

No. 794,430.

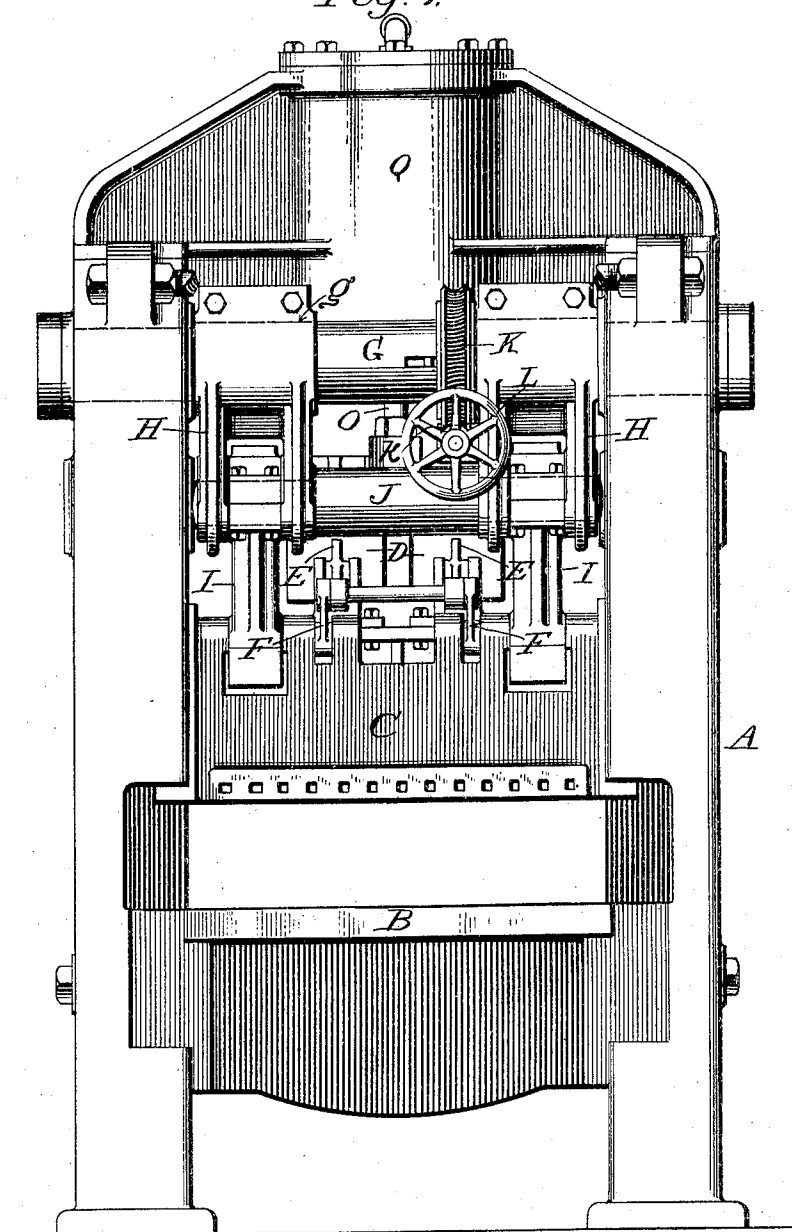
PATENTED JULY 11, 1905.

M. SKLOVSKY.  
PRESS.

APPLICATION FILED OCT. 26, 1904.

