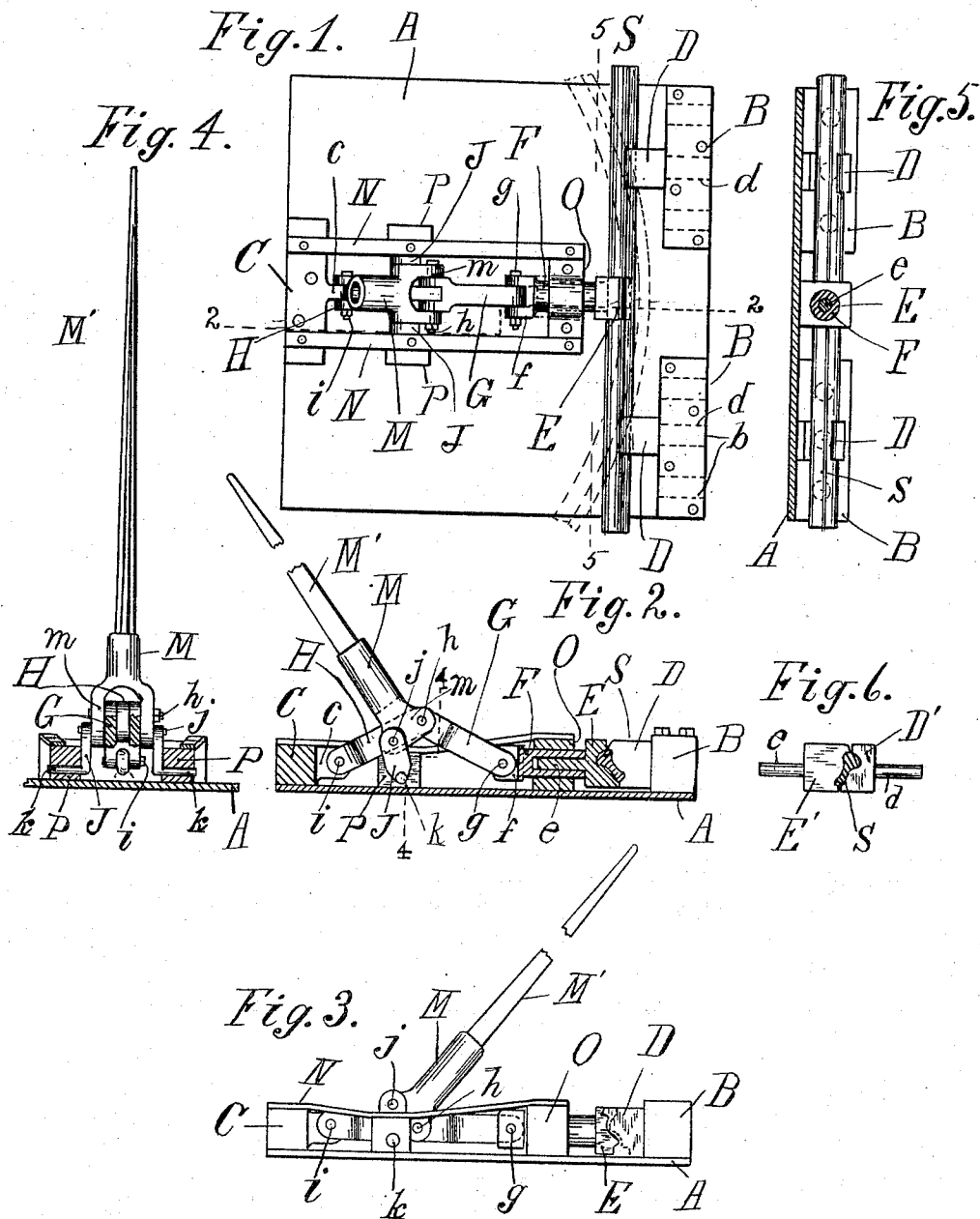


H. A. MINER.  
BENDING MACHINE.  
APPLICATION FILED SEPT. 30, 1909.

1,054,132.

