C. ALVORD.

WOVEN HOSE.

APPLICATION FILED AUG. 30, 1905.

899,092. Patented Sept. 22, 1908.

Fig. 1

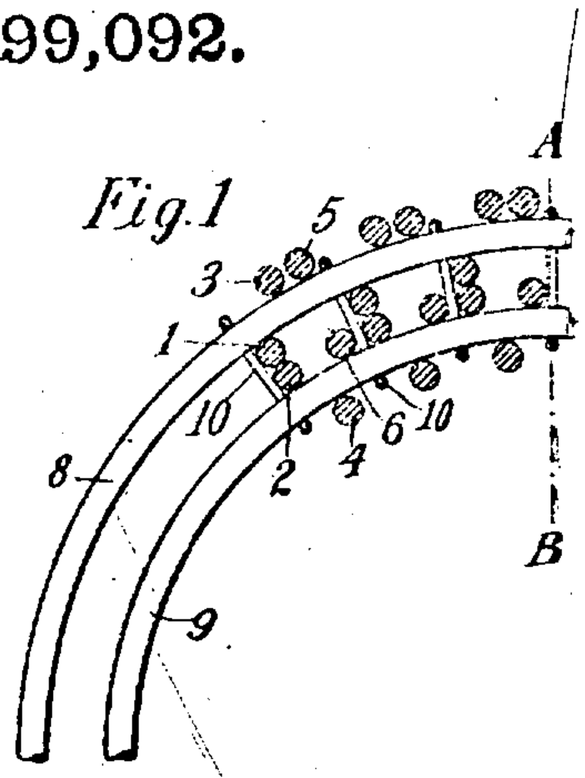


Fig. 2

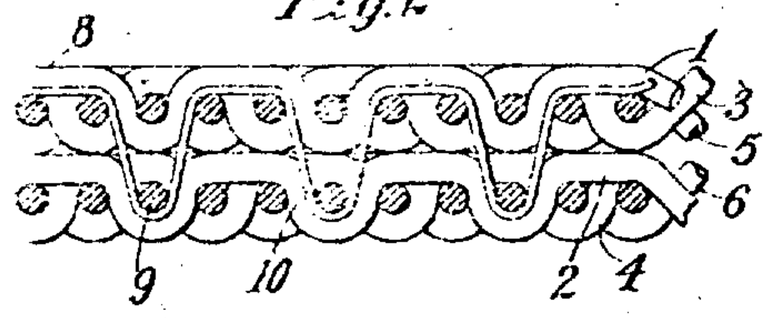


Fig. 3

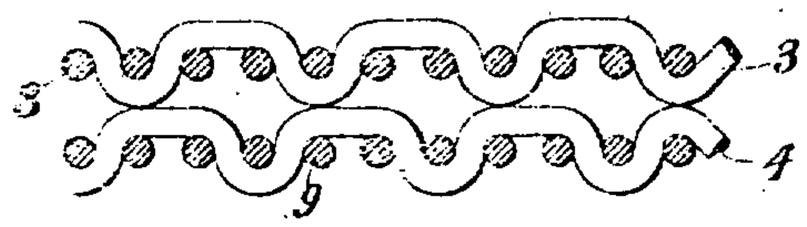


Fig. 7

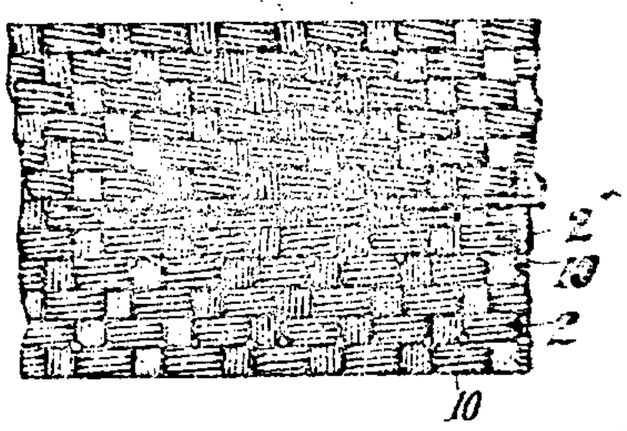


Fig. 4

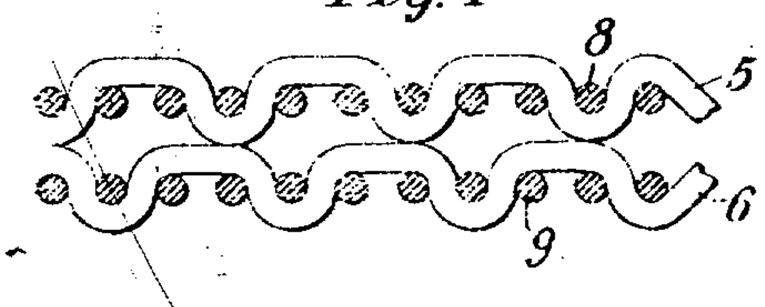


Fig. 8

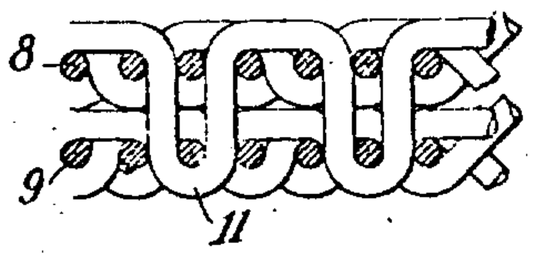


Fig. 5

