

Search query (2): [SP]: technical field[0001] the present disclosure relates to a steel sheet for crown caps that is excellent in shape uniformity during forming of crown caps used for beer bottles etc., to a method for manufacturing the steel sheet, and to crown caps.background art[0002] from the viewpoint of environmental load reduction and cost reduction in recent years, steel sheets for crown caps used for beer bottle caps etc. are being reduced in thickness. generally, there are the following two types of steel sheets reduced in thickness. one is sr (single reduced) steel subjected to hot rolling, cold rolling, annealing, and then temper rolling, and the other is dr (double reduced) steel subjected to secondary cold rolling. as for steel sheets for crown caps, the demand for steel sheets having a thickness of 0.20 mm or less is increasing, and dr steel subjected to secondary cold rolling is preferred because work hardening can be utilized in order to compensate for a reduction in pressure capacity due to a reduction in thickness. however, the dr steel is generally harder than the sr steel, and a problem with the dr steel is its low formability.[0003] when a crown cap is formed, a central portion is drawn to some extent at the initial stage of forming, and then an outer edge portion is formed into a fluted shape. the use of a steel sheet with low formability may cause a defective shape, i.e., non-uniform flute shapes. a crown cap with non-uniform flute shapes has a problem in that, after the crown cap is put on a bottle, pressure capacity is not achieved and leakage of the content occurs, so that the crown cap does not server as a cap. if the strength of the steel sheet of a crown cap is low, there is a risk that the crown cap comes off even when the shapes of the flutes are uniform.[0004] one well-known steel sheet having good formability is ultra-low carbon if (interstitial free) steel. for the purpose of achieving an improvement in formability and a reduction in thickness simultaneously, many studies have been conducted on dr steel that uses the ultra-low carbon steel (for example, patent literature 1 to patent literature 3).citation listpatent literature[0005] ptl 1: japanese unexamined patent application publication no. 7-11333[0006] ptl 2: japanese unexamined patent application publication no. 5-287445[0007] ptl 3: japanese unexamined patent application publication no. 2010-255021summarytechnical problem[0008] however, even when the above conventional techniques are applied to crown caps, the crown caps have a problem in that the performance of the crown caps cannot be ensured.[0009] it is an object of the present disclosure to provide a steel sheet for crown caps that is excellent in formability, a method for manufacturing the steel sheet, and a crown cap.solution to problem[0010] to solve the foregoing problem, the present inventors have conducted extensive studies. the present inventors have studied the chemical composition, hot rolling conditions, cold rolling conditions (primary and secondary), and continuous annealing conditions of ultra-low carbon steel used as a base material. the present inventors have found that, by increasing an average r value and controlling a yp to a suitable value, the rate of occurrence of defective shapes can be reduced and pressure capacity can be ensured.[0011] exemplary embodiments may include as follows.[0012] [1] a steel sheet for crown caps, the steel sheet comprising, in mass percent, c: 0.0005 to 0.0050 percent, si: 0.020 percent or less, mn: 0.10 to 0.60 percent, p: 0.020 percent or less, s: 0.020 percent or less, al: 0.01 to 0.10 percent or less, n: 0.0050 percent or less, and nb: 0.010 to 0.050 percent, the balance being fe and inevitable impurities, the steel sheet having an average r value of 1.30 or more and a yp of 450 mpa or more and 650 mpa or less.[0013] [2] the steel sheet for crown caps according to [1] above, wherein an elongation rate of ferrite is 4.2 or less.[0014] [3] a method for manufacturing a steel sheet for crown caps, the method comprising: hot rolling a steel slab having a chemical composition according to [1] at a slab reheating temperature of 1,150 degrees centigrade or higher and a finishing temperature of 870 degrees centigrade or higher coiling the hot rolled steel sheet at a coiling temperature of 600 degrees centigrade or higher performing pickling then performing primary cold rolling performing annealing at an annealing temperature of recrystallization temperature or more and 790 degrees centigrade or less and then performing secondary cold rolling at a rolling reduction of 10 percent or more and 50 percent or less.[0015] [4] a crown cap obtained by forming the steel sheet for crown caps according to [1] or [2].[0016] in the present disclosure, " percent " indicating the percentage of each compositional component is percent by mass.advantageous effects[0017] a steel sheet for crown caps that has an average r value or 1.30 or more and a yp of 450 mpa or more and 650 mpa or less and excellent in formability is obtained. the use of the steel sheet for crown caps of the disclosed embodiments can improve the shape uniformity of crown caps used for beer bottles etc. and allows sufficient pressure capacity to be achieved.brief description of drawing[0018] fig. 1 is an illustration showing the shape of flutes of a crown cap.description of embodiments[0019] first, a description will be given of compositional components.[c: 0.0005 to 0.0050 percent][0020] c is an element that increases the strength of the steel but decreases its formability. if the amount of solute c in the steel is large, yield elongation increases, and the large amount of solute c is likely to cause age hardening and stretcher strain during forming. therefore, when a continuous annealing method is used, it is necessary to control and reduce the content of c as much as possible at the stage of steelmaking. if the amount of remaining solute c is large, the steel sheet becomes hard, and wrinkles easily occur at the initial stage of the forming of a crown cap, causing an increase in the rate of occurrence of defective shapes. c is also an element having an influence on recrystallization texture. as the amount of c decreases, accumulation in a crystal orientation group in which a 111 direction is parallel to the normal to the sheet surface increases in the texture of the annealed sheet, and the average r value increases. the increase in the average r value improves drawability, and the defective shape of the crown cap is improved. therefore, the content of c is 0.0050 percent or less. to further improve the uniformity of the shape, the content of c is preferably 0.0035 percent or less and more preferably 0.0023 percent or less. however, since excessive decarburization leads to an increase in cost of steelmaking, the lower limit of the content of c is 0.0005 percent.[si: 0.020 percent or less][0021] if a large amount of si is added, the surface treatability of the steel sheet deteriorates, and the corrosion resistance of the steel sheet is reduced. therefore, the amount of si is 0.020 percent or less.[mn: 0.10 to 0.60 percent][0022] mn is added for the purpose of preventing thermal embrittlement. mn also has the effect of preventing a reduction in hot ductility caused by s contained in the steel. it is necessary that the amount of mn added be 0.10 percent or more in order to obtain these effects. in a ladle analysis value specified in jis g 3303 or a ladle analysis value specified by the american society for testing materials (astm a623m-11), the upper limit of mn in tin mill black plates used for general food containers is specified to be 0.60 percent or less. therefore, the upper limit of mn in the disclosed embodiments is 0.60 percent or less. from the viewpoint of formability, mn is preferably 0.45 percent or less.[p: 0.020 percent or less][0023] if a large amount of p is added, the steel becomes hard, and its formability deteriorates. in addition, the large amount of p causes a reduction in corrosion resistance. therefore, the upper limit of p is 0.020 percent.[s: 0.020 percent or less][0024] s is bonded to fe in the steel to thereby form fes, and this causes a reduction in the hot ductility of the steel. to prevent this reduction, s is 0.020 percent or less. if the amount of s is excessively small, the risk of the occurrence of pitting corrosion increases. therefore, s is preferably 0.008 percent or more.[al: 0.01 to 0.10 percent][0025] al is an element added as a deoxidizer. in addition, since al and n form aln, al has the effect of reducing the amount of solute n in the steel. if the content of al is less than 0.01 percent, the deoxidation effect and the effect of reducing the amount of solute n are not sufficient. a content of al exceeding 0.10 percent is not preferable because not only these effects are saturated but also the amount of inclusions such as alumina increases. therefore, the content of al is within the range of 0.01 percent or more and 0.10 percent or less.[n: 0.0050 percent or less][0026] if the amount of n is large, the steel becomes hard due to strain age hardening, and the formability deteriorates. in addition, it is necessary to increase the amount of an element added in order to fix solute n, and this leads to an increase in cost. therefore, the upper limit of n is 0.0050 percent or less. it is difficult to stably reduce the amount of n to less than 0.0010 percent, and this causes the cost of manufacturing to increase. therefore, n is preferably 0.0010 percent or more.[nb: 0.010 percent or more.]

Results: 18

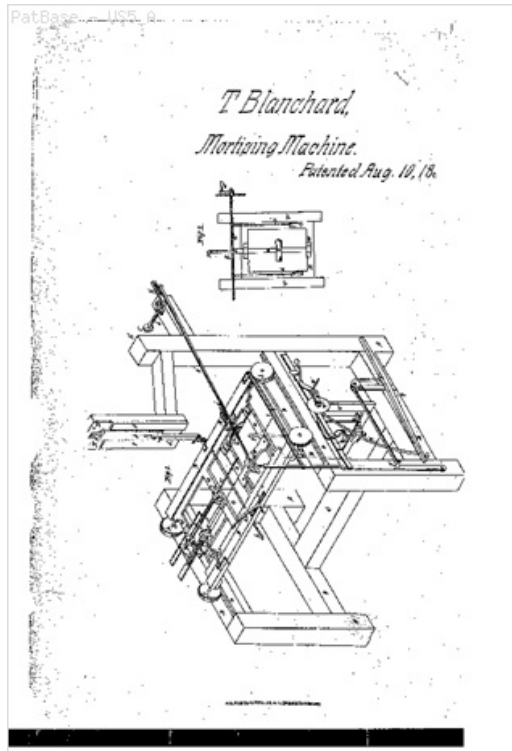
Search history

Search PN=(WO2015/129191) (Results 1)

1:

