No. 770,655. PATENTED SEPT. 20, 1904.

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

MECHANISM FOR OPERATING PUNCH GAGS.

APPLICATION FILED APR. 28, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

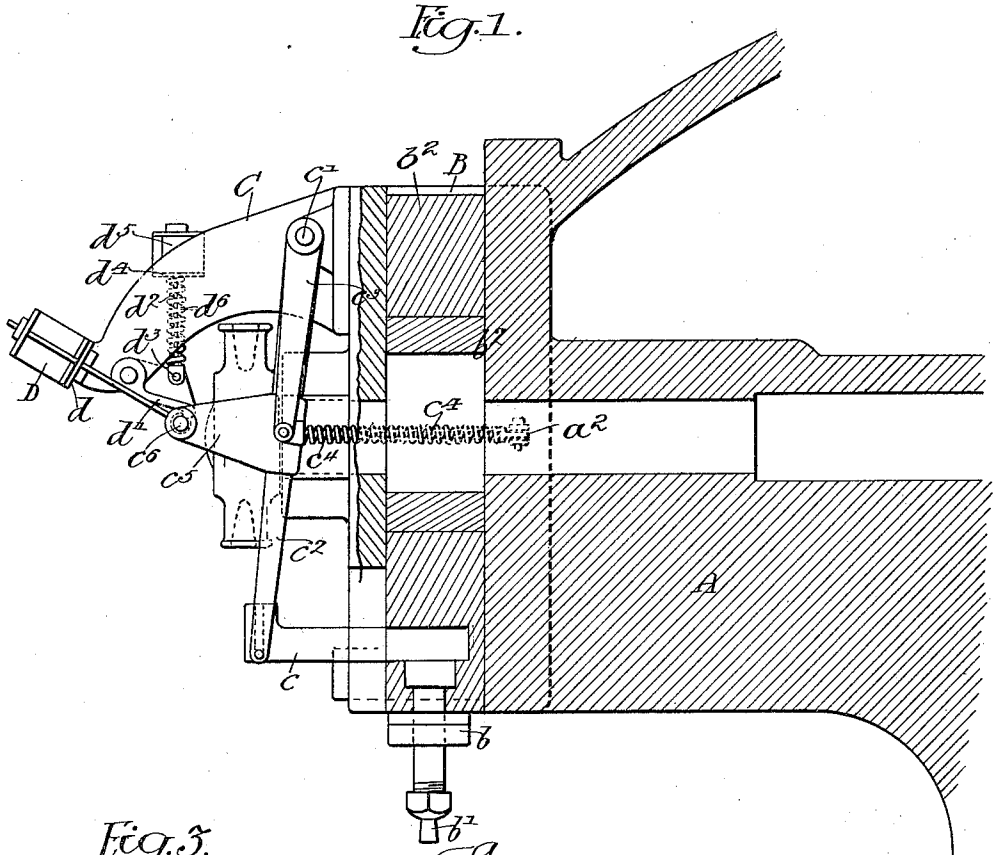
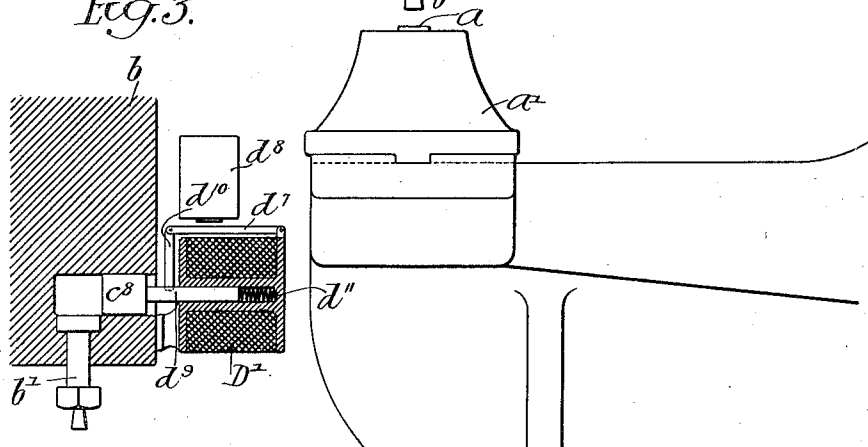


Fig. 3.



