United States Patent

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[54] DRAINAGE TUBE COUPLING

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[52] **U.S. Cl.**.....**285/417,** 61/10, 285/424, 285/DIG. 4

[51] **Int. Cl.**.....**F16l 21/00**

[58] **Field of Search**.....61/10, 11, 16; 138/171, 177; 285/176, 373, 417, 418, 419, 424, DIG. 4

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[57] **ABSTRACT**

A coupling is provided, for slideably receiving ends of drainage tube therein, through its opposite open ends, and for frictionally retaining the same together.

12 Claims, 4 Drawing Figures

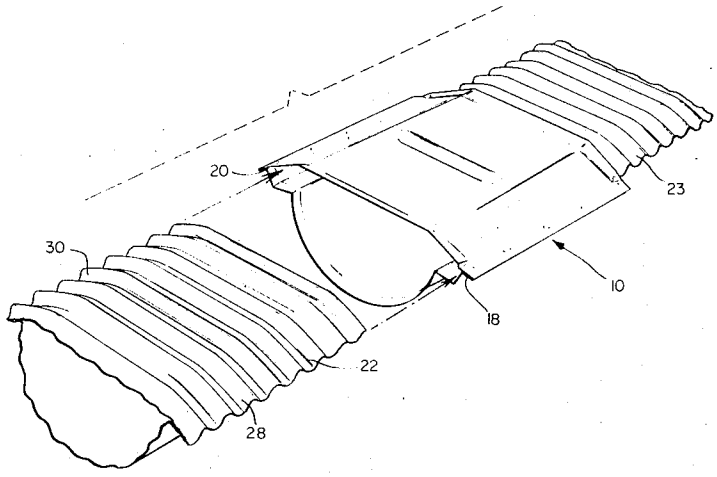


Fig. 1

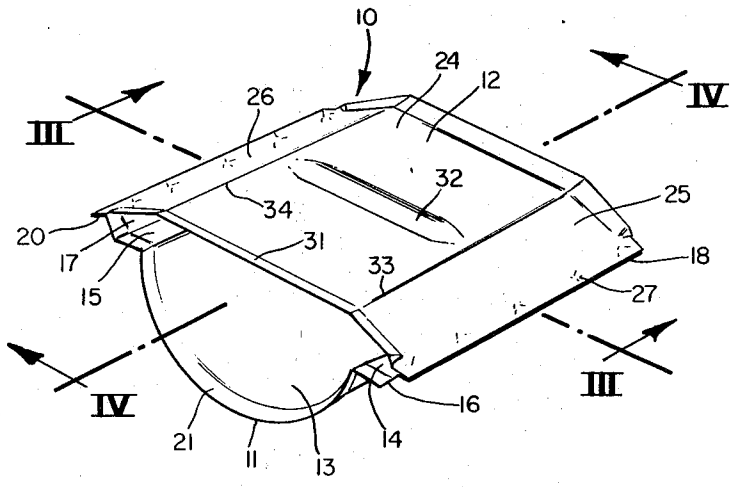
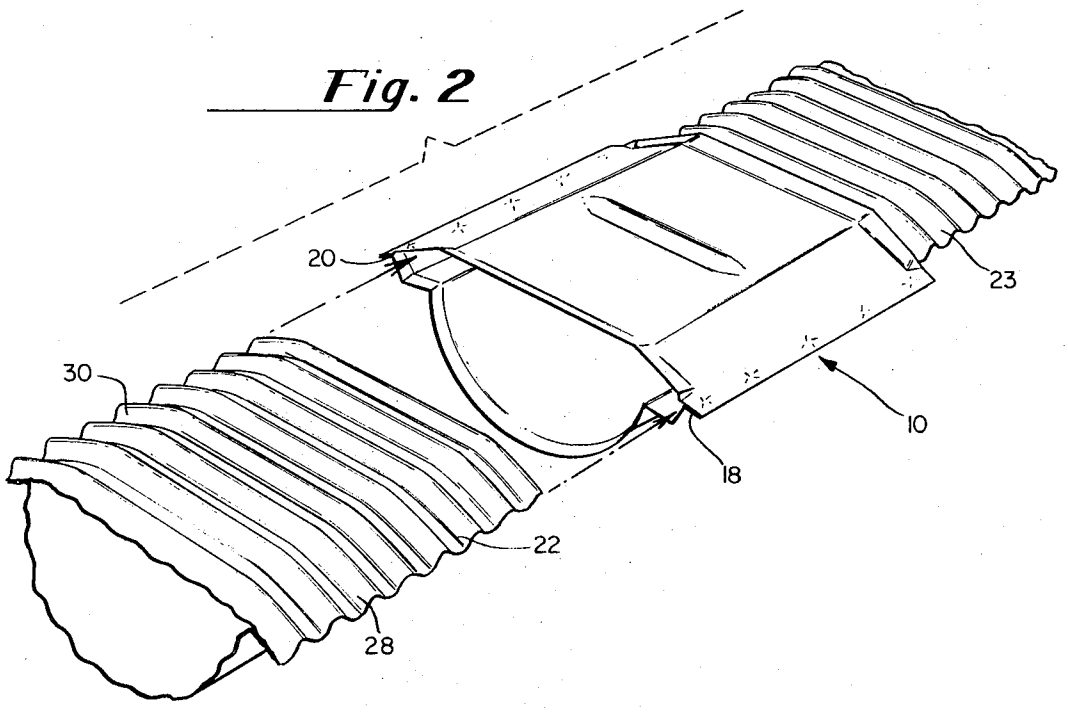


