



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.06.2020 Bulletin 2020/26

(51) Int Cl.:
F24D 19/10 ^(2006.01) **F24H 9/20** ^(2006.01)

(21) Application number: **19213817.0**

(22) Date of filing: **05.12.2019**

(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

• **Protherm Production s.r.o.**
909 01 Skalica (SK)

(72) Inventor: **Pecha, Jozef**
908 46 Unín (SK)

(74) Representative: **Popp, Carsten**
Vaillant GmbH
IRP
Berghauser Straße 40
42859 Remscheid (DE)

(30) Priority: **19.12.2018 SK 2332018**

(71) Applicants:
• **Vaillant GmbH**
42859 Remscheid (DE)

(54) **CONTROL PANEL**

(57) A control panel, in particular for a heating device, functionally connectable to the device by means of cables or wirelessly and mechanically removably fastened to the casing of the device, is formed by a body (20) on which fastening means are arranged comprising of at

least two fasteners (4) provided with spring elements (5), at least two fasteners (6) provided with bosses (7), partitions (10) and slotted openings (11) and at least two bosses (9) provided with openings for hanging.

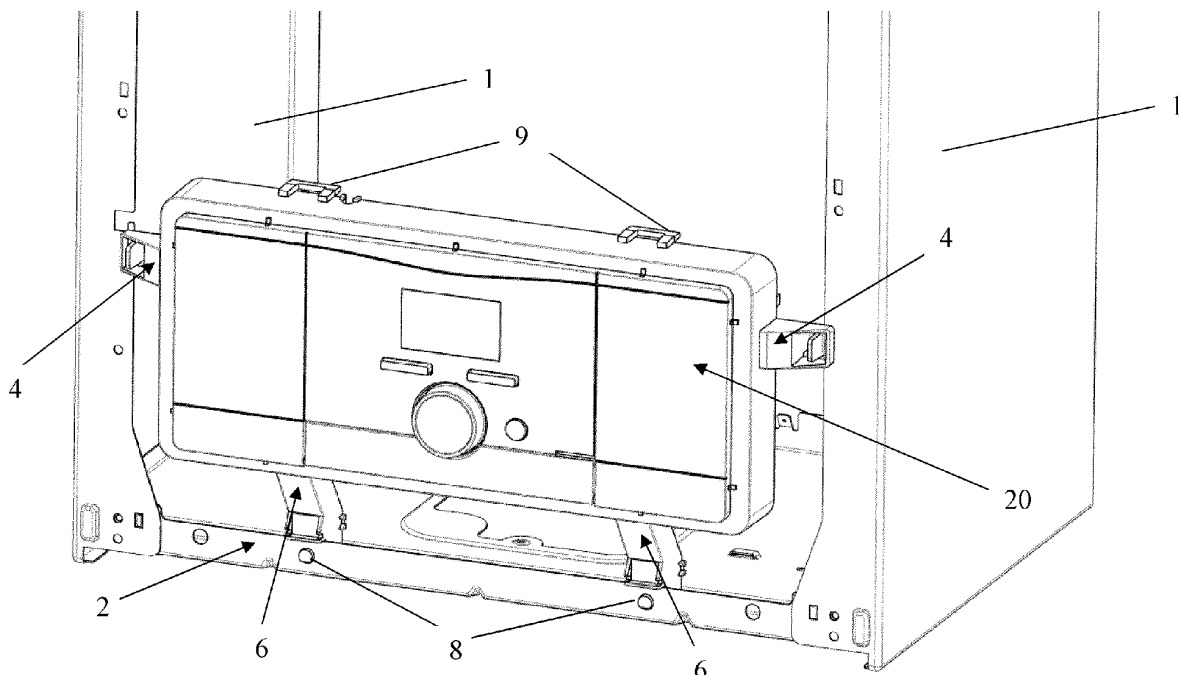


Fig. 1

Description

Field of the Invention

[0001] The technical solution describes a control panel and its fastening to the device housing, in particular a heating device, by means of fastening elements integrated on the control panel body.

Background Art

[0002] In the prior art, heater devices are known which are equipped with a control panel with display and control elements allowing to visually display the state of the device and change the device parameters by the user.

