



EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.01.2023 Bulletin 2023/04

(51) International Patent Classification (IPC):
F24F 1/62 ^(2011.01) **F24F 13/32** ^(2006.01)

(21) Application number: **22185005.0**

(52) Cooperative Patent Classification (CPC):
F24F 1/62; F24F 13/32

(22) Date of filing: **14.07.2022**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **VECAMCO S.r.l.**
35030 Cervarese Santa Croce (PD) (IT)

(72) Inventor: **CAPPELLARI, Dino**
35030 Rubano (PD) (IT)

(74) Representative: **Fabris, Stefano et al**
Cantaluppi & Partners S.r.l.
Piazzetta Cappellato Pedrocchi, 18
35122 Padova (IT)

(30) Priority: **20.07.2021 IT 202100019190**

(54) **SUPPORT BRACKET FOR APPARATUSES, IN PARTICULAR AIR-CONDITIONING INSTALLATION UNITS**

(57) There is described a support bracket for apparatuses, in particular air-conditioning installation units, comprising a first and a second bracket portion (2, 3) which are provided for anchoring the bracket to the wall and for supporting and fixing the apparatus to the bracket, respectively, and securing means (5) between the first and second bracket portions (2, 3) in order to mutually secure the portions in an operative condition, in which they take up an L-shaped configuration which is suitable for supporting the apparatus, the securing means (5) comprising, at an axial end (3b) of the second bracket portion (3), a tubular through-cavity (9) having a

cross-section with a closed, polygonal peripheral profile, which is configured to be engaged, with a substantially positive-locking connection, by a corresponding end portion (10) of the first bracket portion (2), the relative coupling movement being carried out in the longitudinal development direction (Y) of the first bracket portion (2), and at least one frame element (11) which projects from the end portion (10) of the first bracket portion (2), transversely relative to the longitudinal direction (Y), and against which the axial end (3b) of the second bracket portion (3) is intended to abut in the operative condition.

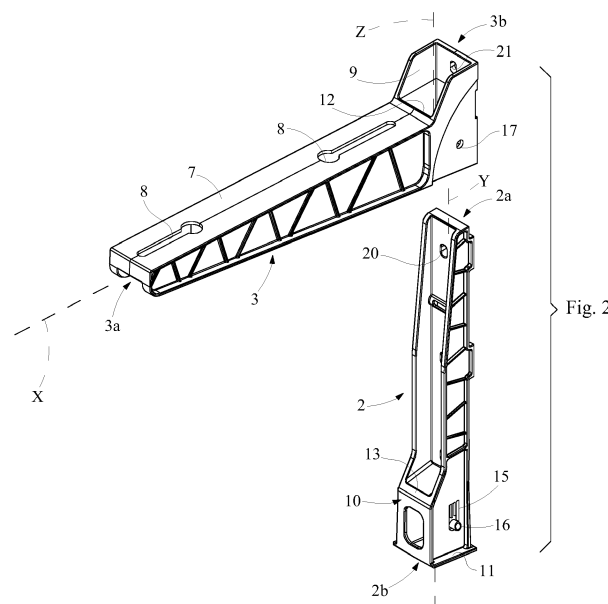


Fig. 2

Description

Technical field

[0001] The present invention relates to a support bracket for apparatuses, in particular air-conditioning installation units, having the features set out in the preamble of the main claim 1.

[0002] The invention particularly, though in a non-exclusive manner, involves the field of bracket-like fixing devices for supporting the exchange groups for air-conditioning installations.

Technological background

[0003] In this context, it is known that the heat exchanger groups, which are used in the air-conditioning installations and which supply the diffusors which are provided in the surrounding areas of the buildings to be air-conditioned, have to be arranged and supported outside the buildings or in any case relocated to such a position as to communicate with the exterior.

[0004] Furthermore, it is typical that the formation of the buildings requires that these exchangers be suspended on the external walls of the buildings or on walls near balconies and windows which are directed towards the exterior of a building so as to allow the heat exchange between hot air and cold air in the exchanger. In order to fix these exchangers to the walls, the widespread use of L-shaped brackets which have such dimensions as to have suitable robustness is well-known, a pair of these brackets normally being sufficient, which brackets are fixed either directly to the walls or to guides which in turn are fixed to the walls, for example, with plug type fixing systems.

[0005] These brackets are further provided with seats for inserting fixing screws with which the apparatus is secured to the brackets themselves.

[0006] A first known type provides for the brackets to be constructed with a final preformed L-shaped formation, but this formation is not particularly convenient for the spatial requirements which are involved in the transport and storage operations.

[0007] Furthermore, there are known brackets, in which the portions or wings which compose the L-shaped bracket are constructed to be separate so as to reduce transport and storage spatial requirements, but they require that the installer carry out the relevant assembly before the installation.

