(12) STANDARD PATENT (11) Application No. **AU 2012203493 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Wave barrier

(51) International Patent Classification(s)
E02B 3/14 (2006.01) ***E02B 3/06*** (2006.01)
E02B 3/04 (2006.01)

(21) Application No: **2012203493** (22) Date of Filing: **2012.06.15**

(30) Priority Data

(31) Number	(32) Date	(33) Country
2011902349	**2011.06.16**	**AU**

(43) Publication Date: **2013.01.10**
(43) Publication Journal Date: **2013.01.10**
(44) Accepted Journal Date: **2016.09.08**

(71) Applicant(s)
CM Concrete Products Pty Ltd

(72) Inventor(s)
Thomas, Phil

(74) Agent / Attorney
Wynnes Patent & Trade Mark Attorneys, U 4 27 Godwin ST, Bulimba, QLD, 4171

(56) Related Art
US 6896445 B1
US 4129006 A
US 954283 A

ABSTRACT

The present invention is a one piece modular concrete barrier where a plurality of barriers can be positioned to form a wave barrier to substantially reduce erosion of beaches. The modular barrier has a base, front intermediate portion, rear intermediate portion and top portion, the base and portions enclosing an internal cavity. Each of the intermediate portions has one or more intermediate recesses or apertures. Two or more barriers are positioned adjacent each other to form a wall where the progress of a wave is impeded and part of the water of the wave is allowed to pass through the wall.

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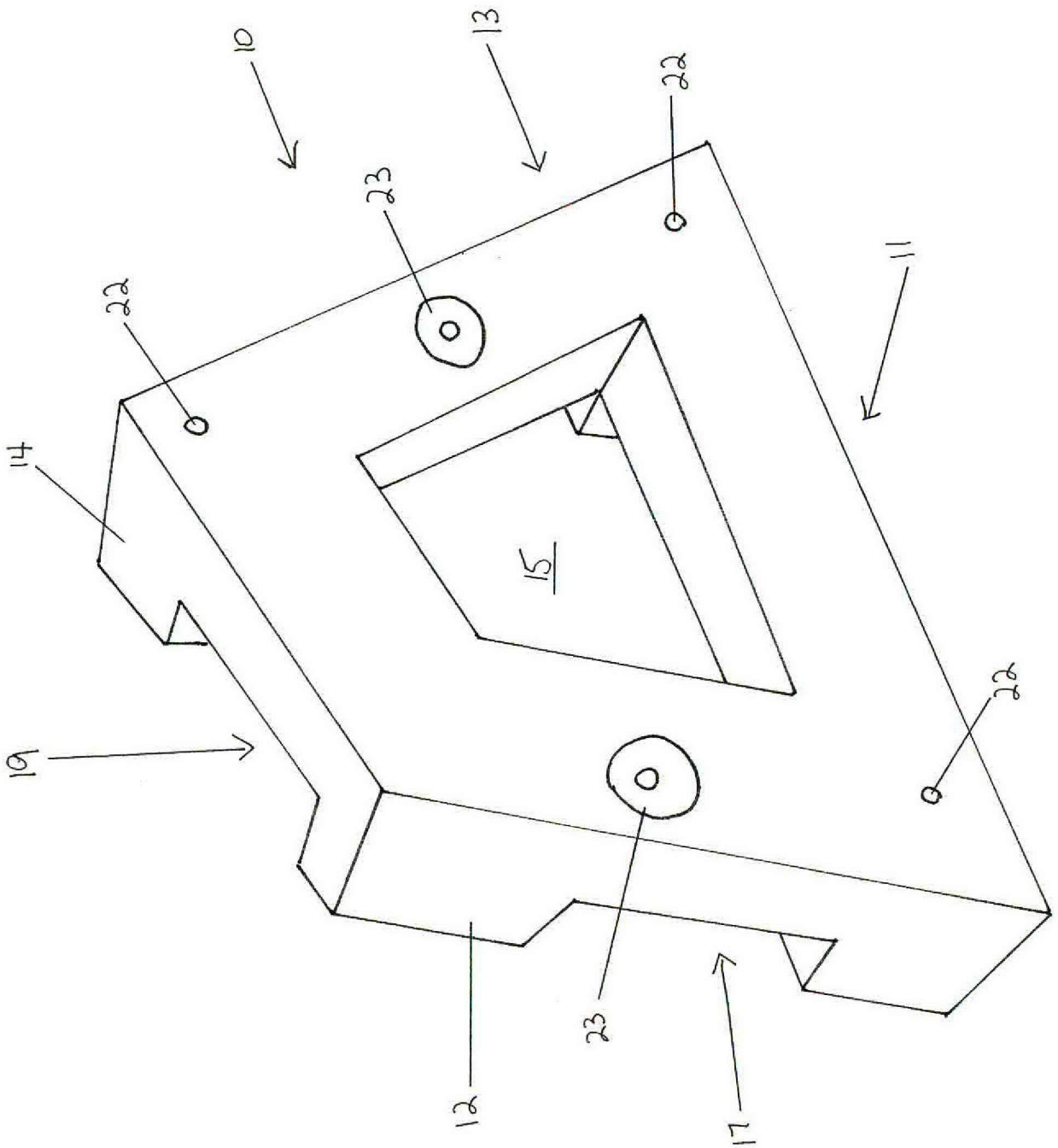
Figure 1



