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(71) Applicant: **S.I.R.A. SRL**
Via Bellini 11
Rastignano (Bologna)(IT)

(72) Inventor: **Gruppioni, Valerio**
Via Bolognesi 4
Pianoro (BO)(IT)

(74) Representative: **Sassatelli, Franco T., Dr.**
c/o INIP via Ruggi 5
I-40137 Bologna(IT)

(54) Bimetal radiator for building heating plants.

(57) The radiator foresees a bimetal element with a steel core, forming the elementary component of the heating fluid duct, integrated with a die-cast aluminium coating. The said elementary duct component consists of two symmetric conduits (1) with intermediate parallel lengths and with terminal parts converging into counterposed main parts (2 and 3) with threaded mouths (4) and with a front part having annular dishings (5) which, in composition, form respectively the higher and lower collectors. The present device, by avoiding the direct contact of the water with the aluminium, does not permit the hydrogen formation while by means of its vertical transport canals with a symmetrical scheme and perfectly cilindrical allows a quick bleeder of the air and avoids the use of gas venting. It results a reversible seamless structure particularly compact and strong.

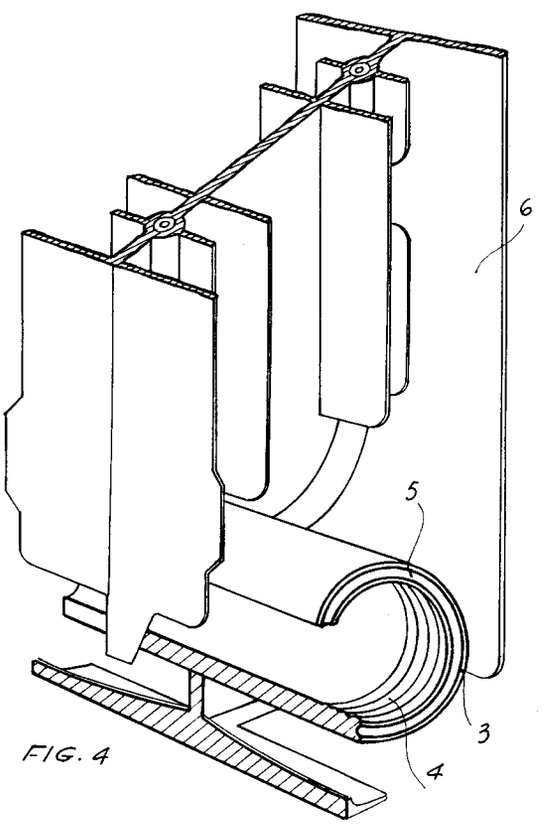

FIG. 4

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The invention relates to a radiator essentially characterized by a bimetal part consisting of a steel core, formed by the heating liquid pipes, and by a die-cast aluminium coating. The radiant elements can be assembled by direct contact of one-piece forms seamless, with reversible mounting and with a sturdier constrution, to be mounted in succession by means of axial cylindric threaded couplings passing in the end volute parts of the elements of the higher and lower convectors to allow continuity of the steel duct.

From the one-piece cast iron overall radiators, heavy and with no pleasant appearance, it has been passed to radiant composable units, using radiant elements and their parts, to adjust their sizes to the actual use requirements. In order to reduce weight and manufacturing costs, the aluminium has been used, but the direct contact of this metal with the heating liquid causes many inconveniences of different kinds, in particular hydrogen formation within the elements with the consequent necessity of preparing gas venting and maintenances.

The invention foresees a modular radiator, with a new and advanced technology, to be proposed for all types of setting, in particular for central, indipendent or differential heating systems and at checked temperature, thus allowing fundamental advantages both during building and as well as management is concerned with lower production costs, energy and fluid savings and lower maintenance costs. In particular, the invention carries out a considerable simplification since it does not require interposition parts among the elements and inside avoids the direct contact between the heating water and the aluminium, thus avoiding hydrogen formation and consequently no gas venting are required. Furthermore by means of its perfectly cylindrical canals and of its canal system, a quick air bleeder is allowed, while the aluminium coating offers many advantages: the thermal efficiency of the radiant unit is optimized and the desired temperature achivied in less time, moreover lightweight structures are allowed with more compactnes and strenght which increase the enjoinment of the product and its duration in time. Essential characteristic of the invention is the adoption of a bimetal radiator in which the steel core carries a very good system of ducts for the heat fluid while the external aluminium coating ensures all the advantages of this material such as the easy treatment its low cost and weight, the high thermic efficiency without the disadvantages that would occur if the same material would be used to form the heating fluid ducts.

