

July 28, 1925.

1,547,609

W. C. ROBINSON ET AL
MANUFACTURE OF FLEXIBLE METALLIC TUBING

Original Filed Feb. 16, 1922 2 Sheets-Sheet 1

FIG. 1.

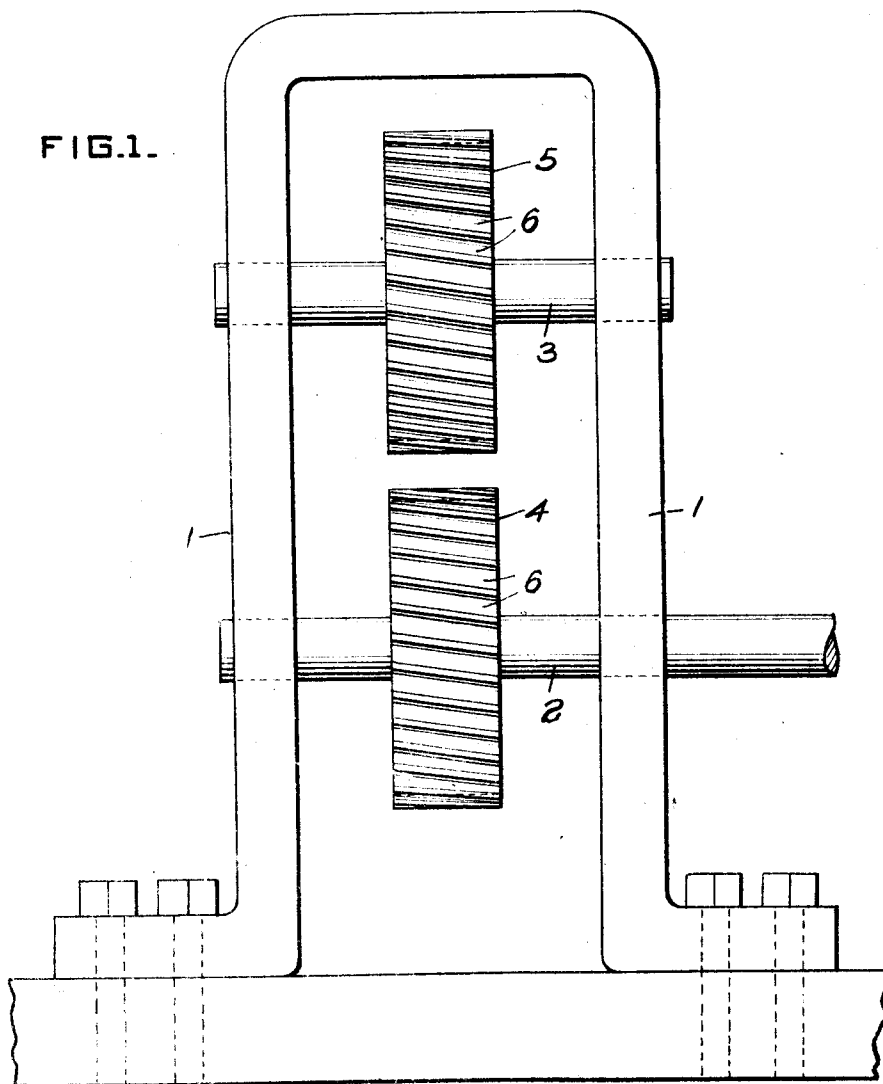
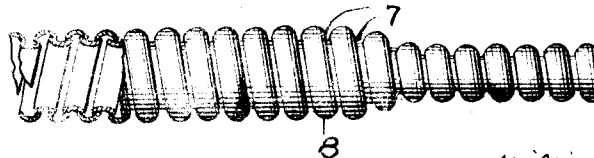


FIG. 5.



