H. W. BUNDY.

TUBING.

APPLICATION FILED APR. 11, 1921.

1,431,368.

Patented Oct. 10, 1922.

2 SHEETS—SHEET 1.

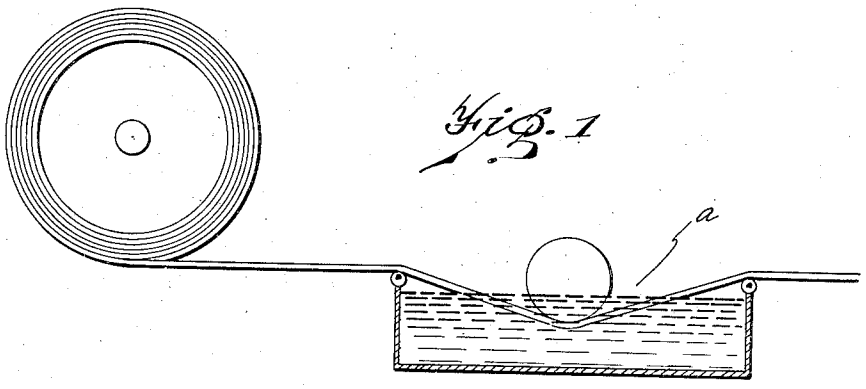


Fig. 1

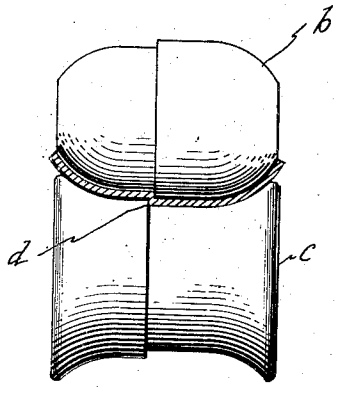


Fig. 2

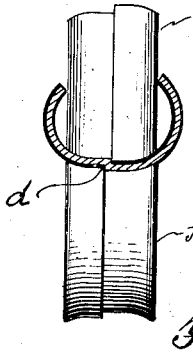


Fig. 3

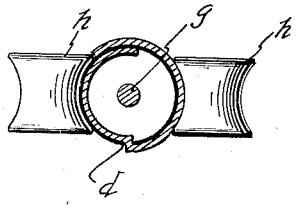


Fig. 5

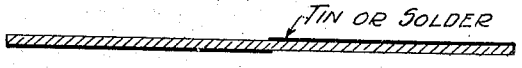


Fig. 6

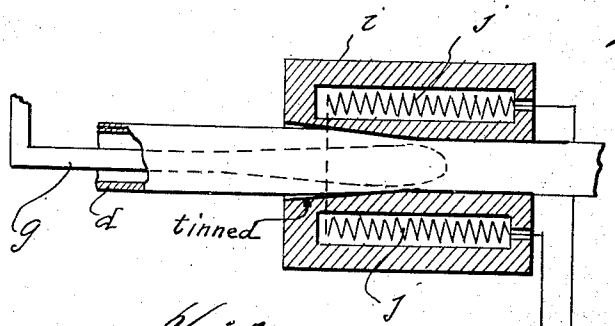


Fig. 4

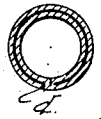


Fig. 7

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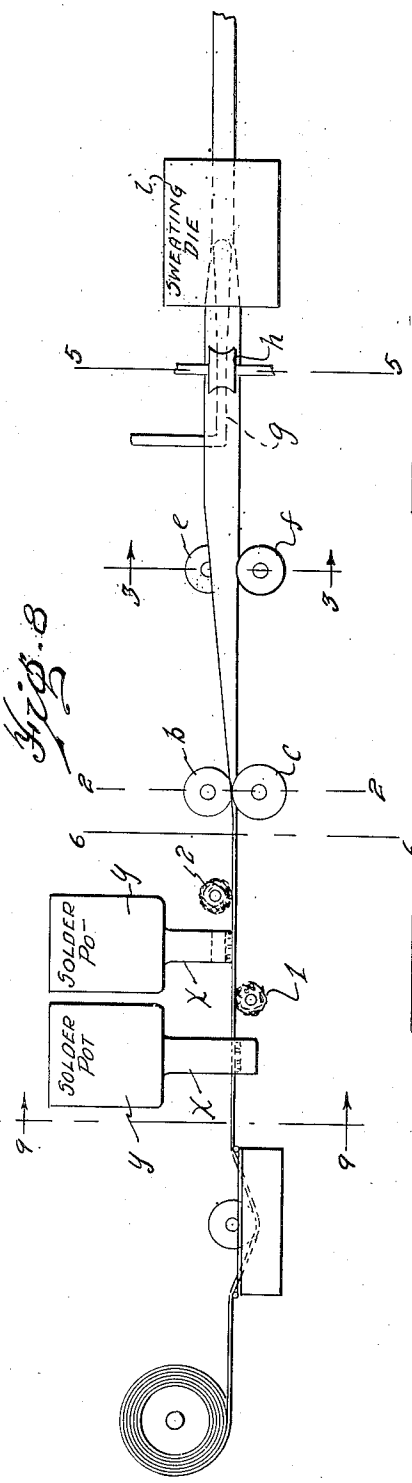


