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(54) **Title:** STEEL PANEL FENCE IN THE FORM OF BLINDS

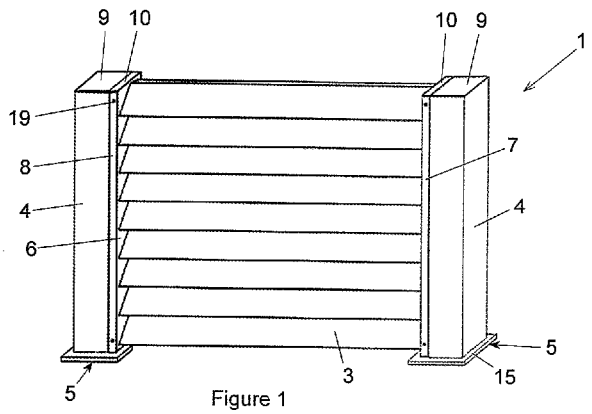

Figure 1

(57) **Abstract:** Steel panel fence in the form of blinds with fence panels (2) made up of horizontal slats (3), supporting posts (4) with floor anchors (5), left and right supports (6, 7) with limiters (14) for the slats, supporting covers (9) and fastening screws(11), while for the supporting posts (4), the inlets (8) are fixed into which the left and right supports (6, 7) are inserted horizontally or vertically with horizontal slats (3) in the form of shallow prismatic forms with a rectangular cross-section, which are fixed for the supports (6, 7) by passing the ends through the openings (13) in the form of equilateral rhomboids, the longitudinal axes of which are inclined at an angle of 45° in relation to the vertical axis of the supports (6, 7).

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# STEEL PANEL FENCE IN THE FORM OF BLINDS

## TECHICAL FIELD

The invention in question generally belongs to the field of construction, and specificially refers to a steel panel fence in the form of blinds intended for fencing the space around residential, business, industrial buildings, etc. According to the International Patent Classification (IPC), the subject of the invention is classified and marked with the basic slassification symbol E04H 17/14, which refers to fences made of rigid parts with poles, and E04H 17/14, which includes means for anchoring.

## TECHICAL PROBLEMS

The technical problem that is solved by the subject invention consists in the folowing: how to construct a fence that is widely applicable for fencing variously used areas around properties, farms, houses, buildings, terraces, balconies, etc., which is installed quickly, easily and simply. It is made of ready-made steel panels made of plasticized and galvanized steel sheet, which eliminates the requirements for additional prosessing.The production time is shortened and the use of special tools for asembly and hard connection is reduced. It is characterized by a high degree of resistance to external influences, high and low temperatures, the corrosive effect of moisture and salt, and simplifies maintenance by reducing the coating with protective agents and paints, and in addition, it is long-lasting, solid, easy to manufacture and install, allows air flow and at the same time provides shelter from unwanted views.

## STATE OF THE ART

Fences are an important part of every construction object that enables people to feel comfortable, secure, and they often decorate the fenced area. Poles and parts of fences are traditionally made of different types of wood, metal and plastic. Although wood is a solid

material, it deteriorates over time under the influence of weather conditions, rots and is attacked by insects. Even when it is treated (protected by painting or impregnation), the wood will rot and decay ofer time. It is very common to make fences from plastic profiles, which are especially sensitive to temperature differences, and even plastic made using the latest technology becomes brittle and sensitive to mechanical stress over time, and after a few years on these fences it is necessary to change all worn segments. In addition, many plastic fence systems involve the use of screws and joints, which negatively affects the appearance of the fence and reduces its attractiveness. The parts (components) of some plastic fence systems do not provide a reliable or safe connection of the segments from which it is formed, they are not solid, so such fences have not entered into widespread use.

Very often, metal fences are used to enclose spaces, which until the invention of galvanized sheets were gradually suppressed due to the harmful corrosive effects of moisture and expensive regular maintenance, such as e.g. coating with protective agents, coloring, etc. With the invention of galvanized sheets, most of these defects have been removed, so that fences made of these materials show the characteristics of strenght and durability. Precisely the characteristics of steel sheets and galvanized steel boxes for the production of pillars and pedestals for anchoring represented the basis of the technical solution of the present invention.

