

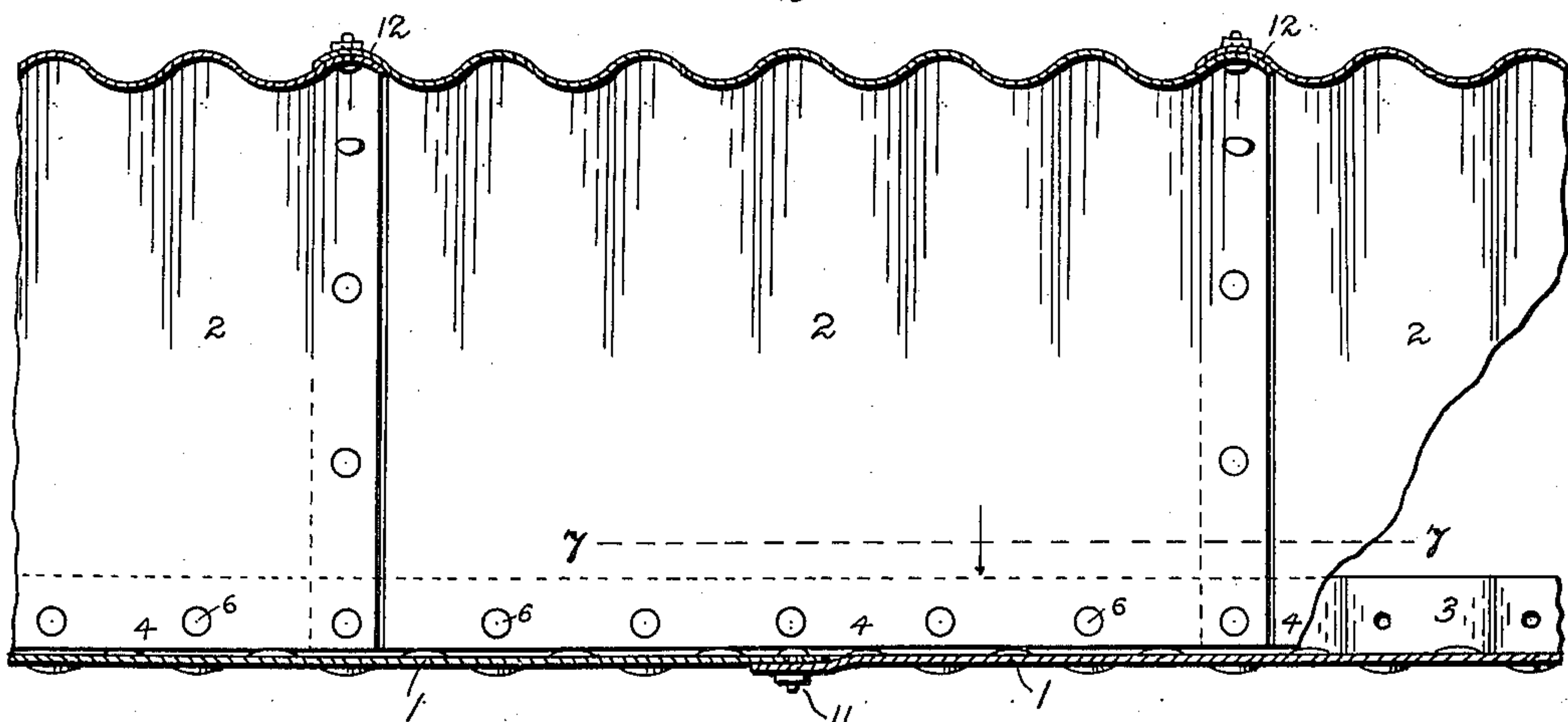
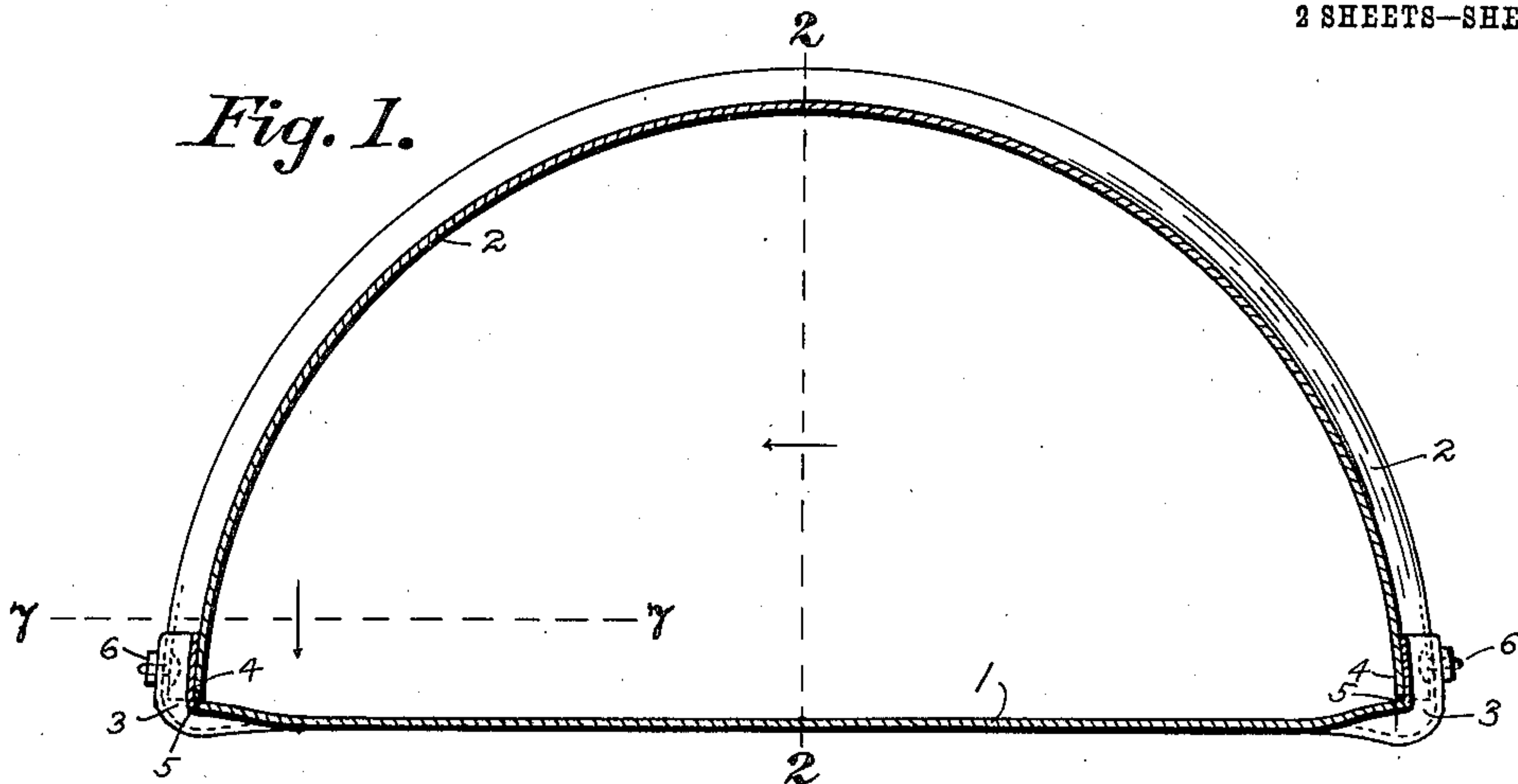
W. N. KLOTZ.  
SHEET METAL CULVERT PIPE.  
APPLICATION FILED APR. 27, 1908.

