Housel & Thayer,

Tubing Machine.

No. 107,051. Patented Sept. 6. 1870.

Fig. 1.

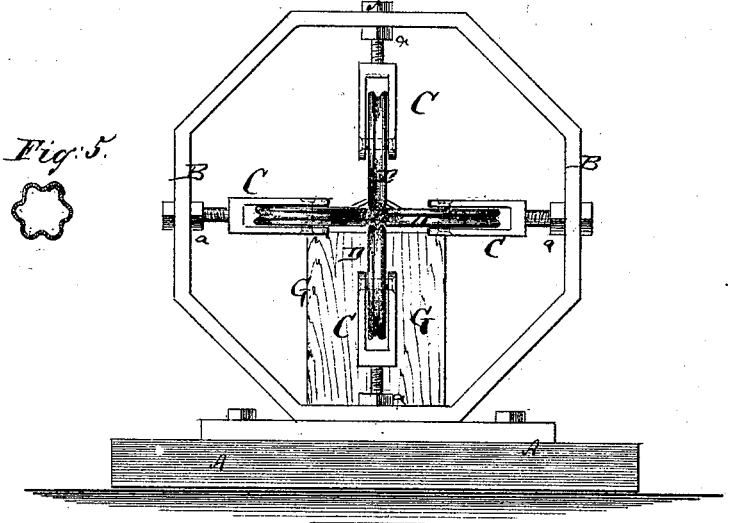


Fig. 5.

Fig. 2

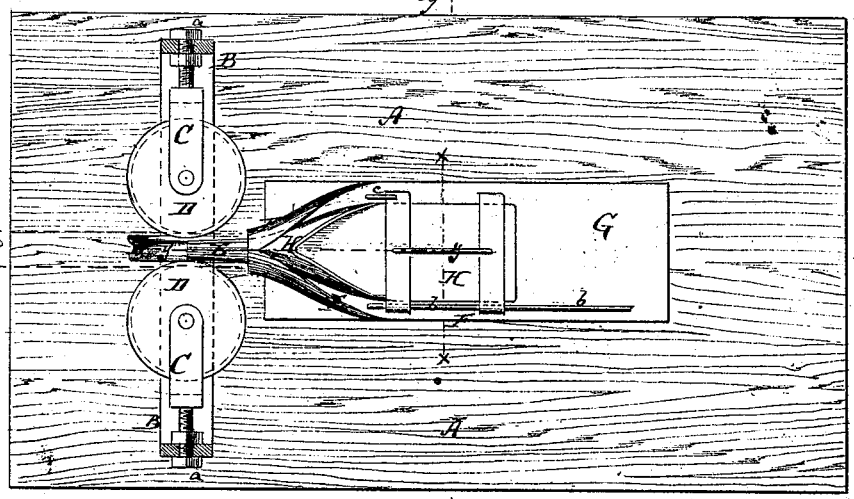
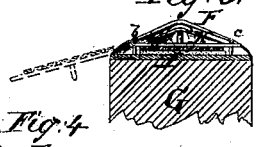
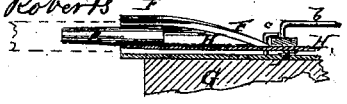


Fig. 3.



Witnesses:
L. S. Mabee
Alex. F. Roberts

Fig. 4



Inventor:
B. F. Housel
S. O. Thayer
Per
Attorneys.

UNITED STATES PATENT OFFICE.

BENJAMIN F. HOUSEL AND SIMEON O. THAYER, OF WINONA, MINNESOTA.

IMPROVEMENT IN MACHINES FOR MAKING TUBULAR LIGHTNING-CONDUCTORS.

Specification forming part of Letters Patent No. **107,051**, dated September 6, 1870.

To all whom it may concern:

Be it known that we, BENJAMIN F. HOUSEL and SIMEON O. THAYER, of Winona, in the county of Winona and State of Minnesota, have invented a new and Improved Machine for Making Lightning-Rods; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

Figure 1 represents a front elevation of our improved machine for making lightning-rods. Fig. 2 is a plan or top view of the same. Fig. 3 is a detail vertical transverse section of the same, taken on the plane of the line *x x*, Fig. 2. Fig. 4 is a detail longitudinal section taken on the plane of the line *y y*, Fig. 2. Fig. 5 is a detail transverse section of the lightning-rod.

Similar letters of reference indicate corresponding parts.

Our invention relates to machines for making tubular corrugated lightning-rods; and consists in certain improvements, which will be first described in connection with all that is necessary to a full understanding thereof, and then clearly specified in claims.

A in the drawing represents the bed supporting our machine. From it projects a vertical frame, B, which supports four (more or less) yokes, C C, that hold as many rollers or wheels D D, as shown. These wheels are provided with grooved edges, and are held at such distance apart from each other that they will embrace a fluted plug, E, in the manner clearly shown in Fig. 1.

If a strip of sheet-copper or other metal is placed around the plug E and drawn between the wheels D D, it will be formed into a hollow fluted rod in the manner clearly shown in Fig. 5. If the metal is wide enough, the lightning-rod will have a lap-joint, as shown.

The yokes C are fastened in the frame B by means of screw shanks and nuts *a*, to allow the wheels to be adjusted any suitable distance apart for larger or smaller rods.

The sheet metal from which the rod is to be made is guided to the wheels on a former, F, which is a plate secured upon a block or frame, G, with that end which is nearest to the wheels turned into a tubular guide.

The plug E is secured to and projects from the end of a sliding plate, H, which is hinged to a rod, *b*, that projects from F, and which has its front end bent similar to F, as shown.

The metal to be bent is placed upon the former F, and is, by the mouth of the same, bent preliminarily to shape it for the fluting. The plug passing through the mouth of F between the wheels has the plate H for a shank. The metal is gradually bent around the conical front part of H, and then by the rollers around the plug, so that it has the perfect shape.

For starting the operation, the plate H is drawn back and swung aside, as shown by dotted lines in Fig. 3. The metal for the rod can then be placed upon F and forced forward through the mouth of the same. The plate F is then swung upon the metal and moved forward to bring the plug between the wheels D, and locked by a suitable catch, *c*. The wheels, while bending the copper around the plug, take the stretch out of the same and make it an entirely reliable lightning-rod. The rod can be made continuous or in sections, as may be desired.

By having wheels with different grooves and plugs shaped accordingly, the invention can be applied to make hollow rods of suitable form.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. For the purpose of corrugating tubes, the fluted plug or mandrel E, combined with four or more rotary benders, D, concave on their peripheries, as and for the purpose specified.

2. The combination, with the fluted plug or mandrel and four or more rotary benders, with peripheries corresponding thereto, of the fixed guide F, constructed and arranged relatively thereto, as and for the purpose specified.

3. The combination, in a tube-bending machine, of the converging guide F with the hinged sliding and end conical plate H, as and for the purpose described.

4. The arrangement, with respect to plug E, of the hinged sliding and swinging plate H, as and for the purpose specified.

BENJAMIN F. HOUSEL.
SIMEON O. THAYER.

Witnesses:
CHARLES H. SMITH,
E. H. GOLLINGS.