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(54) A condenser for a refrigerator, a freezer, a combination thereof, or the like

(57) A condenser (1) for a refrigerator, a freezer, a combination thereof, or the like, which has long working life and which can be produced with tooling of limited complexity, comprises a coil (5) for a refrigerant fluid and a casing (6) for a substance with a high heat capacity; the casing contains the coil (5) and is produced in a single piece by blowing of plastics material.

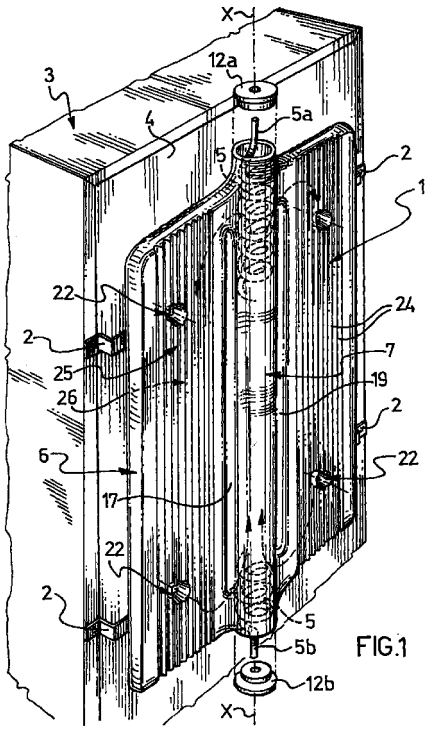

FIG.1

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Description

[0001] The present invention relates to a condenser for a refrigerator, a freezer, a combination thereof, or the like, of the type comprising a coil for a refrigerant fluid and a casing for a substance with a high heat capacity.

[0002] As is known, condensers having a heat capacity capable of increasing energy efficiency have recently been proposed.

[0003] However, these exchangers are complex and leave something to be desired from the point of view of their useful life, particularly because they are subject to corrosion.

[0004] The problem upon which the present invention is based is that of devising a condenser of the type specified which has structural and functional characteristics such as to overcome the above-mentioned disadvantage.

[0005] This problem is solved by a condenser of the type specified which is characterized in that the casing contains the coil and is produced in a single piece by blowing of plastics material.

[0006] Further characteristics and the advantages of the condenser according to the present invention will become clear from the following description of an embodiment thereof, given by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is a perspective view of a condenser according to the present invention,
Figure 2 is a front view of the condenser of Figure 1,
Figure 3 is a side view of the condenser of Figure 2, taken on the arrow III,
Figure 4 is a plan view of the condenser of Figure 2, taken on the arrow IV,
Figure 5 is a section through a detail of the condenser of Figure 2, taken on the line V-V,
Figure 6 is a section through a detail of the condenser of Figure 2, taken on the line VI-VI, and
Figure 7 is a front view showing a detail of the condenser of Figure 2, on an enlarged scale.

[0007] With reference to the appended drawings, a condenser for a refrigerator, a freezer, a combination thereof, or the like is generally indicated 1.

[0008] In the embodiment shown, the condenser 1 is fixed to brackets 2 carried by a domestic refrigerator 3 on a rear wall 4 thereof.

[0009] The condenser 1 comprises a coil 5 for refrigerant fluid and a casing 6 for a substance with a high heat capacity.

[0010] The substance with a high heat capacity is advantageously a fluid and is preferably water.

[0011] The casing 6 comprises three portions, that is, a first, tubular portion 7 having an open upper end 7a and an open lower end 7b, as well as remaining portions, that is, a second, plate-shaped portion 8 having an upper end 8a and a lower end 8b and, finally, a third, plate-shaped portion 9 having an upper end 9a and a lower end 9b.

[0012] The portions 7, 8 and 9 are disposed side by side and, more precisely, the portion 7 is disposed in an intermediate position between the two plate-shaped portions 8 and 9.

[0013] The plate-shaped portions 8 and 9 are formed as mirror images of one another or lie in the same plane.

[0014] The upper ends 7a, 8a and 9a of the portions 7, 8 and 9 together constitute an upper manifold 10 by means of which the portions are in fluid communication with one another.

[0015] Similarly, the lower ends 7b, 8b and 9b of the portions 7, 8 and 9 in turn constitute a lower manifold 11 by means of which the portions are in fluid communication with one another.

[0016] It should be noted that the tubular portion 7, which has a vertical axis X-X, has a predetermined inside diameter D which, for example, is between 40 mm and 60 mm and, in the embodiment shown, is 50 mm.

