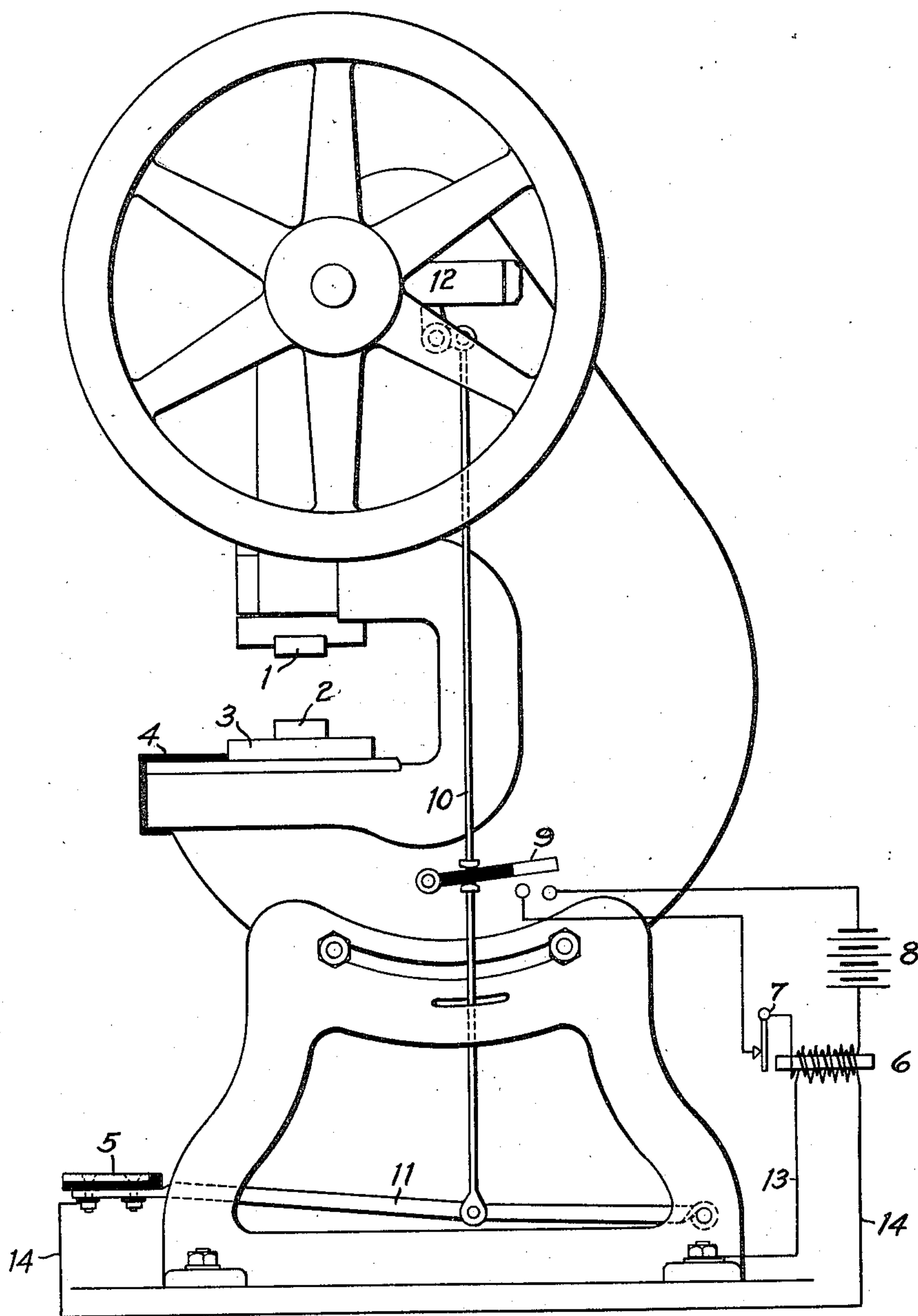


E. W. PINKERTON.
GUARD FOR MACHINERY.
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GUARD FOR MACHINERY.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ERVIN W. PINKERTON, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Guards for Machinery, of which the following is a specification.

This invention relates to a guard adapted to prevent injury to the hand of an operator in feeding material to the operative instrumentalities of a machine.

In machines of certain types, particularly in a die-press, it is impracticable to provide guards by which the operator can be absolutely prevented from accidentally inserting the hand between the dies, or other operative instrumentalities, when the machine is running, since guards for this purpose would interfere with the proper presentation of the work to the machine and would obstruct the operator's view of the work.

The object of the present invention is to produce a guard which will accomplish the same result with a practical degree of certainty, while not requiring the use of members which interfere in any way with the convenient operation of the machine. To this end I propose to employ an electric current in such a manner that, in case the operator allows his hand to approach into dangerous proximity with the operative instrumentalities, the hand is subjected to a shock. This shock not only gives the operator unmistakable warning of danger, but it is also possible, by the use of a current of a powerful, but not dangerous, character, to cause an involuntary movement of the hand by which it is immediately and inevitably withdrawn out of danger.

