(No Model.)

J. MURPHY.

HOSE.

No. 296,436. Patented Apr. 8, 1884.

Fig. 1.

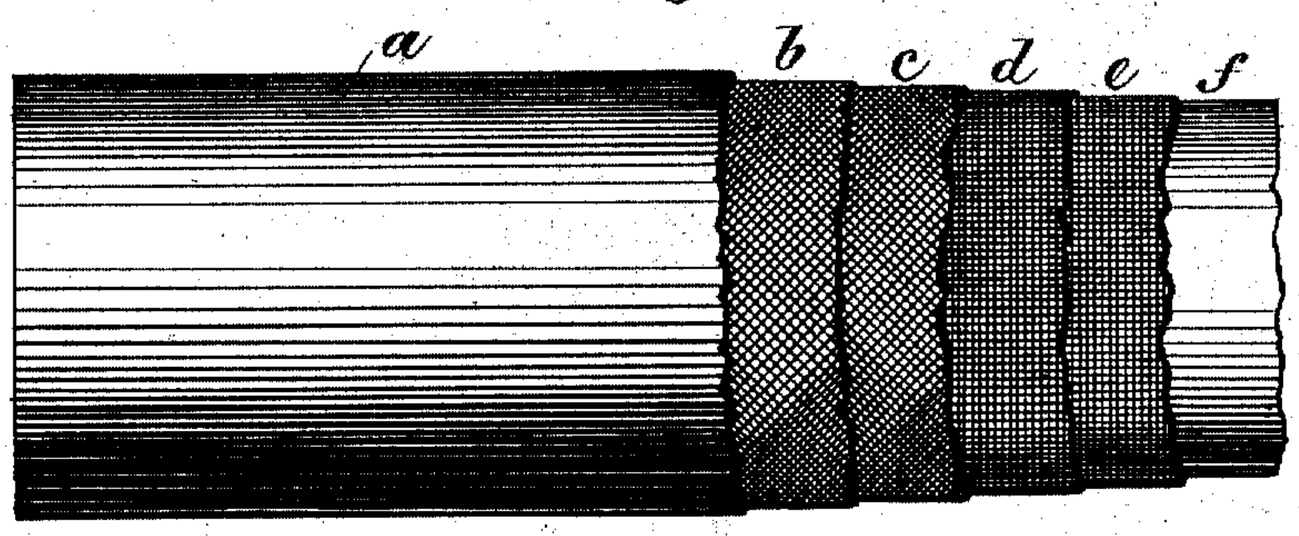


Fig. 2.