Search [SP]: technical field[0001] the present disclosure relates to a steel sheet for crown caps that is excellent in shape uniformity during forming of crown caps used for beer bottles etc., to a method for manufacturing the steel sheet, and to crown caps.background art[0002] from the viewpoint of environmental load reduction and cost reduction in recent years, steel sheets for crown caps used for beer bottle caps etc. are being reduced in thickness. generally, there are the following two types of steel sheets reduced in thickness. one is sr (single reduced) steel subjected to hot rolling, cold rolling, annealing, and then temper rolling, and the other is dr (double reduced) steel subjected to secondary cold rolling. as for steel sheets for crown caps, the demand for steel sheets having a thickness of 0.20 mm or less is increasing, and dr steel subjected to secondary cold rolling is preferred because work hardening can be utilized in order to compensate for a reduction in pressure capacity due to a reduction in thickness. however, the dr steel is generally harder than the sr steel, and a problem with the dr steel is its low formability.[0003] when a crown cap is formed, a central portion is drawn to some extent at the initial stage of forming, and then an outer edge portion is formed into a fluted shape. the use of a steel sheet with low formability may cause a defective shape, i.e., non-uniform flute shapes. a crown cap with non-uniform flute shapes has a problem in that, after the crown cap is put on a bottle, pressure capacity is not achieved and leakage of the content occurs, so that the crown cap does not server as a cap. if the strength of the steel sheet of a crown cap is low, there is a risk that the crown cap comes off even when the shapes of the flutes are uniform.[0004] one well-known steel sheet having good formability is ultra-low carbon if (interstitial free) steel. for the purpose of achieving an improvement in formability and a reduction in thickness simultaneously, many studies have been conducted on dr steel that uses the ultra-low carbon steel (for example, patent literature 1 to patent literature 3).citation listpatent literature[0005] ptl 1: japanese unexamined patent application publication no. 7-11333[0006] ptl 2: japanese unexamined patent application publication no. 5-287445[0007] ptl 3: japanese unexamined patent application publication no. 2010-255021summarytechnical problem[0008] however, even when the above conventional techniques are applied to crown caps, the crown caps have a problem in that the performance of the crown caps cannot be ensured.[0009] it is an object of the present disclosure to provide a steel sheet for crown caps that is excellent in formability, a method for manufacturing the steel sheet, and a crown cap.solution to problem[0010] to solve the foregoing problem, the present inventors have conducted extensive studies. the present inventors have studied the chemical composition, hot rolling conditions, cold rolling conditions (primary and secondary), and continuous annealing conditions of ultra-low carbon steel used as a base material. the present inventors have found that, by increasing an average r value and controlling a yp to a suitable value, the rate of occurrence of defective shapes can be reduced and pressure capacity can be ensured.[0011] exemplary embodiments may include as follows.[0012] [1] a steel sheet for crown caps, the steel sheet comprising, in mass percent, c: 0.0005 to 0.0050 percent, si: 0.020 percent or less, mn: 0.10 to 0.60 percent, p: 0.020 percent or less, s: 0.020

percent or less, al: 0.01 to 0.10 percent or less, n: 0.0050 percent or less, and nb: 0.010 to 0.050 percent, the balance being fe and inevitable impurities, the steel sheet having an average r value of 1.30 or more and a yp of 450 mpa or more and 650 mpa or less.[0013] [2] the steel sheet for crown caps according to [1] above, wherein an elongation rate of ferrite is 4.2 or less.[0014] [3] a method for manufacturing a steel sheet for crown caps, the method comprising: hot rolling a steel slab having a chemical composition according to [1] at a slab reheating temperature of 1,150 degrees centigrade or higher and a finishing temperature of 870 degrees centigrade or higher coiling the hot rolled steel sheet at a coiling temperature of 600 degrees centigrade or higher performing pickling then performing primary cold rolling performing annealing at an annealing temperature of recrystallization temperature or more and 790 degrees centigrade or less and then performing secondary cold rolling at a rolling reduction of 10 percent or more and 50 percent or less.[0015] [4] a crown cap obtained by forming the steel sheet for crown caps according to [1] or [2].[0016] in the present disclosure, " percent " indicating the percentage of each compositional component is percent by mass.advantageous effects[0017] a steel sheet for crown caps that has an average r value or 1.30 or more and a yp of 450 mpa or more and 650 mpa or less and excellent in formability is obtained. the use of the steel sheet for crown caps of the disclosed embodiments can improve the shape uniformity of crown caps used for beer bottles etc. and allows sufficient pressure capacity to be achieved.brief description of drawing[0018] fig. 1 is an illustration showing the shape of flutes of a crown cap.description of embodiments[0019] first, a description will be given of compositional components.[c: 0.0005 to 0.0050 percent] [0020] c is an element that increases the strength of the steel but decreases its formability. if the amount of solute c in the steel is large, yield elongation increases, and the large amount of solute c is likely to cause age hardening and stretcher strain during forming. therefore, when a continuous annealing method is used, it is necessary to control and reduce the content of c as much as possible at the stage of steelmaking. if the amount of remaining solute c is large, the steel sheet becomes hard, and wrinkles easily occur at the initial stage of the forming of a crown cap, causing an increase in the rate of occurrence of defective shapes. c is also an element having an influence on recrystallization texture. as the amount of c decreases, accumulation in a crystal orientation group in which a 111 direction is parallel to the normal to the sheet surface increases in the texture of the annealed sheet, and the average r value increases. the increase in the average r value improves drawability, and the defective shape of the crown cap is improved. therefore, the content of c is 0.0050 percent or less. to further improve the uniformity of the shape, the content of c is preferably 0.0035 percent or less and more preferably 0.0023 percent or less. however, since excessive decarburization leads to an increase in cost of steelmaking, the lower limit of the content of c is 0.0005 percent.[si: 0.020 percent or less][0021] if a large amount of si is added, the surface treatability of the steel sheet deteriorates, and the corrosion resistance of the steel sheet is reduced. therefore, the amount of si is 0.020 percent or less.[mn: 0.10 to 0.60 percent][0022] mn is added for the purpose of preventing thermal embrittlement. mn also has the effect of preventing a reduction in hot ductility caused by s contained in the steel. it is necessary that the amount of mn added be 0.10 percent or more in order to obtain these effects. in a ladle analysis value specified in jis g 3303 or a ladle analysis value specified by the american society for testing materials (astm a623m-11), the upper limit of mn in tin mill black plates used for general food containers is specified to be 0.60 percent or less. therefore, the upper limit of mn in the disclosed embodiments is 0.60 percent or less. from the viewpoint of formability, mn is preferably 0.45 percent or less.[p: 0.020 percent or less][0023] if a large amount of p is added, the steel becomes hard, and its formability deteriorates. in addition, the large amount of p causes a reduction in corrosion resistance. therefore, the upper limit of p is 0.020 percent.[s: 0.020 percent or less][0024] s is bonded to fe in the steel to thereby form fes, and this causes a reduction in the hot ductility of the steel. to prevent this reduction, s is 0.020 percent or less. if the amount of s is excessively small, the risk of the occurrence of pitting corrosion increases. therefore, s is preferably 0.008 percent or more.[al: 0.01 to 0.10 percent][0025] al is an element added as a deoxidizer. in addition, since al and n form aln, al has the effect of reducing the amount of solute n in the steel. if the content of al is less than 0.01 percent, the deoxidation effect and the effect of reducing the amount of solute n are not sufficient. a content of al exceeding 0.10 percent is not preferable because not only these effects are saturated but also the amount of inclusions such as alumina increases. therefore, the content of al is within the range of 0.01 percent or more and 0.10 percent or less.[n: 0.0050 percent or less][0026] if the amount of n is large, the steel becomes hard due to strain age hardening, and the formability deteriorates. in addition, it is necessary to increase the amount of an element added in order to fix solute n, and this leads to an increase in cost. therefore, the upper limit of n is 0.0050 percent or less. it is difficult to stably reduce the amount of n to less than 0.0010 percent, and this causes the cost of manufacturing to increase. therefore, n is preferably 0.0010 percent or more.[nb: (Results 18)

Classifications:**CPC:** Y10T408/356 B23B41/04 B27F5/10**US:** 144/162.1 144/3.1 144/69 144/75 408/30**Family:**

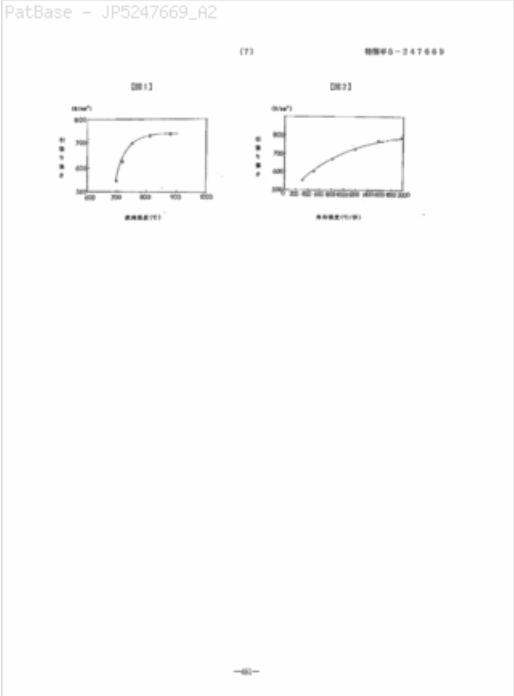
Publication number	Publication date	Application number	Application date
US5 A	18360810		00000000

Probable Assignee: BANK OF AMERICA NA**Assignee(s):** BANK OF AMERICA NA ; BANK OF AMERICA NA AGENT AS

Title: MANUFACTURE OF HIGH STRENGTH STEEL SHEET FOR THINNED AND DEEP-DRAWN CAN

Abstract: Source: JP5247669A [EN] PURPOSE: To prevent shock lines at the time of DTR forming caused by low ductility because of its ductility more excellent than that of a sheet used as stock for thinned drawn can subjected to severe working and manufactured by a double rolling method and therefore to eliminate the breakage of its barrel. CONSTITUTION: This is the method for manufacturing a high strength and high workability steel sheet for a can characterized by subjecting a continuously cast slab constituted of, by weight, 0.07 to 0.15% C, ≤0.03% Si, 0.5 to 1.5% Mn, ≤0.05% P, ≤0.05% S, 0.02 to 0.07% Al and 0.001 to 0.02% N, and the balance Fe with inevitable impurities to hot rolling, pickling and cold rolling, thereafter heating the steel sheet to a two phase range of ferrite-austenite between 750 to 900°C in continuous annealing, soaking it for 1 to 60sec, subsequently executing cooling from the two phase range to ≤200°C at 1000 to 2000°C/sec cooling rate, thereafter applying it with tin or Cr plating and moreover laminating a polyethylene terephthalate film on the surface.

