switch box, the combination of a casing, a fire-arm supported thereby and provided with a trigger, a sprocket-arm having a substantially semi-circular form and pivotally mounted substantially at one of its ends within said casing, a solenoid, a core movable relatively thereto and controllable thereby, said solenoid and said core being so positioned that the path of travel of said core is substantially in alinement with the free end of said sprocket-arm opposite to the end thereof upon which said sprocket-arm is pivotally mounted, and a sprocket chain connected with said trigger and engaging the arcuate edge of said sprocket-arm, said chain being connected with said core.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN DERBY.

Witnesses:
WALTON HARRISON,
PHILIP D. ROLLHAUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."