Nov. 23, 1948. T. T. CRANDALL 2,454,432

PUNCH PRESS STRIPPER

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FIG. 1

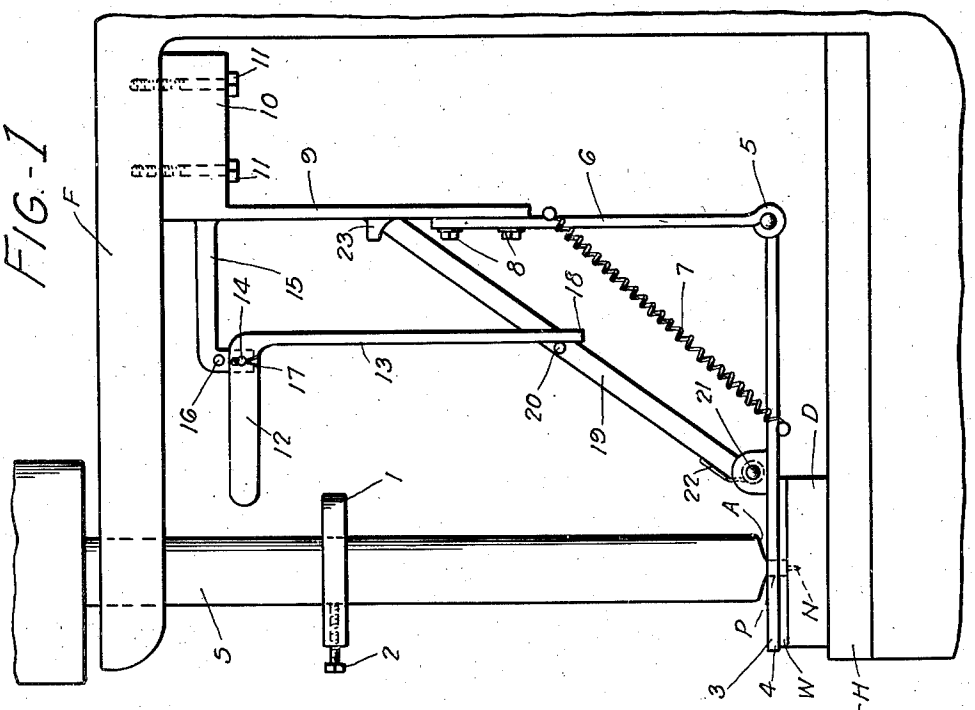
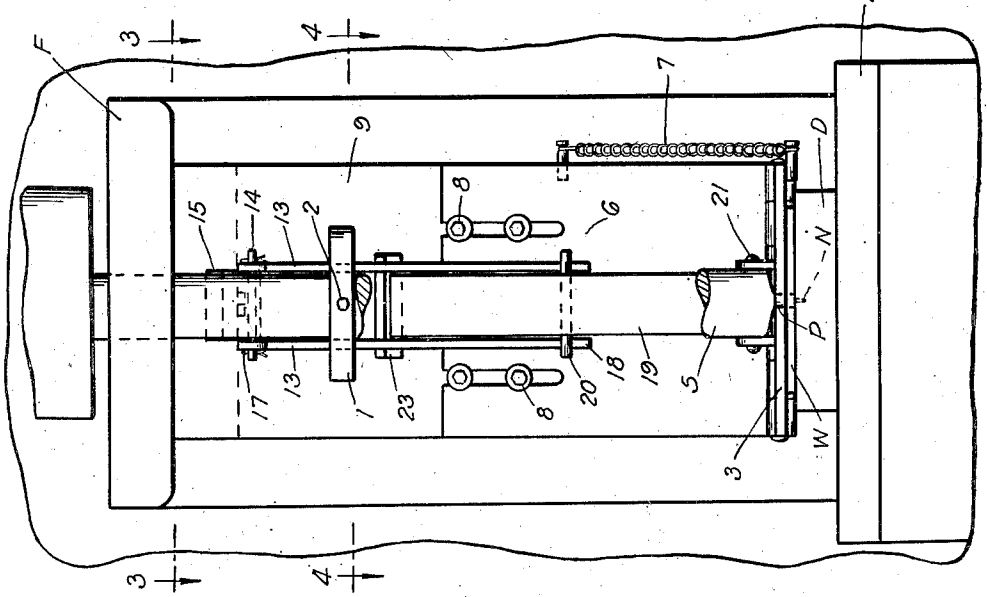


