(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 798 553 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
31.03.2021 Bulletin 2021/13

(51) Int Cl.:
F25D 21/14 *(2006.01)*

(21) Application number: **20193623.4**

(22) Date of filing: **31.08.2020**

(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

(30) Priority: **27.09.2019 TR 201914785**

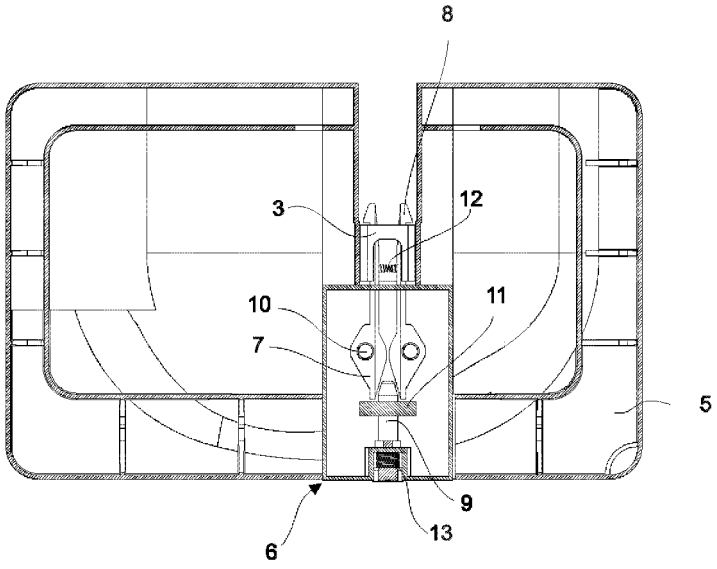
(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
- **GUNDOGAN, Hamdi**
  34445 Istanbul (TR)
- **GORDES, Beytullah**
  34445 Istanbul (TR)
- **UNGOR, Murat**
  34445 Istanbul (TR)
- **KANTIK, Serdar**
  34445 Istanbul (TR)
- **KARADENIZ, Hakan**
  34445 Istanbul (TR)

(54) A COOLING DEVICE HAVING SIMPLIFIED DRIP TRAY ASSEMBLY MEANS

(57) The present invention relates to a cooling device (1) comprising; a compressor (2), an evaporator, a bracket (3) attached onto the compressor (2) forming a conduit (4) in-between, a drip tray (5) to be placed onto the compressor (2) wherein the drip tray (5) is configured to be fluidly communicated with the evaporator via a water discharge line such that the water discharged through said water discharge line is collected into the drip tray (5), the drip tray (5) comprising a fastening means (6) via which the drip tray (5) is removable placed onto the compressor (2) via the conduit (4).

Figure 4



EP 3 798 553 A1

Description

[0001] The present invention relates to a cooling device, in particular to a cooling device having simplified drip tray assembly means.

[0002] The present invention relates to a cooling device having a drip tray that enables the water ensuing from the defrost process to be collected. In cooling devices, for example freezers and refrigerators, the defrost process is carried out in order to remove the frost, accumulating on the evaporator which in time affects the energy efficiency of the cooling device if left unattended. The water resulting from the defrost process is carried to a drip tray provided on or in close vicinity of the compressor. The heat resulting during the operation of the compressor is used to vaporize the water. In the state of the art embodiments, the drip tray is placed on the compressor via clips, wherein the clips are provided on a lower surface of the drip tray. The assembly personnel place the drip tray on the compressor wherein the clips are inserted inside a bracket provided on the compressor. A problem with the state of the art is that the drip tray, once it is fixed on the compressor via the clips, remains on the compressor. The drip tray, if needed to be removed from the compressor, the assembly personnel needs to break the clips rendering the drip tray useless. Therefore, the manufacturing costs of the cooling device increases. This situation necessitates the production of drip trays having a simplified assembly means wherein the said assembly means provides the assembly personnel with the option of easily removing the drip tray from the compressor.

[0003] A prior art publication in the technical field of the present invention may be referred to as US20110232314A1 among others, the document disclosing a cooling appliance having a condensation collection chamber.

[0004] A prior art publication in the technical field of the present invention may be referred to as EP3102898B1 among others, the document disclosing a cooling appliance having an evaporation tray.

[0005] An objective of the present invention is to prevent or minimize the amount of drip trays scrapped during the assembly process which in turn decreases the manufacturing costs.

