

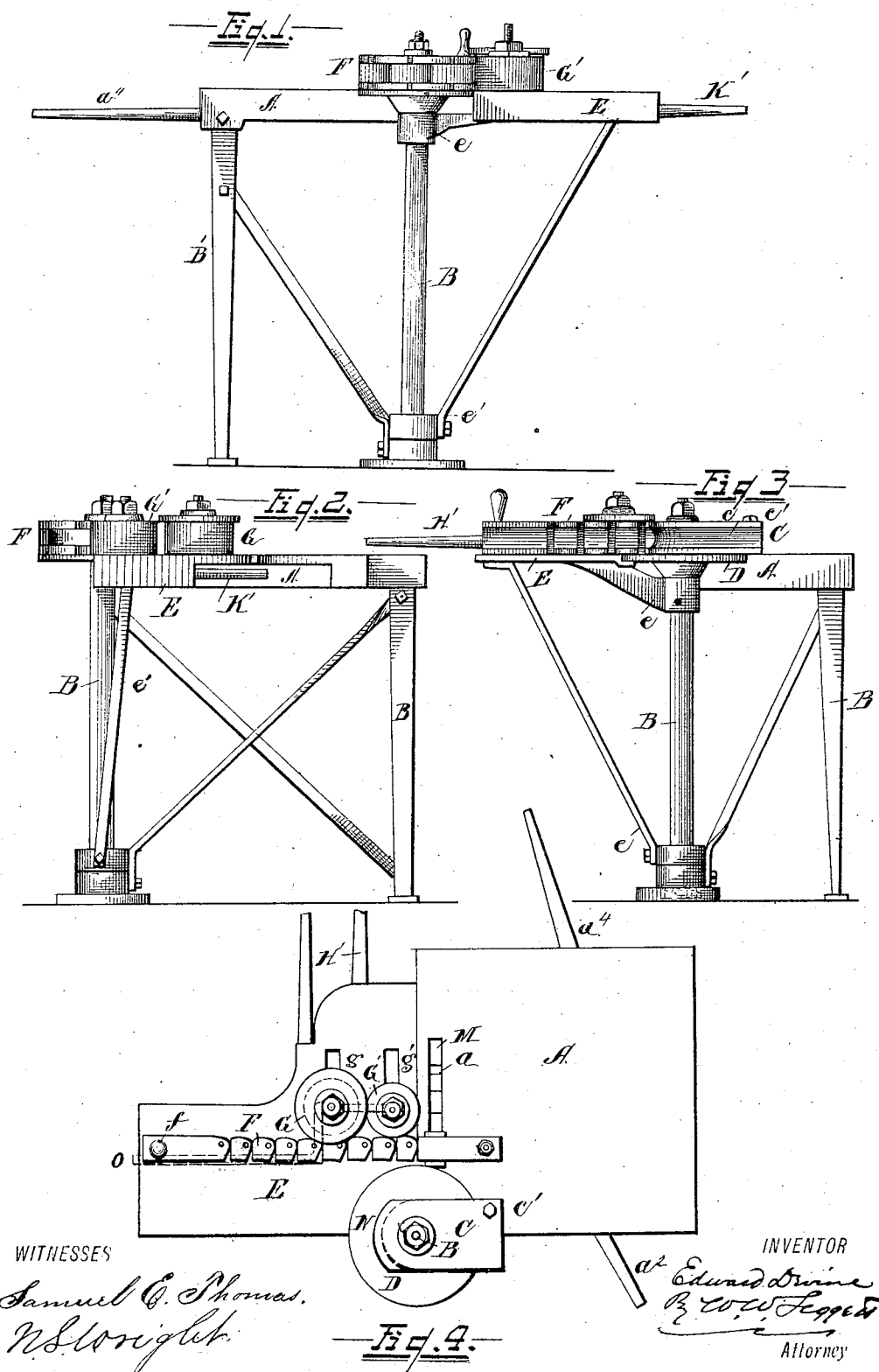
(No Model.)

