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(54) **Camouflage net**

Tarnnetz

Filet de camouflage

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Description

[0001] The present invention relates to nets.

[0002] Camouflage nets are used, particularly by the military, to conceal equipment and personnel and enable them to blend in with their surroundings.

[0003] Traditionally, camouflage nets have consisted of a net comprising a plurality of intersecting net strands, to which a garnish is attached. The garnish is a coated fabric which may have visual and near infrared properties selected to match the terrain where the camouflage net is to be used. The coated fabric may be incised to create a three dimensional (3D) leafy effect, for example. In the latter case, the garnish can be applied to the net in patches to create the look of vegetation from a threat distance or as a complete cover (100%). The garnish may also have a printed or spray painted pattern if required. In addition, radar reflecting/absorbing properties can also be incorporated in the garnish if desired.

[0004] The nets may also comprise low emissivity fabrics which may be strategically placed to cover hot areas of a concealed object in order to produce a multi-spectral camouflage system.

[0005] The net mesh dimension in these traditional nets is typically in the region of 75mm square. This can make the nets difficult to deploy since the mesh may snag on protruding corners of the object to be concealed.

[0006] In addition to the traditional 3D nets, two dimensional (2D) nets are also commonly used. These nets comprise a knitted or open mesh woven fabric with patterning. Radar absorbing or reflecting properties can be incorporated in the yarns or as a finishing process. Cutting down the line of site between image and target the 2D structure helps to reduce the thermal signature of the object. These nets are not particularly suited to woodland surroundings because of the lack of 3D effect although they are good in desert surroundings for concealing the thermal signature of an object. However, heat can build up within the supported structure due to the relatively small holes and this can make it uncomfortable for any crew members beneath the structure. Additionally, these 2D nets may have a garnish sewn into the knitted fabric to improve the 3D effect.

[0007] The visual appearance of such 2D nets is not as good as a patched net in woodland conditions. Similarly, the lack of texture makes such a 2D net not as good for the near and far infrared. However, the 2D nets are much easier to deploy than conventional nets as there is much less snagging due to the substantially smaller mesh size.

[0008] US 2 349 999 A describes a net according to the preamble of claim 1.

[0009] It is the object of the present invention to alleviate some of the problems of the prior art nets or at least to provide an alternative to them.

[0010] According to the present invention there is provided a net comprising a first net mesh having a first mesh dimension and a first area and a second net mesh having

a second mesh dimension and a second area, the second mesh dimension being smaller than the first mesh dimension and the second area being larger than the first area, wherein the first and second net meshes are attached at or near their respective perimeters, the arrangement being such that when the first net mesh is held taut with the second net mesh below it, the second net mesh sags below the first net mesh.

[0011] In effect, such a net enables the best features of the 3D and 2D nets described above to be realised. The first net mesh may conveniently be provided with a suitable garnish and the relatively smaller net mesh dimension of the second net mesh can prevent the net from snagging.

[0012] A further advantage enabled by the present invention is the sagging effect produced between the second net mesh and the first net mesh which helps to improve the visual performance of the overall net. The sagging material of the second net mesh can obscure the line of sight of an observer. This is because as the second net mesh sags away from the first net mesh it firstly falls downwards and then curves under the first net mesh. As the second net mesh curves under the first net mesh this effectively reduces the net mesh size as viewed from the side. Consequently, the sagging material obscures the line of sight of an observer.

[0013] A yet further advantage enabled by the present invention is a reduction of the solar loading of the second net mesh (2D structure). In a conventional 2D net heat can build up due to the fact that the small holes tend to retain the heat. In a net according to the present invention the garnish on the first net mesh shields the second net mesh from the sun and the structure acts as a form of insulation thus providing a better atmosphere within the supported structure.

[0014] The first net mesh is preferably a square mesh and may advantageously have a first net mesh dimension of less than 75mm. Preferably the first net mesh dimension is in the range from about 10mm to about 40mm square and more preferably the range is from about 15mm to about 25mm square. The conventional net mesh for camouflage netting is approximately 75mm square. By reducing the dimensions of the first net mesh this further helps to reduce the likelihood of the net snagging.

[0015] Preferably the second net mesh has a mesh dimension in the range from about 1mm to about 10mm. The second net mesh is preferably in the form of a sheet of fabric with a plurality of uniform holes forming a mesh structure, for example, a fine polyester mesh.

[0016] The second net mesh preferably further comprises at least one ventilation region having a more open mesh than the general second mesh dimension. The mesh dimension at the ventilation region(s) is more open than the second mesh dimension but it is still a tighter mesh than the first net mesh. Typically, the mesh dimension of the ventilation region may be in the range from about 5mm to about 15 mm. The ventilation region(s)

may be provided around the periphery of the second net mesh and/or in the centre of the second net mesh. Alternatively, multiple ventilation regions may be provided on the second net mesh. The location of the multiple ventilation regions may be selected to provide ventilation at specific points in the deployed net structure. This arrangement helps to provide a route for the convection of air. The second net mesh has a small size net mesh which tends to prevent the circulation of air and hence a heat build up can occur. The ventilation region has a slightly larger size net mesh which allows the flow of air and helps to produce a chimney effect as cool air is drawn through the net and exits through the ventilation region. The location of the ventilation region may be selected to minimise detection by thermal imaging.