Patented Feb. 25, 1913.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

HOWARD A. MINER, OF NORRISTOWN, PENNSYLVANIA.

## BENDING-MACHINE.

1,054,132.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed September 30, 1909. Serial No. 520,236.

*To all whom it may concern:*

Be it known that I, HOWARD A. MINER, citizen of the United States, and resident of Norristown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Bending-Machines, of which the following is a specification.

This invention relates to improvements in bending machines, and it is particularly adapted, although not restricted, to machines for bending the corner bars of steel protected concrete street curbs, and other bars, and metal bars on planes inclined to the planes of the bars or elements.

The use of steel protected concrete street curbs has been greatly increasing during recent years, and it is frequently necessary to bend the metal corner bars, to carry them properly around corners at street intersections, and for other reasons. But the proper bending of the bars has proved a very difficult operation to successfully accomplish, and indeed impracticable with bending machines as heretofore constructed. For when in position in the curbs the said bars are set with their webs neither vertical nor horizontal but on a plane between vertical and horizontal; but the bending of the bar must occur in a horizontal plane, and to effect this without "snaking" the bar, and with machines of practicable cost and adapted to the conditions of concrete street curb construction, proved a most difficult matter; and the difficulty was further increased by the necessity, which frequently occurred, that the same bar should have a reverse curvature, both curves being in the same horizontal plane when the bar was in position. To satisfy the practical conditions of concrete curb construction, it was also necessary that the machine should develop such power as to be capable of bending the bars on the shortest requisite radius by mere hand power applied to the operating lever. For a bending machine which required mechanical power to bend and set the corner bars would not be practicable commercially.

I have solved the difficulties and produced a successful machine by the constructions hereafter described, which can be adapted to be operated by mechanical as well as by hand power.

Referring to the drawings, which accompany the specification to aid the description, Figure 1 is a plan of a machine equipped

with my invention, the parts being in the position assumed just before the bar begins to bend. Fig. 2 is a side elevation, partly sectioned of the same parts and in the same position. Fig. 3 is a side elevation of the same parts, but in the position assumed at the end of the stroke of the bending plunger. Fig. 4 is an end elevation partly sectioned, as seen from the left of Fig. 1. Fig. 5 is a section and elevation, about on the plane of the line 5-5 of Fig. 1. Fig. 6 is a detail of the bending blocks or jaws arranged to produce a curvature of a bar the reverse of that produced by the arrangement shown in Fig. 2.

To render the machine completely practicable, it is preferably portable, so as to be carried to the place where curbs are in process of construction, and I will hereinafter describe a portable machine, although, of course, the invention is also applicable to a stationary machine.

On the bed A are firmly secured blocks, B-B and C, and the guide block O; said blocks B-B being preferably separated, and block C positioned opposite the space between said blocks B-B. Said blocks B-B are provided with socket holes *b-b* to movably admit the stems of certain bending blocks, or jaws, D-D, so as to permit of readily changing the said jaws to produce reverse curvatures of the corner bars, and I shall hereinafter designate said blocks D-D by the term "jaws." The pivot blocks P-P are firmly secured to said bed A intermediate the blocks O and C, and parallel top bars N-N, preferably shaped as shown in Fig. 3, are secured to and strengthen said blocks C-P-O. To a lug *c* of said block C is pivoted one end of a toggle arm H, the other end of which is pivoted to the other toggle arm G on pin *h*, the other end of said arm G, being pivoted in the forked end *f* of the plunger F. Said plunger F works through a guide hole in said block O, and is longitudinally socketed to movably receive the stem *e* of the reciprocating bending block or jaw E, and I shall hereinafter designate said block E by the term "jaw." Thus the said jaw E is positioned midway between the aforesaid stationary jaws D-D, and I prefer this arrangement, but of course, the machine might be arranged so that the intermediate jaw would be stationary and the outer jaws would be reciprocating. It will also be seen, that arms H, G, connected

