

O. SMITH.
 DOUBLE ACTION TOGGLE PRESS.
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968,608.

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Fig. 1.

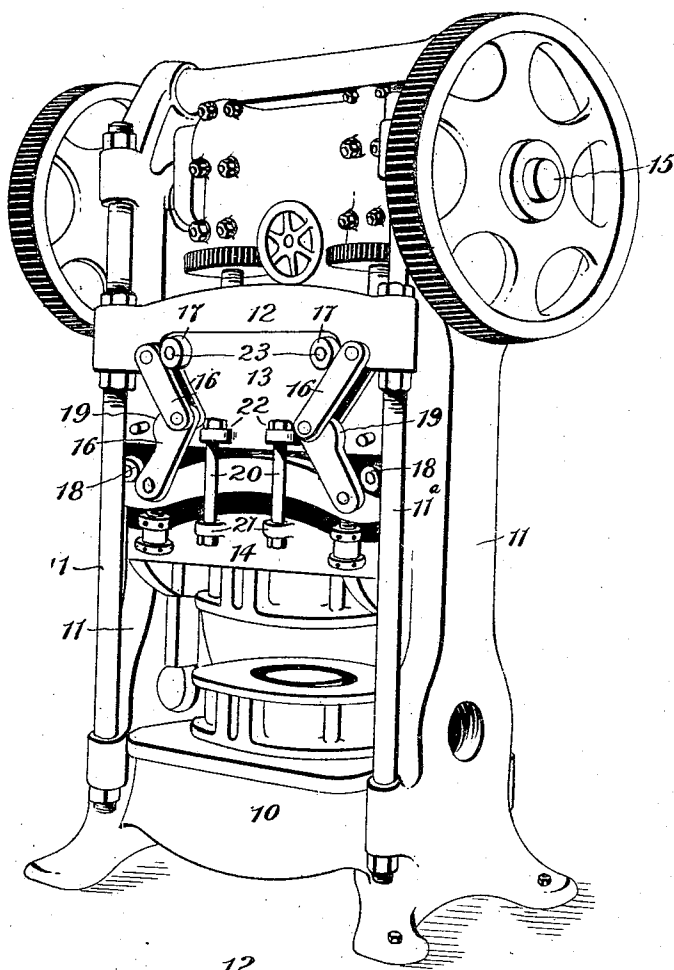
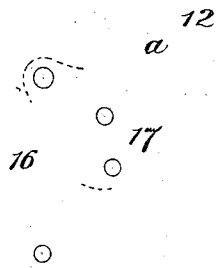


Fig. 2.



Witnesses

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DOUBLE-ACTION TOGGLE-PRESS.

968,608.

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To all whom it may concern:

Be it known that I, OBERLIN SMITH, of Bridgeton, in the county of Cumberland and in the State of New Jersey, have invented a certain new and useful Improvement in Double-Action Toggle-Presses, and do hereby declare that the following is a full, clear, and exact description thereof.

Double action presses, which are presses having two rams, one of which moves through the other, are in respect to the ram-moving mechanism of two general types, the outer ram in one type being moved by cams, and in the other type being moved by toggles. As between the two types, the toggle is preferable to the cams, as the ram-moving means, because with the cams the shaft is subjected to unnecessary pressure after the descent of the ram has been completed.

My invention therefore relates to the toggle type, and my object has been to improve the double action toggle press by simplifying the construction thereof in respect to the number of parts, and the mode of operating the press, the elimination of any side pressure upon the toggles after the same have been straightened for the completion of the descent of the ram, and yet the maintenance of the latter in an absolutely rigid condition in its wholly lowered and holding position, and the elimination of want of reliability or uncertainty in action due to the springiness and torsion of the members of the ram-operating mechanism, and to these ends my invention consists in the double action press constructed substantially as hereinafter specified and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a double action toggle press embodying my invention, both rams being shown in a raised position; and Fig. 2 a detail view showing a different form of my toggle mechanism.

In the embodiment of my invention which I have selected for illustration in the drawings, the press in its general features is of usual construction, it comprising a bolster-supporting bed 10, from which rise columns 11 and posts or rods 11^a that at their upper ends are connected by a truss beam 12, and there are an inner ram 13 and an outer ram

14, the inner ram being connected to a horizontal crank shaft 15, so that by the revolution of said shaft the inner ram is reciprocated vertically to and from the work on the bolster, the shaft being revolved by gearing receiving motion from a suitable driving shaft. The outer ram is chambered or hollow for the passage through it of the inner ram, and in the instance illustrated in the drawings it has sliding bearings on the columns 11 to guide it in its vertical movements. The outer ram near each of its four corners has pivotally connected to it the lower end of one of the links or members 16 of a toggle, the upper end of whose other member 16 is pivotally connected to the truss beam 12, the pivotal connections of the toggle with the ram and truss beam being in the same vertical line or plane.

