(No Model.)

H. D. CHEEVER.

HOSE OR TUBING.

No. 420,863. Patented Feb. 4, 1890.

FIG. I.

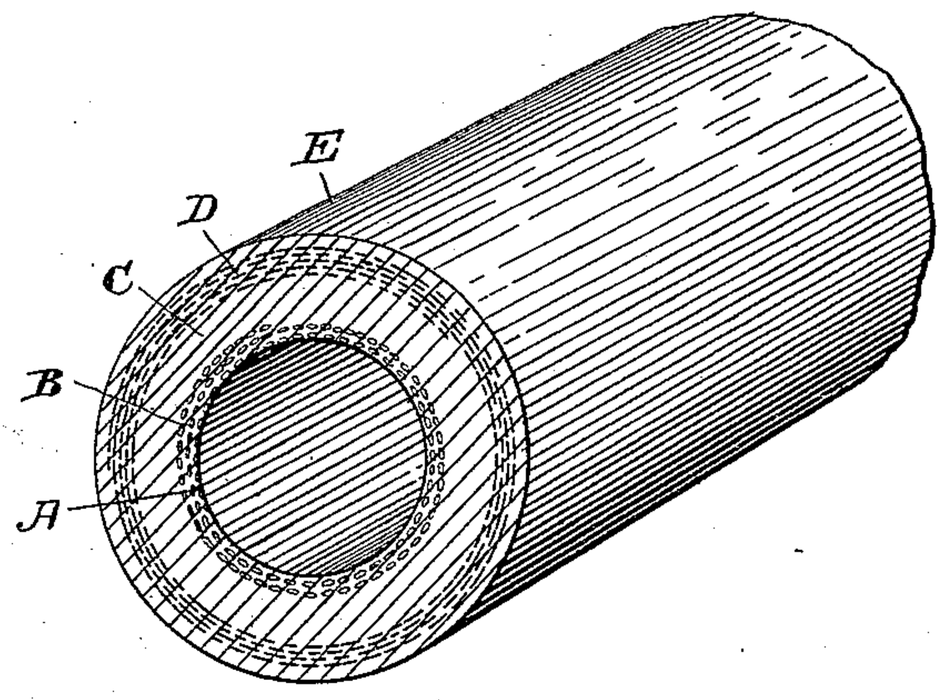
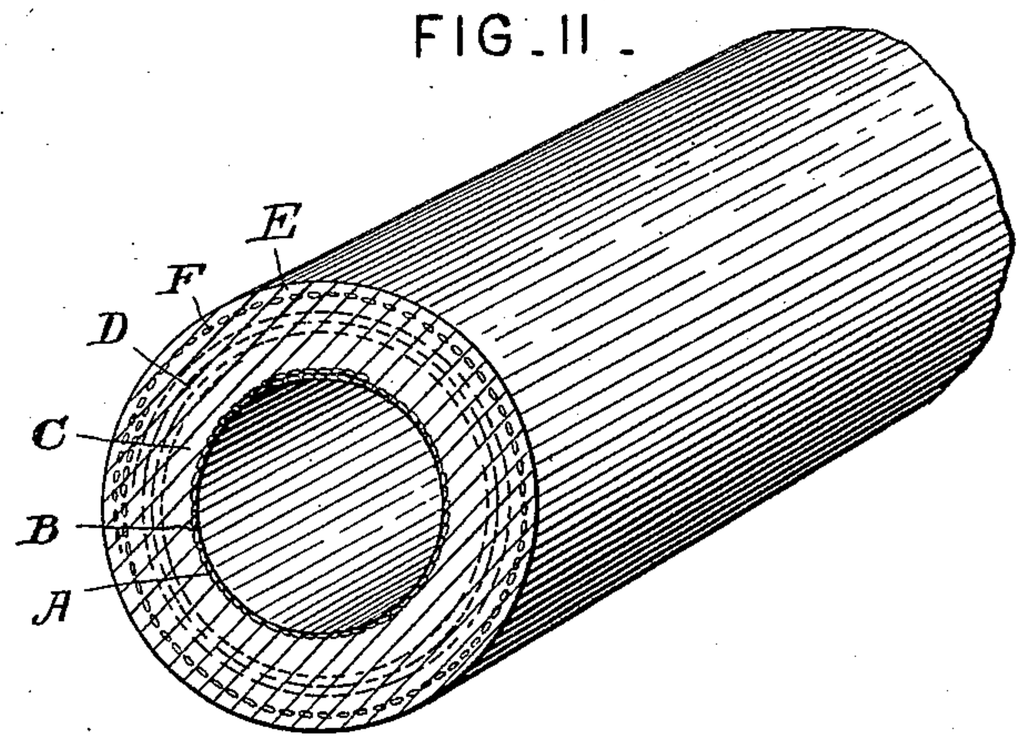


FIG. II.



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UNITED STATES PATENT OFFICE.

HENRY DURANT CHEEVER, OF NEW YORK, N. Y.

HOSE OR TUBING.

