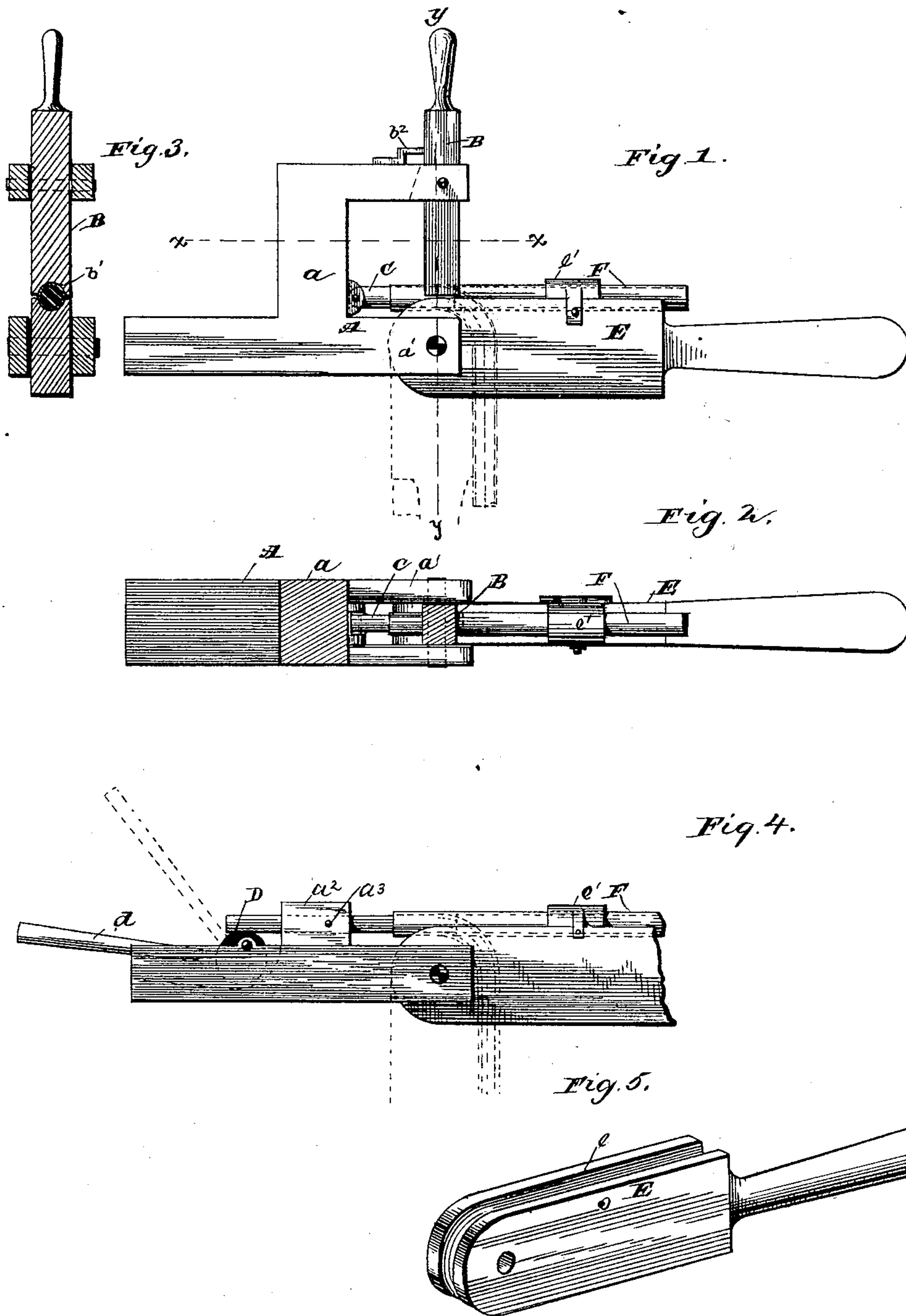


(No Model.)

W. C. WINFIELD.
TUBE BENDING DEVICE.

No. 379,750.

Patented Mar. 20, 1888.



Witnesses
Wm. M. Monroe
Jesse L. Gony.

Inventor
Wm. C. Winfield
H. T. Fisher
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM C. WINFIELD, OF WARREN, OHIO, ASSIGNOR OF TWO-THIRDS TO
ROLLIN A. COBB AND ORRIS R. GRIMMESEY, BOTH OF SAME PLACE.

TUBE-BENDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 379,750, dated March 20, 1888.

Application filed December 2, 1887. Serial No. 256,754. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. WINFIELD, a citizen of the United States, residing at Warren, in the county of Trumbull and State of Ohio, have invented certain new and useful Improvements in Tube-Bending Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in tube-bending machines; and it consists in the construction and operation of parts, as herein-after described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of the specification, Figure 1 is a side elevation of the machine complete. Fig. 2 is a plan view of the machine with the upper part removed on line $x x$, Fig. 1. Fig. 3 is a vertical section on line $y y$, Fig. 1. Fig. 4 is a modification of the machine, showing another way of controlling the mandrel at the point of strain above the former. Fig. 5 is a view of the former.

