J. H. DEAN.

SHEET METAL CULVERT.

APPLICATION FILED SEPT. 22, 1913.

1,140,362.

Patented May 25, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

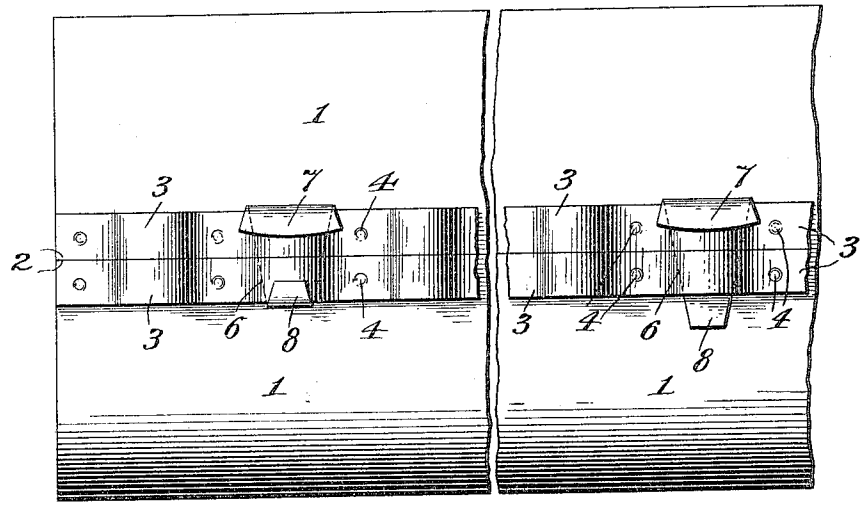
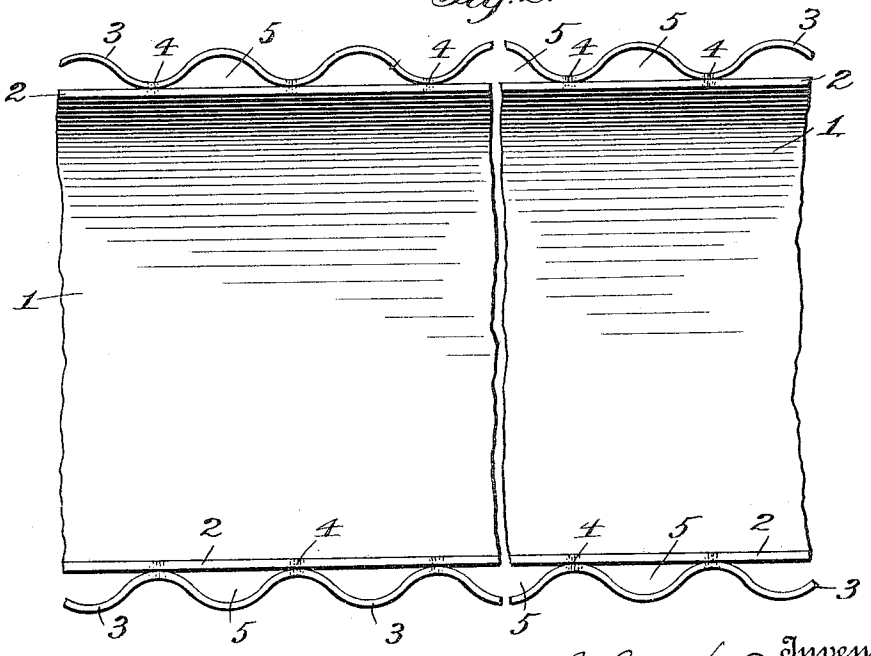


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

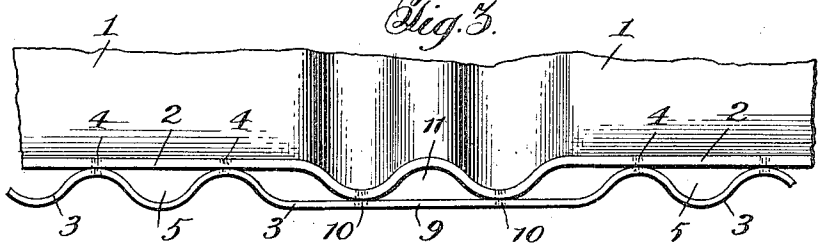


Fig. 4.