A review of the available patent documentation found only a few patents and international applications that, although they bear the same classification designation, have only some similarities with the application in question, namely:

Patent application number WO 03/033841 A1 shows an invention called DEVICE FOR FENCES, which refers to a device that serves to fence an outoor space and is made of many poles and rods that carry tarpaulins, so that each rod is streched between two adjacent poles. The posts and bars are means that are connected to each other and on which the tent canvas is demountably placed, which serves as a fence and is streched between the upper and lower transverse bars. This solution has an aesthetic and safety disadvantage, because in addition

to the fact that such fences are not suitable for every space, they do not provide full protection from passing through them.

Published patent application WO 3106788 A dated 12/24/2003. includes a fence system for the protection of the surface, which contains solid protective grids placed between vertical supporting columns inserted into fixed metal feet fixed to the base. According to this solution, the protective grid is attached to the supporting pillars with the help of hooks fixed on them. This solution is only somewhat similar to the subject invention, but it is more complex and requires much more time for its formation and maintenance.

In published patent application WO 2006/107284 A dated 12.10.2006. in 2010., a portable free-standing fence with and advertising field was shown, which was made of at least two independent posts and one crossbar for which a reinforced flexibile foil was provided as an advertising surface, while the transverse crossbar was made as a tube with a longitudinal groove into which a bar was inserted on which winding elastic film. The supporting pillars are fixed to the base by means of massive metal disks that do not provide sufficient stability for it to fulfill its protective function, so that it can be used for preventive fencing of spaces that are not at height.

A review of propaganda materials from the subject area revealed a large number of companies engaged in the production of panel fences, among which are: Lyctum from Belgrade, Lider from Kulpin, Perform from Pozega, Mojtrg from Nis and others. However, none of these companies have panels in the form of blinds, and besides, due to the way they are made and installed, these products are not relevant to the subject invention. Aware of the shortcomings of known solutions, the inventor decided to construct a new panel fence made of galvanized plasticized sheet that is easy to install, aesthetically attractive, and its construction is significantly more reliable and does not require special maintenance.

## SUMMARY OF THE INVENTION

The essence of the invention is reflected in the fact that the fence in question is made of galvanized and plasticized steel sheet panels, which are manufactured in factories or

workshops in accordance with the needs of space fencing, according to pre-designed dimensions (lenght and height of the fence), and then the finished elements transferred to the place of installation, which makes the process of making the fence maximally simplified and shortened.

The novelty of the invention is that no special tools are used when installing the fence, but the joining and fastening of the panels is done without additional processing and the use of glue, elements for joining and assembling such as nails, screws with nuts, connectors, various types fuses and the like, with which, in addition to simplicity, a better aesthetic effect was achieved because it is known that these parts are the most sensitive to atmospheric influences, they corrode the fastest, decay and leave ugly spots on the fence.

What makes the panel fence, according to the invention, different from similar metal panel fences is that its instalation enables air flow, optimal comfort and safety, while simultaneously creating shelter from unwanted views and privacy protection.

The essence of the invention is represented by the fact that the only part of the fence that goes into the base (concrete base, brick wall, building blocks or in another previously prepared base) is represented by steel screws, with which the consistency of the supporting posts of the fence is achieved through the anchor floor, while all other parts of the fence, made of galvanized and plastic sheet, are located above the base, which significantly contributes to its durability.

One of the important features of the invention is the possibility of simple changes (height, lenght, color) of both the supporting posts, thus creating opportunities to meet the different requirements of designers and owners of the fence.

In addition to the above, the present invention has the following advantages compared to known solutions, the most important of which are:
- much shorter production time
- easy manipulation with ready-made, pre-designed and manufactured segments
- significantly easier, faster and simpler installation of the fence.

- the fence in question is significantly more durable compared to the widely used wooden, metal and plastic fences, with much easier and more economical maintenance.

## A BRIEF DESCRIPTION OF DRAWINGS

In order to make the invention easier to understand, as well as to show how it can be realized in practice, the inventor only, for the sake of example, refers to the attached drawings that relate to the application in question and where:

Figure 1. presents an axonometric view of the assembly of a steel panel fence in the form of a blind with two support columns.

