Oct. 26, 1943. W. H. MURSCH 2,332,590

DIE FOR PUNCH PRESSES AND THE LIKE

Filed May 25, 1942

FIG. 2.

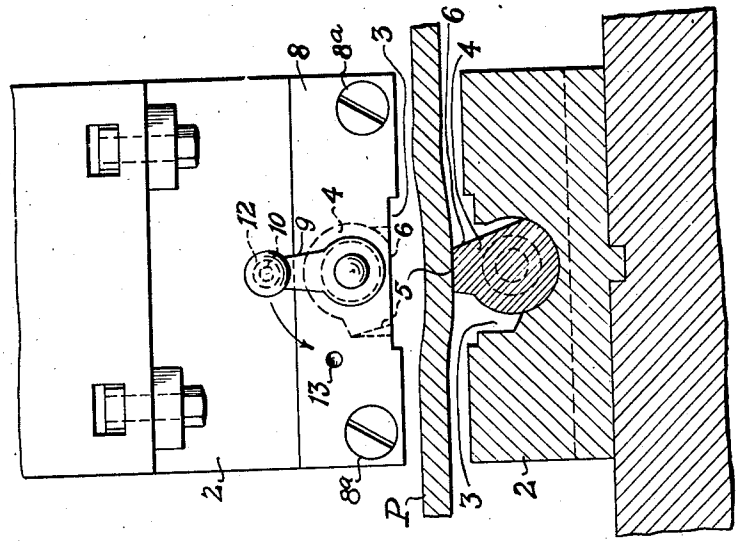
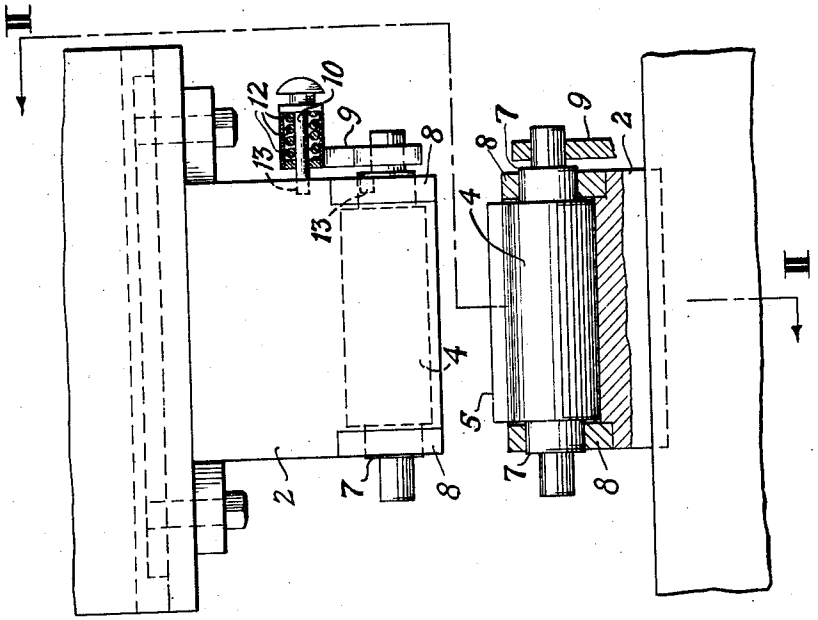


FIG. 1.



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DIE FOR PUNCH PRESSES AND THE LIKE

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2 Claims. (Cl. 153—48)

This invention relates to dies for punch presses and the like and particularly to an improved apparatus or die for use in presses for straightening metallic material, such as armor plate and the like.

It is the general practice in the steel industry to straighten heavy steel plates, such as armor plates, after they have been heat treated. Such straightening is usually done by means of a heavy hydraulic or brake press which bends the plate beyond the elastic limit of the steel in a direction opposite that of the bend, kink or other irregularity in the plate. A pair of dies for contacting the opposite sides of the plates so as to bend the same is assembled in the press for such straightening operations.