[0017] In an alternative embodiment the second net mesh may be provided with a collapsible chimney structure. The collapsible chimney structure could be in the form of a gap in the second net mesh defining a ventilation opening. In order to prevent the ventilation opening snagging it could suitably be provided with a skirt of mesh material depending downwardly from the perimeter of the ventilation opening. The skirt of mesh material would preferably be made of the same material as the second net mesh and would preferably have a length at least equal to the diameter of the ventilation opening. This would help to reduce the snagging whilst preventing a build up of heat beneath the net.

[0018] For a better understanding of the present invention reference will now be made, by way of example, to the accompanying figures in which:

Fig. 1 shows a perspective view of a camouflage net;
 Fig. 2 shows a side view of a camouflage net;
 Fig. 3 shows a side view of a camouflage net;
 Fig. 4 shows a perspective view of a camouflage net;
 Fig. 5 shows a photograph of a front view camouflage net;
 Fig. 6 shows a photograph of a side view of the camouflage net of Fig. 5;
 Fig. 7 shows a photograph of a front view of a camouflage net; and
 Fig. 8 shows a photograph of a side view of the camouflage net of Fig. 7.

[0019] Referring now to Fig. 1, this is a simplified schematic diagram showing a camouflage net 2 set up to conceal an object 4. The camouflage net 2 comprises a first net mesh 6 having a first mesh dimension of approximately 20mm square. The first net mesh 6 is constructed from a plurality of intersecting net strands. The net strands are conventional polyester net strands but may be made from any suitable material. The first net mesh 6 is covered in a camouflage garnish (not shown). The garnish may be applied in patches or as a complete covering. The net 2 is held up by support structures 8 in the form of rigid metal poles. These poles are spaced apart such that the first net mesh 6 is held taut over the object

4. A second net mesh 10 in the form of a lightweight polyester fabric with a plurality of uniform holes is attached to the first net mesh 6 at a plurality of locations 12 along its periphery. The second net mesh 10 has a smaller mesh dimension than the first net mesh 6. The mesh dimension of the second net mesh is approximately 1mm. The second net mesh 10 is attached by means of plastic cable ties but any suitable means may be used. The second mesh dimension is such that it will not easily snag.

[0020] The area of the second net mesh 10 is larger than that of the first net mesh 6. Consequently, the second net mesh 10 sags below the first net mesh 6 when the first net mesh 6 is held taut. The degree to which the second net mesh 10 sags may be determined by the difference in area between the first net mesh 6 and the second net mesh 10 and/or the number of attachment points 12 along the periphery. For example, in Fig. 1 there are 13 attachment points along the length of one side of the net 2. However, in the net 2 shown in Fig. 2, there are fewer attachment points and consequently the net 2 will sag more. The sagging of the second net mesh cuts down the line of sight of sensors at ground level. This effect will be explained in more detail with reference to Figs. 6 and 8.

[0021] Fig. 2 shows a side profile of a net 2 set up to conceal an object 4. There are fewer attachment points 12 between the first net mesh 6 and the second net mesh 10 than in the net of Fig. 1 which results in the second net mesh sagging more.

[0022] Figs. 3 and 4 show a side view and perspective view respectively of another net 2. In addition to the second net mesh 10 being attached to the first net mesh 6 at the periphery, further attachment points 14 are provided in the forms of lines of stitching which run parallel to the edges of the net 2 and help to gather the second net mesh 10. Alternatively, these further attachment points may be in the form of any suitable ties.

[0023] Figs. 5-8 show the deployment of a net 2. The first net mesh 6 is tensioned such that it is taut. Figs. 6 and 8 show side views of the nets 2 of Figs. 5 and 7 respectively and it can be seen that the area of the second net mesh 10 is much larger such that it sags below the first net mesh 6. The mesh dimension of the second net mesh 10 is much closer than that of the first net mesh 10. The second net mesh 10 is attached to the first net mesh 6 at a plurality of locations 12 along its perimeter. As can be seen in Figs. 6 and 8, the second net mesh 10 sags below the first net mesh. The second net mesh 10 curves down and around under the first net mesh 6 such that it hangs substantially vertically near the points of attachment with the first net mesh 6 and lies substantially horizontal at its lowest point. Thus, the effective mesh dimension of the second net mesh 10 decreases towards its lowest point. The closer the second net mesh comes to being horizontal then the smaller the net mesh dimension appears when viewed from the side. With a mesh dimension in the range of from about 1mm to about 10mm

the effective mesh dimension is reduced to the point that it is not possible to see through the second net mesh 10. This has the result of obscuring the line of sight of an observer and preventing the detection of an object concealed beneath the net 2.

[0024] The first net mesh 6 is provided with an attached camouflage garnish 16. The garnish 16 may be a variety of colours as is common in the art. For example, a range of greens and browns would be most suitable for forest or jungle camouflage whilst more sandy coloured shades are preferred for desert camouflage. The garnish 16 is incised to give it a more realistic 3D leafy effect.

[0025] A plurality of loops 18 are provided, extending outwardly from the edges of the net 2. These loops 18 may be used to attach the net 2 to the ground or other structure as shown in Figs. 5 and 7 or they may be used to join two or more nets together.

