

(No Model.)

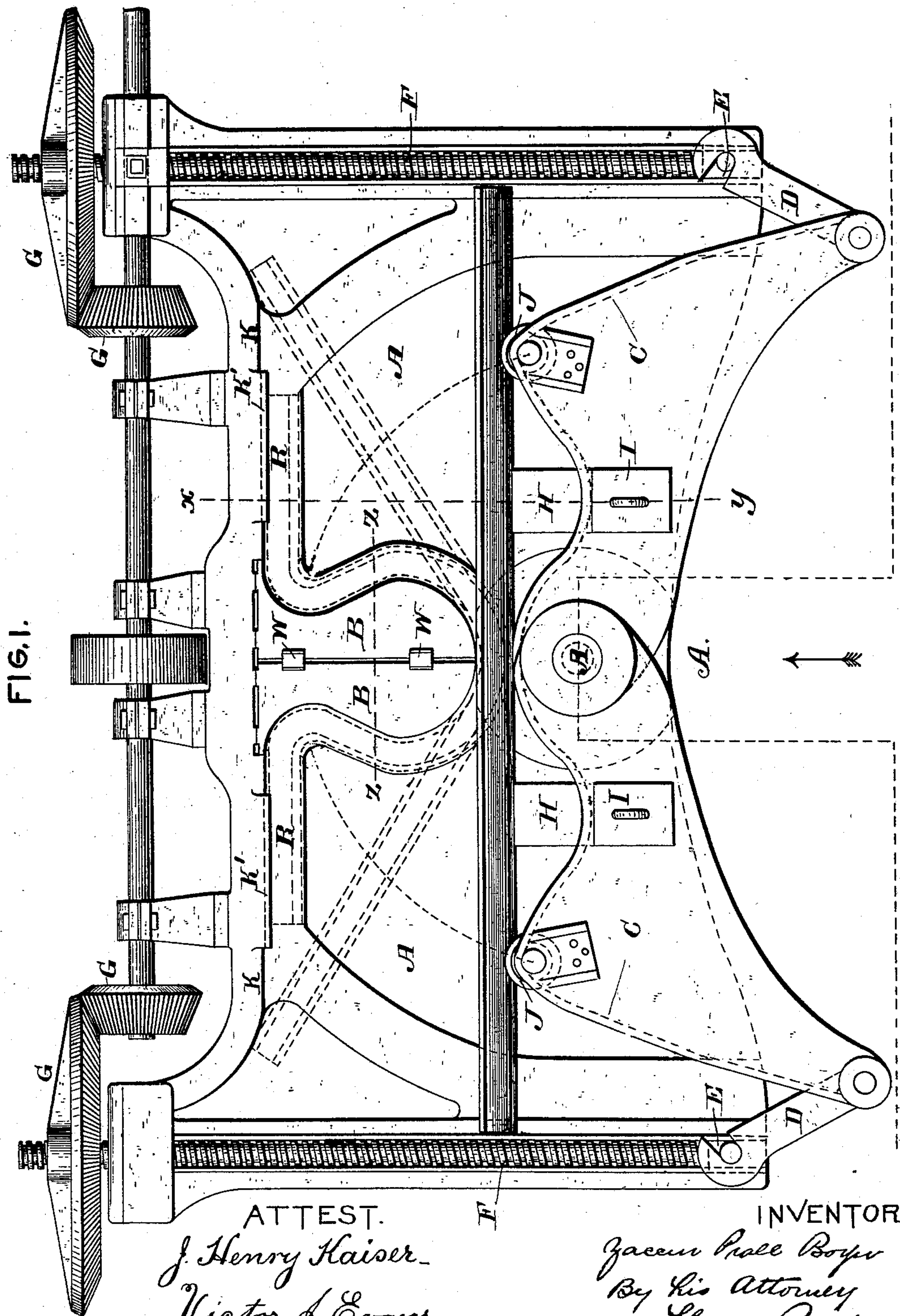
2 Sheets—Sheet 1.

Z. P. BOYER.

MACHINE FOR BENDING RAILS, BEAMS, OR BARS.

No. 389,495.

Patented Sept. 11, 1888.