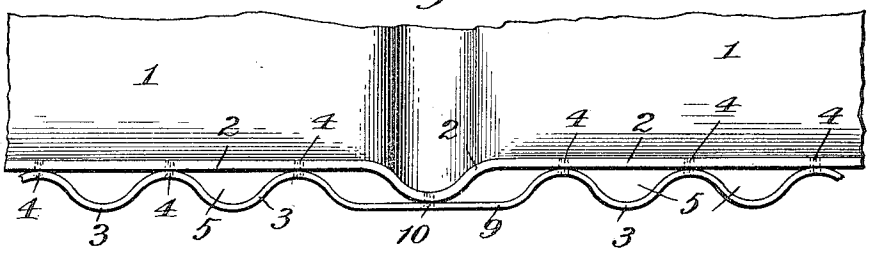


Fig. 5.

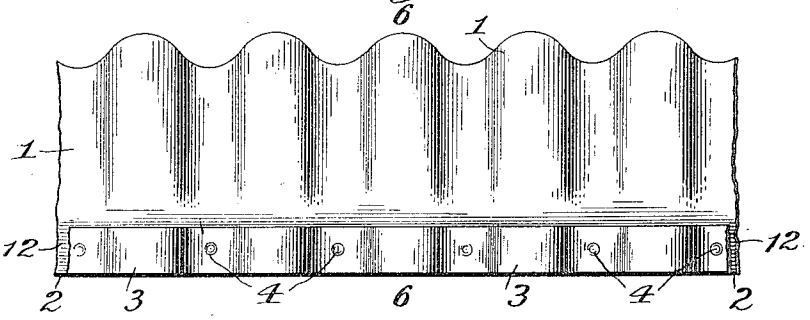


Fig. 6.

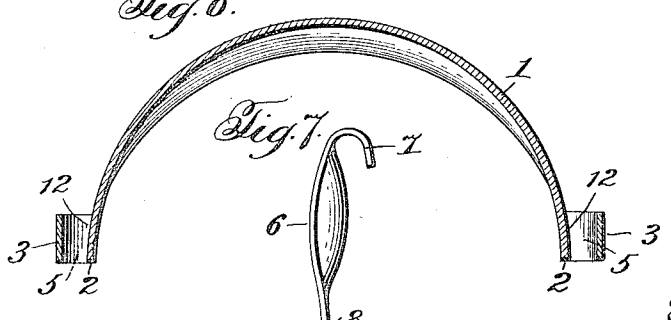


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOHN H. DEAN, OF BIRMINGHAM, ALABAMA.

SHEET-METAL CULVERT.

1,140,362. Specification of Letters Patent. Patented May 25, 1915.

Application filed September 22, 1913. Serial No. 791,078.

To all whom it may concern:

Be it known that I, JOHN H. DEAN, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Sheet-Metal Culverts, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to sheet metal culverts or pipes to be used as drains, aqueducts, or the like, and more particularly to such culverts of the butt-joint nestable type, wherein the same are built of sections adapted to be knocked down and nested together in shipment and storage, and to be set up and formed into a complete culvert or pipe at the place where the same is to be used.

It is the object of this invention to generally improve the construction of such culverts and to provide a culvert which is strong and rigid in construction, cheaply made, and requiring a comparatively small amount of labor in assembling the culvert sections to form the completed culvert.

The type of culvert to which this invention relates is broadly covered in a patent granted to me January 7, 1913, No. 1,049,816, wherein the culvert sections are shown as transversely corrugated, and flat metal strips are welded to the convex corrugations of said sections at or near the longitudinal edges thereof, so that key-receiving sockets or passageways are formed for receiving means in the form of keys or clips, for fastening the culvert sections together.

It is the purpose of this invention to form the culvert sections out of smooth material, that is to say, flat metal sheets, or sheets without corrugations, but of sufficient strength to hold up under the required pressure. Such being the case the metal strips which are welded or riveted along the longitudinal edges of the culvert sections are corrugated or of other sinuous formation, the inner corrugations, or as they may be termed, concave corrugations, being spot-welded to the flat metal sections at or near the longitudinal edges thereof, and thereby forming at intervals between the corrugated metal strip and said smooth metal section or sections, key-receiving sockets or passageways, as will be readily understood.

