No. 794,392. PATENTED JULY 11, 1905.

J. J. BOAX.

BENDING ROLLS.

APPLICATION FILED AUG. 29, 1904.

2 SHEETS—SHEET 1.

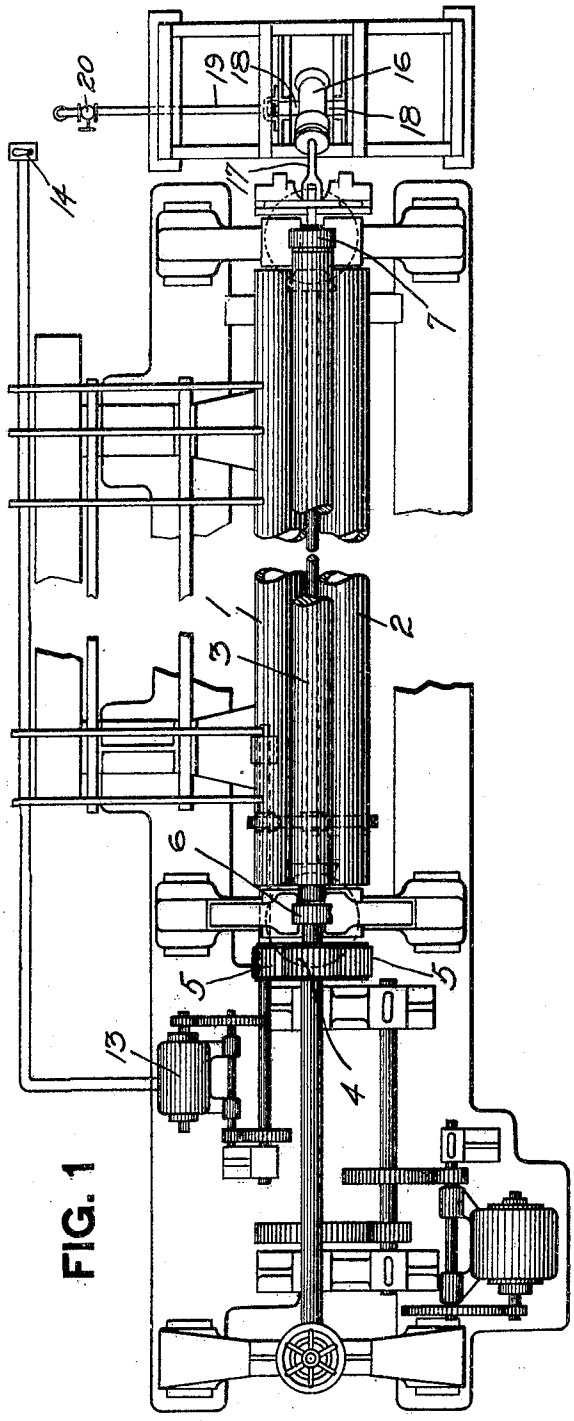

FIG. 1

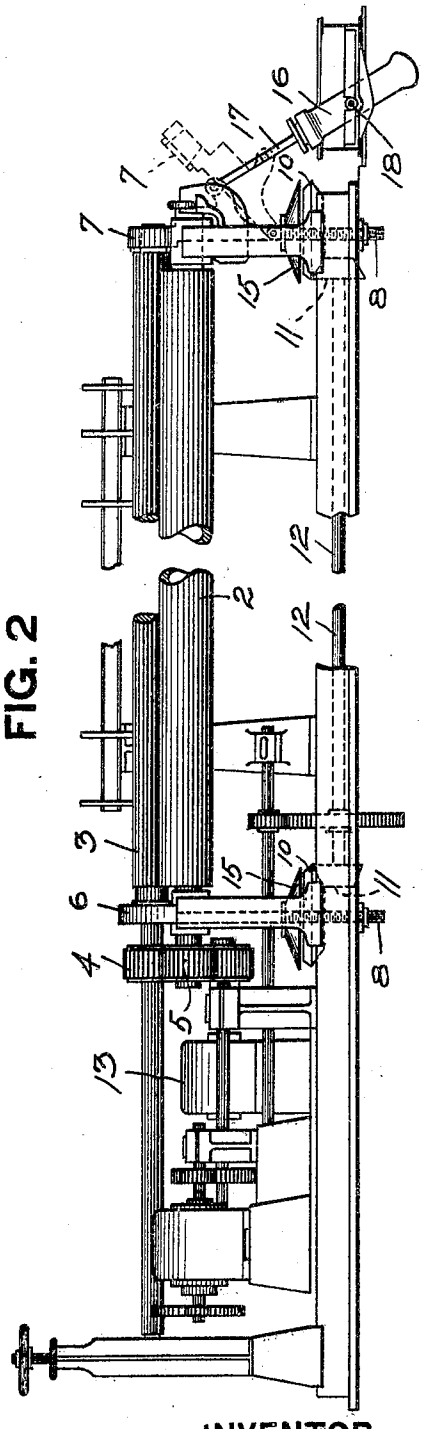

FIG. 2

WITNESSES.