Substantially the invention foresees a bimetal modulus with steel core which forms the elementary component for the heating water ducts, integrated in a die-cast aluminium coating. This elementary duct component consists of two symmetrical conduits 1 with intermediate parallel lengths and with terminals converging into counterposed main parts 2 and 3, with threaded mouths 4 and front part with annular dishings 5 which, in composition, respectively determine the higher and the lower collectors. The present radiator, avoiding the direct contact of the water with the aluminium, does not permit the hydrogen formation whereas the use of its vertical transport canals with symmetric and perfectly cylindrical scheme allows a quick air bleeder and avoids gas venting. A reversible particularly compact and strong structure results. In order to increase the radiating surface and to allow a new kind of composed forms with continuous exposition wall, the aluminium coating is formed by a system of fins: the front one 6, with rounded reentering terminals, and the behind one 7 with the interposed transversal one 8 containing the steel core made of the elementary duct system, equipped on both walls, on four lines, with fins 9 with continuous and separate lengths 10. The structure is completed on the lower and higher end with fins 11 and 12 fitted on fittings 13 and 14 which operate also as beads which characterize the higher and lower parts of the radiating units with reticular visual effect and allowing a plastic effect particularity in connection with the presence of an interposed continuous exposing wall formed by the set of the front fins 6. The radiating unit can be mounted by assembling the forms in direct contact on the mouths of the duct lengths 2 and 3 by imposing the axial joints 15 with thread 16, the seal being allowed by the O-Ring 17 fitted in volumetric fit seats formed by counterposed annular dishings 5 which have been foreseen in front of the mouths. Consequently, since the O-Ring 17 does not underlies to mechanical strain, its longer life is allowed and the trim position of the mounted radiating unit is assured. The unit completion can be obtained by precluding access to the non-coupling mouths with other axial joints with an inserible part 8 with thread 19 and other mesh part 20.

In a version a radiator with steel core is foreseen which uses tubular conduits with thickness of mm. 1,30 for the passage of the heating water from the higher collector to the lower one, and an aluminium coating obtained by means of pressure casting with a UNI 5076 alloy. The present work enables the best results both as far as the finish as well as the radiating capacities are concerned. The O-Ring has a proper resistance for an indefinite time at 120 ° C with a maximum temperature of 150 ° C for a period of about seventy weeks.

An execution form of the invention is illustrated in an indicative way by the drawings of the tables 1, 2 and 3. With reference to table 1, fig. 1 is the

side view of steel core of the element to allow the view of the conduits 1 and of a mouth with main parts 2 and 3 which form the lower and higher collectors. Fig. 2 is the side view of the element. Fig. 3 is its back view. Fig. 4 is the section view of an element allowing to observe an inlet and the aluminium coating. In table 2, fig. 5 is the perspective vie of back side element. Fig. 6 shows respectively the longitudinal and the transversal section of the cylindric axial joint 15 with thread 16. Fig. 7 shows respectively in longitudinal section and at the head the axial joints of the non-coupling mouths. The fittings of coupling joints of the elements and of preclusion of non-coupling mouths can be noted in fig. 8 and fig. 9. Fig. 10 is the perspective view of the structure trace of a radiator obtainable by composing eight elements showing its inside duct system for the heating water and the relative O-Ring . In table 3 fig. 11 is a perspective particular of a radiator allowing to observe the reticular moulding structure and a precluded terminal mouth showing the mesh part 20 of the axial joint in preclusion position. Fig. 12 is the perspective view of three radiators given as an example of the system.

In the realizations the zise of the elements, the thickness and materials of the steel core as well as the aluminium coating, the sealing means and devices, the materials as well as their relevant working systems may be foreseen in different ways and according their relevant specific use requirements. The radiator can be carried out in different ways, combined and integrated with other equivalent ones and fit for the purpose.

Claims

1. Bimetal radiator for building heating plants, characterized by the fact that foresees a bimetal with a steel core, forming the elementary component of the heating fluid duct, integrated in a die-cast aluminium coating. This duct elementary component consists of two symmetrical conduits (1) with intermediate parallel lengthes and with terminals converging into counterposed main parts (2 and 3) with threaded mounths (4) and with front part provided with annular dishings (5) which, in composition, form respectively the higher and the lower collectors. The present device, avoiding the direct contact of the water with the aluminium, does not permit the hydrogen formation while the use of its transport vertical canals with symmetrical scheme and perfectly cylindric allow a quick air bleeder and avoid gas venting. As a result a seamless structure is obtained, reversible and with particular compactness and strength.

