E. ROBERTS.

ELECTRICAL SAFETY DEVICE.

APPLICATION FILED JULY 21, 1917.

1,276,962.

Patented Aug. 27, 1918.

2 SHEETS—SHEET 1.

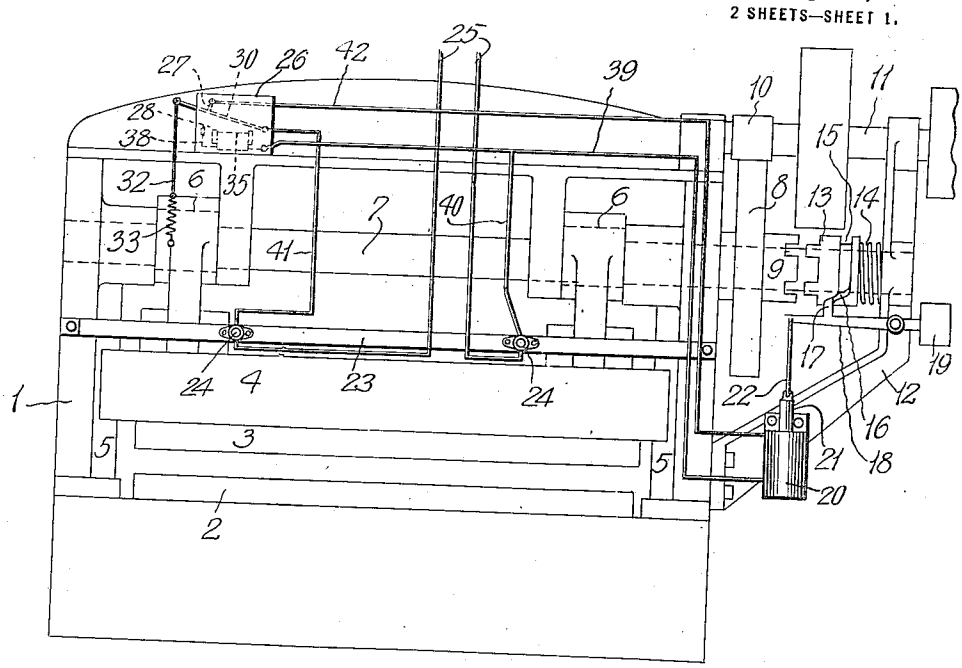


Fig. 1.

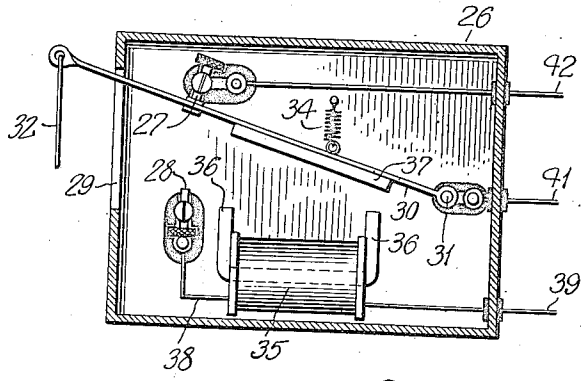


Fig. 2.

Witness

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2 SHEETS—SHEET 2.

Fig. 3.

