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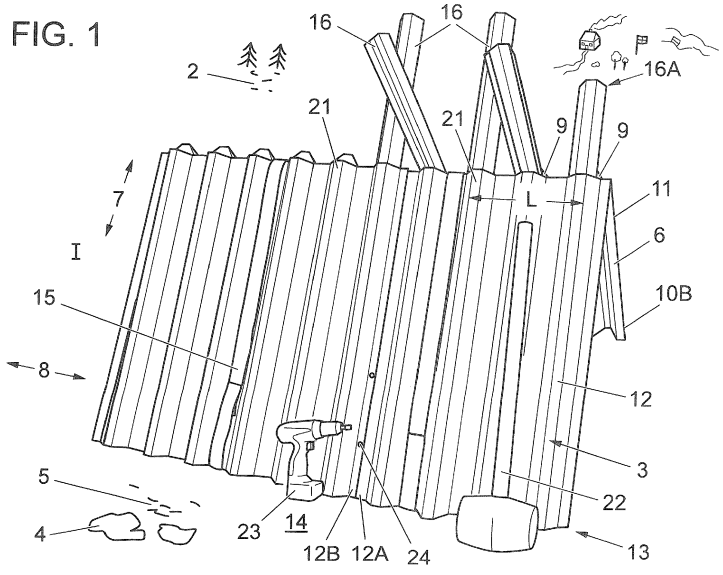
(54) **PROCEEDING AND DEVICE FOR THE FORMATION OF EMBANKMENT BARRIER**

(57) The invention concerns a proceeding and a device for the provision of embankment (1) of areas (2) and the formation of a barrier (3) against chemicals (4), e.g. oil in water or solely water (5), by means of supports (6) formed by folding corrugated sheet-metal plates or corrugated sheets of another material, e.g. plastic or aluminium, transversely to (7) the longitudinal direction (8) thereof along cut-throughs (9) of the sheet-metal plates (10) so that sheet-metal plate portions (11, 12) extend at an angle (A) to each other, and that said folded, formed barrier supports (6) are placed on a substratum (13) so that a folded portion of the respective sheet-metal plate forms a barrier support which is facing the intended damming area and which laterally (8) is formed of a plurality of folded, corrugated sheet-metal plates (10) overlapping each other, the sheet-metal plates being folded (10) in half and the folded sheet-metal plates (10) being placed with the respective ends (10A, 10B) thereof resting on or urged down into the substratum (13) along which they form a bank and coupling together of the sheet-metal plates (10) for the formation of a barrier (3).

According to the invention, a loop of band (15) or another pulling member is allowed surrounding the barrier support (6) and posts (16) adapted in shape to the corrugations (21) are placed internally in ridges formed by side portions and top portion along said barrier support (3) before driving down the posts (16) into the substratum (13).

FIG. 1



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Description

[0001] The present invention concerns a proceeding for the provision of embankment of areas and the formation of a barrier against chemicals, e.g. oil in water or solely water, by means of supports formed by folding corrugated sheet-metal plates or corrugated sheets of another material, e.g. plastic or aluminium, transversely to the longitudinal direction thereof along cut-throughs of the sheet-metal plates so that sheet-metal plate portions extend at an angle to each other, and that said folded, provided barrier support are placed on a substratum so that a folded portion of the respective sheet-metal plate forms a barrier support that is facing intended damming area and that laterally is formed of a plurality of folded, corrugated sheet-metal plates overlapping each other, the sheet-metal plates being folded in half and the folded sheet-metal plates being placed with the respective ends thereof resting on or urged down into the substratum along which they form a bank and coupling together of the sheet-metal plates for the formation of a barrier.

[0002] Discharge of oil and other dangerous chemical substances often entails large damage to nature and animal life in water and ashore. Oil has a tendency to reach far up ashore and this particularly applies for shallow sandy and stony beaches. Clearings after such accidents are often expensive and cumbersome and birds risk in that connection being smeared by the oil.

[0003] It is known to have barriers constructed against water by utilizing slotted, corrugated, partly cut-through, sheet-metal plates that are folded and erected as protection against water overflowing at buildings, roads, and other locations lying low along, e.g. lakes, streams or creeks, and rivers. Examples of this are shown in US 6,935,809 B2.

