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(54) **Mouthpiece for discharge of water and regulation of the level thereof for rice fields and water basins in general**

(57) A mouthpiece (1) for discharge of water and regulation of the level thereof for rice fields and water basins in general, **characterized in that** it is constituted substantially by a prefabricated product made of vibrated reinforced concrete, provided with a cavity (C) departing from which is a connection pipe (T) for the passage of

water, said cavity (C) being designed to contain and confine the vortices and whirlpools formed by the water that flows in the pipe (T) coming from the rice field or water basin. In this way, said turbulent movements of water are prevented from interfering with the soil of the surrounding bank, causing erosion thereof.

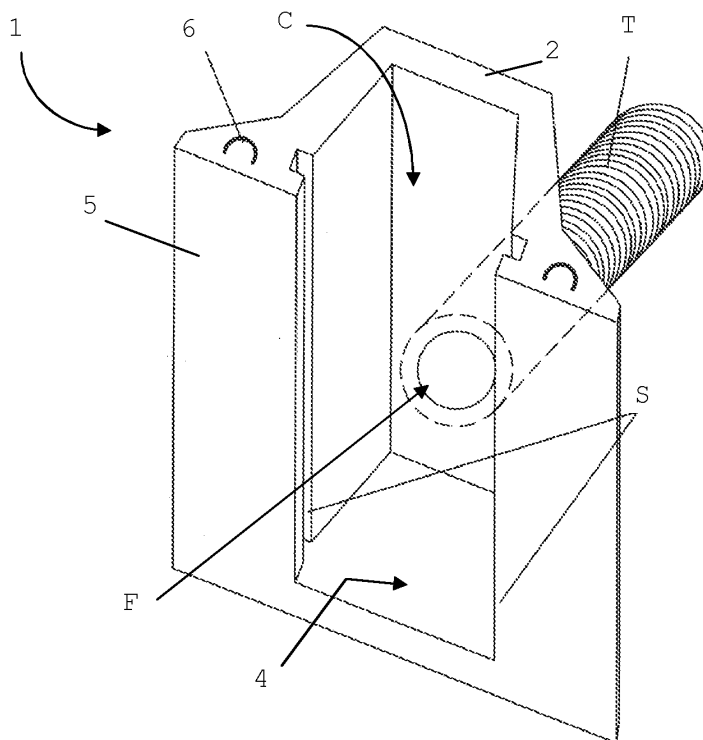


FIG. 2

Description

[0001] The present invention relates to the sector of water basins, such as for example rice fields, for which it is necessary to control the level of water inside them and carry out transfer thereof between one rice field and another or one water basin and another that are adjacent but are at different heights.

[0002] The solutions so far known all present problems of leakage of water and/or erosion of the soil of the bank in the proximity of the channel connecting the two adjacent rice fields or water basins. The regulation of the level is performed by adding or removing soil from the bank along the connection channel.

[0003] Currently, to overcome said drawbacks the endeavour is to coat the connection channel with sheets of plastic material (for example, sheets of nylon or cellophane), which limit erosion of the bank due to the passage of water. Said solution, however, is not definitive, and frequently the water leaks out around the sheets of plastic material and starts the process of erosion, which rapidly causes uncontrolled subsidence of the bank.

[0004] There are also known prefabricated products made of cement, which are substantially channels for connection between two rice fields that are buried in the thickness of the bank and held in position thanks to the presence of an external diaphragm set in the middle, which discharges the thrust of the water onto the bank itself. Evidently, said hydrostatic thrust that is discharged by the diaphragm is not exerted on the entire thickness of the bank, but only on half of it; consequently, the resistance to the thrust of the water along said connection channels is practically halved.

[0005] In addition to this, attempts have also been made to provide channels by laying connection pipes between two adjacent rice fields or basins, but since the cement thus made is not vibrated nor reinforced, it deteriorates rapidly and is readily subject to damage during the operations of ploughing.

[0006] Furthermore, the animals that generally live in the proximity of rice fields usually dig their own burrows in areas corresponding to the aforesaid products made of cement, since they are attracted by heating of the cement itself due to solar radiation. Consequently, said tunnels create connections between the two rice fields that are flooded by the water that traverses them, and in this way, there starts a process of erosion of the bank, which leads rapidly to its yielding.