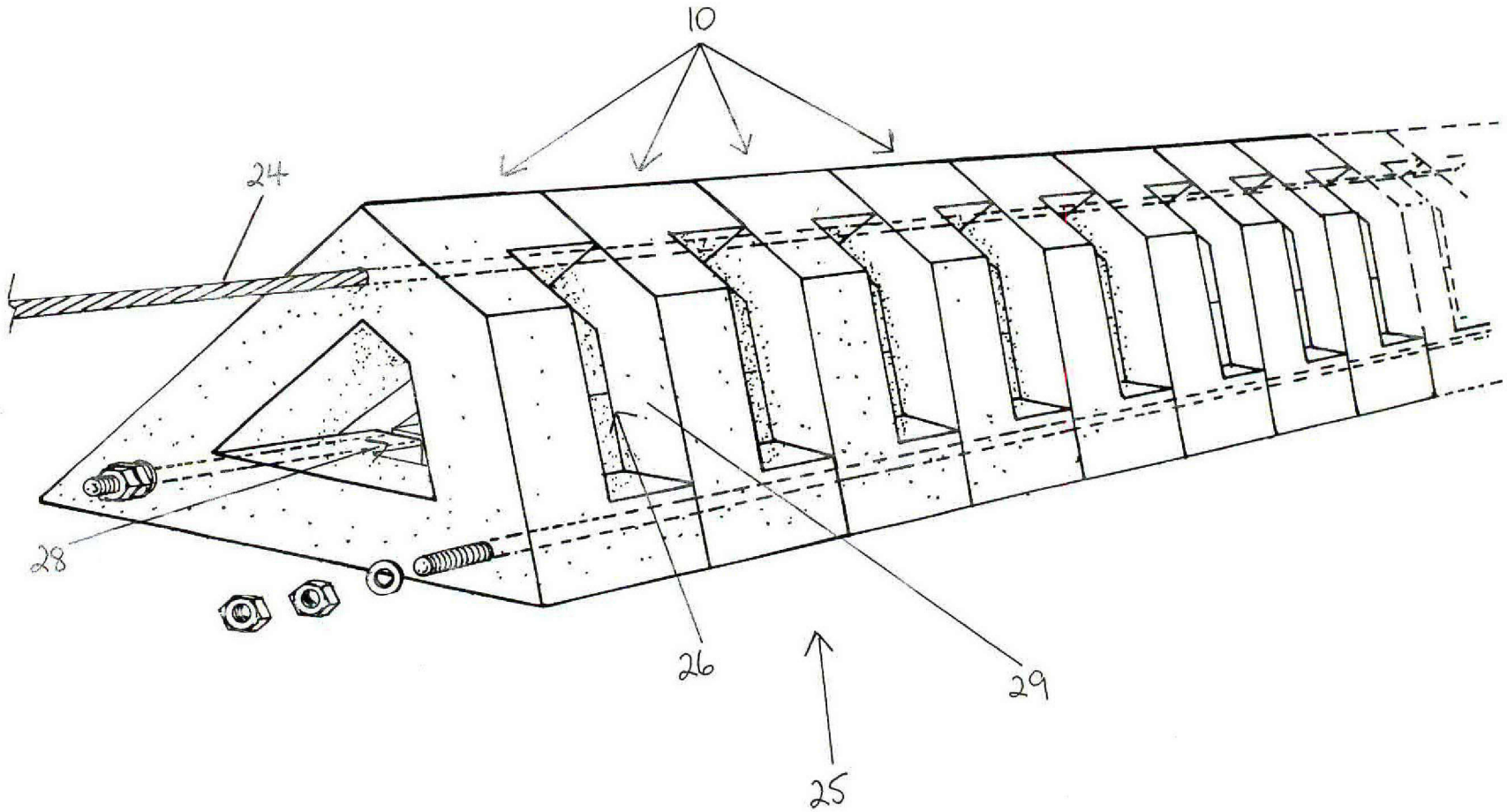


Figure 4

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WAVE BARRIER

FIELD OF INVENTION

The present invention relates to walls and barriers for preventing erosion by waves. The present invention has particular but not exclusive application for beach, foreshore and estuary locations. The specification describes by way of example to the application of the invention on beaches and foreshores, but the invention is not limited to this example.

BACKGROUND OF THE INVENTION

With continual wave action, the sand from beach fronts and foreshores can be scoured and erode particularly during periods of stormy weather conditions. Rock walls on the foreshore have been used to stop the erosion of beaches. Often these rock walls fail because water passes behind the wall, scours the supporting base and destabilizes the wall causing the wall to eventually fall over. Rock walls have also been made extending out into the water to form a groin. Sand often builds up on one side of the groin to the detriment of the other side of the groin. Consequently multiple groins are placed along a beach in an attempt to maintain sand on all the beach sections. The use of rock walls has attained limited success. The use of rock walls however alters the appearance of the shore or beach front and is not particularly environmentally friendly.

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OBJECT OF THE INVENTION

It is an object of the present invention to provide an alternative solution to the problem of foreshore and beach erosion that overcomes at least in part one or more of the above mentioned problems.

SUMMARY OF THE INVENTION

In one aspect the present invention broadly resides in a precast modular wave barrier having a base, front intermediate portion, rear intermediate portion and top portion, the base and portions enclosing an internal cavity; each of said intermediate portions has one or more intermediate recesses or apertures; wherein two or more barriers are positioned adjacent each other to form a wall where the internal cavities substantially align to form an internal passage and the one or more recesses or apertures face outwardly.

Preferably the length of the base is greater than the barrier height.

Preferably the wall impedes the progress of a wave and part of the water of the wave is allowed to pass through the wall.

In another aspect the present invention broadly resides in a precast modular wave barrier having a base, front intermediate portion, rear intermediate portion and top portion; said intermediate portions each having one or more intermediate recesses or apertures, wherein the length of the base is greater than the barrier height; wherein two or more barriers are positioned adjacent each other to form a wall where the progress of a wave is impeded and part of the water of the wave is allowed to pass through the wall.