as described, constitute a toggle for reciprocating said plunger F, and I greatly increase the power of the machine by compounding or doubling the toggle in the following manner: The forked head *m* of a socket-end lever M is pivoted on the said toggle pin *h*, and the other end of said head *m* is pivoted to one end of an auxiliary toggle arm or arms J, the other ends of which are pivoted in said blocks P—P, an excellent construction being illustrated in Fig. 4, wherein two parallel auxiliary toggle arms J—J are employed. A handle M' is inserted in said socket piece M, the oscillation of which actuates said toggle arms H, G, and also simultaneously actuates said auxiliary toggle arms J, and the result is such compounding of the toggle action that hand power applied to said handle M' is sufficient to readily bend any bar to which the machine would be applied. Said jaws E and D—D are shaped to retain the corner bar S at a proper inclination, the recesses in said jaws being respectively shaped to properly fit against and partly around the head, web, and locking dovetail of said corner bar, or to properly fit the opposite sides of corner bars which are differently shaped from that chosen for illustration in Figs. 1, 2 and 6. Said jaws D—D are each provided with a stem *d* adapted to removably fit in its said hole *b* in its proper block B, and said jaw E is provided with a stem *e* adapted to removably fit in the socket of said plunger F; whereby said jaws D—D and E are made readily movable and reversible so as to adapt the machine to curving a bar in opposite directions as desired, or to give the same bar a reverse curve.

The machine is operated as follows: The jaw E being retracted by throwing lever M' to the left of Fig. 2, a corner bar S is placed in position in the recesses of jaws D—D, being then in the inclined position seen in Fig. 2. Now the handle M' is oscillated in the proper direction to the position of Fig. 2, thus bringing said jaw E accurately into contact with the opposite side of corner bar S, and intermediate the points where said bar S is supported by said jaws D—D. Further movement of said handle M' to the right forces said jaw E to the right, in a plane inclined to the plane of the web of said bar S, and so as to bend said bar so indicated by the dotted lines in Fig. 1, the great power of the compound toggle giving the bar a permanent set, even when cold.

The handle M' being then retracted the curved corner bar is removed. If it is desired to give said bar a reverse curvature, the jaws D—D are removed from blocks B—B, and the stems of other jaws recessed to hold the corner bar at a reversed inclination, as seen in Fig. 6, are inserted in the holes in said blocks B—B. Block E is also removed from the socket in plunger F and the stem of another block is inserted therein, said last named block being so recessed as to fit the corner bar when at said reversed inclination. (Fig. 6.) The handle M' being now operated the block E will give the corner bar a curvature, the reverse of that before given, and thus the same bar may be given a reverse curve, and different bars may be curved in opposite directions, according to the requirements of particular curbs.

It will be readily understood from the foregoing description, that my invention is capable of being embodied in machines for bending bars of any kind or shape and is not limited to bending corner bars of concrete curbs, or bars for any particular purpose.

Now having described my improvements I claim as my invention—

1. In a hand bending machine for bending webbed articles, the combination of a block adapted to move rectilinearly and provided with a recess inclined to the motion of said block, and adapted to fit one side of the webbed articles, a reciprocating plunger adapted to movably retain said block, a compound toggle for operating said plunger and hand operated means for actuating said toggle, and a plurality of stationary blocks recessed to fit the other side of said webbed article and located at opposite sides of said movable block, substantially as described.

2. In a bending machine, the combination with a plunger and a bending block movably carried thereby, of a toggle operatively connected with said plunger for moving the same, a compound toggle link J operatively connected with said toggle, and hand operated means for actuating said toggle, substantially as described.

Signed at Philadelphia in the county of Philadelphia and State of Pennsylvania, this 28th day of September A. D. 1909.

HOWARD A. MINER.

Witnesses:

EDWARD J. FISHER,  
ANNA W. KOHN.