[0008] According to another known type, there is provision, if the bracket is prepared in two separate pieces, for them to be assembled in a mutually articulated manner, thereby reducing the transport and storage spatial requirements but nevertheless requiring the installer to carry out the assembly thereof before the operation of fixing to the wall.

[0009] With regard to the materials, conventionally these brackets have been mainly configured using metal

material, which material, on the one hand, ensures lightness and adequate mechanical resistance to loads being applied, on the other hand, it exposes the bracket to the action of the atmospheric agents with inevitable damage to the bracket over time, for example, as a result of corrosion phenomena.

[0010] Technical solutions have further been developed for support brackets which are made from plastics material, in particular configured with the pieces of the bracket (horizontal arm and vertical upright) being separate and able to be secured to each other in a fixed or articulated manner.

Description of the invention

[0011] The invention is directed towards these types of brackets and the main object is to provide a support bracket for apparatuses, in particular air-conditioning installation units, which is structurally and functionally configured to produce a relative fixing system between the pieces of the bracket which are provided in a state separate from each other, which is easy and rapid to assemble by the installer so as to obtain a bracket which is very lightweight but which at the same time ensures reliability for ensuring adequate mechanical resistance to the loads applied.

[0012] These objects and other objects which will be clearly appreciated below are achieved by the invention by means of a support bracket of the above-mentioned type, which is constructed according to the appended claims. According to an aspect of the invention, the bracket comprises a first and a second bracket portion which are provided for anchoring the bracket to the wall and for supporting and fixing the apparatus to the bracket, respectively, and securing means between the first and second bracket portions in order to mutually secure the portions in an operative condition, in which they take up an L-shaped configuration which is suitable for supporting the apparatus. Preferably, the securing means comprise, at an axial end of the second bracket portion, a tubular through-cavity having a cross-section with a closed, polygonal peripheral profile, which is configured to be engaged, with a substantially positive-locking connection, by a corresponding end portion of the first bracket portion, the relative coupling movement being carried out in the longitudinal development direction of the first bracket portion.

[0013] Preferably, the at least one frame element projects from the end portion of the first bracket portion, transversely relative to the longitudinal direction, against which the axial end of the second bracket portion is intended to abut in the operative condition.

[0014] Preferably, the securing means further comprise, in the second bracket portion, a surface abutment which projects towards the interior of the cavity and which is configured to abut, with mutual surface superimposition, against a corresponding surface portion of the first bracket portion, once the operative condition has been

reached.

Brief description of the drawings

[0015] Additional features and advantages of the invention will be better appreciated from the following detailed description of a preferred embodiment thereof which is illustrated by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 is a perspective view of a support bracket which is constructed according to the invention,
- Figures 2 and 3 are additional perspective views of the support bracket of the invention which is shown with detached pieces in respective and different assembly steps,
- Figure 4 is an additional perspective view of the bracket of the preceding Figures in a state shown in an assembled condition,
- Figure 5 is a plan view of the bracket of the preceding Figures,
- Figure 6 is a cross-section along the line VI-VI of Figure 5,
- Figure 7 is a side view of a detail of the bracket of the preceding Figures,
- Figure 8 is a cross-section along the line VIII-VIII of Figure 7.

Preferred embodiments of the invention

[0016] With reference to the cited Figures, there is generally designated 1 a support bracket for apparatuses, typically air-conditioning installation units (not illustrated), which is constructed according to the present invention. Normally, there is provision for a pair of brackets 1 to be provided in a parallel and spaced-apart relationship with suitable relative spacing in order to define the surface support and fixing portions of the apparatus.

[0017] The bracket 1 comprises a first and a second bracket portion which are designated 2 and 3, respectively, and which are configured to be secured to each other at converging ends thereof in order to assume a square configuration which substantially extends in an L-like manner and which is suitable for performing the support function for the apparatus.

[0018] In other words, the first bracket portion 2 forms the vertical upright of the bracket which is provided for anchoring the bracket to the wall while the second bracket portion 3 forms the horizontal arm of the bracket which is provided for supporting and fixing the apparatus to the bracket.

[0019] Each of the bracket portions 2 and 3 extends in a respective main longitudinal extent direction which is designated Y for the bracket portion 2 and X for the bracket portion 3, the bracket portion 2 extending between opposite longitudinal ends 2a, 2b, the bracket portion 3 extending between opposite longitudinal ends 3a, 3b.

[0020] The bracket 1 comprises securing means be-

tween the bracket portions 2, 3 which are generally designated 5 and which are configured to mutually secure the bracket portions 2, 3 at the converging ends 2b, 3b in an operative condition in which the bracket portions take up the general L-shaped configuration suitable for supporting the apparatus.

