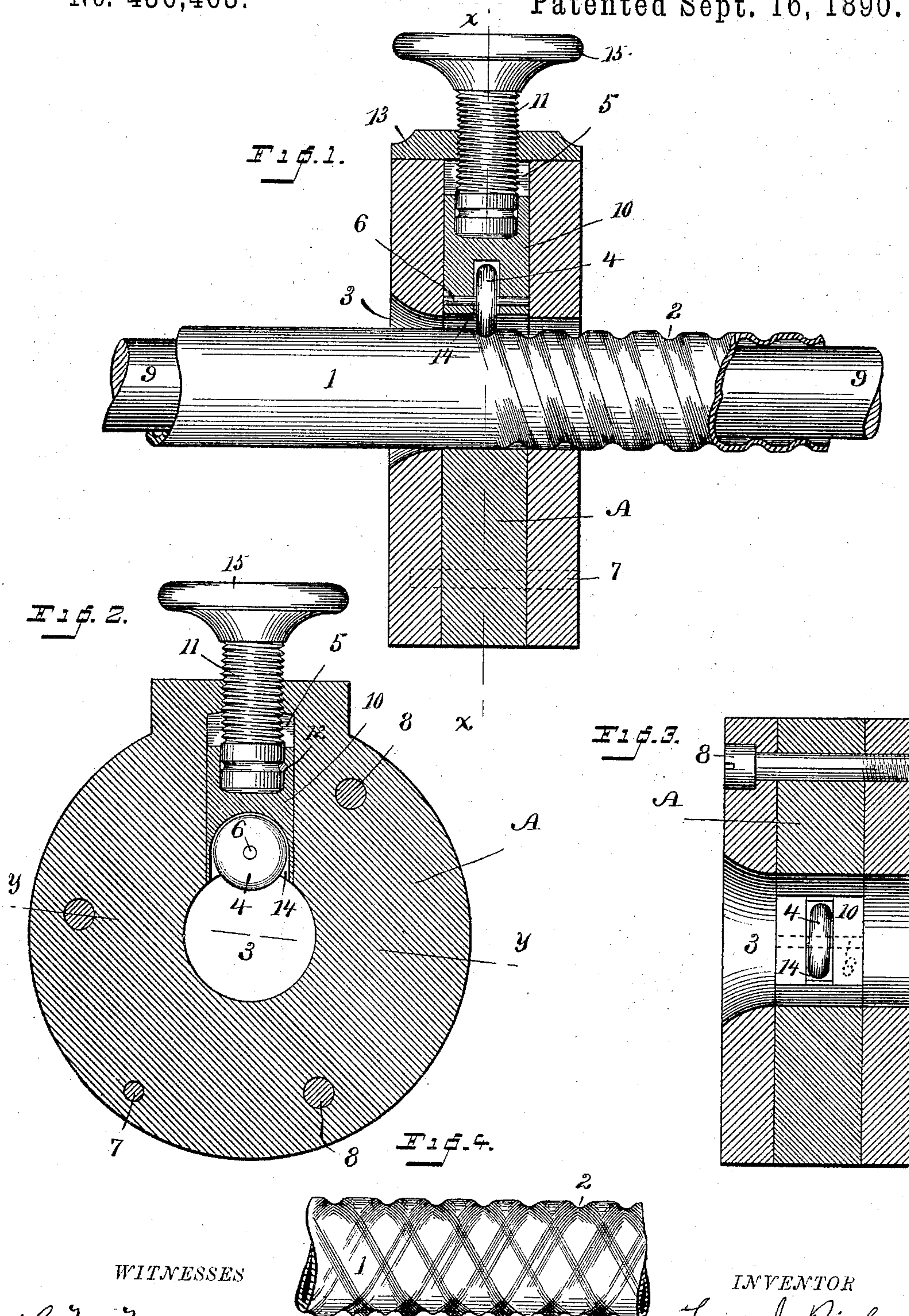


(No Model.)

F. J. RICHARD.  
DIE FOR MAKING SPIRAL TUBING.

No. 436,463.

Patented Sept. 16, 1890.



WITNESSES

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# UNITED STATES PATENT OFFICE.

FRED J. RICHARD, OF WATERBURY, CONNECTICUT, ASSIGNOR TO RANDOLPH & CLOWES, OF SAME PLACE.

## DIE FOR MAKING SPIRAL TUBING.

SPECIFICATION forming part of Letters Patent No. 436,463, dated September 16, 1890.

Application filed June 5, 1890. Serial No. 354,352. (No model.)

*To all whom it may concern:*

Be it known that I, FRED J. RICHARD, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Dies for Making Spiral Tubing; 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.

My invention has for its object the production of spiral ornamentation on tubing at a single operation and upon an ordinary wire-drawing bench, thereby dispensing entirely with the use of machine-lathes and other expensive machinery in the manufacture of this class of tubing.

With this end in view I have devised a novel die for ornamenting tubing, of which the following description, in connection with the accompanying drawings, is a specification, numbers and letters being used to denote the several parts.

Figure 1 is a central section through the die, showing a projection—for example, a wheel or rib in elevation; Fig. 2, a section on the line  $x x$  in Fig. 1, showing the wheel lying in a socket in the carrier; Fig. 3, a section of the die on the line  $y y$  in Fig. 2; and Fig. 4 is an elevation of a piece of tubing ornamented by my novel die.

