2 Sheets - Sheet 1.

J. T. Farrand,

Making Sheet-Metal Tubing.

No. 9,020. Patented June 15, 1852.

Fig. 3.

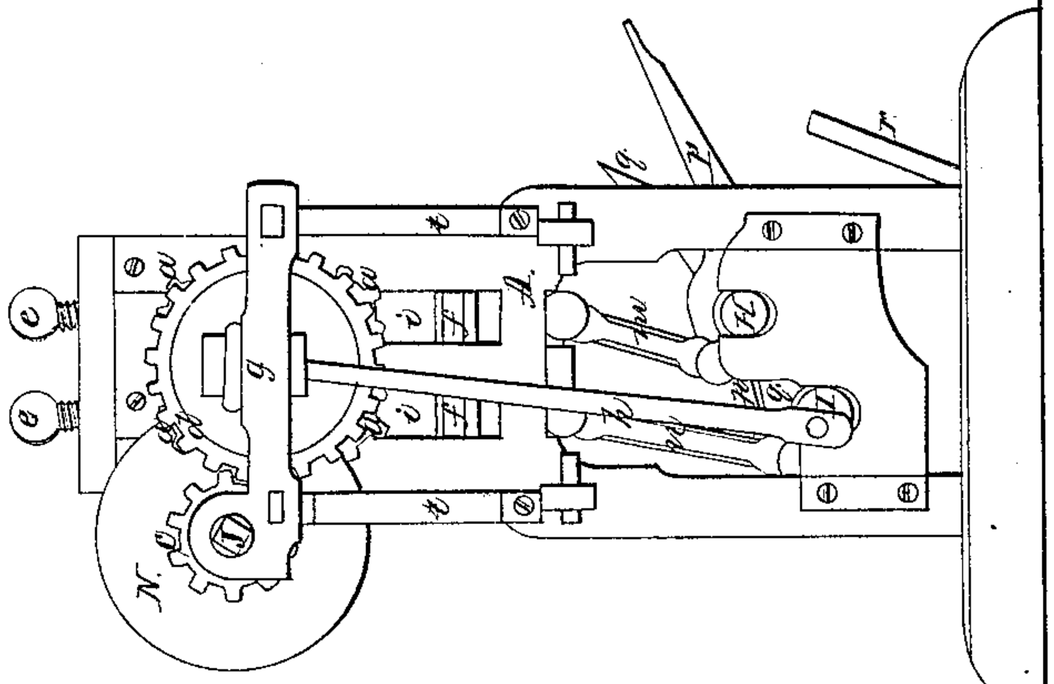


Fig. 2.