Preferably the wave barrier is a one piece unit.

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Preferably there are the one or more intermediate recesses. Preferably the one or more intermediate recesses for the front intermediate portion and the rear intermediate portion are on the same side. More preferably the one or more intermediate recesses for the front intermediate portion and the rear intermediate portion substantially align to form a channel for the passage of water.

Each barrier is preferably precast concrete. More preferably each barrier is of precast concrete having at least 50 mpa tensile strength.

Each barrier is of any suitable shape providing the length of the base is greater than the height of the barrier to form a stable wall. Preferably the barrier has a substantially triangular, trapezoidal, prismatic or semispherical shape. More preferably the barrier has a substantially trapezoidal shape without protruding edges to reduce the possibility of injuries.

Each of the barriers can be colored to suit the immediate environment. The barriers that are used on the beach or foreshore preferably have a sandstone colour.

In one embodiment, each of the barriers has an internal passage through which water can pass. When a plurality of barriers is joined to form a wall, a continuous passage is preferably formed along the longitudinal length of the wall.

In another embodiment each of the barriers has an internal passage and a recess in the top portion, said recess forms an aperture when a wall is formed. The presence of an internal passage and aperture formed in the upper portions of adjacent barriers facilitates the dissipation of the water of the wave and energy of the wave.

The invention in another aspect, broadly resides in a modular one-piece wave barrier having a base, two side walls where one of the side walls is longer than the other side wall and a top wall, wherein each of the side walls and top wall have a

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recess or aperture; wherein two or more barriers are positioned adjacent each other to form a wall where the internal cavities substantially align to form an internal passage and the one or more recesses or apertures face outwardly.

In other embodiments there may be recesses or apertures in the base.

The invention in another aspect, broadly resides in a modular one-piece wave barrier having a base, two side walls where one of the side walls is longer than the other side wall and a top wall, wherein the top wall is shorter in length than the base wall, each of said side walls, base and top wall have a recess or aperture; wherein two or more barriers are positioned adjacent each other to form a wall where the internal cavities substantially align to form an internal passage and the one or more recesses or apertures face outwardly.

Two or more barriers are preferably held and fixed in position by one or more rods or cables to form a substantially stable wall anchored in position. Preferably the rods and cables are stainless steel. Preferably the walls can vary in length and a series of separate wall may be positioned next to each other along a beach front or foreshore. Because a wall can be formed from a plurality of barriers, the length of the wall, shape of the wall, position of the wall and the segmentation of the wall can be varied depending on the requirements.

In another embodiment two or more rows of walls of a plurality of barriers can be positioned on top of each other.

The barrier at the end of one or more rows of a wall preferably has an end cap to stop wildlife from entering the internal passage. More preferably the end cap includes a mesh section to allow water to discharge but prevent animals from entering.

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In another aspect the invention broadly resides in a wave wall formed by the association of two or more barriers as described above. The wave wall is preferably fixed in position by stainless steel rods or cables so that the barriers abut each other and a continuous wall is formed. The features of the barrier and wall described above also apply to this aspect of the invention.

In a further aspect the invention broadly resides in a method of forming a wave wall from a plurality of barriers as described above, said method includes positioning two or more barriers so that they are adjacent each other in an abutting formation and joining the barriers together using cables and/or rods to form a continuous wall.

In a further aspect the invention broadly resides in a method of forming a wave wall from a plurality of modular one-piece wave barriers wherein each barrier has a base, two side walls where one of the side walls is longer than the other side wall and a top wall, the top wall is shorter in length than the base wall, each of said side walls and top wall have a recess or aperture; said method includes positioning two or more barriers so that they are adjacent each other in an abutting formation and joining the barriers together using cables and/or rods to form a continuous wall. wherein two or more barriers are positioned adjacent each other to form a wall where the internal cavities substantially align to form an internal passage and the one or more recesses or apertures face outwardly.

The features of the barriers and walls as described above apply also to this aspect of the invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

In order that the present invention can be more readily understood reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention and wherein:

Figure 1 is a diagrammatic drawing of the wave barrier of the present invention;

Figure 2 is another diagrammatic drawing of the wave barrier of the present invention;

Figure 3 is a diagrammatic top view of the wave barrier of the present invention;

Figure 4 is a diagrammatic view of the wall formed by a plurality of joined wave barriers; and

Figures 5 to 8 are diagrammatic drawings showing in progress order the build-up of sand with a wall formed from a plurality of wave barriers positioned on a foreshore.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to figures 1 to 3 there is shown a substantially trapezoidal shaped barrier 10, having a base 11, front intermediate portion 12, rear intermediate portion 13 and a top portion 14. The barrier 10 has an internal aperture 15. The barrier 10 has a front recess 17, rear recess 18 and a top recess 19. In some embodiments the top recess is part of the front recess. There is also a base recess 20. Other embodiments may not include a base recess. The barrier 10 also has a series of apertures 22 through which stainless steel cable or rod is passed to connect the barriers. There is also two lifting points 23 that a crane or the like can lift

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the barrier 10 into position. The barrier 10 is precast modular concrete having at least 50 mpa tensile strength. The barrier 10 has a sandstone colour.

With reference to figure 4, there is shown a plurality of barriers 10 joined by stainless steel cable 24 to form a wall 25. When two barriers 10 are positioned adjacent each other, the front recess 17 forms a front aperture 26 with the abutting barrier 10. Similarly there is a rear aperture 27 formed with the rear recess 18. A channel between the front aperture 26 and the rear aperture 27 to form the channel 29. The internal aperture 15 of each barrier 10 join to form a passageway 28 substantially perpendicular to the channel 29.

