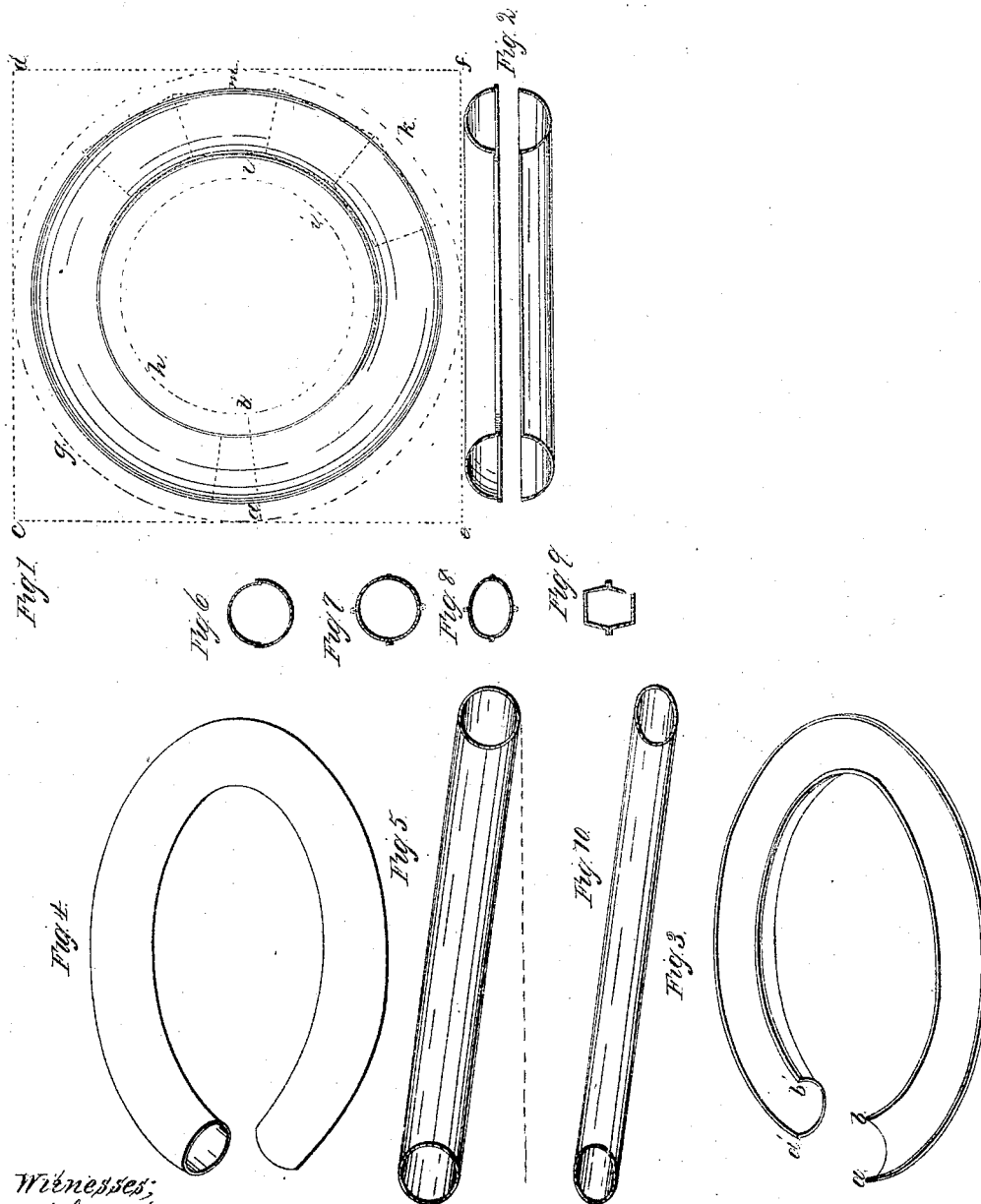


E. SAVORAL.
MANUFACTURE OF SPIRAL TUBING.

No. 45,083.

Patented Nov. 15, 1864.



Witnesses;
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UNITED STATES PATENT OFFICE.

EDUVART SAVORAL, OF WASHINGTON, DISTRICT OF COLUMBIA.

MANUFACTURE OF SPIRAL TUBING.

Specification forming part of Letters Patent No. 45,083, dated November 15, 1864.

