Nov. 18, 1941. E. B. EDWARDS 2,263,292

CONDUIT

Filed Aug. 22, 1939

FIG. 1.

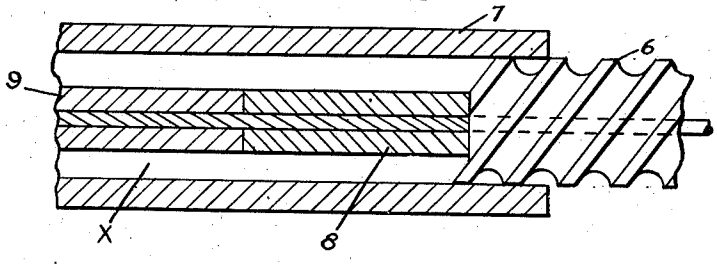


FIG. 2.

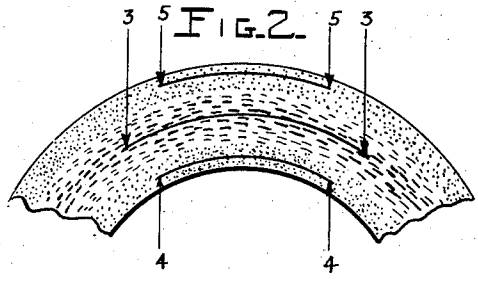


FIG. 3.

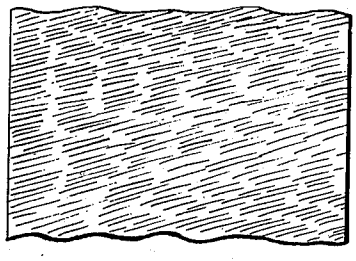


FIG. 4.

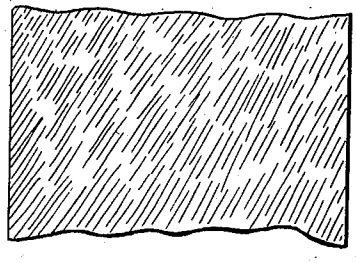
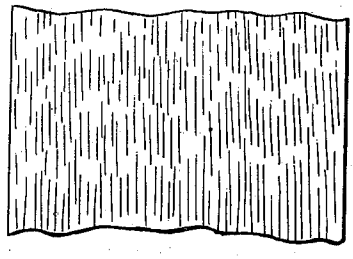


FIG. 5.



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2,263,292

CONDUIT

Edward B. Edwards, Lansdale, Pa.

Application August 22, 1939, Serial No. 291,316

4 Claims. (Cl. 138—80)

This invention relates to conduits, and has more particular reference to conduits made from plastic materials extruded to shape.

The primary object of this invention is to extrude hollow conduits which will retain their given shapes and substantially their dimensions when solidified.

A further object of the invention is to provide a conduit which by virtue of its internal structure will provide great strength without grain.

A still further object of the invention is to provide a conduit from plastics having fibers therein, said conduit constituting a true homogeneous mass and having the center fibers of the wall structure of the conduit extending spirally, and the fibers on either side of the center gradually straightening out toward the length of the conduit.

Still another object of the invention is to provide in conduits any degree of spiral orientation of the center fibers.

According to the invention, the conduit is composed of a binder, filling material, fibrous material and water sufficient to combine the ingredients into a plastic mass, and which, after extrusion, will have the center fibers of the wall structure oriented spirally, and the fibers on either side thereof gradually oriented at an angle thereto.

The drawing illustrates an embodiment of the invention and the views therein are as follows:

Figure 1 is a diagrammatic view of a portion of an apparatus which will accomplish the desired results,

Figure 2 is a cross-sectional view of a segment of the conduit made according to my invention,

Figure 3 is an arcuate section taken on the line 3—3 of Figure 2,

Figure 4 is an arcuate section taken on the line 4—4 of Figure 2, and

Figure 5 is an arcuate section taken on the line 5—5 of Figure 2.

It is to be understood that these figures are illustrative only and the direction of the fibers therein may be changed as desired.

In the manufacture of the conduit different materials may be used depending upon the purpose for which the finished conduit is intended.

