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(54) **Drain constructions.**

(57) A drain construction comprises a preformed assembly which is located in a trench which is then filled, around the preformed assembly, with concrete or similar material. The preformed assembly comprises two angle-section wall members (10,11) which are held apart by spring spacers (21) to define a drainage slot, and a plastics pipe (12) which is slit along its length and the edges of the pipe along each side of the slit engaged in grooves (15) extending along the wall member (10, 11). The upper flanges of the wall members are flush with the ground surface so that water can drain from the surface by flowing down through the slot between the members and into the pipe (12). The spring spacers (21) separating the wall members permit the wall members to move relatively to one another as a result of thermal expansion or contraction, or other movement, of the surrounding material.

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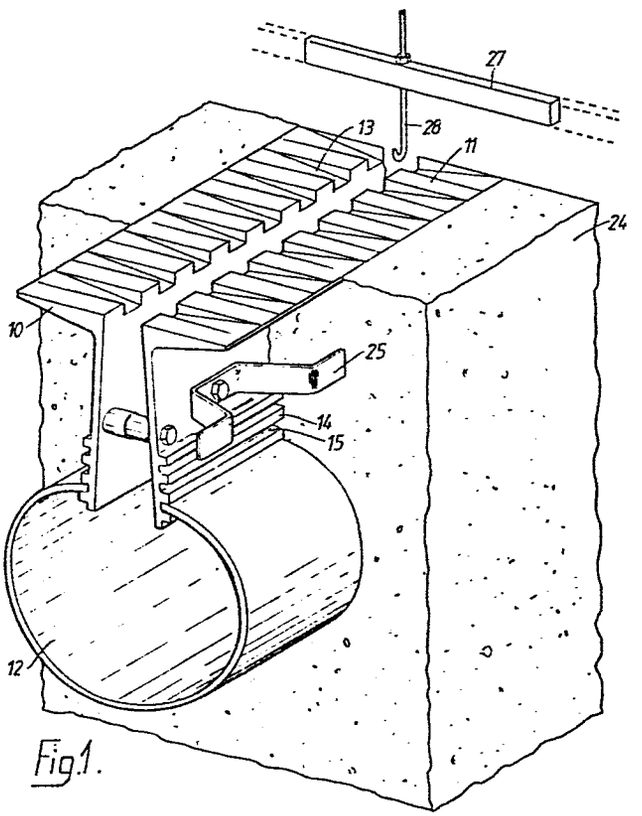

Fig.1.

"Drain Constructions"

This invention relates to drain constructions of the kind generally used for collecting surface water from roadways, paths or other hard paved surfaces on which water or other liquids tend to collect.

Many drainage systems have been used including open gutters, formed by an open channel in the surface to be drained. The channel is often formed in a series of blocks, precast or cast in situ, arranged end-to-end. In many circumstances, however, it may be desirable to cover such a drainage channel with some form of grating in order to prevent entry of debris into the channel and also to provide minimum interruption to the continuity of the surface. This is often desirable on a roadway or other surface over which foot traffic or vehicles run. Installation of conventional drainage channels of the above-mentioned kind is expensive, and the use of gratings is also expensive, due to the cost of the actual grating itself and also the cost of seatings or other fixtures in which the grating is located.

It is the object of this invention to provide a drain construction which is effective in use and construction as well as being inexpensive to produce and simple to install.

According to the invention there is provided an assembly for use in drain construction characterised by an elongate, generally tubular conduit having, extending along the length thereof, an elongate opening which is narrower than the conduit and faces upwardly in use of the assembly, and two spaced elongate wall members connected to the conduit along opposite sides of the opening and extending away from the opening so as to define between them a slot communicating, through the opening, with the interior of the conduit.

Such an assembly may be installed, in a drain construction, by forming a trench in the ground, locating the assembly within the trench with the slot defined by the wall members facing upwardly and the upper edges of the wall members substantially level with the surface of the ground, and then filling the trench up to ground level around the assembly with a material, e.g. a settable material such as concrete, which is such as to embed and support the assembly.

