H. C. KIRK.

METHOD OF MAKING VENTURI TUBES.

APPLICATION FILED JUNE 11, 1917.

1,245,596. Patented Nov. 6, 1917.

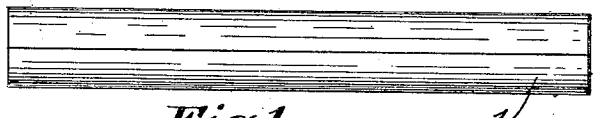


Fig. 1.

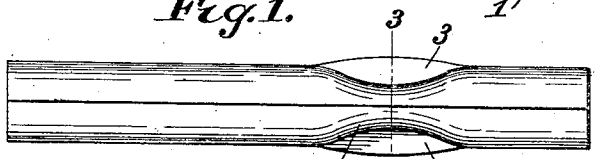


Fig. 2.

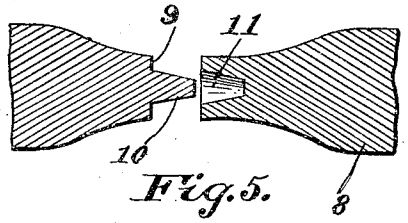


Fig. 5.

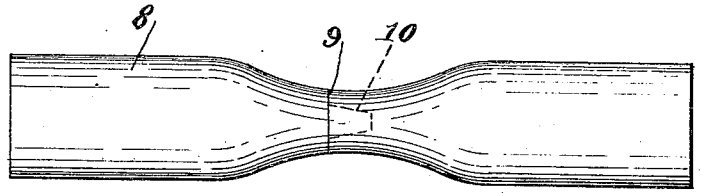


Fig. 4.

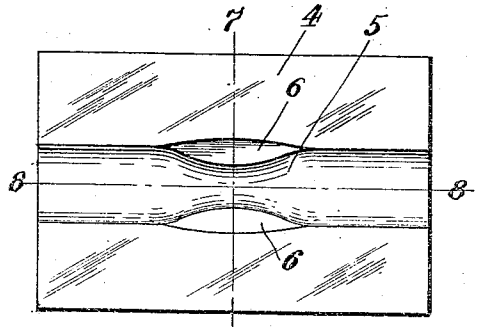


Fig. 6.

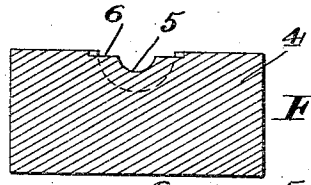


Fig. 7.

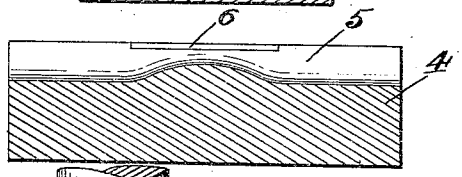


Fig. 8.

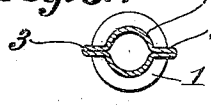


Fig. 3.

Fig. 9.

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METHOD OF MAKING VENTURI TUBES.

1,245,596. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed June 11, 1917. Serial No. 174,051.

To all whom it may concern:

Be it known that I, HENRY C. KIRK, a citizen of the United States of America, residing at Roland Park, Baltimore county, Maryland, have invented certain new and useful Improvements in Methods of Making Venturi Tubes, of which the following is a specification.

A Venturi tube, as the word is used in the mechanical arts, is a tube having its diameter reduced intermediately. The obvious method of making such Venturi tubes is by spinning seamless tubing but on account of the excessive demand for such seamless tubing, it is almost impossible to obtain it in quantities and at prices commensurate with the production of Venturi tubes to meet the demand. The rolled or seamed tubing can, however, be much more easily obtained as its manufacture from sheet metal requires less elaborate apparatus and plant. The seamed tubing cannot, however, be spun to advantage as the circumferential stress necessary to spin tubing of sufficiently heavy grades generally opens the seams or breaks them sufficiently to cause leaks and the lighter tubing which can be spun is not considered sufficiently durable and substantial for this work. This practical difficulty has proved important and has only been overcome at considerable expense of time, money and effort used in the evolution of a method of treating tubing in the production of these Venturi tubes which is applicable to the rolled and seamed tubes as well as to the seamless tubes. This method, broadly stated, consists in reducing the diameter of the tube at a point intermediate of its length by forming plaits, folds or fins in the walls of the tube. These preferably are radially disposed, though this is not essential to the broad conception of the invention but when so placed they have a very useful function as reinforcing members at the otherwise weakened portions of the tube. The operation is accomplished by means of dies shaped to the external form of the venturi and having between the operative surfaces at the sides spaces which receive and form the plaits or fins. The dies, and hence the fins or plaits, may be of any desired number.

