H. BUSSEL.

METAL WORKING DEVICE.

APPLICATION FILED JUNE 17, 1919.

1,387,683.

Patented Aug. 16, 1921.

4 SHEETS—SHEET 1.

Fig. 1.

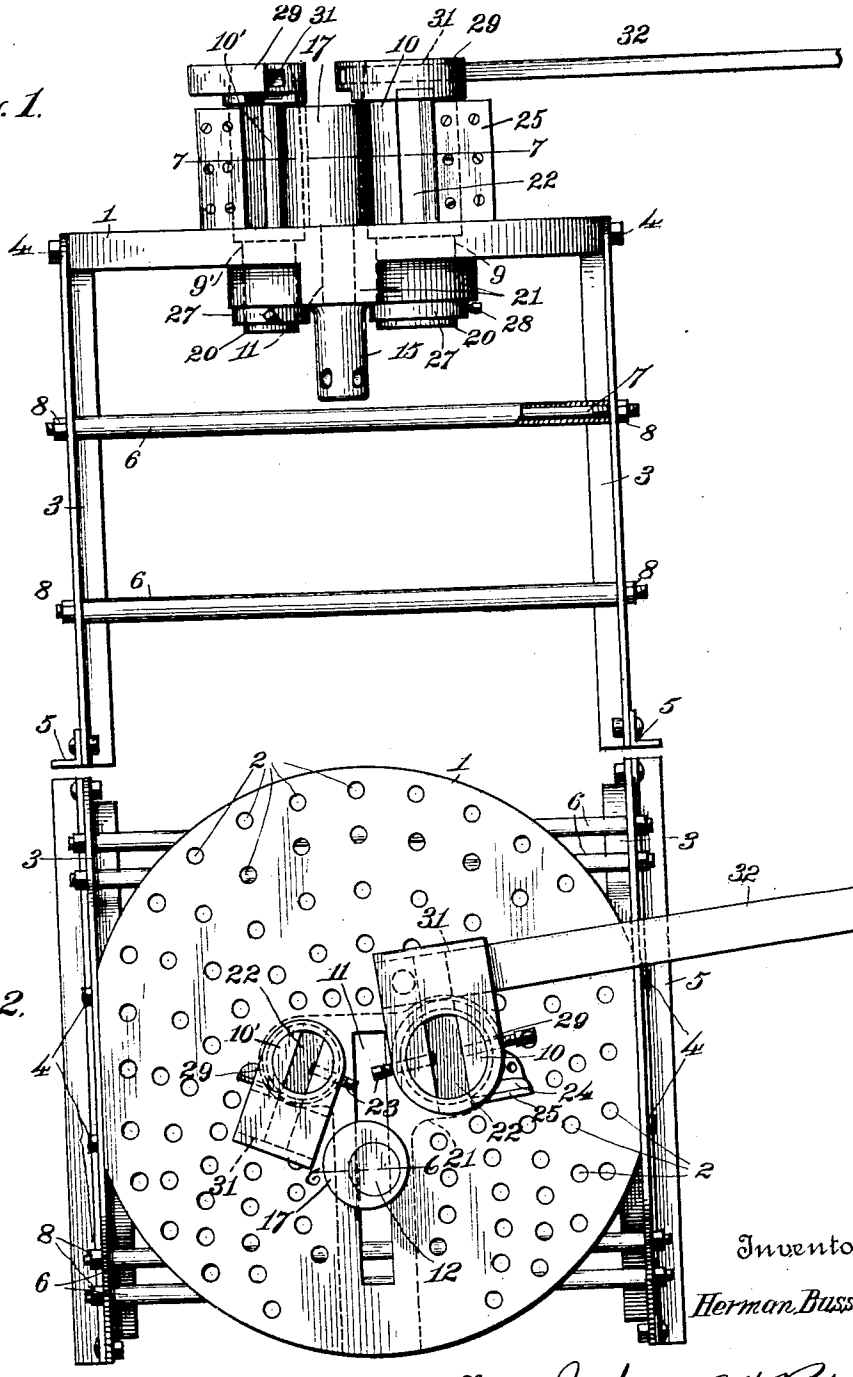


Fig. 2.

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4 SHEETS—SHEET 2.

Fig. 3.

