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(54) MODULAR FENCE WITH DIG PROTECTION

(57) According to one aspect of the invention, a fence frame is disclosed, configured to receive insertion profiles and comprising:
- a bottom profile;
- a first side profile;
- a second side profile; and
- a partition profile;

wherein the bottom profile and the partition profile are each provided with a plurality of perforations; wherein the pluralities of perforations are applied on at least one of the bottom profile and the partition profile in two or more separate rows; wherein the separate rows are positioned in the profiles in such a way that individual insertion profiles may be introduced in one or more ways through a first perforation in the partition profile and a second perforation in the bottom profile.

According to another aspect of the invention, a fencing panel is disclosed, comprising a fence frame and insertion profiles, wherein the fence frame is placed on the ground, wherein the insertion profiles are inserted in two perforations opposite each other, wherein a first end of the insertion profiles is driven into the ground.

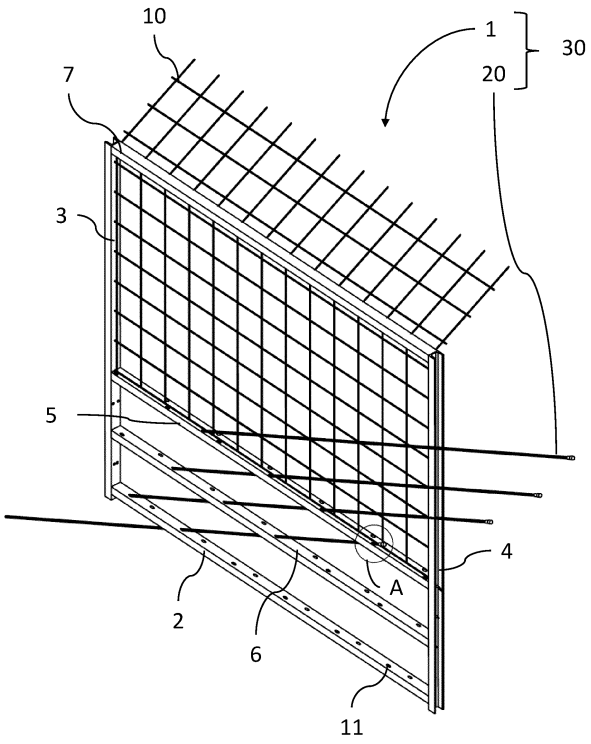

Figure 4a

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Description

Field of the invention

[0001] The present invention relates to the field of the fencing of plots of land.

Prior art

[0002] Fencing of a field where livestock or poultry graze generally serves two purposes; it must both prevent livestock breaking out, and prevent predators breaking in. It is important to realize that animals may not only squeeze through a fence, but may also climb or jump over the fence, may burrow under the fence or may push the fence over.

[0003] A traditional fence consists of posts that are placed in the ground at regular distances apart. A wire or a wire grid is then stretched between these posts. To prevent undermining, the bottom of the wire grid may be buried below the surface. Climbing or jumping over the fence can be prevented by fitting electrified wire or by making the fence high enough. A traditional fence of this kind may be extremely effective. However, the installation and maintenance of this fence is extremely time-consuming and labour-intensive. The durability of traditional solutions also poses problems: rotting of wood, loss of tension, deterioration of plastic insulators and limited reusability when the fence is moved. This is in particular a considerable disadvantage for the flexibility of the livestock farmer when confronted with a variable size or composition of the herd or when a herd is to be moved to another plot.

[0004] Documents US20110240939A1, US20120187359A1, US20130105754A1 and US20150021532A1 all show a system for fastening a row of regularly spaced spikes at the bottom of the wire grid of a fence. These spikes may then be hammered vertically into the ground to anchor the wire grid in the ground and to prevent undermining of the fence. An advantage of these systems is that it is not necessary to dig a trench in order to bury the wire grid. However, the fence posts must still be installed in the traditional manner. In addition, the spikes must also each be connected separately to the wire grid.

[0005] Patent US7216854B2 shows a modular fencing panel that is provided with a row of vertical spikes at the bottom. The fencing panel is erected by pushing the spikes into the ground. These spikes thus simultaneously provide fixation of the panel in the ground and protection against undermining. However, pushing a large number of spikes into the ground simultaneously to a considerable depth causes a "bed of nails effect", so that the panel from US7216854B2 is very difficult to erect with bare hands or simple tools.

[0006] Patent US3484081A shows a modular fencing panel that consists of a separate fence frame and spikes. The panel is erected by anchoring the frame vertically in the ground by means of the spikes. A person skilled in the art will understand that if the individual spikes are placed sufficiently close together, this installation technique may also offer protection against undermining.

[0007] None of the aforementioned systems takes account of the fact that many animals can make the cross-section of their body very small in one direction. They are thus able to squeeze between the parallel vertical spikes. One solution is to place the spikes very close together, but this negates the intended purpose of the systems - to provide a cost-effective fence that can be erected quickly. Thus, the systems for quick erection of a fence do not offer the same level of undermining protection as a traditional buried wire grid.

[0008] In addition, the aforementioned modular fencing panels place the spikes in one row. This means that the spikes must be driven deep into the ground to prevent a larger animal pushing the fence over.

[0009] Thus, there is a need for alternative, improved fencing that can be erected quickly, with simple means and at limited cost, and that nevertheless offers the protection that a traditional buried fence can offer.

Summary

[0010] The aim of the present invention is to offer a solution to the aforementioned and other drawbacks.

[0011] According to a first aspect of the invention, a fence frame is disclosed, configured to receive one or more insertion profiles and comprising:

- a bottom profile;
- a first side profile, positioned at a first lateral end;
- a second side profile positioned at a second lateral end; and
- a partition profile;

wherein the bottom profile is fastened to or between the first side profile and the second side profile; wherein the partition profile is fastened between the first side profile and the second side profile at a distance from and substantially parallel to the bottom profile; wherein the bottom profile and the partition profile are each provided with a plurality of perforations; wherein the plurality of perforations is provided on at least one of the bottom profile and the partition profile in two or more separate rows; wherein the separate rows in the bottom profile and the partition profile are positioned in such a way that individual insertion profiles may be introduced in one or more ways through a first perforation in the partition profile and a second perforation in the bottom profile.

[0012] The fence frame is preferably largely made of metal. The two side profiles are the vertical profiles of the frame; the bottom profile and the partition profile are the horizontal profiles of the frame. The profiles may for example be standard metal profiles, such as U or L profiles, which are welded to each other to make the frame. The bottom profile, the partition profile and the two side

profiles are not necessarily made of profiles with an identical cross-section. It may for example be advantageous to make the partition profile wider than the bottom profile so that individual insertion profiles can be introduced at a larger angle from the plane of the fence frame. Preferably the fence frame is treated to increase its corrosion resistance. Thus, the profiles may be zinc-plated or galvanized or provided with a coating. An alternative is the use of stainless steel profiles.

[0013] The fence frame is intended to be used as the above-ground part of a fence. The dimensioning of the fence frame is preferably adapted to the intended purpose of the fence; thus, a fence frame that is intended to stop wolves will have to be higher and heavier than a fence frame that is intended to stop beavers. Preferably the fence frame is at least one metre high. More preferably the fence frame is at least one and a half metres high. The width of the fence frame is determined through a compromise. With wider fence frames, a fence can be made more quickly, but they are heavier and more difficult to handle than narrower fence frames. Preferably the fence frame is at least one metre wide. Preferably the fence frame is at most three and a half metres wide.

[0014] The pluralities of perforations on the bottom profile and the partition profile are applied in such a way that they form vertical openings in the profiles of the fence frame. Preferably all perforations have the same dimensions. Preferably the perforations are circular or oval. On at least one of these two profiles the perforations are applied in two or more separate rows. These rows run parallel to the longitudinal direction of the profile in question. Preferably at least the partition profile is provided with two rows of perforations. Preferably the distance between the rows is different for the different profiles. More preferably, the distance between the rows of the partition profile is greater than the distance between the rows of the bottom profile. Preferably the perforations are already applied before the profiles are assembled to form a frame.

[0015] In some embodiments of the fence frame the first side profile and the second side profile are each provided with a plurality of perforations, wherein the pluralities of perforations on each of the first side profile and the second side profile are applied in one or more separate rows and wherein the pluralities of perforations on each of the first side profile and the second side profile are applied at least partially over the distance between the bottom profile and the partition profile.

[0016] The pluralities of perforations on the two side profiles are applied in such a way that they form horizontal openings in the profiles of the fence frame. Preferably the perforations on the side profiles have the same shape and the same dimensions as the perforations on the bottom profile and the partition profile. Preferably both side profiles are each provided with two rows of perforations. Preferably the rows on the two side profiles, the bottom profile and the partition profile are applied in such a way that the centre lines of these rows lie in one and the same three-dimensional plane.

[0017] In some embodiments of the fence frame the perforations are arranged in a repeating pattern.

[0018] Preferably the repeating pattern is regular, i.e. the distance between each successive perforation of the same profile and the same row is the same. Preferably this distance is less than twenty centimetres. Preferably the repeating pattern is identical for each row of perforations and for each profile of the fence frame.

[0019] In some embodiments of the fence frame the repeating pattern of the perforations completely covers a perimeter defined by the bottom profile, the first side profile, the second side profile and the partition profile.

[0020] In some embodiments of the fence frame, at least one first perforation in the partition profile is associated with a second perforation in the bottom profile by means of a guide profile, wherein an insertion profile may be introduced into the guide profile.

[0021] The guide profile may be a continuous profile that connects the first perforation in the partition profile to the second perforation in the bottom profile, but this is not necessarily the case. The guide profile may also consist of two subprofiles that are not connected together, wherein the first of the two subprofiles is connected to a perforation in the partition profile and a second subprofile is connected to a corresponding perforation in the bottom profile, wherein both subprofiles are in line, wherein the subprofiles do not bridge the full distance between the partition profile and the bottom profile.

[0022] The guide profile may for example be a hollow tube. The guide profile has a dual function. On the one hand the guide profile facilitates the introduction of an insertion profile through the first and second perforation. Following insertion of an insertion profile in the first perforation, the guide profile will automatically guide the insertion profile through the second perforation, which increases the ease of use and the accuracy for the user. On the other hand the guide profile provides sideways support of the insertion profile so that this cannot buckle over the distance between the bottom profile and the partition profile. This allows slimmer insertion profiles to be used, which in their turn are then easier to insert.