[0006] The method realized to achieve the aim of the present invention and disclosed in the first claim and the dependent claims comprises a cooling device. The cooling device comprises a compressor and an evaporator. The compressor compresses the coolant and pumps the coolant into the cooling cycle. As the coolant passes through the evaporator, it expands, absorbs heat thus cooling the surface of the evaporator. A fan is provided to circulate the air inside the compartments of the cooling device by passing the air through the evaporator. The humidity in the air freezes on the surface of the evaporator forming a layer of frost. The frost layer gets thicker in time, decreasing energy efficiency of the cooling device. Therefore, the cooling devices perform defrost process on regular intervals. The water ensuing from the defrost process is collected inside a drip tray. The drip tray and the evaporator are connected via a water discharge line fluidly connecting the evaporator to the drip tray. As a result, the water ensuing from the defrost process is collected inside the drip tray. The drip tray is placed onto the compressor. The compressor has a casing enclosing the operational parts of the compressor hermetically from the outer environment. A bracket is placed onto the casing of the compressor. The bracket is in the shape of a "U" profile and form a conduit upon being placed onto the compressor. The drip tray comprises an aperture through which the bracket passes through upon placing the drip tray onto the compressor. A fastening means is provided via which the drip tray is removable placed onto the compressor. The fastening means can be provided as a separate part or as an integral part of the drip tray. In the first case, wherein the fastening means is provided as a separate part, the drip tray is placed onto the compressor, the bracket passes through the aperture and then the fastening means is placed onto the drip tray, removable fixing the drip tray onto the compressor via the conduit. In the second case, wherein the fastening means is provided as an integral part of the drip tray, the drip tray is placed onto the compressor, the bracket passes through the aperture and then the fastening means moves along a predetermined path removable fixing the drip tray onto the compressor. The fastening means comprises a pair of lugs wherein each of the said lugs comprises a tab via which the fastening means holds onto the bracket via the conduit. The fastening means further comprises a button which is pressed to move the button towards the lugs and if pressed by a predetermined amount, the button forces the lugs to pivot around their respective axes. Upon pivoting, the tabs converge, decreasing the distance between the tabs, therefore releasing the tabs and the fastening means from the bracket. The lugs have two positions, these positions being the open position and the closed position. After the button is pressed, the button abuts against the lugs and the tabs gets closer effectuating the closed position. Before the button is pressed, the lugs lay parallel to each other, the tabs abut against the bracket inhibiting the movement of the fastening means. By means of the fastening means, the drip tray is placed onto the compressor in an easily removable manner which helps reduce the scrapping of the drip trays during the assembly process. Another advantageous effect provided by means of this invention is that the drip tray is attached onto the compressor by the fasting means, occupying minimum amount of volume which helps increase the volumetric water collection capacity of the drip tray. Another advantageous effect of using the fastening means is that the fastening means can be replaced with a new fastening means instead of replacing the drip tray should the fastening means gets damaged.

[0007] In an embodiment of the invention, the button

moves along a first axis. The lugs extend parallel and in mirror symmetry with respect to the said axis. Upon pressing the button, the button moves along the first axis, gets in between the pair of lugs and abuts the lugs, forcing them toward the closed position. By means of the lugs and the button laying parallel and on the first axis respectively, the fastening means occupies minimum volume. As a result, the volumetric capacity of the drip tray increases which in turn increases the evaporative capacity of the drip tray.

[0008] In an embodiment of the invention, the fastening means comprises a pair of vertical shafts. The vertical shafts extend along a second axis wherein the second axis is almost perpendicular to the first axis but distanced by from the first axis. The vertical shafts help guide the lugs as their position changes from the closed position to the open position and from the open position to the closed position.

[0009] In an embodiment of the invention, the fastening means comprises a support wall. The support wall comprises an opening through which the button passes through. The support wall helps guide the button as the button moves along the first axis.

[0010] In an embodiment of the invention, the fastening means comprises a first biasing means. The first biasing means is placed in-between the lugs and biases the lugs towards the open position. The first biasing means can be a spring. The first biasing means is placed onto a pair of protrusions provided on the lugs wherein the protrusions face each other with the first biasing means interconnecting the protrusions. By means of the first biasing means, the lugs via the help of the tabs, automatically engages with the bracket. As a result, ease of assembly is provided for the assembly personnel.

[0011] In an embodiment of the invention, the fastening means comprises a second biasing means. The second biasing means is placed in-between the button and the support wall or any other surface of the fastening means. The second biasing means biases the button away from the lugs.

[0012] By means of the present invention, the drip tray is removable placed onto the compressor minimizing the amount of drip trays scrapped during the assembly process.

[0013] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.

