

W. C. DOWNS.

Suction-Hose.

No. 134,654.

Patented Jan. 7, 1873.

Fig. 1

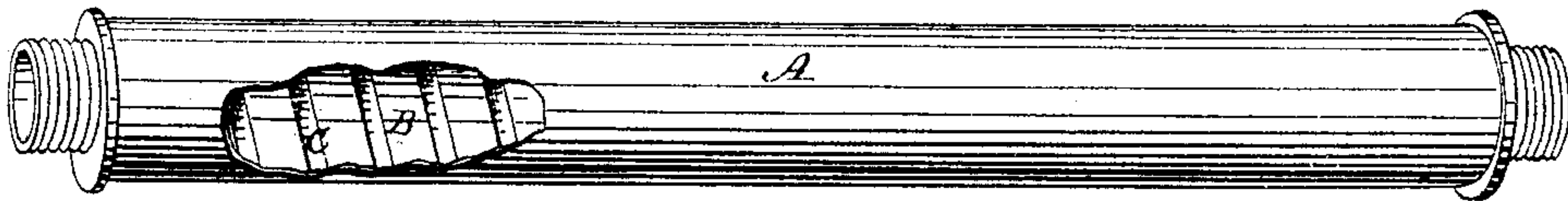


Fig. 2.

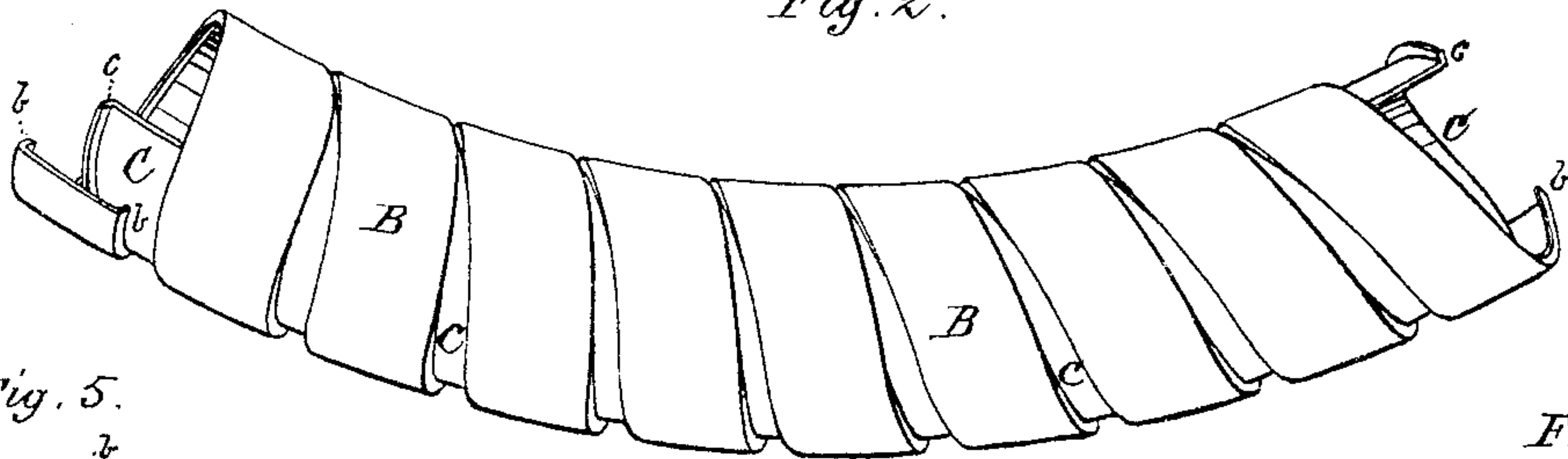


Fig. 5.

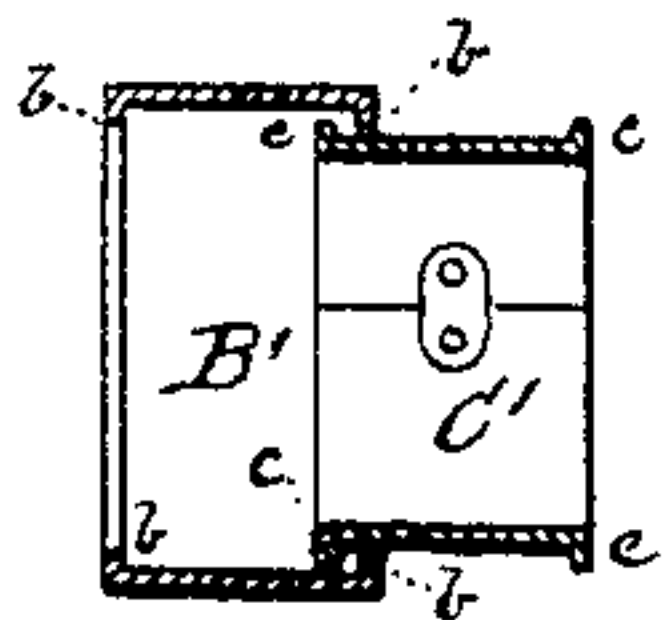


Fig. 6.

