

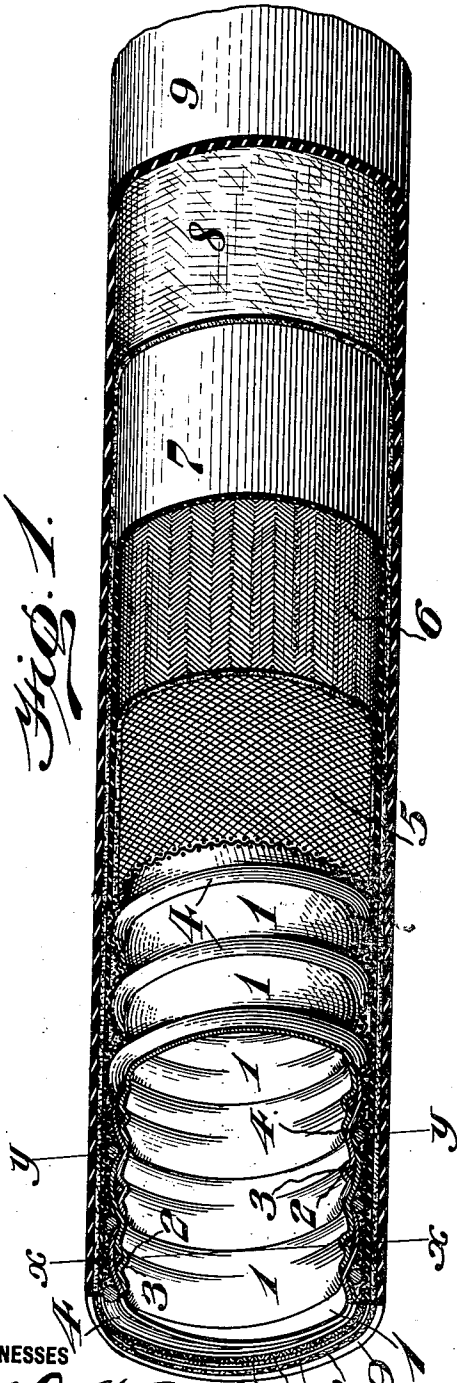
J. J. MULCONROY & E. S. MORRIS.

FLEXIBLE TUBE.

APPLICATION FILED FEB. 2, 1910.

992,516.

Patented May 16, 1911.



WITNESSES

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FLEXIBLE TUBE.

992,516.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed February 2, 1910. Serial No. 541,641.

To all whom it may concern:

Be it known that we, JAMES J. MULCONROY and EDWIN S. MORRIS, citizens of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Flexible Tube, of which the following is a specification.

Our invention relates to a new and useful flexible tube formed of a strip of suitable metal shaped to provide substantially a ball bearing friction surface between the spirals whereby no angles or interlocking parts engage each other which would thus tend to make the tube stiff or unwieldy.

It further consists in providing a packing placed in a suitable channel between the overlapping spirals whereby a liquid tight joint is obtained.

It further consists in providing a suitable spiral wire around the tube and thus strengthening it.

It further consists of other novel features of construction all as will be hereinafter more fully set forth.

The object of our invention is to provide an all metal, or rubber and metal tube that is more flexible than anything heretofore provided, and is constructed in such a manner as to be liquid, air, gas or steam tight under all pressure and under all conditions of usage, the construction of the flexible tube being such that it will not be affected by acid, gas, oil or other liquids, nor will extreme heat cause it to deteriorate.

In the accompanying drawing, we have shown a construction which we have found in practice operates successfully, but it will be evident that the arrangement of the parts may be varied and other instrumentalities may be employed which will come within the scope of our invention, and we do not therefore desire to be limited to the exact form shown and described, but desire to make such changes as may be necessary.

Figure 1 represents a partial sectional view, with certain of the coverings broken away, of a metallic tube embodying our invention. Fig. 2 represents a section on line $x-x$ Fig. 1. Fig. 3 represents a section on line $y-y$ Fig. 1. Fig. 4 represents a section in detached position of the metal strip spiraled.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates

a strip of metal, channeled longitudinally and having a cross section substantially of a double curved form exteriorly convex, with a channel or groove 2 formed in one of the curves, and by reason of the construction of the strip when spiraled by suitable mechanism, the grooved curved shaped half of one portion is forced inside the curved shaped half of an adjacent portion under great pressure, so that the inside of the outer curved shaped half will fit tightly over the grooved curved shaped half.

3 designates a packing, preferably an asbestos string, which is seated in the channel 2 in the curved shaped half, whereby the two parts are suitably packed and produce a liquid, steam, or gas tight contact between the spirals, and does not interfere with the flexibility, it being noticed that by reason of the two curved shaped halves of the spirals that the two parts have substantially ball bearing movement between the same which results in extreme flexibility.

4 designates a wire preferably a heavy steel spring tempered wire which surrounds the spirals and prevents the tube from collapsing should a heavy weight fall or rest on it, or should the wheels of a wagon etc. pass over it.

5 designates one or more coverings which may be braided or woven and which may be wire or fabric, although we preferably use wire. This covering tends to produce a uniform flexibility and prevents the spirals from parting when subjected to extreme internal or elongated strains.

6 designates a fabric covering preferably of asbestos, which is used in connection with a rubber cover, and prevents the rubber from being charred or overcured or vulcanized because of the heat in the tube, when the tube is used to convey high steam pressure.

We preferably desire to use a rubber tube vulcanized to the fabric covering 6. Outside the rubber tube 7, we place a ply of fabric 8, while around this fabric we place a rubber covering 9, to protect the fabric.

We are aware that heretofore tubes have been constructed of spirally wound interlocking strips of metal having packing between the spirals, but we have found that such tubes were made with interlocking flanges or angles on the strip of metal, and that the same have a tendency to make the tubes rigid, and also to cause the packing to

