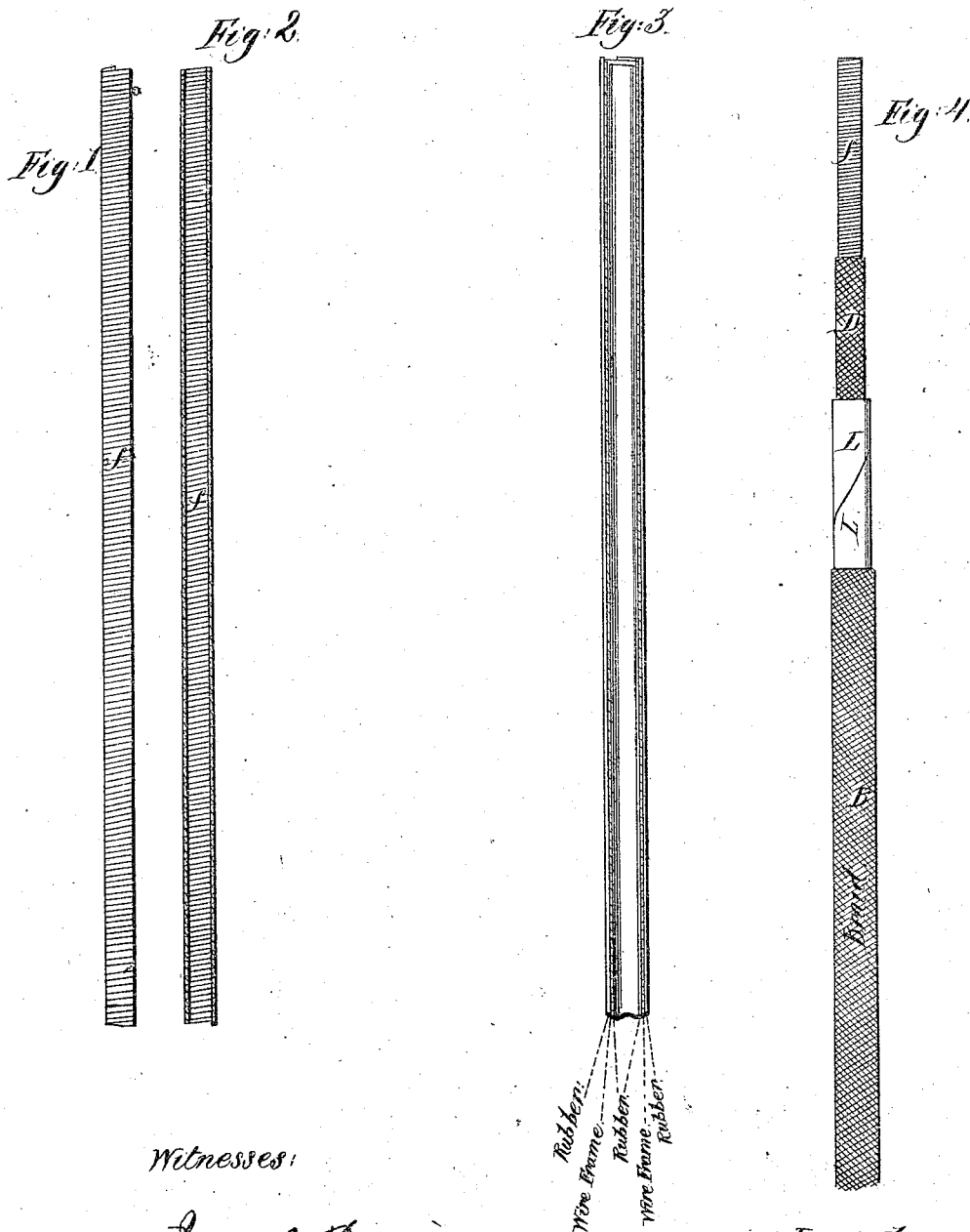


E. P. GLEASON.  
FLEXIBLE TUBING.

No. 46,558.

Patented Feb. 28, 1865.



Witnesses:

Lucas A. Burwell  
Reuben L. Pierce

Inventor:

Elliott P. Gleason

# UNITED STATES PATENT OFFICE.

ELLIOTT P. GLEASON, OF NEW YORK, N. Y.

## FLEXIBLE TUBING.

Specification of Letters Patent No. 46,558, dated February 28, 1865.

*To all whom it may concern:*

Be it known that I, ELLIOTT P. GLEASON, of the city of New York, in the county and State of New York, have invented a new and Improved Flexible Tubing for Conveying Illuminating Gas and for other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1, represents the improved spiral wire frame work of my flexible tubing. Fig. 2, is a vertical section of the same. Fig. 3, is a vertical section of my improved tubing in which both the internal and external surfaces of the wire frame work are covered. Fig. 4, represents a piece of my improved tubing in which only the external surface of the spiral frame work is covered.

