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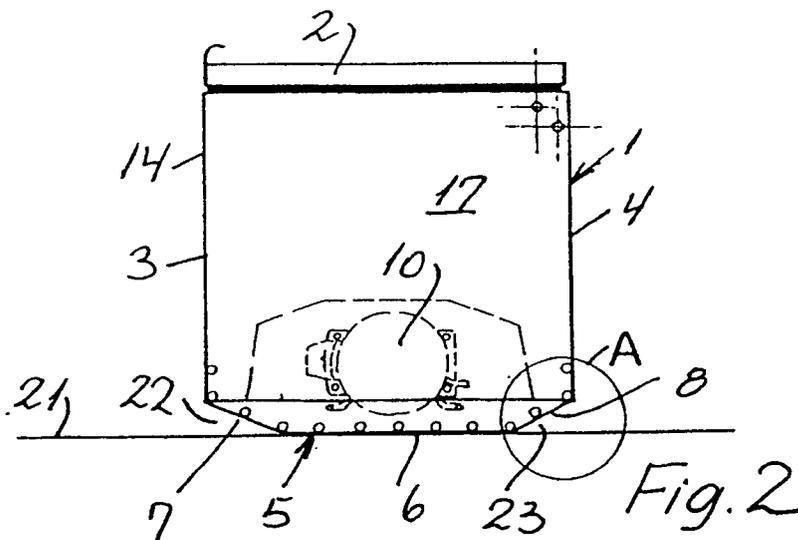
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⑤④ Refrigerator.

⑤⑦ At least a part of the condenser (11) of a refrigerator is arranged at the rear side of the cabinet of the refrigerator. In order to achieve an increased usable volume of the cabinet, the rear side (5) of the cabinet is provided with a generally planar part (6) and rear side parts (7, 8) which extend laterally at both sides of the planar part (6). The rear side parts (7, 8) extend inclined forward with respect to a rear wall (21) along which the refrigerator is installed.



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REFRIGERATOR

The present invention relates to a refrigerator comprising a condenser and of the kind wherein a considerable part of the condenser is shaped as a pipe coil arranged inwardly in good heat conducting connection with the mantle of the cabinet of the refrigerator at the reverse side of the cabinet.

Refrigerators of the kind referred to above are known, wherein the reverse side of the cabinet is planar. Such refrigerators are installed at a predetermined minimum distance from the wall along which the refrigerator is arranged, viz. in such a way that an air flow passage is formed behind the refrigerator having a flow area sufficient for the flowing air to remove the necessary part of the heat generated by the condenser. Due to the fact that the so-called "built-in measurements" as a rule are standardized, which means that the front surface of the refrigerator should not be positioned further away from the wall along which the refrigerator is arranged than a predetermined distance, the observance of the minimum distance between the reverse side of the cabinet and the wall constitutes a limitation as regards the usable volume of the cabinet.

The refrigerator according to the present invention is characterized by the reverse side of the cabinet comprising a generally planar part and reverse side parts extending laterally at both sides of the planar part and being positioned closer to the front side of the cabinet than the planar part. Calculations forming the basis of the present invention have indicated that a cabinet constructed as stated may be arranged with the planar part in the immediate vicinity of the wall because the side ducts provided between the wall in question and the reverse side parts of the cabinet, when installed, offer the necessary air circulation and the possibility of arranging the planar reverse side part of the cabinet in the immediate vicinity of the wall, simultaneously, has the result that the usable volume of the cabinet may be increased.

A particularly simple embodiment of the refrigerator is according to the invention characterized by the planar part being constituted by a vertical central part of the reverse side and by the reverse side parts extending laterally with respect to the planar central part being constituted by planar side parts defining equal, toward the front side of the cabinet open, obtuse angles together with the planar central part.

According to the invention the obtuse angle may lie between approximately 130-165°, preferably between approximately 140-160° and, more preferably, being approximately 150°.

