(No Model.) 2 Sheets—Sheet 1.

E. DEVINE.

PIPE BENDING MACHINE.

No. 292,418. Patented Jan. 22, 1884.

Fig 1.

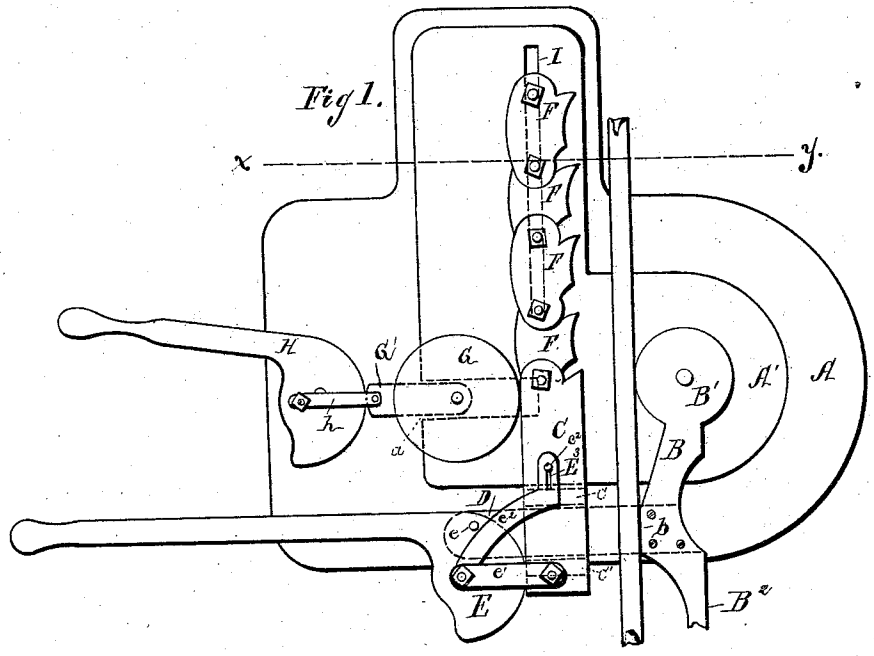
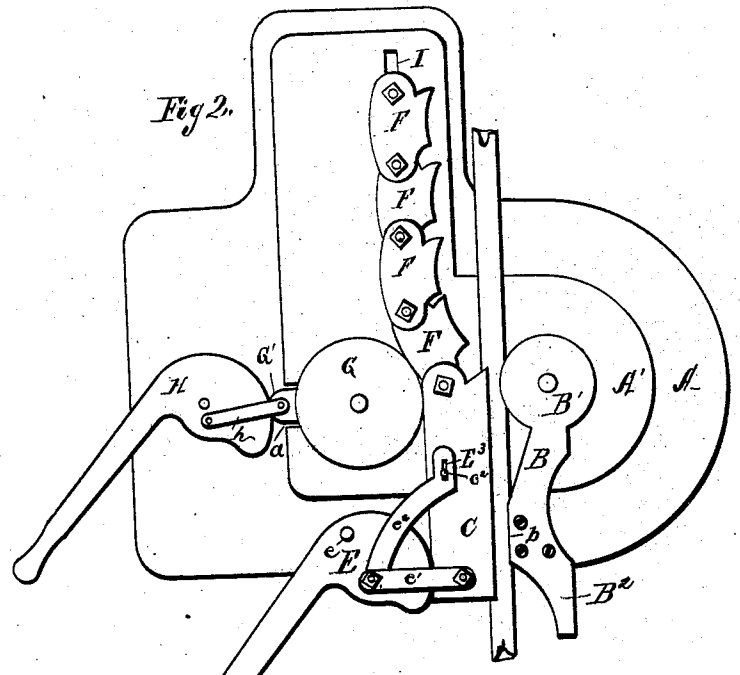


Fig 2.



WITNESSES

Samuel C. Thomas

N. S. Wright.

Edward Devine INVENTOR

By W. W. Seggers.

ATTORNEY

N. PETERS, Photo-Lithographer, Washington, D. C.

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Fig 3.