[0007] The main purpose of the present invention, then, is to overcome all the problems listed above by providing a product for discharge and transfer of water, and regulation of the level of the water, preventing erosion of the banks in an area corresponding to the product itself.

[0008] The above has been obtained, according to the invention, by providing a prefabricated product made of vibrated reinforced concrete, provided with a cavity, departing from which is a connection pipe for the passage

of water, in said cavity there arising vortices and whirlpools formed by the water that is channelled in the pipe itself, preventing said vortices of water from interfering with the soil of the surrounding bank.

[0009] A better understanding of the invention will be obtained from the ensuing description with reference to the attached figures, which illustrate, purely by way of non-limiting example, a preferred embodiment thereof.

[0010] In the drawings:

Figure 1 is a view from above of a preferred embodiment of the invention, with the pipe for discharge of the water installed;

Figure 2 is an axonometric view corresponding to Figure 1;

Figure 3 shows the invention laid along a bank of a rice field or of a water basin;

Figure 4, corresponding to Figure 1, shows an enlarged detail regarding the sealing gasket of the discharge pipe;

Figures 5 and 6 are side views corresponding to the embodiment of Figure 1, which show laying of the product set vertical and inclined, respectively, in such a way that the discharge pipe is always perpendicular to the hole on the rear wall;

Figures 7 and 8 are a view from above and beneath, respectively, of a variant of the invention;

Figure 9 is a cross section according to the vertical plane of symmetry of trace A-A indicated in Figure 7; and

Figures 10, 11 and 12 are, respectively, a front view, a rear view, and a side view corresponding to the variant of Figures 7 and 8.

[0011] The discharge mouthpiece 1 forming the subject of the present invention is a prefabricated product made of vibrated reinforced concrete in order to increase its mechanical resistance as compared with products directly cast *in situ* and improve the characteristics of resistance thereof to atmospheric agents.

[0012] According to a peculiar characteristic of the invention, the product that is described is provided with a cavity C, preferably with substantially trapezoidal horizontal section, which is specifically designed to contain and confine therein the turbulent movements of water that are formed during its passage from the static situation within the rice field to the dynamic situation when it flows within the discharge pipe T that connects the rice field or water basin with the adjacent one at a lower level.

[0013] A further peculiar characteristic of the invention consists in the fact that provided in the rear wall 2 of the product 1 that is located on the side of said cavity C opposite to the one from which the water of the rice field or water basin arrives is a hole F for said discharge pipe T.

[0014] Said hole F is preferably tapered so as to enable correct positioning of a purposely provided sealing gasket G between the pipe T and the hole F, which is provided with a circumferential flange 3, which is pressed by the

pipe T itself against the internal tapered surface of the hole F (see the enlarged detail of Figure 4). This characteristic is particularly useful in so far as, thanks to said arrangement, the very thrust of the water that flows in the discharge pipe T concurs to improving the seal of the gasket G.

[0015] It should be noted that, according to the invention, the smaller diameter of the tapered hole F is situated at the rear and is just a little larger than the external diameter of the discharge pipe T, but such as to prevent passage of the sealing gasket G.

[0016] In this connection, it should be noted that, for proper operation of the sealing gasket G, it is necessary for the pipe T to be set perpendicular to the rear wall 2 in which the tapered hole F is provided.

[0017] Consequently, in the case where it were to be necessary to incline the pipe T, for example on account of a considerable difference in level between the two rice fields or water basins, it is necessary to lay the product 1 according to the invention in such a way that it is also appropriately inclined backwards, as illustrated in Figure 6. In this way, the initial stretch of the discharge pipe T is kept perpendicular to the rear wall 2, and the seal of the gasket G is not jeopardized.

[0018] With reference to Figure 4, it is advisable for the discharge pipe T to be inserted in the mouthpiece after being provided with the external circumferential gasket G, by being slid from the inside to the outside (as indicated by the arrow), and then fitted and fixed in place with the aid of a thick wooden plank, which is rested at the end of the pipe and is struck with a hammer to jam the gasket G properly inside the hole F present in the rear wall 2 of the product 1 itself.