To all whom it may concern:

Be it known that I, EDUVART TH. SAVORAL, of Washington, in the District of Columbia, have invented a new and Improved Mode of Manufacturing Sheet-Metal Tubes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon, in which—

Figure 1 represents a top view of a hollow circular ring punched out of one sheet of metal. Fig. 2 shows a vertical section through two such hollow rings, one placed inverted above the other. Fig. 3 is a perspective view of a hollow ring, cut according to the dotted lines shown on Fig. 1, and bent to form the lower part of a spiral. Fig. 4 is a perspective view of a part of a spiral tube formed of two parts, represented in Fig. 3. Fig. 5 is a vertical diametrical section through Fig. 4. Figs. 6, 7, 8, and 9 represent different shapes of sections which may be given to the tubes, and showing the manner in which two parts forming a tube may be connected. Fig. 10 is a vertical diametral section of a spiral tube having an elliptical section.

Similar letters of reference in each of the several drawings indicate corresponding parts.

The nature of my invention consists in forming sheet-metal tubes with two or more seams parallel to the longitudinal axis of the tube, whether this axis may form a straight line, a spiral, or another curve, and the different parts forming the tube are shaped either by punching or with the hammer.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Tubes made out of sheet-metal generally have many cross-seams, which form as many obstructions to the free passage of fluids or gases conducted by such tubes.

Curved tubes of sheet-metal, especially made in the common way, of several straight tubes of more or less length, according to the sizes of the metallic sheets and to the curvature, have not only many cross joints or seams, but offer far more resistance to the passage of fluids or gases by being "polygons" instead of real curves, as shown in red lines on Fig. 1. Besides this, such curved tubes made in the common way are far more costly, owing to the waste of material and the greater amount of

labor. They are not so durable, are more difficult to repair, and more apt to leak. To avoid these objections, especially in the manufacture of curved tubes in bents and elbows joining straight pipes, I form my tubes out of two or more parts, according to the inside diameter required and to the width of the material to be used, which parts are to be punched out of the sheet-metal and shaped at once by this punching operation, or by the hammer, or otherwise, and which parts are connected by single or double overlapping, by rivets, or by soldering, as the case may require. These seams are always parallel to the longitudinal axis of the tube to be formed.

Thus, for instance, a spiral tube with a circular cross-section will be formed in the following way—viz: A ring, or sectors of a ring, as the size of the material may admit, is or are to be cut out of the sheet-metal in any convenient manner. The ring is formed by two concentric circles or two parallel curves of such radius or curvature as required for the spiral tube to be made, the width of the ring to be such as to form one-half of the tube after punching and to leave sufficient metal on the borders for making the seams. After this, two halves are put together to form a tube, as indicated in Fig. 2, and connected either by single or double overlapping, by riveting, or by soldering, as the case may require, and as many rings or sections of rings joined as may be wanted. In the above-described spirals the seams will be horizontally opposite to each other. When the size of the material and of the spiral wanted admits the cutting of a whole ring, as indicated in blue lines on Fig. 1, where *c d e f* represent the sheet metal, *g h i k* the ring to be cut, *a b l m* the one-half of the tube formed by punching or otherwise. Then it has to be cut through perpendicular to the curvature, as shown by the dotted line *a b*, and one end (marked *a' b'* in Fig. 3) to be raised above the other end, *a b*, to form the "pitch" of the spiral. After this the upper half of the tube has to be laid on the lower half and the seams formed. If preferable, a spiral tube may be formed of straight strips of sheet metal, especially if this can be had of great length, by forming an outside half and an inside half, either around a core or otherwise. In this case the seams will be vertically above each

other, as indicated in red on Figs. 6, 7, 8, and 9, and hereby no waste of material will occur. Straight pipes can be formed in this manner, with two or more seams parallel to the axis of the tube, by "rolling" each part to the required shape, and of any length, without a cross-seam, which the material will admit. This will be of no great advantage by the use of sheet-tin, but the more useful and economical by the use of Russian sheet-iron, sheet-zinc, lead, copper, or brass, or any other sheet metal which can be had of certain lengths.

The advantages of my invention are, first, straight pipes or tubes may be formed by rolling of any length the material admits without any cross joints or seams; secondly, all bents, elbows, or curved tubes—such as spiral tubes for heating or cooling fluids or gases—may be made of the exact curvature desired, inside perfectly smooth, and therefore offering less resistance to the passage of liquids or gases

through them, and being easily cleaned from deposits or other foul matters; thirdly, such curved tubes may be made with less or none waste of material and with a great saving of labor.

I do not claim the manufacture of leaden pipes with two seams, as such are used in trap-tubings for water-closets, nor do I claim any particular shape of the cross-section of pipes; but

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

The manufacture of circular, spiral, or otherwise curved pipes, made of hard sheet metal, in the manner described within and for the purpose set forth.

EDUVART SAVORAL.

Witnesses:

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