Fig. 8.

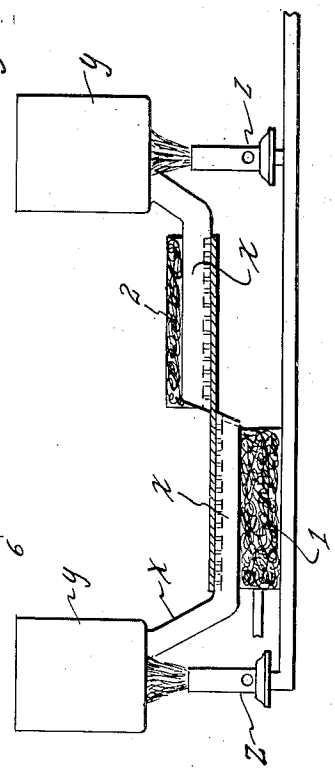


Fig. 9.

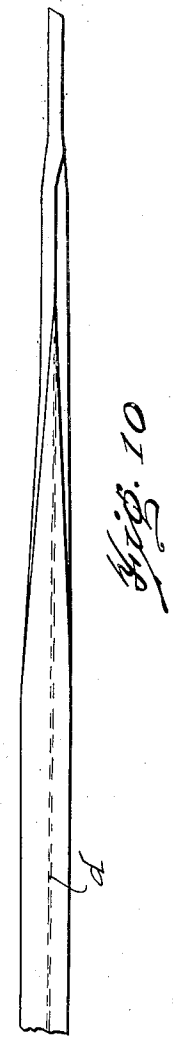


Fig. 10.

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UNITED STATES PATENT OFFICE.

HARRY W. BUNDY, OF DETROIT, MICHIGAN.

TUBING.

Application filed April 11, 1921. Serial No. 460,551.

To all whom it may concern:

Be it known that I, HARRY W. BUNDY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Tubing, of which the following is a specification.

This invention relates to a new tubing and also the process of producing the same.

There are a great many small tubes used in automobiles and other machines which are made of a soft flexible material, such as copper. These tubes are used in automobiles largely for conveying the liquid fuel from the gasoline tank to the vacuum tank and thence to the carbureter and also as radiator tubes.

It is the object of the present invention to provide such a tube of new design and employ a new process to make the same for the purpose of increasing the economy of manufacture. It will, however, be understood that my claims to the product and to the method are in no way limited to tubing intended for the purpose specifically stated. This is merely an illustration.

In the drawings,—

Fig. 1 is a view showing the strip of stock passing through a bath of acid to clean the same.

Fig. 2 is a section on the line 2—2 of Fig. 8 showing the stock passing through the first set of forming rolls.

Fig. 3 is a section on the line 3—3 of Fig. 8 showing the stock passing through the second set of forming rolls.

Fig. 4 is a longitudinal section showing the stock passing through the sizing and sweating die.

Fig. 5 is a section on the line 5—5 of Fig. 8 showing the final set of rolls.

Fig. 6 is an enlarged section on the line 6—6 of Fig. 8 showing in exaggeration the stock tinned or painted with solder before it passes into the dies.

Fig. 7 is a cross section through the finished tube.

Fig. 8 is a side view (diagrammatic) showing the entire apparatus.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is a plan view of the work.

First the stock is passed through a bath *a* of acid, muriatic acid, for instance, to cleanse the same. The stock is then tinned or painted with solder, as shown in Figs. 6 and 9, one-half on one side and the other half in non-opposite position on the other side of the strip. This tinning may be performed in any suitable manner, such as by passing the stock under and over perforated hollow arms *x* connected with solder pots *y* kept hot by the burners *z*. The solder or tin is laid evenly over the metal ribbon by the brushing rolls 1 and 2.

