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(54) Method for mounting steel pipes inside a modular cast aluminium radiator

(57) A modular bimetallic structure body (1) is provided having on its ends couple of ducts (2) with screw threads (3) having centrally the mouths (4) of a couple of parallel steel pipes (5) symmetrically convergent at their ends. Said couple of steel pipes integrated into the aluminium structure itself and forming fitting carrier pipe of the canalization. Said modular element with body (1) carried out starting from a preliminary steel strucutre (6) to be placed in a pressure die-casting mould to obtain the working bodies where the end parts (7) of the preliminary structure (6) come out centrally from the smooth wall ducts (2). Then on the working line (8), with an intermediate feed, the above stated working bodies step in a sequence one after the other in the shearing station (9), on a bearing (10), where a couple of oleodynamic cylinders (11) let simultaneously progress the shearing tools (12) into ducts (2) cutting the end parts (7) and discharge them through the openings (13). A working body is thus formed having in the ducts (2) the mouths of the steel fitting carrier pipes. On te working line (8) the bodies thus obtained reach another working station where the screw thread (3) is operated in the ducts (2).

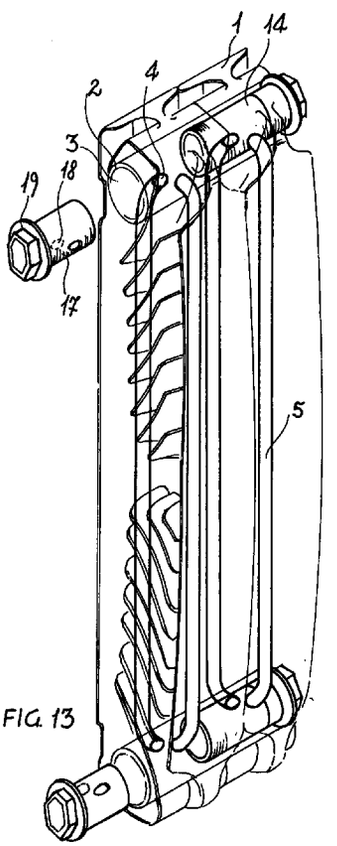

FIG. 13

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Description

The invention refers to a steel canalization for modular bimetallic heating radiators, such a canalization can be carried out with no weldings and installed by screwing down the rectilinear pipe tracts, which constitute its horizontal pipes, into the laying ducts of a fixed part body of the modular elements where the couples of the mouths of the pipe tracts, which form the connection duct, are situated. The above stated horizontal pipes are the residual working part of a preliminary structure integrated inside an aluminium covering during the radiator working process by high-pressure die-casting, subsequently tapered onto terminals by means of shearings which allow the heat to reach the above stated ducts. If compared to the heating radiators which have an only element and are manufactured by pressing, bimetallic modular radiators, which feature a canalization sector integrated into an aluminium structure have the advantage that both the size and the shape of the radiator can be adjusted to the users' specific needs with lower costs of production, control and assembling owing to their compositive simplicity, lower weight and minor overall dimensions. Moreover, as the modular elements have a structure formed by an aluminium covering that can be manufactured through a high-pressure die-casting process, both their model and composition can be varied according to the house interior decoration and furnishing. The monobloc-type steel pipes now in use consist of a counterposed pair of horizontal pipe tracts that can be jointed in different ways; therefore, they can be manufactured either by pressing down or welding the pipe tracts, or even they can be put together by jointing the successive pipe tracts coaxially. The first system has the disadvantage of high operative costs caused by the welding process and by the risk of breakages; as regards the second system, though no welding operations are requested, the assembly procedure is rather complex as the pipe fittings must be rapported on pipe tracts which are located outside the main structure of the basic element. The drawbacks of the second system are caused by the fact that for the heating the radiator modular parts must be installed with interposition devices such as reducing pipe joints on fixed stabilizers, or equipped with locators set on runners. If compared to the working technologies now in use and here described, the invented system for realizing canalization improves the sector in particular way as: a) a very essential composition can be carried out during the radiator unit installation only by screwing down a pair of pipe tracts, which are part of the horizontal duct, into the ducts of the aluminium covering of the radiator element itself, where the mouths of the jointing pipe tracts are positioned in such a way to fit with the corresponding position of the pipe-fitting tracts owing to the original manufacturing system featured by the present invention; b) a cheaper, lighter heating element of smaller dimensions is featured as it can be manufactured with a minimum quantity of steel pipe tracts and through a pressure die-casting manufacturing process, which can be entirely carried out by an automatic cycle; c) the canalization assembling and installation can be made even by non-specialists, as they can be carried out by mnemonic comparison; d) a safety canalization is obtained as no weldings are necessary and also because the steel pipe tracts are connected on a thread line which ensures the pipe-fitting compacting: e) as no external joints are featured, this kind of canalization allow that only the aluminium covering elements necessary to the installation of the radiator structure and fitting with the house interior decoration and furnishing are produced. The manufacturing system features a modular element with an aluminium