2 Sheets—Sheet 1.

E. DEVINE.  
PIPE BENDING MACHINE.

No. 313,302.

Patented Mar. 3, 1885.



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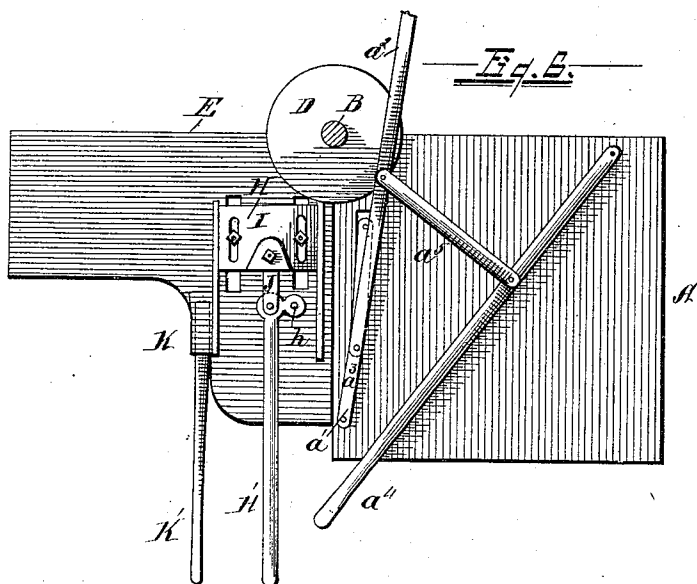
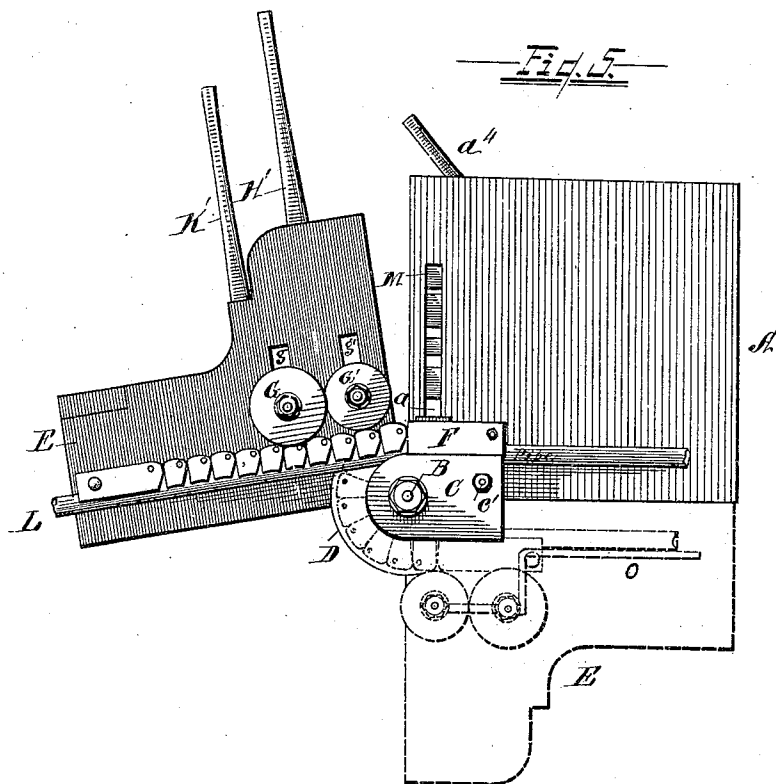
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WITNESSES

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# UNITED STATES PATENT OFFICE.

EDWARD DEVINE, OF DETROIT, MICHIGAN.

## PIPE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 313,302, dated March 3, 1885.

Application filed February 28, 1884. (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.

My invention consists in the combination of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is an end elevation. Fig. 2 is a side elevation with the links closed upon the former. Fig. 3 is another side elevation, showing the position of the table before the links are closed upon the former. Fig. 4 is a plan view showing the table in the same position as Fig. 3. Fig. 5 is another view showing the links in the act of being closed upon the former, showing, also, in dotted lines the links closed upon the former. Fig. 6 is an inverted plan of the table and its mechanism.