With reference to figures 5 to 8, the wall 25 is located on a shoreline between the water and an eroded sand bank. The progress of the waves are impeded by the wall 25 and cannot reach the sand bank. The force of the wave and water is dissipated as part of the water passes through channel 27, along passageway 28 and rebuffed from the front of the barrier 10 (see figure 5).

With time sand gradually builds-up firstly on the front side of the wall 25 then also on the rear side of the wall 25 (see figures 6 and 7). Sand eventually covers the wall 25 (see figure 8). Using a plurality of barriers to form a wall along the shoreline substantially prevents further erosion and may lead in time to the accumulation of sand on the shore.

VARIATIONS

It will of course be realised that while the foregoing has been given by way of illustrative example of this invention, all such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is herein set forth.

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Throughout the description and claims this specification the word “comprise” and variations of that word such as “comprises” and “comprising”, are not intended to exclude other additives, components, integers or steps.

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CLAIMS

1. A precast modular trapezoidal - shaped wave barrier having

a base, a front intermediate portion, a rear intermediate portion and a top portion; the base and portions form a perimeter defining an internal cavity; each of said intermediate portions have one or more intermediate recesses or apertures, said base is longer than the top portion and the top portion slopes downwardly from the rear intermediate portion to the front intermediate portion; wherein in use each of said barrier is orientated with the front intermediate portion closest to the waterside and two or more of said barriers are positioned adjacent each other to form a wall where the internal cavities substantially align to form an internal passage and said top portions form a continuous downwardly sloping top wall.

2. A precast modular wave barrier as claimed in claim 1, wherein the length of the base is greater than the barrier height and two or more of said barriers are positioned adjacent each other to form a wall where the progress of a wave is impeded and part of the water of the wave is allowed to pass through the wall via the recesses or apertures.

3. A precast modular wave barrier as claimed in claims 1 or 2, wherein the wave barrier is a one piece unit.

4. A precast modular wave barrier as claimed in any one of the abovementioned claims, wherein the wave barrier is of precast concrete having at least 50 mpa tensile strength.

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5. A precast modular wave barrier as claimed in any one of the abovementioned claims, wherein the one or more intermediate recesses on adjacent barriers oppose each other and form a channel for the passage of water.

6. A precast modular wave barrier as claimed in any one of the abovementioned claims, wherein the barrier has a recess in the top portion and when two or more barriers are joined to form a wall the recess forms an aperture in the top wall and facilitates the dissipation of the water of the wave and energy of the wave.

7. A precast modular wave barrier as claimed in any one of the abovementioned claims, wherein two or more barriers are held and fixed in position by one or more rods or cables to form a substantially stable wall anchored in position.

8. A modular one-piece wave barrier as claimed in any one of the abovementioned claims, wherein the base of each barrier has a recess or aperture.

9. A wave wall formed from a plurality of precast modular wave barrier as claimed in any one of the abovementioned claims.

10. A wave wall formed from a plurality of precast modular wave barrier as claimed in any one of the abovementioned claims, wherein an internal passage is formed along the longitudinal length of the wall.

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11. A wave wall formed from a plurality of precast modular wave barrier as claimed in any one of the abovementioned claims, wherein an end of one or more rows of a wall has an end cap to stop wildlife from entering the internal passage.

