

J. E. MORSE & O. ANDERSEN.

BENDING MACHINE.

APPLICATION FILED JULY 20, 1909.

990,377.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.

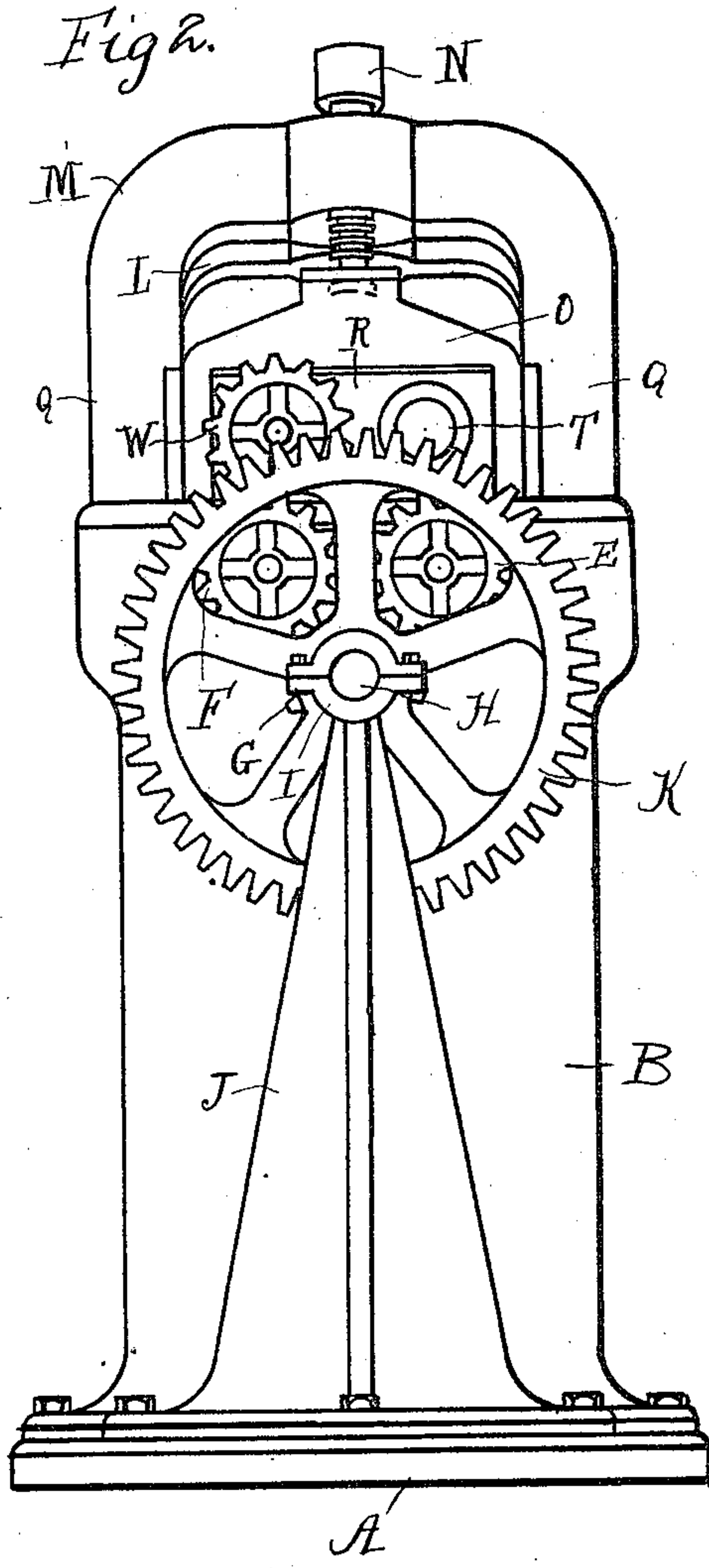
