No. 777,542. PATENTED DEC. 13, 1904.

J. V. W. REYNDERS & W. T. SEARS.

STRIPPER FOR PUNCHES.

APPLICATION FILED JAN. 14, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

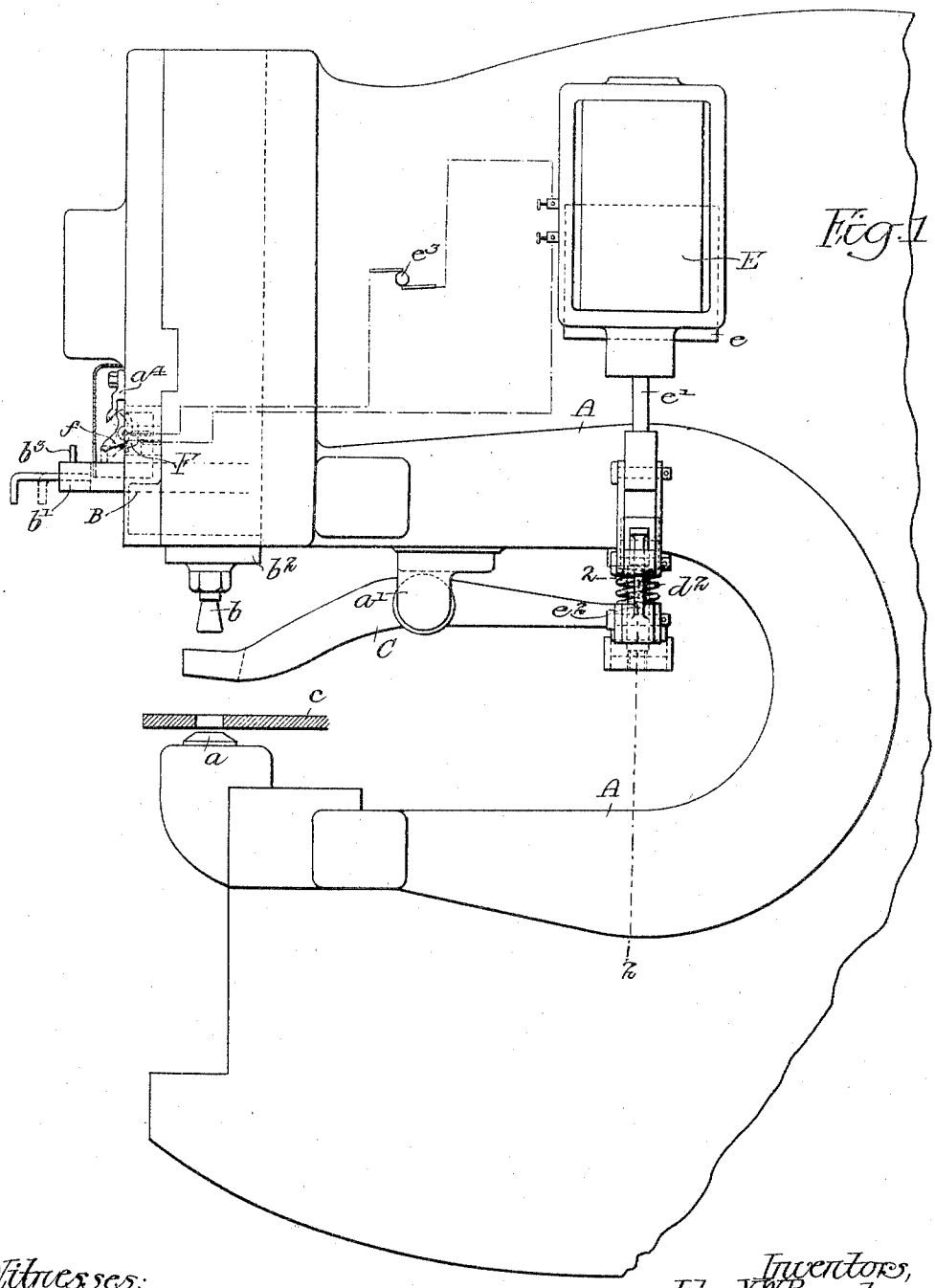


Fig. 1.