[0023] In some embodiments of the fence frame it also comprises a strengthening profile, wherein the strengthening profile is fastened between the first side profile and the second side profile; wherein the strengthening profile is fastened between the bottom profile and the partition profile, at a distance from and substantially parallel to the bottom profile and the partition profile; wherein the strengthening profile is provided with a plurality of perforations; wherein the plurality of perforations are applied on the strengthening profile in one or more separate rows; wherein the separate rows in the strengthening profile are positioned in such a way that individual insertion profiles may be introduced in one or more ways through a first perforation in the partition profile, a second perforation in the strengthening profile and a third perforation in the bottom profile.

[0024] Preferably the strengthening profile is provided

with two rows of perforations. Preferably the rows are applied on the strengthening profile, the bottom profile and the partition profile in one and the same three-dimensional plane.

[0025] The function of the strengthening profile is similar to the second function of the aforementioned guide profile. The strengthening profile provides sideways support of the insertion profile so that the buckling length of the insertion profile is halved over the distance between the bottom profile and the partition profile. This allows slimmer insertion profiles to be used, which in their turn are then easier to insert.

[0026] Combined use of the strengthening profile and guide profiles is not excluded. In this case a guide profile is associated with a first perforation in the partition profile, a second perforation in the strengthening profile and a third perforation in the bottom profile. However, for economic reasons it is preferable to provide either guide profiles, or a strengthening profile.

[0027] In some embodiments of the fence frame it also comprises a top profile and a covering, wherein the top profile is fastened between the first side profile and the second side profile, at a distance from and substantially parallel to the partition profile and to the other side of the partition profile than the bottom profile and wherein the covering covers an opening defined by the top profile, the first side profile, the second side profile and the partition profile.

[0028] If desired, the covering may also wholly or partially cover an opening defined by the bottom profile, the first side profile, the second side profile and the partition profile.

[0029] The presence of the top profile is not strictly necessary. However, the top profile strengthens the fence frame and provides support for the covering.

[0030] The primary function of the covering is to prevent animals being able to crawl through the fence frame. It may comprise openings. A person skilled in the art will be aware that the size of the openings in the covering must be selected as a function of the animals that we wish to stop. Thus, a covering that has to stop a marten must have a smaller size of the openings than a covering that has to stop a cow. A person skilled in the art will be aware that the material of the covering must also be selected as a function of the animals that we wish to stop.

[0031] In some embodiments of the fence frame the covering is a wire grid. Said wire grid may be made from metal wire, which is optionally zinc-plated, galvanized or plastic-coated. The mesh size of the wire grid may be selected as a function of the animal species that we wish to stop. The thickness of the wire may also be selected as a function of the animal species that we wish to stop.

[0032] In some embodiments of the fence frame the covering projects above the top profile and it makes an angle with the plane of the fencing panel above the top profile. Placement of the covering at said angle at the top of the fence frame may prevent animals climbing over the fence frame. A person skilled in the art will be aware that the orientation of the angle must be adapted to the intended aim; the covering must be folded back towards the side along which the panel is not to be climbed on. Instead of folding the covering above the top profile, the first and second side profile may also be provided with a suitable angle.

[0033] In some embodiments the top end of the covering is folded back a second time as an additional deterrent to climbing over.

[0034] There are alternative measures for preventing animals climbing over the fence frame: thus, one or both sides and/or the top of the fencing panel may be provided with electrified wire or barbed wire. The fence frame may for example be made with wire fastenings, distance pieces, insulators or mounting points for these facilities.

[0035] In some embodiments the fence frame is also provided with one or more lifting eyes. These lifting eyes may be used for transport or for pulling the fence frame out of the ground. Preferably the fence frame comprises at least two lifting eyes. Preferably these lifting eyes are fastened to the side profiles or the top profile.

[0036] According to a second aspect of the invention, an assembly is disclosed, wherein the assembly comprises a fence frame according to the first aspect of the invention and one or more insertion profiles, wherein the one or more insertion profiles are longer than the distance between the bottom profile and the partition profile of the fence frame, wherein a first end of the one or more insertion profiles is formed in such a way that it can be inserted in the perforations of the fence frame.

[0037] The insertion profiles are elongated profiles whose diameter is such that they can be introduced into the perforations of the fence frame. The insertion profiles may be hollow or solid profiles. Preferably the insertion profiles are made of metal. Concrete reinforcing rods may for example be used as insertion profiles.

[0038] In some embodiments of the assembly, a second end of the one or more insertion profiles is formed in such a way that it cannot be inserted in the perforations. In addition, this second end may be perforated in order to facilitate optional later extraction of the insertion profile.

[0039] According to a third aspect of the invention, a fencing panel is disclosed, wherein the fencing panel comprises a fence frame and one or more insertion profiles according to the second aspect of the invention, wherein the fence frame is placed substantially vertically on the surface of the ground, wherein the one or more insertion profiles are inserted in two perforations opposite each other, wherein the first end of the one or more insertion profiles is driven into the ground.

[0040] The combination of a fence frame and one or more insertion profiles defines a functional fencing panel. Inserting an insertion profile into two perforations of a fence frame and then driving this insertion profile into the ground serves two aims. Firstly the insertion profile provides anchoring of the fence frame/fencing panel in the ground. Secondly the insertion profile provides undermining protection of the fencing panel. The perforations

in the fence frame serve as a guide so that the one or more insertion profiles can be inserted in the ground in an orderly manner.

[0041] The insertion profiles are long enough to penetrate a considerable distance into the ground. Longer insertion profiles offer better undermining protection and better anchoring of the fencing panel in the ground. On the other hand they are also more difficult to handle and more force is required to drive an insertion profile over a larger length into the ground. A person skilled in the art will be aware that the length over which the insertion profiles have to be driven into the ground depends on the size and weight of the fence frame used, but also on the animal species that we wish to stop with the fencing panel.

[0042] Preferably the insertion profiles have a length such that they can be driven at least 30 centimetres deep in the ground when they are inserted in a fence frame that is placed on the surface of the ground. More preferably, the insertion profiles have a length such that they can be driven at least 40 centimetres deep into the ground.

[0043] The use of a larger number of insertion profiles offers better undermining protection and better anchoring of the fencing panel in the ground. With an increase in the number of insertion profiles used, the distance between individual profiles decreases, so that it is more difficult for burrowing animals to squeeze between the profiles. Preferably the fence frame comprises sufficient perforations so that at least one insertion profile can be placed at twenty-five centimetre spacing. More preferably, at least one insertion profile can be placed at fifteen centimetre spacing.

[0044] In some embodiments the perforations in the fence frame are numbered. This makes it possible to give the user standardized guidelines concerning the placement of the insertion profiles. Thus, the user himself does not have to think about which perforations should be used. The guidelines may also be dependent on the intended use, in particular the animal species that the user wishes to stop and the subsoil on which the fencing panel will be placed. Thus, a user who wants to stop wolves may be advised to use fewer, but longer, insertion profiles, whereas a user who only wants to stop beavers may be advised to use more, but shorter, insertion profiles. A user who wants to stop animals that are able to squeeze through very narrow passages may be advised to place the insertion profiles crosswise, without the user having to wonder which perforations should be used for this.

[0045] The use of numbering and associated guidelines also allows optionally one and the same standardized fence frame - apart from the availability of different heights - to be supplied for each application. The difference between the various applications then resides in the number of insertion profiles and the length and orientation of placement of these insertion profiles.

[0046] In some embodiments the side profiles and/or top profile of the fence frame are provided with pulling eyes. These pulling eyes may be used for pulling the insertion profiles out of the ground by means of a rope, hoist or pulley.

[0047] According to a fourth aspect of the invention, modular fencing is disclosed, wherein the modular fencing comprises one or more fencing panels according to the third aspect of the invention.

[0048] According to a fifth aspect of the invention, a method is disclosed for the placement of a fencing panel according to the third aspect of the invention, wherein the method comprises the steps of: placing the fence frame substantially vertically on the surface of the ground; inserting the one or more insertion profiles in two perforations placed opposite each other; driving into the ground the first end of the one or more insertion profiles that have been inserted in two perforations opposite each other.

[0049] In some embodiments of the method, at least one part of the one or more insertion profiles is introduced substantially vertically through a first perforation in the partition profile and a second opposite horizontal perforation in the bottom profile.

[0050] In some embodiments of the method, at least one part of the one or more insertion profiles is introduced diagonally, either through a first perforation in the partition profile and a second perforation in the bottom profile, or through a first perforation in the partition profile and a second perforation in the first or second side profile, or through a first perforation in the first or second side profile and a second perforation in the bottom profile.

[0051] Preferably, several insertion profiles are introduced crosswise relative to each other. This may be achieved simply by orienting all insertion profiles that are introduced in one row of a profile of the fence frame in a certain direction, and to mirror the insertion profiles that are introduced in another row of the same profile relative to the insertion profiles that have been introduced in the first row. Preferably the angle between two insertion profiles that have been introduced crosswise relative to each other is at least 45°. More preferably the angle between two insertion profiles that have been introduced crosswise relative to each other is at least 60°. The two insertion profiles need not necessarily lie in parallel planes.

[0052] An advantage of the crosswise fitting of several insertion profiles is that these insertion profiles - if they are driven deep enough into the ground - will form a grid in the ground, instead of a row of parallel profiles. This offers superior undermining protection. Now, many animals are able to make the cross-section of their body very small in one direction, so that they can easily squeeze between two profiles. However, most animals are not capable of greatly reducing the total cross-section of their body. A fencing panel with insertion profiles fitted crosswise is thus much more difficult for these animals to undermine.

[0053] In some embodiments of the method, at least one part of the one or more insertion profiles is inserted

at an angle from the plane of the fence frame, through a first perforation in one of the profiles of the fence frame and a second perforation in another profile of the fence frame; wherein the direction between the two aforementioned perforations is not parallel to the side profiles.

[0054] According to a sixth aspect of the invention, a method is disclosed for placement of modular fencing according to the fourth aspect of the invention, wherein the method comprises the steps of: placing one or more fencing panels according to the fifth aspect of the invention; joining the adjacent fencing panels together.

[0055] In some embodiments of the method, two adjacent fencing panels are joined together by simultaneously inserting at least one insertion profile in a connecting profile of the first of the two adjacent fencing panels and a connecting profile of the second of the two adjacent fencing panels.

[0056] In some embodiments of the method, two adjacent fencing panels are joined together by simultaneously inserting at least one insertion profile in a first perforation of the partition profile of the first of the two adjacent fencing panels, a second perforation of a side profile of the first of the two adjacent fencing panels, wherein this side profile is adjacent to the second of the two adjacent fencing panels, a third perforation of a side profile of the second of the two adjacent fencing panels, wherein this side profile is adjacent to the first of the two adjacent fencing panels, a fourth perforation of the bottom profile of the second of the two adjacent fencing panels.

