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(54) **CONDENSOR**

VERFLÜSSIGER

CONDENSEUR

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(56) References cited:
EP-A- 0 383 221 **DE-B- 157 413**
NO-C- 101 033 **SE-B- 365 610**
US-A- 4 876 861

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Description

The present invention relates to an apparatus in refrigerators and/or freezers for condensing a refrigerant, which comprises a condenser in the form of a pipe coil and a number of lamellae disposed on the pipe coil.

Known refrigerators and/or freezers have a static condenser which is placed on the rear side in a space intended therefor. This space encroaches considerably on the space available for the refrigerator and/or freezer compartment itself. In these known constructions the compressor or in many cases the compressors are moreover placed beneath the condenser space, whereby the condenser will be loaded with the working temperature from the compressor or the compressors. This gives rise to a chimney stack effect, whereby dust particles are transported past the compressor or the compressors up to the coil pipe of the condenser and the heat dissipation wires. These will thus be coated with dust particles and this leads to considerable deterioration of the efficiency of the condenser. The manufacture of known condensers is moreover extremely energy-demanding and it is int. al. required that nitrogen gas flows through the pipe coil while the heat dissipation wires are fixedly welded to the pipe walls in order to avoid soot formation during the spot welding itself. A previously known condenser is disclosed in EP-A-0 383 221.

Forming the basis of the present invention lies the task of eliminating or at least considerably reducing the inconveniences in known constructions in accordance with the above.

This task is solved according to the present invention in that the apparatus disclosed by way of introduction is characterized in that the condenser is mounted in a space under the refrigerator and/or freezer cabinet ahead of a compressor assembly. The pipe coil in the condenser is bent for forming a number of straight mutually parallel parts, between which the lamellae are placed. The lamellae have substantially the same length as the straight parts in the pipe coil and display a U-shaped cross section with slight distance between the shanks, which substantially centrally are bent outwardly and on the outside of the outward bending display inward bulges for the placing-in of the pipe coil parts. The shank part on the one side of the inward bulge displays gills with openings aimed in the one direction, while the shank part on the other side of the outward bulge displays gills with openings aimed in the other direction. The shanks are resilient for clamping of the lamellae between the pipe coil parts. The condenser is mounted on the underside of a melt water collector, which is in communication with the refrigerator and/or freezer compartment. The melt water collector and the condenser slope in the one direction.

Through the apparatus according to the present invention the efficiency of the static condenser is considerably increased, whereby the compressor will have increased capacity because of the lower condensation

temperature and as a result thereof a lower energy consumption. This is achieved through the condenser's placement in a space beneath the refrigerator and/or freezer compartment itself ahead of the compressor or the compressors. Through the apparatus according to the present invention there will moreover be obtained larger refrigerated, interior gross volume in the refrigerator and/or freezer compartment. Through the present invention there is moreover made possible application of the lamellae on the condenser coil without the need of any welding. This moreover makes possible free choice of material, eg aluminium. The aiming of the gills on the lamella in the one direction and the other direction gives better through flow and better chimney stack effect. Through the condenser's placement according to the present invention it will moreover be easier to remove dust particles and other dirt which have attached to the same. The combination of the condenser with a melt water collector according to the present invention permits distribution of melt water from the defrosting over as large a surface as possible.

The present invention will in the following be described more closely with reference to the accompanying drawings. Fig 1 schematically shows a cross section through an underpart of a refrigerator and freezer cabinet with one embodiment of an apparatus according to the present invention. Fig 2 shows a pipe coil for a condenser according to the present invention. Fig 3 shows an end view of a lamella according to the present invention on a larger scale than the pipe coil in fig 2.

In fig 1 is shown the lower part of a refrigerator and freezer cabinet 1 which has a bottom plate 2 the bottom plate 2 and the bottom wall 3 defining a space 4 for a compressor 5, a condenser 6 and a melt water collector 7.

