No. 736,145. PATENTED AUG. 11, 1903.

B. S. PEARD.

BENDING MACHINE OR TOOL.

APPLICATION FILED MAR. 15, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

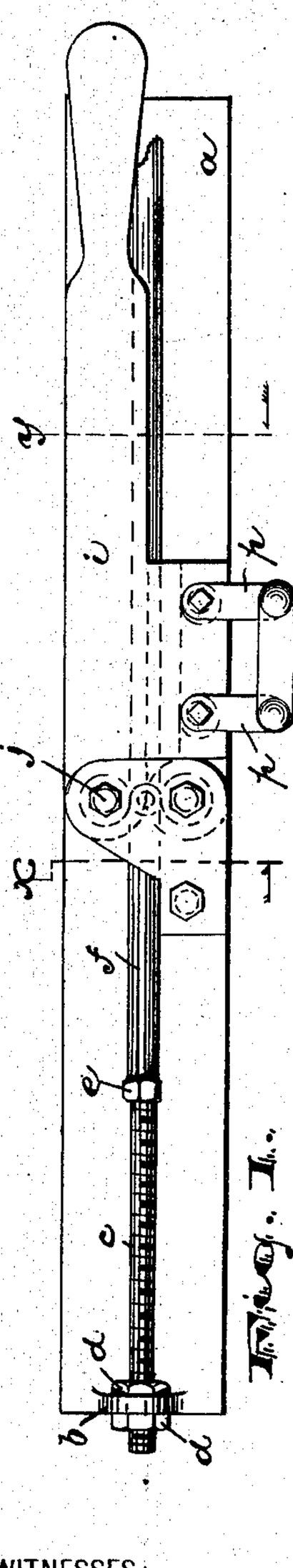

Fig. 1.

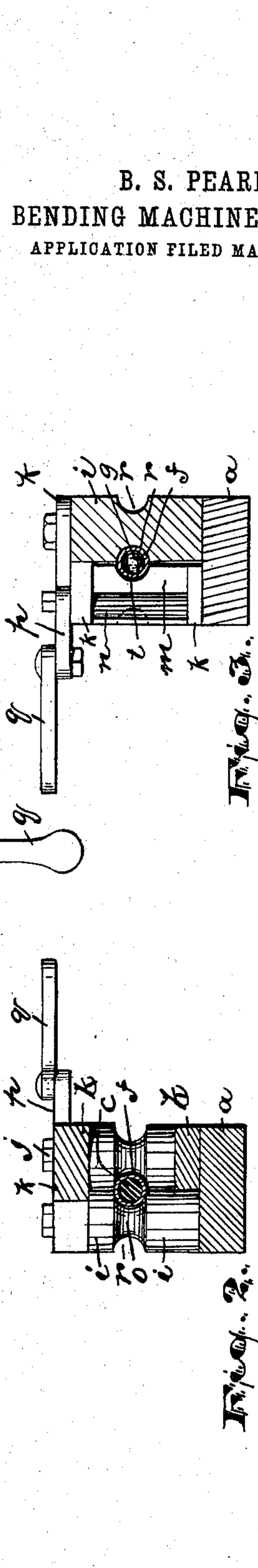

Fig. 2.