In assembling this type of culvert, the complementary sections are placed together with their longitudinal edges meeting or abutting and fastening means in the form of keys or clips are provided for engaging within the passageways formed between the culvert sections and the corrugated strips, said fastening means serving to connect the adjacent strips of complementary sections together, whereby said complementary sections are held and retained in proper assembled relation.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

I have illustrated my invention in the accompanying drawings, in which:—

Figure 1 is a side elevation of a butt-joint culvert embodying my invention; Fig. 2 is a top plan view of the bottom section of said culvert; Fig. 3 is a partial top plan view of a bottom section embodying a modification of the invention; Fig. 4 is a similar view showing a further modification; Fig. 5 is a side elevation of one of the culvert half sections illustrating a still further modification; Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 5, and Fig. 7 is a side elevation of one of the keys or clips.

Referring to the drawings, it is to be noted that each section, indicated at 1, of the metal culvert shown in Figs. 1 and 2 is formed from flat sheet metal curved into proper shape, so that when these sections, which are preferably half sections, are arranged in assembled position to form the completed culvert, the longitudinal edges 2 of complementary sections will abut, so that the culvert for all intents and purposes, has the appearance and strength of an integral cylinder or pipe of smooth material throughout. The smooth culvert sections just referred to, are provided along their longitudinal edges with corrugated metal strips or bars 3, which are secured to said sections at or near the longitudinal edges thereof and preferably by welding or riveting the same thereto. These strips are preferably continuous strips running substantially the entire length of each section, it being noted, however, that they stop short of at least one corrugation on one end of each section to permit the overlapping of the meeting ends of longitudinal adjacent sections. The surface of the metal section to which these strips are secured, is,

as has been referred to, smooth or flat, and as it is desired to form at intervals key-receiving sockets or passageways between the metal strip and the smooth surface of the culvert section, these strips 3 are made of irregular or sinuous formation, preferably corrugated, and the same are welded to the culvert section at the points indicated at 4, thereby forming passageways 5 for the reception of the keys or clips to be hereinafter more particularly referred to.

In assembling the sections of this culvert with the longitudinal edges of upper and lower sections abutting, the corrugated metal strips or bars 3 of complementary sections are arranged to lie adjacent one another, and in this relation, and when the same are fastened or tied together, serve as a means for retaining the sections in connected relation for forming the completed culvert. It is to be understood that these strips may be tied or fastened together by any suitable means, although the preferred type of fastening means is in the form of sheet metal keys or clips 6 substantially as shown in the drawings. These keys or clips are transversely curved intermediate their ends to conform to the curvature of the corrugations of the metal strips 3, so as to neatly fit within the passageways 5, in which position they engage not only the adjacent metal strips 3 but also the sides of the culvert sections near the longitudinal edges thereof, thereby serving as a means to properly position the longitudinal edges of complementary sections in true abutting relation. The keys are furthermore provided with a downwardly bent portion 7, which as will be obvious, serves as the engaging means for one of the strips, preferably the strip of the upper half section, so that all that is necessary in applying these keys to the connecting strips for fastening adjacent strips together, is to insert said key within a passageway 5 with its downwardly bent portion 7 into firm engagement with one of the strips, and then bend the opposite end 8 of said key into firm engagement with the adjacent strip.

The particular purpose of the metal strips, as before mentioned, is to provide a connecting means between complementary culvert sections, but these strips also serve as a means for supporting the sections in nested relation. In this connection it will be noted that when the sections are in nested relation, the inner longitudinal edge of each metal strip rests upon the longitudinal edge of the culvert section below it, thereby allowing the sections to be neatly nested and supported one within the other.

It may be desirable at times to provide a smooth culvert section having one or two transverse corrugations arranged at intervals throughout the culvert section, in which event the metal strips which are used in connection with this form of culvert section are made as shown for instance in Figs. 3 and 4 of the drawing.

In the form shown in Fig. 3, wherein the culvert section is provided with two adjacent transverse corrugations, the metal strip 3 is corrugated for the better part of its length for engaging the smooth or flat surface of the culvert sections, but the portion 9 of the strip, which is to lie adjacent the transverse corrugations of the culvert section, is made flat, and is spot-welded to the convex corrugations, as indicated at 10, thereby forming a key-receiving socket or passageway 11. As will be readily understood, the only difference between the forms of the invention shown in Figs. 3 and 4, is that in Fig. 3 the culvert section is shown with two adjacent corrugations, whereas Fig. 4 shows only a single corrugation.