934,673.

Patented Sept. 21, 1909.

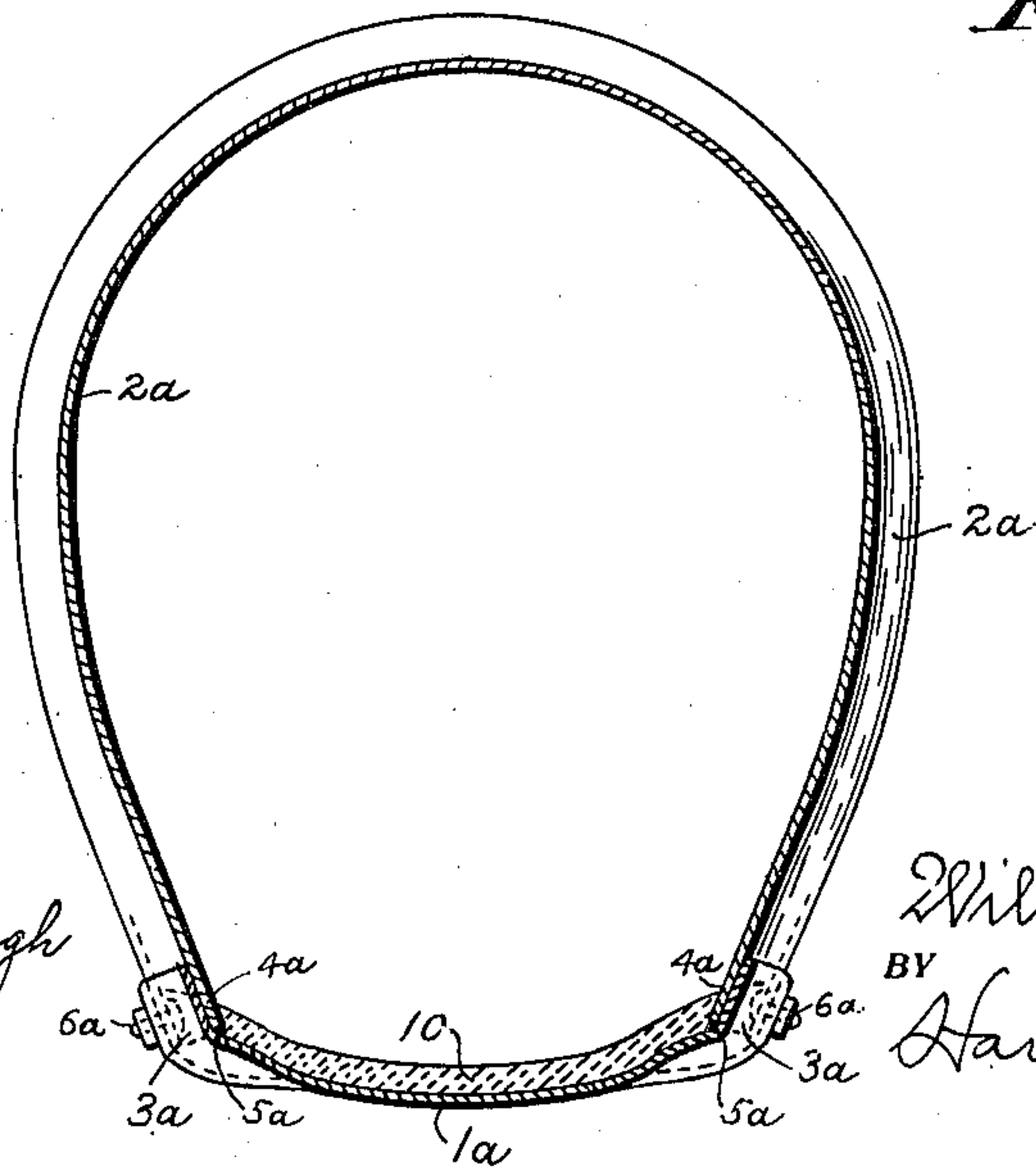
2 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*

*Fig. 3.*



WITNESSES:

