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METHOD FOR INSTALLING VERTICAL GRIDS AGAINST BURROWING ANIMALSDescription

5 [0001] The invention relates to a method for installing vertical grids against burrowing animals and is used in particular for bank reinforcements and embankments to protect against damage caused by burrowing animals.

[0002] Owing to the proliferation of beavers in Central Europe, extensive measures are necessary to protect earth dams, roads and riverbanks. To this end, grids against beavers
10 are placed on embankments and installed as deep as possible in the base region (next to the body of water) (in this regard, see also pamphlet 247/1997 issued by the DVWK [German Association for Water, Wastewater and Waste]).

[0003] Grids against burrowing animals are installed wherever bank reinforcements or embankments have to be protected against damage caused for example by beavers or
15 other burrowing animals. Up to now, the base of these earth structures has been protected by installing protective grids vertically in a temporary open trench. This accordingly requires complicated shoring, excavation and drainage works, and costly steel sheet piles are installed.

[0004] Document DE 20 2015 105 518 U1 describes an animal defence system consisting
20 of a metal grid that can be or is arranged on an embankment of a water-containing basin or a water-carrying canal, an anchoring device, and a means to prevent lifting of the metal grid from the embankment. The anchoring device prevents any downward movement of the metal grid. The animals that are to be defended against can easily dig their way underneath such protective grids.

25 [0005] Document DE 94 18 197 U1 describes a garden bed edging formed of plastic panels to protect against voles and gastropods. Interlocking plastic panels are described, which can be inserted into wrought plastic posts. The add-on grids are formed in different lengths. The posts, panels and, if necessary, grids are embedded as garden bed edging. The edging creates a natural obstacle to voles, but this device is not suitable for
30 reinforcing banks against larger rodents.

[0006] KR 101 068 147 B1 describes the installation of sheet pile profiles in the ground by means of a pile driver. To strengthen the sheet pile profile, a "shaped plate" bent in a

U-shaped manner at the top is used, which additionally engages with lower hook-shaped profiles in corresponding recesses in the sheet pile profile.

[0007] Similarly, in JP S 50 45404 A, a sheet pile is driven into the ground by means of a support structure as a guide, wherein in this case a top reinforcement is provided on the upper side.

[0008] In both the aforementioned variants, there is the risk that a plate that is to be introduced into the ground in place of a sheet pile will be undesirably deformed upon hitting rocks.

[0009] US 8 272 624 B1 relates to a weed barrier system, which is in engagement with a fence. This solution comprises a conventional fence, which is installed in a ground surface and extends upwardly therefrom. Provided below the fence are U-shaped barriers, which receive the bottom side of the fence and with a vertical region are introduced into the ground in order to prevent weed growth beneath the fence section 12.

[0010] This solution is not suitable for introducing grids into the ground and is also not intended for this.

[0011] Document DE 299 09 450 U1 describes the production of a closed protective cage in various sizes from wire mesh, wherein the protective cage prevents rodents from getting into the roots of trees, bushes and shrubs and prevents bite damage thereto. Again, this protective cage is not suitable for protecting bank reinforcements.

[0012] The object of the invention is to develop a method for the installation of vertical grids against burrowing animals, which is of simple construction and easily and inexpensively protects bank reinforcements and embankments against burrowing animals such as beavers, muskrats and other pests.

[0013] This object is achieved by the characterizing features of the first claim.

[0014] Advantageous embodiments will become apparent from the dependent claims.

[0015] The device for the method consists of two shaped plates which are coupled to one another and which can receive protective grids or mats having a width of 1.00 m to 4.00 m and a length of up to 6.00 m. The two shaped plates form the protective casing for the grid to prevent damage during installation. The two shaped plates (support and cover) are joined together at the bottom by a hook connection and at the top by a bolt connection. The sheets can thus be detached from one another following installation in the ground area to be protected and can be pulled back out individually and reused.

[0016] The receptacle/fastening for the protective grid to be installed is located on the support plate.

[0017] A reinforced plate for receiving the clamping jaws of a conventional sheet pile vibrator or pile driver is located on the other shaped plate (cover).

5 [0018] The desired overlapping of the protective grid is ensured by at least one guide plate inserted in the device, so that a closed underground protective barrier is created.

[0019] The guide plate is placed onto the support plate. In an alternative embodiment, the guide plates can easily be secured against slipping by way of a side rail and a top rail. The protective grid, supplied as a roll or prefabricated mat, is fastened to the hooks of the support plate.

