

April 11, 1939.

F. L. CARSWELL ET AL

2,153,790

DRAINAGE TUBE

Filed Jan. 10, 1938

2 Sheets-Sheet 1

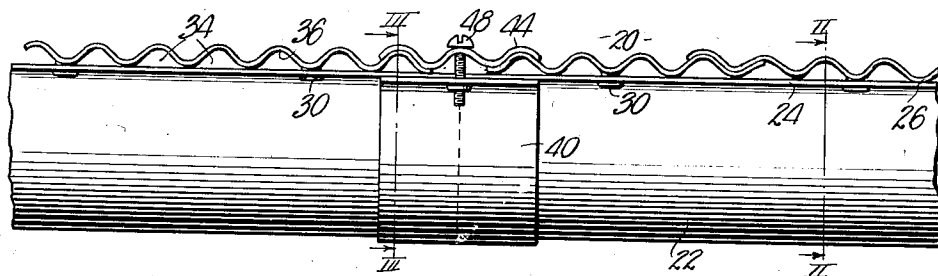


Fig. 1.

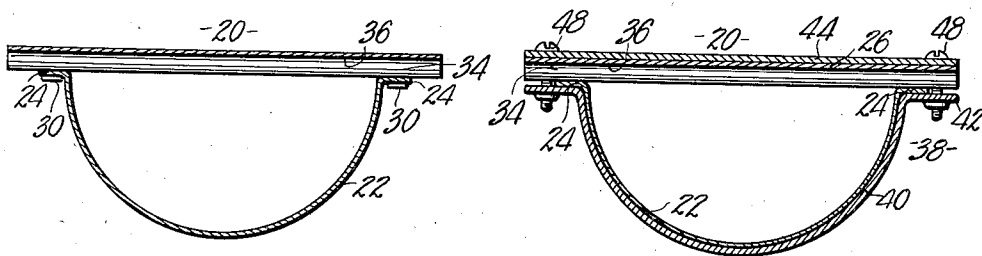


Fig. 2.

Fig. 3.

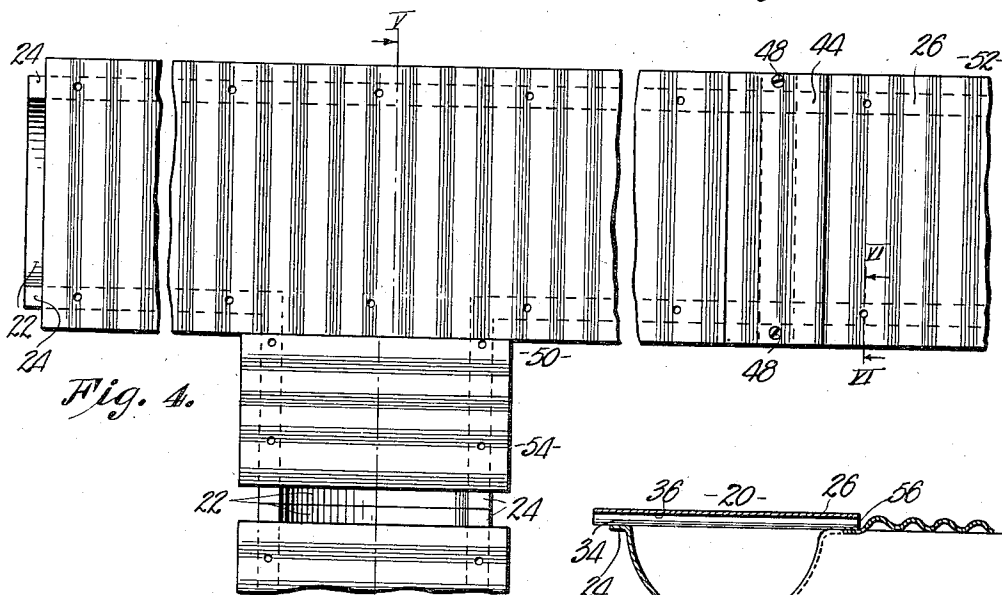


Fig. 4.

Fig. 5.

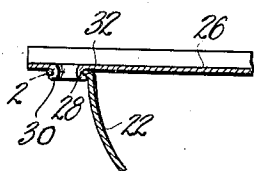


Fig. 6.

INVENTORS,
Firman L. Carswell,
Otto W. Schmidt.
BY
Hovey & Hamilton,
ATTORNEYS.

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2 Sheets-Sheet 2

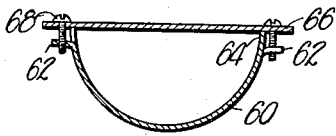


Fig. 8.