2. Bimetal radiator for building heating plants, as per claim 1), characterized by the fact that in order to increase the radiating surface and to allow new kind composite forms with a continuous exposing wall, the aluminium coating consists of a set of fins: a front one (6), with rounded reentering ends, and a back one (7) which have a transversal interposed fin (8) containing the steel core consisting of the elementary system of ducts and equipped on both walls, on four lines, with further fins (9) with continuous and separated lenghts (10).

3. Bimetal radiator for building heating plants, as per claim 1), characterized by the fact that the structure is completed on the lower and higher terminals with fins (11 and 12) fitted on fittings (13 and 14) which act also as beads which characterize the upper and lower parts of the radiating units with reticular visual effect and allow a particularity with plastic effect in connection with the presence of an interposed continuous expositive wall formed by the set of frontal fins (6).

4. Bimetal radiator for building heating plants, as per claim 1), characterized by the fact that the unit can be mounted by assembling the elements with direct contact on the mouths of the duct lengthes (2 and 3) by imposing the axial joints (15) with threads (16) with the seal permits by means of O-Ring (17) fitted in the volumetric fit seats formed by the counterposed annular dishings (5) foreseen in front of the mouthes.

5. Bimetal radiator for building heating plants, as per claim 1), characterized by the fact that since the O-Ring (17) is not liable to mechanical strain its longer life is granted and the unit asset is assured for the fitted radiating unit. The unity completion can be obtained by precluding the access to the non-coupling mouths with other axial connectors fitted with a part (18) which can be inserted with its thread (19) and another catching one (20).

6. Bimetal radiator for building heating plants, as per claim 1), characterized by the fact that an element with steel core is foreseen which uses tubolar conduits with thickness of mm. 1,30 for the passage of the heating water from the upper collector to the lower one, and an aluminium coating obtaned by pressure casting with a UNI 5076 alloy.

