May 7, 1968 M. J. SCALES 3,381,477

FLUME

Filed Jan. 21, 1964 2 Sheets-Sheet 1

Fig. 1.

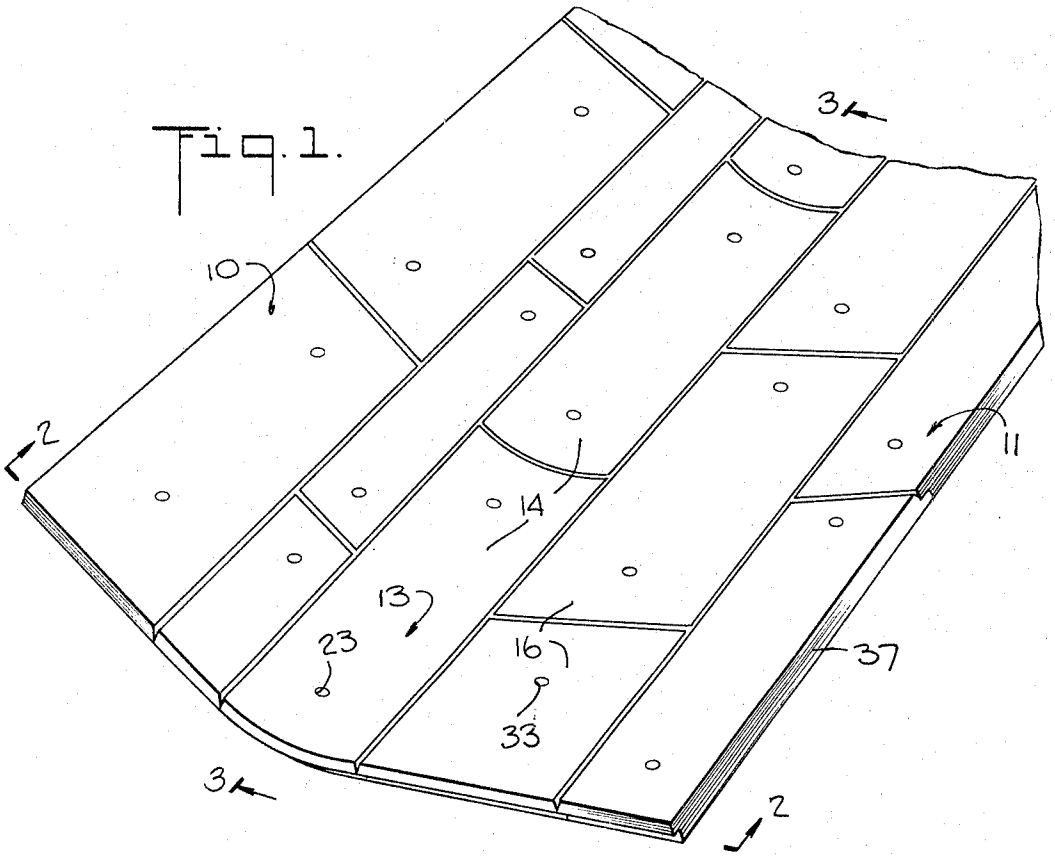


Fig. 7.



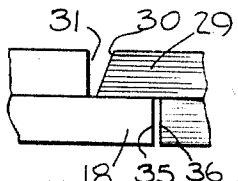


Fig. 8.

Fig. 4.