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Figure 1

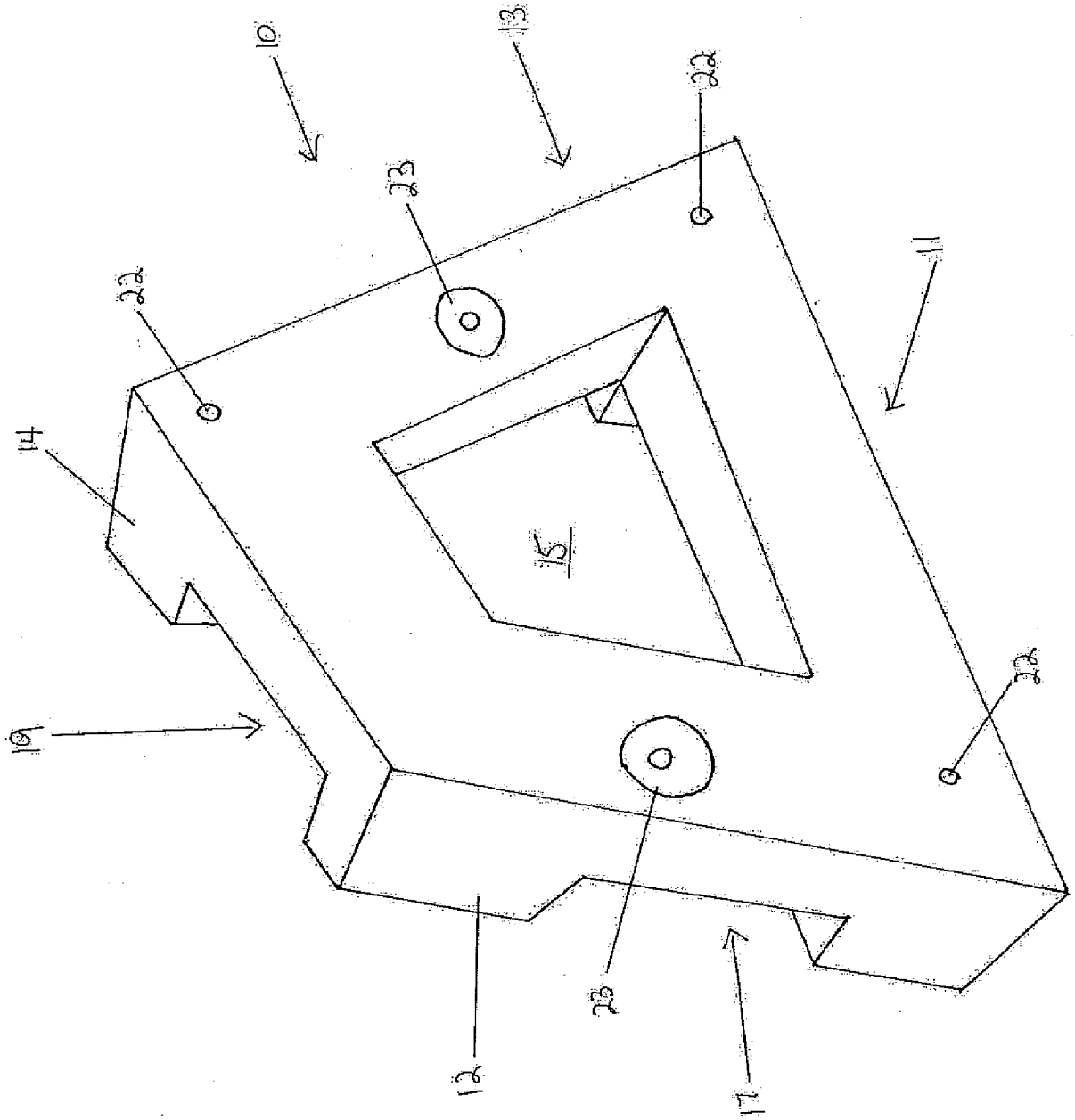

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Figure 2

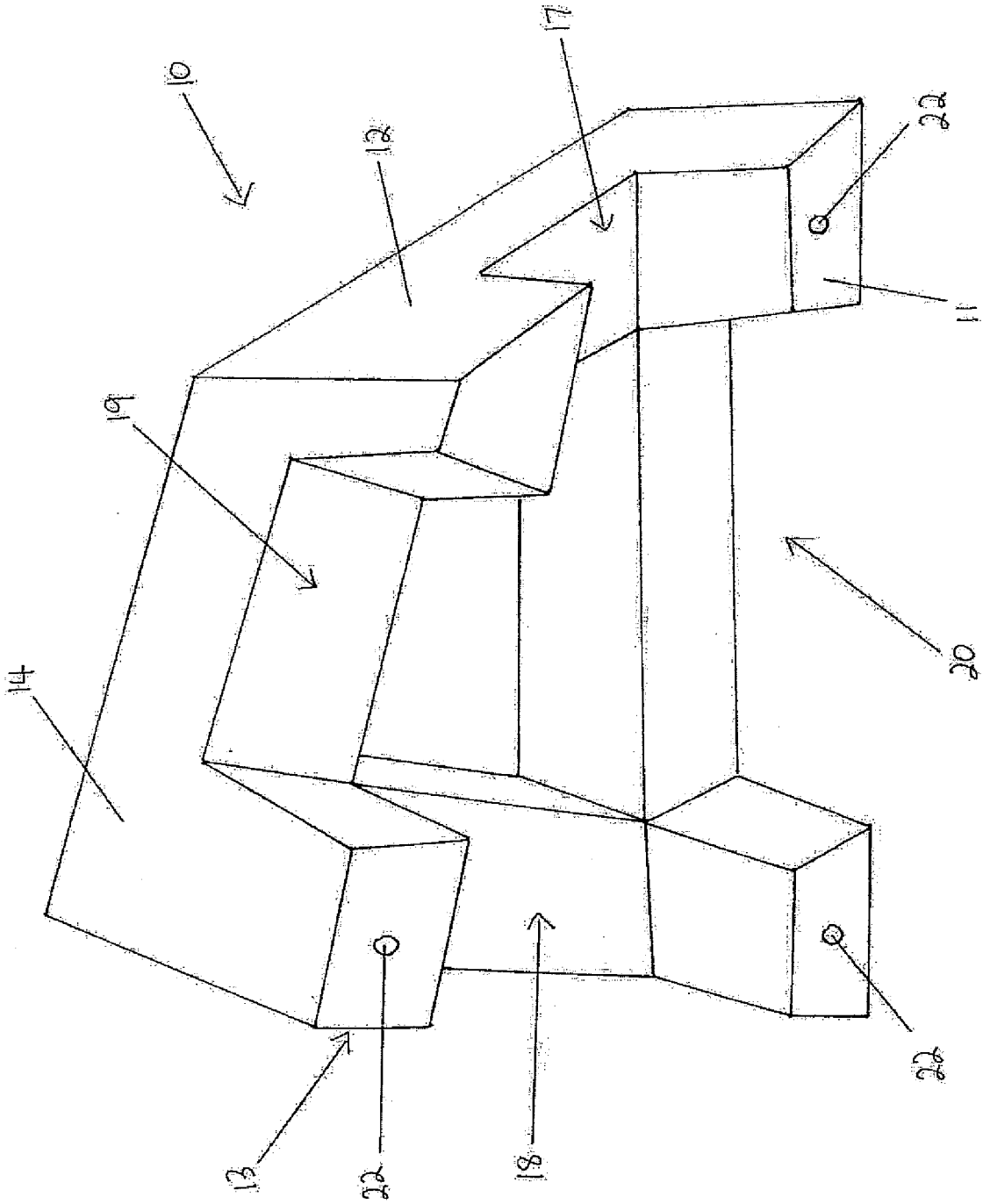

