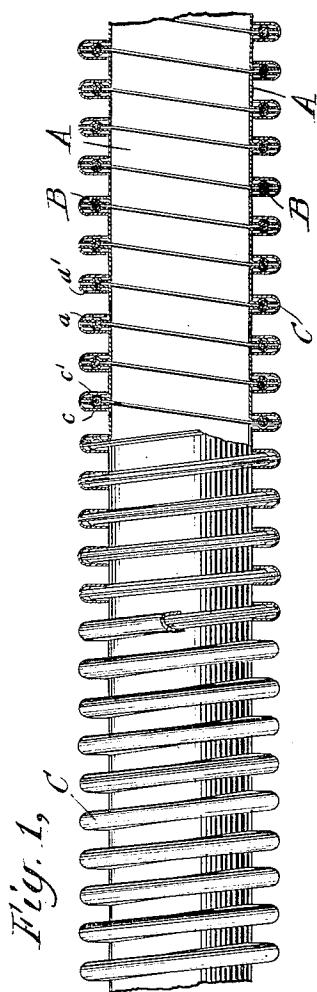


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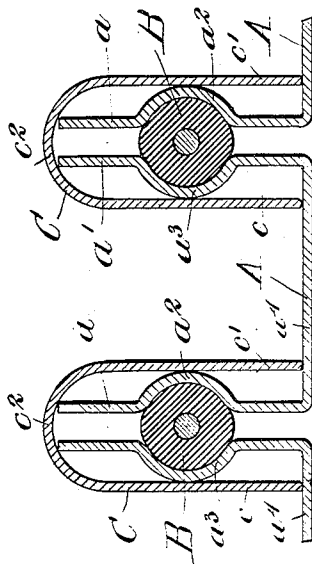
PATENTED MAR. 26, 1907.

E. T. GREENFIELD.  
METALLIC HOSE.

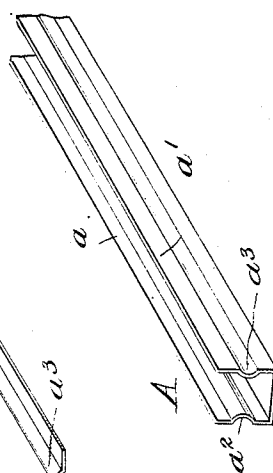
APPLICATION FILED NOV. 6, 1905.



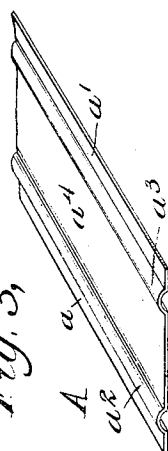
*Fig. 2,*



*Fig. 4,*



*Fig. 3,*



WITNESSES:

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INVENTOR

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# UNITED STATES PATENT OFFICE

EDWIN T. GREENFIELD, OF KIAMESHA, NEW YORK.

## METALLIC HOSE.

No. 848,238.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed November 6, 1905. Serial No. 286,060.

*To all whom it may concern:*

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at Kiamesha, in the county of Sullivan and State of New York, have invented certain new and useful Improvements in Metallic Hose, of which the following is a specification.

The invention concerns particularly a metallic structure capable of use not only for the transmission of a fluid agent such as water or steam, but also for the housing of electrical conductors, which may be loosely run therein or on the exterior of which such structure may be formed as armor.

The object is to provide a structure of this character which may be made impermeable by the fluid agent used, which shall possess ample strength to withstand the effect of continued use, and which may be easily, rapidly, and cheaply manufactured.

In carrying out the invention I employ a plurality of metallic strips to which prior to forming into final shape certain transverse configuration is given by suitable means, such as dies. One of these strips is formed into successive spirals having circumferential flanges, and between such flanges, specially adapted to receive it, I provide a suitable gasket of any desired material, such as metallic wire or a wire having an elastic or compressible covering, such as textile fabric, asbestos, or the like. Another strip, preferably having a substantially U-shaped cross-section, is also formed into successive spirals over the circumferential flanges above referred to, and therefore inclosing the same and the gasket between the adjacent flanges, the spirals formed of this strip preferably serving as binders of the spirals of the first-named strip, although being, if desired, movable relatively thereto. The latter spirals, which may be formed of a metal having substantial resiliency, are movable toward and from each other, the degree of outward movement being, however, determined by the overlying spirals of the second strip. As will be seen, a tube or hose so formed comprises few parts and may be readily manufactured at high speed by suitable mechanism—such, for example, as that set forth in Letters Patent No. 630,503 heretofore granted to me.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is an elevation, partly in section, of a structure employing my invention. Fig.