[0019] A further advantage of the invention lies in the fact that the use of an externally corrugated discharge pipe T eliminates the problems caused by animals that dig their own burrows along said pipe: in fact, the corrugated surface hinders formation of tunnels in a longitudinal direction with respect to the pipe (i.e., transverse to the bank), thus eliminating the possibility of the burrows setting two adjacent rice fields or water basins in communication.

[0020] From the figures, it clearly emerges that the product 1 according to the present invention comprises a main body having a cross section substantially with the shape of a symmetrical (isosceles) trapezium, open in an area corresponding to the major base set on the front side 5 of said product 1.

[0021] The base resting on the ground of said main body is closed.

[0022] The front side 5 of the product 1 facing the rice field can be closed with planks preferably made of wood, via which it is possible to regulate also the level of the rice field or of the water basin.

[0023] Correct positioning of the product 1 so far described must be performed with the modalities described in what follows.

[0024] In order to prevent the water from eroding the

soil underlying the product 1, it is appropriate for installation to be made in such a way that the internal surface 4 of the bottom base is positioned preferably 20 cm underneath the ditch for discharge of the water of the rice field: in this way, to empty out all the water, it is not necessary to remove the bottom wooden plank, and the water that flows out does not have the possibility of passing underneath the product 1, and any possibility of erosion of the bank underlying the invention is thus prevented.

[0025] Parallel to the front side 5, two vertical side channels S are provided, inserted within which are the wooden planks for closing the discharge mouthpiece 1 and/or for regulating the depth of water in the rice field.

[0026] Advantageously, the corrugated external surface of the discharge pipe T facilitates anchorage of said pipe to the soil of the bank in which the product 1 is installed.

[0027] Furthermore, there are also provided two top rings 6 to facilitate lifting and movement of the product 1: said rings 6 are preferably positioned in a way symmetrical with respect to the vertical plane of symmetry of the invention and are preferably set in an area corresponding to the centroidal plane perpendicular to the plane of symmetry.

[0028] A variant of the invention, illustrated in Figure 3 and in Figures 7 to 12, envisages a top slab 7 (also referred to as "safety slab") for closing the cavity C, from which there departs the discharge pipe T, designed to facilitate passage of the operators who walk along the bank and have to climb over the discharge mouthpiece 1. Said top slab 7 is preferably laid in a single piece with the prefabricated product 1, but could also be removable and is usable for raising the bank above the discharge mouthpiece 1 described herein.

[0029] For this purpose, said hoisting rings 6 are preferably housed in purposely provided recesses so as not to project from said top slab 7 in order not to hamper passage of the operating staff.

[0030] In this variant of the invention, it should also be envisaged that the front side of the safety slab 7 will have a central recess that traverses its entire thickness. This recess has the purpose of facilitating the operators when they have to insert/remove the wooden planks, without thereby hurting their hands during sliding of the planks themselves in an area corresponding to the slab 7.

Claims

1. A mouthpiece (1) for discharge of water and regulation of the level thereof for rice fields and water basins in general, **characterized in that** it is constituted substantially by a prefabricated product made of vibrated reinforced concrete, provided with a cavity (C), departing from which is a connection pipe (T) for passage of water, said cavity (C) being designed to contain and confine the vortices and whirlpools formed by the water that flows in the pipe (T) coming

from the rice field or from the water basin; there thus being obtained prevention of said turbulent movements of water from interfering with the soil of the surrounding bank, causing erosion thereof.