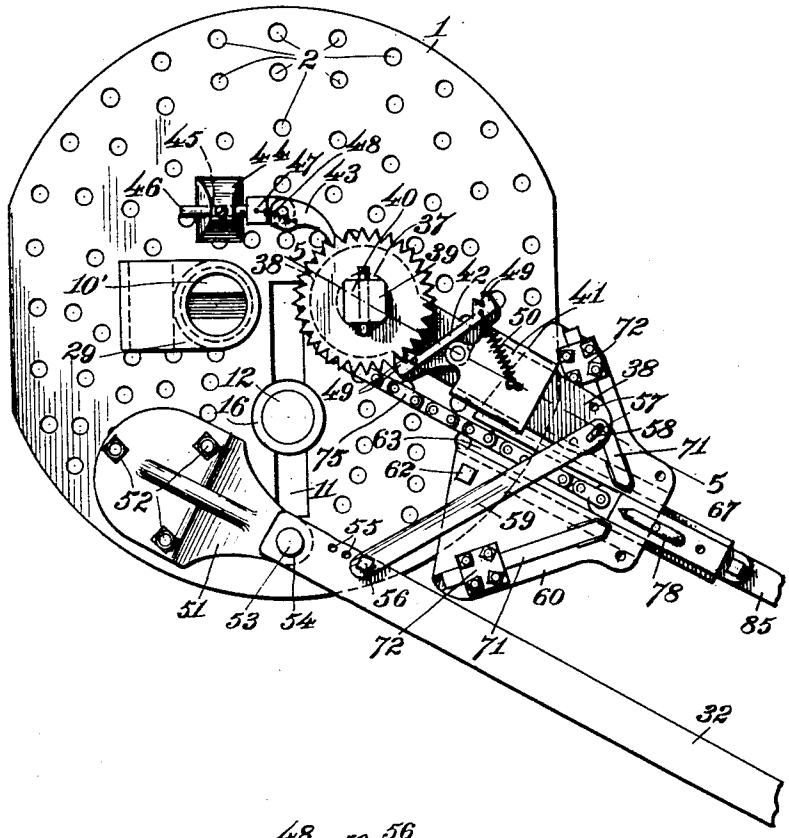
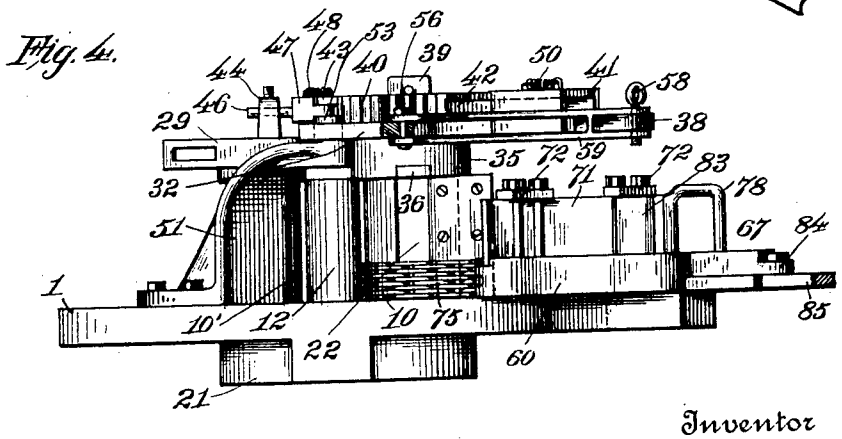


Fig. 4.



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4 SHEETS—SHEET 3.

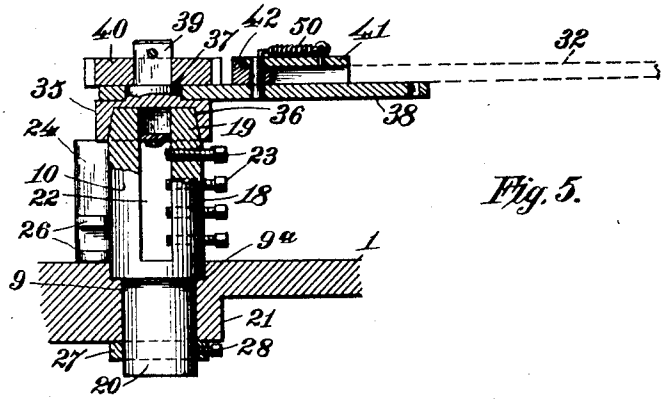
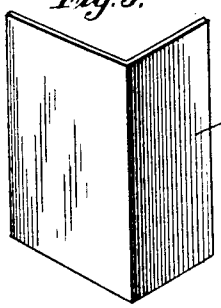


Fig. 5.

