Dec. 7, 1926. 1,610,201

J. J. CAVAGNARO

METAL BENDING MACHINE

Filed Sept. 5, 1923 2 Sheets-Sheet 1

Fig. 1.

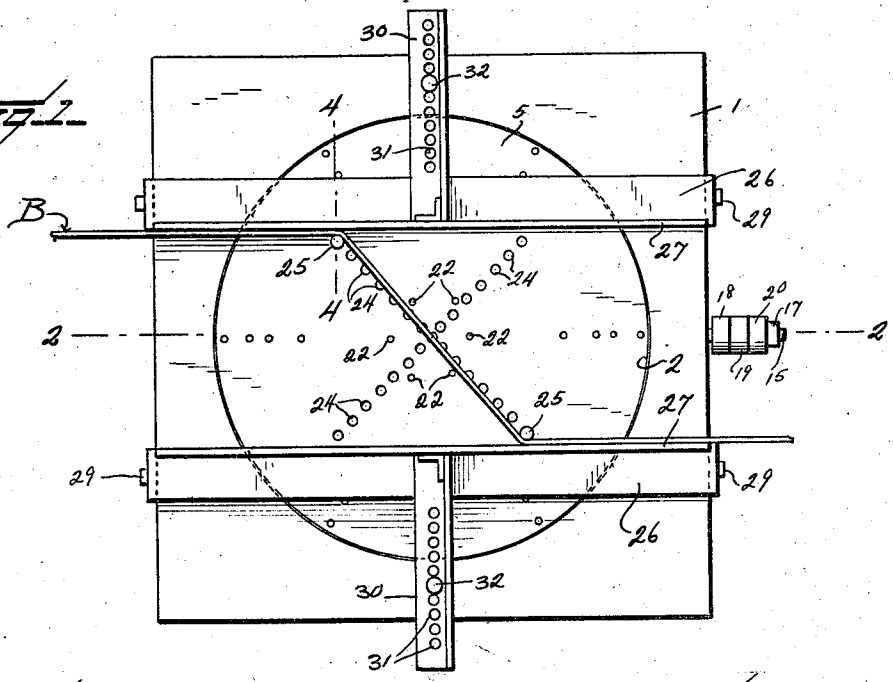


Fig. 5.

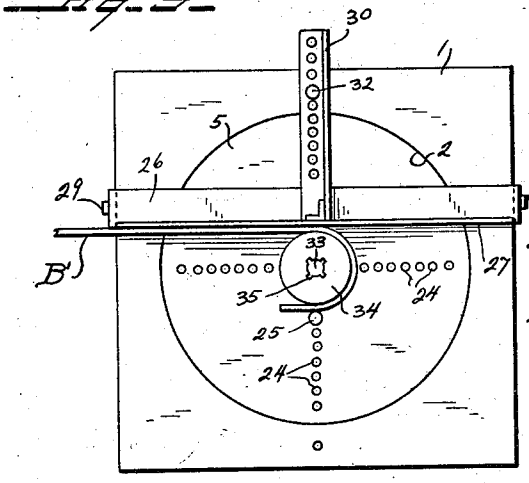


Fig. 6.

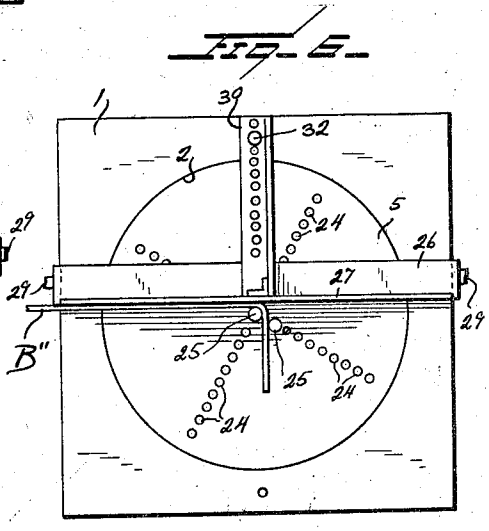


Fig. 4.

