Nov. 10, 1925. 1,560,745

J. S. WALKER

COMBINATION PUNCH AND PRESS

Filed Dec. 11, 1923 2 Sheets-Sheet 1

Fig. 1.

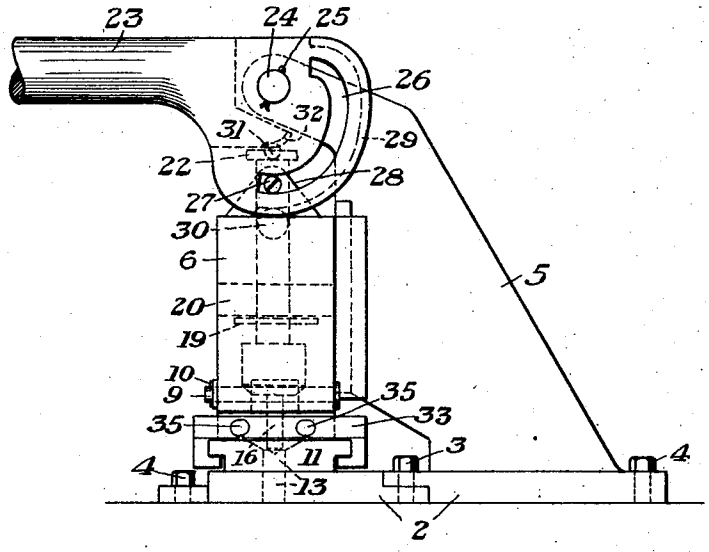


Fig. 8.

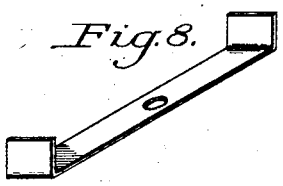
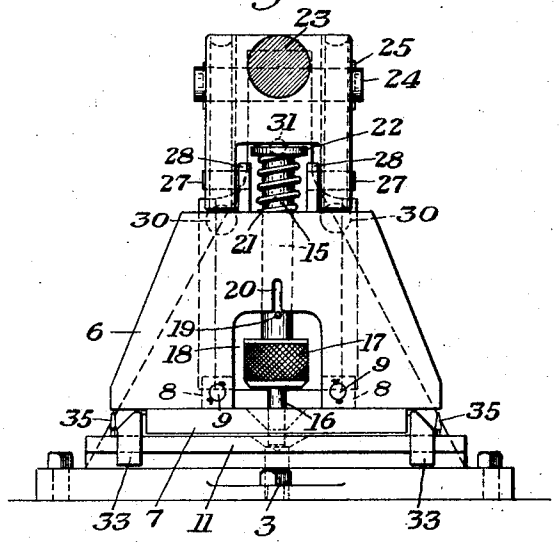


Fig. 2.



INVENTOR

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Fig. 3.

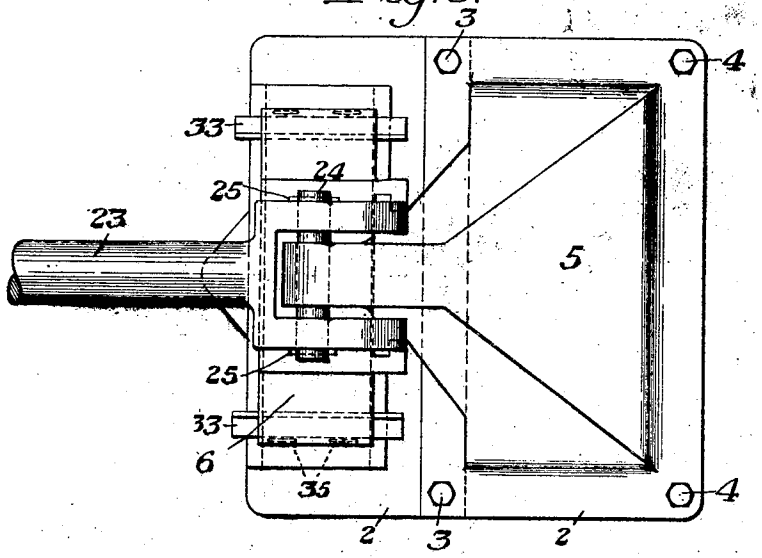


Fig. 4.

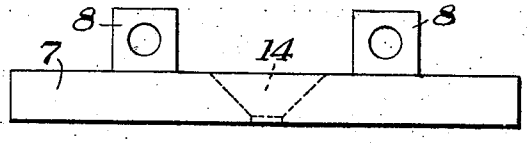


Fig. 5.

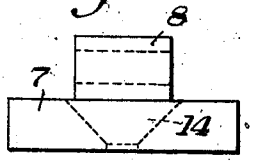


Fig. 6.