Fig. 9.



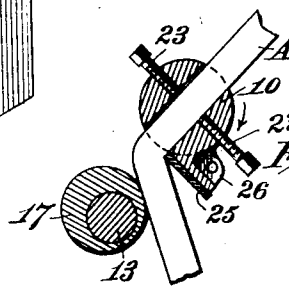


Fig. 7.

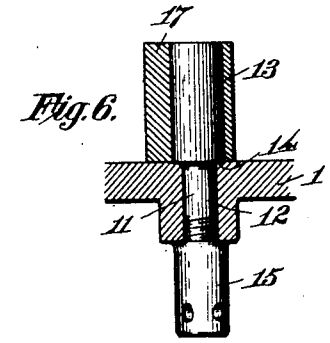


Fig. 6.

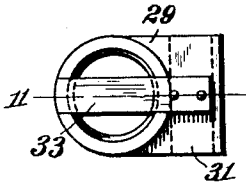
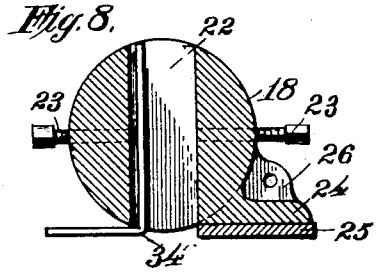


Fig. 10.

Fig. 8.



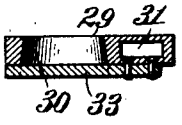


Fig. 11.

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4 SHEETS—SHEET 4.

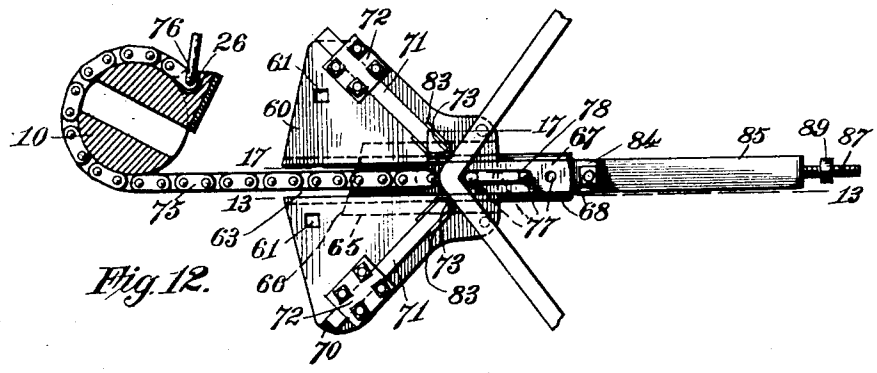


Fig. 12.

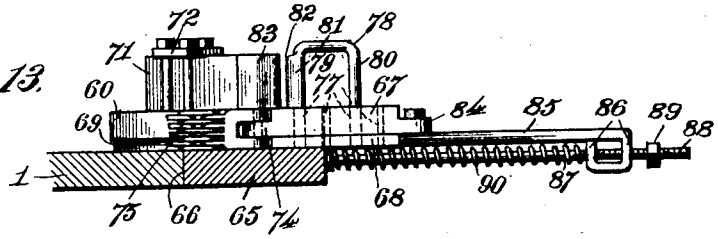
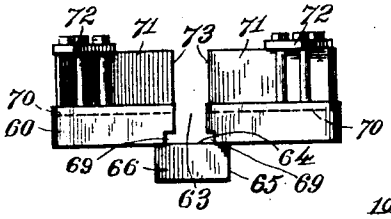


Fig. 13.

Fig. 14.



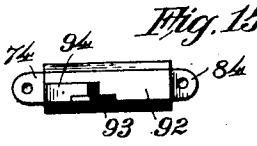


Fig. 15.

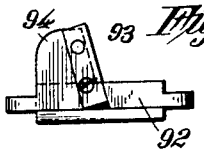


Fig. 16.

