H. C. FERGUSON.

METAL CLENCHING MACHINE.

APPLICATION FILED FEB. 9, 1910.

977,178.

Patented Nov. 29, 1910.

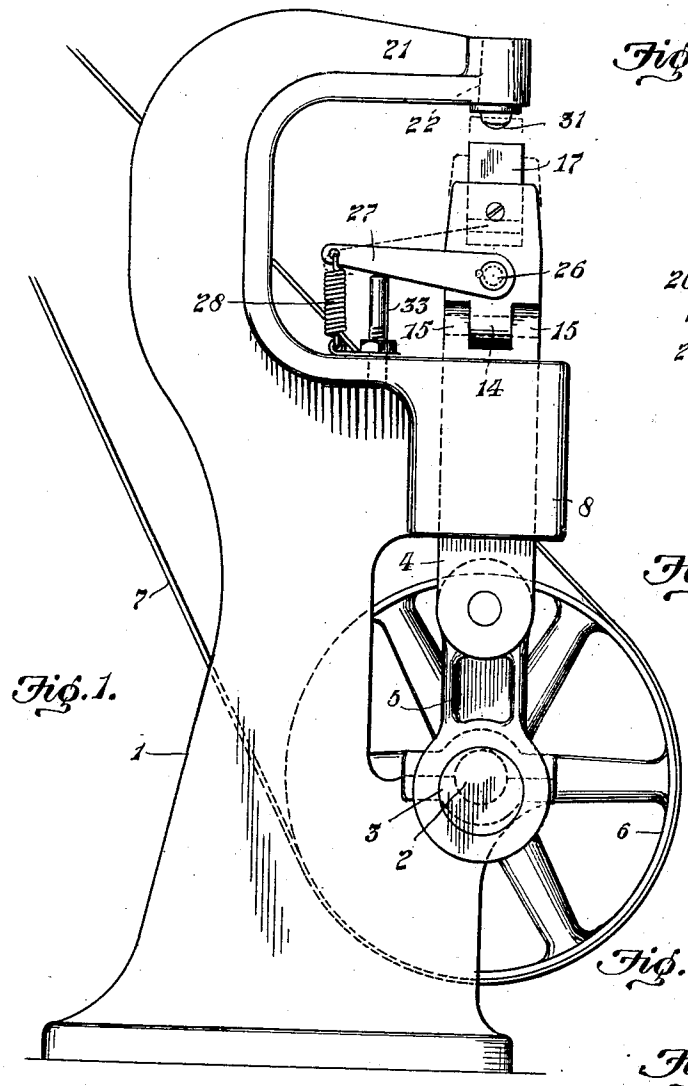


Fig. 1.

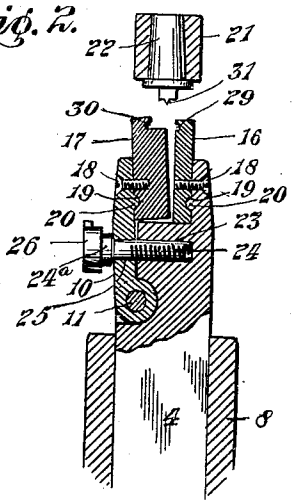


Fig. 2.

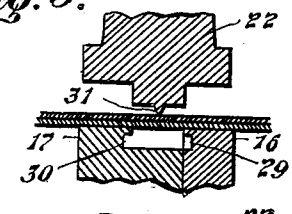


Fig. 3.

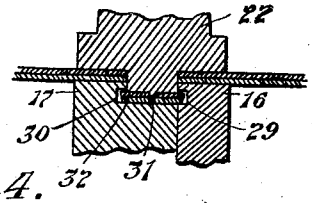


Fig. 4.

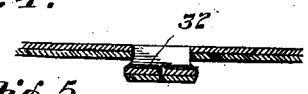


Fig. 5.