structure body 1 having on its ends couple of ducts 2 with screw threads 3 having centrally the mouths 4 of a couple of parallel steel pipes 5 symmetrically convergent at their ends; said couple of steel pipes integrated into the aluminium structure itself and forming fitting carrier pipe of the canalization. The modular element with aluminium body 1 can be carried out starting from a preliminary steel structure 6 to be placed in a pressure die-casting mould to obtain the working bodies where the end parts 7 of the preliminary structure 6 come out centrally from the smooth wall ducts 2. Then, on the working line 8 with an intermediate feed, the above stated working bodies stop in a sequence one after the other in the shearing station 9, on a bearing 10, where a couple of oleodynamic cylinders 11 let simultaneously progress the shearing tools 12 into ducts 2 cutting the end parts 7 and discharge them through the openings 13. A working body is thus formed having in the ducts 2 the mouths of the steel fitting carrier pipes. On the working line 8 the bodies thus obtained reach another working station where the screw thread 3 is operated in the ducts 2. The canalization to be completed during the assembling of the heating elements by screwing down parts of steel horizontal pipe - with an external thread in relation with the screw thread 3 - into the sequence of couples of ducts 2. Said parts consist of horizontal pipe-fitting tracts 14 with openings 15, to be sent to mouths 4 of the starting modular element of the series to be connected and so on until the last but one of them, and of pipe tracts for initial position 16 and for end position 17, the last tract with openings 18 to be conveyed onto the mouths 4 of the last modular body 1, both of them featuring a sealing crown 19 and an external holding part for the tool. The preliminary steel structure 6, shunting from a couple of duct tracts 20, provides parallel intermediate tracts converting on fixing extremities assembled by means of watertight weldings 21 to prevent that the melted aluminium comes into it during the moulding phase of the structure body 1. The heating units to be installed by placing two or more modular unit with an aluminium structural body 1, in a preliminary fixing condition, by previously interposing O ring 24 between their semiseats in a pendant position 22 and 23, then completing their assembling by

screwing down one or more pipe-fitting tracts 14 - which form the horizontal duct- into ducts 2, until their openings 15 have come onto the mouths 4 of the steel pipes 5. The installation is then completed by screwing down a pipe tract for initial position 16 into the duct initial part and, at the end, a pipe tract for end position 17 letting that the openings 18 come onto the mouths 4 of the last modular element. Working realization of the present invention and assembly phase are illustrated by way of example in the drawings of sheets 1, 2 and 3. In sheet 1 fig. 1 is front view of the duct tracts 20 which can be used to make the preliminary steel structure. Fig. 2 is front view of the preliminary steel structure 6 with its parallel pipes held on terminals, which are centrally convergent and assembled with weldings 21 on their fixing borders. Fig. 3 is side view of a working element, carried out by means of a pressure die-casting process, to show the end parts 7 emerging from ducts 2. Fig. 4 is side view of a structural modular body 1, made of aluminium, obtained by shearing the pipe end parts 7 and by screw threading 3 the ducts 2. Fig. 5 is longitudinal section view of an end part of the working body coming from the casting to show a duct 2 with the emerging end part 7. Fig. 6 is longitudinal section view of the same structural modular body 1 with duct 2 screw threaded 3, to show one of the mouths 4 of the couple of steel pipe tracts 5. In sheet 2 fig. 7 shows the shearing of a radiator element to be worked according to the predetermined setting plan of a pair of ducts 2, such an element to be worked reaches the working line 8 by an intermitted feed, and places itself exactly near a bearing 10 standing behind. A couple of oleodynamic cylinders 11, with shearing tools 12 in an initial position, as well as a couple of end parts 7 to be removed and emerging from the ducts 2 are here illustrated. Fig. 8 is transversal section view of the same working process with a view of one of the shearing tools 12 in progress along a duct 2. Fig. 9 is transversal section view of the end part 7 already taken away to form the couple of mouths 4 of the steel pipes 5. In sheet 3, fig. 10 is partial view of the assembling of a radiator unit consisting of two modular bodies 1. It is to be noted a pipe-fitting junction tract 14 in its operative as well as the end pipe tract for initial position 16. Fig. 11 is partial prospectic view of the end part of the modular body 1 with a cutaway of duct 2 with thread 3 and, axially, an exploded drawing of the junction pipe tracts 14 and the pipe tract for initial disposition 16. Fig. 12 is a sectional transversal view of an end part of the modular element 1, showing the coinciding system between the openings 15 and the mouths 4. Fig. 13 is a prospectic view of an heating unit composed of two modular elements with the pipe tract for end position 17.

