(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 000 788**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **78100645.7**

(51) Int. Cl.²: **E 02 B 11/00**, E 01 F 5/00

(22) Date of filing: **10.08.78**

(30) Priority: **11.08.77 GB 33767/77**

(43) Date of publication of application:
21.02.79 Bulletin 79/4

(84) Designated contracting states:
BE CH DE FR NL SE

(71) Applicant: **H.H. Robertson Company**
Two Gateway Center
Pittsburgh Pennsylvania 15222(US)

(72) Inventor: **Jones, Dennis**
Rosemount Alpraham
Tarporley Cheshire(GB)

(74) Representative: **Patentanwälte Dipl.-Ing. A. Grünecker, Dr.-Ing. H. Kinkeldey, Dr.-Ing. W. Stockmair, Dr. rer. nat. K. Schumann, Dipl.-Ing. P. Jakob, Dr. rer. nat. G. Bezold Maximilianstrasse 43**
D-8000 München 22(DE)

(54) Draining ditch headwall unit.

(57) A headwall unit of one-piece lightweight construction. The headwall unit (10) comprises a rim (11) surrounding the mouth of a central recessed portion (R). The recessed portion is defined by an inclined or curved back wall (12), opposed side walls (14) and a preferably flat bottom wall (13). A bracket (15) extending rearwardly from the rear face of the back facilitates handling of the unit and serves as a convenient attachment site for anchoring device (16). When the unit is installed in a ditch wall, bottom wall is substantially horizontal and the rim is substantially flush with the ditch wall.

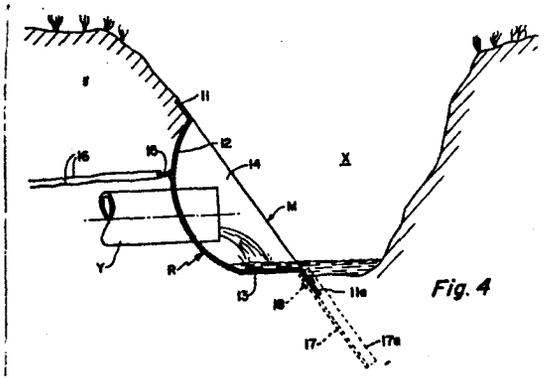

Fig. 4

EP 0 000 788 A1

Draining ditch headwall unit

This invention relates to headwall units for use in drainage ditches, and more particularly to a headwall unit of a one-piece lightweight construction.

Outfall pipes are provided to direct water drained from the surrounding land into drainage ditches. Headwall units are employed in the ditches to prevent erosion of the walls and bottom of the ditch.

One known headwall unit is constructed from two flat concrete slabs. One of the slabs is disposed horizontally and includes a forward portion presented at or near the bottom of the ditch and a rear portion which is embedded in the ditch wall. The forward portion of the first slab presents a transverse slot into which the bottom edge of the second slab is captively retained. The second slab extends upwardly from the first slab and is substantially flush with the ditch wall. A vertically presented elongated slot is provided through which outfall pipes extend.

Such headwall units are not been entirely satisfactory in that they are cumbersome and difficult to install relative to the outfall pipe or pipes. In addition, the manner in which the two slabs are installed exposes the slabs to loosening by water erosion of the wall and bottom of the

ditch. Hence erosion, the undesirable action which the slabs are intended to prevent, ultimately undermines the installation and requires frequent removal and reinstallation of the slabs.

The principal object of this invention is to provide a one-piece lightweight headwall unit which avoids the above and other disadvantages.

A further object of this invention is to provide a headwall unit which protects outfall pipes which project therethrough.

According to this invention, a drainage ditch headwall unit is provided comprising a recessed portion defined by an inclined or curved back wall, opposed side walls and a bottom wall. The walls have substantially coplanar outer edges which define a generally rectangular mouth. An outwardly extending rim surrounds the mouth and is formed integrally with the coplanar edges. The bottom wall preferably is substantially flat and in use is horizontal. The unit preferably is molded from glass fiber reinforced cement.