The melt water collector 7 is in communication with the refrigerator and freezer compartment via one or more holes 8 for leading off melt water from the refrigerator and freezer compartment to the melt water collector 7. The melt water collector 7 is advantageously manufactured of plastic, rectangular and has a triangular cross section. The bottom in the melt water vessel 7 consists of the hypotenuse and on the underside of same the condenser 6 is mounted with the help of suitable fixing members 9 at the upper end and 10 at the lower end. The melt water collector 7 is interiorly provided with step like rails which distribute the water transport over the whole of the vessel's surface. The water is vaporized by the heat transport from the condenser 7 under operation. The bottom of the melt water collector 7 is moreover designed so that it fits on the upper part of the condenser 6 and can extend partly down between parts of the condenser 6.

The condenser 6 comprises a pipe coil 11 according to fig 2. The one end of the pipe coil 11 is coupled to the hot gas outlet 12 of the compressor, while the other end of the pipe coil 11 is coupled to the condensate inlet 13 of the compressor 5. As is apparent in Fig. 2 the pipe

coil 11 consists of a number of mutually parallel straight parts. Between these parallel, straight parts there are disposed lamellae 14 of the type shown in fig 3 and 4. These lamellae 14 are preferably manufactured from hard rolled sheet aluminium of a thickness of for example 0.2 mm. In fig 3 is illustrated one lamella 14 from the one end and it is clearly apparent that the lamella 14 has substantially U-shape, the distance between the shanks being slight in relation to the length of the shanks. Each shank is centrally bent outwardly and displays an inward bulge 15 whose shape corresponds partly with the cross sectional shape of the straight parts of the pipe coil 11. The upper part of the shanks in fig 3 displays gills 16 which are open in the one direction, while the lower parts display gills 17 which are open in the opposite direction. In the illustrated embodiment both of the shanks have gills 16, 17. In that the lamellae 14 are U-shaped, they can be placed between the straight parts in the pipe coil 11 by squeezing together of the shanks which are thereafter allowed to spring back into good contact with the mutually registering straight parts in the pipe coil 11.

In this way there will not be required any other fixing of the lamellae 14 on the pipe coil 11.

As a result of the chimney stack effect air will flow into the space 4 from the arrows 18 past the condenser 6 and the compressor and up on the back side of the refrigerator and freezer cabinet 1.

It shall further be pointed out that in the refrigerator and freezer compartment there is disposed a per se known refrigerant battery which in a well-known manner is coupled to the compressor 5. At each end of the straight mutually parallel parts in the pipe coil 11 there are disposed spacer members in the form of for example a plastic strip with recesses for the pipes for maintaining the distance between the straight pipe parts.

Claims

1. Apparatus in refrigerator and/or freezer for condensing a refrigerant, which comprises a static condenser (6) in the form of a pipe coil (11) and a number of lamellae (14) disposed on the pipe coil, **characterized in that** the static condenser (6) is mounted in a space (4) under the refrigerator and/or freezer cabinet (1) ahead of a compressor assembly (5), **in that** the pipe coil (11) is bent for forming a number of straight mutually parallel parts, between which the lamellae (14) extend, **in that** the lamellae (14) have substantially the same length as the straight parts in the pipe coil (11) and display a U-shaped cross section with slight spacing between the shanks, which substantially are outwardly bent and on the outside of the outward bends display inward bulges (15) for placing on the straight pipe coil parts, and **in that** the shank part on the one side of the inward bulge (15) displays gills (16) with openings aimed in the one direction, while the shank part

on the other side of the inward bulge (15) displays gills (17) with openings aimed in the other direction.

2. Apparatus according to claim 1, **characterized in that** the shanks are resilient for squeezing the lamellae between the straight pipe coil parts.
3. Apparatus according to claim 1, **characterized in that** the condenser (6) is mounted on the underside of a melt water collector (7) which is in communication with the refrigerator and/or freezer compartment.
4. Apparatus according to claim 3, **characterized in that** the melt water collector (7) and the condenser (6) slope in the one direction.

