T. E. MURRAY.

METHOD OF PRODUCING CONDUITS, &c.

APPLICATION FILED JULY 17, 1920.

1,399,308. Patented Dec. 6, 1921.

2 SHEETS—SHEET 1.

Fig: 1.

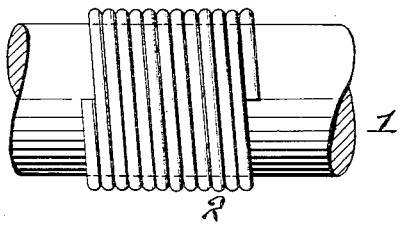


Fig: 2.

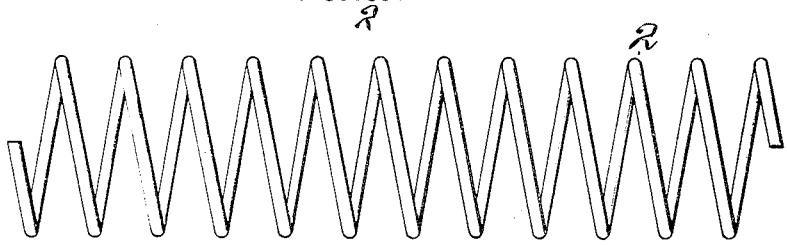


Fig: 3.

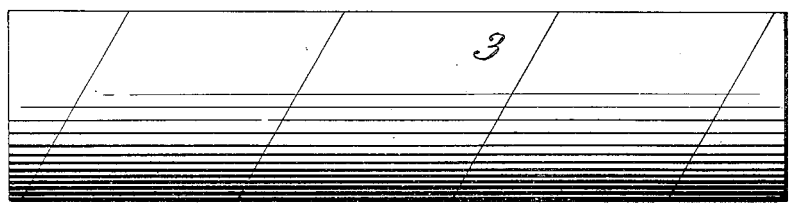


Fig: 4.

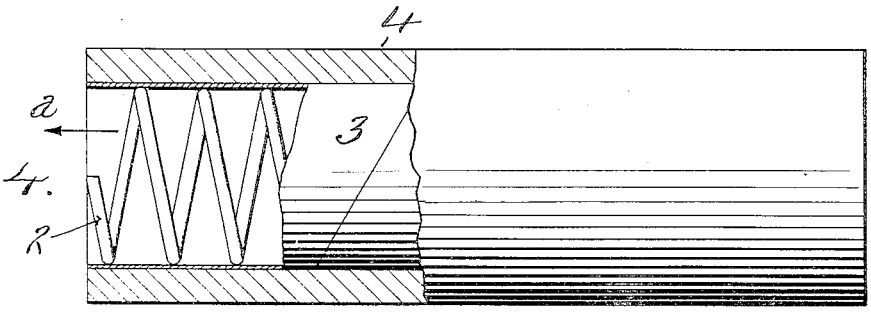
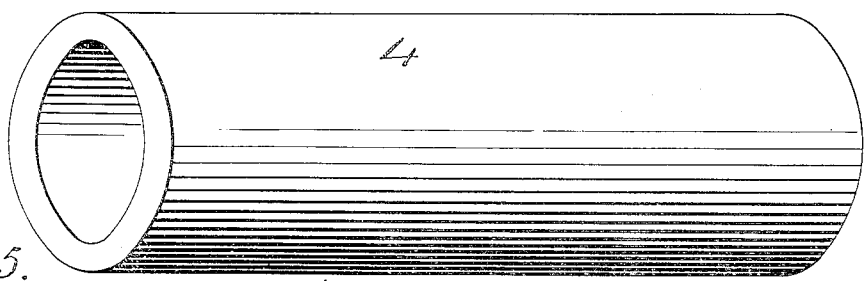


Fig: 5.



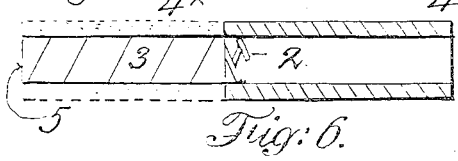


Fig: 6.

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2 SHEETS—SHEET 2.

Fig: 7.

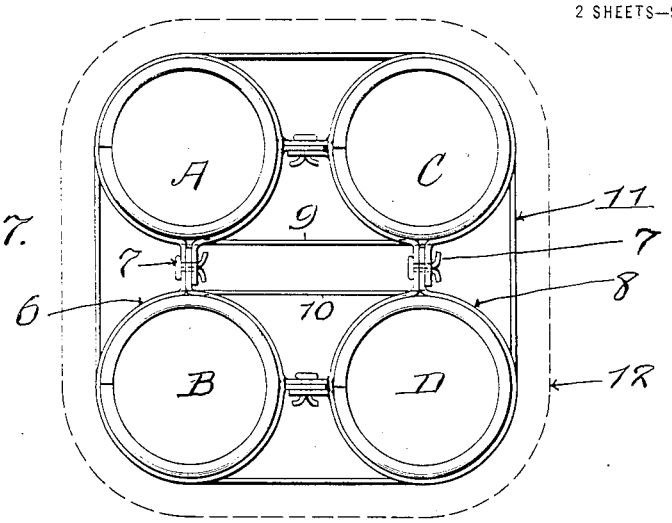


Fig: 8.