Witnesses;
Wesley A. Ruel
Titus H. Sons

Inventors,
John V. W. Reynders,
Willard T. Sears,
by their Attorneys,
Howson & Howson

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

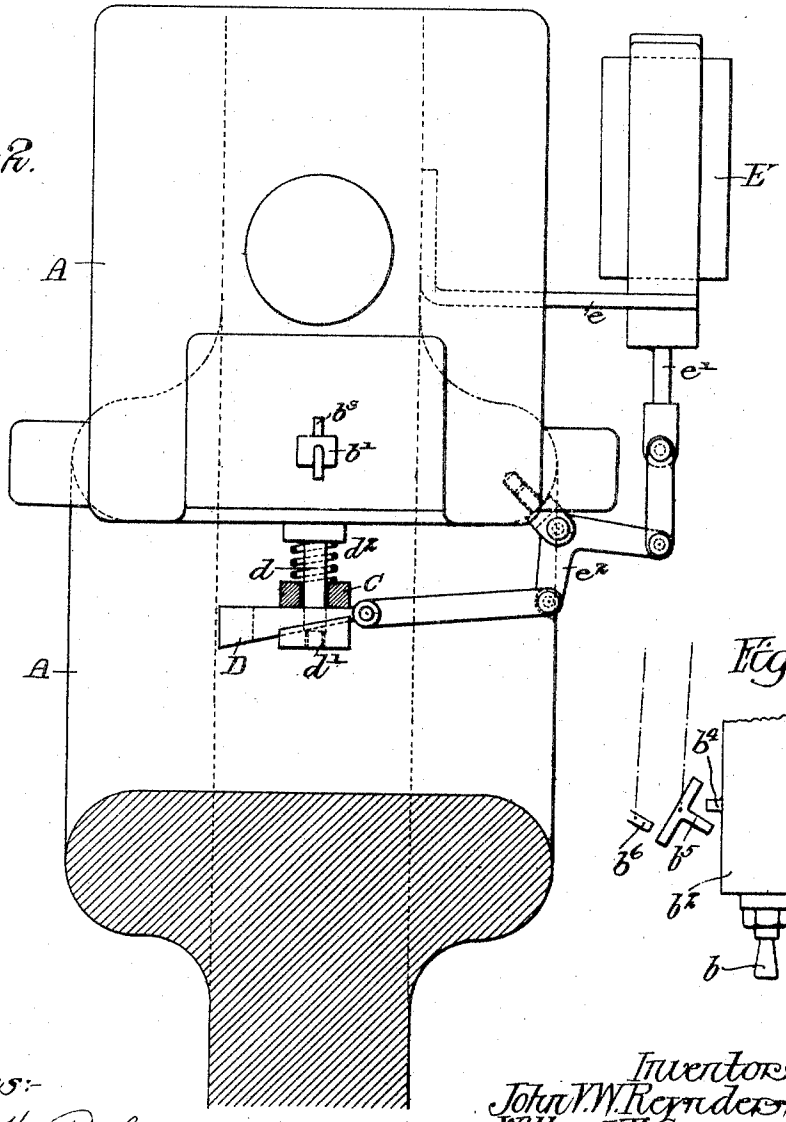


Fig. 3.

Witnesses:-
Wesley A. Reel
Titus H. Sons.

Inventors,
John V. W. Reynders,
Willard T. Sears,
by their Attorneys,
Howson & Howson

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UNITED STATES PATENT OFFICE.

JOHN V. W. REYNDERS AND WILLARD T. SEARS, OF HARRISBURG, PENNSYLVANIA.

STRIPPER FOR PUNCHES.

SPECIFICATION forming part of Letters Patent No. 777,542, dated December 13, 1904.

Application filed January 14, 1904. Serial No. 189,033. (No model.)

To all whom it may concern:

Be it known that we, JOHN V. W. REYNDERS and WILLARD T. SEARS, citizens of the United States, residing in Harrisburg, Pennsylvania, have invented certain Improvements in Strippers for Punches, of which the following is a specification.

Our invention consists in certain improvements in devices known as "strippers for punches," and which are particularly designed to hold a plate or sheet of material from movement during the time that a punch or similar tool is being forced through and withdrawn from the same.

The object of our invention is to provide a stripper with means whereby it is caused to clamp and hold a sheet of material when the gag or other device controlling the operation of the punch is properly moved, and which will be made to release said sheet by the movement of the punch-head or of some other part moving in unison therewith. From this it will be seen that it is desired to clamp and rigidly hold a sheet of material during the time that the punch is moving through it and to release said sheet, so as to permit its bodily movement very shortly after the punch has been withdrawn, it being noted that this end is accomplished automatically after the gag has once been moved to cause operation of the punch. These objects we attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a punching-machine, showing our improved mechanism as applied thereto. Fig. 2 is a front elevation, partly in section, taken on the line 2 2, Fig. 1, further illustrating the arrangement of the various parts of our improved structure; and Fig. 3 is an elevation of a modification of a portion of our invention.

In the above drawings, A represents the frame of a punching-machine, on which is carried a die *a* and a sliding head B, which latter is provided at its lower end with a punch *b*, held in position in the well-known manner. The sliding head is reciprocated by any desired form of driving mechanism, (which has been omitted from the drawings for the sake of clearness,) and the action of the punch in the present instance is dependent upon the position of a piece *b'*, known as a "gag," carried by the moving head.