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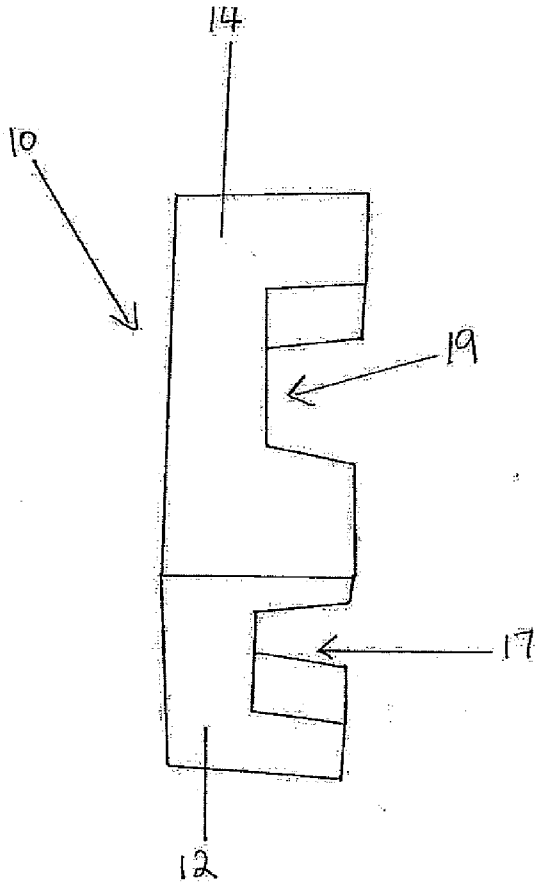
Figure 3



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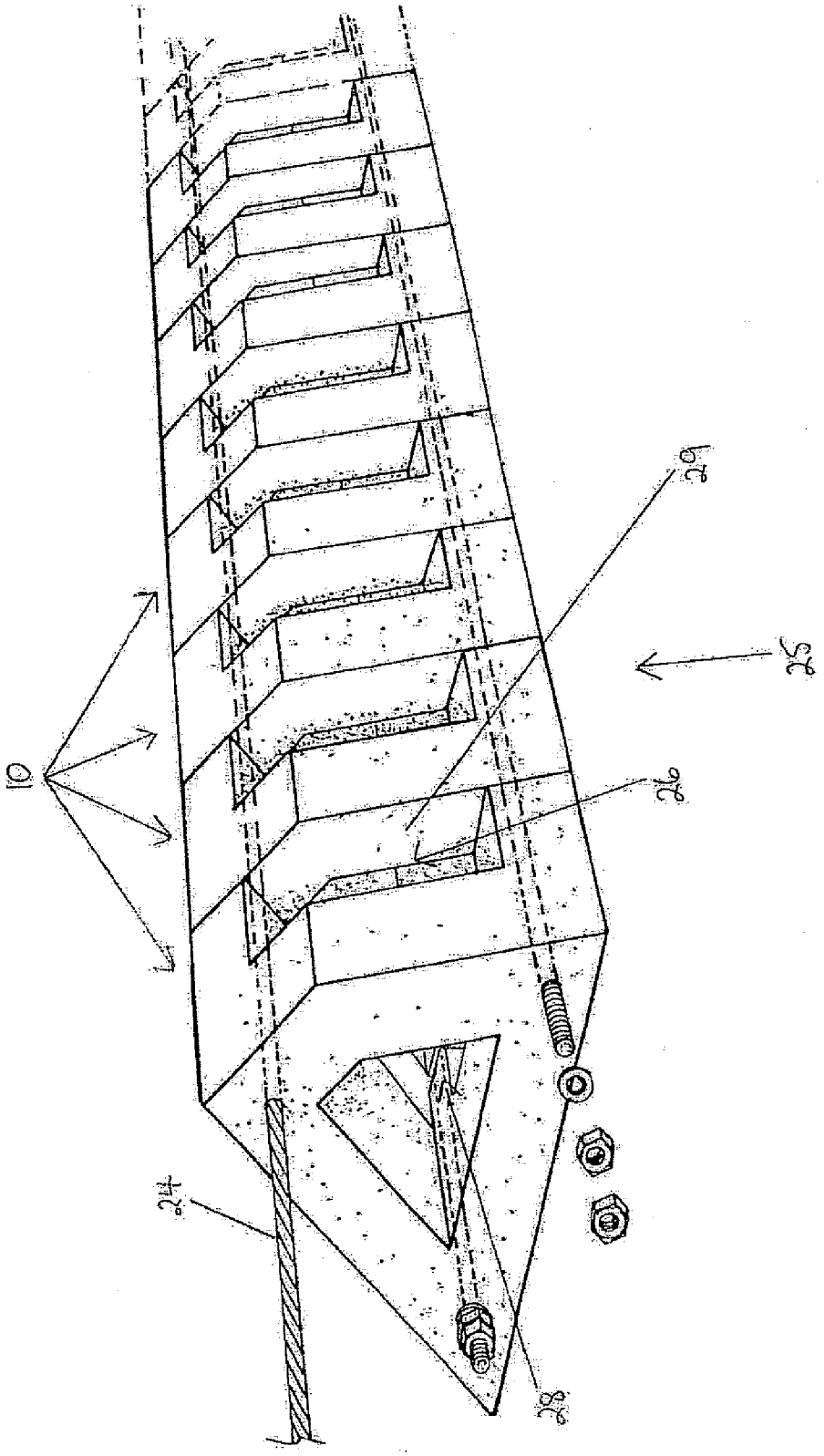

