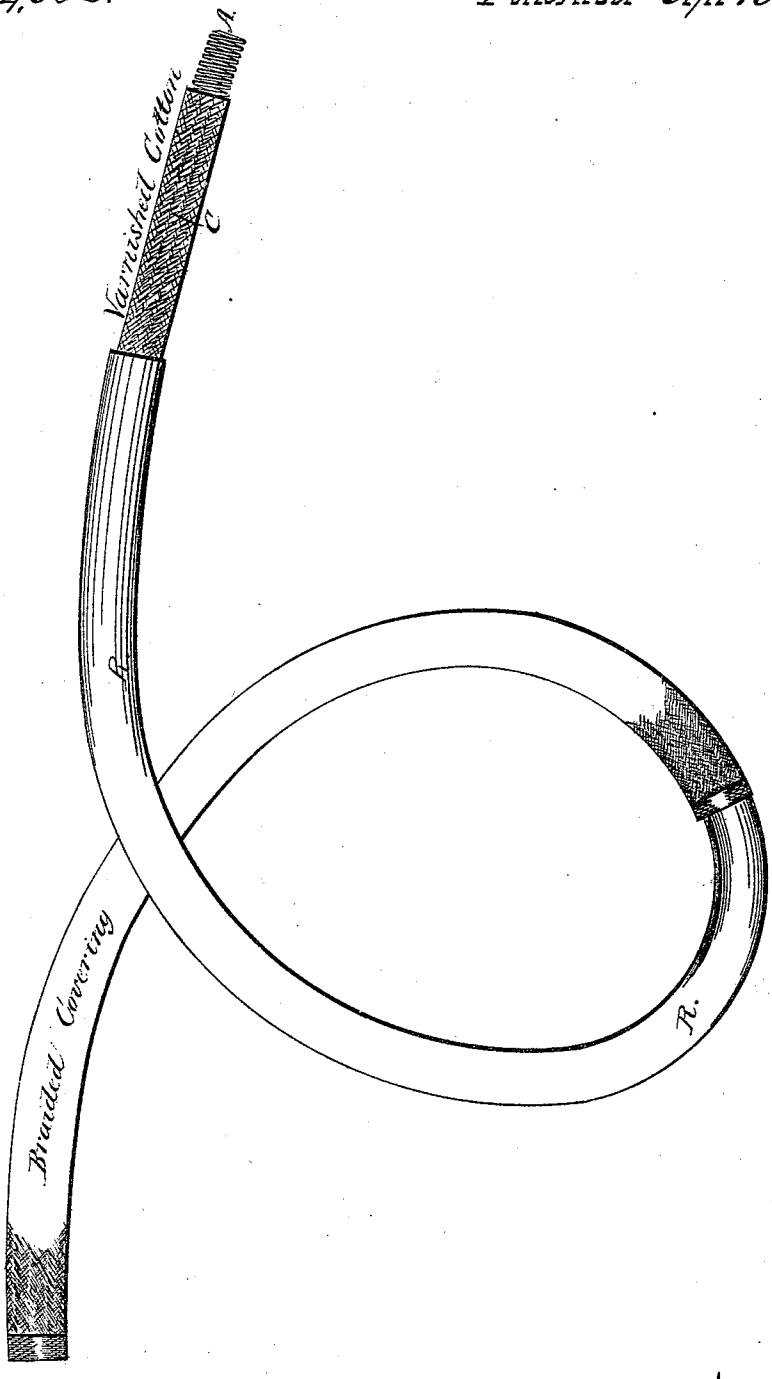
# T. L. Reed,

## Flexible Tubing,

No. 64,362. Patented Apr. 30, 1867.




Witnesses:

Isaac A Brunnell

D. W. Cox Jr.

Inventor:

Thomas L. Reed

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# United States Patent Office.

THOMAS L. REED, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO ATLANTIC TUBING COMPANY, OF SAME PLACE.

*Letters Patent No.* 64,362, *dated April* 30, 1867.

## IMPROVED FLEXIBLE TUBING OR HOSE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, THOMAS L. REED, of the city and county of Providence, and State of Rhode Island, have invented a new and useful improvement in Flexible Tubing or Hose, such as is used for the conveyance of illuminating gas; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a piece of my improved tubing, from a portion of which the several layers or courses of the material are removed to exhibit the construction of the same.