Brief description of the figures

[0057]

Fig. 1 shows a schematic representation of an embodiment of a fence frame according to the present invention.

Fig. 2 shows a schematic representation of an embodiment of a fencing panel according to the present invention.

Fig. 3 shows a schematic representation of an embodiment of a fencing panel according to the present invention.

Fig. 4a shows a schematic representation of an embodiment of a fencing panel according to the present invention.

Fig. 4b shows a schematic enlargement of detail A from Fig. 4a.

Fig. 4c shows a schematic representation of the fencing panel according to Fig. 4a that has been placed on the ground.

Fig. 5a shows a schematic representation of an embodiment of modular fencing according to the present invention.

Fig. 5b shows a schematic enlargement of detail B from Fig. 5a.

Fig. 6 shows a schematic representation of an embodiment of modular fencing according to the present invention.

Fig. 7 shows a schematic representation of the modular fencing according to Fig. 6 that has been placed on uneven ground.

Detailed description

[0058] The present invention will be described on the basis of specific embodiments, which illustrate the description, but are not to be regarded as limiting. A person skilled in the art will appreciate that the invention is not limited by the embodiments shown and/or described and that alternatives or modified embodiments may be developed in accordance with the general concept of this description. The figures shown are only schematic and are not limiting.

[0059] References throughout this description to "an embodiment" imply that one or more particular features, properties or structures that are described in connection with this embodiment may be included in one or more embodiments in the present description. When phrases such as "in one embodiment" or "in some embodiments" are used throughout this text, they do not necessarily, but might well, refer to the same embodiment. In addition, the features, properties or structures that are described on the basis of a particular embodiment may be combined in any suitable manner in one or more embodiments.

[0060] Specific features, properties or structures are indicated in the figures by means of reference numbers. To avoid overloading the figures, not every feature is indicated in every figure. Conversely, to avoid overloading the text, not every feature that is indicated in a figure is also discussed in the context of this specific figure.

[0061] Finally, the use of ordinal numbers such as "first", "second" and the like throughout this account does not in any way imply a hierarchical relationship - whether in terms of importance, position or time - between the features wherein these are used, unless the contrary is stated explicitly. These ordinal numbers only serve to distinguish between different but similar features, properties or structures.

[0062] Fig. 1 shows a schematic representation of an embodiment of a fence frame 1 according to the present invention. The fence frame 1 comprises a bottom profile 2, a first side profile 3, a second side profile 4, a partition profile 5, a strengthening profile 6 and a top profile 7.

[0063] The bottom profile 2, the strengthening profile 6, the partition profile 5 and the top profile 7 are each fastened between the first side profile 3 and the second

side profile 4, substantially parallel to each other and at a distance apart. Alternatively the bottom profile 2 may be fastened to the bottom of the first side profile 3 and the second side profile 4. Alternatively the top profile 7 may be fastened to the top of the first side profile 3 and the second side profile 4.

[0064] The bottom profile 2, the partition profile 5 and the strengthening profile 6 are each provided with a plurality of perforations 11. The first side profile 3 and the second side profile 4 are also provided with a plurality of perforations 11 over the distance between the bottom profile 2 and the partition profile 5. On each of the aforementioned profiles, the perforations 11 are applied in two separate rows, a front row 12 and a back row 13. Applying the perforations in two or more horizontal rows behind one another has important advantages for inserting the insertion profiles, which are illustrated in the context of an alternative embodiment.

[0065] On each of the aforementioned profiles, the perforations 11 are applied in a repeating pattern that covers the full length of the bottom profile 2, the partition profile 5 and the strengthening profile 6. The perforations 11 cover the full distance between the bottom profile 2 and the partition profile 5 on the first side profile 3 and the second side profile 4.

[0066] A person skilled in the art will understand that the presence of the strengthening profile 6 and the top profile 7 is not strictly necessary for the invention. The strengthening profile 6 strengthens the fence frame 1 and supports the insertion profiles, as is illustrated in the context of an alternative embodiment. The top profile 7 strengthens the fence frame 1 and supports an optional covering of the frame, as is illustrated in the context of an alternative embodiment.

[0067] Fig. 2 shows a schematic representation of an embodiment of a fencing panel 30 according to the present invention, which is placed on the surface 50 of the ground. The fencing panel 30 comprises a fence frame 1 and a plurality of insertion profiles 20.

[0068] The fence frame 1 comprises a bottom profile 2, a first side profile 3, a second side profile 4, a partition profile 5 and a top profile 7. The bottom profile 2 and the partition profile 5 are each provided with a plurality of perforations (not visible in Fig. 2). These perforations are applied on at least one of the two profiles in two separate back rows. A perforation of the partition profile 5 is joined to a perforation of the bottom profile 2 by means of a guide profile 8. These guide profiles 8 may for example be in the form of a hollow tube. An insertion profile 20 is introduced through a first perforation in the partition profile 5 into the guide profile 8 and is then driven into the ground. An advantage of the use of guide profiles 8 is that the insertion profiles 20 cannot buckle over the distance between the bottom profile 2 and the partition profile 5 while they are being driven into the ground. As a result, the cross-section of the insertion profiles 20 can be reduced, which saves material and makes it easier for the insertion profiles 20 to be driven into the ground. The presence of guide profiles between several perforations does not necessarily imply that all perforations are joined together by means of guide profiles 8.

[0069] In the embodiment in Fig. 2, the perforations in the partition profile 5 and the bottom profile 2 are applied opposite each other in such a way that the guide profiles 8 are substantially vertical in the X-Y plane. In this case the first side profile 3 and the second side profile 4 do not need to be provided with perforations. Preferably, each of the first side profile 3 and the second side profile 4 are provided on the outer sides of the frame with one or more connecting profiles 9.

[0070] The fact that the guide profiles 8 are substantially vertical in the X-Y plane, which is the plane of the fence frame 1, does not necessarily imply that it is also vertical in the Y-Z plane. Placing the guide profiles 8 at an angle to the vertical in the Y-Z plane offers some advantages. Firstly this ensures that the insertion profiles 20 can be inserted easily, even when they are longer than the distance between the partition profile 5 and the top profile 7. Secondly this means that not all of the insertion profiles are placed in the ground in one and the same plane, so that when in place, the fencing panel is more difficult to push over.

[0071] Fig. 3 shows a schematic representation of an embodiment of a fencing panel 30 according to the present invention. The fencing panel 30 comprises a fence frame 1 and a plurality of insertion profiles 20.

[0072] The fence frame 1 comprises a bottom profile 2, a first side profile 3, a second side profile 4, a partition profile 5 and a top profile 7. The bottom profile 2, the first side profile 3, the second side profile 4 and the partition profile 5 are each provided with a plurality of perforations 11. These perforations 11 are applied on each of the aforementioned profiles in two separate horizontal rows behind one another. Each perforation 11 of one of the aforementioned profiles is joined to a perforation 11 of another profile by means of a guide profile 8.

[0073] In the embodiment in Fig. 3, each perforation is joined to an opposite perforation that is located in the corresponding row. Thus, for example a first perforation 11 in the front row of the partition profile 5 is joined to a second perforation 11 in the front row of the bottom profile 2 or the first side profile 3 or the second side profile 4. Similarly, a first perforation 11 in the back row of the partition profile 5 is joined to a second perforation 11 in the back row of the bottom profile 2 or the first side profile 3 or the second side profile 4. A person skilled in the art will be aware that this is not essential; it is also possible for perforations of non-corresponding rows to be joined together. However, joining of perforations in corresponding rows leads to easier manufacture of the fence frame 1.

[0074] In the embodiment in Fig. 3, the guide profiles 8 are applied diagonally and crosswise in the plane of the fence frame 1. The guide profiles 8 of the back row of perforations 11 are applied at an angle in the plane of the fence frame relative to the guide profiles 8 of the front row of perforations 11. This has the advantage that the

insertion profiles 20 cross each other, so that a grid pattern arises, both above ground and underground. It is much more difficult for an animal to squeeze through a grid than to squeeze between two parallel barriers.

[0075] The size of the mesh 31 of the grid pattern is determined by the number of insertion profiles 20, their spacing and the angle between the guide profiles 8. A person skilled in the art will understand that the mesh 31 may be adapted as a function of the animal species that is to be stopped with the fencing pattern. Thus, it is for example possible to adapt the fence frame itself and provide more perforations to get a smaller mesh, but also not insert an insertion profile in all perforations, to get a larger mesh.

[0076] Fig. 4a shows a schematic representation of an embodiment of a fencing panel 30 according to the present invention. The fencing panel 30 comprises a fence frame 1 and a plurality of insertion profiles 20.

[0077] The fence frame 1 comprises a bottom profile 2, a first side profile 3, a second side profile 4, a partition profile 5, a strengthening profile 6 and a top profile 7. The bottom profile 2, the partition profile 5 and the strengthening profile 6 are each provided with a plurality of perforations 11. The first side profile 3 and the second side profile 4 are also provided with a plurality of perforations 11 over the distance between the bottom profile 2 and the partition profile 5. On each of the aforementioned profiles the perforations 11 are applied in two separate rows, a front row and a back row.

[0078] In the embodiment in Fig. 4a the insertion profiles 20 are introduced diagonally through a first perforation in the partition profile 5, a second perforation in the strengthening profile 6 and a third perforation in the bottom profile 2. A person skilled in the art will understand that some insertion profiles may also be introduced through another row of perforations, for example through a first perforation in one of the two side profiles, a second perforation in the strengthening profile 6 and a third perforation in the bottom profile 2.

[0079] In the embodiment in Fig. 4a the insertion profiles 20 are introduced through perforations 11 that all belong to a corresponding row. The marked insertion profiles 20 are introduced through a first perforation in the front row of the partition profile 5, a second perforation in the front row of the strengthening profile 6 and a third perforation in the front row of the bottom profile 2. Preferably the rows and perforations of the various profiles are suitably disposed opposite each other so that each insertion profile may be introduced through three co-linear perforations on three different profiles. This situation may for example be achieved by providing each profile with an equal number of rows of perforations and an identical regular pattern of perforations. A person skilled in the art will understand that the insertion profiles may if desired also be introduced through perforations of non-corresponding rows of different profiles. Thus, it may also happen that not all profiles have an identical number of rows of perforations.

