Nov. 12, 1940. E. M. SIMS 2,221,208

PROCESS OF MAKING VENEERED TUBING

Filed Feb. 14, 1938

Fig. 1

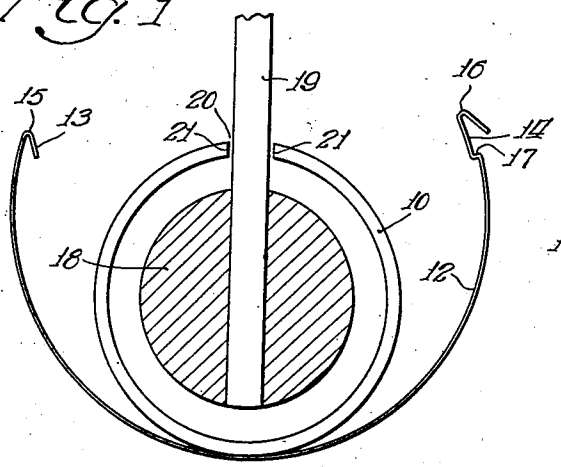


Fig. 2

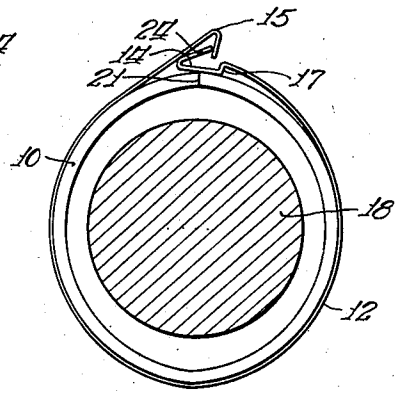


Fig. 3

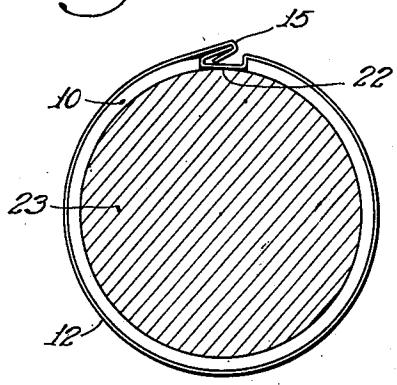


Fig. 5

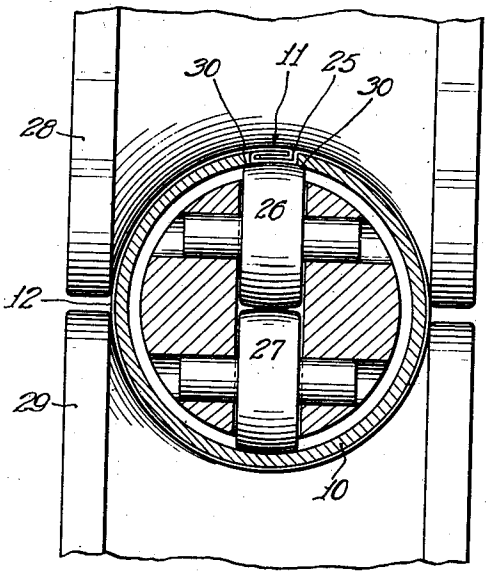


Fig. 4

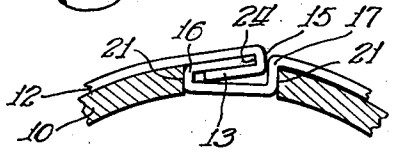
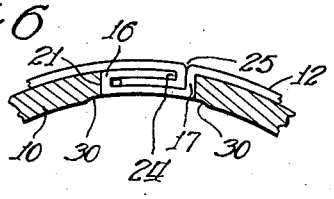


Fig. 6



Inventor:
Ernest M. Sims
By: Roland C. Rehm

Atty.

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PROCESS OF MAKING VENEERED TUBING

Ernest M. Sims, Elkhart, Ind.