WITNESSES

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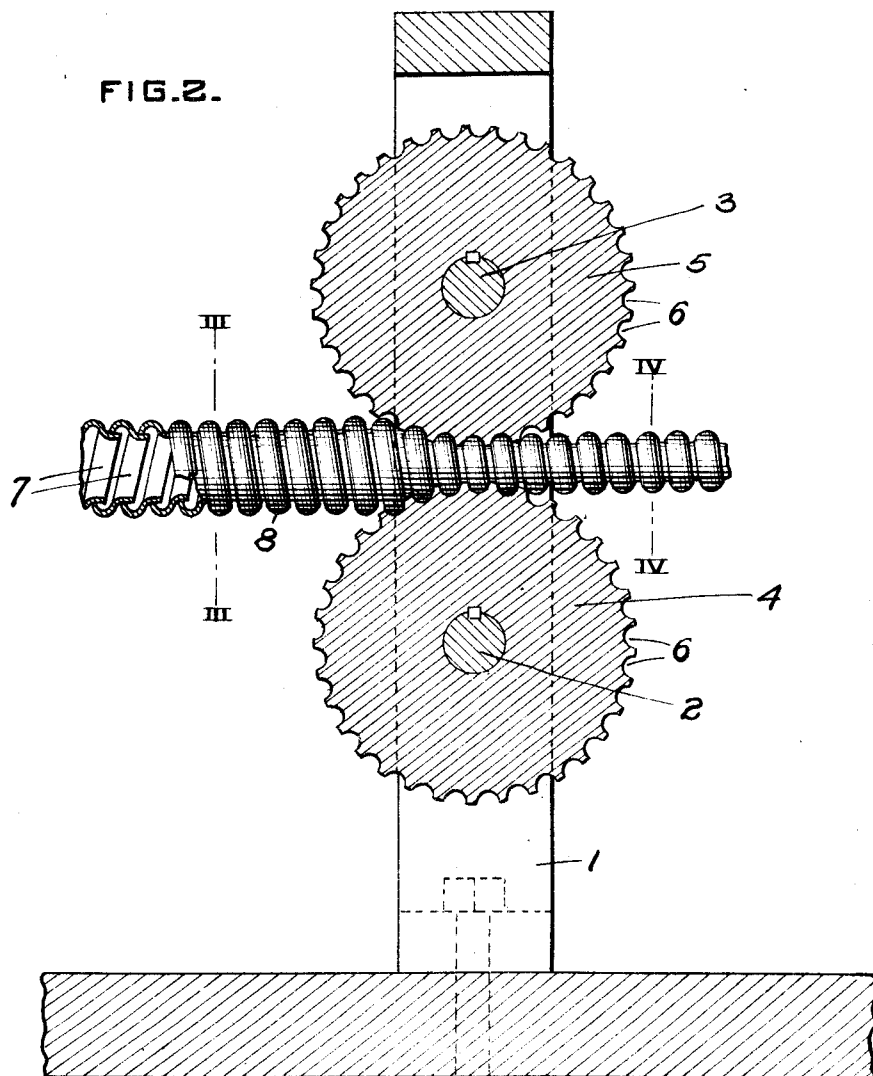


FIG. 3.



FIG. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM C. ROBINSON, OF PITTSBURGH, AND GEORGE E. PHILLIPS, OF BADEN, PENNSYLVANIA, ASSIGNORS TO NATIONAL METAL MOLDING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MANUFACTURE OF FLEXIBLE METALLIC TUBING.

Application filed February 16, 1922, Serial No. 536,904. Renewed May 1, 1925.

To all whom it may concern:

Be it known that we, WILLIAM C. ROBINSON, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, and GEORGE E. PHILLIPS, a subject of the King of Great Britain, residing at Baden, in the county of Beaver and State of Pennsylvania, have invented or discovered certain new and useful
10 Improvements in the Manufacture of Flexible Metallic Tubing, of which improvements the following is a specification.