With this arrangement any water on the top surface of the surrounding material, or any surrounding surface, may flow into the slot and thence down into the drainage conduit.

Preferably, adjustable spacing means are

provided between the elongate wall members.

With this arrangement, movement in the surrounding material due to changes in temperature can be accommodated by allowing the wall members to move apart or towards each other as the surrounding material moves.

The adjustable spacing means may include spring means, such as a helical compression spring, interconnecting the wall members in a manner tending to urge the wall members apart. Alternatively, the adjustable spacing means may comprise a temperature responsive device connected between the wall members in a manner to adjust the spacing between the wall members in accordance with the ambient temperature. Preferably, the adjustable spacing means are enclosed in a protective sleeve extending between the wall members. The protective sleeve may comprise two telescoping parts which slide relatively to one another to accommodate relative movement between said wall members.

The generally tubular conduit may be formed of flexible material so that adjustment of the spacing between the wall members is accompanied by corresponding adjustment of the width of the opening in the conduit, said adjustment being permitted by flexure of the walls of the conduit.

There may be provided on each wall member a plurality of alternative locations for attachment of the conduit thereto, whereby the depth of the slot provided between the wall members, relative to the conduit, may

be adjusted.

A location for attachment of the conduit to each wall member may be provided by at least one longitudinally extending groove along the outer surface of the wall member into which grooves are engageable the two edges of the conduit which define the aforesaid opening therein. Preferably, the conduit is formed of resiliently flexible material, such as a resilient plastics, and said edges of the conduit are retained in said grooves by the resilience of the conduit.

The conduit may be generally circular in cross-section.

The width of the slot defined by said wall members preferably increases as it extends towards the conduit.

The edge of each wall member remote from the conduit may be provided with an outwardly extending flange, and each outwardly extending flange may be formed, on the surface thereof facing away from the conduit, with spaced grooves extending transversely to, and opening into, the slot defined by the wall members. Preferably, the bottom walls of said grooves are inclined towards the conduit as they extend towards the slot defined between the wall members.

A number of the assemblies may be placed end-to-end so that the slots and internal drainage conduits are in communication.

The invention will now be described by way of

example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a drain construction arranged in accordance with the present invention,

Figure 2 is a cross-sectional view of a spring spacer used in the drain construction.

The drain construction shown in the drawings includes an assembly comprising two generally angle section wall members 10 and 11 and a resilient conduit tube 12. The members 10 and 11 are preferably made from cast iron or plastics material and are of similar section. Each is provided along its upper edge with a tapering, shorter outwardly extending flange which is formed on its upper surface with spaced tapering grooves 13 to give a castellated effect at the upper edge of a slot defined between the members. This arrangement tends to dissipate energy in the flow of water across the assembly, thus encouraging the water to flow into the slot. The grooves taper outwardly so as to provide, in the base of each groove, a downward sloping surface leading into the slot.

The longer flanges of the members 10 and 11 extend downwardly but slope away from one another towards the lower ends so that the slot is of increasing width. On the external surface of each wall member, and near the lower edge thereof, is a series of spaced horizontal ridges and grooves 14, 15 which run lengthwise of the members 10 and 11 respectively.

The conduit tube 12, which is made from a resilient material such as, for example, plastics material, is of generally circular configuration but with an upwardly presented longitudinal opening. The edges of the tube which define the opening are engaged in one of the grooves 15 in the respective wall members 10 and 11. In the construction shown there are three such grooves 15 on each of the members and it is possible to engage the tube edges into any chosen pair. By this means the capacity of the drain is adjustable by regulating the depth of the slot and the cross-sectional area of the conduit 12 in relation to the width of the slot between the two members 10 and 11. The tube 12 is conveniently made initially as a complete tube which is split and the two sides separated in order to engage in the grooves 15 in the members 10 and 11 as shown.

To support the two members 10 and 11 and to space them apart there are a number of spacers which are positioned at intervals along the lengths of the members 10 and 11.

