H. WAKEMAN.

Armor for Hose.

No. 213,363 Patented Mar. 18, 1879.

Fig. 4.

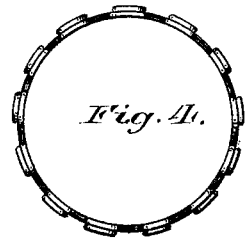


Fig. 1.

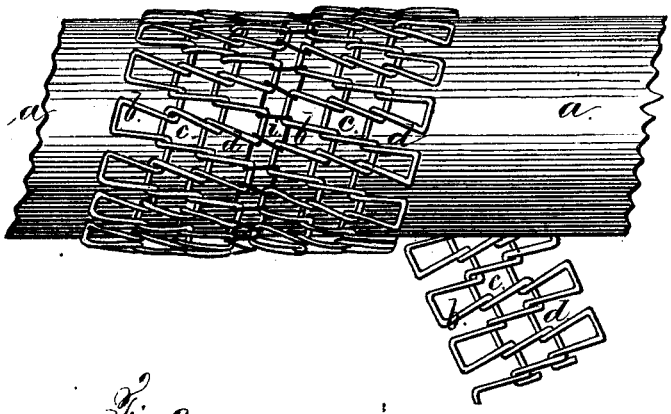


Fig. 2.

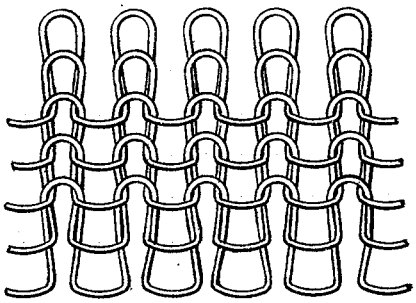
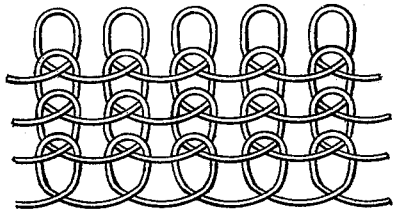


Fig. 3.



Witnesses.
Harold Serrell
Geo. T. Pinckney

Inventor.
Harwood Wakeman
per. Lemuel W. Serrell
atty

UNITED STATES PATENT OFFICE.

HARWOOD WAKEMAN, OF NEW YORK, N. Y.

IMPROVEMENT IN ARMOR FOR HOSE.

Specification forming part of Letters Patent No. **213,363**, dated March 18, 1879; application filed April 2, 1878.

To all whom it may concern:

Be it known that I, HARWOOD WAKEMAN, of the city and State of New York, have invented an Improvement in Armor for Flexible Tubing, of which the following is a specification:

In various patents heretofore granted to me, flexible tubes for air-brakes, mining, and other purposes are described and shown, with a metallic armor that serves to protect the same from wear and from undue strain by the internal pressure, and for preserving the cylindrical character of the tube.

My present invention has the same objects in view, but relates to a different construction of metallic armor or covering.

I make use of a wire armor that is laid together in a manner similar to a knitted fabric and placed around the flexible tube, or said wire armor may be knitted in a tubular form and slipped over the india-rubber or other flexible hose.

In the drawings I have represented a piece of flexible hose with the armor applied to the same.

The tube *a* is to be of leather, rubber, or other suitable material, and the armor around the same is composed of interlocking loops of wire similar to knitting.

The range of loops *b* is interlooped by the second range, *c*, of loops, and so on. This tubular armor may be knitted with wire of any suitable size similar to tubular knitting, and the same may be laid up by hand or by suitable machinery.

I have shown the ranges of loops *b c d* as forming ribbon that is laid helically around the tube, as represented, and the adjacent edges connected by an interlacing wire, *i*. This construction allows the ribbon or strip to be made by machinery and then laid around the tube and interlaced by hand.

The looping may be single, as shown in Fig. 1, or the looping may be double, as shown in Fig. 2, the row of loops that is being laid up being inserted not through the last laid row of loops, but the row of loops next behind the edge row. This causes the armor fabric to be much more compact and strong than when only one range of loops is made use of.

The loops may be twisted so that the wires cross, as shown in Fig. 3, thereby covering the hose more uniformly, and lessening the size of the meshes.

In either of the forms shown in Figs. 2 or 3, the armor is made of the knitted wire in tubular form, the loops being modified in their shape or size from those shown in Fig. 1. Fig. 4 is an end view of the knitted-wire tube.

The wire made use of may be single, and preferably steel galvanized, or it may be composed of several smaller wires twisted together to form a small-sized wire rope.

In my Patent No. 188,446, a flexible armor is shown, in which the wires are interlooped in a form that results from revolving one helix of wire, and thereby interlacing it into another helix, and then flattening the helices, and the wire armor has to be made in a flat form or sheet, and then bent up into a cylindrical form.

In my present invention the armor is made of wire looped together like knitting; thereby each bent-up loop is carried bodily through one of the previously bent-up loops, and spread for the reception of the loop in the next range of loops.

In consequence of this construction of armor I am enabled to make the wire into a complete cylindrical tube, either around the flexible tube or adapted to the reception of such tube.

In my aforesaid patent the wire armor is represented with the flattened helices as at a slight inclination to the tube longitudinally.

In the present instance the narrow strip of armor is wound in a screw form around the tube and the edges interlaced. This allows for the armor being made in a much narrower strip than in aforesaid patent, and promotes the flexibility of the armor.

I claim as my invention—

1. The armor for flexible hose, consisting of a tubular knitted wire fabric, substantially as set forth.

2. The metallic armor for hose, consisting of a strip of wire fabric wound helically around the flexible hose, with the contiguous edges united by a lacing of wire, substantially as set forth.

Signed by me this 29th day of March, A. D. 1878.

HARWOOD WAKEMAN.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.