Classifications:
International (IPC 8-9): C21D9/48 C22C38/00 C22C38/06 C23C28/00 (Advanced/Invention); C22C38/00 C22C38/06 (Advanced/Non-invention); C21D9/48 C22C38/00 C22C38/06 C23C28/00 (Core/Invention); C22C38/00 C22C38/06 (Core/Non-invention)
International (IPC 1-7): C21D9/48 C22C38/00 C22C38/06 C23C28/00



Family:

Publication number	Publication date	Application number	Application date
JP5247669 A2	19930924	JP19920084696	19920306

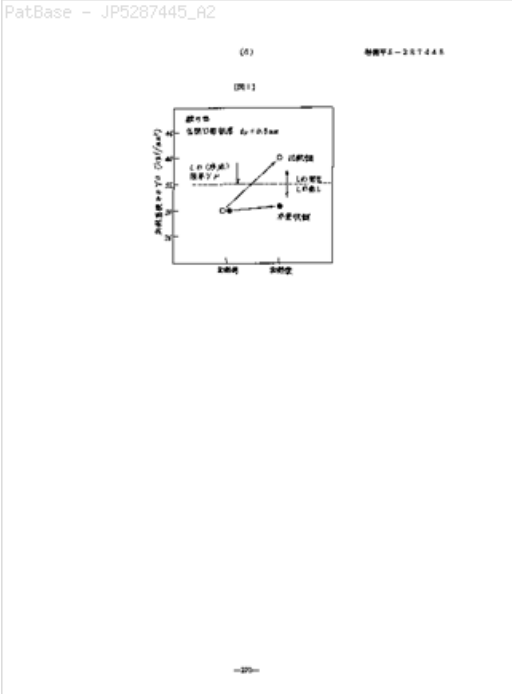
Priority:
JP19920084696 19920306

Probable Assignee: TOYO KOHAN CO LTD
Assignee(s): (std): TOYO KOHAN CO LTD
Inventor(s): (std): AOKI SHINICHI ; IKEDAKA SEI ; SATO DAIZO

Title: NON-AGING STEEL SHEET FOR VESSEL EXCELLENT IN NECK IN WORKABILITY

Abstract: Source: JP5287445A [EN] PURPOSE: To produce a non-aging steel sheet for vessel excellent in neck-in workability by preparing a steel sheet having a specific composition in which respective contents of Ti and Nb are specified. CONSTITUTION: A sheet of a steel which has a composition consisting of, by weight, 0.0003-0.01 percent C, =0.1 percent Si, 0.5-3.0 percent Mn, =0.03 percent P, =0.2 percent Cr, =0.015 percent S, =0.007 percent N, 0.01-0.1 percent Sol.Al, =0.01 percent O, Ti by the amount regulated so that the [effective Ti quantity] represented by equation [effective Ti quantity]=(total Ti)-[(48/14)xN percent +(48/32)xS percent +(48/16)xO percent x(1/2)] becomes <(48/12)xC percent, Nb by the amount where, in correlation with the [effective Ti quantity], (48/12)x[effective Ti quantity]+(93/12)xNb percent is regulated to =C percent and also [effective Ti quantity]+Nb percent is regulated to =0.20, and the balance Fe with inevitable impurities is prepared. By this method, the non-aging steel sheet for vessel excellent in neck-in workability can be obtained.

Classifications:
International (ipc 8-9): C21D9/46 C22C38/00 C22C38/28 C22C38/38 (Advanced/Invention);
C21D9/46 C22C38/00 C22C38/28 C22C38/38 (Core/Invention)
International (ipc 1-7): C21D9/46 C22C38/00 C22C38/28 C22C38/38



Family:

Publication number	Publication date	Application number	Application date
JP3331504 B2	20021007	JP19920093153	19920413
JP5287445 A2	19931102	JP19920093153	19920413

Priority:

JP19920093153 19920413

Probable Assignee: NIPPON STEEL CORP
Assignee(s): (std): NIPPON STEEL CORP
Inventor(s): (std): HIBINO TAKASHI ; YAMAZAKI KAZUMASA

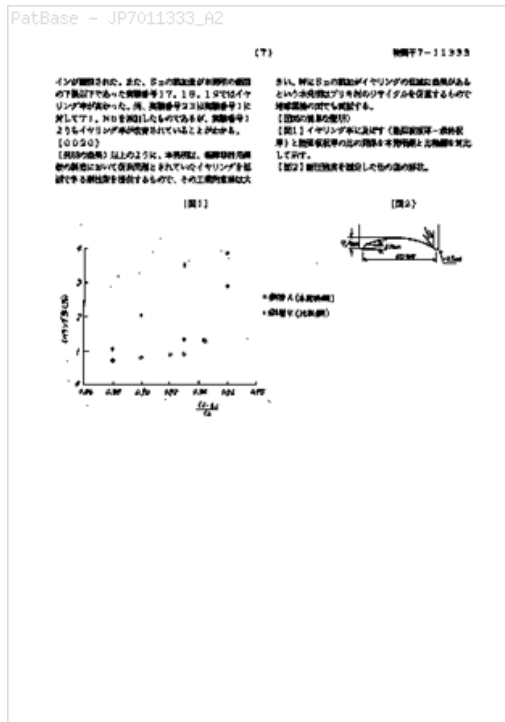
Title: MANUFACTURE OF NON-AGING/LOW EARING STEEL SHEET FOR CONTAINER

Abstract: Source: JP7011333A [EN] PURPOSE: To manufacture a black plate for extremely thin thickness container excellent in earing resistance without generating stretcher strain by making a dead soft steel billet contg. a specific amount of Sn into a sheet metal by executing hot rolling and cold rolling under a specified condition. CONSTITUTION: The dead soft steel billet contg., by weight percent, <0.003 percent C, <0.2 percent Si, <0.6 percent Mn, 0.005-0.2 percent Sn, 0.01-0.1 percent Al, <0.005 percent N, or further <0.005 percent B or <0.05 percent in total of Ti, Nb, Zr, etc., and so as to satisfy an expression: $(C-0.003)/12+N/14+S/32<Ti/48+Nb/93+Zr/91$ is hot rolled at =860 degrees C, made into thickness (th), coiled into a coil and made into the sheet metal of (tf) (0.12-0.22mm) in thickness in the final cold rolling by executing cold rolling and recrystallization annealing after pickling. An inequality of $(th-tf)/th<0.955$ is satisfied between (th) and (tf) and also the cold rolling rate after recrystallization annealing is taken as 0.5-50 percent. The black plate for extremely thin thickness container excellent in earing resistance is manufactured.

Classifications:

International (IPC 8-9): C21D8/02 C21D8/04 C21D9/46 C21D9/48 C22C38/00 C22C38/06 C22C38/14 (Advanced/Invention); C21D8/02 C21D8/04 C21D9/46 C21D9/48 C22C38/00 C22C38/06 C22C38/14 (Core/Invention)

International (IPC 1-7): C21D8/02 C21D8/04 C21D9/46 C21D9/48
C22C38/00 C22C38/06 C22C38/14



Family:

Publication number	Publication date	Application number	Application date
JP2980486 B2	19991122	JP19930153979	19930624
JP7011333 A2	19950113	JP19930153979	19930624

Priority:

JP19930153979 19930624

Probable Assignee:	NIPPON STEEL CORP
Assignee(s): (std)	NIPPON STEEL CORP
Assignee(s):	SHINNIPPON SEITETSU KK
Inventor(s): (std)	SENUMA TAKEHIDE

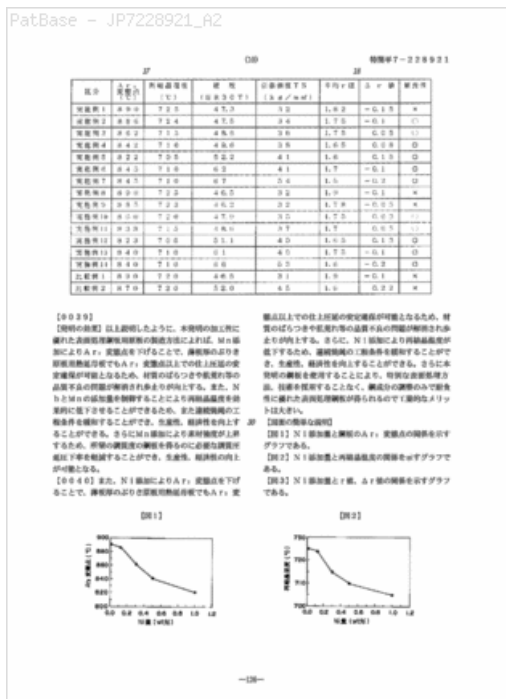
Title: PRODUCTION OF STARTING SHEET FOR SURFACE TREATED STEEL SHEET, EXCELLENT IN WORKABILITY