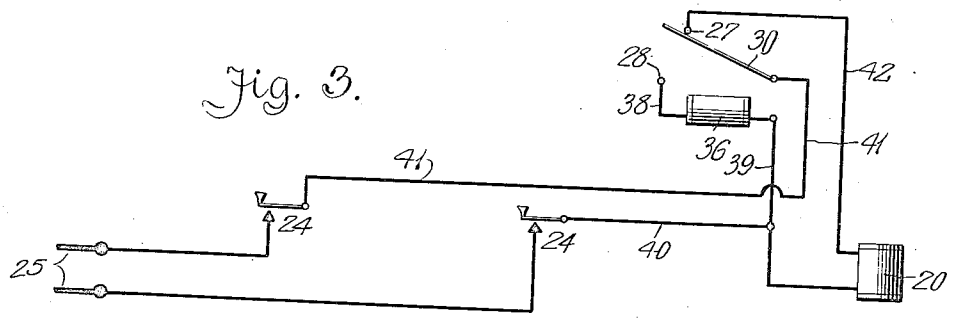
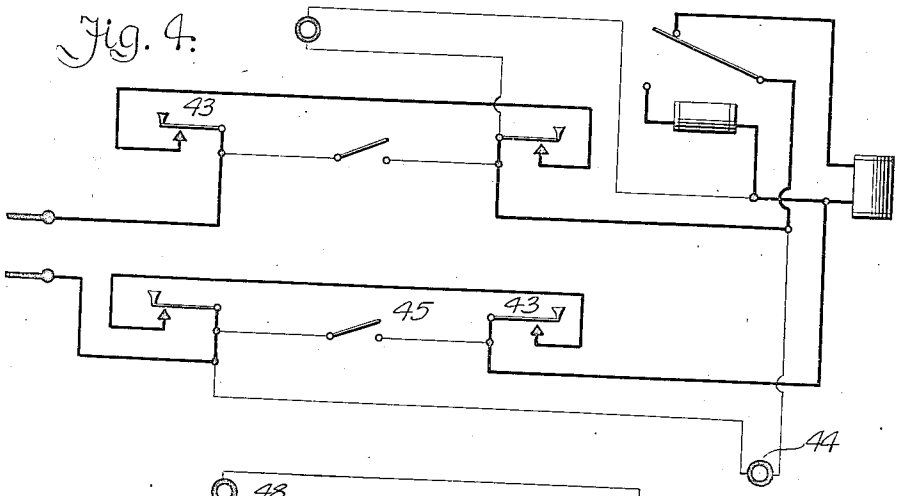
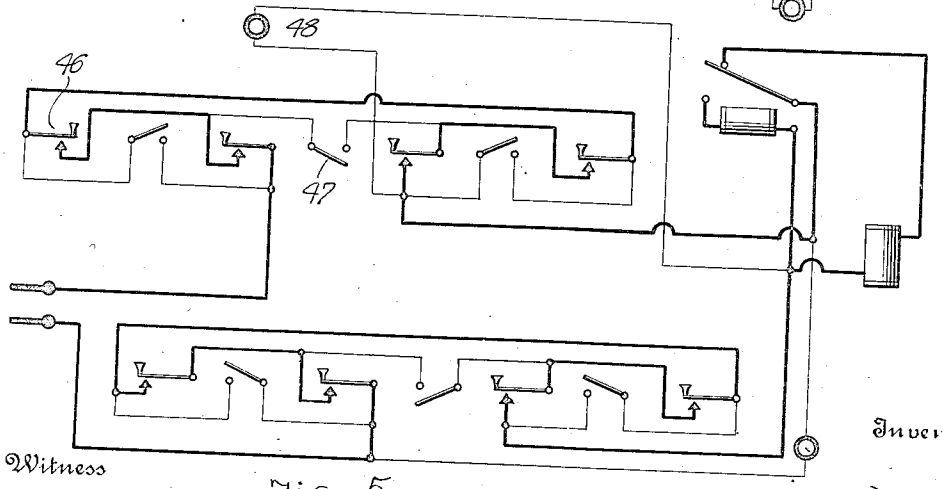


Fig. 4.





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Fig. 5.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL SAFETY DEVICE.

1,276,962. Specification of Letters Patent. Patented Aug. 27, 1918.

Application filed July 21, 1917. Serial No. 181,956.

To all whom it may concern:

Be it known that I, EDWARD ROBERTS, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electrical Safety Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

In the operation of large presses, punches, and various other types of machines, many workmen have been seriously injured by attempting to adjust material and perform necessary and unnecessary duties after a machine has been placed in operation. Furthermore, some machines, as large presses or dies require the attention of two or more attendants, one or more at each side of the machine, and it is not always possible or convenient for the attendant having charge of starting the machine to signal to the other attendants that the machine is about to be placed in operation. As a matter of fact, the majority of accidents happen in connection with machines attended by two or more workmen.

The primary object of my invention is to provide a novel electrical safety device which will necessitate the hands of workmen being in predetermined positions from the beginning to the end of machine operations, thus precluding any danger of the workmen placing their hands in dangerous positions during the operation of the machine.

Another object of my invention is to provide an electrical safety device that may be easily and quickly installed and associated with the starting and stopping mechanism of a machine, the device being of such a nature that the machine cannot be placed in operation by one hand but necessitates both hands of an operator or the hands of all operators.

A still further object of my invention is to provide a simple, and inexpensive safety device that is applicable to various types of machines and highly efficient for preventing carelessness on the part of machine operators.

My invention will be hereinafter specifically described and then claimed, and reference will now be had to the drawings, wherein—

Figure 1 is a side elevation of the safety device as applied to a suitable machine, showing the device designed for a single operation;

Fig. 2 is an enlarged longitudinal sectional view of a magnetic switch forming part of the device;

Fig. 3 is a diagrammatic view of the electrical connections for a one man device;

Fig. 4 is a similar view of the electrical connections for a two man device, and

Fig. 5 is a similar view of the device as wired for a plurality of workmen.