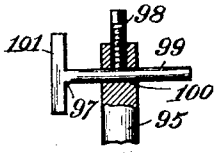
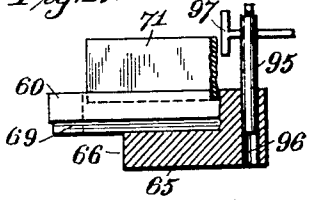


Fig. 18.

Fig. 17.



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UNITED STATES PATENT OFFICE.

HERMAN BUSSEL, OF EL PASO, TEXAS.

METAL-WORKING DEVICE.

1,387,683. Specification of Letters Patent. Patented Aug. 16, 1921.

Application filed June 17, 1919. Serial No. 304,753.

To all whom it may concern:

Be it known that I, HERMAN BUSSEL, a citizen of the United States, residing at El Paso, county of El Paso, and State of Texas, have invented certain new and useful Improvements in Metal-Working Devices, of which the following is a specification.

My invention relates to improvements in metal working devices, that is to devices for bending and shearing metal.

The object of my invention is to provide a hand operated device whereby metal bars of practically any cross sectional area within reason may be readily bent to any desired angle. A further object of my invention is to provide a device of the character mentioned whereby the metal bar may be bent at a sharp angle. A further object of my invention is to provide, in a device as mentioned, means for protecting the bending elements when heated bars are being bent. A further object of my invention is to provide, in a device of the class mentioned, means whereby the bending of the bar through any desired angle may be accomplished by taking operative strokes of any desired length. A further object of my invention is to provide a device as mentioned equipped with interchangeable parts whereby the same may be used for shearing metal bar or stock. Other objects will appear hereinafter.

With these objects in view, my invention consists generally in a bed plate, a rotary post mounted thereon and provided with a stock-receiving slot, means for turning said post, and a pin mounted on said bed plate and adjustable with relation to said post. My invention further consists in a device as mentioned further characterized by a hardened metal plate fixed to said post at one side of the stock-receiving slot and with its face at right angles to the walls of said slot. My invention further consists in a device as mentioned, in combination with an angle plate adapted to be positioned with one wall within the slot to protect the set screws and also to keep said set screws from injuring the heated stock, when the heated stock is being bent. My invention further consists in a device as mentioned in combination with a bracket detachably secured to said bed plate and provided with a pivot pin, a lever pivotally mounted on said pin, an arm rotatably mounted on said post, a ratchet connection between said arm and said post, and a connection between said lever and said arm. My invention further consists in a device as mentioned in which the ratchet mechanism is reversible to turn the post in either direction desired. My invention further consists in a bed plate and rotary slotted post as mentioned, a slotted jig plate detachably connected to the bed plate, a tool slide slidably mounted on said jig plate, a flexible connection between said slide and said rotary post, and fixed work-engaging elements on said jig plate coöperating with the tool slide, whereby the metal may be bent or sheared. My invention further consists in various details of construction, and arrangements of parts, all as will be fully described hereinafter and particularly pointed out in the claims.

My invention will be readily understood by reference to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a front elevation of a device embodying certain features of my invention, the same being illustrated as used for bending stock of all sizes within the capacity of the size of the machine.

Fig. 2 is a plan view of the same.

Fig. 3 is a plan view of the device equipped with the ratchet mechanism and jig plate for bending any stock and special work.

Fig. 4 is an elevation of the same.

Fig. 5 is a detail vertical section on the line 5—5 of Fig. 3.

Fig. 6 is a similar section on the line 6—6 of Fig. 2.

Fig. 7 is a diagrammatic horizontal section on substantially the line 7—7 of Fig. 1, illustrating the process of bending a piece of stock.

Fig. 8 is a detail horizontal section upon an enlarged scale illustrating the protective plate in position.

Fig. 9 is a perspective view of the protective plate.

Fig. 10 is a bottom plan view of a socket member which fits upon the top of the rotary post to receive the turning lever.

Fig. 11 is a section on the line 11—11 of Fig. 10.

Fig. 12 is a plan view of the jig plate, illustrating the adjacent rotary post in its relative position.

Fig. 13 is a vertical section on substantially the line 13—13 of Fig. 12.

Fig. 14 is a front elevation of the jig plate with the slide removed.

Fig. 15 is a plan view of one of the in-

terchangeable slides equipped with a shearing blade.

Fig. 16 is an elevation of the same.

Fig. 17 is a detail sectional view on substantially the line 17—17 of Fig. 12, illustrating a work holder in position, and

Fig. 18 is a detail view of the work holder.