Under normal conditions the piece b^2, carrying the punch, is free to move vertically in the movable head; but when the gag *b'* is moved inwardly it interferes with such motion of said piece, so that the punch, when brought by movement of the sliding head into engagement with a piece of material *c*, is forced through it instead of merely resting upon it, as would otherwise be the case during the lower portion of the stroke of said reciprocating head.

In order to firmly clamp the plate of material *c* to the die preparatory to its being engaged by the punch, we provide a bar C, known as a "stripper," which is forked at its forward end for the passsage of the punch and is pivotally carried by a bracket *a'*, projecting from the frame of the machine.

Passing through an opening in the rear end of the stripper is a bolt *d*, held to the frame of the machine and having a head portion *d'*, while between said head and the end of the stripper is placed a slidable wedge D, which is slotted for the passage of said bolt *d*. A spring d^2 presses upon the end of the stripper, so as to tend to keep its forward end normally raised or out of engagement with a plate to be operated upon. In order to cause said stripper to hold a plate, we provide means for sliding the wedge between the rear end of the stripper and the head *d'* of the bolt, which in the present instance we have illustrated as a solenoid E. This is carried by a bracket *e*, fixed to the frame of the machine, and has an armature to which is fixed a bar *e'*, connected through a system of links and the bell-crank lever e^2 to the wedge D.

In order to control the action of the solenoid, we provide an electric switch F, having a movable contact carried by a pivoted trigger *f* on the sliding head, it being understood that said solenoid and switch are suitably connected in circuit with a current-generator, (indicated at e^3.)

In order to actuate the trigger to cause it

to turn on its pivot, and thereby open or close the switch F, we provide a projection b^3 on the gag b', which when said gag is pushed inwardly will engage the trigger and move it so as to close the switch. There is also upon the frame A a trip-finger a^4, so placed that it will engage the upper end of the trigger as the sliding head of the punch nears the upper portion of its stroke, so as to move said trigger on its pivot and open the switch.

In operation the punch-head is continuously reciprocated, but the punch is normally inactive, since the gag b' is in such a position that it presents no opposition to the movement of the punch-carrying piece into the head when the punch engages a plate of material, and, in addition, the stripper is held out of contact with the plate by means of the spring d^2. When, however, the gag b' is pushed inwardly, the switch F is immediately closed, and the solenoid E is consequently energized. The resulting drawing up of the armature attached to the bar e' causes the wedge D to be moved between the head of the bolt d and the stripper C, so that this latter compresses the spring d^2 and turns on its pivot, clamping the plate to the die a before said plate is engaged by the punch. When now such engagement takes place, the punch is forced through the plate, making the desired hole therein, and as the reciprocating head moves upwardly the trigger f is struck by the trip-finger a^4, and so moved as to open the switch F. This deënergizes the solenoid E, whereupon the weight of the armature and its attached parts, aided by the spring d^2, causes the wedge D to slide outwardly between the end of the stripper and the head d' of the bolt d, so as to cause said stripper to be again raised from the sheet of material. It will thus be seen that the plate operated upon is rigidly held to the die of the machine until the punch has passed into and out of it, and that consequently there is no side strain brought upon the punch itself nor any breaking tendency, as is commonly the case when the work follows the punch and is lifted out of a plane at right angles to the line of the punch movement.

The action of the various parts of the device is so timed that the stripper holds the work immovably until the punch is cleared, after which said stripper lifts sufficiently to permit the plate operated upon to be freely moved into some other position. It will further be noted that while the solenoid is not energized until the gag is pushed in so as to operate the punch it is certainly deënergized automatically upon the upward or return movement of the reciprocating punch-head, the work consequently remaining clamped in position until the punch has reached a certain fixed height free of the plate.

Although we have shown the stripper as operated by movement of the gag and also of the head, it will be understood that where our invention is applied to a punch where the head stops after each stroke and no gag is used the entire operation of the stripper both for clamping and releasing the plate may be controlled by the head alone. One way of accomplishing such a result is shown in Fig. 3, in which is shown a projection b^4 on the head B, there being on the frame of the machine a bell-crank lever b^5, electrically connected to one of the solenoid-terminals with which said projection coacts. This lever has an arm placed to engage a fixed contact b^6, which is connected to one terminal of the current-generator whose second terminal is in turn connected to the second terminal of the solenoid. When now the punch-head is reciprocated, the switch formed by the lever b^5 and the contact b^6 is opened and closed at the proper times to cause the solenoid to suitably hold or release a plate. It will further be obvious to those skilled in the art that a plunger actuated by fluid under pressure or a spring may be substituted for the solenoid without departing from the broad idea of our invention.

We claim as our invention—

1. The combination with a machine-tool of a stripper, mechanism including a source of power independent of the tool mechanism for causing said stripper to act and means for releasing the stripper, substantially as described.