[0003] Heating devices generally include devices for the preparation of domestic hot water for hygienic use and/or for the production of hot water circulating in the heating circuit. The heating circuit is usually connected to the space heaters (radiators, underfloor heating) by means of suitable valves, through which the heat from the water is transferred to the room. The water is heated to a preset working temperature by means of heat generators such as fuel burners or electric heating coils, other primary heating sources (solar panels, heat pumps) are also used in the art. For the purpose of adjusting some parameters of the device, such as the desired temperature at the heating output, the desired domestic hot water temperature, the adjustment of the filling pressure of the heating system, the shutdown of the heating in summer mode and the like, the control and display elements are arranged on the control panel.

[0004] The control and display elements are functionally connected via wires or wirelessly to the control components of the device and to the control electronics. In addition to the set parameters, a display element such as a digital display also displays error messages in the event of a fault in the device.

[0005] The control panel is part of the design of the heater and its appearance varies depending on the type and model of the heater.

[0006] The aim of the manufacturers is to prepare a user-friendly interface for the control of the device and at the same time simplify the assembly and disassembly of the panel as much as possible.

[0007] The most frequently used technical solution consists in that the control panel is fixed to the device by suitable fastening means and consequently the front surface of the control panel is exposed to a through hole in the front cover of the boiler. This type of arrangement complies with the safety standards for the device casings. The control panel is most often fixed by fasteners and screws forming hinges and, if necessary, the control panel can be swung into the outside space after the front cover of the heater has been removed. In this position, the service engineer is allowed access to components that are arranged on the rear of the control panel and, in addition, can perform the necessary operations on other

parts of the device.

[0008] The disadvantage of the hinge mounting is that in case of service intervention requiring the control panel to be tilted, visual inspection of the display elements is impossible. The display elements on the tilted panel are directed downwards and the person servicing the machine does not see the system response on these display elements. Another disadvantage is that if the control panel is removed for replacement, or if the control panel is removed for service on the device, the screws and brackets must be unscrewed.

Summary of the Invention

[0009] The control panel for the device, in particular the heater, is functionally connectable to the device by means of wires or wirelessly and can be mechanically and detachably fastened to the heater housing.

[0010] The removable mechanical fastening is made possible by the fastening means provided on the surfaces of the control panel body: fasteners provided with elastic elements, fasteners provided with bosses, partitions and slotted openings, and bosses provided with suspension openings.

[0011] The fastening of the control panel body to the housing is ensured solely by means of integrated fastening means arranged on the surfaces of the panel and by means of openings, protrusions and surfaces on the covers which are part of the casing of the heating device.

[0012] Positioning in the vertical direction is ensured by means of integrated bosses which fit into the openings arranged on the bottom cover of the device casing and the entire panel is fitted with its fixed fasteners on complementary projections projecting from the bottom cover of the device casing. The control panel is blocked from sliding out by the integrated partition.

[0013] The control panel is secured in the operating position by pushing the spring elements arranged on the side fasteners of the panel against the side covers of the device casing.

[0014] The control panel body includes additional bosses provided with openings to allow the control panel to be hung on the projections arranged on the bottom cover. In addition to the conventional tilted position of the panel, a further service position of the device is thus provided, which allows the display means to be monitored during handling of the device components.

[0015] The advantage of the technical solution is that the control panel body is fastened to the adjacent casing covers of the heater without any brackets and screws, thereby ensuring that the assembly and disassembly is carried out without the use of additional fasteners or tools.

Brief Description of the Drawings

[0016] The technical solution is further explained in drawings, but not limited to them.

Fig. 1 shows the control panel in a fixed position

Fig. 2 shows a side cross-sectional view of the control panel (detailing the joint)

Fig. 3 shows the control panel in a tilted position

Fig. 4 shows the control panel in a service position

Example of Embodiment

[0017] Fig. 1 shows a part of the casing of an electrical heater boiler consisting of the side covers 1 of the casing and the bottom cover 2 of the casing, with the control panel body 20 mounted, with control and display elements and without functional wiring and boiler components.

[0018] The control panel body 20 has essentially a cuboid shape, with one front, one upper, one bottom and two side surfaces, the surface position being understood to be the front view of the boiler in operation with the control panel mounted. On the front surface there are control and display elements that can be operationally connected to the components of the device by means of wires or wirelessly.

