Sept. 26, 1933. F. L. CARSWELL ET AL 1,928,480

CULVERT

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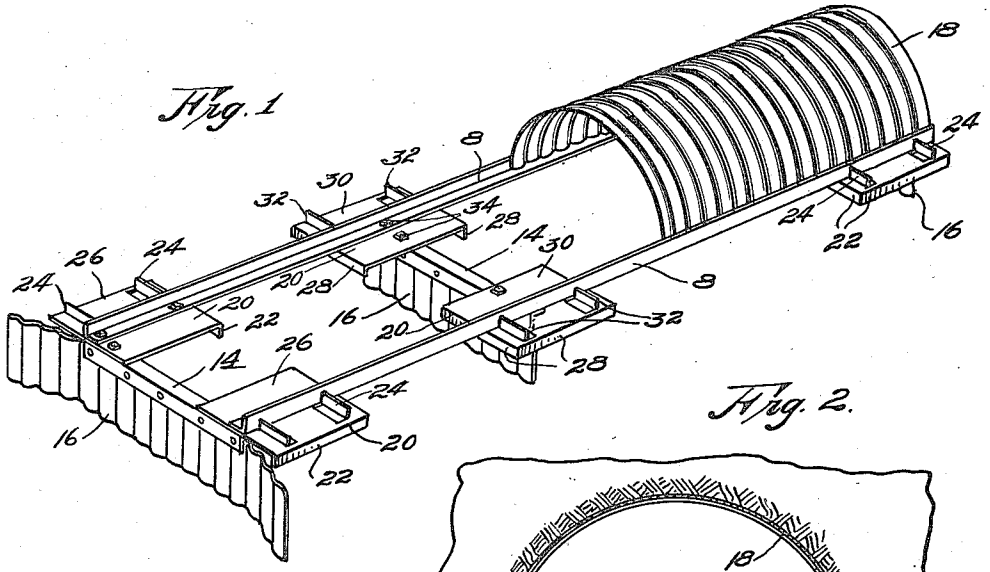


Fig. 1

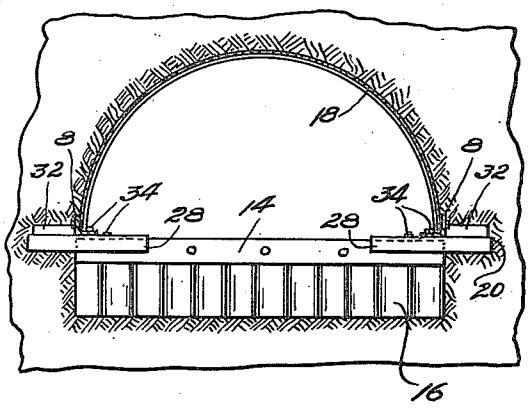


Fig. 2.

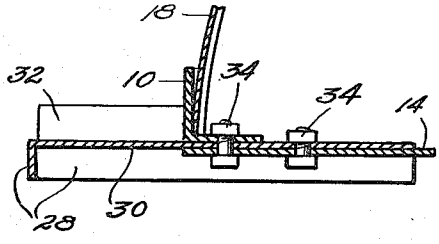


Fig. 3

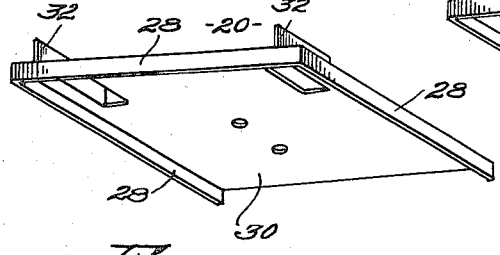


Fig. 4

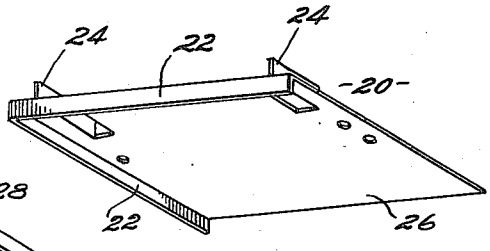


Fig. 5

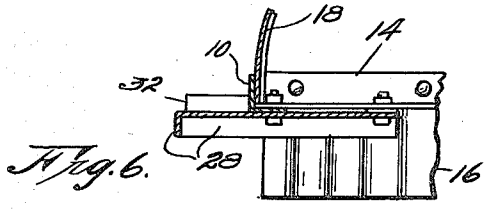


Fig. 6.

