

No. 679,518.

Patented July 30, 1901.

J. F. SKIRROW.
ELECTRICAL STOP FOR ENGINES.

(Application filed Dec. 14, 1900.)

(No Model.)

2 Sheets—Sheet 1.

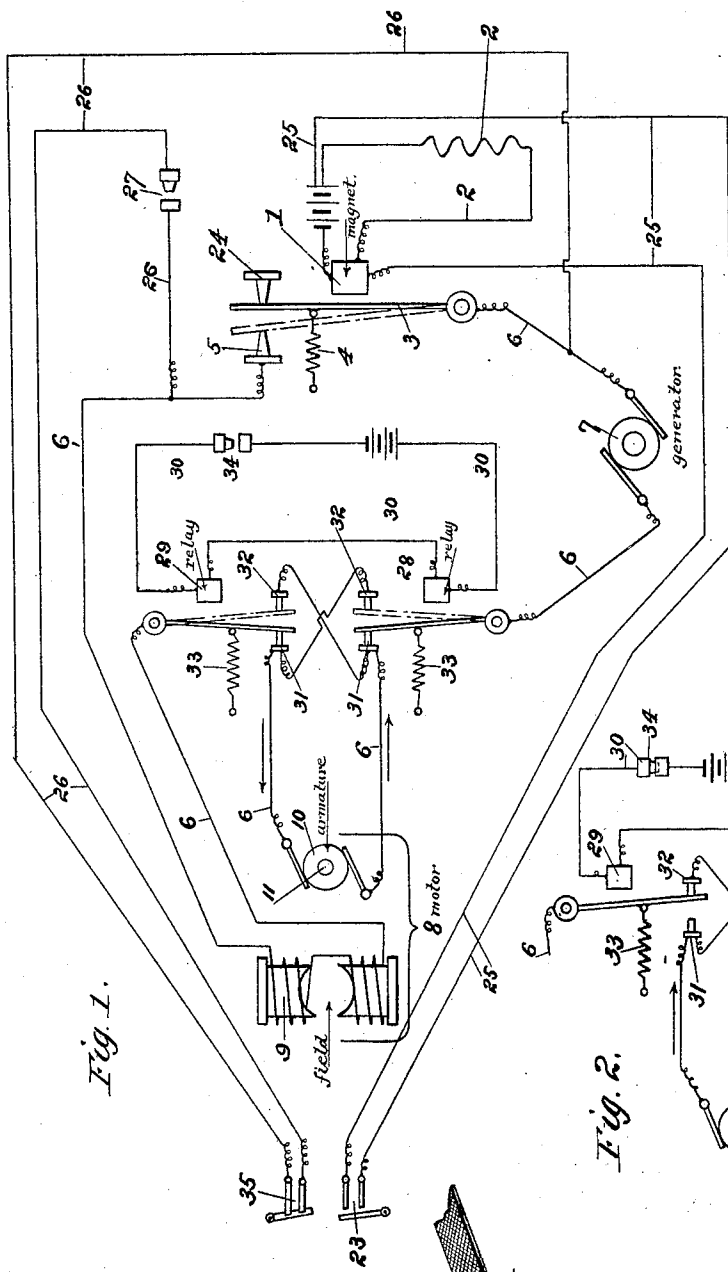


Fig. 1.

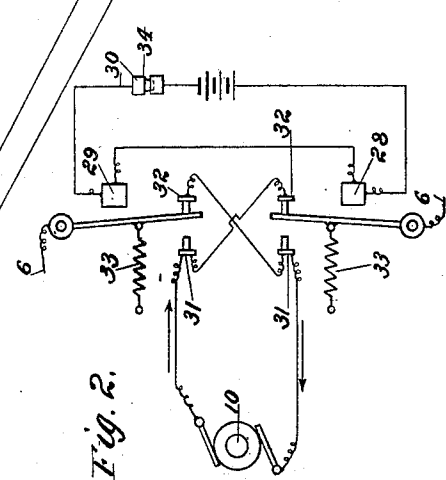


Fig. 2.

