A. SMITH.

SHEET METAL CASING FOR DRAINAGE CULVERTS, CONDUITS, SCREENS, &c.

APPLICATION FILED JUNE 11, 1912.

1,057,098. Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.

Inventor

Andrew Smith

By

Eugene E. Brown
Attorney
A. SMITH.

SHEET METAL CASING FOR DRAINAGE CULVERTS, CONDUITS, SCREENS, &c.

APPLICATION FILED JUNE 11, 1912.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 2.
UNITED STATES PATENT OFFICE.

ANDREW SMITH, OF SAN MATEO, CALIFORNIA, ASSIGNOR TO SMITH METAL PERFORATING COMPANY, OF SAN MATEO, CALIFORNIA.

SHEET-METAL CASING FOR DRAINAGE CULVERTS, CONDUITS, SCREENS, &c.

Application filed June 11, 1912. Serial No. 703,057.

To all whom it may concern:

Be it known that I, ANDREW SMITH, citizen of the United States, residing at San Mateo, in the county of San Mateo and State of California, have invented certain new and useful Improvements in Sheet-Metal Casings for Drainage Culverts, Conduits, Screens, &c., of which the following is a specification.

This invention relates to metal casings, or plates for the linings of drainage conduits, culverts, wells, irrigating tile, conduits for sub-irrigation, screen-plates, etc.

In providing casings for drainage purposes or for screens, it is desirable to provide the maximum area of drainage surface or of drainage apertures while at the same time it is important that the width of each opening or slot should be very narrow in order to prevent the entrance of the solid particles in contact with the perforated casing or screen. Furthermore, it is necessary to preserve the requisite amount of perforated material or to so dispose and brace the walls of the casing that it shall be able to withstand the maximum pressures to which it is liable to be subjected.

The object of my present invention is to provide a maximum drainage capacity for a given surface of the casing or screen and to so dispose the metal thereof that it shall be braced by means of integral reinforcing ribs.

Another object is to so dispose the reinforcing ribs that they may also serve as connecting means for joining a series of sectional units into a continuous casing.

Other objects will appear from the following description, in connection with the accompanying drawings, in which—

Figure 1 illustrates a plan view of a plate slotted in a manner adapted to be formed into the casing or screen of my invention; Fig. 2, shows the plate having the slots brought together into continuous drainage apertures; Fig. 3 is a longitudinal section on the line 3—3 of Fig. 2; Fig. 4 is a transverse section on the line 4—4 of Fig. 2; Figs. 5 and 6 are side elevations, partly in section, of drainage casings embodying my invention having circumferential ribs; Figs. 7 and 8 are, respectively, a cross-section and a side elevation, partly in section, of a drainage section embodying my invention having longitudinally extending reinforcing ribs; and Figs. 9, 10 and 11 are side elevations, partly in section, of casings embodying my invention, showing the manner of connecting the units into a continuous duplex casing.

The process of forming the plates according to my invention, so that the walls of the drainage casings or screens shall be provided with strengthening or reinforcing ribs and simultaneously have their drainage or screening capacity greatly increased, will be apparent from the disclosure of Figs. 1 to 4 inclusive. The plate 1, is first provided with a series or sets of parallel slots 3, separated by imperforate portions or bands 5. The slots in the several sets are shown to be in alignment, but they may be arranged in staggered relation and the individual sets may extend diagonally across the plate so that the ribs hereinafter described shall extend spirally around the tubular casing made therefrom. After the plate has been slotted in the manner described, a series of depressions or loops are formed in the plate at each imperforate band 5, the loops or depressions extending into the perforated or slotted portion upon either side. The plate is then compressed longitudinally to force the sides of the loops together until the portion 5 form double-walled ribs 5', double the thickness of the plate, each of the ribs also including a portion of the adjacent slots 3, which are designated 3°. This construction provides continuous or unobstructed slots for drainage or screening purposes, reinforced by strengthening ribs 5', which do not interfere with the drainage capacity of the slots throughout the entire extent of the plate while imparting an increased rigidity. The importance of this feature of my invention will be appreciated by engineers. The slots are preferably tapering or wedge shaped in cross-section, as illustrated in Fig. 4.