Claims

1. System for realizing the canalization of the heating fluid inside modular bimetallic heating radiators features a modular element with an aluminium structure body (1) having on its ends couple of ducts (2) with screw threads (3) having centrally mouths (4) of a couple of parallel steel pipes (5) symmetrically convergent at their ends integrated into the aluminium structure itself and forming fitting carrier pipe of the canalization; characterized in that:

   - the modular element with aluminium body (1) can be carried out starting from a preliminary steel structure (6) to be placed in a pressure die-casting mould to obtain the working bodies where the end part (7) of the preliminary structure (6) come out centrally for the smooth wall ducts (2);
   - on working line (8), with an intermediate feed, the above stated working bodies stop in a sequence one after the other in the shearing station (9), on a bearing (10), where a couple of oleodynamic cylinders (11) let simultaneously progress the shearing tools (12) into the ducts (2) cutting the end parts (7) and discharge them through openings (13) so forming a working body having in its ducts (2) the mouths of the steel fitting carrier pipes;
   - on working line (8) the obtained bodies reach another working station where the screw thread (3) is operated in the ducts (2).

2. System for realizing the canalization of the heating fluid inside modular bimetallic heating radiators, as per claim 1), characterized in that the canalization to be completed during the assembling of the heating elements by screwing down parts of steel horizontal pipe, with an external thread in relation with the screw thread (3), into the sequence of couples of ducts (2) of the modular elements (1); said parts consists of horizontal pipe-fitting tracts (14) with openings (15), to be sent to mouths (4) of the starting modular element of the series to be connected and so on until the last but one of them, and of pipe tracts for initial disposizion (16) and for end disposition (17), the last tract with openings (18) to be conveyed onto the mouths (4) of the last modular body (1), both of them featuring a sealing crown (19) and an external holding part for the tool.

3. System for realizing the canalization of the heating fluid inside modular bimetallic heating radiators, as per claim 1), characterized in that the preliminary steel structure (6), shunting from a copule of duct tracts (20), provides parallel intermediate tracts converting on fixing extremities assembled by means of watertight weldings (21) to prevent that the melted aluminium comes into it during the moulding phase of the structure body (1).

4. System for realizing the canalization of the heating fluid inside modular bimetallic heating radiators, as

per claim 1), in that the heating units to be installed by placing two or more modular unit with an aluminium structural body (1), in a preliminary fixing condition, by previously interposing O ring (24) between their semiseats in a pendant position (22 and 23), then completing their assembling by screwing down one or more pipe-fitting tracts (14), which form the horizontal duct, into ducts (2) until their openings (15) have come onto the mouths (4) of the steel pipes (5); it is then completed by screwing down a pipe tract for initial disposition (16) into the duct initial part and, at the end, a pipe tract for end disposition (17) letting that the openings (18) come onto the mouths (4) of the last modular element.