It has been previously proposed to employ electricity to guard a punching-press in the manner stated, by means of apparatus which is automatically thrown into operation when the dies of the punching-press move together, and which is thrown out of operation again automatically when the dies move apart. Such a construction is effective, however, only in machines provided with operative instrumentalities which, like dies, move intermittently toward and from each other. In the present invention, however, I arrange the electrical apparatus to be thrown into, and out of, operation by the treadle, or other manually-operable device by which the machine as a whole is thrown

into or out of operation. Accordingly, my novel arrangement is applicable to machines of all kinds having dangerous operative instrumentalities, whether these operate intermittently, as in a press, or constantly, as in the case of a sawing or molding-machine, or the like, the electric apparatus being operative so long as the operator retains the treadle in depressed position to continue the operation of the machine.

A further feature of the invention consists in the use of the treadle, or other manually-operable device, as one electrode for conducting the current to the body of the operator, whereby I simplify the construction of the device and avoid the necessity of an independent electrode for the purpose.

The accompanying drawing is a side-elevation of a die-press provided with a guard embodying the present invention.

The machine of the drawing is a die-press of ordinary form, having the usual upper and lower dies 1 and 2. The lower die rests upon a metal plate or bed 3 supported on the frame of the machine, and this plate serves as a conductor for the electric current. The front-portion of the frame of the machine is covered by insulating material 4, so that the operator may touch this part without receiving a shock, but if, in feeding the material between the dies, he inadvertently permits his hand to approach into dangerous proximity to the dies, the contact between his hand and the plate 3 subjects the hand to a powerful shock, causing the hand to be immediately and involuntarily withdrawn.

To complete the electric circuit through the operator I make use of the treadle 5 of the machine as an electric contact in such circuit. This treadle is insulated from the pivoted arm 11 on which it is supported, and is connected with one terminal of the source of electricity. The source of electricity may be an ordinary induction-coil 6, of which the primary winding is connected in series with the usual circuit-breaker 7, and battery 8. In order that the current of the battery may be economized I arrange a switch 9 in circuit with the primary-winding of the coil, and this switch is actuated by a rod 10, which constitutes the connection between the treadle-arm 11 and the usual clutch-mechanism 12 by which the machine is thrown into operation. When the operator depresses the treadle 5 to start the machine in the usual manner, the arm 11 draws

down the rod 10, thus throwing the clutch-mechanism into operation and at the same time the switch 9 closes the primary-circuit through the induction-coil. In case the operator now touches the plate 3 with his hand a current from the secondary winding of the coil flows through a wire 13 to the frame of the machine, thence to the plate 3, and the hand of the operator. The current returns through the operator's body, and his foot, to the treadle 5, and thence, by means of a flexible wire 14, back to the coil. As soon as the operator releases the treadle, to stop the machine, the switch 9 breaks the primary circuit of the coil, and there is no further consumption of current.

My invention is applicable to machines of various types, and obviously various sources of electric current may be employed. Where the machine is not provided with any member conveniently located to serve as a contact to engage the hand of the operator it will be obvious that a special part may be applied to the machine for this purpose.

I claim:—

1. In combination with a machine having operative instrumentalities and driving mechanism therefor, including a normally inoperative clutch, means for generating high-tension electricity, a conductor located adjacent said instrumentalities and in the path of movement of the operator's hand when feeding work to the machine, a manually-operable member for throwing and holding said clutch into operation, connections between said generating-means, said conductor and said manually-operable member, whereby a circuit may be produced through the operator's body in case the hand is brought into contact with said conductor,

and means connected with, and actuated by, the manually-operable member for throwing the generating-means into, or out of, operation simultaneously with the clutch.

2. In combination with a machine having operative instrumentalities and a treadle-controlled driving mechanism therefor, means for generating high-tension electricity adapted to produce a powerful, but not dangerous, shock, a conductor located adjacent said instrumentalities and in the path of movement of the operator's hand when feeding work to the machine, and connections between said generating-means, said conductor and the treadle of the machine, whereby a circuit may be produced through the operator's body in case the hand is brought into contact with said conductor.

3. In combination with a machine having operative instrumentalities and a treadle-controlled driving-mechanism therefor, means for generating high-tension electricity adapted to produce a powerful, but not dangerous, shock, a conductor located adjacent said instrumentalities and in the path of movement of the operator's hand when feeding work to the machine, connections between said generating-means, said conductor and the treadle of the machine, whereby a circuit may be produced through the operator's body in case the hand is brought into contact with said conductor, and a circuit-breaker operated by the treadle and connected with said generating-means to throw the latter into operation when the treadle is depressed to start the machine.

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