K. J. THORSBY.

METALLIC CULVERT.

APPLICATION FILED FEB. 14, 1912.

1,028,638.

Patented June 4, 1912.

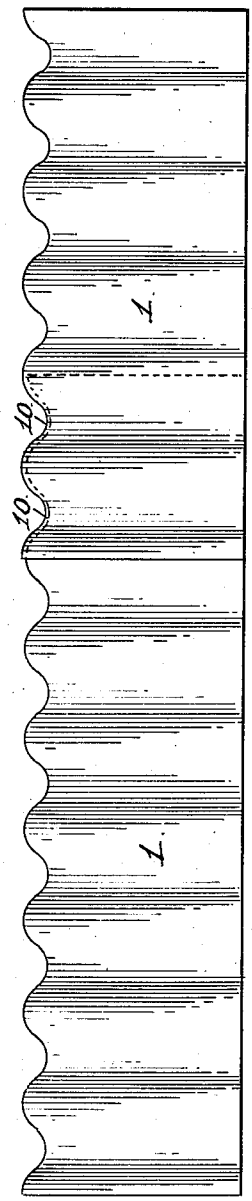

Fig. 1.

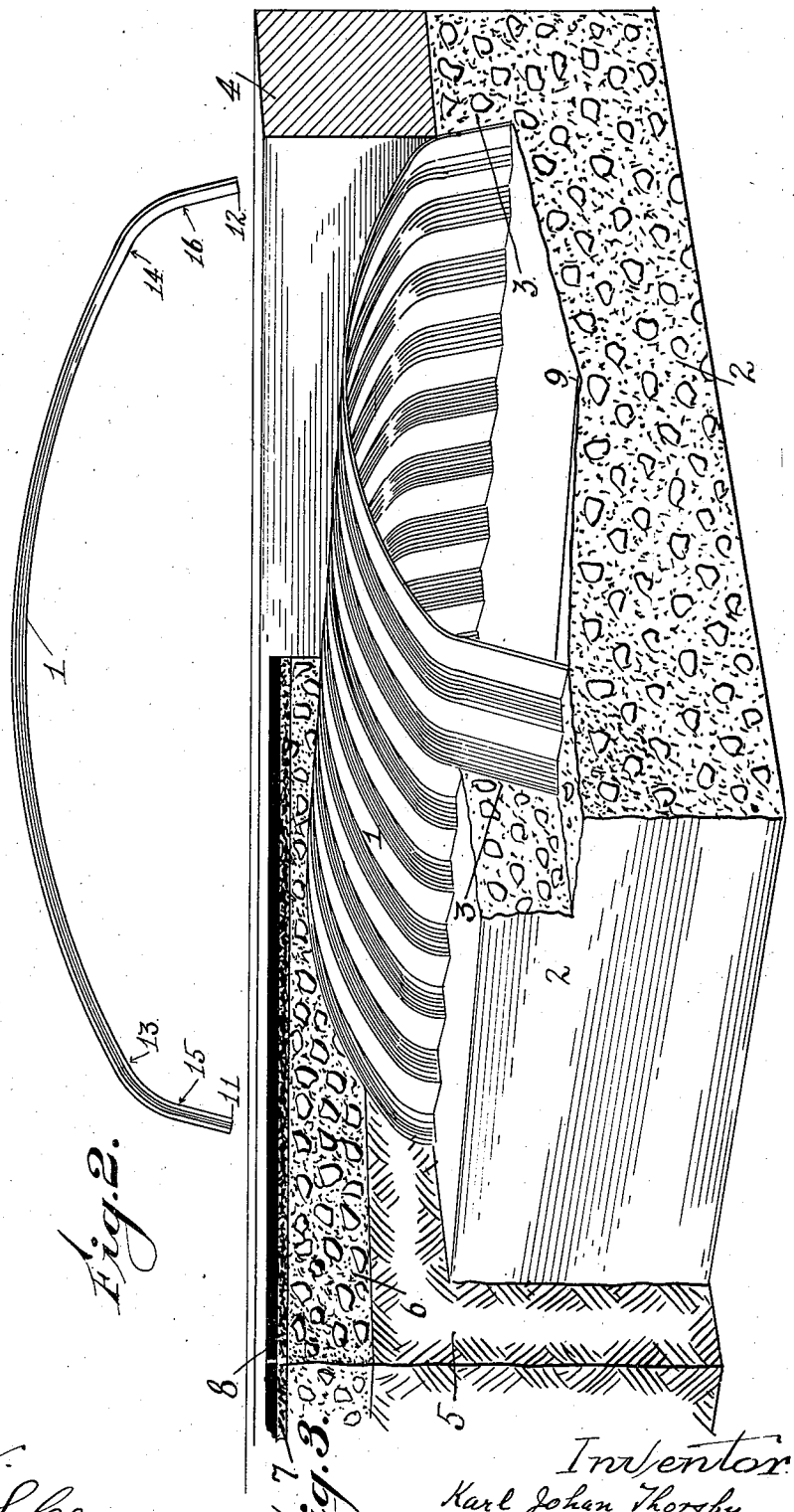

Fig. 2.

