July 6, 1937. I. J. VAN HUFFEL 2,086,143

METAL TUBING

Filed April 24, 1936



Fig-1

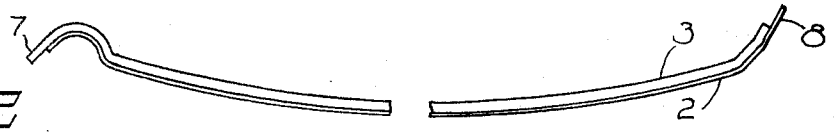


Fig-2

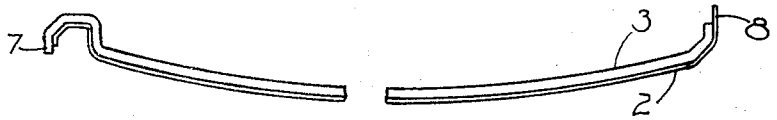


Fig-3

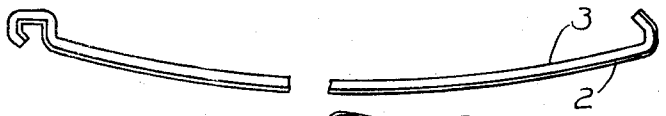


Fig-4



Fig-5



Fig-6

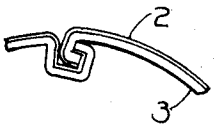


Fig-7

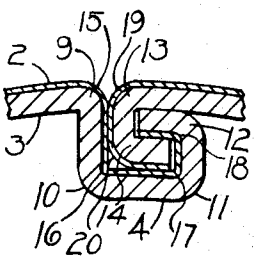


Fig-9

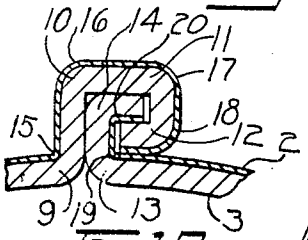


Fig-10

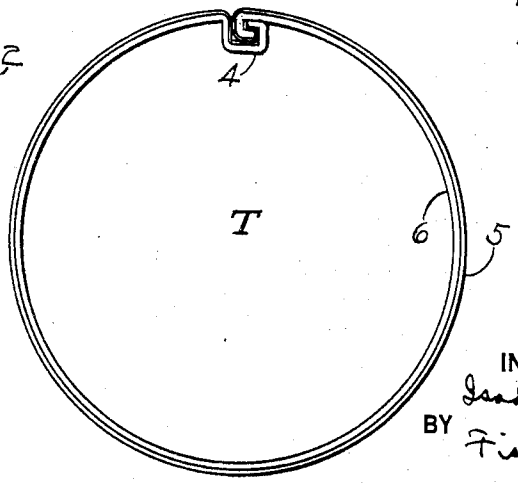


Fig-8

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METAL TUBING

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Application April 24, 1936, Serial No. 76,291

3 Claims. (Cl. 138—74)

My invention relates to multi-ply or multi-walled tubes or tubing suitable for use in fabrication of beds, furniture, towel racks, exhaust pipes and the like.

Heretofore, it has been common practice to construct tubing of relatively cheap metal, such as rolled steel, and to then coat the exposed surface to provide finish or other desirable qualities. It has also been proposed to make tubing of laminated shells, one of rolled steel and the other of more expensive metal such as stainless steel, brass or other non-ferrous metal. However, difficulty has been encountered in intimately joining the shells together and where welding was resorted to, this operation tended to destroy the non-corrosive qualities of the material. Furthermore, insofar as I am aware, no one has heretofore found it possible to satisfactorily weave the opposing longitudinal meeting edges of such laminated tubing together into a double seamed joint.

One of the principal objects of the invention is to provide a tube comprising inner and outer shells of different sheet metal material, the meeting edges of the shells being lapped and infolded to make a double seamed joint.

A further object is to provide a double walled tube of sheet metal the meeting edges of the two walls being flush, and lapped and infolded to form a double seamed joint.

A further object is to provide a double walled rolled tube of sheet metal material the walls of which will not separate under stress of bending or upsetting fabricating operations.

Other objects and advantages of the invention will be apparent as the specification is considered with the accompanying drawing, in which:

Figure 1 is an end view of the strips in overlapping superimposed position;

Figures 2, 3, and 4 are end views of the strips showing the initial bends progressively formed in making the double seam joint;

Figures 5, 6, and 7 are fragmentary end views showing the manner in which the bent ends of the strips are interlocked;

Figure 8 is an end view of the completed tube;

Figure 9 is an enlarged fragmentary section through the double seam joint shown in Figure 8; and

Figure 10 is an enlarged fragmentary section showing a double seam joint formed on the outside of the tube.