FIG. 2



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FIG. 5

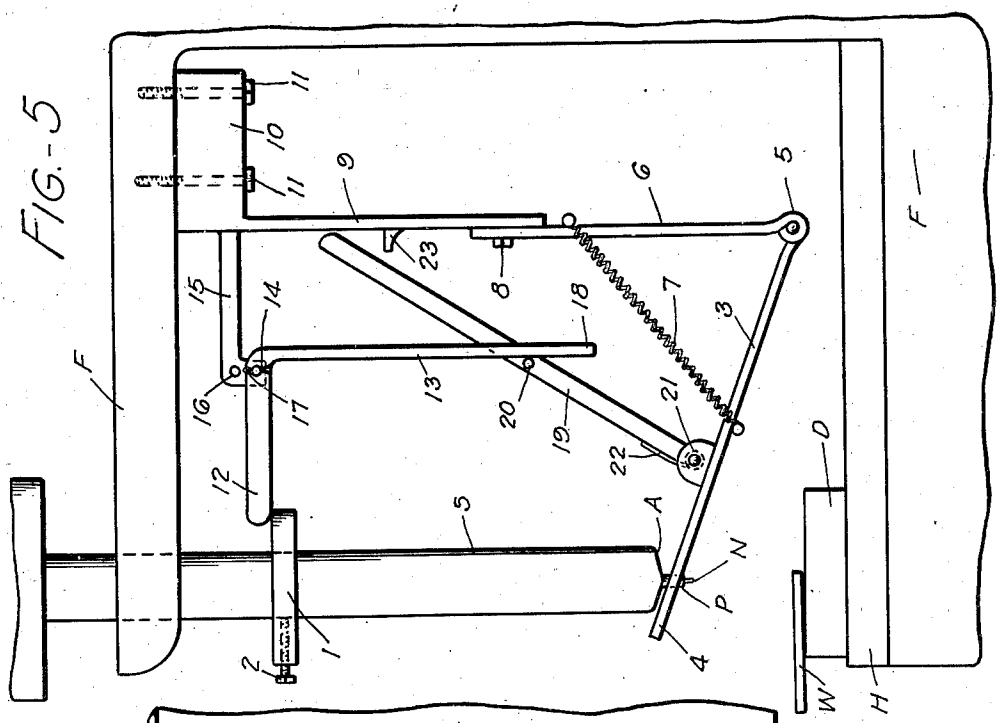


FIG. 3

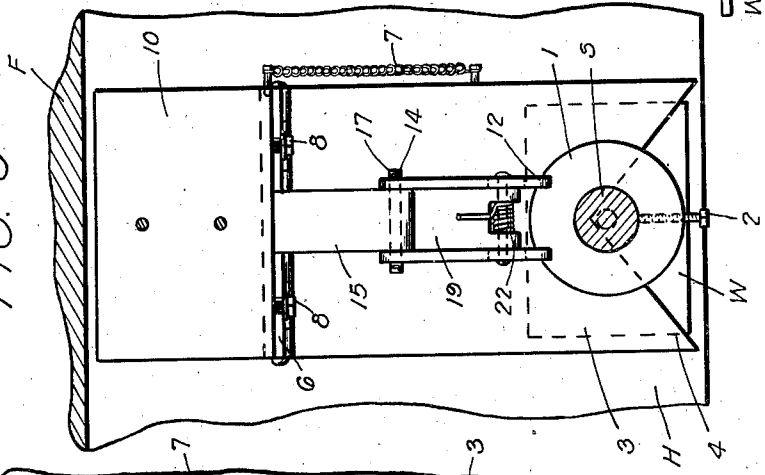
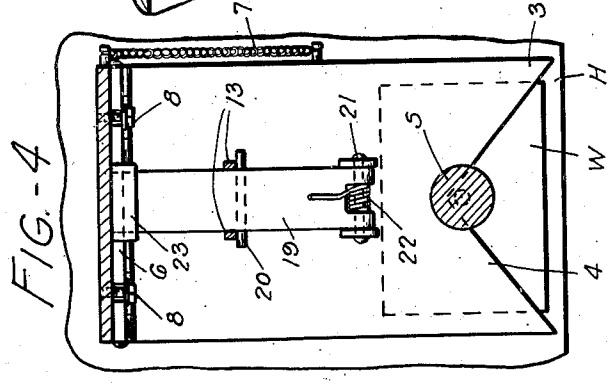