2 SHEETS—SHEET 1.

*Fig. 1.*



WITNESSES  
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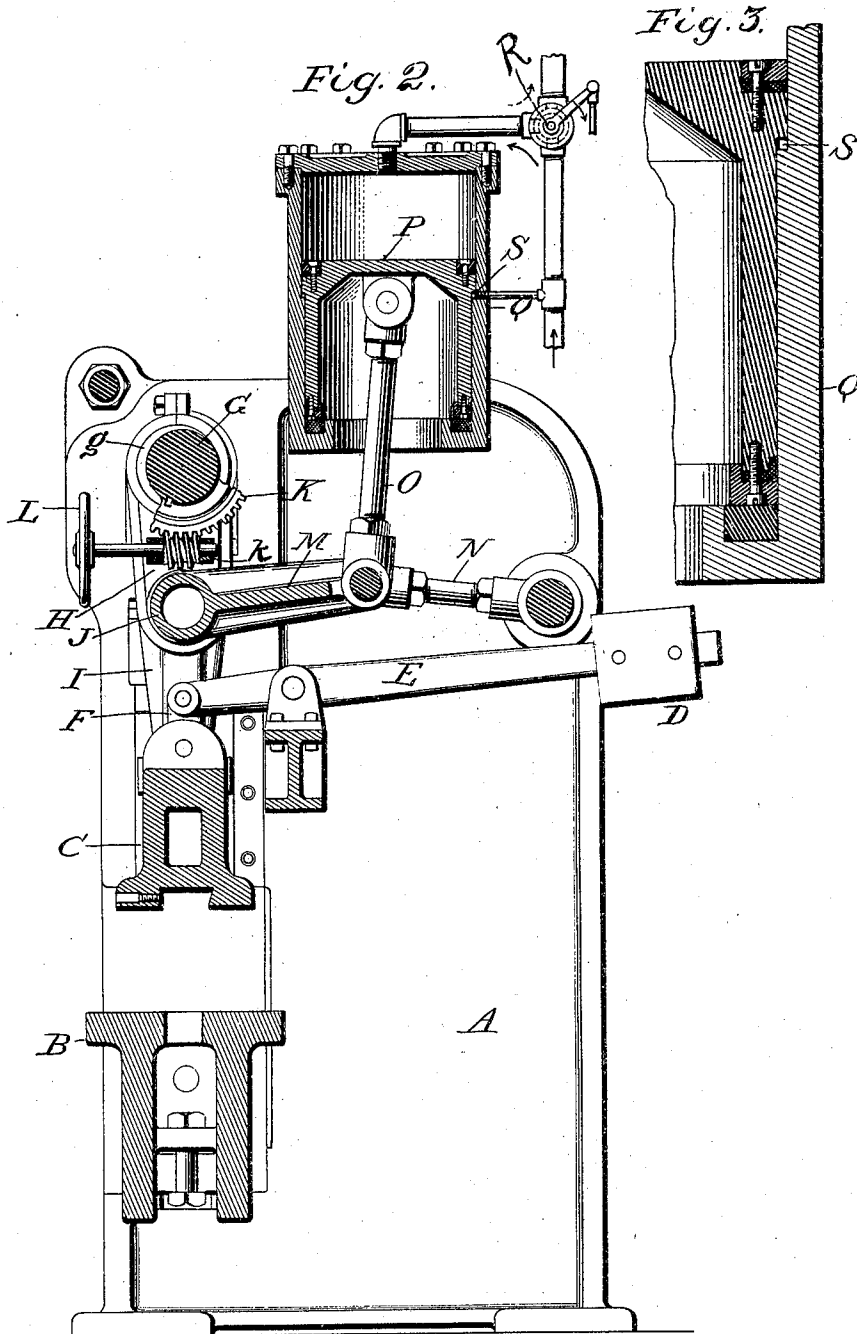
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

MAX SKLOVSKY, OF MOLINE, ILLINOIS, ASSIGNOR TO DEERE & COMPANY,  
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## PRESS.

SPECIFICATION forming part of Letters Patent No. 794,430, dated July 11, 1905.

Application filed October 26, 1904. Serial No. 230,136

*To all whom it may concern:*

Be it known that I, MAX SKLOVSKY, a citizen of the United States, residing at Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of my invention are to improve the efficiency and convenience of operation of pneumatic and other dynamic-fluid power-presses; to lessen the power required for operating the same, particularly for effecting the reverse or return movements of the presser; to economize in the use of compressed air or other fluid pressure employed for impelling the piston; to cushion the piston against the heavy impact of its working stroke, and to increase the transmission of power through an improved arrangement of toggles.