[0080] One advantage of the use of the strengthening profile 6 is that the effective buckling length for the insertion profiles 20 is reduced during driving into the ground. Thus, the cross-section of the insertion profiles 20 - which is also determined by the need to prevent buckling of these profiles - can be reduced, which saves material and makes it easier for the insertion profiles 20 to be driven into the ground. In comparison with the use of guide profiles, as illustrated in the context of an alternative embodiment, the use of the strengthening profile 6 leads to easier manufacture of the fence frame 1 and to greater freedom of choice for the user when inserting the insertion profiles 20. However, it is also possible to combine a strengthening profile with guide profiles.

[0081] In the embodiment in Fig. 4a, the fence frame 1 comprises a covering 10. This covering 10 covers the opening formed by the partition profile 5, the first side profile 3 and the second side profile 4. A person skilled in the art is aware of suitable materials for the covering, for example such as garden wire or fencing. In the embodiment in Fig. 4a the covering 10 projects above the top profile 7. The projecting part is folded at an angle relative to the plane of the fence frame 1. Placing the covering 10 at said angle at the top of the fence frame 1 may prevent animals climbing over the fencing panel 30. A person skilled in the art will be aware that the orientation of the angle must be adapted to the intended aim; the covering must be folded back towards the side along which the panel is not to be climbed on. Instead of folding the covering 10 above the top profile 7, the first and second side profiles 3 and 4 may also be provided with a suitable angle. Instead of folding the covering 10 once, the covering may be folded twice, for maximum prevention of climbing.

[0082] There are alternative measures for preventing animals climbing over the fencing panel 30: thus, one or both sides and/or the top of the fencing panel may be provided with electrified wire or barbed wire.

[0083] Fig. 4b shows a schematic enlargement of detail A from Fig. 4a. In this detail it can be seen that the second end 21 of an insertion profile is made thicker, so that it does not fit in a perforation 11. Making the second end 21 thicker leads to several advantages. Firstly the thickened end prevents the insertion profile 20 being inserted too deeply so that it is no longer accessible. A second advantage becomes evident on pulling an already placed fencing panel out of the ground, whether or not by machine. Owing to the thickened end, the insertion profile is automatically also pulled out of the ground and remains attached to the fencing panel. Finally, the thickened end also makes it easier to drive the insertion profile 20 into the ground, for example by hammering. The thickened end may also be made with a perforation, so that the insertion profile can be extracted more easily. The thickening may for example also be achieved by welding a plain washer on the insertion profile or by folding back the insertion profile.

[0084] Fig. 4c shows a schematic representation of the

fencing panel according to Fig. 4a that has been placed on the surface 50 of the ground. Owing to the crosswise placement of the insertion profiles 20, these insertion profiles 20 form a grid underground. Said grid offers much better protection against undermining than just spikes inserted vertically. The mesh 31 of the grid may be adapted by increasing the number of insertion profiles 20 introduced and/or by adapting the pattern of the perforations on the profiles of the fence frame. Thus, a fencing panel 30 that will need to stop martens must have a smaller mesh than a fencing panel that is to stop wolves.

[0085] Fig. 5a shows a schematic representation of an embodiment of modular fencing 40 according to the present invention. The modular fencing 40 consists of two fencing panels 30 and 30', which have been anchored in the ground with insertion profiles and have been joined together.

[0086] In the embodiment in Fig. 5a, the insertion profiles 20 are inserted in the ground substantially vertically. This means that the insertion profiles must be placed with a smaller spacing than crosswise placed insertion profiles to obtain an equal level of undermining protection.

[0087] Fig. 5b shows a schematic enlargement of detail B from Fig. 5a. Each of the two adjacent fencing panels 30 and 30' is provided with one or more guide profiles along the outer side of each of the side profiles. Fig. 5b illustrates how the adjacent fencing panels 30 and 30' are joined together by simultaneously inserting an insertion profile 20 in a first guide profile 9, fastened to the outer side of side profile 4 of fencing panel 30 and a second guide profile 9', fastened to the outer side of side profile 3' of fencing panel 30'. The respective adjacent side profiles are designated 4 and 3'. Preferably, the insertion profile is also introduced into a second pair of guide profiles, as can be seen in Fig. 5a, so that the two adjacent fencing panels remain at a fixed distance from each other. The manner of anchoring illustrated allows the two panels to be placed at a different height or at an angle relative to each other.

[0088] The guide profiles 9 and 9' may also be made with a mechanism that allows the distance between side profiles 4 and 3' to be adjusted, so that the side profiles 4 and 3' no longer have to run parallel to each other. The same effect may be achieved by using an extension piece between the guide profiles 9 and 9'.

[0089] A person skilled in the art will be aware that the adjacent fencing panels 30 and 30' can also be fastened to each other in some other way without prejudice to the spirit of the invention. Thus, for example a U-shaped connecting piece may be placed over the adjacent side profiles 4 and 3'. These U-shaped connecting pieces may improve the stability of the modular fencing, as well as its visual appearance.

[0090] If extra stability from the plane of the enclosure is desired, for example to prevent pushing over by large animals, diagonal supporting posts may also be placed transversely to the modular fencing.

[0091] Fig. 6 shows a schematic representation of an embodiment of modular fencing 40 according to the present invention. The modular fencing comprises three fencing panels 30, 30' and 30". These fencing panels are anchored in the ground by means of insertion profiles 20 that are placed diagonally and crosswise. Two adjacent fencing panels are joined together by simultaneously inserting at least one insertion profile 20 in:

- a first perforation of the partition profile of the first of the two adjacent fencing panels;
- a second perforation of a side profile of the first of the two adjacent fencing panels, wherein this side profile is adjacent to the second of the two adjacent fencing panels;
- a third perforation of a side profile of the second of the two adjacent fencing panels, wherein this side profile is adjacent to the first of the two adjacent fencing panels;
- a fourth perforation of the bottom profile of the second of the two adjacent fencing panels.

[0092] This manner of joining together the adjacent panels creates a continuous grid of insertion profiles 20 below the surface 50, so that the modular fencing offers excellent protection against undermining. The extent of protection depends on the size of the mesh 31 that is produced and how deeply the insertion profiles 20 are driven into the ground.

[0093] This method for joining adjacent panels may be used in combination with the method illustrated in Figs. 5a and 5b. This may be especially useful in corners of plots, where the method in Fig. 5a and 5b allows an arbitrary angle to be made in a simple manner between two adjacent fencing panels.

[0094] The horizontal space between two adjacent fencing panels is merely illustrative. If the perforations in the adjacent side profiles of two adjacent fencing panels are aligned, the insertion profile 20 that joins the two panels together can be inserted through the perforations at equal height of each of the two adjacent side profiles. In that case adjacent fencing panels can be placed against each other almost without a gap.

[0095] Fig. 7 shows a schematic representation of the modular fencing 40 according to Fig. 6 that has been placed on uneven ground. Even in the case of uneven ground, adjacent fencing panels can be joined together by the method described.

[0096] In the embodiments in which the covering of the fencing panels is folded back above the top profile to prevent climbing on the fencing, an excessively large opening may form between the folded-back covering of two adjacent fencing panels when they are not in line. These openings may be filled by fastening a wire grid cut to measure on the two adjacent fencing panels to cover the opening. Alternatively a fencing panel according to the invention may be provided that is specially adapted to bridge over corners in the modular fencing. For example, adapted panels may be provided forming an angle

of 45° or 90°. A fencing panel according to the invention may also be provided that is specially adapted to bridge over height differences in the modular fencing.

[0097] A person skilled in the art is also aware that it is desirable that the modular fencing 40 comprises a gate, door or other access opening. This access opening also needs undermining protection. Said access with undermining protection may for example be made with a fence frame according to the present invention, if the partition profile is placed close enough to the bottom profile so that people and animals can easily step over it. The opening between the partition profile, the two side profiles and the top profile can then be provided with a gate or door. In this way, the undermining protection of the fencing is not interrupted at the level of an access opening. Since neither the overall dimensions, nor the manner of placement of the adapted fence frame change relative to a standard fence frame, an access opening of this kind can be placed in a modular manner in the fencing.

Reference numbers

[0098]

1	fence frame
2	bottom profile
3, 3’	first side profile
4	second side profile
5, 5’	partition profile
6	strengthening profile
7	top profile
8	guide profile
9, 9’	connecting profile
10	covering
11	perforations
12	front row of perforations
13	back row of perforations
20	insertion profiles
21	second end of insertion profile
30, 30’, 30"	fencing panel
31	mesh
40	modular fencing
50	surface

Claims

1. Fence frame (1), configured to receive one or more insertion profiles (20), comprising

a bottom profile (2);
a first side profile (3, 3’), positioned at a first lateral end;
a second side profile (4) positioned at a second lateral end; and
a partition profile (5, 5’);
wherein the bottom profile (2) is fastened to or between the first side profile (3, 3’) and the second side profile (4);
wherein the partition profile (5, 5’) is fastened between the first side profile (3, 3’) and the second side profile (4) at a distance from and substantially parallel to the bottom profile (2);
wherein the bottom profile (2) and the partition profile (5, 5’) are each provided with a plurality of perforations (11);
wherein the pluralities of perforations (11) are applied on at least one of the bottom profile (2) and the partition profile (5, 5’) in two or more separate rows (12, 13);
wherein the separate rows (12, 13) in the bottom profile (2) and the partition profile (5, 5’) are positioned in such a way that individual insertion profiles (20) may be introduced in one or more ways through a first perforation (11) in the partition profile (5, 5’) and a second perforation (11) in the bottom profile (2).

2. Fence frame (1) according to claim 1, wherein the first side profile (3, 3’) and the second side profile (4) are each provided with a plurality of perforations (11);

wherein the pluralities of perforations (11) are applied on each of the first side profile (3, 3’) and the second side profile (4) in one or more separate rows (12, 13);
wherein the pluralities of perforations (11) on each of the first side profile (3, 3’) and the second side profile (4) are applied at least partially over the distance between the bottom profile (2) and the partition profile (5, 5’).

3. Fence frame (1) according to claim 1 or 2, wherein the perforations (11) are arranged in a repeating pattern.

4. Fence frame (1) according to claim 3, wherein the repeating pattern completely covers a perimeter defined by the bottom profile (2), the first side profile (3, 3’), the second side profile (4) and the partition profile (5, 5’).

5. Fence frame (1) according to one of the preceding claims, wherein at least one first perforation (11) in the partition profile (5, 5’) is associated with a second perforation (11) in the bottom profile (2) by means of a guide profile (8), wherein an insertion profile (20) may be introduced in the guide profile (8).