FIG. 4



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UNITED STATES PATENT OFFICE

2,454,432

PUNCH PRESS STRIPPER

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Application November 22, 1946, Serial No. 711,783

1 Claim. (Cl. 164—110)

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My present invention relates generally to machines for punching metal sheets, and more specifically to an improved punch press stripper which is automatically operated by the reciprocating punch of the press to strip the work from the punch, and which is especially designed for use with quick-acting machines of the pneumatic or other power operated and upright type.

As is well known, after the reciprocating punch on its working stroke passes through the work, as a metal sheet, and into the die, frequently on the return stroke of the punch the work binds or sticks to the punch and is lifted from the die. To remedy this objectionable condition time and labor are required in removing the work from the punch and in re-assembling the parts for subsequent operations.

The primary object of my invention is the provision of a stripping mechanism for co-action with the reciprocating punch, that is automatically actuated by the punch on its working stroke to hold down the work on the die, and spring-operated for following, after a delay interval, the punch on its return or retracting stroke. The stripping mechanism includes a minimum number of parts that may with facility be manufactured at low cost of production, and assembled, and installed with standard types of punching machines with convenience to insure a mechanism that is simple in operation, reliable in the performance of its functions, and effective in use.

The invention consists in certain novel combinations and arrangements of parts as will hereinafter be described and more specifically set forth in my appended claim.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged in accord with one mode I have devised for the practical application of the principles of the invention. It will be understood however, that changes and alterations are contemplated and may be made in these exemplifying drawings and mechanical structures, within the scope of my claim, without departing from the principles of the invention.

Figure 1 is a view in side elevation showing so much of a punching machine as is necessary to illustrate the installation of the stripping mechanism, which is here shown in held down position with the work on the die; and Figure 2 is a front face view of the equipment shown in Fig. 1.

Figure 3 is a horizontal sectional view as at line 3—3 of Fig. 2; and Figure 4 is a similar view at line 4—4 of Fig. 2.

Figure 5 is a view similar to Fig. 1 but showing the punch uplifted, together with the stripper mechanism, in order to give access to the work for adjustment of the work on the die.

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In order that the general arrangement and utility of parts may readily be understood I have shown in the assembly drawings a portion of the machine frame F, including the die holder H, upon which the die D is mounted; and a metal sheet on which the pattern has previously been laid out by a template, is designated as the work W, and supported on the die for punching according to the pattern.

The punch shaft S, which is power operated to reciprocate vertically in bearings of the frame F directly above the die is fashioned with a punch P and pilot point or nib N, and as indicated in the drawings, the lower end of the shaft S forms an annular shoulder A.

In carrying out my invention the reciprocating shaft S is equipped with a vertically adjustable actuating lug or abutment in the form of a collar or ring 1 that is mounted on the shaft, and fixed in set position by means of a set screw or set bolt 2 threaded through the collar against the shaft. This rigidly mounted actuating lug 1 travels with the shaft to automatically trip a holding-down or latch device for the stripper at the end of its upward or return stroke and release the stripper as indicated by the position of parts of the mechanism in Fig. 5.