[0017] The coil 5, which is constituted, for example, by a copper pipe, is wound in a cylindrical helix having an outside diameter d slightly smaller than the inside diameter D of the tubular portion and terminates in opposite ends 5a and 5b extending axially and projecting from the casing 6 through plugs 12a and 12b arranged so as to close the open ends 7a and 7b of the tubular portion 7.

[0018] It is important to note that the portions 7, 8 and 9 of the casing 6 constitute a plastics element 13 produced in a single piece by blowing in accordance with known techniques, for example, by the techniques used for the manufacture of plastics containers, for example, polyethylene, or polypropylene containers and the like.

[0019] The plastics element which constitutes the casing 6 advantageously comprises opposed side walls 14 and 15, the wall 14 facing towards the rear wall 4 of the refrigerator 3 and the wall 15 facing outwardly, for example, close to a wall against which the refrigerator is placed.

[0020] The walls 14 and 15 have respective regions 16 and 17 (as well as 18 and 19) which extend vertically, are limited to a predominant central region of the height of the walls 14 and 15, and are recessed to an extent such that they meet so as to delimit the tubular portion 7 relative to the plate-shaped portion 8 (as well as relative to the plate-shaped portion 9).

[0021] Moreover, the wall 14 has four projecting frustoconical regions 20 and the wall 15 has four frustoconical regions 21 which are recessed to an extent such that they mate with the regions 20. The regions 20 and the regions 21 together form respective nipples 22 for the fixing of the condenser 1 to the brackets 2, for example, by means of screws.

[0022] The walls 14 and 15 also have, in the por-

tions 8 and 9, respective corrugations, all indicated 23, in the form of parallel grooves 24 extending vertically and having approximately triangular cross-sections, forming a region 25 with a high rate of thermal exchange.

[0023] Moreover, the plate-shaped portions 8 and 9 are tapered from the top towards the bottom, that is, the walls 14 and 15 are inclined slightly to the vertical in the plate-shaped portions 8 and 9, with a reduction in the thickness of the plate-shaped portions from the top towards the bottom.

[0024] As a result, the condenser forms, with the wall 4 of the refrigerator, a chimney-like space 26 with a cross-section which becomes smaller from the bottom towards the top. A similar space, not shown in the drawings, is intended to be formed between the condenser and the wall against which the refrigerator is placed.

[0025] It is important to note that the water contained in the tubular portion in which the coil is confined is subject to an upward flow in the direction of the arrow A, and that the water contained in the plate-shaped portions 8 and 9 is subject to a downward flow, indicated by the arrows B, with the establishment of a generally thermosiphonic circulation, indicated C, for the water, involving the manifolds 10 and 11 in which the upward and downward flows change their direction.

[0026] The condenser according to the present invention has the important advantage of being completely free of corrosion phenomena, and can thus be expected to have an almost indefinite working life.

[0027] Moreover, the condenser according to the present invention can also be produced easily and quickly with tooling of limited complexity. It can therefore be produced, even on a large scale, without large investment, advantageously limiting costs.

[0028] Finally, it should be noted that the condenser according to the present invention has a high energy efficiency. In fact, the low coefficient of heat exchange of the plastics material is largely offset by the increased efficiency of the heat exchange due to the thermosiphonic circulation, to the corrugations, which increase the heat-exchange surface, and to the tapering, which causes turbulent movements of the air ascending in the spaces.

[0029] Naturally, in order to satisfy contingent and specific requirements, an expert in the art may apply to the embodiment of the condenser described above with reference to the drawings many modifications and variations all of which, however, are included within the scope of protection of the invention as defined by the following claims.

Claims

1. A condenser (1) for a refrigerator, a freezer, a combination thereof, or the like, of the type comprising a coil (5) for a refrigerant fluid and a casing (6) for a substance with a high heat capacity, characterized in that the casing (6) contains the coil (5) and is produced in a single piece by blowing of plastics material.

2. A condenser (1) according to Claim 1, characterized in that the casing (6) comprises portions (7, 8, 9) extending vertically, disposed side by side, and in fluid communication at least in the region of respective upper ends (7a, 8a, 9a) and lower ends (7b, 8b, 9b), and in that the coil (5) is confined in one (7) of the portions.

3. A condenser (1) according to Claim 2, characterized in that the substance with a high heat capacity is a liquid which ascends in the portion (7) of the casing (6) in which the coil (5) is confined and descends in the remaining portions (8, 9) of the casing (6), with the establishment of thermosiphonic circulation.