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[0020] The protective grid protruding at the top beyond the support panel can be cut off by means of an angle grinder or wire cutter.

[0021] The second plate panel is then placed as a cover onto the support plate in such a way that these are connected to one another at the bottom by simply being hooked together. At the top, a force-fitting connection between the two shaped plates (support and cover) is established by means of bolts. The protective grid is now located between the two plates. The device is then set upright in such a way that it can be picked up by a sheet pile vibrator or ram (clamping area on the cover plate).

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[0022] The device comprising the protective grid is installed along the intended construction axis by means of a conventional sheet pile vibrator or pile driver.

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[0023] The bolts at the top are then detached and the two shaped plates are pulled out individually.

[0024] The protective grid and the guide plate remain in the ground.

[0025] The next segment is installed as described above, but the device is pressed against the guide plate remaining in the ground and lowered. This ensures the desired close-fitting overlap of the joint area. The guide rail from the first process can now be pulled out and reused for the next operation.

25

[0026] The joint area can additionally be secured by means of an edge reinforcement so that levering apart is prevented. This is particularly necessary when taking measures to protect against beavers.

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[0027] A closed underground barrier can thus be produced.

[0028] With the device and the method according to the invention, the protective grids in various dimensions and types can be installed vertically in a closed construction in the

ground areas to be protected. The time-consuming preparatory work can thus be omitted. Protection against burrowing animals, such as beavers, muskrats and other pests, can thus be produced easily and inexpensively.

[0029] The invention will be illustrated below by means of drawings.

5 [0030] In the drawings:

Fig. 1 shows a first shaped plate in the form of the support,

Fig. 2 shows an illustration of the device in a front view and a side view,

Fig. 3 shows a side view of the guide plates,

Fig. 4 shows a plan view of a protective grid installed by means of the device,

10 Fig. 5 shows a schematic illustration of the method on a road surface.

[0031] Fig. 1 shows a first shaped plate 1 in the form of the support, wherein the first shaped plate 1 has notches 2 for holding the grid. Furthermore, a bracket 3 with hook tabs is arranged at the lower end.

15 [0032] Fig. 2 shows a device in a front view and a side view. The second shaped plate 4 is designed in the form of the cover and has a reinforced plate 4.1 for receiving the clamping jaws of a conventional sheet pile vibrator 5 or a pile driver 5.

[0033] The first and second shaped plate 1, 4 are connected to one another at an upper end and a lower end by means of retaining elements in such a way that the upper retaining element is designed in the form of bolts 6 and the lower retaining element is designed in
20 the form of a hook connection with hooks 7. The grid 8 is arranged between the first and second shaped plate 1, 4.

[0034] The device has a guide plate 9 placed onto the first shaped plate 1, which guide plate is easily secured against slipping by simply being clamped between the shaped plates 1 and 4. A guide plate 9 is shown in a first and second side view in Fig. 3.

25 [0035] Fig. 4 shows the arrangement of the protective grid in a plan view. The grids 8 have a width of 1.5 to 4 m and are preferably arranged with an overlap of 0–50 cm at the join, depending on requirements. The top area of the figure shows the device with the grid and guide plate inserted, the device having been pressed against the guide plate.

[0036] Fig. 5 shows a schematic illustration of a road surface. The grid 8 is installed in
30 an edge area R of a road S. The method can be divided into three method steps following the first insertion of a grid. In a first method step following installation of the device, consisting of the first and second shaped plate 1, 4, the latter are pulled out of the ground, and the grid 8 and a guide plate 9 remain in the ground.

[0037] In the next step, the device is again equipped with a grid 8 and a further guide plate 9a. Installation then takes place, with the guide plate 9 that remains in the ground being used as a guide.

5 [0038] In the third step, the device and the first guide plate 9 are pulled out of the ground and then are equipped with a further grid 8 and the pulled-out guide plate 9. These steps are repeated until the edge area R is protected along the required length.

[0039] With the device and the method according to the invention, vertical protective grids can be inexpensively installed on embankments, earth dams and other earth structures to be protected, even at relatively great depths. Subsoil risks such as quicksand
10 and high groundwater levels, etc. can thus be avoided. This technology is able to replace complicated methods such as sheet piling, open trenches with drainage, etc.

