

E. E. NORQUIST.  
SHEET METAL CULVERT.  
APPLICATION FILED FEB. 23, 1909.

929,784.

Patented Aug. 3, 1909.

*Fig. 1.*

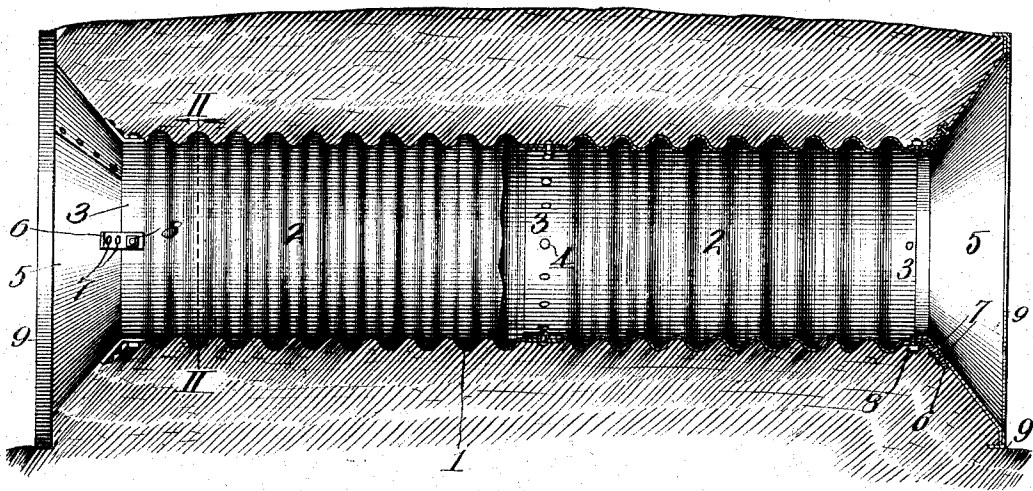


*Fig. 2.*

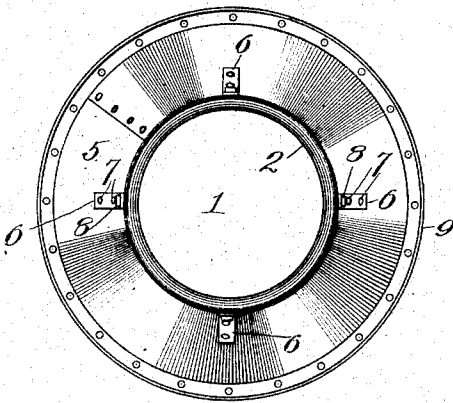
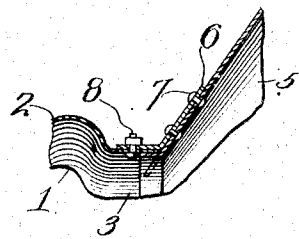


*Fig. 3.*



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## SHEET-METAL CULVERT.

No. 929,784.

Specification of Letters Patent.

Patented Aug. 3, 1909.

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*To all whom it may concern:*

Be it known that I, EMANUEL E. NORQUIST, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Sheet-Metal Culverts, of which the following is a specification.

This invention relates to culverts and more especially to sheet metal culverts, and my object is to produce a device of this character of such form as to reliably anchor itself against endwise creepage or movement and form guards tending to hold intact the superposed side portions of the overlying road and thereby incidentally protect itself against injury by the wheels of vehicles traveling on such road.

A further object is to produce a culvert, having a flaring mouth to act as a concentrating nozzle for accelerating the flow of water through the culvert at times and incidentally protect the earth in the immediate vicinity of the receiving end of the culvert from washing away and also tend to prevent rodents from burrowing through the roadway along or very near the top of the culvert and thus weakening the road.

A further object is to produce a culvert having a strong and rigid flaring mouth against which bunches of weeds or other matter carried by the water may be more readily broken up by the force of the latter than would be the case if such debris lodged against the end of the relatively small body-portion of the culvert.

A still further object is to produce a culvert which can be installed at a minimum cost and may be of knock-down construction to facilitate handling and shipment.

With these general objects in view, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawing, in which;—

Figure 1, is a vertical transverse section of a road equipped with a culvert embodying my invention, the culvert being shown partly in elevation and partly in longitudinal section. Fig. 2, is a cross section of the culvert on the line II—II of Fig. 1. Fig. 3, is an enlarged fragmentary section of the culvert.