[0004] If such a barrier is only erected in the sand, waves and swells risk drawing along the sand that the barrier is erected on out in the water and finally also the entire barrier after underwashing of the substratum under the barrier.

[0005] Thus, it is important to reliably anchor such a formed barrier to the substratum on which it is arranged and along which it is intended to protect against overflowing water and other unpleasant things.

[0006] Said object is achieved by means of a proceeding according to the present invention, which essentially is characterized in that a loop of band or another pulling member is allowed surrounding the barrier support.

[0007] It is also an object of the invention to provide a device that is suitable to be applied for accomplishing a said proceeding.

[0008] Such a device according to the invention is characterized in that band loops reach around unfolded sheet-metal plates in erected barrier-forming state.

[0009] The invention is described in the following in the form of a preferred embodiment example, reference being made to the accompanying drawings, in which

Fig. 1 shows a part of a barrier as seen obliquely from the front during the fastening thereof,
Fig. 2 shows the barrier as seen from the side,
Fig. 3 shows parts, which are included in a said barrier and means for the mounting thereof, and
Fig. 4 shows a cross-section of a part of the barrier and particularly one clamping post thereof.

[0010] A proceeding for the provision of embankment 1 of areas 2 and the formation of a barrier 3 against chemicals 4, e.g. oil in water or solely water 5, by means of supports 6, takes place in such a way that corrugated sheet-metal plates 10 or corrugated sheets of another material, e.g. plastic or aluminium, are folded transversely to 7 the longitudinal direction 8 thereof along cut-throughs 9 of the sheet-metal plates 10 so that sheet-metal plate portions 11, 12 extend at an angle A to each other. Furthermore, the folded, formed barrier support 6 is placed on a suitable substratum 13 so that a folded portion 12 of the respective sheet-metal plate 10 forms a barrier support, which is facing intended damming area 14 and which laterally 8 is formed of a plurality of folded, corrugated sheet-metal plates 10 overlapping each other. In that connection, the sheet-metal plates 10 are folded in half and the folded sheet-metal plates 10 are placed with the respective ends 10A, 10B thereof resting on or urged down into the substratum 13 along which they form a bank and coupling together of the sheet-metal plates 10 for the formation of a barrier 3.

[0011] According to the present invention, a loop of band 15 or some other suitable pulling member is allowed surrounding the barrier support 6 so that the same remains in a folded-out, angled, A-shaped cross-sectional profile position, as, for instance, is shown in Fig. 2.

[0012] In addition, the post 16 is placed internally in the ridges 17 formed internally in the hollow space that is limited by side portions 18; 19 and top portion 20 of the respective corrugation 21 on a common side A of the sheet-metal plate, along said barrier support 3 before driving down the posts 16 into the substratum 13.

[0013] Suitably, the posts 16 are driven down by means of a rubber mallet 22 in order not to damage the rear ends 16A of the posts 16 in the ridges 17 of the respective barrier support half 11, 12 in which posts 16 are alternately placed on the halves 11, 12 that are facing and turned from, respectively, the intended damming area. It is also possible to utilize protection, which is put over the portion it is intended to hit against.

[0014] In order to get it tight between longitudinally 8 interconnected barrier support halves 11, 12, end portions 11A, 11B, 12A, 12B of overlapping halves 11, 12 are bolted together, by means of, for instance, a nut driver 23, suitably using self-tapping screws 24.

[0015] A device 30 according to the present invention for the embankment 1 of areas 2 and for the formation of a barrier 3 against chemicals 4, e.g. oil in water, or solely water 5, and which comprises a number of supports 6, which are in the form of laterally 8 interconnect-

able and longitudinally corrugated sheet-metal plates or corrugated sheets of another material, e.g. plastic or aluminium, are formed of sheet-metal plates which are cut-through transversely to the longitudinal direction thereof in the direction from one long side of the sheet-metal plates and entirely through the same up to the opposite other side of the sheet-metal plates. Said cut-throughs 9 are arranged to form folding hinges for the sheet-metal plates in question with the remaining sheet-metal plate portions between the cut-throughs 9 for the formation of said folding hinges for the sheet-metal plates and the two halves 11, 12 thereof so that the sheet-metal plates in an upturned angled position form a said barrier 3. Thus, the sheet-metal plates are approximately in the middle entirely cut-through in the bottom parts as well as the sides of said corrugations and leaving the top portions non-cut-through for the formation of two foldable portions 11, 12 transverse to 8 the longitudinal direction 25 of the sheet-metal plates.