Figure 4

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Figure 5

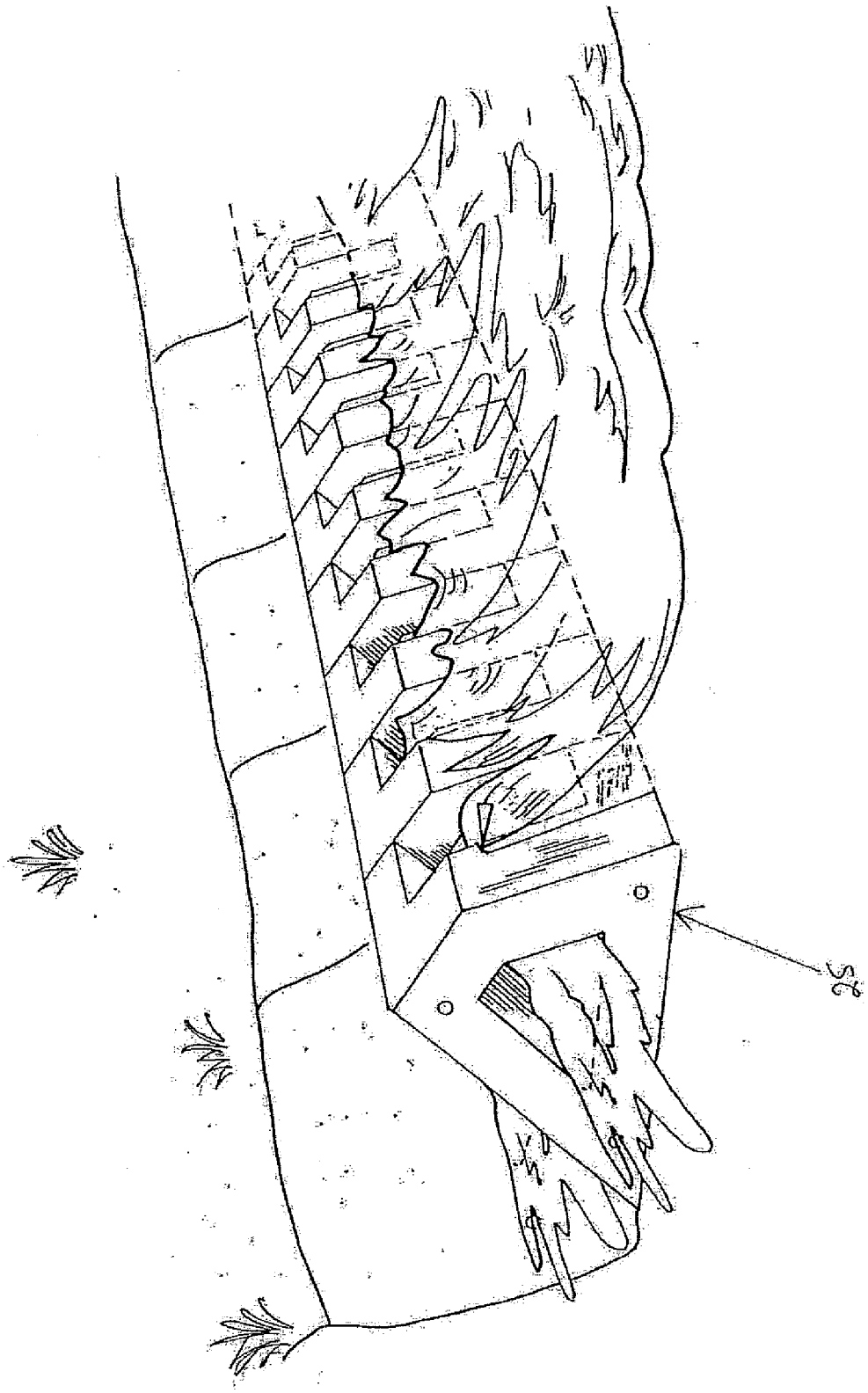

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Figure 6