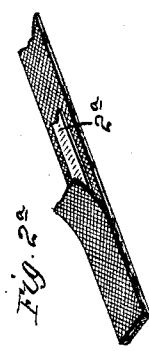


Fig. 2a

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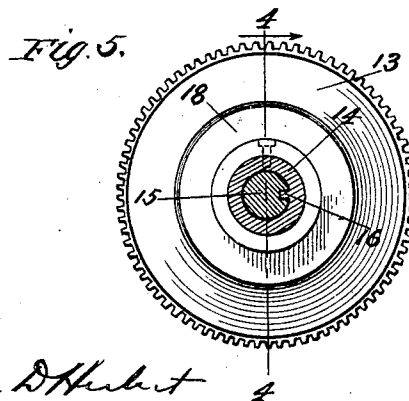
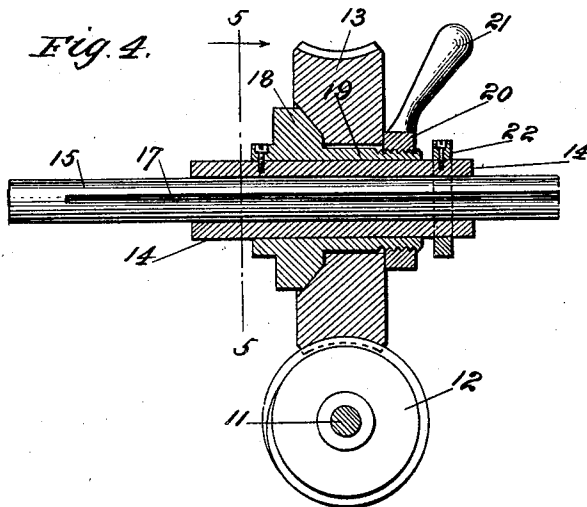
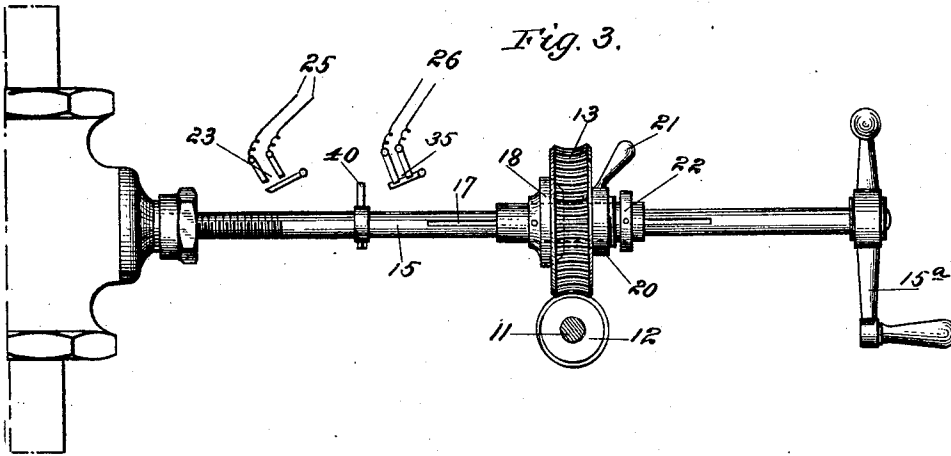
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WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRICAL STOP FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 679,518, dated July 30, 1901.

Application filed December 14, 1900. Serial No. 39,925. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. SKIRROW, a citizen of the United States, residing at East Orange, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Electrical Stops for Engines, &c., of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of the apparatus; Fig. 2, a similar detail view showing the motor-reversing mechanism; Fig. 2^a, a detail view of the breakable conductor which forms the safety-circuit; Fig. 3, a side elevation of the valve-operating apparatus; Fig. 4, a vertical sectional view on line 4 4 of Fig. 5, and Fig. 5 a similar sectional view on line 5 5 of Fig. 4.

One object of this invention is to provide an electrically-operated controlling means whereby the operation of an engine may be stopped or controlled should any vital part of the engine break or become disarranged.

Another object of the invention is to provide electrical means in connection with this safety apparatus for stopping or starting the engine without disturbing or interfering in any way with the operation of the safety or emergency apparatus.

Referring to the various parts by numerals, 1 designates an electromagnet which is in a normally closed safety-circuit 2. The conductor forming this circuit is of such material that it may be easily broken, and it is adapted to be carried to any desired part of an engine and be secured thereto in such a manner that should the engine become broken at the point where the conductor is secured thereto this local circuit will be broken or interrupted sufficiently to release the armature 3 of the magnet 1. One form of this conductor is shown in detail in Fig. 2^a, in which a thin flexible cover of insulating material, preferably fabric, surrounds a thin non-ductile conducting medium 2^a, preferably tin-foil, the whole forming a thin tape, which may be readily secured to the engine at any desired point. As soon as the armature 3 is released the spring 4 will draw it against the contact 5. To this contact one terminal of a normally open main motor-circuit 6 is connected, the

other terminal of this motor-circuit being connected to the armature 3. A generator 7 and a motor 8, this latter being composed of the field 9 and armature 10, are placed in this motor-circuit.

Connected to the shaft 11 of the motor-armature and operated by the rotation thereof is a controlling mechanism. This controlling mechanism may be a throttle-valve-operating device, as shown in the drawings, when the apparatus is to be applied to an engine, or it may be a belt-shifter or a brake or any other suitable controlling device when the apparatus is to be applied to other forms of mechanisms.

