



(19)

Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 853 227 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
24.03.1999 Bulletin 1999/12

(51) Int. Cl.⁶: F28F 9/18, F28D 1/03

(43) Date of publication A2:
15.07.1998 Bulletin 1998/29

(21) Application number: 98100457.5

(22) Date of filing: 13.01.1998

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC

NL PT SE

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: 14.01.1997 JP 4833/97

(71) Applicant: ZEXEL CORPORATION
Tokyo 150 (JP)

(72) Inventor:
Kato, Soichi,
c/o Zexel Corporation
Osato-gun, Saitama (JP)

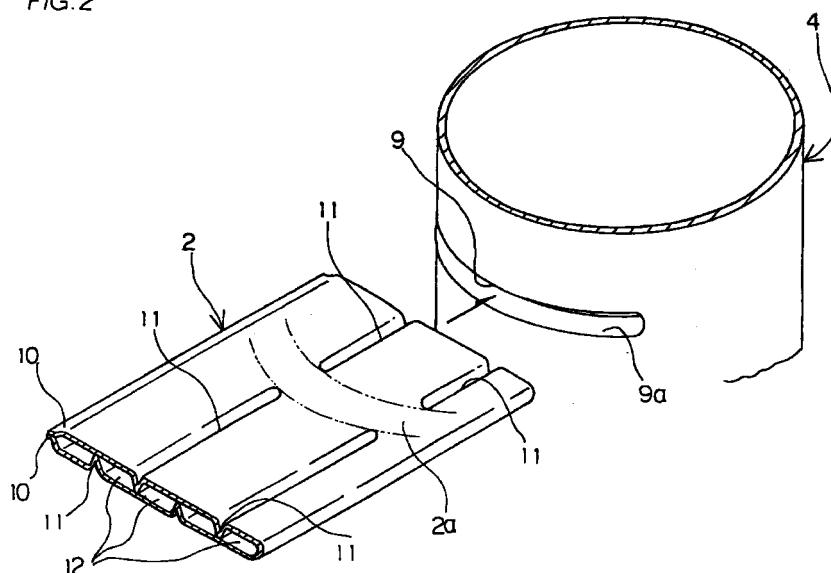
(74) Representative:
Füchsle, Klaus, Dipl.-Ing. et al
Hoffmann Eitle,
Patent- und Rechtsanwälte,
Arabellastrasse 4
81925 München (DE)

(54) Heat exchanger

(57) To obtain a heat exchanger having an improved brazing property between tubes with beads formed and tube insertion holes of header pipes. A heat exchanger 1 which is formed by inserting ends of a tube 2, which has long beads 11, 11 formed to divide inside passages, into tube insertion holes 9 of header pipes 3, 4 and brazing the tube 2 with edges of the tube insertion holes 9, wherein a flat portion 2a without the beads 11 is formed on the ends of the tube 2, a burring 9a is

formed on the edges of the tube insertion holes 9 so to be brazed in contact with the flat portion 2a, and the flat portion 2a is formed to have a width A in a longitudinal direction of the tube, which is larger than a width B of the burring 9a in the longitudinal direction of the tube. Accordingly, even if the inserting degree of the tube 2 is deviated to some extent, brazing between the tube and the header pipes is not affected at all.

FIG. 2



EP 0 853 227 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 98 10 0457

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P,X	DE 197 28 247 A (ZEXEL CORP) 8 January 1998 * figure 7 * ---	1	F28F9/18 F28D1/03
A	EP 0 724 125 A (ZEXEL CORP) 31 July 1996 * column 5, line 9 - line 18; figures 2,3 * * page 5, line 41 - line 46; figure 4 * ---	1	
A	DE 43 40 378 A (ZEXEL CORP) 1 June 1994 * column 4, line 48 - column 5, line 42 * * column 7, line 25 - line 32; figures 8-10 * ---	1	
A	US 5 092 398 A (NISHISHITA KUNIHIKO ET AL) 3 March 1992 * column 3, line 26 - line 35; figure 4 * ---	1	
A	PATENT ABSTRACTS OF JAPAN vol. 095, no. 008, 29 September 1995 -& JP 07 120181 A (ZEXEL CORP), 12 May 1995 * abstract; figures 1,2 * -----	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			F28D F28F
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	28 January 1999	Mootz, F	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone	T : theory or principle underlying the invention		
Y : particularly relevant if combined with another document of the same category	E : earlier patent document, but published on, or after the filing date		
A : technological background	D : document cited in the application		
O : non-written disclosure	L : document cited for other reasons		
P : intermediate document	& : member of the same patent family, corresponding document		

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 10 0457

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-01-1999

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
DE 19728247	A	08-01-1998		JP 10019492 A		23-01-1998
				JP 10019493 A		23-01-1998
EP 0724125	A	31-07-1996		JP 8200977 A		09-08-1996
				CN 1129157 A		21-08-1996
				US 5689881 A		25-11-1997
DE 4340378	A	01-06-1994		JP 6159986 A		07-06-1994
				KR 122533 B		13-11-1997
US 5092398	A	03-03-1992		DE 4004949 A		23-08-1990
				FR 2664370 A		10-01-1992
				KR 129089 B		07-04-1998
				KR 9607987 B		17-06-1996
				US 5036914 A		06-08-1991