In the said drawing, 1 indicates a culvert of corrugated metal, such as galvanized iron or steel and composed by preference of a plurality of sections 2 terminating at their ends in smooth or non-corrugated cylindrical ends 3; one of the non-corrugated ends of one of the sections being fitted snugly in an end of the adjacent section and secured rigidly thereto by rivets 4, or otherwise.

The length of the body of the culvert will preferably be less than the width of the road, irrespective of the number of sections of which such body is composed, and at each end it will be provided with a flaring mouth or funnel 5, the reduced ends of the funnels being snugly embraced by the juxtaposed ends of the body and rigidly connected to the same by angle brackets 6 riveted as at 7 or otherwise to the funnels and bolted as at 8 or otherwise to the body, the outer edges of the funnels being reinforced and stiffened by angle-iron rings 9. The aggregate length of the body and funnel-ends of the culvert are substantially equal to the width of the road, as shown in Fig. 1, so that the funnels form abutments or lateral supports for the sides of the superposed portions of the road and thus avoid the necessity of unduly narrowing the same by sloping it materially downward at its sides or necessitating the employment of a culvert as frequently occurs, considerably longer than the width of the road. It will also be noted that the funnels tend to guard against the side portions of the road washing away immediately over the culvert in heavy rains and thus eventually exposing the latter to contact with the wheels of passing vehicles, which contact in time, will cut through and thus materially impair the strength and serviceability of the culvert.

A culvert of this character has a greater capacity than one of the same diameter throughout, as the funnel at the receiving end acts as a nozzle to accelerate the flow of the water through the body by creating a suction therein. The funnel is advantageous also in that an obstruction such as a fence rail, bridging the same will be subjected to greater leverage from a rush of water and debris than if lodged across the mouth of the body and hence will break more readily under such pressure and thus eliminate in a material degree the possibility of the culvert becoming choked and failing to

perform its proper function. The funnels by projecting upward to substantially the plane of the crown or surface of the road tends to deter rodents such as rats and rabbits from burrowing through the road closely adjacent to the upper part of the culvert and possibly weakening the road sufficiently for it to break down under the pressure of heavy vehicles and perhaps expose the culvert to contact by the wheels of such vehicles.

In practice the body of the culvert is disposed in a trench made to receive it and then the reduced ends of the funnel-shaped end-portions are slipped into the ends of the body and the two parts secured together. The portions of the funnel-shaped ends projecting into the ends of the body are then peened or hammered outward from the position shown in dotted lines Fig. 3, to the position shown in full lines said figure and Fig. 1, so as to produce water-tight lap-joints between the body and the funnel-shaped end-portions, it having been found in practice, that the connection between the body and end-portion can be more conveniently and expeditiously made before the inner ends of the funnel-shaped portions are hammered than subsequently.

A culvert of corrugated metal possesses the advantage over a non-corrugated culvert in that it has less tendency to creep or work endwise, but it will be understood that my invention contemplates the employment of non-corrugated as well as corrugated metal culverts equipped with funnel-shaped ends.

From the above description it will be apparent that I have produced a culvert embodying the features enumerated as desirable, and which is susceptible of modification

in minor particulars without departing from the spirit and scope of the appended claims.

Having thus described the invention what I claim as new and desire to secure by Letters-Patent, is:

1. A culvert, comprising a body, funnel-shaped end-portions secured to and projecting into the ends of the body and provided at their ends of greatest diameter with circular stiffening rings.

2. A culvert, comprising a body consisting of corrugated sections terminating in non-corrugated adjacent ends fitting one within the other and secured together, and provided at their opposite ends with flaring end-portions; said flaring end-portions being of truncated conical form with their inner ends projecting in and secured to the body-portion and their outer ends provided with stiffening rings.

3. A culvert, comprising a body consisting of corrugated sections terminating in non-corrugated adjacent ends fitting one within the other and secured together, and provided at their opposite ends with flaring end-portions; said flaring end-portions being of truncated conical form, with their inner ends projecting in and secured to the body-portion and their outer ends provided with stiffening rings, the reduced ends of said inner-portions being substantially cylindrical and snugly embraced by the adjacent ends of the body.

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

EMANUEL E. NORQUIST.

Witnesses:

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G. Y. THORPE.