Mary A. Cavanaugh  
Ruth A. Miller

INVENTOR

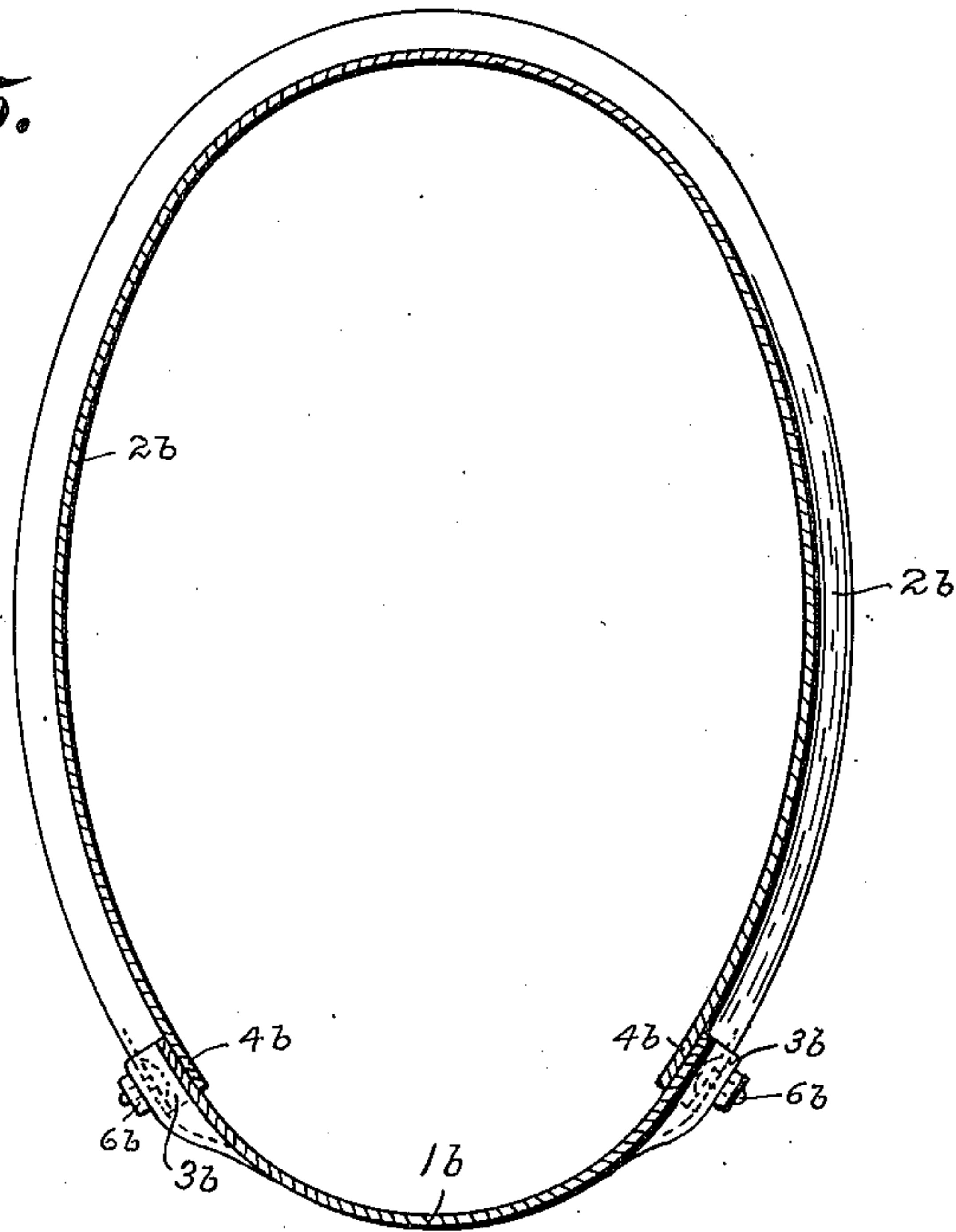