Figure 2. presents an axonometric view of the horizontal slats inserted into the supports.

Figure 3. is a schematic representation of the vertical insertion of horizontal slats with supports into the inlay on the support columns.

Figure 4. represents the axonometric view of the left support column connected to the guide for vertical insertion of horizontal slats with supports in the view from the outer side.

Figure 5. represents an axonometric view of the right support column connected to the guide for vertical insertion of horizontal slats with supports in the view of the outer side.

Figure 6. represents an enlarged detail of the connection of the ends of the horizontal slats with the support inserted into the guide fixed to the support column without the covers of the upper openings.

Figure 7. is an axonometric view of the left support column for horizontal insertion of supports with horizontal slats into a single guide in the view of the inner side.

Figure 8. is an axonometric view of the right support column for horizontal insertion of supports with horizontal slats in a guide with one guide in view of the outer side.

Figure 9. is a schematic representation of the horizontal insertion of supports with horizontal slats into the guides on the supporting columns.

Figure 10. is an enlarged detail of the left supporting column with openings for horizontal slats on the left support and covers inserted into the upper openings.

Figure 11. is an enlarged detail of the lower part of the support column with floor anchor and holes for screws.

Figure 12. represents an enlarged detail of the lower part of the supporting column with floor anchor and fastening screws.
Figure 13. represents a schematic representation of the fastening of the lead-in for the supporting column using riveting pliers.
Figure 14. represents the axonometric view of the left lead-in for vertical insertion.
Figure 15. represents the axonometric view of the left lead-in for horizontal insertion.
Figure 16. represents the axonometric view of the cover of the supporting column.
Figure 17. represents the axonometric view of the cover of the horizontal slats.
Figure 18. represents the axonometric view of the left support of the horizontal slats.
Figure 19. represents the axonometric view of the right support of the horizontal slats.

## DETAILED DESCRIPTION OF THE INVENTION

As can be seen from the pictures of the attached drawing, the steel panel fence (1) consists of panels (2) composed of: horizontal slats (3), supporting column (4) with floor anchors (5), left and right supports (6, 7) with limiters (14), lead in (8) with guides (18), covers (9) of the supporting columns, covers (10) of the supports and fastening screws (11).

Horizontal slats (3) are made of galvanized rectangle steel pipes additionally plasticized, which achieves double protection of the metal against oxidation, other harmful effects and resistance to temperature changes +/-40°C, moisture, harmful effects of salt from the air and consistent mechanical stress. Horizontal slats (3) are made as elongated, hollow prismatic form with a rectangular cross-section, and their lenght depends on the desired size of the fence of a certain space.Viewed from the side, picture 2, it can be seen that the horizontal slats (3) end with openings (12), in the form of equilateral rhomboids, corresponding to the openings (13) on the left and right carriers (6, 7).

The left and right carriers (6, 7) are cut so that their side edges of the longer sides are made in the form of an "L" profile with symmetrically spaced opposite ends oriented towards the central axis, and these ends represent limiters (14) for limiting the movement of the horizontal slats (3). The connection of the horizontal slats (3) with the left and right supports was achieved by inserting their ends through openings (13) made in the form of equilateral

rhomboids with the shorter sides facing the upper and lower ends of the carriers (6, 7), while their longitudinal axes are inclined at an angle of 45° to the vertical carrier axis.

The supporting columns (4) are also made of plasticized steel boxes with a rectangular section, closed from the bottom side with integral floor anchors (5) in the form of rectangular steel plates, strengthened by welding for the bottom of the supporting columns (4). Floor anchors (5) are wider than the supporting columns (4), so that, viewed from above, they form square frames (15) in the verices of which circular openings (16) are positioned, through which the supporting columns (4) are fixed to the ground (24) with screws (11).

