F. GOELER.

SHEET METAL BENDING MACHINE,

APPLICATION FILED SEPT. 2, 1913.

1,131,055.

Patented Mar. 9, 1915.

2 SHEETS—SHEET 1.

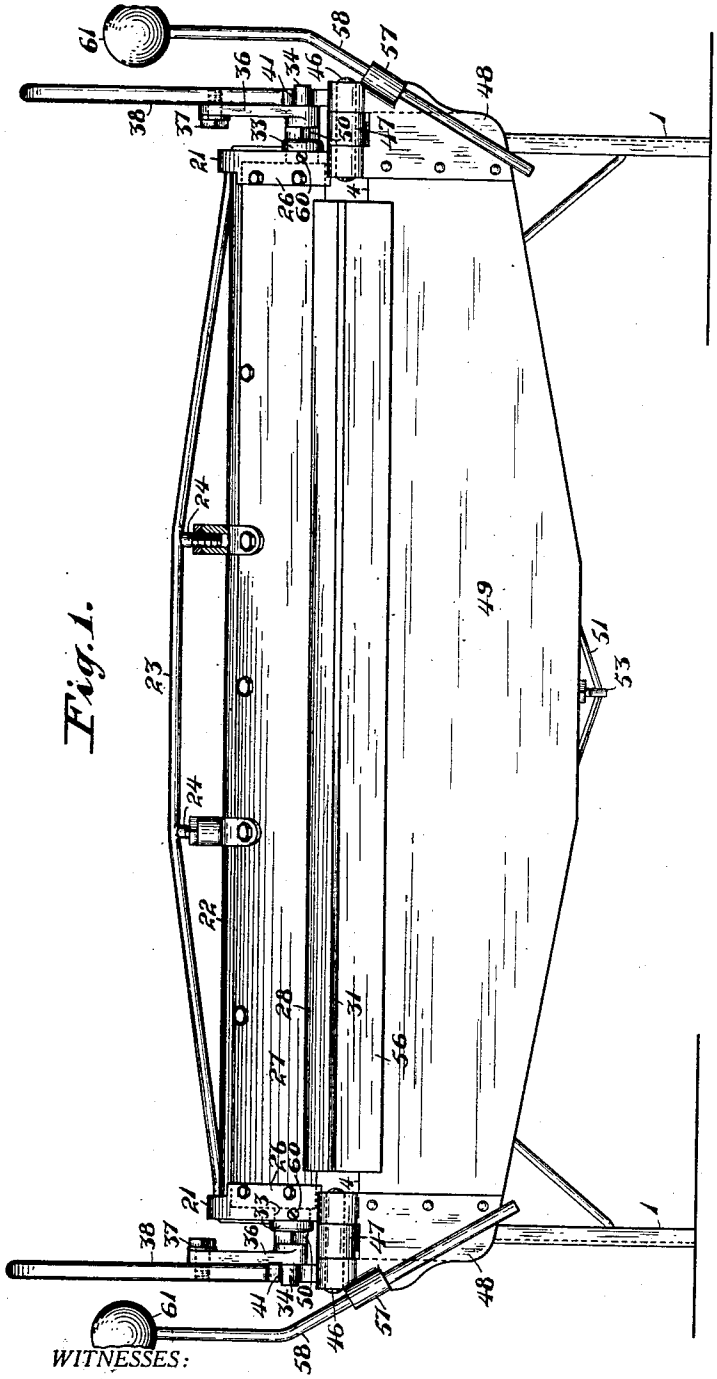


Fig. 1.

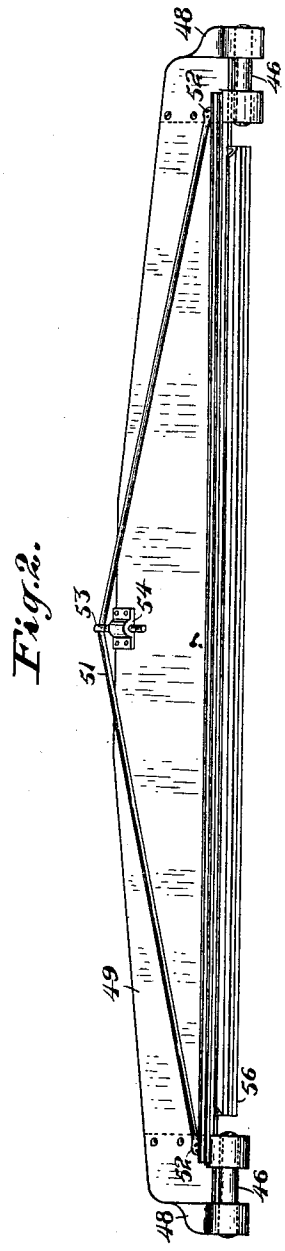


Fig. 2.