[0019] The control panel body 20 is fastened to the bottom cover 2 of the device casing by means of its integrated fasteners 6 on which the bosses 7 are arranged. The bosses 7 are inserted during assembly into the prepared openings 8 arranged on the bottom cover 2 of the electric boiler casing.

[0020] Fig. 2 is a side cross-sectional view of the joint of the control panel body 20 in a mounted state at the connection of the fastener 6 to the bottom cover 2.

[0021] In detail A, there is shown a partition 10 which is supported by a protrusion 3 extending from the bottom cover 2.

[0022] The partition 10 secures the control panel body 20 from sliding out of the position secured by the bosses 7. During assembly, the control panel body 20 is first mounted on the projections 3 by means of slotted holes 11 arranged on the fastener 6, rotated from the tilted position upwards, the bosses 7 are placed in the holes 8 and then the control panel is fixed in the operating position so that the spring elements 5, which are arranged on the side fasteners 4, are pressed against the respective surfaces (not shown) on the side covers 1 of the electric boiler casing.

[0023] Fig. 3 shows the control panel body 20 in the tilted position, the fasteners 6 are mounted on the projections 3 through the slotted openings 11. From this tilted position the control panel is mounted into the operating position or it is removed.

[0024] From the tilted position of the control panel shown in Fig. 3, the control panel can also be fixed to the service position shown in Fig. 4.

[0025] In the service position in Fig. 4, the control panel body 20 is suspended by means of bosses 9 provided

with openings on the protrusions 3, the control panel body 20 being operatively connected (not shown) by cables or wirelessly to the components of the electric boiler. In this convenient position of the control panel, the service engineer can monitor the display elements, adjust the parameters by means of the control elements, and simultaneously manipulate with the components located in the interior of the electric boiler.

[0026] The described fastening means - fasteners 4, fasteners 6, spring elements 5, bosses 7 and bosses 9 arranged on the control panel body 20 are formed of plastic together with the control panel body 20 by molding from one mold.

[0027] The control panel body 20 is provided with control and display elements, connectors for connection cables and control electronics. The fastening of the control panel to the electric boiler housing is ensured solely by the integrated fastening means of the fasteners 4, the fasteners 6, the bosses 7 and the surfaces arranged on the side covers of the housing 1 and the openings 8 and protrusions 3 arranged on the bottom cover of the housing 2.

[0028] The number of fasteners 4 and 6 and bosses 7 and 9 is not limited by the example described, it being understood that their number may vary on different models of the control panel.

Industrial Applicability

[0029] The solution of control panel mounting with integrated elements without the use of additional fasteners and tools is suitable for any device using a separate control panel.

[0030] The benefit of this solution lies in the quick assembly in the production process as well as in the quick dismantling for service tasks, and the economical savings associated with the removal of additional fasteners are also not negligible.

[0031] The present technical solution optimizes the mounting of the control panel to the heater housing and thus enables fast assembly in the production as well as improved access to the control panel and other components of the heater during servicing.

List of reference signs:

[0032]

- 1 - side cover
- 2 - bottom cover
- 3 - protrusion
- 4 - fastener
- 5 - spring element

- 6 - fastener
- 7 - boss
- 8 - opening 5
- 9 - boss
- 10 - partition 10
- 11 - slot opening
- 20 - body

15

Claims

1. A control panel, in particular for a heating device, functionally connectable to the device by means of cables or wirelessly and mechanically removably fastened to the casing of the device, 20
characterized in that
it is formed by a body (20) on which fastening means are arranged comprising of at least two fasteners (4) provided with spring elements (5), at least two fasteners (6) provided with bosses (7), partitions (10) and slotted openings (11) and at least two bosses (9) provided with openings for hanging. 25
2. The control panel according to the claim 1, 30
characterized in that
the body (20) is formed as a plastic extrusion by molding from one mold together with the fasteners (4, 6), the elastic elements (5) and the bosses (7, 9). 35
3. The control panel according to the claim 1, 40
characterized in that
that the body (20) is provided with control and display elements and is operatively connected to the device by means of wires or wirelessly, the bosses (7) arranged on the fasteners (6) are inserted into the openings (8) arranged on the bottom cover (2), the partitions (10) arranged on the fasteners (6) are pressed against the protrusions (3) arranged on the bottom cover (2) of the device casing and the spring elements (5) arranged on the fasteners (4) are pressed against the side covers (1) of the device casing. 45
4. The control panel according to the claim 1, 50
characterized in that
the body (20) is provided with control and display elements and is operatively connected to the device by means of wires or wirelessly and the bosses (9) are hinged to the protrusions (3) arranged on the bottom cover (2) of the device casing. 55

