C. D. VORIS.

REINFORCED CEMENT CULVERT.

APPLICATION FILED MAR. 13, 1908.

902,027. Patented Oct. 27, 1908.

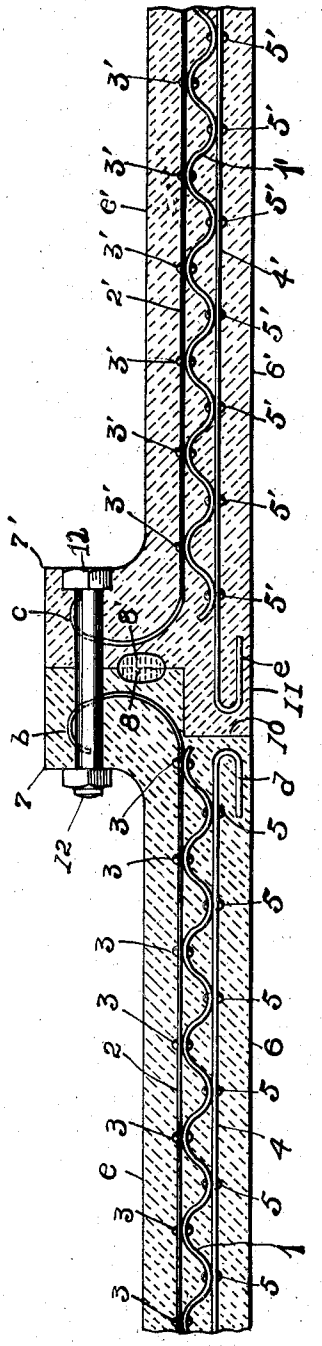


Fig. 1

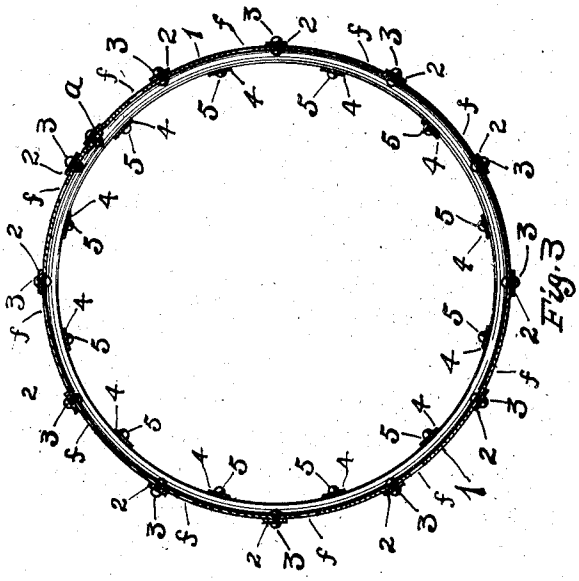


Fig. 3

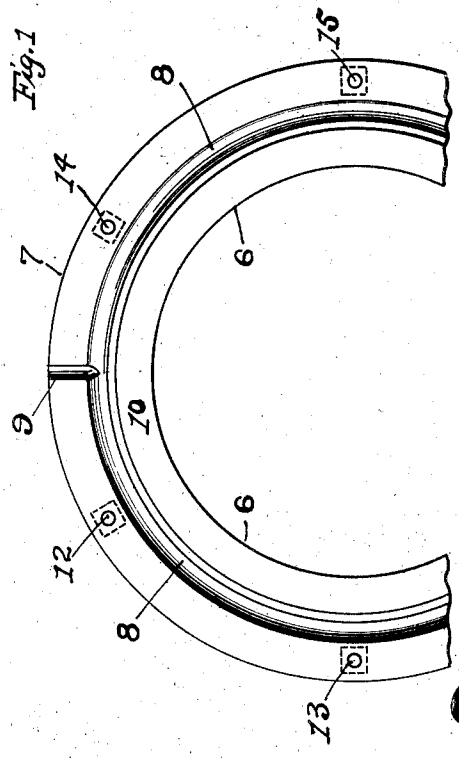


Fig. 2

WITNESSES:

H. E. Beecroft

R. E. Randle.

C. D. Voris,

INVENTOR;

BY Robert A. Randle

ATTORNEY.

UNITED STATES PATENT OFFICE.

CLIFFORD D. VORIS, OF CRAWFORDSVILLE, INDIANA.

REINFORCED CEMENT CULVERT.

No. 902,027. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed March 13, 1908. Serial No. 420,953.

To all whom it may concern:

Be it known that I, CLIFFORD D. VORIS, a citizen of the United States, residing in Crawfordsville, in the county of Montgomery and State of Indiana, have invented a Reinforced Cement Culvert, containing new and useful features and details of construction, of which the following is a full and accurate specification and exposition, being such as will enable others to make and use the same with absolute exactitude.

The objects of my present invention, broadly speaking, is to provide a culvert or the like composed of cementitious material formed upon a reinforcing metal framework, the whole constituting a culvert which will be easy to manufacture, having a maximum of strength, being practically indestructible, and which can be made and sold at a comparatively low price.

A further object is to provide a culvert which may be manufactured in any size and be formed in one or a plurality of sections as desired, with means for securely connecting the sections together to form a waterproof joint.

Other minor objects and particular advantages will be made apparent in the course of the following specification.

One manner for carrying out my invention in a practical manner and that which in practice has been found the most desirable, is shown most clearly in the accompanying drawings, in which,—

Figure 1 is a sectional view of a portion of two sections joined together in operative position. Fig. 2 is an end view of a portion of the reinforcement of one of the sections. And Fig. 3 is a cross sectional view, taken through the body of one of the sections.