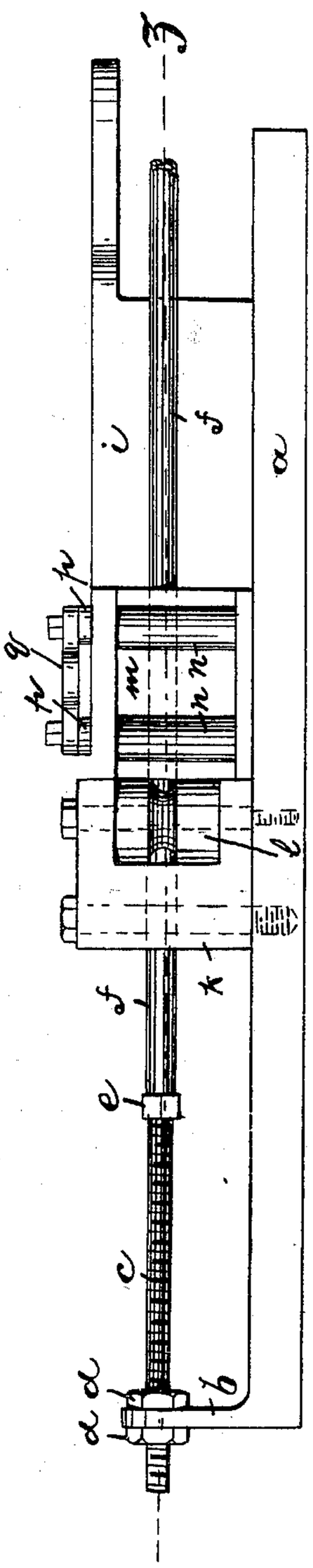

Fig. 3.

WITNESSES:

Thury Krug

Russell M. Everitt

INVENTOR:

Benjamin S. Peard,

BY

Drake & Co.

ATTORNEYS.

No. 736,145. PATENTED AUG. 11, 1903.

B. S. PEARD.

BENDING MACHINE OR TOOL.

APPLICATION FILED MAR. 15, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

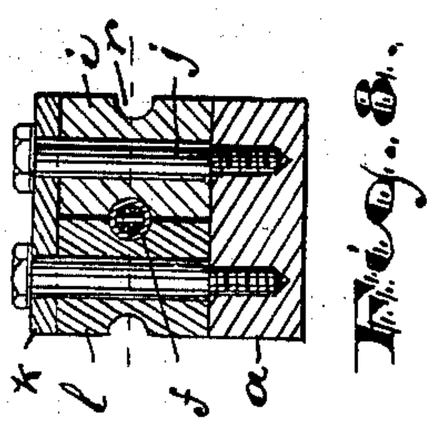

Fig. 6.

