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(54) METHOD AND SYSTEM FOR WELDING A GUIDING STRIP WITH STAINLESS STEEL COIL

(57) A method and a system for welding guiding strips for a stainless steel coil are provided, wherein the method comprises the steps of: welding a guiding strip for the steel strip head at the end of an annealing and pickling line for a raw coil; introducing the guiding strip for the head to a coiler; winding the steel strip with the guiding strip welded thereto into a stainless steel coil; conveying the steel coil to an uncoiler; unwinding the outer circle of the steel coil by the uncoiler; welding a guiding strip for the outer circle; rewinding the steel strip together with the guiding strip for the outer circle by the uncoiler. The method and the system for welding guiding strips for a stainless steel coil is not only applicable for the stainless guiding strip, but also for other kinds of steel guiding strip, the cost of the device is low, usage efficiency of the associated devices is high. Furthermore, no need to completely unwind the coil, a partial unwinding enables welding both ends of the stainless steel coil.

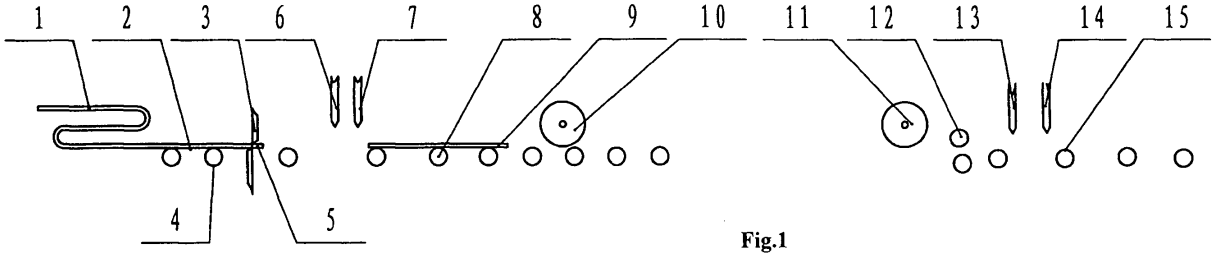

Fig.1

EP 2 130 620 A1

Description

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from Chinese Patent Application No. 200710061655.X, titled "METHOD FOR WELDING A GUIDING STRIP WITH STAINLESS STEEL COIL", filed on March 28, 2007, the disclosures of which are incorporated herein by reference in its entirety.

FIELD OF THE PRESENT INVENTION

[0002] The present invention relates to the technology of welding guiding strips for a stainless steel coil, more particularly to a method and a system for welding a guiding strip with a stainless steel coil.

BACKGROUND

[0003] Conventionally, in the course of cold rolling of a stainless steel strip, rolling is carried out by a single stand reversible cold rolling mill. As the distances from the coilers on both sides to the center of the rollers are large, the total length of the stainless steel raw material which cannot be rolled on both sides is about 14-16 m, thereby reducing the finished product ratio greatly. For the purpose of utilizing this part of raw material effectively and thus increasing the finished product ratio, normally guiding strips with thickness smaller than that of base material are welded on both ends of the stainless steel raw material strip, thereby increasing the available rolling length and improving the finished product ratio.

[0004] Now, there are two existing methods of welding guiding strips for a stainless steel coil. One of the method is welding guiding strips on a black coil (the steel coil which is not treated by annealing and pickling) by adopting a complete preparatory machine, which comprises the following steps in sequence: uncoiling, head cutting, welding a guiding strip, uncoiling the entire coil on the coiler, head cutting at the tail end and welding a guiding strip, thereby it achieves the welding of guiding strips at both ends of the coil. In this method, as it must uncoil the entire coil on a coiler and then perform the welding of a guiding strip at the tail end, the shortcomings of this method are: the necessity of providing a complete preparatory machine, a large amount of investment, the necessity of uncoiling the entire coil when welding guiding strips, the long time of device occupation, the low usage efficiency of the device and the high possibility of the damage to the surface of the steel coil. Also, as guiding strips are directly welded to a black coil, the tension control in the subsequent production at the annealing and pickling line becomes difficult, which may cause serious results, such as strip breakage inside the furnace. At the same time, as the guiding strip itself also passes through the hot processing production line with the steel coil, it occupies the machine and influences the capacity of the annealing and pickling line for the raw material. Further, as the guiding strip is required to pass through the production line together with the stainless steel, it must use 300 series austenitic stainless steel as the material of the guiding strip. The other method is welding a guiding strip for the head on a simple preparation assembling set (which only includes a coiler and a welding machine without a coiler), which comprises the following steps in sequence: uncoiling, head cutting, welding guiding strip and withdrawing the steel coil back to the coiler. This method has the advantage of low device investment. And it can weld the guiding strip to a white coil (the steel coil which is treated by annealing and pickling) without the uncoiling of the entire coil. However, the guiding strip can only be welded to one end of the steel coil and can not be welded to the other end, which will not satisfy the need of stainless steel production. And the consumption of raw material is large during rolling process.