Fig. 2



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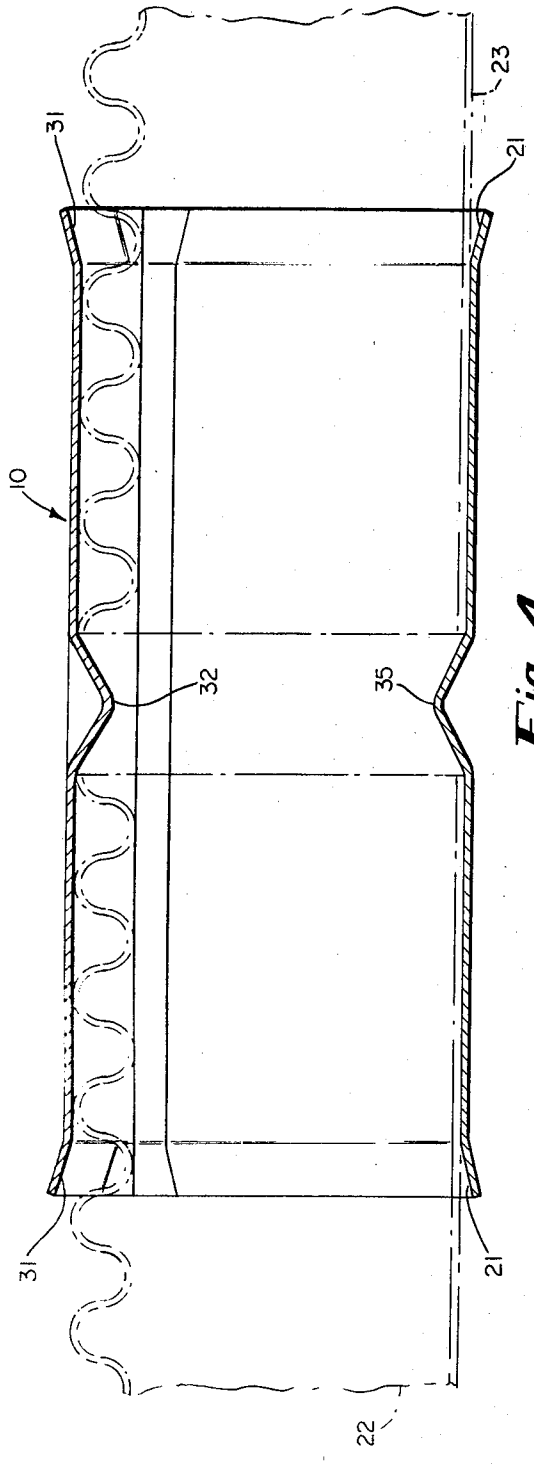


