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WORK STOP OR POSITIONING MEANS FOR FORMING AND BENDING MACHINES

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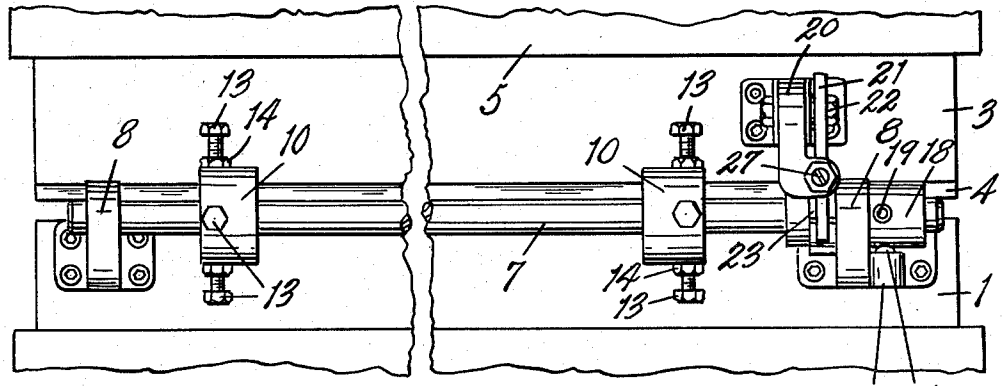


FIG. 1

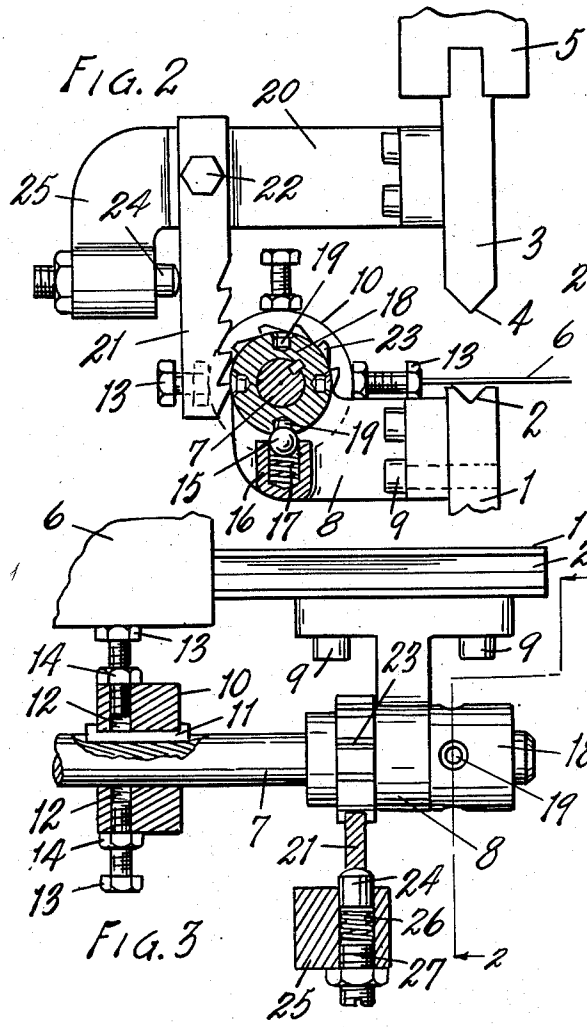


FIG. 2

FIG. 3

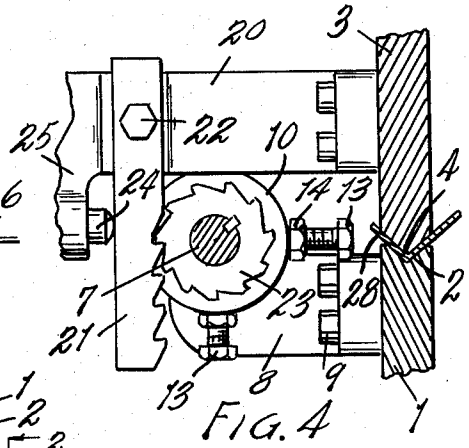


FIG. 4

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WORK STOP OR POSITIONING MEANS FOR FORMING AND BENDING MACHINES

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6 Claims. (Cl. 153—21)

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This invention relates to improvements in work stop or positioning means for forming and bending machines.