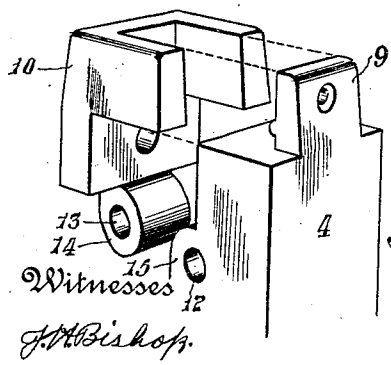


Fig. 8.

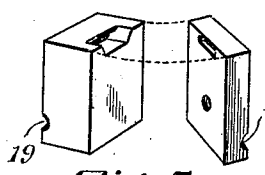


Fig. 7.

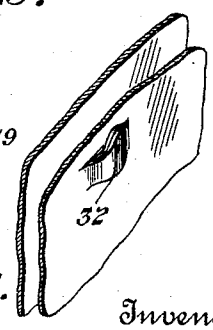


Fig. 6.

Witnesses

F. A. Bishop.

Sylvia Boron

Inventor

Harry C. Ferguson.

By Bond & Miller

Attorneys

# UNITED STATES PATENT OFFICE.

HARRY C. FERGUSON, OF CANTON, OHIO, ASSIGNOR TO THE EMPIRE NOVELTY COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

## METAL-CLENCHING MACHINE.

977,178. Specification of Letters Patent. Patented Nov. 29, 1910.

Application filed February 9, 1910. Serial No. 542,958.

*To all whom it may concern:*

Be it known that I, HARRY C. FERGUSON, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Metal-Clenching Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, and to the numerals and figures of reference marked thereon, in which—

Figure 1 is a side elevation. Fig. 2 is a vertical section showing portion of the housing, the die jaw carrying members and die jaws and the upper or fixed die. Fig. 3 is a vertical section showing portions of the die jaws and the fixed die and illustrating two sheets of metal placed in proper position to be clenched. Fig. 4 is a similar view showing the position of the die jaws and die and illustrating the metal properly clenched. Fig. 5 is a sectional view illustrating two sheets of metal properly clenched together. Fig. 6 is a portion of two sheets of metal properly clenched. Fig. 7 is a detached view illustrating the lateral movable die jaws. Fig. 8 is a perspective view of the die jaw holding bars showing the same disconnected from each other.

The present invention has relation to sheet metal clenching machines and it consists in the different parts and combination of parts hereinafter described and particularly pointed out in the claims.

Similar numerals of reference indicate corresponding parts in all the figures of the drawing.

In the accompanying drawing, 1 represents the combined base and standard which is of the usual form such as commonly used, wherein a movable plunger is employed and fixed die. To the base or standard 1 is journaled a shaft 2 upon which shaft is mounted an eccentric 3, which eccentric is for the purpose of imparting reciprocating movement to the plunger 4 by means of the usual connecting pitman 5. Upon the shaft 2 is mounted the power wheel 6, which power wheel is driven in the usual manner by the belt 7. The base or standard 1 together with the shaft journaled therein and the devices used for imparting reciprocating movement to the plunger 4 are of the usual construction and hence no specific description is deemed necessary, owing to the fact that the construction and arrangement of these parts are well known in the art and do not within themselves constitute any specific part of the present invention, except that they must necessarily be present and used in connection with the novel features of the present invention. The plunger 4 is held in true vertical position and guided by means of the housing 8, which housing constitutes an integral part of the combined base and standard. The plunger 4 is provided at its top or upper end with the flange 9, said flange being located and arranged substantially as shown in Figs. 2 and 8. To the plunger 4 at its top or upper end at one side thereof is pivotally connected the die jaw holding block 10, pivotal connection being made by means of the usual cross bolt or rivet 11 passed through the apertures 12 and 13 located through the connecting members 14 and 15, said parts constituting an ordinary hinge.

To the flange 9 and to the block 10 are attached the die jaws 16 and 17, the die jaw being fixed to the plunger 4 and so attached that there can be no relative movement as between the plunger and the die jaw. The die jaw 17 is fixed to the block 10 and is so fixed that there can be no relative movement as between the die jaws 17 and the block 10, said die jaws are securely fixed to the flange 9 and to the block 10 respectively by means of the screws 18 or their equivalents.