Fig. 4

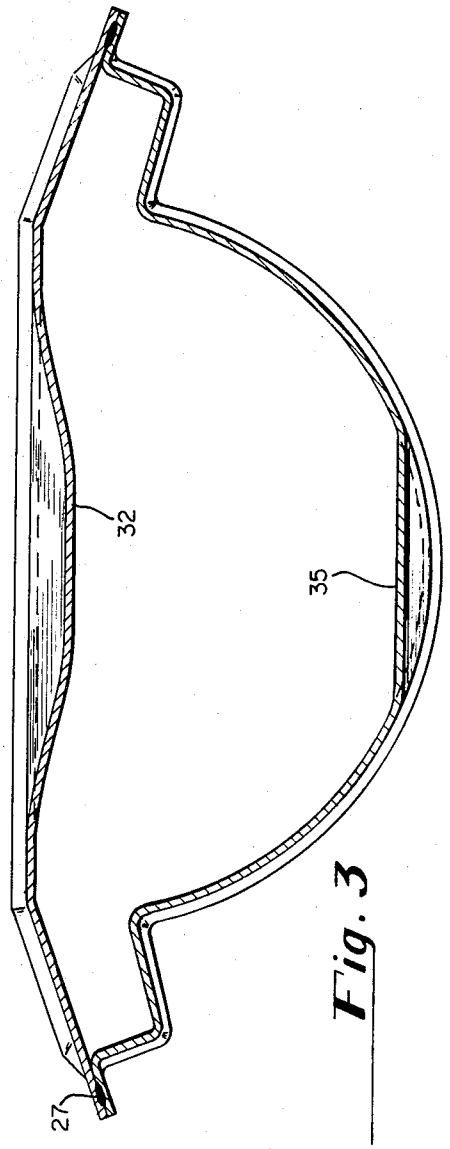


Fig. 3

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DRAINAGE TUBE COUPLING

BACKGROUND OF THE INVENTION

Today's construction techniques, particularly involving the construction of roads and the like, wherein it is anticipated that it will be necessary to provide adequate drainage for the roads, generally at opposite sides thereof, along the roads but beneath the road level, it has become commonplace to provide drainage ditches, generally filled with a loose substance, such as gravel or the like. At the bottoms of the ditches, means are provided for carrying off water that filters through the ditches to the water carrying-off means.

In the past, concrete pipe has been utilized and has worked generally effectively. However, it has been found, that by the use of a metal drainage tube, a tube or conduit of greatly reduced size may be utilized, as compared with concrete conduit lines, due to the ability of a smooth metal, for example, steel surface of the drainage tube to freely convey water, by laminar flow, in that the use of metallic tubes without cumbersome junctures between opposed sections does not result in the turbulence for the flow being conveyed therethrough that junctures between adjacent sections of concrete pipe would cause. Thus, for the same amount of desired water flow, a much smaller metallic drainage tube may be utilized.

Such drainage tubes have come to be constructed to have a round bottom portion, and a cover portion. In many instances, the cover portion is corrogated because it is usually placed in a trough or trench with the upper surface of the cover portion uppermost, carrying the weight of a substantial portion of gravel, or like film material. The corrogations in the cover portion thus prevent its deformation. Means are provided to permit entry of water, either through the cover portion, or through the curved bottom of the drainage tube, but preferably through the cover portion, and preferably such means also has capability for preventing the inflow of small soil particles, dirt and the like, into the drainage tube, which may otherwise tend to clog the tube.

The drainage tubes are generally provided in sections of predetermined length, for example, ten or twenty foot lengths, which must be connected together by some suitable means. Generally, the connectors or couplings have been of the same general configuration as the drainage tubes, having a rounded lower portion and a corrogated upper portion which would facilitate the locking together of adjacent drainage tube sections. However, by having such a corrogated configuration for coupling cover portions, it has been necessary for mechanics and like personnel to utilize tools for securing coupling cover portions to coupling bottom portions, in locking relationship with adjacent tube sections, as by applying metal screws or the like, as the securing means.

Such coupling structures have generally been adequate for their intended purpose, but have, on occasion, been somewhat cumbersome in their application, and have required the expenditure of time in their assembly, as in the assembly of adjacent drainage tube sections together.

SUMMARY OF THE INVENTION

The present invention is directed toward overcoming difficulties attendant to prior art types of drainage tube couplings, in providing couplings that may be instantly applied over the end of the drainage tube section, and which can readily receive an adjacent drainage tube section therein, in a quick and efficient manner, yet providing the desired strength when placed in a trench or the like, as with prior art techniques.

Accordingly, it is a primary object of this invention to provide a coupling for drainage tube and the like, of novel construction.

It is a further object of this invention to accomplish the above object, wherein the coupling is adapted to receive drainage tube sections therein, through opposite ends.

It is a further object of this invention to accomplish the above object, wherein the coupling is adapted to slideably receive adjacent tube sections through its ends, and to frictionally engage the same in received relation.

It is a further object of this invention, to accomplish the above objects, wherein means are provided for terminating inward movement of one drainage tube section, relative to the coupling.

It is a further object of this invention to provide a drainage tube coupling that is completely assembled for use in the field, without requiring the use of screws and like connectors by personnel installing drainage tube.

Further objects and advantages of the present invention will be readily apparent to those skilled in the art from a reading of the following brief descriptions of the drawing figures, detailed description of the preferred embodiment, and the appended claims.

IN THE DRAWINGS

FIG. **1** is a top perspective view of a drainage tube coupling in accordance with this invention.