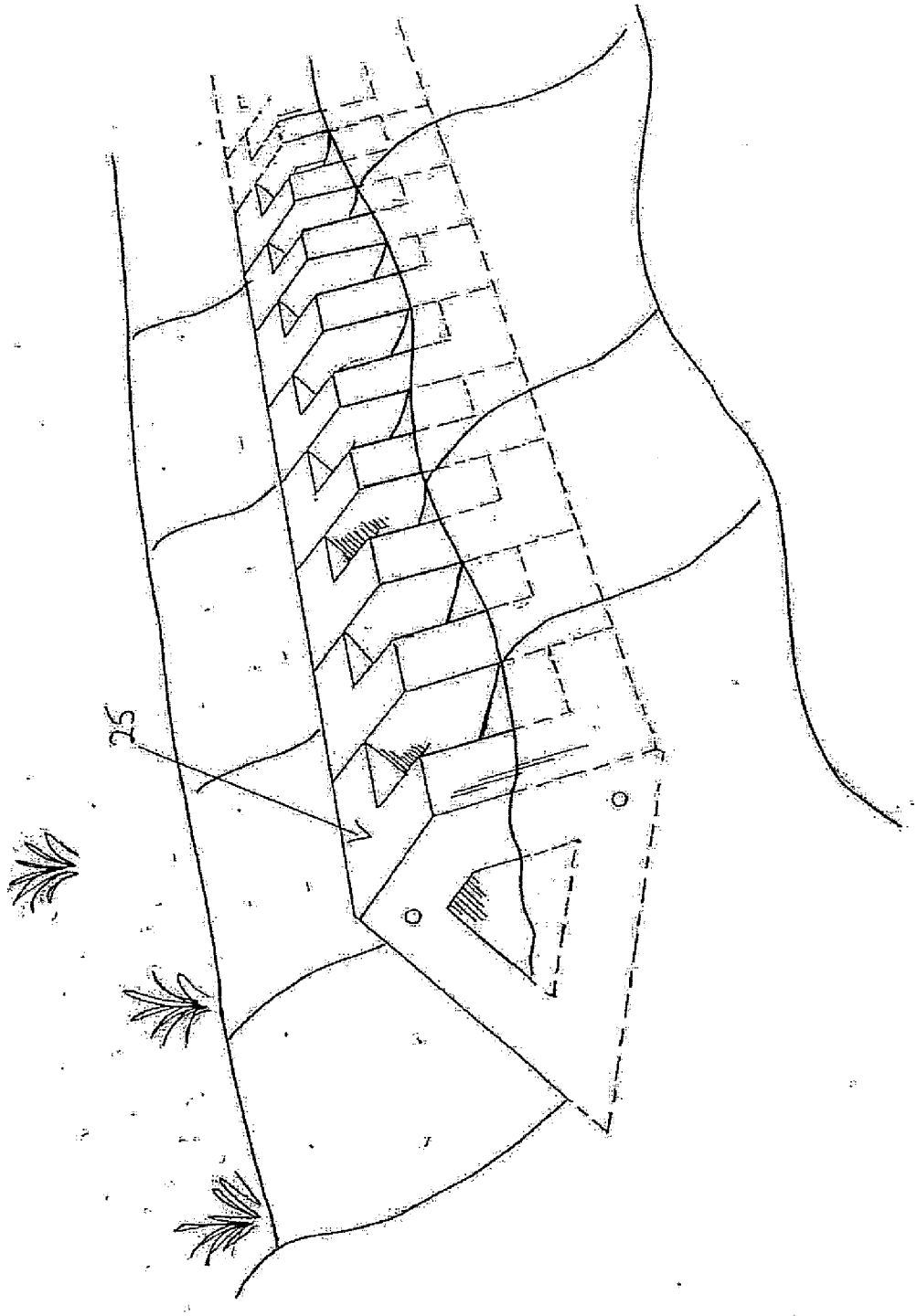

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Figure 7

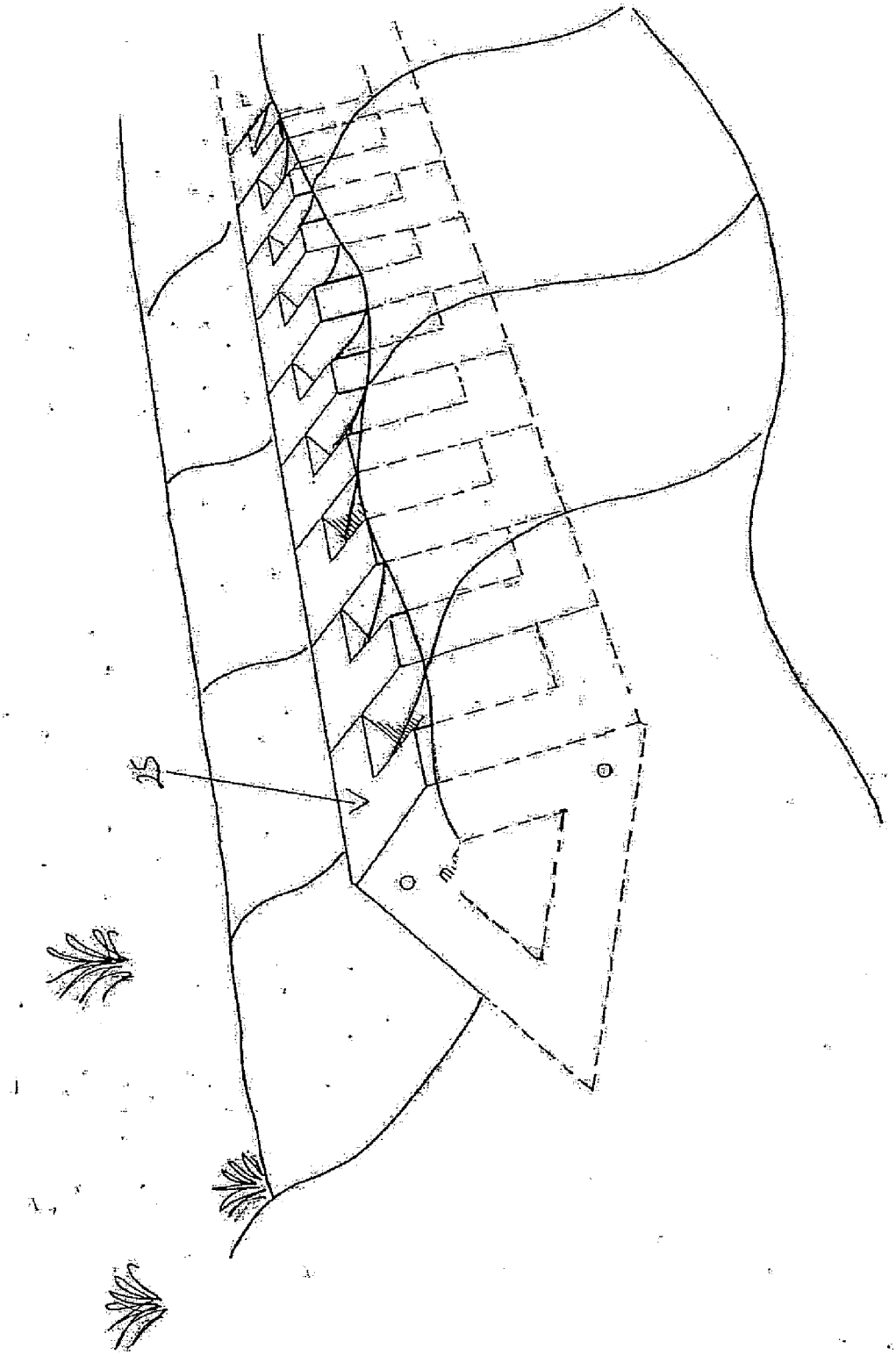

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Figure 8