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

(11) Publication number : **0 600 845 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **93850207.7**

(51) Int. Cl.[5] : **A47F 3/04**

(22) Date of filing : **02.11.93**

(30) Priority : **30.11.92 SE 9203595**

(43) Date of publication of application :
08.06.94 Bulletin 94/23

(84) Designated Contracting States :
DE ES FR GB SE

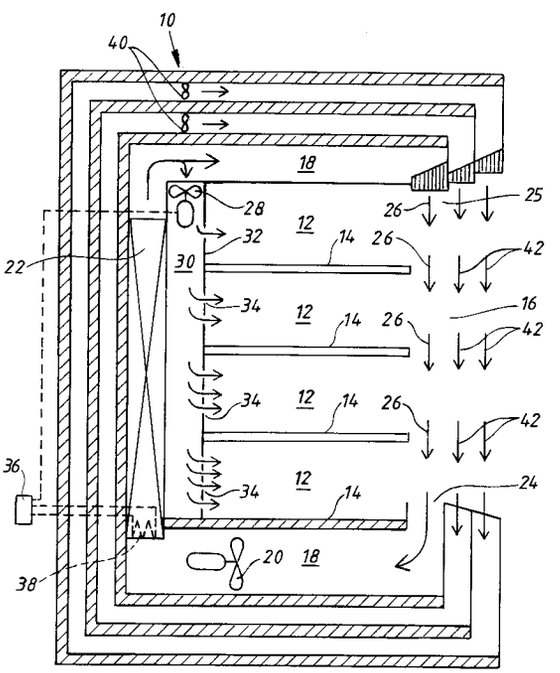
(71) Applicant : **AKTIEBOLAGET ELECTROLUX**
Luxbacken 1
S-105 45 Stockholm (SE)

(72) Inventor : **Lilja, Karl Gunnar**
Stenbrottsvägen 1
S-671 33 Arvika (SE)
Inventor : **Iverlund, Bertil**
Utblicksvägen 41
S-671 33 Arvika (SE)
Inventor : **Wickman, Lars-Ake**
Gesällvägen 21
S-671 51 Arvika (SE)

(74) Representative : **Erixon, Bo et al**
c/o AB ELECTROLUX Corporate Patents & Trademarks
S-105 45 Stockholm (SE)

(54) Freezer display cabinet with a vertical air curtain.

(57) At a freezer display cabinet (10), where a cooling element (22) cools the air for a vertical air curtain (26), which in its turn cools goods in the cabinet to freezing temperature (about -18°C), one lets the air also flow through the goods from the rear for further cooling of the goods. At defrosting of the cooling element heated air is circulated through the cooling element (22) and the curtain (26), while the air flow from the rear through the goods is shut off, so that humid defrosting air cannot form frost on the goods here.



EP 0 600 845 A2

The invention refers to a freezer display cabinet showing a substantially vertical rear wall, a plurality of shelves for storing goods at freezing temperature arranged above each other along the wall, a first air duct extending from a first place at the front edge of the lowest shelf, in substantially horizontal direction under the lowest shelf, in substantially vertical direction behind the rear wall and in substantially horizontal direction above the uppermost shelf to a second place above the front edge of the uppermost shelf, a first fan to circulate air through the duct to the second place, from where the air moves downwards i an air curtain outside the front edges of the shelves to the first place and a cooling element to cool the air circulating through the duct to freezing temperature, the cooling element being defrosted by the fan circulating heated air through the duct.

In a known such freezer display cabinet, where the goods should be kept at a temperature of about -18°C, the goods become, as a consequence of the air curtain being heated by the surroundings of the cabinet during its movement from the first to the second place, warmer the lower down they are located in the cabinet.

The object of the invention is to improve the known cabinet such, that this temperature difference of goods at different places in the cabinet decreases.

This object is attained in the freezer display cabinet according to the invention by openings in the rear wall to bring about air flows from the first air duct through the spaces formed between the shelves and by means for shutting off the air flows, when the cooling element is defrosted.