The main objects of this invention are:

First, to provide a forming and bending machine with a work stop or positioning means which enables the successive forming of a plurality of edge portions of a sheet without the operator laying down the work and picking it up again.

Second, to provide a stop or work positioning means for a bending or forming machine of the type comprising an anvil jaw member and a coacting reciprocating jaw member which can be readily applied to or embodied in existing and widely used types of machines.

Third, to provide a stop or work positioning mechanism which can be quickly and easily adjusted for positioning work for forming different widths of flanges or other edge conformations on a single piece of work.

Fourth, to provide a work positioning mechanism having these advantages which is entirely automatic in its operation permitting the forming of flanges or the like of different widths on the edges of the single sheet.

Fifth, to provide a structure of this character which is entirely automatic in its operation after the stops thereof are once set or positioned.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary rear elevational view of portions of a forming or bending machine embodying my invention, the parts other than the stop or positioning means being mainly shown in conventional form.

Fig. 2 is an enlarged fragmentary view on a line corresponding to the broken line 2—2 of Fig. 3.

Fig. 3 is a fragmentary view, parts being shown in section to illustrate structural details.

Fig. 4 is a fragmentary view partially in section corresponding to that of Fig. 2 showing the jaw members in closed position.

In the accompanying drawing I have illustrated only such portions of a forming or bending machine as are deemed necessary to illustrate a practical commercial embodiment of my invention. Referring to the drawing, 1 represents a fixed forming jaw member having a lon-

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gitudinally extending V-shaped recess 2 in its face. The coacting jaw member 3 has an A-shaped face 4 adapted to coact with the V-shaped face of the jaw member 1. The jaw member 3 is carried by a reciprocating head 5. It will be understood that the actuation of the head is controlled by the operator. However, as machines of this type are in quite extensive commercial use and are known to those skilled in the art the operating mechanism is not illustrated.

It will be understood that the jaw forming member 1 is supported upon the bed of the machine and that the head 5 reciprocates relative to the bed of the machine. A piece of work is indicated at 6 in operative position for a forming operation. At the rear of and in parallel relation to the forming member 1, I mount a shaft 7. In the embodiment illustrated the shaft is supported by brackets 8 mounted directly on the anvil member 1 by means of bolts 9. The shaft 7 has axially spaced collars 10 secured thereto to rotate therewith as by means of the keys 11. These collars have radial bores 12 internally threaded to receive the externally threaded stop members 13 which are secured in their adjusted positions by means of the lock nuts 14.

In the structure illustrated the stops have 90° angular spacing, the adaptation being designed to permit forming operations on all four edges of a piece of work 6. To hold the shaft in proper position to present its stops in proper relation to the anvil forming member, I provide a ball detent 15 supported in a socket 16 by means of the spring 17. The shaft is provided with a keeper collar 18 having keeper recesses 19 at 90° angular spacing and positioned to receive the detent when a pair of the stops are properly positioned relative to the forming jaw 1.

The corresponding pairs of stops 13 are axially aligned. These stops may be adjusted radially of the shaft to position the work for forming flanges of the desired width and successively formed flanges may be of different widths. The shaft is rotated one step on each stroke of the head 5. In the embodiment illustrated, this is accomplished by providing the forming member 3 with a rearwardly projecting bracket 20 on which a multiple toothed pawl 21 is pivoted at 22. This pawl coacts with the ratchet wheel 23 on the shaft. The teeth on the pawl and on the ratchet wheel are so arranged that the shaft is rotated on the retracting stroke of the movable forming member. The pawl is yieldably supported by the spring biased thrust member 24 disposed in a

bore provided therefor in the arm 25 of the bracket 20. The spring 26 is adjustably supported by means of the threaded abutments 27—see Fig. 3.