SPECIFICATION forming part of Letters Patent No. 420,863, dated February 4, 1890.

Application filed November 27, 1889. Serial No. 331,806. (No model.)

To all whom it may concern:

Be it known that I, HENRY DURANT CHEEVER, of New York city, in the county and State of New York, have invented a new and useful Improvement in India-Rubber Hose or Tubing, which improvement is fully set forth in the following specification.

This invention relates more particularly to the construction of hose or tubing designed to be used for conveying steam, or for acids, caustic alkalies, and other fluids that corrode or otherwise act detrimentally upon most substances employed in the manufacture of hose and tubing as at present conducted; and the object of my invention is to improve the india-rubber hose or tubing both in point of durability and in heat-non-conducting properties.

Tubes or hose for conducting steam are mostly made by forming a tube of vulcanizable compound of india-rubber over a mandrel, tightly or closely winding, so as to exclude all air, a covering of linen or cotton duck having facings or coatings of india-rubber spread over its surface (technically known as "friction-rolled") a number of times corresponding to the desired strength of the tube, covering these windings or "plies" with india-rubber, binding the whole with cloth, submitting the whole to a vulcanizable temperature during a time, according to the composition of the rubber, in properly-constructed chambers, and finally removing the outer binding or cloth and the vulcanized tube or hose from the mandrel.

The details of manipulation during the successive steps are so commonly known by manufacturers that it is not deemed necessary to specify them further here.

In carrying out my improvement I first coat a sheet of asbestus cloth on one side with a vulcanizable compound of india-rubber, and form a tube of this over a mandrel, with the asbestus side next to the mandrel. I next form a tube of vulcanizable compound of india-rubber over the asbestus, then add the windings or plies of linen or cotton duck which have been coated with rubber compound, and inclose the whole with rubber, and proceed precisely as is practiced in the construction of ordinary hose, as has above been described. For some purposes, however, the linen or duck may be omitted.

In the accompanying drawings, which form part of this specification, I have illustrated the manner in which the invention is or may be carried into effect, Figure I being a view in perspective and cross-section of a piece of hose having the asbestus lining, and Fig. II a similar view of a piece of hose having an additional layer of asbestus just beneath the cover.

A represents a web or strip of asbestus cloth, over which is laid a thin coating B of unvulcanized india-rubber compound. The strip thus prepared is wound, with the asbestus side inward, on a mandrel, the strip being preferably of such width that it may form two or more plies, as shown in Fig. I. Around this is then applied a tube C of vulcanized india-rubber compound. I then preferably add the windings or plies D of duck or linen coated with rubber, as usual in the construction of similar hose or tubing, and apply to the whole a cover or external sheathing E of rubber. The tube thus built up is then vulcanized in the usual way.

For some purposes it may be desirable to interpose another layer of asbestus cloth F, Fig. II, just underneath the rubber covering E, which will serve to protect the body of the hose from external changes of temperature, as well as to assist in preventing condensation of the steam when the hose is exposed in a cold atmosphere. When this external layer of asbestus is employed, the lining A may be of one thickness only, as shown in Fig. II.

By my improvement I obtain hose or tubes having a substantial lining of asbestus throughout their whole length. Comparative trials of this hose to ordinary hose of like capacity prove them to be greatly superior in endurance or lasting qualities, evidently from the protection given by the shield of asbestus against the prolonged action of the heat of high-pressure steam on rubber. The hose or tubes thus formed may be successfully used for conveying acids and alkaline solutions which would soon destroy ordinary hose and tubes.

It is obvious that for some purposes the plies of linen or cotton duck may be omitted

in the construction of the tubes, and that the whole structure may consist of vulcanized rubber having a lining of asbestus made as described.

I am aware that it has been proposed heretofore to protect a rubber tubing by braiding or wrapping around it filaments of asbestus; but such wrapping does not answer the purposes of my invention, and it forms no integral part of the tubing itself. It has also been proposed to apply a layer of asbestus in the form of powder or loose fiber over a lining of metal, covering the whole with a coating of rubber; and it has further been proposed to incase a rubber tube or hose in an outer ply of wire mesh to which a layer of asbestus in the form of a pulp has been applied. In none of these cases, however, does the presence of the asbestus contribute to the lasting qualities of the tube or render it any better adapted to withstand the direct action of steam or of chemical agents; and, so far as I am aware, it has never been proposed heretofore to provide hose or tubing with a lining of asbestus. Moreover, the employment of asbestus cloth according to my invention, as distinguished from loose fiber, with a coating of rubber compound vulcanized thereon, produces a web or ply of great strength and endurance.

Having now described my said invention, what I claim is—

1. A hose or tube having a lining composed of asbestus cloth helically wound with a backing of rubber vulcanized thereon, substantially as described.

2. A hose or tube composed, essentially, of rubber compound vulcanized between an exterior layer or wrapping and an interior layer or lining of asbestus, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY DURANT CHEEVER.

Witnesses:

GEO. T. MANSON,

WM. H. HODGINS.