Figure 1 - is a cross sectional side view of the cooling device

Figure 2 - is a side view of the compressor

Figure 3 - is a perspective view of the drip tray from below

Figure 4 - is a view of the drip tray from above wherein the lugs are in open position

Figure 5 - is a view of the drip tray from above wherein the lugs are in closed position

[0014] The following numerals are assigned to different parts demonstrated in the drawings and referred to in the present detailed description of the invention:

1. Cooling device
2. Compressor
3. Bracket
4. Conduit
5. Drip tray
6. Fastening means
7. Lug
8. Tab
9. Button
10. Vertical shaft
11. Support wall
12. First biasing means
13. Second biasing means

[0015] The present invention relates to a cooling device (1) comprising a compressor (2), an evaporator, a bracket (3) attached onto the compressor (2) forming a conduit (4) in-between,a drip tray (5) to be placed onto the compressor (2) wherein the drip tray (5) is configured to be fluidly communicated with the evaporator via a water discharge line such that the water discharged through said water discharge line is collected into the drip tray (5), the drip tray (5) comprising a fastening means (6) via which the drip tray (5) is removable placed onto the compressor (2) via the conduit (4).

[0016] The present invention relates to a cooling device (1), comprising the fastening means (6) wherein the fastening means (6) comprises; a pair of lugs (7) wherein each of the lugs (7) comprises a tab (8) via which the fastening means (6) holds onto the bracket (3) in an open position of the lugs (7), a button (9) pressable by means of force exerted and which upon being pressed, forces the pair of lugs (7) to pivot around respective axes towards a closed position during which the tabs (8) converge, freeing the tabs (8) and the drip tray (5) from the bracket (3) and the compressor (2) respectively. The button (9), upon being pressed moves along the fastening means (6), abuts against the lugs (7) and the lugs (9) pivot which in turn draws the tabs (8) closer. As a result, the fastening means (6) is released from the bracket (3) and therefore the drip tray (5) is released from the compressor (2). By means of this invention, ease of assembly for the drip tray (5) is provided. Another advantageous effect is that the assembly personnel can easy remove the drip tray (5) from the compressor (2) without damaging any parts of the drip tray (5) or that of the fastening means (6) which decreases the scrapping of said parts.

[0017] In a preferred embodiment of the invention, the button (9) moves along a first axis and that the pair of lugs (7) extend parallel and symmetrical with respect to the first axis and wherein the button (9) upon being pressed gets in between the pair of lugs (7) via a rear

end of the pair of lugs (7) located opposite the tabs (8).

[0018] In a preferred embodiment of the invention, the fastening means (6) comprises a pair of vertical shafts (10) pivotably guiding the pair of lugs (7).

[0019] In a preferred embodiment of the invention, the fastening means (6) comprises a support wall (11) having an opening via which the button (9) is guided.

[0020] In a preferred embodiment of the invention, the fastening means (6) comprises a first biasing means (12) biasing the pair of lugs (7) towards the open position.

[0021] In a preferred embodiment of the invention, the fastening means (6) comprises a second biasing means (13) biasing the button (9) away from the pair of lugs (7).

[0022] In a preferred embodiment of the invention, the fastening means (6) is configured to be placed onto a groove provided on the drip tray (5) by sliding along the first axis.

Claims

1. A cooling device (1) comprising;
a compressor (2),
an evaporator,
a bracket (3) attached onto the compressor (2) forming a conduit (4) in-between,
a drip tray (5) to be placed onto the compressor (2) wherein the drip tray (5) is configured to be fluidly communicated with the evaporator via a water discharge line such that the water discharged through said water discharge line is collected into the drip tray (5), the drip tray (5) comprising a fastening means (6) via which the drip tray (5) is removable placed onto the compressor (2) via the conduit (4),
characterized in that
the fastening means (6) comprises;
a pair of lugs (7) wherein each of the lugs (7) comprises a tab (8) via which the fastening means (6) holds onto the bracket (3) in an open position of the lugs (7),
a button (9) pressable by means of force exerted and which upon being pressed, forces the pair of lugs (7) to pivot around respective axes towards a closed position during which the tabs (8) converge, freeing the tabs (8) and the drip tray (5) from the bracket (3) and the compressor (2) respectively.

2. A cooling device (1) according to claim 1, **characterized in that** the button (9) moves along a first axis and that the pair of lugs (7) extend parallel and symmetrical with respect to the first axis and wherein the button (9) upon being pressed gets in between the pair of lugs (7) via a rear end of the pair of lugs (7) located opposite the tabs (8).

3. A cooling device (1) according to claim 1, **characterized in that** the fastening means (6) comprises a pair of vertical shafts (10) pivotably guiding the pair of lugs (7).