2. The mouthpiece (1) according to the preceding claim, **characterized in that** said cavity (C) has a horizontal section substantially having the shape of a symmetrical (isosceles) trapezium, which is open in an area corresponding to the major base set on the front side (5) of said product (1).
3. The mouthpiece (1) according to Claim 1 or Claim 2, **characterized in that**, in the rear wall (2) of the product that is located on the side of said cavity (C) that is opposite to the one from which the water of the rice field or of the water basin arrives, there is provided a hole (F) for said discharge pipe (T).
4. The mouthpiece (1) according to the preceding claim, **characterized in that** the hole (F) is tapered so as to enable correct positioning of a purposely provided sealing gasket (G) between the pipe (T) and the hole (F), which is provided with a circumferential flange (3) that is pressed by said pipe (T) against the internal tapered surface of the hole (F); it thus being obtained that the very thrust of water that flows in the discharge pipe (T) concurs to improving the seal of the gasket (G); where the smaller diameter of the tapered hole (F) is situated at the rear and is just a little larger than the external diameter of the discharge pipe (T), but such as to prevent passage of the sealing gasket (G).
5. The mouthpiece (1) according to the preceding claim, **characterized in that** for proper operation of the sealing gasket (G) it is envisaged that the pipe (T) is set perpendicular to the rear wall (2) in which the tapered hole (F) is provided.
6. The mouthpiece (1) according to Claim 1, **characterized in that** said discharge pipe (T) is corrugated on the outside to hinder the formation of tunnels in a longitudinal direction with respect to the pipe (i.e., transverse to the bank) by animals that dig their own burrows along said pipe and around the product; there thus being obtained elimination of the possibility of said tunnels setting in communication two adjacent rice fields or water basins; the corrugated outer surface of the discharge pipe (T) moreover facilitating anchorage of said pipe to the soil of the bank in which the product (1) is installed.
7. The mouthpiece (1) according to Claim 1, **characterized in that** it has a base resting on the ground that is closed and that has a front side (5) facing the rice field, which is designed to be closed with planks preferably made of wood, via which it is possible to

regulate also the level of the rice field or of the water basin.

8. The mouthpiece (1) according to Claim 1, **characterized in that**, in order to prevent the water from eroding the soil underlying the product (1), it is designed to be laid in such a way that the internal surface (4) of the bottom base resting on the ground is positioned approximately 20 cm underneath the ditch for discharge of the water of the rice field; it thus being obtained that, in order to empty all the water, it is not necessary to remove the bottom wooden plank, and the water that flows out does not have the possibility of passing underneath the product (1), thus preventing any possibility of erosion of the bank underlying the mouthpiece (1) itself.
9. The mouthpiece (1) according to Claim 7, **characterized in that** parallel to the front side (5) there are provided two vertical side channels (S), inserted within which are the wooden planks for closing the mouthpiece for discharge (1) and/or regulation of the depth of water in the rice field.
10. The mouthpiece (1) according to Claim 1, **characterized in that** two top rings (6) are provided to facilitate lifting and movement of the product (1), said rings (6) being positioned in a way symmetrical with respect to the vertical plane of symmetry of the invention and being arranged in an area corresponding to the centroidal plane perpendicular to the plane of symmetry.
11. The mouthpiece (1) according to Claim 1, **characterized in that** it envisages a top or safety slab (7), which closes at the top the cavity (C) from which the discharge pipe (T) departs and which is designed to facilitate passage of the operators who walk along the bank and have to climb over the discharge mouthpiece (1); said top slab (7) being usable also for raising the bank above the discharge mouthpiece (1).
12. The mouthpiece (1) according to the preceding claim, **characterized in that** said top slab (7) is cast in a single piece with the prefabricated product (1), or else is removable.
13. The mouthpiece (1) according to Claim 11 or Claim 12, **characterized in that**, in order not to hamper passage of the operating staff, said lifting rings (6) are housed in purposely provided recesses so as not to project from said top slab (7).
14. The mouthpiece (1) according to Claim 11, **characterized in that** the front side of the safety slab (7) is provided with a central recess that traverses its entire thickness; said recess having the purpose of facili-

tating the operators when they have to insert/remove the wooden planks, without thereby hurting their hands during sliding of the planks themselves in an area corresponding to the slab (7).