SUMMARY OF THE PRESENT INVENTION

[0005] In order to overcome the above shortcomings of the existing methods for welding guiding strips for a stainless steel coil, according to the present invention, it is provided a method and a system for welding guiding strips for a stainless steel coil, which can reduce the device investment and increase the usage efficiency of the device.

[0006] The method for welding guiding strips for a stainless steel coil according to the present invention comprises the steps as follows:

[0007] Welding a guiding strip for the steel strip head at the end of an annealing and pickling line for a raw material;

[0008] introducing the guiding strip for the head to a coiler; and winding the steel strip with the guiding strip welded thereto into a stainless steel coil;

[0009] conveying the steel coil to an uncoiler;

[0010] unwinding the outer circle of the steel coil by the uncoiler;

[0011] welding a guiding strip for the outer circle; and

[0012] rewinding the guiding strip for the outer circle together with the steel coil by the uncoiler. In the above method for welding guiding strips for a stainless steel coil, the material of the guiding strip may be the stainless steel plate which is the same with that of the steel coil, or may be the stainless steel plate which is different from that of the steel coil. It is also possible to use the guiding strip made of carbon steel plate, galvanized steel plate or alloy steel plate.

[0013] The system for welding guiding strips for a stainless steel coil according to an embodiment of the present invention comprises a preparation assembling set consisted of an uncoiler and a first welding machine, wherein the uncoiler unwinds the outer circle of the steel coil, the first welding machine welds the guiding strip for the outer circle, and the uncoiler rewinds so as to wind the guiding strip for the outer circle together with the steel coil after

welding, which further comprises:

[0014] a second welding machine provided at the end of an annealing and pickling line for a raw material, for welding a guiding strip for the steel strip head ;

[0015] a coiler, for introducing the guiding strip for the head and winding the steel strip with the guiding strip for the head welded thereto into a steel coil ;

[0016] a conveying apparatus, for conveying the steel coil to the uncoiler.

[0017] The system may further include an edge digging machine. After the welding of the second welding machine, the edge digging machine is used for performing the edge digging treatment of the welding seam between the steel strip and the guiding strip for the head.

[0018] According the present invention, it achieves the function of welding guiding strips at both ends of the white coil by means of adding a welding machine at the end of the annealing and pickling line for a raw material, which is used for the welding of the guiding strip for the steel strip head, and adding a simple preparation assembling set matched with the annealing and pickling line for a raw material, which is used for the welding of the guiding strip for the steel strip tail. Therefore, the present invention solves the problems caused by the existing methods commonly used for welding the guiding strips, such as the influence to the production capacity of the annealing and pickling line for a raw material; the difficulties in the force control in the annealing and pickling line for a raw material, especially the tension control in the furnace, which may cause the problem of strip breakage inside the furnace; and the surface damage due to one more time entire coil uncoiling for welding the guiding strip.

[0019] Compared with the prior methods for welding guiding strips for the stainless steel coil, the method for welding guiding strips for the stainless steel coil according the present invention has the advantages as follows:

[0020] 1) by using the simple preparation assembling set matched with the annealing and pickling line device for a raw material, it can realize the welding of guiding strips at both ends of the treated white coil, thereby solving the problems of high investment, low efficiency and surface damage of steel strip due to one more time entire coil uncoiling, while sufficiently increasing the production capacity of the annealing and pickling line for a raw material, and radically eliminating the serious problem of strip breakage inside the furnace in the annealing and pickling line for a raw material due to the difficulty of the tension control for the annealing and pickling line for a raw material when welding guiding strips on a black coil.

[0021] 2) compared with the method of welding a guiding strip by the existing simple preparation assembling set, it can realize the welding of guiding strips at both ends of the white coil, and thus the consumption of stainless steel base material can be reduced in the following processing.