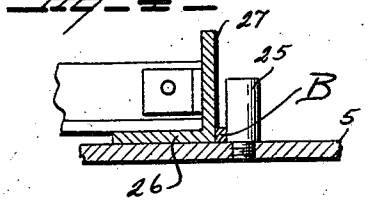
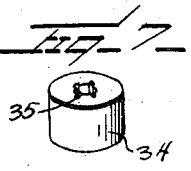


Fig. 7.



INVENTOR.

J. J. Cavagnaro

BY Watson E. Coleman

ATTORNEY.

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J. J. CAVAGNARO

METAL BENDING MACHINE

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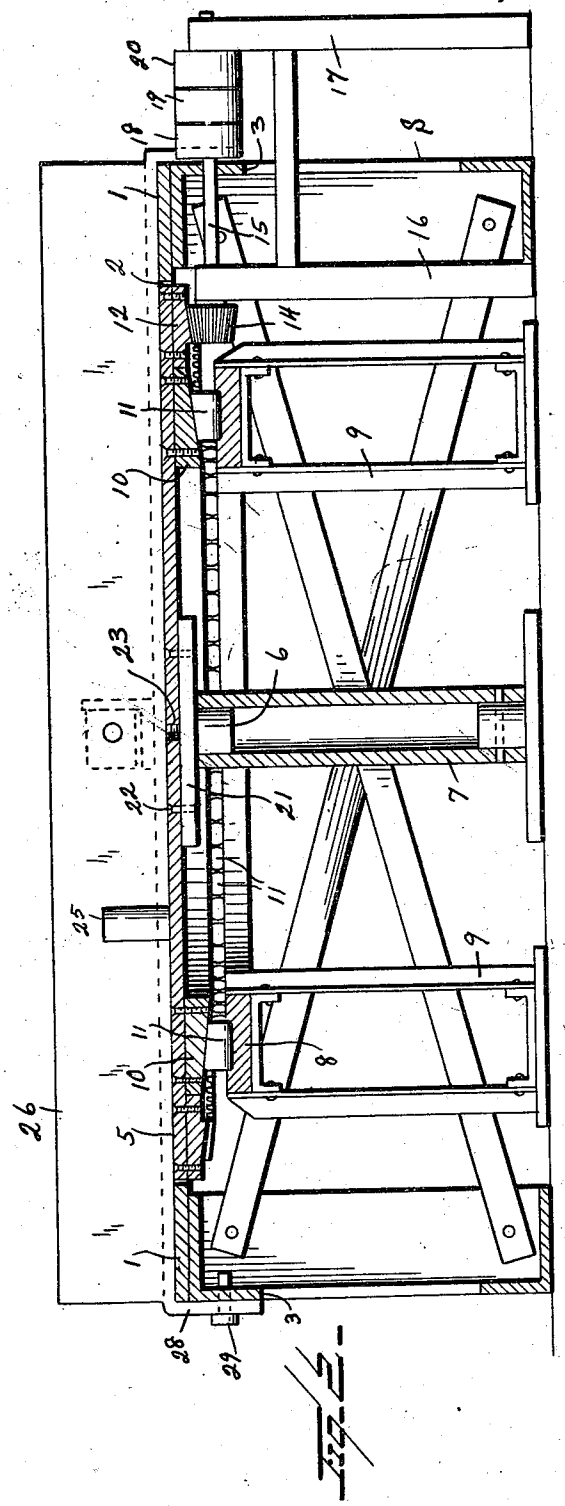