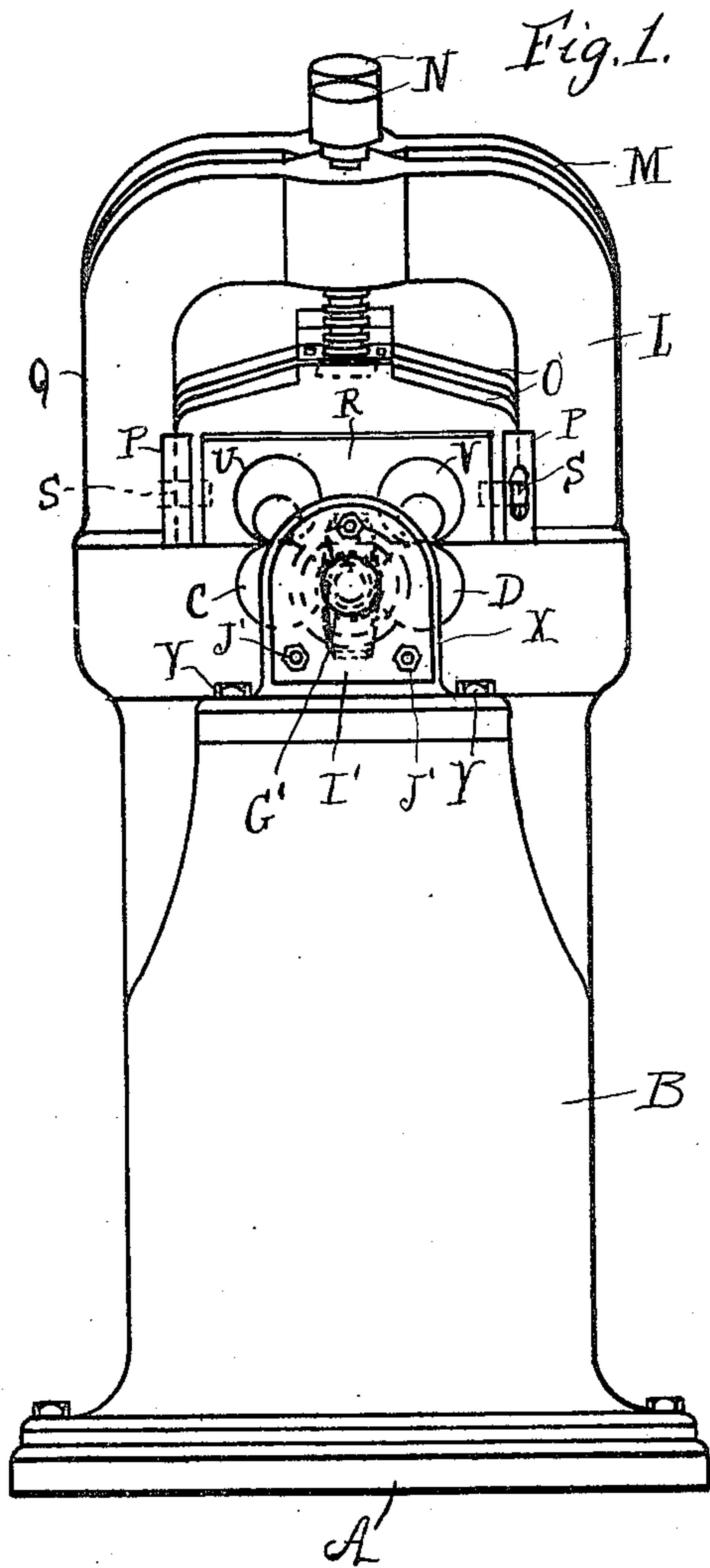
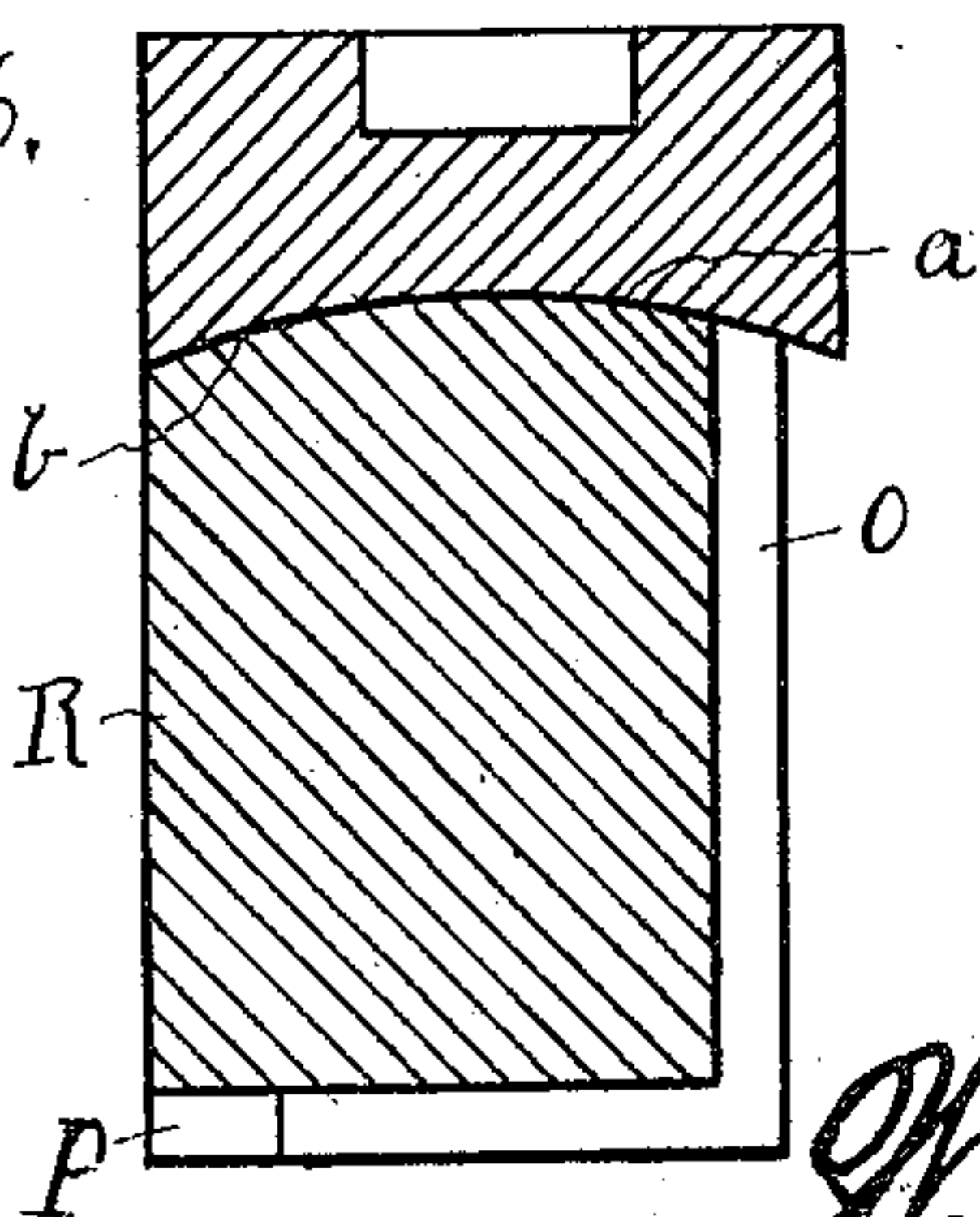