[0016] According to the invention, a number of band loops 15 are now comprised, which have such a width that they reach around unfolded sheet-metal plates 11, 12 in erected barrier-forming state I. Posts 16, which have cross-sections which are adapted in shape to corrugations 21 of the side portions 18, 19 and top portion 201 of the sheet-metal plates are interconnectable with said sheet-metal plates according to the above mentioned proceeding.

[0017] Said corrugations 21 and posts 16 have paired, leaning side portions 18, 19 as well as a straight top portion 20, similar to a tunnel having leaning, outwardly widening walls and a straight roof.

[0018] The sheet-metal plates have a width B of about 1 m and the distance C between the corrugations 21 is about 30-80 mm and the depth is the like.

[0019] All cut-throughs 9 are arranged to extend from a common side of the sheet-metal plates and said sheet-metal plates, which are corrugated in the longitudinal direction 25 of the sheet-metal plates with valleys and peaks, are arranged so that the sheet-metal plates can be piled closely to each other so that they in piled position occupy a little space.

[0020] The corrugations of all sheet-metal plates 10 are congruent with each other and the posts 16 are formed of folded sheet-metal plate and are open along one long side thereof so that they are pileable in each other for the formation of a pile.

[0021] The sheet-metal plates 10 are galvanized and lacquered so that they resist being re-used and stand severe weather conditions.

[0022] The sheet-metal plates 10 may be lying piled on loading pallets and be transported to the site for the barrier construction. There, the sheet-metal plates 10 are unfolded to state shown in Figs. 1 and 2 and the bands 15 are threaded onto the oblique barrier support 6. Laterally 8, the sheet-metal plates are coupled together by means of screws 24. In case of sand as substratum, the sheet-metal plates are pressed down into the sand so that they are stably positioned. Then, the posts 16 are threaded in the widened cut-throughs 9, as is shown in the drawings, so that the posts 16 rest against the abutting corrugations 21 after which the posts are then driven down to a suitable depth into the substratum 13. The posts are suitably driven down alternately in each barrier support half 11, 12 on suitable distances L from each other along the intended barrier 3.

[0023] Water/chemicals reaching the barrier 3 are efficiently stopped thereby and beaches and other areas are accordingly saved from serious damage, both environmental and economical damage.

[0024] Dismounting of the barrier is provided in the reversed order and the parts are easy to clean afterwards for being possible to be re-used.

[0025] The function and nature of the invention should have been clearly understood from the above-mentioned and also with knowledge of what is shown in the drawings but the invention is naturally not limited to the embodiments described above and shown in the accompanying drawings. Modifications are feasible, particularly as for the nature of the different parts, or by using an equivalent technique, without departing from the protection area of the invention, such as it is defined in the claims.

Claims

1. Proceeding for the provision of embankment (1) of areas (2) and the formation of a barrier (3) against chemicals (4), e.g. oil in water or solely water (5), by means of supports (6) formed by folding corrugated sheet-metal plates or corrugated sheets of another material, e.g. plastic or aluminium, transversely to (7) the longitudinal direction (8) thereof along cut-throughs (9) of the sheet-metal plates (10) so that sheet-metal plate portions (11, 12) extend at an angle (A) to each other, and that said folded, provided barrier support (6) are placed on a substratum (13) so that a folded portion of the respective sheet-metal plate forms a barrier support that is facing intended damming area and which laterally (8) is formed of a plurality of folded, corrugated sheet-metal plates (10) overlapping each other, the sheet-metal plates being folded (10) in half and the folded sheet-metal plates (10) being placed with the respective ends (10A, 10B) thereof resting on or urged down into the substratum (13) along which they form a bank and coupling together of the sheet-metal plates (10) for the formation of a barrier (3), **characterized in that** a loop of band (15) or another pulling member is allowed surrounding the barrier support (6).

2. Proceeding according to claim 1, **characterized in that** posts (16) adapted in shape to the corrugations (21) are placed internally in ridges formed by side portions and top portion along said barrier support (3) before driving down the posts (16) into the sub-

stratum (13).