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CULVERT

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9 Claims. (Cl. 61—16)

This invention relates to culverts and especially that type formed of metal or other suitable substance that is used in establishing subterranean passages for the flow of water, and one of the main aims of the instant invention is the contemplation of improvements for such culverts that will permit installation in soil where, under normal conditions, excessive settling might take place or a washing away of the soil beneath the culvert is possible because of the nature of said soil.

The invention relates to open bottom culverts such as illustrated and described in the copending application Serial Number 633,714, filed September 19, 1932.

Under normal conditions a culvert such as disclosed in the above-identified application remains in place and precludes washing or any undermining effect which flowing water might have. It has been found, however, that in some localities quick sand or soil of like character is encountered and it becomes necessary to employ footings. To carry out such requirement, plates of an extremely novel nature have been devised to be combined with the culvert structure previously set forth, which plates are arranged in series along each side of the culvert frame and have upstanding and depending lugs and flanges respectively, which serve as retards for small streams of water that might be set up at objectionable places.

Minor objects of the invention, including many specific details of construction and advantages found in culverts embodying this invention will be set forth during the following specification, referring to the accompanying drawing, wherein:

Figure 1 is a perspective view of a culvert embodying this invention, with a part of the wall thereof removed for clearness.

Fig. 2 is a vertical cross section through the culvert, showing the same buried to form a subterranean passage.

Fig. 3 is an enlarged, detailed, fragmentary, sectional view taken through one of the footing plates and showing the method of assembly at that point.

Fig. 4 is a perspective view of one of the center plates.

Fig. 5 is a similar view disclosing one of the end plates, and,

Fig. 6 is a fragmentary, sectional view through a portion of the culvert, showing a slightly modified form.

In constructing a culvert in accordance with this invention, same is preferably formed to present a main frame having side rails 8 that should be of angle iron construction to present an upstanding wall 10 and a wall which lies in the major plane of the frame. Tie bars 14 hold side rails in spaced relation and likewise carry depending aprons 16 which lie in a vertical plane and preferably in a plane perpendicular to the major plane of the culvert frame.

When the culvert is in operative position, or installed, aprons 16 preclude undermining as the water flows along the subterranean passage formed beneath arcuate wall 18 created by positioning sheet metal upon side rails 8, as clearly shown in Figs. 1 and 2. Advantageous ways of establishing connection between wall 18 and side rails 8 and other points of advantage found in the structure herein described to this point have been disclosed in the above-identified copending application and to one skilled in the art, the function of depending aprons 16 and the advantage of forming a culvert as described at once becomes obvious.

Where there is likelihood of settling, a series of plates 20, such as illustrated, should be combined with the hereinbefore mentioned structure, and since these plates are to be affixed to the frame at points adjacent each tie bar 14, plates 20 near the end of the main frame are formed slightly differently than those intermediate the ends. Fig. 4 represents a plate made to be placed intermediate the ends of the culvert, while Fig. 5 shows a plate made to be positioned at the ends thereof. To set up proper balance, these footing plates should be arranged along each side rail 8 in opposed relation and project laterally on each side thereof in substantially the same major plane as that occupied by the main frame of the culvert having side rails 8 and tie bars 14.

Each of the end plates has a depending flange 22 extending along two sides thereof and a plurality of upstanding lugs 24 struck therefrom to lie in a plane at right angles to the plane of the body 26 of the plate. When these end plates 20 are moved to position, one edge lies against the depending wall of the associated tie bar 14 so that danger of water working beneath the plate is precluded. Upstanding lugs 24 each shut the upstanding wall 10 of side rail 8 which supports the plate, and, as shown in the drawing, these lugs 24 are positioned on the outside of side rails 8 so that they serve as retards for any flow of water which might tend to open up a passage at this point. Depending flanges 22 serve to overcome any undermining and when the culvert equipped

with these footing plates is installed it will remain in position regardless of the character of soil encountered.