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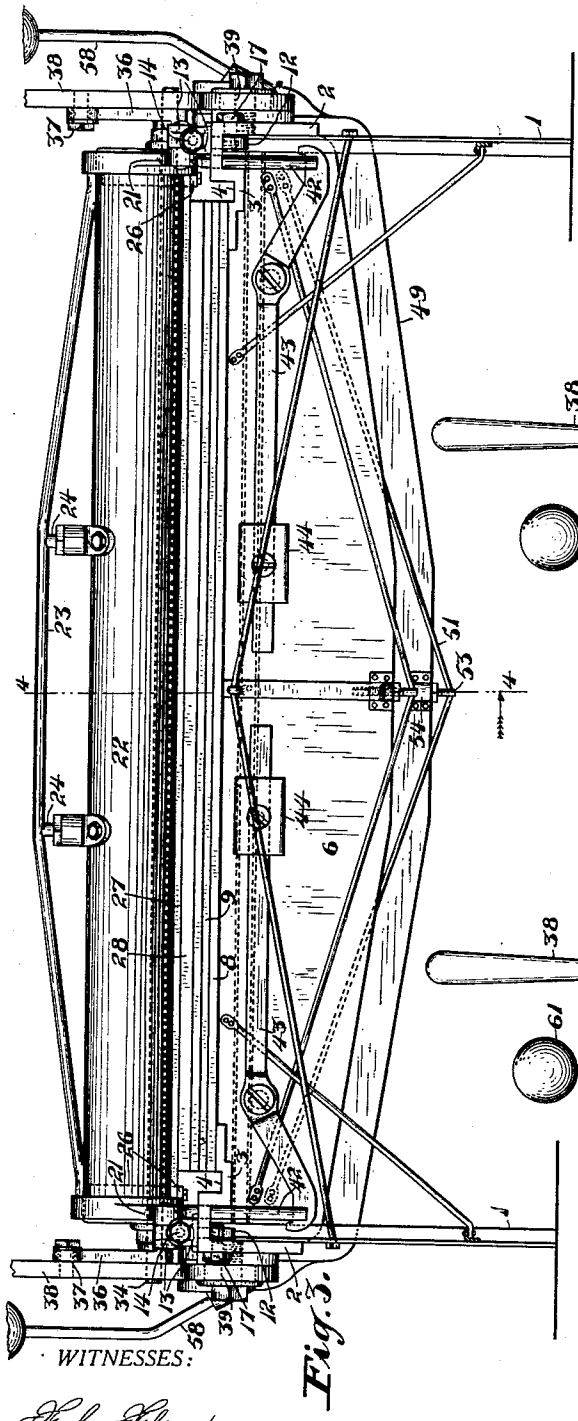


Fig. 3.

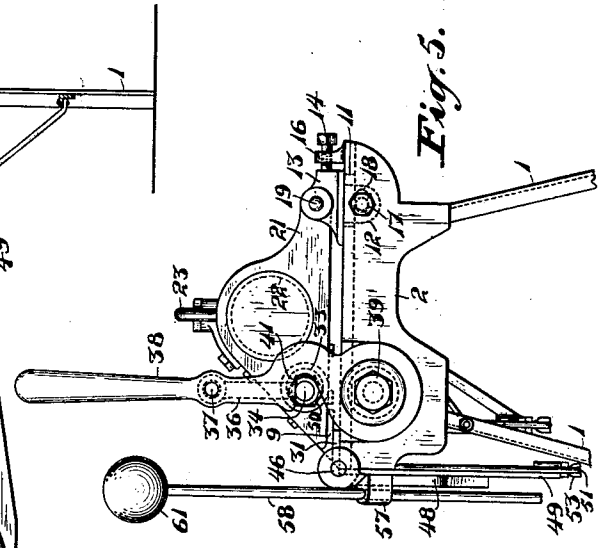


Fig. 5.

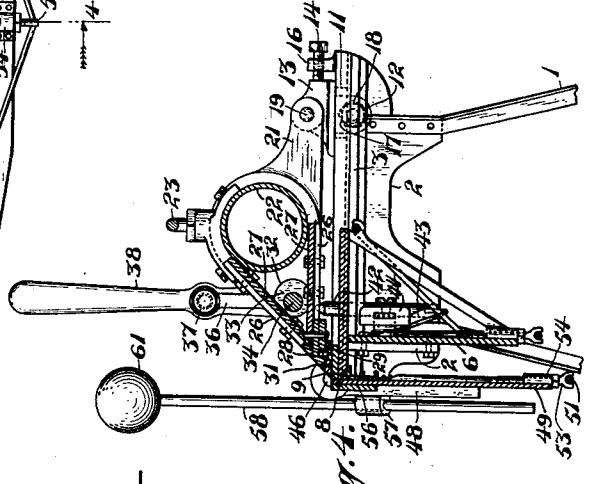


Fig. 4.

