2 Sheets--Sheet 1.

J. VAN D. REED.

Fire-Hose.

No. 161,272. Patented March 23, 1875.

Fig: 1.

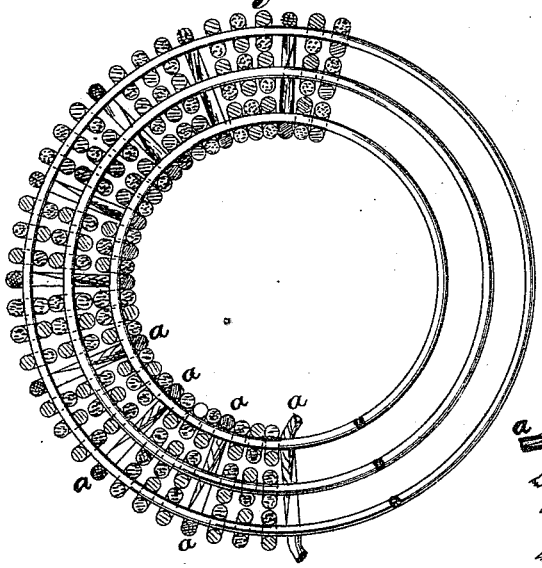


Fig: 2

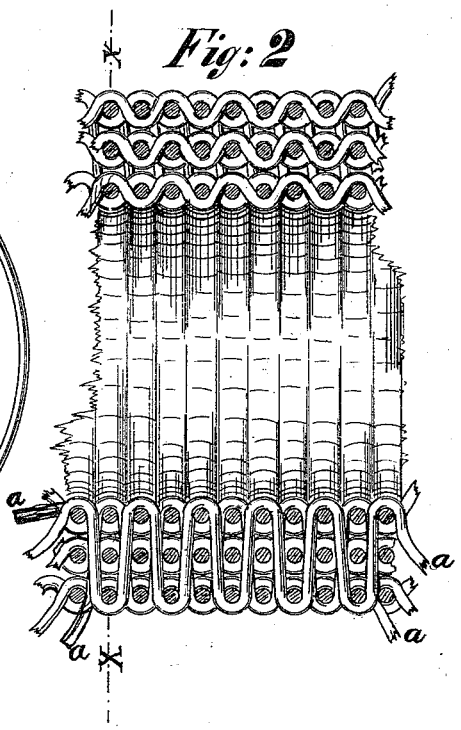
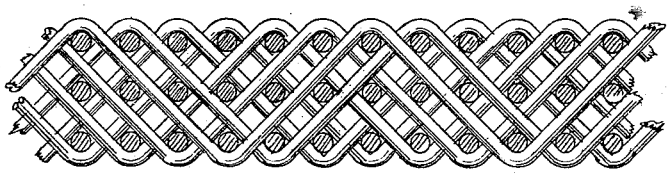


Fig: 3.



Witnesses:

P. S. Clark

F. E. Bond

Inventor.

John van Dusen Reed.