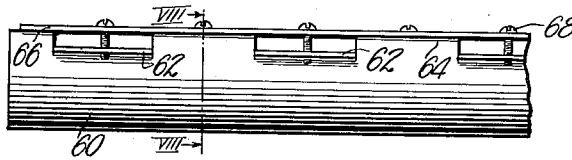


Fig. 7.

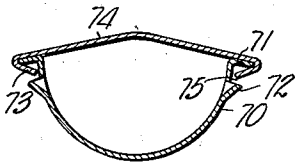


Fig. 10.

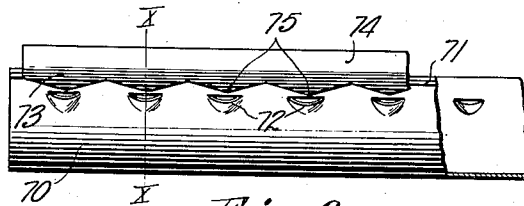


Fig. 9.

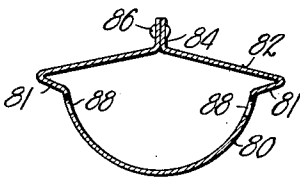


Fig. 12.

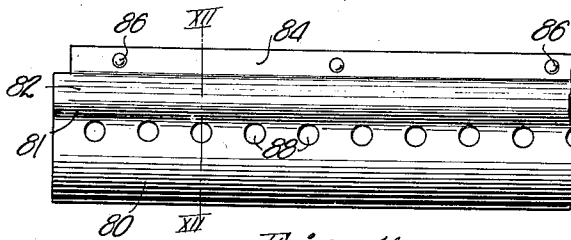


Fig. 11.

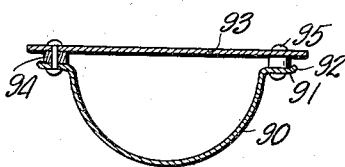


Fig. 14.

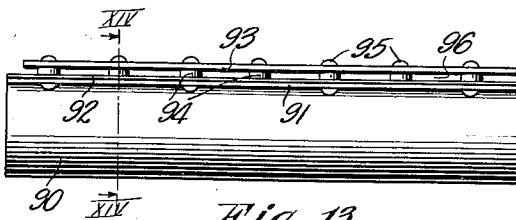


Fig. 13.

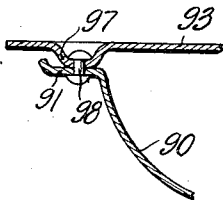


Fig. 15.

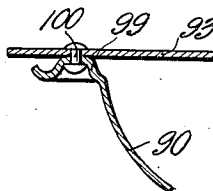


Fig. 16.

BY

INVENTORS,
Firman L. Carswell,
Otto W. Schmidt.
Hovey & Hamilton,
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,153,790

DRAINAGE TUBE

Firman L. Carswell, Johnson County, Kans., and
Otto W. Schmidt, Kansas City, Mo.

Application January 10, 1938, Serial No. 184,302

7 Claims. (Cl. 61-10)

This invention relates to improvements in drainage tubes and has for its principal object, the provision of specially constructed tube having protected inlet openings whereby they remain open for the admission of liquid to the tube.

Another object of the present invention is the provision of a drainage tube having means for directing the liquid flow toward the inlet openings to the interior of the tube.

A further object of this invention is the provision of a drainage tube comprising a channel having a cover member extending beyond the outer edges thereof to overlap inlet openings adjacent the upper edges of said channel.

Another object is the provision of a drainage tube adapted to abut a similar tube and specially constructed connecting means whereby the abutted tubes are secured together.

With these and other objects which will appear during the course of the specification, in view, reference will now be had to the drawings wherein:

Figure 1 is a side elevation of interconnected drainage tubes embodying this invention.

Fig. 2 is a cross sectional view taken on line II—II of Fig. 1.

Fig. 3 is a cross sectional view taken on line III—III of Fig. 1.

Fig. 4 is a plan view of the tubes showing a T-connection by means of which the tubes are operatively joined together.

Fig. 5 is a vertical section taken on line V—V of Fig. 4.

Fig. 6 is an enlarged section taken on line VI—VI of Fig. 4.

Fig. 7 is a side elevation of a modified form of the tube wherein the cover plate is planar in form and rests directly upon the edge of the channel.

Fig. 8 is a vertical cross section taken on line VIII—VIII of Fig. 7.

Fig. 9 is a side elevation of another modified form of the tube.

Fig. 10 is a vertical cross section taken on line X—X of Fig. 9.

Fig. 11 is a side elevation of a modified form of the tube wherein the tube is constructed by means of a single sheet of material.

Fig. 12 is a vertical sectional view taken on line XII—XII of Fig. 11.

Fig. 13 is a side elevation of a further modification wherein the planar cover member is spaced apart from the channel member by means of special spacers, to form openings therebetween.