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3 Claims. (Cl. 113—34)

This invention relates to veneered tubing and its manufacture, and, among other objects, aims to provide an improved and superior tubing of this character.

The nature of the invention may be readily understood by reference to one illustrative embodiment thereof shown in the accompanying drawing.

In said drawing:

Figs. 1 to 5 are sections through the product in successive stages of formation. Fig. 1 shows the initial assembly; Fig. 2 the interlocking of the veneer; Fig. 3 the registry of the seam with the recess in the inner tube; Fig. 4 is an enlarged partial section through the seam just prior to its completion; and Fig. 5 shows the completion of the seam; and

Fig. 6 is a section on an enlarged scale of a portion of the completed tubing.

Veneered tubing is generally characetrized by an inner body or supporting base made of inexpensive metal, covered with a thin veneer of more expensive metal, the inner body giving the tube its strength and the veneer its finish. The veneer may be of various kinds, depending upon the service which the tubing is to perform. Generally it comprises some non-corrosible material such as stainless steel. To minimize costs, the veneer, such as stainless steel, is made very thin (for example .018"), and is as a result so flexible that it is difficult to maintain the seam, which unites the edges of the veneer, in its original and inconspicuous condition. The thin metal tends to pull out and open the seam, thereby loosening the veneer on the inner supporting tube and making the seam relatively more conspicuous. Welding at the seam is impracticable for a thin veneer.

I have devised a tubing and its method of manufacture wherein the veneer is locked around the base member in such a way as to form an inconspicuous and permanently tight seam. The drawing illustrates one type of tubing of this character and one method of manufacturing the same. As there shown, the inner member 10 and the lock seam 11 in the veneer 12 cooperate to hold the seam against opening or loosening and to maintain the veneer tightly around the inner member.

The inner tube 10 is made from a relatively heavy gauge metal (being for example .050" thick), and in this instance is formed from a strip which is passed through a series of forming dies or rolls which progressively bend it into whatever tubular contour is desired. Forming apparatus of this character is well-known and need not be described. The veneer 12 is provided in strip form and, in the illustrative method, is progressively bent around the inner tube. At a preliminary stage in the method, the opposite margins 13 and 14 of the veneer are folded over to provide complementary hooks 15 and 16, which later are interlocked, as shown in Fig. 2, as the first step in forming the seam. The margin of the strip intended to underlie the seam when the latter is formed is also advantageously sharply inwardly offset as at 17 to permit the formation of an inconspicuous seam whose outer surface is flush with the outer contour of the tubing.

To facilitate the aforesaid initial interlocking, the inner tube is caused to contract until the hooks are engaged. In the illustrative method, just prior to this interlocking, the inner tube is passed over a rod-like plug 18 extending longitudinally through the tube to a point where the seam is completely finished. The plug is supported by a blade or plate 19 which passes through the slot 20 between the edges 21 of the inner tube. Beyond the point of termination of the plug support 19, the diameter of the tubing is temporarily reduced (by reducing or eliminating the slot 20) to permit the aforesaid initial interlocking of the pre-formed margins of the veneer (see Fig. 2). In this region the diameter of the plug is, of course, small enough to permit such reduction in diameter. After the margins of the veneer have been thus interlocked, the inner tube is again enlarged to restore the slot 20, into which the inwardly offset portions 22 of the seam fall (see Fig. 3). The spreading of the inner tube is advantageously effected by enlarging the diameter of the plug at this point, as indicated at 23, Fig. 3.

The seam is thereupon completely closed and compressed to fill the slot 20. In this operation, the extremity 24 of the underlying margin is caused to abut and press against the hook 15 (on the other margin) at the point where the veneer turns inwardly, thereby forcing the veneer at this point tightly against the offset 17 of the other margin, and reducing the visible portion of the seam to an inconspicuous line 25. The action of the extremity 24 in clamping and anchoring the opposite margin of the veneer is illustrated on an enlarged scale in Fig. 4. As there shown, the extremity 24 contacts the corner of hook 15 before the seam is entirely closed. The complete closing or compression of the seam therefore causes the extremity 24 to exert a thrust against hook 15, thereby so tightly clamping the opposite margin of the veneer as to prevent its loosening regardless of the thinness and flexibility of the veneer. The

extremity 24 of course reacts against the edge 21 of the inner tube and the latter supports the thrust by reason of the tension in the tightly enveloping veneer. The foregoing elements thus cooperate to maintain the seam and to prevent loosening of the veneer.