per C. P. Fetch

his Atty.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

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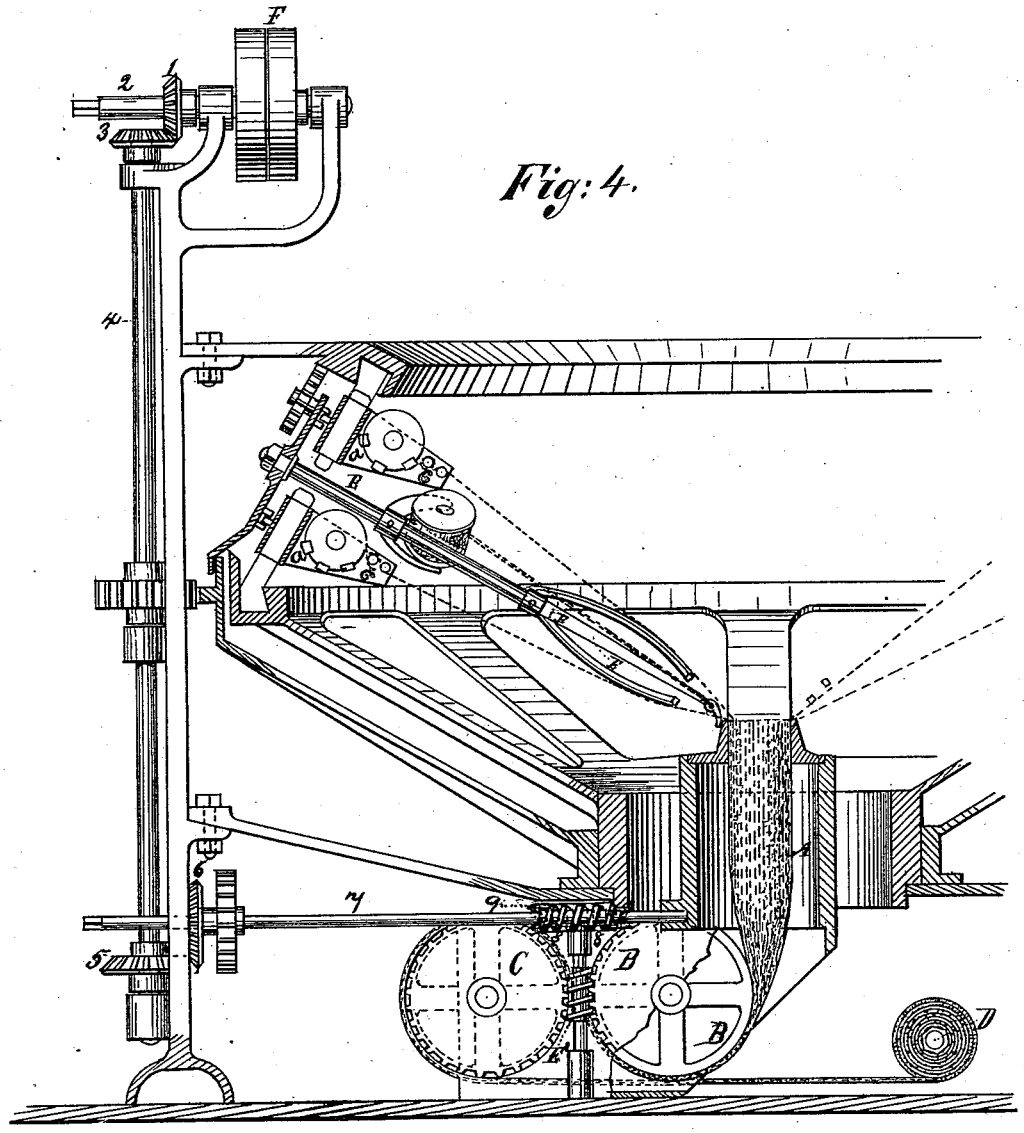
Fig: 4.



Witnesses:
Henry Eichling.
B. S. Clark

Inventor:
John van Dusen Reed
per L. L. Tiet
his Atty.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

JOHN VAN DUSSEN REED, OF NEW YORK, N. Y.

IMPROVEMENT IN FIRE-HOSE.

Specification forming part of Letters Patent No. **161,272**, dated March 23, 1875; application filed March 16, 1875.

To all whom it may concern:

Be it known that I, JOHN VAN DUSSEN REED, of the city of New York, county and State of New York, have invented a new manufacture, consisting of Improved Fire-Hose, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

Figure 1 is a cross-section of my new fire-hose, constituted of more than a single ply. Fig. 2 is a longitudinal section of the same. Fig. 3 is a similar view of one of the practicable modifications of the texture of my hose. Fig. 4 is a sectional view of a loom in which, with certain modifications and additions, herein described, my new hose may be woven.

My invention relates to fire-hose, composed of cotton, linen, or other equivalent fibrous material, woven in a circular form, without a selvage, with the warp-threads of each series uniformly spaced, and with the weft closely packed up, so as to form a hose of uniform solidity in every part.

Single-ply hose, woven entire, has been made both by myself and others, and multi-ply hose has also been so made; but such hose has lacked the essential characteristics of my invention, being fabricated by a method which results in separating, on opposite sides of the tube, two adjacent warp-threads of each ply that may be woven somewhat farther apart from each other than are the intermediate threads from each other, and the sharp bend at these lines of the warp remains permanently in the web, whereby there is formed along the lines of this separation two weak places running the entire length of the hose. When such hose is woven upon a mandrel, as is sometimes done, the warp is evenly spaced, and the hose made of practically uniform strength; but it is impossible to beat up the weft to form a close, compact fabric.

The drawings represent several sections of my three-ply hose, Fig. 1 being a cross-section, and Fig. 2 a longitudinal section. Fig. 3 is also a longitudinal section of a three-ply hose, showing a modification, in which each and all the warp-threads pass back and forth through the entire thickness of the web.

In Fig. 1, the large circles represent the warp-threads of a three-ply hose, and the small circles the ends of the warp-threads. Each warp-thread and its adjacent warp-threads constitute, in fact, a distinct web, and then the said three webs are tied together by certain strands *a* of the warp, (represented by full lines in Fig. 2 and Fig. 3,) which pass through the web from face to face, between and crossing the woof-threads.

The combination of the three webs thus tied together I consider the preferable fabric; but, if preferred, it may have the peculiar structure seen in Fig. 3.

In order that those skilled in the art may be able to fabricate my new hose, whether two, three, or more ply, I will describe a method and a loom by which it may be produced, not limiting myself, however, to any special method or instrumentality, my claim, in this specification, being for the product itself as a new manufacture.