[0021] The first bracket portion 2 is provided with a surface 6 which is intended to support and anchor the bracket to the wall or which is intended, in another embodiment, to be engaged with fixing guides (not shown) which are secured to the wall, the second bracket portion 3 having a surface 7 for supporting and fixing the apparatus, for example, by means of screws or similar fastening means. To this end, there are provided on the surface 7 through-holes 8 for engaging with the fixing screws.

[0022] It will be observed how the condition with the bracket portions 2, 3 disassembled (Figure 2) is distinguished by a reduced overall transverse spatial requirement for the benefit of the transportability and the storage of the bracket, the extended L-shaped configuration taken up in the assembled condition (Figure 1) instead representing the operative condition capable of performing the support function.

[0023] There is further provision for the first and second bracket portions 2, 3 to be made preferably from thermoplastic material. In one embodiment, there is provision for selecting as the plastics material a polyamide, preferably reinforced with glass fibres in order to ensure for the bracket suitable characteristics of resistance to the loads to be supported.

[0024] The bracket portions 2, 3 are further configured to be obtained by means of injection-moulding in a plastics material mould.

[0025] The securing means 5 comprise at the axial end 3b of the bracket portion 3 a tubular through-cavity 9 having a main axis Z which is directed perpendicularly to the direction X and which has a cross-section with a closed, polygonal profile, in one embodiment this profile having a quadrilateral and preferably square profile.

[0026] The cavity 9 is configured to be engaged, with a substantially positive-locking connection, by a corresponding portion 10 of the first bracket portion 2, the portion 10 extending near the end 2b of the bracket portion 2, the relative coupling movement being carried out in the longitudinal development direction Y of the first bracket portion 2.

[0027] The portion 10 advantageously has a box-shaped formation which is defined by side walls which are connected to a base wall, the walls delimiting a hollow internal space, as clearly shown, for example, in Figure 2.

[0028] The securing means 5 further comprise a frame element 11 which extends from the end portion 10 of the first bracket portion 2 in a transverse direction to the longitudinal direction Y and against which the end 3b of the second bracket portion 3 is intended to abut in the operative condition suitable for the support function.

[0029] The securing means further comprise, in the second bracket portion 3, a surface abutment 12 which

projects with a predetermined inclination towards the interior of the cavity 9 in the region of the upper opening of the cavity and which is configured to abut, with mutual surface superimposition, against a respective surface portion 13 which is provided in the first bracket portion, in a corresponding position, once the operative interconnection condition of the bracket portions has been reached.

[0030] With particular reference to Figures 2 and 3, the mutual securing condition of the bracket portions is achieved from a position (Figure 2), in which the tubular cavity 9 is facing, in a spaced-apart condition, the end 2a of the bracket portion 2, and which is followed by a coupling movement, in the direction Y, in which the bracket portion 2 extends through the cavity (Figure 3) over the entire longitudinal extent of the portion 2 until reaching the operative condition in which the portion 10 is engaged in a positive-locking manner with the cavity, the portion 3 abutting in the lower region against the lower frame element 11, and in the upper region abutting against the surface portion 13 with the abutment 12. The sectional view of Figure 6 clearly shows the positive-locking connection condition of the walls of the portion 10 against the internal walls of the cavity 9 and the condition of moving into abutment against the frame 11 and the surface portion 13.

[0031] In this configuration, the relative blocking between the bracket portions 2, 3 is advantageously brought about, substantially without undesirable occurrences of play and with an effective distribution of the pressures which result from the loads which are applied to the horizontal bracket portion 3 (resulting from the weight of the apparatuses supported by the support brackets) and which are discharged at the surfaces of the lower frame 11 and in the region of the upper abutment 12.

[0032] In this regard, the frame element 11 extends over a main portion of the peripheral profile of the section, in a preferred manner it extends along three sides of the square section of the end portion 10 of the vertical bracket portion 2 and the surface portion 13, for moving into abutment with the abutment 12, extends in the region of the fourth side of the section (the section not affected by the frame 11 in the lower region). This formation together with the box-shaped form of the portion 10 which is intended to engage, with positive-locking connection, with the tubular cavity 9, confers suitable robustness and rigidity on the interconnection zone of the bracket portions, but the securing action between the interconnected portions not requiring the use of any additional fixing means, such as screws or similar fastening elements.

[0033] The bracket 1 is further provided with anti-uncoupling means for the second bracket portion 3 from the first bracket portion 2, which means are active between the bracket portions 2, 3 in the operative interconnection condition. The anti-uncoupling means comprise a pair of resiliently flexible extension pieces 15 which are provided in the first bracket portion 2, each extension

piece 15 having at a free end thereof a respective locking latch 16 which is intended to engage with a corresponding hole 17 which is formed in the second bracket portion 3, when the bracket portions 2, 3 reach the operative condition of mutual securing.