List of reference signs

[0040]

15	1	first shaped plate
	2	notches
	3	bracket
	4	second shaped plate
	4.1	reinforced plate
20	5	pile driver/sheet pile vibrator
	6	bolts
	7	hooks
	8	grid
	9	guide plate
25	9a	second guide plate
	R	edge area
	S	road

Patentkrav

1. Fremgangsmåde til installation af lodrette gitter til beskyttelse mod muldvarpe i jorden,
5 **kendetegnet ved, at** et gitter (8) er fastgjort i en anordning mellem en første formplade (1) i form af en bærer og en anden formplade (4) i form af et dæksel ved hjælp af en forbindelse af den første og den anden formplade (1, 4) og er installeret i jorden langs en konstruktionsakse, og **ved, at** forbindelsen afbrydes efter installation, og formpladerne (1, 4) trækkes enkeltvist op af jorden, så gitteret (8) forbliver i jorden.
- 10 2. Fremgangsmåden ifølge krav 1, **kendetegnet ved, at** to føringsplader (9) er arrangeret mellem den første formplade (1) og den anden formplade (4), hvilke føringsplader (9) forbliver i jorden, når de to formplader med gitteret (8) trækkes op.
- 15 3. Fremgangsmåden ifølge krav 1 eller 2, **kendetegnet ved, at** et næste segment af gitteret (8) og en anden føringsplade (9a) isættes og fastgøres mellem den første og anden formplade (1, 4), og **ved, at** anordningen presses mod den første føringsplade (9), der forbliver i jorden, på en sådan måde, at der frembringes en overlapning af samleområdet for gitteret (8), og **ved, at** den første og anden føringsskinne og den første og anden
20 formplade (1, 4) efterfølgende tages op af jorden.
4. Fremgangsmåden ifølge ethvert af kravene 1 til 3, **kendetegnet ved, at** installationen af formpladerne (1, 4) med gitteret (8) udelukkende udføres ved hjælp af en
25 spunsvægsvibrator (5) eller en piloteringsmaskine (5).
5. Fremgangsmåden ifølge ét af kravene 1 til 4, **kendetegnet ved, at** samleområdet for et første og et andet gitter (8) desuden er fastgjort ved hjælp af en kantforstærkning, så adskillelse gennem forskubning forhindres.

