April 10, 1934. F. K. SIMMONS ET AL 1,954,653

POWER PRESS

Filed Feb. 27, 1932

Fig. 1.

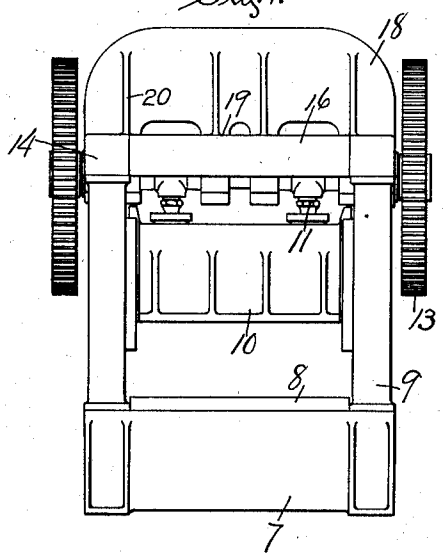


Fig. 2.

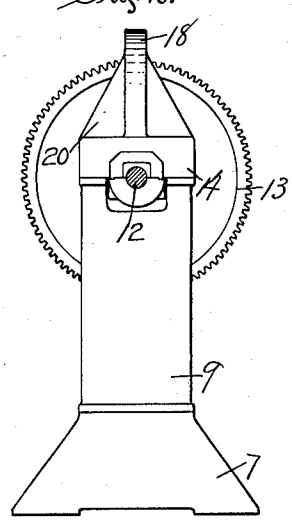


Fig. 3.

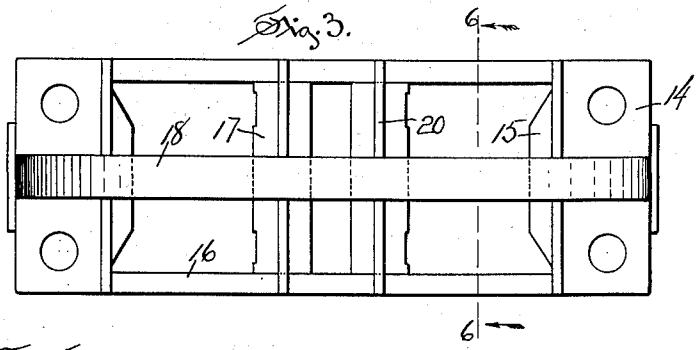


Fig. 4.

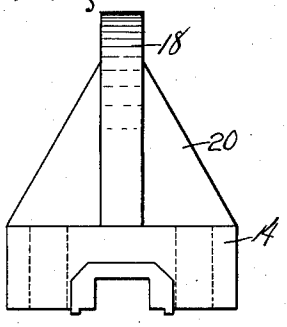


Fig. 5.

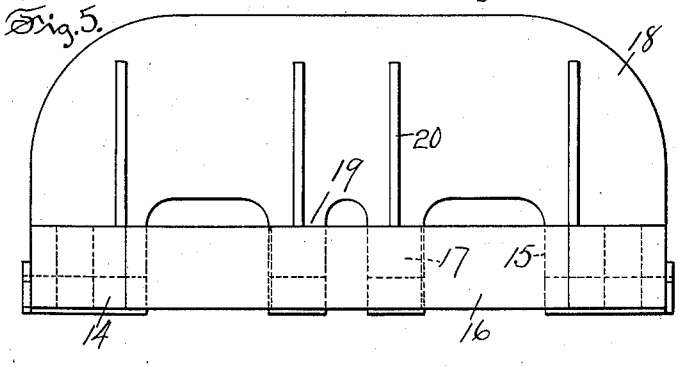
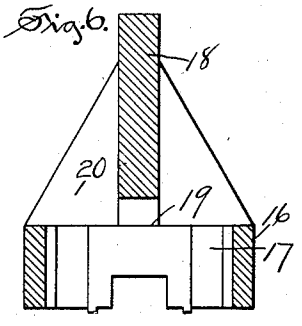


Fig. 6.



INVENTOR
Frank K. Simmons,
Curtis A. Sherman,
by
Arthur B. Jackins,
ATTORNEY

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1,954,653

POWER PRESS

Frank K. Simmons, West Hartford, and Cortis F. Sherman, Hartford, Conn., assignors to The Henry & Wright Manufacturing Company, Hartford, Conn., a corporation of Massachusetts

Application February 27, 1932, Serial No. 595,528

8 Claims. (Cl. 164—19)

Our invention is embodied in that type of machine wherein great pressure is exerted in cutting, stamping or otherwise shaping metallic sheets or articles, and an object of our invention, among others, is the production of a machine of this type that, while being of minimum weight shall, at the same time, possess such strength and rigidity as to resist to a maximum degree any liability to distortion during its operation.

One form of a power press embodying our invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawing, in which—

Figure 1 is a view in front elevation of our improved press.

Figure 2 is a side view of the same.

Figure 3 is a top view on enlarged scale of the head of the frame of our improved press.

Figure 4 is an end view of the same.

Figure 5 is a front view of said head, and

Figure 6 is a view in cross section on a plane denoted by the dotted line 6—6 of Figure 3.

The production of machines of the type forming the subject matter of this application involves a problem of construction such that the frame will be distorted to a minimum degree under the enormous pressures encountered in the ordinary operation of such machines, this problem having heretofore been met by making the frames of ponderous weight. More recently attempts have been made to construct these machines of less weight and particularly from comparatively thin pieces of metal welded together which again requires the problem above mentioned to be solved and to provide a frame that will successfully withstand, without undue distortion, the forces to which the frames are subjected.