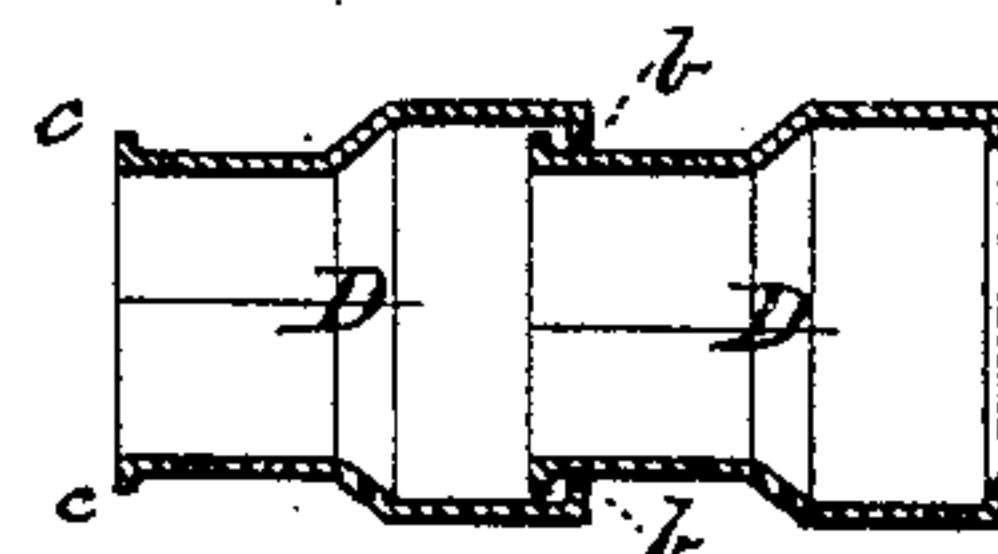


Fig. 3.

