H. J. HARDY.

MACHINE FOR BENDING RODS, BARS, OR THE LIKE.

APPLICATION FILED DEC. 29, 1919.

1,385,542. Patented July 26, 1921.

2 SHEETS—SHEET 1.

Fig. 1

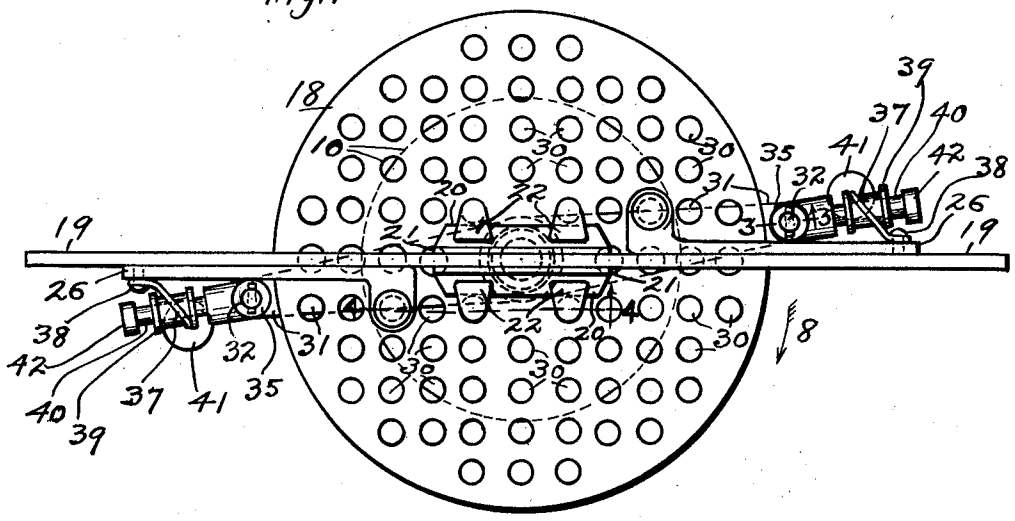
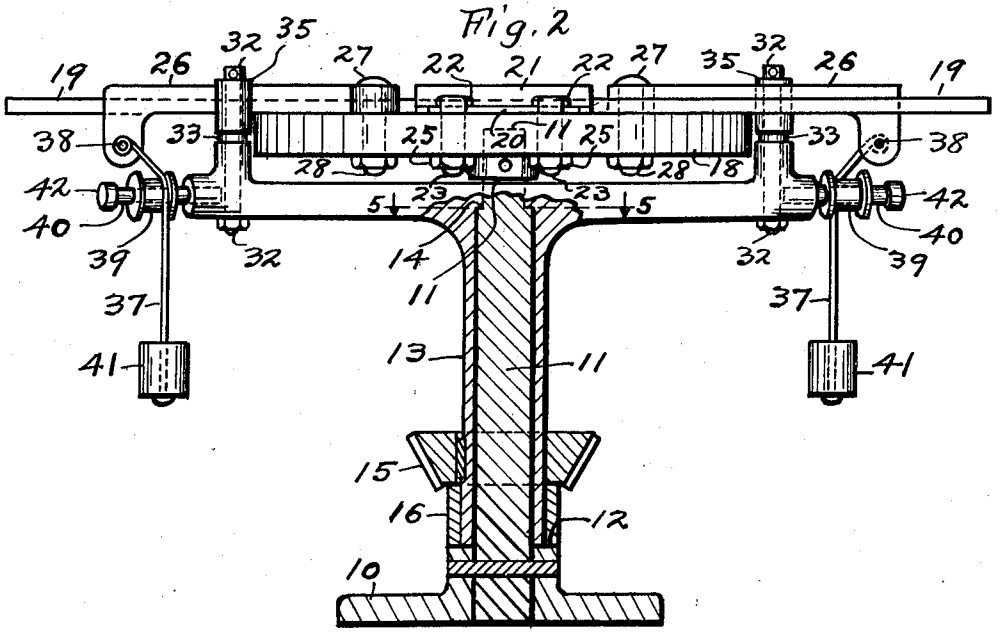