Patentansprüche

1. Vorrichtung in einem Kühl- und/oder Gefriergerät zum Kondensieren eines Kühlmittels, umfassend einen statischen Kondensator (6) in der Form einer Rohrschlange (11) sowie eine Reihe von auf der Rohrschlange angeordneten Lamellen (14), dadurch gekennzeichnet, daß der statische Kondensator (6) in einem Raum (4) unter dem Kühl- und/oder Gefrierschrank (1) vor einer Kompressorbaugruppe (5) montiert ist, dadurch, daß die Rohrschlange (11) zur Bildung einer Reihe von geraden, parallel zueinander verlaufenden Teilen gewunden ist, zwischen denen die Lamellen (14) verlaufen, dadurch, daß die Lamellen (14) im wesentlichen dieselbe Länge haben wie die geraden Teile in der Rohrschlange (11) und einen U-förmigen Querschnitt mit geringem Abstand zwischen den Schäften aufweisen, die im wesentlichen nach außen gebogen sind und auf der Außenseite der Auswärtsbiegungen nach innen gerichtete Ausbuchtungen (15) aufweisen, die auf die geraden Rohrschlangentile gesetzt werden, und dadurch, daß der Schafftteil auf der einen Seite der nach innen gerichteten Ausbuchtung (15) Kühlrippen (16) mit Öffnungen aufweist, die in die eine Richtung weisen, während der Schafftteil auf der anderen Seite der nach innen gerichteten Ausbuchtung (15) Kühlrippen (17) mit Öffnungen aufweist, die in die andere Richtung weisen.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Schäfte elastisch sind, so daß die Lamellen zwischen den geraden Rohrschlangentilen eingeklemmt werden können.
3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Kondensator (6) auf der Unterseite eines Schmelzwasserkollektors (7) montiert ist, der mit dem Kühl- und/oder Gefrierfach in Verbin-

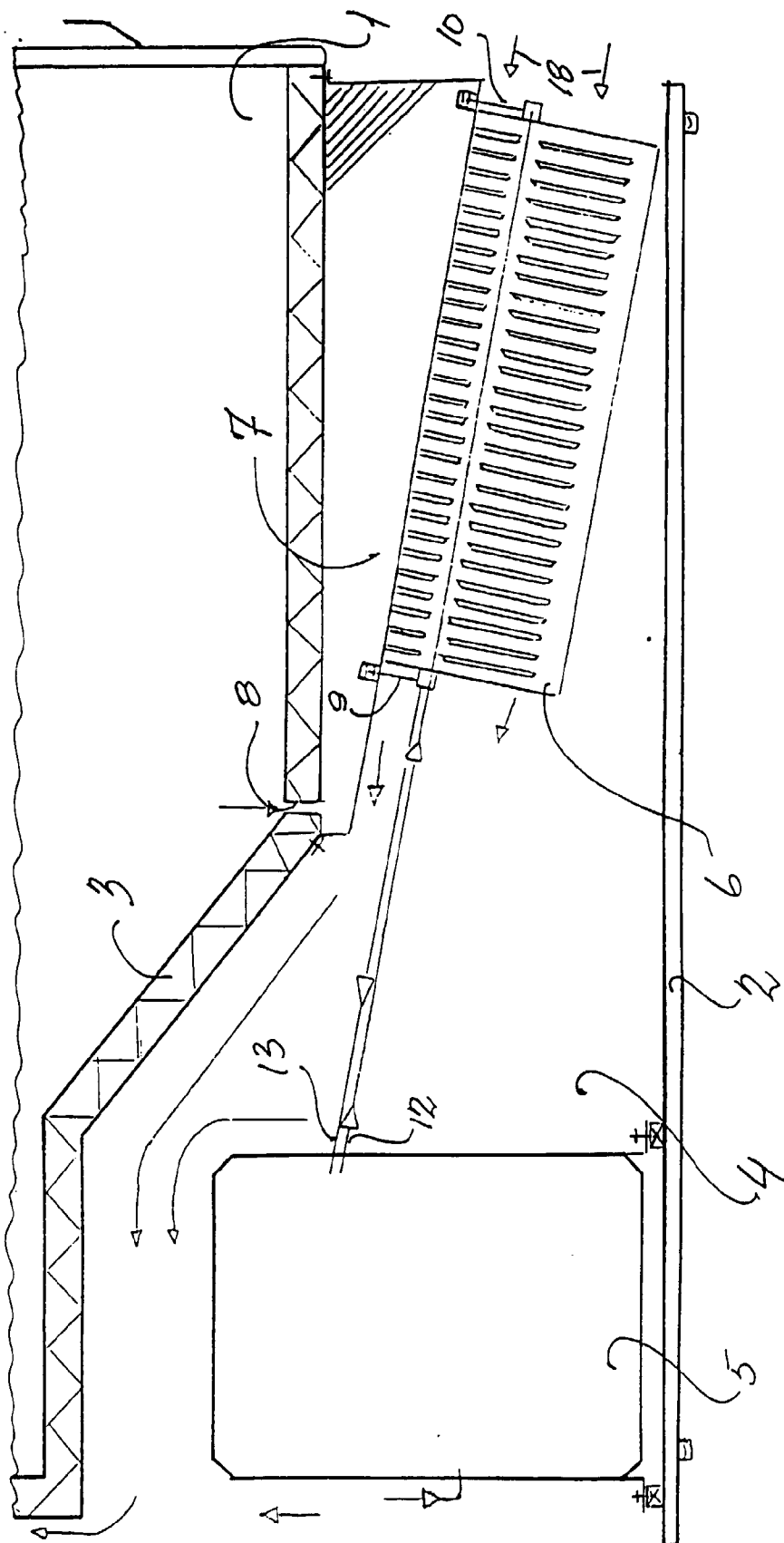
dung steht.