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Titus W. Sears.

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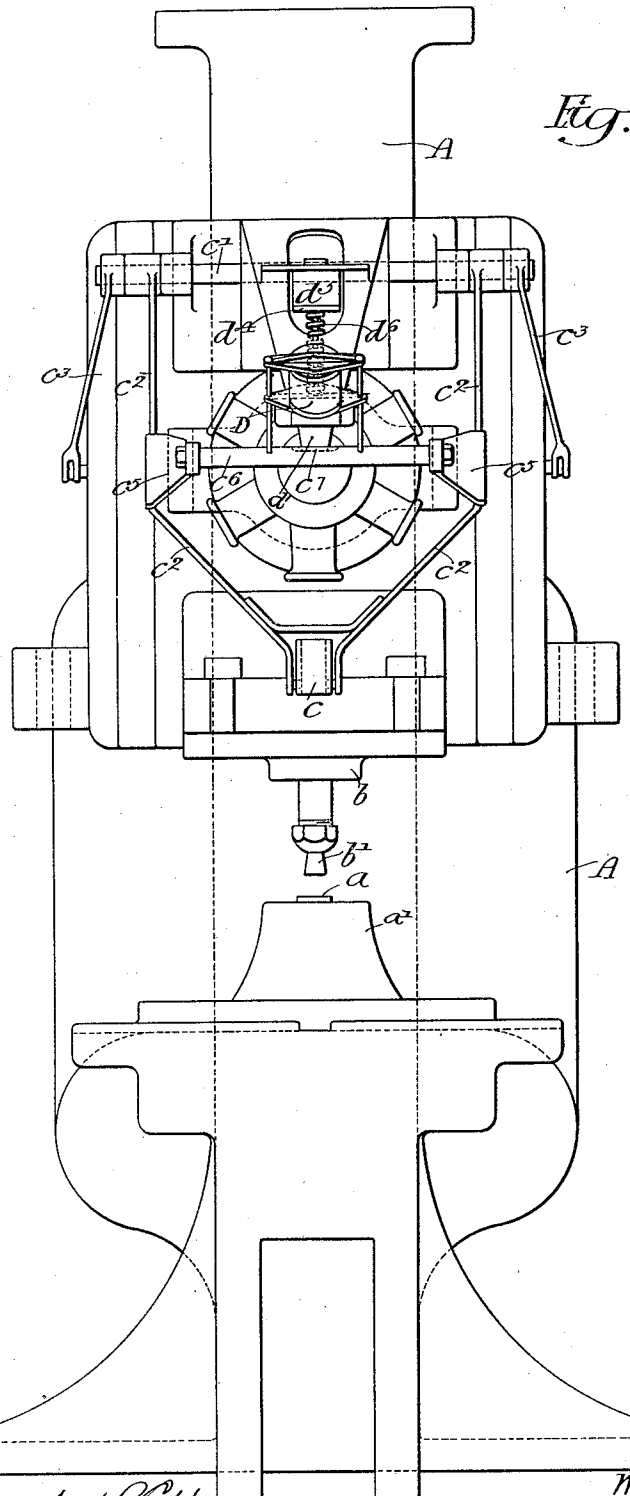
J. V. W. REYNDERS & W. T. SEARS.

MECHANISM FOR OPERATING PUNCH GAGS.

APPLICATION FILED APR. 28, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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No. 770,655. Patented September 20, 1904.

UNITED STATES PATENT OFFICE.

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

MECHANISM FOR OPERATING PUNCH-GAGS.

SPECIFICATION forming part of Letters Patent No. 770,655, dated September 20, 1904.

Application filed April 28, 1904. Serial No. 205,328. (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 Mechanism for Operating Punch-Gags, of which the following is a specification.