According to a further embodiment of the invention at least the reverse side parts extending laterally with respect to the planar part may be constituted by

material having a high heat capacity per unit of area. Hereby it is achieved that said reverse side parts will be able to act as heat accumulators because they, when the refrigerator is started, will be able to accommodate a part of the condenser heat and after the refrigerator has been stopped, they can emit the heat accumulated whereby the period during which the emission of the heat lasts, may be increased beyond the period during which the compressor works whereby the capacity of the condenser will be increased.

In order to achieve the high heat capacity the reverse side parts may according to the invention consist of comparatively thick metal sheet material. As an example of such material steel having a thickness of approximately 2 mm may be mentioned as compared with a thickness of the sheet material for the remaining part of the mantle of the cabinet of 0.6 mm.

According to the invention the condenser may be shaped as a pipe coil having vertically extending pipe strings.

In order to achieve an increased emission of the condensation heat along the side parts, the pipe strings of the condenser may be arranged closer adjacent each other at the reverse side parts extending laterally with respect to the planar part than at the planar part.

According to the invention the total width of the side parts may constitute between approximately 20-50%, preferably between approximately 25-35% and, more preferably, may constitute approximately 28% of the total width of the cabinet.

The invention will hereinafter be further explained with reference to the drawing, in which

fig. 1 shows a rear view of an embodiment of the refrigerator according to the invention,

fig. 2 shows a top view of the refrigerator shown in fig. 1,

fig. 3 shows a left-hand view of the refrigerator shown in fig. 1,

fig. 4 shows a perspective view of the refrigerator shown in fig. 1, and

fig. 5 shows a horizontal section through the refrigerator corresponding to the circle A shown in fig. 2.

In the drawing 1 is the cabinet of the refrigerator and 2 is a front door of the cabinet. The cabinet has planar side walls 3, 4 and the reverse side is indicated by the numeral 5. The reverse side comprises a planar part 6 and along both sides of the planar part 6 rear side parts 7, 8 extend, which are arranged closer to the front door 2 of the cabinet than the rear side part 6 because the side parts 7, 8 extend under an obtuse angle with respect to the planar part 6. This angle is according to the embodiment shown in the drawings

approximately 150° but may lie between approximately 130-165° and, preferably between approximately 140-160°.

According to the embodiment shown in the drawing the total width of the side parts constitutes approximately 30% of the total width of the cabinet but the width of the side parts may vary between approximately 20-50%, preferably between approximately 25-35% of the total width.

The cabinet is provided with a refrigerating assembly which according to the embodiment shown comprises a compressor 10 to which a condenser 11 belongs. The condenser is constituted by a pipe coil having vertically extending pipe strings as indicated schematically with broken lines in fig. 1. According to the embodiment shown in the drawing five condenser pipe strings are provided at the planar part 6 as indicated in fig. 2, one string is arranged at the transition to each of the side parts 7, 8, one string is arranged along each of the side parts 7, 8, one string along the rear edge of each side wall 3, 4 and one string along each of these rear edges. As it appears from fig. 5, the pipe condenser 11 is arranged inwardly with respect to the mantle or outer covering 14 of the cabinet and is connected with the mantle or outer covering in a good heat conducting way because the pipe coil is adhered by means of good heat conducting adhesive mass 15.

As it appears from fig. 5, the side part 8 consists of sheet material which in the case illustrated is constituted by a steel plate having a thickness of 2 mm. The other side part 7 is shaped correspondingly. The remaining part of the mantle 14 of the cabinet consists of steel sheet material having a thickness of approximately 0.6 mm.

The side parts 7, 8 are connected with the adjacent sheet edges e.g. by welding or in any other way, which results in a sealed connection. Furthermore, the cabinet is provided with an insulation, not shown, which joins the inner surface of the outer coating.

At the top the planar part 6 is connected with an inclined top side part 16 and, furthermore, the top surface of the cabinet is constituted by a planar top part 17. At the bottom the planar part 6 merges into an inclined rear wall part 18 which ends at a ceiling 19 for a recess 20 wherein the compressor is arranged.