3. Proceeding according to claim 2, **characterized in that** posts (16) are alternately placed and driven down in the barrier support half facing and turned from, respectively, the intended damming area.

4. Proceeding according to any one of claims 1-3, **characterized in that** end portions (11A, 11B; 12A, 12B) of barrier support halves (11, 12) connecting to and overlapping each other are bolted together.

5. Device (30) for the embankment of areas and the formation of a barrier (3) against chemicals (4), e.g. oil in water or solely water, and which comprises a number of supports (6), which are in the form of laterally (8) interconnectable and longitudinally corrugated sheet-metal plates or corrugated sheets of another material, e.g. plastic or aluminium, said sheet-metal plates being cut-through transversely to the longitudinal direction thereof in the direction from one side of the sheet-metal plates and entirely through the same up to the opposite other side of the sheet-metal plates, and that said cut-throughs (9) are arranged to form folding hinges for the sheet-metal plates in question,
so that, in an upturned angled position, the sheet-metal plates form a barrier erectable on a substratum as support and protection against surrounding water, and that the sheet-metal plates approximately in the middle thereof are entirely cut-through in the bottom valleys as well as the sides of said corrugations, leaving the top portions non-cut-through, for the formation of two foldable portions (11, 12) transverse to the longitudinal direction (25) of the sheet-metal plates, according to any one of the above claims, **characterized in that** band loops reach around unfolded sheet-metal plates (11, 12) in erected barrier-forming state (I).

6. Device according to claim 5, **characterized in that** posts (16) having cross-sections adapted in shape to corrugations (21) of the side portions (18, 19) and top portion (20) of the sheet-metal plates are interconnectable with the sheet-metal plates by the fact that corrugations (21) and posts (16) have paired, leaning side portions (18, 19) as well as a straight top portion (20) similar to a tunnel having leaning, outwardly widening walls and a straight roof.

7. Device according to any one of claims 5-6, **characterized in that** the sheet-metal plates (10) have a width of about 1 m, and that the distances (C) between the corrugations (21) are about 30-80 mm and the depth is the like.

8. Device according to any one of claims 5-7, **characterized in that** all cut-throughs (9) are arranged to extend from a common side of the sheet-metal plates (10) and said sheet-metal plates (10), which are corrugated in the longitudinal direction (25) of the sheet-metal plates with pressed-down valleys and pressed-up peaks, are arranged so that they can be piled closely to each other.

9. Device according to any one of the above claims 5-8, **characterized in that** the corrugations (21) of all sheet-metal plates are congruent with each other.

10. Device according to any one of claims 5-9, **characterized in that** the sheet-metal plates are galvanized and lacquered.

11. Device according to any one of claims 5-10, **characterized in that** the posts (16) are formed of folded sheet-metal plate and are open in one long side thereof and pileable in each other for the formation of a pile.