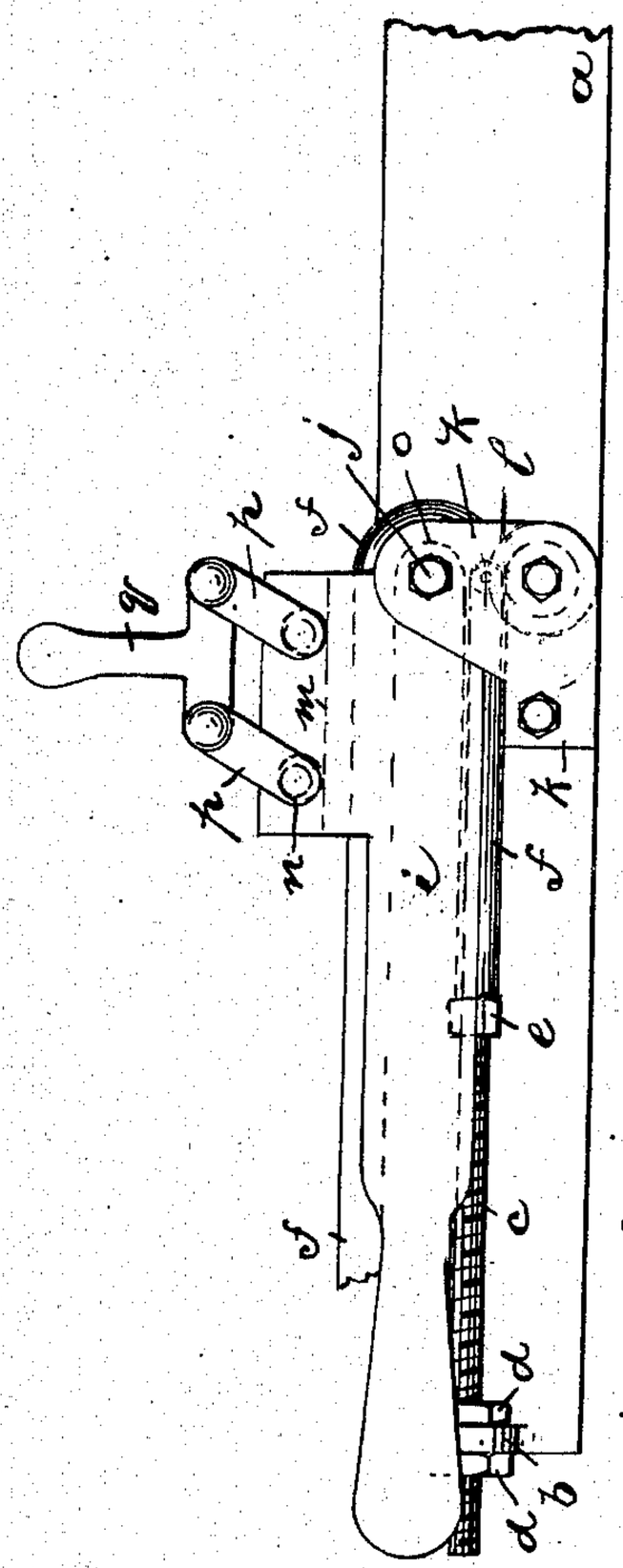

Fig. 5.

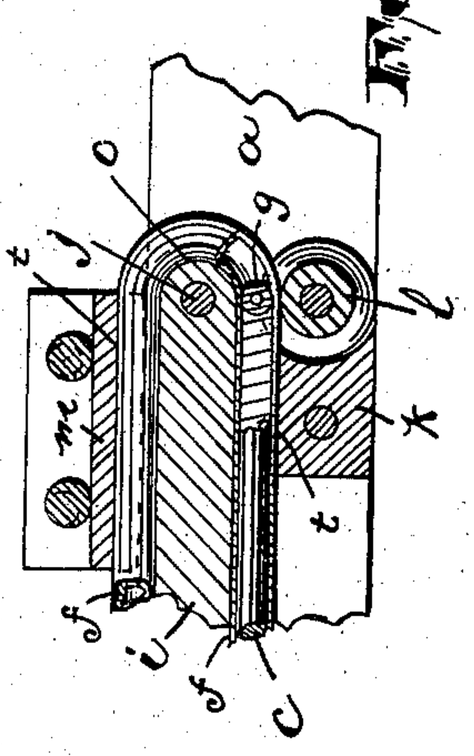

Fig. 7.

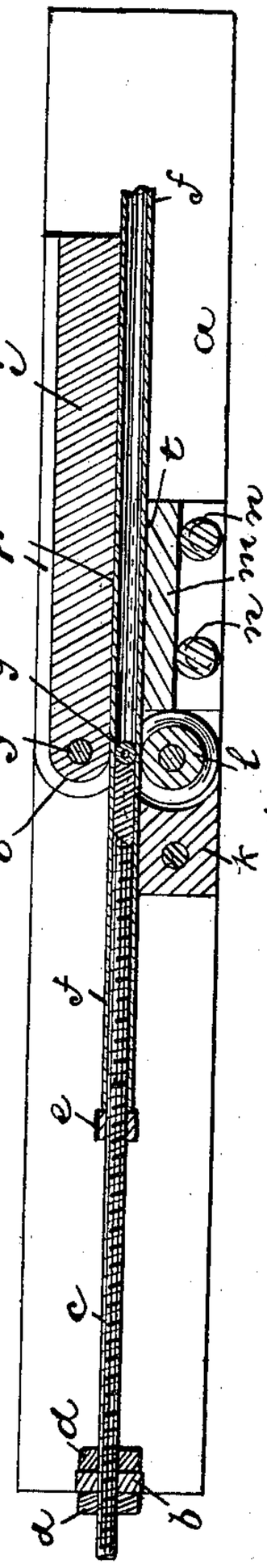

Fig. 8.

Fig. 9.

WITNESSES:

Henry Krug

Russell M. Everett.