Heretofore, one of the dies consisted generally of a slab or die block having a recess therein on the outer face thereof into which the plate being straightened is pressed, and the other or opposed die consisted of a slab or die block having a projecting portion or face which was adapted to cooperate with the recess in the opposed die to straighten any irregularities in the plate. Such bends or other irregularities may be located at various points along the plate and also may be in any direction with reference to the surface or edges of the plate. To remove the bends or other irregularities by dies heretofore mentioned and other dies heretofore suggested and used it was necessary oftentimes to turn the plate over quite frequently in order that the male and female dies were disposed on the proper sides of the bend or kink in the plate. Such turning of the plates was not only tedious but also consumed a considerable amount of time, thereby interfering with production. Therefore, it will be seen that such procedure was not entirely satisfactory.

Accordingly, it is one of the objects of the present invention to provide an improved apparatus or die for use with presses for straightening metallic plates, which eliminates any need of turning the plate over to straighten the same regardless of the direction of the irregularity therein after the same has once been assembled between the dies, eliminating thereby excessive handling of the plate and reducing the straightening time to a minimum.

It is another object of the invention to provide an improved die for use with presses for straightening metallic plates which can be used either as a female or a male die member, and one which can be easily and quickly converted from one to the other.

It is still a further object of this invention to provide an improved die for use with presses for straightening metallic plates which is simple and inexpensive in its construction, and at the same time, a die which is efficient and effective in its use.

Various other objects and advantages of this invention will become more apparent during the course of the following specification and will be particularly pointed out in the appended claims.

In the accompanying drawing there is shown, for the purpose of illustration, an embodiment which my invention may assume in practice.

In this drawing:

Fig. 1 is an end elevational view partly in section of the improved die of my invention, and

Fig. 2 is a sectional view taken on line II—II of Fig. 1.

Referring more particularly to the drawing, the improved die of my invention comprises a rectangular-shaped body member or die block 2 having a laterally extending recess 3 arranged therein centrally thereof. There is disposed in the recess 3 a laterally extending eccentric or cam-like member 4 having a flat outer-faced eccentric or cam portion 5 with a flat-faced portion 6 arranged on one side thereof. There is arranged on each end of the eccentric member 5, a journaled portion 7 which is mounted in suitable bearings arranged in side plates 8 which are suitably attached to the sides of the die block 2, preferably by means of machine screws 8a. It will be understood that the eccentric member 4 is mounted for limited oscillating movement in the recess 3 therein.

There is provided a crank or handle 9 which is mounted on the end of one of the journaled portions 7 of the eccentric member 4 on the outer side of the side plate 8. The eccentric member 4 is rotated or oscillated by means of the crank 9 and there is arranged in the outer end thereof preferably a locking pin 10 having a coil spring 12 arranged therearound which is housed in the outer end of the crank for maintaining the pin in a locked position in a well-known manner. In the side plate 8 adjacent the handle 9 there is arranged a pair of holes 13 with which the locking pin 10 is adapted to cooperate so as to lock the eccentric member 4 in one of two positions.

The improved die of my invention functions in the following manner:

It will be understood that the die of my invention is adapted to be used primarily for straightening metallic plates, such as steel armor plates and the like, and that it may be used with any

conventional-type press. There is provided an upper and lower die which are identical and each is constructed in the manner hereinbefore described. One of the dies 2 is positioned on the platen of the press with which the dies are to be used and the other or upper die is positioned directly opposite the lower die and attached to the ram of the press in any suitable manner. The plate P to be straightened is placed between the dies in the press and if the plate to be straightened has a downward bend or kink therein, i. e., a bend extending downwardly from the bottom surface of the plate as it is positioned between the dies as shown in Fig. 2 of the drawing, in order to remove such bend therefrom it is necessary to bend the plate at the bend in an upwardly direction. To remove such a bend by means of the die of the present invention the eccentric member 4 of the bottom die is rotated by means of the handle or crank 9 so that the eccentric or cam portion 5 thereof extends upwardly from the recess 3 and projects beyond the upper face of the die so that the flat-faced portion thereof is substantially parallel to the lower face of the plate to be straightened. The eccentric member 4 of the upper die is disposed in a retracted position so that the same is disposed in the recess 3 in a retracted position below the lower or outer face of the die. With the eccentric members of each of the dies arranged in such positions it will be seen that the eccentric member of the lower die is in its projected position while the eccentric member of the upper die is in its retracted position and the flat portion 6 thereof is substantially parallel to the upper surface of the plate and spaced from the outer or lower surface of the die. With the eccentric members disposed in such positions it will be seen that the plate P will be bent in a direction opposite that of the bend therein upon operation of the ram of the press; that is, the bent portion of the plate will be bent upwardly by action of the projecting eccentric member of the lower die into the recess 3 in the upper die to position directly below the eccentric member therein which is in its retracted position.