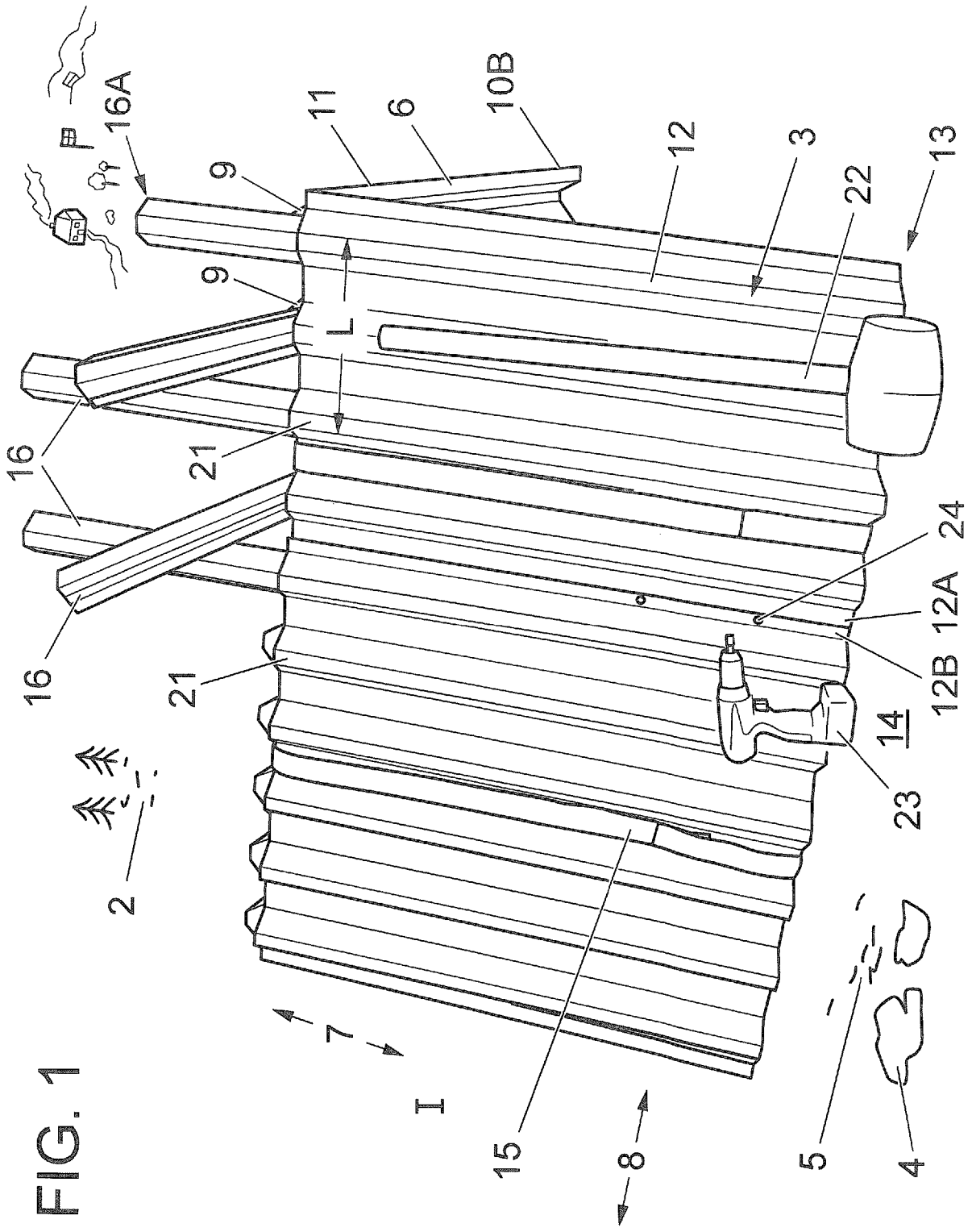


FIG. 1