INVENTOR.
MICHAEL J. SCALES

BY Frank G. Bauer

ATTORNEY

May 7, 1968 M. J. SCALES 3,381,477

FLUME

Filed Jan. 21, 1964 2 Sheets-Sheet 2

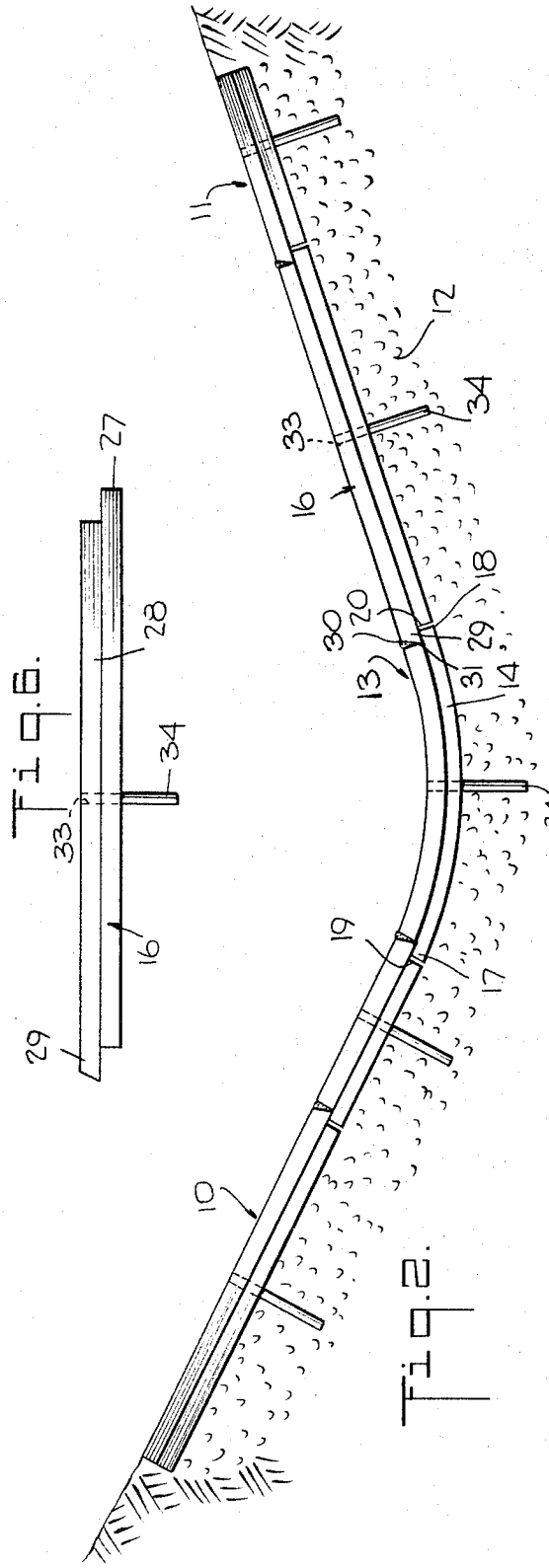


Fig. 2.

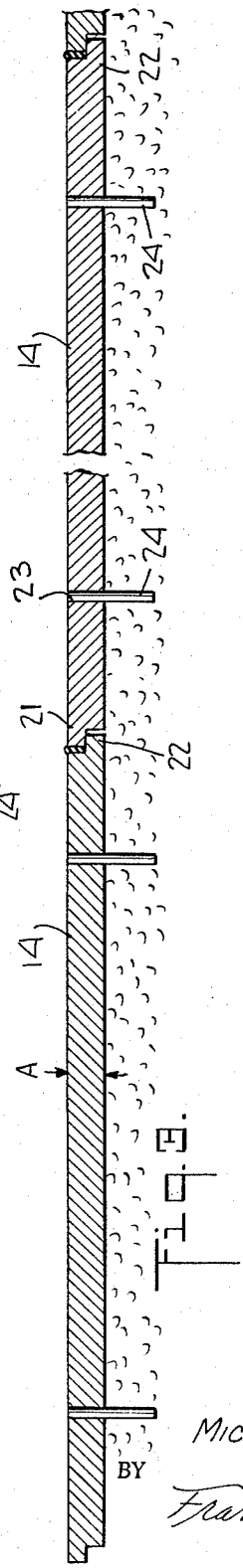


Fig. 4.

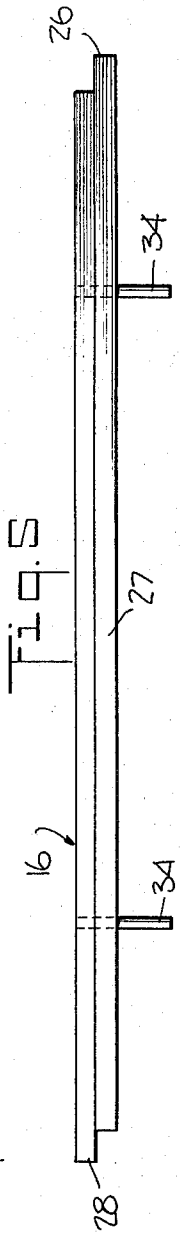


Fig. 5.

Fig. 6.

INVENTOR.
MICHAEL J. SCALES
BY
Frank A. Bower
ATTORNEY

United States Patent Office 3,381,477 Patented May 7, 1968

3,381,477

FLUME

Michael J. Scales, 248 Piermont Ave., Nyack, N.Y. 10960

Filed Jan. 21, 1964, Ser. No. 339,166
4 Claims. (Cl. 61—7)

This invention is specifically directed to the structure of flumes for guiding water along a drainage channel or brook.

