

June 22, 1943.

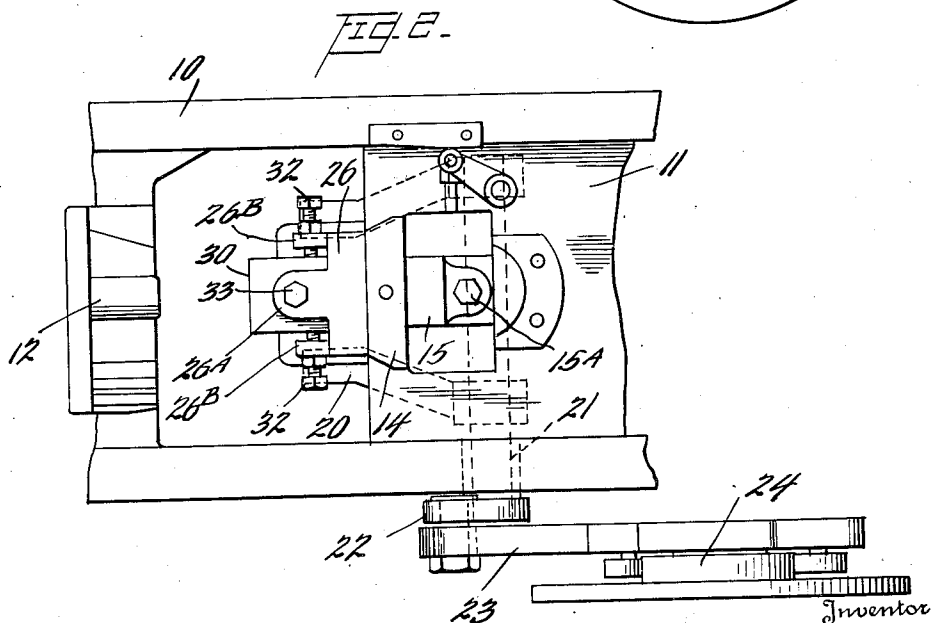
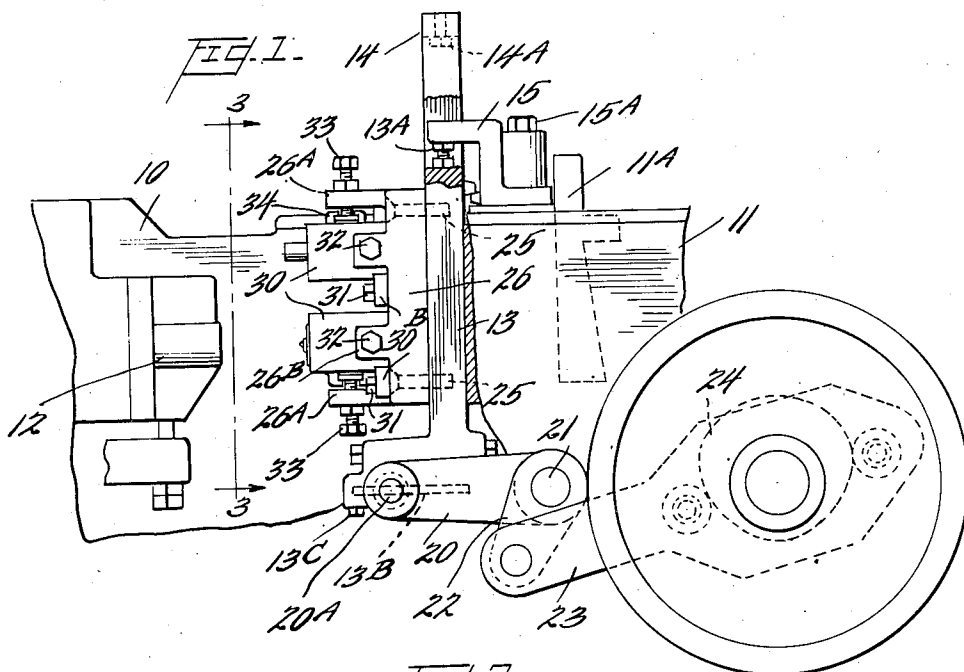
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2,322,262