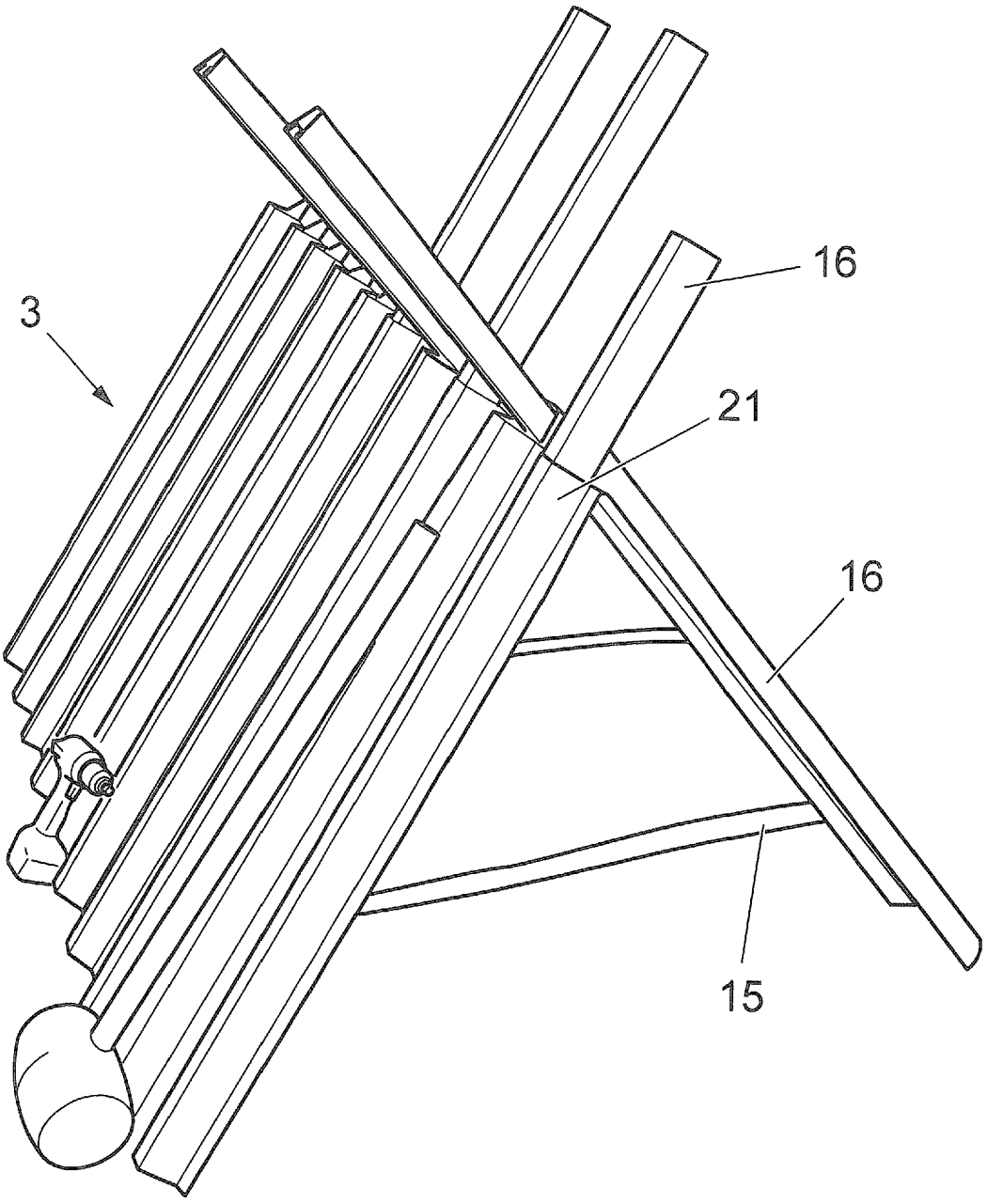
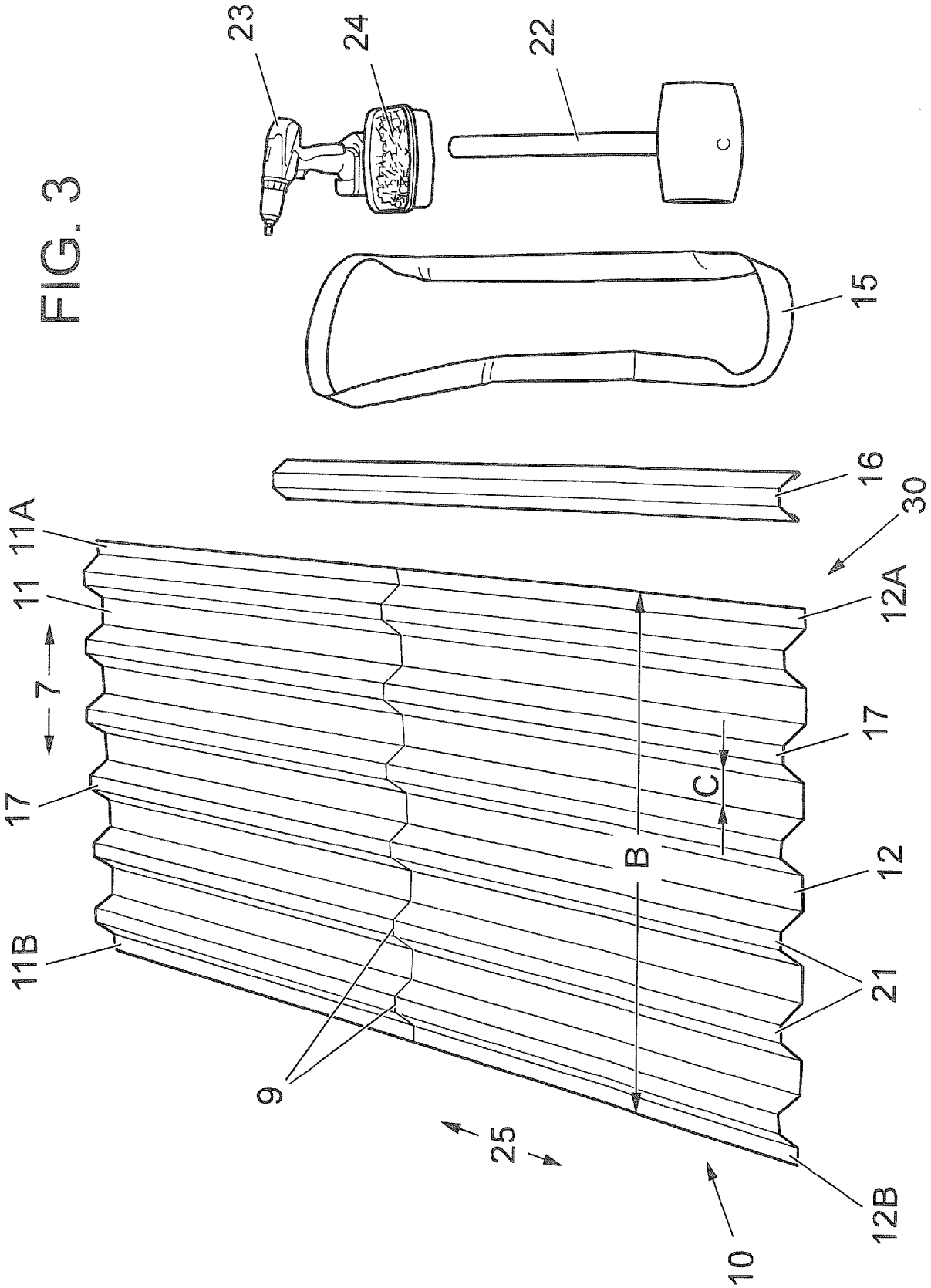


