

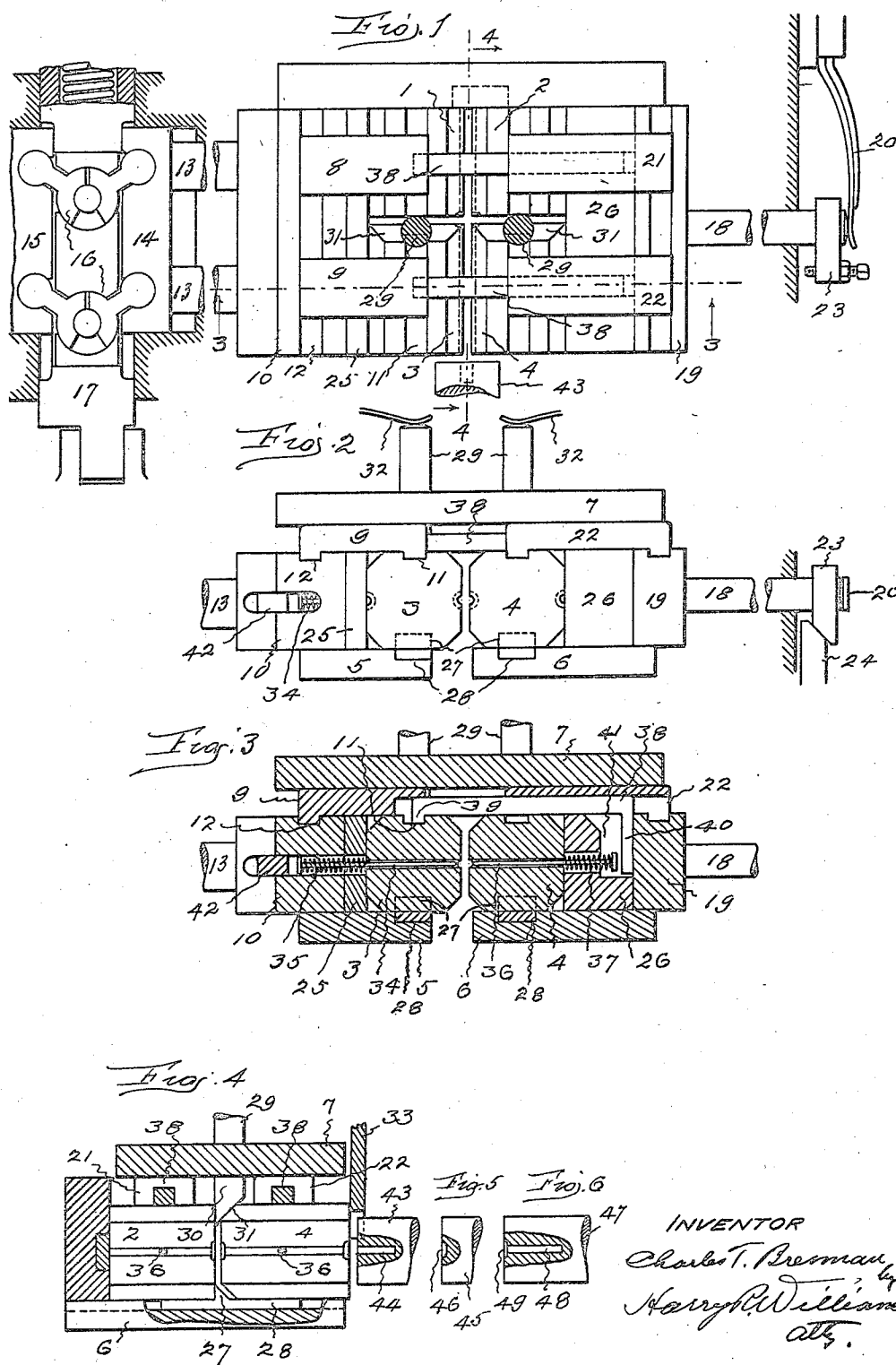
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OPEN DIE HEADER

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OPEN DIE HEADER

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This invention relates to an open die heading machine of the class in which, after the stock is fed between the dies, the dies are closed and moved transversely from feed position for cutting off a length of stock and carrying the cut blank to a position in which it is subjected to the action of a punch or punches.

The object of the present invention is to provide for such a machine, either single or multiple stroke, very simple die controlling and blank ejecting means whereby a long blank which has been merely headed by a swaging operation, or which has been expanded at one or more localities along its length by a compression operation, or subjected to both operations, will be positively ejected from the dies without being distorted.

In the accompanying drawing only the dies and associated die actuating and controlling mechanisms of a conventional heading machine adapted to produce one or two enlargements along the body of a blank, or produce an enlargement on the body and a head at the end of a blank are illustrated.

Fig. 1 shows a top view of the dies, slightly opened, and parts of the means for actuating and controlling the dies.

Fig. 2 is a view looking toward the front end of the dies.

Fig. 3 shows a section of the dies taken on the plane indicated by the dotted line 3—3 on Fig. 1.

Fig. 4 is a section taken on the plane indicated by the dotted line 4—4 on Fig. 1.