Abstract: Source: JP7228921A [EN] PURPOSE: To obtain a starting sheet for surface treated steel sheet, excellent in workability, with superior productivity by successively subjecting a slab of ultralow carbon steel containing specific amounts of Mn, Nb, Ni, etc., to hot rolling, coiling, cold rolling, annealing, and temper rolling under respectively specified conditions. CONSTITUTION: A steel, having a composition consisting of, by weight, =0.005 percent C, =0.04 percent Si, >0.5-1.0 percent Mn, =0.02 percent P, 0.010-0.15 percent Al, =0.004 percent N 0.002-0.02 percent Nb and the balance Fe with inevitable impurities, is refined. A slab of steel with this composition is heated to 1150-1300 degrees C, hot-rolled at =(Ar₃ transformation point -30 degrees C) finish rolling temp., and coiled at 450-700 degrees centigrade After acid pickling, cold rolling is done at =80 percent draft. Successively, the resulting steel sheet is annealed under the conditions of 700-800 degrees centigrade soaking temp. and 10-20sec soaking time and then temper-rolled at 1.0-50 percent draft. It is preferable that, if necessary, Mn among steel components is regulated to 0.1-0.6 percent and, further, Ni is incorporated by 0.01-1.0 percent.

Classifications:

International (IPC 8-9): C21D8/02 C21D9/46 C22C38/00
C22C38/12 (Advanced/Invention);
C22C38/00 C22C38/12 (Advanced/Non-invention);
C21D8/02 C21D9/46 C22C38/00 C22C38/12 (Core/Invention);
C22C38/00 C22C38/12 (Core/Non-invention)

International (IPC 1-7): C21D8/02 C21D9/46 C22C38/00
C22C38/12



Family:

Publication number	Publication date	Application number	Application date
JP7228921 A2	19950829	JP19940315035	19941219

Priority:

JP19930319424 19931220 JP19940315035 19941219

Probable Assignee: KAWASAKI STEEL CO

Assignee(s): (std): KAWASAKI STEEL CO

Assignee(s): KAWASAKI STEEL CORP ; JFE STEEL CORP

Inventor(s): (std): ARAYA MASATOSHI ; KATO TOSHIYUKI ; TOSAKA AKIO

Title: STEEL SHEET FOR WELDED CAN EXCELLENT IN FLANGE WORKABILITY AND NECK FORMABILITY AND PRODUCTION THEREOF

Abstract: Source: JP8218146A [EN] PURPOSE: To produce an excellent steel sheet for a welded can, at the time of producing a steel sheet by subjecting a dead soft steel slab to hot rolling and cold rolling including process annealing, by combining the refulation of the contents of C and Nb in the slab stock and the optimum secondary cold rolling draft. CONSTITUTION: A dead soft steel slab contg., by weight, <0.0050 percent C, <0.04 percent Si, 0.1 to 0.6 percent Mn, =0.02 percent P, 0.01 to 0.15 percent Al, <0.005 percent N and 0.002 to 0.03 percent Nb is heated at 1150 to 1300 degrees centigrade and is subjected to hot rolling so as to regulate the finish rolling temp. to the Ar₃ transformation point -30 degrees centigrade or above to form into a hot rolled sheet, which is coiled at 450 to 700 degrees centigrade Next, this steel sheet is pickled to remove away scales, and after that, it is subjected to cold rolling at =80 percent draft and is successively subjected to continuous annealing in the temp. range of the recrystallization temp. to 800 degrees centigrade Then, it is subjected to secondary cold rolling at 20 to 40 percent draft to form into a cold rolled steel sheet having a final sheet thickness. The steel sheet for a welded can capable of can making even by the conventional blanking method and free from the generation flange cracking and neck wrinkling can be obt'd.

Classifications:

International (IPC 8-9): C21D8/00 C21D9/46 C22C38/00 C22C38/12 (Advanced/Invention);
C21D8/00 C21D9/46 C22C38/00 C22C38/12 (Core/Invention)

International (IPC 1-7): C21D8/00 C21D9/46 C22C38/00 C22C38/12

Family:

Publication number	Publication date	Application number	Application date
JP8218146 A2	19960827	JP19950020541	19950208

Priority:

JP19950020541 19950208

Probable Assignee: KAWASAKI STEEL CO

Assignee(s): (std): KAWASAKI STEEL CO

Assignee(s): KAWASAKI STEEL CORP ; JFE STEEL CORP

Inventor(s): (std): TOSAKA AKIO ; KUKUMINATO HIDEO ; KATO TOSHIYUKI ; ARAYA MASATOSHI

Abstract: Source: JP4045602B [EN] PROBLEM TO BE SOLVED: To produce a steel sheet for a can having stable mechanical properties in the longitudinal direction and width direction of a coil while its deep drawability is satisfied. SOLUTION: A steel slab contg., by weight, less than or equal to 0.0050 percent C, less than or equal to 0.010 percent Si, 0.050 to 1.50 percent Mn, less than or equal to 0.020 percent P, less than or equal to 0.015 percent S, less than or equal to 0.0050 percent N, less than or equal to 0.150 percent Al and 0.0030 to 0.020 percent Nb, and the balance Fe with inevitable impurities is subjected to rough rolling, and the obt'd. sheet bar is coiled and is subjected to heat holding treatment. Next, the edge parts of the recoiled sheet bar are heated, and finish rolling is executed in such a manner that the rolling finishing temp. is regulated to (Ar3 transformation point +50 deg.C) to (Ar3 transformation point -50 deg.C). Then, after the completion of the rolling, it is air-cooled, and, subsequently, in hot run cooling, while it is applied with masking in such a manner that at least either the upper or lower cooling water does not directly hit the edge parts of the steel sheet, it is water-cooled at the average cooling rate of less than or equal to 100 deg.C/sec, is coiled at 600 to 750 deg.C, is thereafter subjected to pickling, is subjected to cold rolling at 80 to 98 percent draft and is annealed at the recrystallization temp. or above.

Classifications:

International (IPC 8-9): C21D8/04 C21D9/46 C22C38/00 C22C38/12 C22C38/14 (Advanced/Invention); C21D8/04 C21D9/46 C22C38/00 C22C38/12 C22C38/14 (Core/Invention)

International (IPC 1-7): C21D8/04 C22C38/00 C22C38/12

項	C	Si	Mn	P	S	N	Al	その他	A _{r3} (℃)	備 考
A	0.0023	0.010	0.55	0.012	0.006	0.0020	0.035	Nb/0.0120	860	適合鋼
B	0.0040	0.005	0.20	0.005	0.007	0.0030	0.025	Nb/0.0090	870	適合鋼
C	0.0015	0.002	0.18	0.009	0.002	0.0022	0.015	Nb/0.0070	875	適合鋼
D	0.0035	0.009	0.25	0.011	0.008	0.0015	0.025	Nb/0.0100	870	適合鋼
E	0.0037	0.005	0.80	0.012	0.011	0.0023	0.043	Nb/0.010 Ti/0.008	855	適合鋼
F	0.0090	0.013	0.79	0.013	0.005	0.0033	0.045	Nb/0.0090	865	比較鋼
G	0.0026	0.013	1.35	0.013	0.006	0.0023	0.045	Nb/0.0090	850	比較鋼

Family:

Publication number	Publication date	Application number	Application date
JP4045602 B2	20080213	JP19950258964	19951005
JP9104919 A2	19970422	JP19950258964	19951005

Priority:

JP19950258964 19951005

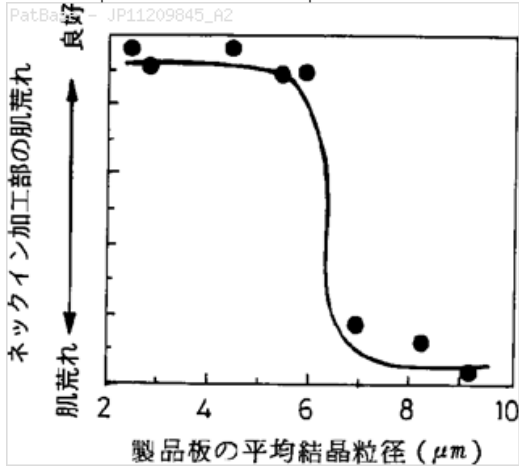
Probable Assignee: KAWASAKI STEEL CO
Assignee(s): (std): KAWASAKI STEEL CO
Assignee(s): KAWASAKI STEEL CORP ; JFE STEEL CORP
Inventor(s): (std): FURUKIMI OSAMU ; KUKUMINATO HIDEO ; TOSAKA AKIO

Title: STEEL SHEET FOR CAN, EXCELLENT IN WORKABILITY AND SURFACE ROUGHING RESISTANCE, AND ITS MANUFACTURE

Abstract: Source: JP11209845A [EN] PROBLEM TO BE SOLVED: To provide a steel sheet for can, having workability necessary for can forming and excellent surface roughing resistance after can manufacture, and its manufacture. SOLUTION: A steel slab, having a composition consisting of, by weight, 0.001-0.005 percent C, =0.10 percent Si, 0.4-1.0 percent Mn, =0.04 percent P, =0.02 percent s, 0.01-0.10 percent Al, =0.0050 percent N, 0.008-0.10 percent Nb, and the balance Fe with inevitable impurities, is heated to 1000-1350 degrees C, and roughing is finished at a temp. between (Ar₃ transformation point + 250 degrees C) and (Ar₃ transformation point + 150 degrees C). Subsequently, finish rolling is performed at a temp. between (Ar₃ transformation point + 100 degrees C) and (Ar₃ transformation point - 50 percent oC). Within 2 sec after the completion of finish rolling, cooling is started at a rate of =50 degrees C/sec. Then, coiling is done at <580 to 400 degrees C, and cold rolling is carried out at 80 to 95 percent draft. The resultant steel sheet is continuously annealed at a temp. between the recrystallization finishing temp. and 800 degrees centigrade and further temper-rolled at 0.5 to 40 percent.