COLD HEADING MACHINE

Filed Jan. 15, 1942

2 Sheets-Sheet 1



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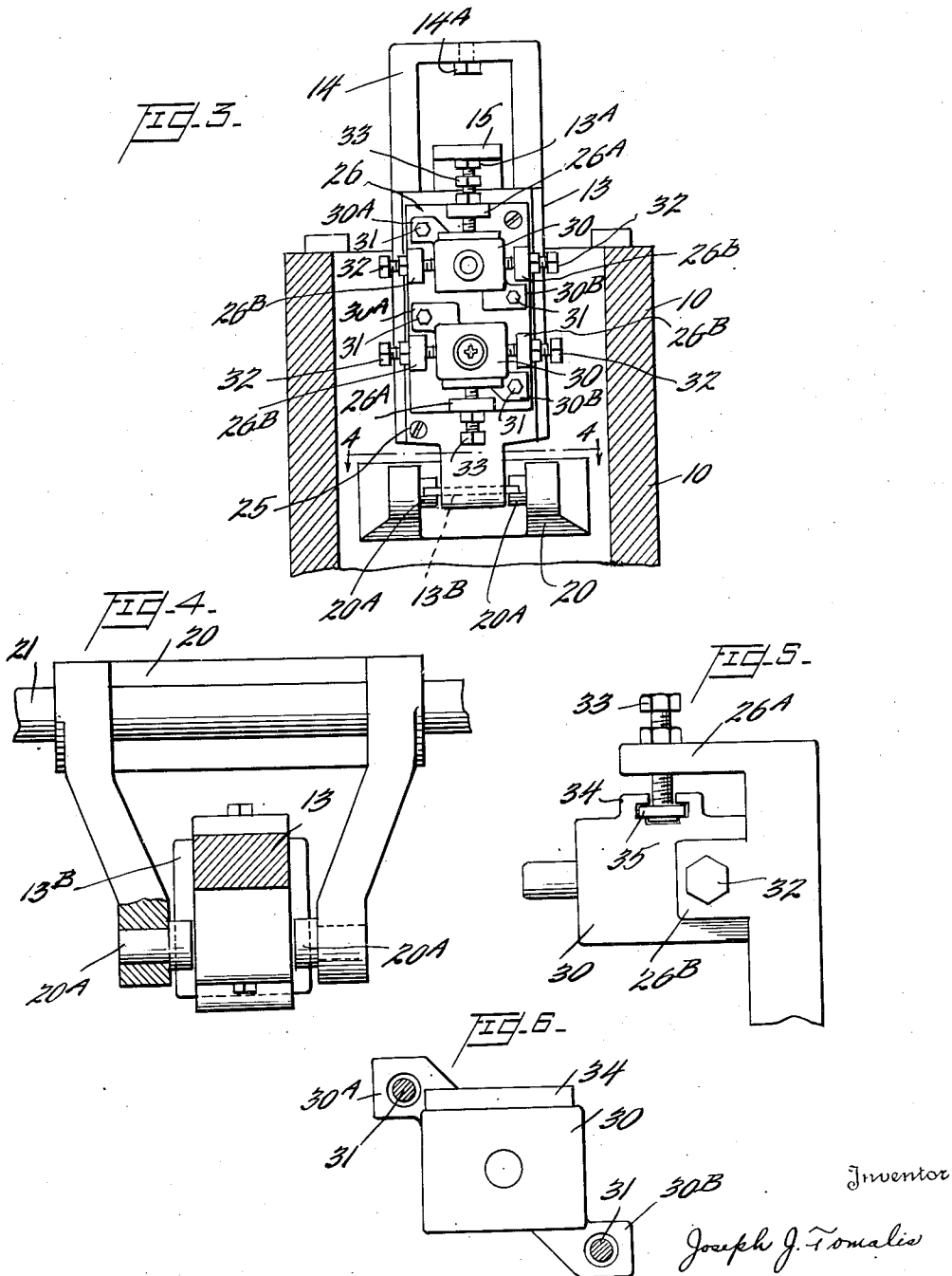
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**2,322,262**