In the present instance the seam is completed and compressed as aforesaid by a roll 26 carried by the plug in registry with slot 20. The reaction against the roll is carried by an opposite roll 27 (also carried by the plug) bearing aginst the inner tube at a point opposite the seam and by exterior pressure rolls 28 and 29 having the contour of the veneered tube and closely surrounding the same to render the action of roll 26 effective. Roll 26 may advantageously be wider than the finished seam to roll down the adjacent edges 30 of the inner tube to force such edges tightly against the seam. Minor variations in width of the strip from which tube 10 is formed (and consequent variations in width of the slot 20) are thus compensated for, thereby making it unnecessary to adhere to close tolerances.

A similar product may be made by other though less practical methods. For example, the veneer tube and its seam may be first formed and then drawn over the inner tube when the latter is in contracted condition and so arranged that when expanded its slot lies in registry with the veneer seam. It is not practically possible, however, by such method of fabrication to cause the seam to wedge as tightly or be held as tightly in the slot in the inner tube.

While the invention is particularly advantageous in connection with thin or highly flexible outer coverings, it may be applied advantageously to heavy gauge metal. Nor is the invention limited to the details of the illustrative embodiment herein disclosed since these may be variously modified. Moreover it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and sub-combinations.

Having described my invention, I claim:

1. The process of making veneered metal tubing comprising enclosing a slotted tube with a strip of sheet metal veneer, bending over the margins of said strip at a preliminary stage in the process for forming a lock seam, offsetting one of said margins sharply inwardly to shape it to fit over an edge of the inner tube at the slot, reducing the slot in said inner tube to reduce the diameter thereof and interlocking said margins, then expanding said inner tube, fitting the interlocked margins in said slot, compressing the seam thus formed to exert lateral pressure on the edges of said inner tube at the slot, and upsetting the inner surface of the edges of said inner tube adjacent said slot to increase the mutual pressure between said inner tube and said seam.

2. The method of forming veneered metal tubing comprising enclosing an inner supporting tube having its edges separated by a longitudinal slot with a strip of sheet metal veneer having its longitudinal margins preformed for a longitudinal lock seam, one of said margins being sharply inwardly offset to fit over one of the edges of said inner tube at the slot, reducing the slot in said inner tube to reduce the diameter of said inner tube and interlocking said preformed margins around said inner tube while the latter is reduced in diameter, again widening said slot and locating said seam in said slot, said veneer being of such dimensions as to be tight around said inner tube, and compressing said seam in said slot to place said inner tube in compression and the outer veneer in tension and thereby to effect a gripping of the inwardly offset margin and the base of the fold of the other margin between the edge of the inner tube and the edge of the inwardly offset margin to prevent loosening of the veneer on said inner tube.

3. The process of making veneered metal tubing comprising enclosing a slotted inner tube with a strip of sheet metal veneer, bending over the margins of said strip at a preliminary stage in the process for forming a lock seam, offsetting one of said margins sharply inwardly to shape it to fit over an edge of the slot in the inner tube, forming said veneer around said inner tube, reducing the slot in said inner tube to reduce the diameter thereof and interlocking said margins around said inner tube while the latter is reduced in diameter, then expanding said inner tube, said veneer being of such dimensions as to be tight around said inner tube, fitting the interlocked margins in said slot and compressing the seam thus formed to expand the latter tightly against the edges of said inner tube to place the latter in compression and said veneer in tension, thereby to cause portions of said interfolded margins including said inwardly offset margin to be tightly gripped against an edge of said inner tube to prevent loosening of the veneer on said inner tube.

ERNEST M. SIMS.