My said invention consists in combining a non-collapsable tube of braided cotton, or similar material, with an India-rubber sheath or tube by means of a chemical composition of such a nature that the two tubes will be completely united as one tube, and so that the India rubber will be protected from the dissolving action of the deposits of the gas in its passage through it, and the tubing be rendered gas-tight in consequence.

The non-collapsable tube above mentioned consists of a spiral-wire coil, A, such as is usually employed in flexible tubing, and a single layer or sheath of cotton, C, braided thereon by means of a braiding machine in the manner ordinarily practised and well known, the wire coil forming a foundation or framework, which shapes the tube, and prevents it from collapsing by bending or other cause under the general circumstances incident to its use for the purpose it is intended. A number of these tubes, say twelve or fifteen, are stretched parallel to each other in a frame, from two to three inches apart, the tubes being of lengths convenient for use, say from six to twelve feet long; and while thus held the cotton braid is stuffed and coated with the following chemical composition: Linseed oil, twelve gallons; sulphate of zinc, six ounces; sugar of lead, six ounces. Boil together in a copper vessel steadily for two or three days, the longer time the better, until the composition is of about the consistency of tar, when add of camphene sixteen gallons, to reduce it to the proper consistency to be easily applied, the composition being of the nature of a transparent varnish. This varnish is applied to the cotton braid, and allowed to harden, when another coating of it is applied, and allowed to dry in turn, and the application repeated until the cotton has received from eight (8) to twelve (12) successive coatings, which renders the tube thus formed impervious to illuminating gas. But from the nature of the fabric to which the varnish is applied, it being composed of a number of threads or yarns plaited together, the continual bending and coiling of the tube and exposure to the air will cause the tube to become dry and hard, and, on being bent, the threads or yarns will separate one from another, and form cracks in the varnish at the interstices of the plaited strands, through which the gas will escape in such quantities over the affected surface as to render the tube obnoxious to the smell, and worthless for the purpose intended. But by combining with the said tube an overlaying sheath or tube of India rubber, in the manner hereafter specified, the fabric of the first tube will be protected and preserved in its original impervious condition under the severest usage to which it is likely to be subjected, while, at the same time, the India rubber will be protected from contact with the gas deposits, and its own impervious nature be preserved intact, and made to contribute to the one grand result which is sought in the manufacture of this article. The said India-rubber sheath R is combined with the varnish tube by first coating the surface of the said tube with India-rubber cement, so called, consisting of India rubber dissolved in naphtha; and having prepared a strip of the vulcanizable compound of India rubber (caoutchouc) of the requisite length, and of a width that will wrap in two folds or layers around the tube, I insert a metallic rod in the bore of the tube, and, by rolling the tube evenly from end to end over the said strip of "compound," roll it upon the tube, to which it will firmly adhere and to itself, and thus be rolled up into one homogeneous mass, without any seam or joint. I then wrap the tube tightly in one or two, or more, folds of wet muslin or cotton cloth, and place the tube and rod in a tight chest, to which a pressure of steam is admitted, which will afford a regular temperature of from two hundred and forty to two hundred and sixty degrees of heat, by means of which the India-rubber compound of the sheath will be vulcanized, (as it is termed;) and such is the nature of the varnish that, by the action of the moist heat derived from the steam, the fabric of the inner tube becomes incorporated with the material of the outer sheath or tube, so as to be difficult of separation therefrom, which has the effect to prevent the plaited threads of the inner fabric from separating from each other, and from affording a means for the gas to escape, in the manner above explained. The peculiar heat derived from steam is, it should be understood,

highly essential, if not indispensable, to the above result, as the dry heat arising from a more immediate contact with fire would be likely to inflame or char the varnished cotton and destroy it. I have mentioned above that the braid work is of cotton, merely because, as a material, it is most generally used for such braiding, and not because it is exclusively essential to the result, or that I intend to be confined to the use of that fibre alone. So also with regard to India rubber for the material of the external sheath; I do not wish to be understood as confining myself to this material to the exclusion of other similar vulcanizable gums or substances which, in the same manner, and without further invention, will afford the requisite protection, and supply an additional imperviousness, substantially as above described.

What I claim, and desire to secure by Letters Patent, is—

The flexible, impervious tubing formed by combining the non-collapsable tube with a sheath or tube of India rubber or other vulcanizable gums or compounds, by the means and substantially as described, for the purpose specified.

In witness whereof I have hereunto set my hand this twentieth day of November, A. D. 1866.

THOMAS L. REED.

Witnesses:

ISAAC A. BROWNELL,

D. K. HOXSIE.