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

KARL JOHAN THORSBY, OF OAKLAND, CALIFORNIA, ASSIGNOR TO CALIFORNIA CORRUGATED CULVERT COMPANY, OF OAKLAND, CALIFORNIA, A CORPORATION OF CALIFORNIA.

METALLIC CULVERT.

1,028,638. Specification of Letters Patent. Patented June 4, 1912.

Application filed February 14, 1912. Serial No. 677,610.

To all whom it may concern:

Be it known that I, KARL JOHAN THORSBY, a subject of the King of Norway, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Metallic Culverts, of which the following is a specification.

My invention relates to the class of metallic culverts, and particularly to those of the part round or arch type, designed for use beneath railroad tracks, roadways and especially paved streets.

The object of my invention is to provide a strong and durable culvert of this character, capable of being put up with a minimum labor cost, and inexpensive in manufacture.

A further object of my invention is to provide a simple and effective arch-culvert, which may be made up of a number of sections and of separate sheets of metal, preferably corrugated, said sheets being curved as hereinafter explained.

To these ends and with these objects in view, my invention consists in the novel culvert which I shall now fully describe by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the metallic section of my culvert, showing the union of two plates of said section. Fig. 2 is an end view of the metallic section of the culvert, showing its cross-sectional shape. Fig. 3 is a sectional perspective view of the culvert as it will appear in ordinary street construction.

The metallic section of the culvert consists of a plate or a plurality of plates 1, preferably corrugated as I have here shown. When a plurality of plates are used, they are united by overlapping one or more corrugations, as shown at 10, in Fig. 1. The arch of the plates 1 is formed, as shown in Fig. 2, on a curve of relatively long radius throughout its greater portion, as, for example, between the points 13 and 14. Beyond these points, namely to the points 15 and 16 respectively, the plates are bent on a curve of comparatively short radius. From the points 15 and 16 to the extremities 11 and 12 respectively, the ends of the plates are left straight.

In Fig. 3 I show the complete culvert, involving the metallic section 1 and its environment as will occur in street construction. 2 is a fundamental support or base, upon which the metallic section 1 rests, which base forms the bottom of the culvert, being formed with a smooth surface of any desired shape, as, for example, a shape as here shown, curving or inclining downward to the middle, as at 9, in order to give a larger water-way and reduced friction. 4 is the curb, and 5, 6, 7 and 8 show the different grades of the street section.

It is to be especially noted that the base 2, which may be made of any substantial material, such, for example, as concrete, continues up the sides of the metallic section 1, as shown at 3, to at least the full length of the straight portions thereof between the points 11—15 and 12—16 heretofore described. The usual practice heretofore has been to form the full length of part-circle culverts as a one-half or a less part of a full circle. With such a shape, when there is a wide base and a comparatively short rise the pressure on the extremities is very great, and in many cases has cracked the concrete at these points. I have overcome this by the shape of the culvert section here shown.

By the use of the sheets or plates 1 of the metallic section having the long curve of relatively great radius followed by the short curves of relatively small radius, succeeded by the straight sides or ends to the extremities, and these latter being reinforced by the uprising base at 3, there follows as a result that as the side thrust stresses of the sections are distributed on these straight portions, the strain on the concrete or other material composing the base is considerably reduced.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is—

1. In a metallic culvert of the arch-type, the metallic section thereof bent throughout the greater portion of its arch on a curve of relatively long radius, said curve being followed at each end with short curves of relatively small radius, and said short curves being followed by straight portions continuing to the extremities of the section sides.

2. A metallic culvert of the arch-type, comprising a metallic section bent throughout the greater portion of its arch on a curve of relatively long radius, said curve being

followed at each end with short curves of relatively small radius, and said short curves being followed by straight portions continuing to the extremities of the section sides, and a base upon which the extremities of the metallic section rest, said base forming the bottom of the culvert.

3. A metallic culvert of the arch-type, comprising a metallic section bent throughout the greater portion of its arch on a curve of relatively long radius, said curve being followed at each end with short curves of relatively small radius, and said short curves being followed by straight portions continuing to the extremities of the section sides, and a base upon which the extremities of the metallic section rest, said base forming the bottom of the culvert, and continuing up the outside of the straight portions of the sides of said metallic section.

4. A metallic culvert of the arch-type, comprising a metallic section bent throughout the greater portion of its arch on a curve of relatively long radius, said curve being followed at each end with short curves of relatively small radius, and said short curves being followed by straight portions continuing to the extremities of the section sides, and a base upon which the extremities of the metallic section rest, said base forming the bottom of the culvert, the surface of said bottom being inclined downward from each side, and said base continuing up the outside of the straight portions of the sides of the said metallic section.

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

KARL JOHAN THORSBY.

Witnesses:

S. A. FORD,

C. R. HODGKIN.