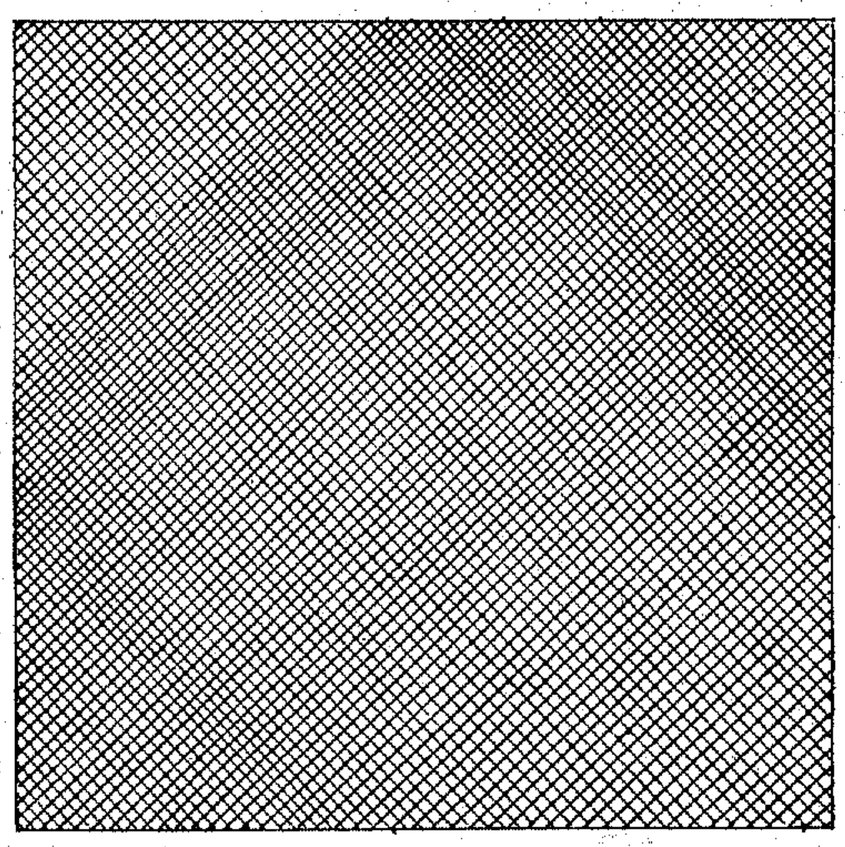
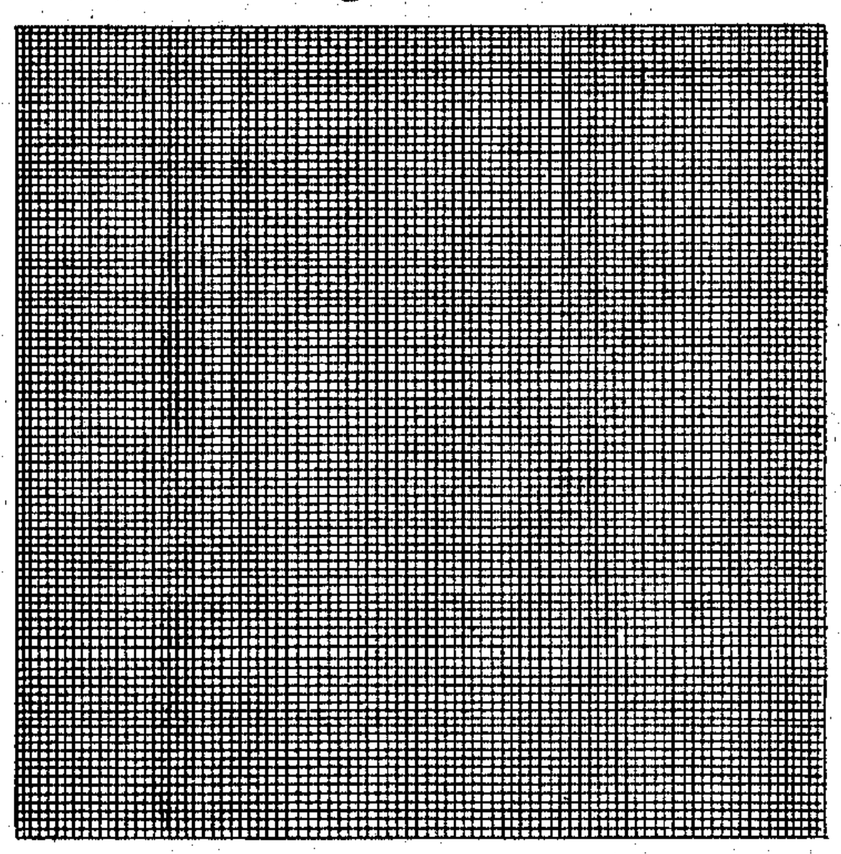


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN MURPHY, OF BROOKLYN, NEW YORK.

HOSE.

SPECIFICATION forming part of Letters Patent No. 296,436, dated April 8, 1884.

Application filed January 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN MURPHY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Hose, of which the following is a specification, reference being had therein to the accompanying drawings.

Heretofore hose generally, and especially fire-hose, has been made up of an interior and exterior layer of rubber, with generally a number of thicknesses of cotton duck interposed between the two layers of rubber, the thickness of duck being cemented to the layers of rubber and to each other by a rubber cement, and the whole being subsequently vulcanized. It has been customary by some manufacturers to cut the duck which is used for this purpose on the bias, and by other manufacturers it has been customary to cut the duck straight and not on the bias; but both of these methods have serious objections in use. When the duck is cut on the bias, the tendency of the hose, when subjected to pressure, is to increase in diameter and decrease in length, because there is no fabric which contains fibers running in such direction as to directly oppose the radial strain due to the pressure. On the other hand, when the duck has been cut straight and not on the bias, the objection has been that where a sudden turn or bend was made in the hose in use the strain brought upon the longitudinal fibers of the duck was so great as to cause them to break and injure the hose.