4. A condenser (1) according to Claim 3, characterized in that the portion (7) of the casing (6) in which the coil (5) is confined is substantially tubular, and that the coil (5) is shaped as a cylindrical helix.

5. A condenser (1) according to Claim 4, characterized in that the remaining portions (8, 9) of the casing are substantially plate-shaped.

6. A condenser (1) according to Claim 5, characterized in that there are two coplanar plate-shaped portions (8, 9) disposed beside the tubular portion (7), on opposite sides thereof.

7. A condenser (1) according to Claim 6, characterized in that the plastics casing (6) comprises opposed side walls (14, 15) with regions (16, 17, 18, 19) which extend vertically and are recessed so that they meet one another, delimiting the tubular portion (7) relative to the plate-shaped portions (8, 9).

8. A condenser (1) according to Claim 6, characterized in that the opposed side walls (14, 15) of the plastics casing (6) comprise, in the plate-shaped portions (8, 9), projecting regions (20) and recessed regions (21) mating with the projecting regions (20), together defining nipples (22) for the fixing of the condenser (1).

9. A condenser (1) according to Claim 6, characterized in that the side walls (14, 15) of the plastics casing (6) comprise, in the plate-shaped portions (8, 9), corrugations (23) defining respective regions (25) with a high rate of thermal exchange.

10. A condenser (1) according to Claim 6, characterized in that the plate-shaped portions (8, 9) are

tapered from the top towards the bottom.