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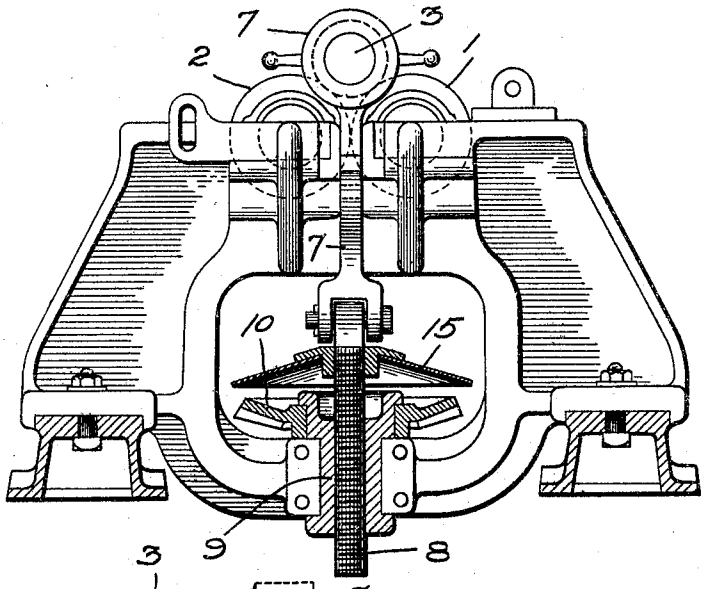
2 SHEETS—SHEET 2.

FIG. 3



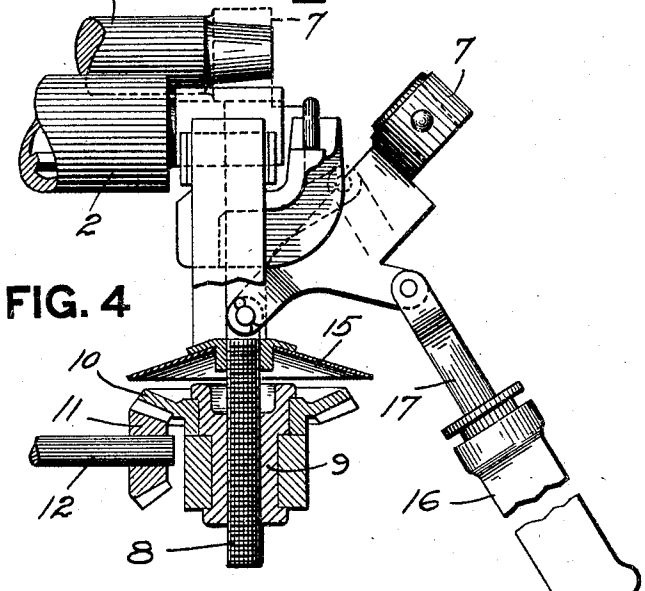


FIG. 4

WITNESSES.

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PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 794,392. Patented July 11, 1905.

UNITED STATES PATENT OFFICE.

JOHN J. BOAX, OF McKEESPORT, PENNSYLVANIA, ASSIGNOR TO NATIONAL TUBE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

BENDING-ROLL.

SPECIFICATION forming part of Letters Patent No. 794,392, dated July 11, 1905.

Original application filed January 29, 1904, Serial No. 191,173. Divided and this application filed August 29, 1904. Serial No. 222,575.

To all whom it may concern:

Be it known that I, JOHN J. BOAX, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Bending-Rolls; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to rolls for bending plates into tubular form.

The object of my invention is to provide power mechanism for operating a movable bearing at one end of the top bending-roll and to otherwise improve mechanism of this character.

In the manufacture of large size lap-weld tubing, boiler-shells, and the like the plates are bent into tubular form by passing them sidewise between three horizontal rolls, two of said rolls being arranged side by side and the third being placed above the same and being adjustable vertically to press the plate down into the angle between the tops of the two bottom rolls, thus causing the plate to be curled edgewise into tubular form around the top roll. To remove the plate from the rolls, the bearing at one end of the top is removable, so that the bent-up plate can be pulled endwise off of said roll. The common practice is to mount said bearing on a horizontal pivot, so that it can be swung outwardly away from the end of the top roll.