The stripping mechanism includes a stripper or holding down arm 3 having a forked or bifurcated free end 4 that encompasses the punch P, and this arm is pivoted or hinged at 5 to the lower end of a sectional, vertically adjustable bracket composed of a lower section 6 to which the stripper arm is connected by a helical spring 7 that tends to elevate the forked end of the stripper arm and cause it to follow the punch on its upward or return stroke. In addition to the lower section 6, this sectional bracket includes a fixed section 9 and these sections are adjustably connected by means of a pair of slots 7, 7 in the lower section and pairs of clamp bolts 8, 8 mounted on the fixed section, in order that the bracket may with facility be adapted to the dimensions of a punching press. The fixed section 9 of the bracket is fashioned with an angular flange 10 that is firmly secured in proper position by bolts 11 which attach it to the frame F.

On the working stroke of the punch the stripper arm 3 is pressed down against tension of spring 7 by contact of the shoulder A with the forked end 4 of the arm 3, and as the punch P passes through the work W and into die D the stripper is held down, by arm 19 and stop lug 23, in the position of Fig. 1, until it is tripped on the return or upper stroke of the punch.

For releasing the holding down device of the stripper on the up stroke of the punch, the lug or collar 1 on the shaft S of the punch co-acts with an oscillatible trip lever having a short arm 12 and a right angular longer arm 13 and pivoted

at 14 on a bracket arm 15 which is rigidly mounted, as by welding, on the attaching flange 10 of the adjustable bracket 6—9.

The bracket arm 15 is provided with bearing holes, as 16 for the pivot pin 14 in order to permit accurate adjustment in the assembly of parts, and a cotter pin as 17 is employed to retain the pivot pin against displacement.

The actuating arm 12 of the trip lever is located above the lug or collar 1 and in the path of movement of the reciprocating collar or lug, so that on its upstroke the lug will strike arm 12 and thereby swing the depending arm 13 of the lever inwardly toward the punch.

The lower end 18 of the arm 13 is bifurcated to straddle an obliquely disposed locking link or spring latch 19 that is instrumental in holding down the stripper 3—4 on the work as the punch is being withdrawn therefrom. The bifurcated end 18 of the trip lever co-acts with a cross-pin 20 of the latch 19 to form a loose pin and slot connection between these parts that permits relative movement of the parts without actually disconnecting them.

The latch arm or locking link 19 is pivoted at 21 on the upper face of the stripper, and an auxiliary spring 22 forms a spring hinge that tends to swing the link 19 away from the punch and constantly in contact with the pin 20; and when free to act, spring 22 swings the link or latch 19 into position under an abutment 23 welded on bracket section 9.

With the parts in position of Fig. 5 ready access is had to adjust the work W on the die for a punching operation, and as the punch descends, it pushes the stripper 3—4 downward.

The lug or collar 1 withdraws its support from the arm 12 of the trip lever leaving the lever dangling freely, and as the stripper is pressed down, the latch 19 under force of spring 22 is swung on its pivot sending its upper free end against the section 9 of the supporting bracket and under the abutment 23 of the bracket; and the stripper is thus held down on the work W by the link 19 in engagement with its stop or abutment 23, as indicated in Fig. 1.

On the upstroke of the punch, the stripper holds down the work until the collar or lug 1 strikes the short arm 12 of the trip lever, and by positive action of the trip lever against pin 20 the link, 19, which is spring-held, is withdrawn from under the stop or abutment 23. Now the extended spring 7, by contraction, lifts the stripper to position of Fig. 5 to clear the work and die and permit adjustment of the work, and the stripper mechanism is again in position for operation under a succeeding working stroke of the punch.

The pin 20 rides or slides at all times in close contact with the depending arm or bifurcated end 18 of the arm 13 of the trip lever, and the springs 7 and 22 constantly tend to hold the pin against the arm.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

The combination with a reciprocating punch having an actuating lug, and a fixed frame, of an adjustable bracket and means for fixing it on the frame, a stripper pivoted on the bracket and having a forked free end engaging the punch, a lifting spring connecting the stripper with the bracket, a spring-pressed link pivoted on the stripper and an abutment on the frame for engagement by the free end of the spring-pressed link, an L-shaped trip lever having one arm in the path of said lug and pivoted on the frame, a second lever arm straddling the link, and a cross pin on the link in constant engagement with the straddling arm.

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