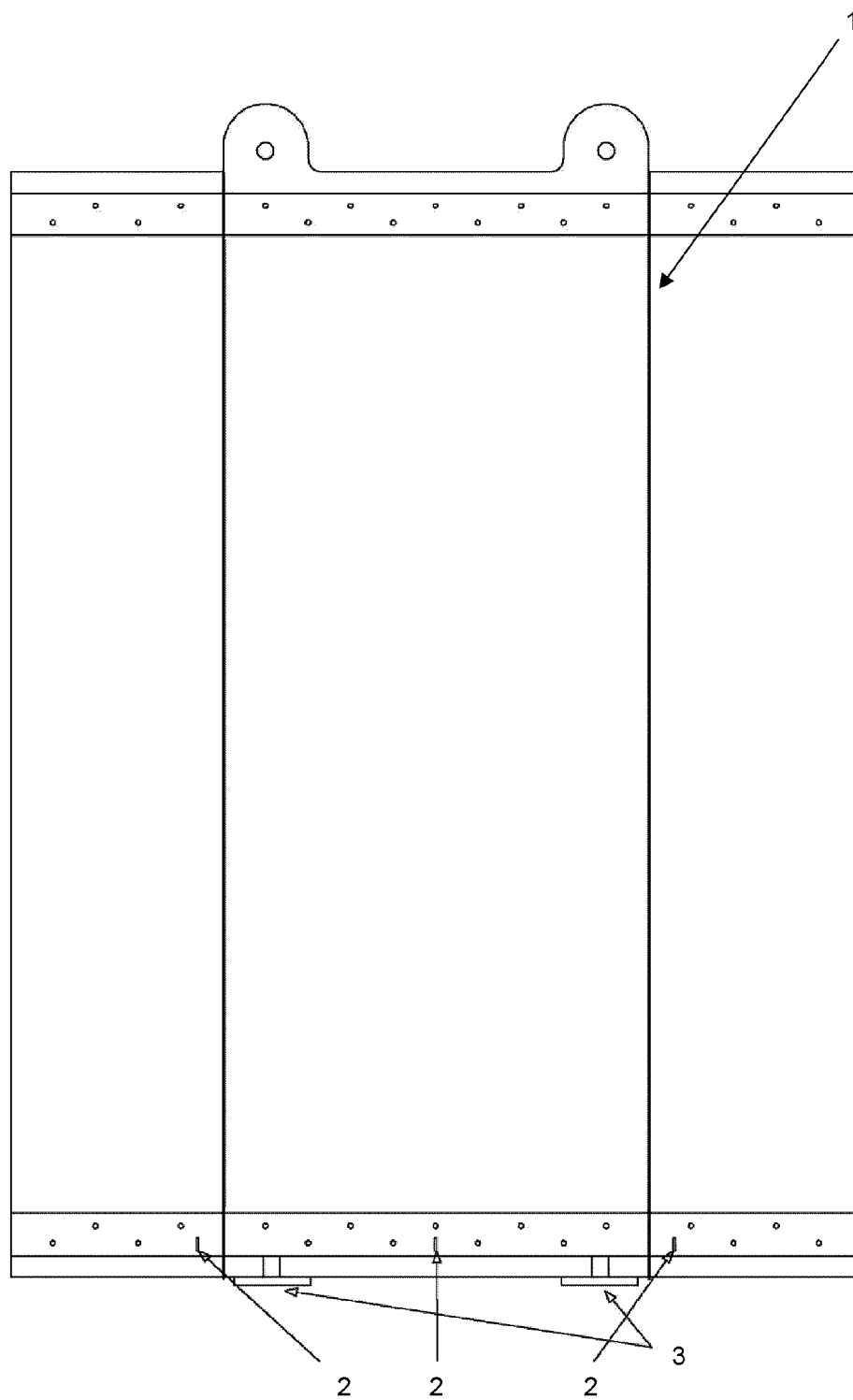


Figure 1

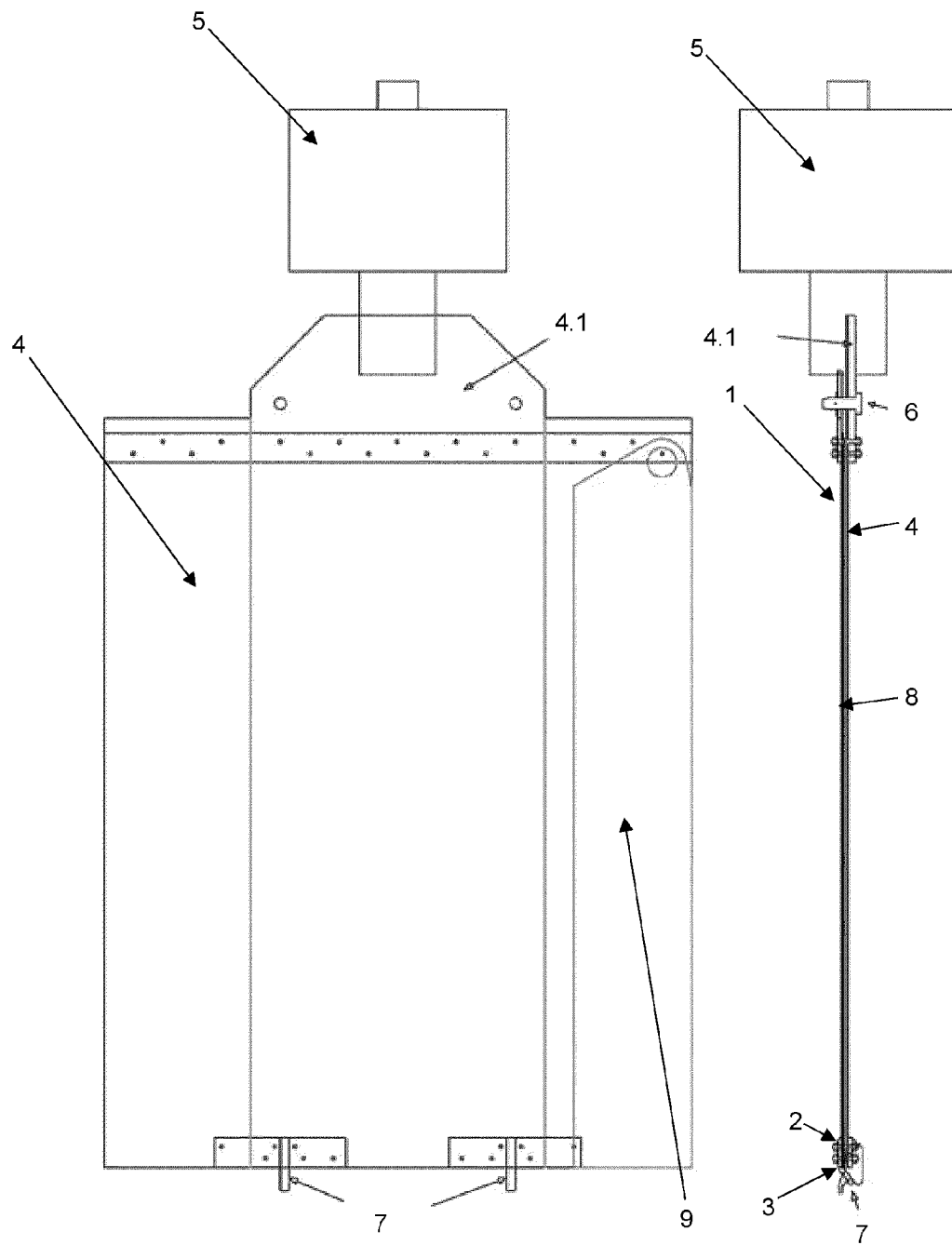