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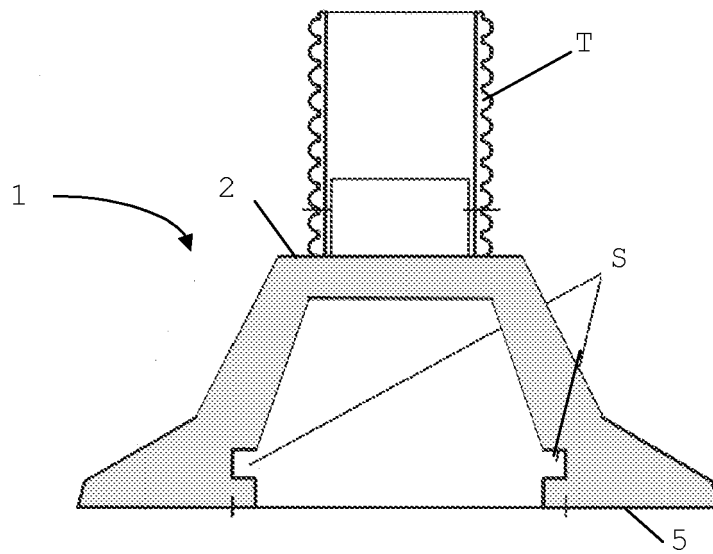


