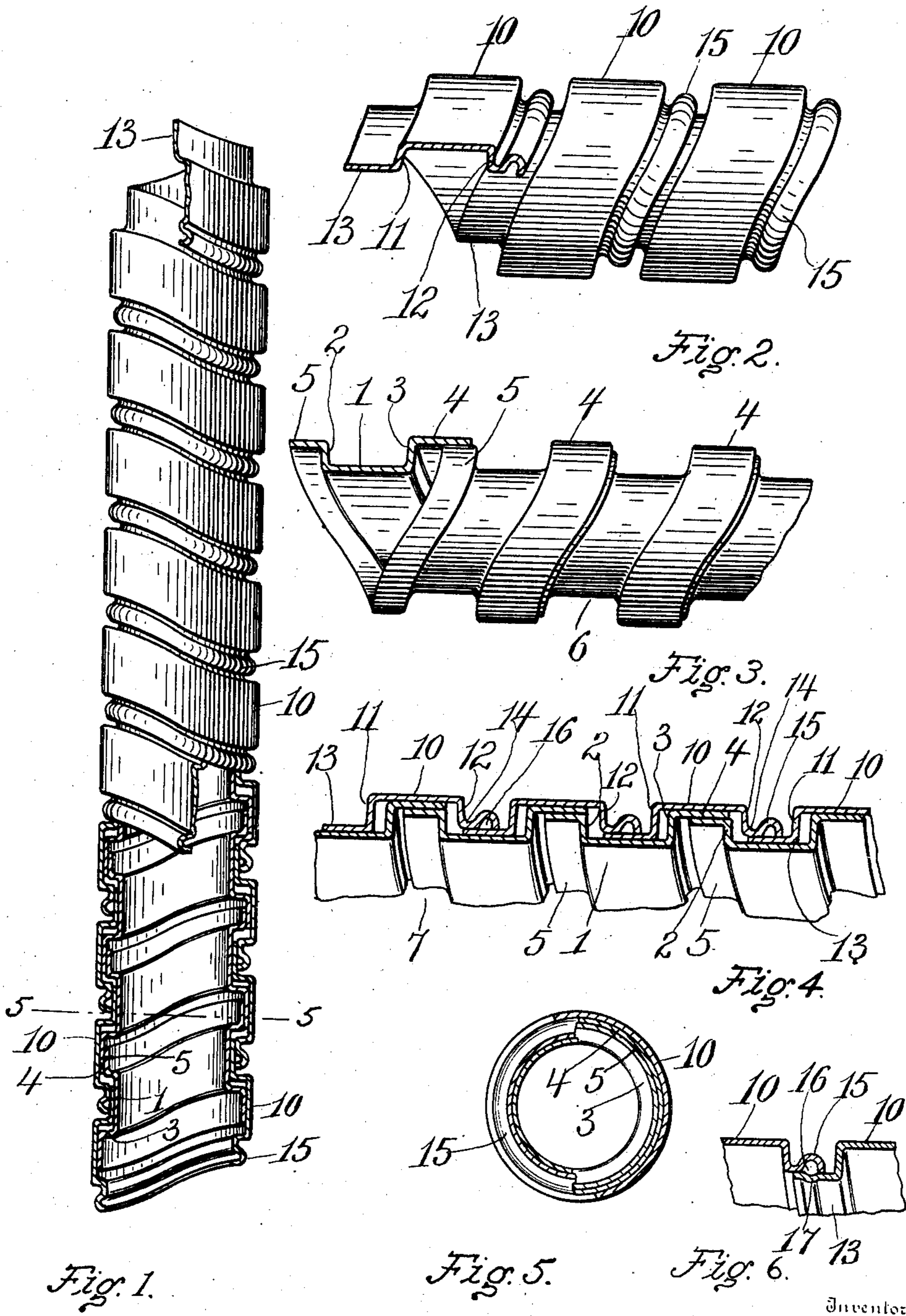


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PATENTED JULY 24, 1906.

W. W. HARRIS.
FLEXIBLE METALLIC TUBING.
APPLICATION FILED JUNE 27, 1905.



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FLEXIBLE METALLIC TUBING.

No. 826,658.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WINFRED W. HARRIS, of Winthrop, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Flexible Metallic Tubing, of which the following is a specification.

This invention relates to flexible metallic tubing, and comprises such a tubing formed of two tubes, one arranged upon and interlocked with the other, but without any interlocking between the strip composing one tube and the strip composing the other.

Figure 1 in front elevation shows a tube constructed in accordance with my invention, a part of the tube being shown in section in order to illustrate the arrangement of the tubes with respect to each other. Fig. 2 is a side elevation of a portion of the outer tube. Fig. 3 is a like view of the inner tube. Fig. 4 is a longitudinal section of a portion of the tube, showing the interlocking construction between the two tubes and the sliding union between the marginal flanges of the strip forming each tube. Fig. 5 is a cross-sectional view on line 5 5 of Fig. 1. Fig. 6 is a detail view of one form of packing-chamber.

