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

(11) Publication number: **0 297 907**
**A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **88306029.5**

(51) Int. Cl.[4]: **E 02 B 11/00**

(22) Date of filing: **01.07.88**

(30) Priority: **03.07.87 FI 872958**

(43) Date of publication of application:
**04.01.89 Bulletin 89/01**

(84) Designated Contracting States:
**AT BE DE FR GB NL SE**

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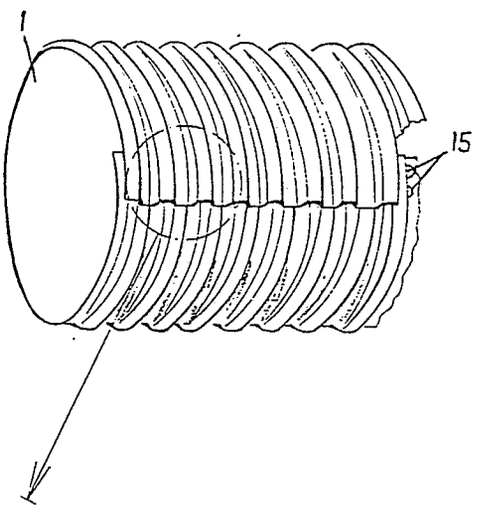
(54) **Plastics drainage pipe and manufacture thereof.**

(57) The invention relates to a plastic drainage pipe with laterally corrugated wall (1). The material forming the wall (1) of the pipe is in at least one zone along the length of the pipe arranged to overlap so that the overlapping parts (9, 10) of the pipe form between them water inlet channels (8, 16), the entry apertures of which channels are orientated downwards with the pipe in its installed position.

The invention additionally relates to a method for manufacture of such drainage pipe by placing the free parts (9, 10) of the pipe one on top of the other and joining them permanently together for example by glueing or welding.

FIG. 2.

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## Description

### Plastics drainage pipe and manufacture thereof

The present invention relates to a plastics drainage pipe comprising laterally corrugated parts fixed one on top of the other, between which parts water inlet channels are formed. The invention further relates to a method for manufacture of such plastics drainage pipes.

In underground drainage usually plastics drainage pipes are used, which are generally laterally corrugated so-called corrugated pipes. This corrugated form imparts rigidity to the pipes. In plastics drainage pipes there are holes so that water can enter the pipe. The water inlet holes of the pipe are normally located around the pipe at the bottom of the corrugations. In the pipe there may be 4 - 10 rows of holes.

In ordinary drainage pipes the water inlet holes are dimensioned so small that water can enter the pipe but sand (filter material) cannot. A disadvantage of these drainage pipes is that impurities and rust are always carried together with the water and these collect on the walls of the holes, so that the holes rapidly become blocked preventing water from entering the pipe. For this reason the water inlet holes should be so large and they should be so numerous that the holes remain open as long as possible and the intervals between flushing the pipes clean are as long as possible.

Drainage pipes usually lie in a trench on a bed of sand. The sand acts as a filter material. If there are large holes in the drainage pipe then it is necessary to prevent sand from passing through these holes into the pipe and prevent the holes becoming blocked by the action of the sand.

A plastics drainage pipe of the type mentioned at the beginning of this description is known from the specification of EP Application 0 115 477. Said drainage pipe comprises a complete, laterally corrugated inner pipe having water inlet holes in its upper part, and fitted on top of said inner pipe a laterally corrugated outer pipe. This outer pipe is made from laterally corrugated pipe, the diameter of which corresponds to the diameter of the inner pipe, by cutting away about one-third of its periphery and then forcing said outer pipe on top of the inner pipe. These pipes are permanently joined to each other, e.g. by welding, in such a manner that the bottom of the corrugation of the outer pipe and the ridge of the corrugation of the inner pipe are connected, so that the bottom of the corrugation of the inner pipe and the ridge of the corrugation of the outer pipe form between them a water inlet channel.