Referring to Figure 2, each spacer comprises a helical compression spring 21, opposite ends of which abut plates 18, 19 on the inner surfaces of the wall members 10, 11 respectively. The spring is located by screws 22, 23 which project through the wall members and into the ends of the spring. It is protected against dirt and debris by two telescopically slideable tubes 16, 17 which surround the spring 21, the ends of the tubes being closed

by the plates 18, 19.

The spring 21 permits the members 10 and 11 to move towards and away from one another as a result of movement or expansion of the material surrounding the assembly.

In an alternative arrangement the spacers may be temperature responsive piston and cylinder units containing fluid which is responsive to temperature change to tend to expand the unit, so as to keep the members 10, 11 apart while allowing some relative movement thereof.

As shown in Figure 1, in use the assembly is embedded in a body of material, indicated at 24, such as concrete or tarmac or construction material including polymer structures. The material is settable and provides a flat top surface. Any expansion or contraction of this material results in movement of the members 10 and 11 towards or away from one another and this is accommodated by the spring spacers.

Keying elements 25 are provided on the sides of the members 10 and 11 to lock them into the settable material 24.

The method of making the drain construction comprises assembling the members 10 and 11 and the tube 12 in correct relationship, as shown, the spring spacers being inserted at intervals along the length of the assembly. Further similar assemblies are placed end-to-end to provide a continuous drain. Typically, each assembly may have a length of one metre or longer. Connecting

members (not shown) in the form of sleeves surrounding the tube 12 may be fitted to provide a water-tight or substantially water-tight seal between adjacent lengths of the drain. In this way a complete drain, with a continuous open slot and a continuous drainage conduit may be simply formed in minimum time.

The assemblies are placed in a prepared trench and are suspended by hooks 28 from battens 27 which are long enough to reach datum levels in the surrounding surface. The hooks 28 are adjustable in length, having adjustment nuts 28 engaging threads on the upper ends thereof. The hooked lower ends engage the spring spacers already described.

Once the assemblies are in place, the trench is back-filled with settable material to the required level corresponding to the top surfaces of the flanges of the members 10 and 11.

Alternatively, the assembly may be initially below the required level, and the placing of the settable material may be such as to lift the assembly into the correct position so that its top surface lies level with that of the settable material itself.

In order to prevent settable material dropping into the slot, this may be filled with boards or other components which are afterwards removed.

If it is desired that the slot should be discontinuous, bridge pieces are inserted at spaced positions along the length of the slot.

This assembly provides a continuous drain which may have a fall from one end to another. Longitudinal and transverse levels are taken into account. Any expansion or contraction of the settable material or its surrounding material as a result of changes in temperature, or other movement, is readily accommodated by movement of the members 10 and 11 under the influence of the spring spacers.

The spring or equivalent spacers may be used in other circumstances in bridge or road engineering where expansion is to be accommodated.

CLAIMS

1. An assembly for use in drain construction characterised by an elongate, generally tubular conduit (12), having, extending along the length thereof, an elongate opening which is narrower than the conduit and faces upwardly in use of the assembly, and two spaced elongate wall members (10, 11) connected to the conduit along opposite sides of the opening and extending away from the opening so as to define between them a slot communicating, through the opening, with the interior of the conduit (12).

2. An assembly according to Claim 1, characterised in that adjustable spacing means (21) are provided between said elongate wall members (10, 11).

3. An assembly according to Claim 2, characterised in that said adjustable spacing means include spring means (21) interconnecting the wall members (10, 11) in a manner tending to urge the wall members apart.

4. An assembly according to Claim 3, characterised in that said spring means comprise a helical compression spring (21).

5. An assembly according to Claim 2, characterised in that said adjustable spacing means comprise a temperature responsive device connected between the wall members (10, 11) in a manner to adjust the spacing between the wall members in accordance with the ambient temperature.

6. An assembly according to any of Claims 3 to 5, characterised in that said adjustable spacing means are

enclosed in a protective sleeve (16, 17) extending between the wall members (10, 11).

