E. L. GALE, Sr.

SAFETY DEVICE FOR PUNCH PRESSES.

APPLICATION FILED OCT. 8, 1912.

1,127,356. Patented Feb. 2, 1915.

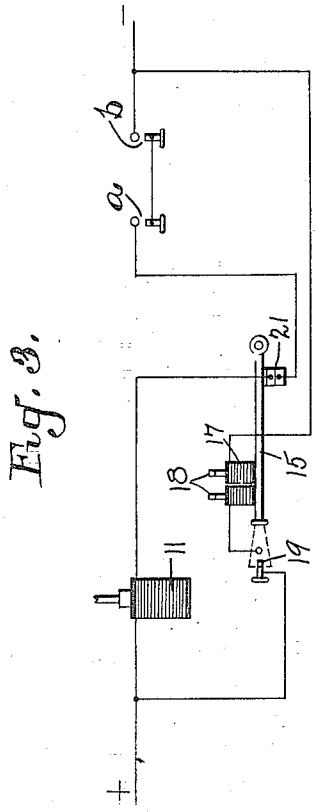


Fig. 3.

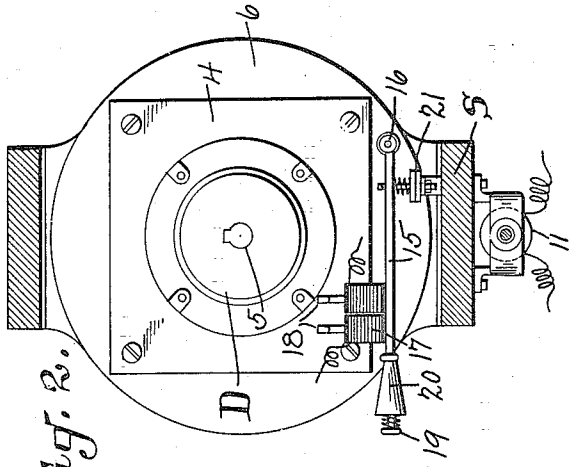


Fig. 2.

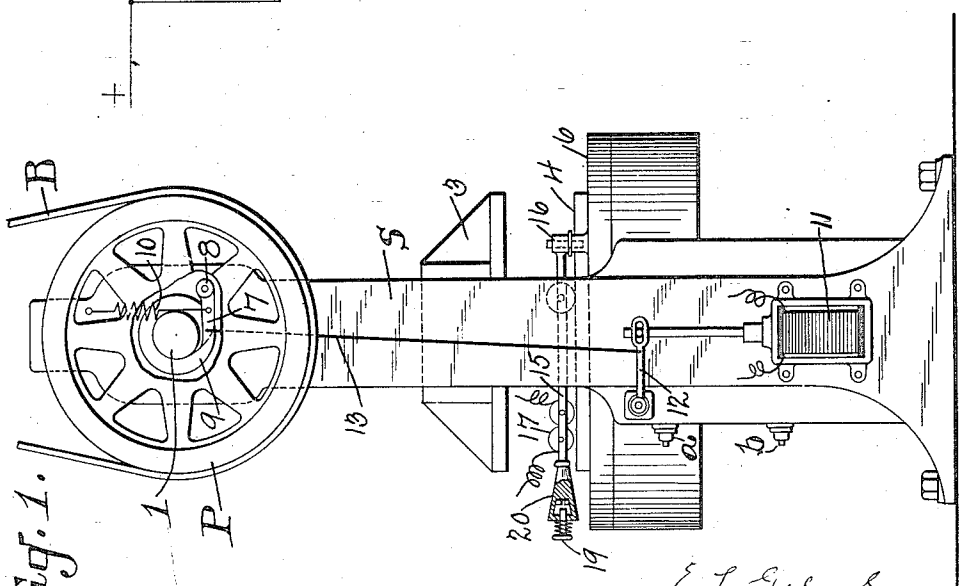


Fig. 1.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR PUNCH-PRESSES.

1,127,356. Specification of Letters Patent. Patented Feb. 2, 1915.

Original application filed October 12, 1911, Serial No. 654,280. Divided and this application filed October 8, 1912. Serial No. 724,637.

To all whom it may concern:

Be it known that I, ERNEST L. GALE, Sr., a citizen of the United States, residing in Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Safety Devices for Punch-Presses, of which the following is a specification.

My invention relates to safety devices for use in connection with punching machines.

An object of the invention is to provide means to prevent the operation of the machine except when the operator has both hands employed in a safe position, thereby preventing the danger of the punch being operated while the attendant's hand is beneath the die carrier.

This case is a division of my co-pending application Serial No. 654,280, filed October 12, 1911, safety device for punch presses.

Referring to the accompanying drawings, Figure 1 is an elevation view of a punching machine with the present invention applied thereto; Fig. 2 is a sectional view showing the die in plan; Fig. 3 is a diagrammatic view of the electrical devices and circuits employed.

The punch press is carried by a vertical standard or support S in the upper end of which is mounted a shaft 1 to which is secured a pulley P. The latter is connected, by means of a belt B, to any suitable source of power. A die carrier 4 is mounted on the bedplate 6 in position to coöperate with the punch carrier 3. The die D, as shown in Fig. 2 is provided with a central opening 5, so that the punching machine is adapted to produce laminations for an armature of a dynamo electric machine. In the process of making a punching, the pulley P is given one complete revolution, causing the punch carrier to be moved downward and coöperate with a die to form a punching and then lifted to its initial position. The pulley P is connected to operate the die carrier by means of a trip device comprising a pawl or cam lever 7 mounted on a pivot 8 and cooperating with a cam 9 of the clutch, which connects the shaft 1 with the mechanism for operating the die carrier. A spring 10 normally holds the lever 7 in its upward position in which the clutch is disconnected so that the pulley P runs free. The trip device is operated by an electromagnet 11, connected through a lever 12 and a rod or link 13 to the lever 7. In circuit with the winding of the electromagnet 11 are two normally open push button switches *a* and *b*. These switches are suitably located so that both hands of the attendant are required to close them and thereby effect the operation of the punch press. This forms a positive means for preventing the attendant from accidentally placing either hand beneath the die carrier or in any dangerous position while the press is operating. The push button switches *a* and *b*, as shown in Fig. 1, are located one above the other on the standard S, but they may be located in any other desired or convenient position, as, for example, at the edge of the bedplate, it being important, however, that they be placed far enough apart so that they cannot both be operated at the same time with one hand.