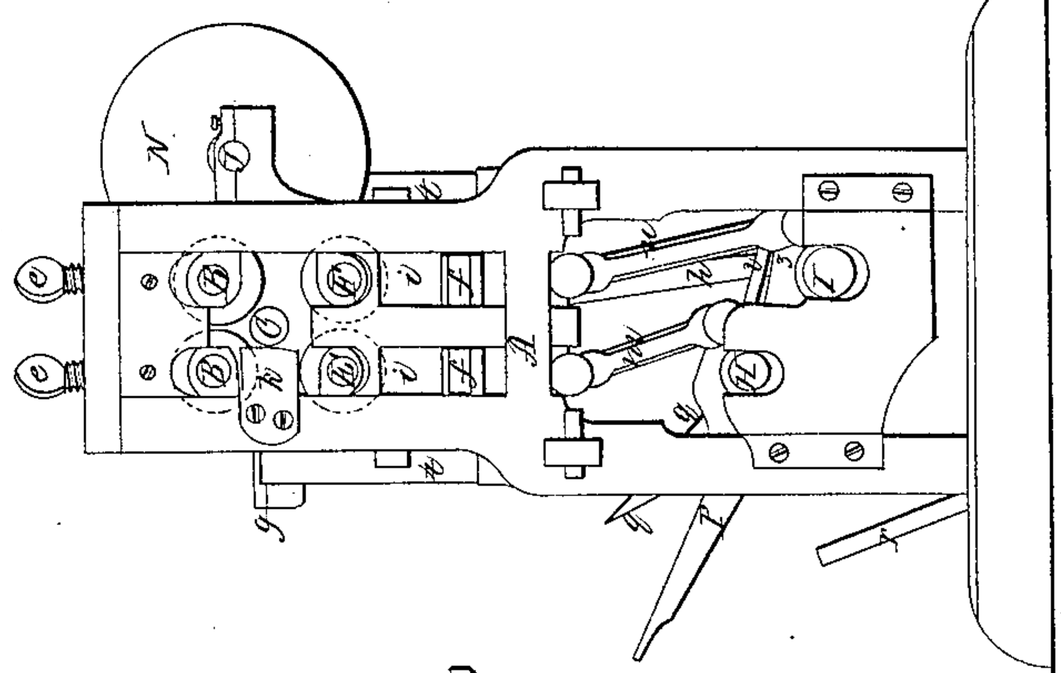
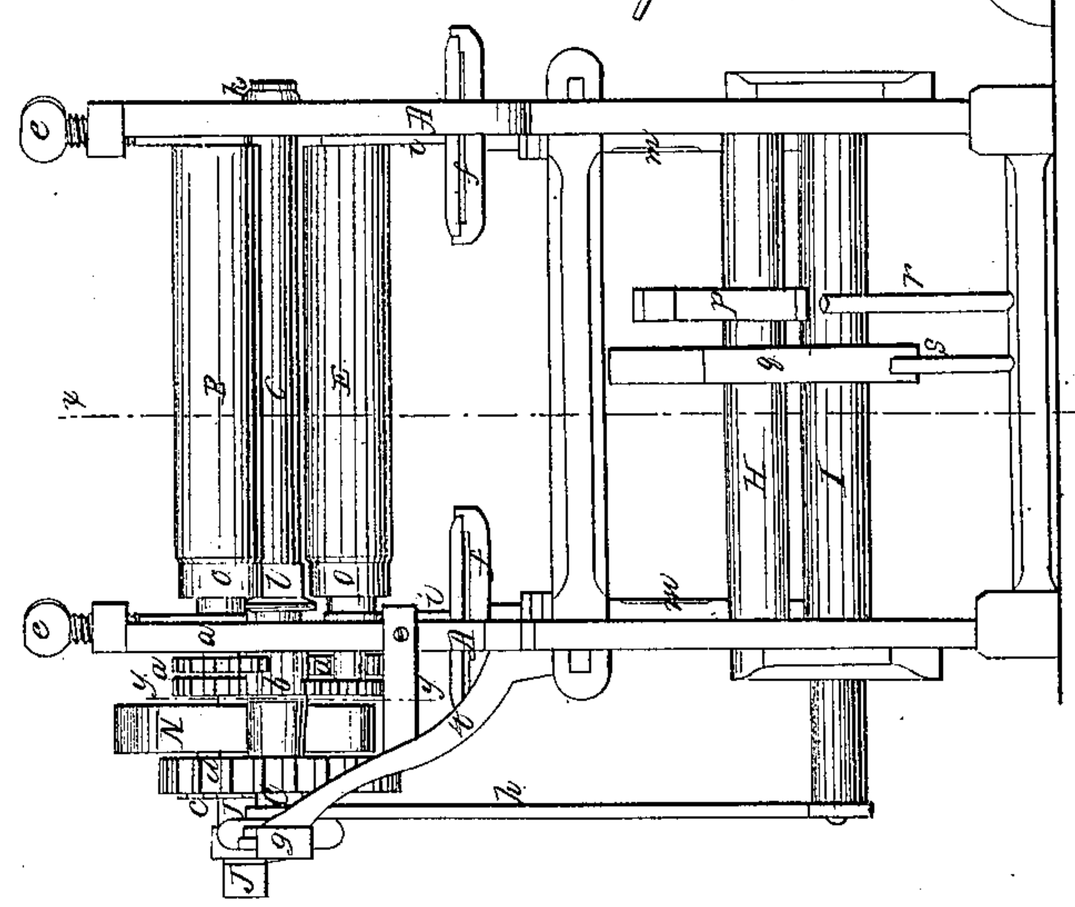


Fig. 1.



