

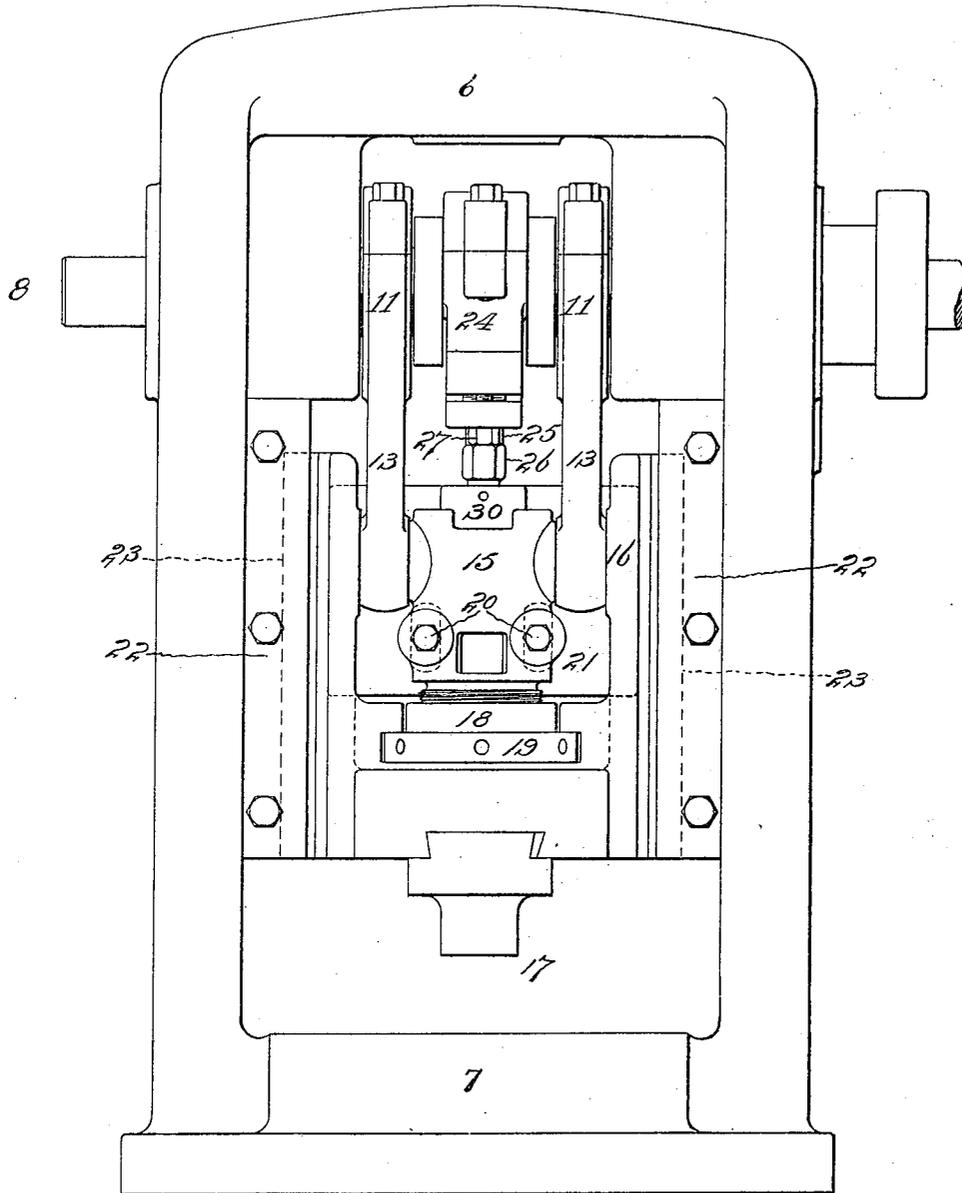
A. C. CAMPBELL.  
DOUBLE ACTING PRESS.

(Application filed June 27, 1900.)

(No Model.)