Fig. 14 is a vertical cross section taken on line XIV—XIV of Fig. 13.

Fig. 15 is an enlarged fragmentary view of the tube showing special means for separating the cover member from the channel, and,

Fig. 16 is a further modified form of structure whereby the cover member is separated from the channel to form openings therebetween.

Throughout the several views like reference characters designate similar parts and the numeral 20 designates a drainage tube comprising a channel 22 made of any desired cross sectional shape. In order to obtain the greatest amount of cross sectional area for the amount of sheet metal used, it has been considered best to provide a semicircular trough or channel. Furthermore, this curved structure presents a smooth flow surface and produces a strong structure. The rectangular, triangular or other shaped troughs, might in most instances, be substituted for the semi-cylindrical shape.

As shown in Figs. 1 to 6 inclusive, it will be noted that channel 22 is provided at its upper outer edges with out-turned flanges 24 of a sufficient width to serve as a bearing ledge for the top or cover member 26, which is rigidly secured thereto in any suitable manner, such as shown in Fig. 6 at 28 wherein a portion 30 of the metal of the cover is formed through an opening 32 in flange 24 and then clinched to secured the parts together.

Top or cover member 26 is preferably made of an elongated sheet of transversely corrugated material of a width suitable to extend beyond said flanges at each side of the channel thereby providing an overhanging ledge above the openings 34, formed by the under valleys 36 of the corrugated cover. When the tube is placed in the ditch and covered with earth, the opening 34 will be more or less protected so that it will not become clogged with earth material. By the use of the transverse corrugations all liquid collecting on the tube cover 26 will be directed to the sides thereof and adjacent openings 34. Much of the liquid that collects on top of cover 26 will cling to the surface thereof and be directed through openings 34 and into the channel where it will be drained away to any desired point.

It is contemplated that these tubes shall be butted together and secured against relative movement by the following means. The cover 26 is spaced apart from the ends of the channel 22 as clearly shown in Figs. 1 and 4, so that when the channels are in abutted relation as shown, the ends of adjacent covers will be spaced apart. A

two piece band connector 38, comprising U-shaped member 40 with out-turned ears 42, is adapted to overlap the joint between the channels with the ears 42 resting against and extending beyond the flanges 24 and a corrugated strip 44 adapted to overlap adjacent cover members 26 and extend across the space therebetween. The corrugations in 44 are adapted to register with corresponding corrugations in the respective cover member, so that when the screws 48 are provided to secure the two members 40 and 44 together, as shown, the abutted tubes will be retained in aligned relation. It will be noted that the screws 48 extend between the spaced apart ends of the cover members 26 and adjacent the channel flanges 24. Furthermore, the over-all dimension of the connector members 40 and 44, is substantially equal to the width of the cover member 26, thereby presenting a continuous tube of uniform width.

In many instances, it is found expedient to provide means whereby lateral branches may be extended from certain of the tubes and for this purpose a T-section 50, as shown in Figs. 4 and 5 may be provided. The T-section comprises a main tube 52 and a lateral branch 54 communicating therewith. While only a right angled lateral is shown, it is apparent that any desired number of laterals might be added and the angled relation to the main tube might be varied to any desired degree. It will be noted that the corrugations of the cover members of sections 52 and 54 are at relative angled relation, and that these covers may be overlapped as shown at 56 in Fig. 5.

Referring to Figs. 7 and 8 it will be noted that the channel 60 is of semi-circular form with spaced apart out-turned ledges 62 formed in the opposite upper edges thereof, whereby openings 64 are formed beneath the planar cover member 66 which rests on the upper edges of channel 60 and is secured to ledges 62 by means of screws 68. The ledges at opposite sides of the channel are preferably in offset relation and the cover extends beyond the edges of the channel. Ledges 62 may be inwardly and downwardly inclined, thus facilitating the flow of water, collecting thereon, to the interior of the channel.

Modified form shown in Figs. 9 and 10 are of a structure slightly varied from the first form described wherein the channel 70 is provided with out-turned flanges 71 and upwardly opened louvers 72 positioned in the side walls of the channel below the in-turned edge portion 73 of the upwardly inclined cover member 74. It will be noted that the edge portions 73 are inwardly and downwardly inclined and terminate just above said louvers whereby water drained from the cover will be directed to the top openings of said louvers. To further facilitate the flow of liquid to the interior of the tube, it will be noted that the edges of the cover members are serrated at 75 with the down turned points positioned directly above said louver openings.

Another modification of the tube, shown in Figs. 11 and 12, comprises a tube made of a single sheet of metal formed to present a channel 80 with outwardly extending ledges 81 at its opposite upper edges, and top inclined walls or covers 82 having up-turned flanges 84, which are joined together by rivets 86, or by any other suitable means such as welding, etc. The opposite side walls of channel 80 are provided with a series of openings 88 which are positioned directly beneath ledges 81 and above the bottom of channel 80.