Classifications:

International (IPC 8-9): C21D8/04 C21D9/48 C22C38/00 C22C38/12 (Advanced/Invention);
C21D8/04 C21D9/48 C22C38/00 C22C38/12 (Core/Invention)
International (IPC 1-7): C21D8/04 C21D9/48 C22C38/00 C22C38/12



Family:

Publication number	Publication date	Application number	Application date
JP11209845 A2	19990803	JP19980015512	19980128

Priority:

JP19980015512 19980128

Probable Assignee: KAWASAKI STEEL CO

Assignee(s): (std): KAWASAKI STEEL CO

Assignee(s): KAWASAKI STEEL CORP ; JFE STEEL CORP

Inventor(s): (std): TOSAKA AKIO ; KUKUMINATO HIDEO ; FURUKIMI OSAMU ; ARAYA MASATOSHI ; ARAYA MAKOTO

Title: HIGH-STRENGTH STEEL SHEET EXCELLENT IN DEEP DRAWING CHARACTERISTICS AND METHOD FOR PRODUCTION THEREOF

Abstract: Source: US2006191612A [EN] The present invention provides a high-strength steel sheet useful for applications to automobile steel sheets and the like and having excellent deep drawability, a tensile strength (TS) of as high as 440 MPa or more, and a high r value (average r value?1.2), and a process for producing the steel sheet. The steel sheet has a composition containing, by percent by mass, 0.010 to 0.050 percent of C, 1.0 percent or less of Si, 1.0 to 3.0 percent of Mn, 0.005 to 0.1 percent of P, 0.01 percent or less of S, 0.005 to 0.5 percent of Al, 0.01 percent or less of N, and 0.01 to 0.3 percent of Nb, the Nb and C contents in steel satisfying the relation, (Nb/93)/(C/12)=0.2 to 0.7, and the balance substantially including Fe and inevitable impurities. The steel microstructure contains a ferrite phase and a martensite phase at area ratios of 50 percent or more and 1 percent or more, respectively, and the average r value is 1.2 or more.

Classifications:

International (IPC 8-9): B21B3/00 C21D8/02 C21D8/04 C21D9/46

C22C38/00 C22C38/04 C22C38/12 C22C38/14 C22C38/16

C22C38/26 C22C38/28 C22C38/38 C22C38/48 C22C38/50

C22C38/58 (Advanced/Invention);

C21D8/04 C21D9/46 C22C38/00 C22C38/12 (Advanced/Non-

invention);

B21B3/00 C21D8/02 C21D9/46 C22C38/00 C22C38/04 C22C38/12

C22C38/58 (Core/Invention);

C21D8/04 (Core/Non-invention)

International (IPC 1-7): B21B3/00 C21D9/46 C22C38/00 C22C38/12

C22C38/58

CPC: C22C38/02 C21D8/04 C21D2211/005 C21D2211/008

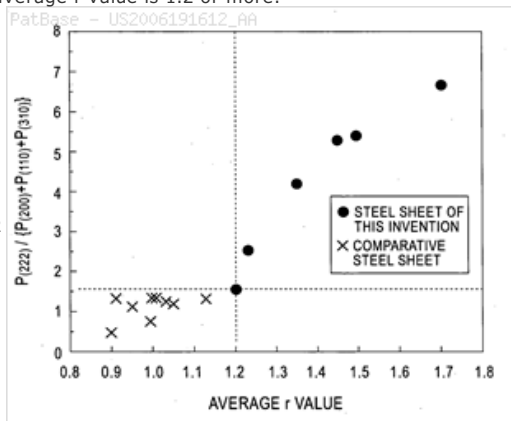
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European: C22C38/02 C22C38/04 C22C38/06 C22C38/12

M21D211/00F M21D211/00M M21D8/04

US: 148/320 148/332 148/333 148/335 148/336 148/337 148/533

148/603 148/651 148/652



Family:

Publication number	Publication date	Application number	Application date
CA2530834 AA	20051229	CA20042530834	20040917
CA2530834 C	20111101	CA20042530834	20040917
CN102517493 A	20120627	CN201210003599	20040917
CN102517493 B	20141112	CN201210003599	20040917
CN1833042 A	20060913	CN200480022331	20040917
DE602004043254 D1	20131031	DE200460043254T	20040917
EP1666622 A1	20060607	EP20040773419	20040917
EP1666622 A4	20061129	EP20040773419	20040917
EP1666622 B1	20130904	EP20040773419	20040917
JP2005120467 A2	20050512	JP20040258659	20040906
JP4635525 B2	20110223	JP20040258659	20040906
KR100760593 B1	20070920	KR20067001268	20040917
KR20060030909 A	20060411	KR20067001268	20040917
US2006191612 AA	20060831	US20040566852	20040917
US7686896 BB	20100330	US20040566852	20040917
WO05031022 A1	20050407	WO2004JP14039	20040917

Priority:

EP20040773419 20040917 JP20030335731 20030926 JP20040258659 20040906
 WO2004JP14039 20040917 WO2004JP14039 20060119

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): HOSOYA YOSHIHIRO ; JFE STEEL CORP ; JFE STEEL KK ; KAWASAKI STEEL CO ; OKUDA KANEHARU ; URABE TOSHIKI ; YOSHIDA HIROMI

Inventor(s): (std): HOSOYA YOSHIHIRO ; OKUDA KANEHARU ; OKUDA KANEHARU ; YOSHIDA HIROMI ; YOSHIHIRO YOSHIDA HIROMI OKUDA ; YOSHIHIRO HOSOYA ; TOSHIKI URABE ; KANEHARU OKUDA ; HIROMI YOSHIDA ; URABE TOSHIKI

Inventor(s): URABE TOSHIKI CHIYODA KU ; YOSHIDA HIROMI CHIYODA KU ; YOSHIDA HIROMI OKUDA KANEHARU URABE TOSHIKI ; YOSHIDA HIROMI OKUDA KANEHARU URABE TOSHIKI HOSOY ; OKUDA KANEHARU CHIYODA KU ; HOSOYA YOSHIHIRO CHIYODA KU

Agent(s): MOFFAT AND CO; GRUENECKER PATENT U RECHTSANWALTE PARTG MBB; GRUENECKER KINKELDEY STOCKMAIR AND SCHWANHAUSSER; SUGIMURA KOSAKU; IP GROUP OF DLA PIPER RUDNICK GRAY CARY US LLP; DLA PIPER LLP (US); DLA PIPER LLP

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT KE KG KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NA NE NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

Title: COLD-ROLLED STEEL SHEET AND PROCESS FOR PRODUCING THE SAME

Abstract: Source: US2009300902A [EN] A cold-rolled steel sheet that is suitable for battery cases and has low anisotropy is composed of, by mass percent, C: less than or equal to 0.0030 percent, Si: less than or equal to 0.02 percent, Mn: 0.15 to 0.19 percent, P: less than or equal to 0.020 percent, S: less than or equal to 0.015 percent, N: less than or equal to 0.0040 percent, Al: 0.020 to 0.070 percent, Nb: 1.00 less than or equal to Nb/C (atomic equivalent ratio) less than or equal to 5.0, B: 1 ppm less than or equal to B-(11/14)N less than or equal to 15 ppm (in the expression, B and N denote the contents of the respective elements), and the balance: being Fe and inevitable impurities, and has a planar anisotropy Deltar of the r-value in the range of -0.10 less than or equal to Deltar less than or equal to 0.10. In a process for producing the steel sheet, the cold rolling is performed at a rolling ratio of 70 to 87 percent, and then annealing is performed on a continuous annealing line at an annealing temperature of from the recrystallization temperature to 830 degrees centigrade

Classifications:

International (IPC 8-9): C21D8/02 C21D8/04 C21D9/46 C22C38/00 C22C38/04 H01M6/00 (Advanced/Invention);

C21D8/02 C21D8/04 C21D9/46 C22C38/00 C22C38/04

H01M6/00 (Core/Invention)

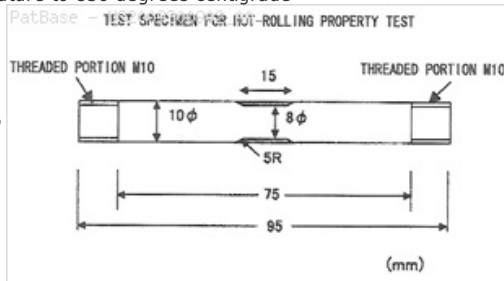
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C21D8/0436 C21D8/0473 C21D9/48 C22C38/06 C21D8/0226

C21D8/0236

European: C21D9/46 C22C38/00D C22C38/04

US: 148/330 148/330S 148/624 148/624S 29/623.1 29/623.100P



Family:

Publication number	Publication date	Application number	Application date
CN101563475 A	20091021	CN200680056726	20061220
CN101563475 B	20110511	CN200680056726	20061220
EP2103703 A1	20090923	EP20060843369	20061220
EP2103703 A4	20100616	EP20060843369	20061220
KR20090078836 A	20090720	KR20097010823	20061220
KR20120040758 A	20120427	KR20127009633	20061220
US2009300902 AA	20091210	US20090519539	20090722
WO08075444 A1	20080626	WO2006JP325986	20061220

Priority:

WO2006JP25986 20061220

WO2006JP325986 20061220

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): INOUE TADASHI ; JFE STEEL CORP ; MINEJI NOBUKO ; SUGIHARA REIKO

Inventor(s): (std): TADASHI INOUE ; SUGIHARA REIKO ; REIKO SUGIHARA ; NOBUKO MINEJI ; MINEJI NOBUKO ; INOUE TADASHI

Agent(s): HENKEL FEILER AND HAENZEL; IP GROUP OF DLA PIPER LLP; OCHIAI KENICHIRO

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: PROCESSES FOR PRODUCTION OF STEEL SHEETS FOR CANS

Abstract: A high-strength steel sheet for cans which has a tensile strength of 550 to 650MPa and a total elongation of 5 percent or above is obtained by conducting hot rolling with a finishing temperature of the Ar3 transformation temperature or above, cold rolling, and then recovery annealing at a temperature of the recrystallization initiation temperature minus 200 degrees centigrade to the recrystallization initiation temperature minus 20 degrees centigrade. Further, the addition of Nb: 0.001 to 0.05 percent and/or B: 0.0001 to 0.005 percent brings about a steel sheet for cans which has a tensile strength of 550 to 700MPa and a total elongation of 4 percent or above while enabling the annealing in the same temperature range as that of conventional steel sheets for cans.

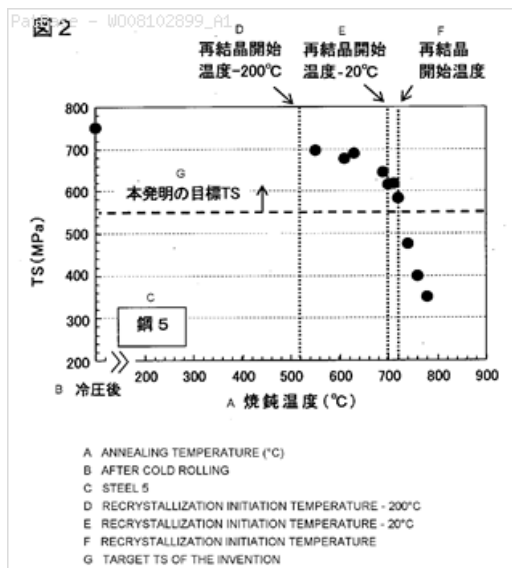
Classifications:

International (IPC 8-9): B21B3/00 C21D8/02 C21D9/46 C22C38/00 C22C38/04 C22C38/06 C22C38/12 (Advanced/Invention); B21B3/00 C21D8/02 C21D9/46 C22C38/00 C22C38/06 C22C38/12 (Core/Invention)

International (IPC 1-7): C22C 38/00

CPC: C21D8/02 C21D9/46 C22C38/04 C22C38/06 C21D8/0426 C21D8/0436 C21D8/0473 C21D9/48 C22C38/004

European: C21D8/02 C21D9/46 C22C38/04 C22C38/06



Family:

Publication number	Publication date	Application number	Application date
CN101578381 A	20091111	CN200880001425	20080219
CN101578381 B	20130619	CN200880001425	20080219
DE602008041383 D1	20160114	DE200860041383T	20080219
EP2123780 A1	20091125	EP20080711889	20080219
EP2123780 A4	20101027	EP20080711889	20080219
EP2123780 B1	20151202	EP20080711889	20080219
JP2008202113 A2	20080904	JP20070041065	20070221
JP5076544 B2	20121121	JP20070041065	20070221
KR101128315 B1	20120412	KR20097010592	20080219
KR20090084885 A	20090805	KR20097010592	20080219
TH105550 A	20101230	TH20081000790	20080218
WO08102899 A1	20080828	WO2008JP53125	20080219

Priority:

EP20080711889 20080219 JP20070041065 20070221 WO2008JP53125 20080219

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): IWASA HIROKI ; JFE STEEL CORP ; JFE STEEL KK ; KOJIMA KATSUMI ; NISHIHARA YUKA

Inventor(s): (std): HIROKI IWASA ; IWASA HIROKI ; KATSUMI KOJIMA ; KOJIMA KATSUMI ; NISHIHARA YUKA ; NISHIHARA YUKEI ; YUKA NISHIHARA

Agent(s): HOFFMANN EITLE PATENT U RECHTSANWALTE PARTMBB; HOFFMANN EITLE; OCHIAI KENICHIRO

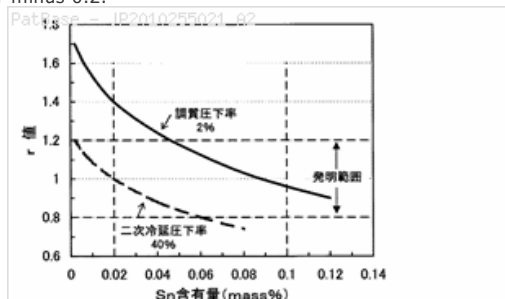
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Title: COLD-ROLLED STEEL SHEET FOR STEEL SHEET FOR CAN, STEEL SHEET FOR CAN AND METHOD FOR PRODUCING THEM

Abstract: Source: JP2010255021A [EN] PROBLEM TO BE SOLVED: To provide a cold-rolled steel sheet for a steel sheet for can which uses an extra-low carbon steel as the stock by effectively utilizing Sn intruded as inevitable impurities, can be produced by continuous annealing, and is suitable to use for can expansion, to provide the steel sheet for a can, and to provide methods for producing them. SOLUTION: The steel sheet for a can is obtained by applying one or more selected from electroplating, chromium plating and nickel plating, or applying oil to the surface of a cold-rolled steel sheet for a steel sheet for a can having a componential composition comprising, by mass, 0.001 to 0.01 percent C, less than or equal to 0.1 percent Si, 0.1 to 1.2 percent Mn, less than or equal to 0.05 percent P, less than or equal to 0.05 percent S, 0.001 to 0.10 percent Al, less than or equal to 0.03 percent N, less than or equal to 0.02 percent Nb and >0.02 to 0.10 percent Sn, and the balance Fe with inevitable impurities, and whose r value is 1.0 plus or minus 0.2.

Classifications:

International (IPC 8-9): B21B3/00 C21D9/46 C22C38/00
C22C38/12 (Advanced/Invention)



Family:

Publication number	Publication date	Application number	Application date
JP2010255021 A2	20101111	JP20090103607	20090422
JP5463720 B2	20140409	JP20090103607	20090422

Priority:

JP20090103607 20090422

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): JFE STEEL CORP ; KAWASAKI STEEL CO

Inventor(s): (std): SUJITA SHIGEKO ; SATO SATORU ; NAKAZAWA DAICHI ; KOJIMA KATSUMI ; KAWAMURA KATSUTO ; KATO HISAKATSU ; EMOTO HIDEKI ; ARAYA MAKOTO

Title: FLUIDIZING MIX FOR A COMPOSITION WITH A BASE OF HYDRAULIC BINDER

Abstract: Source: US2012129981A [EN] A hydraulic composition includes at least one hydraulic binder; at least one first water-reducing additive including at least one phosphonic amino-alkylene group; at least one second water-reducing additive including at least one polymer with a comb structure, the concentration by weight of dry extract of the second additive being from 25 percent to 100 percent of the concentration by weight of dry extract of the first additive.

Classifications:

International (IPC 8-9): C04B C04B103/30 C04B24/00 C04B24/12 C04B24/24 C04B24/26 C04B24/32 C04B28/02

C08K5/5317 (Advanced/Invention);

C04B103/30 (Advanced/Non-invention);

C04B (Subclass/Invention)

CPC: C04B40/0039 C04B24/003 C04B24/243 C04B24/2647

C04B28/02 C04B2103/006

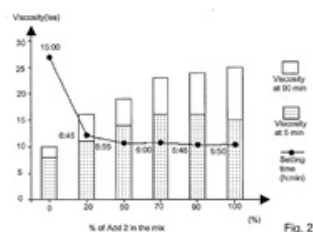
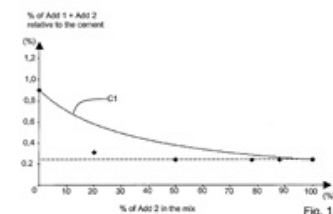
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US: 524/131 524/131S 524/5 524/5P

PatBase - US2012129981_AA

Patent Application Publication May 24, 2012 US 2012/0129981 A1



Family:

Publication number	Publication date	Application number	Application date
BR112012002597 A2	20160322	BR20121102597	20100802
CA2768649 AA	20110210	CA20102768649	20100802
CN102482150 A	20120530	CN201080034362	20100802
EP2462071 A1	20120613	EP20100762963	20100802
FR2948931 A1	20110211	FR20090003861	20090805
FR2948931 B1	20130517	FR20090003861	20090805
IL217732 A0	20120329	IL20100217732	20100802
IL217732 A1	20170629	IL20100217732	20100802
IN01083DN2012 A	20121102	IN2012DN01083	20120206
MA33506 B1	20120801	MA20120034601	20120203
RU2012108091 A	20130910	RU20120108091	20100802
RU2536898 C2	20141227	RU20120108091	20100802
TN2012000021 A1	20130919	TN20120000021	20120113
US2012129981 AA	20120524	US20100388567	20100802
WO11015781 A1	20110210	WO2010FR51641	20100802
WO11015781 A4	20110414	WO2010FR51641	20100802
ZA201200647 A	20120926	ZA20120000647	20120125