The drainage of water can become quite destructive in eroding the drainage bed, causing it to change its course and filling in drainage areas and channels. In order to reduce or eliminate this destructive effect of running water, drainage ditches have been lined with poured concrete. This is expensive and, therefore, other less expensive structures are resorted to. The usual less expensive way is to embed rocks or bricks along the bottom and sides of the drainage channel or brook. Although this is initially low in cost, it is not durable and it is subjected to destruction due to freezing weather and to the action of the flowing water. Often in extreme torrents the entire stone bedding is destroyed. Thus the stones have to be relaid from time to time. Other means have been contemplated and used to surface a drainage channel, each of which has had shortcomings as to expense, method of installation and durability to withstand the action of the elements and flowing water.

An object of this invention is to provide a durable lining for a drainage channel or brook which is inexpensive both on the initial installation and on subsequent maintenance.

Another object of the invention is to provide a drainage lining that can be inexpensively prefabricated and inexpensively laid in a permanent setting.

The invention is shown in the following figures, in which

FIG. 1 is a perspective view of an assembled lining for a drainage channel;

FIG. 2 is a sectional view taken along lines 2—2 of FIG. 1;

FIG. 3 is a longitudinal section taken along the center of the lining of lines 3—3 of FIG. 1;

FIG. 4 is a perspective view of a planar section of the lining;

FIG. 5 is an edge view of the planar section of the lining;

FIG. 6 is an end view of the planar section of the lining;

FIG. 7 illustrates an alternate form of the edge of a section; and

FIG. 8 is an enlarged view of the joint between lining sections.

The drainage channels may be shaped in various forms depending upon the amount of water to be handled and the configuration of the terrain. In FIG. 2 the drainage channel has moderately sloped sides 10 and 11 forming a modified V shape with a loose gravel base 12. The lining 13 rests on the bed 12 to form a hard surface to resist the eroding effects of the flowing water. As illustrated in FIG. 1 the lining 13 is formed of a plurality of generally rectangular shaped sections, preferably made of concrete. The sections are prefabricated at a manufacturing plant and shipped to the construction site where they are individually laid in place.

In this embodiment the center sections 14 are concavely curved and the side sections 16 forming the sloped sides of the drainage channel are planar. This is the preferred form of the lining sections. However, other forms may be used. The center curved sections 14 are generally rectangular in shape with parallel sides and ends. The section has

a thickness A and along the side edges are flanges 17 and 18 extending from the lower portion of the side edges, as illustrated in FIG. 2, to form longitudinally extending notches to receive flanges of the side sections 16. The ends of the center sections 14 have flanges 21 and 22 with the flange 21 extending from the upper portion of the end surface to form a lower notch extending across the width of the center section, and the flange 22 extending from the lower portion of the end surface to form an upper notch extending across the width of the center section. Thus the flanges 21 and 22 are alternately arranged so that they interfit as illustrated in FIG. 3.

The side sections 16 are planar and have longitudinally extending side surfaces parallel to one another and longitudinally extending end surfaces parallel to one another. As illustrated in FIGS. 4 and 5, the side flange 27 extends from the lower portion of the side surface to form an upper longitudinally extending notch, and the side flange 29 extends from the upper portion of the side surface to form a lower longitudinally extending notch. At the ends of the planar side sections 16 the end flange 26 extends from the lower portion of the end surface and the upper flange 28 extends from the upper edge. Thus in the side sections 16 the side flanges are alternately arranged and the end flanges are alternately arranged.

As illustrated in FIG. 2 the side flanges 29 overlap with the side flanges 17 and 18 of the center section. Similarly, the side flanges 29 of the sections further up on the sloped sides 10 and 11 overlap with the side flanges 27 of the sections adjacent to the center section. Thus the upper flanges are overlapping in the direction of the flow of water down the sides of the flume, and the flanges 21 overlap the lower flanges 22 in the direction of flow of water along the flume.

As illustrated in FIGS. 1 and 2, the sections 16 may be made of different areas and the sections longitudinally laid in relation to one another and to the center sections so that they are in overlapping relation and there is no continuous separation extending directly across the flume.

The outer edges 37 of the upper sections 16 may have flat surfaces without flanges, since this is adjacent to the ground and will provide an easy packing of the ground along the edges (FIG. 7).

In FIG. 8 an enlarged fragmentary view of the relationship of the sections is illustrated in which the upper flange 29 overlaps the lower flange 18. The upper flange 29 has a longitudinal surface 30 which is outwardly sloped to the plane of the section 16 so as to form a V-shaped groove with the side surface 31 of the center section 14. The V-shaped groove provides space for filler material to seal the joints between these sections. The angulation of the edges also permits the sections of the lining to be tilted at different angles so that the flume can be accommodated to different types of ditches and to variations in the slope.