[0034] In greater detail, the extension pieces 15 are provided with respective opposite walls of the end portion 10 of the bracket portion 2 and the latches 16 are configured to project externally from the surface profile of the walls. As a result of the effect of this projection, following the coupling of the portion 10 in the cavity 9, each latch 16 is moved into a retracted position as a result of the interference with the horizontal portion 3 of the bracket, this movement resiliently deforming the extension piece 15 so as to generate a resilient return action which moves the latch 16 to engage with the corresponding hole 17 when the hole, during the coupling movement, is brought into the region of the latch. In this position, the latch 16 remains retained in the corresponding hole 17, performing the locking function for the relative unscrewing movement of the bracket portions.

[0035] The disengagement of each latch 16 from the corresponding hole 17 can be brought about only by means of a deliberate action with which the latch is pressed (for example, using a tool, such as the tip of a screwdriver), counter to the resilient return applied by the extension piece in order to disengage the corresponding hole.

[0036] Therefore, only by simultaneously disengaging both the latches in the manner described above can the uncoupling movement of the second bracket portion from the first bracket portion be released again, which leads to the bracket portions being disassembled.

[0037] Through-holes which are formed in the bracket portion 2 and which are configured for fixing the bracket to the wall by means of screw type blocking elements are designated 20.

[0038] The hole 20 nearest the portion 10 of the bracket portion 2 is further arranged to be coaxial with a hole 21 which is formed in the bracket portion 3, the coaxiality between the holes occurring when the bracket portions 2, 3 are in the operative condition of mutual securing. In this manner, the wall-fixing of the bracket with a screw type means which engages with both the hole 21 and the hole 20 which are coaxial with each other ensures further relative fastening between the bracket portions 2 and 3.

[0039] The invention thereby achieves the objects set out, affording the advantages mentioned.

[0040] A main advantage involves the fact that, with the bracket of the invention, there are obtained, in conjunction with each other, an extreme lightness of the structure (all the components are made of plastics material) together with a suitable robustness thereof for the resistance to the stresses resulting from the loads being supported, an improved ease of use, both during the transport and storage steps (with separate bracket portions) and in the operative support condition (bracket with interconnected square portions), as well as an improved

ease and speed of assembly of the bracket in the extended, square operative configuration, without requiring the installer to use screw type fixing means or similar other fastening elements for interconnecting the bracket portions.

Claims

1. A support bracket for apparatuses, in particular air-conditioning installation units, comprising a first and a second bracket portion (2, 3) which are provided for anchoring the bracket to the wall and for supporting and fixing the apparatus to the bracket, respectively, and securing means (5) between the first and second bracket portions (2, 3) in order to mutually secure the portions in an operative condition, in which they take up an L-shaped configuration which is suitable for supporting the apparatus, **characterized in that** the securing means (5) comprise:

- at an axial end (3b) of the second bracket portion (3), a tubular through-cavity (9) having a cross-section with a closed, polygonal peripheral profile, which is configured to be engaged, with a substantially positive-locking connection, by a corresponding end portion (10) of the first bracket portion (2), the relative coupling movement being carried out in the longitudinal development direction (Y) of the first bracket portion (2),

- at least one frame element (11) which projects from the end portion (10) of the first bracket portion (2), transversely relative to the longitudinal direction (Y), and against which the axial end (3b) of the second bracket portion (3) is intended to abut in the operative condition.

2. A bracket according to claim 1, wherein the securing means (5) further comprise, in the second bracket portion (3), a surface abutment (12) which projects towards the interior of the cavity (9) and which is configured to abut, with mutual surface superimposition, against a corresponding surface portion (13) of the first bracket portion (2), once the operative condition has been reached.
3. A bracket according to claim 1 or 2, wherein the cavity (9) has a cross-section having a quadrilateral peripheral profile.
4. A bracket according to claim 3, wherein the cross-section of the cavity (9) has a square peripheral profile.
5. A bracket according to any one of the preceding claims, wherein the first bracket portion (2) is configured to extend through the cavity (9), during the

coupling movement in the longitudinal development direction (Y) of the first bracket portion (2), from the end thereof opposite the end portion (10) of the first bracket portion (2) until reaching the mutual securing condition between the bracket portions (2, 3).

6. A bracket according to any one of the preceding claims, wherein the frame element (11) extends over a main portion of the peripheral profile of the cross-section of the end portion (10) of the first bracket portion (2).
7. A bracket according to any one of the preceding claims, wherein the first and second bracket portions (2, 3) are constructed from thermoplastic material.
8. A bracket according to any one of the preceding claims, comprising anti-uncoupling means for the second bracket portion (3) from the first bracket portion (2), which means are active between the bracket portions in the operative condition.
9. A bracket according to claim 8, wherein the anti-uncoupling means comprise at least one resiliently flexible extension piece (15) which is provided in the first bracket portion (2) and which has at an end thereof a latch (16) which is intended to engage with a respective hole (17) which is formed in the second bracket portion (3), when the operative condition of mutual securing is reached between the bracket portions (2, 3).
10. A bracket according to claim 9, wherein there are provided a pair of the extension pieces (15) which are provided on respective opposite walls of the first bracket portion (2).