My invention relates to pipe-bending machines, and is more especially designed as an improvement upon a machine of this nature for which Letters Patent were granted to me January 27, 1884, No. 292,418. It has for its object improved means for adjusting the links to and from the head of the former, also improved means of reciprocating the adjustable disks, and contemplates, moreover, a stationary former, while the disks are arranged to be rotated with the links about the head of the former to bend the pipe.

My invention embraces, in addition, other novel features of construction and arrangement relating to the machine as a whole and its improved operation.

I carry out my invention as follows:

In the drawings, A is a stationary table. B and B' are any suitable means of support for the same.

C is a stationary former, provided with a groove, *c*, upon its edge, adapted to receive the pipe. This former may be secured to the table in any suitable way—as, for instance, it may be bolted at one end, as shown at *c'*. The

outer end or head of the former may be secured upon the upwardly-projected end of the standard B. I prefer to make these formers removable, so that formers of different sizes can be adjusted upon the table as may be desired.

D is an annular bed located beneath the former C. This bed is also made, preferably, removable, so that different sizes may be used, if desired; but I do not confine myself to such a bed made removable, as it may be rigidly secured in place beneath the former, or might be an integral part of the table or leaf.

E is a rotatable support, hinged or pivoted to the standard B in any suitable manner—as, for instance, by the sleeved arm *e* and the sleeved brace *e'*. This support is so constructed that it may be partially rotated about the standard B and disk D, so as to occupy the varying positions shown more particularly in Figs. 1, 2, 4, and 5. This support need not necessarily be pivoted to the standard B, as it may be hinged in any proper way so as to be rotated about the fixed former C.

F represents a series of former-links similar in construction to those in my patent above referred to. One end of this series of links is so located upon the table A that they may be moved to and from the former C. This mechanism is more particularly shown in Fig. 5.

*a* represents a slot in the table, and *a'* a lever mechanism connected through said slot to said series of links, the construction and operation of which being such as to throw the links back from or against said former, as may be desired. I do not limit myself in any manner to any special mechanism for moving said links; but in Fig. 6 suitable mechanism is shown secured underneath the table A, a lever-arm, *a''*, projecting so as to be readily grasped by the operator. Upon the rotatable support E are located one or more disks, G and G', adapted to be reciprocated so as to crowd the former-links against the former as said leaf is rotated. I do not limit myself to any special mechanism for reciprocating said disks. As shown in the drawings, said leaf is provided with suitable orifices, *g* and *g'*.

H is any suitable lever mechanism connected with said disks through said orifices, the construction and operation of which is such as to cause the reciprocation of said disks.

Said lever mechanism is provided with an extended lever-arm, H', whereby this reciprocation may be readily accomplished by the operator. While I would have it understood that I do not confine myself to any mechanism for causing the reciprocation of said disks and the movement of said links, the mechanism illustrated in the drawings, and which I have found very suitable, is as follows: Connected with the end of the former-links through the slot *a* is an arm, *a*<sup>3</sup>, pivoted to the lever *a*<sup>2</sup>, which lever is also pivoted to the bed of the table. In order that the links may be moved from either side of the table, I prefer to provide an additional lever, *a*<sup>4</sup>, pivoted at one end to the bed of the table and united to the lever *a*<sup>2</sup> by the connecting-arm *a*<sup>5</sup>. It will be seen thus that by throwing either of the levers *a*<sup>2</sup> or *a*<sup>4</sup> to or fro the links will be moved to and from the former C. To reciprocate the disks G and G', said disks are connected through the orifices *g* and *g'* with a sliding plate, I, which plate is connected by a toggle-arm, J, to the lever H', said lever being angular or cam-shaped at its inner end, and pivoted to the leaf, as shown at *h*.

In order to revolve the support E, it may be provided at any suitable point with a lever-socket, K, to receive a removable lever, K'. I do not limit myself to any particular construction of the annular bed D, as all that is required is any suitable method of hinging the support E so that it may be rotated about the head of the former C, as described. This bed might be omitted without departing from the principle of my invention.