[0026] As can best be seen in Fig. 8, a region of ventilation 20 is provided at the periphery of the second net mesh 10. For clarity, the region of ventilation is indicated by a dotted line. The region of ventilation 20 has a more open mesh dimension than the bulk of the second net mesh 10 and provides a route for the convection of air. The mesh is hexagonal and the dimension of the mesh is between the dimension of the first net mesh 6 and the second net mesh 10. The small mesh dimension of the second net mesh 10 tends to retain the heat. However, air is able to flow more freely through the ventilation region 20. In an alternative embodiment, the ventilation region 20 could be provided in the middle of the second net mesh 10 or at a plurality of locations within the second net mesh 6.

[0027] In a further embodiment a collapsible chimney structure could be provided in the second net mesh 10. The collapsible chimney structure would be in the form of a gap in the second net mesh 10 defining a ventilation opening. In order to prevent the ventilation opening snagging it could suitably be provided with a skirt of mesh material depending downwardly from the perimeter of the ventilation opening. The skirt of mesh material would preferably be made of the same material as the second net mesh 10 and would preferably have a length at least equal to the diameter of the ventilation opening. For example, if the ventilation was in the form of a circular opening with a diameter of 50cm it would be preferable to have a skirt with a length of approximately 100cm. This would help to reduce the snagging whilst preventing a build up of heat beneath the net 2.

Claims

1. A net (2) comprising a first net mesh (6) having a first mesh dimension and a first area and a second net mesh (10) having a second mesh dimension and a second area, the second mesh dimension being smaller than the first mesh dimension, wherein the first and second net meshes (6, 10) are attached at

or near their respective perimeters, **characterized in that** the second area is larger than the first area, so that when the first net mesh (6) is held taut with the second net mesh (10) below it, the second net mesh (10) sags below the first net mesh (6).

2. A net (2) according to claim 1, wherein the first net mesh (6) is provided with a camouflage garnish (16).
3. A net (2) according to claim 1 or claim 2, wherein the first net mesh (6) is a square mesh.
4. A net (2) according to any preceding claim, wherein the first net mesh (6) has a mesh dimension of less than 75mm.
5. A net (2) according to claim 4, wherein the first net mesh (6) has a mesh dimension in the range from about 10mm to about 40mm.
6. A net (2) according to claim 5, wherein the first net mesh (6) has a mesh dimension in the range from about 15mm to about 25mm.
7. A net (2) according to any preceding claim, wherein the second net mesh (10) has a mesh dimension in the range from about 1mm to about 10mm.
8. A net (2) according to any preceding claim, wherein the second net mesh (10) comprises a ventilation region (20) having a more open mesh than the second mesh dimension.
9. A net (2) according to claim 8, wherein the ventilation region (20) is provided around the periphery of the second net mesh (10).
10. A net (2) according to claim 8, wherein the ventilation region (20) is provided in the centre of the second net mesh (10).
11. A net (2) according to any preceding claim, wherein the second net mesh (10) has a ventilation opening.
12. A net (2) according to claim 11, wherein a skirt of mesh material is provided depending downwardly from the ventilation opening.
13. A net (2) according to claim 12, wherein the length of the skirt is longer than the diameter of the ventilation opening.

Revendications

1. Filet (2) comportant une première maille de filet (6) ayant une première dimension de maille et une première aire, et une seconde maille de filet (10) ayant

une seconde dimension de maille et une seconde aire, la seconde dimension de maille étant plus petite que la première dimension de maille, dans lequel les première et seconde mailles de filet (6, 10) sont fixées au niveau de leurs périmètres respectifs, ou à proximité de ceux-ci, **caractérisé en ce que** la seconde aire est plus grande que la première aire, de sorte que lorsque la première maille de filet (6) est maintenue serrée avec la seconde maille de filet (10) en dessous de celle-ci, la seconde maille de filet (10) s'affaisse en dessous de la première maille de filet (6).

2. Filet (2) selon la revendication 1, dans lequel la première maille de filet (6) est munie d'une garniture de camouflage (16). 15
3. Filet (2) selon la revendication 1 ou 2, dans lequel la première maille de filet (6) est une maille carrée. 20
4. Filet (2) selon l'une quelconque des revendications précédentes, dans lequel la première maille de filet (6) a une dimension de maille inférieure à 75 mm. 25
5. Filet (2) selon la revendication 4, dans lequel la première maille de filet (6) a une dimension de maille dans la plage d'environ 10 mm à environ 40 mm. 30
6. Filet (2) selon la revendication 5, dans lequel la première maille de filet (6) a une dimension de maille dans la plage d'environ 15 mm à environ 25 mm. 35
7. Filet (2) selon l'une quelconque des revendications précédentes, dans lequel la seconde maille de filet (10) a une dimension de maille dans la plage d'environ 1 mm à environ 10 mm. 40
8. Filet (2) selon l'une quelconque des revendications précédentes, dans lequel la seconde maille de filet (10) comporte une zone de ventilation (20) ayant une maille plus ouverte que la seconde dimension de maille. 45
9. Filet (2) selon la revendication 8, dans lequel la zone de ventilation (20) est agencée autour de la périphérie de la seconde maille de filet (10). 50
10. Filet (2) selon la revendication 8, dans lequel la zone de ventilation (20) est agencée au centre de la seconde maille de filet (10). 55
11. Filet (2) selon l'une quelconque des revendications précédentes, dans lequel la seconde maille de filet (10) a une ouverture de ventilation.
12. Filet (2) selon la revendication 11, dans lequel une jupe du matériau de maille est agencée suspendue vers le bas à partir de l'ouverture de ventilation.