2 Sheets - Sheet 2.

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Fig. 6

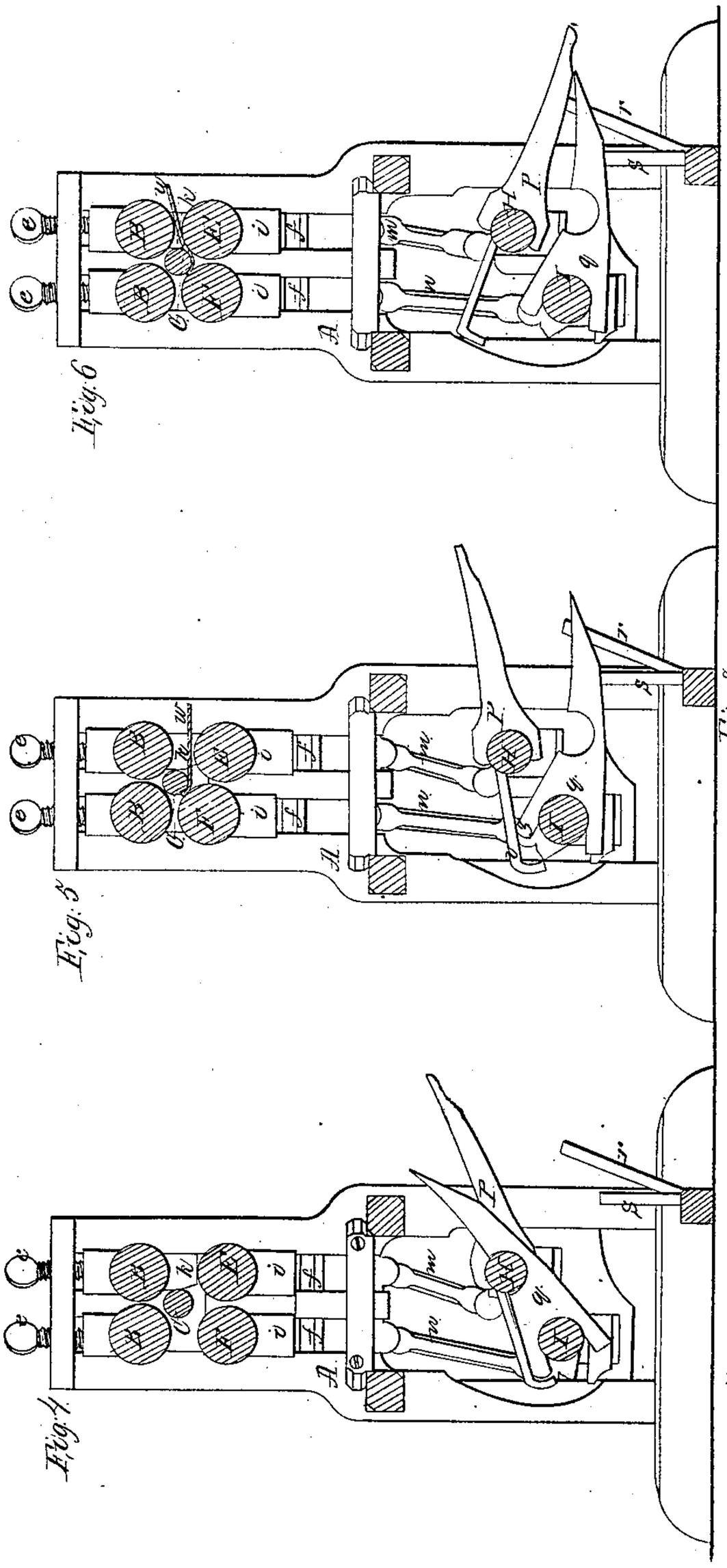


Fig. 11

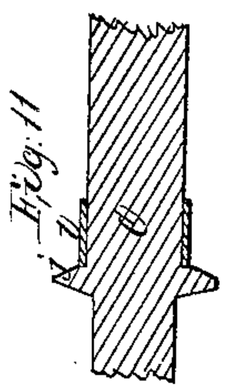


Fig. 12

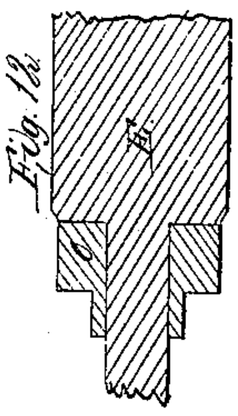


Fig. 5

Fig. 8

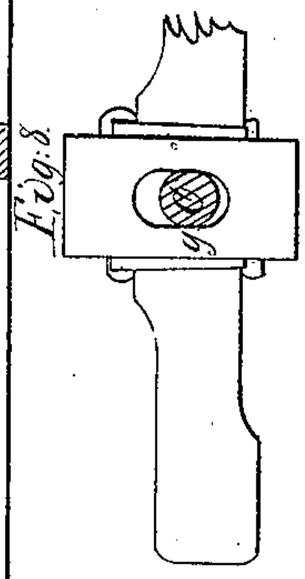


Fig. 9

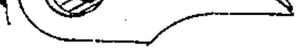


Fig. 10

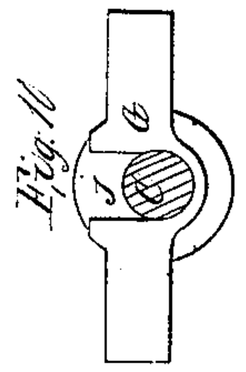
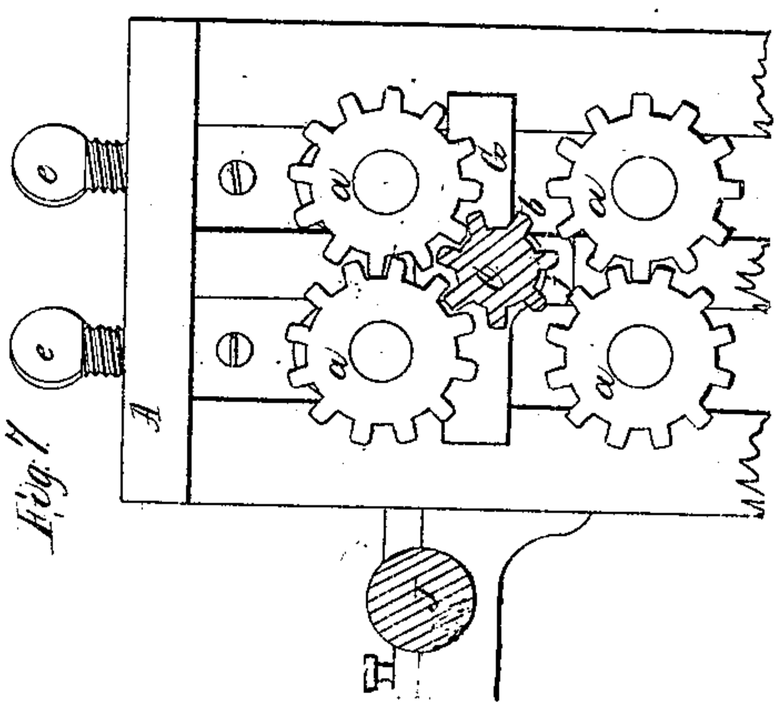


Fig. 4

Fig. 7



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JEHIAL T. FARRAND, OF PORT BYRON, NEW YORK.

IMPROVED MACHINE FOR MAKING SHEET-METAL TUBES.

Specification forming part of Letters Patent No. **9,020**, dated June 15, 1852.

To all whom it may concern:

Be it known that I, JEHIAL T. FARRAND, of Port Byron, in the county of Cayuga and State of New York, have invented a new and Improved Machine for Making Tubes of Sheet Metal; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of my improved machine for making tubes of sheet metal; Figs. 2 and 3, end elevations of the same; Figs. 4, 5, and 6, transverse vertical sections of the same in the line *x* of Fig. 1, showing different positions of some of its parts in different stages of the process of making the tubes; Fig. 7, section of a portion, detached, in the line *y* of Fig. 1; Figs. 8, 9, and 10, views of detached portions, and Figs. 11 and 12 sections of detached portions.

Like parts are designated by like letters in all the figures.

Having constructed a suitable frame, A, I insert near each other two cylinders, B B, in its upper part, within suitable bearings, which are adjustable up and down by screws *e e*, &c. Two other cylinders, E F, of corresponding size, are also placed perpendicularly below the cylinders B B and are mounted in movable bearings *i i*, &c. The said bearings *i i*, &c., move up and down in guiding-slots (or grooves) in the ends of the machine and rest upon the operating-pitmen *m n*, which are jointed to short arms that project from the oscillating shafts H I, which are placed in the lower portion of the machine, with their journals resting in fixed bearings. The shafts H I are oscillated by means of the levers *p q*, which are made fast to them and project forward, as shown in the drawings. Springs *f f* are inserted between the bearings *i i* of the lower rollers, E F, and the pitmen *m n*, for the purpose of giving an elastic pressure to the said rollers when they are forced upward into an operating position.