In a preferred form, the back wall is provided with a substantially U-shaped handle or bracket which extends rearwardly therefrom. The handle or bracket facilitates handling of the unit and also serves as a convenient attachment site for anchoring devices.

In drawings which illustrate embodiments of the invention,

FIGURE 1 is a perspective view of a headwall unit according to the invention;

FIGURE 2 is a transverse cross-section taken horizontally

through the headwall unit of FIGURE 1;

FIGURE 3 is an isometric view of a marginal flange extension; and

FIGURE 4 is a vertical cross-sectional view illustrating the headwall unit installed in the wall of a ditch.

FIGURES 1 and 2 illustrate a headwall unit 10 molded from glass fiber reinforced cement. The unit 10 comprises central recessed portion R which is defined by an inclined or curved back wall 12, a flat bottom wall 13 and flat side walls 14. The walls 12, 13, 14 have substantially coplanar outer edges which define a generally rectangular mouth M. An outwardly extending rim 11 surrounds the mouth M and is formed integrally with the outer edges of the walls 12, 13, 14. As shown in FIGURE 4, the unit 10 is intended to be installed in a drainage ditch X with the bottom wall 13 disposed substantially horizontally and with the rim 11 substantially flush with the ditch wall.

As shown in FIGURES 2 and 4, a U-shaped handle 15 is secured to and extends rearwardly from the rear face of the back wall 12. A length of webbing 16 (FIGURE 4) connected to the member 15, is buried in the earth adjacent to the ditch X. The webbing 16 provides a simple but effective means for anchoring the unit 10 in place embedded in the ditch wall. The webbing 16 may be formed from any suitable material. For example, a polyester type webbing has been found suitable for use as the webbing 16.

An extension 17 (FIGURE 3) may be provided having upstanding flanges 17a provided along its opposite longitudinal edges. The extension 17, as illustrated in FIGURE 4, may be secured to a lower rim portion 11a, for example by bolts 18, and extends downwardly therefrom. The extension 17

is useful in unusually deep ditches to prevent undermining the ditch wall.

In FIGURE 2, the broken lines illustrate an alternative shape of the recessed portion R. In this instance the back wall 12 has an arcuate shape in cross-section which merges smoothly into the side walls 14. The arcuate shape facilitates entry of an outfall pipe Y' at angles other normal to the direction of flow of the ditch X. Other shapes may of course be employed depending upon the mode of usage. The cutting of holes in the back wall 12 to accommodate outfall pipes such as Y or Y' may be effected in any convenient manner.

To accommodate pipes up to 300 millimeters in diameter, the unit 10 has the following typical dimensions. The recessed portion R has a depth of 300 millimeters. The back wall 12 is formed at a radius of approximately 490 millimeters and has a minimum width of approximately 400 millimeters. The bottom wall 13 has an average width of about 408 millimeters and is 300 millimeters long. The mouth M is 900 millimeters long and 450 millimeters wide. The rim 11 has a uniform width of 100 millimeters. The unit 10 has a material thickness of 10 millimeters. The nominal weight of the unit 10 is approximately 24 kg.

The extension member 17 has a width of 675 millimeters; can be provided in any desired length, e.g., 300, 600, 900 millimeters; and has a thickness of 10 millimeters. The flanges 17a have a height of 25 millimeters.

It will be appreciated that for pipes having a diameter larger than 300 millimeters in diameter, the dimensions and material thickness of the marginal flange 11 could be retained and only the dimensions of the central recessed portion R be correspondingly increased.

Recent developments in the field of glass fiber reinforced cement (GRC) have yielded relatively thin, relatively lightweight structural materials having remarkable tensile strength, flexural strength and impact resistance. See U.S. patents 3,852,082; 3,902,912; British patents 1,200,732; 1,243,972. The GRC products contain Portland cement, sand, water and alkali-resistant glass fibers comprising from about 0.5 to 10 percent by weight of the wet cement mixture.