13. Filet (2) selon la revendication 12, dans lequel la longueur de la jupe est plus longue que le diamètre de l'ouverture de ventilation.

Patentansprüche

1. Netz (2) mit einem ersten Netzmaschengeflecht (6) mit einer ersten Maschenweite und einem ersten Bereich und mit einem zweiten Netzmaschengeflecht (10) mit einer zweiten Maschenweite und einem zweiten Bereich, wobei die zweite Maschenweite kleiner ist als die erste Maschenweite, wobei das erste und das zweite Netzmaschengeflecht (6, 10) an oder nahe ihrem jeweiligen Rand befestigt sind, **dadurch gekennzeichnet, dass** der zweite Bereich größer ist als der erste Bereich, so dass das zweite Netzmaschengeflecht (10) unter dem ersten Netzmaschengeflecht (6) durchhängt, wenn das erste Netzmaschengeflecht (6) mit dem zweiten Netzmaschengeflecht (10) darunter straff gespannt gehalten wird.
2. Netz (2) nach Anspruch 1, bei dem das erste Netzmaschengeflecht (6) mit einer Tarnverzierung (16) versehen ist.
3. Netz (2) nach Anspruch 1 oder 2, bei dem das erste Netzmaschengeflecht (6) ein quadratisches Maschengeflecht ist.
4. Netz (2) nach einem der vorhergehenden Ansprüche, bei dem das erste Netzmaschengeflecht (6) eine Maschenweite von weniger als 75mm hat.
5. Netz (2) nach Anspruch 4, bei dem das erste Netzmaschengeflecht (6) eine Maschenweite im Bereich von etwa 10mm bis etwa 40mm hat.
6. Netz (2) nach Anspruch 5, bei dem das erste Netzmaschengeflecht (6) eine Maschenweite im Bereich von etwa 15mm bis etwa 25mm hat.
7. Netz (2) nach einem der vorhergehenden Ansprüche, bei dem das zweite Netzmaschengeflecht (10) eine Maschenweite im Bereich von etwa 1mm bis etwa 10mm hat.
8. Netz (2) nach einem der vorhergehenden Ansprüche, bei dem das zweite Netzmaschengeflecht (10) einen Lüftungsbereich (20) aufweist, der ein offeneres Maschengeflecht hat als die zweite Maschenweite.
9. Netz (2) nach Anspruch 8, bei dem der Lüftungsbereich (20) um den Rand des zweiten Netzmaschengeflechts (10) herum vorgesehen ist.

- 10.** Netz (2) nach Anspruch 8, bei dem der Lüftungsbe-
reich (20) in der Mitte des zweiten Netzmaschenge-
flechts (10) vorgesehen ist.
- 11.** Netz (2) nach einem der vorhergehenden Ansprü- 5
che, bei dem das zweite Netzmaschengeflecht (10)
eine Lüftungsöffnung aufweist.
- 12.** Netz (2) nach Anspruch 11, bei dem eine Schürze
aus einem Material aus Maschengeflecht vorgese- 10
hen ist, die von der Lüftungsöffnung nach unten
hängt.
- 13.** Netz (2) nach Anspruch 12, bei dem die Länge der
Schürze größer ist als der Durchmesser der Lüf- 15
tungsöffnung.

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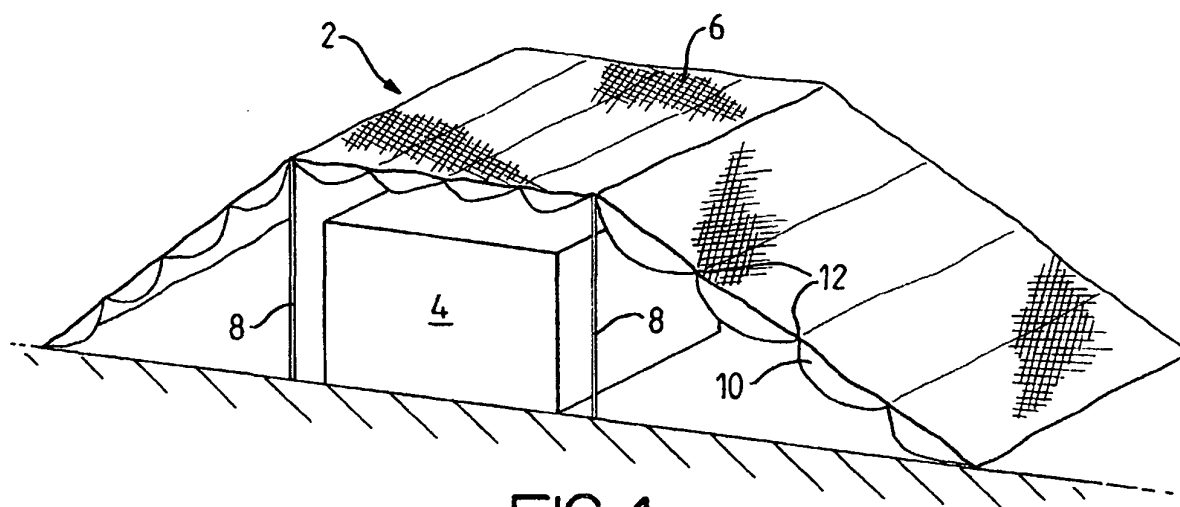


