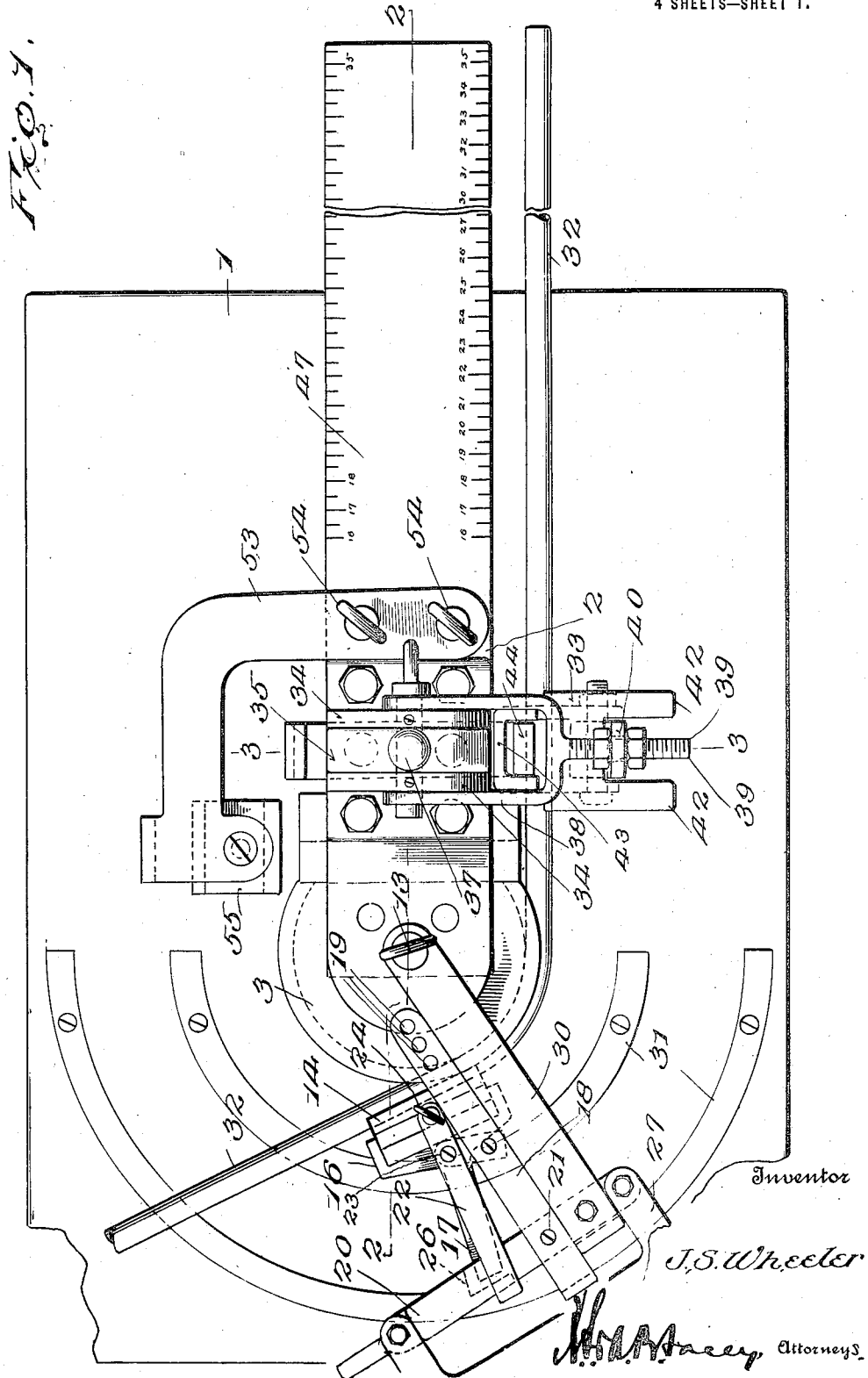


BENDING MACHINE.

1,263,301.