FIG. **2** is a fragmentary top perspective view of a pair of drainage tube sections and a coupling member, with one such section being illustrated in exploded relationship with respect to the coupling.

FIG. **3** is an enlarged transverse cross-sectional view of the coupling of this invention, taken generally along the line III—III of FIG. **1**.

FIG. **4** is an enlarged longitudinal sectional view of the coupling of this invention, taken generally along the line IV—IV of FIG. **1**, and wherein adjacent drainage tube sections are illustrated in phantom.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings in detail, reference is first made to FIG. **1**, wherein there is illustrated a coupling **10**, in accordance with this invention, comprising a bottom U-shaped member **11**, and a cover member **12**. The coupling is generally of sheet metal construction, such as steel, although aluminum or the like may be utilized, as well as other sheet metals, as desired.

The bottom U-shaped member **11** is arcuately curved at **13**. The member **13** terminates at its uppermost sides in flanges having laterally outwardly bent inner flange portions **14** and **15**, extending along the length of opposite sides of the bottom member **11**, with the portions **14** and **15** having angularly upwardly bent spacing or connecting flange portions **16** and **17** respectively, which terminate in laterally outwardly bent flange terminal portions or outer portions **18** and **20**, respectively.

Opposite ends of the coupling member **11** have chamfered or outwardly bent funnel portions **21**, as illustrated most particularly in FIG. **4**, for the purpose of facilitating reception of adjacent drainage tube sections **22**, **23**, therein.

The cover member **12** includes a generally horizontal major surface portion **24**, which terminates at its lateral sides in sloped side portions **25** and **26**, which extend downwardly into overlying relation with respect to bottom flange portions **14** and **15**, respectively, as well as angularly bent flange portions **16** and **17**, respectively, for engagement of outer most portions of the sloped sides **25** and **26** with flange terminal portions **18** and **20** of the bottom member **11**. A plurality of spot welds or the like **27** along the outer most edges of the sloped portions **25** and **26** connect such portions with outer most flange portions **18** and **20**, as illustrated. Thus, voids are provided between the flange portions on opposite sides of the bottom member **11**, and the downwardly sloped side portions of the cover member **24**, for reception of protruding side portions **28** and **30** of drainage tube sections **22** and **23** therein. End portions of the cover member **12** are provided with flared or chamfered lips **31**, as illustrated in FIGS. **1** and **4**, particularly, also to facilitate the accommodation of drainage tube sections **22** and **23** at opposite ends of the coupling **10**.

The cover member 12 is provided with a depression 32 therein, extending transversely of the coupling 10, between bent lines 33 and 34 thereof, as illustrated in FIG. 1, with the depression 32 being formed integral with the cover member 12, and extending into the interior of the coupling member 10, toward the bottom member 11 thereof.

Similarly, the bottom member 11 is provided with an inward extension or protrusion 35, extending toward the protrusion 32, and is also integral with the bottom member 11. The protrusions 32 and 35 are generally aligned as illustrated in FIG. 4, and are disposed at the approximate center of the coupling 10, between ends thereof, for the purpose of providing a stopping point for terminating inward movement of drainage tube sections 22 and 23, as they are slid into the coupling 10, to assure centering of the coupling 10 on adjacent drainage tube sections 22 and 23.

In accordance with the use of the coupling 10 of this invention, it will be seen that tube sections 22 and 23 may be placed into either end, and the flared portions 21 and 31 will facilitate their entry. Their entry, as aforesaid, will be terminated by protrusions 32 and 35. The size of the interior of the coupling member 10 will be selected to facilitate sliding engagement of adjacent sections 22 and 23 therein, but yet to hold the same totally therein once they are disposed within the coupling member 10, in frictional engagement. In accordance with facilitating the entry of the sections 22 and 23 into the coupling member 10, the interior surface of the coupling member 10, and preferably the interior surface of both upper and lower portions 12 and 11, respectively thereof, are of a desired smoothness to permit sufficient sliding friction to facilitate manual application of the coupling member 10 over the ends of sections 22 and 23, but yet to facilitate a high degree of frictional engagement between engaged components once the sections 22 and 23 are disposed within the member 10. In accordance with the above, the various corrogations of the cover members of the sections 22 and 23 each cooperate to describe a surface with their respective apices having substantially the same configuration as the interior surface of the cover member 12, to facilitate engagement of the cover member 12 with the corrogated covers of the sections 22 and 23.

In accordance with all of the foregoing, it will be seen that there is provided a coupling 10 having ease of field assembly, but yet one which is economically constructed. The coupling 10 also has the desired load-carrying capabilities, in that it is reinforced with drainage tube sections disposed therein, during use, with the protrusions 32 and 35 also providing rigidity and strength therefor, when disposed at the bottom of a ditch, that may be filled with gravel or the like.