FIG. 1

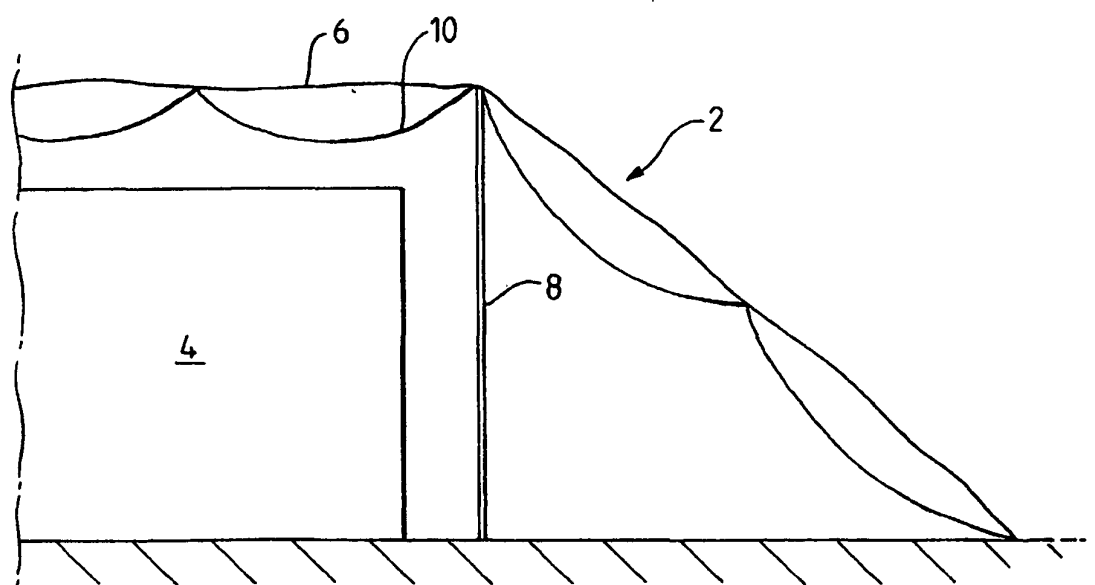


FIG. 2

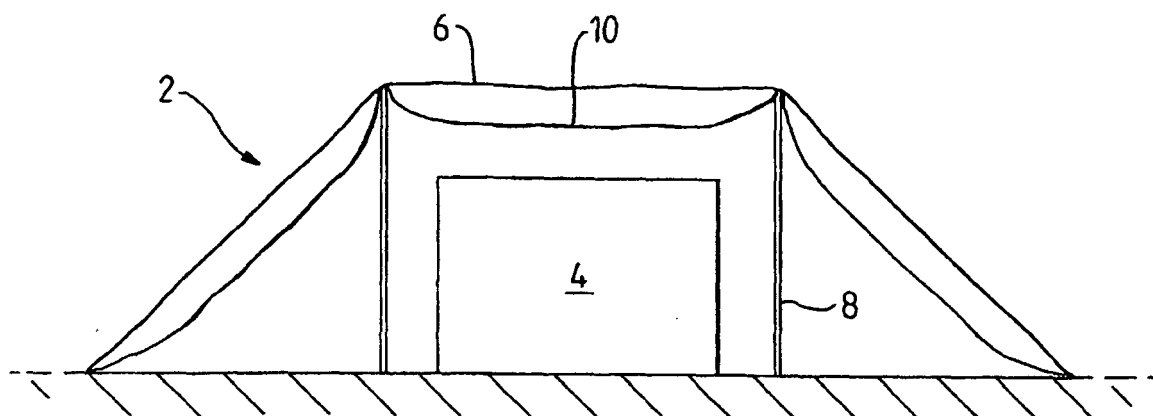