Figure 2

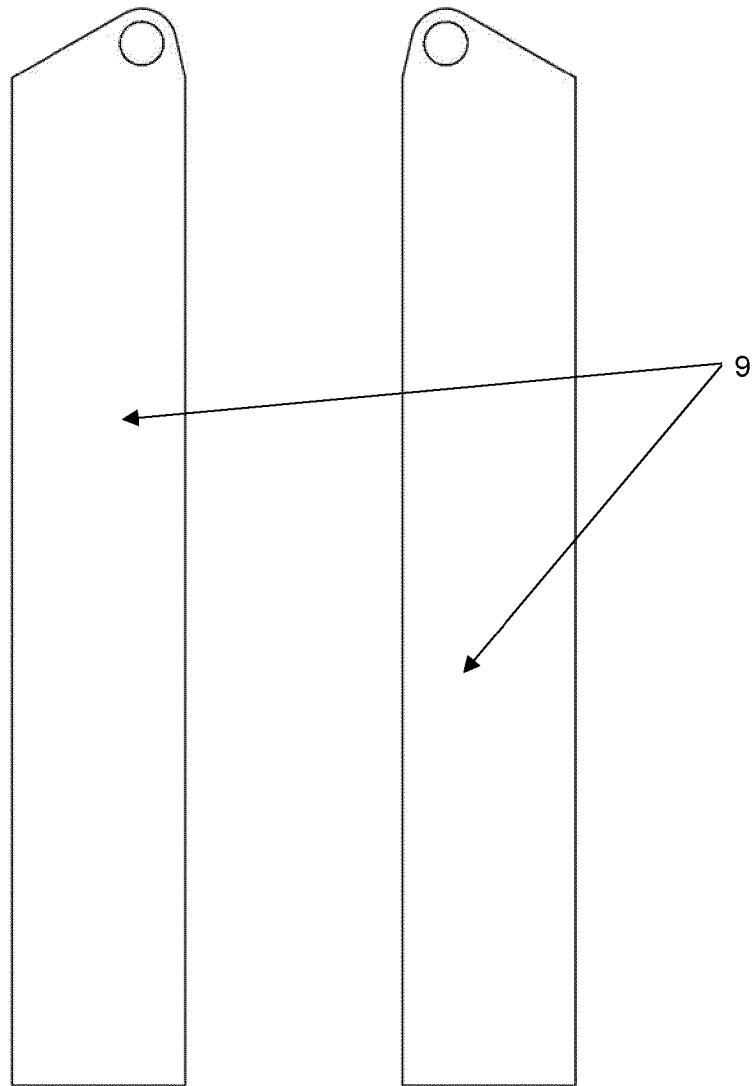


Figure 3