The unit 10 and the extension member 17 preferably are fabricated from GRC.

It will be appreciated that the present invention provides a headwall unit which is of a lightweight construction, may be easily installed, and may be nested with other similar units for transport and storage. It will also be appreciated that the end of the outfall pipe Y or Y' is disposed entirely within the recessed portion R and is thereby protected against breakage.

The headwall unit 10 may also be employed in inflow situations such as where the drainage path crosses beneath a road or similar obstruction. In such a case, the drainage water flow from the ditch X, through the mouth M and into the pipe Y or Y'.

A grill or grating member may be provided across the mouth M, particularly in such inflow situation, to prevent obstruction of the mouth M and pipe by debris.

CLAIMS:

1. A one-piece headwall unit for a drainage ditch, comprising:

a central recessed portion defined by a back wall, opposed side walls, and a bottom wall, the coplanar outer edges of said back wall, said opposed side walls and said bottom wall defining a generally rectangular mouth; and

a rim surrounding said mouth and extending outwardly from said coplanar outer edges.

2. The headwall unit of Claim 1 wherein said bottom wall is substantially flat.

3. The headwall unit of Claim 1 or Claim 2 including anchor means attached to a back face of said unit and adapted to extend rearwardly thereof.

4. The headwall unit of Claim 1 including an extension member secured to a lower rim portion and extending downwardly therefrom.