FIG. 2

FIG. 3



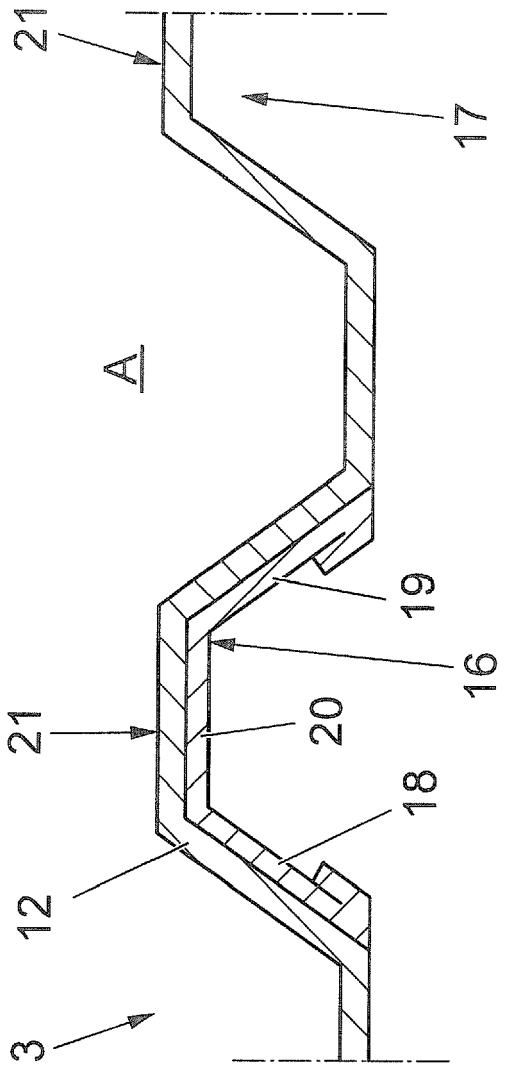


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 9047

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	US 6 935 809 B2 (SVENSSON GERHARD [SE]) 30 August 2005 (2005-08-30) * column 3, line 1 - column 5, line 52; figures *	1-11	INV. E02B3/10
A	GB 194 845 A (JOHN WORTHINGTON) 22 March 1923 (1923-03-22) * page 1, line 46 - page 2, line 13; figure *	1,5	

TECHNICAL FIELDS SEARCHED (IPC)

E02B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 September 2016	Van Bost, Sonia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

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16-09-2016

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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