6. Fence frame (1) according to one of the preceding claims, wherein the fence frame (1) also comprises a strengthening profile (6);

wherein the strengthening profile (6) is fastened between the first side profile (3, 3’) and the second side profile (4);

wherein the strengthening profile (6) is fastened between the bottom profile (2) and the partition profile (5, 5'), at a distance from and substantially parallel to the bottom profile (2) and the partition profile (5, 5');
wherein the strengthening profile (6) is provided with a plurality of perforations (11);
wherein the pluralities of perforations (11) are applied on the strengthening profile (6) in one or more separate rows (12, 13);
wherein the separate rows (12, 13) are positioned on the strengthening profile (6) in such a way that individual insertion profiles (20) may be introduced in one or more ways through a first perforation (11) in the partition profile (5, 5'), a second perforation (11) in the strengthening profile (6) and a third perforation (11) in the bottom profile (2).

7. Assembly comprising a fence frame (1) according to one of the preceding claims and one or more insertion profiles (20);

wherein the one or more insertion profiles are longer than the distance between the bottom profile (2) and the partition profile (5, 5');
wherein a first end of the one or more insertion profiles (20) is formed in such a way that it can be inserted in the perforations (11).

8. Assembly according to claim 7, wherein a second end (21) of the one or more insertion profiles (20) is formed in such a way that it cannot be inserted in the perforations (11).

9. Fencing panel (30, 30', 30"), comprising a fence frame (1) and one or more insertion profiles (20) according to claims 7 or 8;

wherein the fence frame (1) is placed substantially vertically on a surface (50) of the ground;
wherein the one or more insertion profiles (20) are inserted in two perforations (11) opposite each other;
wherein the first end of the one or more insertion profiles (20) is driven into the ground.

10. Modular fencing (40) that comprises one or more fencing panels (30, 30', 30") according to claim 9.

11. Method for placing a fencing panel (30, 30', 30") according to claim 9, wherein the method comprises the following steps:

placing the fence frame (1) substantially vertically on a surface (50) of the ground;
inserting the one or more insertion profiles (20) in two perforations (11) placed opposite each other;
driving into the ground the first end of the one or more insertion profiles (20) that have been inserted in two perforations (11) opposite each other.

12. Method according to claim 11, wherein at least one part of the one or more insertion profiles (20) is introduced diagonally,

either through a first perforation (11) in the partition profile (5, 5') and a second perforation (11) in the bottom profile (2);
or through a first perforation (11) in the partition profile (5, 5') and a second perforation (11) in the first or second side profile (3, 3', 4);
or through a first perforation (11) in the first or second side profile (3, 3', 4) and a second perforation (11) in the bottom profile (2).

13. Method for placing modular fencing (40) according to claim 10, wherein the method comprises the following steps:

placing one or more fencing panels (30, 30', 30") according to the method in claim 11;
joining together the adjacent fencing panels (30, 30', 30").

14. Method according to claim 13, wherein two adjacent fencing panels (30, 30', 30") are joined together by simultaneously inserting at least one insertion profile (20) in a connecting profile (9, 9') of the first of the two adjacent fencing panels (30, 30', 30") and a connecting profile (9, 9') of the second of the two adjacent fencing panels (30, 30', 30").

15. Method according to claim 13, wherein two adjacent fencing panels (30, 30', 30") are joined together by simultaneously inserting at least one insertion profile (20) in

a first perforation (11) of the partition profile (5, 5') of the first of the two adjacent fencing panels (30, 30', 30");
a second perforation (11) of a side profile (3, 3', 4) of the first of the two adjacent fencing panels (30, 30', 30"), wherein this side profile (3, 3', 4) is adjacent to the second of the two adjacent fencing panels (30, 30', 30");
a third perforation (11) of a side profile (3, 3', 4) of the second of the two adjacent fencing panels (30, 30', 30"), wherein this side profile (3, 3', 4) is adjacent to the first of the two adjacent fencing panels (30, 30', 30");
a fourth perforation (11) of the bottom profile (2) of the second of the two adjacent fencing panels (30, 30', 30").