# COLD HEADING MACHINE

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2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

2,322,262

## COLD HEADING MACHINE

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Application January 15, 1942, Serial No. 426,910

8 Claims. (Cl. 10—12)

This invention relates to a cold heading machine which is primarily designed for forming the heads on screws or bolts of the kind shown in U. S. Patent No. 2,046,839, and punching the recesses in such heads. The machine may be generally described as a two-blow heading machine in which there is a fixed or stationary die for holding the blank and two punches adjustably mounted on a punch slide which is carried by a horizontally reciprocating gate or ram, the slide being movable vertically on the ram so that the punches are forced against the blank successively to first form the head of the screw or bolt and then punch the recess therein.

In a two-blow machine of this kind it has been found of extreme importance to provide means by which the movable punches can be quickly and accurately positioned and adjusted in any desired direction relative to each other on the punch slide and relative to the stationary die. A slight inaccuracy in the setting of the punches and particularly the recess-forming punch will result in frequent breaking of the punch or in the production of a high percentage of ruptured or defective screw heads. Also it is extremely important that the means for positioning and adjusting the punch holders be so arranged that the same are easily and readily accessible to the operator, thus permitting quick and accurate adjustment of the same. In an effort to meet these difficulties various arrangements have heretofore been employed in machines of this type without success. In general, these prior machines included a single holder for the punches mounted directly on the gate or on a punch-holding slide carried by the gate so that any change in the setting of one punch relative to the die resulted in a similar change of the other punch. Independent and accurate setting of each punch is impossible. In some cases the mechanism employed for operating the punch-carrying slide on the ram to successively present the punches to the die includes complicated arrangements aimed to accurately position the punches, but these arrangements are difficult of adjustment, particularly by inexperienced operators, with the result that excessive punch breakage is apt to occur especially in the recess-forming punch.

The present invention aims to overcome the above defects and difficulties in machines of this type, and, in brief, this is accomplished by providing a separate holder for each punch and mounting these holders on the punch slide in such a manner that each punch can be independently adjusted in any direction relative to the die and

to each other. By this arrangement each punch can be set with precise accuracy relative to the other and to the fixed die and the difficulties above mentioned are obviated.

5 The invention is set forth in greater detail in the following specification and illustrated in the accompanying drawings, forming a part hereof, and in which:

10 Figure 1 is a fragmentary side elevation of a machine embodying the invention;

Figure 2 is a plan view of the same;

Figure 3 is a vertical transverse section on the line 3—3 of Figure 1;

15 Figure 4 is an enlarged horizontal section on the line 4—4 of Figure 3;

Figure 5 is an enlarged side elevation of one of the punch holders; and

Figure 6 is an enlarged front elevation of one of the punch holders.