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3

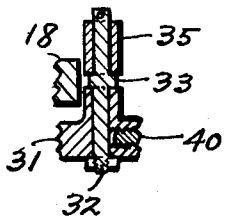


Fig. 4

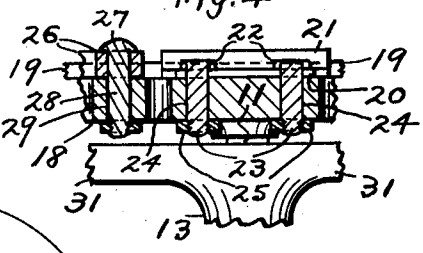


Fig. 5

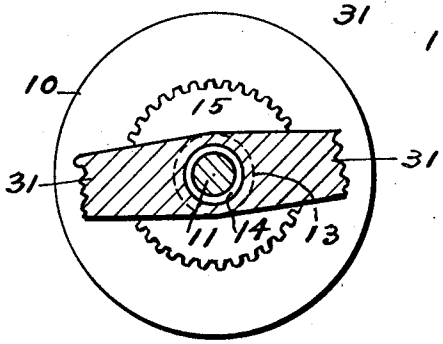
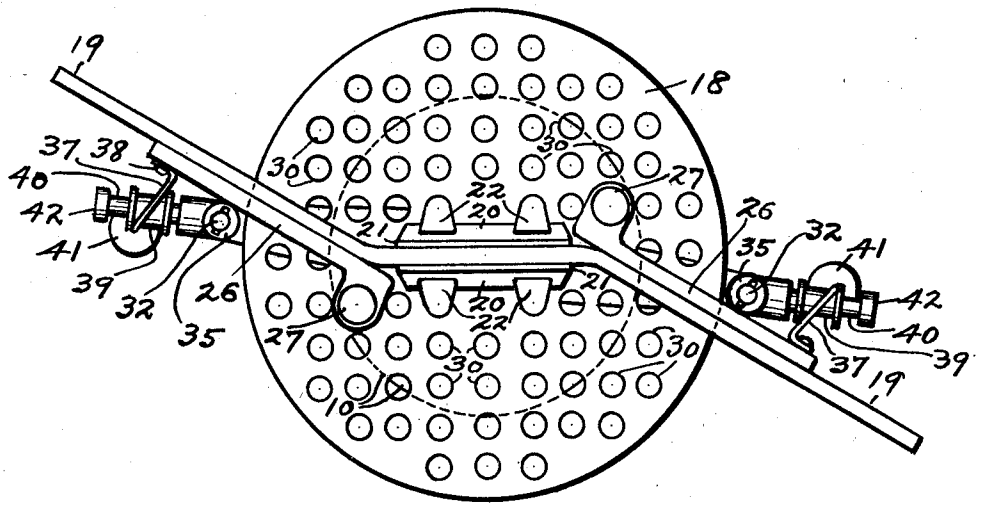


Fig. 6



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UNITED STATES PATENT OFFICE.

HAROLD J. HARDY, OF CLEVELAND, OHIO.

MACHINE FOR BENDING RODS, BARS, OR THE LIKE.

1,385,542. Specification of Letters Patent. Patented July 26, 1921.

Application filed December 29, 1919. Serial No. 348,138.

To all whom it may concern:

Be it known that I, HAROLD J. HARDY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Machine for Bending Rods, Bars, or the like, of which the following is a specification.

This invention relates to improvements in machines for bending metal rods, bars and the like.

The primary object of this invention is to construct a metal-bending machine in which opposite end portions of a metal rod or bar can be bent simultaneously horizontally or laterally in opposite directions respectively.

Another object is to employ a lever or levers for bending a rod or bar and to provide improved means for operating said lever or levers.

Another object is to render my improved bending machine simple and durable in construction, and efficient and reliable in its operation.

With these objects in view, and to attain any other object hereinafter appearing, this invention consists in certain features of construction, and combinations and relative arrangements of parts, hereinafter described in this specification, pointed out in the claims, and illustrated in the accompanying drawings.

In said drawings, Figure 1 is a top plan of a metal-bending machine embodying my invention. Fig. 2 is a side view, partly in central section. Fig. 3 is a vertical section taken along the line 3—3, Fig. 1. Fig. 4 is a vertical section taken along the line 4—4, Fig. 1. Fig. 5 is a horizontal section taken along the line 5—5, Fig. 2. Fig. 6 is a top plan. In Fig. 6 the bending levers are shown actuated into a position in which they have bent opposite end portions respectively of a rod or bar laterally in opposite directions respectively, whereas in Fig. 1 said levers are shown as in position to begin their bending operation.

Referring to said drawings, 10 indicates the circular base of a metal standard comprising a substantially verical metal post 11 arranged centrally of said base and secured to the base in any approved manner. Said base extends around the lower end portion of the post 11 and (see Fig. 2) forms an upwardly facing annular shoulder 12 extending around said post. Said post is circular in cross-section and forms an upright bearing for a substantially vertical tubular shaft 13 which loosely embraces and extends endwise of said post. The upper portion of said post is provided (see Figs. 2 and 5) with an upwardly facing annular shoulder 14 which is concentric in relation to the shaft which has its upper portion extending over and seated on said shoulder. The shaft is operatively provided with a bevel-gear 15 for rotating the shaft, and I would here remark that any well known means (not shown) for rotating said gear and consequently the shaft in opposite directions alternately are employed, but mechanisms for effecting a partial rotation of a shaft in opposite directions alternately are too well known to require illustration and description in this specification. The gear 15 is shown spaced upwardly from the base of the supporting standard, and a collar 16 loosely embraces the shaft 13 between said base and said gear.

