2 Sheets—Sheet 1.

R. HALE.

MACHINES FOR BENDING METAL-BARS.

No. 194,675. Patented Aug. 28, 1877.

Fig. 1.

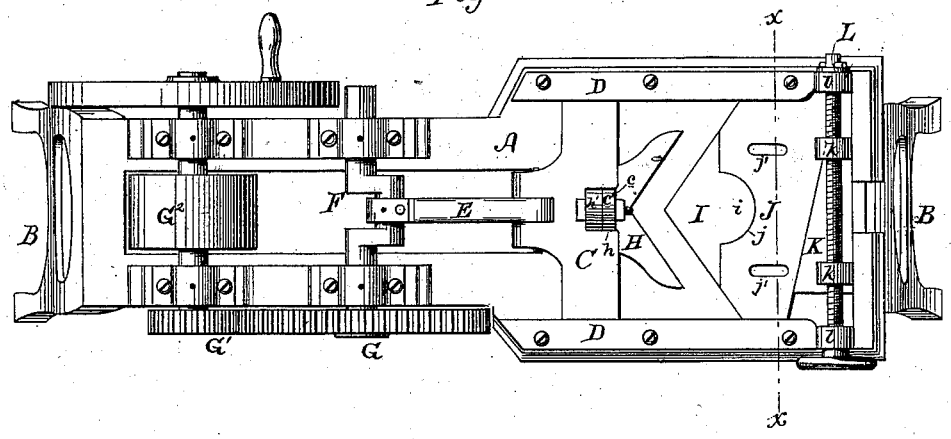
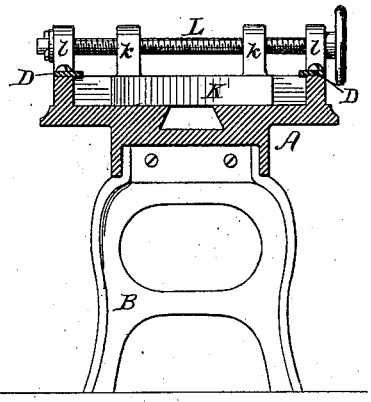


Fig. 2.



WITNESSES:

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Geo. H. Evans.

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2 Sheets—Sheet 2.

R. HALE.

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Fig. 3.

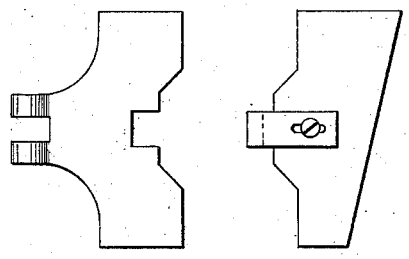


Fig. 4.

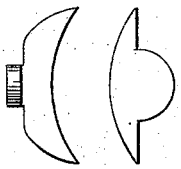
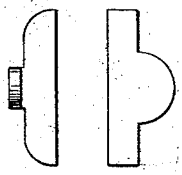


Fig. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ROBERT HALE, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN MACHINES FOR BENDING METAL BARS.

Specification forming part of Letters Patent No. **194,675**, dated August 28, 1877; application filed July 18, 1877.

To all whom it may concern:

Be it known that I, ROBERT HALE, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Machines for Bending Metal Bars, of which the following is a clear, full, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of my invention. Fig. 2 is a cross-section through the line *x x* of Fig. 1. Figs. 3, 4, and 5 are detail views of modifications of the die and former.

This invention relates to improvements upon patent 152,106, granted to me June 16, 1874; and consists of movable die-plates and changeable dies, in combination with the wedge, operated transversly by a screw, all as hereinafter fully described.

In the drawings, A is an iron frame or bed, supported upon legs B. The cross-head C is held by the guide-boards D D, and receives a reciprocating motion from the crank-shaft F, through connecting-rod E, which is operated through the medium of the gear-wheels G G^1 and band-wheel G^2, which receives its motion from any desired motor. H is the former, secured to the cross-head C. The former is provided with a square shoulder, *c*, which fits in a recess, *h*, in the cross-head, and they are secured together by a bolt passing through the projecting flanges *c'* and *h'* of the former and cross-head. I is a removable die, and J the die-plate, said die being provided with a curved projection, *i*, which fits snugly in the curved recess *j* in the die-plate. In the present instance, the die is made in the form of a triangle, with its longest side bearing against the die-plate, and the former is recessed out to correspond with the die. The die-plate J is held by the guide-boards D, and is adjusted toward or from the former to conform to the thickness of metal bar to be bent by means of the wedge K, which is moved transversely across the bed A by means of the hand-screw L, which is supported in bearings *l l*, and passes through the vertical screw-bearings *k k* of the wedge, said die-plate being beveled off on its rear side to correspond with the shape of the wedge. The slots *j' j'* in the die-plate are to admit of its being held by bolts and a strap across the top of the plate, and be moved, as required, by the wedge and screw.

Fig. 3 represents a metal die and former, the former making the cross-head for shaping car-truss track-frame irons, which is probably the largest work that would be likely to be done on the machine, and, on account of the length of the bars, takes the whole width of the machine, therefore requiring the whole of the cross-head from the former. Fig. 4 represents a die and former for bending iron bars in a circular shape, and Fig. 5 represents a pair of straight dies and former for straightening old bridge, car, and other bolts and rods.

I do not desire to limit myself to the form of die and former to be used, as they may be varied to correspond with the shape desired to be given to the bars to be bent.

In the operation of my machine the cross-head, with its attached former, is thrown back from the die-block, and the bar of metal to be bent is placed or fed between the die and former. The cross-head, with its former, is then moved forward, carrying the outer ends of the metal bar, while the center, by means of the die-block, is forced into the groove or recess in the former, which corresponds with the shape of the die, and which gives to the bar of metal the proper shape desired. A backward movement of the former leaves the bar so that it can be readily removed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a machine for bending metal bars, of the movable die-plate J, transverse wedge K, provided with the bearings *k k*, and the screw L, all relatively arranged substantially as and for the purpose specified.

2. The combination, in a machine for bending metal bars, of the recessed cross-head C, removable former, die-block, and die-plate, and transversely-removable wedge K, substantially as and for the purpose specified.

ROBERT HALE.

Witnesses:

HORACE H. THOMAS,

A. S. BRADLEY.