It has been found, particularly on presses having crankshafts with comparatively long strokes, that where the tools begin their operation on the work near the mid-stroke of the operating movement of the slide or ram in each press, an enormous pressure must be transmitted by the pitman or pitmen to the slide or ram while the pitman or pitmen is or are at a substantial angle with respect to the vertical center line of the machine. This enormous pressure is resolved into two forces, one of which is along the vertical center line of the crankshaft and the other along the horizontal center line of the crankshaft.

Both of these forces tend to distort the head, the vertical force tending to bow the head outwardly with a result that the sides of the frame are bowed inwardly. The horizontal force tends to bow the head sideways with a result that the sides of the frame are twisted.

Unless these distortions in the head are reduced to a minimum, the sides of the frame are distorted to such an extent as to effect the guiding of the slide or ram, resulting in excessive wear on the latter member and also the tools.

We have, after much study and repeated experiment, found that if the head of the frame be made rigid enough to withstand said outward bowing distortion the problem of distortion of other parts of the frame is practically solved. We have therefore directed our attention to the production of a power press in which the head of the frame has sufficient rigidity to withstand the distortion hereinbefore referred to.

Our improved machine having a head with the characteristics just described is shown in the accompanying drawing in which the numeral 7 denotes the base of the machine, 8 a die plate supported on the table of said base, 9 the sides of the frame secured to and rising from the base, 10 a ram or slide mounted in slideways in the frame in any ordinary manner and operated as by means of pitmen 11 connecting the slide with a crank shaft 12 mounted in bearings at the tops of the sides in any ordinary manner, and which shaft may be rotated as by means of gears 13 secured to the shaft and meshing with driving gears not herein shown. The parts of the frame just mentioned may be constructed in any desired manner, but preferably they will be composed of comparatively thin pieces or sheets of metal secured together by welding.

It is preferable to make these welded members from a metal having substantially the same ultimate tensile and compressive strength as this permits the use of easily obtained commercial shapes from which to cut and form the various elements entering into the welded members.

The head comprises base blocks 14 located at each end of said head and having inwardly projecting integral stays 15. Each block has an opening, preferably rectangular in form, on its under surface to receive journal bearings for a crankshaft. Connecting bars 16 are abutted at their opposite ends against the inner surfaces of the base blocks at the outer ends of the latter, and as shown in Figure 3 of the drawing, a flat surface being provided on the blocks between the stays 15 and the ends of the blocks to receive the ends of the connecting bars 16. Struts 17 spaced a slight distance apart are

abutted with their opposite ends against the inner surfaces of the connecting bars 16, said struts having rectangularly shaped openings to receive crank-shaft journal bearings.

In the machine shown the distance between the side members is such that it is preferable to have a plurality of struts 17. It is understood, however, that where this distance is reduced, a single strut may be used or in some types of machines no struts at all may be employed without departing from the spirit of the invention.

A crown 18 of arch shape sets upon the blocks 14, said crown also having inwardly projecting supports 19 that set upon the struts 17.

Bracing plates 20 of triangular shape are placed in the angles between the crown 18 and the base blocks and struts, as shown in Figure 4 of the drawing, said plates extending upwardly well toward the top of the crown 18. It will be understood that in some types of small machines these bracing plates may be dispensed with.

All of the parts of the head just described are secured one to another as by means of welding, the abutting surfaces, ends and edges being suitably prepared in any desired manner to provide a joint of maximum strength.

With this construction those familiar in the art will readily see that the vertical component of the force is resisted by the crown 18 having great depth as compared with its thickness. Furthermore, any slight tendency to bow upward and which would result in the side members bowing inwardly is resisted by the connecting bars 16. Also any tendency of the latter to distortion is resisted by the struts 17 which are also reinforced by the plates 20.

An important feature of our invention resides in the journal bearings constructed to form struts extending between and secured to the connecting bars 16 and which may be reinforced by the bracing plates 20.

This construction results in a high moment of inertia in both the horizontal and vertical planes, reducing the distortion in the head to a minimum and a head comparatively light in weight.

We claim:

1. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said blocks, a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks, and means for connecting said bars to the lower edge of said crown intermediate its ends.

2. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said blocks, a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the upper surfaces of said blocks, and a strut secured at its opposite ends to said connecting bars intermediate the ends of said crown and secured to the lower edge of said crown.

3. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of said standards, connecting bars secured at their opposite ends to opposite ends of said blocks, a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks and resting thereupon, and struts spaced apart near the crosswise center of said crown and secured to the lower edge thereof and at their opposite ends to said connecting bars.

4. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks each to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said base blocks, a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks and resting thereupon, struts secured to the lower edge of said crown near the crosswise center thereof and spaced one from the other, and bracing plates secured in the angles between said crown and said base blocks and struts, said plates being secured at their abutting ends to said members.

5. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said blocks, and a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks.

6. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said blocks, and a crown comprising a piece having a width at least four times as great as its thickness and secured at its opposite ends to the crosswise center of said blocks.

7. A power press comprising a base, standards rising from the base, and a head supported by said standards and including base blocks to be received upon the ends of the standards, connecting bars secured at their opposite ends to opposite ends of said blocks, a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks, and bracing plates secured in the angles between the crown and said base blocks.

8. A head for a power press, said head including base blocks serving as a support for the head, connecting bars secured at their opposite ends to opposite ends of said blocks, and a crown comprising a piece of much width as compared with its thickness secured at its opposite ends to the crosswise center of said blocks.

FRANK K. SIMMONS.
CORTIS F. SHERMAN.