7. An assembly according to Claim 6, characterised in that the protective sleeve comprises two telescoping parts (16, 17) which may slide relatively to one another to accommodate relative movement between said wall members (10, 11).

8. An assembly according to any of the preceding claims characterised in that the generally tubular conduit (12) is formed of flexible material so that adjustment of the spacing between the wall members (10,11) is accompanied by corresponding adjustment of the width of the opening in the conduit, said adjustment being permitted by flexure of the walls of the conduit.

9. An assembly according to any of the preceding claims, characterised in that there are provided on each wall member (10,11) a plurality of alternative locations (15) for attachment of the conduit thereto, whereby the depth of the slot provided between the wall members, relative to the conduit, may be adjusted.

10. An assembly according to any of the preceding claims, characterised in that a location for attachment of the conduit to each wall member (10, 11) is provided by at least one longitudinally extending groove (15) along the outer surface of the wall member, into which grooves are engageable the two edges of the conduit (12) which define the aforesaid opening therein.

11. An assembly according to Claim 10, characterised

in that the conduit (12) is formed of resiliently flexible material and said edges of the conduit are retained in said grooves (15) by the resilience of the conduit.

12. An assembly according to any of Claims 1 to 11, characterised in that the conduit (12) is formed from resiliently flexible plastics material.

13. An assembly according to any of Claims 1 to 12, characterised in that the conduit (12) is generally circular in cross-section.

14. An assembly according to any of Claims 1 to 13, characterised in that the width of the slot defined by said wall members (10, 11) increases as it extends towards the conduit (12).

15. An assembly according to any of Claims 1 to 14, characterised in that the edge of each wall member (10, 11) remote from the conduit is provided with an outwardly extending flange.

16. An assembly according to Claim 15, characterised in that each outwardly extending flange is formed, on the surface thereof facing away from the conduit (12) with spaced grooves (13) extending transversely to, and opening into, the slot defined by the wall members (10, 11).

17. An assembly according to Claim 16, characterised in that the bottom walls of said grooves (13) are inclined towards the conduit (12) as they extend towards the slot defined between the wall members (10,11).

18. A method of installing a drain construction for

draining water from the surface of the ground, characterised by the steps of forming a trench in the ground, locating within the trench at least one assembly according to any of Claims 1 to 17, with the slot defined by said wall members (10, 11) facing upwardly and the upper edges of the wall members substantially level with the surface of the ground, and then filling the trench up to ground level around the assembly with a material (24) which is such as to embed and support the assembly.

19. A method according to Claim 18 characterised in that the material (24) in which the assembly is embedded is concrete.