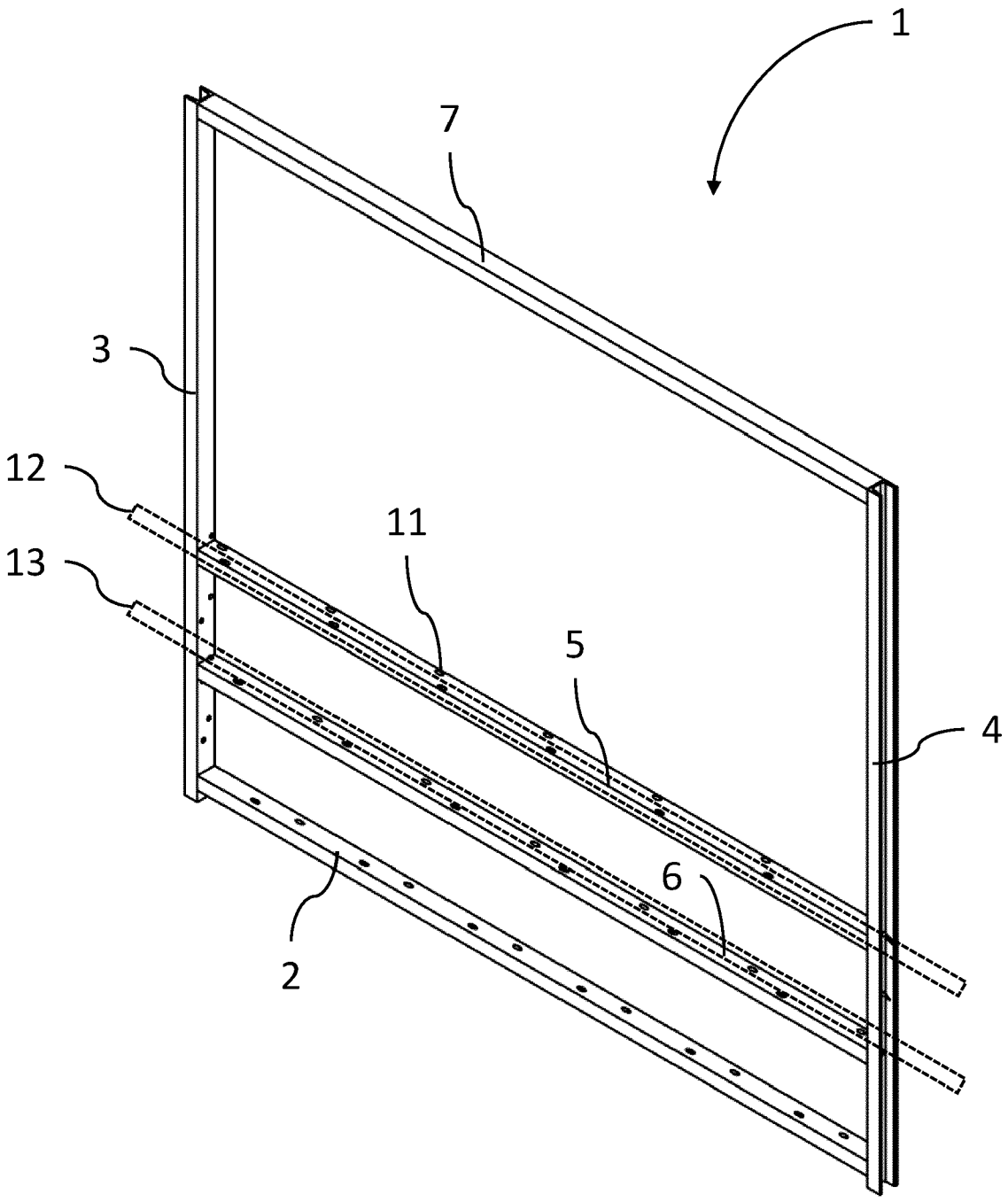

Figure 1

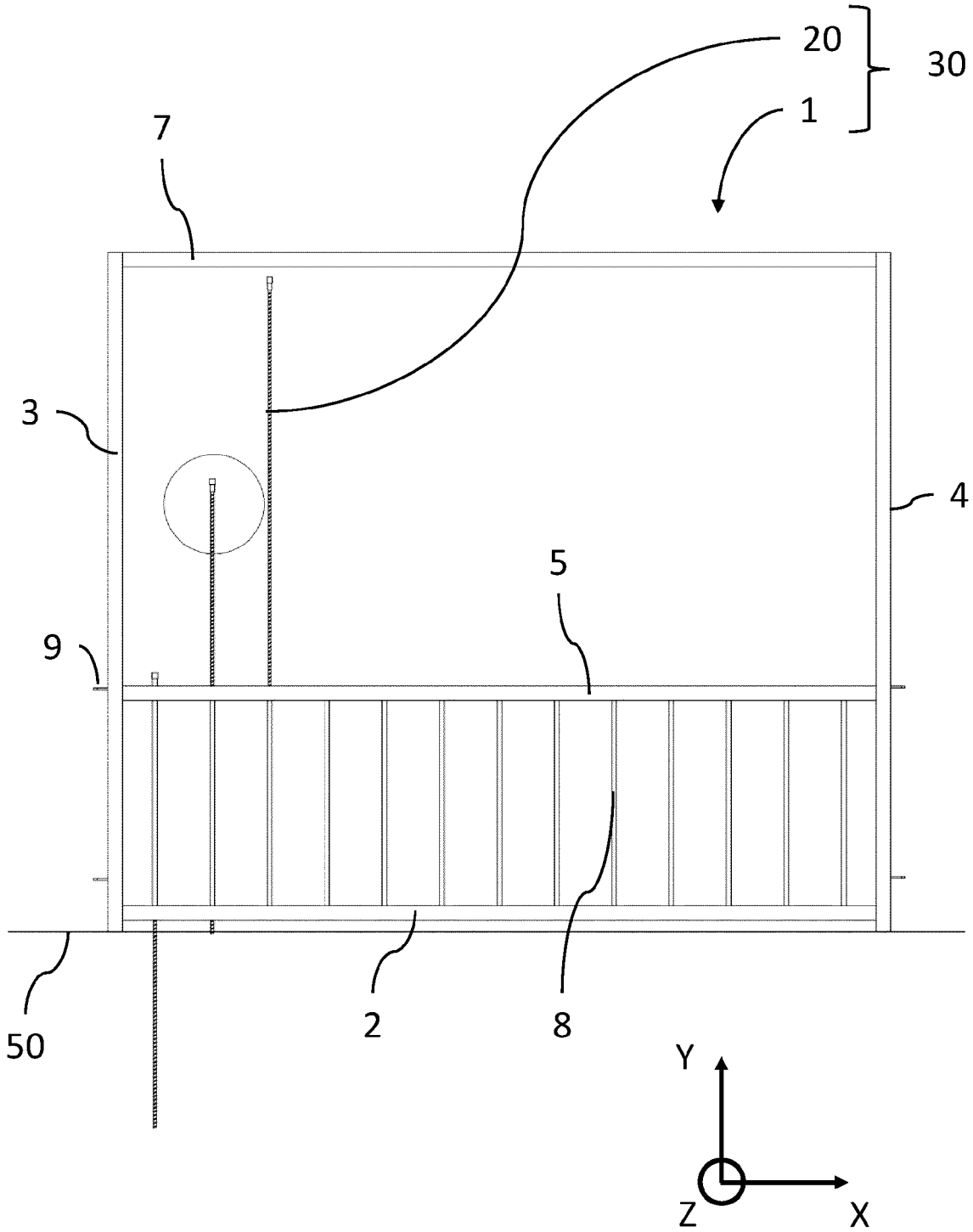

Figure 2

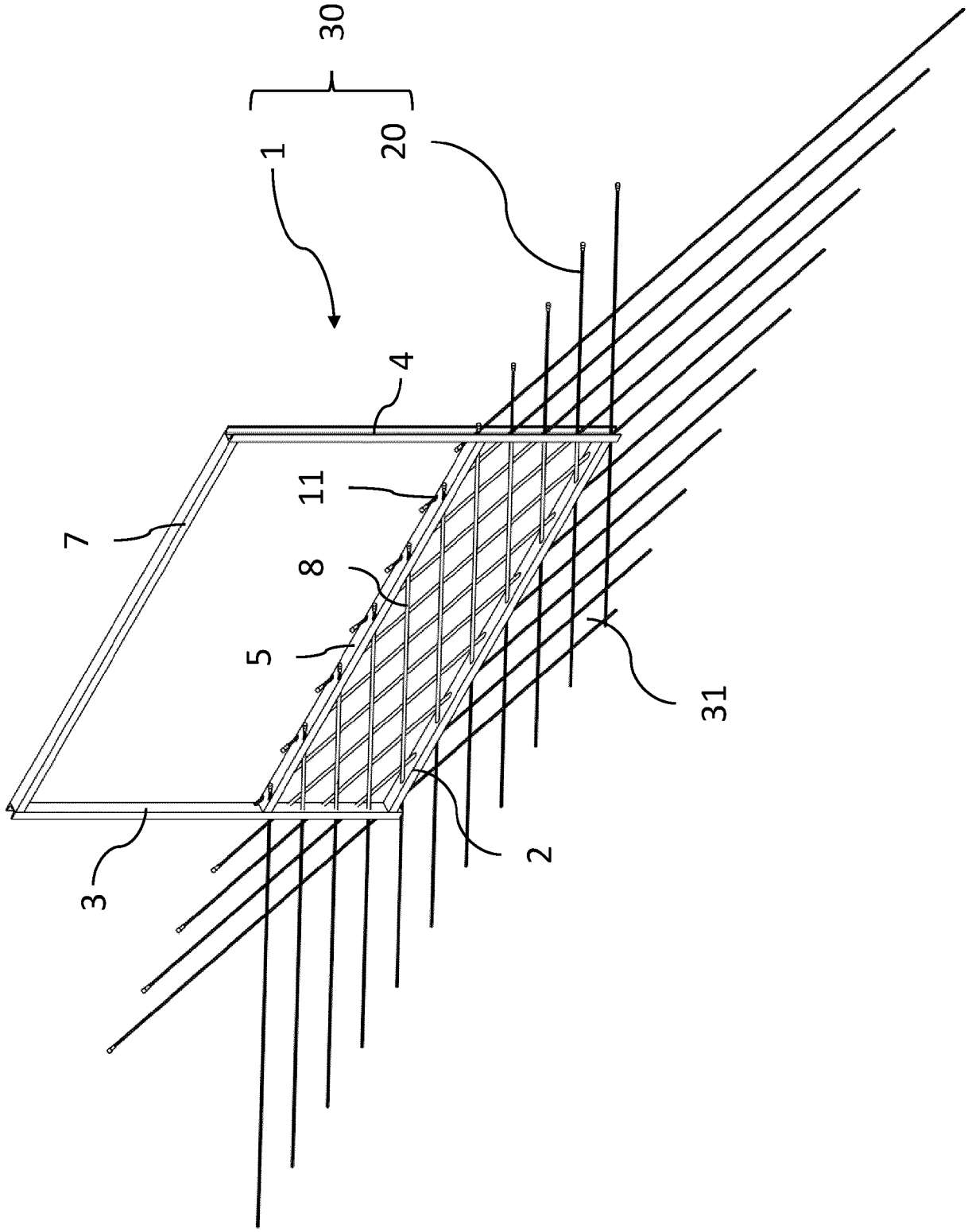

Figure 3

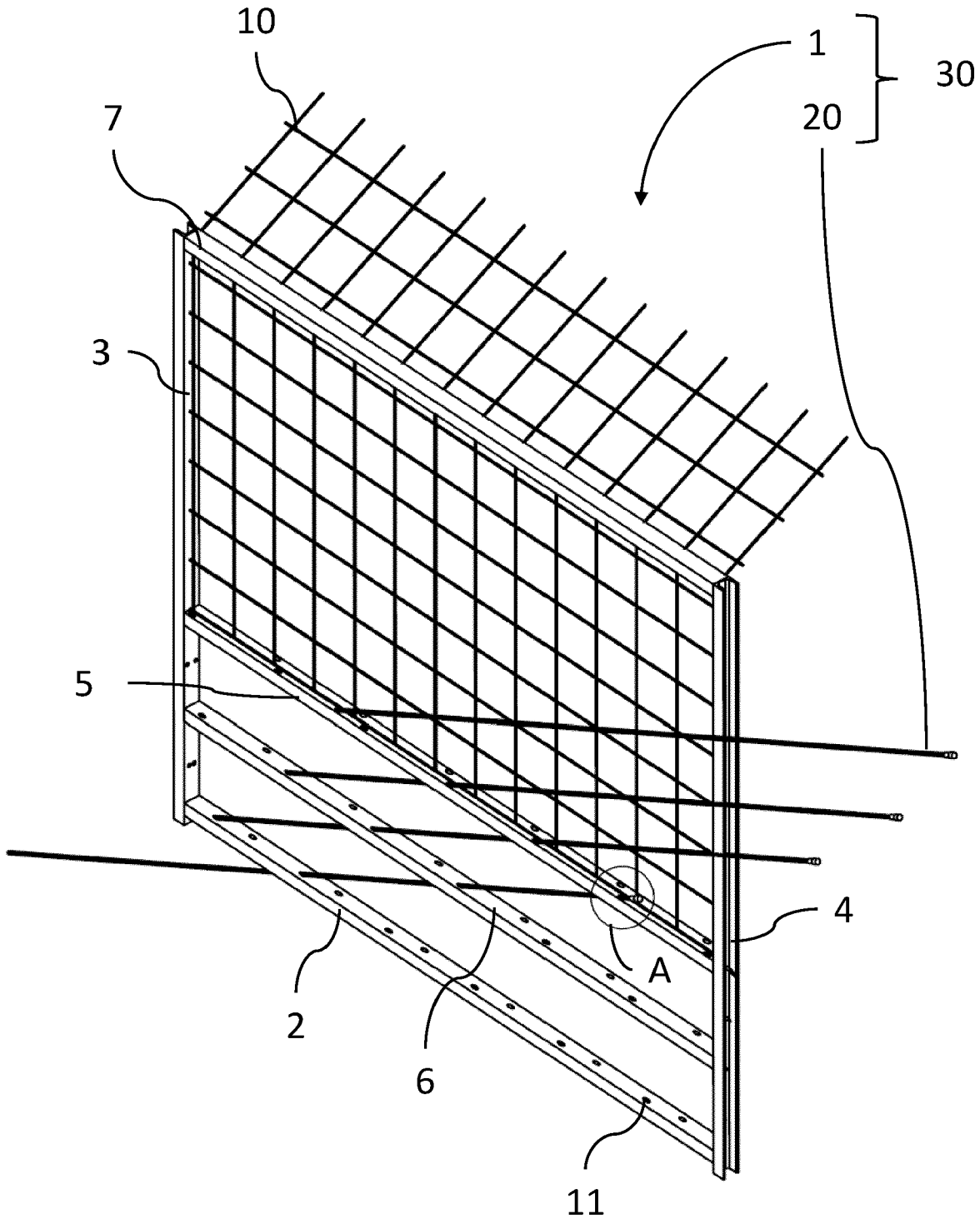

Figure 4a

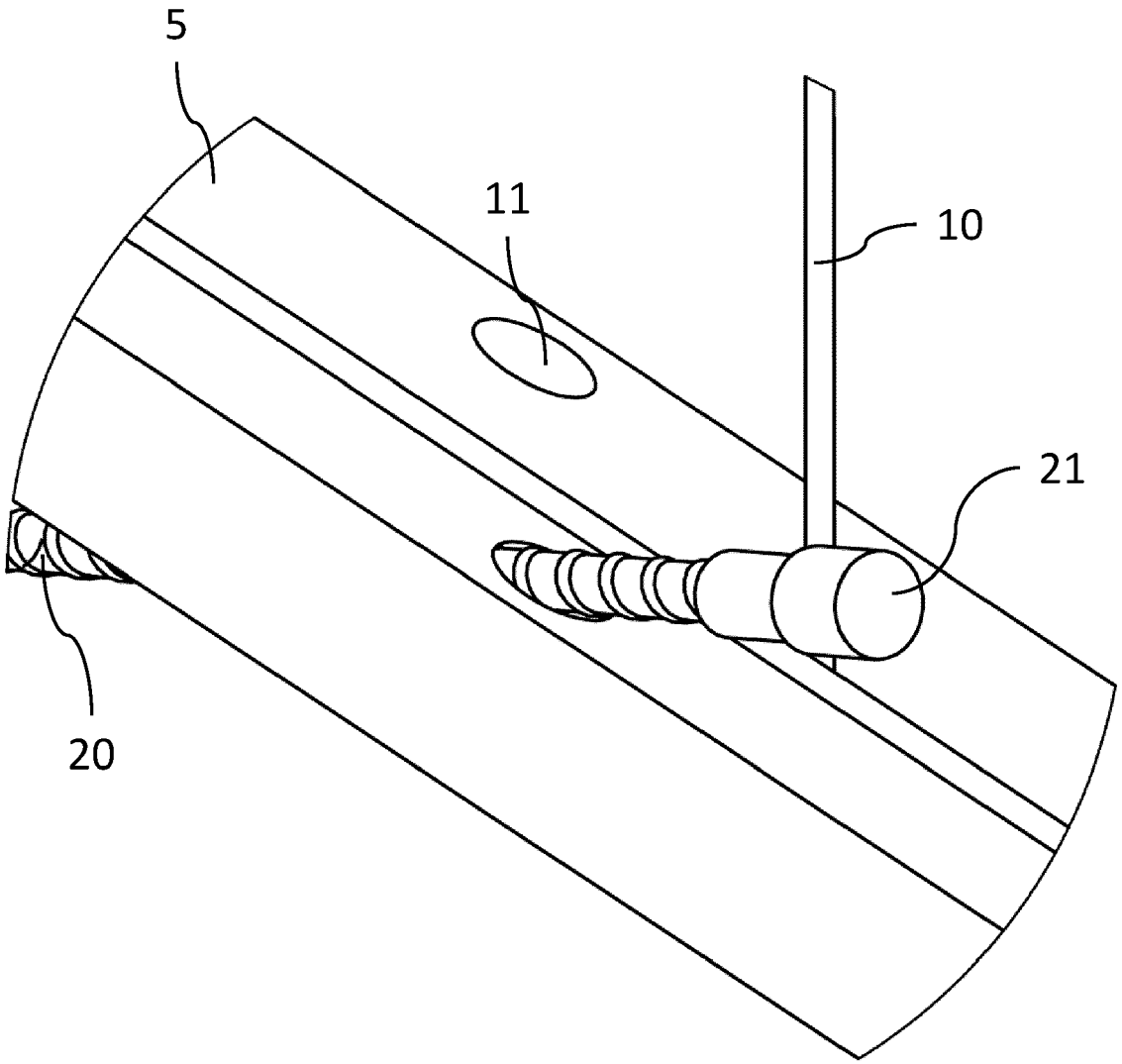

Figure 4b

