Dec. 19, 1944. J. MOSELEY ET AL 2,365,286

FLEXIBLE TUBING

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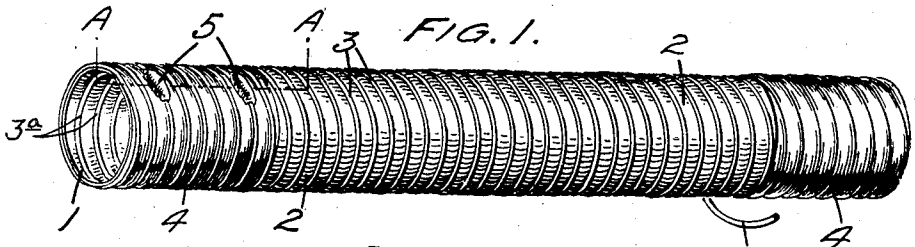


FIG. 1.

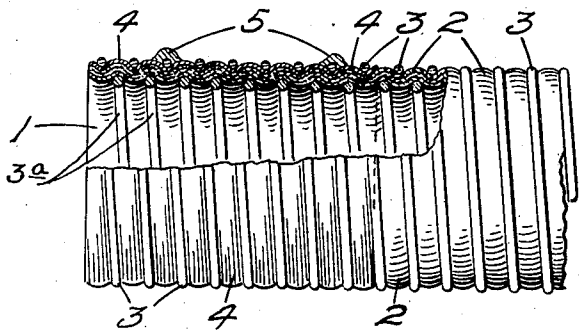


FIG. 2.

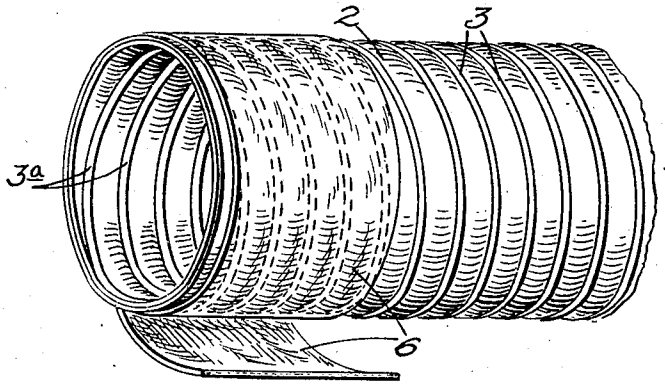


FIG. 3.

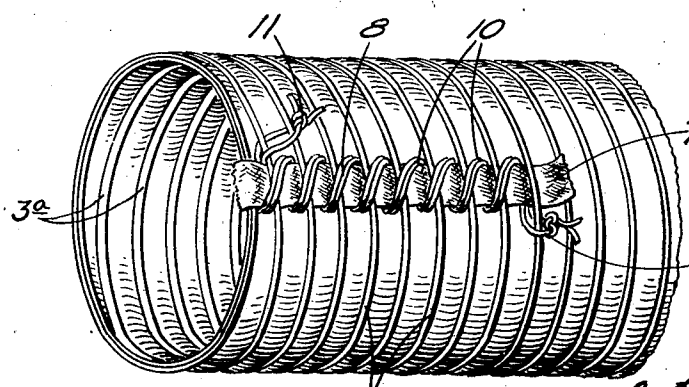


FIG. 4.

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UNITED STATES PATENT OFFICE

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FLEXIBLE TUBING

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6 Claims. (Cl. 138—57)

This invention relates to improvements in flexible tubing and in the manufacture thereof. Flexible tubing is often manufactured with one or more layers of wire therein and the present invention relates to such tubing which has an outer layer of wine coiled around the same.

According to the present invention a flexible tube is provided having a layer of wire coiled around the same wherein means are provided for anchoring the said wire to the tube so as to prevent relative movement between the wire and the remainder of the tube. The said outer layer of wire is principally designed as a reinforcing member to bind the structure of the tube together and if it shifts the results are detrimental to the tube.

In one embodiment of the invention a layer or layers of metal are affixed upon the outer surface of the tube and the wire is superposed thereon and secured thereto. Preferably the wire layer is in the form of a helix having its coils uniformly spaced around the body of the tube. The layer or layers of metal are preferably not continuous throughout the length of the tube but may be disposed at intervals throughout the length of the tube. It is in general sufficient if a layer of metal is applied at either end of a length of the flexible tube the said layer extending for a short distance longitudinally of the tubing and preferably brass foil or sheet is employed.

In another embodiment a length of adhesive tape is superimposed upon the outer wire layer in such a manner as firmly to adhere thereto and secure the same firmly in position. In yet another form of the invention the coils or helices of the outer wire layer are secured to one another by tape, thread or similar material.