Referring now to the drawings, 1 indicates the bed plate which is provided with a plurality of perforations 2 which constitute bolt or pin receiving apertures for securing parts of the mechanisms or templets thereto, as will appear more fully hereinafter. The bed plate is supported in any suitable manner, but, as shown in the drawings, I have provided a frame constructed of angle irons and bent to form legs 3 connected by transverse portions 4 which are bolted to the bed plate 1. The lower ends of the legs 3 are connected by angle irons 5 forming a firm footing for the device. The legs are spaced apart by pipe sections 6 through which are extended rods 7 upon the ends of which are nuts 8, forming clamps for rigidly connecting said legs.

The bed plate is also provided with a pair of circular recesses 9 and 9′ which form sockets in which are mounted posts 10 and 10′, respectively. These posts and sockets are identical with the exception that one post and socket is of greater diameter than the other. The bed plate 1 is also provided with a substantially radially-disposed slot 11 which extends into juxtaposition to the said posts. Adjustably mounted in the slot 11 is a pin 12, the upper portion 13 of which is of greater diameter than the portion within the slot forming a shoulder 14 which rests upon the upper face of the plate 1. Threaded upon the lower end of the pin 12 is a clamping nut 15 by means of which the pin may be rigidly secured to the plate in any desired position with relation to the post 10 or 10′. In using the device for some purposes the stock to be bent is secured to one of the posts and bears against the pin 11; and to protect the pin from injury a sleeve is fitted over the portion 13 thereof. This may be in the form of a section of pipe 16 as indicated in Fig. 3, or may be an eccentric member 17 as indicated in Figs. 2, 6 and 7.

As above stated, the posts 10 and 10′ are similar with the exception of their diameters, and, therefore, the description of one will suffice for both. These each comprise a cylindrical body portion 18 having a slightly tapered upper end 19 and a depending stem 20 of less diameter than the body portion 18 and projecting through the bottom of the table 1. To strengthen the table adjacent the apertures 9, 9′ and 11, and to give longer bearings for the posts 10—10′ and pin 13, the same is thickened materially, as indicated at 21. The upper end of the recess 9 is enlarged, as at 9^a, to receive the lower portion of the cylindrical body 18. Extending diametrically through the body portion 18 from the upper end thereof to a plane with the top of the table 1 is a recess 22 in which the stock to be bent may be secured by means of a plurality of set screws 23 projecting through both walls of the body 18. Extending laterally from the cylindrical portion 18 of the body is a flange 24 to the outer face of which is secured as by screws 25′ a special hardened steel plate 25, the face of which is at right angles to the adjacent wall of the recess 22, as shown clearly in Figs. 7 and 8. Arranged behind the flange 24 are a pair of superimposed lugs 26 which strengthen said flange and are provided for other purposes hereinafter described. A collar 27 is secured to the stem 20 by a set screw 28 and bearing against the bottom of the portion 21 of the bed plate securely holds the post in position but permits free rotation of the same. Suitable means must be provided for turning the post and to this end I provide a socket member 29 (see Figs. 10 and 11) which is formed with a tapered recess 30 to receive the tapered end 19 of the socket and a tangentially arranged recess 31 to receive the end of an operating lever 32. Extending diametrically across the member 29 is a bar 33 which fits within the upper end of the recess 22.

This construction permits replacement of the member 33 when the same becomes worn or damaged, without replacing the complete socket member and also permits said member 33 to be made of high grade hardened material and the remainder of a softer wrought iron, the advantages of which are obvious.

In operating the device as so far described, the stock A to be bent is arranged within the recess 22 and secured in position therein by the set screws 23, so that the portion where the bend is to be made rests at the inner edge of the plate 25. The pin 11 and its sleeve is then positioned in proper relation to the posts 10 or 10′ and secured in position by the nut 15. The post is then rotated by means of the lever 32 until the stock is bent to the desired angle, which may be of any degree up to a right angle. See Fig. 7. As a usual thing, the stock may be bent cold, but if it is desired to bend the same while hot, the post may be protected by means of an angle plate 34 which is positioned with one wall thereof within the slot between the set screws and the work to protect the set screws from the heat and also to protect the heated stock from injury by the set screws. See Figs. 8 and 9.