2. The combination of a tool having a reciprocating portion with a gag for causing action of the same, a clamp for work, mechanism actuated by operation of the gag for causing the action of the clamp and means for throwing said clamp out of action, substantially as described.

3. The combination with a machine-tool having a continuously-acting part and a tool carried thereby, of a device for causing the tool to be connected to said continuously-acting part to act upon a piece of work, a stripper and mechanism operatively connected to the tool-actuating device for causing the stripper to be energized, substantially as described.

4. The combination with a machine-tool having a movable head, a tool and a gag for operatively connecting said head and tool, of a clamp, means controlled by the gag for causing the clamp to hold work operated upon and means for automatically releasing the clamp, substantially as described.

5. The combination in a machine-tool of a stripper, mechanism including a source of power independent of the tool for operating said stripper and a controlling device for said mechanism, the same including means for causing automatic release of the stripper, substantially as described.

6. The combination of a punch having a gag and a stripper, mechanism for causing operation of the said stripper, said mechanism being placed to be operated on by the gag and also

by some other portion of the machine, substantially as described.

7. The combination with a punch of a stripper for work to be operated on, a magnet having an armature connected to said stripper and means for controlling the action of the magnet, substantially as described.

8. The combination with a punch having its tool carried in a movable head of a gag for controlling the action of the tool, a stripper, a magnet having a movable element operatively connected thereto, and a switch in circuit with said magnet, said switch being placed to be acted on by the gag, substantially as described.

9. The combination in a punch of a head carrying a tool, means for controlling the action of said tool, a stripper and electrical apparatus operatively connected to the stripper having means for connecting it to the punch-controlling mechanism, substantially as described.

10. The combination with the punch of a stripper; a magnet having an armature connected to said stripper, an electrical switch in circuit with the magnet, means for automatically opening the switch and mechanism for controlling the action of the punch, the same being placed to operate the switch, substantially as described.

11. The combination in a punch having a sliding head and a gag therein for controlling the action of the tool, of a trigger placed to be moved by the gag, an electrical switch operated by said trigger, a magnet in circuit with the switch, a stripper and an armature for the magnet operatively connected to the stripper, substantially as described.

12. The combination in a punch having a sliding head and a gag therein for controlling the action of the tool, of a trigger placed to be moved by the gag, an electrical switch operated by said trigger, a stripper, a magnet in circuit with the switch and an armature for the magnet operatively connected to the stripper, with means other than the gag for causing opening of the switch, substantially as described.

13. A punch having a sliding head provided with a gag for controlling the action of the tool, a trigger carried by the head and placed to be acted on by the gag, a projection on the frame of the machine placed to engage the trigger at one point of its path of motion, an electrical switch operated by the trigger, a magnet in circuit with the switch, a stripper, an armature for the magnet and mechanism connecting the armature and the stripper, substantially as described.

14. The combination with a punch of a pivoted bar placed to act as a stripper, means tending to normally retain the bar out of engagement with the work operated on, a magnet having an armature operatively connected to the bar and means for causing the magnet to be energized at will, substantially as described.

15. The combination with a machine-tool of a stripper, a source of power independent of the tool mechanism for actuating the stripper and a device common to the tool mechanism and to the stripper for causing operation of said stripper, substantially as described.

16. The combination with a punch of a stripper consisting of a bar pivoted to the frame of the machine, a spring acting on the stripper and tending to keep the same out of engagement with work operated upon, a fixed abutment and a wedge between said abutment and the stripper, a magnet having an armature, mechanism connecting said wedge with the armature and means for causing energization of the magnet, substantially as described.

17. The combination with a punch of a pivoted bar forming a stripper, a headed bolt attached to the frame of the machine at one end of the bar, a spring on said bolt tending to retain one end of the stripper out of engagement with work operated on, a wedge between the head of the bolt and stripper, a magnet having an armature, means connecting the armature with the wedge and means for causing the magnet to be energized at will, substantially as described.

18. The combination in a punch of a reciprocable head, a stripper, mechanism operative independent of said head for actuating said stripper and means controlled by the said head for governing the release of said stripper-actuating means, substantially as described.

19. The combination in a punch of a reciprocable head, a stripper, means for actuating the same and electrical means operated by the said head for controlling the action of the stripper-actuating means, substantially as described.

20. The combination with a punching-machine of a stripper, means operated independently of the punching mechanism for causing said stripper to act, and means for releasing the stripper, substantially as described.

21. The combination in a punch of a reciprocable head, a stripper, electrical mechanism for actuating the same, and means controlled by the head for controlling the action of said mechanism, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN V. W. REYNDERS.
WILLARD T. SEARS.

Witnesses:
WM. C. ARMOR,
MARY C. HAUER.