Arranged over and spaced upwardly from the shaft 13 in Figs. 1 and 2 is a substantially horizontal circular metal bed 18 on which a straight metal rod or bar 19 is shown placed in position to be bent. Said bar or rod extends diametrically across the bed and beyond the outer circumferential edge of the bed, and said bed is mounted on the post 11 and rendered rigid with said post in any approved manner. Said bed is concentric in relation to the shaft 13, and the outer circumferential edge of the bed extends concentrically relatively to said shaft. On the central portion of said bed is mounted a pair of angle-plates which are arranged at opposite sides respectively of the central portion of the rod or bar 19, and each of said angle-plates (see Figs. 1, 2 and 4) has one wing or member 20 thereof horizontal and resting on the bed and has its other wing or member 21 projecting vertically upwardly and affording lateral support to the adjacent side of said bar or rod. Said angle-plates are shown secured to said bed by clamping bolts which have jaws or heads 22 overlapping the top sides of the horizontal members of said plates and have their shanks 23 extending through holes 24 in the bed. Said shanks 23 project below the bed, and nuts 25 are threaded, at the under side of the bed, onto said shanks and tightened against the bed. It will be ob-

served therefore that the vertical members 21 of said angle-plates form a pair of oppositely arranged parallel abutment-members which are spaced laterally to permit the interposition laterally between them of the bar or rod 19. Two bending levers 26 are arranged at opposite ends respectively of said pair of angle-plates and shown in Figs. 1 and 2 as engaging opposite end portions respectively of the rod or bar 19, and said levers are suitably spaced from said angle-plates. Each lever 26 is mounted on the bed 18 and shown fulcrumed to the bed by a vertical fulcrum-pin which (see Fig. 4) has a head 27 resting on the lever and has its shank 28 extending through a hole 29 in the bed. The levers 26 are therefore arranged to move in a horizontal plane and to bend opposite end portions respectively of the bar or rod 19 laterally in opposite directions respectively. The bed 18 is preferably provided, in addition to the holes 24 and 29, with holes 30 to permit different relative adjustments of said levers and the hereinbefore mentioned angle-plates, and to permit the use of different sizes and shapes of angle-plates and levers, and to permit of other work not considered necessary to describe in this specification.

The shaft 13 is provided, at its upper end and in proximity to the bed 18, with two laterally and outwardly projecting arms 31 arranged substantially radially of the bed at opposite sides respectively of the shaft and extending beyond the outer circumferential edge of the bed. Each arm 31 is provided at its outer end with a vertical pin 32 which is arranged opposite and spaced from the outer circumferential edge of and extends above the bed 18 and has a diametrical enlargement 33 which is opposite said edge and rests on said arm. Said pin is provided above its enlargement 33 with a vertical anti-friction roller 35 which rest on said enlargement. The relative arrangement of the parts is such that to bend the end portions of the rod or bar 19 from the position shown in Fig. 1 into the position shown in Fig. 6 the shaft 13 is rotated in the direction required to actuate the levers 26 in the direction indicated by the arrow 8 in Fig. 1. Each lever 26 therefore extends into the path of the roller 35 of the adjacent shaft-arm 31. Each lever (see Fig. 2) is provided at its outer end with a rigid downwardly projecting member 36, and a cable 37 which is attached at one end, as at 38, to said member 36 leads thence to and over a guide-pulley 39 rotatably mounted on and shiftable endwise of a pin 40 which (see Figs. 1 and 3) is arranged at the outer end of and in line endwise with the adjacent shaft-arm 31 and threaded at its inner end into and consequently removable from said shaft-arm. Attached to the other end of and suspended by said cable is a weight 41 acting to retain the connected lever in contact with the roller 35 on said shaft-arm during the rotation of the shaft in the direction required to return the shaft-arms from the position shown in Fig. 6 into the position shown in Fig. 1. The pin 40 of each shaft-arm 31 is provided at its outer end with a head 42 arranged to prevent movement of the guide-pulley 39 outwardly off said pin. It will be observed that the levers 26 are arranged to engage opposite sides respectively of one and the same rod or bar, that the vertical members 21 of the hereinbefore mentioned angle-plates constitute means for affording lateral support between said levers to opposite sides of said bar or rod, that the rollers or lever-actuating members 35 are arranged to travel circumferentially of the space next over the bed 18 in the same direction circumferentially of said space and disposed diametrically opposite in relation to the bed, that the shaft and its arms 31 constitute means for moving said lever-actuating members simultaneously in the same direction circumferentially of said space, and that as said lever-actuating members are carried by the different arms 31 respectively obviously the rotation of the shaft in the required direction causes both lever-actuating members to be moved simultaneously so as to bend opposite end portions of the rod or bar 19 laterally in opposite directions respectively.

