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71 Applicant: **BAXI PARTNERSHIP LIMITED**
Brownedge Road
Bamber Bridge Preston, PR5 6SN(GB)

72 Inventor: **Edmundson, Michael John**
134 Halifax Road
Nelson Lancashire(GB)
Inventor: **Grundy, Ian Townsend**
Hollin Croft Briers Brow
Wheelton Chorley PR6 8HD(GB)

74 Representative: **Massey, Alexander et al**
MARKS & CLERK Suite 301 Sunlight House
Quay Street
Manchester, M3 3JY(GB)

54 **Heat exchangers.**

57 A heat exchanger, for use especially but not exclusively in a gas-fired appliance, is of unitary construction and comprising a water inlet manifold (11) and a water outlet manifold (12) interconnected in water flow communicating relationship by at least one externally-finned heat exchange tube (13).

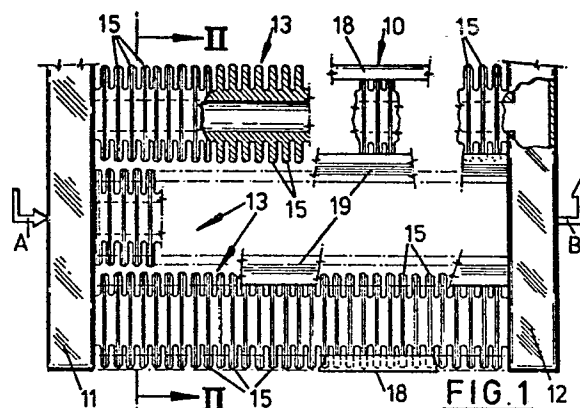
A preferred heat exchanger consists of three parallel externally-finned heat exchanger tubes integral with the end manifolds.

With such a unitary heat exchange structure it will be manifest that during installation and servicing, save for water pipe connections to the manifolds and a drain plug, there are no sealing requirements and consequently there are no possible leakage paths from the heat exchanger *per se*.

The heat exchanger is preferably but not exclusively formed of cast-iron and is preferably but not exclusively formed using a green sand moulding process with the fins (15) disposed as closely together as is possible within the limitations of the moulding process. The fins are preferably of radiused configuration and also of converging configuration both transversely and axially of the respective heat exchanger tube to facilitate the moulding process.

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Turbulence-creating means (17) is provided between at least some of the adjacent fins of the or each heat exchange tube to ensure re-mixing of combustion products of different temperature in the region of the heat exchange tube to improve the heat transfer qualities of the heat exchanger.





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.4)
X	GB-A- 864 277 (GLOW-WORM BOILERS LTD.) * page 1, lines 60-86; figures 1,2, reference no. 24,25 * ---	1,2,4,6 ,7	F 24 H 1/40 F 24 H 9/00 F 24 H 1/12 F 28 F 1/28
X	DE-A-2 036 012 (REYNOLDS) * page 3, paragraphs 2,3; figures 1,2, reference no. 3 * ---	1-3,7	
A	GB-A-1 123 437 (HOVEY) * page 1, lines 62-69; figure 1, reference no. 18 * ---	1,4,6	
A	DE-B-2 448 790 (VIESSMANN) * column 4, lines 11-15 * ---	7	
A	DE-C-2 245 357 (RENDAMAX PRODUKTEN B.V.) * column 3, lines 15-24 * -----	8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 24 H 1/00 F 24 H 9/00 F 28 F 1/00 F 28 F 13/00
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
BERLIN	29-06-1988	PIEPER C	
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	