

(No Model.)

J. & W. R. THOMAS.
CULVERT.

No. 590,490.

Patented Sept. 21, 1897.

WITNESSES

Severance.
Edw. Jones.

INVENTORS

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UNITED STATES PATENT OFFICE.

JAMES THOMAS AND WILLIAM R. THOMAS, OF CATASAUQUA, PENNSYLVANIA.

CULVERT.

SPECIFICATION forming part of Letters Patent No. 590,490, dated September 21, 1897.

Application filed December 14, 1896. Serial No. 615,717. (No model.)

To all whom it may concern:

Be it known that we, JAMES THOMAS and WILLIAM R. THOMAS, citizens of the United States, residing at Catasauqua, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Culverts; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in culverts, and more particularly to that class of culverts which are constructed of metallic sections. Its object is to facilitate the construction of such culverts and at the same time produce culverts of great rigidity, strength, lightness, and durability; and to this end the invention consists of certain novel constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a culvert constructed according to our invention. Fig. 2 is a side elevation of a portion of a culvert, showing an embankment above it. Fig. 3 is a fragmentary plan view illustrating the manner in which the sections are constructed, so as to be bolted together at their ends and edges. Fig. 4 is a sectional view showing the manner in which the metal of the sections is corrugated on both of its surfaces, and Fig. 5 is a longitudinal sectional view showing the construction of the foot-sections of the segments.

A A' designate segmental sections constructed of corrugated steel, cast-iron, or other suitable metal and united to form a culvert-section, as B, by being bolted together on radial lines, as *a*. Each section has its inner and outer curved surfaces formed on wavy or serpentine lines, as *c c'*, so as to be light, yet strong. At each side edge of a section a bolting-flange *d* is provided, and each of these flanges have holes for the passage of uniting-bolts *f*, as illustrated.

At each of the ends of the sections bolting-flanges *g*, having nicely-matching vertical surfaces, are provided, and through these flanges holes are formed for the passage of bolts *h*, which hold the sections together in a semi-circular form.

The corrugations and the side flanges of

each section may be strengthened at suitable points by bracing webs or partitions *d'*.

The end or foot sections A of each semicircular segment have their lower end flanges *g'* made broad, so as to have a good bearing-surface to rest upon masonry or other suitable foundation, as C. The side flanges of these foot-sections A' are also broadened out to the width of the said flanges *g'* and form braces, as *d''*, which serve to add greatly to the strength of the said foot-sections for receiving the thrusting strain of the culvert. The said foot-sections A' are further provided at their lower ends, on the inner surface thereof, with toe-pieces *a''*, preferably cast upon said sections, and are adapted to fit upon the edge of the foundations or masonry, thus preventing the spreading of the culvert.

It will be seen that braces *d''* and the broad flanges of the foot-sections, as well as the toes or projections *a''*, are important features of this device, for by their use not only is a secure anchorage of the culvert ends effected, but the strength of the culvert is materially increased, and great steadiness of the structure is insured.

If desired, triangular corrugated sections may be bolted upon each side of the culvert to make the contour thereof conform to the contour of the embankment above the culverts, as illustrated in Fig. 2.

In constructing the culvert it is only necessary, after a suitable foundation has been laid, to bolt the segmental sections firmly together upon said foundation, and then the earth or embankment may be placed over the culvert thus formed and graded to the proper height.

What we claim is—

1. A metallic culvert constructed of segmental metal sections corrugated on their inner and outer surfaces and having radial abutting ends and bolting-flanges, the end or foot sections being provided with bracing-flanges which widen out at their lower ends to form a broad bearing and bracing-support to receive the end thrust of the culvert, substantially as described.

2. A metallic culvert constructed of intermediate metal segmental sections corrugated on their inner and outer surfaces, and having radial abutting ends and bolting-flanges and end or foot corrugated sections provided with bolting-flanges and broad integral flanges

forming base-plates resting directly upon broad-topped foundations, said sections also having integral bracing side flanges connecting the base-plates with the upper bolting-flanges for strengthening the same, substantially as described.

3. A metallic culvert constructed of intermediate corrugated metal sections having radial abutting ends, bolting end and side flanges, and base or foot sections, having bolting-flanges, broad flanges forming base-plates resting directly upon broad-topped foundations, strengthening side flanges connecting the base-plates and the radial bolting-flanges and integral toe projections, adapted to overhang the inner edge of a suitable foundation for bracing and holding the culvert in position, substantially as described.

4. A metallic culvert constructed of segmental metal sections corrugated on their inner and outer surfaces and having radial abutting ends and bolting-flanges, the end of the foot-sections being provided with integral toe projections, directly engaging and overhanging the inner edges of broad-topped foundations, &c. for bracing and holding the culvert in position without further securing means, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

JAMES THOMAS.

WILLIAM R. THOMAS.

Witnesses:

R. E. WILLIAMS,

PATRICK McNALLY.