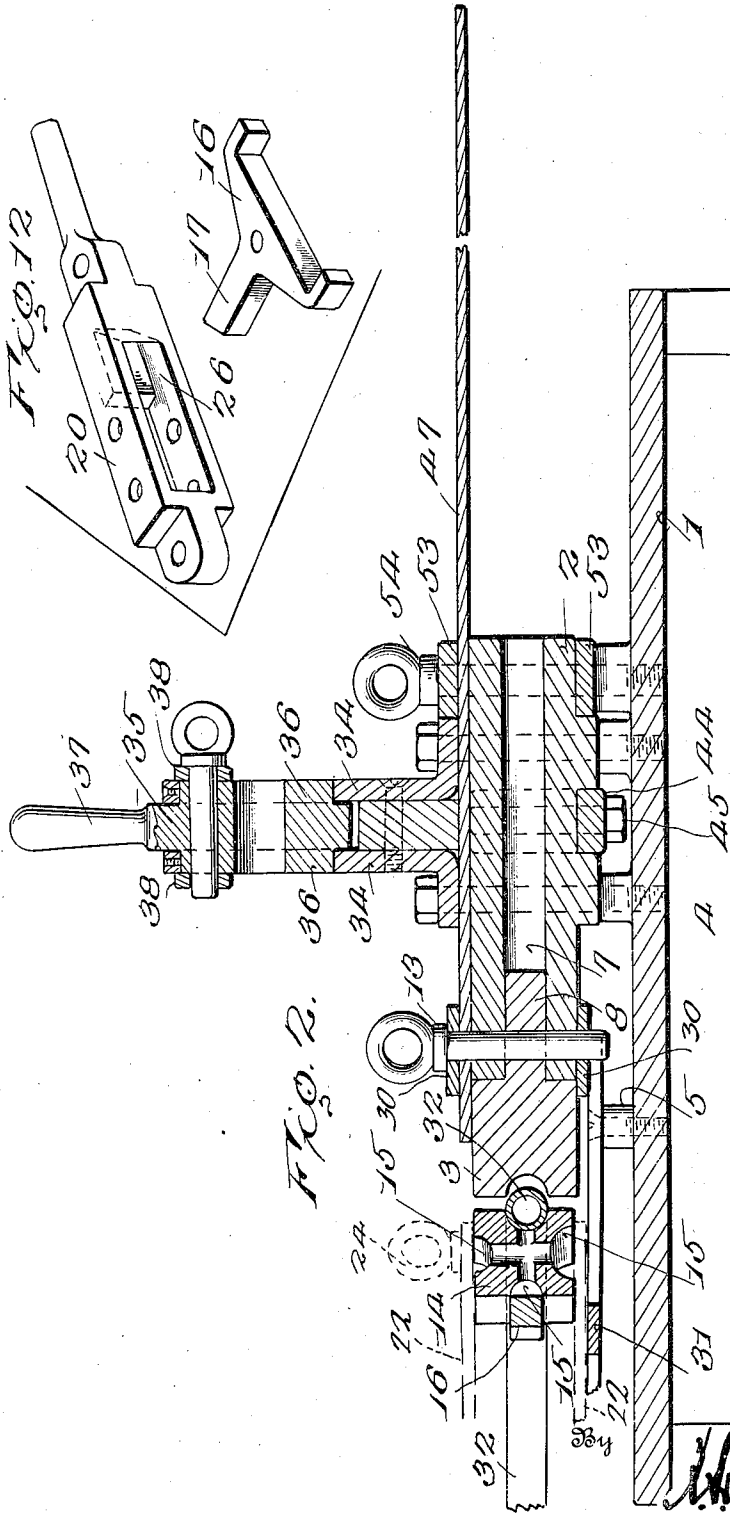
4 SHEETS—SHEET 1.



J. S. WHEELER.
BENDING MACHINE.
APPLICATION FILED APR. 26, 1917.

1,263,301.

Patented Apr. 16, 1918.
4 SHEETS—SHEET 2.