20 Referring to the drawings in detail, the machine embodies a frame 10 in which is slidably mounted a ram or gate 11, operated by any suitable mechanism (not shown), and which moves the ram horizontally toward and from the fixed die 12 supported in the frame 10, the ram being adjustable forward and back by the well known wedge mechanism indicated at 11A. A vertically reciprocating punch-carrying slide 13 is mounted on the front end of the gate or ram 11, and guided in its reciprocation by any suitable guiding means on the ram. A U-shaped stop member 14 is secured to the top of the slide 13 and extends upwardly therefrom. A stop arm 15 is rigidly mounted on the gate 11 of the machine, as by bolt 15A, and this arm extends into position between the sides of the stop member 14. Adjustable stops 13A and 14A are mounted respectively on the slide 13 and the member 14 in position to engage the arm 15 and limit the up- and-down movement of the slide 13. Vertical reciprocation of the slide 13 is effected by means of a yoke 20, keyed or otherwise rigidly secured to a transverse shaft 21 which is supported for oscillation in the frame 10. An arm 22 is rigidly secured to one end of the shaft 21 and this arm is oscillated by means of a reciprocating member 23 operated from a cam 24 which is rotated by any suitable mechanism in the machine. To connect the yoke 20 with the slide 13, a plate 13B is rigidly secured to the lower part of the slide 13, as by bolts 13C, and this plate is arranged in a substantially horizontal position. Each arm of the yoke 20 carries a slotted trunnion 20A and the plate 13B is slidably received in the slots of these trunnions. As a result, when the

yoke 20 is oscillated, the slide 13 is reciprocated vertically on the ram 11; that is, transversely of the movement of the ram. Also the slotted connection between the plate 13B and trunnions 20A permit horizontal reciprocation of the ram 11 and slide 13 toward and from the fixed die 12. The horizontally reciprocating ram 11 and the vertically reciprocating punch slide 13 are arranged to operate in timed relation.

Rigidly mounted on the front face of the slide 13, as by bolts 25, is a backing or truss plate 26 on which the punch holders 30, 30 are adjustably mounted. The means for accurately adjusting the holders 30 and securing them in position are substantially the same for each holder. The truss plate 26, at its upper end and also at its lower end, is provided with a forwardly projecting lug 26A. Each of the punch holders 30 is provided at one of its upper corners with a laterally projecting ear 30A and on its diametrically opposite lower corner with a similar ear 30B. Bolts 31 extend through the ears 30A and 30B into the truss plate 26 and serve to secure the punch holders in adjusted position. The holes in the ears 30A and 30B are somewhat larger than the bolts 31, so that when the bolts are loosened, each holder may be independently adjusted in any desired direction up or down or laterally or even diagonally of the other holder or in any desired direction transversely to the direction of the movement of the ram. To obtain accurate lateral adjustment of the holders, the truss plate 26 is provided on each side of the punch holders 30 with a threaded lug 26B and a bolt or set screw 32 is threaded through each of these lugs and into engagement with the punch holders. By careful manipulation of the bolts 32 accurate lateral adjustment of the holders can be made. The bolts 32 are preferably provided with lock nuts to firmly hold the same in adjusted position. To obtain vertical adjustment of the holders 30, a bolt 33 is threaded through each of the upper and lower lugs 26A of the truss plate and provided with a lock nut for holding the same in position. The inner ends of the upper and lower bolts 33 are secured to their respective punch holders so as to permit lateral adjustment of the holders relative to these bolts. To accomplish this, the upper surface of upper holder 30 and the lower surface of the lower holder 30, are provided with spaced hook-shaped lugs or extensions 34 and back of these lugs a rectangular plate 35 is arranged, these plates being provided with holes through which the adjusting screws 33 rotatably pass, the end of each screw being flanged or upset to form a head for engaging the adjacent plate. The bolts 33 thus afford means for vertical adjustment of the holders 30 and at the same time they do not interfere with lateral adjustment of the same.

Any suitable punches may be mounted in the holders 30 such for example as those illustrated in my prior Patent No. 2,165,424 which are designed to first form a head on a screw blank 65 and then punch a recess in the same.

From the foregoing it will be seen that the invention provides means by which the punches in a two-blow heading machine may be readily positioned with extreme accuracy even by inexperienced operators so that much of the difficulty heretofore encountered in the breaking of punches and rupturing of screw heads by punching the recesses therein may be avoided.