A drawback of this solution disclosed in the specification of EP Application 0 115 477 is that for the manufacture of the drainage pipe disclosed therein two separate pipes, i.e. an inner pipe and an outer pipe, are required and taking into account that raw material costs constitute an appreciable part of the price of drainage pipe this drainage pipe is not sensible from the economic point of view. Further, the water inlet holes are in the upper part of the inner pipe, so that the water has to rise through the channel between the inner and outer pipes and along the periphery of the inner pipe up to its upper part. Consequently in the course of time impurities settle on the outer surface of the inner pipe, especially in the vicinity of the water inlet holes in its upper part, and said impurities impair the function of the drainage pipe and can even lead to blockage of the holes.

The purpose of the present invention is to provide a plastics drainage pipe in which the aforesaid defects and drawbacks have been eliminated and in which the water inlet holes are relatively numerous and large and in which blockage of said holes is effectively prevented. A further purpose of the invention is to provide a method for manufacture of such a plastics drainage pipe.

It has been possible to realize these objectives by the present invention, the principal characteristics of which are apparent from the accompanying claims.

Contrary to the specification of EP Application 0 115 477 the drainage pipe of the invention is manufactured starting from a single laterally corrugated pipe, so that in respect of raw material consumption the drainage pipe of the invention is equivalent to ordinary drainage pipe.

According to the invention the pipe material is arranged so as to overlap in at least one zone along the length of the pipe, so that the overlapping pipe parts form between them water inlet channels.

With the drainage pipe of the invention it is of essential importance that the inlet holes of the water inlet channels are orientated downwards when the pipe is in its installed position. The water then has to flow for some distance in the water inlet channel before it can run into the pipe itself and as a consequence of this the water inlet channels are effectively protected from blockage and the filter material (sand) surrounding the pipe does not get into the pipe.

According to an advantageous embodiment of the invention the material of the pipe wall is arranged overlapping so that the bottom of the corrugation of the inside part of the pipe and the ridge of the corrugation of the outside part of the pipe form between them the water inlet channel.

It is possible to form various water inlet holes in said inside part of the pipe, although this is not essential in order to achieve a sufficient flow of water.

The drainage pipe of the invention differs mainly from prior-known drainage pipes in that the water does not enter the pipe directly via water inlet apertures (holes), but has to flow along the water inlet channels in order to enter the pipe.

The shape of the corrugations of the laterally corrugated pipe determines the size of the water inlet channels. The size of the channels can be adjusted, for instance by changing the height of the ridges. The height of the ridges can, for instance, change only at at those points where the parts of the pipe are overlapping. The channels may even be very

large, since as a consequence of the aforesaid orientation of the channels sand cannot rise into the channels.

The water inlet channels can be in one side of the pipe or also in both sides.

The drainage pipe of the invention is advantageously manufactured by cutting laterally corrugated pipe open in the longitudinal direction or by already at the stage of manufacture of the pipe forming a laterally corrugated pipe which is open along one line in the longitudinal direction. Thereafter and in the same manufacturing stage the free parts of the pipe are forced one on top of the other and the end coming from one side is at the same time forced to move in the longitudinal direction so that the bottom of the corrugation of one part of the pipe meets the top of the corrugation of the other part of the pipe and in this position the parts of the pipe are permanently joined together in a manner considered appropriate. In this way at every corrugation channels for the flow of the water are formed between the ridge of the corrugation of the outside part of the pipe and the bottom of the corrugation of the inside part of the pipe. With this method of manufacture a laterallly corrugated drainage pipe is obtained in which the water inlet channels are located in one side of the pipe.

If an even larger number of water inlet channels is desired, the pipe can be manufactured by cutting a laterally corrugated pipe longitudinally into two parts essentially equal in size, after which these pipe halves are joined together so that at the position of the joint on both sides the upper half covers the half below it and the halves are joined together so that the bottoms of the corrugations of the upper half touch the ridges of the corrugations of the lower half.

The joining together of the pipe halves can be carried out by glueing or welding or by some other method known per se.

At the position of the join the ridges of the corrugation of one half and the bottoms of the corrugation of the other half can be shaped so as to obtain the best possible surface contact. It is also possible by various profiles to arrange slip stops or to achieve a locking action by foring various lips on the pipe.