Inventor

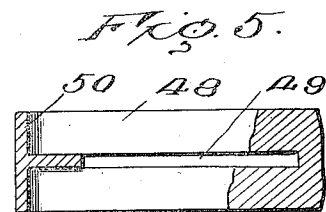
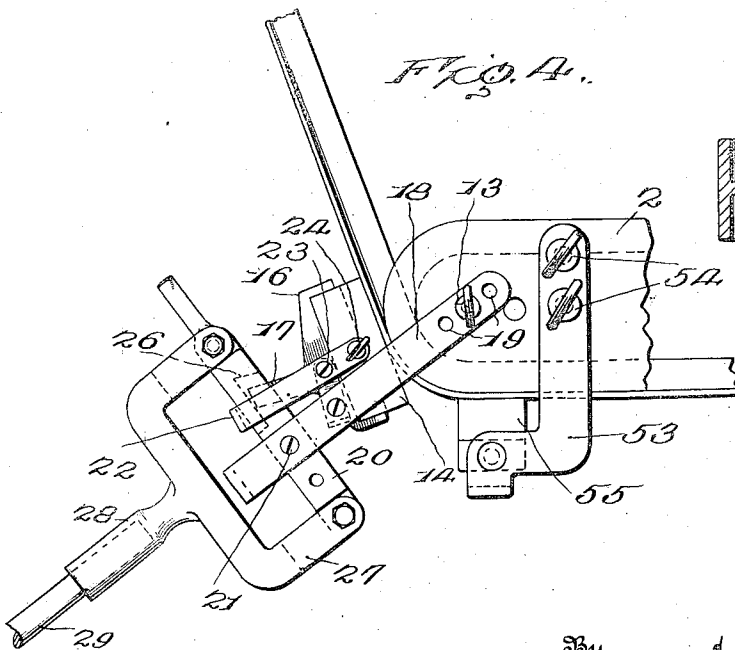
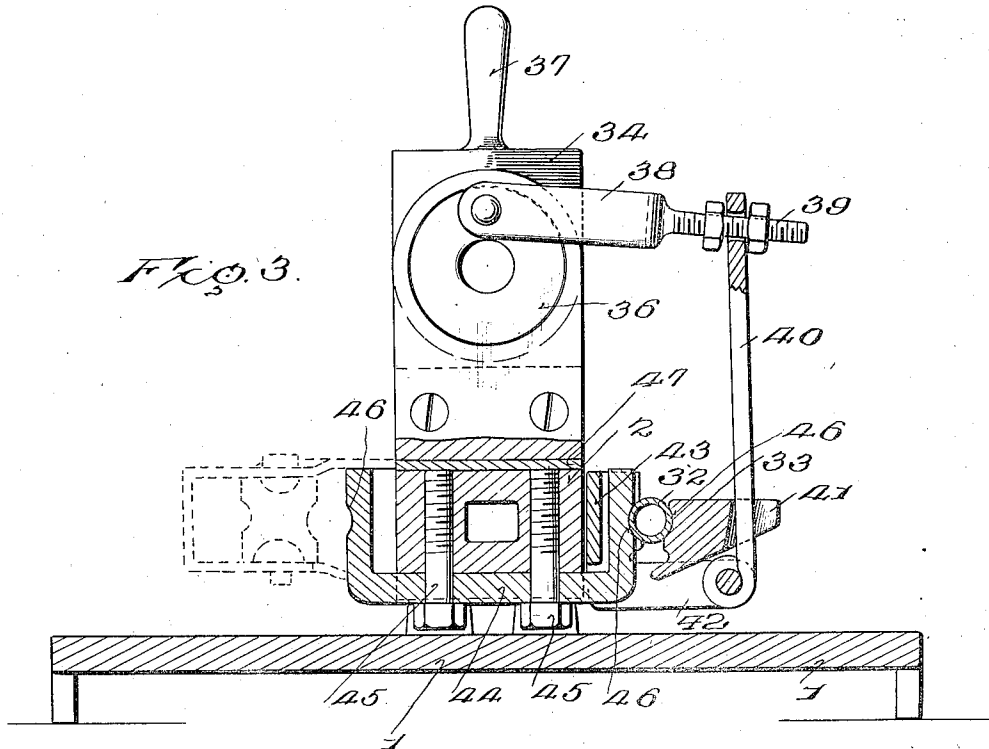
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4 SHEETS—SHEET 3.