Having thus described the invention, what is

claimed as new and desired to be secured by Letters Patent is:

1. In a machine of the kind described, a stationary die, a ram movable toward and from said die, a slide carried by said ram, two independent punch holders carried by said slide one above the other, means for vertically reciprocating said slide on said ram to alternately present said holders to said fixed die, two lugs on said slide one above the upper punch holder and one below the lower punch holder, a set screw threaded through each of said lugs and engaging said holders, whereby said holders may be vertically adjusted on the slide, a threaded lug carried by said slide on each side of each of said holders, and a set screw threaded through each of said last named lugs and engaging said holders, whereby the holders may be laterally adjusted on the slide, and means for locking said holders to the slide.

2. In a screw heading and punching machine, a stationary die for holding a blank, a reciprocating ram movable toward and from said die, a punch-carrying slide mounted on and movable with said ram toward and from said die, two independent punch holders carried by said slide, means for reciprocating said slide and holders in a direction transverse to the movement of said ram, to present said holders alternately to said die, and cooperating means on each of said holders and said slide for independently adjusting each holder on said slide toward or from or laterally of the other holder on said slide.

3. In a screw heading and punching machine, a stationary die for holding a blank, a reciprocating ram movable toward and from said die, a punch-carrying slide mounted on and movable with said ram toward and from said die, two independent punch holders carried by said slide, means for reciprocating said slide and holders in a direction transverse to the movement of said ram, to present said holders alternately to said die, and cooperating means on each of said holders and said slide for independently adjusting each holder on the slide toward or from or diagonally of the other holder.

4. In a screw heading and punching machine, a stationary die for holding a blank, a reciprocating ram movable toward and from said die, a punch-carrying slide mounted on and movable with said ram toward and from said die, two independent punch holders carried by said slide, means for reciprocating said slide and holders in a direction transverse to the movement of said ram, to present said holders alternately to said die, cooperating means on said slide and each of said holders for independently adjusting each holder toward and from the other holder in the direction of reciprocation of said slide and other cooperating means on said slide and each of said holders for adjusting the latter in a direction transverse to the reciprocating movement of said slide.

5. In a screw heading and punching machine of the kind described, a stationary die for holding a blank, a ram movable horizontally toward and from said die, a punch-carrying slide mounted on and movable with said ram, two independent punch holders mounted on said slide, means for reciprocating said slide vertically on said ram to alternately present said punch holders to said die, and separate means on said slide and holders for independently adjusting each of said holders vertically and laterally relative to the other and relative to said slide.

6. In a screw heading and punching machine of the kind described, a stationary die for supporting a blank, a ram movable horizontally toward and from said die, a slide carried by said ram, two independent punch holders carried by said slide, means for vertically reciprocating said slide and holders on the ram in timed relation with the reciprocation of the ram, whereby said holders are alternately presented to said die, independent cooperating means on said slide and each of said holders for independently adjusting the holders on the slide in a direction transverse to the vertical movement thereof, and separate means on said slide and each of said holders for adjusting the holders vertically on the slide.

7. In a screw heading and punching machine of the kind described, a stationary die, a ram movable toward and from said die, a slide carried by and movable with said ram, two independent punch holders carried by said slide, one above the other, independent means for adjusting each of said holders vertically toward or from the other, independent means for adjusting each of said holders laterally of the direction of movement of said ram, an ear secured to each side

of each of said holders, and bolts engaging said ears and said slide for rigidly securing the holders in adjusted position on the slide.

8. In a screw heading and punching machine of the kind described, a stationary die, two independent punch holders having punches adapted to cooperate with said die to form a recessed screw head, a slide on which said holders are mounted one above the other, means for moving said holders alternately toward said die, and means for adjustably securing said holders on said slide, said last named means comprising two lugs on said slide one above the upper punch holder and one below the lower punch holder, a set screw threaded through each of said lugs and engaging said holders, whereby the holders may be vertically adjusted on said slide, a threaded lug carried by said slide on each side of each of said holders, and a set screw threaded through each of the said last named lugs and engaging said holders, whereby the holders may be laterally adjusted on the slide, and means for locking said holders in adjusted position on the slide.

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