Fig. 6.



WITNESSES

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*H. C. Burton*

INVENTORS

*Joseph E. Morse*  
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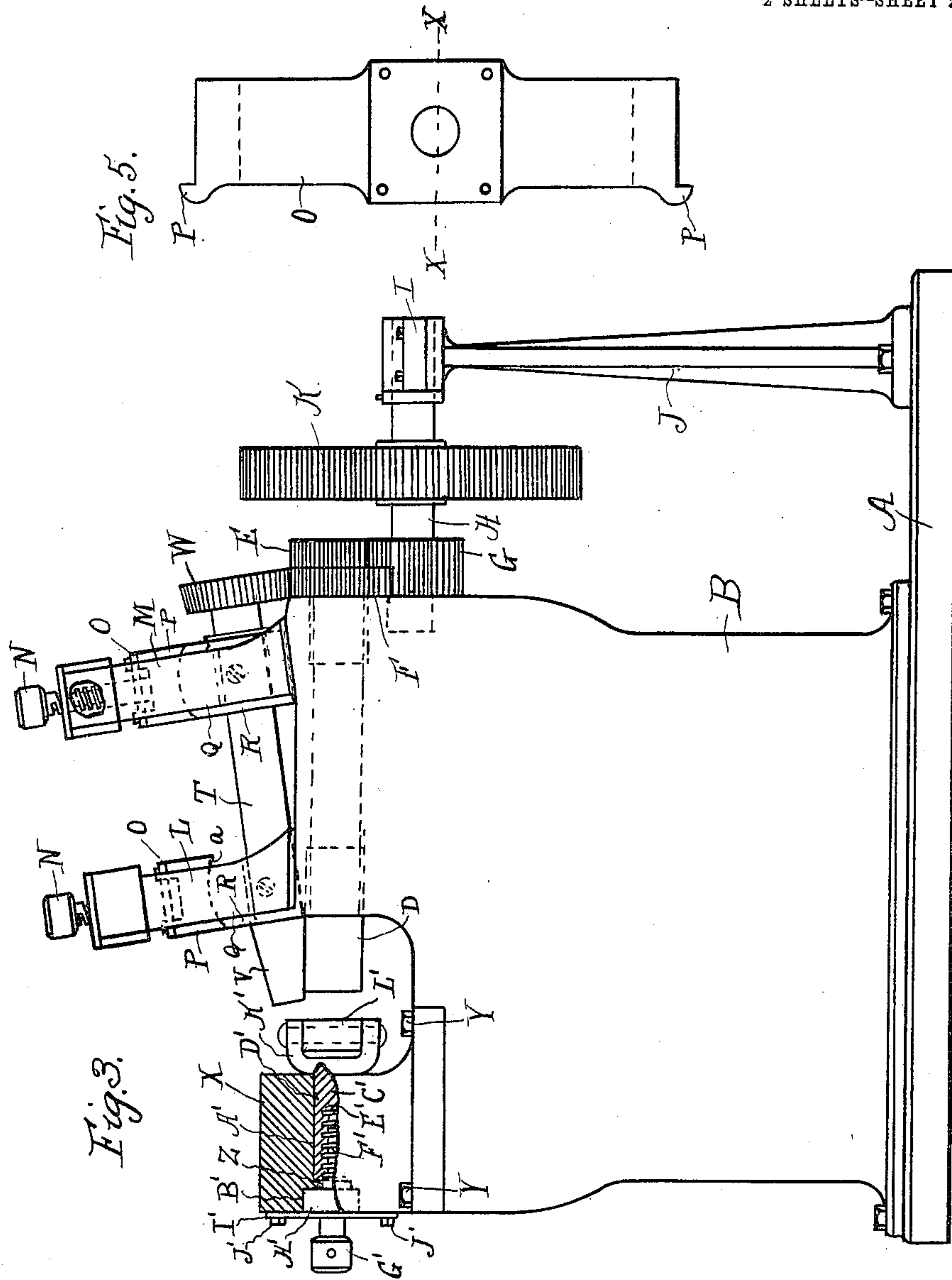


Fig. 5.