On the 4th day of June, 1872, Letters Patent of the United States were reissued to me for improvement in looms for weaving hats. I have employed said loom, with certain modifications, changes, and additions, in the weaving of my new fire-hose of more than one ply.

The general description of that loom I shall not here repeat, but refer thereto for the same, confining my present description to the changes and additions necessary for the production of my new hose.

In order that these changes and additions may be the more readily understood, I have reproduced here, in Fig. 4 of the drawings, a sectional view of the parts of the said loom by which the warp strands or threads are carried and the woof-thread delivered into the web, and shown therein, the above-named necessary additions and changes.

In this loom the warp-strands are held on spools, carried by jacks arranged around a circle, the strands converging toward the center of the circle, where they pass down through a hollow cylinder, over the upper circular edge of the said cylinder. Just at this edge the woof-strands are woven into the warp by a shuttle, which is carried around the circle, and winds the woof into the web spirally, thus forming a continuous cylindrical tube. The ends of the warp-threads, before the operation of weaving in the woof is commenced, are

gathered together, carried down through the cylinder A, Fig. 4, around under the drum B, over the drum C, and back around a drum or axle, D. By a stress of a weight or spring upon the axle D, the proper tension is given to the warp-threads.

Upon the shafts *c c'* of the drums B C are gears, which are driven by the worm E', to which motion is communicated from the driving-pulley F, through the shaft and gears 1, 2, 3, 4, 5, 6, and 7, and the worm and gear 8 and 9. The warp-carriers or jacks *a* are held between vertical guide plates or partitions, and are caused to move up and down in their places between said guide-plates by the harness to give the requisite motion to the warp-strands in the act of weaving, the shuttle being carried in the end of the arm E, which is attached to the frame carrying the harness, and revolves with it, thus winding the said woof-thread into the web spirally and continuously from end to end of the hose, all of which, so far as relates to the action of the woof-carriers and shuttle, is fully described in the Letters Patent before referred to.

Now, to produce a double-ply web a second shuttle and shuttle-carrying arm are provided, the said arm being attached to the revolving carriage or rings of the loom, the two arms being placed at opposite sides of the loom, each shuttle carrying a separate woof-thread. A certain number of the jacks or warp-carriers are made to carry the threads to form one of the ply, and an equal number to carry those to form the other ply. The warp-threads for each web are thrown by their carriers to form with the woof-thread, delivered from the shuttles respectively, a separate web, and then the two webs are tied together into one by another set of the warp-threads, which cross through both webs, back and forth, around the two woof-threads, the jacks carrying these tying-threads being, by the direction of the guide-rings of the harness, which actuate them, made to thus pass back and forth through the entire thickness of both webs. Usually about every fourth warp-strand is made such tying-strand. A greater or less number may be used at pleasure.

The operation described will produce a fabric the relative position and direction of the several threads of which are represented by the Figs. 1 and 2, the former being a cross-section of the hose, and the latter a longitudinal section. These drawings are made on a greatly-enlarged scale, and the strands or threads are represented as separated widely from each other, in order that their relative position and direction may be plainly seen.

In the actual web the strands are, of course, crowded into close contact with each other. To do this I attach, at essentially right angles to the end of the shuttle-carrying arm, a divider consisting of two arms, *e e*, formed into an oblate frame. The shuttle travels between the arms of the divider, and delivers the weft evenly and closely between the warp-strands, which are forced apart in its passage, and these warp-strands, being closed after the passage of the divider, tie the weft up solidly and firm, and it is further compacted by the next passage of the shuttle and divider.

I do not intend to limit myself to the precise arrangement of the threads here shown. If preferred, that shown in Fig. 3 may be adopted. To accomplish this, it is only necessary to so construct and arrange the harness of the loom as to move the warp-carriers to give the warp-thread the necessary motions, which any mechanic or weaver skilled in the art will know how to do.

To make a three-ply hose (the one represented in the drawings) it is only necessary to add a thread-shuttle and shuttle-carrier, divide the warp-threads into three sets, one for each web, and construct and arrange the harness to throw the carriers of the several sets to weave with the three woof-strands three separate webs, and then to cause the tying-strands to pass through the three webs, and around all the three woof-threads, or to cause all the woof-threads to cross and recross through the web and around all the woof-threads, as seen in Fig. 3.

There are, I believe, novel and patentable devices and combinations above indicated, not found in the loom already secured to me by the Letters Patent referred to, and which are necessary on the loom described for the weaving of more than a single ply, which I do not intend to claim in this specification, intending to reserve the same for a separate application for a patent, which it is my purpose to make.

I here claim as a new manufacture—

Fire-hose woven entire of an originally circular form, constituted of more than a single ply, and having the warp-threads uniformly spaced and the weft compactly packed up, substantially as described.

In witness I have hereunto set my hand.

J. VAN D. REED.

Witnesses:

B. S. CLARK,

FRED. E. BOND.