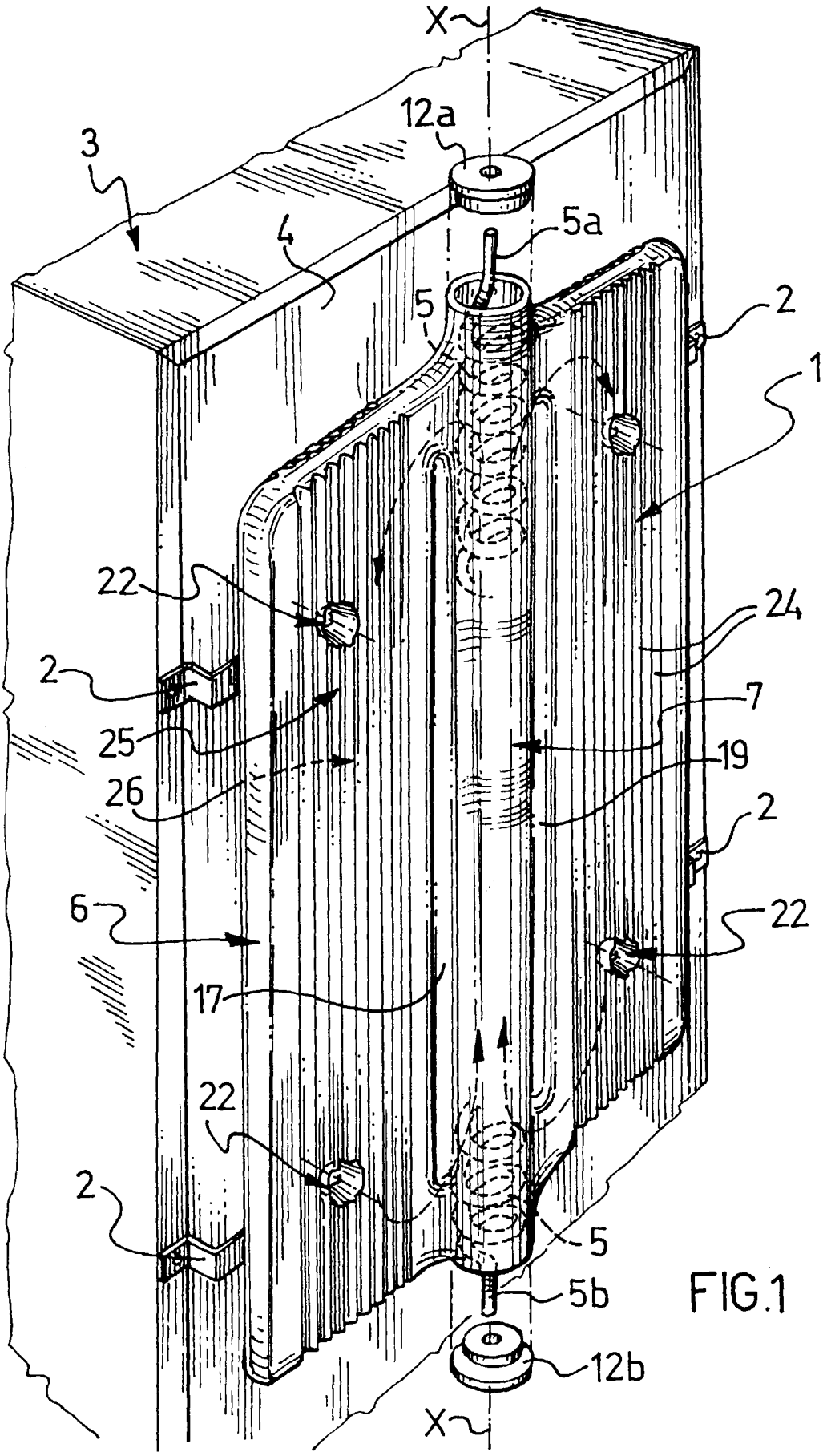

FIG.1

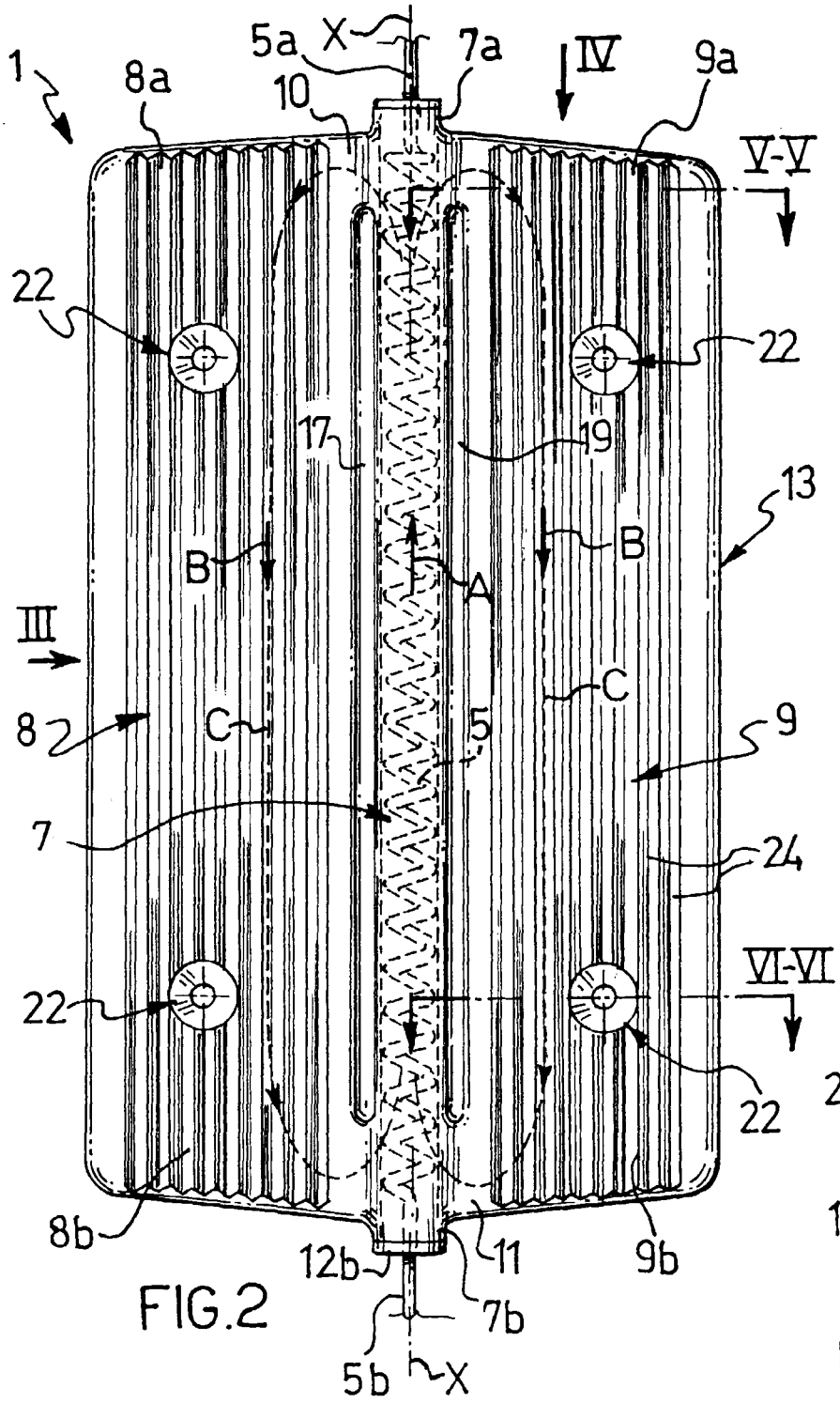

FIG.2

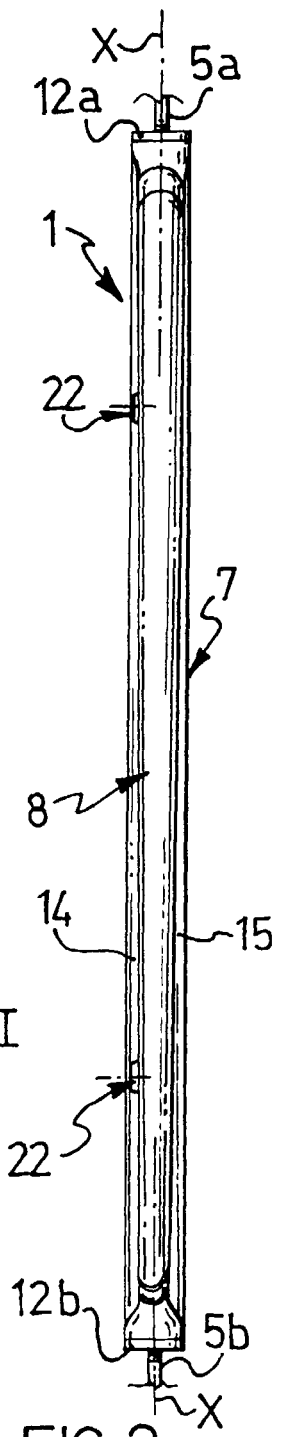

FIG.3

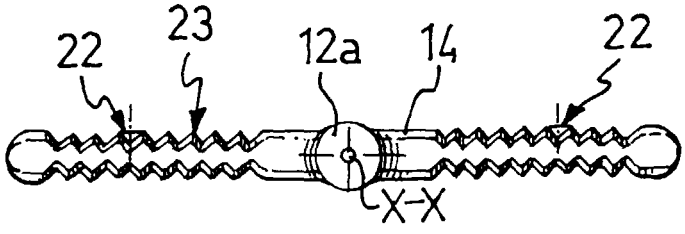

FIG.4

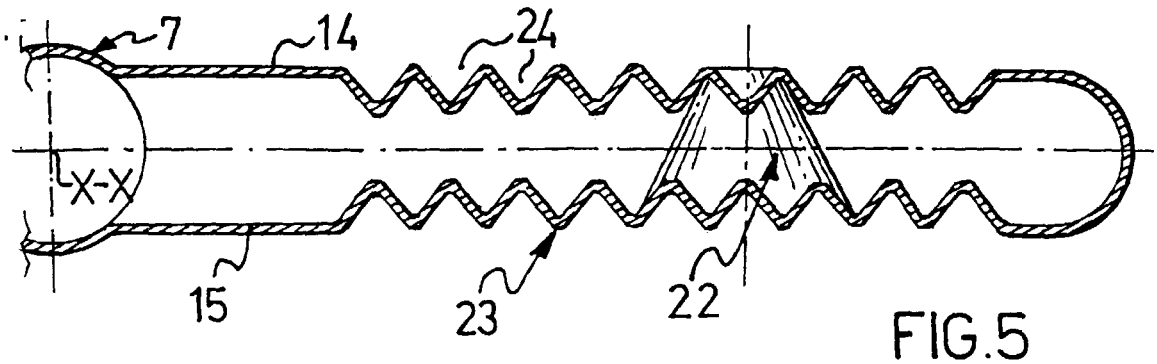

FIG.5

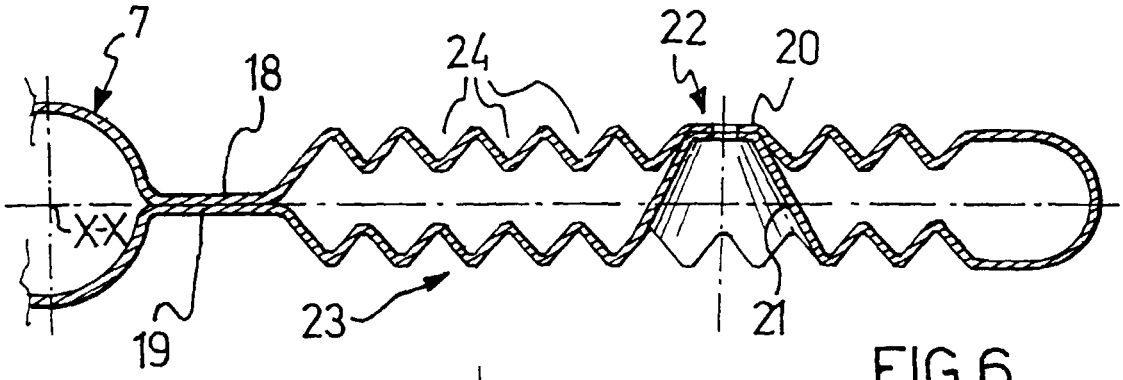