Inventor

J. S. Wheeler

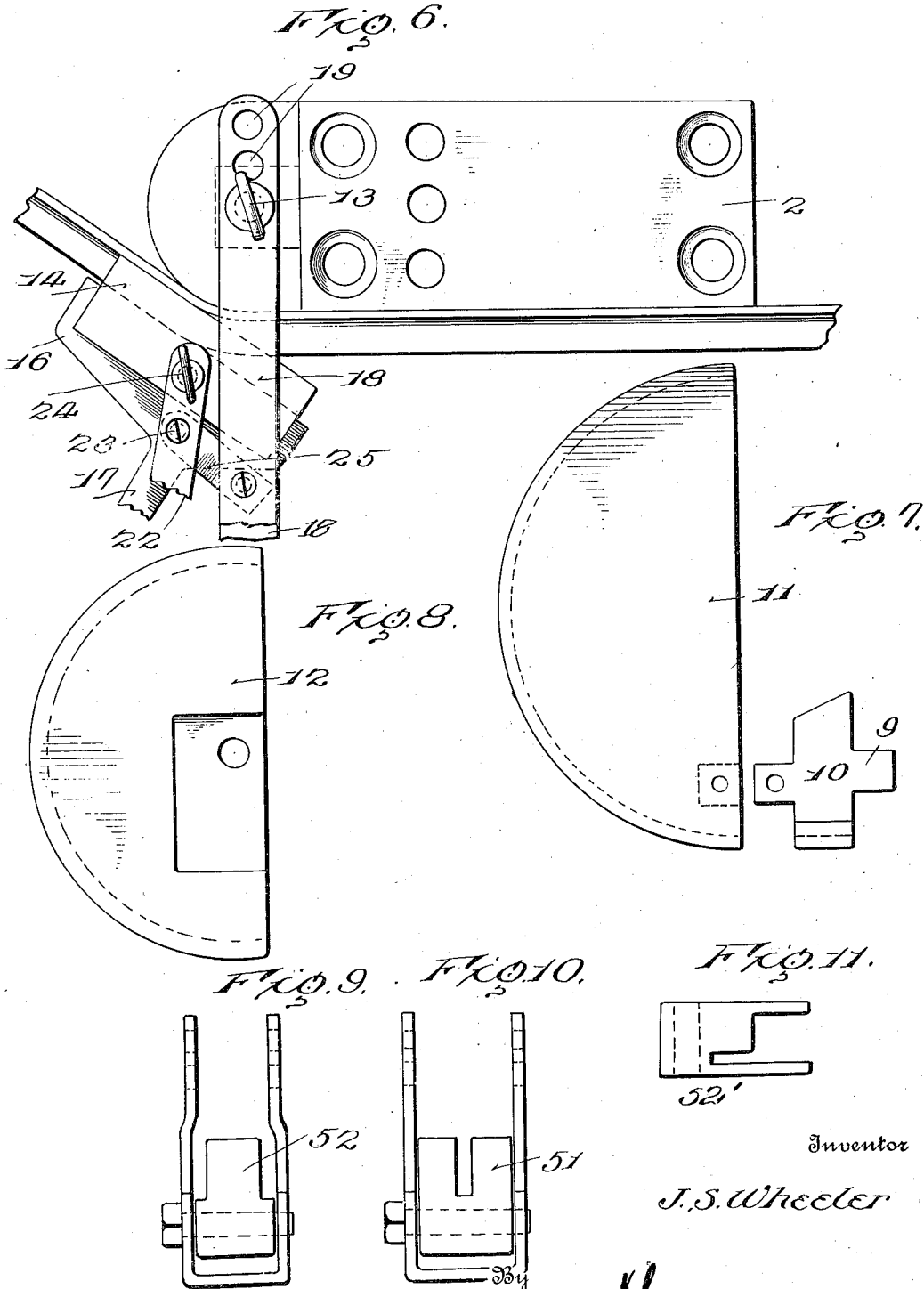
By

W. H. Sawyer, Attorneys.

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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN S. WHEELER, OF DUNSMUIR, CALIFORNIA.

