

Title (en)
Vacuum furnace for the heat treatment of metallic work-pieces.

Title (de)
Vakuumofen zur Wärmebehandlung metallischer Werkstücke.

Title (fr)
Four sous vide pour le traitement à chaud de pièces métalliques.

Publication
EP 0313889 A1 19890503 (DE)

Application
EP 88116478 A 19881005

Priority
DE 3736502 A 19871028

Abstract (en)
[origin: US4869470A] A vacuum furnace for heat treatment of metallic workpieces wherein the heat conductors are formed as conduits fitted with bore holes and connected by electrical insulators to coolant gas distributor.

Abstract (de)
Eine rasche Aufheizung und eine rasche Abkühlung von metallischen Werkstücken mit Inertgasen in Vakuumöfen erreicht man, wenn die Heizleiter als Rohre ausgebildet, zum Ofeninnenraum mit Bohrungen versehen und über elektrische Isolierstücke mit einer Kühlgasverteilungsvorrichtung verbunden sind.

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C21D 1/613; C21D 1/767

IPC 8 full level
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Citation (applicant)
• DE 2839807 A1 19800327 - DEGUSSA
• DE 2844843 A1 19800430 - IPSEN IND INT GMBH
• DE 2839807 A1 19800327 - DEGUSSA
• DE 2844843 A1 19800430 - IPSEN IND INT GMBH
• DE 1919493 A1 19701105 - IPSEN IND INTERNAT GMBH

Citation (search report)
• [AD] DE 2839807 C2 19860417
• [A] DE 1259919 B 19680201 - HAROLD NORREGARD IPSEN
• [A] EP 0163906 A2 19851211 - SCHMETZ INDUSTRIEOFENBAU UND V [DE]
• [A] US 4235592 A 19801125 - SMITH CHARLES W JR [US], et al
• [A] US 4113977 A 19780912 - HOCHSTRASSER OTTO, et al
• [AD] DE 2844843 C2 19850912
• [AD] DE 1919493 A1 19701105 - IPSEN IND INTERNAT GMBH

Cited by
EP0727498A1; US5938866A; DE10117987A1; CN102383112A; DE102019204869A1; WO9700974A1; WO9416278A1; EP0344413B1

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US 4869470 A 19890926; AT E65800 T1 19910815; AU 2440588 A 19890504; AU 601084 B2 19900830; BG 49829 A3 19920214; BR 8805558 A 19890711; CA 1313043 C 19930126; CN 1015474 B 19920212; CN 1033840 A 19890712; CS 276378 B6 19920513; CS 711288 A3 19920513; DD 283455 A5 19901010; DE 3736502 C1 19880609; DE 3864008 D1 19910905; DK 164747 B 19920810; DK 164747 C 19921228; DK 596488 A 19890429; DK 596488 D0 19881027; EP 0313889 A1 19890503; EP 0313889 B1 19910731; ES 2023994 B3 19920216; FI 85386 B 19911231; FI 85386 C 19920410; FI 884514 A0 19880930; FI 884514 A 19890429; HU 199903 B 19900328; HU T49652 A 19891030; IL 87761 A0 19890228; IL 87761 A 19930131; IN 170643 B 19920425; JP H01142018 A 19890602; NO 169783 B 19920427; NO 169783 C 19920805; NO 884390 D0 19881004; NO 884390 L 19890502; PL 156379 B1 19920331; PL 275470 A1 19890502; PT 88895 A 19890914; PT 88895 B 19970228; SU 1813194 A3 19930430; YU 193888 A 19900430; YU 46575 B 19931116; ZA 886832 B 19890530

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US 26077188 A 19881021; AT 88116478 T 19881005; AU 2440588 A 19881027; BG 8572388 A 19881017; BR 8805558 A 19881027; CA 581507 A 19881027; CN 88108739 A 19881026; CS 711288 A 19881027; DD 32110788 A 19881026; DE 3736502 A 19871028; DE 3864008 T 19881005; DK 596488 A 19881027; EP 88116478 A 19881005; ES 88116478 T 19881005; FI 884514 A 19880930; HU 561588 A 19881027; IL 8776188 A 19880915; IN 764CA1988 A 19880912; JP 25609788 A 19881013; NO 884390 A 19881004; PL 27547088 A 19881025; PT 8889588 A 19881028; SU 4356698 A 19881026; YU 193888 A 19881017; ZA 886832 A 19880913