Referring more particularly to the drawing, T denotes a tube comprising an outer shell 5 and an inner shell 6. The shells are simultaneously formed from a laminated sheet or strip 1, consisting of superimposed sheet metal strips 2 and 3 of equal width but differing in thickness from each other. The layer or strip 3, is preferably of cold rolled steel and the layer or strip 2, is made from stainless steel, brass or other suitable non-ferrous metal. As the material, including finishing cost, of which the outer shell 5, is made is higher than that of inner shell 6, the strip 3, for purposes of economy and strength is thicker than the strip 2. The strips 2 and 3, are first arranged in the superimposed relation illustrated in Figure 1 of the drawing, and the body and longitudinal edges of the strips are then bent, by successive operations or steps, into the configurations progressively shown in Figures 2 to 4 of the drawing.

After the marginal edges have been thus bent they are inter-locked together in the manner indicated in Figures 5 to 7 inclusive. A final operation consists in applying an outward pressure to the lapped and infolded edges thus squeezing these inter-locked parts together to form a tight double seam joint 4, and to draw the shells into close contact with each other. These various bending operations are preferably, but not necessarily, carried out in a roller die machine, not shown.

It is essential that the edges of the strips 2 and 3, be substantially flush with each other, when the Figure 4 stage of bending operations has been reached, because it would otherwise be practically impossible to inter-lock the opposing edges in the desired manner. However, due to the fact that there are four bending operations at the left hand edge of the composite strip 1, and only two at right hand edge, plus the fact that strip 3 is thicker than strip 2 and assumes an outside position on the left hand bends and an inside position on the right hand bends, it becomes necessary to compensate for the relative distances the side edges of the thicker strip 3 will be stretched.

The desired compensating action is obtained by having one edge of strip 3, in this instance the left hand edge viewing Figure 1, initially overlap or extend beyond the corresponding marginal edge of the strip 2, of composite sheet or strip 1, as at 7, and this necessarily results in the opposite edge of strip 2 overlapping the other or right hand edge of strip 3, as at 8. The edges of the composite strip 1 are then bent in the opposing directions, illustrated in Figures 1 to 4 inclusive, the left hand edge being bent at four places, 9, 10, 11, and 12 respectively, whereas but two bends, 13 and 14 are necessary at the right hand edge of the com-

posite strip. The corresponding edges of the thin strip at the same time are given the bends 15, 16, 17 and 18 and 19 and 20 respectively. In this connection it will be noted that the thicker strip 3 is subjected to six short bending operations, two at one side edge and four at the other side edge, whereas the strip 2 has three long bends and three right angle or short bends, thus resulting in relatively greater elongation or stretching of the thicker strip.

The surfaces of the relatively thick strip 3 being much farther away from the axis thereof than is true of the strip 2, the edges of this strip are capable of being stretched in the bending operations, whereas the edges of the thinner strip 2 will be stretched, to a negligible degree. Furthermore there being only half as many short bends in the thin strip as there are in the thicker strip 3, it will be seen that the stretching of the relative parts will be equalized to cause the edges of the strips 2 and 3 to become flush with each other at the completion of the bending operations. The difference in thickness of the two strips, the extent of the overlap and the character and number of the bends are all factors in producing the desired results.

The final pressing or drawing operations, which compress together the meeting edges of the strips 2 and 3, at the joint 4, and insures a tight joint, also draws the two shells more closely together. This action has the effect of forcing the shells into such intimate relationship that the body of the strips will not separate under fabricating stresses, such as bending and upsetting the tube.

The double walled tube T is as strong, if not stronger, than a single walled tube of equal thickness, and has the advantage of economy in that the more expensive stainless steel or brass strip can be made relatively thin. While the non-corrosive shell 5 is shown on the outside of the tube, for some purposes it might be desirable to have this shell on the inside. This could readily be accomplished by reversing the order of the strips 2 and 3, that is, by placing the strip 2 on top of strip 3 in Figure 1 or initial position.

The modified double seam joint 20 illustrated in Figure 10, is the same as disclosed in Figure 9, with the exception that in the modification the seam is formed on the outside of the tube.

Having thus described my invention, what I claim is:

1. A tube comprising inner and outer shells of sheet metal, an outer edge on the inner sheet extending beyond the corresponding outer edge on said outer sheet, and an outer edge on said outer sheet extending beyond the corresponding edge on said inner sheet thereby forming laps at the respective ends of the sheets, the lapped meeting edges of said shells being infolded to make a double seamed joint common to both shells, the shells being drawn together to prevent separation during bending and upsetting of the tube.

2. A tube comprising shells of sheet metal, a longitudinal edge of one shell extending beyond the corresponding longitudinal edge of the second shell, and a longitudinal edge of the second shell extending beyond the corresponding longitudinal edge of the one shell, for equalizing the stretch between said shells when said shells are lapped and infolded to make a double seamed joint common to both shells.

3. A tube comprising shells of sheet metal, an edge of one shell extending beyond the corresponding edge of the second shell, and an edge of the second shell extending beyond the corresponding edge of the one shell thus forming laps for the meeting edges of said shells, said lapped meeting edges being infolded to make a tight double seamed joint common to both shells, the joint area being subjected to pressure whereby the joint is effectively sealed.

ISADORE J. VAN HUFFEL.