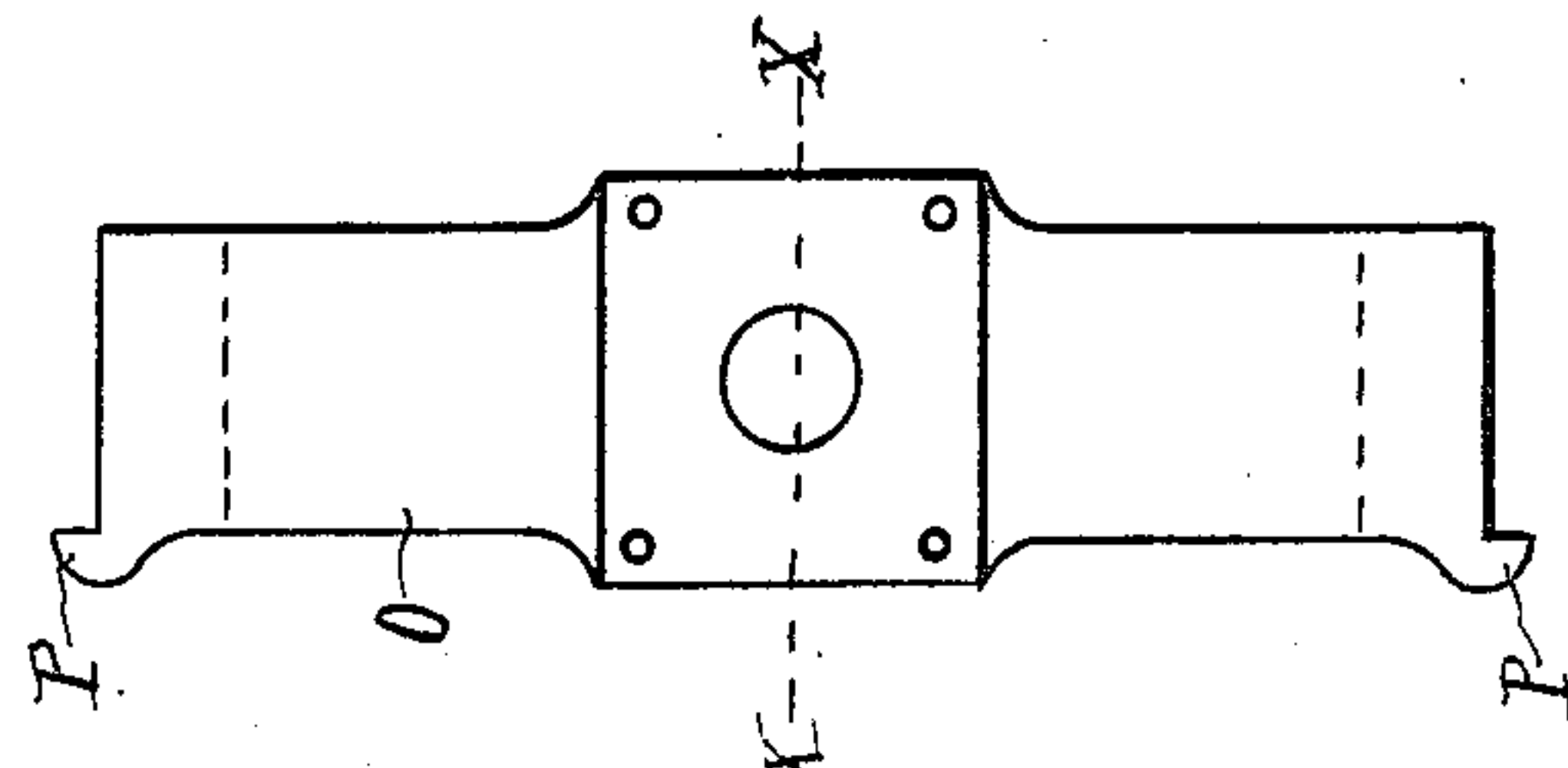


Fig. 3.