4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß der Schmelzwasserkollektor (7) und der Kondensator (6) in der einen Richtung geneigt sind. 5

Revendications

1. Appareil dans un réfrigérateur et/ou congélateur destiné à condenser un réfrigérant, qui comporte un condenseur statique (6) sous la forme d'un serpentin (11) et un certain nombre de lamelles (14) disposées sur le serpentin, **caractérisé en ce que** le condenseur statique (6) est monté dans un espace (4) sous le meuble réfrigérateur et/ou congélateur (1) devant un ensemble compresseur (5), **en ce que** le serpentin (11) est recourbé pour former un certain nombre de parties droites mutuellement parallèles entre lesquelles se prolongent les lamelles (14), **en ce que** les lamelles (14) ont sensiblement la même longueur que les parties droites du serpentin (11) et présentent une coupe transversale en forme de U avec un léger espacement entre les tiges, qui sont sensiblement recourbées vers l'extérieur et présentent à l'extérieur des courbes externes des renflements rentrants (15) pour un placement sur les parties droites du serpentin, et **en ce que** la partie tige d'un côté du renflement rentrant (15) présente des ailettes (16) dont les ouvertures pointent dans une direction, tandis que la partie tige de l'autre côté du renflement rentrant (15) présente des ailettes (17) dont les ouvertures pointent dans l'autre direction. 10 15 20 25 30 35
2. Appareil selon la revendication 1, **caractérisé en ce que** les tiges sont élastiques pour serrer les lamelles entre les parties droites du serpentin. 40
3. Appareil selon la revendication 1, **caractérisé en ce que** le condenseur (6) est monté sur la face inférieure d'un bac récupérateur d'eau fondue (7) qui communique avec le compartiment réfrigérateur et/ou congélateur. 45
4. Appareil selon la revendication 3, **caractérisé en ce que** le bac récupérateur d'eau fondue (7) et le condenseur (6) sont inclinés dans la même direction. 50

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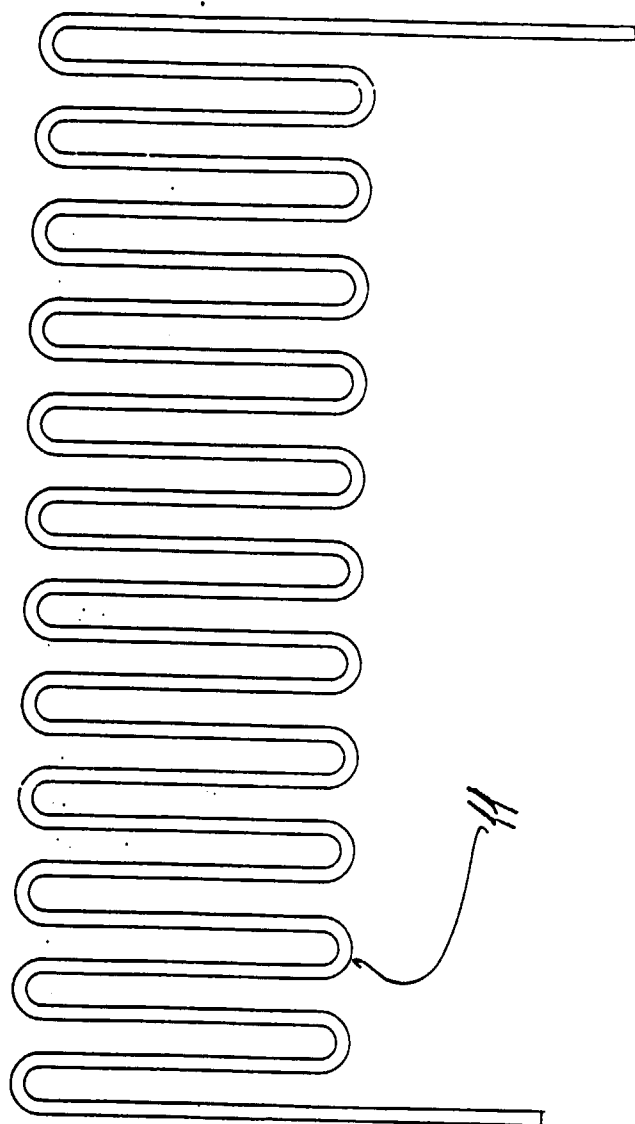