The stock then passes between the upper and lower rolls *b* and *c*, which puts the jog or shoulder *d* in the stock. This jog is at one side of the center of the strip so that one side is wider than the other to curl over such narrower portion. From these the stock reaches the rolls *e* and *f* which serve to curl it up as shown in Figs. 3 and 8. The stock then passes over the mandrel *g* as shown in Figs. 4 and 8, and the horizontally-disposed pressure rolls *h*, *h* serve to press the stock in overlapped relation, as shown in Fig. 5. The head of the mandrel is located in the sweating and sizing die *i*, which is provided with an electric heating coil *j* or any other suitable source of heat. When the stock is drawn into this sizing die it is drawn from the diameter shown in Fig. 5 to the final diameter shown in Fig. 7. This causes a complete overlap through the entire 360 degrees (excepting the jog) and brings the two edges of the stock up against the opposite sides of the jog *d*. This die necessarily subjects the two overlapping plies to considerable pressure and at the same time sweats the tin or solder and cements the two plies or layers together so as to make an absolutely tight fit. Obviously rolls could be used in place of the sweating and sizing die.

Obviously thinner stock will be used for each ply than would ordinarily be the thickness of the stock in the final tube. This forms a liquid-tight, air-tight, tubing that may be cheaply manufactured in continuous lengths.

The term solder is used in the claims in the broad sense of any suitable metallic material for uniting suitable surfaces.

What I claim is:

1. A tubing comprising a single strip of solder coated metal longitudinally drawn and fashioned into a body having a soldered and sweated multiple ply hollow cross section with a longitudinally running seam.

2. A tubing, comprising a single strip of metal provided with a jog or shoulder and fashioned into a body having a soldered mul-

tiple ply hollow cross section with the edges of the strip on opposite sides of the jog.

3. A tubing, comprising a single strip of metal provided with a jog and fashioned into a body having a multiple ply hollow cross section and with the plies fastened together by an interposed material with the edges of the strip on opposite sides of the jog.

4. A tubing formed of a single strip of material longitudinally drawn into a body having a multiple ply hollow cross section with a longitudinally running seam.

5. A tubing formed of a single strip of material longitudinally drawn into a body so that the cross section is a multiple ply hollow cross section having one ply overlying another ply and fastened thereto by an interposed material.

6. A tubing formed of a single strip fashioned with a jog longitudinally therein and having the body of the strip formed up into a multiple ply overlapping tube with the edges of the strip on opposite sides of the jog and an interposed soldering material for fastening the plies together.

7. The method of producing tubing which comprises the forming of a jog in a longitudinal strip of material and the curling of the edges of the material into a multiple ply body having a hollow cross section with the edges of the strip on opposite sides of the jog.

8. The method of producing tubing which comprises the forming of a jog or shoulder in a longitudinal strip of material and the curling up of the edges of the material into a multiple ply hollow cross section and the soldering of the same together.

9. The method of producing tubing which comprises the applying of solder or tin to opposite sides of a strip of metal on non-registering portions, the forming up of the sides of the material into a body having a hollow plural ply cross section, and the sweating of the body to fasten the plies together.

10. A tube made up of a plurality of plies with their edges directed longitudinally of the tube and with solder evenly distributed over adjacent plies and the plies sweated together.

11. The method of producing tubing which comprises the applying of solder to the stock before the same is formed up and then forming the stock while longitudinally moving in a straight line into a tube of a plurality of overlapping plies and heating the said tube while longitudinally moving to sweat the solder and secure the plies together.

12. The method of producing continuous tubing which comprises the distribution of solder over the stock on portions that are to overlap, the forming of the stock while longitudinally moving into a longitudinally seamed tube having a plurality of overlapping plies with the intervening solder, and the heating of the tube to sweat the solder between the plies and secure the same together.

13. The method of producing tubing which comprises the distributing of soldering material over the portions of the stock that lie together in the finished tube, then forming the stock while longitudinally moving into a tube having a longitudinally running seam and a plurality of overlapping plies with intervening soldering material, and then heating the tube to sweat the soldering material and thereby secure the plies together.

14. The method of producing tubing which comprises the applying of solder to those portions of the longitudinally moving stock that are to be overlapped, the forming of the metal stock while longitudinally moving into a plural ply tubing having a longitudinally running seam, and the sweating of the solder to hold the plies together.

15. A tube made up of a plurality of solder-coated plies longitudinally drawn into overlapped relation forming a plural ply tube with the plies sweated together.

In testimony whereof I affix my signature.

HARRY W. BUNDY.