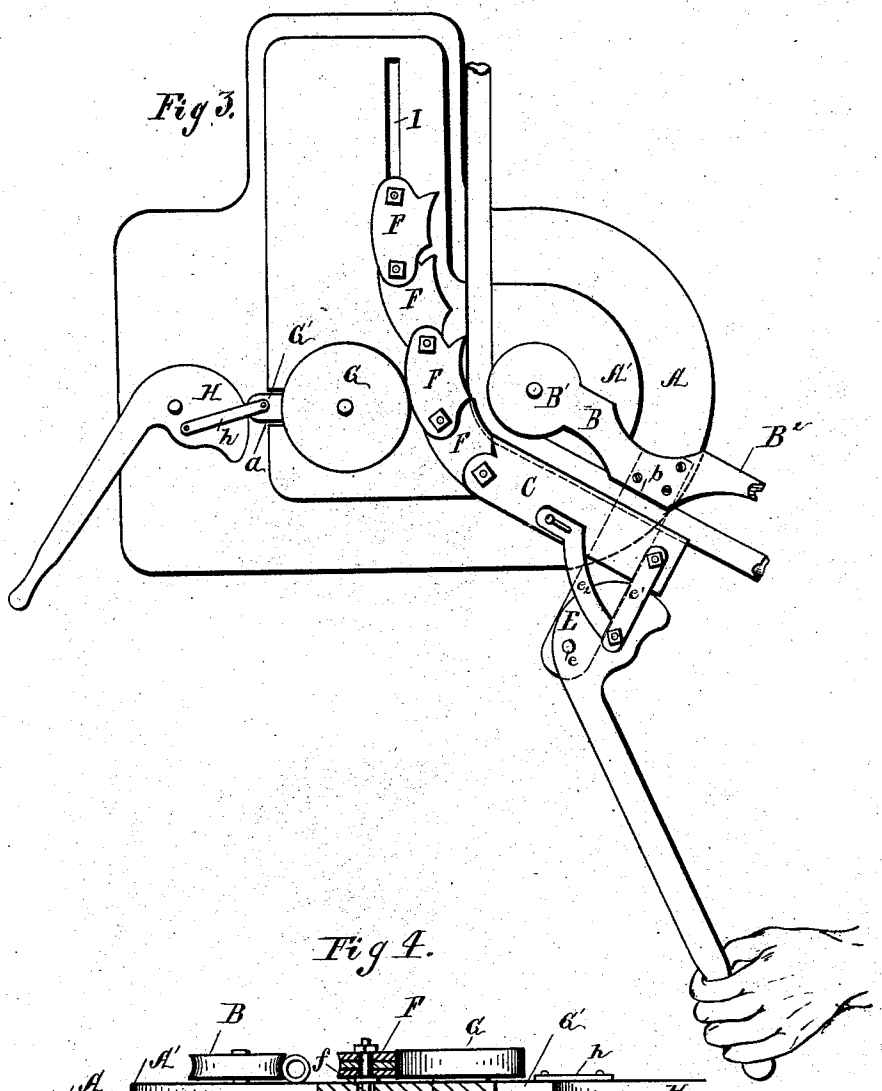


Fig 4.

WITNESSES

Samuel E. Thomas

N. S. Wright

INVENTOR

Edward Devine

By W. C. C. Leggett.

ATTORNEY

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

EDWARD DEVINE, OF DETROIT, MICHIGAN.

PIPE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 292,418, dated January 22, 1884.

Application filed August 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DEVINE, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Pipe-Bending Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

The object of this invention is to provide novel and efficient mechanism for bending pipe; and to such end it consists in the combination of devices hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus, with the parts in position to receive the pipe to be bent; Fig. 2, a similar view, with the parts clamping the pipe in position to begin the bending operation; Fig. 3, a similar view, showing the position of the parts when the pipe is being bent; and Fig. 4 is a vertical section on the line *x y* of Fig. 1.

In the drawings, A indicates a table or frame having a raised bed, A′, and B′ is the annular former-head, centrally pivoted or journaled to the bed, and constructed with a peripheral groove to receive the pipe, and having an arm, B, provided with a shoulder, *b*, and extended into a lever-arm, B^2, the shoulder being also grooved, so that the groove will sit into it. The connection, as shown, provides for the rotation of the annular former-head about its pivotal connection with the bed of the table.

C indicates a clamp adjustable toward and from the shoulder *b*, and grooved along its length, so that the pipe can sit between the shoulder and clamp, the latter having means whereby it may be closed against the former-head B′ and the shoulder *b*, to clamp the pipe, or be opened for the removal or insertion of the pipe. For instance, the clamp may be provided with guides *c c′*, arranged against the opposite sides of a track, D, which is preferably secured at one end to the shoulder *b* while it is free at its other end.

E indicates a cam-lever, pivoted to the outer end of the track D, as at *e*, and suitably connected with the clamp C by a link, *e′*, and a link, e^2, provided with a slot, E^2, adapted to slide upon the pin, c^2, as the cam-lever is operated. Secured to the end of the clamp is a series of links, F, of any desired number, composing a pliable link-former, the inner edges of said links being constructed on the arc of a circle, corresponding with the annular former-head, and the edges are also provided with grooves for the reception of the pipe. The links of the pliable former have a pivoted connection one with another, in any suitable manner—as, for example, in the manner illustrated in Fig. 4—one link being constructed with a tenon adapted to enter a corresponding slot in another link, the construction being such that each link in turn may be crowded against the annular former-head B′, as the latter is rotated upon the bed of the table.

For the purpose of forcing the upper end of the clamp firmly against the annular former-head, and also for the purpose of forcing the pliable link-former firmly into engagement with the annular former-head B′, as the latter is rotated, I have provided a movable disk, G, pivoted to an arm, G′, adapted to be adjusted backward and forward into a slot, *a*, in the bed of the table.