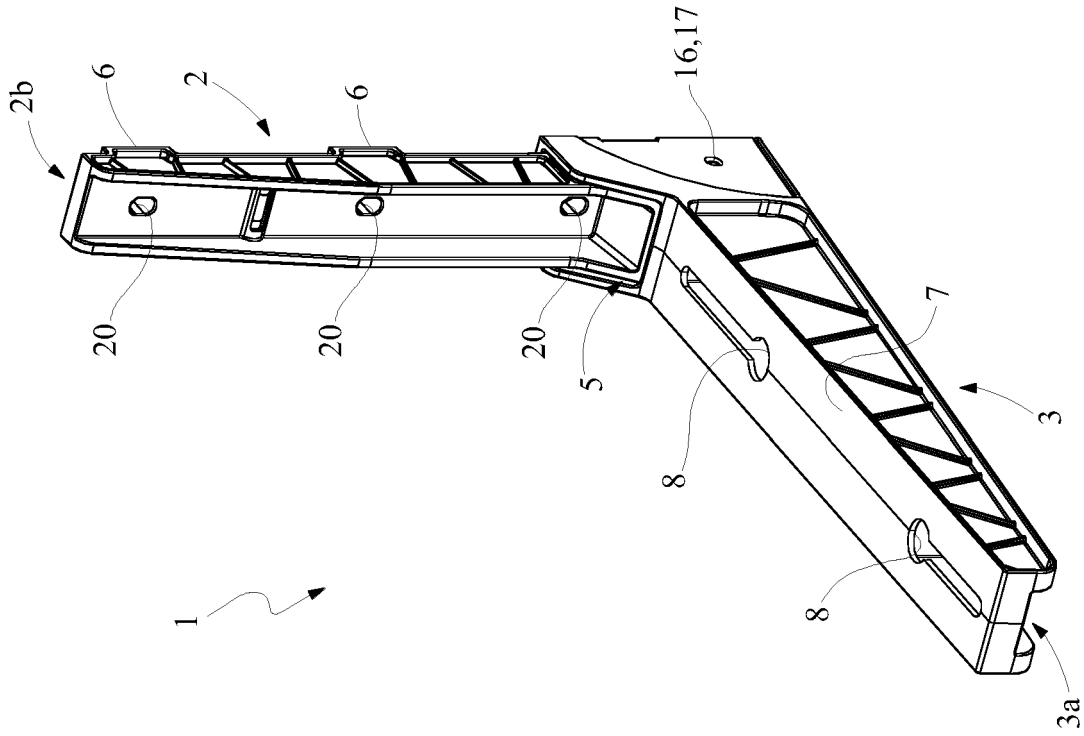
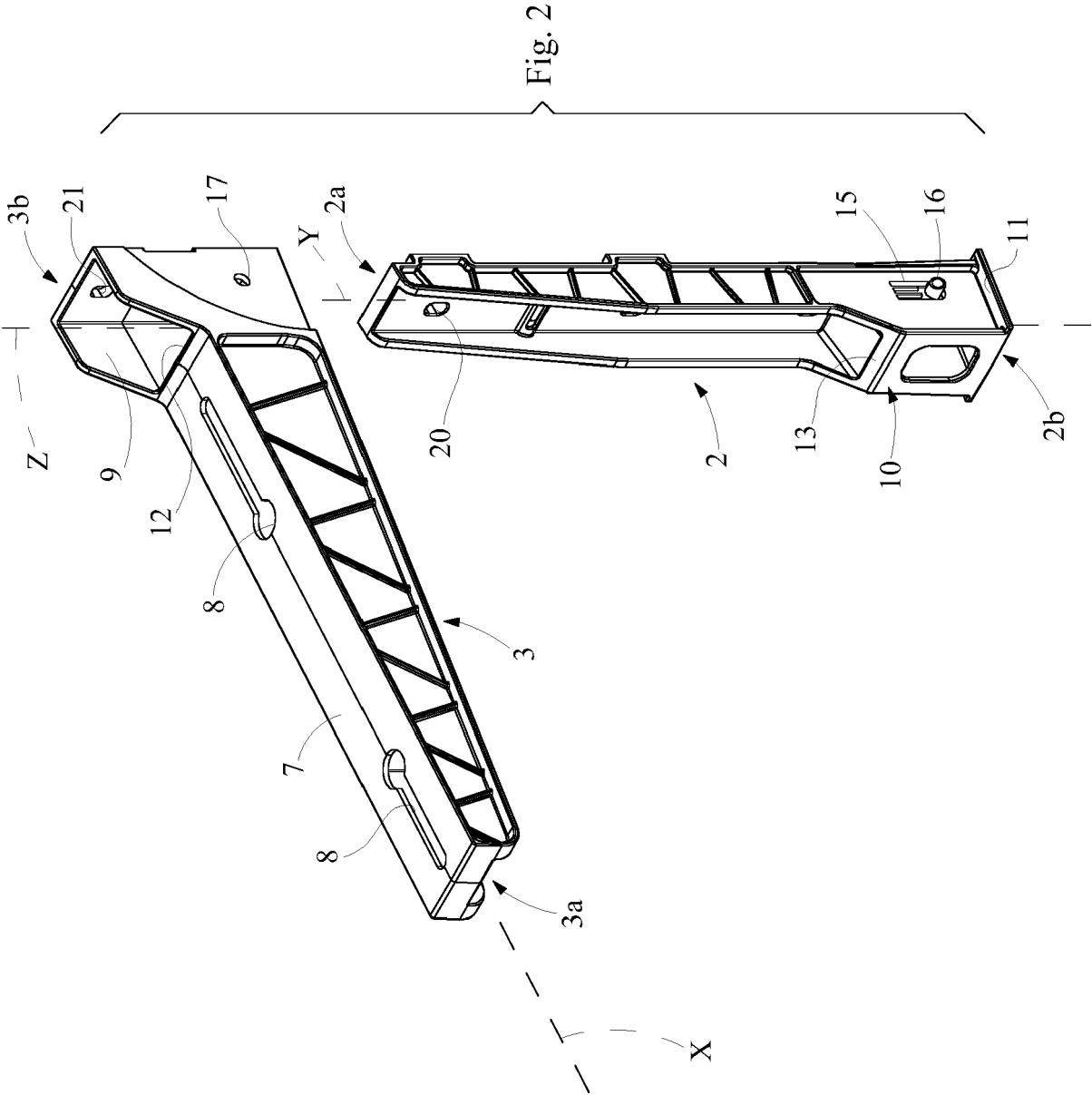