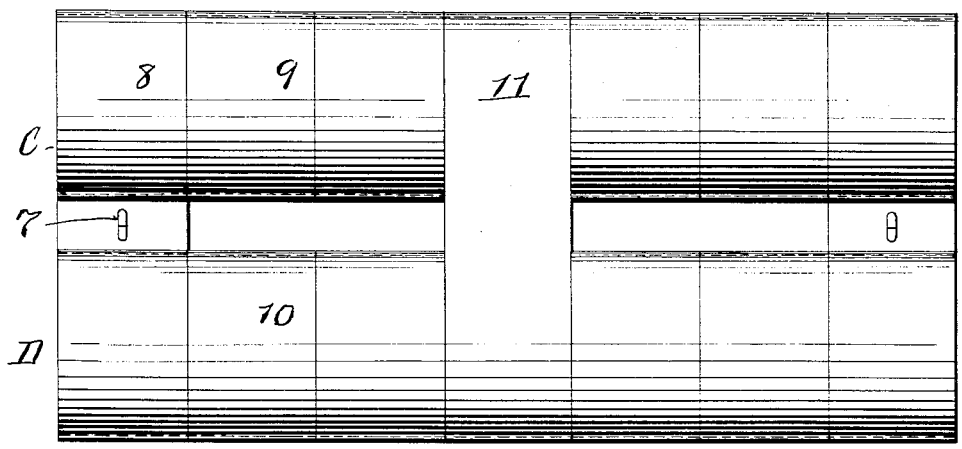
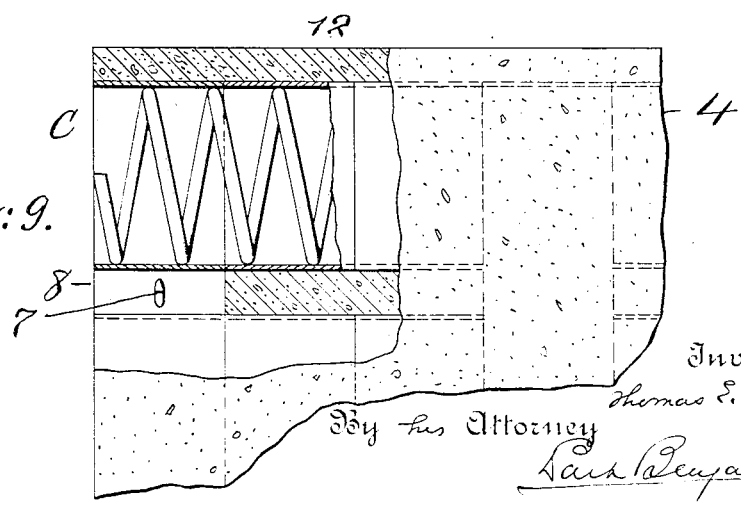


Fig: 9.



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UNITED STATES PATENT OFFICE.

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METHOD OF PRODUCING CONDUITS, &c.

1,399,308. Specification of Letters Patent. Patented Dec. 6, 1921.

Application filed July 17, 1920. Serial No. 396,956.

To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Methods of Producing Conduits, &c., of which the following is a specification.

The invention is a method of producing conduits, pipes, tubes or ducts, and, if desired, in the place where said conduits are to be installed. The said conduits may be of any material capable of being rendered plastic and of afterward hardening. The method consists in the several steps pointed out in the claims.

In the accompanying drawings—

Figure 1 shows a portion of a cylindrical mandrel with a helical coil of wire wound thereon. Fig. 2 shows the coil removed from the mandrel and extended. Fig. 3 shows the extended coil or core enveloped in smooth flexible material such as paper. Fig. 4 shows the material in plastic state applied to the wrapped core to form a wall thereon—a portion of this figure being broken away to show the coil and wrapping. Fig. 5 shows the completed conduit after hardening of the material and withdrawal of the coil. Fig. 6 illustrates the method of producing progressively and in sections a conduit of desired length. Fig. 7 is an end view of a group of four wrapped coils or cores united by bands of stiff paper to support the same in relative position in forming a multiple conduit. Fig. 8 is a side elevation of the united cores of Fig. 6 before the application thereto of the plastic material. Fig. 9 shows partly in section and partly in elevation one end of one of the cores and adjacent parts of the conduit of Fig. 7.