Between the cylinders B B and E F is inserted a mandrel, C. One end of the said mandrel projects beyond the main body of the frame of the machine, and is received into a vertical oblong opening in the bearer *g*, which bearer is supported by the braces *t t*, as shown in Figs. 1 and 8. Where the mandrel passes through the end of the main body of the frame of the machine it also passes through an oblong vertical opening corresponding with the opening in the aforesaid bearer *g*, save that it is sufficiently broad to allow a little lateral play to the mandrel. The opposite or right-hand end of the said mandrel is not confined in bearings, but has, so far as its above-described bearings at the left-hand end of the same will admit, free play in all directions save one, where it is prevented by the stop K, as shown in Fig. 2. A pitman, *h*, connects the mandrel C to a short crank on the projecting end of the oscillating shaft I. The said pitman is connected to the mandrel just within the bearer *g*, and the opening in the said pitman that receives the mandrel is vertically elongated, as shown in Fig. 9.

The pitman *h* serves the following purpose, to wit: When the lower rollers, E F, are dropped down into their lowest positions, as shown in Figs. 1 and 4, the tension of the pitman on the projecting end of the mandrel will, in connection with the bearing of the mandrel in its box in the end of the main body of the frame of the machine, retain the same in a horizontal position at a short distance below the upper rollers, B B, as shown in Figs. 1 and 4, in which position the tube formed upon the said mandrel can be freely drawn off from the unconfined end of it through the opening surrounding the same in the end of the machine, as shown in Fig. 2. Cog-wheels *a a*, &c., are placed upon the ends of the rollers B B, E F, and a pinion, *b*, upon the mandrel C, which gears into the said cog-wheels and imparts motion to the rollers when the machine is operated.

J is the driving-shaft, the outer end of which is supported by the bearer *g*. The pinion *c* upon the driving-shaft gears into the cog-wheel *d* on the mandrel, and imparts motion to it.

Power may be communicated to the driving-shaft by means of a band acting upon the pulley N, upon the same, or in any other manner.

The operation of my above-described machine for forming sheet-metal tubing is as follows, viz: Motion having been imparted to the machine, the lever *q* is forced down upon its stop *s*, which movement will turn the shaft I, and thereby cause the pitman *n n* to elevate

roller F to such a degree as to bring it in contact with the mandrel C and carry that upward by pressure and the action of the pitman *h* until it is made to nearly or quite bear against the rollers B B, as shown in Fig. 5, which movement brings the cog-wheel *a* on the roller F into gear with the pinion *b* on the mandrel, and also brings the said pinion *b* closely into gear with the cog-wheels *a a* on the rollers B B, and also causes the free end of the mandrel to bear against the stop *k*. The metallic sheet *w* is then inserted between the roller F and the mandrel, and as soon as it is caught by them to draw it forward the lever *p* is forced down upon its stop *r*, which elevates the front roller, E, and causes it to give such a curve to the inserted side of the metallic sheet (see Fig. 6) that as it is carried forward into the machine it will cause it to embrace and pass around the mandrel and to be acted upon by the whole series of compressing-rollers. A flange, *j*, radiates from the mandrel and bears against the left-hand end of all the compressing-rollers which surround it when they are in an acting position, which flange serves as a guide to the end of the metallic sheet and prevents it from emerging beyond the ends of the said rollers. To procure the requisite enlargement of one end of the tube to enable it to receive the end of another tube in joining the tubes together, the compressing-rollers are diminished in size at one end, as shown at *o o*, &c., and the mandrel has an enlargement at *l* that fits into said depressions in the compressing-rollers. To prevent grinding and friction produced by the sliding of the sheet metal over the said depressions in the compressing-rollers and the enlargement in the mandrel, (which adds greatly to the power required to operate the machine,) I place movable collars *o o*, &c., upon the said rollers and a movable collar, *l*, upon the mandrel, of such a size as to produce the requisite depressions of the rollers and enlargement of the mandrel, as shown in Figs. 11 and 12.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Such an arrangement and combination of the mandrel and the inclosing compressing-rollers and their opperating accessories as will, after a tube has been formed upon the mandrel, enable me to depress the lower rollers clear of the mandrel, and by the same movement depress the mandrel and retain it in a horizontal position between and clear of the four compressing-rollers, with one of its ends left free and unconfined to facilitate the removal of the said tube from the mandrel, substantially as herein set forth.

2. The placing of the movable collars *o o* upon the compressing-rollers and the movable collar *l* upon the mandrel, for the purpose of producing an enlargement at the end of the tube without causing straining or friction, substantially as herein set forth.

JEHIAL T. FARRAND.

Witnesses:
J. S. BROWN,
Z. C. ROBBINS.