Our invention consists in an improved combination of apparatus for the automatic operation of the gag or bar by which a punch may be put in operative connection with or disconnected from a constantly-acting head, so as either to be forced through a plate of material properly inserted in the machine or to merely rest upon said piece of material without being forced into or through it.

The object of the invention is to provide means for automatically moving the gag to disconnect the punch from its operating mechanism and cause it to be engaged by a holding device, so as to be retained in such position, a further object being to provide means whereby the holding device may be released, so as to permit the gag being drawn by a suitably-disposed spring into position to cause operation of the punch.

Broadly, we desire to provide by our invention a device for moving a punch-gag into engagement with holding means whereby it is retained in position to cause the punch to be inactive and also to provide means for releasing the gag from said holding means.

In more limited form we desire to provide a magnet for pulling out a punch-gag, so as to prevent operation of the punch, normally retaining the gag in such inoperative position by means of a catch and also providing a magnet for releasing the catch and permitting the gag to be moved under action of a spring into a position 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, illustrating the same as equipped with our invention. Fig. 2 is a front elevation of the machine shown in Fig. 1, and Fig. 3 is a slightly-modified form of our invention.

In Figs. 1 and 2 of the above drawings, A represents the massive frame of a punching-machine having a head portion B, in which is a plunger b, carrying a punch b'. There is, as usual, a lower die a, carried upon a suitably-formed portion a' of the frame A, while within the head A is a portion b^2, (indicated in dotted lines,) constantly reciprocated by a well-known form of driving mechanism, which as it forms no part of the present invention is not illustrated in detail. The movable portion b^2 under normal conditions has no action upon the punch-carrying plunger b, which simply moves into a suitable recess in the lower part of said portion at each stroke thereof. If, however, the gag c be moved inwardly by any means, it fills said recess, causing the punch-plunger and the punch b' to be moved downwardly and forced through any material placed between it and the die a. There is fastened to the top portion of the punch-head a forwardly-projecting arm or standard C, provided with bearings for a horizontal shaft c', upon which are fixed a pair of arms c^2, pivotally connected at their lower ends to the gag c. There are also on this shaft a second pair of arms c^3, to each of which is attached a spring c^4, connected to a suitable portion, as a^2, of the frame of the machine. These springs are so designed as to always tend to turn the arms c^3, and consequently the arms c^2, in a direction to force inwardly the gag c. There are in the present instance on each of the arms c^2 a pair of forwardly-projecting plates c^5, between which extends a bar c^6, having in it a recess c^7, as indicated in dotted lines, for a purpose hereinafter noted. Upon the standard C is carried a magnet-coil D, having an armature d, to which are connected a pair of rods d', whose ends are also connected to the cross-bar c^6. These parts are so proportioned that when the magnet-coil is energized to attract its armature d the bar c^6 with the arms c^2 and c^3 and the gag c are moved against the action of the spring c^4 into the positions shown in Fig. 1. There is pivoted to the standard C a catch or latch piece d'' of such dimensions as to engage the recess c^7 in the bar c^6 under the action of gravity whenever the system to which

said bar is attached is moved into the proper position. There is, however, a rod d^2 connected to this catch at d^3, which rod is also connected to the armature d^4 of a magnet d^5, also carried by the standard C. A compression-spring d^6 is placed upon the rod d^2, so as to assist in forcing the catch into the recess c^7 on the bar c^6 when this latter is brought into engagement therewith. When said magnet d^5 is energized, its armature is attracted, compressing the spring d^6 and turning the catch d' on its pivot, so as to release the bar c^6.

Under operative conditions the above-described machine, with its attached parts, may be made to serve as one element of a system including electric circuits so connected that whenever the magnet D is energized the gag c will be moved in a position such that the punch is inoperative and will be held in this position by the catch d' until by the energization of the magnet d^5 the catch d' is moved so as to release the levers c^2 and c^3, thereby permitting the spring c^4 to act and move the gag to such a position as to cause the punch b' to be forced through a properly-placed sheet of material.

It will be noted that the armature of the magnet D is connected to the levers c^2 at a point relatively near their fulcrum, while the gag c is at the end of said levers and relatively distant from said fulcrum. By this means we are enabled to secure a comparatively large movement of the gag by a much smaller movement of the magnet-armature.