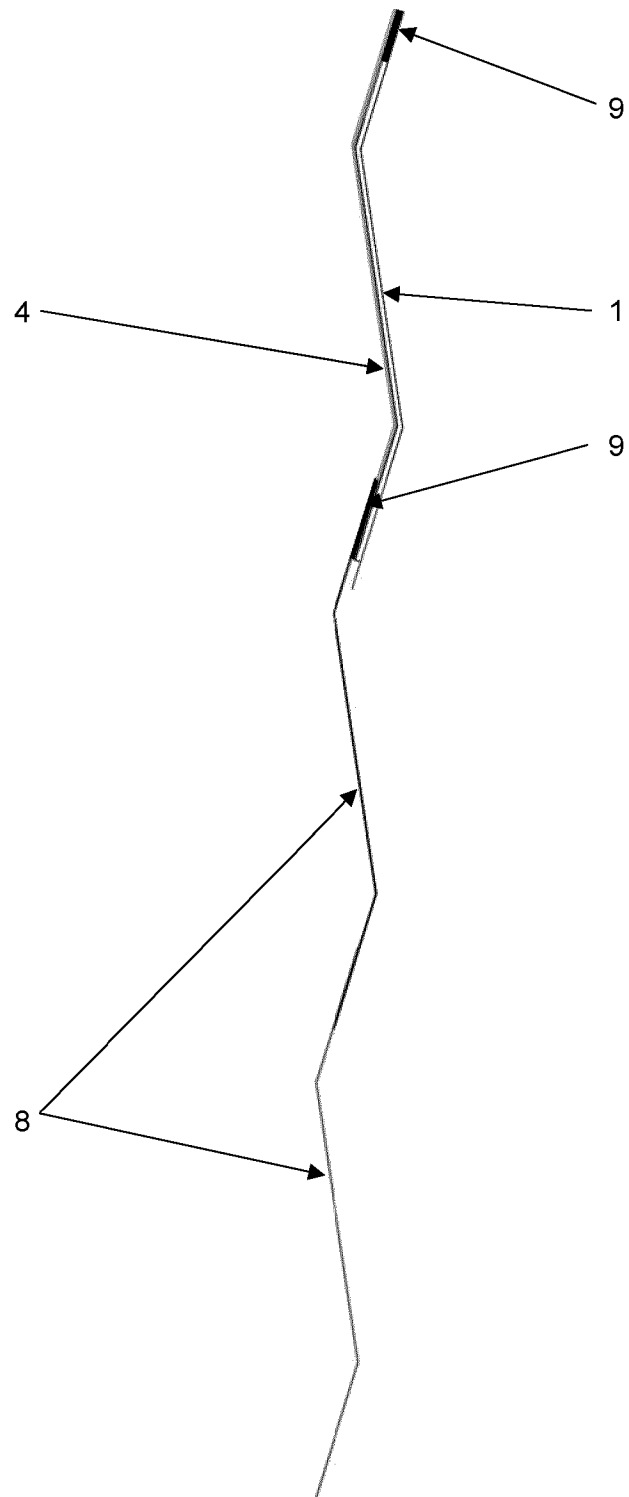


Figure 4

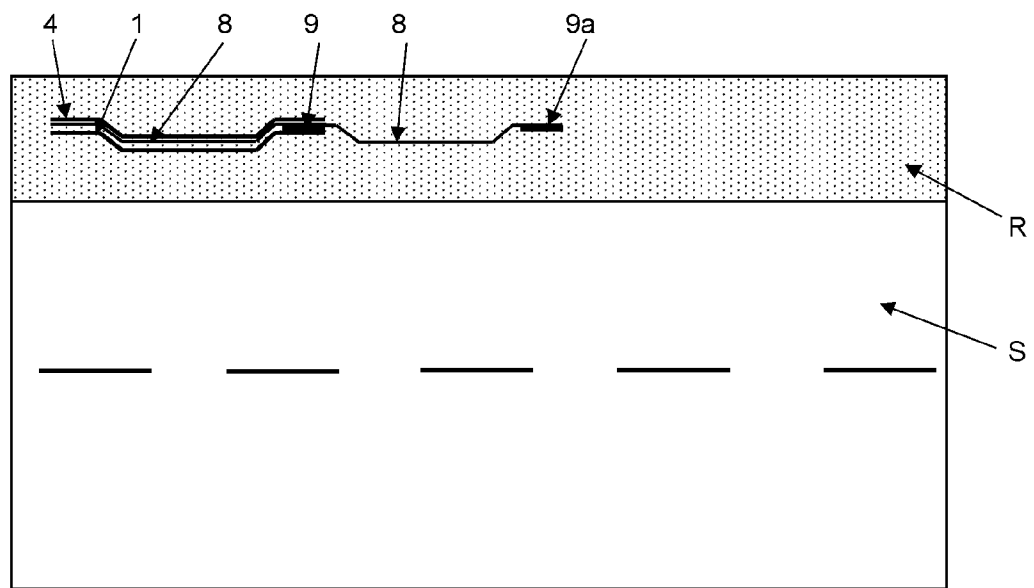


Figure 5