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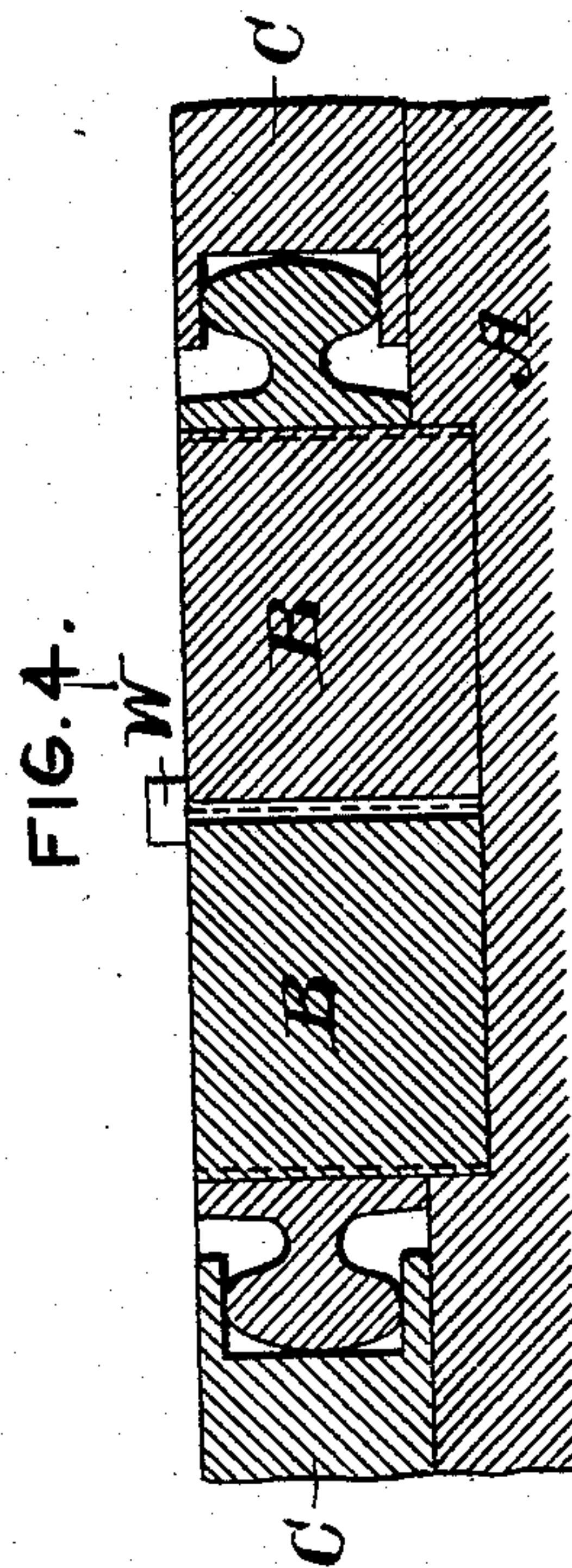
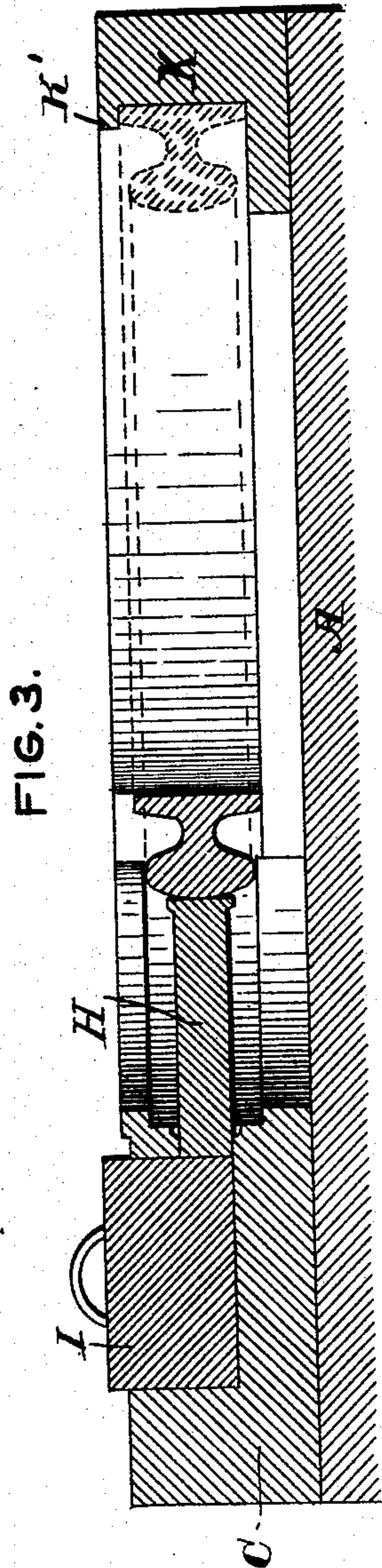
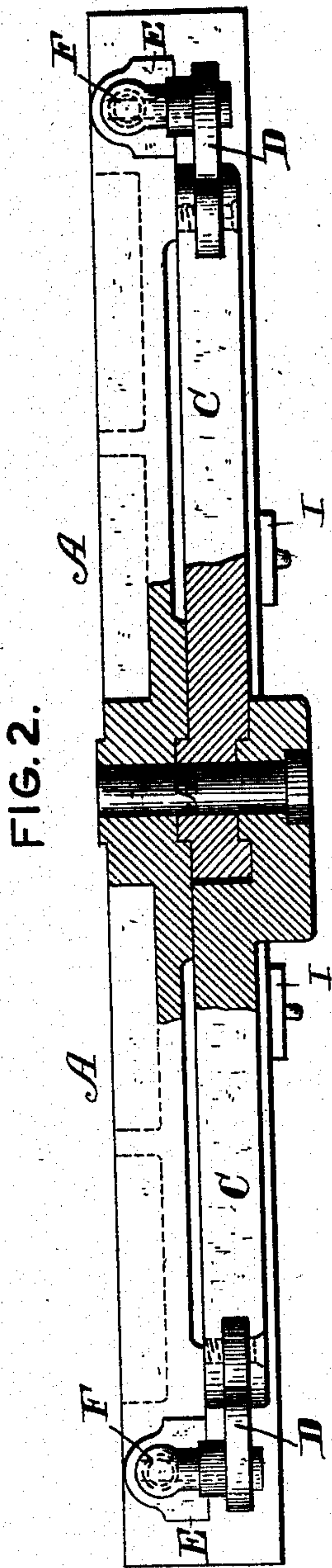
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ATTEST.
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UNITED STATES PATENT OFFICE