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UNITED STATES PATENT OFFICE.

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SHEET-METAL-BENDING MACHINE.

1,131,055. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed September 2, 1913. Serial No. 787,557.

To all whom it may concern:

Be it known that I, FREDERICK GOELER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Sheet-Metal-Bending Machines, of which the following is a specification.

The present invention relates to improvements in sheet metal bending machines.

One object of the invention is to provide a machine of this character which will be simple in construction, convenient in operation, and very powerful in proportion to its size.

A further object is to provide a machine by which can be bent sheet metal having its edges bent at right angles.

In the accompanying drawing, Figure 1 is a front view of my improved sheet metal bending machine; Fig. 2 is a rear perspective view of a front plate detached; Fig. 3 is a rear view of the machine; Fig. 4 is a transverse vertical section on the line 4—4 of Fig. 3; Fig. 5 is an end view of the machine.

Referring to the drawing, the stationary frame of my improved sheet metal bending machine is supported at each end upon two legs 1, there being secured to the front leg at each end an angle plate 2 having an inwardly extending supporting flange 3 formed with a transversely extending groove 4. To said angle plate is secured a front plate 6. Supported by said top sections is a top plate 8 upon which is secured a wearing strip 9 the front edge of which registers with the front edge of the top plate 8.

In the rear portions of the top sections of the angle plates are formed slots 11, through which hangers 12 depend from pivot blocks 13, said blocks being adjusted by screws 14 screwed through apertured lugs 16 rising from said top sections, screws 17 passing through longitudinal slots 18 in said angle plates and being screwed into said hangers to clamp the bearing blocks in the position to which they have been adjusted. Pivoted in said blocks are pins 19 extending outwardly from the rear ends of broad arms or plates 21, which have large circular apertures to receive the ends of a cylinder 22 extending longitudinally of the machine and connecting said arms together so that they move in unison. A tie rod 23 is secured at its ends to said arms and its mediate portion is adjustably supported by posts 24 resting upon the cylinder. Said arms 21 are formed with inwardly extending flanges 26, the flanges from each arm meeting at an acute angle, and to said flanges are secured backing plates 27 extending longitudinally of the machine. To said plates is pinned, near their meeting edges, a clamping plate 28, to which is detachably secured, by screws 29, a wearing strip 31, having a sharp or beveled front edge adapted to register with the front edge of the wearing strip 9. In each arm is a bearing 32 in which is rotatably mounted a circular disk 33, through both of which disks extends an eccentric rod 34, which passes through the lower end of links 36, the upper ends of which are pivotally connected, as shown at 37, to levers 38, fulcrumed at 39 upon the end plates of the machine. Each lever 38 is formed in its front edge with a recess 41, the side of which, remote from the pivot of the lever, engages the projecting end of the rod 34, when the lever is swung into a vertical position, so that said side serves to take part of the stress upon the end of the rod 34, instead of the whole of said stress being transmitted to the pivot 37. When said lever is so swung unto a vertical position it depresses the jaw, formed by the wearing strip 31, and clamping and backing plates 28, 27, firmly upon the stationary wearing strip 9. Furthermore, when the rod 34 has passed the dead center, that is, the plane between the axes of the pivots 37 and 39, it is self-locking, as any upward pressure on the clamping jaw tends to press said rod 34 still farther away from said plane. By reason of the rod 34 extending the length of the machine, the clamping jaw can be operated from either side.

In order to counter-balance the weight of the movable jaw, there are provided pins 42, which extend through the angle plates 2, and the upper pointed ends of which engage the under sides of the arms of the jaw. The lower ends of said pins are supported by short arms of levers 43 pivoted upon the rear side of the front plate, the long arms of said levers carrying adjustable weights 44.