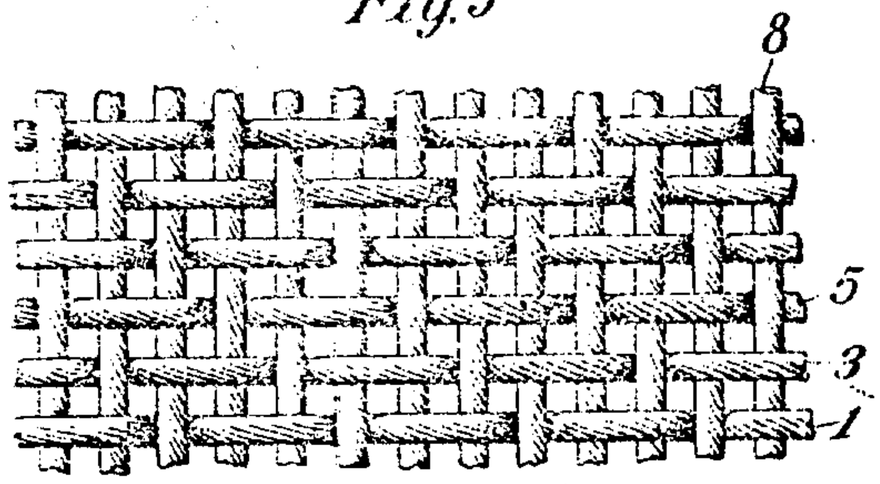


Fig. 9

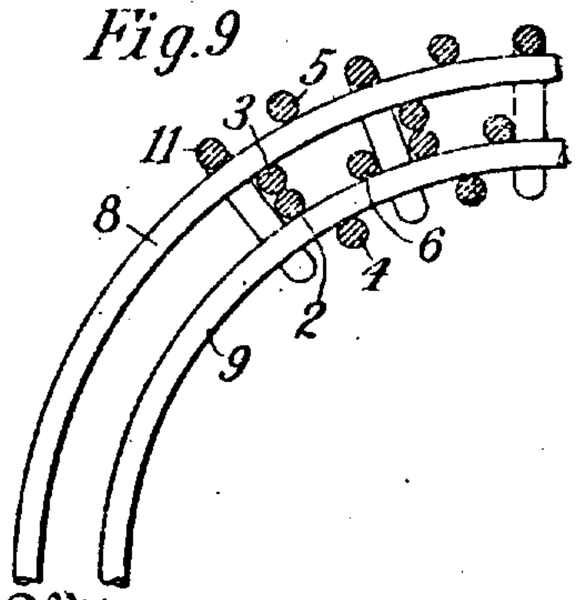
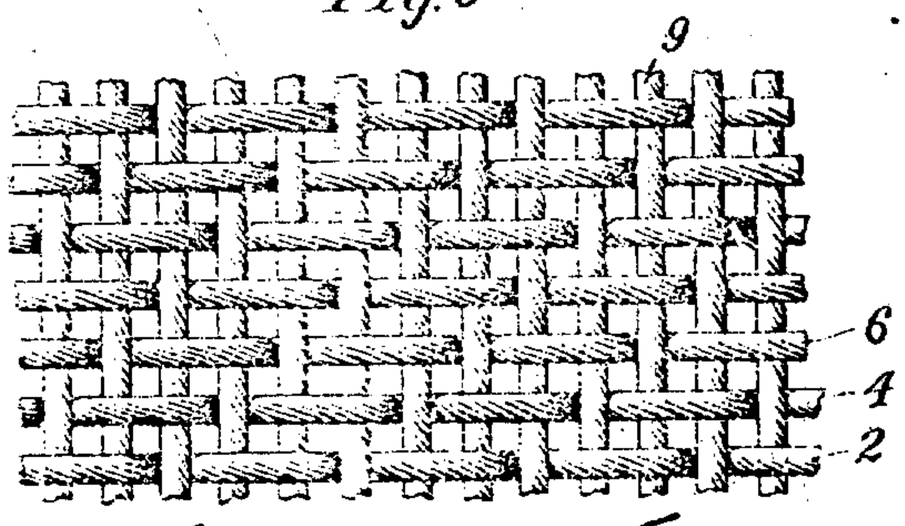


Fig. 6



Witnesses
Paxton Morton
Raphael Netter

Clinton Alvord Inventor.
By his Attorney Ewin Hopkinson

UNITED STATES PATENT OFFICE.

CLINTON ALVORD, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO FABRIC FIRE HOSE COMPANY, A CORPORATION OF NEW YORK.

WOVEN HOSE.