If it is desired to remove a downwardly extending bend or kink from the plate P, i. e., a bend extending downwardly from the bottom surface of the plate as it is positioned between the dies, the eccentric members 4 of each of the dies is reversed. The pins 10 are pulled out of their locked position in the holes 13 and the eccentric member of the upper die is rotated by means of the handle 9 so that the eccentric or cam portion 5 carried thereby projects below the lower or outer face of the upper die and the eccentric member of the lower die is rotated so that the eccentric or cam portion carried thereby is moved into the recess 3 therein to a retracted position below the upper or outer face of the lower die. In such a position it will be seen that when the ram of the press is operated so as to move the upper die downwardly and in engagement with the top surface of the plate, the plate P will be bent downwardly by the projecting cam portion 5 of the eccentric member of the upper die into the recess 3 of the lower die, thereby removing the bend from the plate.

As a result of my invention it will be seen that there is provided an improved die which can be used either as a female die member or a male die member, thereby providing a die which is extremely flexible in its use. By providing such a die for use in presses for straightening metallic plates it will be seen that the die can be easily and quickly converted from a male die to a female die or vice versa, thereby eliminating the necessity of turning the plate over from time to time for straightening of bends or kinks disposed in opposite directions. It will be seen that the die of the present invention is extremely simple in its operation in use and will effectively remove any irregularities from a plate so as to straighten the same properly.

While I have shown and described a specific embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. Apparatus for straightening metallic plates and the like, including a pair of opposed dies with each having a substantially flat working surface, each of said dies having a recess arranged substantially centrally in the working surface thereof, a rotatable member arranged in the recess of each of said dies, means carried by each of said dies in which the ends of the respective rotatable members are journaled, each of said rotatable members having a cam-like portion arranged on one side thereof and a flat-faced portion arranged on another side of the same, with each of said rotatable members adapted to be rotated to and locked in one position so that the cam-like portion carried thereby projects outwardly in a protracted position beyond the flat working surface of the die and adapted to be rotated to and locked in another position so that the cam-like portion carried thereby assumes a retracted position in the recess inwardly from the flat working surface of the die with the flat-faced portion of each of said rotatable members assuming a position inwardly of said flat working surface and substantially parallel thereto so as to provide a substantially continuous flat surface in the recess spaced from said flat working die surface whereby the cam-like portion of one of the rotatable members when it assumes a protracted position is adapted to force the material of the plate adapted to be straightened into the recess of the opposed die and against the flat-faced portion of the rotatable member therein when the cam-like portion of the rotatable member of that die assumes a retracted position, means for rotating said rotatable members so that the cam-like portions carried thereby are moved to their retracted and protracted positions, and means for locking said rotatable members in each of said positions.

2. Apparatus for straightening metallic plates and the like, as defined in claim 1, including a handle member arranged on one end of each of the rotatable members for rotating the same, and means carried by each of the handle members for locking the same against movement in either one of two positions, said locking means consisting of a reciprocable pin member extending through the handle member substantially parallel to the rotatable member, each of said dies having a pair of spaced apart holes arranged in the side thereof with which the inner end of the pin member is adapted to cooperate to lock the handle against rotative movement, said holes in each die being arranged in the arcuate path of the pin member upon rotation of the rotatable member with one of said holes positioned oppo-

site the handle portion when the rotatable member is positioned so that the cam-like portion carried thereby assumes a protracted position, the pin member cooperates with the hole to lock the rotatable member in such position and the other of said holes positioned so that the pin member cooperates therewith to lock the rotatable member when the cam-like portion carried thereby assumes a retracted position, and a coil spring arranged around each of said pins for maintaining the same in their locked positions in said holes.

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