5. The headwall unit of Claim 1 wherein said headwall unit is formed from glass fiber reinforced cement.

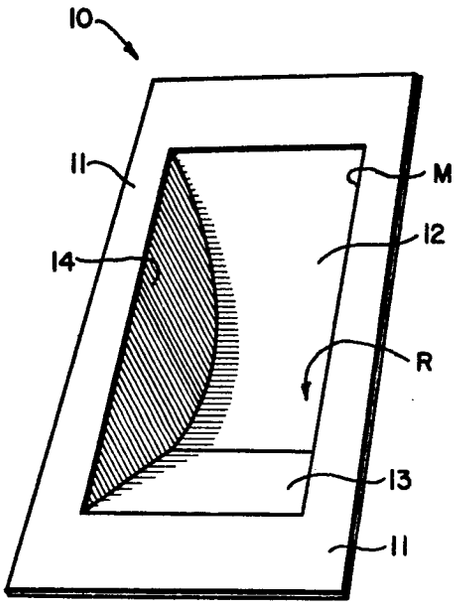

Fig. 1

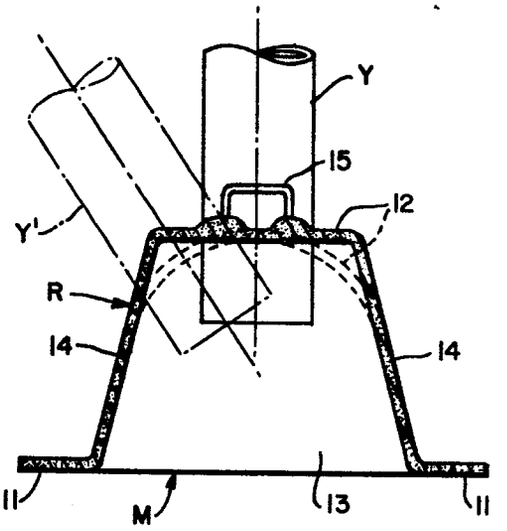

Fig. 2

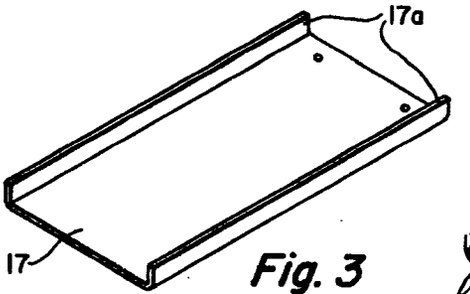

Fig. 3

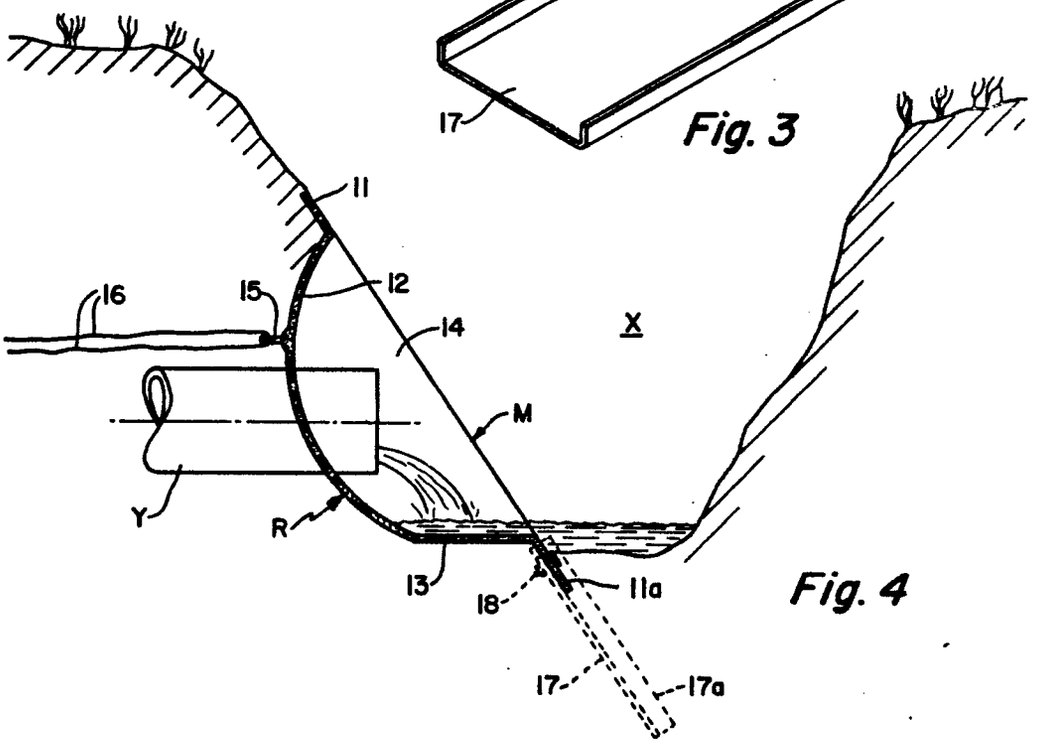

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 78 10 0645

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	DE - U - 1 940 946 (DYCKERHOFF) * Complete abstract *	1,2
	DE - A - 2 203 160 (PFEIFENBRING) * Pages 10-13; figures *	1,2
	US - A - 1 620 089 (FISCHER) * Page 1, lines 56-111; figures *	1,2,4
	US - A - 1 593 488 (DIMICK) * Page 1, lines 53-112; page 2, lines 1-111; figures *	1,2,4
	FR - A - 2 264 922 (BLEBK) * Page 3, lines 36-38; page 4, line 1; figures *	3
	DD - A - 48 362 (HENNEBERG) * Column 4, lines 3-8; figures *	3
D	US - A - 3 902 912 (WOLF) * Complete patent *	5
D	GB - A - 1 200 732 (NATIONAL RESEARCH) * Complete patent *	5

CLASSIFICATION OF THE APPLICATION (Int. Cl.²)

E 02 B 11/00
E 01 F 5/00

TECHNICAL FIELDS SEARCHED (Int.Cl.²)

E 02 B
E 03 F
E 01 F

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21-11-1978	DAMITIO