Aug. 22, 1933. R. H. STONE 1,923,693

FLEXIBLE TUBE

Filed June 4, 1929

FIG. 1

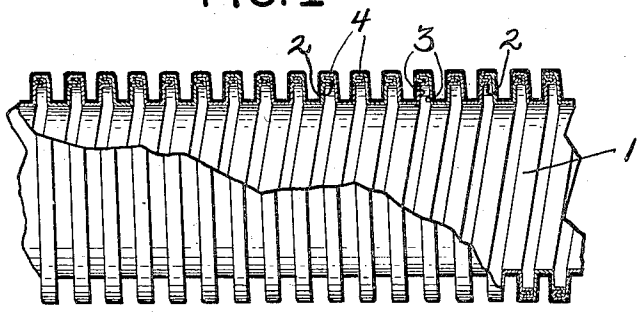


FIG. 2

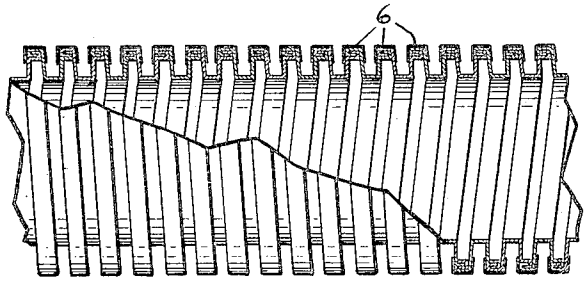
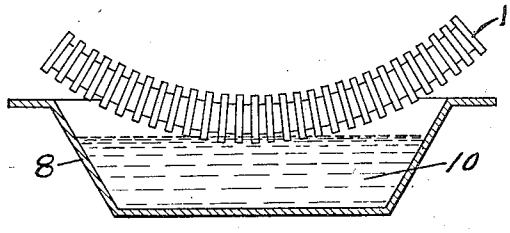


FIG. 3



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Patented Aug. 22, 1933 1,923,693

UNITED STATES PATENT OFFICE

1,923,693

FLEXIBLE TUBE

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Application June 4, 1929. Serial No. 368,339

3 Claims. (Cl. 137—75)

This invention relates to flexible tubes reenforced by the sealing of the parts together, the tube being formed from a helically disposed strip having the edges of adjacent convolutions folded together.

The object of this invention is to render tubes more durable and rugged as well as to prevent leakage and slippage in the joints such as would be caused by the rotation of the tubing, one end with relation to the other. It is especially applicable to those flexible tubes formed from helically disposed strips and having the edges of adjacent convolutions interfolded into fixed relation. The flexibility of the tube being provided by a groove, lengthwise of the strip, forming the corrugations the sides of which move toward or away from each other to permit flexure of the tube. In this type of tube indicated, stress applied to the joint either tending to twist the tube or acting longitudinally of it, particularly the former, is liable to loosen the joint and cause deterioration and quick destruction of the tube. According to the present invention the parts of the joint are held firmly together, preventing relative movement in a line parallel to the axis of the tube as well as in a circumferential direction.

Further and more detailed objects and advantages will appear from the following specification, claims and drawing in which

Fig. 1 shows a portion of my tubing with parts cut away to show the sectional configuration.

Fig. 2 shows a modified arrangement embodying the features of my invention with parts shown in section; and

Fig. 3 shows a method of applying the sealing material.

Referring now more particularly to the drawing, the tube may be formed from a strip by the same method and apparatus as shown and described in the Patent No. 1,198,392 to Brinkman September 12, 1916. This tubing as formed according to this patent referred to, is fluid tight and an effective carrier of fluid for a great many purposes. However, where the tubing is subjected to rough usage or high pressures various arrangements for reenforcing have been successfully applied to this type of tubing. In some cases coverings designed to prevent elongation and expansion of the joint beyond the normal condition have been applied.

According to the method and means for reenforcement and leak preventing about to be described, it is unnecessary to apply any special auxiliary means to the tubing during its manufacture but the special means for reenforcing and strain resistance may be applied after the tube has been mechanically completed so that the tubing may be manufactured in the standard form and retained in stock until such time as it is desired to be utilized. Then, according to the use to which the tube is intended to be subjected, the reenforcement may be applied as desired. The particular type of tubing, and to which the reenforcing has been applied, is shown in Fig. 1 wherein the tubing 1 is constructed with the seam or joint 2 shown at the edges of the convolutions of the strips from which the tube is constructed. The flexibility of this tubing is permitted by the relative movement of the corrugation sides 3 toward and away from each other.