Similar numbers and letters of reference indicate like parts.

Referring first to Figs. 1 to 5, inclusive, in order to make the conduit shown in Fig. 5, I proceed as follows:

Upon a cylindrical mandrel 1 of a diameter substantially the same as that of the inner diameter of the desired conduit, I wind a helical coil 2 of wire—the turns being preferably placed close together so that the mandrel may be made conveniently short. The number of turns in the coil 2 will depend upon the desired length of the conduit or conduit section to be made, and also upon the distance between the turns when the coil is extended longitudinally to produce said length. A coil when extended longitudinally is illustrated in Fig. 2, but it is to be understood that the selected length is further to be governed by the requirement that the distance between the turns shall not be so great as to prevent a wrapping 3 of paper or other thin, smooth, flexible material being wound thereon, as shown in Fig. 3, and in any suitable manner secured in place.

To the core formed of coil and wrapping (Fig. 3) I apply by molding or in any other convenient way material 4, such as cement, in a plastic state to embed said core and to form the wall of the conduit. When this material becomes sufficiently hard, I withdraw from it the coil 2 longitudinally, as indicated by the arrow *a*. The smooth wrapping 3 permits of this withdrawal and prevents engagement of the coil with the conduit wall. After the withdrawal of the coil, this wrapping may be left in the conduit or be removed in any suitable way. The final result is the completed cement conduit of desired diameter, and as shown in Fig. 5.

Where a conduit longer than that which can be conveniently made on a single core is desired, I can produce the same in successive sections and continuously for any desired length. To this end, as shown in Fig. 6, instead of withdrawing the coil entirely from the completed conduit thereon, I may withdraw it for the greater portion of its length, leaving the remainder still within the conduit to support the withdrawn portion in line therewith. I then place upon the protruding portion 5 a wrapping 3, as before, and then apply the plastic material 4* so as to contact with and correspond in diameter to the wall 4 of the completed section and to be a continuation thereof. When the additional wall 4* is hardened, I once more withdraw the coil partially, and proceed as before, thus forming section after section of the conduit until the entire desired length is completed. Instead of leaving a portion of the core within the first section of the conduit to form a support, as described, I may withdraw the whole core and support it in any other suitable way in contact and end registry with the said first section and apply

the plastic material to form the wall of the second section in continuation of the wall of the first section, as already explained.

When I wish to make a multiple conduit, I proceed as follows: see Figs. 7, 8 and 9, in which a group of four ducts is illustrated.

Four wrapped cores A, B, C, D produced as already set forth, are connected by bands of stiff cardboard or paper so as to stand preferably, as here shown, relatively parallel and mutually supporting one another in position; that is to say, the cores A, B are connected by the continuous band 6 which passes around both cores and has its parts brought into contact between said cores and connected together by any suitable fastener, such as shown at 7. The cores C, D are connected by the band 8 in the same way. The cores A, C and B, D are connected by similar bands 9 and 10, which stand at right angles to the bands 6, 8. Finally, around the group of cores is secured a band 11. The plastic material 4 is then applied so as to fill all the spaces between the cores and to extend outwardly beyond the group to form a protecting wall 12—all of the supporting bands then being left embedded in said material. The coils are finally withdrawn, leaving the quadruple conduit finished.

Actual production on an extended scale has already shown that conduits for electric cables or wires can thus be made cheaply and rapidly. Any suitable material capable of being rendered plastic and of afterward hardening may be used.

I claim:

1. The method of making progressively and in consecutive sections a conduit, which consists in, first, producing a helical wire coil; second, enveloping said coil in a wrapper of smooth flexible material; third, molding a wall of material in plastic state upon said wrapped coil as a core and allowing said material to harden; fourth, withdrawing said coil from its hardened envelop and supporting the same in contact with the end thereof with its longitudinal axis in prolongation of the axis of said envelop; fifth, applying to said withdrawn coil a wrapper of smooth flexible material; sixth, molding a wall of material in plastic state upon said last-named coil and allowing said material to harden in contact with the end of the wall of the conduit previously made, and seventh, withdrawing said coil and repeating the aforesaid steps until a conduit of desired length is obtained.

2. The method of making a multiple conduit, which consists in, first, producing a plurality of helical wire coils; second, enveloping each of said coils in a wrapper of smooth flexible material; third, disposing said wrapped coils in a group parallel to one another and supporting one upon the other in said position; fourth, filling the spaces between said wrapped coils with plastic material and covering said group of coils with an outer layer of the same and allowing said material to harden, and fifth, withdrawing said coils.

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

THOMAS E. MURRAY.

Witnesses:

GERTRUDE T. PORTER,

MAY T. MCGARRY.