WITNESSES

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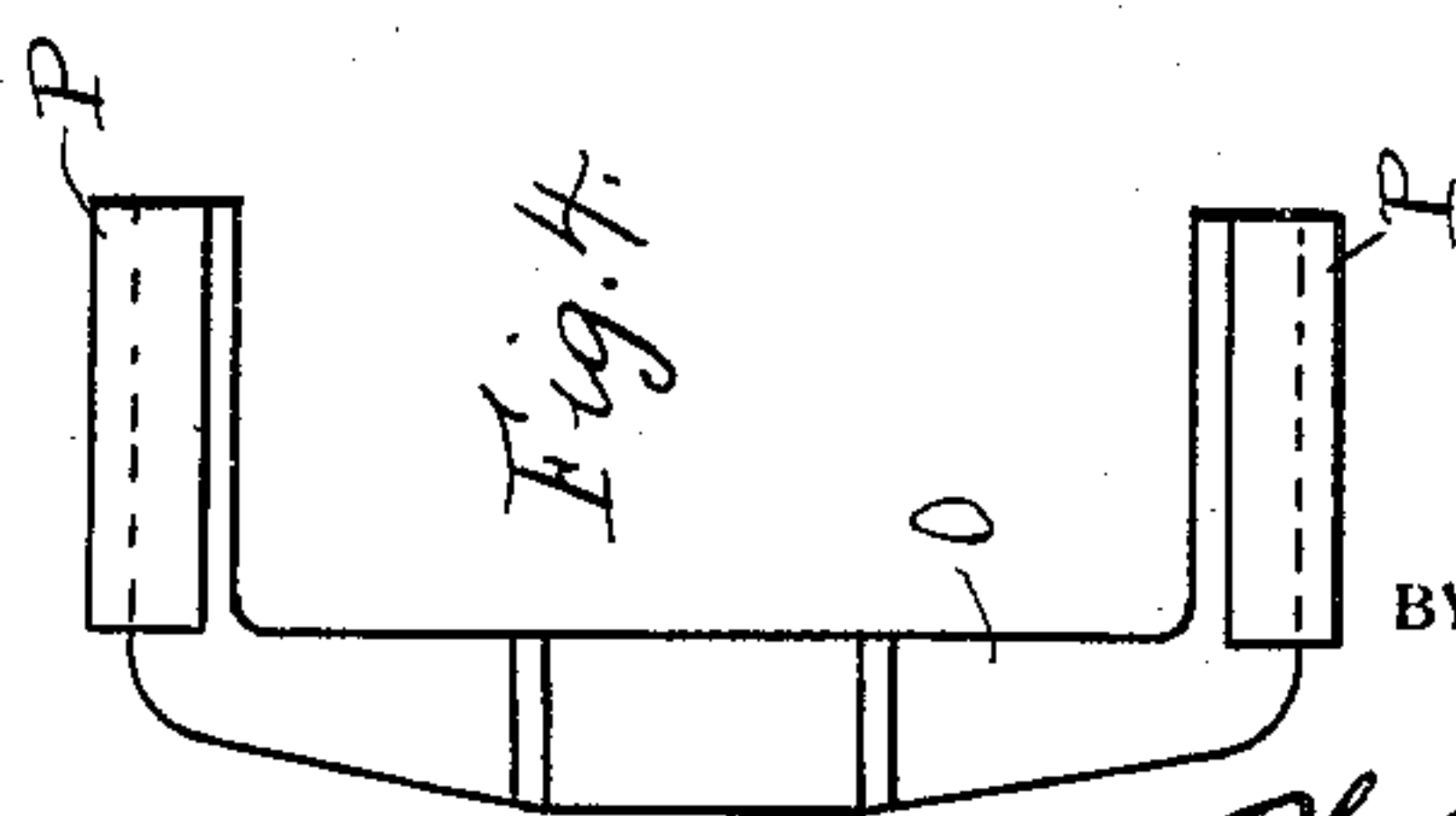


Fig. 4.