3 Sheets—Sheet 1.

*Fig. 1*



*Witnesses:*

*V. R. Holcomb.*

*C. E. Mustland.*

*Inventor:*

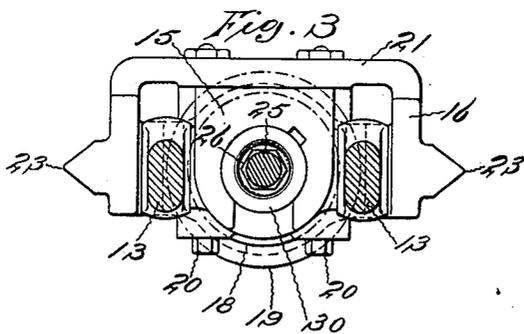
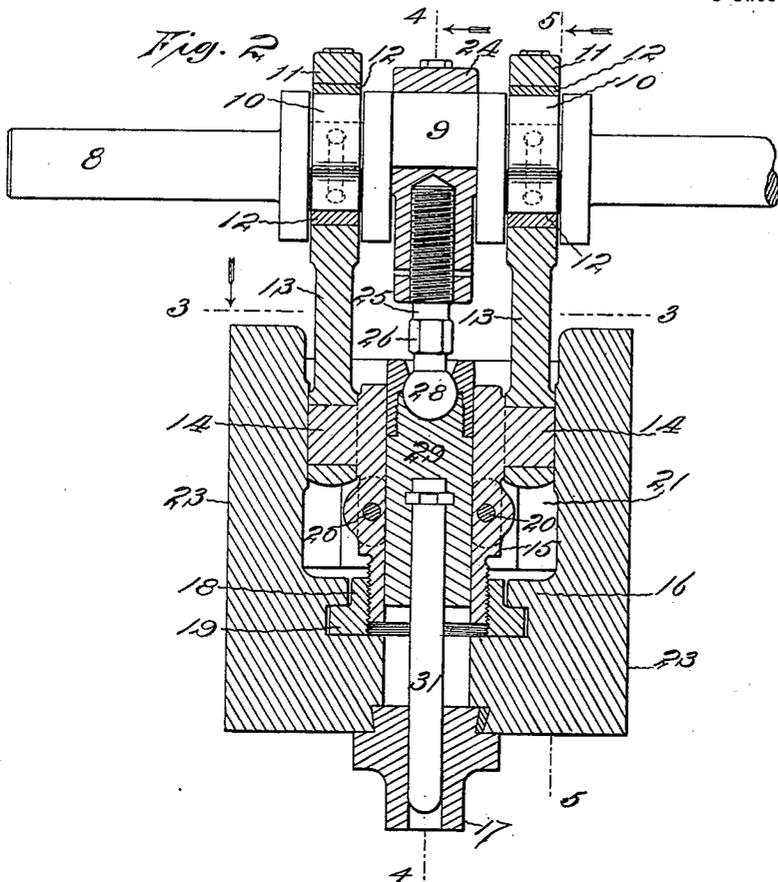
*Andrew C. Campbell, by  
Harry P. Williams  
att'y.*

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DOUBLE ACTING PRESS.

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(No Model.)

3 Sheets—Sheet 2.



Witnesses:

V. Q. Holcomb

C. E. Beckstead

Inventor:

Andrew C. Campbell, by

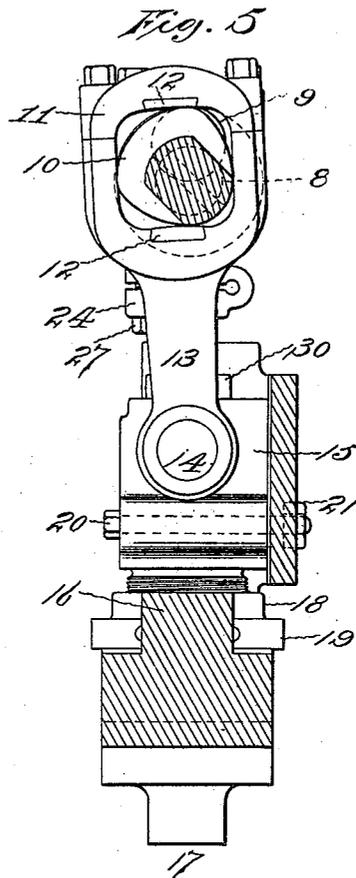
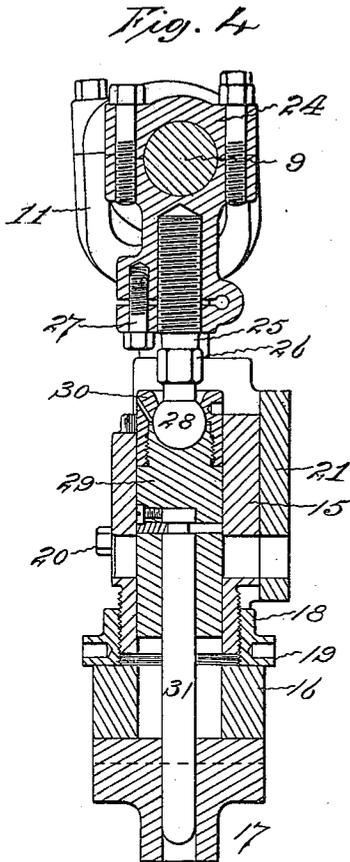
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DOUBLE ACTING PRESS.

(Application filed June 27, 1900.)

(No Model.)

3 Sheets—Sheet 3.



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C. E. Buchanan.

Inventor:  
Andrew C. Campbell, by  
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# UNITED STATES PATENT OFFICE.

ANDREW C. CAMPBELL, OF WATERBURY, CONNECTICUT, ASSIGNOR TO  
THE E. J. MANVILLE MACHINE COMPANY, OF SAME PLACE.

## DOUBLE-ACTING PRESS.

SPECIFICATION forming part of Letters Patent No. 667,675, dated February 12, 1901.

Application filed June 27, 1900. Serial No. 21,861. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW C. CAMPBELL, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Double-Acting Presses, of which the following is a specification.

This invention relates to those presses which cut blanks from sheet metal and draw the blanks into shells.

The object of the invention is to simplify the mechanisms which operate the cutting and drawing punches of such presses, whereby the cost of building is reduced and the efficiency is increased.

This invention resides in a press of this nature having the mechanisms that operate the punches so constructed and arranged that the cutting-punch at the limits of its reciprocating movement is caused to dwell after the manner incident to the cutting-punch of the common cam-press by means having the simplicity and cheapness of those of the ordinary crank-press, while the drawing-punch is regularly moved by a simple crank.

Figure 1 of the accompanying drawings shows a front elevation of a double-acting press that embodies the invention. Fig. 2 is a vertical sectional view of the punches, the punch-slides, and the mechanisms for reciprocating these parts. Fig. 3 is a horizontal section of these parts looking down from the plane of the broken line 3 3 of Fig. 2. Fig. 4 is a vertical section on the plane indicated by the broken line 4 4 of Fig. 2, and Fig. 5 is a vertical section on the plane indicated by the line 5 5.

The frame 6 may be supported upon a bench or any design of legs, and any desired dies may be placed upon the bed 7.

The driving-shaft 8 is supported by suitable bearings near the upper ends of the pillars of the frame. At the middle of the frame the shaft is formed with a crank 9, and on each side of the crank the shaft bears a cam 10. On each cam is a yoke 11, with a rectangular opening so designed that the periphery of the cam is always in contact with the four walls of the opening, the upper and lower walls of