Fig. 1



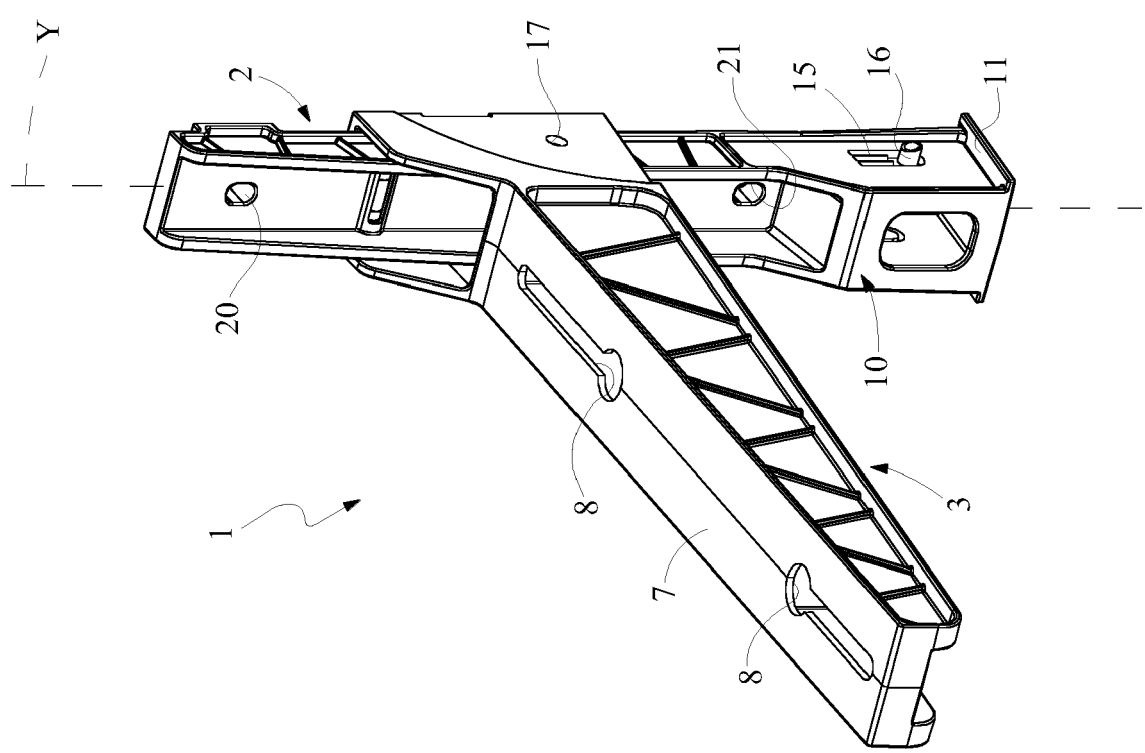


Fig. 3

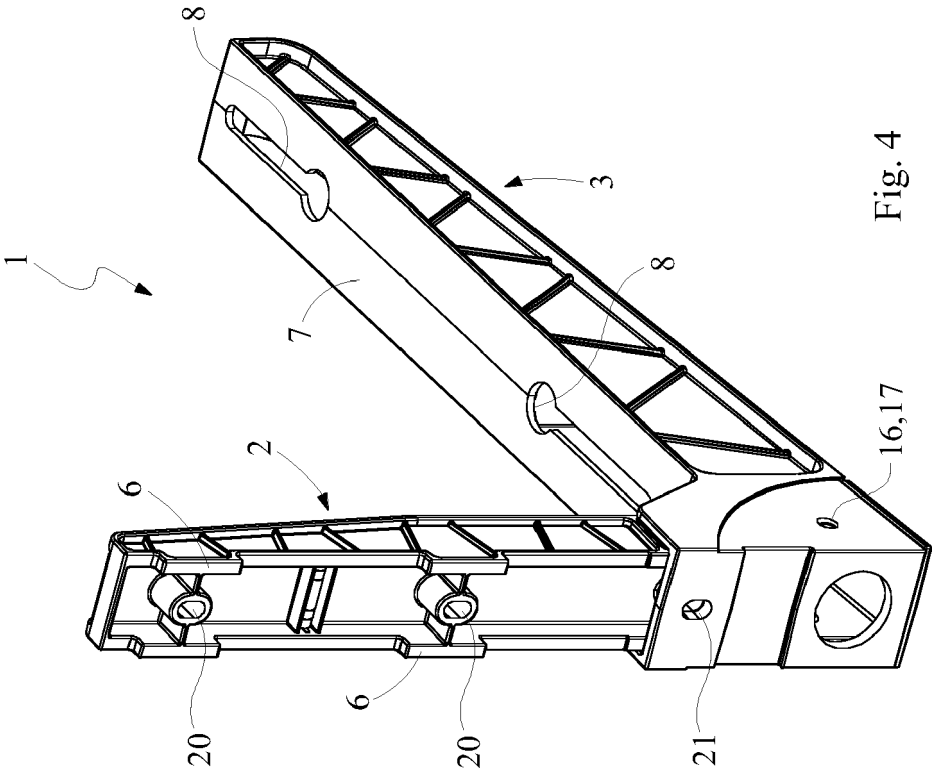


Fig. 4

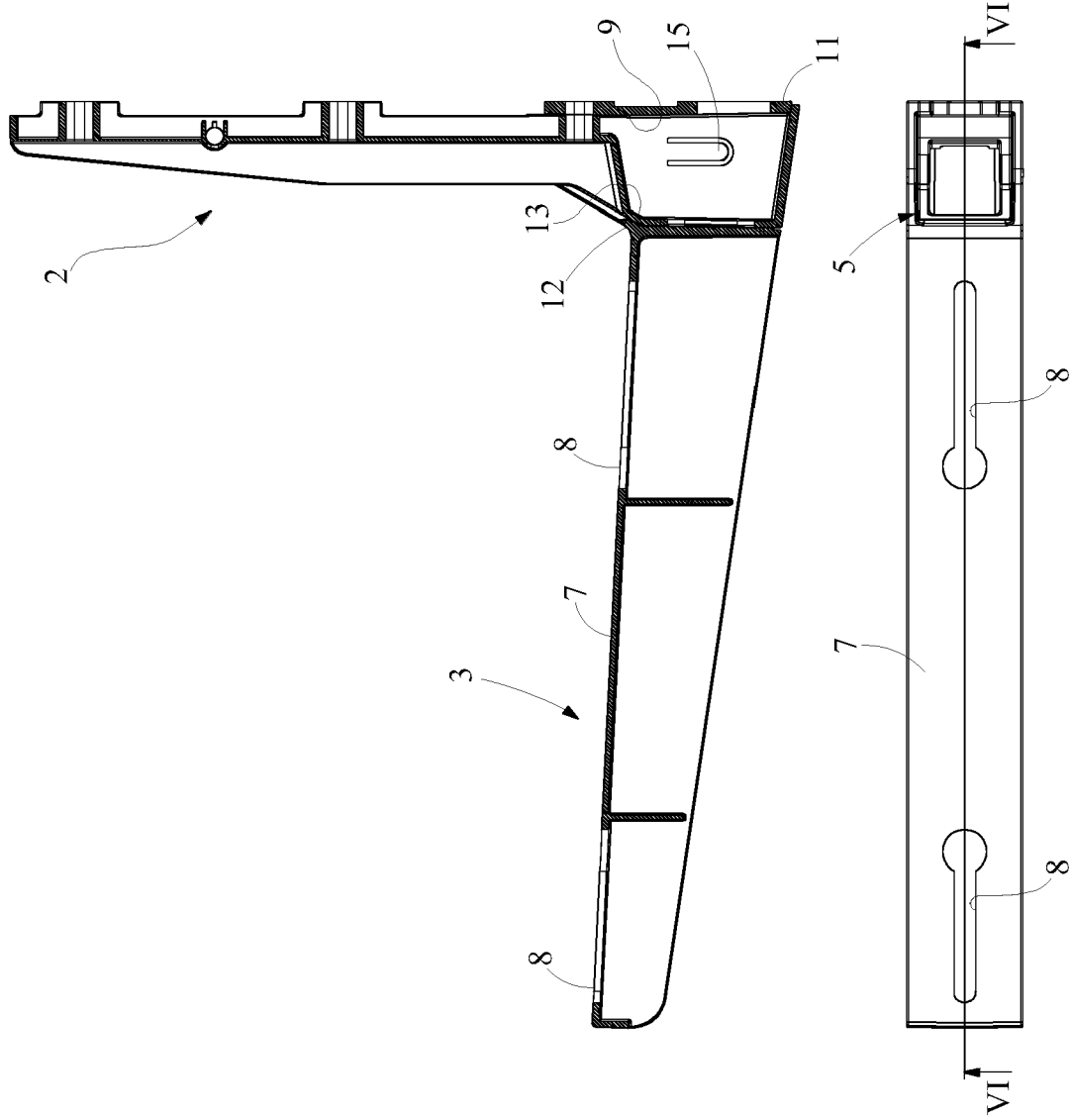


Fig. 6

Fig. 5

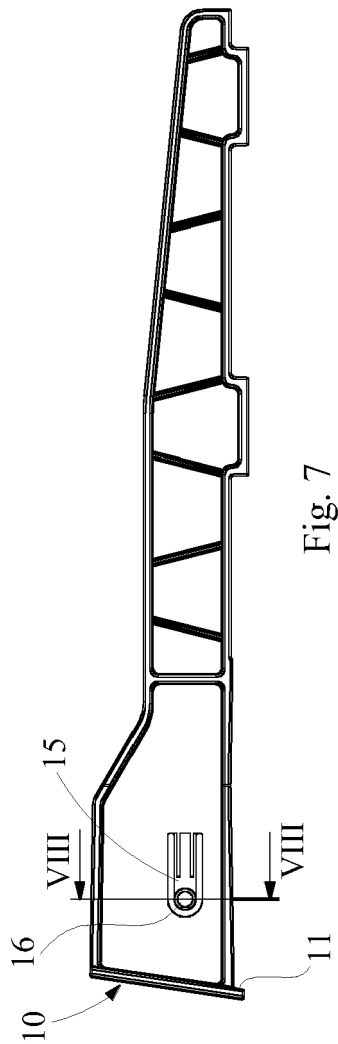


Fig. 7

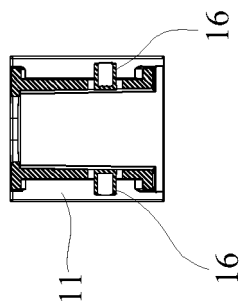


Fig. 8



EUROPEAN SEARCH REPORT

Application Number

EP 22 18 5005

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	CN 110 925 898 A (XUZHOU GONGLE RUBBER PLASTIC MACHINERY CO LTD) 27 March 2020 (2020-03-27) * paragraphs [0012] - [0020]; figure 1 * -----	1-10	INV. F24F1/62 F24F13/32
A	KR 970 047 281 A (LG ELECTRONICS INC [KR]) 26 July 1997 (1997-07-26) * the whole document * -----	1-10	
A	CN 211 011 659 U (JIANGSU AEF PURIFICATION EQUIPMENT MFG CO LTD) 14 July 2020 (2020-07-14) * the whole document * -----	1-10	
A	GB 2 377 620 A (AINSWORTH REFRIGERATION [GB]) 22 January 2003 (2003-01-22) * the whole document * -----	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 November 2022	Examiner Schwaiger, Bernd
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 18 5005

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-11-2022

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
	CN 110925898 A	27-03-2020	NONE	

15	KR 970047281 A	26-07-1997	NONE	

	CN 211011659 U	14-07-2020	NONE	

20	GB 2377620 A	22-01-2003	NONE	

25				
30				
35				
40				
45				
50				
55				

EPO FORM P0459

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