[0022] 3) as the guiding strips are welded to the white coil which has been treated in the annealing and pickling line for a raw material, the guiding strips may no longer pass through the annealing and pickling line for a raw material together with the stainless steel, thereby reducing the consumption of the stainless steel guiding strips in the annealing and pickling line for a raw material.

[0023] 4) as the devices, such as the coiler, of the annealing and pickling line for a raw material can be utilized, compared with the arrangement of providing the devices with the same functions, the number of the components of the preparation assembling set can be reduced, thereby reducing dramatically the investment cost.

[0024] 5) as the guiding strips are welded to the white coil which has been treated in the annealing and pickling line for a raw material, the guiding strips may no longer pass through the annealing and pickling line for a raw material together with the stainless steel coil, thereby it has the possibility of using carbon steel guiding strip, zinc galvanized steel guiding strip and alloy steel guiding strip in the production of stainless steel according to the present invention.

[0025] According to the method for welding guiding strips for stainless steel coil of the present invention, it can increase the production capacity of the annealing and pickling line for a raw material, eliminate the influences of the guiding strips to the control of the annealing and pickling line for a raw material and thus eliminate the danger of the breakage of the guiding inside the furnace, and dramatically reduce the consumption of the stainless steel guiding strip in the following processing and when the guiding strip passing through the annealing and pickling line for a raw material. Meanwhile, as it can realize the welding of guiding strips at both ends of the white coil only with the aid of a simple preparation assembling set, device investment can be efficiently reduced. And carbon steel guiding strip, zinc galvanized steel guiding strip and alloy steel guiding strip can be used, thereby eliminating the limitation of the necessity of using stainless steel guiding strip.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] Figure 1 is a schematic view of cutting steel strip head in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0027] Figure 2 is a schematic view of welding the guiding strip for the steel strip head in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0028] Figure 3 is a schematic view of winding the steel strip with the stainless steel guiding strip welded thereto in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0029] Figure 4 is a schematic view of cutting the tail end of the stainless steel strip in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0030] Figure 5 is a schematic view of conveying a

steel coil in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0031] Figure 6 is a schematic view of unwinding the stainless steel coil by the uncoiler in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0032] Figure 7 is a schematic view of welding the guiding strip for the steel strip tail in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0033] Figure 8 is a schematic view of winding the steel coil by the uncoiler in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0034] Figure 9 is a reference top view showing the main devices and associated devices in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

[0035] Figure 10 is a reference side view, with underground parts sectioned, showing the main devices and associated devices in the method for welding guiding strips for a stainless steel coil according to an example of the present invention.

The reference symbols in the above figures are:

1. looper
2. stainless steel strip
3. cutting machine
4. carrier platform
5. the steel strip head
6. welding machine
7. edge digging machine
8. guiding strip platform
9. guiding strip
10. coiler
11. uncoiler
12. straightening machine
13. welding machine
14. edge digging machine
15. guiding strip platform
16. stainless steel coil
17. the steel strip tail
18. steel coil car
19. guiding strip
20. roller track
21. pinch roller
22. guide roller
23. guide roller
24. coiler
25. pinch roller
26. plate piler for guiding strip
27. waste material bucket
28. walking beam
29. plate piler for guiding strip
30. suction-cup crane for guiding strip
31. packing paper machine
32. packing paper machine
33. suction-cup crane for guiding strip

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0036] In the following, the embodiments of the method for welding guiding strips for a stainless steel coil according to the present invention are described in details with reference to the figures. But the embodiments of the method for welding guiding strips for a stainless steel coil according to the present invention would not be limited to the examples as follows.

[0037] The example of the present invention provides a system for welding guiding strips for a stainless steel coil, which comprises a preparation assembling set consisted of an uncoiler and a first welding machine, wherein the uncoiler unwinds the outer circle of the steel coil, the first welding machine welds a guiding strip for the outer circle, and the uncoiler rewinds so as to wind the guiding strip for the outer circle together with the steel coil after welding, which further comprises:

[0038] a second welding machine provided at the end of an annealing and pickling line for a raw material, for welding a guiding strip for the head to the steel coil;

[0039] a coiler, for introducing the guiding strip for the head and winding the steel strip with the guiding strip for the head welded thereto into a steel coil;

[0040] a conveying apparatus, for conveying the steel coil to the uncoiler.

[0041] The system may further include an edge digging machine. After the welding of the second welding machine, the edge digging machine is used for performing the edge digging treatment to the welding seam between the steel strip and the guiding strip for the head.