The invention is described in the following in greater detail with reference to the accompanying drawings, in which

Figure 1 shows a drainage pipe according to the invention as seen from the end of the pipe,

Figure 2 shows a perspective view of the construction of Figure 1 as seen from the right,

Figure 3 shows a perspective view of a detail of Figure 2,

Figure 4 shows another drainage pipe according to the in vention as seen from the end of the pipe,

Figure 5 shows a perspective view of the construction of Figure 4 as seen from the right, and

Figure 6 shows a perspective view of a detail of Figure 5.

Figures 1 - 3 show a laterally corrugated plastics drainage pipe 1 in which the bottom 4 of the corrugation of the inside part 10 of the pipe and the ridge 5 of the corrugation of the outside part 9 of the pipe form a water inlet channel 8. The ridge 6 of the corrugation of the inside part 10 of the pipe is joined to the bottom 7 of the corrugation of the outside part 9 of the pipe. The length of the water inlet channel 8 depends on how much the lower, inside part 10 of the pipe and the upper, outside part 9 of the pipe are arranged to overlap.

In the bottom 4 of the corrugation of the inside part 10 of the pipe there are water inlet holes 15, which are located in two rows along the length of the pipe.

When the drainage pipe 1 has been installed in the trench, water enters water inlet channel 8 through the lower ends of the water inlet channels and leaves the water inlet channels through water inlet holes 15 and exit apertures 16 into the drainage pipe itself.

Figures 4 - 6 show a laterally corrugated plastics drainage pipe which is formed of two pipe halves 2 and 3. The end parts 11 and 13 of the upper pipe half 2 are fitted on top of the end parts 12 and 14 of the lower pipe half 3, so that the bottoms 4 of the corrugation of the inside pipe parts 13 and 14 and the ridges 5 of the corrugation of the outside pipe parts 11 and 13 form water inlet channels 8 on both the left and right sides. The ridges 6 of the corrugation of the inside pipe parts 12 and 14 are joined to the bottoms 7 of the corrugation of the outside pipe parts 11 and 13. The length of the water inlet channel 8 depends on how much the upper pipe half 2 and the lower pipe half 3 are joined overlapping.

In the bottoms 4 of the corrugation of the inside parts 12 and 14 of the pipe there are water inlet holes 15, which are located in two rows along both sides of the length of the pipe.

When the drainage pipe has been installed in the trench, water enters water inlet channel 8 through the lower ends of the water inlet channels and leaves the water inlet channels through water inlet holes 15 and exit apertures 16 into the drainage pipe itself.

It will of course be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

## Claims

1. A plastics drainage pipe, comprising laterally corrugated parts (9, 10; 11, 12; 13, 14) fixed one on top of the other and between which are formed water inlet channels (8), **characterized** in that said parts originate from one and the same laterally corrugated pipe and that in the pipe there is at least one zone along the length of the pipe in which pipe parts (9, 10; 11, 12; 13, 14) overlap and between them form water inlet channels (8) the entry apertures of which are orientated downwards with the pipe in its installation position and the exit apertures

(16) of which open into the pipe.

2. A drainage pipe according to Claim 1, **characterized** in that pipe parts (9, 10; 11, 12; 13, 14) are arranged overlapping so that the bottom (4) of the corrugation of the inside pipe part (10, 12, 14) and the ridge (5) of the corrugation of of the outside pipe part (9, 11, 13) form a water inlet channel (8) between them.

3. A drainage pipe according to Claim 1 or 2, **characterized** in that in the inside parts (10, 12, 14) of the pipe there are additionally water inlet holes (15).

4. A drainage pipe according to any of Claims 1 - 3, **characterized** in that the water inlet channels (8) are in one zone located on one side of the pipe and running in the longitudinal direction of the pipe.

5. A drainage pipe according to any of Claims 1 - 3, **characterized** in that the water inlet channels (8) are in two zones running in the longitudinal direction of the pipe and located essentially diametrically on either side of the pipe.

6. A method for manufacture of a drainage pipe according to any of Claims 1 - 4, **characterized** in that a laterally corrugated pipe (1) is formed which is open along one line in the longitudinal direction of the pipe and the free parts (9, 10) of said pipe are placed one on top of the other and permanently joined together for example by glueing or welding to form a laterally corrugated pipe in which the overlapping parts (9, 10) of the pipe form between them water inlet channels (8).