4. A cooling device (1) according to claim 1, **characterized in that** the fastening means (6) comprises a support wall (11) having an opening via which the button (9) is guided.

5. A cooling device (1) according to claim 1, **characterized in that** the fastening means (6) comprises a first biasing means (12) biasing the pair of lugs (7) towards the open position.

6. A cooling device (1) according to claim 1, **characterized in that** the fastening means (6) comprises a second biasing means (13) biasing the button (9) away from the pair of lugs (7).

7. A cooling device (1) according to claim 1, **characterized in that** the fastening means (6) is configured to be placed onto a groove provided on the drip tray (5) by sliding along the first axis.

Figure 1

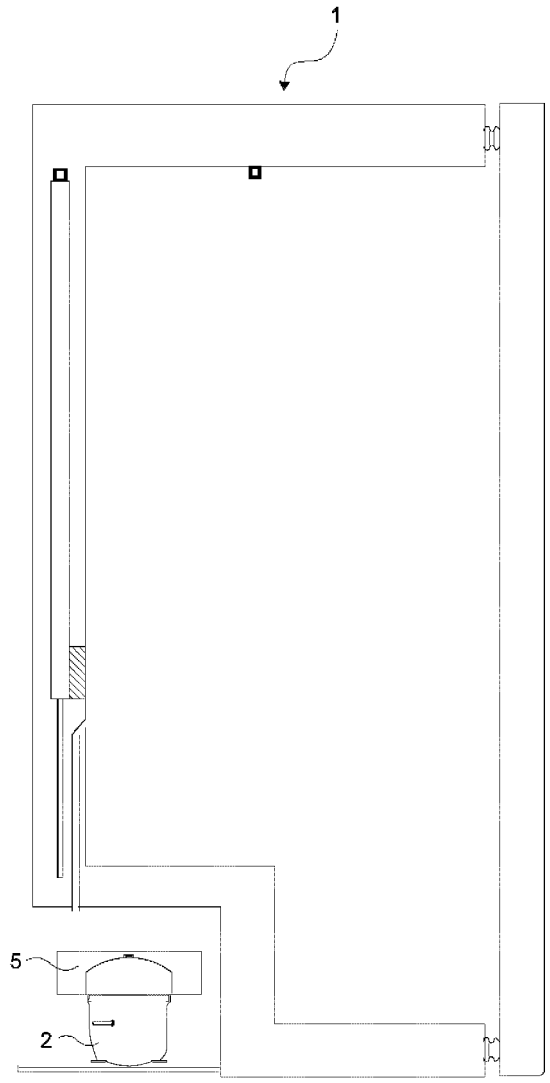


Figure 2

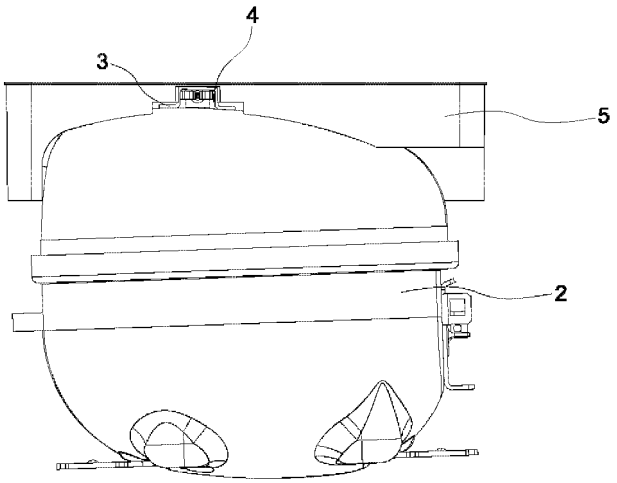


Figure 3

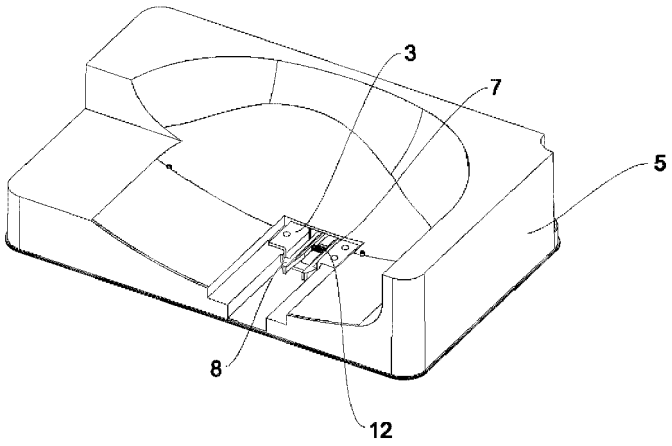


Figure 4

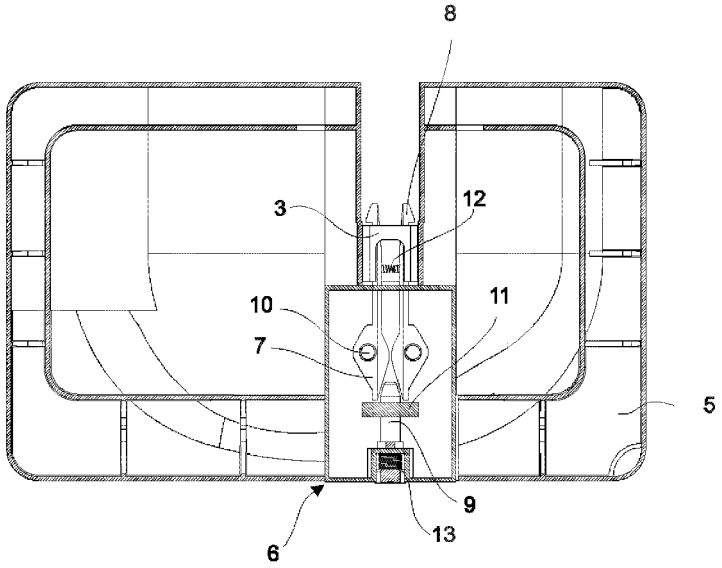
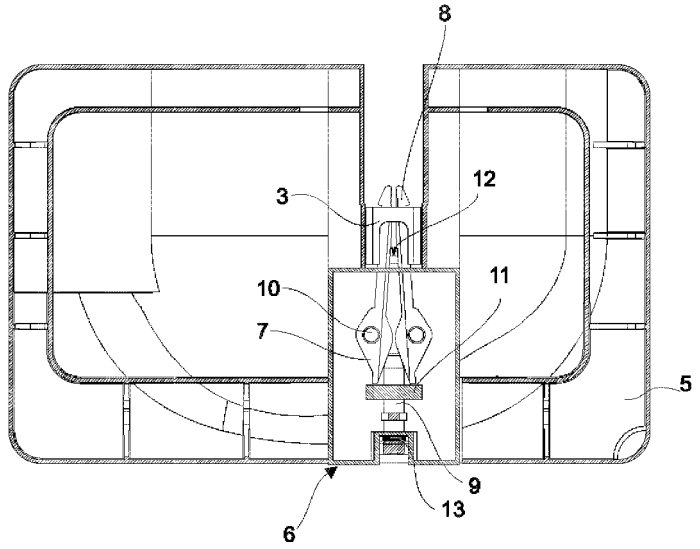


Figure 5



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 19 3623

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 103 940 176 B (HEFEI HUALING CO LTD) 13 January 2016 (2016-01-13) * the whole document *	1-7	INV. F25D21/14
A	DE 10 2014 208118 A1 (BSH HAUSGERÄTE GMBH [DE]) 5 November 2015 (2015-11-05) * figures 1-9 *	1-7	