[0042] The method for welding guiding strips for a stainless steel coil according to the present invention will be described in details with reference to the example of the system.

[0043] The system according to the example of the present invention has the features as follows:

1) a welding machine is provided at the end of the annealing and pickling line for a raw material;
2) an edge digging machine is added after the welding machine;
3) a simple preparation assembling set is provided aside immediately after the annealing and pickling line for a raw material;
4) a displacing and buffering position for the steel coil is provided between the annealing and pickling line for a raw material and the simple preparation assembling set;
5) the uncoiler in the simple preparation assembling set can uncoil as well as coil; and
6) an edge digging machine and a welding machine are provided after the uncoiler in the simple preparation assembling set.

[0044] Example 1

[0045] The example provides a method of welding on a steel strip, 1500 mm in width, 260 m in length and 8 mm in thickness, spreaded from a heat treated 0Cr18Ni9 steel coil, which comprises the steps as follows:

[0046] I. welding a guiding strip for the stainless steel strip head at the end of an annealing and pickling line for a raw material

[0047] 1) as shown in figure 1, the stainless steel strip 2 passes through a looper 1 to the carrier platform 4 at the outlet of the annealing and pickling line for a raw material, a length of 200 mm is cut away with a parallel-blade cutter 3 at the steel strip head 5 of the uncoiled stainless steel strip 2 which is spreaded, so that the width of the steel strip head after cutting is the same with that of the steel strip base material for the purpose of facilitating welding;

[0048] 2) a 0Cr18Ni9 stainless steel guiding strip, 1500 mm in width, 10m in length and 6 mm in thickness, is putted onto the guiding strip platform 8;

[0049] 3) as shown in figure 2, the front end of the guiding strip 9, i.e. the left end in the figure, is aligned with the cutting edge of the steel strip head of the stainless steel strip 2, and the stainless steel guiding strip 9 is welded to the cutting edge of the steel strip head of the stainless steel strip 2 by a welding machine 6 which comprising an edge digging machine 7;

[0050] 4) the unwelded portion at the welding seam of the stainless steel strip is digged out by the edge digging machine 7.

[0051] II. coiling by a coiler in the annealing and pickling line

[0052] 1) as shown in figure 3, the right end of the welded guiding strip 9 is introduced into a coiler 10 so that the stainless steel strip 2 whose front end is welded to the stainless steel guiding strip 9 is coiled,

[0053] 2) as shown in figure 4, during the coiling process of the coiler 10, when the tail end 17 of the stainless steel strip 2 passes through the cutter 3, a length of 200 mm is cut away with the cutter 3 at the tail end 17 of the stainless steel strip 2 so that the width of the steel strip tail after cutting is the same with that of the stainless steel base material;

[0054] 3) the stainless steel strip is coiled by the coiler 10 into a stainless steel coil 16;

[0055] III. Logistics conveying the steel coil

[0056] As shown in figure 5, a liftable steel coil car 18 is provided to convey the stainless steel coil 16 with a guiding strip welded thereto to a uncoiler 11 in a simple preparation assembling set;

[0057] IV unwinding the outer circle of the stainless steel coil by the uncoiler

[0058] 1) as shown in figure 6, the stainless steel coil 16 is loaded onto the rotating uncoiler 11, the outer circle of the stainless steel coil 16, i.e. the tail of the stainless steel strip, is unwound so that a length of 15 m in the outer circle is spreaded and then the spreaded stainless steel strip is straightened by a straight head straightening machine 12 so as to make it flat;

[0059] 2) a 0Cr18Ni9 stainless steel guiding strip 19, 10 m in length, 1500 mm in width and 6 mm in thickness, is putted onto the guiding strip platform 15;

[0060] V. welding the guiding strip for the outer circle

[0061] 1) as shown in figure 7, the left end of the guiding strip 19 is aligned with the steel strip tail of the stainless steel coil 16, and the stainless steel guiding strip 19 is welded together with the steel strip tail of the stainless steel coil 16 by a welding machine 13;

[0062] 2) the unwelded portion at the welding seam of the stainless steel strip is digged out by a edge digging machine 14;

[0063] VI. coiling the steel coil by the uncoiler

[0064] as shown in figure 8, the uncoiler 11 is actuated to make the uncoiler 11 rotate reversely, so that the steel strip head of the stainless steel coil 16 together with the stainless steel guiding strip 19 welded thereto are wound together.