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# UNITED STATES PATENT OFFICE.

JOSEPH E. MORSE AND OTTO ANDERSEN, OF PHILADELPHIA, PENNSYLVANIA.

## BENDING-MACHINE.

990,377.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed July 20, 1909. Serial No. 508,632.

*To all whom it may concern:*

Be it known that we, JOSEPH E. MORSE and OTTO ANDERSEN, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Bending-Machines, of which the following is a specification.

Our invention relates to a new and useful improvement in bending machines, and has for its object to provide a machine simple in construction but exceedingly durable and efficient in action by which angle irons may be bent in variety of different curves.

The device is especially adapted to use in bending circular hoops from angle irons to be used in binding together the parts of a tank or similar object.

The above objects are accomplished by the pressure of a number of rolls upon the metal so as to flatten a portion thereof which will change the length of one edge of the angle iron, thus causing it to take the shape of a circle.

With these ends in view, this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, we will describe its construction in detail, referring by letter to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a front elevation of a bending machine made in accordance with our improvement. Fig. 2, a rear elevation thereof. Fig. 3, a side elevation showing parts thereof in section to more clearly illustrate the working of the same. Fig. 4, an enlarged front view of the yoke. Fig. 5, a still greater enlarged plan view of the yoke, and Fig. 6, a section at the line  $x-x$  of Fig. 5 showing the bearing plate in position.

In carrying out our invention as here embodied, A represents the base of the machine having a frame B secured thereto, in the upper end of which are mounted the rolls C and D; to the rear of which are mounted the pinions E and F, the pinion E being set farther to the rear than the pinion F, both of said pinions meshing with a third pinion G, which is of sufficient thickness to equal the thickness of the other two pinions, and

this pinion G is mounted on the shaft H, one end thereof being journaled in the frame B, the opposite end being mounted in the journal I formed with the standard J, which is secured to the base A.

On the shaft H is mounted a gear K, to which the power is applied for running the machine. On the frame B are mounted the arches L and M, which are set at some desirable angle thereto, and into these are threaded the screws N, each of which is swiveled in the upper end of a yoke O, whose under surface is concave as at  $a$  and having formed with the sides thereof the guides P, the inside surface of which rest against the uprights Q of the arches L and M. In the yokes O are pivoted the journal blocks R whose upper surface is convex as at  $b$ , by means of the trunnions S, and in these journal blocks are mounted the shafts T of the conical rolls U and V.

To the rear end of the shaft of the conical roll V is secured the bevel gear W which meshes with the pinion F, so that when said pinion is revolved the roll V will be revolved.

On the forward end of the frame B is mounted the block X which is secured to the frame B by the bolts Y. In this block is formed the horizontal opening Z, in the walls of which is formed the key-way A'. The forward end of the opening Z is enlarged, as indicated by B' for a purpose to be hereinafter described.

In the opening Z fits a sleeve C' having a key D' formed therewith adapted to register with the key-way A' so as to prevent said sleeve from turning. In the sleeve are formed the internal threads E' with which engage the threads F' of the screw G', said screw having a collar H' adapted to rest in the enlarged portion B' of the opening Z, and when said collar is in position in the enlarged portion B', a cap I' is placed over the same and secured to the block X by the bolts J' thereby preventing the collar and thus the screw from being withdrawn, but allowing the same to be revolved for moving the sleeve C' backward and forward.

With the upper end of the sleeve C' is formed a yoke K' in which is journaled a roll L', said roll adapted to hold the metal being bent against the rolls C, D, U and V.

The operation of the device is as follows:—The rolls U and V are adjusted in relation to the rolls C and D by turning the



screws N which will raise or lower the yokes O, thus raising or lowering the conical rolls U and V, or if one of the screws N is turned and the other one left stationary it will change the angle of the surfaces of the conical rolls U and V in relation to the surfaces of the rolls C and D.