Priority:

FR20090003861 20090805 WO2010FR51641 20100802

Probable Assignee: LAFARGE

Assignee(s): (std): VILLARD EMMANUEL ; VENON STEPHANE ; RINALDI DAVID ; LAFARGE SA ; ROCCA DENIS ; LAFARZH ; LAFARGE GROUP ; LAFARGE FONDU INT ; LAFARGE FONDU INTERNAT

Assignee(s): LAFARGE FONDU INTERNATIONAL ; LAFARGE

Inventor(s): (std): EMMANUEL VILLARD ; RINAL DI DAVID ; RINALDI DAVID ; ROCCA DENIS ; ROKKA DENI ; STEPHANE VENON ; VENON STEFAN ; VENON STEPHANE ; VIJJAR EHMMANJUEHL ; VILLARD EMMANUEL ; DAVID RINALDI ; DENI ROCCA

Inventor(s): DENIS ROCCA ; ROCCA DENI

Agent(s): NORTON ROSE CANADA SENCRL SRL LLP; BERRUET LAURE; LAFARGE; PEARL COHEN ZEDEK LATZER BARATZ; MERIGEAULT SHONA

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: COLD-ROLLED STEEL PLATE AND METHOD FOR PRODUCING SAME

Abstract: Provided is a cold-rolled steel plate having excellent moldability and shape retention, and outstanding production stability using actual machinery. Also provided is a method for producing same. The composition contains 0.0010 to 0.0030 percent C, no more than 0.05 percent C, 0.1 to 0.3 percent Mn, no more than 0.05 percent P, no more than 0.02 percent S, 0.02 to 0.10 percent Al, no more than 0.005 percent N, 0.010 to 0.030 percent Nb, and 0.0010 to 0.0050 percent B, with the remainder made up of iron and inevitable impurities. The average total elongation (Elm) is at least 42 percent, and average r value (rm) is 1.2 to 1.6. By maintaining post cold-rolling annealing for 30 to 200 sec. at a holding temperature of (820+Nb/15+B-CR) to 860 degrees centigrade according to compression rate CR(percent), Nb content (mass ppm) and B content (mass ppm), it is possible to manufacture the cold-rolled steel plate using actual machinery in a stable manner, without pinpoint control of the holding temperature.

Classifications:

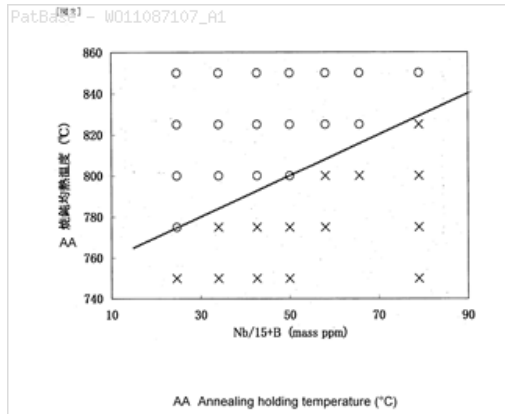
International (IPC 8-9): B21B1/22 B21B3/00 C21D8/02 C21D9/46 C22C38/00 C22C38/02 C22C38/04 C22C38/06 C22C38/12 C22C38/14 (Advanced/Invention);

B21B1/22 B21B3/00 C21D8/02 (Core/Invention);

B21B1/22 B21B3/00 C21D8/02 C22C38/02 C22C38/04 C22C38/06 C22C38/12 (Core/Non-invention)

CPC: C21D8/0236 C21D8/0273 C21D9/46 C22C38/12

European: C21D8/02D6 C21D8/02F8 C21D9/46



Family:

Publication number	Publication date	Application number	Application date
■ CN102712983 A	20121003	CN201180006238	20110107
■ CN102712983 B	20140312	CN201180006238	20110107
■ IN05768CN2012 A	20150213	IN2012CN05768	20120702
■ JP2011144428 A2	20110728	JP20100006554	20100115
■ JP5056863 B2	20121024	JP20100006554	20100115
■ KR101463667 B1	20141119	KR20127019805	20110107
■ KR20120099144 A	20120906	KR20127019805	20110107
■ MX2012008181 A1	20120803	MX20120008181	20110107
■ MY155323 A	20150930	MY20120002967	20110107
■ TH132433 A	20140403	TH20111000038	20110114
■ TW201139697 A	20111116	TW20110101212	20110113
■ TWI429757 B	20140311	TW20110101212	20110113
■ WO11087107 A1	20110721	WO2011JP50586	20110107

Priority:

JP20100006554 20100115 WO2011JP50586 20110107

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): FUJITA KOICHIRO ; HANAZAWA KAZUHIRO ; JFE STEEL CORP ; KIZU TARO ; TAKAJO SHIGEHIO

Inventor(s): (std): FUJITA KOICHIRO ; HANAZAWA KAZUHIRO ; KAZUHIRO HANAZAWA ; KIZU TARO ; KOICHIRO FUJITA ; SHIGEHIO TAKAJO ; TAKAGI SHIGEHIO ; TAKAJO SHIGEHIO ; TARO KIZU

Agent(s): OCHIAI KENICHIRO

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: STEEL PLATE HAVING EXCELLENT MOLDABILITY AND SHAPE RETENTION, AND METHOD FOR PRODUCING SAME

Abstract: Provided are a cold-rolled steel plate having excellent moldability and shape retention, and a method for producing same. The plate contains, in mass percent, 0.0010 to 0.0030 percent C, no more than 0.05 percent Si, 0.1 to 0.5 percent Mn, no more than 0.05 percent P, no more than 0.02 percent S, 0.02 to 0.10 percent Al, 0.0010 to 0.0050 percent N, and 0.010 to 0.035 percent Nb. Moreover, Al content and N content satisfy the relation stipulated in formula (1) below; Al content and N content satisfy the relation stipulated in formula 1, with the remainder being made up of Fe and inevitable impurities. The steel plate has a composition principally comprising ferrite particles having an average particle size of 8 to 20 micrometres, and the surface ratio of ferrite particles on the plate surface within 15 degrees from {211} is 50 percent of said structure. [percent Al]/[percent N]²/10 (formula 1). [percent M] represents the content of element M (mass percent).

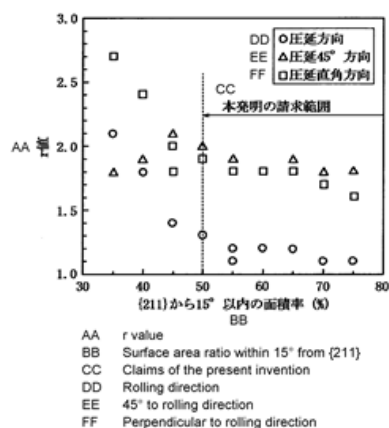
Classifications:

International (IPC 8-9): B21B3/00 C21D1/26 C21D11/00 C21D8/02 C21D9/46 C22C38/00 C22C38/12 (Advanced/Invention); C21D1/26 C21D11/00 (Core/Invention); C21D1/26 C21D11/00 C21D8/02 C21D9/46 C22C38/12 (Core/Non-invention)

CPC: C22C38/02 C21D8/0436 C21D8/0473 C21D9/48 C21D2211/004 C21D2211/005 C22C38/001 C22C38/04 C22C38/06 C22C38/12

European: C21D8/04D6 C21D8/04F8 C22C38/00B C22C38/02 C22C38/04 C22C38/06 C22C38/12 M21D211/00D M21D211/00F M21D9/48

PatBase - WO11087108_R1
【図1】



Family:

Publication number	Publication date	Application number	Application date
■ CN102712982 A	20121003	CN201180006233	20110107
■ CN102712982 B	20170426	CN201180006233	20110107
■ IN05781CN2012 A	20150213	IN2012CN05781	20120702
■ JP2011144430 A2	20110728	JP20100006963	20100115
■ JP5051247 B2	20121017	JP20100006963	20100115
■ KR101464845 B1	20141125	KR20127019804	20110107
■ KR20120099507 A	20120910	KR20127019804	20110107
■ MX2012008180 A1	20120803	MX20120008180	20110107
■ MX348493 B	20170615	MX20120008180	20110107
■ MY155322 A	20150930	MY20120002968	20110107
■ TH132755 A	20140411	TH20111000037	20110114
■ TW201134956 A	20111016	TW20110101215	20110113
■ TWI427162 B	20140221	TW20110101215	20110113
■ WO11087108 A1	20110721	WO2011JP50587	20110107

Priority:

JP20100006963 20100115 WO2011JP50587 20110107

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): FUJITA KOICHIRO ; HANAZAWA KAZUHIRO ; JFE STEEL CORP ; KAWASAKI STEEL CO ; YASUHARA EIKO ; TAHARA KENJI ; KIZU TARO ; TAKAJO SHIGEHIRO ; KOGA HIDEHARU ; KUMAGAI MASATOSHI

Inventor(s): (std): EIKO YASUHARA ; FUJITA KOICHIRO ; HANAZAWA KAZUHIRO ; HIDEHARU KOGA ; KAZUHIRO HANAZAWA ; KENJI TAHARA ; KIZU TARO ; KOGA HIDEHARU ; KOICHIRO FUJITA ; KUMAGAI MASATOSHI ; MASATOSHI KUMAGAI ; SHIGEHIRO TAKAJO ; TAHARA KENJI ; TAKAGI SHIGEHIRO ; TAKAJO SHIGEHIRO ; TARO KIZU ; TAWARA KENJI ; YASUHARA EIKO ; YASUHARA HIDEKO