Should a greater leverage be necessary to bend heavy stock than is obtainable with

the simple arrangement above described, or should it be undesirable or impossible to move the lever through as much a sweep as is necessary to make the desired bend, I provide a suitable mounting on the bed plate for the operating lever and connect the same through ratchet mechanism with the rotary bending post. This arrangement is illustrated in Figs. 3, 4 and 5 of the drawings. As shown therein the stock member 29 is replaced by a socket member 35 having a tapered recess to receive the tapered end 19 of the post and a transverse bar 36 having the same office as the bar 33 of the stock member 29. The socket member 35 is provided with an upwardly extending cylindrical portion 37 upon which is mounted for free rotation an arm 38, and above the portion 38 is a squared extension 39 to receive a ratchet wheel 40 having a squared socket to receive the same, as shown in Figs. 3 and 5. The arm 38 is provided with a sleeve 41 adapted to receive one end of the operating lever 32 and mounted upon said arm is a dog 42 which engages the teeth of the ratchet wheel 40. It is obvious that with this arrangement the post 10 may be rotated by several short sweeps of the operating lever. To prevent retraction or reverse movement of the post upon reverse movement of the ratchet arm 38, I provide a pawl or pawls 43 supported upon a post 44 which may be arranged in any desired position with relation to the post 10, the same being secured in position by a bolt passing through one of the apertures 2 in the bed plate. The post 44 is provided at its upper end with a transverse aperture 45 in which is mounted a stem 46 having a head 47 upon which the pawl or pawls 43 are pivotally mounted. Springs 48 hold the pawls in engagement with the ratchet wheel 40. By this arrangement the pawls may be reversed for a purpose hereinafter described. The dog 42 comprises a bar pivoted adjacent its center and provided at each end with one or a pair of teeth 49, either pair of which may be brought into engagement with the ratchet wheel 40. A spring 50 holds the dog in proper operative position and this spring may be attached to either end of the dog as desired to bring the opposite end of the dog into engagement with the wheel 40. It is obvious that by this arrangement the ratchet may be arranged to rotate the post in either direction, and it is for this reason that the pawls 43 are made reversible to coöperate therewith.

When greater leverage is required, I secure a bracket 51 to the bed plate 1, the securing bolts 52 of which pass through apertures 2 in the bed plate. This bracket is provided with an upwardly extending pivot pin 53 which engages in an aperture 54 in the end of the operating lever 32. The lever 32 is provided adjacent the pivot end with a plurality of apertures 55 to receive a bolt 56, and the outer end of the arm 38 is also provided with perforations 57 to receive a pivot pin 58. A connecting link 59 is secured to the arm 38 and lever 32 by means of the bolt 56 and pin 58. It is obvious that by this arrangement great power may be applied to the rotary bending post.

60 indicates a jig or forming plate provided with bolt holes 61 to receive bolts 62, said bolts extending through apertures 2 to secure the jig plate in position upon the bed plate 1. The jig is formed with a longitudinally-disposed slot 63, the bottom 64 of which is flush with the top of the table 1. The plate is thickened as at 65 beneath said slot and the forward portion is cut away forming a shoulder 66 which rests against the edge of the plate 1, thereby relieving the bolts 62 of all strain. The forming plate 60 is preferably secured to the bed 1 so that the line of the slot 63 is substantially tangential to the post 10. Slidably mounted in the slot 63 is a forming slide 67 which is provided with laterally extending face flanges 68 which fit in undercut portions 69 at the base of the groove 63. The upper face of the plate 60 is provided with angularly disposed grooves 70 in which are arranged the lower edges of blades 71, said blades extending considerably above the surface of the plate and held in position by clamps 72 which permit adjustment of the ends of the blades with relation to each other and the slot 63. These blades are preferably arranged at right angles to each other, or forty-five degrees to the slot 63, and one end of the same are sharpened to form guiding edges 73 for use when the device is to be employed for shearing the stock. The slide is provided at one end with a perforated ear 74 to which may be attached a chain 75, the opposite end of the chain being secured by a pin 76 between the lugs 26 on the post 10, so that by rotating the post 10 by any of the means above described the slides 67 will be moved through the groove 63 and between the adjacent ends of the blades 71. The slide 67 is provided with a plurality of apertures 77 to receive forming tools which coöperate with the said blades. These may be of any desired or preferred construction, but in the drawings I have illustrated a U-shaped member 78 formed of a metal rod bent to form the vertical legs 79 and 80 connected by the upper portion 81. The portion 79 is formed with an angular forward forming edge 82. By this arrangement with the member 78 arranged as shown and the stock A positioned against the outer ends of the plates 71, a sharpened bend may be given to the stock, as indicated in Figs. 12 and 13. By reversing the member 78 with

the round legs 80 in front a rounded bend will be given the stock instead of the acute or sharp bend. Various sizes and shapes of tools may be substituted for the member 78. When used for bending, as indicated in Fig. 12, the guiding edges are covered by spring clips 83 thereby preventing the knives from cutting the stock and also preventing the stock from injuring or dulling the blades.