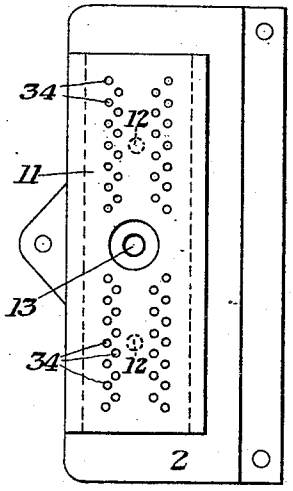
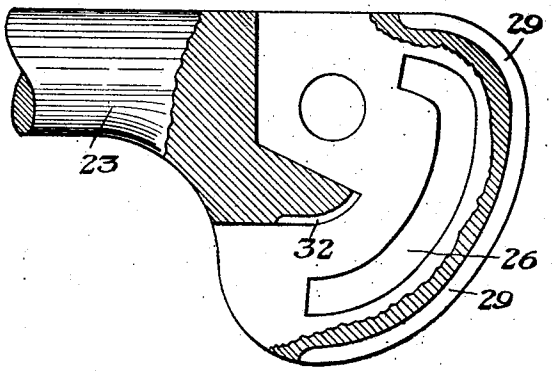


Fig. 7.



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Patented Nov. 10, 1925. 1,560,745

UNITED STATES PATENT OFFICE.

JOHN S. WALKER, OF PITTSBURGH, PENNSYLVANIA.

COMBINATION PUNCH AND PRESS.

Application filed December 11, 1923. Serial No. 679,962.

To all whom it may concern:

Be it known that I, JOHN S. WALKER, a citizen of the United States, residing at Pittsburgh, county of Allegheny, State of Pennsylvania, have invented a new and useful Improvement in Combination Punches and Presses, of which the following is a full, clear, and exact description.

The present invention relates to a combination punch and press particularly adapted for the shaping and punching of metal, such as band iron, sheet metal, and similar material.

An object of the invention is to provide a light, portable apparatus of this character which can be used either as a punch or a press or as a combination punch and press.

Another object of the invention is to provide an apparatus having provision for adjustment whereby different sizes of material may be operated upon.

A further object of the invention is to provide an apparatus in which the parts may be readily assembled and disassembled and in which the shaping dies may be readily replaced by other dies of a different size or form.

In the accompanying drawings, there is shown, for purposes of illustration only, one embodiment of my invention, it being understood that the drawings do not define the limits of the invention, as changes may be made in the construction and operation therein disclosed without departing from the spirit of the invention or scope of my broader claims.

In the drawings:

Figure 1 is a side elevation of an apparatus embodying my invention;

Figures 2 and 3 are, respectively, a front elevation and plan view of the apparatus shown in Figure 1;

Figures 4 and 5 are, respectively, a side elevation and an end elevation of the upper die;

Figure 6 is a plan view of a portion of the base of the apparatus and of the lower die associated therewith.

Figure 7 is a fragmentary sectional view of the operating lever; and

Figure 8 is a perspective view of a strip of metal after it has been shaped and punched.

In the illustrated embodiment of my invention, the apparatus comprises a base 2 made in sections for facilitating the assemblage and disassemblage of the parts, the two sections of the base being secured together by bolts 3. These bolts and other bolts 4 secure the base to any suitable support. Rising from the base is a standard 5 with the front face of which a vertically movable plunger 6 has sliding interlocking engagement.

Mounted upon the lower end of the plunger is an upper die 7, this die having a pair of upwardly extending lugs 8 received in slots in the lower end of the plunger, the die being secured to the plunger by means of a pair of pins 9 extending through the lower end of the plunger and through the lugs 8. These pins are headed at one end and are held in position by means of cotter pins 10 extending through their other end. A cooperating lower die 11 is removably mounted on the base by means of a pair of pins 12 projecting from the lower face of the die into openings in the base. The lower die is provided with a central opening 13 which also extends through the base 2, and the upper die 7 is provided with a registering tapered opening 14.

Mounted in the plunger 6, centrally thereof, for reciprocation in a vertical direction, is a plunger 15 having a chuck at its lower end for holding a punch 16, the chuck being operated by a knurled nut 17. The plunger 6 is bifurcated at its lower end to provide a central opening 18 to accommodate the lower end of the plunger 15 and the parts carried thereby, in order to give easy access to the knurled nut 17 for opening and closing the chuck. A pin 19 is carried by the lower end of the plunger 15 and engages in a vertical slot 20 in the plunger 6, whereby the plunger 15 is prevented from turning during reciprocation thereof. The plunger 15 projects above the upper end of the plunger 6 and a coil spring 21 surrounds the projecting portion of the plunger 15 and engages at its lower end the upper end of the plunger 6 and at its upper end a flange 22 formed on the upper end of the plunger 15.

An operating lever 23 is bifurcated at one end to straddle the upper end of the standard 5 and a pivot pin 24 extends through the bifurcated end of the lever and through the upper end of the standard, said pivot pin being held in postion by cotter pins 25 extending through its opposite ends. Each arm of the bifurcated end of the lever has

an eccentric cam slot 26 therein, into which extends a pin 27 which is screwed into a lug 28 projecting from the upper end of the plunger 6. Each arm of the bifurcated end of the lever is also provided in its edge with an eccentric cam groove 29 in which an anti-friction ball 30, seated in a recess in the upper end of the plunger 6, engages. With this construction, when the operating lever 23 is swung in a clockwise direction, as viewed in Figure 1, the plunger 6 is raised by reason of the engagement of the pins 27 in the cam slots 26, and when the lever is swung in a counter clockwise direction, the plunger 6 is depressed by reason of the engagement of the anti-friction balls 30 in the cam grooves 29.