By looking at *Figure 10* and *Figure 13* it is easy to see that, for the opposite inner sides (17) of the supporting columns (4), there are reinforced rectangular inlets (8), with vertical outlets on the long side edges that represent guides (18) for inserting supports (6, 7) with horizontal slats (3). The guides (8) are of the same dimensions as the sides of the supporting columns (4), and the distance between the guides (18) is equal to the width of the left and right supports (6, 7). The guides (8) for the supporting columns (4) are strengthened with pop threads (rivets, 19) inserted into the openings (20) using riveting pliers (23), as shown in *Figure 13*. Depending on the method of inserting the supports (6, 7) with horizontal slats (3), the guides (8) are made with one or two guides (18). The strengthening of the left and right supports (6, 7) with horizontal slats (3) for the supporting columns (4) is done either by vertical pulling from top to bottom, between the guide (8) guides (18), as shown in *Figure 3*, or by horizontal insertion, as shown in *Figure 9*, with the fact that in that case they are inlets (8) made without guides (18) on the side from which the interconnected supports (6, 7) with horizontal slats (3) are inserted.

In that case, the reinforcement of the supports (6, 7) is done with pop threads (19) through the openings (20).

Completing the fence assembly (1), as shown in Figure 1, is completed by inserting plastic covers (9) into the openings (21) at the upper ends of the supporting columns (4) and covers (10) into the openings (22) formed after the supports (6, 7) have been strengthened with horizontal slats (3) for inlets (8). The number of panels (2) is determined by the lenght of the

fenced space, where the subsequent panels are connected to each other by literally joining the next supports (6, 7) with horizontal slats (3) and inlets (8) using threads for the outer sides of the supporting columns (4). The height of the fence (1) is achieved by making supporting columns (4) of the appropriate height, while at the same time reducing or increasing the number of horizontal slats (3), and the lenght of the left and right supports (6, 7) with horizontal slats (3) and inlets (8) is determined according to their number. A fence made in this way is easy to install, aesthetically attractive, and its construction is solid, reliable and stable enough to fulfill its protective function, and at the same time, it does not require complex maintenance.

## INDUSTRIAL APPLICATION OF THE INVENTION

The industrial production of the subject invention is absolutely possible in factories for the production of metal objects, and even in well-equipped metal processing workshops, based on the technical documentation that experts in the subject field can easily do using the description and drawings from this application. The invention is suitable for serial production and is easily applicable for setting up all kinds of fences around properties, farms, houses, buildings, terraces, balconies and the like. The application of the invention is especially recommended in cases where the fence is placed in places exposed to extreme temperature differences and in environments exposed with high humidity, where classic fences made of wood or plastic deteriorate quickly despite the complicated maintenance that implies expensive replacements and repairs.

# PATENT CLAIMS

1. Steel panel fence in the form of blinds, characterized by the fact that the fence (1) is made up of panels (2) composed of horizontal slats (3), supporting posts (4) with floor anchors (5), left and right supports (6, 7) with limiters (14), guides (8) with guides (18), covers for supporting posts (9), support covers (10) and fastening screws (11), where the horizontal slats (3) are made of plasticized galvanized steel boxes, designed as elongated slender prismatic forms with a rectangular cross-section and ending with openings (12) in the shape of equilateral rhomboids, matching the openings (13) on the left and right supports (6,7), and by the fact that the left and right supports (6, 7) are cut so that their side edges of the longer sides are made in the shape of an „L" profile with symmetrically oppositely spaced ends oriented towards the central axis, where these ends represent bounderies (14), and because the horizontal slats (3) are connected to the supports (6, 7), and because the inlets (8) are of the same dimensions as the sides of the supporting columns (4), in which the distance between the guides (18) is equal to the width of the left and right supports (6, 7), in which the guides (8) for the opposite inner sides (17) of the supporting columns (4) are strengthened with pop-threads (19) inserted into the openings (20).

2. Steel panel fence in the form of blinds, according to claim 1, characterized by the fact that the connection of the horizontal slats (3) with the left and right supports (6, 7) is achieved by passing their ends through the corresponding openings (13) in the form of equilateral rhomboids with the shorter sides facing the upper and lower ends of the supports (6, 7), while their longitudinal axes inclined at an angle of 45° in relation to the vertical axes of the supports (6, 7).

3. Steel panel fence in the form of blinds, according to claim 1, characterized by the fact that the rectangular guides (8) are made with guides (18) on the long side edges of the form of vertical outlets, while the guide (8) for vertical insertion of supports (6, 7) with horizontal slats (3) contains two guides (18).