BENDING-MACHINE.

1,263,301.

Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed April 26, 1917. Serial No. 164,764.

To all whom it may concern:

Be it known that I, JOHN S. WHEELER, a citizen of the United States, residing at Dunsmuir, in the county of Siskiyou and State of California, have invented certain new and useful Improvements in Bending-Machines, of which the following is a specification.

This invention provides an appliance which admits of tubing, rods, bars or the like being readily bent into any desired form without distorting the cross sectional outline thereof.

The present invention seeks to increase the efficiency and extend the field of usefulness of the machine disclosed in Letters Patent Nos. 1,206,742 and 1,206,743 granted to me November 28, 1916.

Referring to the annexed drawings:—

Figure 1 is a top plan view of a machine embodying the invention;

Fig. 2 is a vertical longitudinal section on the line 2—2 of Fig. 1;

Fig. 3 is a transverse section on the line 3—3 of Fig. 1;

Fig. 4 is a detail plan view of the pressure applying mechanism, the supplemental form being omitted and the arrangement of the work holder being different from that shown in Fig. 1;

Fig. 5 is a fragmentary edge view of a form for bending T-iron;

Fig. 6 is a plan view of an arrangement differing somewhat from the arrangement shown in Fig. 1;

Fig. 7 is a detail plan view of a filler block or coupling and a supplemental form;

Fig. 8 is a similar view of another supplemental form;

Figs. 9 and 10 are detail views of work holders;

Fig. 11 is a detail view of a presser block for treating angle iron;

Fig. 12 is a view showing parts of the pressure applying mechanism in detail.

The machine comprises a base 1, which may be of any construction so as to form a substantial support for the working parts. Mounted upon the base 1 is the bending mechanism, the same comprising a form, a presser piece, and a leverage mounting for the presser piece. As indicated most clearly in Figs. 1 and 2, the machine comprises a main body 2 and an end form 3, it being understood that, when bending a pipe, bar or rod, the particular form corre-

sponding with the curve to which the material is to be bent is selected. The active portion of the form is that about which the work is bent and such active portion is formed with a groove corresponding to the size, shape, or diameter of the work so as to form a snug seat for the same. The body and forms are supported a distance above the base 1 and are connected thereto by means of bolts or like fastenings 4. Spacing sleeves 5 are slipped upon the bolts or fastenings 4 between the base 1 and the forms. The forms 3 are supplementary and are provided in different sizes, thereby adapting the machine for general use for bending pipes, rods or bars of different sizes and in varying curves. Other forms may be provided to adapt the machine to any special or particular work. In Fig. 1 I have shown a form 3 at one end of the main body for bending the work on a curve of a radius greater than one-half the width of the body while in Fig. 6 I have shown a form equal in radius to one-half the width of the body, and in Fig. 4 have shown the end of the main body as arcuate to serve as the form. In Figs. 7 and 8 are shown forms for bending the work on curves of longer radius. The body 2 is generally constructed with a recess 7 in its end to receive a tongue 8 on a form or a tongue 9 on a filler or coupling 10 which is employed to connect the main body and the larger forms 11 or 12, the construction preventing relative angular movement between the body and the form. A bolt 13 is inserted through the body and the tongue to prevent withdrawal of the form and this bolt serves as a fulcrum for the pressure applying mechanism. In order that the work may be properly supported, that end of the form at which the initial bend is made cannot be spaced from the side of the body a distance greater than the distance between said side and the inner clamping jaw, for which reason the larger forms are coupled eccentrically to the body. It will be noted, particularly on reference to Figs. 1 and 6, that the main body is provided with a plurality of vertical openings therethrough so that the fulcrum 13 may be shifted to be always concentric with the form in use.