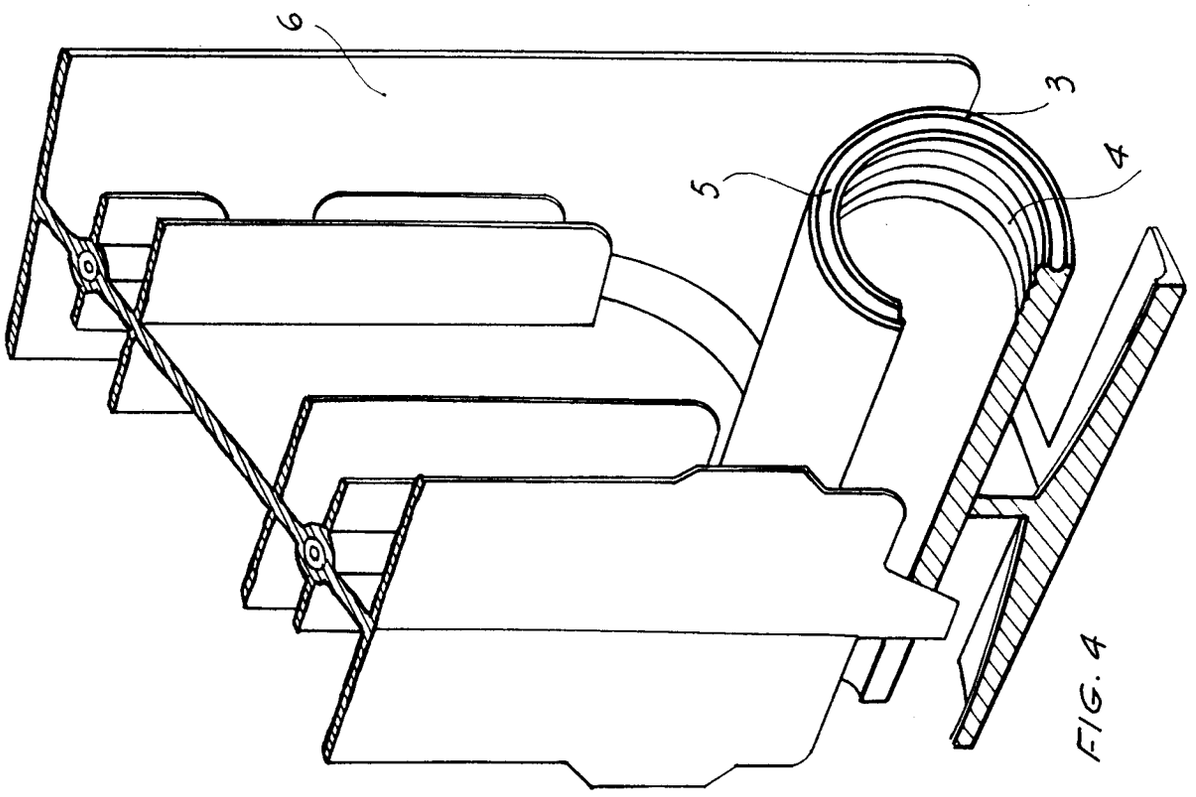

FIG. 4

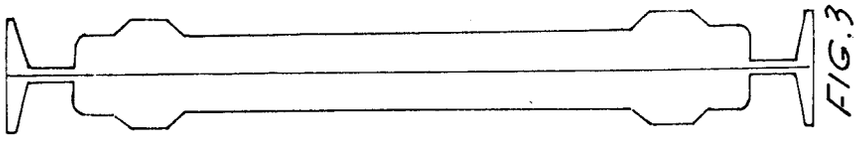

FIG.3

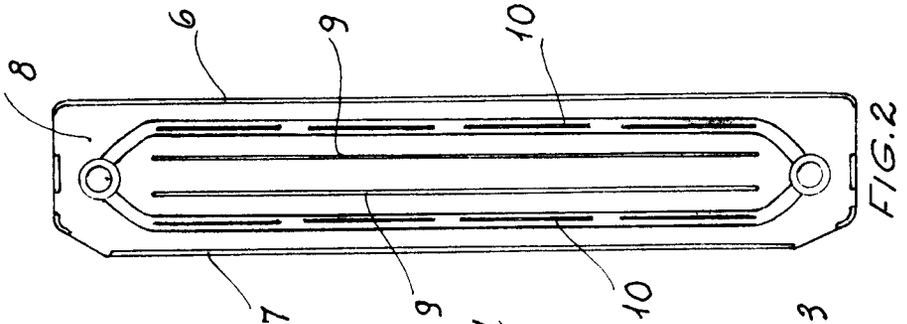

FIG.2

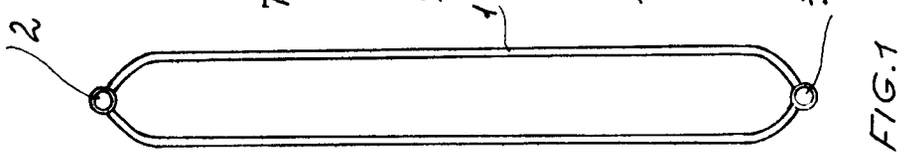

FIG.1

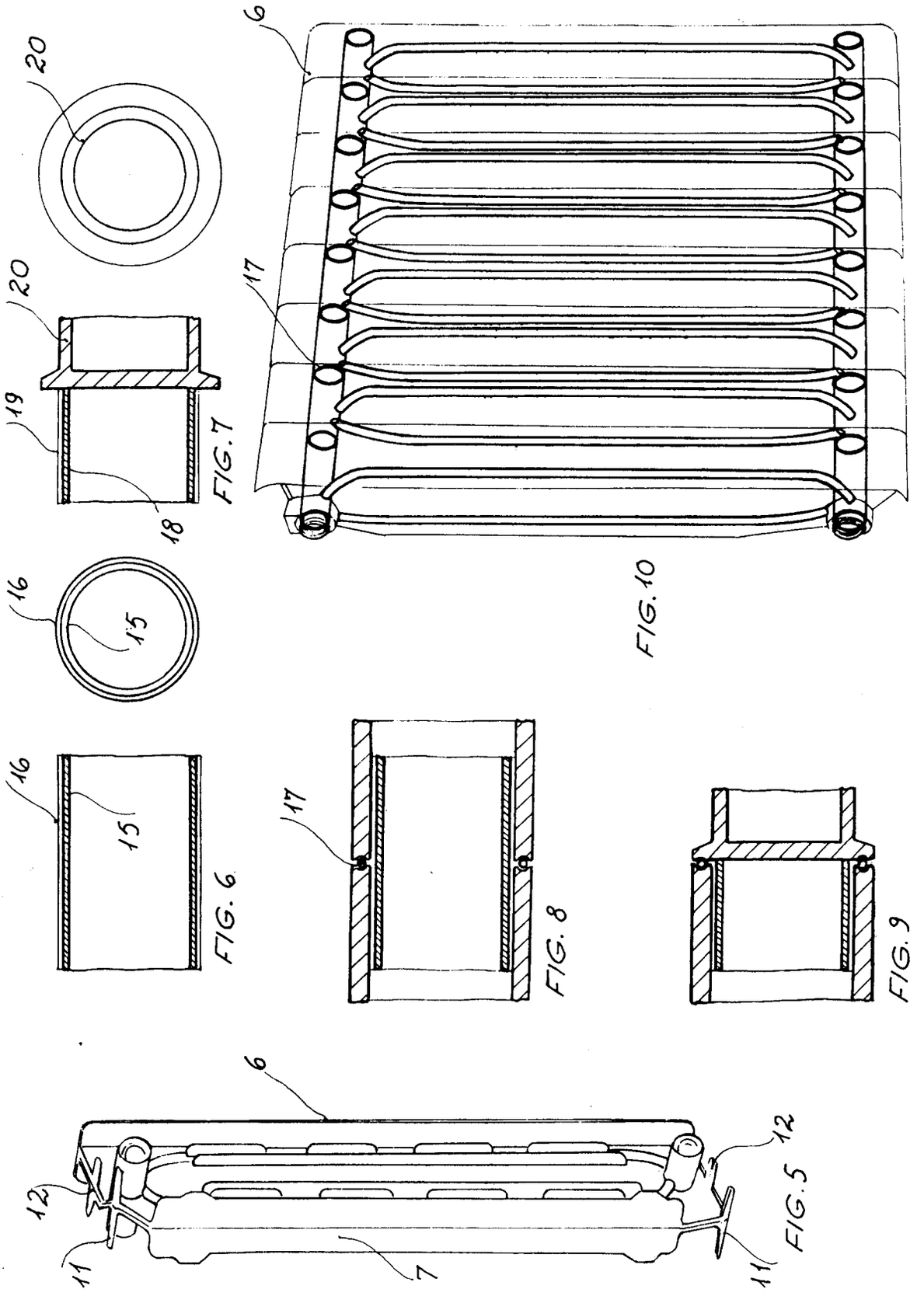

FIG. 7

FIG. 10

FIG. 6

FIG. 8

FIG. 9

FIG. 5

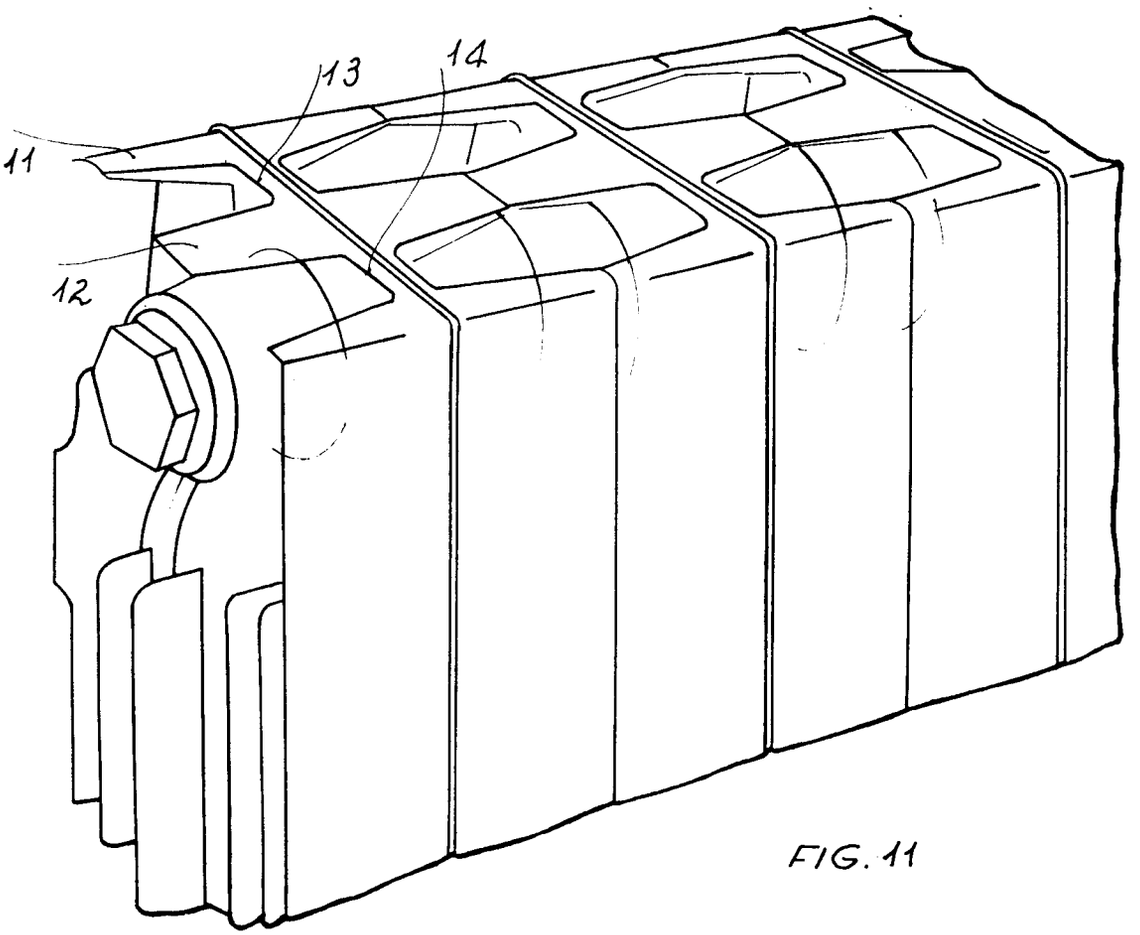

FIG. 11

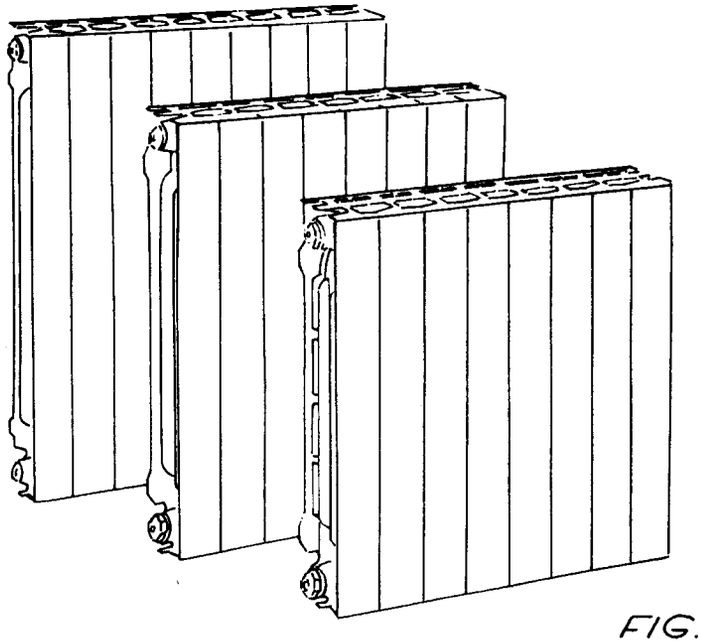

FIG. 12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0463

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,Y	FR-A-1 013 149 (FERRISI) * the whole document *	1,2,3,6	F 28 F 21/08 F 28 D 1/02