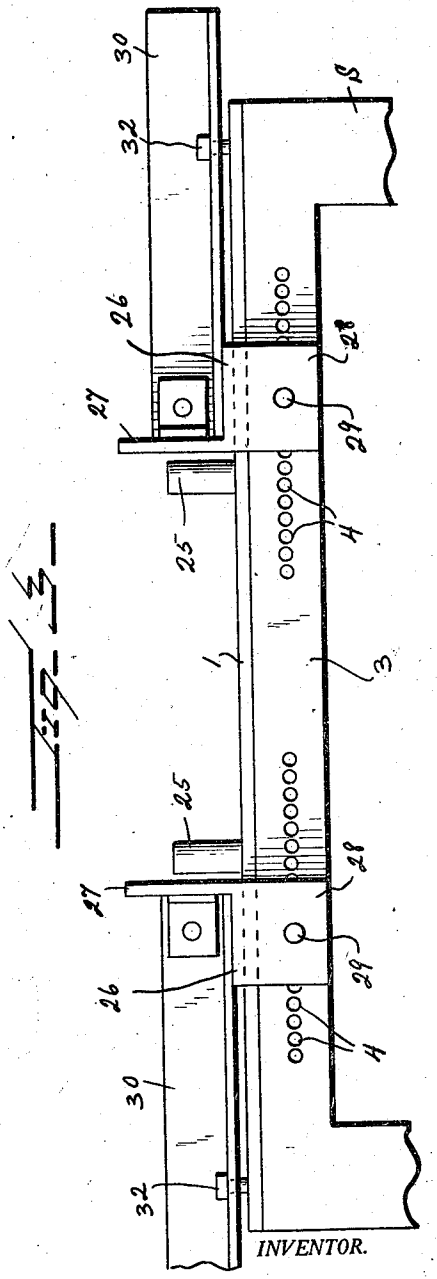

INVENTOR.

J. J. Cavagnaro

BY Watson E. Coleman

ATTORNEY.

Patented Dec. 7, 1926. 1,610,201

UNITED STATES PATENT OFFICE.

JOHN JAMES CAVAGNARO, OF SAN FRANCISCO, CALIFORNIA.

METAL-BENDING MACHINE.

Application filed September 5, 1923. Serial No. 661,109.

This invention relates to metal bending machines and has relation more particularly to a device of this general character especially designed and adapted for use in bending metal bars and it is an object of the invention to provide a novel and improved device of this general character whereby a bar may be readily bended at a plurality of points therealong at a single operation and also whereby the bar may be bended at right angles or readily formed with a hook of desired radius.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved metal bending machine whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a view in top plan illustrating a machine constructed in accordance with an embodiment of my invention;

Fig. 2 is a enlarged sectional view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary view in side elevation of the structure as illustrated in Fig. 1;

Fig. 4 is an enlarged fragmentary sectional view taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is a view in top plan illustrating an assembly for bending a bar;

Fig. 6 is a view similar to Fig. 5 showing an assembly for making a right angle bend; and

Fig. 7 is a view in perspective of a bushing for making a hook bend.

As disclosed in the accompanying drawings, 1 denotes a table of desired dimensions and which has its central portion provided with a circular opening 2. The table 1 is supported at a desired elevation by the supporting structure S which structure at opposite sides of the table providing the depending flanges 3.

Each of the flanges 3 at each side of its longitudinal center is provided with a series of circular openings 4, adjacent openings being in relatively close proximity one to the other.

Snugly fitting within the opening 2 is a revolving table 5 provided at its axial center with a depending trunnion 6. The trunnion 6 engages within the upper portion of a tubular post 7 whereby the table 5 is supported for rotation about a fixed axis.

Underlying the marginal portion of the table 5 is the horizontally disposed annular trackway 8 supported by the columns 9. The trackway 8 also underlies an annular trackway 10 secured to the under surface of the table 5, and interposed between the trackways 8 and 10 are the anti-friction members 11 herein disclosed as rollers. By this means the outer or marginal portion of the table 5 is effectively supported yet permitting the table 5 to have desired rotation with a minimum of frictional resistance.

Also secured to the under face of the table 5 and positioned outwardly of the trackway 10 is an annular rack 12 with which meshes a gear 14. The gear 14 is fixed to a shaft 15 suitably supported by the posts 16 and 17 and an adjacent end flange 3. The shaft 15 extends beyond the table 1 and operatively engaged with said extended portion is a forward drive pulley 18, a loose pulley 19 and a reverse pulley 20, each of which being adapted to be selectively engaged in any desired manner with a suitable source of power. Through the instrumentality of these pulleys 18 to 20 the table 5 may be caused to rotate in either direction preferred.

The trunnion 6 hereinbefore referred to is carried by a plate 21 which is bolted or otherwise secured to the table 1 as indicated at 22. The table 5 at its axial center has disposed therethrough an opening 23 and radiating from said central opening 23 are the series 24 of openings, each series 24 being herein disclosed as substantially at right angles to the adjacent series.

My improved machine as herein disclosed is particularly designed for the bending of metallic bars for concrete reinforcement although I do not wish to be understood as limiting myself in this respect.