For the purpose of assisting in holding the die jaws 16 and 17 in proper position with reference to the flange 9 and the block 10 the die jaws are each provided with the grooves 19 located upon their outer faces, which grooves are for the purpose of receiving the inward projecting ribs 20 formed upon the flange 9 and the block 10 respectively; this construction is best illustrated in Fig. 2.

The combined base and standard 1 is provided with the integral neck portion 21, which neck portion is provided with the die 22 and is located directly above the die jaws 16 and 17. To the top or upper portion of the plunger 4 is attached the screw threaded bolt 23, which screw threaded bolt is located in the screw threaded aperture 24. The bolt 23 is provided with the head 24ª,

which head is for the purpose of pressing or bearing against the outer face of the pivoted block 10, said pivoted block being provided with the aperture 25, through which the bolt 23 passes. The bolt 23 is also provided with the enlarged head 26 to which head is securely attached the lever arm 27 which is located and arranged substantially as shown in Fig. 1. To the opposite end of the lever 27 from that to which it is attached to the bolt head 26 is connected the spring 28, the opposite end of said spring being attached to the base or standard 1 or to some other fixed point.

It will be understood that in order to properly compress and bend the sheets of metal so that two or more sheets may be clenched together it is necessary that at the time the bending and cutting of the metal is done the die jaws 16 and 17 be brought together as illustrated in Figs. 3 and 4, but by reason of the fact that a portion of the metal is forced into the grooves 29 and 30 formed in the upper ends of the die jaws it is necessary to part or separate said die jaws as illustrated in Fig. 2, so that the sheets of metal are freed from the die jaws 16 and 17. For the purpose of bringing the block 10 together with its die jaw toward the flange 9 and the die jaw 16 the screw threaded bolt 23 is provided, which screw threaded bolt is rotated during the upward stroke of the plunger by reason of the attached bolt 23 being attached to the lever arm 27 and the opposite end of said lever arm being held against upward movement by reason of the spring 28 and as the plunger moves upward the head of the bolt 24 will cause the block 10 to turn slightly upon its pivotal point carrying said block and die jaw toward the relatively fixed die jaw 16, thereby bringing the die jaw 16 into the position illustrated in Figs. 3 and 4.

For the purpose of stopping the rotation of the bolt 23 after the die jaws have been brought closely together the spring 28 is provided, which spring is so tensioned that the lever arm 27 will move upward with the plunger in a true or substantially true vertical direction and without any rocking or oscillation, thereby, preventing any breaking or tearing of the threads upon the bolt 23.

It will be understood that the die jaws should be brought close together before they have reached their full upward stroke so that after the die jaws have been properly brought together they can continue their upward stroke without imparting any rotary movement to the bolt 23. When the die jaws have moved upward a sufficient distance to bring the upper surface of the upper sheet of metal into contact with the die point 31, a further upward movement of the die jaws will cause the metal to be cut so as to sever the sides of the punched parts 32, but the die 22 must be so formed that it will only cut two sides of the punched portions 32 and leave the end portions integral with the sheets of metal designed to be clenched together. During the time the die jaws 16 and 17 are reaching their full upward movement the die point 31 will press the metal in opposite directions so as to crowd or force portions of the sheets of metal into the grooves or recesses 29 and 30 as best illustrated in Fig. 4, the finished clenching being illustrated in Fig. 5. After the die 22 and the die point 31 have performed their functions the plunger 4 is moved downward, which downward movement parts the die jaws by reason of the lever arm 27 striking the post or fulcrum 33, thereby, rocking said lever arm in the opposite direction from that during the time of the upward movement of the plunger and also rotating the bolt 23 in the opposite direction from the rotation of the bolt during its upward movement which opposite direction of rotation parts the die jaws 16 and 17 and releases the two sheets of metal acted upon or clenched together.