Y	FR-A-1 594 536 (FARAL DI MARIANI) * the whole document *	2,3	
Y,A	WO-A-8 801 039 (SANTORO) * page 2, line 16 - page 3, line 13 * * page 12, line 16 - page 13, line 10; figures 3,4 *	6,4,5	
A	DE-A-2 308 480 (VIESSMANN) * page 1, line 12 - page 3, line 15 *	1	
Y	US-A-3 439 732 (ANDREOLI) * column 1, line 62 - column 2, line 2 * * column 2, line 70 - column 3, line 5; figure 10 *	1-4	
Y	FR-A-2 260 077 (FONDERIE LLI PERANI SPA) * page 2, line 4 - page 3, line 15; figures 1-5 *	1-4	
A	FR-A-958 243 (RAPPILLARD) * page 2, line 15 - page 2, line 23; figure 2 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	US-A-3 194 306 (WENGER) * column 2, line 15 - column 2, line 49; figure 4 *	1	F 28 F F 28 D
A	FR-A-2 237 161 (S.G.F.) * the whole document *	1	
A	FR-A-2 279 055 (ALBARI SPA) * page 1, line 1 - page 1, line 4 * * page 2, line 8 - page 2, line 20; figure 1 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	12 June 91	BELTZUNG F.C.

CATEGORY OF CITED DOCUMENTS

- X : particularly relevant if taken alone
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