The pick off device for removing the punchings and scrap, is herein shown as comprising a lever 15, having a pivot 16 mounted on the bedplate 6. An electromagnet 17, having extended pole pieces 18, is secured to the lever 15. A push button switch 19 or other circuit controlling device is located in a handle 20 on the end of the lever 15. The switch 19 is in circuit with the winding of the electromagnet 17. A switch 21 in circuit with the electromagnet 11 comprises contacts carried by the lever 15 and the standard S, respectively. Electric current for operating the magnets 11 and 17 may be supplied from any convenient and suitable source of electricity.

The operation is as follows: When the sheet metal has been placed in position on the die, the attendant closes the switches *a* and *b* by pressing a push button with each hand. This establishes a circuit through the magnet 11, switch 21, and switches *a* and *b*. The magnet 11 being thus energized, pulls its core downward. and, through its connections with the cam lever 7, pulls the latter into position to permit the operation of the clutch, thereby caus-

ing the operation of the punch carrier 3. The operator now releases the push button switches and permits a return of the cam lever 7, which, as the pulley P completes a revolution, engages the cam 9 and releases the clutch, the parts being thus brought again to their initial position. The operator now grasps the handle 20 of the pick off device and by closing the push button switch 19, energizes the magnet 17. At the same time the lever is swung inward, so that the magnet cores 18 take hold of the sheet iron punching and scrap. The lever is then returned and the push button switch 19 released. As the contacts of the switch 21 are separated when the pick off device is swung inward beneath the punch carrier, the circuit through the magnet 11 can only be established and the punch operated when the pick off device is withdrawn from beneath the punch carrier to a safe position.

It will be apparent that the safety features comprised in the present invention are adapted for use with various forms of punching machines. As shown, for example in the patent to Scott and Gale, 948,382, February 8, 1910, the pick off device may be automatically operated, and various other automatic features and other modifications and approved devices are adapted to be used in conjunction with the novel features of the present invention. Various modifications of the safety apparatus herein shown might also be employed without departing from the spirit and scope of my invention. I wish therefore not to be limited to the exact construction herein disclosed.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination of a punch press, electro-magnetic mechanism to operate the same, hand operated devices controlling the operation of said mechanism and employing both hands of the attendant, said devices being separated a sufficient distance to prevent the operation of both by one hand.

2. In combination, a punching machine, power mechanism, a trip device operable to connect said power mechanism to the punching machine, an electro-magnet adapted to operate the trip device, and a plurality of manual switches in the electromagnet circuit and out of proximity to each other.

3. A punching machine, hand operated switches out of proximity to each other, an electromagnet in circuit with said switches, and means operated by said magnet for connecting the machine with a source of operating power.

4. In combination, a punching machine, power mechanism, an electro-responsive device operable to effect a connection between said machine and the power mechanism, and manually operable normally open switches in the circuit of said device and located at a sufficient distance apart to prevent their simultaneous operation with one hand.

5. The combination of a machine, electro-responsive means controlling the operation of said machine, and switches controlling said electro-responsive means and requiring the use of both hands of an attendant in safe positions when the machine is operated.

6. The combination with a press having a clutch trip, of safety actuating means for said trip, said actuating means including a pair of separated switches, and an electro-magnetic device for directly actuating said trip, said device being arranged to be energized only when said switches are operated simultaneously, whereby the actuation of said clutch trip is solely effected upon the operation of said switches, for the purposes set forth.

7. The combination with a press having a clutch trip, of safety actuating means for said trip, said actuating means including a pair of separated switches in series with each other, and an electro-magnetic device for directly actuating said trip, said device being arranged in series with said switches, whereby the actuation of said clutch trip is solely effected upon the operation of said switches, for the purposes set forth.

8. The combination with a press having a clutch trip, of safety actuating means for said clutch trip, said actuating means comprising a solenoid for directly actuating said trip, and a pair of switches controlling said solenoid and arranged so that both must be operated before said solenoid is energized, whereby the actuation of said clutch trip is solely effected upon the operation of said switches, for the purposes set forth.

9. The combination with a press having a clutch trip, of safety actuating means for said clutch trip, said actuating means comprising a solenoid for directly actuating said trip, and a pair of switches connected in series with said solenoid and with each other, whereby the actuation of said clutch trip is solely effected upon the operation of said switches, for the purposes set forth.

10. In a device of the character described, the combination with a movable member for tripping the clutch of a press, power means for moving said member, and controlling means movable with the hands of the operator for controlling said power means, and arranged to cause said means to move the tripping member only when both hands of the operator are outside the danger zone of the press.

11. In a device of the character described, the combination with a movable member for tripping the clutch of a press, of an electro-magnetic motor for operating said movable member, a pair of switches controlling the circuit of said motor, a pair of arms for

operating said switches movable with the hands of the operator, said switches being in series and arranged to close the circuit through said motor, only when both hands of the operator are outside the danger zone of the press.

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

ERNEST L. GALE, Sr.

Witnesses:
G. D. Rose,
Edward H. Steits.