Dec. 8, 1953 W. PEDDINGHAUS ET AL 2,661,786

BENDING MACHINE

Filed Dec. 21, 1950

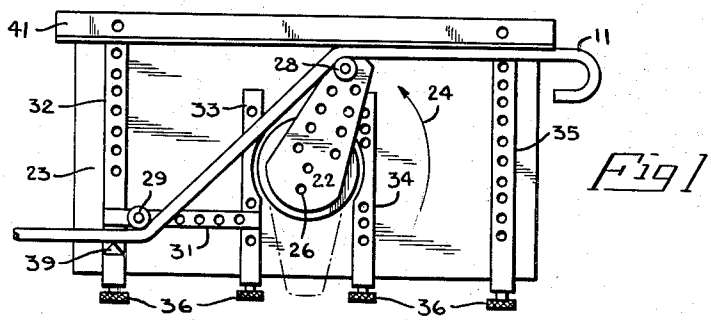


Fig 1

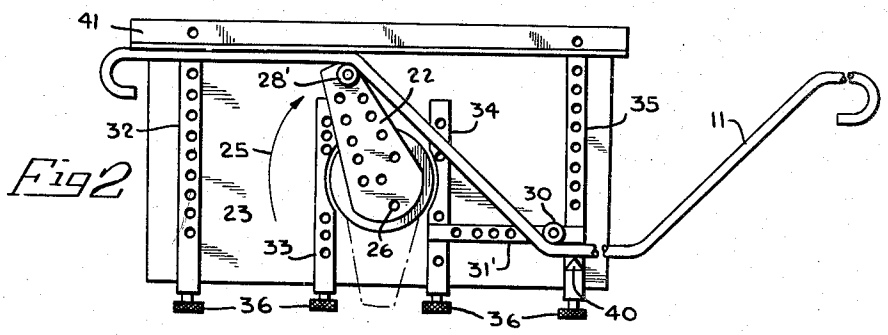


Fig 2

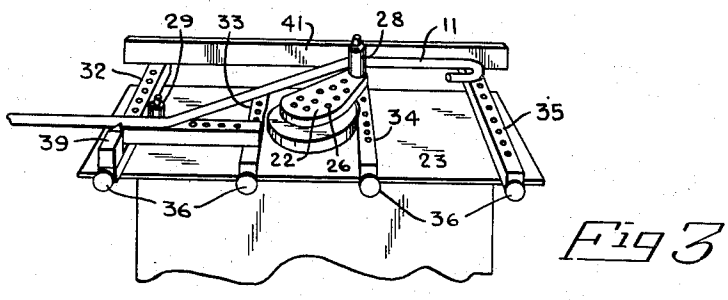


Fig 3

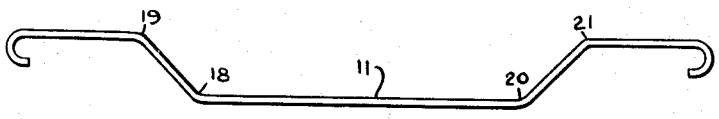


Fig 4

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Patented Dec. 8, 1953

2,661,786

UNITED STATES PATENT OFFICE

2,661,786

BENDING MACHINE

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Application December 21, 1950, Serial No. 201,912

Claims priority, application Germany March 24, 1950

2 Claims. (Cl. 153—15)

1

This invention relates to bending machines and particularly to machines for bending steel rods and reinforcing irons.

Machines of this type are generally provided with an oscillating removable bending plate provided with holes for the insertion of bolts which support bending rollers.

The creation of so-called "double bents" which are adjacent step-shaped bents, can only be effected in customary bending machines by replacement of the bending plate with a bending lever or arm of which the length at least corresponds to the distance of the bent limiting points.

Consequently large bending arms are required and this is particularly so if heavy work pieces are bent and the bending levers reach far over the width of the bending table and endanger the working personnel. In order to eliminate accidents protective devices must be applied generally consisting of semicircular protective plates shaped in conformity with the operative range of the bending arm on the charging side of the machine and protective rails on the opposite side. These protective devices interfere with the servicing and the operation of the machine and cause the attendants to use bending plates in cases where the same do not answer the operative requirements arising in bending large and heavy objects; consequently the economy of the operation is reduced, as the adjacent double bents by the use of bending plates can only be made by two successive steps.

Moreover, a long bending arm necessitates a large size of the bending table and a higher power input.

It is the primary object of the invention to eliminate the above recited economical and safety endangering disadvantages and shortcomings of the art.

It is a further important object of the invention to enable the bending of large and heavy workpieces and particularly the production of double bents in the same machine and to eliminate an exchange of the bending arm in bending these large workpieces.

It is also an object of the invention to dispense with the hitherto required voluminous protective devices.

It is a further object of the invention to greatly reduce the size of the bending machine without in any way diminishing its applicability particularly in the production of double bents.

It is another object of the invention to render the bending machine easily adjustable to the

2

varying shapes and sizes of the objects to the bent.