The presser block adapted to coöperate with the form is indicated at 14, each edge or side of the same being straight and formed with a groove 15 which corresponds

with the groove of the form with which the presser piece is adapted to cooperate. The presser block is preferably of metal and fits within a saddle 16 which is provided with an outwardly projecting arm 17. A clevis or stirrup 18 forms part of the leverage mounting of the pressure mechanism and consists of a flat bar doubled on itself into U-form with its longitudinal members embracing the upper and lower sides of the form and adapted to be pivoted to the body by a pin or bolt inserted through any one of the openings 19 at its inner end. In Figs. 4 and 6 it is shown so pivoted by the bolt 13. A handle or lever 20 is connected with the clevis 18 by a screw 21 and a second clevis or stirrup 22 has its longitudinal side members disposed at opposite sides of the lever, the saddle, and the presser block and is secured to the saddle and the block by screw 23 and pin or bolt 24, respectively, while links 25 connect the saddle with the clevis 18, the end of the stirrup 22 passing around the lever as will be understood. The handle or lever 20 is recessed, at 26, to receive the outer end of the arm 17 and a bracket 27 has its ends secured to the lever so that its intermediate portion spans the outer ends of the several clevises. On the outer side of this bracket is a socket 28 in which may be fitted the end of a supplemental lever 29. It will be understood that the supplemental forms are used interchangeably according to the work to be done and that in using the smaller forms the pivot point of the clevis 18 is through one or another of the openings 19 according to the radius of the form. Should it be necessary to use a very large supplemental form, a third clevis 30 may be fitted around the lever 20 and pivoted to the main body as shown clearly in Figs. 1 and 2.

Arcuate supports or tracks 31 are disposed at the working end of the machine and are adapted to receive and support the pressure mechanism and the bar to be bent. The curved supports may be provided in any desired number and are in a plane parallel with a plane passing through the form so as to support the pressure mechanism throughout the bending operation.

It will be understood that the lower members of the several stirrups ride on the tracks and maintain the presser block and other relatively movable parts of the pressure applying mechanism out of contact with the track so that interruption of the operation by reason of such contact of parts cannot occur.

A pipe or tube to be bent is indicated at 32 and is retained in place by means of a suitable clamp or work-holder. The body 2 may constitute one jaw of the work-holder while the other jaw, indicated at 33, is movable. Upon the upper side of the main body

are spaced standards 34 between which is a disk 35 having hubs 36 rotatably fitted in the standards. A handle 37 extends from the disk and a stirrup or clevis 38 embraces the standards and has its ends pivoted eccentrically to the hubs. A threaded stem 39 adjustably connects the clevis with the upper end of an arm 40 rising from the movable jaw 33 and passing through a notch 41 in the outer end of said jaw. The lower end of said arm is pivoted to and between the branches 42 of a forked base piece which fits against the edge of the main body as shown at 43 and forms a seat for an up-turned end of an anchor 44. The anchor extends beneath and is rigidly secured to the main body by bolts 45 and firmly anchors the work-holder in place. The opposed faces of the jaw 33 and the upstanding portions of the anchor and the base piece are grooved to properly engage the work as shown at 46. When the handle 37 is swung downwardly, the jaw 33 is forced toward the body 2 and the work thereby securely clamped in place. The work-holder may be shifted from side to side of the body at will and a plurality of interchangeable jaws 33 are provided so that the particular jaw designed for the work in hand may be used.

The operation is obvious. The work is clamped in place and the pressure mechanism then swung around the form so that the work will be forced into an arc determined by the arcuate edge of the form against which it is pressed, the pin or bolt 13 holding the pressure mechanism to the form during the entire bending operation. Any pipe, rod or bar may be bent readily to any desired angle without any buckling or cross-sectional distortion. A plurality of holes are provided through the forms and the rigid body to provide for reversing the forms, the pressure mechanism, and the work-holder so that any desired bend may be given the work. It will be readily noted that the presser block and saddle may have a slight motion relative to the handle or lever so that the first movement of the presser block will be an accommodation of itself to the angle at which the work may lie and subsequent movement of the handle lever will force the block against the bar, rod or tube with sufficient pressure to bend it around the form. It will be readily noted that as two levers or handles may be simultaneously utilized, a very strong pressure may be easily applied and the desired result easily and quickly attained.

