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MECHANISM FOR BREAKING STEEL BARS.

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1,284,312. Patented Nov. 12, 1918.

Fig. 1

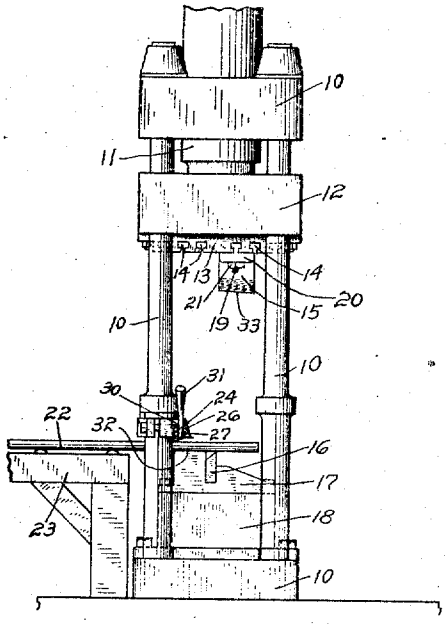


Fig. 2

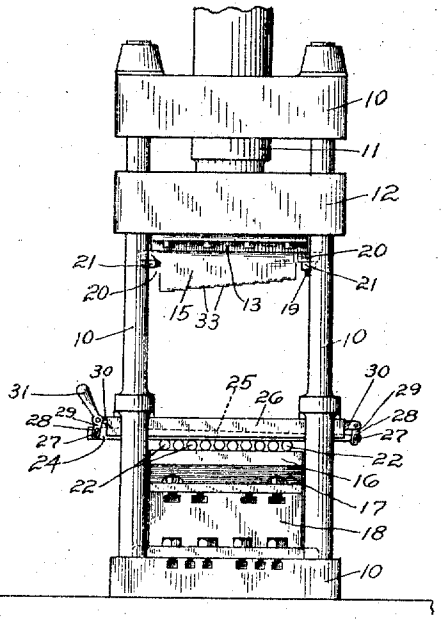
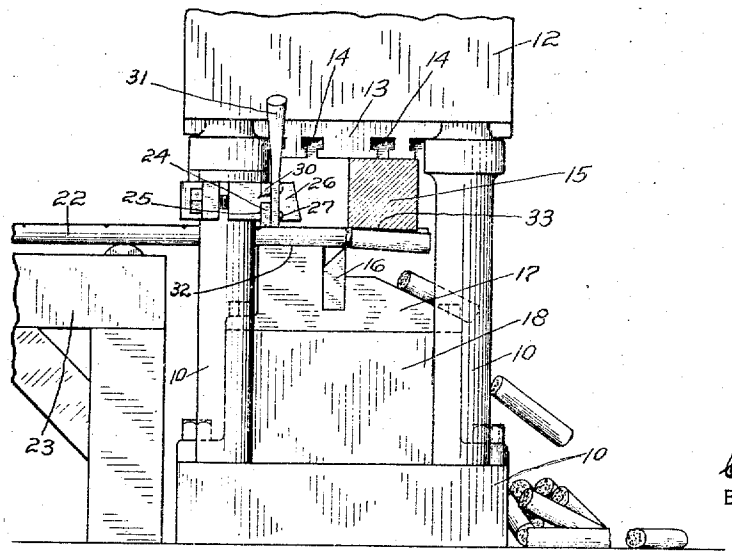


Fig. 3



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MECHANISM FOR BREAKING STEEL BARS.

1,284,312. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed May 10, 1918. Serial No. 233,796.

To all whom it may concern:

Be it known that I, CHARLES A. GLOVER, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Mechanism for Breaking Steel Bars, of which the following is a specification.

This invention is adapted for use wherever it is required to break steel bars into billets or blanks in the manufacture of various articles, for example shell bodies, the stock for which comes in the form of bars from three inches upward in diameter, and the bars have to be broken into blanks from six inches upward in length. In a large factory amply provided with furnaces and drawing mechanism, it becomes a serious proposition to supply the blanks as fast as required, and it is not unusual for production to be delayed, owing to the inability of the mechanism in use to supply the blanks as fast as required.

My present invention has for its object to provide mechanism that will fully meet the requirements by breaking blanks from a plurality of steel bars successively at each actuation of a hydraulic press, the bars being prepared for breaking in the usual manner, that is by nicking or scoring with an oxy-acetylene torch and then chilling.

With this and other objects in view, I have devised the novel breaking mechanism which I will now describe, referring to the accompanying drawing forming a part of this specification and using reference characters to indicate the several parts.

Figure 1 is an elevation of a hydraulic press showing the application thereto of my novel breaking mechanism, the ram and die being in the raised position;

Fig. 2, a view as seen from the right in Fig. 1, and

Fig. 3 is a view on an enlarged scale, corresponding with Fig. 1, showing the die in the breaking position.