20. A drain construction when formed by the method of Claim 18 or Claim 19.

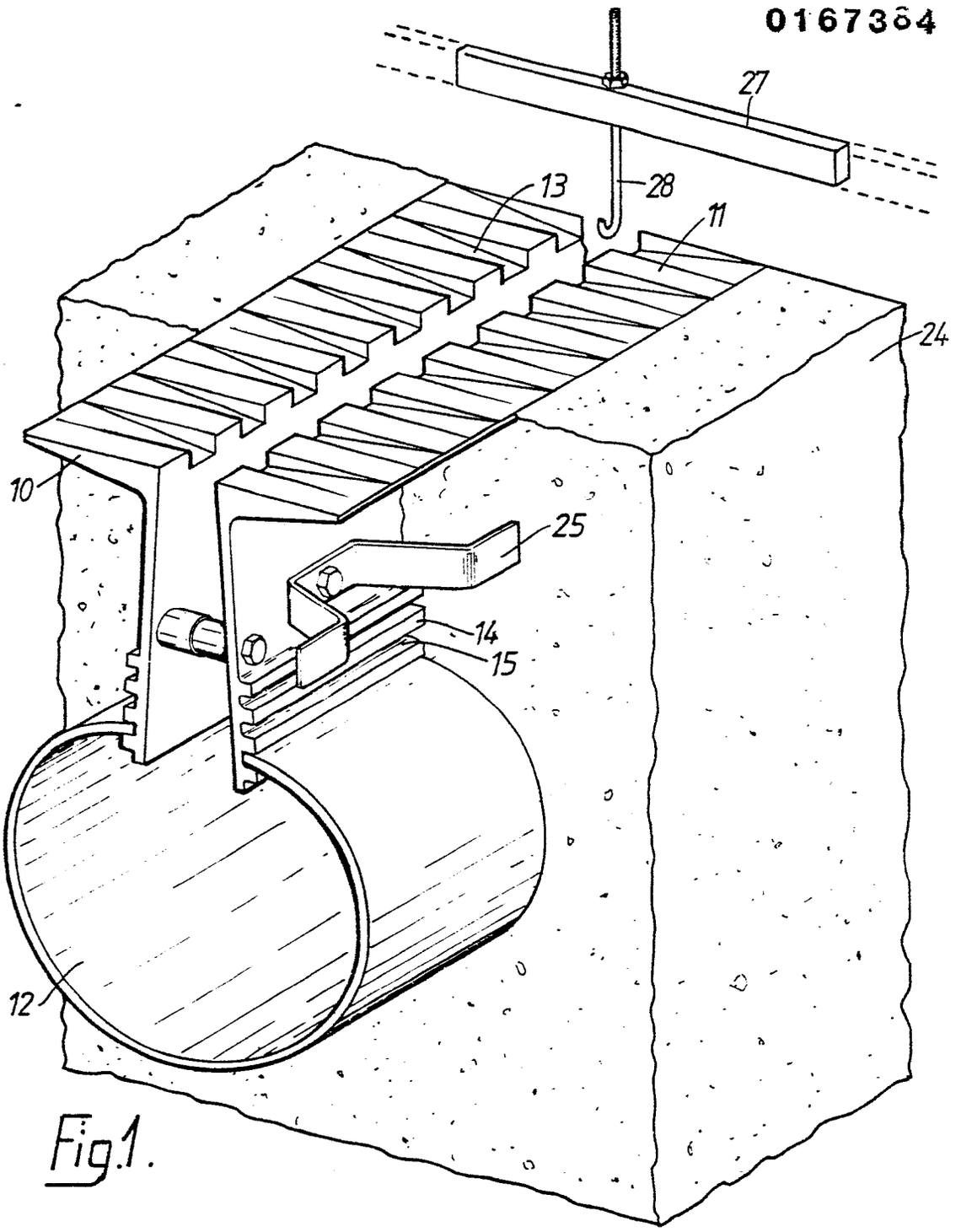

Fig.1.

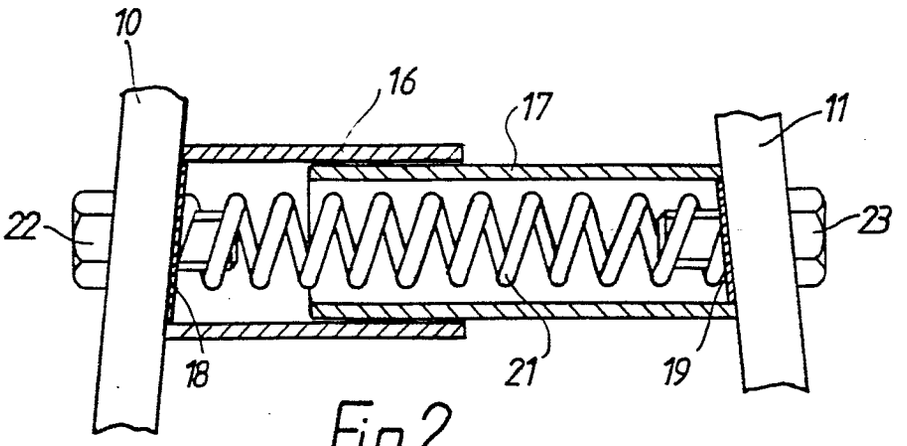

Fig.2.