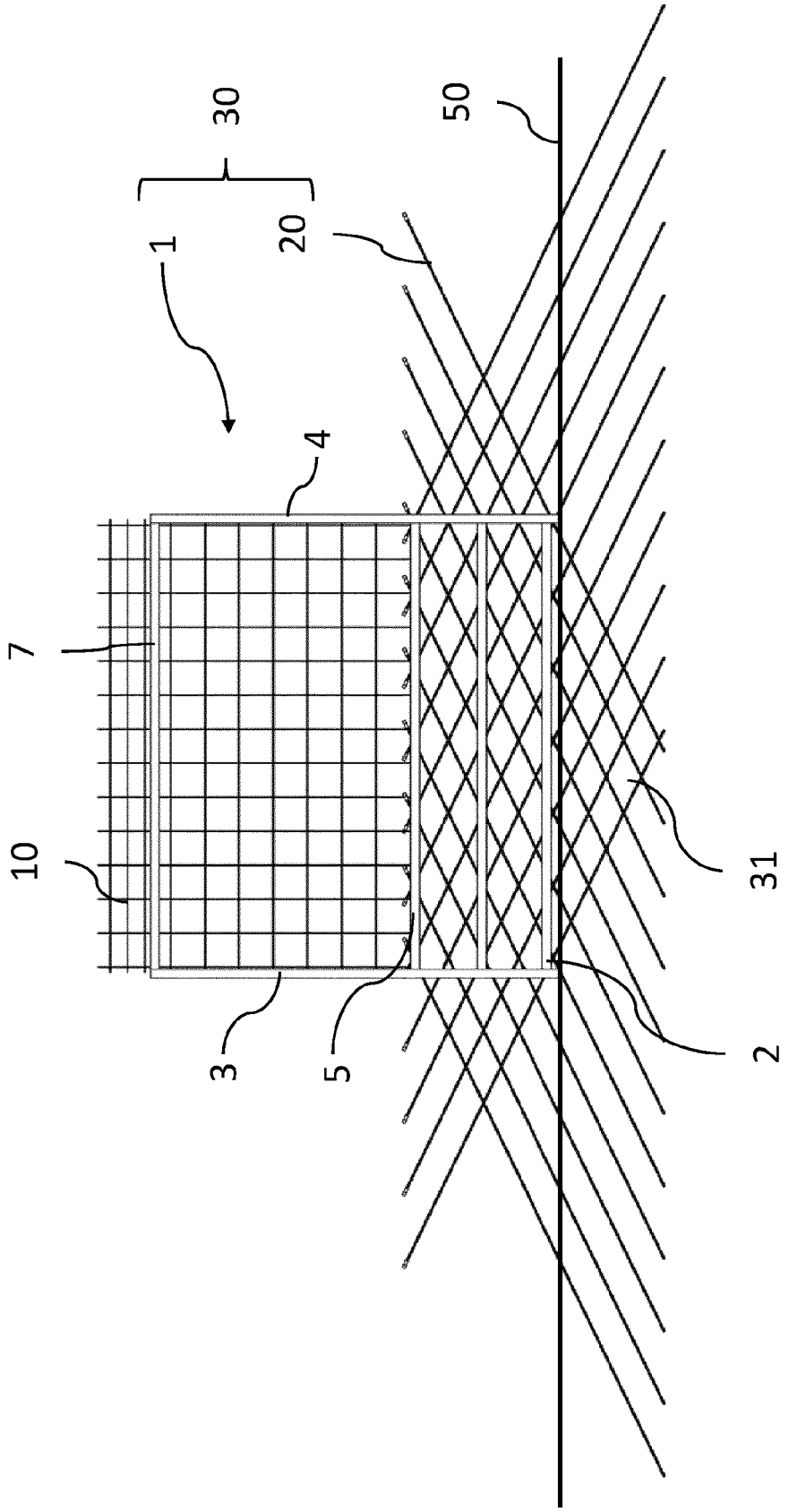

Figure 4c

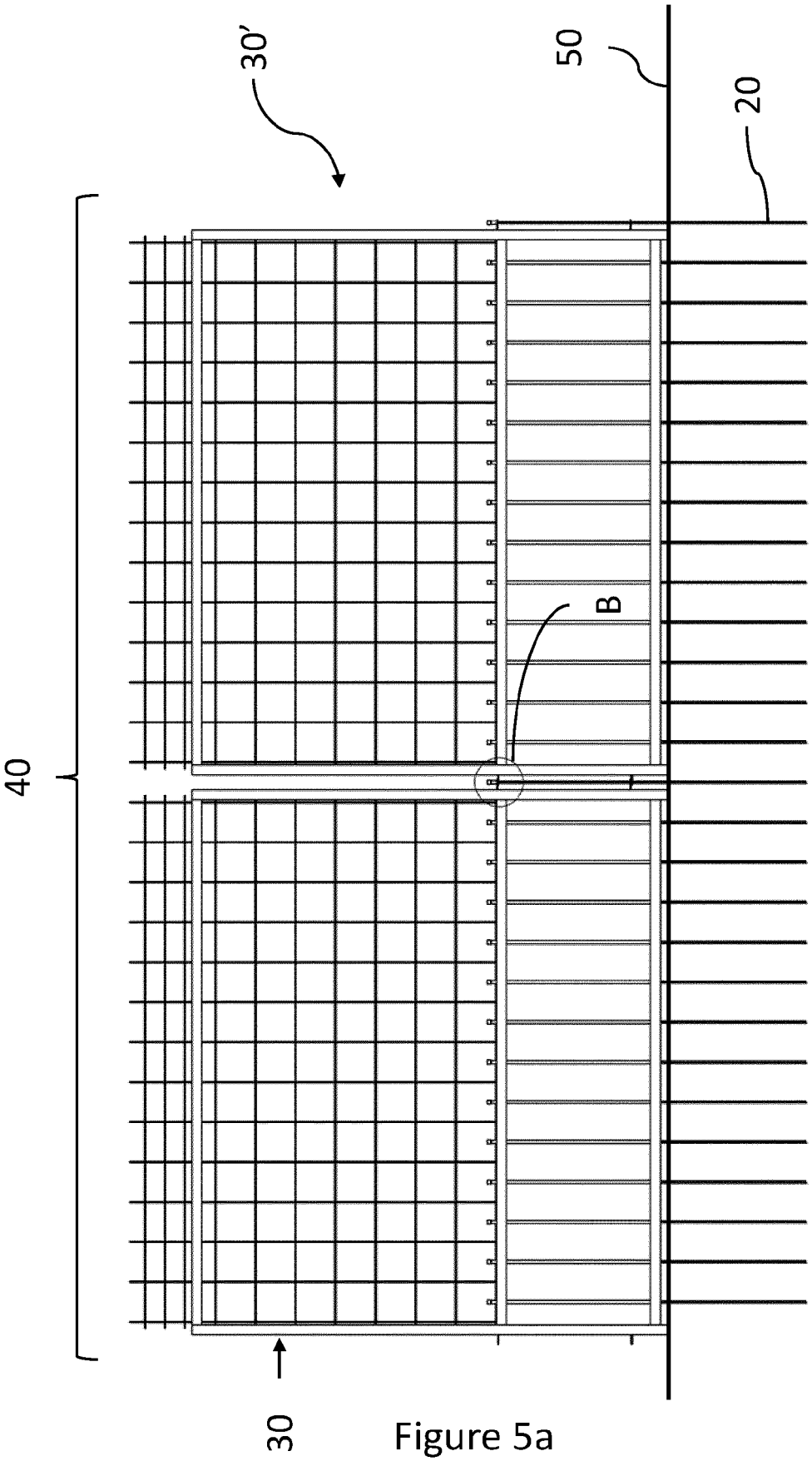

Figure 5a

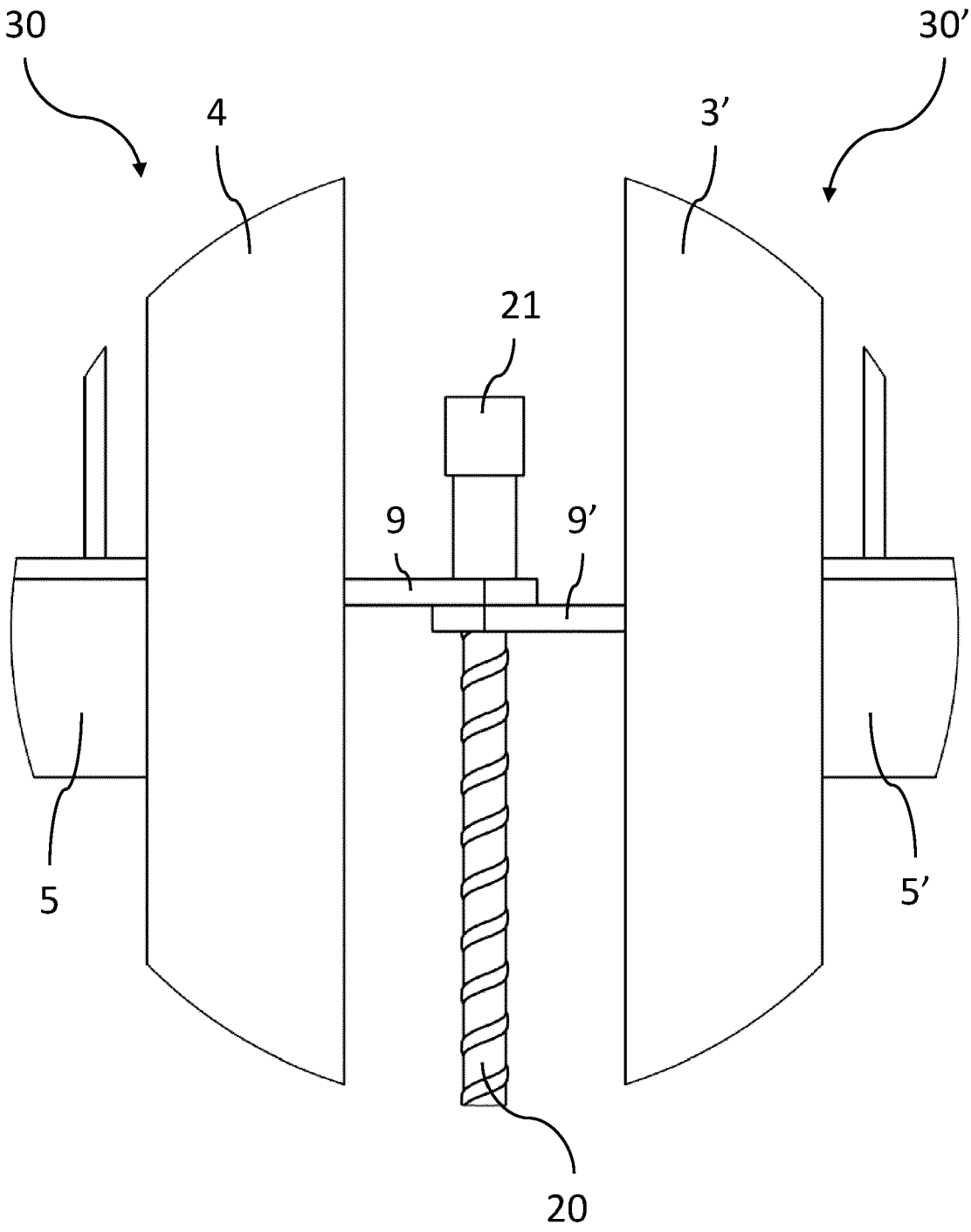

Figure 5b

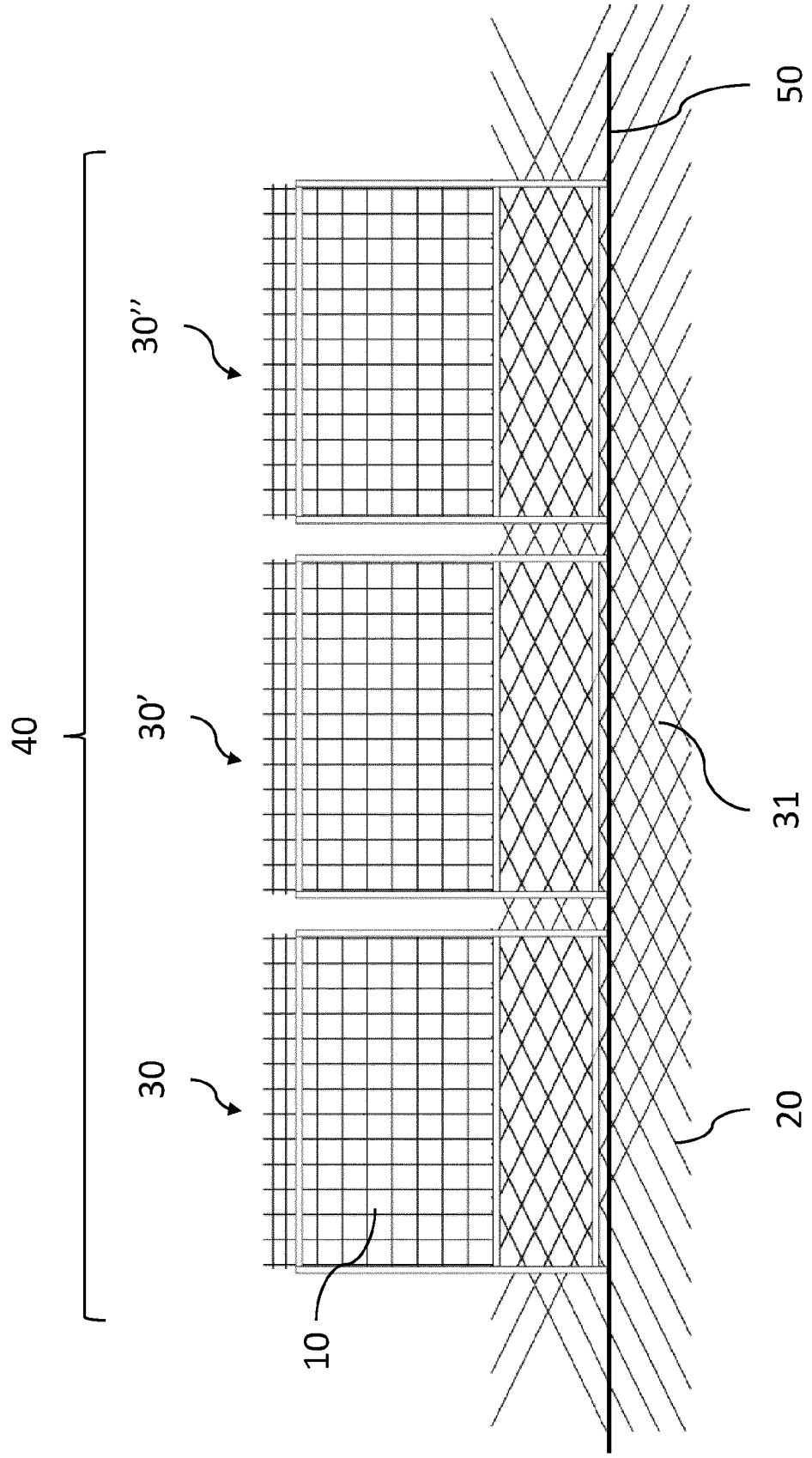

Figure 6

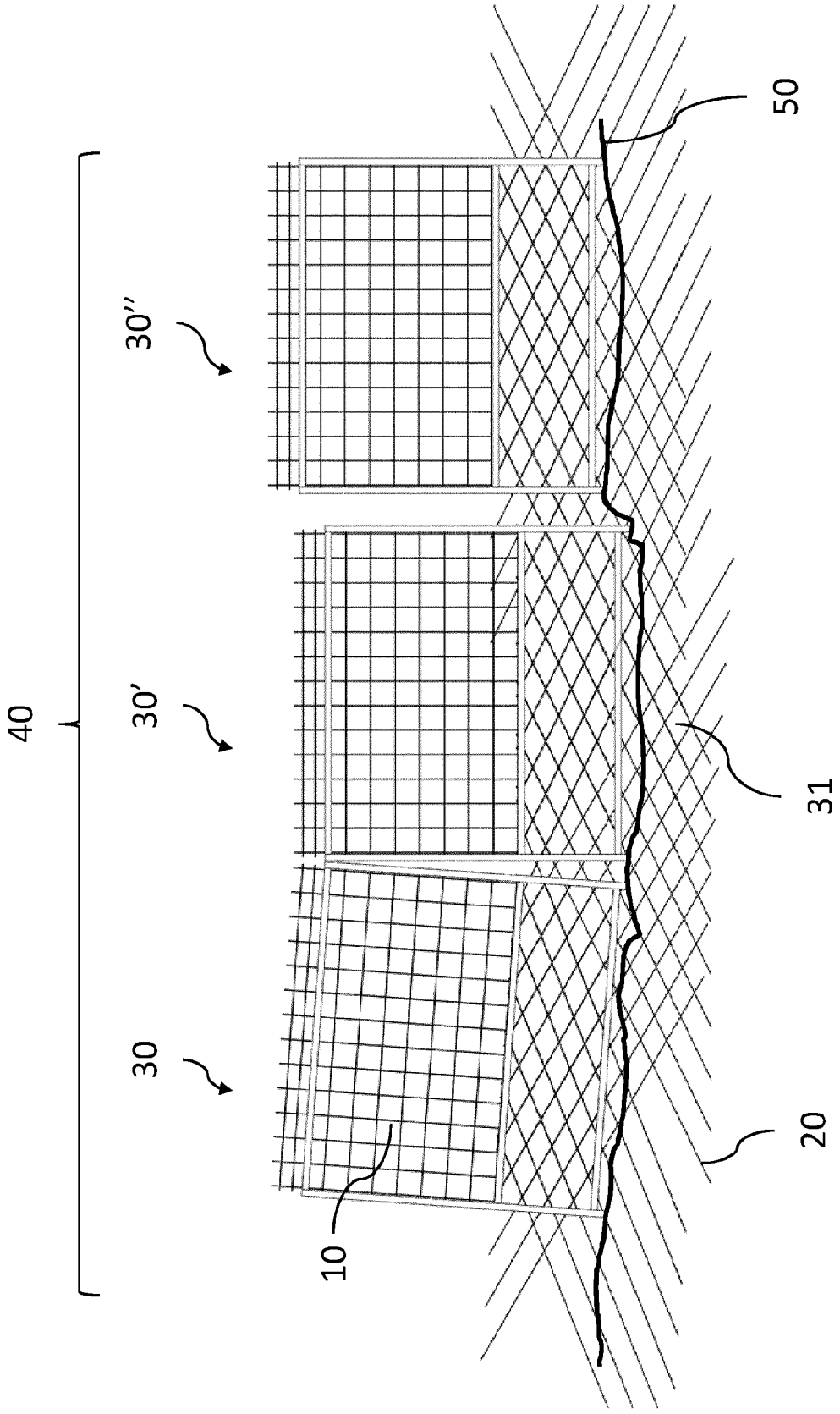

Figure 7

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EUROPEAN SEARCH REPORT

Application Number
EP 22 21 6459

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 April 2023	Stefanescu, Radu

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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