An anti-friction ball 31 is seated in a recess in the upper end of the punch plunger 15 and this ball engages in a cam groove 32 in a portion of the lever projecting between the arms of the bifurcated end thereof. By reason of the engagement of the ball 31 in the cam groove 32, the punch plunger 15 is depressed simultaneously with the plunger 6. It will be noted, however, that the ball 31 leaves the cam groove 32 after the plunger 6 has made only a portion of its upward stroke and that the ball does not engage in said groove until the plunger 6 has completed the greater portion of its downward stroke, so that in the operation of the apparatus, the plunger 6 makes a portion of its downward stroke before the punch plunger begins to move downwardly, and thereafter the two plungers move downwardly simultaneously. This permits the material being operated upon being at least partially shaped before the punch begins to operate thereon. The upward movement of the punch plunger 15 is limited by the pin 19 engaging the end of the slot 20. The lower die 11 has overhanging longitudinal edges and a pair of jaws 33 are mounted on the die and have sliding interlocking engagement with said overhanging edges, whereby the jaws may be adjusted towards and from each other. The die is provided with a number of staggered openings 34 therein and pins 35 are adapted to be inserted in certain of these openings to prevent relative movement of the jaws away from each other when they have been adjusted.

The operation of the apparatus is as follows: Assume that it is desired to punch and shape, for example, a strip of band iron to give it the form shown in Figure 8. The operating lever 23 will be swung in a clockwise direction from the position shown in Figure 1 to raise the plunger 6 and parts carried thereby. The flat strip of iron will then be laid upon the jaws 33, and the operating lever 23 swung back into the position shown in Figure 1. This will cause the plunger 6 to descend and effect a shaping of the metal strip between the upper and lower dies, as shown in Figure 2. During the final portion of the downward movement of the plunger 6, the plunger 15 will be depressed to cause the punch to punch an opening in the metal piece.

In the illustrated embodiment of the invention, the upper and lower dies have been shown as having plain surfaces, but these dies may be removed and replaced by other dies having any desired form of shaping surfaces, in order to give the shaped piece the desired shape. It will also be apparent that the apparatus can be used for shaping without punching by simply removing the punch, or it can be used for punching without shaping by removing the upper die and the sliding jaws.

I claim:

1. In a metal working apparatus, a standard, a vertically movable plunger slidably mounted upon said standard, an upper die on the lower end of said plunger, a cooperating lower die, an operating lever pivoted to said standard and having eccentric grooves in one end thereof, an anti-friction ball seated in the upper end of the plunger and engaging in one of said grooves, a vertically movable punch plunger slidably mounted in said first mentioned plunger, an anti-friction ball seated in the upper end of said punch plunger and engaging another of said grooves, whereby when said lever is swung in one direction said plungers are depressed, a pin carried by the upper end of said plunger and working in a cam slot in said lever, and a spring tending to raise said punch plunger, whereby when said lever is swung in the opposite direction said plungers are raised, substantially as described.

2. In a metal working apparatus, a standard, a lower die, a pair of jaws slidably mounted on said die for movement towards and from each other, means for preventing relative movement of said jaws away from each other when in adjusted position, a vertically movable plunger slidably mounted on said standard, an upper die on the lower end of said plunger adapted to cooperate with said lower die and jaws for shaping a piece of metal between the upper die and the lower die and jaws, and means mounted on said standard for operating said plunger, substantially as described.

3. In a metal working apparatus, a base having a standard rising therefrom, a lower die carried by said base, a vertically movable plunger slidably mounted on said standard, an upper die detachably mounted upon the lower end of said plunger, an operating lever having a bifurcated end straddling and pivoted to the upper end of said standard, each arm of the bifurcated end of said lever having a cam slot therein and having a cam groove formed in its edge, and pins

and anti-friction means carried by the upper end of said plunger and engaging in said slots and grooves respectively, substantially as described.

4. In a metal shaping and punching apparatus, a standard, a vertically movable plunger slidably mounted upon said standard, cooperating upper and lower shaping dies, said plunger having the upper die mounted on the lower end thereof, a vertically movable punch plunger, a spring tending to elevate said punch plunger, and a manually operated lever for operating both plungers adapted, when swung in one direction, to effect first the shaping of the work and then the punching thereof, substantially as described.

5. In a metal shaping and punching apparatus, a standard, a vertically movable plunger slidably mounted upon said standard, cooperating upper and lower shaping dies, said plunger having the upper die mounted on the lower end thereof, vertically movable punch means mounted on said plunger and adapted to be projected through an opening in the upper die, and a manually operated lever having cam means for cooperation with said plunger and said punch means whereby when said lever is swung in one direction the work is first shaped between said dies and then punched by said punch means, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN S. WALKER.