By said air flows the goods will also be flowed through by cooling air, whereby the heat transfer from the goods to the cooling air being improved resulting in that the temperature difference between goods on different places in the cabinet decreases. The air flows are shut off during the defrosting of the cooling element in order that the humid defrosting air, which then appears, shall not flow through the frozen goods and form frost on them.

An embodiment of a freezer display cabinet according to the invention is described below in connection with the figure of the attached drawing.

By 10 is designated a freezer display cabinet with spaces 12, in which goods, which are stored at freezing temperature (about -18°C) on shelves 14, are available through a vertical access opening 16. The spaces 12 are surrounded by a duct 18, im which a fan 20 and a cooling element 22 are located. The fan 20 circulates air through the duct 18 from a first place 24 at the lower front edge of the lowest space 12 through the cooling element 22, which cools the air, to a second place 25 at the upper front edge of the uppermost space 12, from where the air moves downwards in front of the spaces 12 in an air curtain 26, which cools the goods, to the first place 24. The goods are also cooled by air, which has been cooled by the cooling element 22 and after that is sucked by a fan 28 into a duct 30 arranged behind a rear wall 32 of the spaces 12, from which duct 30 the fan 28 brings the air to flow through openings 34 in the rear wall 32, from where the air passes between the goods in substantially horizontal direction and after that is united to the air curtain 26.

The air curtain 26 is heated by the surroundings of the cabinet during its movement from the second place 25 to the first place 24, goods in spaces 12 located at a lower level thereby becoming less cooled by the air curtain 26 than goods in spaces 12 located at a higher level. This poorer cooling is compensated thereby that one lets the air flows through the openings 34 become larger through spaces 12 located at a lower level, e.g. thereby that one arranges more openings 34 here, than through spaces 12 located at higher levels.

When the cooling element 22 shall be defrosted a signal is given to a means 36, which puts the cooling element 22 out of operation, activates a heating element 38 and stops the fan 28. The fan 20 continues at this to circulate air, which now is heated by the element 38, through the duct 18, the cooling element 22 and the curtain 26. By the fan 28 now standing still, the humid defrosting air, which now is circulated by the fan 20, is prevented from flowing via the openings 34 through the goods and form frost on them. Throttle valves, which are not shown, can also be arranged to break the communication between the ducts 18 and 30 during the defrosting period.

To lower the energy consumption of the cabinet one can in a way known per se by fans 40 circulate uncooled air in one or more further air curtains 42 outside the curtain 26.