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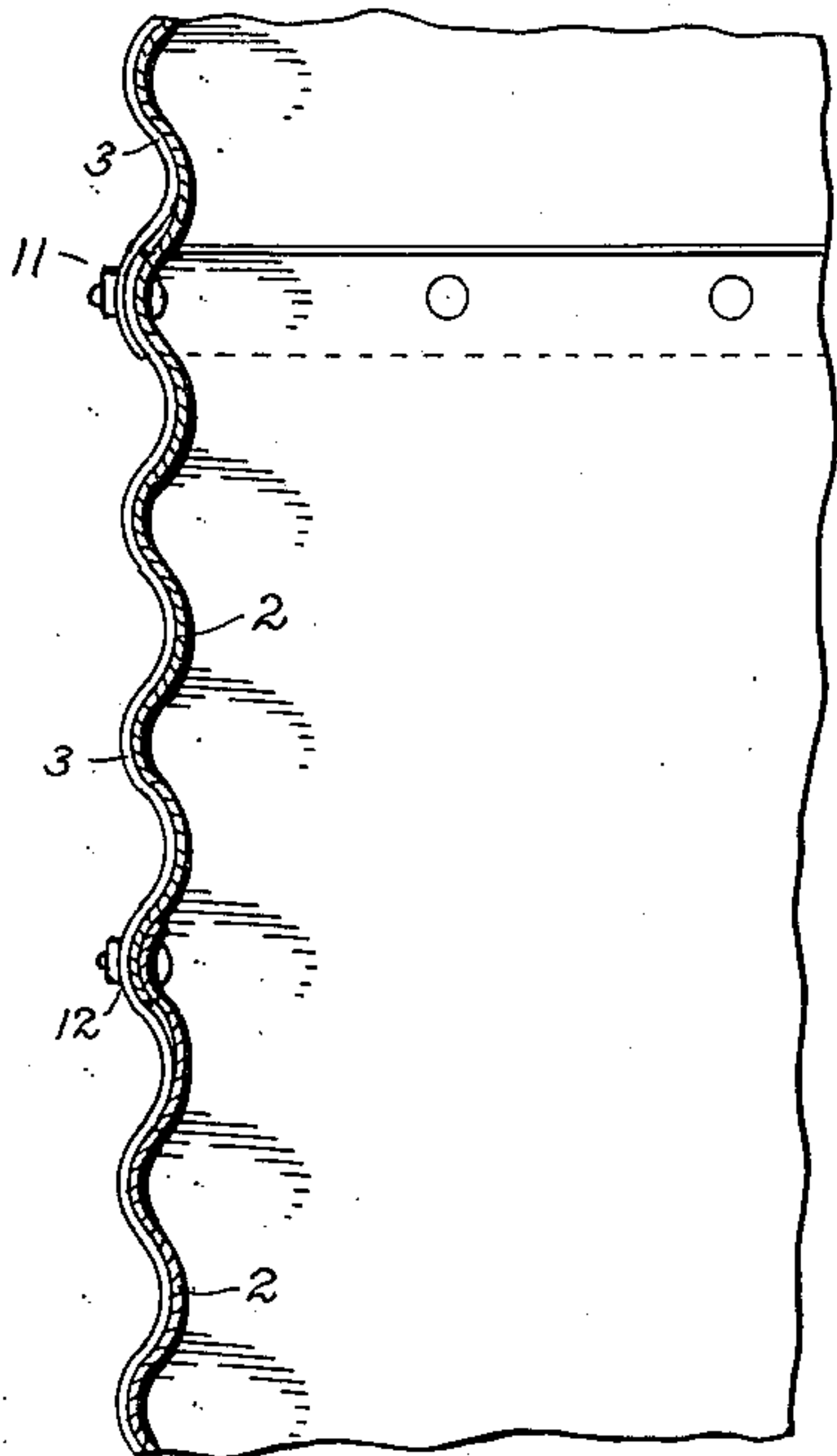
934,673.