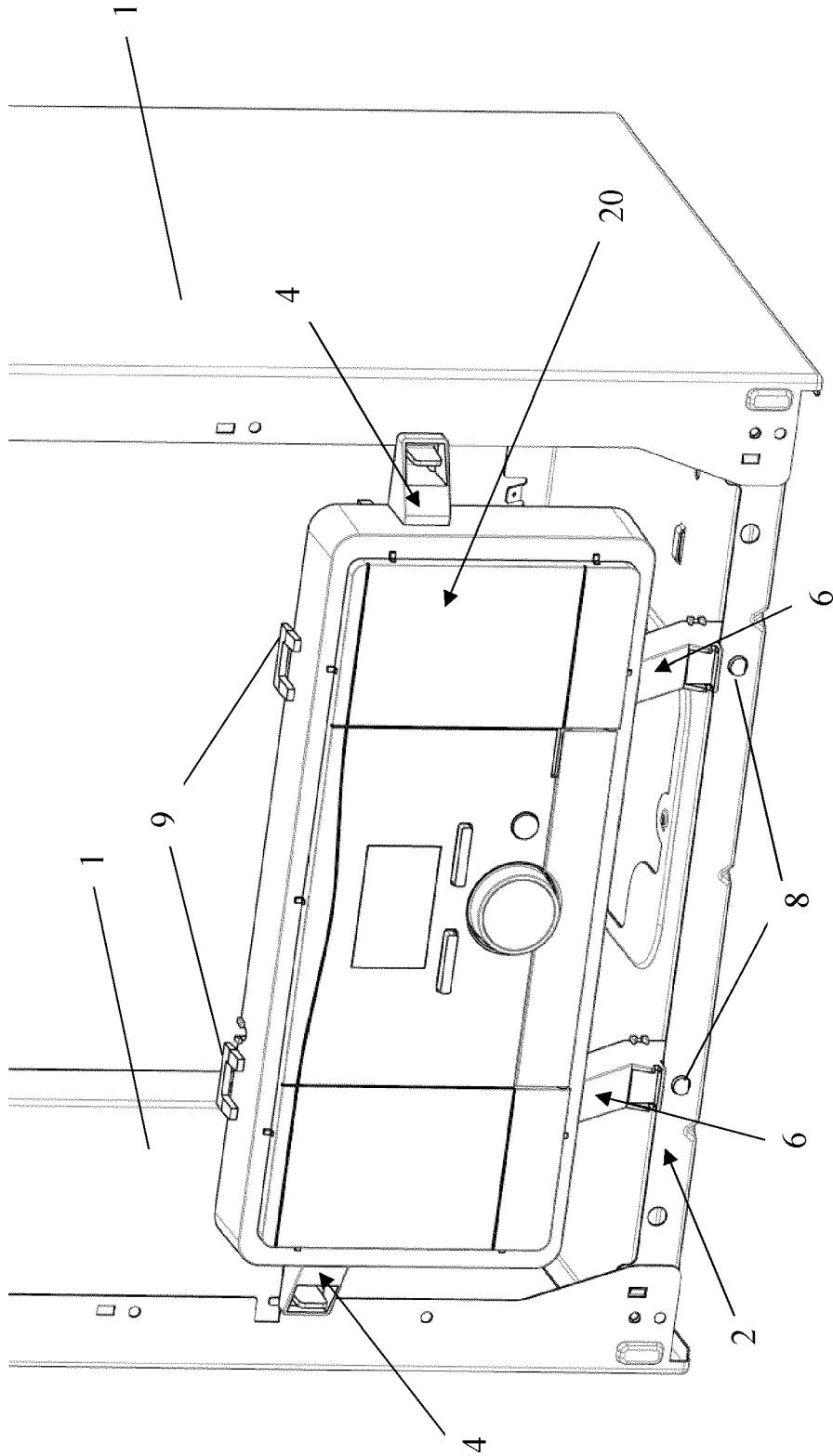


Fig. 1

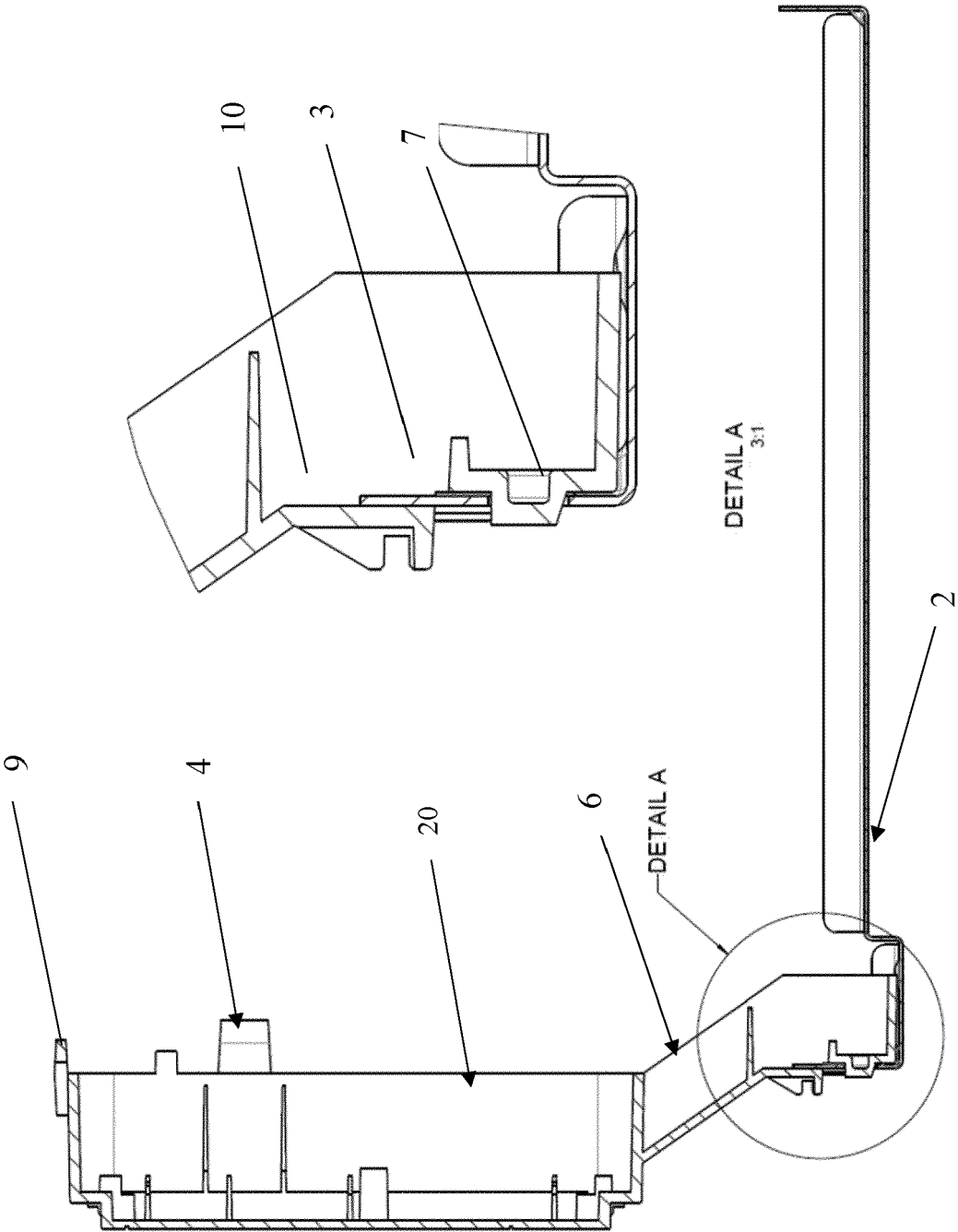


Fig. 2

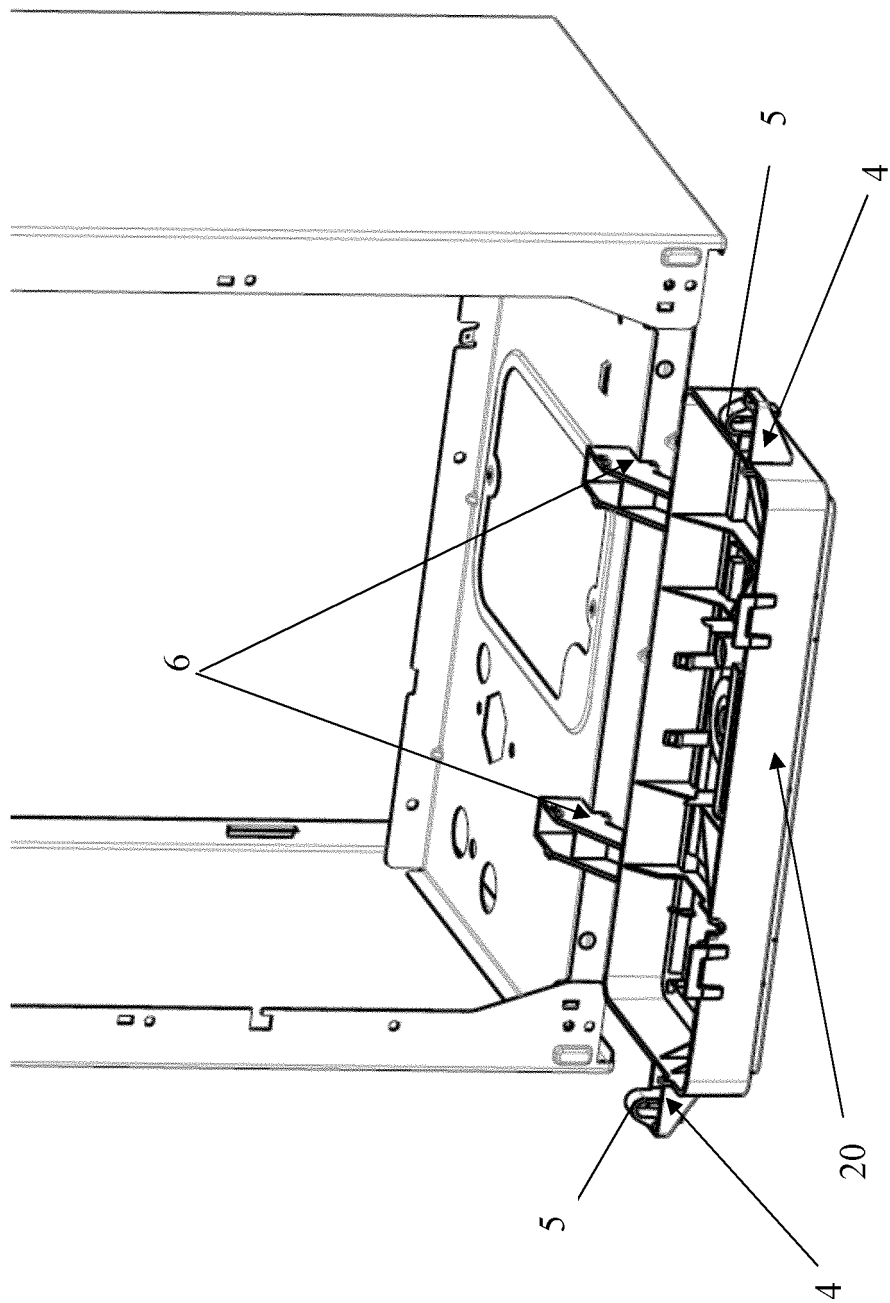


Fig. 3

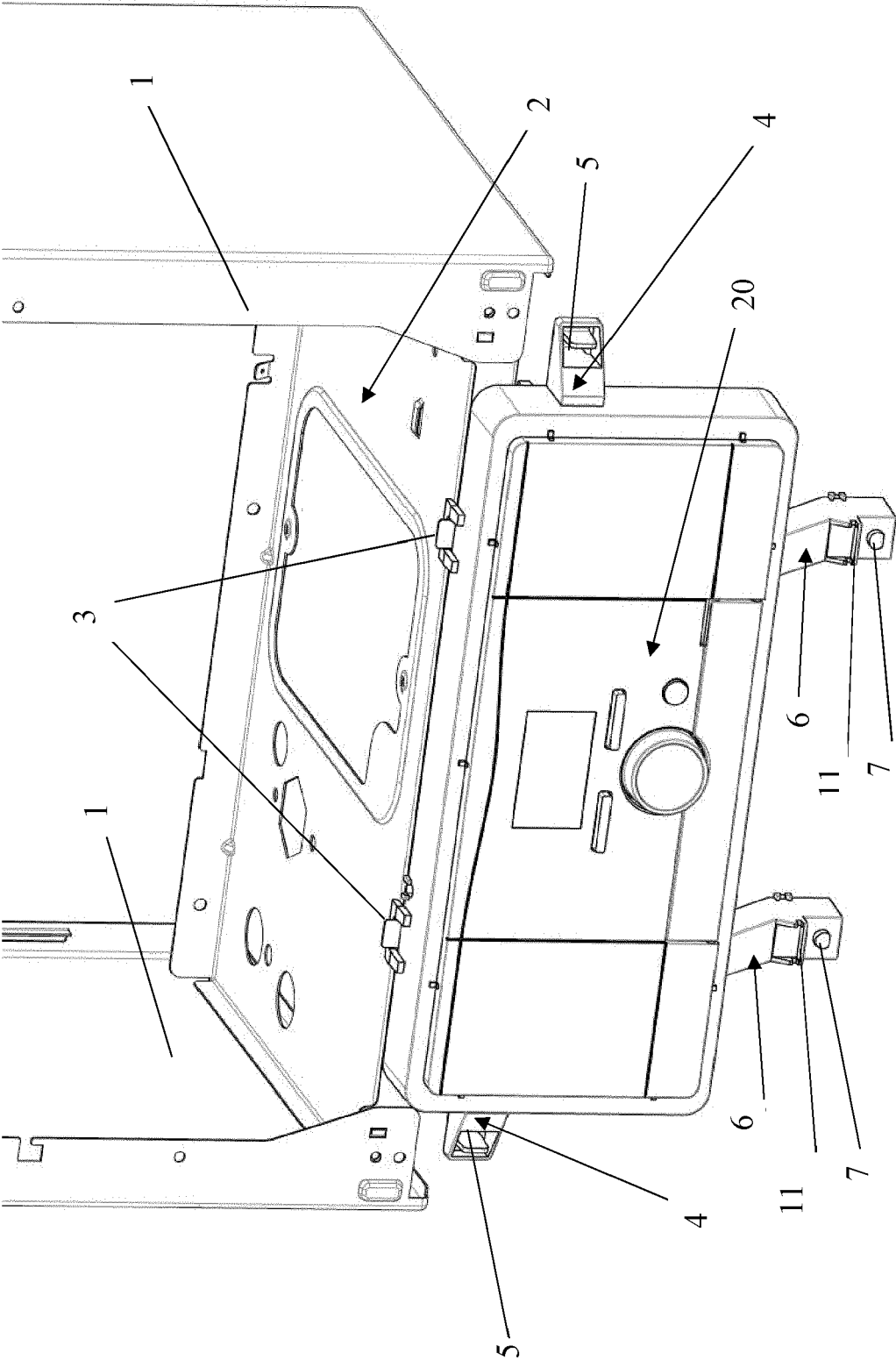


Fig.4



EUROPEAN SEARCH REPORT

Application Number
EP 19 21 3817

5

10

15

20

25

30

35

40

45

50

55

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	EP 2 963 355 A1 (STIEBEL ELTRON GMBH & CO KG [DE]) 6 January 2016 (2016-01-06) * paragraphs [0037], [0041], [0048] - [0050]; figures 5-7 *	1-4	INV. F24D19/10 F24H9/20
X	KR 2009 0003293 U (LOTTE ENG & MACHINERY MFG CO LTD) 8 April 2009 (2009-04-08) * abstract; figures 1-4 *	1-4	
X	KR 2011 0137120 A (LOTTE ALUMINIUM CO LTD [KR]) 22 December 2011 (2011-12-22) * abstract; figures 1-4 *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24D F24H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 17 February 2020	Examiner García Moncayo, O
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			

EPO FORM 1503 03/02 (P04C01)

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

EP 19 21 3817

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.

17-02-2020

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2963355 A1	06-01-2016	DE 102014009472 A1 EP 2963355 A1	31-12-2015 06-01-2016
-----	-----	-----	-----
KR 20090003293 U	08-04-2009	NONE	
-----	-----	-----	-----
KR 20110137120 A	22-12-2011	NONE	
-----	-----	-----	-----

15

20

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