A	DE 10 2011 087810 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 6 June 2013 (2013-06-06) * the whole document *	1	
A,D	DE 10 2008 054936 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 24 June 2010 (2010-06-24) * figures 1-3 *	1	
A	CN 102 635 992 B (HEFEI MIDEA ROYALSTAR REFRIGER; HEFEI HUALING CO LTD) 25 June 2014 (2014-06-25) * figures 1-8 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 January 2021	de Graaf, Jan Douwe

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 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 19 3623

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.

13-01-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 103940176 B	13-01-2016	NONE	
DE 102014208118 A1	05-11-2015	NONE	
DE 102011087810 A1	06-06-2013	CN 104160228 A	19-11-2014
		DE 102011087810 A1	06-06-2013
		EP 2788696 A1	15-10-2014
		PL 2788696 T3	29-07-2016
		WO 2013083435 A1	13-06-2013
DE 102008054936 A1	24-06-2010	CN 102257337 A	23-11-2011
		DE 102008054936 A1	24-06-2010
		EA 201170805 A1	30-01-2012
		EP 2379961 A2	26-10-2011
		JP 2012513011 A	07-06-2012
		KR 20110111367 A	11-10-2011
		TR 201808176 T4	23-07-2018
		US 2011232314 A1	29-09-2011
		WO 2010069721 A2	24-06-2010
CN 102635992 B	25-06-2014	NONE	

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

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20110232314 A1 **[0003]**
- EP 3102898 B1 **[0004]**