4. Steel panel fence in the form of blinds, according to claim 1, characterized by the fact that the guide (8) for the horizontal insertion of supports (6, 7) with horizontal slats (3) contains one guide (18) on the opposite side from which the insertion of supports (6, 7) with horizontal slats (3) is performed.

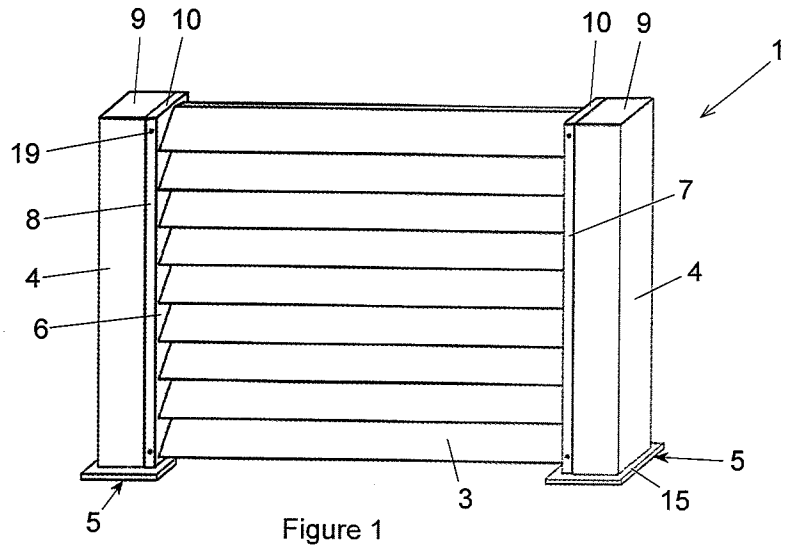



Figure 1

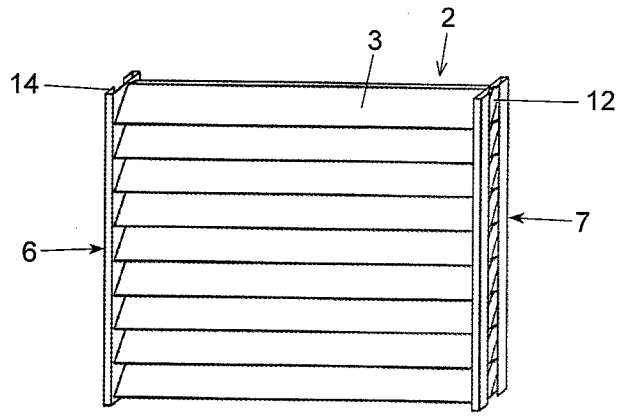



Figure 2

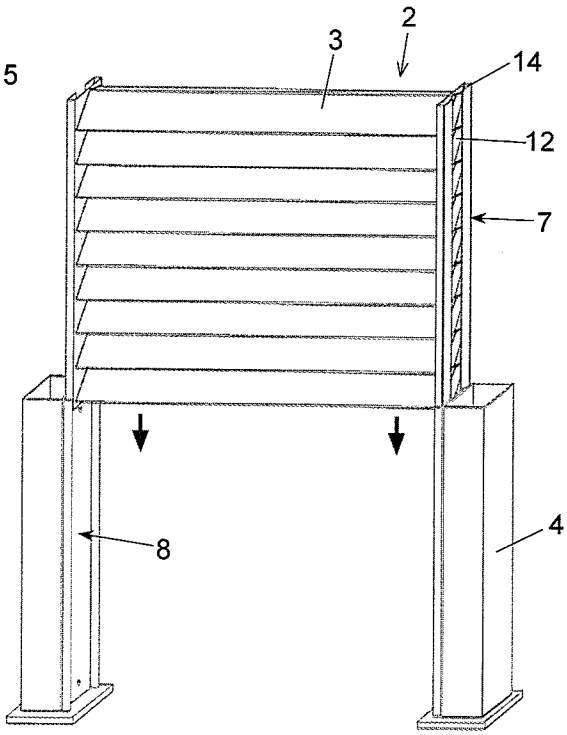



Figure 3