In the accompanying drawing I have illustrated the invention so far as it is capable of being shown.

Figure 1 is an elevation of a short piece of seamed tubing;

Fig. 2 is an elevation of a similar piece of tube made into a venturi in accordance with my invention;

Fig. 3 is a transverse section on the line 3, 3 of Fig. 2;

Fig. 4 is a side elevation of the mandrel which may be used to support the tube from within during the formation of the venturi;

Fig. 5 is a longitudinal, central section of the same partly broken away for convenience;

Fig. 6 is a plan of one of the dies looking at the operative surface;

Fig. 7 is a section on the line 7, 7 in Fig. 6;

Fig. 8 is a section on the line 8, 8 in Fig. 6; and

Fig. 9 is an elevation of the two dies and the mandrel in operation, a portion of the dies being cut away and shown in section to disclose the mandrel and tube being operated upon, the latter being in section.

Referring to the drawings by numerals:

The method consists in treating sheet metal tubing 1, which may be either seamed or seamless but is shown as a seamed tube, forming in the tube a venturi 2 by plaiting or folding the side walls of the tube where the venturi is located and thus reducing the diameter of the internal passage, forming ribs or plaits 3, preferably radially disposed as shown. In the practice of the method I use dies 4 of any convenient number having their operative surfaces hollowed out at 5 in corresponding sections of the external form of the tube at the venturi. These hollows also include spaces 6 formed by offsetting a portion of the adjacent surfaces of the dies and corresponding to the fins or plaits 3. These are adapted to receive and form folds of metal thrown out by the reduction of the diameter of the tube. These folds as already stated, have a reinforcing function at a point where the tube would otherwise be weakened. To support the tube from within in order to prevent crushing of the tube, and make the reduced portion uniform, I find it convenient to use a mandrel 8, shaped to the inside of the venturi and formed in two sections joined at 9 so that the mandrel may be removed after the operation.

To center the sections I preferably provide a central pin or stud 10 on one section which coöperates with and enters a corresponding opening 11 in the other section.

In Fig. 9 I have shown the dies in the die press 12 provided with suitable handles 13 for the mandrels and abutments 14 for positioning the tube relatively to the mandrels, a stationary abutment 15 also being provided at one end to engage the positioning member 16. This latter part of the apparatus relating to the press, handles, abutments and so forth may be provided by the designer and is not a part of the invention.

The operation consists in placing the tube containing the mandrel in the hollow of one die and forcing the other die down on it reducing the diameter of the tube by forming plaits which conform to the spaces 6 in the dies at the same time the dies and the mandrel control the form of the venturi externally and from within.

I have thus described my invention specifically and in detail in order that its nature and operation may be fully understood; however, the specific terms herein are used descriptively rather than in their limiting sense and the scope of the invention is defined in the claims:

1. A method of making a Venturi tube from sheet metal tubing which consists in plaiting the side walls of the tube at a point intermediate of its length thus reducing the diameter and taking up the surplus metal, at the same time shaping the walls of the tube externally according to the desired form of the venturi.

2. A method of making a Venturi tube from sheet metal tubing which consists in plaiting the side walls of the tube at a point intermediate of its length thus reducing the diameter and taking up the surplus metal at the same time shaping the walls of the tube externally and internally according to the desired form of the venturi.

3. A method of making a Venturi tube from sheet metal tubing which consists in forming radial plaits in the side walls of the tube at a point intermediate of its length thus reducing the diameter and taking up the surplus metal, at the same time shaping the walls of the tube according to the desired form of the venturi.

Signed by me at Baltimore, Maryland, this 9th day of June, 1917.

HENRY C. KIRK.

Witnesses:
ZELLA KUHN,
PORTER H. FLACETT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."