My invention consists principally in providing power mechanism for moving the end bearing of the top roll into and out of position.

It also consists of details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of bending-rolls with my invention applied thereto. Fig. 2 is a side view of the same. Fig. 3 is a vertical sectional view showing the means for adjusting the top roll; and Fig. 4 is a side view, partly broken away, of the movable end bearing for the top roll.

The bending-rolls will be of the usual type, comprising bottom rolls 1 and 2, mounted in suitable housings and driven by any suitable mechanism. The top roll 3 is placed, as usual in this class of mechanism, just above the two bottom rolls. This top roll also will be driven by any suitable mechanism, preferably by the gear 4 thereon, meshing with gears 5 on the bottom rolls. The bearings 6 and 7 of the top roll are vertically adjustable in order to draw said top roll down to effect the bending of the plate, this vertical adjustment being secured by connecting to the bearings of said rolls screws 8, which are surrounded by rotating nuts 9, held against longitudinal movement and provided with bevel-gears 10, the latter being engaged by power-driven pinions 11, so that thereby the top roll can be positively drawn down during the bending operation. The pinions 11 are carried by a shaft 12, driven from any suitable source of power, such as an electric motor 13, which is controlled by means of a controller 14, placed in any convenient place.

The construction and operation so far described are old. I have improved this construction by providing a hood or shield 15 on the screws 8 and over the gears 10, so as to protect these from scale and other foreign matter, these hoods being of general dome shape, as shown in Figs. 3 and 4.

The end bearing 7 is pivotally connected to its screw 8, as shown in Figs. 2 and 4, in order to permit said bearing to be swung out of the way when the tube is being stripped from the top roll.

Another of my improvements consists in providing power mechanism for moving this bearing. To this end I provide a power-cylinder 16, which may be actuated by either air, steam, or water and which is connected to said movable bearing in such manner that it can swing the same into and out of position. For simplicity of arrangement I prefer to connect the piston-rod 17 directly to the swinging bearing. This necessitates movement of the cylinder to accommodate itself to the position of the bearing. Consequently said cylinder is pivoted so as to freely swing, this pivoting being secured by providing it with trunnions 18, one of which is made hollow, and has connected thereto the pipe 19 for

admitting the pressure medium to the cylinder. The controlling-valve 20 in this pipe is placed in close proximity to the position of the bender, so that by merely manipulating this valve he is able to swing the movable bearing into and out of position, thus dispensing with the hand-labor heretofore employed.

In conjunction with the bending-rolls described there will be used reciprocating mechanism for stripping the bent-up plate off the top roll, as described and claimed in my application filed January 29, 1904, Serial No. 191,173, of which application the present one is a division. The controlling-valve 20 for the power-cylinder 16 can be placed in close proximity to the controller for the stripper, and also close to the controller 14 for the motor 13, which actuates the adjusting-screws. In this way a single workman can attend to all the necessary movements of the bending-rolls and stripping mechanism, thus doing away with a number of workmen now necessary, and doing away entirely with the heavy work heretofore necessary.

What I claim is—

1. In a plate-bending machine, the combination of three bending-rolls, a pivotally-mounted bearing for one of said rolls, and pivotally-mounted power mechanism having a reciprocating element connected to said bearing and arranged to move the same into and out of engagement with the roll.

2. In a plate-bending machine, the combination of three bending-rolls, a pivotally-mounted bearing at the end of one of said rolls, a pivotally-mounted power-cylinder, and a piston-rod therefor connected directly to said swinging bearing.

3. In a plate-bending machine, the combination of three bending-rolls, a swinging bearing for the end of one of said rolls, a power-cylinder having its piston-rod connected directly to said bearing, trunnions on which said power-cylinder is mounted, one of said trunnions being hollow, and a pressure-supply pipe connected to said trunnions.

4. In a plate-bending machine, the combination of two bottom rolls and one top roll, vertically-movable bearings for the top roll, screws connected to said bearings, stationary rotating nuts on said screws, gears on said nuts, pinions engaging said gears, and a hood on said screws over said gears.

5. In a plate-bending machine, the combination of the bending-rolls, vertically-movable bearings for the top roll, vertically-movable means connected to said bearings, one of said bearings being pivoted to this vertically-movable means, a pivotally-mounted power-cylinder, and a piston-rod for said cylinder connected directly to said bearing.

In testimony whereof I, the said JOHN J. BOAX, have hereunto set my hand.

JOHN J. BOAX.

Witnesses:

ROBERT C. TOTTEN,

G. KREMER.