Patented Sept. 21, 1909.  
2 SHEETS—SHEET 2.

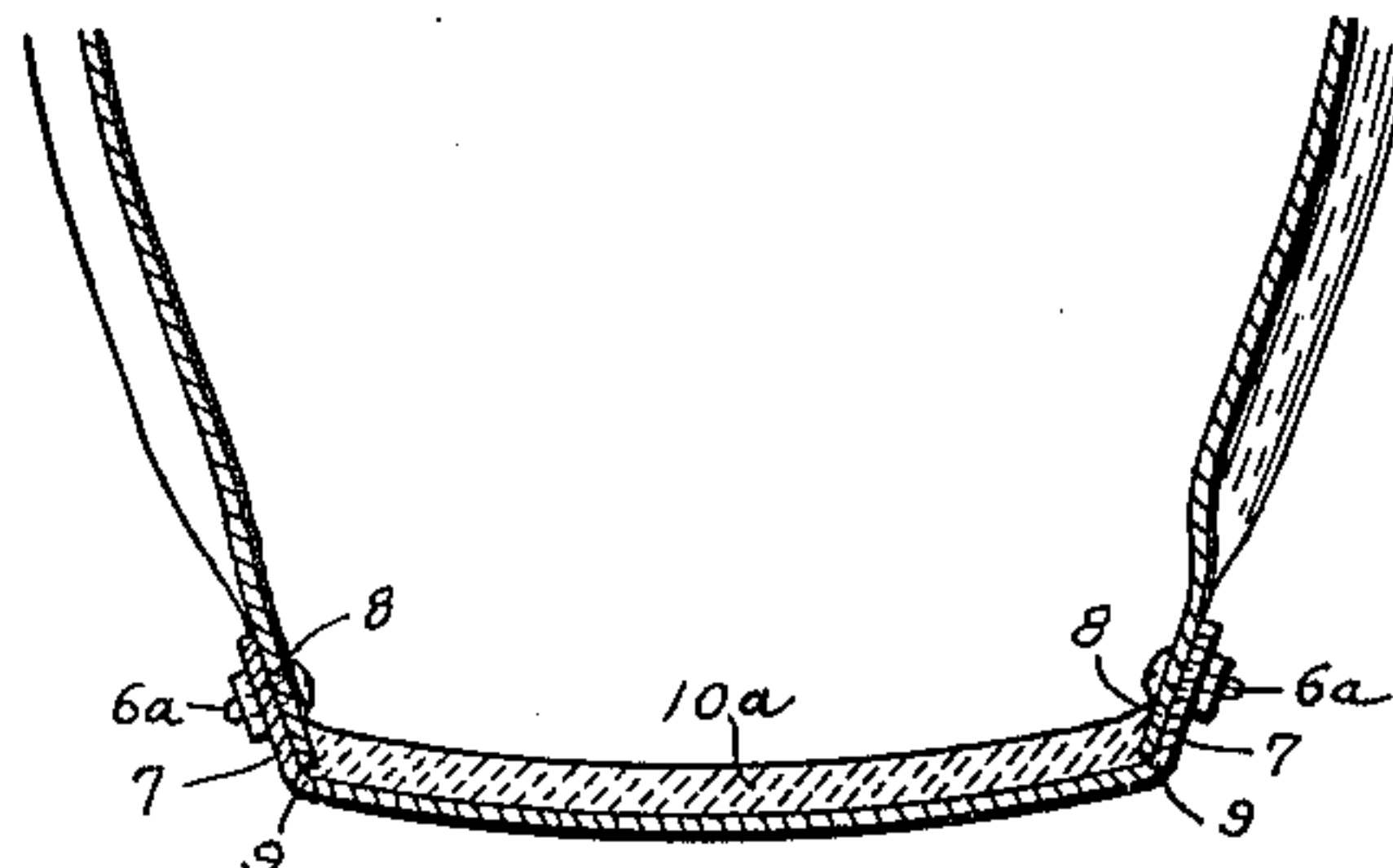