What I claim is—

1. In a machine for bending a metal rod, bar or the like, a substantially horizontal bed, two spaced levers arranged over and fulcrumed to the bed and movable in a horizontal plane and arranged to engage opposite sides respectively of one and the same bar or rod to be bent laterally, means for affording lateral support between said levers to said rod or bar, two lever-actuating members movable circumferentially of the bed and arranged diametrically opposite, and means for moving said lever-actuating members simultaneously in the same direction circumferentially of the bed, one of the levers extending into the path of one of said lever-actuating members, and the other of said levers extending into the path of the other of said lever-actuating members.

2. In a machine for bending a metal rod, bar or the like, a standard comprising a substantially vertical post which is circular in cross-section and forms an upright bearing, a tubular upright shaft loosely embracing said post and provided at its upper end with a laterally and outwardly projecting arm, means for rotating the shaft, a substantially horizontal circular bed arranged above said shaft and supported from said post, a lever mounted on and fulcrumed to the bed and movable in a horizontal plane and adapted

to be employed in bending a bar or rod laterally during movement of said lever in the required direction, an anti-friction roller arranged to actuate said lever in said direction and carried by the aforesaid arm, and means acting to retain said lever in contact with said roller.

3. In a machine for bending a metal rod, bar or the like, a standard comprising a substantially vertical post which is circular in cross-section and forms an upright bearing, a tubular upright rotatable shaft loosely embracing said post and provided at its upper end with a laterally and outwardly projecting arm, a sustantially horizontal bed arranged above said shaft and supported from said post, a lever arranged over and fulcrumed to the bed and movable in a horizontal plane and adapted to be employed in bending a rod or bar laterally during movement of said lever in the required direction, a member arranged to actuate said lever in said direction and carried by the aforesaid arm, a bearing-forming pin supported from the outer end of and arranged in line endwise with said arm, a guide-pulley rotatably mounted on and shiftable endwise of said pin, a cable attached at one end to the aforesaid lever and thence leading to and over said pulley, and a weight attached to the other end of and suspended by the cable.

4. In a machine for bending a metal rod, bar or the like, a standard comprising a substantially vertical post which is circular in cross-section and forms an upright bearing, a tubular upright rotatable shaft loosely embracing said post and provided at its upper end with a laterally and outwardly projecting arm, a substantially horizontal bed arranged above said shaft and supported from said post, a lever mounted on and fulcrumed to the bed and movable in a horizontal plane and adapted to be employed in bending a rod or bar laterally during movement of said lever in the required direction and provided at its outer end with a downwardly projecting member, a member arranged to actuate said lever in said direction and carried by the aforesaid arm, a pin supported from the outer end of and arranged in line endwise with and removably secured to said arm and provided at its outer end with a head, a guide-pulley rotatably mounted on and shiftable endwise of said pin between said head and said arm, a cable attached at one end to the aforesaid downwardly projecting member of the lever and thence leading to and over said pulley, and a weight attached to the other end of and suspended by the cable.

5. In a machine for bending a metal rod, bar or the like, a standard comprising a substantially vertical post which is circular in cross-section and forms an upright bearing, a tubular upright rotatable shaft loosely embracing said post and provided at its upper end with a laterally and outwardly projecting arm, a substantially horizontal bed arranged above said shaft and supported from said post, a lever arranged over and fulcrumed to the bed and movable in a horizontal plane and adapted to be employed in bending a rod or bar laterally during movement of said lever in the required direction, a vertical pin carried by the outer end of the aforesaid arm and arranged opposite the outer circumferential edge of and extending above the bed, and a roller carried by said pin and arranged to actuate the aforesaid lever in the aforesaid direction.

6. In a machine for bending a metal rod, bar or the like, a standard comprising a substantially vertical post which is circular in cross-section and forms an upright bearing and has its upper portion provided at a point spaced downwardly from the upper extremity of the post with an upwardly facing annular shoulder, a tubular upright rotatable shaft which embraces said post and has a portion thereof extending over and seated on said shoulder and is provided at its upper end with two laterally and outwardly projecting arms arranged at opposite sides respectively of the shaft, a substantially horizontal bed arranged above said shaft and supported from the aforesaid post, two spaced levers mounted on and fulcrumed to the bed and movable in a horizontal plane and arranged to engage opposite sides respectively of one and the same bar or rod to be bent laterally, means for affording lateral support between said levers to opposite sides of said rod or bar, and two lever-actuating members carried by the different aforesaid arms respectively, one of the levers extending into the path of one of said lever-actuating members and the other of said levers extending into the path of the other of said lever-actuating members.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

HAROLD J. HARDY.

Witnesses:
BASIL F. JOHNSON,
CASPER J. DOVER.