When the correct adjustment has been obtained, the angle iron is placed between the rolls V and D and the roll L' is moved toward the first named rolls until it rests against the angle irons, thus holding it at all times in the same relation to the rolls U, V, C and D. As the rolls are revolved a portion of the metal of the angle iron will be flattened, thus changing the length of one edge thereof, which will cause said angle iron to bend around in the form of a circle, the size of the circle being regulated by the amount of pressure brought to bear upon the metal and also by the bevel formed thereon which is regulated by changing the angle between the surfaces of the conical rolls and the plain rolls.

It will be noticed that only one of the conical rolls is provided with power transmitted thereto by the bevel gear W, the other being caused to revolve by friction.

Of course we do not wish to be limited to the exact details of construction here shown as these may be varied within the limits of the appended claims without departing from the spirit of our invention.

Having thus fully described our invention, what we claim as new and useful, is—

1. In a machine of the character described, a frame, rolls journaled in the upper end thereof, pinions secured to the rear of said rolls, a standard, a shaft, one end of which is journaled in said standard, the opposite end being journaled in the frame, a pinion mounted on said shaft engaging the pinions on the rolls, means for transmitting power to said shaft, arches mounted upon the upper end of the frame at some desirable angle thereto, yokes having guides formed with the sides thereof slidably mounted in said arches, screws passing through said arches having their lower ends swiveled in the yokes, bearing plates pivoted to the yokes, shafts mounted in said bearing plates, conical rolls secured to the forward end of said shafts, and a bevel gear mounted on the rear end of one of said shafts and meshing with one of the pinions secured to the first named rolls.

2. In a machine of the character described, a frame, rolls journaled in the upper end thereof, pinions secured to the rear of said rolls, a standard, a shaft, one end of which is journaled in said standard, the opposite

end being journaled in the frame, a pinion mounted on said shaft engaging the pinions on the rolls, means for transmitting power to said shaft, arches mounted upon the upper end of the frame at some desirable angle thereto, yokes having guides formed with the sides thereof slidably mounted in said arches, screws passing through said arches having their lower ends swiveled in the yokes, bearing plates, trunnions for pivoting said bearing plates to the yokes, shafts mounted in said bearing plates, conical rolls secured to the forward ends of said shafts adapted to lie in close relation to the first named rolls, a bevel gear attached to the rear end of one of said shafts and meshing with one of the pinions, and means for holding a piece of metal in contact with the rolls.

3. In a machine of the character described, a frame, rolls journaled in the upper end thereof, pinions secured to the rear of said rolls, a standard, a shaft, one end of which is journaled in said standard, the opposite end being journaled in the frame, a pinion mounted on said shaft engaging the pinions on the rolls, means for transmitting power to said shaft, arches mounted upon the upper end of the frame at some desirable angle thereto, yokes having guides formed with the sides thereof slidably mounted in said arches, screws passing through said arches having their lower ends swiveled in the yokes, bearing plates, trunnions for pivoting said bearing plates to the yokes, shafts mounted in said bearing plates, conical rolls secured to the forward ends of said shafts adapted to lie in close relation to the first named rolls, a bevel gear attached to the rear end of one of said shafts and meshing with one of the pinions, a block mounted on the forward upper end of the frame, said block having a horizontal opening therein, the outer end of which is enlarged, the walls of said opening having a keyway formed therein, a sleeve having internal threads and provided with a key mounted in said opening, a yoke formed with the inner end of said sleeve, a roll journaled therein, a screw having a collar adapted to engage the internal threads of the sleeve, said collar resting in the enlarged portion of the opening and a plate secured to the block for holding the collar in place.

In testimony whereof, we have hereunto affixed our signatures in the presence of two subscribing witnesses.

JOSEPH E. MORSE.  
OTTO ANDERSEN.

Witnesses:

JOHN J. HAGAN,  
HARRY A. HAGAN.