The invention is described herein with reference to a press used for die-work or for swaging or stamping metal, such a machine being illustrated in the accompanying drawings, which form a part of this specification. While especially applicable to this type of press, wherein the working movements of the presser are within a comparatively short range, the invention is also applicable to machines designed for other kinds of work—such, for example, as bending, punching, cutting, drawing, forging, compressing, and various purposes for which power-presses are ordinarily employed.

The invention resides in the application of certain new principles, the novel arrangement of differential pressures for effecting the pressing and return operations, the mechanism for transmitting increased power, together with the various adjuncts and devices in connection therewith and combination of parts, substantially as hereinafter described, and particularly pointed out in the claims following the description.

In the drawings, Figure 1 is a front elevation of a press containing a preferred form of

embodiment of the invention. Fig. 2 is a vertical cross-section of the same. Fig. 3 is an enlarged detail section of a fragment of the cylinder and piston.

The illustrated machine is shown upright and has a vertically-reciprocatory press-head or die-holder; but in describing this specific construction it will be understood that the invention is not limited thereto, but may be applied to horizontally or angularly working presses, and that various modifications may be made in details of arrangement and construction.

Letter A denotes the frame of the machine; B, the bed or table for holding the anvil, blank-holder, or stationary die, and C the movable press-head for holding the coacting pressing-die.

The press-head is approximately or nearly counterbalanced by a weight or weights D. Two weights are shown attached to the long arms of levers E, from the short arms of which the press-head is pivotally sustained by links F. This counterweight furnishes a large proportion of the power for raising the press-head. Other appropriate means may of course be substituted.

G denotes a shaft mounted above the cross-head or substantially in the plane of its reciprocations. This shaft is connected to the press-head by a toggle or toggles whose links or toggle-arms are designated by the letters H I. Two of such toggles are shown, due to the length of the press-head and the advantage of sustaining and connecting it from two points; but both may be considered, in effect, a single toggle. Flexion of the toggles permits raising the press-head, while straightening or extension thereof by pressure against the knuckles forcibly depresses the press-head to effect the pressing, swaging, stamping, or other operation for which the invention is intended.

In the present illustration the upper toggle-links H extend from bearing-boxes inclosing the shaft G. A swinging shaft J is journaled in bearings in said toggle-links H. The lower toggle-links I, from which the press-

head is pivotally sustained, are provided with bearing-boxes inclosing said shaft J between bifurcations of the upper toggle-links H. Said shaft J has an enlarged medial part fitted between the two upper toggle-links, thus keeping it from endwise movement.

A convenient means for adjusting the toggles H I is afforded by journaling the boxes of the upper toggle-links H on eccentrics or eccentric portions *g* of shaft G. Said shaft has a worm-wheel K engaged by a screw *h*, operated by a hand-wheel L. Obviously by turning the hand-wheel the shaft can be turned to adjust the eccentrics within the bearings of the toggle-links. The bearing for the shaft of the hand-wheel may be fixed or it may be carried by one of the toggle-links H. In the latter case the shaft G will rock with the toggle-links during their flexion.

The toggle or toggles H I are operated by a toggle M N, one of whose arms N has a stationary pivot or fulcrum, while the other arm M is pivotally connected to the knuckle of the toggle or toggles H I, projecting in this instance from the medial part of shaft J. Pressure upon the knuckle of toggle M N is transmitted to the knuckle of toggle or toggles H I and by the latter toggle to the press-head. Thus the press-head is operated by the conjoint action of the two toggles, obtaining the mechanical advantage and power of both, and hence a powerful pressure is brought to bear upon the press-head. For obtaining still greater power the series of toggles may be increased, one link of each toggle of the series connecting with the knuckle of the next toggle.

The knuckle of the toggle M N is pivotally connected by the rod or pitman O to the piston-head P in cylinder Q, the piston being driven, preferably, by compressed air. Steam, water under pressure, or other dynamic fluid may, however, be employed for driving the piston.