In Fig. 3 magnets D' and d^8 are shown as carried directly by the reciprocating punch-plunger, the gag c^8 being attached to the armature d^9 of said magnet D'. Magnet d^8 is preferably supported above magnet D' and has a pivotally-movable armature d^7, to which is connected a bar d^{10}, placed to engage a recess in the armature d^9 when this latter has been moved toward the magnet D' by the energization thereof. A spring d^{11} is placed to act upon the armature d^9, so as to tend to force the gag c^8 into position above the punch b'. Under normal conditions the bar d^{10} engages the recess in armature d^9, so as to hold the gag against the action of the spring d^{11} in a position such that the punch is inactive. The energization of the magnet d^8 attracts the armature d^7 thereof and by raising the bar d^{10} releases the armature d^9, thereby permitting the said spring to force the gag into the recess above the punch, so as to cause operation thereof. When it is desired to throw the punch out of action, the magnet D' is energized, with the result that the armature d^9 is moved so as to compress the spring d^{11} and the bar d^{10} permitted to fall into the recess in said armature, so as to retain it in such retracted position.

We claim as our invention—

1. The combination with a punch of a gag, a motor for moving said gag so as to render the punch inoperative, a device for retaining said gag in such inoperative position and a second motor for actuating said device to release the gag, substantially as described.

2. The combination with a punch of a gag having means tending to move it into a position to cause operation of the punch, a source of power for moving said gag to render the punch inoperative, with means in addition to said source of power for holding the gag in said inoperative position, substantially as described.

3. The combination with a punch of a gag, a source of power for moving said gag to render the punch inoperative, with means in addition to said source of power for retaining the gag in said inoperative position, substantially as described.

4. The combination with a punch of a gag, a source of power for moving said gag to render the punch inoperative, with means in addition to said source of power for retaining the gag in said inoperative position, and a second source of power for releasing said retaining means, substantially as described.

5. The combination with a punch of a gag, a magnet having its movable element connected to said gag for actuating the same, with a catch for retaining the gag in a definite position after the magnet has acted, and means for causing said catch to release said gag, substantially as described.

6. The combination with a punch of a gag, a magnet for moving the gag into a position such that the punch is inoperative, a catch for holding the gag in such position, and a second magnet for moving said catch, substantially as described.

7. The combination with a punch of a gag, a device for moving said gag into a position such that the punch is inoperative, a catch for holding the gag in such position, with a magnet for actuating the catch to release said gag, substantially as described.

8. The combination with a punch of a gag, a device for moving said gag into a position such that the punch is inoperative, a catch for holding the gag in such position, with a magnet for actuating the catch to release said gag and a spring for moving the gag into position to cause operation of the punch, substantially as described.

9. The combination with a punch having a gag, of a lever connected to the gag and a magnet having its movable element connected to said lever, a catch for holding the gag in a definite position and a second magnet operative on said catch, substantially as described.

10. The combination with a punch having a gag, of a lever connected to said gag, a spring active upon said lever and a magnet for moving said lever in opposition to said spring, a catch for holding the gag in a definite position and means for releasing the catch, substantially as described.

11. The combination with a punch of a gag, a pair of magnets of which one is operative upon said gag, and a catch for retaining said gag in such a position that the punch is inoperative, said catch being actuated by the second magnet to release said gag, substantially as described.

12. The combination with a punch of a gag, a lever connected thereto, a magnet operative upon said lever for moving the gag into such a position that the punch is inoperative, a pivoted catch for holding said lever after the magnet has moved it, a second magnet for turning the catch on its pivot and a spring tending to move the lever against the action of said first magnet, substantially as described.

13. The combination with a punch of a gag, a shaft, one pair of arms connected to said shaft and to said gag, a spring active upon said arms, a magnet having its armature connected to the arms, a pivoted catch for retaining the arms and the gag in a position such that the punch is inoperative, and a second magnet having its armature connected to said catch, 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 E. HAUER.