On the shaft 11 of the motor-armature is secured a worm 12, which meshes with a worm-gear 13. A sleeve 14 is loosely mounted on a rod 15 and is formed with a rib 16, which enters a longitudinal groove 17 in the rod and causes the rod and the sleeve to rotate together. The rod 15 is free to slide through the sleeve and the sleeve is held against longitudinal movement by the worm 13, or any other suitable means may be provided for this purpose. In the drawings the rod 15 is shown as operating a valve; but it is obvious that other forms of controlling devices may be connected thereto and be operated thereby. On the sleeve is rigidly mounted a clutch member 18, which is formed with a central tubular extension 19, which surrounds the sleeve 14 and on which the gear 13 is loosely mounted, one face of said gear being recessed to receive the clutch member 18. To rigidly clamp the gear 13 to the clutch member 18, a clamp-ring 20 is threaded on the end of the tubular extension 19 of the clutch member, an operating-handle 21 being secured to said ring. Secured on the sleeve 14 adjacent the clamp-ring 20 is a collar 22, which prevents the detachment of said ring from the tubular extension 19. The rod 15 is continued through the sleeve 14 and is provided with a crank 15^a. By turning the clamp-ring to release the gear 13 from the clutch member the rod may be rotated by means of the crank 15^a to operate the valve. It is of course evident that the gear 13 may be secured permanently to the sleeve 14 and that the clutch member and clamping-ring may be dispensed with. As

the rod is threaded in the valve-casing, it will be moved longitudinally when it is rotated. Carried by the valve-rod is a stop 40, which when the valve is closed by means of the electric motor 8 engages a switch or push-button 23 and closes a normally open local circuit 25, connected to the magnet 1. As soon as this circuit is closed the magnet 1 returns armature 3 to its normal position against stop 24 and breaks the motor-circuit, thereby stopping the motor 8. The main motor-circuit is so formed that when it is completed through the armature 3 and the contact 3 the motor-armature will rotate in the proper direction to close the valve.

To operate the valve-closing or other controlling mechanism from any desired point and without breaking or otherwise interrupting the closed safety-circuit, the supplemental motor-circuit 26 is connected to the main motor-circuit. This supplemental motor-circuit bridges the break which is in the main motor-circuit when the armature 3 is in the position shown in Fig. 1 and is provided at the desired point with a switch or push-button 27, by which the circuit may be closed and the motor 8 set in motion to close the valve.

To reverse the motor from any desired point, so that the valve may be opened or closed or other controlling mechanism operated by means of the main or supplemental motor-circuits, a current-reversing means is connected to the brushes of the motor-armature. This means consists of two relays 28 and 29, connected together by a normally open local circuit 30, the armature of each relay working between a set of contacts 31 and 32, each contact 31 being electrically connected to the contact 32 of the other set, as shown in Figs. 1 and 2. The armatures of the relays are normally held against contacts 31 by springs 33. When it is desired to reverse the motor, the circuit 30 is closed by means of the push-button or switch 34, thereby causing the relay-armatures to swing to the contacts 32, as shown in Fig. 2. The current will then flow through the motor-armature, as indicated by the arrows in Fig. 2, thereby reversing the motor.

To break the supplemental motor-circuit, and thereby stop the motor after the valve has been opened, a normally closed switch 35 is placed in this circuit in the path of the stop 40 on the valve-rod, said stop engaging and opening said switch when the valve has been moved to its open position, thereby interrupting the supplemental motor-circuit and stopping the motor.

It will be obvious that this apparatus may be employed to operate other forms of mechanisms than controlling devices, and I therefore do not wish to limit myself to this one application of the apparatus or to the exact construction shown, as changes may be made without departing from the scope of the invention.

Having thus fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. A controlling mechanism, an electric motor connected thereto, a main motor-circuit, means for closing said motor-circuit, a closed safety-circuit, means in said safety-circuit operating normally to hold open the motor-circuit-closing means and to release said closing means when the current through the safety-circuit is interrupted.

2. A controlling mechanism, an electric motor connected thereto, a main motor-circuit, means for closing said motor-circuit, a closed safety-circuit formed of a readily-breakable conductor adapted to be connected to a machine at any point, means in said circuit operating normally to hold open the motor-circuit-closing means and to release said closing means when the safety-circuit is broken.

3. A valve-operating mechanism, an electric motor connected thereto, a motor-circuit, a normally closed safety-circuit, means controlled by the closed safety-circuit for holding open the main motor-circuit whereby should the closed safety-circuit be broken the motor-circuit would be closed.

4. A controlling mechanism, an electric motor, a motor-circuit, means to close said circuit, a closed safety-circuit, means in said safety-circuit for normally holding open the motor-circuit-closing means, and means in the motor-circuit for reversing the motor.