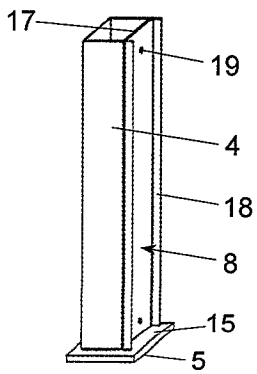
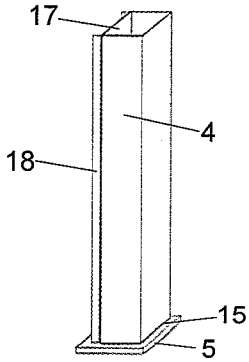



Figure 4

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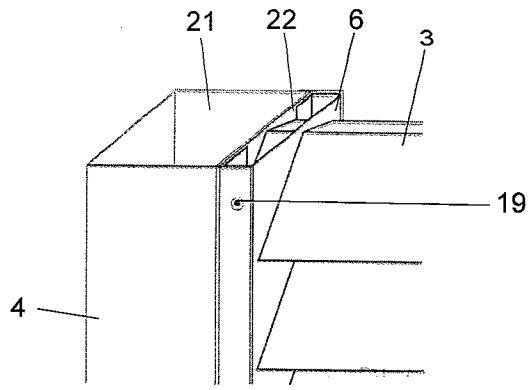
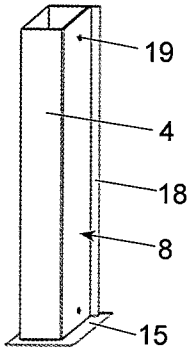



Figure 6

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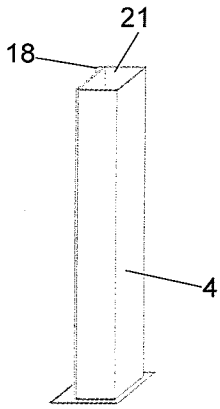



Figure 8

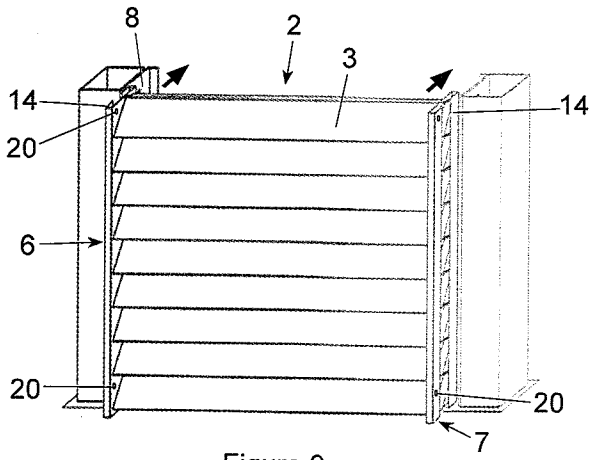



Figure 9

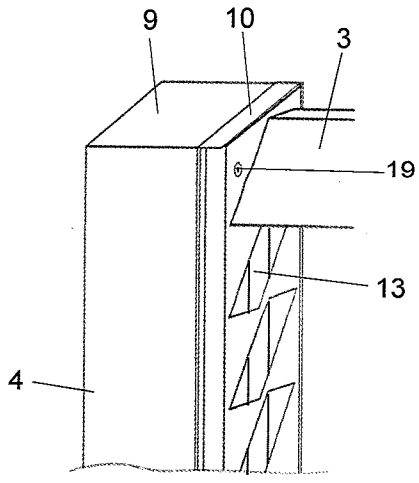
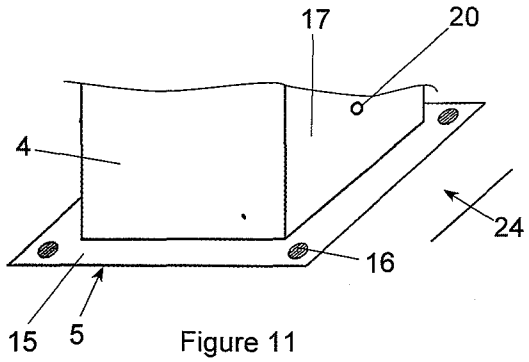