The lower longitudinal side surfaces 35 and 36 are slightly spaced to allow for expansion and contraction or relative movement between the sections. The ends of the sections 14 and 16 are similarly related to provide grooves for filler material as well as the side sections 16. These grooves are illustrated in FIG. 1.

In order to hold the sections 14 and 16 against longitudinal and lateral movement, particularly on steep slopes, holes 23 and 33 are provided through the sections 14 and 16, respectively, and pins 24 and 34, respectively, extend through these holes with a somewhat loose fit and are embedded into the gravel bed 12. As illustrated, two holes are provided for each section so as to prevent any twisting and movement of the sections so that they are held in aligned relation with one another. The pins, however, permit the sections to move vertically to respond to

variations in the ground produced by freezing weather. The spacing of the ends and providing of a resilient filler material between the sections permits this relative movement so that the slabs are not broken or chipped. The pins 24 and 34 pass through the sections 14 and 16, respectively, through the center portion of the sections having the thickness A, thus individually pinning each section separate from the adjacent sections.

It is thus seen from the foregoing description that the sections 14 and 16 provide a smooth surface lining which provides for a smooth flow of water through the channel with relatively few eddies which would cause erosion of the lining. The formation of the gravel bed 12 follows well-known construction techniques and the linings are manufactured at a plant where the quality and uniformity of the materials may be maintained and the linings may be made on a mass basis. The installation and interleaving of the sections, as previously described, is simple and may be readily done by the workers. The pins are inserted after the lining sections are in place and may be pounded in by hammer manually or mechanically operated. The filler material inserted in the V-shaped grooves may be of the standard type provided between concrete sections. The lining provides all the desirable features of a poured concrete lining without all the expense of forms, mixing and preparation at the site. Unskilled labor may be used to install the lining.

A very desirable feature of this lining is that it is easily maintained. At various times during the year, preferably in the spring of the year, the drainage ditches may be inspected and if any sections have been raised or distorted by the winter freezing they may be easily pounded back into place. This has the advantage even over a poured concrete lining, since once the lining is cracked or broken due to freezing the repair of the lining is again an expensive operation, whereas the reforming of the sectional lining can be again done by unskilled labor.

The preferred form of the lining has been described in detail. Other forms may be made utilizing the basic characteristics of these linings to secure the same desirable results.

The invention is set forth in the appended claims.

I claim:

1. A flume forming a drainage channel on a base having sloped sides comprising center pieces extending longitudinally to the channel and having transverse edges at opposite ends and side edges extending longitudinally, said side edges of each center piece having flanges extending from the lower section of each side edge to form longitudinal side notches extending the length of each center piece for receiving flanges of an adjacent piece, one transverse edge of each center piece having an end flange over the width of said respective center piece and extending in the longitudinal direction from the upper section of the respective center piece and the other transverse edge of each center piece having a flange extending from the lower section of said other transverse edge similarly to the one end flange to form overlapping of said center pieces, first side pieces having longitudinal side edges and transverse end edges, each side edge adjacent to said center pieces having a side flange extending from the upper section of said respective side edge and each side edge opposite to said center pieces having a side flange extending from the lower section of the respective side edge, each of said transverse end edges of said first side pieces having a flange, said flanges at opposite ends of a respective side piece extending from an upper section of said side piece at one end and from a lower section at the other end and with adjacent flanges of consecutive side pieces in overlapping relation and second side pieces each having longitudinal second side edges with each second side edge adjacent to said first side pieces having a second side flange extending from the upper section thereof towards said center pieces and overlapping said side flanges of said first side pieces on said side edges opposite to said center pieces and each of said second side pieces having end flanges at opposite ends extending from upper and lower section of a respective second side piece, said end and side flanges of said pieces forming an alternate overlapping of said pieces to permit in cooperation with said flanges vertical movement of said pieces, and a peg extending downwardly through each respective piece to hold and anchor to the base said respective piece in place transversely to said peg while permitting movement in the direction of said peg.