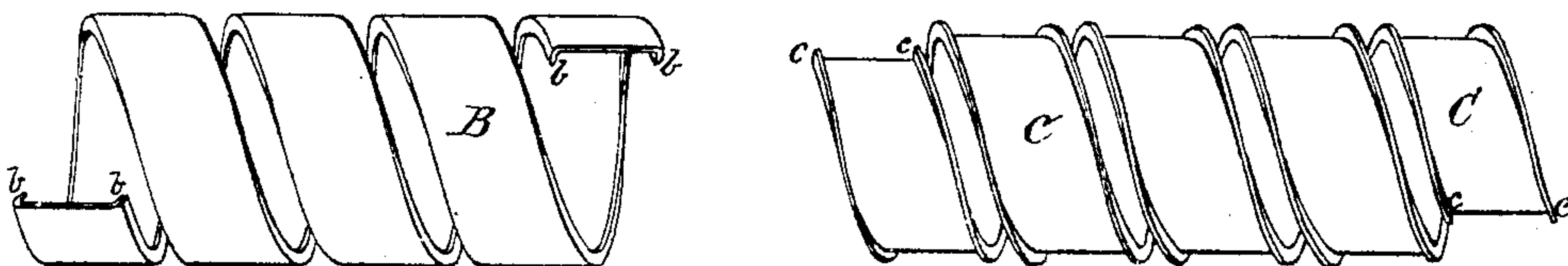
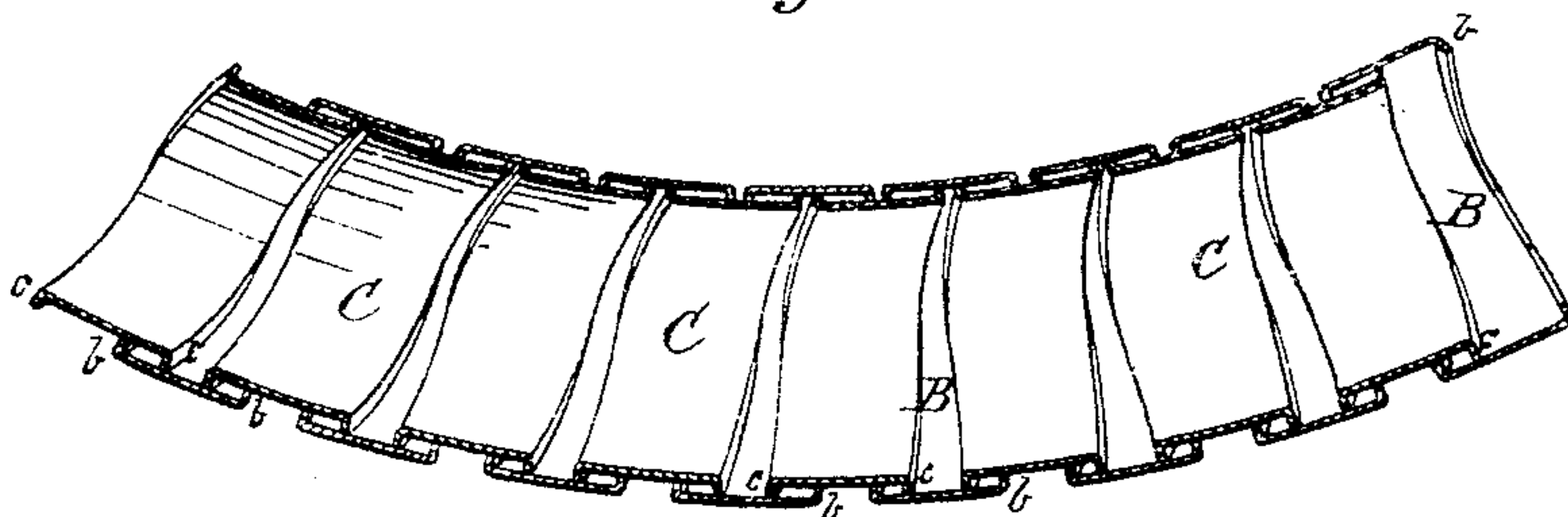


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE

WILLIAM C. DOWNS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SUCTION-HOSE.

Specification forming part of Letters Patent No. 134,654, dated January 7, 1873.

To all whom it may concern:

Be it known that I, WILLIAM C. DOWNS, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Suction-Hose.

My improvements relate to that general class of suction-hose which, whether composed in the main of leather, canvas, or rubber, is provided with a flexible interior metallic skeleton-like structure for preventing collapse of the hose while in use. My invention consists in a novel metallic foundation-structure, composed of two distinct spiral lengths of flattened metal, one of which is so laid within the other that the spiral spaces occurring in either coil will be matched or covered by the flat metallic surface of the other; and, also, in a novel construction of the edges of the annular metal, whereby the inner and outer coils will be prevented from separating, and yet be free to move within certain prescribed limits and afford the essential degree of flexibility; and I do hereby declare that the following specification, taken in connection with the drawing furnished and forming a part of the same, is a clear and true description thereof.

Referring to the drawing, Figure 1 represents, in perspective, a section of suction-hose embodying my improvements. Fig. 2 represents a section of the same with the exterior covering or hose proper removed, and the coils bent or curved, as frequently occurs in practical use. Fig. 3 represents the two metallic coils separated from each other. Fig. 4 represents, in longitudinal section, a portion of a section of hose, whether the stiffener be spiral or a series of band-like rings. Fig. 5 represents, in section, a combination of interior and exterior band-like rings; and Fig. 6, a modification of the same embodying my invention.

A denotes the hose proper, which may be composed either of leather riveted in the usual manner of seamless water-proof canvas, or it may be the ordinary so-called rubber hose. It is, however, deemed preferable to employ a hose composed of textile fabric and rubber, as it is more readily rendered air-tight than any other kind of hose, and is comparatively light, very strong, and flexible. B denotes the larger or exterior metallic coil. It may be