Fig 2

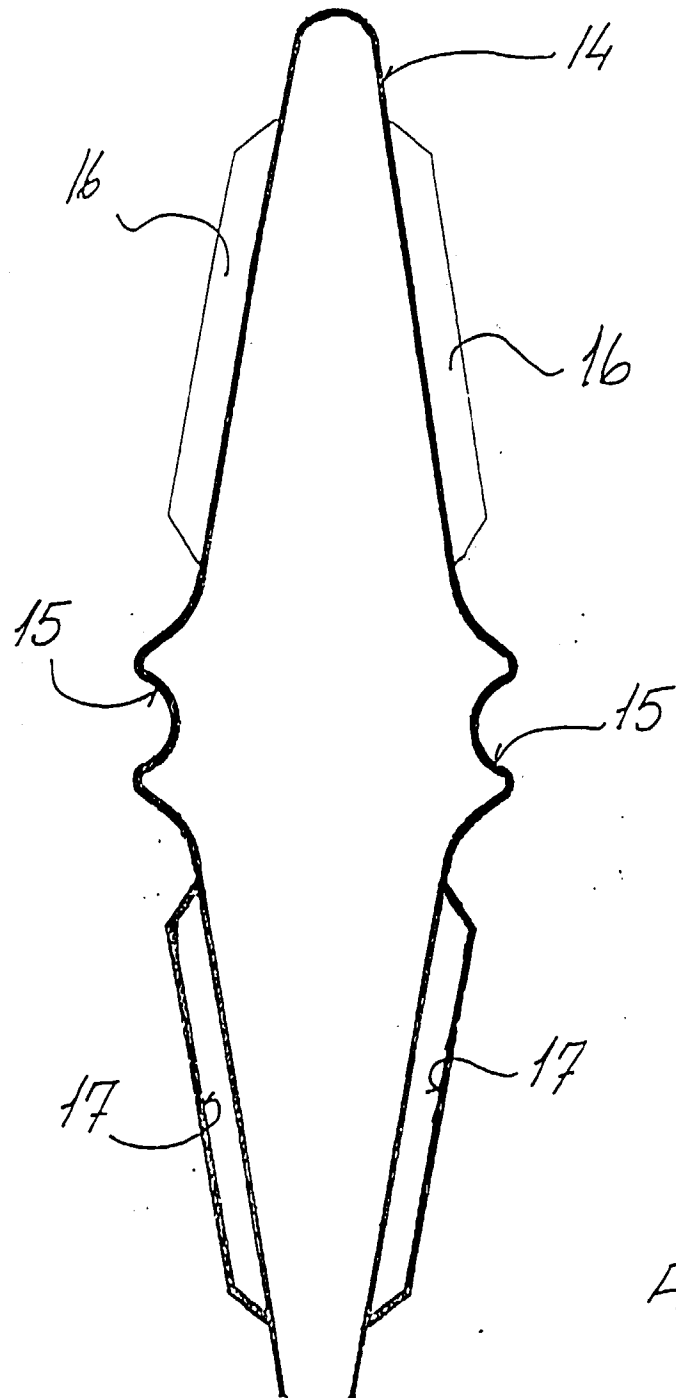


Fig 3