This type of tube eliminates the necessity of but one joint and presents an inclined water course leading to the openings 88 through which liquid may pass to channel 80.

A still further modified form is shown in Figs. 13 and 14 wherein the channel or trough member 90 is provided with substantially horizontal out-turned flanges 91 at its opposite edges. These flanges 91 are also provided at their outer edges with an up-turned flange 92. Positioned above and overlapping the outer edges of the channel 90, is a planar cover plate 93 spaced apart from said channel by means of spacers 94. Rivets or bolts 95 extend through cover 93, spacer 94 and channel flange 92 to secure the parts in fixed relation. When so related, it is apparent that openings 96 will be formed between cover plate 93 and the channel member thereby permitting the inflow of liquid to the channel for drainage purposes.

Figs. 15 and 16 show a means that might be substituted for the means shown in Fig. 14 for spacing the channel from the cover plate. In Fig. 15 a portion of the cover plate metal is pressed downwardly to form an offset boss 97 which rests against the flange 91 and is secured thereto by means of a rivet 98. This simply eliminates the use of the spacer member 94.

In Fig. 16 the pressed-up boss 99 formed in flange 91, serves as a bearing point for the cover plate 93 which is secured thereto by means of rivet 100. It is very apparent that these parts might be spot-welded thereby eliminating the use of the rivets as shown.

Throughout the several modified forms, it will be observed that the principal feature of novelty is the overhanging ledge which serves to protect the opening to the channel against the direct packing of earth material thereagainst, thereby greatly facilitating the flow of liquid to the channel.

A further feature present in all forms described, is the provision of flowing surfaces toward the openings in the tube which are either in a horizontal plane or inclined downwardly toward said opening. Should the ledges or flanges be inclined downwardly away from the openings, then the tendency would be to deposit the liquid collected at a point remote from said openings which would greatly hinder the drainage of the surrounding earth.

In operation, these drainage tubes are usually placed conveniently below the surface of the ground and may be covered by means of earth or any other porous material.

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

1. A drainage tube comprising a sheet metal channel having outwardly extended longitudinal flanges at its upper edges; a substantially planar sheet secured in spaced relation to said flanges and extending therebeyond whereby tubular openings to said tube are formed between said sheet and channel flanges at spaced relation relative to the longitudinal edges of said sheet.

2. A drainage tube comprising a sheet metal channel having out-turned flanges at its opposite longitudinal edges, cover strip extending across the open side of said channel and beyond the outer edges of the flanges respectively, spacing members positioned between said flanges and cover strip whereby they are spaced apart to provide openings therebetween to permit liquid to flow into said channel.

3. A drainage tube comprising a sheet metal channel having out-turned flanges at its opposite longitudinal edges, an undulated cover strip extending across said channel and beyond the outer edges of the flanges respectively, said flanges and cover strip being spaced apart at intervals to provide openings therebetween, whereby water may be directed to said channel from points spaced apart from the outer walls thereof.
4. A drainage tube comprising a sheet metal channel having outwardly extending flanges along its upper edges, a transversely corrugated top strip of sheet metal adapted to rest on said flanges and extend outwardly therebeyond whereby a series of openings are formed between each flange and said top strip and a series of transverse valleys are disposed in the upper surface of the top strip.
5. A drainage tube comprising a series of abutting outwardly flanged channels; a transversely corrugated cover strip spaced apart from each end of said channel and extending beyond the outer edges thereof; means for securing said strip to its associated channel with openings formed therebetween; a two-piece connecting band over-lapping adjacent end portions of said channels and cover strips and secured together by means interconnecting said band pieces, said

means being positioned beyond said channel flanges and between the ends of adjacent cover strips.

6. A drainage tube comprising a plurality of abutting outwardly flanged channels; a cover sheet for each of said channels spaced apart from the respective ends thereof and extending beyond the outer flanged edges thereof, said channels having openings formed along its opposite upper portion beneath said cover sheet whereby liquid may pass into said tubes; a two-piece connecting band overlapping adjacent ends of said cover sheets and abutting channels; and means to secure said connecting band parts together.

7. A drainage tube comprising a series of abutting channels; a cover sheet for each of said channels spaced apart from the respective ends thereof and extending beyond the outer edges thereof, said channels and covers being relatively off-set and assembled so as to present openings along the upper edges of the tube beneath said cover sheet whereby liquid may flow into said tube, and a member circumscribing abutting ends of adjacent tubes whereby the tubes are secured in fixed relation with the space between adjacent cover sheets closed.

FIRMAN L. CARSWELL.
OTTO W. SCHMIDT.