Footing plates positioned intermediate the ends of the culvent are formed in substatnially the same manner as those at the ends thereof with the exception of depending flanges 28 which should be formed around three sides of body 30 instead of only the two adjoining sides, as is the case with end plates 20. Upstanding lugs 32 are struck from body 30 of this intermediate plate to abut upstanding wall 10 of side rail 8 in a manner as heretofore mentioned to serve the same purpose. These footings should be formed of sheet metal of suitable gauge and may be affixed directly to the culvert frame by bolts or analogous securing means 34. If it becomes necessary to use more sets of opposed plates 20 than there are tie bars 14, plates formed as shown in Fig. 4 may be used at any point throughout the length of the culvert.

In some instances it is desirable to establish a "flow surface" above all footing plates. If so, tie bars 14 may be turned so that one wall thereof projects upwardly into a position between the longitudinal edges of wall 18, as shown in Fig. 6. In so arranging the culvert parts, all footing plates will be buried and an earthen surface established in the plane with the tops of tie bars 14.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A culvert comprising a frame having a pair of side rails; a wall closing one side of said frame and disposed thereabove; and a series of spaced apart normally substantially horizontal separate plates rigidly secured to each side rail of said frame to bear upon a soil surface.

2. A culvert comprising a frame; a wall closing one side of said frame and disposed thereabove; a plurality of spaced apart, depending aprons secured to said frame transversely thereof at its other side; and a series of spaced apart normally horizontal plates rigidly secured to said frame.

3. A culvert comprising a frame; an arcuate wall closing one side of said frame; and a series of spaced apart, planar plates to bear upon a soil surface secured to the other side of said frame, said plates extending laterally from the frame to the outside thereof.

4. A culvert comprising a frame having longitudinally extending side rails and transverse tie bars joining said side rails; an arcuate wall carried by the frame and extending across said frame from one side rail to the other; and a series of spaced apart plates secured to each of said side rails, said plates being disposed in a plane parallel to the major plane of said culvert frame and projecting laterally to each side of said side rails.

5. A culvert comprising an open frame having side rails and tie members to maintain the side rails in spaced relation; a wall extending from one side rail to the other, above said frame; and a series of separate plates secured to each side rail in spaced apart relation along each side rail to bear upon a soil surface.

6. A culvert comprising an open frame having side rails and tie members to maintain the side rails in spaced relation; a wall extending from one side rail to the other, above said frame; and a series of plates secured to each side rail in spaced apart relation along each side rail, each of said plates having an upstanding lug struck therefrom in engagement with the side of the respective associated side rail.

7. A culvert comprising an open frame having side rails and tie members to maintain the side rails in spaced relation; a wall extending from one side rail to the other, above said frame; and a series of plates secured to each side rail in spaced apart relation along each side rail, each of said plates having downturned flanges along at least two of the edges thereof.

8. A culvert comprising an open frame having side rails and tie members to maintain the side rails in spaced relation; a wall extending from one side rail to the other, above said frame; and a series of plates secured to each side rail in spaced apart relation along each side rail, each of said plates having an upstanding lug struck therefrom in engagement with the side of the respective associated rail and downturned flanges along at least two of the edges thereof.

9. A culvert comprising an open frame having side rails and tie members to maintain the side rails in spaced relation; a substantially arcuate wall extending from one side rail to the other, above said frame; a series of depending, spaced apart aprons secured to said frame, transversely thereof at its other side and disposed in planes substantially perpendicular to the major plane of the said frame; and a plate secured to each side rail at the juncture thereof with each depending apron to serve as a footing for the culvert frame, said plates each extending laterally to each side of the associated rail and disposed in a plane parallel to the major plane of said frame.

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