which, being subjected to the severest wear, are provided with hardened shoes 12. The cams and yokes are so shaped that the yokes have substantially rectangular movements—a transverse movement when up, a downward movement on one side, a transverse movement when down, and an upward movement on the other side—during each rotation of the driving-shaft. The shank 13 of each yoke is perforated and embraces a trunnion 14, projecting from the tubular coupling-piece 15, that is located in a recess in the slide 16, which bears the cutting-punch 17. On the lower threaded end of the coupling-piece is a nut 18, with a flange 19, that lies in a mortise in the slide. The slide bearing the cutting-punch may be moved with relation to the coupling-piece bearing the trunnions by turning this nut for adjusting the end of the cutting-punch so it will properly coact with the cutting-die. After these parts have been adjusted the slide and coupling-piece are fastened together by setting up the clamping-bolts 20, which pass through the coupling-piece and slots in the rear wall 21 of the slide. On the inside of the frame-pillars are V-shaped ways 22, along which the V-shaped edges 23 of the slide are free to move. The cams first cause the yokes to move transversely toward the front without giving any vertical movement to the cutting-punch slide, then to move downwardly, so as to force the cutting-punch slide toward the bed, then to move transversely toward the rear without vertically moving the cutting-punch slide, and finally to move upwardly and raise the cutting-punch slide from the bed. These movements are so timed that the punch carried by the slide is held raised sufficiently long to allow a sheet of metal to be properly placed over the cutting-die and is held depressed upon the cut blank the necessary period to allow the drawing-punch to properly perform its function of drawing the blank from beneath the cutting-punch and forcing it through the drawing-die.

On the crank 9 is a crank-block 24, and the threaded end of a spindle 25 is screwed into the threaded socket that is formed in the lower end of this block. The spindle has an angular section 26 for the application of a

wrench, and the end of the block is slitted and provided with a set-bolt 27, that may be tightened for clamping the spindle after it has been turned to the desired position. The lower end of the spindle is provided with a globular head 28, that fits into a globular socket at the upper end of the drawing-punch plunger 29, that is free to move vertically in the openings through the coupling-piece and cutting-punch slide. The spindle-head is loosely held in position by a cap 30, that is screwed upon the upper end of the plunger.

The shank of the drawing-punch 31 is fastened in the opening in the plunger in a common manner. The drawing-punch plunger is moved with relation to the crank-block by turning the spindle for adjusting the end of the drawing-punch so that it will perform its function at the correct time.

The drawing-punch is moved upwardly and downwardly with a regular crank-movement—that is, the punch is practically always in motion, traveling slowest when the crank is in line with the axis of the punch and fastest when the crank is at right angles with the axis of the punch.

The cutting-punch moves upwardly and downwardly at appreciable intervals—that is, it stops for a short time when fully raised and also when down. This action is accomplished by the crank-acting cams and the swinging connections between the cams and the cutting-punch slide, and as these connections are swinging they do not require the usual guides which are employed with cam-presses for guiding the movement of the connections in vertical planes.

While the cams give a dwell to the cutting-punch at the upward limit of its movement the crank is raising the drawing-punch out of the way and time is provided for feeding the material over the dies beneath the punches. During the dwell given to the cutting-punch at the lower limit of its movement that punch holds the blank which it has cut until the crank causes the drawing-punch to force the

blank downwardly from beneath the cutting-punch into the drawing-die.

This mechanism has the simplicity of the ordinary simple crank-press, and yet it provides the desired movements for the punches which are incident to the complicated cam-press.

I claim as my invention—

1. In combination in a double-acting press, a driving-shaft having a crank and two four-motion cams, a drawing-punch plunger, an adjustable connection between the crank and the drawing-punch plunger, a cutting-punch slide, and swinging connections between the cams and the cutting-punch slide, which connections by the cams are lowered, swung in one direction, raised and swung in the opposite direction successively, whereby the cutting-punch slide is lowered and raised and caused to dwell at each limit of movement, substantially as specified.

2. In combination in a double-acting press, a driving-shaft having a crank and two four-motion cams, a drawing-punch plunger, an adjustable connection between the crank and the drawing-punch plunger, a cutting-punch slide, a coupling adjustably connected with the cutting-punch slide, and swinging connections between the cams and coupling, substantially as specified.

3. In combination in a double-acting press, a driving-shaft having a crank and two four-motion cams, a drawing-punch plunger, a connection between the crank and the drawing-punch plunger, a cutting-punch slide, a coupling located in a recess in the cutting-punch slide, a nut adjustably connecting the coupling and slide, trunnions projecting from the coupling, and yokes on the cams and connected with the trunnions of the couplings, substantially as specified.

ANDREW C. CAMPBELL.

Witnesses:

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HAROLD W. CAMPBELL.