My invention consists, essentially, of a die having a central opening, and projecting into said opening one or more suitable projections, preferably made adjustable—for example, a smooth wheel or rib, or one or more wheels or ribs, depending upon the pattern which it is desired to produce, and the mode of use consists in passing a piece of plain tubing through the opening in the die and rotating the die as the tubing is drawn forward, the roller or rib acting to produce a spiral groove therein.

1 denotes a piece of ordinary plain drawn or brazed tubing, my invention being applicable to all ordinary tubing, whether made of brass or other metals or alloys, and 2 denotes a groove or grooves formed therein by my novel die. The special mechanism by which the piece of tubing is drawn forward

and the mechanism by which the die is rotated form no portion of my present invention. In practice I use an ordinary wire-drawing bench, fix the die in any suitable manner in a rotating head, and move the tubing forward by any suitable or preferred mechanism, the sole requirements of my present invention being a rotating die having a central opening and one or more projections extending into said opening and adapted to engage the surface of the piece of tubing, the number of projections or wheels used depending, of course, on whether a single, double, triple, or quadruple spiral ornamentation is desired.

The die as a whole is denoted by A, the central opening by 3, and the projection extending into the opening by 4.

In practice I preferably use a roller or rollers to form the grooves, and have illustrated that form of projection in the drawings, a single illustration only being deemed sufficient for the purposes of this specification.

The die is made in two or more sections, one or more of said sections being provided with an opening 5, extending inward to the central opening, in which the carrier 10 for the roller is socketed, the roller itself lying in a socket 14 in the carrier and turning freely on a pin 6 passing through the carrier. The roller is made adjustable by means of a screw 11, the inner end of which is not threaded, and is connected to the carrier by means of a pin 12, engaging half-grooves in the carrier and inner end of the screw, as clearly shown in Fig. 2. The thread of the screw engages a cap-piece 13, which is preferably cast integral with the central section and completely covers opening 5 and extends a sufficient distance over the other plates to give the necessary amount of strength and rigidity. The screw is provided with a finger-piece 15 for convenience in operation. The roller may thus be adjusted to produce any required depth of groove, and the adjustment may be changed as often as may be required by simply turning screw 11 in or out. The roller or rollers may be mounted horizontally to the plane of the sections or slightly at an angle thereto. In practice I preferably mount the roller at a slight angle to the plane of the sections, as indicated in Fig. 3, and where but



one roller is used form the die in three sections, as shown in the drawings, each section being provided with a central opening, which openings, when the sections are assembled, constitute opening 3. The opening in the outer section is preferably made to flare outward, as shown, so as to permit the ready insertion of the tube. The rear section is provided with a pin 7, (see dotted lines, Fig. 1,) which passes through the central section and into the front section, whereby the sections are held in alignment, and the sections are rigidly secured together by screws 8.

9 denotes a mandrel, which may or may not be used, depending upon the gage of the tubing that is being ornamented.

In ornamenting the heavier gages of tubing I use a mandrel approximating in diameter the minimum diameter of the tubing after it is ornamented, the mandrel entering the tubing loosely and acting as a support therefor to prevent irregular grooving or tearing of the metal by the projection.

The ornamental grooves may of course be either right or left hand spirals, or both right and left hand spirals, crossing each other, thereby producing a diamond-shaped pattern. Both the spiral and diamond ornamentation may be considerably varied by making the spirals single, double, triple, or quadruple, as may be preferred, or by retracting and then resetting the roller in the manner just described the surface of the tubing may be left alternately plain and ornamented.

Having thus described my invention, I claim—

1. A rotary die for ornamenting tubing, having a central opening and formed in sections, substantially as described, suitably secured together, one or more of said sections being provided with rollers the edges of which project into the central opening, as and for the purpose set forth.

2. A rotary die for ornamenting tubing, consisting of three sections rigidly secured together by a pin and screws, each of said sections having central openings which register with each other, the opening in the forward section flaring outward, the central section being provided with an opening having therein an adjustable carrier provided with a socket 14, and a roller mounted in said socket, the edge of said roller extending into the central opening, as and for the purpose set forth.

3. A rotary die for ornamental tubing, having a central opening and formed in sections suitably secured together, the central section having an opening 5, extending to the central opening, a cap-piece 13, covering said opening, a carrier 10, having a roller socketed in said opening, and a screw the unthreaded head of which is loosely connected to the carrier and the thread of which engages the cap-piece, whereby the cap and roller may be adjusted, substantially as described.

4. A die of the class described, formed in sections rigidly secured together, the central section having an opening 5 and a cap-piece covering said opening, a screw passing through the cap-piece and unthreaded at its inner end, and a carrier loosely secured to the inner end of the screw and having a roller adapted to extend into the central opening, as and for the purpose set forth.

5. The combination, with a rotary die having a central opening adapted to receive a piece of tubing and one or more projections, substantially as described, extending into said opening, of a mandrel adapted to pass loosely within the tubing that is being acted upon.

In testimony whereof I affix my signature in presence of two witnesses.

FRED J. RICHARD.

Witnesses:

NATHL. R. BRONSON,

HELEN J. BIRKENMAYER.