It will be understood that by providing the post or fulcrum 33 that the lever or arm 27 will be positively actuated during the downward stroke of the plunger 4. For the purpose of providing means for adjusting the tension of the spring 28 the post or fulcrum 33 should be adjustably attached so that it may be moved up or down with reference to the lever arm 27, thereby providing means for properly adjusting the tension of the spring 28 so that the bolt 23 will only be rotated sufficiently to properly close the die jaws 16 and 17 and to prevent any movement of the block 10 and the die jaw 17 further than is necessary to properly bring the die jaws together and to move them only sufficiently apart to release the sheets of metal.

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

1. In a machine of the class described, the combination of a standard and base, a reciprocating plunger, a fixed die, the reciprocating plunger provided with relatively movable die-jaws, said die-jaws provided at their free ends with grooves and means for imparting relative movement between one of the die-jaws and the plunger during the upward and downward stroke of said plunger, substantially as and for the purpose specified.

2. In a machine of the class described, the combination of a standard and base, a reciprocating plunger, means for imparting reciprocating movement to the plunger, die jaws carried by the plunger, one of said die

jaws relatively fixed to the plunger and movable therewith, the other die jaw carried by the plunger adapted for pivotal movement with reference to the plunger, said die jaws provided with grooves upon their inner adjacent faces and a fixed die provided with a die point and means for relatively moving the die jaws with reference to the plunger, substantially as and for the purpose specified.

3. In a machine of the class described, the combination of a base and standard, a reciprocating plunger carried by the standard, means for imparting reciprocating movement to the plunger, said plunger provided with die jaws, one fixed and the other movable with reference to the plunger, said plunger provided with a screw threaded aperture located below the die jaws, a screw threaded bolt located in the screw threaded aperture, a hinged block provided with an aperture and the aperture adapted to receive the screw threaded bolt, said bolt provided with a head adapted for contact with the hinged block, a lever arm fixed to the screw threaded bolt, a spring secured to the opposite end of the lever arm and the lever arm adapted to rotate the screw threaded bolt in opposite directions by the reciprocating movement of the plunger, and a fixed die, substantially as and for the purpose specified.

4. In a machine of the class described, the combination of a base and standard, a reciprocating plunger carried by the standard, means for imparting reciprocating movement to the plunger, said plunger provided with die jaws, one fixed and the other movable with reference to the plunger, said plunger provided with a screw threaded aperture located below the die jaws, a screw threaded bolt located in the screw threaded aperture, a hinged block provided with an aperture and the aperture adapted to receive the screw threaded bolt, said bolt provided with a head adapted for contact with the hinged block, a lever arm fixed to the screw threaded bolt, a spring secured to the opposite end of the lever arm and the lever arm adapted to rotate the screw threaded bolt in opposite directions by the reciprocating movement of the plunger, a fulcrum post located below the lever arm and a fixed die, substantially as and for the purpose specified.

5. In a machine of the class described, the combination of a base and standard, a reciprocating plunger carried by the standard, means for imparting reciprocating movement to the plunger, said plunger provided with die jaws, one fixed and the other movable with reference to the plunger, said plunger provided with a screw threaded aperture located below the die jaws, a screw threaded bolt located in the screw threaded aperture, a hinged block provided with an aperture and the aperture adapted to receive the screw threaded bolt, said bolt provided with a head adapted for contact with the hinged block, a lever arm fixed to the screw threaded bolt, a spring secured to the opposite end of the lever arm and the lever arm adapted to rotate the screw threaded bolt in opposite directions by the reciprocating movement of the plunger, an adjustable fulcrum post located below the lever arms and a fixed die, substantially as and for the purpose specified.

6. In a machine of the class described, a standard and base, a fixed die, a plunger adapted to move to and from the fixed die, die-jaws carried by the plunger and means for opening and closing said die-jaws during their upward and downward movement, substantially as and for the purpose specified.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

HARRY C. FERGUSON.

Witnesses:
F. W. Bond,
Sylvia Boron.