Nov. 27, 1934. A. Y. DODGE 1,981,950

METHOD OF FORMING CONDUITS

Filed May 22, 1930

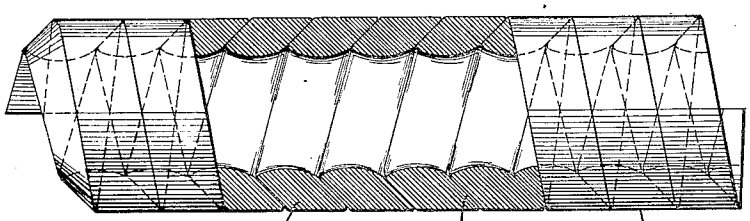


FIG. 1

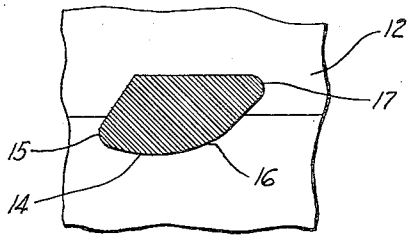


FIG. 2

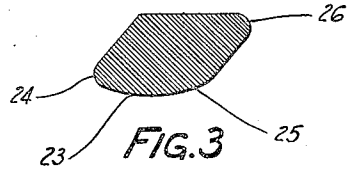


FIG. 3

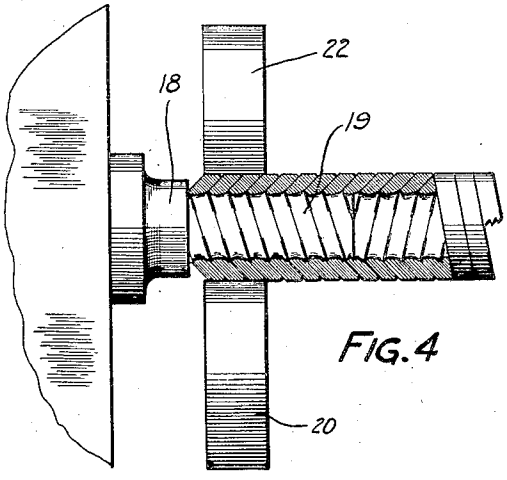


FIG. 4

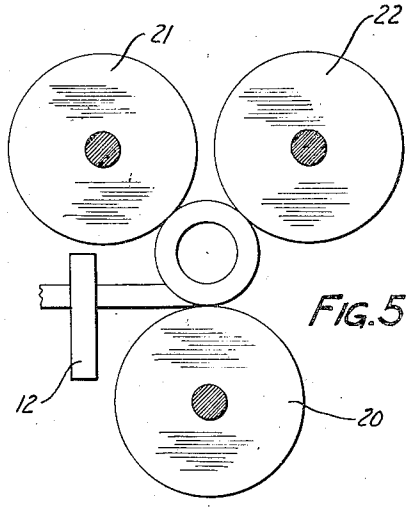


FIG. 5

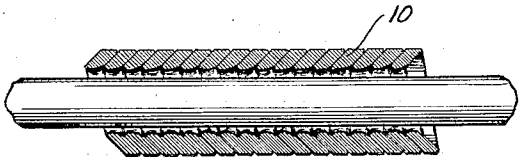


FIG. 6

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Patented Nov. 27, 1934

1,981,950

UNITED STATES PATENT OFFICE

1,981,950

METHOD OF FORMING CONDUITS

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Application May 22, 1930, Serial No. 454,588

4 Claims. (Cl. 29—148.2)

This invention relates to conduits and more particularly to flexible conduits and a method for the production thereof.

An object of the invention is to provide a single strand conduit.

Another object of the invention is to provide a conduit which will maintain an equal length at its natural axis upon flexing or bending.

Another object of the invention is to provide a conduit for an operating cable which will not chafe or otherwise injure the cable.

A further object of the invention is to provide a conduit for an operating cable, in which friction between the fixed and movable elements is reduced to a minimum.

A further object of the invention is to provide a conduit for an operating cable through which the cable may be readily fed without engaging abutting edges.

A further object of the invention is to provide a conduit formed from a single strand of metal wound in a helix, each convolute of which is nested in the adjacent convolute to form a slightly curved surface at the line of contact.

Other objects of the invention will appear from the following description taken in connection with the drawing, which forms a part of this specification, and in which:

Figure 1 is a side elevation of a section of a conduit, partly broken away;

Figure 2 illustrates a die through which the strand is drawn before rolling;

Figure 3 is a cross section of one of the convolutions of the helix;

Figure 4 is a side elevation of a mandrel and rollers co-operating therewith, illustrating the winding of the helix;

Figure 5 is an end elevation illustrating a strand after it has been drawn through the die being fed to the mandrel beneath the rollers; and

Figure 6 is a side elevation of a section of the conduit illustrating an operating wire positioned therein.

Referring to the drawing for more specific details of the invention, 10 represents generally a section of a flexible conduit. As shown, the conduit is formed of a single strand or strip of metal 11 wound in a helix. The strand is first drawn through a die 12 to shape or deform the metal, so that in cross section it is substantially a trapezoid having an arcuate face 14 and curved apexes 15, 16 and 17. The strand is then wound on a mandrel 18 having a spiral groove 19, beneath suitable rollers 20, 21 and 22 arranged in spaced relation to the mandrel and adapted to be driven from a suitable source of power, not shown.

As the strand 11 is fed to the mandrel beneath the rollers, it is again deformed, so that in cross section it is substantially a parallelogram having a curved face 23 and curved apices 24, 25 and 26. This deformation is due to the upsetting of the inner surface to conform to the mandrel and the drawing of the outer surface which takes place upon coiling the strand.

When coiled, each convolution of the helix is nested in the adjacent convolution, as indicated at 27, and is preferably formed with a slightly curved surface at the line of contact, so that when the conduit is flexed or bent, it has no tendency whatsoever to shorten or lengthen.

It should be observed that upon coiling the strand it is not bent about its weakest axis, but about an axis approximately 20° to 25° divergent with its weakest axis. It will also be observed that the inner surface of each convolution is curved, so that rounded surfaces are presented on the inner diameter of the conduit. Thus, under all conditions regardless of the different positions in which the conduit may be bent, a cable operating in the conduit will not be injured by sharp contacting edges and hence there is considerably less friction between the conduit and the cable than in any other structure, due to the minimum bearing surface between these elements.

Although this invention has been described in connection with certain specific embodiments, the principles involved are susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention is, therefore, to be limited only as indicated by the scope of the appended claims. The conduit as an article of manufacture is claimed in my divisional application No. 712,619, filed February 23, 1934.

Having thus described the various embodiments of the invention, what I claim is new and desire to secure by Letters Patent is:

1. A method for forming a conduit comprising drawing a metallic strand, coiling the strand and deforming the cross section of the strand while coiling by upsetting the inner surface and drawing the outer surface.

2. A method for forming a conduit comprising drawing a strand to form a trapezoid, coiling the strand and deforming the cross section of the strand while coiling to form in cross section a parallelogram.

3. A method for forming a conduit comprising

drawing a metal strand to form in cross section a trapezoid, coiling the strand and deforming the cross section of the strand while coiling to form in cross section a parallelogram having a curved face and curved apices.

4. A method for forming a conduit comprising shaping a strand of metal to form in cross section a trapezoid having one curved face, coiling the strand to form a helix and deforming the cross section of the strand while coiling to form in cross section a parallelogram having a curved face and curved apices.

ADIEL Y. DODGE.