FIG. 1

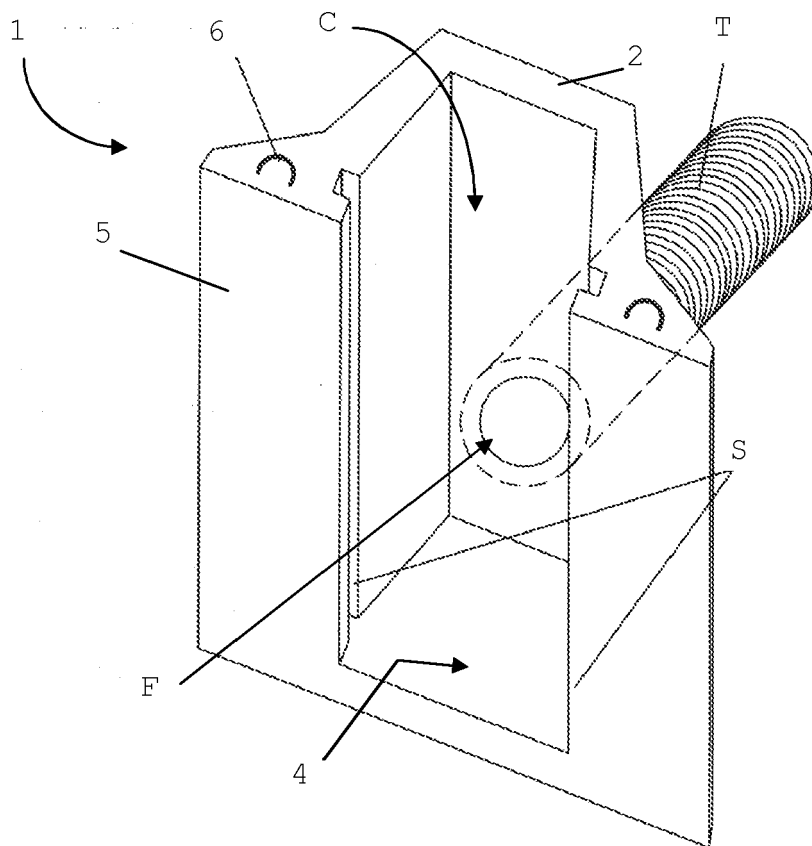


FIG. 2

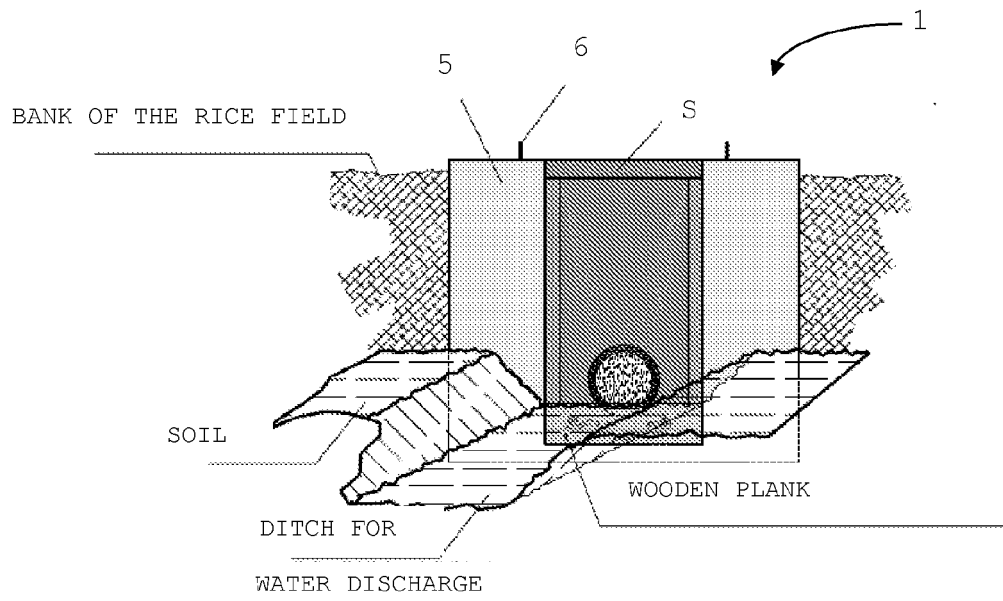


FIG. 3

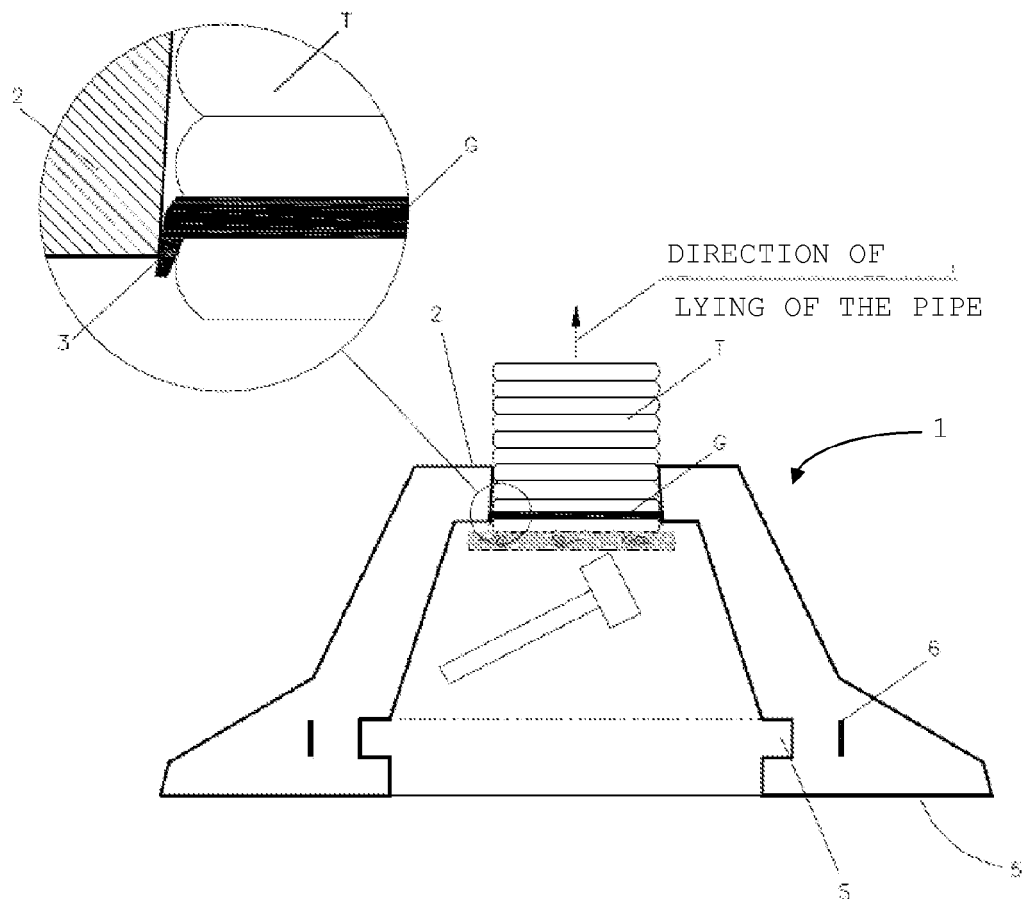


FIG. 4

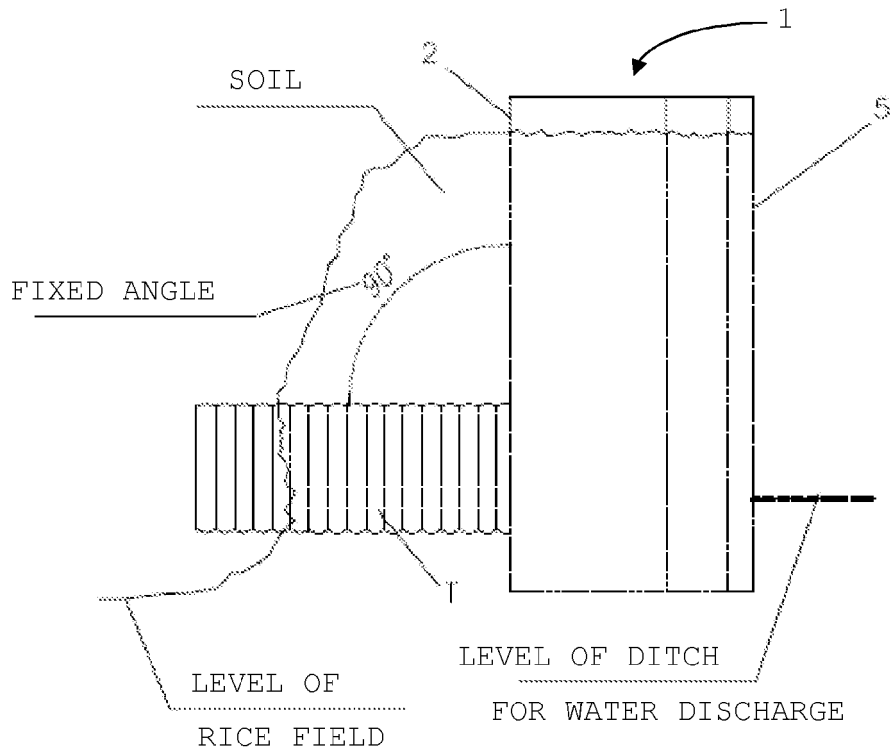