INVENTOR:

Benjamin S. Peard,

BY

Drake & Co

ATTORNEYS.

No. 736,145. Patented August 11, 1903.

UNITED STATES PATENT OFFICE.

BENJAMIN S. PEARD, OF BROOKLYN, NEW YORK.

BENDING MACHINE OR TOOL.

SPECIFICATION forming part of Letters Patent No. 736,145, dated August 11, 1903.

Application filed March 15, 1902. Serial No. 98,375. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN S. PEARD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Bending Machines or Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to enable tubes to be bent more perfectly and without the formation of wrinkles and similar defects at the bend, to secure a greater uniformity of thickness of metal at the outer or convex and inner or concave curvatures of the bend, to reduce the cost of the bending-tool machine and to facilitate the work of bending, and to obtain other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved bending machine or tool and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a plan of my improved machine. Fig. 2 is a section of the same, taken at line *x* of Fig. 1. Fig. 3 is a section taken at line *y*. Fig. 4 is a side elevation. Fig. 5 is a detail plan showing the bending-lever after having bent the tube. Fig. 6 is a detail horizontal section, and Fig. 7 is a complete horizontal section, taken at line *z* of Fig. 4, the two figures showing two positions of the bending-lever. Fig. 8 is a view showing a slight modification of construction which will be further referred to, and Fig. 9 is a detail section showing the end of a certain rod or shaft on an enlarged scale.

In said drawings, *a* indicates a bed or plate having at one end a stud *b*, formed integral with said plate, on which a screw-shaft *c* is secured by means of nuts *d* or otherwise. Said screw-shaft *c* extends from said stud *b* in a direction parallel with the plate *a* and carries a nut *e*, which serves as an adjustable stop regulating the position of the tube *f* thereon, as will be hereinafter described. At the extremity of the threaded rod or shaft *c* the same is provided with an antifriction-wheel *g*, which is more or less closely ball-shaped and over which the tube *f* is bent, the said wheel *g* being pivoted between ears *h*, formed at the extremity of the shaft, and having a curved periphery corresponding with the curved outer sides of the ears, so that the end of the shaft is made hemispherical, as indicated in Fig. 9. Said antifriction-wheel *g* is free to rotate continuously or repeatedly on its axis at the extremity of the rod or shaft *c* in either direction in accordance with the greater frictional pressure thereon whether it be at one side or the other of the wheel, thereby securing a more even and easy movement of the tube and a smooth and regular bend. Near to said hemispherical end is fulcrumed a bending-lever *i*, the said lever being directly fulcrumed on a shaft or pin *j* disposed a little away at one side from the line of the rod or shaft *c*, as clearly shown in Fig. 7. Said shaft or pin *j* is supported by the bed-plate *a* and a grooved block or standard *k*, bolted to said bed-plate, and said block or standard is preferably provided with a roller *l*, over which the tube may be drawn. At one side of said lever *i* the same is provided with a grooved clamping-block *m*, between which and the grooved body of the lever the tube *c* extends, and eccentrics *n n* bear against the back of said clamping-block and serve to press said block against said lever-body, and thus firmly and securely fasten the tube thereto. Said eccentrics may be linked by links *p p* to a common handpiece *q*, so that when the said handpiece is operated by the hand the two eccentrics *n* will be turned to or from clamping relation simultaneously and together. The end of the lever toward the fulcrum is rounded concentrically, as at *o*, with the fulcrum shaft or pin *j* and is likewise grooved, the groove being a continuation of the grooves *r r* at opposite sides of said lever and lying in the plane of the groove *s* in the block *k* or grooved roller *l*. The groove in the

said block *k* and roller *l* is in alinement with the groove *t*, Fig. 3, in the clamp-block *m* when the lever *i* is in its initial position or position assumed preliminary to the bending operation.