As illustrating a conventional form of machine, there is shown in Fig. 1 a housing 1 for a stationary member 2 and a reciprocable member 3, the latter being carried by a head 4 reciprocated on guides 5 by extensions 6 operated by drive shafts 7. On the drive shaft 7 is a loose gear wheel 8 having a clutch member 9 and said loose gear wheel meshes with a gear wheel 10 on a shaft 11 driven from a suitable source of power, as an electric motor. At the end of the machine, there is a bracket or bearing 12 assisting in supporting the drive and driven shafts 7 and 11 respectively, and on the drive shaft 7 is slidably keyed a clutch member 13 adapted for establishing rotative continuity between the gear wheel 8 and the shaft 7 by intermeshing with the clutch member 9. The clutch member 13 is constantly pressed by a spring 14 between ~~said~~ clutch member and the bracket 12, and said clutch member has a peripheral groove 15 provided with a cam portion 16. Extending into the groove 15 is the arm 17 of a fulcrum lever 18, carried by the bracket 12, said lever having the short end or portion thereof provided with a weight 19 so that the arm 17 of said lever will be normally retained in the groove 15 of the clutch member 13. When the arm 17 is removed from the groove of the clutch member 13, the expansive force of the spring 14 will force the clutch member into mesh with the clutch member 9 and thus place the machine in operation. When the lever 18 is released the arm 17 will engage in the groove 15 and on the cam portion 16 of said groove reaching the arm 17, the clutch member 13 is automatically retracted against the tension of the spring 14 and there is a cessation in the operation of the machine. It is the present practice to operate the lever 18 by a treadle or lever, and to install my safety device, I dispense with such operating means.

The safety device includes a conventional

form of solenoids 20 mounted on the bracket 12 with the core 21 thereof connected to the long arm or portion of the lever 18 by a link 22.

In front of the reciprocable head 4 and at a height convenient to the hands of an operator, is a support 23 suitably attached to the housing. On the support 23 in spaced relation, are push buttons or instrumentalities 24 necessitating a constant pressure for hand manipulation to maintain electric circuits, and connected to these push buttons are lead-in wires 25.

Suitably connected to the housing 1, preferably near the top thereof, is a casing 26 and in said casing are contact members 27 and 28. These contact members are in proximity to a slot 29 in an end wall of the casing 26, and extending through the slot 29 is a switch arm 30, which is pivoted, as at 31, within the casing. The outer end of the switch arm 30 is connected by a link 32 and a spring 33 to one of the eccentrics 6 or the reciprocable head 4, so that the switch arm 30 will be lowered in synchronism with the reciprocable head 4. To elevate the switch arm 30 a small retractile spring 34 connects said switch arm to the casing 26.

In the casing 26 is an electromagnet 35 having pole pieces 36 adapted to be engaged by an armature 37 carried by the switch arm 30 and said electromagnet is connected by a wire 38 to the contact member 28.

Another wire 39 from the electromagnet 35 extends out of the casing 36 and is connected to the solenoid 20, said wire having a branch 40 extending to one of the push buttons 24.

The switch arm 30 is connected by a wire 41 to the other push button 24, and the contact member 27 is connected by a wire 42 to the solenoid 20. All of the wires are suitably insulated and insulation material is used in connection with the casing 26, switch arm 30 and contact members 27 and 28 to prevent short circuits.

From the electrical connections shown in Figs. 1, 2 and 3, it is apparent that both of the push buttons 24 must be pressed and maintained under compression to energize the solenoid 20 so that the core 21 thereof will be lowered and the arm 17 of the lever 18 shifted to release the clutch member 13 and place the machine in operation. The clutch as shown is intended to prevent a repeat operation of the machine, and various other types of clutches can be used which will immediately cause a cessation in the operation of the machine should the operator remove his hands from the push buttons 24.

In Fig. 4, there is shown a diagrammatic view of the electrical wiring of a machine that has a set of push buttons 43, at each side thereof and besides these push buttons there are signal lamps 44 and switches 45. The switches 45 permit of either set of push buttons being rendered inoperative but with both switches closed the lamps 44 will indicate from one workmen to another when certain circuits are completed for the operation of a machine.

In Fig. 5 of the drawing there are two sets of push buttons 46 for each side of the machine and in the electrical wiring of said push buttons there are included switches 47 and visible signals 48.

It is therefore apparent that the safety device can be used on very large machines and controlled by a plurality of workmen, and while in the drawings there are illustrated the preferred embodiments of my invention, it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claim.

What I claim is:—

In an electrical device for machines, the combination with a source of electrical energy, a clutch controlling the operation of the machine, and an arm controlling the operation of said clutch, of a solenoid in circuit with said source of electrical energy and adapted to be energized to have the core thereof shift said clutch control arm, push buttons adapted for completing the circuit of said solenoid, and a switch arm shifted by said machine to break the circuit of said solenoid even though the push buttons are depressed.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWARD ROBERTS.

Witnesses:
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KARL H. BUTLER.