FIG. 5

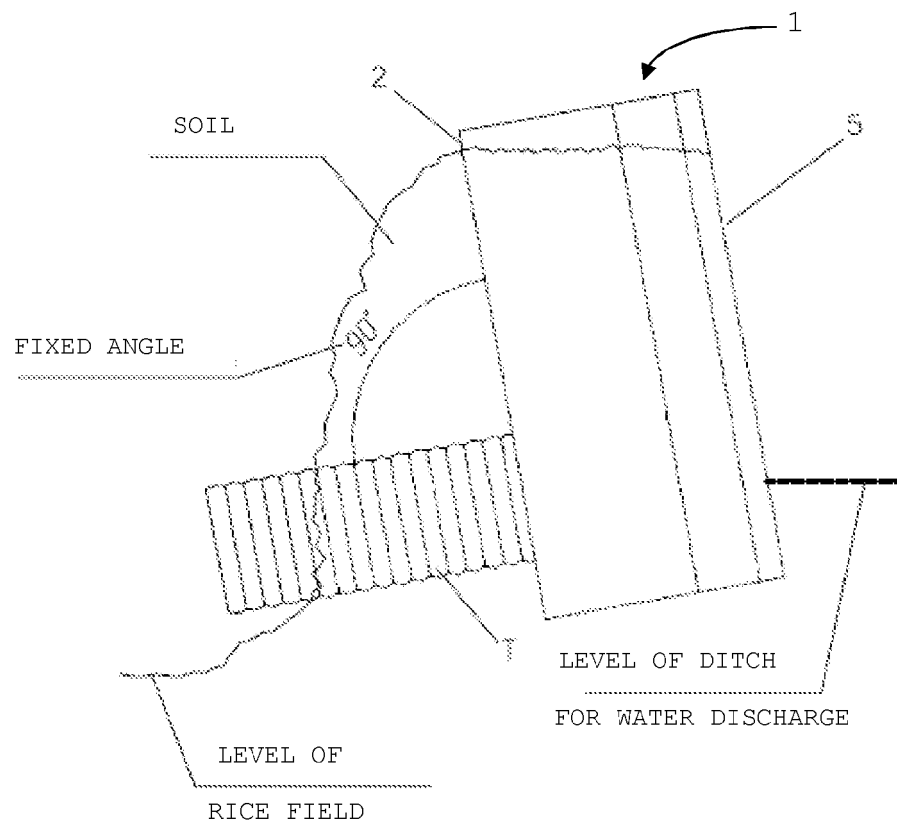


FIG. 6

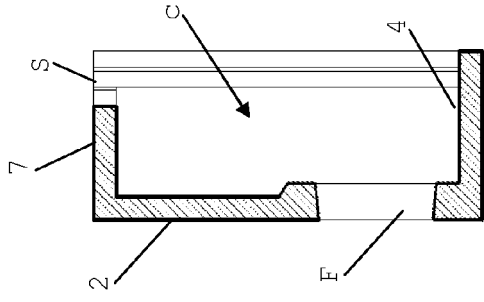


FIG. 9

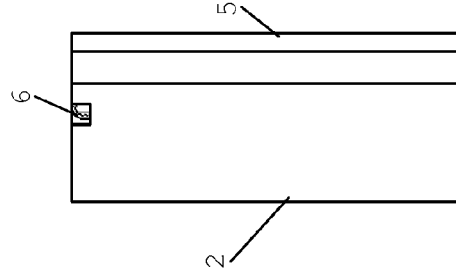


FIG. 12

