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BROKERAGE MARKETING PACKAGE

"METHOD OF HEAT TREATING MAGNESIUM ALLOYS & MAGNESIUM GRAIN REFINING USING VANADIUM"

THIS OFFERING IS FOR SALE OF

US 8,414,717 B2 **US 8,784,579 B2**

Redacted Summary: Full document including market overview, exemplary players and product, and possibly EOUs available upon request. Contact: justin@ipapproach.com

Justin Ehrlickman

September 2019

Non-Confidential Marketing Package

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Justin Ehrlickman | justin@ipapproach.com | 845-558-7901

Details of the offering and planned bidding process for purchasing the patent portfolio is outlined below:

THIS OFFERING IS FOR SALE OF

"METHOD OF HEAT TREATING MAGNESIUM ALLOYS & MAGNESIUM GRAIN REFINING USING VANADIUM"

US 8,414,717 B2 US 8,784,579 B2

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EXECUTIVE SUMMARY

IPApproach LLC, is pleased to present the attached exclusive patents for sale **"METHOD OF HEAT TREATING MAGNESIUM ALLOYS"** which include U.S. Patent **US 8,414,717 B2** and "**MAGNESIUM GRAIN REFINING USING VANADIUM**" which include U.S. Patent **US 8,784,579 B2** assigned to **Joka Buha.**

The patent **US 8,414,717 B2** relates to the method for low temperature heat treatment of an age-hardenable magnesium based alloys. The technology disclosed provides the following advantages,

- ✓ Age hardening of magnesium based alloys can be effected at significantly lower temperatures than are typically used during conventional T6 ageing,
- ✓ The tensile properties of most heat treatable magnesium alloys are limited compared to those of the currently used aluminum alloys, which is one of the main limitations for the wider application of magnesium alloys but the present invention includes a method to improve the tensile strength of magnesium alloys.
- ✓ The enhanced ageing response typically comprises at least an improvement in both tensile strength and ductility.
- ✓ The low temperature heat treatment is accelerated, resulting in improved mechanical properties, such as ductility, strength and hardness levels, comparable to or better than those in the T6 condition.
- ✓ Fracture toughness of alloys can be also significantly improved through age hardening.
- ✓ An increase in the heat treatment temperature and the change of GP zone type, size, morphology and density in general results in increase in tensile strength and hardness while the ductility and fracture toughness remain improved compared to the T6 condition.

EXECUTIVE SUMMARY

The patent **US 8,784,579 B2** relates to process of grain refining magnesium metal or magnesium based alloy which includes the step of providing a melt of magnesium alloy wherein melting includes grain refining agent like vanadium. The technology disclosed provides the following advantages,

- ✓ The inventive vanadium grain refiner is applicable to all magnesium-based alloys and to both cast and wrought magnesium based alloys, particularly those where magnesium comprises more than 75 wt % (weight percent).
- ✓ Presence of a trace amount of grain refiner like vanadium in the magnesium solid solution significantly improves the magnitude and kinetics of hardening during ageing.
- ✓ Refining Agent like Vanadium used in this invention has a multiple beneficial effect on some alloys, which is not observed with grain refiners such as zirconium or carbon and carbon-bearing compounds. This makes vanadium a highly suitable and preferred choice as grain refiner even for magnesium alloys that have traditionally been grain refined by zirconium.
- ✓ By using a grain refiner comprised of vanadium metal alone or vanadium metal in the combination with one or more alloying elements intended to be present in the magnesium alloy, it is possible to produce uniform grain size of cast alloys which is at least two times smaller than when the said grain refiner is not used, thereby significantly improving the mechanical properties of cast alloys and wrought products, particularly the tensile properties in the as-cast state.

The global magnesium alloys market was approximately USD 1.3 billion in 2018 and is expected to generate around USD 3.38 billion by 2026, at a CAGR of around 12.7% between 2019 and 2026.

PORTFOLIO BIBLIOGRAPHY

S. No.	Patent No./ Application No.	Title	Priority Date	Filing Date	Publication Date
1.	US 8,414,717 B2	Method of heat treating Magnesium alloys.	May 14, 2007	April 29, 2008	April 9, 2013
2.	US 8,784,579 B2	Magnesium Grain refining using vanadium	April 22, 2008	April 20, 2009	July 22, 2014

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FOREIGN COUNTERPART OF US 8,414,717 B2

S. No.	Patent No./ Application No.	Title	Priority Date	Filing Date	Publication Date
1.	AU2007202131 A1	Method of heat treating magnesium alloys	May 14, 2007	May 14, 2007	Dec 04, 2008
2.	AU2008251005 B2	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	Mar 03, 2011
3.	CA2684645 C	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	Sep 26, 2017
4.	CN101680072 B	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	Jun 27, 2012
5.	EP2162559 B1	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	Apr 05, 2017

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FOREIGN COUNTERPART OF US 8,414,717 B2

S. No.	Patent No./ Application No.	Title	Priority Date	Filing Date	Publication Date
6.	IL201808 A	Method of heat treating magnesium alloys	May 14, 2007	Oct 28, 2009	Jul 31, 2013
7.	JP5483363 B2	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	May 07, 2014
8.	RU2454479 C2	Magnesium alloy heat treatment method	May 14, 2007	Apr 29, 2008	Jun 27, 2012
9.	WO2008138034 A1	Method of heat treating magnesium alloys	May 14, 2007	Apr 29, 2008	Nov 20, 2008

FOREIGN COUNTERPART OF US 8,784,579 B2

S. No.	Patent No./ Application No.	Title	Priority Date	Filing Date	Publication Date
1.	AU2009240770 B2	Magnesium grain refining using vanadium	Apr 22, 2008	Apr 20, 2009	Mar 20, 2014
2.	CN102016095 B	Magnesium grain refining using vanadium	Apr 22, 2008	Apr 20, 2009	Mar 26, 2014
3.	WO2009129559 A1	Magnesium grain refining using vanadium	Apr 22, 2008	Apr 20, 2009	Oct 29, 2009

THANK YOU!

ANY QUESTIONS ABOUT THIS PATENT SALE OFFERING SHOULD BE DIRECTED TO:

JUSTIN EHRLICKMAN | justin@ipapproach.com | 845-558-7901

IPAPPROACH LLC | 300 E 54th St. | Suite 11 D | NY, 10022