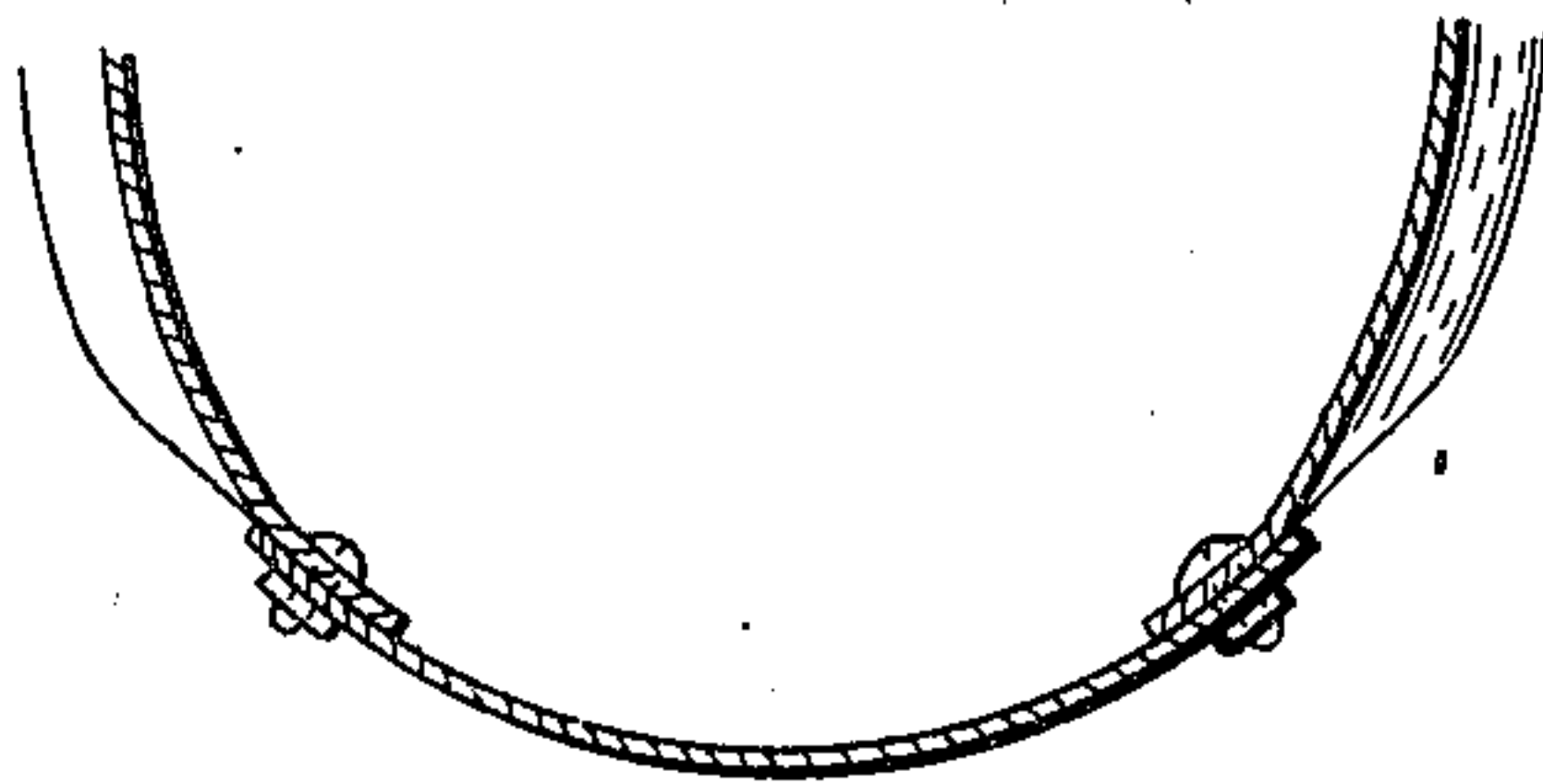
*Fig. 5.*