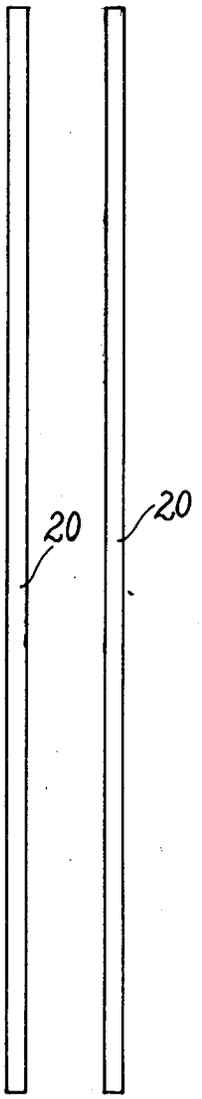

FIG.1

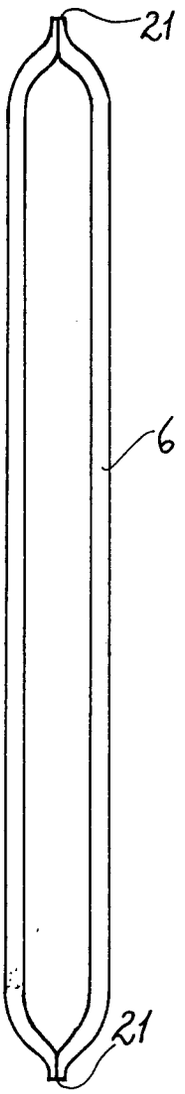

FIG. 2

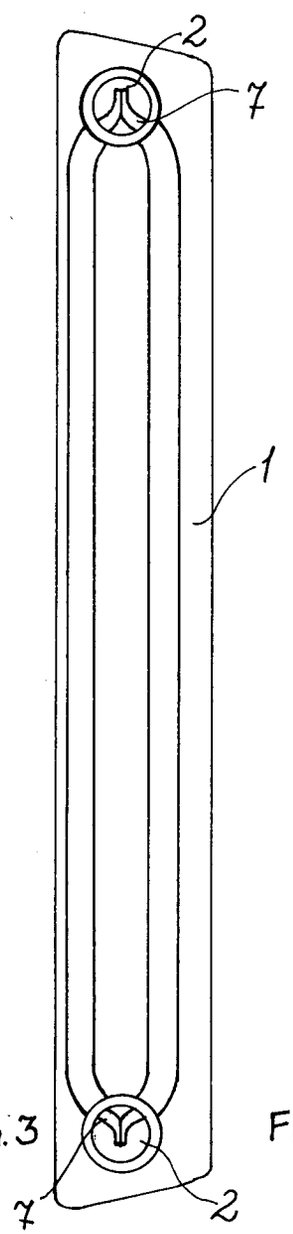

FIG.3

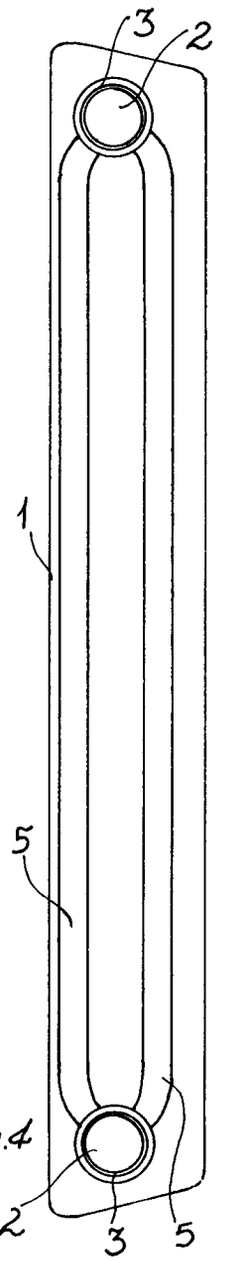

FIG.4

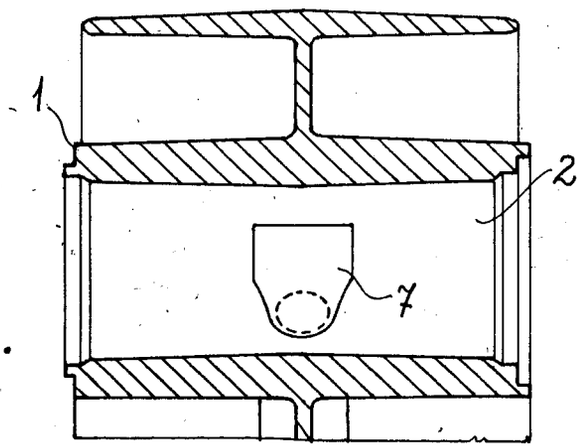

FIG. 5

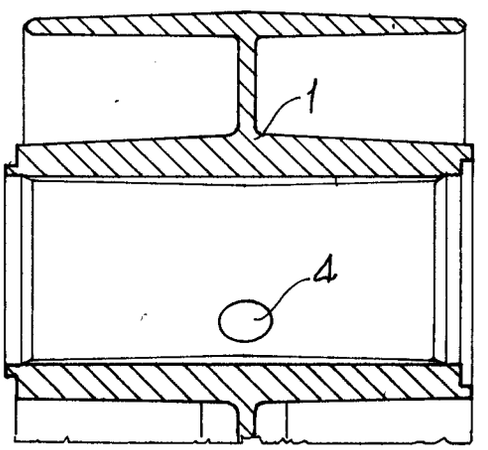

FIG. 6