The refrigerator shown operates in the following way :

The cabinet is installed with the planar rear side part 6 in the immediate vicinity of a wall which is indicated by means of a line 21 in fig. 2. Thereby duct parts 22, 23 having wedge shaped cross sections are formed between the rear side parts 7, 8 and the wall 21. If the cabinet is arranged for instance in a kitchen, the duct parts 22, 23 may laterally be limited by adjacent kitchen furniture.

During the operation of the refrigerator upwardly moving air streams will flow through the duct parts 22,

23, which may cool the reverse side parts 7, 8. Calculations and experiments forming the basis of the present invention have indicated that even though no flow duct of any significance is provided between the planar reverse side part 6 and the wall 21, a sufficient condenser capacity nevertheless is achieved. However, in this connection it should be mentioned that even though the planar part 6 is arranged in the immediate vicinity of the wall 21, the planar part 6 nevertheless will emit heat, viz. by radiation/conduction to the wall 21. In case furniture is arranged laterally with respect to the cabinet 1, cooling of the condenser parts arranged along the sides of the cabinet will also take place by radiation/conduction.

However, in order to increase the capacity of the condenser the refrigerator according to the embodiment shown is provided with the comparatively thick plate parts which, as previously explained, constitute the rear side parts 7, 8. These plate parts have a certain heat accumulating capacity and, accordingly, they may accumulate a part of the condenser heat to be emitted and they may emit this heat after the compressor of the cabinet has been stopped. In order to achieve a comparatively high emission of heat to the rear side parts 7, 8, the pipe strings of the condenser pipe may be arranged with a smaller pitch along the rear side parts 7, 8 than along the planar rear side part 6.

Due to the close arrangement of the planar rear side part 6 against the wall 21, the depth of the cabinet may be increased in front of the rear side part 6 corresponding to the gap which otherwise is prescribed for refrigerator cabinets and, simultaneously, a predetermined building-in depth may be respected, viz. in such a way that the front door 2 of the cabinet does not extend further forward than corresponding to a cabinet arranged with a gap between the reverse side and the wall along the full width of the rear side.

Claims

1. Refrigerator comprising a condenser (11) and of the kind wherein a considerable part of the condenser (11) is shaped as a pipe coil arranged inwardly in good heat conducting connection with the mantle of the cabinet of the refrigerator at the reverse side of the cabinet, **characterized** by the reverse side of the cabinet (1) comprising a generally planar part (6) and reverse side parts (7, 8) extending laterally at both sides of the planar part (6) and being positioned closer to the front side (2) of the cabinet than the planar part (6).
2. Refrigerator according to claim 1, **characterized** by the planar part being constituted by a vertical central part of the reverse side (5) and by the reverse side parts extending laterally with respect

to the planar central part being constituted by planar side parts (7, 8) defining equal, toward the front side of the cabinet open, obtuse angles together with the planar central part (6).