FIG. 3

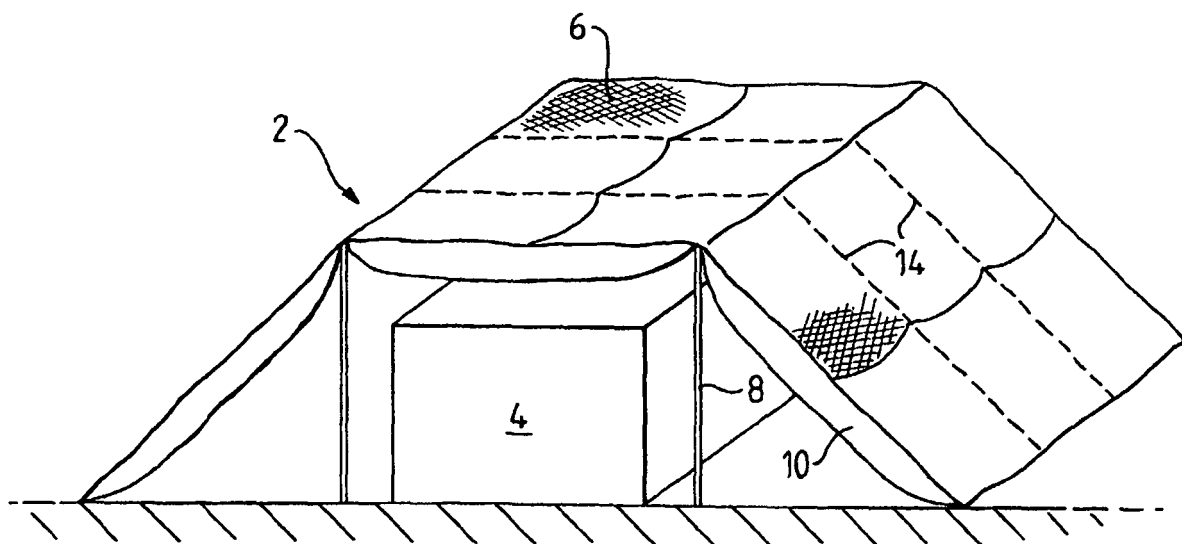


FIG. 4

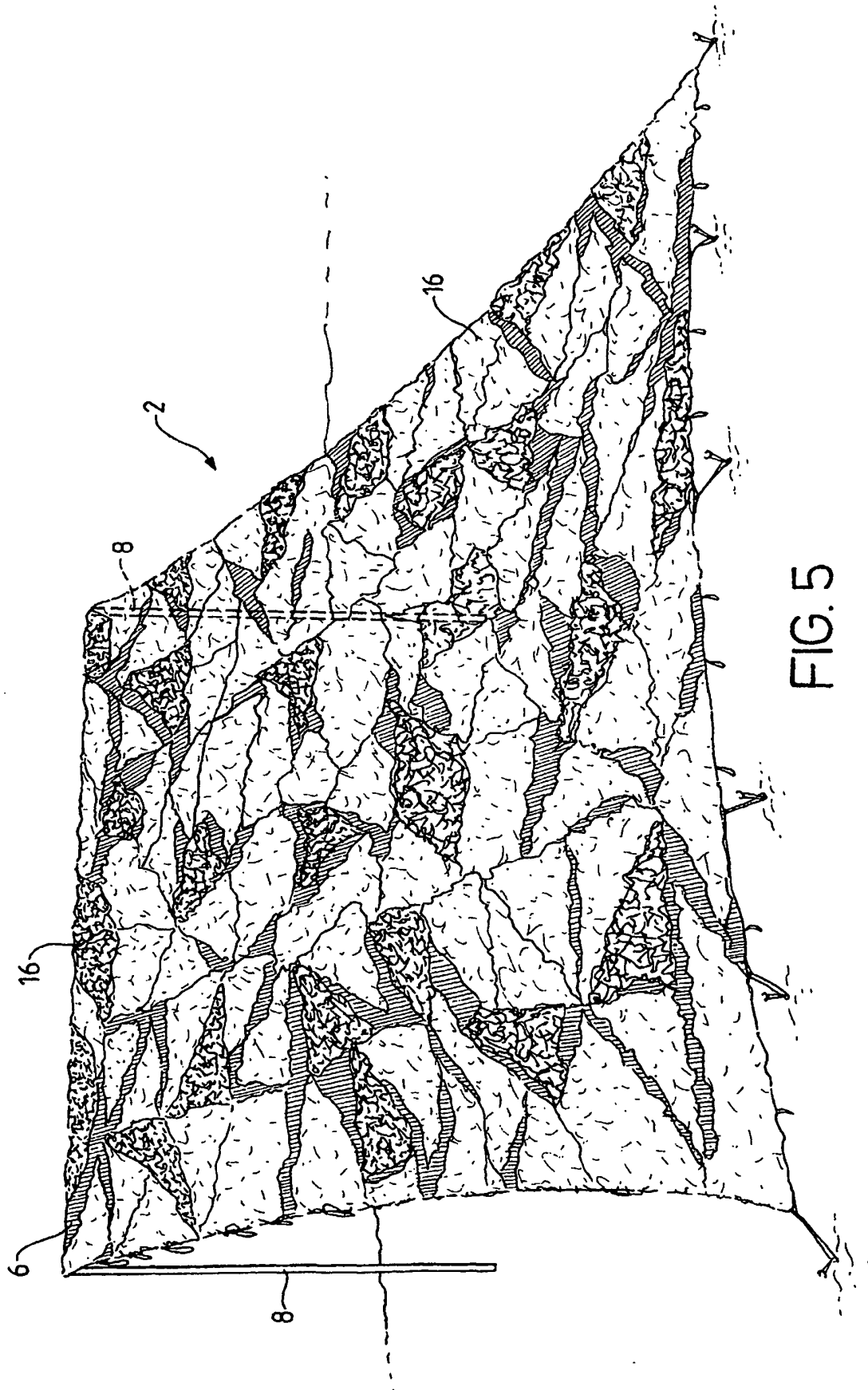