Similar indices denote like parts throughout the several views of the drawings.

In order that construction of my invention may be more fully understood and its many advantages be fully appreciated, I will now take up a detail description thereof in which I will set forth the construction as briefly and as comprehensively as I may.

It should be understood, when there is more than one section, that each of the sections are to be formed identical with each other, the two ends of each section being formed substantially as shown in Fig. 1.

The parts shown in the left-hand section in Fig. 1 will be indicated by certain numerals, while like parts in the right-hand section will be denoted by similar numerals primed, it being understood the left-hand end of the left-hand section has its flange or end portion constructed identical with the left-hand end of the right-hand section, and vice versa.

The indices 1 and 1′ denote each a sheet of metal bent into a substantially cylindrical shape and provided with spaced circumferential corrugations extending from end-to-end thereof, the longitudinal meeting edges of said sheets being overlapped and riveted, or otherwise secured, together as indicated by the rivet *a* in Fig. 3. Extending longitudinally of said sections are a plurality of metal bars 2 and 2′, each secured to the outer apexes of each of the corrugations by rivets 3 and 3′, by which the bars are secured to the metal tubing as indicated. Also extending longitudinally of the sections, but located on the inner surface thereof, are a plurality of metal bars 4 and 4′, each secured to the inner apexes of each of the corrugations by the rivets 5 and 5′. The bars 4—4′ are positioned alternately with the bars 2—2′, as is indicated in Fig. 3, and they are positioned a short distance apart. The ends of the bars 2—2′ extend at each end beyond the termini of the metal tube to which they are secured, from the ends of which they are bent outward and back forming the loops *b* and *c*, substantially as shown in Fig. 1. And the ends of the bars 4—4′ extend at each end beyond the metal tube to which they are secured and are bent back parallel with their main portion forming the hooks *d* and *e*, substantially as shown in Fig. 1.

A plurality of apertures are formed through the wall of the metal tubes, said apertures being indicated by the letter *f*, as shown in Fig. 3, and are for the purpose of allowing the cement on each side of the metal tube to be united therethrough.

After the metal reinforcing has been formed as shown and described, the whole is covered with a comparatively heavy thickness of cement, which is molded in form desired, substantially as shown in Fig. 1, in which the numerals 6—6′ designate the cement body and the numerals 7—7′ denote the outwardly extending and oppositely disposed cement flanges. Extending around in the oppositely disposed faces of the flanges 7—7′ is a channel 8—8′, the two channels, when united, forming an inclosed aperture, as indicated in Fig. 1. At one point in its circumference the said aperture extends out

to the periphery of the flanges, forming the pour-hole 9, as indicated in Fig. 2, thereby forming an inlet to said aperture after two sections have been united, for the purposes presently appearing.

An angular notch 10 is formed around in the inner face of the left-hand section to receive the tongue 11 of the right-hand section, substantially as indicated in Fig. 1.

Longitudinally alined apertures are formed through the flanges 7—7′ to receive the bolts, as the bolts 12, 13, 14 and 15, for securing two sections together as indicated in Fig. 1. Said bolts should be provided with a fixed head on one end and a cavity should be formed in the flange to receive the heads, which will prevent the bolts from turning when their nuts are being turned thereon. Said bolt apertures are located at points between two loops *b* and between two loops *c*. Any desired number of sections may be thus secured together, after which a thin compost of cement may be prepared and poured in the channel 9, filling the channel 8—8′ which, after the compost has solidified, will unite the sections and form a water-tight joint.

I desire that it be understood that while I have shown and described a specific construction I am not limited thereto, but am entitled to a broad construction of the principles here involved, it being understood that various changes may be made in details of construction without departing from the principles of my invention or sacrificing any of the advantages thereof.

Having now fully shown and described my invention, and the best means for its construction to me known at this time, what I claim and desire to secure by Letters Patent of the United States, is—

1. A culvert or the like comprising a circumferentially corrugated metal tube having a plurality of apertures therethrough, a plurality of bars secured to the inside wall of the tube, a plurality of bars secured to the outside wall of the tube, the end portions of the last named bars being curved back, a cement body covering all of said metal parts and having a notch formed in one end thereof and a tongue formed at the other end thereof, and a flange formed at each end thereof, two or more of the sections thus formed being adapted to be connected tandem.

2. A culvert or the like formed of cement sections, a flange extending out from around each end of each section, having a notch formed in one end of each section, a tongue extending out from the other end of each section, means for sealing the adjoining ends of the sections together, which means comprises a half-round channel formed in oppositely disposed adjoining faces of each of the flanges which together form a substantially round aperture which at one point opens to the periphery of the flanges, said aperture being adapted to be filled with a sealing compost after the sections are united, bolts for connecting the sections, and means for reinforcing the sections.

3. A culvert or the like comprising a corrugated sheet metal section formed cylindrical in cross section, a plurality of bars located both on the exterior and the interior and extending longitudinally of and secured to said sheet metal, reverse curves formed by the ends of said bars, and a cement body inclosing said metal parts, all substantially as shown and described.

4. A culvert or the like formed of tubular cement-sections, flanges extending out at right-angles from around each end of each section, a notch formed on one end of each section, a tongue extending out from the other end of each section, the said tongue of one section being adapted to fill the notch of the adjoining section, bolts for securing the flanges of adjoining sections together, means for sealing the adjoining ends of the sections after they are secured together, and a system of reinforcing inclosed in each of the sections, substantially as described.

In testimony whereof I have hereunto subscribed my name to this specification in the presence of two subscribing witnesses.

CLIFFORD D. VORIS.

Witnesses:

BRUCE HAINES,

ROBERT H. CISSEL.