With these and additional objects in view which will become apparent, as this description proceeds, the invention will now be described in detail and with reference to the accompanying drawings which illustrate the invention and the art to which it pertains.

In the drawings,

Figures 1–3 show views of a bending machine in its various operating positions for the production of a reinforcing iron provided with hook-shaped and with double bents,

Figure 4 is a side view of the finished reinforcing iron.

In the bending device constructed in conformity with the invention and illustrated in Figures 1 to 3 the bending crank arm 22 is actuated in the direction of arrows 24 and 25 by a reversing gear which is located underneath rectangular table 23. Several bores 26 serve to take up the supporting bolt of the bending roller 28.

For the production of the double bents 18, 19 and 20, 21, Figure 4, a pair of bending rollers 29 and 30 is provided; these rollers are inserted into the holder strips 31 and 32 which extend in the longitudinal direction of table 23. The holders are adjustably supported on rails 32, 33 and 34, 35 extending across table 23; the holes in these rails are spaced to permit small adjustments. A step-free adjustment and therewith great accuracy of the bents may be obtained by an additional longitudinal and lateral adjustment of the rails 32, 33, 34, 35 which may be effected in any known manner, for example, by means of worm-gear spindles as indicated at 36.

The bending device, illustrated in Figures 1 to 3 is operated, as follows.

To produce the double bents 18, 19 and 20, 21, Figure 4, respectively one bending roller 28 is inserted into the bending arm 22 and additional rollers 29 and 30 are inserted into holders 31 and 32 respectively. The rod 11 is entered between the rollers and the bending arm 22 is swung in the direction of arrows 24 and 25 respectively.

The rod 11 is propped by the adjustable abutments 39 or 40 and by a longitudinal horizontally extending abutment member 41 which is adjustable by insertion into holes provided in rails 32 and 35.

As apparent from Figures 1 and 2 the invention enables the production of far outreaching double bents with a comparatively small bending crank arm.

The reinforcing iron rod 11 is in conformity

with Figure 1 provided with the first double bent by the cooperation of crank arm 22 which is oscillated in the direction of arrow 24 and of the roller 29 of roller pair 29, 30 which roller is located on the left side of the table; the rod 11 is held between roller 29 and abutment 39.

The second bent is made in accordance with Figure 2 on the opposite side of the table and by the cooperation of lever arm 22, roller 30 and abutment 40, the lever being oscillated in the direction of arrow 25. The hitherto customary protective devices can be entirely spared.

The production of double bents is effected by means of a single pair of rollers; the one roll oscillates with the crank arm and the other one, which cooperates with an abutment, is located on a support which is adjustable parallel to the bending table. Accordingly the length of the crank arm is not dependent upon the distance of the bending points; therefore the length of the crank arm can be greatly reduced.

The adjustability of the bending rollers, which are solidly supported upon a holder of the bending table, may be attained by a variety of measures.

A particularly simple and useful construction results from the insertion of the roller which cooperates with an abutment in a rail which extends parallelly to the longitudinal side of the bending table; this rail is adjustable by means of additional, hole provided rails which are mutually and parallelly adjustable.

The table dimensions which are mainly dictated by the length of the bending arm may be accordingly shortened and the weight of the machine essentially reduced. Moreover, the power consumption is smaller as with the hitherto customary rod bending devices, since the bending force acts upon a much shorter crank arm.

The invention has been described with reference to a preferred embodiment and it will be understood that many variations and modifications thereof may be resorted to without departure from the scope of the invention as defined in the following claims.

We claim:

1. An apparatus for applying double bends to steel rods and comprising a horizontal table, a crank arm having one end rotatably mounted on the table for rotation about a vertical axis, a first bending roller mounted on the other end of the crank arm, a longitudinal horizontally extending abutment member mounted on said table, the distance between the crank arm axis of rotation and said first bending roller being greater than the distance between said axis and said abutment member, means for holding one end of a rod in a direction parallel to said abutment member, a second bending roller adjacent said holding means and located at the side thereof closest to said abutment member and to said crank arm axis of rotation, and means for mounting said holding means and said second bending roller on the table, the distance between said bending rollers when the first roller is adjacent said abutment member being greater than the distance between the crank arm axis of rotation and the first bending roller.

2. An apparatus for applying double bends to steel rods and comprising a horizontal table, a crank arm having one end rotatably mounted to the table for rotation about a vertical axis, a first bending roller mounted on the other end of the crank arm, a longitudinal horizontally extending abutment member mounted on said table, the distance between the crank arm axis of rotation and said first bending roller being greater than the distance between said axis and said abutment member, means for holding one end of a rod in a direction parallel to said abutment member, a second bending roller adjacent said holding means and located at the side thereof closest to said abutment member and to said crank arm axis of rotation, and means for mounting said second bending roller in any selected one of several positions on said table, said positions locating the axis of said second bending roller at varying distances from said abutment and said crank arm axis of rotation.

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