With the parts thus arranged the corresponding stops aligned axially of the shaft are adjusted to position the work as indicated in Fig. 2 for forming a flange of the desired width. The operator then positions the work as indicated at 6 in proper relation to the anvil jaw and in engagement with the stops. The operator then trips the control mechanism for the head 5, not illustrated, and the head is actuated to form the flange as indicated at 28 in Fig. 4. The head 5 is automatically retracted and on the retracting stroke the shaft is rotated to bring another stop or stops into position. The work is then turned by the operator to present another edge. This is repeated for each edge to be formed. This can be done without laying down the work and picking it up again and it avoids repeated handling and minimizes time.

Applicant is familiar with presses designed to simultaneously perform different shaping operations on the same piece at one stroke of the press. However, there are many kinds of work and quantities of work which do not justify a press of that character. The applicant's invention is well adapted for economical commercial production of work of the character indicated.

Applicant has not attempted to illustrate and describe various modifications and adaptations which may be desired for particular work or types of jaws and their operative relation as it is believed that this disclosure will enable those skilled in the art to embody or adapt the invention as may be desired.

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

1. In a bending machine, the combination of an anvil jaw member, a reciprocating head member provided with a jaw member coacting with said anvil jaw member, a shaft disposed at the rear of said anvil jaw member with its axis of rotation disposed parallel thereto, said shaft having axially spaced collars rotatable therewith, certain of said collars having 90° angularly spaced radial threaded bores therein, work stops adjustably threaded in said bores, a ratchet wheel on said shaft, a spring biased pawl on said head member coacting with said ratchet wheel to rotate the shaft one step on each return stroke of the crosshead, and means for retaining said shaft against rotation intermediate the rotational movements imparted thereto by said pawl and ratchet wheel.

2. In a bending machine, the combination of an anvil jaw member, a reciprocating head member provided with a jaw member coacting with said anvil jaw member, a shaft disposed at the rear of said anvil jaw member with its axis of rotation disposed parallel thereto, angularly spaced work stops adjustably mounted on said shaft, a ratchet wheel on said shaft, a spring biased pawl on said head member coacting with said ratchet wheel to rotate the shaft one step on each return stroke of the crosshead, and means for retaining said shaft against rotation intermediate the rotational movements imparted thereto by said pawl and ratchet wheel.

3. In a machine of the class described, the combination of an anvil jaw member, a reciprocating jaw member coacting therewith, a shaft disposed at the rear of said anvil jaw member with its axis of rotation disposed parallel thereto, sets of axially spaced work stops on said shaft, the stops of the sets being angularly spaced and independently adjustable radially of the shaft, corresponding stops of the sets being aligned axially of the shaft, means for rotating said shaft one step on the retracting stroke of the reciprocating jaw member, and means for retaining said shaft against rotation intermediate the rotational movements imparted thereto by said rotating means.

4. In a machine of the class described, the combination with a relatively fixed forming member and a coacting reciprocating mounting forming member, a stop shaft rotatively mounted at the rear of said fixed forming member in spaced relation thereto, axially spaced work stop members mounted on said shaft in spaced relation for axial adjustment relative to each other and each including a plurality of angularly spaced stops, the corresponding stops of the members being in alignment, and means for rotating said shaft step by step in timed relation to the return stroke of the reciprocating forming member to position corresponding stops in operative relation relative to the fixed forming member to facilitate the positioning of the work thereon.

5. In a machine of the class described, the combination of a relatively fixed forming member and a coacting reciprocatingly mounted forming member, a stop shaft rotatably mounted at the rear of said relatively fixed forming member in spaced parallel relation thereto and with its axis in approximately the plane of the face thereof, angularly spaced work stops mounted on said shaft for independent adjustment radially thereof, and means for rotating said shaft step by step in timed relation to the actuation of the reciprocating forming member to successively position the stops in operative relation to the fixed forming member to facilitate the positioning of the work thereon.

6. In a machine of the class described the combination with a relatively fixed forming member and a coacting reciprocating mounting forming member, of a stop member rotatively mounted at the rear of said fixed forming member with its axis of rotation in spaced parallel relation thereto, said stop member having a plurality of angularly spaced stops and means for rotating said stop member step by step in timed relation to the actuation of the reciprocating forming member to successively position the stops in operative relation to the fixed forming member to facilitate the positioning of the work thereon.

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