refrigerating compartment is larger than that in the freezing compartment and the amount of outdoor air, outside the interior space 11, entering the refrigerating compartment is therefore larger than that of outdoor air entering the freezing compartment.

[0024]

The inventors measured a temperature Tin and a humidity ϕin of each of the freezing compartment return air and the refrigerating compartment return air and obtained the following results.

(Refrigerating compartment return air) Tin = 5 degrees C ϕin = 80%

(Freezing compartment return air) Tin = -15 degrees C ϕin = 60%

[0025]

The inventors calculated the proportion of the contribution of the refrigerating compartment return air to the water content of the air 23 entering the cooler 15 and the contribution of the freezing compartment return air thereto on the basis of the above-described results and the amounts of flow of air returning from the compartments. The result revealed that the water content of the refrigerating compartment return air was seven or more times that of the freezing compartment return air in the air 23. Hence, frost formation on the cooler 15 can be mainly attributed to the refrigerating compartment return air.

[0026]

Fig. 3 is a diagram illustrating a schematic configuration of an evaporator 31 and its surroundings in a related-art refrigerator. In Fig. 3, the evaporator 31 functions as a cooler. A return air passage 32 is an air passage for refrigerating compartment return air 36. A defrosting heater 33 is heating means for heating the cooler 15 to defrost the evaporator 31. A drip pan 34 receives drips or the like from the ~~cooler~~ evaporator 31 ~~15~~ upon, for example, defrosting. A guide plate 35 guides the refrigerating compartment return air 36 to send the air through openings 35a to the evaporator 31 ~~cooler 15~~. As described above, the refrigerating compartment return air 36 is air coming from the refrigerating compartment. Furthermore, freezing compartment return air 37 is air coming from the freezing compartment.

[0027]

Fig. 4 includes diagrams illustrating a change in temperature of the freezing compartment return air 37 upon passing through the evaporator 31 ~~cooler 15~~. As the freezing compartment return air 37 moves in an X direction (toward an outlet of the evaporator ~~cooler 15~~) in Fig. 4(a), the temperature of the freezing compartment return air 37 approaches the temperature of the evaporator 31 as illustrated in Fig. 4(b). The temperature of the freezing compartment return air 37 is substantially identical to that of the evaporator 31 in the vicinity of the outlet of the evaporator 31.

[0028]

Accordingly, as long as the amount of flow of the freezing compartment return air 37 is constant and the temperature of the evaporator 31 is constant, the temperature of the freezing compartment return air 37 at the outlet of the evaporator 31 is determined by the size of the evaporator 31 (or a distance in which the freezing compartment return air 37 passes through the evaporator 31). If the evaporator 31 having the same size has a structure in which the freezing compartment return air 37 is allowed to enter the evaporator 31 ~~cooler 15~~ at a point between the inlet and the outlet of the evaporator 31 ~~cooler 15~~, the distance in which the air passes through the evaporator 31 would decrease, so that the temperature of the freezing compartment return air 37 might fail to fully fall at the outlet of the evaporator 31 ~~cooler 31~~, leading to insufficient cooling capacity.

[0029]

Fig. 5 includes diagrams illustrating the cooler 15 in Embodiment 1 of the present invention. Fig. 5(a) is a perspective view of the cooler 15 in Embodiment 1. Fig. 5(b) is a top view of the cooler 15. Fig. 5(c) is a front view of the cooler 15 as seen from the interior space of the refrigerator. For example, as illustrated in Fig. 5(b), the cooler 15 in Embodiment 1 includes a portion in which the pitch of fins is wide and the number of fins is small and the portion is adjacent to the rear surface of the refrigerator (or adjacent to the exterior of the refrigerator) as seen from the interior space of the refrigerator. The refrigerating compartment return air containing a high water content is allowed to pass through this portion so that clogging by frost is reduced. Although both the fin pitch and the number of fins are varied in Fig. 5,

CLAIMS

[Claim 1]

A refrigerator that includes a refrigerating compartment and a freezing compartment, the refrigerator comprising:

a cooler that includes a heat transfer tube through which a refrigerant passes and a plurality of fins arranged, the cooler being configured such that a pitch of fins in a first portion through which air coming from the refrigerating compartment passes is wider than that in a second portion through which air coming from the freezing compartment passes and/or a number of fins in the first portion ~~through which the air coming from the refrigerating compartment passes~~ is smaller than that in the second portion ~~through which the air coming from the freezing compartment passes~~, and the first portion ~~through which the air coming from the refrigerating compartment passes~~ is closer to an exterior of the refrigerator than the second portion ~~through which the air coming from the freezing compartment passes~~, the cooler exchanging heat between the refrigerant and the air coming from the freezing compartment and the refrigerating compartment to cool the air;

a circulating fan that circulates air between the cooler and an interior space of the refrigerator; and

a dedicated fan that blows air cooled by the cooler to the refrigerating compartment.

[Claim 2]

The refrigerator of claim 1, further comprising:

a damper configured to switch a flow path so as to allow freezing compartment return air to further flow into the first portion of the cooler.

[Claim 3 ~~2~~]

The refrigerator of claim 1 or 2, further comprising:

heating means for defrosting the cooler,

wherein the heating means is configured to supply heat to the cooler such that an amount of heat supplied to the portion through which the air coming from the refrigerating compartment passes is larger than that to the portion through which the air coming from the freezing compartment passes.

[Claim 4 ~~3~~]

The refrigerator of claim 3 ~~claim 2~~, wherein the heating means is disposed in contact with the cooler.

[Claim 5 ~~4~~]

The refrigerator of any one of claims1 to 4 ~~claims 1 to 3~~,

wherein the refrigerating compartment is disposed above the freezing compartment, and

wherein the dedicated fan is disposed at a level higher than the freezing compartment.

[Claim 6 ~~5~~]

The refrigerator of any one of claims 3 to 5 ~~claims 2 to 4~~, wherein the heating means externally supplies heat to the cooler.

[Claim 7 ~~6~~]

The refrigerator of any one of claims1 to 6 ~~claims 1 to 5~~, wherein the cooler is configured such that a capacity of the portion through which the air coming from the refrigerating compartment passes is smaller than a capacity of the portion through which the air coming from the freezing compartment passes.