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(71) Applicant:
**CONSOLIDATED ENGINEERING COMPANY, INC.
Kennesaw, GA 30144-3651 (US)**

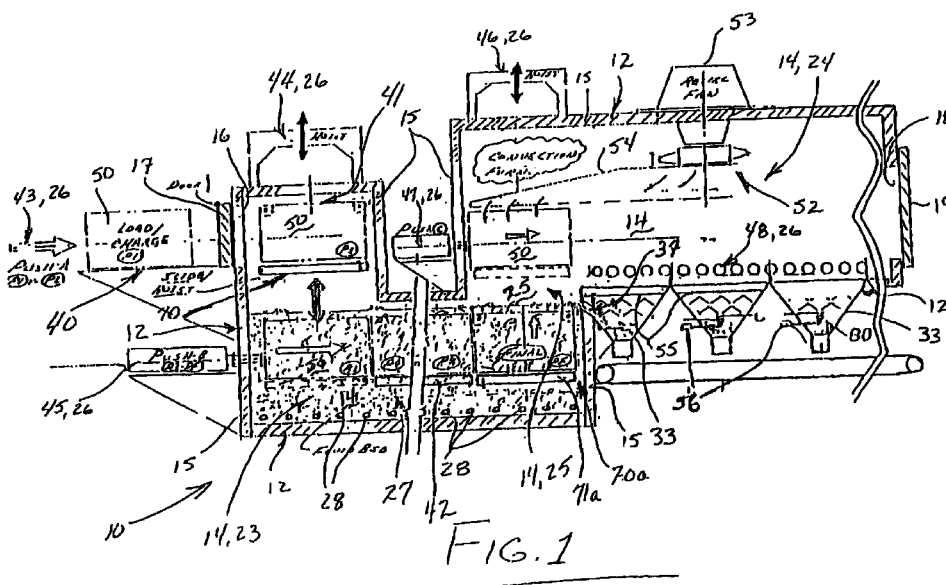
(72) Inventors:
• **Crafton, Scott P.**
Marietta, Georgia 30064 (US)
• **Lewis, James L., Jr.**
Kennesaw, Georgia 30144 (US)

(74) Representative:
Schurack, Eduard F. et al
Hofstetter, Schurack & Skora
Balanstrasse 57
81541 München (DE)

(54) **Combination conduction/convection furnace**

(57) A single furnace system (10) integrates, in combination, two or more distinct heating environments (which in the preferred embodiments include a conduction heating environment (23) and a convection heating environment (24)) integrated such that the multiple environments define a continuous heating chamber (14) through which a moving workpiece (such as a casting)

transitions from one heating environment to the other without being exposed to the atmosphere. In accordance with the preferred methods, the transitioning of the casting from one environment to the other is accomplished with no meaningful change in temperature.



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EUROPEAN SEARCH REPORT

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EP 99 10 5668

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)
X	WO 98 14291 A (PROCEDYNE CORP) 9 April 1998 (1998-04-09) * page 13, line 11 - line 15; claims; figure 3 *	1-16	B22D29/00 B22D31/00
X	GB 2 187 398 A (TUDOR ROOF TILE CO LD) 9 September 1987 (1987-09-09) * page 1, line 50 - line 55; claims; figures *	1-7	
A	WO 97 30805 A (CONSOLIDATED ENG CY) 28 August 1997 (1997-08-28)		
D	& US 5 829 509 A (S.P.CRAFTON)		
A	US 5 565 046 A (S.P.CRAFTON) 15 October 1996 (1996-10-15)		
A	DE 195 30 975 A (VAW ALUCAST GMBH) 27 February 1997 (1997-02-27)		
A	EP 0 546 210 A (CONSOLIDATED ENG CY) 16 June 1993 (1993-06-16)		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
D	& US 5 294 094 A (S.P.CRAFTON)		B22D F27B
A	FR 2 448 573 A (LA PHYSIQUE APPLIQUEE IND) 29 August 1980 (1980-08-29)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 April 2000	Examiner Coulomb, J
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	

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

EP 99 10 5668

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.

27-04-2000

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9814291	A	09-04-1998	EP	0954398 A	10-11-1999
GB 2187398	A	09-09-1987	GB	2152404 A	07-08-1985
WO 9730805	A	28-08-1997	AU	2190497 A	10-09-1997
			US	5957188 A	28-09-1999
			US	5829509 A	03-11-1998
US 5565046	A	15-10-1996	US	5354038 A	11-10-1994
			US	5850866 A	22-12-1998
			AT	165030 T	15-05-1998
			AU	677774 B	08-05-1997
			AU	3594693 A	15-03-1994
			BR	9305607 A	13-06-1995
			CA	2121047 A,C	03-03-1994
			CN	1097662 A	25-01-1995
			DE	69318000 D	20-05-1998
			DE	69318000 T	24-12-1998
			EP	0612276 A	31-08-1994
			ES	2114039 T	16-05-1998
			JP	11129055 A	18-05-1999
			JP	2849213 B	20-01-1999
			JP	7506299 T	13-07-1995
			MX	9302659 A	28-02-1994
			WO	9404297 A	03-03-1994
			AU	663088 B	28-09-1995
			AU	1906292 A	30-12-1992
			AU	690776 B	30-04-1998
			AU	4076395 A	21-03-1996
			BR	9206048 A	20-12-1994
			CA	2103136 A,C	25-11-1992
			EP	0546210 A	16-06-1993
			JP	2851574 B	27-01-1999
			JP	8224656 A	03-09-1996
			JP	2620027 B	11-06-1997
			JP	6507839 T	08-09-1994
			KR	9705373 B	15-04-1997
			MX	9202441 A	01-11-1992
			WO	9220478 A	26-11-1992
			US	5350160 A	27-09-1994
			US	5531423 A	02-07-1996
			US	5551998 A	03-09-1996
			US	5294094 A	15-03-1994
DE 19530975	A	27-02-1997	NONE		

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

EP 99 10 5668

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.

27-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 546210 A	16-06-1993	AU 663088 B	28-09-1995
		AU 1906292 A	30-12-1992
		AU 690776 B	30-04-1998
		AU 4076395 A	21-03-1996
		BR 9206048 A	20-12-1994
		CA 2103136 A,C	25-11-1992
		JP 2851574 B	27-01-1999
		JP 8224656 A	03-09-1996
		JP 2620027 B	11-06-1997
		JP 6507839 T	08-09-1994
		KR 9705373 B	15-04-1997
		MX 9202441 A	01-11-1992
		WO 9220478 A	26-11-1992
		US 5350160 A	27-09-1994
		US 5354038 A	11-10-1994
		US 5531423 A	02-07-1996
		US 5565046 A	15-10-1996
		US 5551998 A	03-09-1996
		US 5850866 A	22-12-1998
		US 5294094 A	15-03-1994
FR 2448573 A	05-09-1980	NONE	