5. A controlling mechanism, an electric motor connected therewith, a motor-circuit, a closed safety-circuit, means in said safety-circuit to normally hold open the motor-circuit-closing means and to release said motor-circuit-closing means when the safety-circuit is interrupted, an open circuit connected to this means, and means operated by the controlling mechanism to close said circuit and thereby open the motor-circuit.

6. A controlling mechanism, an electric motor connected thereto, a main motor-circuit, means for closing said motor-circuit, a closed safety-circuit, means in said safety-circuit operating to normally hold open the motor-circuit-closing means and to release said closing means when the current through the safety-circuit is interrupted, a normally open supplemental motor-circuit connected to the main motor-circuit and bridging the closing means of the main motor-circuit, means for closing said supplemental motor-circuit, means adapted to be operated by the controlling mechanism to open said supplemental motor-circuit, and means for reversing the motor.

7. The combination of an electric motor, a motor-circuit, means for closing said motor-circuit, a closed safety-circuit, means in said safety-circuit operating normally to hold open the motor-circuit-closing means and to release said closing means when the current through the safety-circuit is interrupted and thereby close the motor-circuit, with a movable rod, a controlling device connected to

said rod, and means connected to the armature of the motor for moving said rod.

8. The combination of an electric motor, a motor-circuit, means for closing said motor-circuit, a closed safety-circuit, means in said safety-circuit operating normally to hold open the motor-circuit-closing means and to release said closing means when the current through the safety-circuit is interrupted and thereby close the motor-circuit, with a movable rod, a controlling device connected to said rod, means connected to the armature of the motor for moving said rod, and means for permitting said rod to be moved independently of the movement of the armature.

9. A controlling mechanism comprised of a rotatable longitudinally-movable rod and a controlling device carried by said rod, a loose sleeve on said rod rotatable therewith but held against longitudinal movement, a gear carried by said sleeve, a clutch member secured to said sleeve, a clamp for holding the gear against the clutch member, means for rotating the gear, means whereby the rotation of the sleeve will cause the rotation and longitudinal movement of the rod.

10. In combination, a controlling mechanism, main circuit, means for closing said circuit connected to said controlling mechanism and operative means in said circuit adapted to be put in operation by the closing of said circuit, a safety-circuit, means in said safety-circuit operating to hold open the main-circuit-closing means when normal conditions prevail in said circuit and to release said closing means when abnormal conditions prevail in the safety-circuit.

11. A controlling mechanism, a main circuit, means for closing said circuit, operative means in the main circuit connected to the controlling mechanism and adapted to be put in operation by the closing of said main circuit, a safety-circuit, means in said safety-circuit operating to hold open the main-circuit-closing means when normal conditions prevail in the safety-circuit and to release said closing means when abnormal conditions prevail in said circuit.

12. In combination, a controlling mechanism, a main circuit, a motor therein connected to said controlling mechanism, means for closing the main circuit, a safety-circuit, means in said safety-circuit for holding open the main-circuit-closing means when normal conditions prevail in the safety-circuit and to re-

lease said closing means when abnormal conditions prevail in said safety-circuit.

13. In combination, a controlling mechanism, a main circuit, a motor therein connected to said controlling mechanism, means for closing said circuit, a normally closed safety-circuit, means in said safety-circuit operating normally to hold open the main-circuit-closing means and to release said closing means when the safety-circuit is interrupted.

14. A controlling mechanism, an electric motor connected thereto, a main motor-circuit, means for closing said motor-circuit, a closed safety-circuit, means in said safety-circuit operating to normally hold open the main-motor-circuit-closing means, and to release said closing means when the current through the safety-circuit is interrupted, a normally open supplemental motor-circuit connected to the main motor-circuit and bridging the closing means of the main motor-circuit, means for closing said supplemental motor-circuit, means adapted to be operated by the controlling mechanism to open the supplemental circuit.

15. In combination, a controlling mechanism, a motor connected to said controlling mechanism, a main motor-circuit, means for closing said main motor-circuit, a safety-circuit, means in said safety-circuit operating to normally hold open the main-motor-circuit-closing means, a normally open supplemental motor-circuit bridging the break in the main motor-circuit and connected to the main motor-circuit, means for closing said supplemental motor-circuit, and means operated by the motor to open said supplemental motor-circuit.

16. A normally open main circuit, a motor therein, means for automatically closing said circuit, and a safety controlling device connected to the motor and operated thereby.

17. A motor-circuit, a motor therein, means for closing said circuit, a controlling device operated by the motor, and means operated by the controlling device to open the motor-circuit.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 12th day of December, 1900.

JOHN F. SKIRROW.

Witnesses:

THEODORE L. CUYLER Jr.,
J. A. E. CRISWELL.