As illustrated in Fig. 1 of the drawings, the machine is employed to bend the bar B at a plurality of points at a single operation and when so employed the pins 25 are selectively engaged within the openings of aligned series 24.

The depth of the bends are under control

of the beams 26 which are disposed across the tables 1 and 5 at desired distances at opposite sides of the axial center of the table 5. Each of the beams 26 has its inner longitudinal marginal portion defined by an upstanding flange 27 with which the bar directly contacts and which also permits several bars to be superimposed one upon the other so that the same may be properly bended at a single operation.

The extremities of the beams 26 are provided at each end with a depending wing 28 which overlies an adjacent end flange 3 and a pin 29 which is disposed through said wing 28 and a desired opening 4 whereby the beams 26 are effectively locked in desired adjusted position.

Secured to the central portion of the flange 27 of each of the beams 26 is an angle bar 30 herein disclosed as disposed at right angles to the beams 26 and the bottom flange of the member 30 is provided with a series of openings 31 disposed longitudinally thereof through which is adapted to be selectively engaged a pin 32 which also engages the table 1. This member 30 prevents bending or flexing of the beams 26 during a bending operation whereby the efficiency of the machine is materially facilitated.

The assembly illustrated in Fig. 5 is one whereby a rod is adapted to be bended to provide a hook and when so employed a pin 33 is engaged within the central opening 23 of the table 5 and with which pin is engaged a bushing 34 of desired radius. The pin 33 and bushing 34 are provided with the interlocking tongues and grooves as indicated at 35 whereby the bushing is fixed to the pin 33. A beam 26 is properly adjusted with respect to the applied bushing 34 and a pin 25 positioned as required as is illustrated in Fig. 5 so that upon requisite turning of the table 5 the desired bending of the bar B′ will be effected. By having the bushing 34 fixed to the pin 33, the bushing 34 will rotate with the table 5 so that the bending of the bar B′ will be by rolling action and not by drawing or otherwise distorting the body of the bar B′.

The assembly illustrated in Fig. 6 is primarily for the purpose of effecting a right angular bend in the bar B″ and in which assembly a pin 25 is engaged within the central opening 23 and a second pin 25 selectively engaged within an opening in one of the desired series 24 so that upon requisite turning of the table 5 the desired bending action will be effected.

From the foregoing description it is thought to be obvious that a metal bending machine constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:

1. A metal bending machine comprising a table having the intermediate portion cut out, a rotatable table positioned within the cut out portion of the first named table, said rotatable table being provided with a central opening and with a series of openings radiating from the central opening, one or more pins selectively engaged with the openings of the rotatable table, and a beam supported by the first named table and extending across the rotatable table.

2. A metal bending machine comprising a table having the intermediate portion cut out, a rotatable table positioned within the cut out portion of the first named table, said rotatable table being provided with a central opening and with a series of openings radiating from the central opening, one or more pins selectively engaged with the openings of the rotatable table, a beam supported by the first named table and extending across the rotatable table, and means for adjusting the beam with respect to the center of the rotatable table.

3. A metal bending machine comprising a table having the intermediate portion cut out, a rotatable table positioned within the cut out portion of the first named table, said rotatable table being provided with a central opening and with a series of openings radiating from the central opening, one or more pins selectively engaged with the openings of the rotatable table, a beam supported by the first named table and extending across the rotatable table, means for adjusting the beam with respect to the center of the rotatable table, and means coacting with the beam and the first named table for bracing the intermediate portion of the beam.

4. A metal bending machine comprising a table having the intermediate portion cut out, a rotatable table positioned within the cut out portion of the first named table, said rotatable table being provided with a central opening and with a series of openings radiating from the central opening, one or more pins selectively engaged with the openings of the rotatable table, a beam supported by the first named table and extending across the rotatable table, and means for moving the rotatable table in either direction.

5. A metal bending machine comprising a table having the intermediate portion cut out, a rotatable table positioned within the

cut out portion of the first named table, said rotatable table being provided with a central opening and with a series of openings radiating from the central opening, one or more pins selectively engaged with the openings of the rotatable table, and means supported by the first named table and extending across the rotatable table, said means being positioned at opposite sides of the axial center of the rotatable table.

In testimony whereof I hereunto affix my signature.

JOHN JAMES CAVAGNARO.