Figure 10

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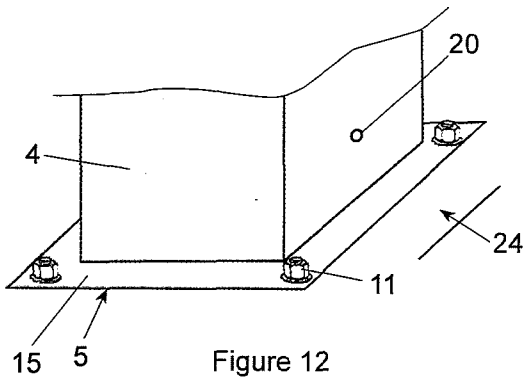


Figure 12

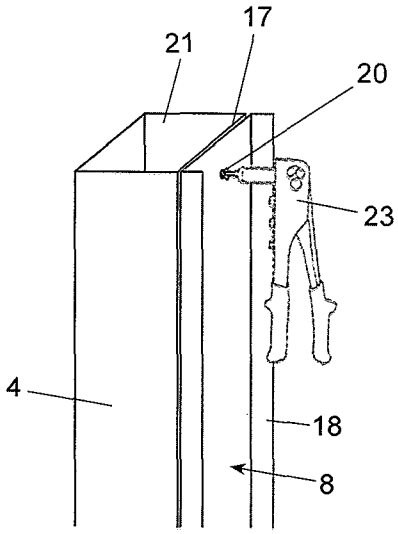


Figure 13

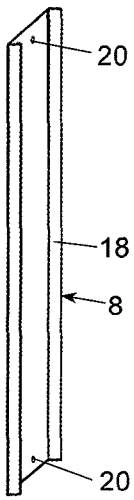


Figure 14

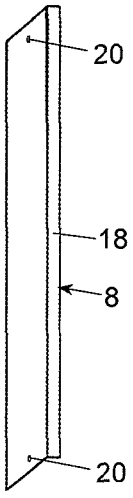


Figure 15

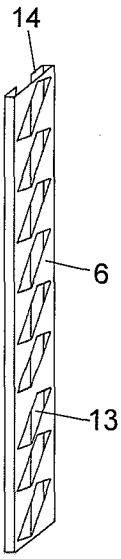


Figure 18

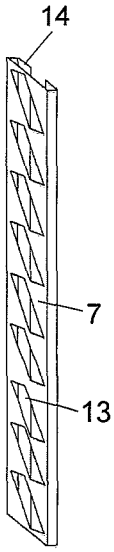


Figure 19

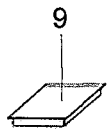


Figure 16

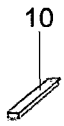


Figure 17

# INTERNATIONAL SEARCH REPORT

International application No
PCT/RS2024/000009

**A. CLASSIFICATION OF SUBJECT MATTER**
INV. E04H17/14 E04H17/16
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)
E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | EP 3 940 174 A1 (JAPE LT UAB [LT])<br>19 January 2022 (2022-01-19)<br>paragraph [0020] - paragraph [0026];<br>figures 1-5 | 1-4 |
| A | US 5 639 069 A (MCCLURE JACK A [US])<br>17 June 1997 (1997-06-17)<br>figures 1-5 | 1-4 |
| A | WO 2007/140516 A1 (JESSUP ANNETTE [AU];<br>JESSUP MICHAEL [AU])<br>13 December 2007 (2007-12-13)<br>figures 1-3 | 1-4 |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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|---|---|
| 8 October 2024 | 23/10/2024 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Decker, Robert |

# INTERNATIONAL SEARCH REPORT

**Information on patent family members**

**International application No**
PCT/RS2024/000009

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| EP 3940174 A1 | 19-01-2022 | EP 3940174 A1 | 19-01-2022 |
| | | LT 6822 B | 10-06-2021 |
| | | PL 3940174 T3 | 11-09-2023 |
| US 5639069 A | 17-06-1997 | NONE | |
| WO 2007140516 A1 | 13-12-2007 | AU 2007257316 A1 | 13-12-2007 |
| | | WO 2007140516 A1 | 13-12-2007 |