FIG. 5

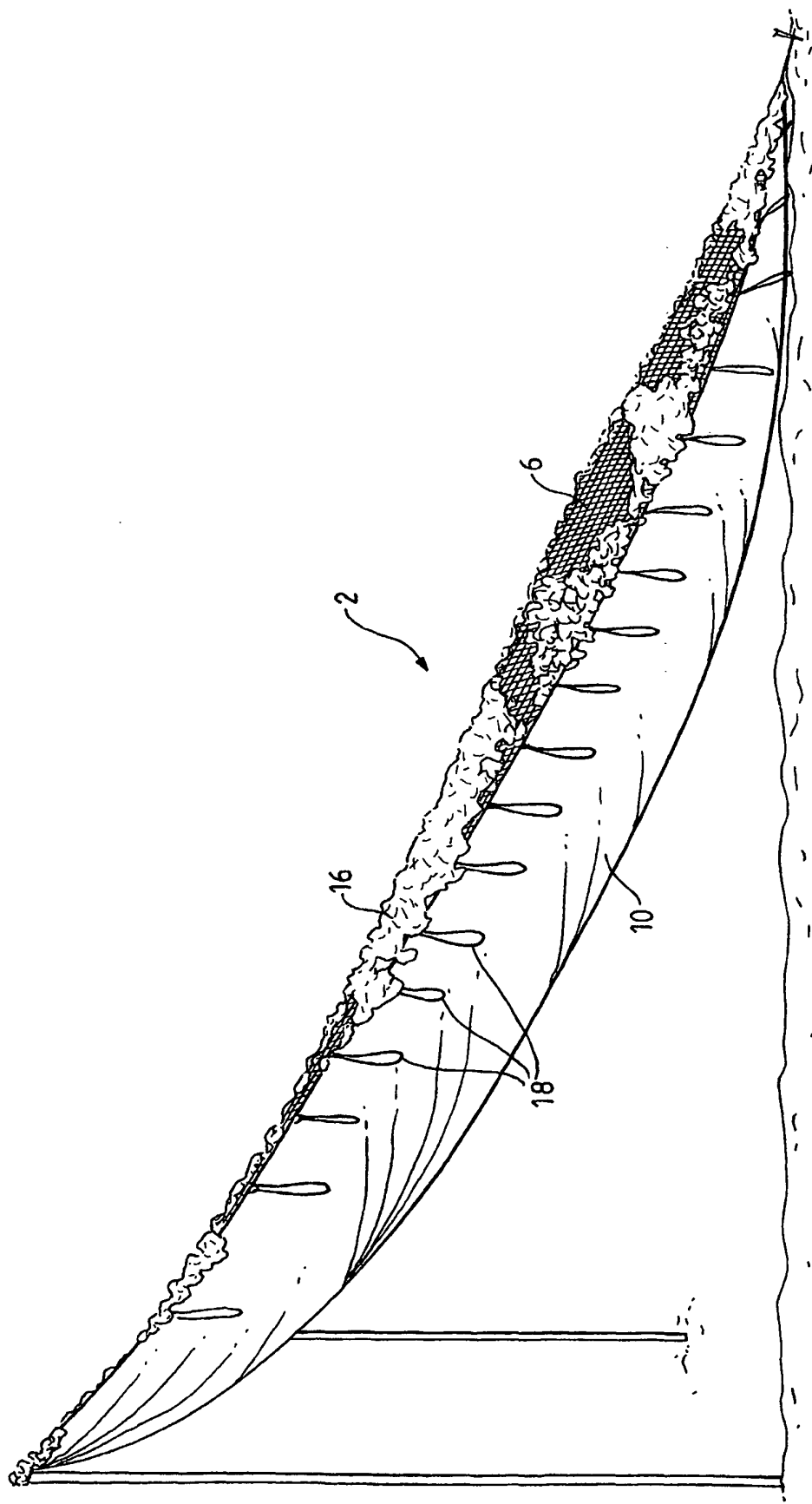


FIG. 6