The parts being constructed and arranged as described, the straight tube to be bent double or otherwise is run through the alined grooves, coinciding to form a straight tubular passage therefor, onto the rod or shaft *c* until stopped at the proper position by the adjusted stop *e*. The eccentrics *n n* are then turned and the clamp plate or block is forced against the tube, so that it is firmly fastened to the lever. The lever is then turned on its fulcrum, so that the tube is drawn off from the rod *c* and gradually turned on the curved bearing of the lever, the bending being performed where the ball-like extremity of the rod *c*, lying within the tube, and the curved bearing of the lever and the grooved block or standard *k* lie closely adjacent or contiguous to properly hold the tubular metal from wrinkling as it is being bent.

I am aware that variations of construction may be employed without departing from the invention. For example, the roller *l* may be dispensed with without materially affecting the results, and the construction of the block or standard may be changed, as shown by comparison of Figs. 4 and 8.

Having thus described the invention, what I claim as new is—

1. In a tube-bending machine, the combination of a base-plate, a standard on said base-plate horizontally grooved at one upright side and having at the upper part of its forward end a horizontal projection extending forward and also laterally from said grooved side, a roller vertically pivoted between said projection and the base-plate in line with the standard, a mandrel projecting from the rear of said standard into said groove thereof, and a bending-lever fulcrumed between the lateral portion of said projection of the standard and the base-plate and being adapted to swing in horizontal plane, said bending-lever having a rounded end and having around said end and along both edges a groove adapted to receive the opposite side of a tube from that which lies in the said groove of the fixed standard.

2. In a tube-bending machine, the combination of a base-plate, a grooved bearing-roller *l*, vertically mounted thereon, a mandrel projecting longitudinally of the base-plate into the groove of said roller, a bending-lever fulcrumed in transverse line of the base-plate with said bearing-roller *l*, and being grooved at its edge which lies next said roller as the lever extends longitudinally of the base-plate away from the said mandrel, parallel plates *k*, *k*, projecting horizontally from the side of said lever on opposite sides of said groove, a clamping-block *m*, adapted to slide between said plates toward and away from the lever and being correspondingly grooved at its adjacent edge, and means mounted upon said parallel plates for forcing said clamping-block toward the lever.

3. In a tube-bending machine, the combination with a pivoted bending member having tube-clamping means, and fixed stay means adapted to guide the tube to said bending member, of a mandrel comprising a rod having a convexly-rounded end with a longitudinal slot therein disposed in the plane of the bending member, and a roller or wheel pivoted in said slot and having its periphery curved in conformity with the surface of the end of the rod.

4. In a tube-bending machine, the combination with a pivoted bending member having tube-clamping means, and fixed stay means adapted to guide the tube to said bending member, of a mandrel comprising a rod adapted to fill the tube to be bent and having at its end a pivoted wheel or roller lying wholly within the cylindrical surface of said rod or an extension thereof.

5. In a tube-bending machine the combination of a base-plate having at one end a stud *b*, a standard fixed upon said base-plate intermediate of its end, one upright side of said standard being horizontally grooved and its end away from said stud being provided at its upper part with a projection extending horizontally over the base-plate and also laterally with respect to the grooved side of the standard, a bearing-roller vertically pivoted between said projection and the base-plate in line longitudinally of the base-plate with said standard, a bending-lever fulcrumed between said projection and the base-plate in line transversely of the base-plate with said roller, means carried by said lever for clamping a tube thereto, a mandrel comprising an exteriorly-threaded rod extending from said stud on the base-plate and lying at its free end between the said roller and bending-lever, said rod being adapted to fill a tube to be bent and having at its said free end a roller or wheel, and a stop-nut on said threaded rod.

6. In a tube-bending machine, the combination with a pivoted bending member having tube-clamping means, and fixed stay means adapted to guide the tube to said bending member, of a stationary mandrel having a free end lying between said bending member and stay means and provided thereat with a roller or wheel, and a stop adjustable on said mandrel independent of the same and adapted to limit the sliding of a tube onto said mandrel.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of March, 1902.

BENJAMIN S. PEARD.

Witnesses:
CHARLES H. PELL,
C. B. PITNEY.