In commercial manufacture it has been found that a satisfactory conduit may be composed of the following ingredients in approximate proportions:

	Pounds
Binder, such as cement	200
Filler, such as sand	300
Fibrous material, such as asbestos, cotton, jute, hemp, wood pulp and the like	100
Water in sufficient quantity to form the above in a plastic mass.	

It will, of course, be understood that the foregoing formula is illustrative only, and has no limiting effect upon the invention herein discussed.

In United States Patent No. 2,144,213, granted January 17, 1939, a mechanism for extruding plastic materials is shown and described.

The material to form the conduit is extruded by a feed screw 6 through a die 7 over a die 8, and, if desired, over a die 9.

The angle of the fibers in the wall of the conduit may be controlled in four ways, namely:

1. Pitch of the screw lands,
2. The speed of the screw,
3. The orifice of the die, and
4. The length of the die.

In a given instance, the feed screw 6 feeds a ribbon through the orifice at a set R. P. M., and the die members 7 and 8 by their friction on the material so fed will change the angle of the fibers so as to bring the surface fibers more nearly in the direction of the length of said dies. This change of angulation will, of course, gradually swing to the center of the conduit wall where the angulation is greatest. Now, the greater the length of the stationary die member 7, the more completely will the surface of the outer walls of the conduit be turned or be arranged in the direction of the length thereof.

By decreasing the size of the wall or the orifice X, and retaining the same R. P. M. of the feed screw, a greater length of conduit or more linear feed will be formed in the given time, and by reason of increased resistance the relative angularity of the fibers in the zones indicated in Figure 2 will be altered. Consequently, the angle of the fibers due to increased resistance will be changed so that those fibers lying nearest the inner and outer surfaces will be oriented at an angle approximating or approaching the length of the formed conduit.

It will at once be seen that this same condition will hold true regardless of the speed and amount of feed and the thickness of the conduit wall if the outer stationary die member 7 is lengthened and the die 9 made stationary and accordingly lengthened. However, to control the arrangement of the fibers of the inner surface the die member 9 may be stationary or rotating.

In order to provide flexibility, and so as to control the difference in orientation between the fibers at the outer surface of the conduit and those at the inner surface, the outer stationary die 7 and inner die may be of different lengths and/or a rotary die 8 substantially conforming to the diameter of the die 9 located adjacent the screw 6 so that this die will turn the inner surface fibers toward its direction of rotation, while the outer surface fibers will approximate or approach the direction of the length of the conduit.

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Figures 3, 4 and 5 are, therefore illustrative of a given conduit, but as will be understood from the foregoing description, the fiber directions may be controlled by combination changes, some of which have been hereinbefore mentioned, and in conduit manufacturing according to this invention the fibers at the inner and outer surfaces of the conduit wall will be oriented in a direction at an angle or angles to the center fibers of said wall.

The conduit after curing may be treated with an acid solution to neutralize alkalinity. The conduit may have its surfaces or one of them coated with material such, for instance, as a bituminous compound to render the conduit duct waterproof, thereby preventing the duct from absorbing acid or alkaline solutions which might enter the duct under flood conditions.

The purpose of this change in fiber orientation is to eliminate the grain and thus strengthen the conduit.

Of course, the conduit illustrated and described herein may be modified in various ways without departing from the invention herein set forth and hereafter claimed.

The invention is hereby claimed as follows:

1. An extruded conduit comprising cement and asbestos fibrous material having varying length fibers, wherein the longer fibers at and near the surfaces are disposed generally parallel to each other, and wherein the general direction of the longer fibers at one surface is different from the general direction of the longer fibers at the other surface.

2. An extruded hollow member of substantially uniform cross-section comprising fibrous material and cement, with the fibers near the inner and outer wall surfaces extending generally longitudinally of the conduit, and the fibers of the central portion of the wall extending in different directions from said inner and outer fibers to eliminate fiber grain.

3. An extruded conduit comprising fibrous material and cement with the longer fibers near the inner and outer wall surfaces extending generally longitudinally of the conduit, and the fibers of the central portion of the wall extending generally in a different direction from the inner and outer fibers to eliminate fiber grain.

4. An extruded conduit comprising fibrous material and cement with the longer fibers of the central portion of the wall arranged in a generally spiral direction, and the longer fibers near the inner and outer wall surfaces arranged angularly of the longer fibers of the central portion of the wall.

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