Similar letters of reference indicate corresponding parts in all the figures.

My invention consists, first, in forming the spiral wire frame work or foundation of flexible tubing, of flattened wire or its equivalent; secondly, of an article of flexible tubing composed of a spiral frame work of flattened wire or its equivalent and an impervious external covering or both an internal and external covering substantially as hereinafter specified.

The said wire frame work (Figs. 1 and 2) is formed by first passing metal wire between drawing rolls to flatten it to the proper degree and afterward winding it upon an arbor of a suitable diameter to give the desired bore to the tubing. The advantages resulting from the use of flat wire for this purpose are numerous, among others: it lays more evenly in winding, forming a complete tube of itself, with a smooth and even surface which is better adapted to receive a braided external covering, than a frame work of round wire. Again, the flat wire frame work occupies less space diametrically, and in thickness than the round wire frame work, and the covering is not as much affected by bending when flat wire is used, and is therefore less liable to crack and become leaky.

The spiral frame work formed of flattened wire is so thin, that it will admit of a thin interior and exterior covering which considering the closeness and evenness with which the flat wire may be wound forms a light impervious and durable tubing when

formed as hereinafter specified, while the same coverings upon a round wire frame work would greatly increase the exterior diameter of the tubing, or diminish the interior diameter or bore of the same. And when an interior covering is dispensed with, the flatness of the interior surface of the spiral frame work together with its smoothness, and compactness renders it far superior to the round wire for this purpose.

The tubing composed of the flat wire frame work with an internal and external covering is fully shown by transverse section in Fig. 3. This description of tubing may be made by wrapping one or more thicknesses of the vulcanizable compound of caoutchouc, or like material upon a metal rod of the diameter required for the bore of the tubing, (the said rod being rubbed with soap or some material that will prevent the compound from adhering to it) and then winding thereon the flat wire, or drawing the wire frame work (which has been wound separately) over the compound on the rod, after which the external surface of the wire is wrapped with one or more thicknesses of the sheet vulcanizable compound of caoutchouc, which is rolled to an even surface and a cylindrical form between two smooth flat surfaces. The tube thus formed is then subjected to the well known vulcanizing process, or any other by which the compound will be sufficiently cured or treated to render it elastic, and make it adhere to the interior and exterior surfaces of the metal frame work, after which operation the metal rod is withdrawn and the tubing is ready for use.

The flat wire frame work may be covered with other material besides caoutchouc compound, as for instance braid work or a woven fabric which is made to adhere to the metal surface, by saturating the fibrous material with rubber cement (so called) or with boiled linseed oil, or varnisher, in which case the wire should be wound with some space between the convolutions of the wire in order that the material with which the covering is saturated may penetrate and pass between the convolutions of the frame work and connect the internal and external coverings through and through the same and hold them firmly to the frame work when the saturating material becomes dry, or is properly cured.

The tubing compound of the flat wire

framework and an external covering is fully shown in Fig. 4. This description of tubing may be made by enveloping the external surface of the wire frame work *f*, with a covering of braid *D*, the frame work being first coated with rubber cement or varnish after which the braid (*D*) is saturated with several coats of boiled linseed oil, or varnish each of which is allowed to dry before another is applied. This saturated braid is then covered with a wrapping of sheep or calf skin *L*, cut into a strip the edges skived to match and cemented so that by winding the strip upon the braid spirally the skived edges will be firmly united and thereby form a close sheath or covering. This leather is then stuffed with neat's-foot oil, tallow or other suitable material, which while it closes the pores of the leather will lubricate its surface slightly and over this lubricated covering I lay another one of braid *B*, and this I saturate and cover with boiled oil, varnish, or other material that will render the braided covering impervious to gas, or water, which completes the tubing, and it is ready for use.

This description of tubing may be formed by a simple wrapping of the vulcanizable compound over the flat wire frame work, but when more than one covering of saturated braid work is used I consider it best to interpose an impervious lubricating covering between the two coverings of braid to render the tubing more supple and less likely to crack by bending.

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

1. The spiral frame work of flat wire, substantially as described for the purpose specified.

2. I claim a flexible tubing composed of a spiral frame work of flat wire or a flat metal strip and an impervious external covering, or both an internal and external covering substantially as described.

3. I claim the lubricating impervious covering of leather, substantially as described.

ELLIOTT P. GLEASON.

Witnesses:

ISAAC A. BROUNELL,  
REUBEN S. PIERCE.