7. A method according to Claim 6, **characterized** in that the ridges (6) of the corrugation of the inside part (10) of the pipe and the bottoms (7) of the corrugation of the outside part (9) of the pipe are aligned and permanently joined together.

8. A method for manufacture of a drainage pipe according to any of Claims 1 - 3 and 5, **characterized** in that a laterally corrugated pipe is cut open long two lines in the longitudinal direction of the pipe to form two pipe parts (2, 3), one pipe part (2) is placed over the other pipe part (3) so as to be overlapping on both sides and the overlapping parts (11, 12; 13, 14) of the pipe are joined permanently together for example by glueing or welding to form a laterally corrugated pipe in which the overlapping parts (11, 12; 13, 14) of the pipe form between them water inlet channels (8).

9. A method according to Claim 8, characterized in that the ridges (6) of the corrugation of the lower part (3) of the pipe and the bottoms (7) of the corrugation of the upper part (2) of the pipe are aligned and permanently joined together.

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FIG. 1.

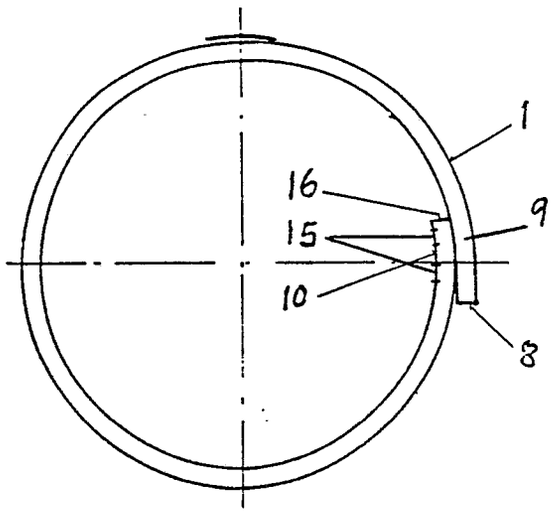
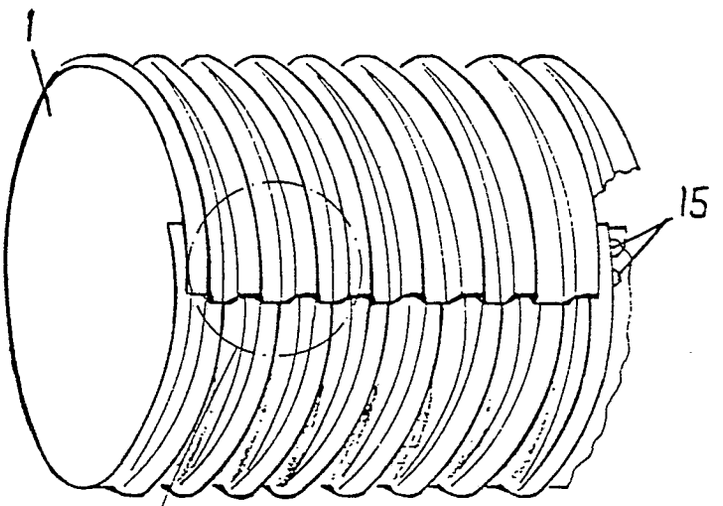



FIG. 2.



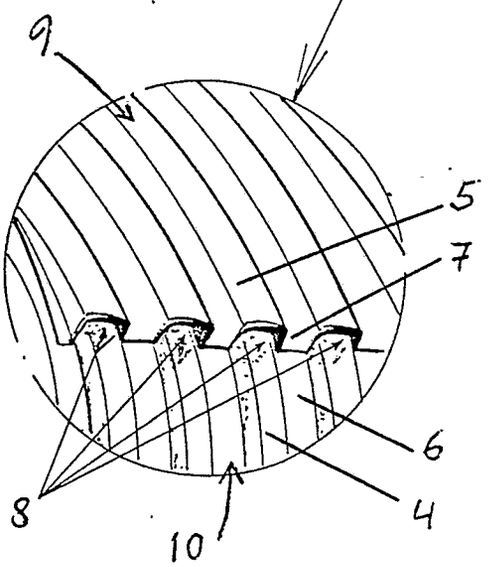




FIG. 3.

