Iron alloy that is lighter and stronger than stainless steel

Iron alloy with specific gravity less than 7, 0.2% proof stress more than 1000 MPa, and tensile stress more than 1000 MPa

Overview

Although stainless steel is an industrially important iron alloy, its specific strength is inferior to that of other metals because of its large specific gravity. An iron alloy having low specific gravity and high strength is required for the transport equipment.

The present invention provides high strength iron alloy having the maximum 0.2% proof stress and the tensile stress more than 1000 MPa while having the specific gravity less than 7.

Effect & Application

Table 1 shows mechanical properties of various examples, and Figure 1 shows stress-strain curves. All the examples have high strength, which is
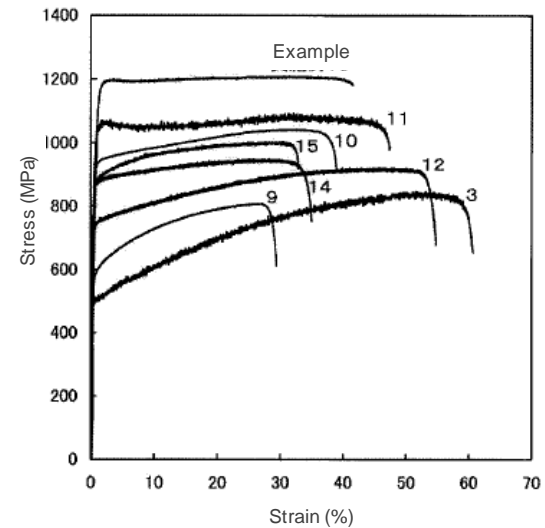- 0.2% proof stress more than 500 MPa
- tensile stress more than 800 MPa

Application to the transport equipment and the structural materials is expected.

IP Data

IP No.   :   JP4654440
Inventor   :   ISHIDA Kiyohito, KAINUMA Ryosuke, SUTOU Yuji
Admin No.   :   T05-117

Figure 1

Features・Outstandings

Table 1

	Fe	Mn	Al	C	Si	Cr	Ni	Young's modulus GPa	0.2% proof stress MPa	Tensile stress MPa	Tensile elongation %
Example 3	Balance	15.1	7.6	1.28	0.03	5.5	0.3	185	510	840	59
Example 4	"	15.2	7.6	1.32	0.02	5.6	4.5	205	560	876	58
Example 6	"	20.1	7.65	0.9	0.02	5.1	0.015	180	627	880	42
Example 7	"	20.2	8.1	1.8	0.5	3	0.02	134	720	860	46
Example 8	"	20.5	8.8	1.2	0.1	5.3	0.02	184	870	1063	38
Example 9	"	20.6	9.7	0.51	0.02	0.1	0.2	220	545	808	29
Example 10	"	20.6	10	1.3	0.05	5.2	0.35	210	900	1040	38
Example 11	"	20.8	10.1	1.5	0.1	5.1	0.03	200	1030	1080	47
Example 12	"	20.8	11	1.1	0.1	0.5	0.015	172	725	918	54
Example 13	"	21.2	11	1.8	0.2	5.2	0.02	118	1150	1208	40.5
Example 14	"	21.2	11.2	1.3	0.15	0.5	0.012	200	835	943	35
Example 15	"	21.5	12	0.99	0.1	5.1	0.1	250	875	1000	32.2

Material samples are available under material transfer agreement (negotiable about amount and price).

Contact

Tohoku Techno Arch Co., Ltd.
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