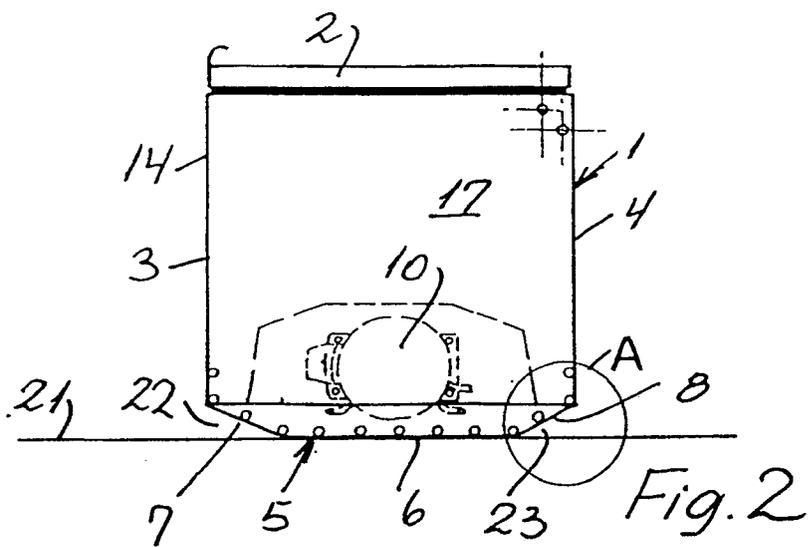
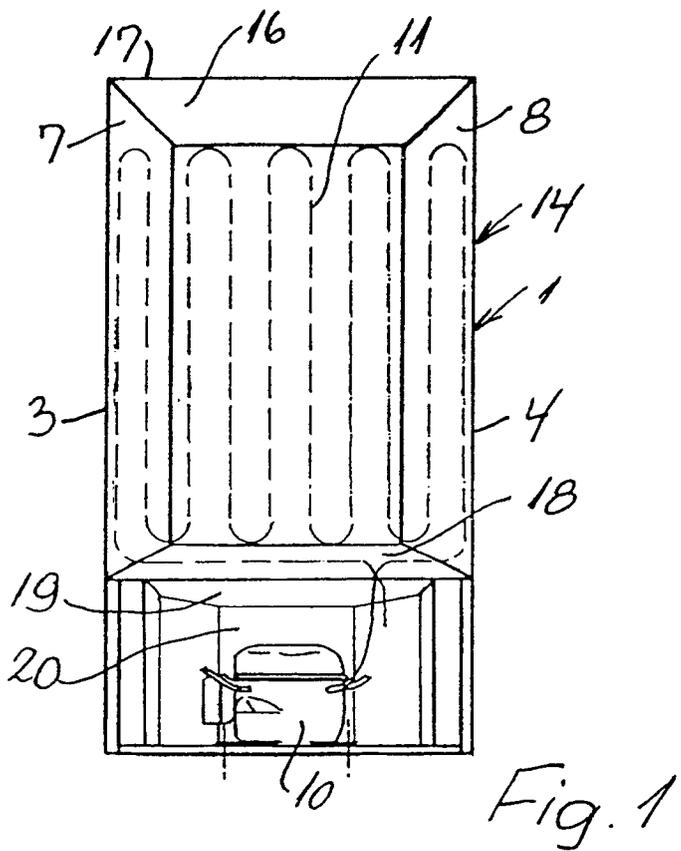
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3. Refrigerator according to claim 2, **characterized** by the obtuse angle lying between approximately 130-165°, preferably between approximately 140-160° and, more preferably, being approximately 150°. 10
4. Refrigerator according to claim 1, **characterized** by at least the reverse side parts (7, 8) extending laterally with respect to the planar part (6) consisting of material having a high heat capacity per unit of area. 15
5. Refrigerator according to claim 4, **characterized** by the reverse side parts (7, 8) consisting of comparatively thick metal sheet material. 20
6. Refrigerator according to claim 1, **characterized** by the condenser (11) being shaped as a pipe coil having vertically extending pipe strings. 25
7. Refrigerator according to claim 6, **characterized** by the strings being arranged closer adjacent each other at the reverse side parts (7, 8) extending laterally with respect to the planar part (6) than at the planar part (6). 30
8. Refrigerator according to claim 1, **characterized** by the total width of the side parts (7, 8) constituting approximately 20-50%, preferably approximately 25-35% and, more preferably, approximately 28% of the total width of the cabinet. 35

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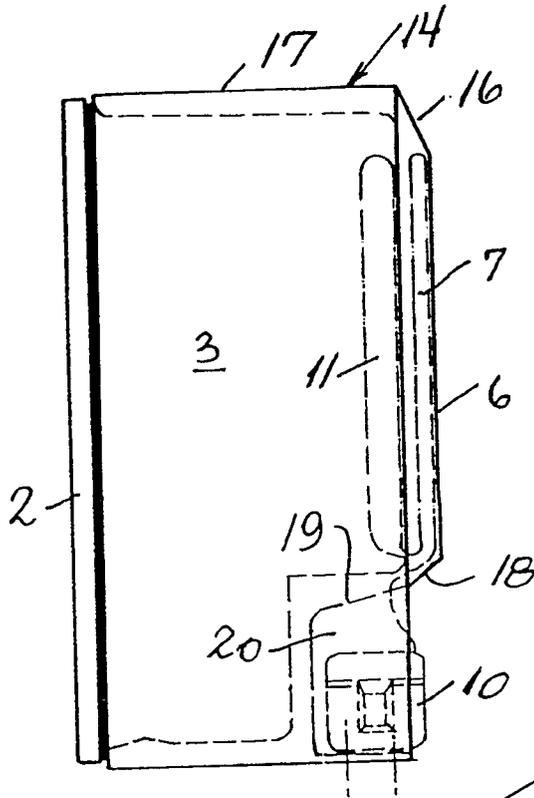