2 is an enlarged sectional detail, and Figs. 3 and 4 are enlarged perspective views illustrating sections of one of the strips of which the structure shown in the other figures is formed.

Referring to the drawings, which illustrate a preferred embodiment of the invention adapted for use, for example, as a hose or conduit, as before stated, A designates the metallic strip of which the inner spirals are formed. This may be passed in the flat between suitable dies and longitudinally corrugated on lines equidistant from its center, as shown in Fig. 3. The lateral edges of said strip, including the portions so corrugated, are then turned upward at substantially right angles to the portion between them and the strip so formed passed through a suitable forming apparatus, whereby the same is bent or curved into successive spirals, the up-turned sides  $a'$  forming circumferential flanges, the flange of one spiral being adjacent to and parallel with that of the adjoining spiral, the inwardly-curved corrugation  $a^2$  of one flange being opposite the correspondingly-curved corrugation  $a^3$  of the adjacent and parallel flange. As this operation proceeds a suitable gasket B (here shown as of wire covered with a compressible material) is fed between said adjacent flanges and received within the corrugations  $a^2$   $a^3$ . Also as the operation proceeds a second strip C, preferably previously given a U-shaped cross-section, as by suitable dies, is formed into a succession of outer spirals over the circumferential flanges  $a'$ , each of these spirals having the sides  $c'$  and closed outer end  $c^2$ . The extreme edges of said spirals—i. e., the open ends of the sides  $c'$ —will preferably bear against the outer surface of the body portions  $a^4$  of the spirals of the inner series, the extreme edges of the flanges  $a'$  bearing against the closed ends of such outer spirals. Also the sides  $c'$  of said outer spirals will preferably bear against the corrugations  $a^2$   $a^3$ , forcing the same toward each other, and therefore against the interposed gasket B, thereby compressing the latter and binding the same and said flanges  $a'$  firmly together. This, however, does not bring said flanges  $a'$  into contact, but permits the same to remain separated by a suitable distance, so that in flexing the structure these flanges may move relatively to each other. Excess of movement, which might have a disrupting tendency, is precluded by the sides  $c'$  of the outer series

of flanges. If desired, in order to reduce the movement referred to the extreme edges of said sides may be turned slightly inward, as will be readily understood.

5 It will be obvious that in addition to the other advantages to which attention has been called a structure such as that above described possesses ample flexibility to adapt  
15 it for the desired use, and this is obtained without sacrificing the element of strength  
10 and durability.

What I claim is—

1. A series of metallic spirals having adjacent circumferential flanges, a gasket between said flanges and means inclosing said  
15 adjacent flanges and securing them together, substantially as described.

2. A series of metallic spirals having circumferential flanges adjacent but not in contact, a gasket between said flanges and means  
20 inclosing said adjacent flanges and securing them and said gasket together, substantially as described.

3. A series of metallic spirals having circumferential flanges, a gasket between said  
25 flanges and another series of metallic spirals extending over said flanges, substantially as described.

4. A series of metallic spirals having circumferential flanges provided with corrugations, a gasket between said flanges and co-  
30 acting with said corrugations and means inclosing said flanges and securing them together, substantially as described.

5. A series of metallic spirals having adjacent circumferential flanges, a gasket of compressible material between said flanges and means inclosing said flanges and securing  
35 them together, substantially as described.

6. A series of metallic spirals having adjacent, corrugated, circumferential flanges, a

gasket between said flanges and coacting with the corrugations thereof and another series of metallic spirals extending over said  
45 flanges, substantially as described.

7. A series of metallic spirals having adjacent circumferential flanges, a gasket between said flanges and another series of metallic spirals extending over said flanges and  
50 holding the same together under pressure, substantially as described.

8. A series of metallic spirals having adjacent corrugated, circumferential flanges, a gasket between said flanges and coacting with the corrugations thereof and another  
55 series of metallic spirals extending over said flanges and coacting with said corrugations to hold said flanges together, substantially as described.

9. A series of metallic spirals having radially-disposed non-overlapping flanges at the edges thereof, a gasket between said  
60 flanges, and means for securing said flanges together, substantially as set forth.

10. A series of metallic spirals having corrugated radially-disposed non-overlapping  
65 flanges at the edges thereof, a gasket between said flanges and entering the corrugations therein, and means for securing said flanges together, substantially as set forth.

11. A series of metallic spirals having radially-disposed non-overlapping flanges at the edges thereof, a gasket between said  
70 flanges, and a second series of metallic spirals securing said flanges together, substantially as set forth.

This specification signed and witnessed this 3d day of November, 1905.

EDWIN T. GREENFIELD.

Witnesses:

S. O. EDMONDS,  
D. S. EDMONDS.