composed of iron, although, on account of its great liability to corrosion, it is, no doubt, preferable that brass or other less corrosive metal be employed. C denotes the smaller or inner metallic coil. Both of these coils are formed from a flat strip of metal, of such thickness as will afford sufficient resistance to external pressure when in use. Each strip, when formed into the coil, should extend throughout the length of the section of hose in which it is to be used. As an instance of desirable dimensions, it will be stated that if brass of good quality be used the strip may be, say, from one to four inches in width, more or less, and, say, one-eighth of an inch, more or less, in thickness. The length of the sections desired and the nature of service expected from the hose will, of course, determine the proportions best suited in each case. Each coil should be so wound that when it is straight there will be a continuous spiral space of, say, from one-half inch to one inch in width, more or less, extending from end to end between the annular edges of the coil. The inner coil should be so set longitudinally within the outer one that its spiral lines will generally correspond therewith, and also so that the open spaces of the one will be matched or covered by the inner and outer flat surfaces of the outer and inner coils, respectively. By this means the two coils will constitute a closed metallic pipe. At each end the two coils are firmly united to each other by rivets or other means, which causes each to always maintain proper relations with the open spaces of the other. In bending, the spaces of both coils, of course, widen on one side and close on the other, and each coil closes or matches the openings in the other. Should the bending by accident be carried too far, it is possible that the edges of the interior coil might protrude somewhat into the enlarged open spaces of the outer one, and result in the cracking of the hose. To secure a desirable degree of flexibility, and at the same time to confine the movements of the coils in bending within certain desirable limits, I have provided a means by which, while each coil can act independent of the other to a certain extent, each will limit and control the movement of the other should any undue bending be attempted. This is accomplished by having on each edge of the strip compos-

ing the outer coil an inward projecting flange, *b*, extending from end to end, and also by having on the edges of the inner coil certain outwardly-projecting flanges *c*. When the coils are bent the flanges *c* and *b* are brought into contact with each other on the side of the greatest curve, and by such contact they limit the spreading movement of the coils. This portion of my invention may be applied to a system of alternate inner and outer rings of flat metal, and by exercising a similar function the flanges or shoulders will hold the rings together and guard against their undue displacement within the hose, and yet admit of the desired flexibility, within limits prescribed, in substantially the same manner as described in connection with the continuous coils.

Figs. 5 and 6 illustrate the application of my improvement to band-like rings.

In Fig. 5 two distinct and separate rings, *B'* and *C'*, are provided, respectively, with the inwardly-projecting flanges *b* and the outwardly-projecting flanges *c*. As in the case of the spiral structure, they have the same perfect matching of joints, and possess the same freedom to move within certain prescribed limits.

In Fig. 6 each of the rings *D* combines within itself the form and function of the two rings *B'* and *C'*, and, being each provided with the inward-projecting flange *b* at one end, and the outward-projecting flange *c* at the other, are limited in their movement with relation to each other, as in the other instances shown. When constructed as shown in Fig. 5 the outer rings *B'* may either be made of rolled metal with brazed or otherwise closed joints, or cast solid of brass or other suitable metal. The inner rings *C'* may be of rolled metal, or, if desired, of cast metal. In either case they must be so cut as to admit of their being so reduced in size that they may enter the ends of the outer rings. If made of rolled metal they will readily spring to their original position and occupy the proper place. If of cast-metal they can be opened out on an arbor ring by ring as they are put together. Should it be deemed necessary, tie-plates may be riveted thereto, as illustrated in Fig. 5. When constructed as shown

in Fig. 6, the small ends will be split longitudinally and compressed so as to enter the larger ends, and then caused to resume their proper position, as in the case of the others described.

My improved suction-hose has a peculiar value in presenting at all points a sustaining foundation for receiving the pressure of the hose proper while more or less contracted during heavy suction; and, on the other hand, when receiving water under pressure from a hydrant, the continuous metallic surface relieves the hose from undue outward pressure and the objectionable distension consequent thereon, which sooner or later results in breaking the hose, rendering it pervious to air, and unfit for suction.

I am aware that it is not new to employ a single flattened spiral coil as a stiffener or foundation for suction-hose, and that a succession of metallic rings have also been so employed. I am not aware, however, that prior to my invention suction-hose has ever been made in which a continuous metallic surface was presented at the water-way, and in which the continuity of metallic surface would be maintained whether the hose be laid straight or curved.

I therefore claim as new and desire to secure by Letters Patent—

1. The combination, within a suitable suction-hose, of two flexible spiral stiffeners, composed of sheet metal, having corresponding spiral lines, and located one within the other, substantially as described, whereby the section of hose will have the desired flexibility, a proper foundation, and present in the water-way a continuous metallic surface whether the hose be straight or bent, as and for the purposes specified.

2. Annular or spiral metallic suction-hose stiffeners, composed of an inner and an outer series, arranged to match joints, and provided respectively with outward and inward projecting flanges *c b*, as and for the purposes specified.

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Witnesses:

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