The piston is represented in Fig. 2 at its extreme lowermost position. This position is attained by admission of compressed air through an intake-port at the top. The intake is controlled by an ordinary two-way valve or cock, as R. In one position of the cock the air is admitted to impel the piston, and thereby effect the pressing operation. A second turn of the cock shuts off the air and opens an exhaust through the same port to permit escape of air from the cylinder.

It will be noticed that the cylinder is single-acting, the force of the motive fluid being utilized to impel it in the direction for transmitting power to the press-head. An important feature of this invention is the means for lifting the press-head and returning the piston to its uppermost position. As before stated, a large proportion of power necessary for this purpose is afforded by the counter-acting weight or weights D. The remaining

power necessary is furnished by air-pressure in a small annular space S. As shown, the piston-head works in an enlarged bore of the cylinder and has a reduced trunk working in the smaller bore, thus providing the afore-said space S, which is kept in constant existence by the limits of travel of the piston. Preferably this annular space is always open to the air-pressure, so that in forcing the piston-head downward the air entering at R operates against the pressure in S; but the area of the piston-head is so much greater than that of said annular space that the large differential pressure powerfully forces down the piston, which, however, is thus cushioned against the impact of its working stroke. When the exhaust is open, the air escapes from the cylinder and the piston automatically rises to its initial position by reason of the air-pressure in the small annular space.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. A press having, in combination, a presser, a cylinder, a piston working therein operatively connected with the presser, means for applying differential fluid-pressure on opposite sides of the piston, the greater pressure serving to drive the piston in a direction to effect the pressing operation against resistance of the smaller pressure which returns the piston at the end of its working stroke while the motive fluid is exhausted from the working end of the cylinder, and a mechanical power device coöperating with said smaller pressure to return the presser.

2. A press having, in combination, a presser, a counteracting device adapted to exert force in returning the presser after its working movement, a single-acting cylinder whose working piston is operatively connected with the presser and is forced by fluid-pressure in a direction to effect the pressing operation, and an annular working space at the side of the piston opposite to its working face in communication with the source of motive fluid and in which a relatively slight fluid-pressure acts to return the piston while the motive fluid is exhausted from the working end of the cylinder.

3. A press having, in combination, a presser, a counteracting device, a cylinder whose working piston is forced in an operative direction by fluid-pressure acting on one side and returned by fluid-pressure acting on a relatively minute area on the opposite side, a toggle whose knuckle is connected to said piston, and a second toggle whose knuckle is connected to one of the links of the first toggle and which has one of its own links connected to the presser, flexion of said toggles when the piston is returned allowing lifting or back motion of the presser, and straightening of said toggles when the piston is operatively impelled causing forcible movement of the presser to effect the pressing operation.

4. A press having, in combination, a presser, a counterbalancing device, a single-acting cylinder whose working piston is operatively connected with the presser and forced in a direction to effect the pressing operation by fluid-pressure acting on its working side, and a relatively small working space or chamber at the opposite side of said piston in communication with the source of motive fluid and in which the fluid-pressure operates to return the piston during the exhaust of fluid from the working side, in conjunction with the action of said counterbalancing device.

5. A press having, in combination, a presser, an actuating-toggle therefor, a counteracting mechanical power device adapted to exert force in returning the presser after its working operation, a cylinder, a working piston therein operatively connected to the toggle for actuating the same, a motive-fluid supply, means for admitting and exhausting said motive fluid to and from the working side of the piston, and a relatively small working chamber in the cylinder at the opposite side of the

piston in constant communication with the source of motive fluid.

6. A press having, in combination, a vertically-movable presser, an actuating-toggle therefor arranged above and longitudinally of the line of movement of the presser which is suspended from the lower links of the toggle, a counteracting weight connected to the presser, and a cylinder whose working piston is operatively connected with toggle, means for admitting and exhausting motive fluid to and from the working side of the piston, and a relatively small working chamber at the opposite side of the piston in communication with the source of motive fluid which operates in connection with the aforesaid weight to return the piston and presser after the working movement thereof.

In testimony whereof I affix my signature in presence of two witnesses.

MAX SKLOVSKY.

Witnesses:

CHARLES H. POPE,  
FRED H. COOPER.