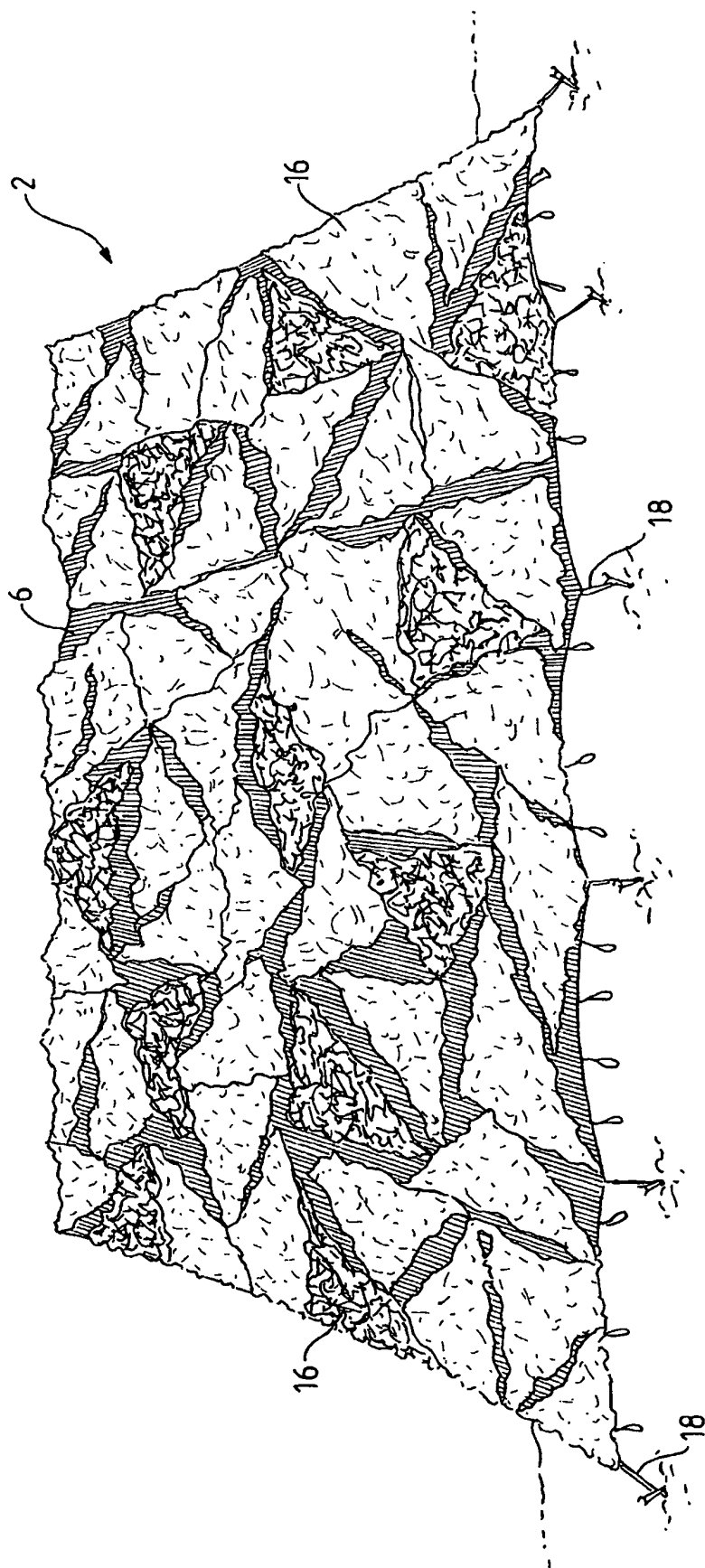


FIG. 7

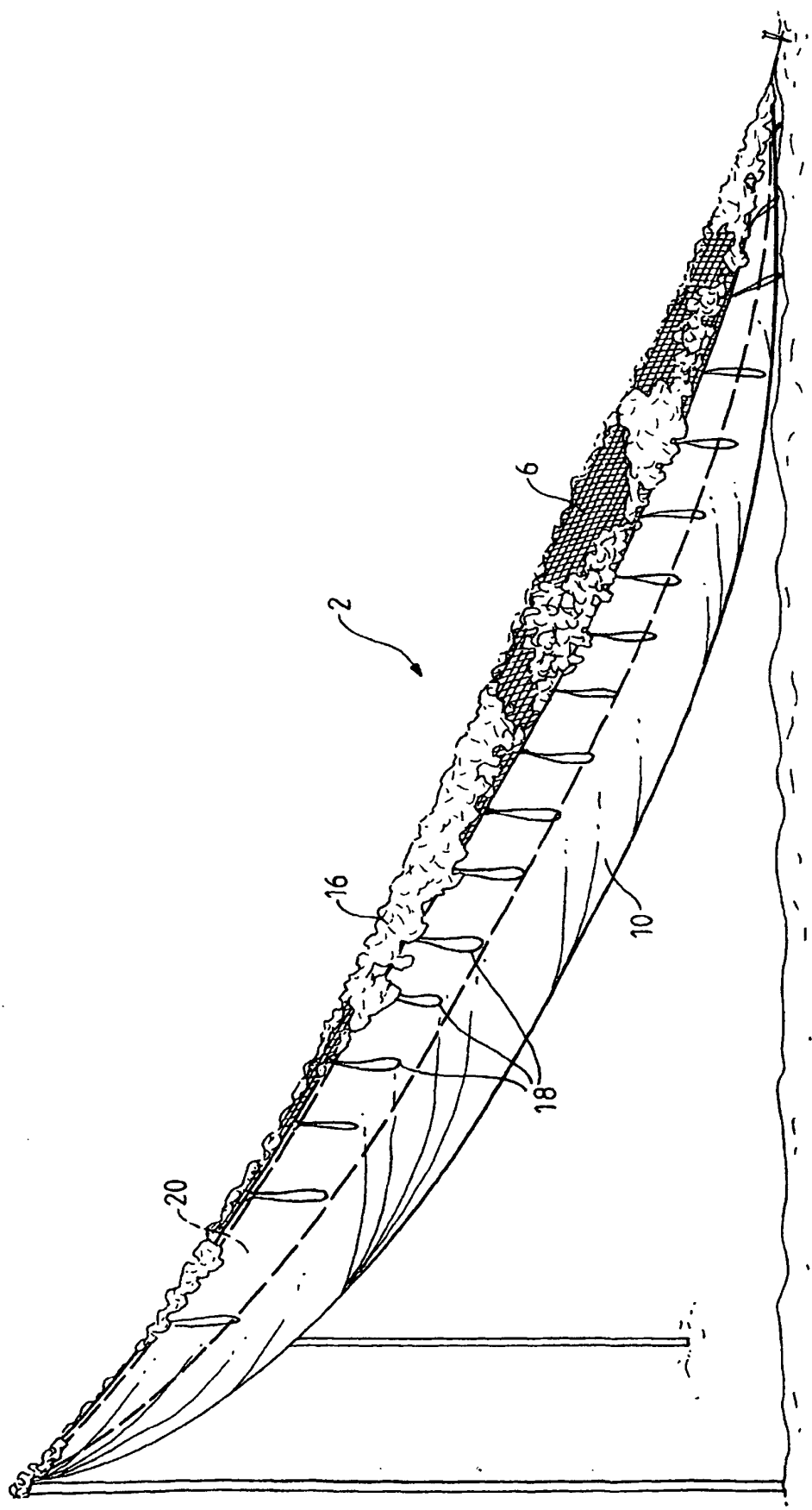


FIG. 8