The toggles when flexed or bent have their knuckles extending inward or away from the sides of the press, which is their position when the inner ram is ascending and is completely raised. It will be seen that I hang or suspend the outer ram from the truss beam, or a stationary part of the press, by means of the sets of toggles so that under the influence of gravity, the outer ram tends downward and will move downward, sliding along the guide posts or columns, but to force the outer ram downward if need be, and as well supply the power necessary to move it into its final and work-holding position, I provide preferably for each toggle an offset or projection on the side of the inner ram, so located and arranged that as the inner ram descends, said offset or projection will engage the toggle knuckle on the inner side, and traveling over the same will force it outward, and thereby straighten the toggle. I preferably make the offset or projection in the form of a roller 17 to reduce or ease the friction, although if preferred, the toggle joint or knuckle may be provided with a roller, and the offset or projection will be in the form of a stationary lug. In order to open or break the toggle to release the outer ram and permit its ascent, I provide a similar offset or projection also in the form of a roller 18, if a roller 17 be used

for the other offset or projection, so situated and arranged as to engage a shoulder or projection 19 at the toggle joint or knuckle that projects outwardly toward the side of the press when the inner ram is moved upward. The continued ascent or lifting of the outer ram after the breaking of the toggle, and its partial lifting as a result of the action of the roller 18 upon the toggle projection 19, may be effected or produced by providing on the outer ram one or more vertical studs or posts 20 each of which passes through an eye or opening in a horizontal lug or boss 21 on both the front and back sides of the inner ram if need be, above which lug or boss, and adapted to be engaged by the top thereof when the inner ram ascends, is a shoulder on the stud or post that may be in the form of a nut 22 screwed thereon. It will be evident that by this connection between the two rams, the inner ram may have a limited extent of vertical movement independently of the outer ram.

It will be seen that by my invention I use virtually but a single operating mechanism to reciprocate both rams, and I thus not only greatly simplify the machine, but I secure greater certainty or reliability of action of the outer ram, for I eliminate the torsion which is consequent upon the use of a long shaft as a part of the outer ram reciprocating mechanism, and since the toggle-engaging offsets or projections are on the solid body which composes the inner ram, any derangement due to springiness of the press members is avoided; and when the toggles are straightened they are subjected to no lateral or sidewise pressure, so that any exertion of power or pressure at this time is obviated and yet the inner ram is held down with absolute rigidity.

A very important feature of my invention is the ability to construct a press originally as a single action press, that is, a press with a single ram, and then convert it into a double action press merely by adding to it the outer ram, the toggles and the toggle-engaging offsets or projections, it being necessary for the latter purpose merely to provide the inner ram with horizontal holes for the reception of the rods or shafts 23 which form the journals for the rollers 17 and 18 when the toggle-engaging offsets or projections are in the form of rollers.

It is to be understood that the particular press shown in the drawings and described in detail herein, is merely one embodiment of my invention, and that my invention may be embodied in a press differing in particular construction from that shown and described. It is to be understood of course that any number of toggles may be employed, any number employed being con-

veniently possible because each toggle is operated independently of the other.

To illustrate a different construction that may be made embodying my invention, I invite attention to Fig. 2 of the drawings, in which, instead of employing two projections or rollers 17 and 18, a single projection or roller corresponding to the roller 17 may be employed for both pushing the toggles into a straightened out position at the end of the ram stroke and releasing them at the beginning of the ascent, the upper toggle link being provided with a curved arm or tail *a* that projects laterally and downward in position to be engaged by the roller 17 when it ascends.

Having thus described my invention, what I claim is—

1. A press having a frame comprising a horizontal truss beam at the top, two reciprocating rams, toggle mechanism acting upon one ram, said toggle mechanism being suspended from the truss beam, and means carried by the other ram for acting upon said toggle mechanism.

2. A press having two reciprocating rams, a plurality of independent toggles connected with one of the rams, and an independent toggle-engaging means for each toggle.

3. A press having two reciprocating rams, a plurality of toggles connected with one of the rams, and an independent toggle-engaging means for each toggle carried by the other ram.

4. A press having two reciprocating rams, toggles connected at one end with one of the rams, a support for the other end of the toggles, and means carried by the other ram that alternately engage the toggles in the reciprocations of the ram.

5. A press having two reciprocating rams, toggles connected at one end to one of the rams, a support for the other ends of the toggles, means carried by the other ram for straightening the toggles and for flexing the same, and a loose connection between the rams, whereby one is moved by the other when the toggles have been flexed.

6. A press having two reciprocating rams, toggle mechanism acting upon one ram, and parts mounted directly upon the body of the other ram and moving therewith for acting upon said toggle mechanism.

7. A press having two reciprocating rams, toggle mechanism acting upon one ram, parts mounted directly upon the body of the other ram and moving therewith for acting upon said toggle mechanism, and a loose connection between said rams through which movement of one ram by the other in one direction is effected.

8. A press having two reciprocating rams, toggle mechanism acting upon one ram, parts mounted directly upon the body of the

other ram and moving therewith for acting upon said toggle mechanism, and a loose connection between said rams through which movement of one ram by the other in one direction is effected, said means comprising a bolt on one ram having a head or enlargement, and an eye on the other ram.

In testimony that I claim the foregoing I have hereunto set my hand.

OBERLIN SMITH.

Witnesses:

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