*Fig. 7.*



*Fig. 6.*



*Fig. 4.*

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# UNITED STATES PATENT OFFICE.

WILLIAM N. KLOTZ, OF CANTON, OHIO, ASSIGNOR TO THE CANTON CULVERT COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

## SHEET-METAL CULVERT-PIPE.

934,673.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed April 27, 1908. Serial No. 429,395.

*To all whom it may concern:*

Be it known that I, WILLIAM N. KLOTZ, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Sheet-Metal Culvert-Pipes, of which the following is a specification.

The invention relates to a culvert pipe made of sheet metal, preferably galvanized sheet iron or steel, and having annular strengthening corrugations. Such pipes are generally made with the corrugations extending entirely around the pipe, and the transverse ridges formed by the corrugations in the bottom of the pipe prevent a free flow or a scouring action of the water therein, and interfere with the passing of leaves and other detritus, which thus accumulate and are deposited in the intervening grooves.

The object of the invention is to form such a pipe with a smooth bottom, and to make the same in sections which can be nested into small space for shipment and readily assembled and fastened together at the place of use. These objects are attained by making the pipe of one or more smooth bottom sections and one or more annularly corrugated top sections, and to shape the edge portions of one section so that they will overlap and fit the abutting edge portions of the other section.

A further purpose of the invention is to strengthen the joined edge portions of the two sections by flanging one edge portion to form an angle into which the other edge portion is abutted.

The invention furthermore pertains to the use, when desired, of a layer of concrete or other cementitious material in the bottom of the pipe, the same being arranged to cover and seal the joined overlapping edge portions of the two sections, thereby making an absolutely water-tight pipe.

These general objects and other minor advantages are attained by the construction and arrangement illustrated in the accompanying drawings, forming part hereof, in which—

Figure 1 is a cross section of a pipe made with a flat bottom section and a semi-circular annularly corrugated top section, the edge portions of the bottom section being crimped and flanged to overlap and fit the edge portions of the top section; Fig. 2, a

longitudinal section on line 2—2, Fig. 1; Fig. 3, a cross section of a pipe made with a transversely curved smooth bottom section and a horseshoe-shaped annularly corrugated top section, the edge portions of the bottom section being crimped and flanged to overlap and fit the edge portions of the top section; Fig. 4, a fragmentary section of the bottom portion of a similar pipe in which the edge portions of the bottom section are flanged, and the edge portions of the top section are flattened to fit the flanges and abut in the angle of the bottom section; Fig. 5, a cross section of a pipe having a transversely curved smooth bottom section and an oval-shaped annularly corrugated top section, the edge portions of the bottom section being crimped to fit the edge portions of the top section; Fig. 6, a fragmentary section of the bottom portion of a similar pipe, with the edge portions of the upper section flattened to fit the edge portions of the lower section; and Fig. 7, a fragmentary plan section on line 7—7, Figs. 1 and 2.

Similar numerals refer to similar parts throughout the drawings.