10 denotes the framework of a hydraulic press, which may be of any ordinary or preferred construction or design, 11 the ram, which carries a head 12 adapted to slide on guides forming a part of the frame work, 13 a jig which is bolted to the head and is provided with T-slots 14, to provide for the attachment thereto of the die 15, in various positions as may be required in breaking blanks of different lengths. It is a vitally important feature of the present invention that a plurality of bars are broken successively at each actuation of the mechanism. This is effected through the peculiar construction of the die, the configuration of which will be readily understood from Figs. 1 and 2. The two distinguishing characteristics of the die are, first, that its operative face comprises a plurality of steps, indicated by 33, these steps lying in parallel planes and transversely to the long dimension of the die, and second, that the operative face of each step inclines slightly from the front (*i. e.*, from the direction of the feed) backward and downward toward the rear, the rear end of each step being slightly lower than the front end. This is in order to give the greatest possible leverage by insuring that the breaking force of the die will be applied at the greatest possible distance from the nicking or scoring. The die is secured to the jig by means of bolts 19, the heads of which engage one of the T-slots in the jig, and which pass through flanges 20 at the ends of the die, the die being secured in place by nuts 21, engaging the bolts and bearing against the flanges.

16 denotes the knife or anvil, which is seated in a knife block 17, itself resting upon a block 18. The knife is of course heavy, the cutting edge lying preferably in the horizontal plane and on the far side from the direction of the feed, as will be understood from Fig. 3. In front of the knife, the knife block stands the full height of the edge which gives a support for the bars while being operated upon by the die, this support being indicated by 32. Beyond the knife, the knife block is cut away so that when the bars are broken the blanks drop away from the knife, as indicated in Fig. 3. The nicked or scored bars, indicated by 22, are fed in over a suitable table, indicated by 23. The bars may be moved forward by any suitable feeding mechanism, which is not illustrated, as specifically it forms no part of the present invention, which simply requires that the bars be fed forward uniformly when the die rises.

As a means of retaining the bars securely in place for the breaking operation, I provide a tapering, clamping bar 24, which is adapted to be reciprocated in a tapering slot 25 in the underside of a block 26, which is rigidly secured to the guides or any other convenient portion of the framework. The clamping bar is provided with pins 27 which

engage slots 28 in links 29, the upper ends of which are pivoted to ears 30 extending from the block. One of the links is provided with a handle 31, for convenience in operation.

The operation of the mechanism as a whole will be readily understood from the drawing. The work is fed in from the left, as seen in Figs. 1 and 3. The left side, as seen in these views, is therefore considered as the front of the machine and the right side as the rear. The words "rear" and "rear edge," therefore, as used in this specification mean the side or edge farthest from the left as seen in Figs. 1 and 3, that is farthest in the sense of the direction of feed. When the die is raised, as in Fig. 1, the clamping bar is loosened by means of the handle and the bars are fed rearward the required distance, which of course places the next nicks or scorings in position to register with the edge of the knife. The operator then by means of the handle operates the clamping bar and clamps the bars securely. As both the clamping bar and the slot in which it is seated are inclined slightly forward and downward, it follows that as the bar is moved forward the wedging action of the inclines of the slot and the bar will force the latter downward and cause it to grip securely the bars to be operated upon. It will be noted that in operation the portion of each bar that is to be broken off to form a blank, projects beyond the knife and is unsupported, the knife block being cut away on that side. The end of the bar back of the nick or scoring, however, in addition to bearing upon the edge of the knife is supported firmly by the knife block itself, upon which the bars to be operated upon are clamped by the clamping bar. When the die moves downward, it will be obvious from Fig. 2, that the bars will be engaged successively not simultaneously, but that an instant after the first bar, counting from the left as seen in Fig. 2, has been broken by the lowest step in the die, the second bar will be engaged by the second step, and so on until the bars are all broken. It is important, however, that the entire force of the press is delivered upon each bar individually, so that with my present construction of die no more power is required to break a plurality of bars at each actuation of a hydraulic press than has heretofore been used to break a single bar. Another important feature is that the greatest possible leverage of the die is utilized by causing the die to incline from the front backward and downward toward the rear so that the rear end of each step will first engage the bar and, in fact, do the breaking.

Having thus described my invention, I claim:

1. Mechanism for breaking steel bars comprising a knife having its edge in the horizontal plane and a die comprising a series of steps adapted to operate on bars successively, the operative face of each step inclining downward from the direction of feed.

2. Mechanism for breaking steel bars comprising a knife having its end in the horizontal plane, a die comprising a series of steps, each step being an incline lowest at its rear edge, and means for clamping a plurality of bars while being acted upon by the die.

3. Mechanism for breaking steel bars comprising a knife having its edge in the horizontal plane, a die comprising a series of steps, each inclining downward from the direction of feed for the purpose set forth, a knife block which supports the rods before the knife and is cut away beyond the knife, and a clamping bar by which the bars are clamped upon the knife block before the knife.

4. Mechanism for breaking steel bars comprising a knife, means for holding a plurality of bars while being operated upon, and a die comprising a series of steps adapted to act on the bars successively, each step being lowest at its rear end.

5. Mechanism for breaking steel bars comprising a knife, a knife block having a support for the bars, an inclined clamping bar coöperating with the support, a block having an inclined slot in which the clamping bar may reciprocate, and links on which the clamping bar is suspended, the inclines of the clamping bar and slot causing the bars to be operated upon to be gripped between the support and the clamping bar when the latter is moved forward.

6. Mechanism for breaking steel bars comprising a knife, a block in which it is seated and which is provided before the knife with a support for the bars, an inclined clamping bar, a block having an inclined slot in which the clamping bar may reciprocate, links by which the clamping bar is suspended, one of said links having a handle by which the clamping bar is operated to hold the bars in place, and a die comprising a series of steps which coöperate with the knife to break the bars successively.

In testimony whereof I affix my signature.

CHARLES A. GLOVER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."