FIG.6

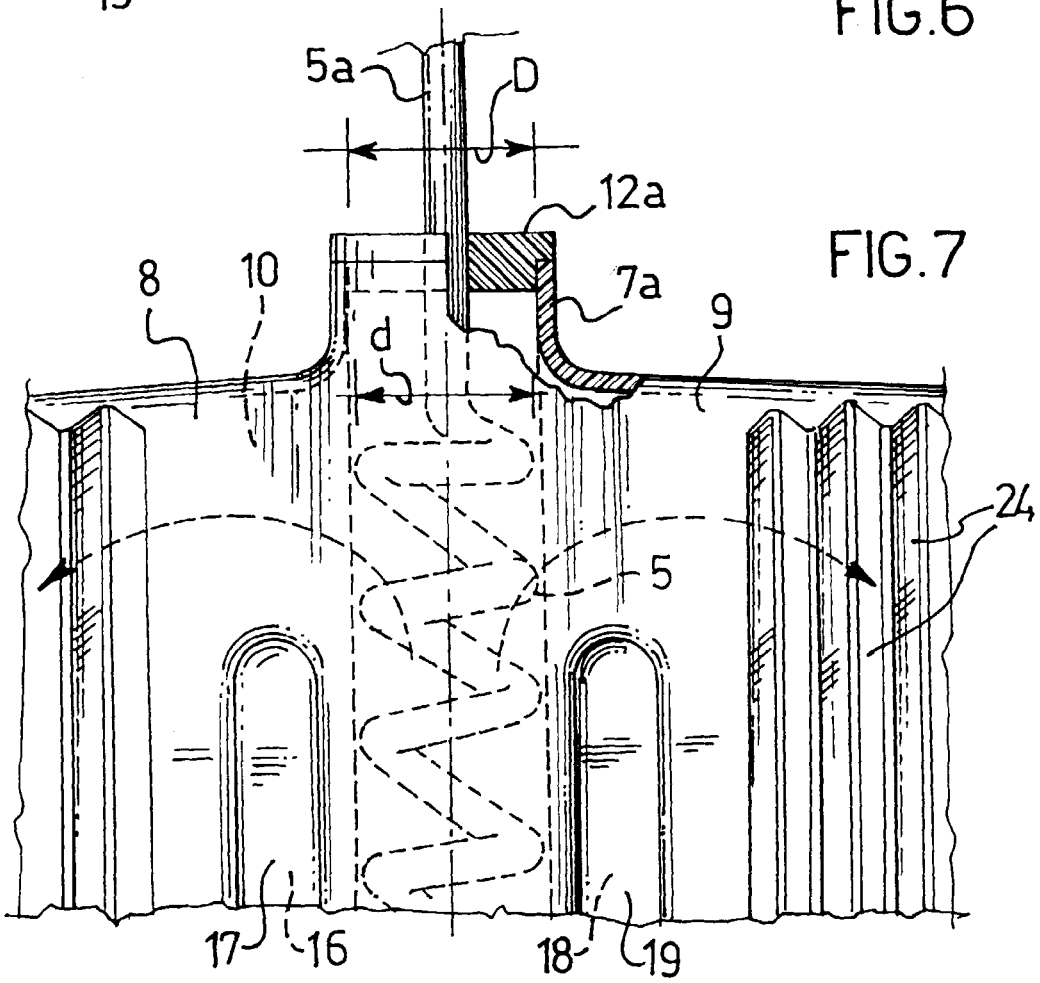

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 3075

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.7)
Y	EP 0 552 122 A (ANJOU PISCINE SERVICE) 21 July 1993 (1993-07-21) * abstract; figure * * page 1, line 45 - page 3, line 31 *	1	F25B39/04 F28D7/02 F28D15/00
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

F28D
F25B
F28F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 March 2000	Yousufi, S

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