Agent(s): OCHIAI KENICHIRO

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: STEEL SHEET FOR CAN AND PROCESS FOR PRODUCING SAME

Abstract: Provided are a high-strength steel sheet for cans which has excellent flangeability and a process for producing the steel sheet. The steel sheet contains, in terms of mass percent, 0.001-0.040 percent, excluding 0.040 percent, C, 0.003-0.100 percent Si, 0.10-0.60 percent Mn, 0.001-0.100 percent P, 0.001-0.020 percent S, 0.005-0.100 percent Al, and 0.0130-0.0170 percent, excluding 0.0130 percent, N, with the remainder comprising Fe and incidental impurities. The steel sheet has a value of (N total)-(N as AlN) (wherein "N total" is the total content of N and "N as AlN" is the content of N present as AlN) of 0.0100-0.0160 percent and an average plastic strain ratio, i.e., average r value, of higher than 1.0. The high-strength steel sheet is obtained by conducting hot rolling, winding the sheet at a temperature below 630 degrees C, cold-rolling the sheet at a rolling reduction of 91.5 percent or more, and subjecting the sheet to annealing and then secondary cold rolling at a rolling reduction of 20 percent or less.

Classifications:

International (IPC 8-9): C21D8/02 C21D9/46 C22C38/00

C22C38/06 C22C38/50 (Advanced/Invention);

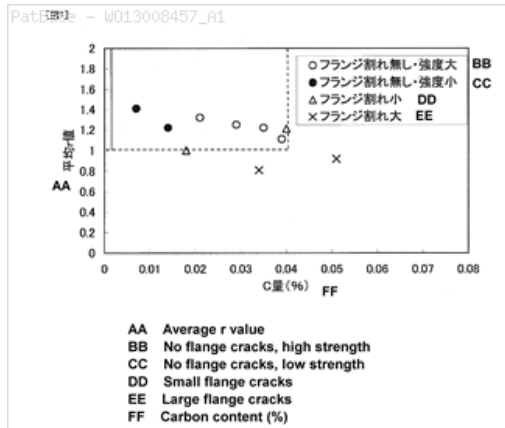
C22C38/50 (Advanced/Non-invention);

C21D9/46 C22C38/00 C22C38/06 C22C38/50 (Core/Invention)

CPC: C22C38/04 C22C38/001 C22C38/02 C22C38/06 C21D8/0426

C21D8/0442 C21D8/0468 C21D8/0473 C21D9/08 C21D9/46

C22C38/004 C22C38/50



Family:

Publication number	Publication date	Application number	Application date
■ CN103649353 A	20140319	CN201280034146	20120711
■ CN103649353 B	20161109	CN201280034146	20120711
■ CO6880059 A2	20140228	CO20140028689	20140211
■ JP2013019027 A2	20130131	JP20110153718	20110712
■ JP5794004 B2	20151014	JP20110153718	20110712
■ KR20140030334 A	20140311	KR20147002973	20120711
■ TH134397 A	20140606	TH20121003464	20120711
■ TW201311912 A	20130316	TW20120125056	20120712
■ TWI564403 B	20170101	TW20120125056	20120712
■ WO13008457 A1	20130117	WO2012JP04467	20120711

Priority:

JP20110153718 20110712 WO2012JP04467 20120711

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): JFE STEEL CORP ; KAWASAKI STEEL CO ; KOJIMA KATSUMI ; TADA MASAKI ; TOBIYAMA YOICHI ; TANAKA TAKUMI

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Agent(s): KUMASAKA AKIRA ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: STEEL SHEET FOR CROWN CAP, METHOD FOR MANUFACTURING SAME, AND CROWN CAP

Abstract: Source: US2016362761A [EN] A steel sheet for crown caps includes C: 0.0005 to 0.0050 percent, Si: 0.020 percent or less, Mn: 0.10 to 0.60 percent, P: 0.020 percent or less, S: 0.020 percent or less, Al: 0.01 to 0.10 percent, N: 0.0050 percent or less, Nb: 0.010 to 0.050 percent, and Fe and inevitable impurities. The steel sheet has an average r value of 1.30 or more and a YP of 450 MPa or more and 650 MPa or less. The steel sheet is obtained by hot rolling a steel slab at a slab reheating temperature of 1,150 degrees centigrade or higher and a finishing temperature of 870 degrees centigrade or higher; coiling the hot rolled steel sheet at a coiling temperature of 600 degrees centigrade or higher, performing pickling; then-performing primary cold rolling; performing annealing at an annealing temperature of recrystallization temperature or more and 790 degrees centigrade or less; and performing secondary cold rolling at a rolling reduction of 10 percent or more and 50 percent or less.

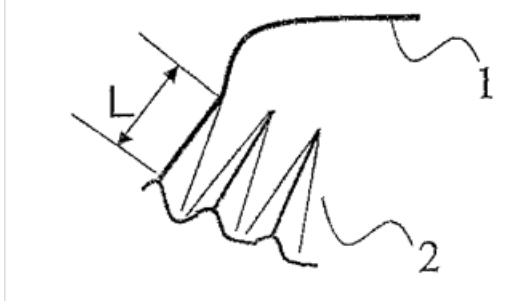
Classifications:

International (IPC 8-9): B21B1/22 B21B3/00 B65D41/12 C21D6/00 C21D8/02 C21D9/46 C22C38/00 C22C38/02 C22C38/04 C22C38/06 C22C38/12 C23G1/00 (Advanced/Invention); C22C38/00 (Core/Invention)

CPC: C21D8/0268 C21D8/0226 C21D8/0236 C21D8/0263 C22C38/001 C22C38/02 C22C38/04 C22C38/06 C21D8/0468 C21D8/0473 C22C38/002 C23G1/00 B65D41/12 C21D9/46 C21D2211/005 C22C38/004 C22C38/12

US: 215/328

PatBase - US2016362761_AA



Family:

Publication number	Publication date	Application number	Application date
■ CN106029926 A	20161012	CN201580010012	20150213
■ CO20160000497 A2	20170331	CO20160000497	20160729
■ JP2015129191 A1	20170330	JP20160505035T	20150213
■ JP6195012 B1	20170913	JP20160505035T	20150213
■ KR20160126014 A	20161101	KR20167026089	20150213
■ TH165655 A	20170803	TH20161004843	20150213
■ TW201536930 A	20151001	TW20150105830	20150224
■ TWI541363 B	20160711	TW20150105830	20150224
■ US2016362761 AA	20161215	US20150121540	20150213
■ WO15129191 A1	20150903	WO2015JP00684	20150213

Priority:

JP20140033851 20140225 WO2015JP00684 20150213

Probable Assignee: JFE STEEL CORP

Assignee(s): (std): JFE STEEL CORP ; KAWASAKI STEEL CO

Inventor(s): (std): HIRAGUCHI TOMONARI ; HIRAGUCHI TOMOYA ; NAKAMARU HIROKI ; NAKAMURA HIROKI ; KIKUCHI TOSHIHIRO ; KOJIMA KATSUMI ; TSUJIMOTO MASAMI

Inventor(s): MASAMI TSUJIMOTO ; TOMONARI HIRAGUCHI ; TOSHIHIRO KIKUCHI ; HIROKI NAKAMARU ; KATSUMI KOJIMA

Agent(s): JUAN PABLO CADENA SARMIENTO; KUMASAKA AKIRA ET AL

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: STEEL FOR BOTTLE CAP AND MANUFACTURING METHOD OF STEEL

Abstract: Source: CN106868400A [EN] The invention discloses steel for a bottle cap and a manufacturing method of the steel and belongs to the technical field of metal materials. Smelting components of the steel for the bottle cap include, by weight percent, 0.06 percent -0.08 percent of C, 0.4 percent -0.6 percent of Mn, smaller than or equal to 0.04 percent of Si, 0.05 percent -0.09 percent of P, smaller than or equal to 0.02 percent of S, 0.015 percent -0.055 percent of Als and the balance Fe. Leveling is conducted after hot rolling, cold rolling and annealing are conducted, rolling is conducted with the deformation of 10 percent to 18 percent, and needed strength and machining performance are obtained. 0.03 weight percent to 0.05 weight percent of phosphorus is used for replacing the solution strengthening function of part of carbon, continuous casting in a peritectic area is avoided, and therefore the probability of forming of surface crack defects, caused by continuous casting in the peritectic area, of a casting blank is lowered; and meanwhile, the reduction rate of 10 percent to 18 percent is adopted in the leveling process for optimizing the cold-rolled strip steel performance, the application performance index of a manufactured target finished product is also the same with that of traditional design, and optimal design with high quality and low cost is achieved.

Classifications:**International (IPC 8-9):** C21C5/28 C21D8/02 C22C38/02

C22C38/04 C22C38/06 (Advanced/Invention)

CPC: C22C38/04 C21C5/28 C21D8/0226 C21D8/0236 C21D8/0242 C22C38/002 C22C38/02 C22C38/06**Family:**

Publication number	Publication date	Application number	Application date
■ CN106868400 A	20170620	CN201710171346	20170321

Priority:

CN201710171346 20170321

Probable Assignee: DELONG STEEL LTD**Assignee(s):** (std): DELONG STEEL LTD**Inventor(s):** (std): MENG XIANCHENG ; WANG DONGMING ; YAN WENKAI ; YU FEI