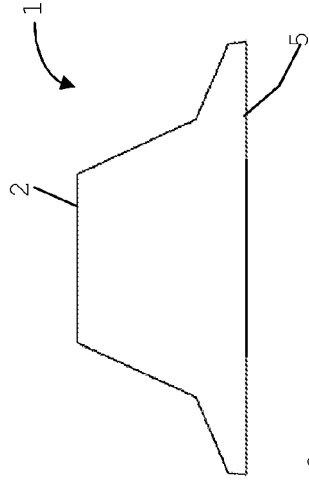


FIG. 8

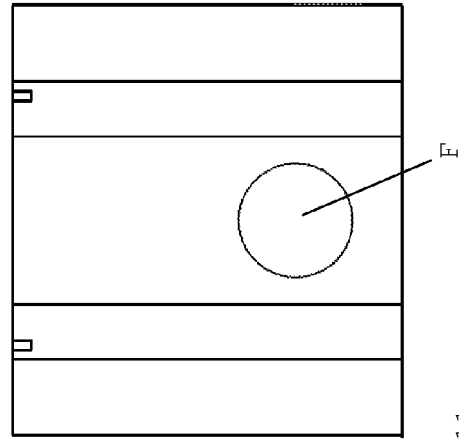


FIG. 11

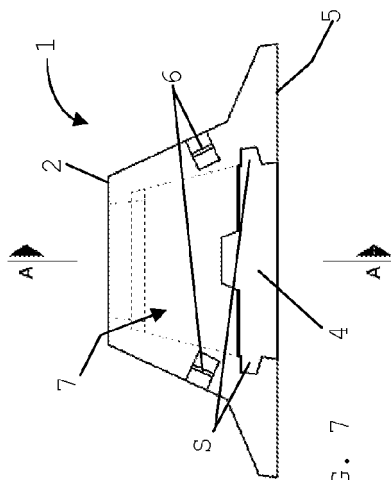


FIG. 7

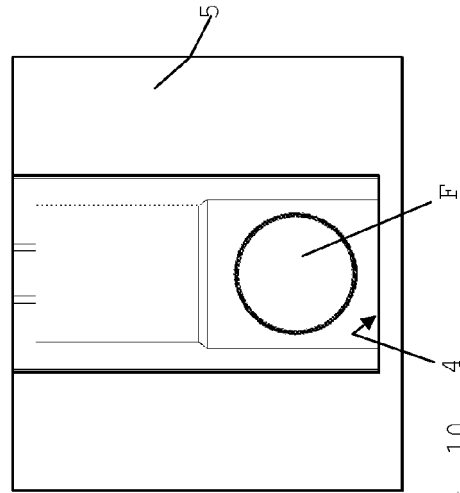


FIG. 10