FIG. 4.

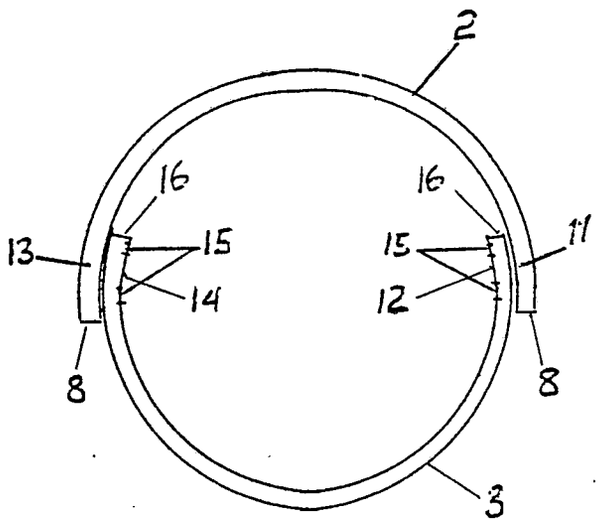
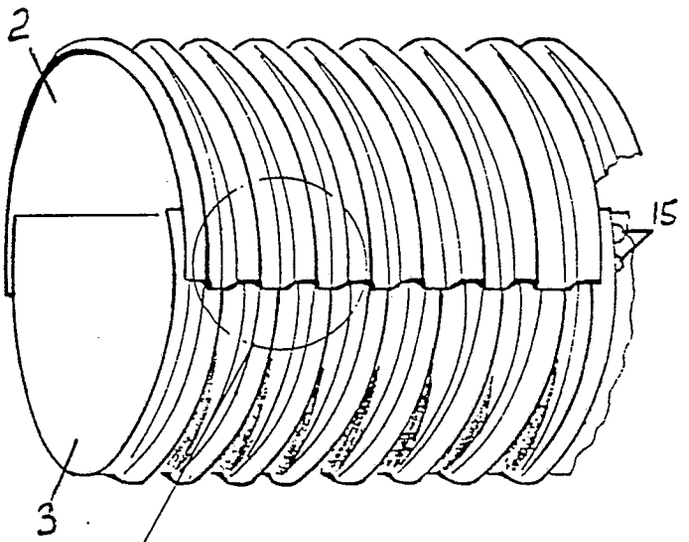



FIG. 5.



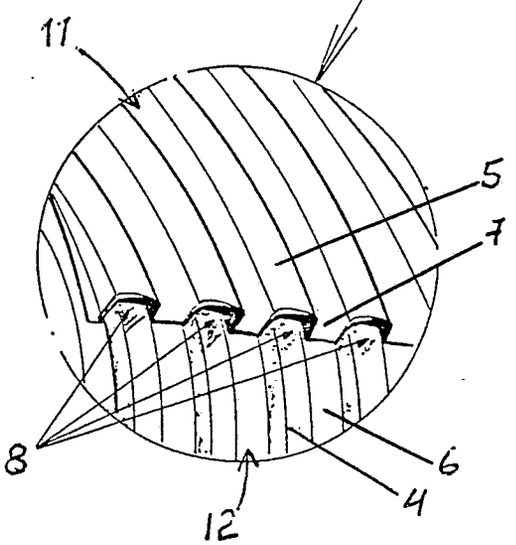




FIG. 6.

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# EUROPEAN SEARCH REPORT

Application Number

EP 88 30 6029

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.3) |
|---|---|---|---|
| A | EP-A-0 033 570 (WAVIN)<br>* abstract; figures 4, 5 * | 1 | E 02 B 11/00 |
| A | DE-A-2 642 623 (INTERPLANT)<br>* figure 1 * | 1 | |
| A | DE-B-1 180 201 (NOBEL-BOZEL)<br>* figure * | 1 | |
| A | US-A-4 163 619 (FALES) | | |

TECHNICAL FIELDS SEARCHED (Int. Cl.3)

E 02 B 11/00
F 16 L 11/00

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| BERLIN | 21-09-1988 | SCHAEFFLER C.A.A. |

CATEGORY OF CITED DOCUMENTS

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