H indicates a cam-lever, pivoted to the table, and connected by a link, *h*, to the arm G′, so that, as the the cam-lever is operated, the disk G will be adjusted to and fro.

I indicates a groove in the bed of the table, adapted to receive one or more guide-pins, *f*, upon the links of the pliable former.

The operation of the apparatus is as follows: The parts being set for the reception of the pipe, as illustrated in Fig. 1, the clamp is forced against the annular former-head B′ and the shoulder *b*, by means of the cam-lever connected therewith. The disk G is then forced into contact with the clamp by means of its operating-cam lever. When this is done the annular former-head is rotated through the lever-arm B^2, about its pivoted connection with the table, the clamp, with its track D, secured to the shoulder of the arm B, is rotated therewith, thus drawing the links of the pliable former, one by one, about the disk G, forcing each link into firm contact with the annular former-head. As the links, one after another, are drawn into contact with the disk, they close against the pipe, as the annular former-head is rotated, causing it to be accu-

rately bent between the former-head and the edges of the links composing the pliable former, the series of links being of a sufficient number to allow the pipe being bent in a semicircle. As each link is forced against the annular former-head, it retains its firm contact therewith, as in Fig. 3; and when it is desired to remove the pipe, the disk G is removed by means of its cam-lever, when, by reversing the movement of the former-head, each link, by means of the guide-pins beneath following in the track of the groove I, in the bed of the table, will be thrown back from the former-head B′ and into proper position. Then, by removing the clamp G, by means of its cam-lever, the apparatus resumes the position illustrated in Fig. 1.

What I claim is—

1. The combination of a frame or table, the annular former-head B′, constructed with a grooved edge, a clamp, C, provided with means whereby it may be reciprocated, a series of links secured to said clamp, and a disk, G, provided with means whereby it may be reciprocated, the construction being such that the clamp may be forced against the annular former-head, and carried with said former-head as it is rotated, substantially as described.

2. In a pipe-bending machine, the clamp C, provided with a series of links, F, the inner edges of which are constructed on the arc of a circle, and grooved for the reception of the pipe, said links pivotally connected to each other and with the clamp, substantially as described.

3. A pipe-bending machine, consisting in the combination of a frame or table, the former-head B′, constructed with an annular grooved edge and pivoted to the table, said head provided with a lever-arm, a suitable clamp, a track rigidly secured at one end to the lever-arm, mechanism for reciprocating said clamp upon said track, a series of links pivotally connected with each other and with the clamp, the inner edges of said links constructed on the arc of a circle, and grooved for the reception of the pipe, and a pivoted disk, said disk provided with mechanism whereby it may be reciprocated, substantially as described.

4. A pipe-bending machine, consisting of a suitable frame or table, provided with a raised bed, A′, a former-head, B′, pivotally connected thereto and constructed with an annular grooved edge, and adapted to be rotated, a clamp, C, adapted to hold the pipe against the former-head, mechanism for reciprocating said clamp and for holding it firmly against the former-head, said clamp provided with a series of links pivotally connected with each other and with the clamp, the inner edges of said links constructed upon the arc of a circle, the construction being such that as the former-head is rotated the clamp with the series of links pivoted thereto will be carried with the former-head and be successively engaged with the pipe to bend it over the former-head, substantially as described.

5. A pipe-bending machine, consisting of a suitable table or frame, a former-head pivoted thereto, and having a lever-arm, a track firmly secured at one end to said arm, a clamp provided with a cam-lever connected therewith, and adapted to be reciprocated upon said track, said clamp provided with a series of links pivotally connected together and to said clamp, and in connection therewith a rotary disk provided with a cam-lever suitably connected thereto and adapted to be reciprocated upon the bed of the table, substantially as described.

6. A pipe-bending machine, consisting of a suitable bed or table, a former-head, B′, pivotally connected thereto, and provided with a lever-arm, a clamp provided with a series of links pivotally connected together and to said clamp, mechanism for reciprocating said clamp, a disk, means for reciprocating the disk upon the bed of the frame or table, said bed provided with a groove, I, the links having one or more guide-pins, *f*, adapted to travel in said groove, the construction being such that when the former-head is rotated the clamp and the links connected thereto will be carried with said former-head, and when the latter is retracted the guide-pins in said groove will throw said links out of engagement with the former-head, substantially as described.

7. The combination of an annular former-head, a clamp disconnected from the former-head but adapted to receive between it and the former the article to be bent, a pliable former, composed of pivoted links having a pivotal connection with the clamp, and means for reciprocating the clamp and revolving the same, to carry the pliable former around the article being bent, substantially as described.

In testimony whereof I sign this specification in presence of two witnesses.

EDWARD DEVINE.

Witnesses:
N. S. WRIGHT,
M. B. O'DOGHERTY.