During flexing action stress is applied to the seams 2 tending to cause them to open up, particularly if great flexure is applied to the tube within a restricted length. Also, if rotation is imparted to one end of the tubing and the other held stationary, so as to cause a winding up action or an uncoiling of the convolutions of the strip, then there is a tendency to some slippage in the joint or seam 2 so that loosening of the joint whereby leakage and deterioration of the joint and final destruction of the usefulness of the tube, is liable to occur.

According to the present invention, in order to prevent any movement in the joints from any cause which would occur during the ordinary use of the tubing, these joints are reenforced by an adherent metallic coating 4 applied to the exterior of the tube and covering and entering within the joints. If desired, not only the joint, but the entire exterior of (or any part of) the tubing may be completely coated with the covering, such complete coating being shown in Fig. 1. This is particularly adapted for use with tubings which are subjected to corrosion or wearing action, in which case the coating may be composed of material which is resistant to the particular type of corrosion or wearing action encountered. The coating may be composed of solder, lead, brazing material, zinc or other metallic elements.

If it is found desirable to coat only a portion of the tubing, which must be sufficient to cover the joint or seam, a construction as shown in Fig. 2 can be utilized, in which the seam 2, which is at the crest of the corrugation, is covered with a coating 6 which adheres thereto both on the outside and will also permeate to some extent within the joint itself, sealing it and preventing any movement whatsoever therein.

The method of applying this coating is more clearly indicated in Fig. 3 in which a container 8 is adapted for holding the fluid coating material 10 so that it may be maintained in a fluid condition and arranged in a location so that the tubing 1 may be introduced therein. This tubing may be bent downwardly until it comes into contact with the adherent metal bath up to the point at which it is desired to coat the tube. As shown, it comes only up to, or slightly beyond the joint. However it may be immersed deep enough to cover the entire surface. While thus immersed it is given a rotary motion so as to coat the entire circumference. It may also be given a progressive, longitudinal movement so that a complete length of tubing may be properly coated by the adherent metallic coating.

The tube having been coated from the bath of material 10, which may, for instance, be molten solder or lead, as described, the hardening of that coating on cooling will secure the joint parts firmly together so that loosening of the joint is prevented as well as protection against wear and corrosion being provided.

It is thus apparent that a reenforced metallic tubing and a method of reenforcing it has been described, which is effective for both preventing leakages in the joint and as well to reenforce the tubing structure in such a way as to prevent leakages and undue strains from being set up in the material from which the tube is constructed.

It is not intended to be limited to the exact structure set forth but variations and modifications could well be included without departing from the original scope and spiriting of the disclosure herein. I desire to be limited only as indicated in the following claims.

What I claim is:

1. A flexible corrugated tube comprising a helically disposed strip having the edges of adjacent convolutions interfolded to form a helical seam at the outermost side of the corrugation, the said seam being fixed and the tube depending for flexibility on bending of the material in the corrugation, the said seam being coated with a metal layer which adheres to the seamed parts tightening the seam and holding the parts against displacement.

2. A flexible corrugated tube comprising a helically disposed resilient metal strip having a longitudinal groove forming the corrugation in the completed tube, said strip having the edges of adjacent convolutions interfolded to form a helical seam at the outermost side or crest of the corrugation, the said seam being rigid and the tube depending for flexibility on bending of the metal in the walls of the corrugation and said seam being coated with a layer of metal which adheres to the seamed parts, tightening the seam and holding the parts against displacement.

3. A flexible corrugated tube comprising a helically disposed resilient metal strip having a longitudinal groove forming the corrugation in the completed tube, said strip having the edges of adjacent convolutions interfolded to form a helical seam, said seam being rigid and the tube depending for flexibility on bending of the metal in the walls of the corrugation and said seam being coated with a layer of metal which adheres to the seamed parts, tightening the seam and holding the parts against displacement.

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