2. A flume forming a drainage channel on a base having sloped sides comprising center pieces extending longitudinally to the channel and having transverse at opposite ends and side edges extending longitudinally, said center pieces being concavely curved between said side edges, said side edges of each center piece having flanges extending from the lower section of said side edges to form longitudinal side notches extending the length of each center piece for receiving flanges of an adjacent piece, each of said transverse edges of said center pieces having an end flange over the width of a respective center piece and extending in the longitudinal direction at one end from the upper section of the respective center piece and at the other end from the lower section of said other transverse edge similar to said end flange extending from the upper section to form overlapping of said center pieces, planar side pieces having longitudinal side edges each side edge adjacent to said center pieces having a side flange extending from the upper section of a respective side edge and positioned in said side notches of said center pieces in planar overlapping relation with said side flanges of said center pieces, said planar side pieces having transverse end edges, each of said transverse ende edges of said side pieces having an end flange, one end flange extending from the upper section of one end edge, said other edge flange extending from the lower section of the other end edge, said flanges of said pieces forming alternate upper and lower overlapping of said pieces to form a smooth drainage surface, a peg extending downwardly through each respective piece to hold and anchor to said base said respective piece in place transversely to said peg while permitting vertical movement of said center and side pieces while maintaining a generally smooth drainage surface to flowing water.

3. A flume forming a drainage channel on a base having sloped sides comprising center pieces extending longitudinally to the channel and having transverse edges at opposite ends and said edges extending longitudinally, said center pieces having upper and lower sections, said side edges of each center piece having flanges extending from said side edges along one of said sections to form longitudinal side notches extending the length of each center piece along said other section for receiving flanges of an adjacent side piece, each of said transverse edges of each center piece having an end flange over the width of said respective center piece and extending in the direction of the center piece at one end from the upper section of said center piece and at the other end from the lower section of said center piece to form overlapping of the center pieces, side pieces with upper and lower sections and having longitudinal side edges, each side edge adjacent to said center pieces having a side flange extending from the other section of said side piece from which the flange on said center piece extends to fit in an adjacent notch on a center piece, each side edge opposite to said center pieces having a side flange extending from the same section of a respective side edge as the flanges on the center pieces, each of said transverse end edges of said first side pieces having a flange, said flanges being at opposite ends of a respective side piece extending from an upper section of said side piece at one end and from a lower section at the other end with adjacent flanges of consecutive side pieces in overlapping relation, second side pieces having longitudinal second side edges with each second side edge adjacent to said first side piece having

a second flange extending from the other section thereof towards said center pieces and overlapping said flanges of said first side pieces on said side edges opposite to said center pieces and each of said second side pieces having end flanges at opposite ends extending from upper and lower sections of a respective second side piece, said end and side flanges of said pieces forming an alternate overlapping of said second side pieces to permit in cooperation with said flanges vertical movement of said pieces, said overlapping flanges having spaces between said flanges extending from the lower section of a respective piece and an adjacent piece and having spaces for filler material between said flanges extending from the upper section of a respective piece and an adjacent piece, and a peg extending downwardly through each respective piece to hold and anchor to the base said respective piece in place transversely to said peg while permitting movement in the direction of said respective peg.

4. A flume forming a drainage channel on a base having sloped sides comprising center pieces extending longitudinally to the channel and having transverse edges at opposite ends and side edges extending longitudinally, said center pieces having upper and lower sections, said center pieces being concavely curved between said side edges, said side edges of each center piece having flanges extending from one of said sections of said side edges to form longitudinal side notches extending the length of each center piece along the other of said sections for receiving flanges of an adjacent side piece, said transverse edges of each center piece having an end flange over the width of said respective center piece and extending in the longitudinal direction of the center piece from the upper section of said respective center piece and another end flange over the width of a respective center piece and extending from the lower section of said center piece to form overlapping of the center pieces, planar side pieces with upper and lower sections and having longitudinal side edges,

each side edge adjacent to said center pieces having a side flange extending from the other section of said side piece from which the flange on said center piece extends to fit in said notches on said center pieces adjacent said center pieces and positioned in said side notches of said center pieces in planar overlapping relation with said side flanges of said center pieces and each of said side pieces having end edges with end flanges of a respective side piece extending from the upper section of one end edge and the lower section of the other end edge, said end and side flanges of said pieces forming alternate upper and lower overlapping of said pieces to form a smooth drainage surface, said overlapping flanges having spaces between said flanges extending from the lower section of a respective piece and an adjacent piece and having spaces for filler material between said flanges extending from the upper section of a respective piece and an adjacent piece, a peg extending downwardly through each respective piece to hold and anchor to the base said respective piece in place transversely to said peg while permitting vertical movement of said center and side pieces while maintaining a generally smooth drainage surface to flowing water.

References Cited

UNITED STATES PATENTS

953,051	3/1910	Demuralt	61—37
2,344,302	3/1937	Harza	61—37

FOREIGN PATENTS

133,739	9/1927	Switzerland.
437,789	11/1935	Great Britain.
447,943	3/1949	Italy.
609,215	9/1960	Italy.
580,731	8/1958	Italy.

EARL J. WITMER, *Primary Examiner.*