In the modified form of the invention shown in Fig. 5 of the drawings, the culvert section is shown as transversely corrugated throughout its entire length, but these corrugations do not extend to the extreme longitudinal edges of said section, a smooth or flat surface being provided along each longitudinal edge as indicated at 12. To these flat surfaces are welded the corrugated metal strips 3 in a manner as particularly set forth above.

In arranging the sections to form a culvert any number thereof may be employed to produce the desired circumference, but usually two sections only are necessary, as clearly shown in the drawings, preferably arranged as upper and lower complementary sections. It will be noted that the sections of the culvert embodying this invention may be all alike, thus making it unnecessary to keep two different kinds of section in stock to form a complete pipe or culvert.

Many advantages are obtained by a construction of sheet metal culvert along the lines as herein specified, some of which advantages have already been set forth in the objects of this invention, and it will be perfectly obvious that the assembling of the parts is simple and effectual, and is of such a character that it may be accomplished where the work of installing a culvert is being carried on. It is to be further noted that the sections are constructed without outstanding flanges and that the complementary sections are adapted to be connected together with their longitudinal edges abutting, without the use of bolts, rivets, or similar fastening devices engaging the metal sections themselves. It may be further stated that it has been found particularly advisable at times to provide a smooth or flat surfaced culvert or pipe such as just described, and the invention herein

set forth provides a novel and effectual means of forming key-receiving sockets or passageways along the longitudinal edges of the sections from which the culvert is made, so that said sections may be connected together with their longitudinal edges abutting, in which relation said sections may be firmly retained by means of suitable fastening devices which are adapted to engage within said passageways.

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

1. A smooth or flat surfaced culvert having longitudinal edges adapted to be connected together, and a metal strip or bar of sinuous formation spot-welded to the culvert along the longitudinal edges thereof, whereby key-receiving sockets or passageways are formed.

2. A smooth or flat surfaced culvert having longitudinal abutting edges, a metal strip or bar of sinuous formation spot-welded to the culvert along the longitudinal edges thereof and forming with the culvert key-receiving sockets or passageways arranged at intervals throughout the length of said culvert, and keys or clips adapted to engage within said passageways for holding and retaining the longitudinal edges of the culvert in connected relation.

3. A smooth or flat surfaced metal culvert having longitudinal abutting edges, a metal strip or bar of sinuous formation spot-welded to the culvert along each longitudinal edge thereof, the strips along longitudinally adjacent edges of the culvert being also arranged to lie in abutting relation, whereby coöperating key-receiving sockets or passageways are formed at the abutting edges of said culvert, and keys or clips adapted to engage within said coöperating passageways for connecting adjacent strips together for completing the culvert joint.

4. A sheet metal culvert comprising complementary sections having smooth or flat surfaces at or near their longitudinal edges, a metal strip or bar secured to each of said sections, said strip being so formed as to leave a space at intervals between the culvert and the strip, and means for fastening the strips or bars of adjacent sections together.

5. A sheet metal culvert comprising complementary sections having smooth or flat surfaces at or near their longitudinal edges, a corrugated metal strip or bar secured to each of said sections whereby key-receiving sockets or passageways are formed along the longitudinal edges of said sections, and means engaging within said passageways for fastening the strips or bars of adjacent sections together.

6. A sheet metal culvert having smooth or flat surfaces at or near its longitudinal edges, and a corrugated metal strip secured to the smooth surface of said sections for forming key-receiving sockets or passageways.

7. A sheet metal culvert comprising complementary sections having smooth surfaces at or near their longitudinal edges, a corrugated metal strip or bar extending longitudinally of the sections and secured to the sections along said longitudinal edges, and keys or clips transversely curved to conform to the curvature of the corrugations of said metal strip and adapted to be inserted between the section and the strips and bent over the same to fasten the sections together.

8. A sheet metal culvert comprising complementary sections having smooth or flat surfaces at or near their longitudinal edges, corrugated metal strips secured to said sections along the longitudinal edges thereof thereby forming passageways between said sections and the metal strips, and keys or clips so shaped as to conform to the curvature of the corrugations of said strip and adapted to be inserted within said passageways and bent over the strips to fasten the sections together.

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

JOHN H. DEAN.

Witnesses:
C. S. V. ZIMMERMAN,
VIOLA S. MCGEE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."