Pivoted upon pivot pins 46 which extend through bearings 47 formed on the angle plates 2 are end plates 48 which are riveted to a bending plate 49, which is strengthened by a tie bar 51 of which the ends are se-

cured, as shown at 52, to the bending plate, and the middle passes through a forked end of a screw 53 screwed in a socket 54 secured upon the bending plate. Upon the outer side of the bending plate and adjacent to the edge extending between its pivot is a wearing strip 56. Extending obliquely outward from each end plate 48 is a bearing 57 of a counter-balance arm 58, carrying at the end remote from the bending plate a counter-balance weight 61, said weights counter-balancing the weight of the bending plate, so that to swing the plate on its pivots requires a force only sufficient to overcome inertia, and no weight is required to be lifted. Said weights 61 are formed of globes or balls to furnish convenient handles for swinging the bending plate. The grooves 4 in the angle plates 2 are for the purpose of permitting the machine to be used for bending a sheet of metal which has flanged edges, said flanges being received in said grooves, while the remainder of the sheet metal is pressed between the two wearing strips 31 and 9.

An important feature of my invention is that by this construction I am enabled to raise the clamping jaw to such a height that a large piece of sheet metal can be inserted between the clamping jaw and the stationary clamping plate in order to bend said sheet metal along any line thereof. After said sheet metal has been placed upon the stationary clamping plate and the movable clamping jaw has been moved down nearly into contact with the upper surface of said sheet metal, the sheet metal can readily be shifted to any position in which it will be bent along the exact line desired, because said clamping jaw, although very heavy, exerts no pressure upon the upper surface of said sheet metal, and moreover said clamping jaw will remain in any elevated position, by reason of the counter-balancing means provided.

An important feature of my invention resides in the provision which is herein made for varying, for different thicknesses of metal to be bent by the machine, the height of the movable clamping jaw above the stationary plate. This is due to the fact that the rod 34, the ends of which are connected to the lower ends of the links 36, passes eccentrically through the disks or bushings 33, which are revoluble in the arms or heads 21. Each of these bushings is provided with an angular portion 50, by which it may be turned with a wrench, and there is also provided for each bushing a set screw 60 screwed through the edge of the head 21, and which can secure the bushing in any position to which it has been turned. Thus, if it is desired to change the distance between the stationary and movable jaws for a different thickness of sheet metal, all that is necessary is to unscrew the set screws 60, turn the bushings in the proper direction through the angular distance required, and screw the set screws in again, securing the bushings in place. In order to insure that the bushings are turned through equal angular distances there may be provided thereon marks indicating the distance through which they are turned.

A very valuable feature of my invention resides in the fact that the movable jaw will remain in any position in which it has been placed. In that respect it differs from prior machines of this general character in which the movable jaw is required to be thrown back the full distance whenever a readjustment is made of the position of the sheet metal. With my machine such is not the case, but it is only necessary to raise the movable jaw from the sheet metal a sufficient distance to permit the sheet metal to be moved, and the movable jaw will remain in this position until the sheet metal has been readjusted, and then the movable jaw can be clamped against the sheet metal plate. In prior machines of this character, when the sheet metal was too thick to be bent by the bending plate, the effect would be that the strain on the sheet metal would cause the clamping jaw to be moved backward by turning about the pins 19. In my invention such is not the case. The reason for this is that the rod 34 has been moved beyond the center lines of the pivots 37 and 39. In other words, the pressure on the movable jaw only tends to move it downward, or more firmly upon the sheet metal, on account of the points to which pressure is applied being past the center of resistance.

Another important feature of my construction is that it affords a large opening at the back through which to pass sheet metal having a flange. The magnitude of this opening will evidently depend upon the length of the pins 42.

I claim:—

1. In a sheet metal bending machine, a pivoted jaw having end arms or plates, a rod in bearings in said plates, a rod, links through the lower ends of which the ends of the rod pass, levers fulcrumed upon the ends of the machine and to which are pivotally connected the upper ends of the links, each lever being formed in its front edge with a recess the upper side of which can engage the corresponding end of the rod to receive part of the upward stress on the rod.

2. In a sheet metal bending machine, a pivoted jaw comprising a cylinder, pivoted end arms or plates, around and secured to the cylinder and rod in bearings in said plates, links through the lower ends of which the ends of the rod pass, levers fulcrumed upon the ends of the machine and to

which are pivotally connected the upper ends of the links, each lever being formed in its front edge with a recess the upper side of which can engage the corresponding end of the rod to act as a cam to depress the jaw.

3. In a sheet metal bending machine, a pivoted jaw having end arms or plates, a rod in bearings in said plates, a rod, links through the lower ends of which the ends of the rod pass, levers fulcrumed upon the ends of the machine and to which are pivotally connected the upper ends of the links, each lever being formed in its front edge with a recess the upper side of which can engage the corresponding end of the rod to receive part of the upward stress on the rod, the parts being arranged so that the lower ends of the links swing to their closing position past the center lines between the pivots of the levers on the machine and the pivots of the links on the levers.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FREDERICK GOELER.

Witnesses:
FRANCIS M. WRIGHT,
D. B. RICHARDS.

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