The rear end of the slide 67 is provided with a perforated ear 84 to the under side of which is bolted a bar 85 having a depending guide 86 formed by bending the end of said bar downwardly inwardly and then upwardly as indicated and perforating the vertical portions to receive a rod 87, the inner end of which rests against the rear end of the portion 65 and the outer end thereof being threaded, as at 88, to receive a nut 89. A spring 90 is arranged upon the rod 87 and normally tends to force the bar 85 and slide 67 outwardly, said outward movement being limited by the nut 89. Preferably the inner end of the rod 87 is headed, as at 91.

When it is desired to shear the stock, the clips 73 are removed from the knife blades and the slide 92 (see Figs. 15 and 16) is substituted for the slide 67, the body of said slides being substantially identical in size and shape. This shearing slide is provided with a blade 93 which is backed by a boss or lug 94 preferably formed integral with the slide.

In Figs. 17 and 18, I have shown a work holder for holding the stock on the jig or forming plate when desired. This comprises a post 95 adapted to be arranged in a perforation 96 in the outer end of the forming plate, a work engaging member 97, and a set screw 98 for holding the same in position. The member 97 comprises a rod 99 extending through a transverse aperture 100 in the upper end of the post 95 and a cross head 101 upon the outer end thereof. With this device the work or stock may be securely held in position.

With a machine as above described, any kind of stock may be bent, that is, flat stock, angle irons or pipes. It should also be noted, in reference to the eccentric 17, that by the use of said eccentric stock one-sixteenth of an inch or less in thickness up to one inch thick may be bent without requiring readjustment of the post 12.

I claim:—

1. A bed plate provided with a pair of circular sockets, rotary posts mounted therein and each provided with a stock-receiving slot, said plate also being provided with an elongated slot extending between said sockets, a pin adjustably mounted in said slot with relation to said posts, and means for turning said posts, substantially as described.

2. In a device of the class described, a rotary bending post comprising a cylindrical body portion having a diametrically-disposed stock-receiving slot, a hardened plate secured to the outer face of said post with its outer face at right angles to the adjacent face of said slot, and means for turning said post, substantially as described.

3. In a device of the class described, a bed plate, a rotary bending post provided with a stock receiving socket, a pin adjustably mounted on said plate with relation to said post and an eccentrically formed sleeve on said pin, substantially as described.

4. In a device of the class described, a rotary bending post comprising a cylindrical body portion having a diametrically-disposed stock-receiving slot, set screws threaded through the walls of said post, for holding the stock within said slot, means for turning said post, and an angular protective plate having one wall arranged within said slot to be positioned between the ends of the set screws and the work, substantially as described.

5. A device of the class described, comprising a bed plate, a bending post thereon provided with a stock receiving slot, a bending member on said plate, adjacent said post, a socket fitting the upper end of said post, an arm rotatably mounted thereon, a ratchet wheel fixed to said socket, a dog on said arm engaging said ratchet wheel, a lever receiving socket on said arm, a post on said plate adjacent the first said post, and a pawl supported on said last-mentioned post and engaging said ratchet wheel, substantially as described.

6. A device as set forth in claim 5 in which said ratchet mechanism and said pawl are reversible, substantially as described.

7. In a device of the class described, a bed plate, a rotary post mounted thereon and provided with a stock-receiving slot, ratchet mechanism on the upper end of said post, a bracket secured to said plate, an operating lever pivoted thereon, and a connection between said lever and said ratchet mechanism, substantially as described.

8. A device as set forth in claim 5 in which the last mentioned pawl is mounted upon a reversible member, and means for holding said member in either operative position, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMAN BUSSEL

Witnesses:
BERNARD MACK,
R. E. LYONS.