The recess 26 in the handle or lever receives the free end of the stem 17 and permits the saddle to rock so that in bending a pipe, for instance, when the presser block 14 reaches the threaded end of the pipe the end of the stem 17 will bear against the

end of the recess 26 and will prevent the block kicking or digging into the pipe and scoring of the threads will be prevented. When the pressure applying mechanism is returned to its initial position to permit shifting of the work for a second bend, the engagement of the stem 17 with the end of the recess 26 holds the block out of the way of the work while it is being shifted. While bending, the clevis 22 stands away from the clevis 18 at its outer end and the links 25 connect the said clevis and the saddle, lying at an angle of about 45 degrees, and the presser block is held so that it just clears the form. When the mechanism is thrown back to permit shifting of the work, the outer end of the clevis 22 bears against the clevis 18 and its inner end stands away from the latter, the links 25 lying parallel with the block 14.

A measuring or gage plate 47 is secured upon the main body and projects therefrom at the end remote from the form. This plate is graduated so as to indicate the distance from the end of a bar to the center of a bend therein and, therefore, facilitates locating the bar relative to the form so that the bend may be formed at the desired point.

In Fig. 5, the form 48 is shown provided with a flat edge having a deep longitudinal groove 49 therein to accommodate a bar of T-iron 50. The presser block 51 (Fig. 10) to cooperate with this form will have a similar configuration so that the bar may be bent with the stem of the T on either side of the bend. Fig. 9 shows a presser block 52 of such shape as to operate on channel or angle iron, and Fig. 11 shows a presser piece 52' for acting on channeled or angled iron.

I have also illustrated a second form of work-holder which may be used instead of or as a supplement to the work-holder previously described. The said second form of work-holder comprises a clevis or stirrup having its branches or members 53 disposed above and below the main body and secured thereto by two bolts 54 so that it will be held firmly in place during the bending operation. By removing the bolt more remote from its end, the clevis may be swung about the other bolt to permit insertion or removal of the work. The clevis is angular

or L-shaped and at its outer end carries a block or jaw 55 which is provided with a plurality of work-engaging sides of different shapes. A plurality of these blocks may be provided and used interchangeably so that work of a wide range of outlines may be accommodated.

Having thus described the invention, what is claimed as new is:

1. In a bending machine, the combination of a form, a clevis pivoted to the form, a lever extending laterally from the clevis in the plane of the form, a presser block disposed between and in the same plane with the lever and the form, a saddle carrying the presser block, and having an arm loosely engaging the lever, a connection between the saddle and the clevis, and a second clevis secured to the saddle and the presser block and adapted to bear against the first mentioned clevis.

2. A bending machine comprising a form, a clevis having a connection with the form, a recessed lever extending laterally from the clevis, a presser device disposed between the lever and the form and having an arm playing in the recessed lever between the ends thereof, and connections between the presser device and the clevis, said last-mentioned connections being free of the lever.

3. In a machine of the character described, the combination of a body, an anchor secured to and projecting from the body, a base piece seating upon the projecting portion of the anchor and held to the body by the same, a movable jaw slidably mounted on said base piece and cooperating with the base piece and the anchor to hold the work, an arm pivoted on the base piece and bearing against and free of the outer side of said jaw, and means for operating and locking said arm.

4. In a machine of the character described, the combination of a form, a clevis pivoted to the form, a lever inserted through and secured in the outer end of the clevis, a bracket secured to the lever and spanning the clevis, a handle fitted to said bracket between the ends thereof, and a presser block supported from the clevis and the lever.

In testimony whereof I affix my signature.

JOHN S. WHEELER. [L. S.]