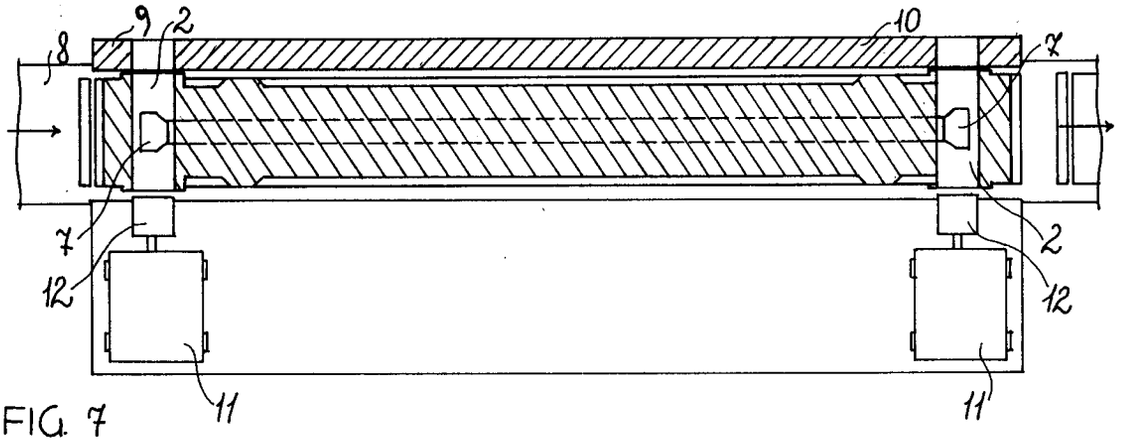

FIG. 7

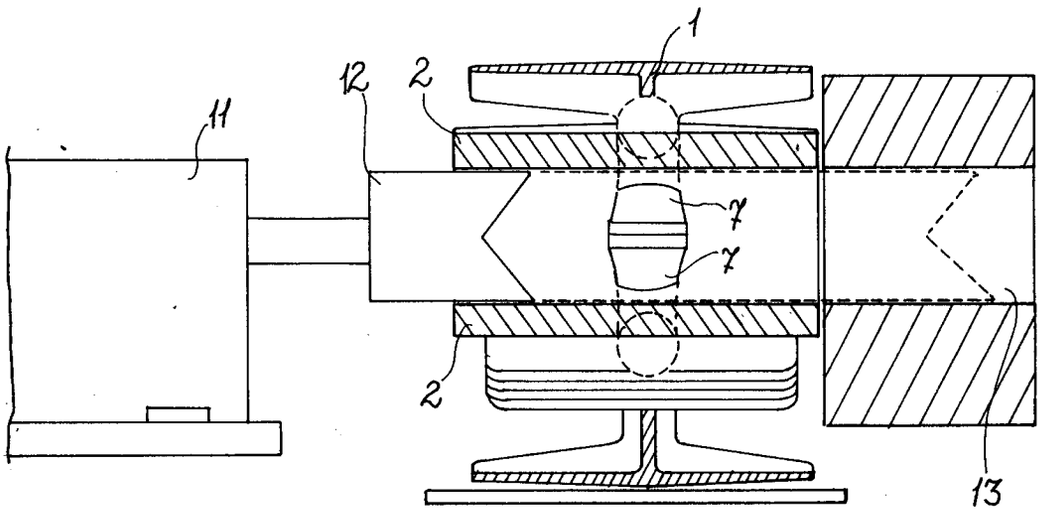

FIG. 8

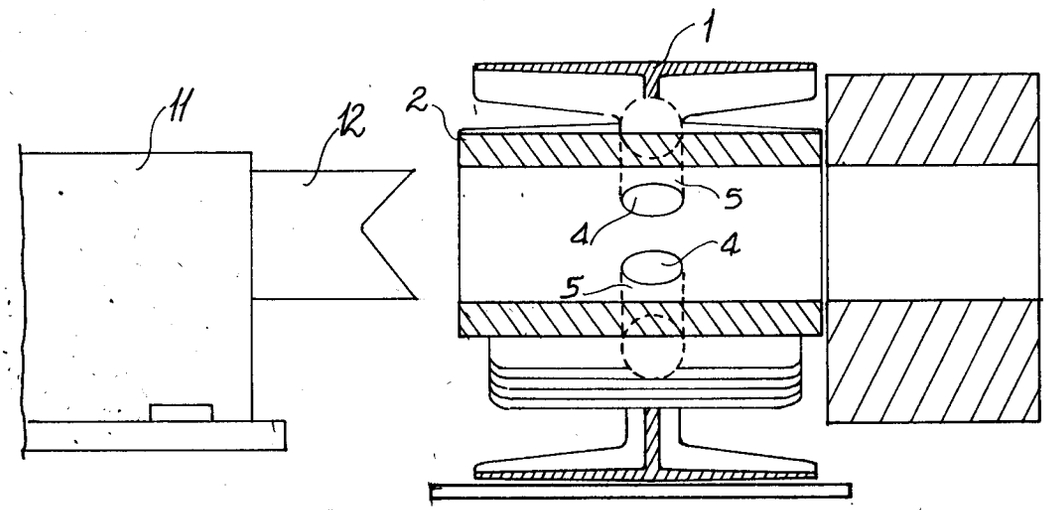

FIG. 9

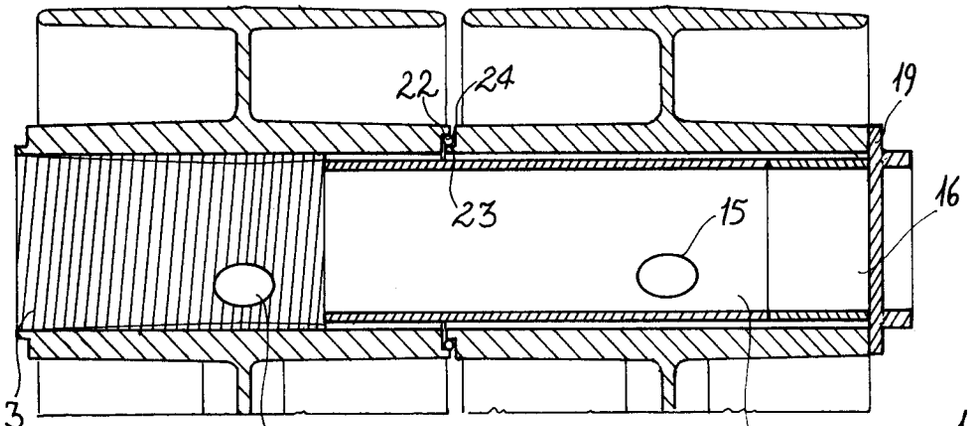

FIG. 10

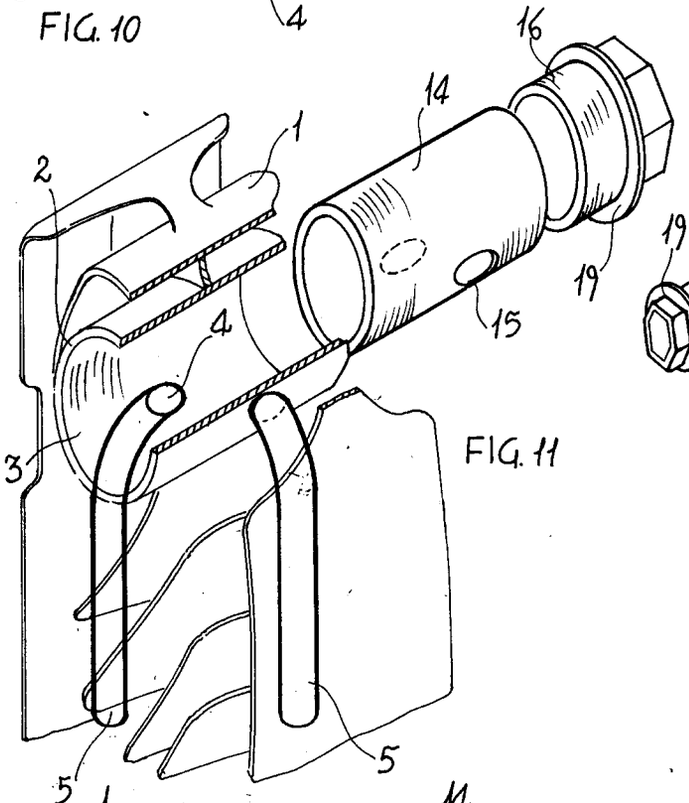

FIG. 11

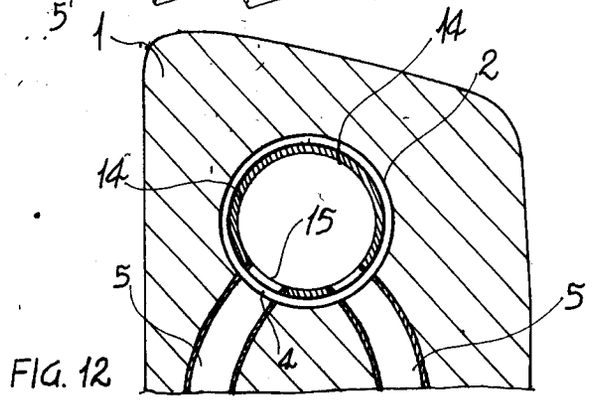

FIG. 12