It is the object of the present invention to provide flexible metallic tubing of novel
15 cross-sectional contour, whereby it may be more adaptable to use in particular situations or relations where its use is desired, more especially such as exist or may arise when such tubing is used as conduit for
20 electrical conductors. Flexible metallic tubing of the type to which the invention relates is formed of successive helical convolutions of a strip or strips of hard metal to form a tube which is circular in cross-
25 section, the strip or strips being of such cross-sectional form that the edges of successive convolutions are interengaged in such way as to permit of limited axial movement of the convolutions relatively to one another,
30 thus attaining the desired flexibility of the tubing as a whole. This type of tubing and various methods of its manufacture are so well known to those skilled in the art that further description is unnecessary.

By the present invention we produce flexible metallic tubing of non-circular cross-sectional contour, and preferably of generally elliptical form. Such elliptical tubing
40 has the advantage that under certain circumstances a given combination of conductors can be carried in a conduit of smaller internal area. Also where it is desired to conceal the conduit in the wall or ceiling of a room, a lesser depth of plaster than
45 necessary in the case of a circular conduit will be sufficient to cover it. And generally speaking it is better adapted to use in some of the present commercial installations.

In the accompanying drawings we have illustrated conventionally a means which is
50 suitable for the practice of the invention. Figure 1 is a front view of a pair of shaping rolls. Fig. 2 is a sectional side elevation, showing the shaping of "single-strip" tubing.

Fig. 3 is a cross-section on the line III—III; 55 and Fig. 4 a cross-section on the line IV—IV of Fig. 2. Fig. 5 shows a "two-strip" tubing, a portion of which has been shaped.

In suitable bearings in the housing 1 are mounted the shafts 2, 3 of the rolls 4, 5, the
60 lower roll-shaft 2 being extended for connection with a suitable source of power (not shown). The working faces of the rolls are provided with diagonal grooves 6 having a slope corresponding to the pitch of the
65 coils 7 of the tubing 8 to be operated upon, and of a size which will permit the successive grooves to effectively engage the successive coils both above and below, and
70 thus draw the tubing through the pass between the rolls. As is best shown in Fig. 2 the already-formed flexible tubing 8 of circular cross-section is fed into the roll-pass,
75 through which it is drawn and it is thereby flattened above and below, while on its medial transverse diameter the coils are left free to move outwardly in opposite directions,
80 whereby the circular tubing shown in Fig. 3 is converted into one of general elliptical form, as shown in Fig. 4. By this operation local distortion of the tubing is prevented and a symmetrical and uniform product is obtained.

The invention is not necessarily limited
85 to the production of tubing of elliptical form, since it is obviously adaptable to the formation of the tubing into other non-circular shapes or such character that the active
90 forming surfaces may be cooperatively arranged to so control the operation that it may be carried out without local distortion of the tubing.

We claim as our invention:

1. The method of manufacture of flexible
95 metallic tubing of non-circular cross-sectional contour, which consists in helically coiling a metallic strip or strips into successive interengaging convolutions, and then rolling the tubing to the form desired;
2. The method of manufacture of flexible
100 metallic tubing of non-circular cross-sectional contour, which consists in helically coiling a metallic strip or strips into successive interengaging convolutions of circular
105 form, and then rolling the tubing to the form desired between rolls having working surfaces provided with transverse grooves engaging said convolutions.

3. The method of manufacture of flexible metallic tubing of elliptical cross-sectional contour, which consists in helically coiling a metallic strip or strips into successive interengaging convolutions of circular form, and then flattening diametrically opposite portions of the tubing between rolls provided with transverse grooves engaging said convolutions. 15

In testimony whereof we have hereunto set our hands.

WILLIAM C. ROBINSON.
GEORGE E. PHILLIPS.

4. The method of manufacture of flexible metallic tubing of elliptical cross-sectional contour, which consists in helically coiling a metallic strip or strips into successive interengaging convolutions of cir-

Witnesses:

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FRANCIS J. TOMASSON.