The object of my invention is to construct a hose which will not be open to either of these objections—that is to say, in use it will neither be caused to expand by pressure from within to any practical extent, and at the same time will not be liable to break when subjected to turns or short bends.

My invention consists in interposing between the two thicknesses of rubber which coat the hose on its interior and exterior two or more thicknesses of cotton duck, one or more of said thicknesses being cut on the bias and placed next or near the the exterior covering of rubber, and one or more of said thicknesses being cut straight and not on the bias, and being placed on the thickness or thicknesses which are cut on the bias. The interior thickness or thicknesses of cotton duck contain fibers which run circumferentially around the hose, and thus present a direct resistance against radial strain from within, while at the same time the duck which is outside of the same and cut on the bias does not present fibers running longitudinally of the hose in such manner as to be liable to break by bending or short turns.

In the drawings, Figure 1 shows a side view of a short piece of my hose, with its various layers of duck and exterior rubber removed sufficiently to show the general construction of each. Fig. 2 shows a piece of the duck cut on the bias, and Fig. 3 a piece cut straight.

At *a* is shown the exterior coating of rubber, of the usual thickness commonly employed heretofore.

At *b* is shown a portion of the first thickness of cotton duck next the exterior coating of rubber. This thickness of cotton duck is cut on the bias, as shown in Fig. 2, so that its fibers run around the hose in a spiral direction, as indicated in Fig. 1.

At *c* is shown the next thickness of cotton duck, and this also is cut on the bias, so that its fibers run around the hose in a spiral direction, as indicated.

At *d* is shown the next thickness of duck toward the center, and this thickness, unlike the two external thicknesses, is not cut on the bias, but is cut straight, as shown in Fig. 3, so that its fibers, instead of running around the hose in a spiral direction, run in planes nearly or quite longitudinal with and at right angles to the axis of the hose.

At *e* is shown the next thickness of duck toward the center, and this, like the thickness *d*, is not cut on the bias, but has its fibers running in planes nearly or quite longitudinal with and at right angles to the axis of the hose.

At *f* is indicated the internal thickness of rubber, which serves as the lining of the hose. These various thicknesses of rubber and canvas are put together in the usual manner (preferably breaking joints) and vulcanized.

I do not limit myself to the exact angle at which the fibers of the external thickness or thicknesses of duck run, the object being to have them at a sufficient angle to prevent any

direct strain being brought upon the fibers by a sudden twist or turn in the hose; nor do I limit myself to having the fibers of the interior thickness of fabric run exactly in the directions indicated, the object being to have them run sufficiently near in that direction to substantially oppose the tendency to radial expansion by the direct or nearly direct strain upon the fibers running around the hose.

I do not limit myself to the number of thicknesses of the textile fabric employed, providing there may be more than one thickness, so that there can be both a thickness of fabric cut on the bias and a thickness not cut on the bias; nor do I limit myself to the proportion which the thicknesses cut on the bias bear to the whole number of thicknesses.

I have indicated in the drawings a hose having four thicknesses of fabric, with the two external thicknesses cut on the bias; but my invention might be usefully applied by cutting the three external thicknesses on the bias, or by cutting only one external thickness on the bias.

I make no claim to the structures shown and described in the Letters Patent No. 184,907, granted to T. L. Reed, November 28, 1876, and No. 164,946, granted to J. M. Stone, June 29, 1875.

I claim—

1. As an article of manufacture, a hose containing an interior and exterior layer of rubber, and interposed between said layers of rubber a textile fabric cut straight, surrounded by a textile fabric cut on the bias, substantially as set forth.

2. In a hose, the combination, with a textile fabric cut straight, of a textile fabric cut on the bias and so arranged that the textile fabric cut on the bias is outside of the textile fabric cut straight, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN MURPHY.

Witnesses:

TERENCE J. MORRIS,

HENRY W. HEWITT.

Correction in Letters Patent No. 296,436.

It is hereby certified that in Letters Patent No. 296,436, granted April 8, 1884, upon the application of John Murphy, of Brooklyn, New York, for an improvement in "Hose," an error appears in the printed specification requiring correction, as follows: In line 51, page 1, the word "on" should read *within;* and that the Letters Patent should be read with this correction therein to make it conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 15th day of April, A. D. 1884.

[SEAL.]

M. L. JOSLYN,
Acting Secretary of the Interior.

Countersigned:

BENJ. BUTTERWORTH,
Commissioner of Patents.