For some purposes the plate shown in Fig. 2, may be used in flat or plane form, as for instance, for screens, drains or filters. Casings for drainage, culverts, tiling, well-casings, etc., are usually in tubular form and for this purpose the plates shown in Fig. 2, are formed into cylindrical casings, either with external ribs, as in Fig. 5, or with internal ribs as illustrated in Fig. 6. The longitudinal slots are continuous throughout the casing. As previously pointed out, the
slots extend into the rib from either side so that the drainage is unobstructed even at the places adjacent the ribs, as indicated by the arrows in Figs. 3, 5 and 6, thus greatly increasing the drainage capacity of the casing. It is evident that the ribs in Figs. 5 and 6 may be spirally arranged.

The reinforcing ribs may extend longitudinally and the slots may be circumferential or transverse of the casing as illustrated in Figs. 7 and 8. This construction is desirable when it is desired to increase the longitudinal stiffness of the casing.

The reinforcing ribs may extend spirally about the casing as shown in Fig. 9, and constitute also screw projections to engage corresponding grooves in an external complementary casing unit 2, threaded thereover. If desired, both inner and outer casing units may have slotted walls to form a duplex drainage casing. The interlocking ribs 5° and grooves 8° may be proportioned to cause a slight space therebetween, the casing walls in order that the slots may not be closed by the adjacent casing. It will be observed that the manner of forming the ribs 5° leaves the interior of the casing or conduit smooth and unobstructed.

Instead of employing separate internal and external casing units, as shown in Fig. 9, I may form each unit with two diameters, one half being made smaller than the other half and the smaller diameter having ribs 5°, while the larger diameter is provided with corrugations the grooves 8° of which are adapted to thread upon the ribs 5° of an adjacent section. In this manner each unit becomes in the assembled duplex casing, an inner section throughout one half 1° and an outer section throughout the other half 2°.

I may provide a duplex casing having smooth walls upon both exterior and interior. For this purpose I form the outer casing sections 3° with inwardly projecting spiral ribs and the inner casing sections 1° with outwardly projecting spiral ribs which are so spaced that they will thread with those of the outer casing in the manner illustrated in Fig. 11. This construction also spaces the walls of the casings apart and thus prevents the closing of the slots, if the walls are perforated. The casings shown in Figs. 9, 10 and 11 may be slotted in the manner previously described.

The advantages resulting from my invention will be apparent from the foregoing description.

My method of forming the perforated plates, greatly enhances the efficiency of the drainage casings or of the screens by increasing the relative area covered by the openings. At the same time that the area of the slots is increased by making them continuous, I have also added very materially to the strength and rigidity of the plate or casing by the duplex ribs.

I claim:

1. A sheet metal casing for culverts, tiles, conduits, wells and drainage purposes, comprising a tubular member having continuous uninterrupted slots and reinforcing ribs extending transversely of said slots.

2. A sheet metal casing for culverts, tiles, conduits, wells and drainage purposes, comprising a tubular member having continuous uninterrupted slots and reinforcing ribs extending spirally around the casing.

3. A sheet metal casing for culverts, tiles, conduits, wells and drainage purposes, comprising a tubular member having continuous uninterrupted slots and double-walled, reinforcing ribs extending transversely of said slots, said slots extending across said ribs.

4. A sheet metal plate for drainage casings, screens, etc., provided with reinforcing ribs and slots extending across said ribs.

5. A sheet metal plate for drainage casings, screens, etc., provided with reinforcing ribs and continuous, uninterrupted slots extending across and projecting into said ribs.

6. A sheet metal casing for drainage casings, conduits, wells, etc., provided with double-walled reinforcing ribs.

7. A duplex sheet metal casing for drainage casings, conduits, etc., comprising an inner sectional member having spiral double-walled ribs, and an outer sectional member adapted to telescope thereover and having spiral corrugations arranged to thread upon said spiral ribs.

8. A sheet metal casing for culverts, tiles, conduits, wells and drainage purposes, comprising a tubular member having continuous uninterrupted slots and reinforcing ribs extending transversely of said slots, said tubular member having smooth unobstructed and substantially unbroken walls.

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

ANDREW SMITH.

Witnesses:
E. C. Brown,
James M. Spear.