Fig. 3

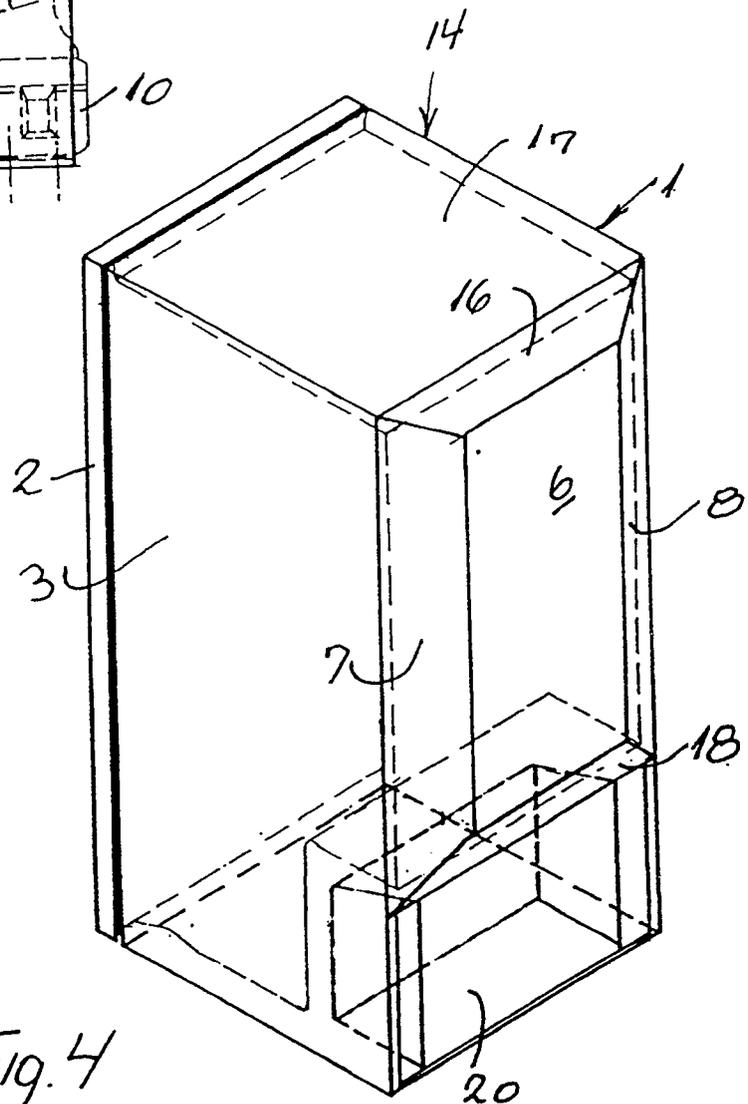
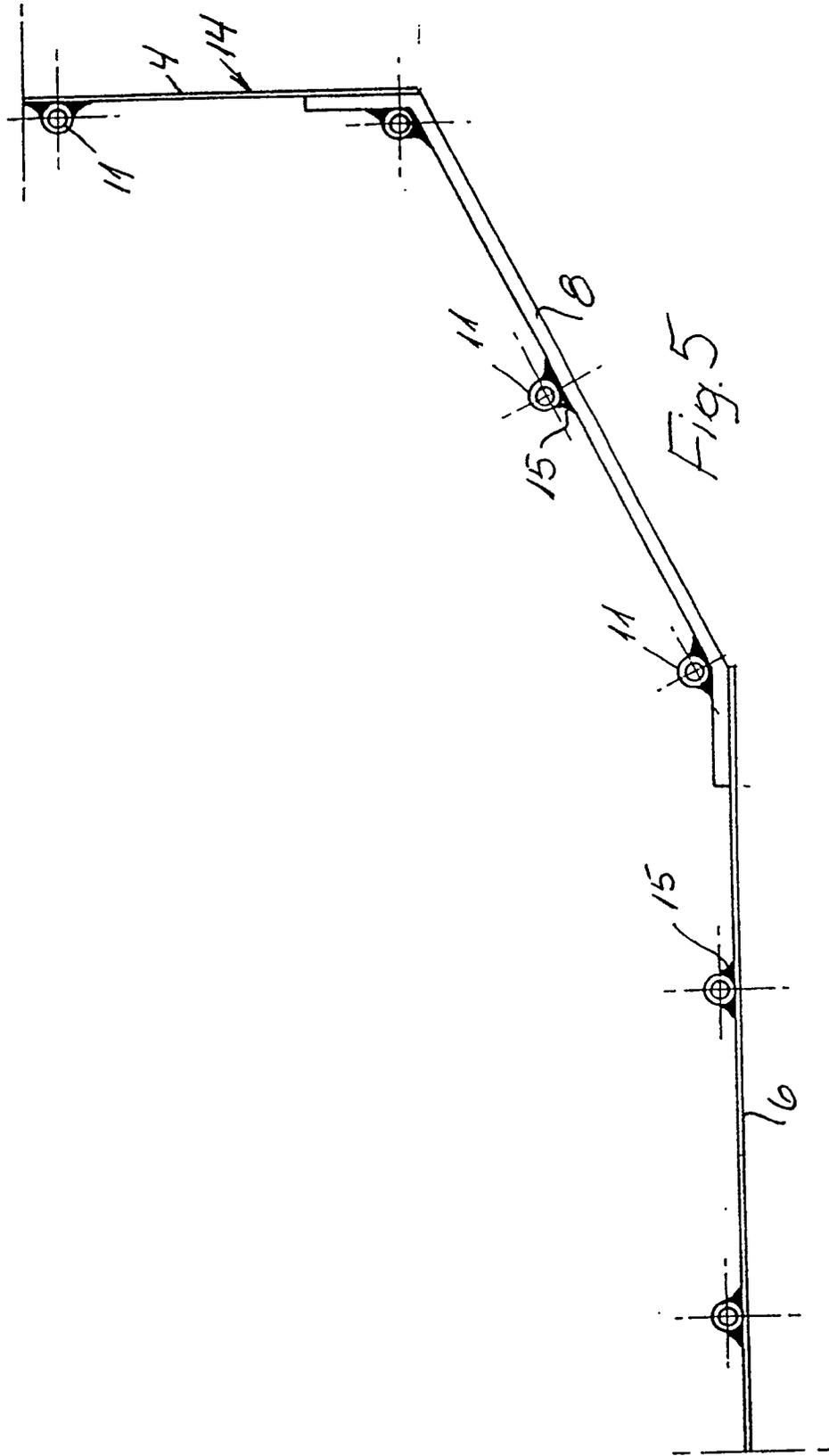


Fig. 4





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EUROPEAN SEARCH REPORT

Application Number

EP 90 61 0075

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-2 621 490 (HARRIS) * Whole document * ---	1,4,6	F 25 B 39/04 F 25 D 23/00
X	US-A-2 606 429 (ATCHISON) * Column 1, line 44 - column 4, line 50; figures 1-4 * ---	1,4,6	
A	US-A-2 666 301 (DOEG) * Column 1, line 50 - column 5, line 28; figures 3,5 * ---	1,4	
A	US-A-2 139 521 (SCHWELLER) * Page 1, right-hand column, line 8 - page 3, right-hand column, line 15; figures 2-3 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 25 B F 25 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-04-1991	Examiner BAECKLUND O.A.
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	

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