ZACCUR PRALL BOYER, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR BENDING RAILS, BEAMS, OR BARS.

SPECIFICATION forming part of Letters Patent No. 389,495, dated September 11, 1888.

Application filed November 2, 1887. Serial No. 254,120. (No model.)

To all whom it may concern:

Be it known that I, ZACCUR PRALL BOYER, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented a new and useful Improvement in a Machine for Bending Metal Rails, Beams, or Bars, of which the following is a specification.

My invention relates to improvements upon my former patent, No. 370,371, dated September 27, 1887; and it consists of certain features of construction, which are hereinafter described.

The objects of my invention are to more perfectly and economically bend a rail made of steel or other metal into substantially a horseshoe shape for cable-railway yokes; but my invention, by slight changes in the details of construction, may be easily adapted to bending or forming metal bars, rails, or beams into a variety of forms, as pointed out in this specification.

Experience has demonstrated that in bending steel rails with my machine, as patented, I am not able at all times to prevent the rail from turning, twisting, or buckling. Accidents of this kind are liable to happen at any time, and when they occur the rail is rendered useless as a yoke for cable-railway construction.

The steel yoke for cable-railway conduits, intended to be made by my improvement, which yoke is also covered by Letters Patent, requires that the head, web, and flange of the rail shall be preserved in the yoke; hence the necessity is apparent of such mechanism in a bending-machine as will meet these requirements. If in the bending of the rail the shape of the rail is changed in the particulars as just stated, the required form is lost, the proportions are changed, and the necessary connections with the brackets, slot-rails, and other parts of the railway construction are rendered usually impracticable and always costly. Another difficulty met with is to produce the proper angle at the bends or corners of the yoke, so as to provide a neat bearing for the knees or brackets which support the slot-rails of the railway, and to preserve the sides of the yoke in a nearly vertical position, so as to preserve the strength guaranteed by the form of the yoke; all of which desirable objects I attain by means of the mechanism illus-

trated in the accompanying drawings, in which—

Figure 1 is a plan view of the entire machine with connection shaft and gearing. Fig. 2 is a front elevation and part section through fulcrum of levers. Fig. 3 is a cross-section of the device through lines X Y. Fig. 4 is the die in section on lines Z Z, showing it connected in dotted lines, and also showing rail in final position, partly inclosed by arms C C.