Figs. 5 and 6 illustrate shapes of punches that may be used.

In the embodiment of the invention illustrated there are a pair of complementary inner die blocks 1 and 2 and a pair of complementary outer die blocks 3 and 4. These die blocks are movably retained in the die pocket of the heading machine in the well known manner, being supported by bed plates 5 and 6, and held down by a cap plate 7.

When a compression enlargement is to be produced on a blank the pair of die blocks 1, 2, are located so they will grip the blank inside of where the enlargement is to be formed, and the pair of die blocks 3, 4, are located so they will grip the blank outside of where the enlargement is to be formed, the blocks of both pair being capable of transverse movements for opening and closing. The pair of die blocks 3, 4, are also capable of longitudinal separation from the pair 1, 2, being separated therefrom when a blank is entered and after the blank is gripped being forced longitudinally toward the pair 1, 2, so that

the blank will be expanded between the adjacent ends of the pairs of die blocks.

The die blocks 1 and 3 may be moved transversely toward and from the die blocks 2 and 4 for gripping and releasing the blank by such a toggle mechanism as is mentioned in U. S. Patent No. 1,804,029, May 5, 1931. In this mechanism the die blocks 1 and 3 are connected by yokes 8 and 9 with a plunger head 10, one end of the yokes extending into slots 11 that extend across the die blocks and the other end of the yokes entering a slot 12 that extends across the plunger head. Two plungers 13 attached to the head 10 are connected with a movable toggle block 14 between which and a fixed toggle block 15 are toggle links 16 carried by a slide 17 that is reciprocated at the proper times by the well known cam or crank mechanism.

The die blocks 2 and 4 may be moved toward the die blocks 1 and 3 by such means as is set forth in the patent above referred to. This means comprises a plunger 18 with a head 19 that is normally pressed inward by a spring 20, the plunger head having a slot that is connected by yokes 21 and 22 with slots across the die blocks 2 and 4. At the end of the plunger 18 is a lug 23 that is engaged by a bolt 24 which temporarily obstructs and retards the inward movement of the plunger 18 and die blocks 2 and 4, as described in the prior patent mentioned.

A filling plate 25 of a thickness depending upon the size of the die blocks 1 and 3 is located between those blocks and the plunger head 10, and a filling plate 26 of suitable thickness is placed between the die blocks 2 and 4 and the plunger head 19.

The pair of die blocks 1 and 2 are held from forward movement by means of teeth 27 on plates 28 that are secured in slots in the die supporting plates 5 and 6, the teeth 27 extending upward and engaging the front faces of the die blocks so that while preventing their being drawn forward they do not obstruct their opening and closing movements.

As previously pointed out the pair of die blocks 3 and 4 are capable of a longitudinal movement so that they may be separated from the pair of die blocks 1 and 2. Pins 29 with wedge-shaped inner ends 30 are arranged to engage the beveled inner edges 31 of the die blocks 3 and 4. These pins are carried by the die cap and are normally pressed down by springs 32 fastened on the die cap after the manner illustrated in U. S. Patent No. 1,889,004, November 29, 1932. When there is no obstruction to the outward movement

of the front die blocks these pins being pressed down by the springs tend to separate longitudinally the adjacent ends of two pair of die blocks. The forward movement of the front die blocks 3 and 4 may be limited by a face plate 33 attached to the die cap in the usual way as disclosed in Patent No. 1,889,004.

Extending through each of the die blocks 1 and 3 is an ejector pin 34 that is normally drawn inward by a spring 35, and extending through each of the die blocks 2 and 4 is an ejector pin 36 drawn inward by spring 37. Yoke-shaped pieces 38 are arranged with one end 39 engaged in the slots 11 of the die blocks 1 and 3, and the other end 40 of these yokes extends into slots 41 in the filling plate 26. The ends 40 of these yokes 38 extend down into line with the inner ends of the ejector pins 36 in the die blocks 2 and 4. A fixed bar 42 may be arranged opposite the inner ends of the ejector pins 34.

In producing a compression enlargement, after a length of stock has been fed between the die blocks and the die blocks closed and carried over by the toggle mechanism, a punch 43 is by the common reciprocating mechanism forced against the faces of the pair of die blocks 3 and 4 and drives them backward, the punch having a bore 44 which permits the entrance of the end of the blank without deforming it when the punch engages the front die blocks 3 and 4. As the inner die blocks 1 and 2 tightly grip the inner section of the blank and the outer die blocks 3 and 4 tightly grip the outer section of the blank, when the outer die blocks are driven in, the metal of the blank between the pairs of dies is expanded and forms a collar between the adjacent ends of the dies of a shape and size of the recess between the dies. If a two-blow machine is being used a punch 45 with a socket 46 shaped to form a head at the end of the blank may then be caused to strike the end of the blank. If, however, a second collar or expansion is to be formed on the blank a punch 47 may be employed, which punch will have a bore 48 that will receive the end of the blank and a socket 49 into which the metal may be expanded as the end of the punch engages the faces of the die blocks 3 and 4.