The form of pipe illustrated in Figs. 1, 2 and 7, is well adapted for use on unyielding foundations, and is composed of the flat bottom sections 1, and as shown, with the semi-circular annularly corrugated top sections 2. The edge portions 3 of the bottom sections are flanged upward, and are also crimped throughout their whole width to conform to the corrugations of the top section, the edge portions 4 of which are abutted into the angle 5 formed by the flanged edge portions of the bottom section; and the sides of the similarly shaped edge portions of the respective sections are nested together. The overlapping edge portions may be fastened together as by means of the bolts 6, the heads of which are preferably located in the internal grooves of the corrugations, but it is evident that when a pipe of this construction is embedded in the ground, the fastening of the edge portions together can be dispensed with for the reason that the thrust action of the arched upper section will hold its edges securely in the flanged angles of the lower section, and the sections cannot possibly be separated. It will be noted that the crimping and flanging of the edges of the lower section greatly strengthen the same, and that a rigid base is thus furnished



for the support of the legs of the arch of the top section.

The form of pipe illustrated in Figs. 3 and 4, is adapted for use on a foundation which although somewhat yielding, is not soft, and is composed of a smooth bottom section 1<sup>a</sup>, slightly curved transversely, and an annularly corrugated horseshoe-shaped top section 2<sup>a</sup>. In Fig. 3, the edge portions 3<sup>a</sup> of the bottom section are flanged upward and crimped to fit the edge portions 4<sup>a</sup> of the top section, which are abutted in the angle 5<sup>a</sup> formed by the flanged edge portions of the bottom section; while in Fig. 4, the edge portions 7 of the bottom section are flanged upward, and the edge portions 8 of the top section are flattened to fit the whole width of the overlapping edge portions of the bottom section, and are abutted in the angle 9 formed by the flanges thereof. The overlapping edge portions may be fastened as by the bolts 6<sup>a</sup>. In both figures, a layer of concrete, 10 and 10<sup>a</sup>, is shown extending entirely across the bottom section and also covering the edges of the top section so that the edge joints are sealed and a water-tight pipe is formed. It will be noted that by reason of the smoothness of the bottom section, the layer of concrete is of uniform thickness and strength throughout, and that the concrete will not only stiffen and strengthen the arch section of the bottom of the pipe, but will protect the same against the abrasion of flowing water and detritus. It will be understood; however, that the use of the concrete lining in the bottom of the pipe is not essential to the other features of the invention.

The form of pipe illustrated in Figs. 5 and 6 is well adapted for use on soft foundations, and as shown, the bottom section 1<sup>b</sup> is formed smooth but considerably curved transversely, and the annularly corrugated top section 2<sup>b</sup> is oval shape in form. In Fig. 5, the edge portions 3<sup>b</sup> of the bottom section are crimped to fit the overlapping edge portions 4<sup>b</sup> of the top section, but are not flanged to form an angle for the same. In this form of construction, it is practically necessary that the overlapping edge portions shall be fastened together as by the bolts 6<sup>b</sup>. In Fig. 6, the edge portions of the bottom section are not crimped, but the overlapping edge portions of the top section are flattened to fit the edge portions of the bottom section.

The pipe is readily made up of one or more relatively long bottom sections, the end edge portions of which are preferably overlapped and bolted together as shown at 11 in Fig. 2, upon which are placed a series of relatively short top sections, the end corrugations of which are readily overlapped

by merely placing one upon another, and they are preferably bolted together as shown at 12 in Fig. 2; and, when used, the concrete layer is formed on the bottom of the pipe as the several sections are put in place.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions, the edge portions of one section being shaped to fit the whole width of the overlapping edge portions of the other section.

2. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions, the edge portions of one section being shaped to fit the whole width of the overlapping edge portions of the other section, with means for fastening the edge portions together.

3. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions, the edge portions of the smooth section being crimped to fit the whole width of the overlapping edge portions of the opposite section.

4. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions, the edge portions of the smooth section being crimped to fit the whole width of the overlapping edge portions of the opposite section, with means for fastening the edge portions together.

5. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions having their whole width shaped alike and the edge portions of one section being flanged to form an angle into which the edge portions of the other section are abutted.

6. A sheet-metal pipe including a smooth section and an annularly-corrugated opposite section with overlapping edge portions having their whole width shaped alike and the edge portions of one section being flanged to form an angle into which the edge portions of the other section are abutted, with means for fastening the edge portions together.

7. A culvert pipe including sheet metal bottom and top sections joined together at the edges and a layer of cementitious material on the bottom section and sealing the edge joints.

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Witnesses:

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