No. 899,092. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed August 30, 1905. Serial No. 276,368.

To all whom it may concern:

Be it known that I, CLINTON ALVORD, a citizen of the United States, and a resident of Worcester, county of Worcester, and State of Massachusetts, have invented new and useful Improvements in Woven Hose, of which the following is a description.

This invention relates to multiple ply woven hose and it has for its object the production of a very strong hose of this type which has the plies solidly woven together and is not liable to twist or squirm under pressure.

In two ply woven hose, as ordinarily constructed, the two plies are entirely distinct from each other, the fabrics being in either plain or twill. These two fabrics are woven independently and the smaller one drawn inside the larger one, thus producing the ordinary "jacket hose" of the trade. In some instances the two plies are woven or stitched together, and in that case the fabrics are of plain weave. Hose made in either of the ways above stated is not entirely satisfactory, as it is liable to twist and squirm under pressure and the two plies are not so united as to act as a unitary structure.

The hose which forms the present invention is free from the defects above mentioned and, described in general terms, it may be said to consist of a plurality of plies which are all woven with a twill, the spirals of the twills in adjacent plies of the fabric running in opposite directions and the several plies being solidly bound together by means of binding threads or warps, which may be special threads provided simply to bind the plies together or portions of the warps of the several plies which are interwoven.

In the drawings forming part of this specification, I have illustrated the invention as embodied in two ply hose, two slightly different embodiments of the invention being illustrated. It is to be understood, however, that the number of plies may be increased, if desired, without departing from the spirit of the invention.

Figure 1 is a partial sectional end view of a piece of hose, showing the two plies bound together by special binding threads or warps, the view being diagrammatic in character to show more clearly the arrangement of the threads or strands. Fig. 2 is a diagrammatic view in longitudinal section on the line A—B of Fig. 1. Figs. 3 and 4 are diagrammatic views showing the mode of weaving the various threads to form a twill. Fig. 5 is a diagrammatic view showing the direction of the twill in the outer ply of the hose. Fig. 6 is a view similar to Fig. 5 but showing the twill of the inner ply. Fig. 7 is a fragmentary view of a piece of hose with a portion of the outer ply of the fabric removed and illustrating the opposite spirals of the twill in the two plies. Fig. 8 is a longitudinal section through a modified form of hose, showing the binding of the plies together by interweaving the warp strands of the plies and dispensing with additional binder warps. Fig. 9 is a diagrammatic transverse sectional view of the fabric shown in Fig. 8.

Referring to the drawings by the reference characters marked thereon, 1, 3, and 5 designate the three warp threads of the outer ply of the hose fabric, these three threads being woven together with a filling 8 to form the outer ply. The warp threads of the inner ply are designated 2, 4, and 6 and are woven together with a filling 9. The two plies of fabric shown in Figs. 1 to 7 inclusive are bound together by means of binder warps 10 which follow the course shown in Fig. 2.

As is plainly shown in the drawings, each ply of the hose is woven with a three harness twill. When the yarn or strand 1 is depressed so the filling strand 8 will pass over it, the yarns or strands 3 and 5 are both up so that the strand 8 lies beneath them. At the next insertion of the filling 8, the yarns 1 and 5 are up, but the yarn 3 is down. At the third insertion of the filling 8, the yarns 1 and 2 are up and the yarn 5 is down. In this way the twilled effect shown in Figs. 5 and 7 is produced.

The inner ply of the hose is woven in similar manner, except that the spiral of the twill extends in the opposite direction. The warp threads are so disposed through the process of weaving that the thread 1 and the thread 2 follow corresponding courses with respect to the filling threads 8 and 9, the thread 1 being directly over the thread 2. The binding warps 10 operate in sequence with the warp threads 1 and 2, as clearly shown in Fig. 2.

In Figs. 8 and 9 the hose fabric is shown with the two plies bound together by means of a warp thread 11 which takes the place of the warp thread 1 and the special binder warp 10. It is, however, considered better

practice to use a separate binding warp for fastening the two plies together than to make use of a single binding warp, as illustrated in Figs. 8 and 9.

As will be readily seen, the hose woven in this manner is very firm and homogeneous in texture and, owing to the opposite directions of the spirals formed by the twills in the adjacent plies, the tendency of one ply to squirm under pressure is counter-balanced by the tendency of the other ply to squirm in the other direction, much objectionable twisting while the hose is under pressure being avoided.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A tubular hose fabric comprising a plurality of twilled plies, the spirals of the twills in adjacent plies extending in opposite directions.

2. A tubular hose fabric comprising a plurality of twilled plies and a series of binder warps by which said plies are united, the spirals of the twills in adjacent plies extending in opposite directions.

3. A tubular hose fabric comprising a plurality of twilled plies woven together into a unitary structure, the filling threads in the several plies being substantially parallel and the twills in the adjacent plies extending in opposite directions.

In testimony whereof, I have affixed my signature in the presence of two witnesses.

CLINTON ALVORD.

Witnesses:

M. LILLIAN DAVIS,

P. W. WOOD, Jr.