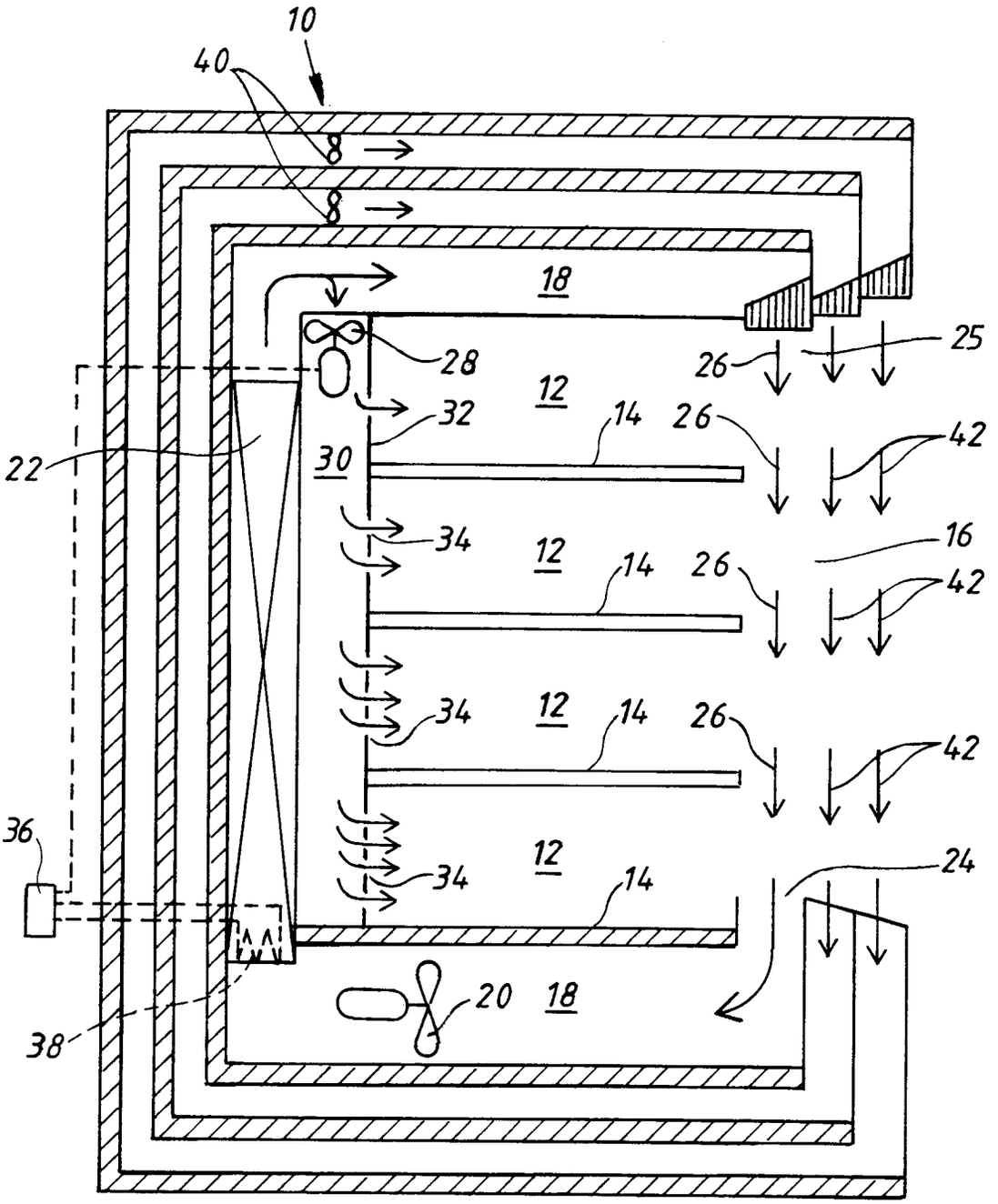
Claims

1. Freezer display cabinet (10) showing a substantially vertical rear wall (32), a plurality of shelves (14) for storing goods at freezing temperature arranged above each other along the wall, a first air duct (18) extending from a first place (24) at the front edge of the lowest shelf, in substantially horizontal direction under the lowest shelf, in substantially vertical direction behind the rear wall (32) and in substantially horizontal direction above the uppermost shelf to a second place (25) above the front edge of the uppermost shelf, a first fan (20) to circulate air through the duct (18) to the second place (25), from where the air moves downwards i an air curtain (26) outside the front edges of the shelves to the first place (24) and a cooling element (22) to cool the air circulating through the duct to freezing temperature, the cooling element (22) being defrosted by

the fan (20) circulating heated air through the duct, **characterized** by openings (34) in the rear wall (32) to bring about air flows from the first air duct (18) through the spaces (12) formed between the shelves (14), and means (36) for shutting off said air flows, when the cooling element (22) is defrosted.

2. Feezer display cabinet according to claim 1, **characterized** in, that the openings (34) are such, that the air flows become larger through spaces located at a lower level than through spaces located at a higher level.

3. Freezer display cabinet according to claim 1 or 2, **characterized** in, that the openings (34) communicate with the air duct (18) via a second air duct (30), that a second fan (28) is arranged in the second air duct (30) for bringing about said air flows and that said means (36) shuts off the second fan (28), when the cooling element (22) is defrosted.


10
40
18
28
25
26
12
32
14
26
42
22
30
34
16
12
14
26
42
34
12
14
26
42
36
34
12
14
24
20
18
38