It will be apparent from the foregoing that various modifications may be made in the details of construction, as well as in the use of the coupling of this invention, all within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A drainage tube coupling for use in connecting drainage tube together comprising a first member of generally U-shaped configuration in transverse cross-section having outturned flanges at upper sides thereof, said outturned flanges each having an outer portion, an inner portion, and a spacing portion extending between and connecting said outer and inner portions, and a second member that is a cover member, extending between and connecting said outer portions of said outturned flanges but being spaced from said inner portions by said spacing portions of said outturned flanges to accommodate drainage tube flanges therein, and means securing said cover member to said outer portion, said cover member and said inner portions of said first member having longitudinally smooth and straight inner surfaces between open ends and an interior portion of said cover member, said smooth and straight inner surfaces extending for sufficient distances inwardly of said ends to comprise means for facilitating sliding of drainage tube inwardly of opposite ends thereof.

2. The coupling of claim 1, wherein said securing means comprises permanent securing means.

3. The coupling of claim 2, wherein said cover member includes a generally flat central portion having downwardly angularly sloped side portions extending between said central portion and said flange outer portions.

4. The coupling of claim 2, wherein said permanent securing means comprises spot welds.

5. The coupling of claim 3, wherein a central interior portion of at least one of said cover member and said U-shaped member is provided with a protrusion extending out of the plane of the interior surface of said member, toward the other said member, comprising means for facilitating abutment of drainage tube ends thereagainst.

6. The coupling of claim 5, wherein said protrusion comprises a transversely extending rib, integral with its said members.

7. The coupling of claim 6, wherein free ends of at least one of said cover member and said U-shaped member are outwardly flared to accommodate the reception of drainage tube therein.

8. The coupling of claim 6, wherein said securing means are located in outermost portions of said cover member that overlie said outer portions of said outturned flanges.

9. The coupling of claim 5, including in the combination a pair of drainage tube sections disposed inwardly of the coupling from each end thereof, frictionally held therein, on opposite sides of said protrusion.

10. The coupling of claim 9, wherein the upper surface of each said section is corrogated with apices of said corrogations cooperating to define surfaces substantially of the same configuration as the inner surface of said cover member.

11. A drainage tube coupling comprising a first member of generally U-shaped configuration in transverse cross-section having outturned flanges at upper sides thereof and a second member that is a cover member, extending between and connecting outer sides of said outturned flanges, and means securing said cover member to said outer sides, said cover member having a longitudinally smooth and straight inner surface between open ends and an interior portion of said cover member, said smooth and straight inner surface extending for sufficient distances inwardly of said ends to comprise means for facilitating sliding of drainage tube inwardly of opposite ends thereof, wherein said securing means comprise permanent securing means, wherein said cover member includes a generally flat central portion having downwardly angularly sloped side portions extending between said central portion and said flange outer sides, wherein a central interior portion of at least one of said cover member and said U-shaped member is provided with a protrusion extending out of the plane of the interior surface of said member, toward the other said member, comprising means for facilitating abutment of drainage tube ends there against, wherein said protrusion comprises a transversely extending rib, integral with its said members, wherein flanges of said U-shaped member and overlying sloped side portions of said cover member include inner spaced portions and outer portions, with the outer portions having the securing means therein, and wherein said inner spaced portions of a flange of said U-shaped member includes a transversely outwardly directed portion connected to an outer flange portion by an angularly disposed flange portion.

12. A drainage tube coupling for use in connecting drainage tubes together, comprising a lower generally U-shaped portion in transverse cross-section having outturned flanges at upper sides thereof, said flanges each having an outer portion, an inner portion, and a spacing portion extending between and connecting said outer and inner portions, and an upper cover portion extending between and connecting said outer portions of said outturned flanges but being spaced from said inner portions by said spacing portions of said outturned flanges to accommodate drainage tube flanges therein, said cover portion and said inner flange portions having longitudinally smooth and straight inner surfaces between open ends and an interior portion of said cover portion comprising means for facilitating sliding of drainage tube inwardly of opposite ends thereof, wherein said cover portion includes a generally flat central

portion having downwardly angularly sloped side portions extending between said central portion and said flange outer sides, wherein a central interior portion of at least one of said cover portion and said U-shaped portion is provided with a protrusion extending out of the plane of the interior surface of said one of said cover portion and U-shaped portion, toward the other said portion, and wherein said protrusion comprises a transversely extending rib, integral therewith and comprising means for facilitating abutment of drainage tube there against.

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