When the forming operations have been accomplished the die blocks 1 and 3 are pulled transversely by the toggle mechanism and after they have receded a short distance the ends of the ejector pins 34 in these blocks engage the fixed bar 42 and their movement with the die blocks being obstructed their ends push the blank from the forming recesses in the die blocks 1 and 3. As the die blocks 1 and 3 are retracted the die blocks 2 and 4 being temporarily restrained by the mechanism mentioned, the ends of the yokes 38 are pulled with the die blocks 1 and 3 so as to engage the ejector pins 36 carried by the blocks 2 and 4 and cause them to push the blank from the forming recesses in these blocks. The mechanisms are timed so that after the blank has been ejected the die blocks 2 and 4 are allowed to move with the blocks 1 and 3 to feed line.

By the means described the die blocks are positively opened and closed at the proper times and the blanks positively ejected from between the die blocks after being formed regardless of the length of the blank. This simple mechanism may be used for ejecting long blanks which are merely headed in which case but one pair of die blocks of the proper length would be required.

The invention claimed is:

1. An open die blank heading machine having a stationary die pocket, transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies in said pocket and closing the dies at one limit of their movement and opening the dies at the other limit of their movement, ejectors carried by the opposing dies, means fixed in the die pocket adapted when the dies are opened to engage and project an ejector into the shaping cavity of the die on one side, and an element engaged with said last mentioned die and extending to the die on the other side, which element is adapted when the dies are opened to engage and project an ejector into the shaping cavity of the said die on the other side.

2. An open die blank heading machine having a stationary die pocket, transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies in said pocket and closing the dies at one limit of their movement and opening the dies at the other limit of their movement, ejectors carried by the opposing dies, means in the die pocket adapted when the dies are opened to engage and project an ejector into the shaping cavity of the die on one side, and a yoke with one end engaged with said last mentioned die and extending to the die on the other side, which yoke is adapted when the dies are opened to engage and project an ejector into the shaping cavity of the said die on the other side.

3. An open die blank heading machine having a stationary die pocket, transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies in said pocket and closing the dies at one limit of their movement and opening the dies at the other limit of their movement, ejectors carried by the opposing dies, stationary means in the die pocket adapted to engage and project an ejector into the shaping cavity of the die by which it is carried when said die is retracted, and an element with one end fastened to said last mentioned die and its other end adapted when said die is retracted to engage the ejector carried by the opposing die and project it into the shaping cavity of said opposing die.

4. An open die blank heading machine having a stationary die pocket, transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies in said pocket and closing the dies at one limit of their movement and opening the dies at the other limit of their movement, ejectors carried by the opposing dies, means in the die pocket adapted when the dies are opened to engage and project an ejector into the shaping cavity of the die by which it is carried, and a yoke with one end entering a cavity in and engaged with and moved by said last mentioned die and its other end entering a cavity in the opposing die and adapted when the dies are separated to engage the ejector carried by said opposing die and project it into the shaping cavity of said opposing die.

5. An open die blank heading machine having a stationary die pocket, a plurality of pairs of transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies in said pocket and concertedly in the same directions and closing the dies at one limit of their movement and opening the dies at the other limit of their movement, ejectors carried by the dies, means in

the die pocket adapted when the dies are opened, to engage an ejector and project it into the shaping cavity of the die by which it is carried, and means directly engaged with said last mentioned die and with the opposing die, said means adapted when the dies are opened to engage the ejector carried by the opposing die and project it into the shaping cavity of said opposing die.

6. An open die blank heading machine having a stationary die pocket, a plurality of pairs of transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for concertedly sliding said dies transversely back and forth in said pocket and for longitudinally separating one pair of dies from the other, ejectors carried by opposing dies, means in the die pocket adapted when the dies are opened to engage and project ejectors into the shaping cavities of the dies on one side, and means engaged with said last mentioned dies and adapted when the dies are opened to engage and project ejectors into the shaping cavities of the dies on the other side.

7. An open die blank heading machine having a stationary die pocket, transversely sliding complementary dies loosely located in said pocket, mechanism associated therewith for transversely sliding the dies back and forth in said pocket, and for opening and closing said dies, and a yoke in the die pocket with one end engaged with a die on one side said yoke extending across the division between the dies and hav-

ing its other end projecting into an opening in the other die, and adapted to engage an ejector carried by the latter die and project the ejector into the shaping cavity of the latter die when the dies are separated.

8. An open die blank heading machine which has a stationary die pocket with a plurality of pairs of transversely slidable complementary dies loosely located in said pocket and mechanisms associated therewith for transversely sliding and causing the opening and closing of said dies and for longitudinally separating one pair of dies from the other pair of dies, and means fixed in said pocket and engaging the end faces of the inner pair of dies and without obstructing the transverse sliding movements of the dies preventing the longitudinal movement of the inner pair of dies from the back wall of the pocket.

9. In an open die blank heading machine which has a stationary die pocket with transversely sliding complementary dies loosely located in said pocket and mechanism associated therewith for transversely sliding and for causing the opening and closing of said dies, ejectors carried by the opposing dies, the ejector in one die being projected by stationary means in the die pocket, and the ejector in the opposing die being projected by a yoke that, in the die pocket, extends from one die to the other die and is carried transversely with the dies, as the dies are opened and closed.

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