The principal parts of the device are a bed-plate, a sectional die detachably secured to the bed-plate, levers or arms turning on a fulcrum, blocks movable on the inside of the arms, flanged wheels secured to said arms, connecting-bars, and screw-shafts.

Similar letters throughout this specification refer to corresponding parts of the device.

A represents the bed-plate, in form as shown in the drawings, and has a vertical flange, K, against which the horizontal ends of the yoke are forced, and which has a horizontal flange, K', which embraces the flanges of said yoke, thus keeping the ends thereof in true alignment, thereby preventing twisting or warping.

B B represent the die, of a configuration to give the required interior form to the yoke in shape approximating that of a horseshoe. It is understood, however, that this die can assume any shape desired, the form of the die depending upon the shape into which the metal is desired to be bent. This die is in two parts, as is clearly shown by the drawings, and is furnished with wedges W W to allow the die to be contracted, thus more easily allowing the rail when bent to be disengaged.

C C are the levers or arms of the device, which are pivoted or hinged at A, and are of equal lengths and similar in shape. These arms are provided with two connecting-bars, D D, which are attached to the cross-heads E E by means of pins. These arms or levers are provided with flanges to overlap the rail and have such a contour that when in their ultimate position they embrace the die, thus preventing the rail when being bent from turning, twisting, or buckling in receiving its final shape.

F F are the screw-shafts transmitting the power from the main gearing G G.

H H are push-blocks working in guides in or upon the arms C C to support the rail at the

point shown in the drawings and to operate upon those portions of the rail.

I I are plugs, by means of which the blocks H H are held out in contact with the rail, and which, when removed, permit the blocks to recede into the arms as the rail is forced against the same in the act of bending. Said blocks are provided with flanged faces to bear against the head of the rail.

J J are flanged wheels inside and on the ends of the arms to accelerate the bending of the rail, and particularly to compel the rail to take the exact form of the die in the angles formed by the ends and the main body of the yokes.

The operation of the device is as follows: The rail to be operated upon is first heated to the required degree and is then placed on the bed-plate of the machine, so that the rail rests on the side of its head and flange and presents the flange toward the die. Power is then applied to the gearing, and as the screw-shaft revolves the connecting-bars gradually cause the arms to approach the die, carrying with them the rail, until the arms, with the rail partly inclosed, snugly embrace the die. At this moment the power is reversed by well-known mechanical methods. The screw-shaft revolves in the contrary direction, withdrawing the arms from the die, leaving the rail still embracing the die. The wedges are then removed and the die is contracted sufficiently to allow the removal of the rail, which retains the form or contour of the die and retains, also, the head-web and flange of the rail. The blocks H H, when in position, protrude sufficiently beyond the arms to operate upon the rail simulta-

neously with the wheels on the ends of the arms. At a given time in the approach of the arms to the die the plugs I I are removed, allowing the blocks to take their position flush with the operating-face of the arms. When the arms are in position to receive a rail, the blocks are forced forward sufficiently to allow the introduction of the plugs, when the device is again ready for operation. The office of the wheels on the end of the arms is apparent and has been sufficiently described.

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

1. In a device for bending metal bars, beams, or rails, the combination, with the bed-plate having a sectional die, of movable arms having flanged wheels, located substantially as described, and flanged-faced movable push-blocks, and mechanism for operating the same, substantially as shown and described.

2. In a device for bending metal rails or bars, the combination, with a bed-plate having a horseshoe-shaped die made in sections, of pivoted arms having flanged wheels, flanged-faced movable blocks protruding therefrom, with supporting-plugs for said blocks, and reciprocating mechanism for operating the arms, substantially as shown and described.

In witness that I claim the same I have hereunto set my hand this 17th day of October, A. D. 1887.

ZACCUR PRALL BOYER.

In presence of—

Z. P. BOYER, Jr.,
GEO. M. ROADS.