The operation of the device is as follows: By the proper movement of one of the levers *a*<sup>2</sup> or *a*<sup>4</sup> and the lever H' the disks G and G' and the former-links are thrown back from the former C, and the machine is ready for the reception of the pipe L. By the opposite movement of said levers the former-links are closed against the former C, the pipe being embraced between the two. The disks G and G' are also suitably closed upon said links. Now, by means of the lever K', the support E is forced around into the position shown in dotted lines in Fig. 5, crowding the former-links with the pipe about the former C, bending the pipe into the desired shape. In this way the pipe may be readily bent without its being filled with sand, in the usual manner heretofore practiced, and without its being marred. By throwing the support back the pipe may be released by throwing back the links and disks in the manner specified. The disks G and G' are pivoted upon the support, as in the patent referred to.

It is evident that for larger or smaller pipe, or in order to make a larger or smaller bend, it will be necessary to make the inner end of the chain adjustable nearer to or farther from the former C. I accomplish this object by inserting in the slot *a* a series of blocks, M, which are removable. Should it be desired to open the chain to a greater distance from the form-

er, one or more of the blocks M may be removed, or, should it be desired to limit the distance to which the chain might be removed from the former to a shorter distance, one or more blocks M may be inserted in said slot; or smaller blocks may be inserted in the slot, if preferred.

I prefer, also, to locate upon the top of the former a plate, N, extended suitably over the end of the former so as to engage over the links when they are bent about said former, to more thoroughly hold them down into proper position. When the support is retracted from the position shown in dotted lines in Fig. 5, and the disks G and G' are thrust back to release the pipe, the links may be removed from the pipe by hand, or this removal may take place automatically by means of a rod, O, which is secured at one end to the disk and bent to engage with the pin *f*, as shown in Fig. 5, when the support is folded about the former. Now, when the support is thrown back into the position shown in Fig. 4, said rod passed around the pin *f* will of necessity carry the free end of the chain back, and the engagement of said rod over said pin will throw the chain out in the position shown in Fig. 4. This operation is automatic, as the support is returned to its primary position.

Instead of a hinged support, a portion of the table-bed might be constructed so as to rotate about the former, and upon which the rotary disks may be located.

What I claim is—

1. The combination, with a former, of a series of connected former-links movable to and from said former, a support rotatable about the former, and one or more reciprocating disks located upon said rotatable support and adapted to be brought to bear against said links, substantially as and for the purpose described.

2. The combination, with the table provided with suitable standards, of a former, C, secured thereto, a series of connected former-links secured at one end to said table and free to be moved to and fro, a rotatable support hinged upon one of said standards and movable about said former, and one or more reciprocating disks attached to said support and adapted to be brought to bear against said links, substantially as described.

3. The combination, with a table, of a former constructed with a grooved edge, a support rotatable about said former, one or more reciprocating disks secured to said support, and a series of former-links constructed with grooved edges and adapted to be carried about the former and forced against the latter as the support is rotated, substantially as described.

4. The combination, with a table, of a stationary former, adjustable former-links movable around said former, the levers described for moving said links, a support rotatable about said former and provided with one or more movable disks, and a toggle-lever for moving said disks, substantially as described,

5. The combination, with a removable former, of a removable annular bed, D, a series of former-links movable about and against said former, and a hinged support provided with one or more reciprocating disks, substantially as and for the purpose described.

6. The combination of a former having a plate, N, secured thereto, a series of connected links movable about and against said former, and a hinged support provided with one or more reciprocating disks, substantially as and for the purpose described.

7. The combination, with a stationary former, of automatically-reciprocating former-links, and a hinged support provided with one

or more reciprocating disks for moving said links against said stationary former, substantially as described.

8. The combination, with a supporting-table provided with an orifice, a, of a removable former, former-links movable about and against said former, and removable blocks M, located in said orifice, substantially as and for the purpose described.

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

EDWARD DEVINE.

Witnesses:

N. S. WRIGHT,

M. B. O'DOHERTY.