

*T. L. Reed,*

*Hose.*

*No. 103369.*

*Patented May 24. 1870.*

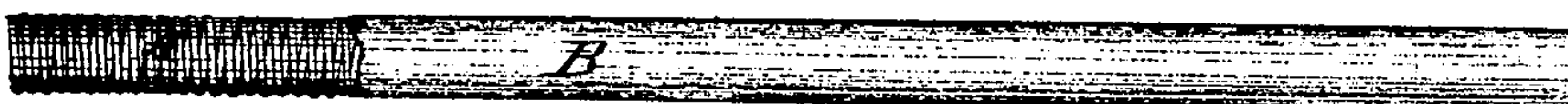
*Fig 1.*



*Fig 2.*



*Fig 3.*



*Fig 4.*



*Witnesses.*

*Isaac A. Bunnell.*  
*A. L. Bradley*

*Inventor.*

*Thomas L. Reed*

# UNITED STATES PATENT OFFICE.

THOMAS L. REED, OF PROVIDENCE, RHODE ISLAND.

## IMPROVEMENT IN FLEXIBLE TUBING OR HOSE.

Specification forming part of Letters Patent No. 103,369, dated May 21, 1870.

*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 conducting illuminating-gas; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view of a piece of spiral wire coil, such as is used to prevent flexible tubing from collapsing. Fig. 2 represents a piece of such coil with the spaces between the convolutions filled with flexible cement, which forms part of my said improvement, as a foundation for flexible tubing. Fig. 3 represents a piece of such foundation covered with preserved animal-intestines. Fig. 4 represents a piece of flexible tubing composed of the said foundation, the covering of animal membrane, a coating of braid, and a covering over that of india-rubber, (vulcanized caoutchouc.)

Similar letters indicate corresponding parts in all the figures.

The first part of my invention consists in forming a foundation for flexible tubing of a spiral wire coil with the spaces between the convolutions of the wire filled, and the wire itself coated with an elastic varnish or cement that will produce a smooth gasway through the coil, and protect the wire and the coverings outside of the same from the action of the gas or its deposits, or from any external application.

The second part of my invention consists of a flexible tubing composed of the combination of the said wire and cement foundation, and a covering of animal-intestines, or of braid, or cloth, or india-rubber, or all combined. The wire-coil is coated and its convolutions filled by dipping or drawing it through a quantity of the cement while in a limpid state, and afterward suspending the coil to allow the excess of material to run off and that which is retained to dry and harden. The material or varnish or cement which I prefer to use for this purpose is that mentioned in the specification attached to Letters Patent No. 64,362, granted to me April 30, 1867; but I wish it understood that other varnishes and cements may be employed, and

asimilar effect produced. This filling and coating of the wire-coil, it will be understood, converts the porous wire frame into an air-tight tube. It destroys the corrugated effect of the bare wire by filling up the spaces between the convolutions, and by so doing a smooth interior surface is formed, through which the gas will more freely pass when in use as a conductor, and from which the gas will readily escape when the tube is disconnected and not in use, and the unpleasant smell of retained gas will be avoided, it being well understood by those who are familiar with the use of flexible tubing that the convolutions of the wire-coil and the loose fibers of the braided or other similar covering serve to retain a quantity of gas within the tube, even after it has been for some time disconnected and left open, the effect of which is to saturate the tube with the disagreeable smell of gas, so that after a time even a tube which is practically gas-tight becomes as offensive and objectionable as one which is in reality pervious and leaky. The importance and value of the said improvement as a foundation for flexible tubing is obvious when it is considered that it is applicable to all varieties, of whatever material the outside or body is composed, and whether used for conducting air, gas, or sound. A tube of unusual flexibility can be produced upon this foundation by drawing thereon one or more lubricated animal-intestines, the air being thus excluded from the cement of the foundation, and the suppleness of the intestines being constantly preserved, the tube thus formed is to all appearances as flexible as the bare wire coil; or this cemented wire foundation may be covered with an ordinary india-rubber tube, which will, beside the advantages above enumerated, prevent the gas from coming in contact with and penetrating the india-rubber, thus making a non-collapsible and impervious india-rubber tube.

I purpose, also, to make a flexible tubing composed of the cemented wire foundation, covered with one or more—say three or four—animal-intestines, and the whole covered with a braid of cotton or other suitable fibrous material, as shown in Fig. 4, A being the cement wire foundation, B the intestines, and C the fibrous braid; and this braid may simply serve as a covering, or it may be at once the cov-



ering and outside finish. In either case I would have the outer surface of the intestine, if possible, free from any lubricating material, so that it will not be absorbed by the fibrous material to the detriment of the under layers of intestines. This can be accomplished by drawing on the last intestine without being lubricated further than what may be taken from that underneath, so that the cotton or other fibrous braid will be laid upon a dry layer of intestine, and cannot therefore obstruct the moisture from those underneath next to the foundation.

I propose, also, to make the flexible tubing composed of the cement wire foundation A, Fig. 4, an over-covering of animal-intestines B, a covering of fibrous braid, C, and draw over this an india-rubber tube, D, coating the braid with a lubricating compound of paste and glycerine or other similar material to cause the rubber tube to slip easily over the braid.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The cement wire foundation A, substantially as described, for use in flexible tubing or hose.

2. The combination of the said cement wire foundation A, as described, with one or more animal-intestines B, substantially as described, to form a flexible gas-tight tube.

3. The combination of the cement wire foundation with an india-rubber covering or tube, substantially as described.

4. The combination of the cement wire foundation A, the layer or layers of animal-intestines B, and a braided covering, C, of fibrous material, as described.

5. The combination of the cement wire foundation A, the layer or layers of animal-intestines B, the covering of fibrous material C, and an india-rubber tube or sheath, D, substantially as described, to form a flexible gas-tight tubing.

In testimony whereof I have hereunto subscribed my name this 15th day of April, A. D. 1870.

THOMAS L. REED.

Witnesses:

ISAAC A. BROWNELL,  
A. L. BRADLEY.