

C. E. L. HOLMES.
Making Seamless Metal Tubing.

No. 29,276.

Patented July 24, 1860.

Fig. 3.

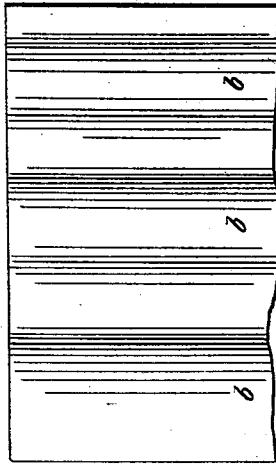


Fig. 4.



Fig. 5.

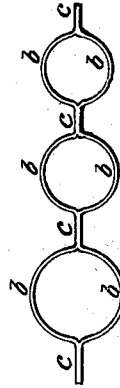


Fig. 1.

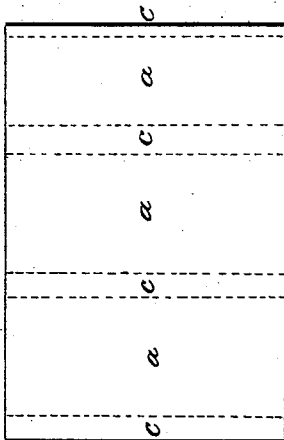


Fig. 2.



Fig. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

C. E. L. HOLMES, OF WATERBURY, CONNECTICUT.

FORMING SEAMLESS TUBES.

Specification of Letters Patent No. 29,276, dated July 24, 1860.

To all whom it may concern:

Be it known that I, C. E. L. HOLMES, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and Improved Process for Forming Seamless Tubing; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents an ingot of brass, copper or other suitable metal prepared for rolling; Fig. 2 an end view of Fig. 1, showing the metal strips in the same, of three different sizes; Fig. 3, a top view of a portion of Fig. 1, when reduced to a flattened state between rollers. Fig. 4, an end view of Fig. 3, with the metal slightly opened, ready for receiving the mandrel that fully opens the plates to a state represented in Fig. 5, which is an end view of a series or gang of tubes, ready to be separated for the finishing operation. Fig. 6 shows the finished seamless tube.

Similar letters of reference indicate corresponding parts in the several figures.

To enable those skilled in the art to fully understand my invention I will proceed to describe my improved process of making solid, or seamless tubing.

I arrange within the flask or box, in which the tube metal is to be run a desirable number of thin sheet iron (hoop iron) or other suitable malleable metal strips *a, a*, of a uniform width throughout, and of an even thickness; these are so placed within the box, that when the metal is run into and around the strips, they will be in the middle of the width of the ingot or bar, as clearly shown in Fig. 1; any desirable number of these strips, as stated before, may be thus completely inclosed by a solid mass of metal, and the strips may all be of an equal width, or of different widths according to the different sizes of tubes to be made. The bars of metal are not restricted to any limited width or length, but they may be made as wide and as long as they can be conveniently managed in the after processes, and they may contain any number of the strips *a, a*. When the ingots are thus formed, after they cool, they are taken to the rolling mill, and in a cold state reduced down to the required thickness represented in Fig. 4, which of course greatly increases their length, as

the metal spreads out between the rollers, which have plain parallel surfaces. The strips *a, a*, of course flatten out with the body of metal inclosing them, and become so laminated and loose that they may be readily drawn out, leaving the spaces they filled perfectly clear and free to receive a rod, carrying on its end a flat elliptical die which opens the plate, or separates the thin portions *b, b*, by its being drawn through, and leaves the spaces in the condition represented clearly in Fig. 4, at which stage the flat, or flattened plates are ready to receive the larger or more rounding dies or "openers", and these are drawn through the longitudinal spaces in the plate until the spaces are reduced to cylindrical shapes or cylinders, represented in Fig. 5, each of which are connected together by a neck *c*. In order to form elliptical tubes, the operation is stopped after passing through the proper elliptical die. The tubes are at this stage separated from each other, and the necks *c*, or portions projecting from each side of each tube, are trimmed down closely to the surface of the tube, but not too closely, as it will weaken the tube at these points, but short ridges or fins should be left, which, after the tubes are passed through a die constructed in a suitable manner, is drawn or rolled down into the body of the tube, leaving it smooth and of a uniform thickness throughout. The tubes thus made are smoothed and polished in the usual manner.

It will be seen that the most essential feature in my process, upon which I base my improvement is, first casting the metal in flat bars, or ingots, with strips of metal introduced which serve to give me the spaces to separate the metal that forms the tubes after the bars are rolled down to the desired thinness, and by the use of these strips from one to fifty, or more or less, tubes may be rolled out at one and the same operation, while with any other known process for making solid tubes, only one tube can be rolled at an operation, and this very imperfectly, as those familiar with the processes are fully aware. Then it will be seen that the opening of my tubes, and the reducing them to a cylindrical shape, can be done with much greater facility. The rolling is done with the ordinary smooth faced rollers, and the drawing or opening may be effected by a simple rod carrying a conical head of the

desirable size and transverse shape, which rod may be moved by friction rollers, or in any other suitable way.

Having thus described my invention, what
5 I claim as new, and desire to secure by Letters Patent is—

The process herein described for making seamless tubes which consists in casting the

metal with a thin metallic strip in its center and then rolling the same in the manner and 10 for the purpose herein shown and described.

C. E. L. HOLMES.

Witnesses:

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