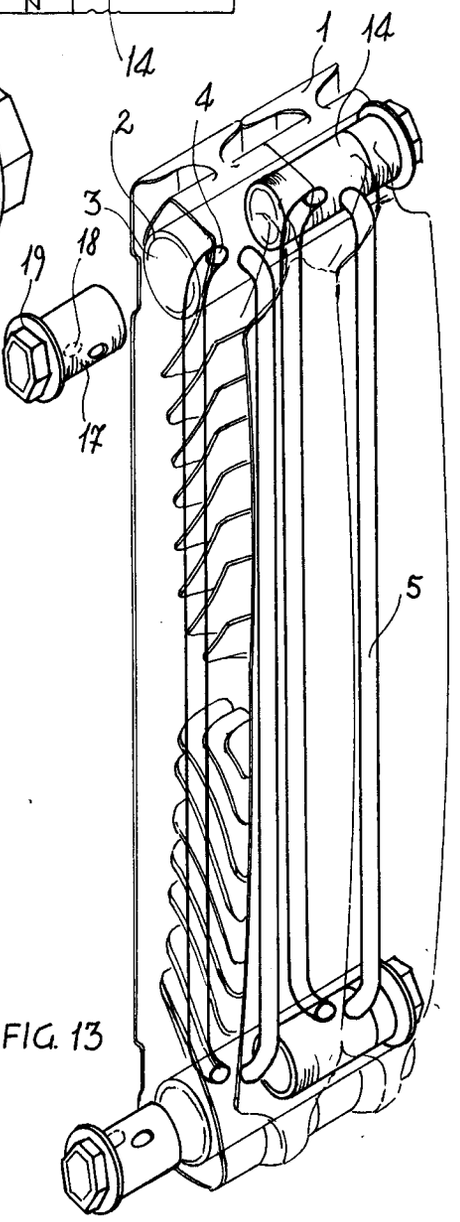

FIG. 13

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0380

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.6)
X	IT-A-1 186 825 (SIRA SRL) 16 December 1987 * the whole document * ---	1,3,4	F28F21/08 F28F9/26 B22D19/00
A	EP-A-0 481 154 (S I R A SRL) 22 April 1992 * the whole document * ---	1,2	
A	FR-A-1 013 149 (PAOLO FERRISI) * the whole document * -----	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F28F
B22D
F28D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 November 1996	Zaegel, B

CATEGORY OF CITED DOCUMENTS

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