The distinguishing and novel features of my machine are the fixed mandrel and the pivoted and moving former. In other machines for the same purpose the former is made stationary and the mandrel is movable and sweeps around the former. The objections to this form of device are overcome in my machine, and the construction is simplified and the operation made more perfect and easy.

In the drawings, A represents a base or frame, shown in Fig. 1 as having an elbow-standard, a , in which is pivoted a lever, B, for a purpose hereinafter explained.

C is the mandrel, shown in the first-described form of the machine as attached to the base of the elbow and projecting horizontally therefrom over the part a' of the base, and in the other form, Fig. 4, as attached to a short standard or projection, a'' . In the latter form the mandrel extends through the standard, but is held from moving longitudinally therein by a pin or screw or equivalent means, as a^3 , and a cam, D, with a lever, d , at the outer extremity, serves to level and fix the mandrel in relation

to the former. According to the first-named form, Fig. 1, the mandrel is pivoted at its rear extremity to the elbow-standard, and the lever B serves as a bearing to hold the mandrel down to its work over the former. This lever has a semi-cylindrical groove, b' , adapted to fit over the mandrel and the tube placed thereon for bending, and a stop, b^2 , prevents its movement from a vertical position when bending of the tube or pipe occurs.

E is the former, pivoted in an open slot in the base, and provided with a rounded inner end, and a semi-cylindrical groove, e , extending along its upper edge and over or around its rounded extremity. A clamp, e' , of suitable construction for fastening the tube or pipe, (indicated by F in the drawings,) is secured on the former and prevents the pipe from being drawn inward when being bent.

The details of the construction above described may of course be considerably varied and still be within the scope of my invention, the invention, as before stated, being chiefly located in the fixed mandrel, and a former which turns on a pivot and bends the tube or pipe over its grooved and rounded end, while at the same time it draws the tube or pipe off the mandrel. The particular means of securing or holding the mandrel, therefore, are not material. I have shown two methods of securing it; but others are obvious and may be adopted. By these means a tube may be bent to bring its ends at right angles to each other, or to greater or less angle, as shall be desired, and the bend made uniform in cross-section at all points and with a perfectly plain smooth surface throughout, whether upon the inner or the outer radius of the curvature. Either an oval or a circular cross-section can be given to the bend, as may be preferred.

The operation will readily be understood from the foregoing description. In the first form of device the tube is slipped over the mandrel the desired distance and then clamped on the former, so as to prevent slipping thereon. The lever B is then brought into position to take the upward pressure at the point of strain, when all the parts are ready for action. The former is then borne down, say, to the dotted lines in Fig. 1, or to a greater or less

extent, according to the extent of the curvature required. In this movement the tube is firmly fixed on the former, but is gradually drawn off the mandrel and bent, as shown.

5 Obviously the machine might be placed in a horizontal position; but this is not desirable.

According to Fig. 4 the operation is practically the same; but the means for holding the mandrel down to work are different. In this
10 case the mandrel and the post in which it is supported would require sufficient strength to hold the mandrel-point firmly to its place when the bending of the tube occurs.

What I claim is—

15 1. In a device for bending tubes and the like, a base having a mandrel fixed thereon, and a former pivoted on said base and having its curved portion beneath the mandrel, substantially as set forth.

20 2. In a device for bending tubes and the like, a stationary base and a mandrel having a portion of its length projecting beyond its support on said base, in combination with a former pivoted on the base and provided with
25 a clamp for holding the article to be bent, substantially as set forth.

3. In a device for bending tubes and the like, a former pivoted to turn on a base, and a mandrel held stationary on said base, with
30 its free end projecting over the former, substantially as set forth.

4. In a device for bending tubes and the like, a base and a former having a circular grooved end pivoted in said base, in combination with a stationary mandrel, substantially
35 as set forth.

5. In a device for bending tubes and the like, a former grooved along its edge and end and having a handle and clamp, substantially
40 as described, in combination with a base to which the former is pivoted, and a mandrel fixed over the end of said former, substantially as set forth.

6. In a device for bending tubes and the like, a base and a mandrel fixed on said base
45 and extending over a projection thereof, in combination with a former pivoted on said projection and having a grooved portion which extends about the sides of the mandrel, substantially as set forth. 50

7. In a device for bending tubes and the like, a base and a mandrel firmly fixed thereon, in combination with a former pivoted in the
55 base beneath one end of the mandrel and having a clamp and handle, substantially as set forth.

WILLIAM C. WINFIELD.

Witnesses:

H. T. FISHER,
I. L. COREY.