The same numerals of reference indicate the same parts in all of the figures.

Each tube is composed of a strip of metal suitably fashioned and spun together in a helical form. The metal strip comprising the inner tube is, as shown, formed with a flat central portion 1, each edge of which is bent upward, forming lips 2 3, the lip 3 being formed with a horizontal flange 4 and the lip 2 being formed with a horizontal flange 5. In the tube as constructed the flange 4 rests upon the flange 5, but is not interlocked therewith, the two flanges 4 and 5 being free to slide on each other. It will be seen that the flat central portion 1, with the lips 2 and 3, form a spiral channel, as 6, around the tube, while the flanges 4 and 5, together with the lips 2 and 3, also form a spiral channel, as 7, around the tube, the latter channel opening into the tube, while the channel 6 is upon the outside. It will further be seen that the interior bore of the tube is formed by the flat central portion 1 and that said bore is uniform and smooth, offering no obstruction to the passage of the whole or part of an object

therethrough. Further, as shown in Figs. 3 and 4, the flange 4 is arranged upon the flange 5, each being free to move on the other and offering no abutment or interlocking to prevent the separation of a convolute by the flange 4 passing off the flange 5.

Referring to Fig. 2, the tape composing the outer tube is formed with a flat central portion 10, provided on one edge with an inwardly-projecting lip 11 and on the other edge with an inwardly-projecting lip 12, the lip 11 being formed with a horizontal flange 13. The lip 12 is formed with a relatively narrow horizontal flange 14, which at its edge is bent upon itself, making a ring-shaped member 15, the walls of which form a chamber 16, adapted to receive packing material of any preferred construction. As shown, the metal strip of the outer tube, fashioned as above described, is spun upon itself in a helical manner, the flange 14, with its ring 15, resting upon the flange 13 and free to slide thereon. In practice the two tubes are spun simultaneously one within the other, resulting in the construction shown in Figs. 1 and 3, the flat central portion 1, with its lips 2 and 3 of the inner tube, forming an annular exterior chamber in which are arranged the flanges 13 and 14 of the outer tube, while the flat central portion 10 and flanges 11 and 12 of the outer tube form an interior annular chamber in which are arranged the lips 2 and 3 and flanges 4 and 5 of the inner tube. While by the described construction either tube by itself might have its individual convolutes separated, yet when combined into the two-part tube the channel of each tube acts as a means for bonding the marginal flanges of the other tube. I thus provide a tube wherein the marginal flanges of each strip are given free play one upon the other and are prevented from separation by the members on the other strip. The joint or overlapping edges of one tube are covered and protected by the other tube.

In Fig. 6 I have shown another form of packing-chamber 16, composed of the ring 15 and a complementary depression 17 formed in the flange 13.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in

which it may be made or all of the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. A flexible metallic tube comprising two
5 strips of material, each formed with a central depression and marginal flanges, each of said strips being spun upon itself in a helical manner to form an independent tube with overlapping but freely-slidable edges, one of said
10 tubes being arranged within the other and the overlapping edges of one tube being arranged in the depression of the other tube.
2. A flexible metallic tube comprising two
15 strips of material, each formed with a central depression and marginal flanges, each of said strips being spun upon itself in a helical manner to form a double tube one within the other, the flanges of one tube being overlapped and arranged in the depression of the
20 other tube.
3. A flexible metallic tube comprising an inner and an outer tube, each formed of a strip of metal spun upon itself in a helical manner to form a tube with overlapping but
25 slidable edges, the overlapping edges of one tube being arranged in a chamber or depression in the wall of the other tube.
4. A compound tube formed of two tubes,
30 one within the other, each tube being formed of a strip spun upon itself, with overlapping edges, and provisions whereby the joint of

the overlapping edge of each tube is protected by the other tube.

5. A compound tube formed of two tubes,
35 one within the other, each tube being formed of a strip spun upon itself, with overlapping but unlocked edges, and a central helical chamber, the overlapping edges of one tube being arranged in the chamber of the other tube.

6. A compound tube formed of two tubes,
40 one within the other, each tube being formed of a strip spun upon itself, with overlapping but unlocked edges, a central helical chamber, the overlapping edges of one tube being
45 arranged in the chamber of the other tube, and a marginal chamber formed in the strip of the outer tube to receive the packing material.

7. A compound tube formed of two tubes,
50 one within the other, each tube being formed of a strip spun upon itself in a spiral manner with overlapping edges, and provisions upon each tube for preventing the separation of
55 the edges of the other tube.

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

WINFRED W. HARRIS.

Witnesses:

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E. BATCHELDER.