In order that the invention may be clearly understood the same will now be described with reference to the accompanying drawing which illustrates three forms which it may assume.

Figure 1 is a perspective view of a flexible tube constructed according to the invention;

Figure 2 is a vertical section on the line A—A of Figure 1;

Figure 3 is a perspective view of a modification of the invention, and

Figure 4 is a perspective view of a further modification thereof.

In the embodiment of the invention shown in Figures 1 and 2 the tube is formed of an inner wire coil 3^a upon which are superposed a number of layers of textile material or kraft paper 1, the whole being built up on a mandrel which is not shown in the drawing, the last layer 2 beneath the outer coil of wire 3 being of kraft paper. At either end of the length of tubing a layer of brass foil 4 is superposed upon the layer 2. The layer 4 may be wrapped around the layer 2 manually and one layer is generally found to be sufficient. The outer coil of wire 3 is then applied to the tube in the usual well known manner, being wrapped around the same in the form of a helix which may have its coils spaced apart for a suitable distance which may vary according to the diameter of the tube. The wire is then secured to the brass layer at the points where it surrounds the same, this being advantageously effected by soldering the same thereto, for example, as shown at 5. Instead of providing the layers of brass foil at either end of the tube only, such layers may be provided at intervals throughout the length thereof, or the same may be applied continuously of its length if desired.

In the modification shown in Figure 3 the tube is made up as before of one or more layers of textile material or kraft paper, the last layer of which is shown at 2. This is surrounded by the wire helix 3 which is anchored at the end of the tube by means of a length of adhesive tape 6 which is superimposed thereon so as firmly to adhere thereto.

In the embodiment illustrated in Figure 4 the tube is again built up in layers on a mandrel in the manner already hereinbefore described and one or more lengths of tape 7 formed of textile material is or are placed longitudinally of the tubing, the outer layer of wire 3 being affixed thereon in the form of a helix; one length of tape as shown will, in general, be sufficient. After the outer layer of wire 3 has been secured thereon the end portions of the tape 7 are held in place by means of string or thread 8 which is secured at or near the ends of the tape to the outer wire layer for example as at 9. This may be effected manually by means of a needle threaded with string. The end of the string is first anchored to the outer wire layer and the string then passed under or through the tape by means of the needle at those parts thereof 10 where the tape lies between the helices of the outer wire layer and over the actual strands of wire of the said layer throughout the whole length of the said tape, being finally again secured to a strand of the outer wire layer at the other end of the tape as at 11. The tape preferably extends the full length of the tube but need not, in all cases, do so. For convenience it is only shown as extending for a portion of the

length of the tube in Figure 4. Where the method described with reference to Figure 4 is employed, the tube, or that part thereof along which the tape extends, may be surrounded with adhesive tape in the manner described with reference to Figure 3.

Having described our invention, we declare that what we claim and desire to secure by Letters Patent is:

1. In a flexible tube, a flexible body portion, a wire helix tightly coiled about the tube body portion and having its coils uniformly spaced along the body portion, means for holding said coils in their uniformly spaced relation comprising flexible elements disposed at spaced intervals along the tube intermediate the tube and the wire helix, and means for securing the coils of said helix to said flexible elements.

2. In a flexible tube, a flexible body portion, a wire helix surrounding the tube body portion and having its coils uniformly spaced along the tube, means for holding said coils in their uniformly spaced relation and against unwinding comprising a separate short flexible element disposed intermediate the outer surface of the tube and the wire helix in the area of the tubing adjacent the end thereof, and means for securing the surrounding coils of the helix to the element, the wire helix being wound tightly about the element in the end area of the tube and being tightly wound directly about the outer surface of the tube throughout its circumference in the tube area adjoining the inner end of the flexible element.

3. A flexible tube comprising a body portion, a layer of metal surrounding a part of said body portion, a wire helix surrounding the tube tightly coiled around said body portion and said layer of metal so as to press thereon, the coils of said helix being uniformly spaced apart and positively secured to said metal layer.

4. A flexible tube comprising a body portion, a short flexible layer of metal surrounding said body portion in the area adjacent the end thereof, a wire helix having the coils thereof uniformly spaced apart tightly wound about the metal layer and tightly wound about the outer surface of the tube beyond the inner end of the metal layer, and means positively securing surrounding coils of the helix to said metal layer.

5. A flexible tube comprising in combination a body portion, a wire helix coiled around the said body portion and having its coils uniformly spaced apart around the said body portion, and a length of textile material extending beneath the wire coils and secured thereto.

6. A flexible tube comprising in combination a body portion, a wire helix coiled about said body portion and having its coils uniformly spaced apart along the body portion, and a fastening consisting of a length of textile material extending beneath coils of the helix, the said textile material being secured to said helix by means of string passed under and over said textile material.

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