[0065] VII. coil stripping

[0066] the stainless steel coil 16 is stripped from the uncoiler 11.

[0067] It should be noted that, during the welding process mentioned above,

[0068] a. as the welding operation for the guiding strip is preformed at the end of the annealing and pickling line for a raw material, it is necessary to take 5-6 minutes for this operation. In this case, the shutdown of the process section of the annealing and pickling line for a raw material for waiting is not allowed. Therefore, in order to avoid the shutdown in the process section of the annealing and pickling line for a raw material, the looper at the end of the annealing and pickling line for a raw material may be increased so as to increase the steel strip storage amount of 5-6 minutes with the length of 160 m-210 m (generally, about 200 m). For this reason, it is possible to provide a looper with two layers, and add a tension control system comprising a looper car, a hoist system and corresponding tension rollers, and perform the synchronous control by adopting two looper cars simultaneously.

[0069] b. as an edge digging treatment is needed after welding, an edge digging machine matched with the welding machine at the end of the annealing and pickling line for a raw material is provided, and an edge digging machine matched with the welding machine in the simple preparation assembling set is also provided.

[0070] c. as the uncoiler in the simple preparation assembling set must perform the functions of uncoiling and coiling, and its rhythm must match with the rhythm of coil striping in the annealing and pickling line for a raw material, a steel coil storage saddle may be provided between the annealing and pickling line for a raw material and the simple preparation assembling set as a buffing position to adapt the rhythm of the simple preparation assembling set according to the capacity of the annealing and pickling line for a raw material and the rhythm of coil striping in welding the guiding strip.

[0071] After finishing, it is ready for the next process.

[0072] Example 2

[0073] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are 1Cr17. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0074] Example 3

[0075] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are 2Cr13. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0076] Example 4

[0077] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are Q255. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0078] Example 5

[0079] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are 08F. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0080] Example 6

[0081] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are A3. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0082] Example 7

[0083] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are 45 steel. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0084] Example 8

[0085] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are galvanized carbon steel plate. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0086] Example 9

[0087] The difference between this example and example 1 is that the materials of the guiding strip 9 and the guiding strip 19 are 15Cr alloy steel plate. The material of the stainless steel coil and the welding steps in this example are the same with those in the example 1.

[0088] The arrangement of the main devices used in the examples mentioned above is shown in figures 9 and 10.

[0089] The simple preparation assembling set in the present invention mainly comprises an uncoiler, a straightening machine, an edge digging machine and a welding machine. As compared with the existing preparation assembling set, the uncoiler in the present invention can rewind so as to wind the steel strip, therefore it does not need to uncoil the entire steel coil completely and it does not need to provide a coiler here.

[0090] The existing preparation assembling set, which can realize the welding of guiding strips at both ends of the stainless steel coil, mainly comprises an uncoiler, a straightening machine, an edge digging machine, a welding machine and a coiler.

[0091] In figure 9, the coiler 24 is used as a backup device.

[0092] As described from the examples mentioned above, the present invention achieves the function of welding guiding strips at both ends of the white coil (the stainless steel coil which is treated by annealing and pickling) by means of adding a welding machine at the end of the annealing and pickling line for a raw material, which is used for the welding of the guiding strip for the steel strip head, and adding a simple preparation assembling set matched with the annealing and pickling line for a raw material, which is used for the welding of the guiding strip for the steel strip tail. Therefore, the present invention solves the problems caused by the existing methods commonly used for welding the guiding strips, such as the influence to the production capacity of the annealing and pickling line for a raw material; the difficulties in the force control in the annealing and pickling line for a raw material, especially the tension control in the furnace, which may cause the problem of strip breakage inside the furnace; and the surface damage due to one more time entire coil uncoiling for welding the guiding strip.

[0093] In the examples mentioned above, the devices as follows can be used. However, the methods in the examples of the present invention are not limited to use these devices, and other devices with the same functions can also be used.

[0094] Cutter: made by Taiyuan Heavy Machinery Group Co., Ltd.

Main components: hydraulic driving members, cutting blades, electrical sensing control components;

Function: cutting the steel strip along the lateral direction, also other cutters with the corresponding functions can be used.

[0095] Coiler: made by Taiyuan Heavy Machinery Group Co., Ltd.

Main components: motor, drum, hydraulic driving members, electrical sensing control components;

Function: coiling, also other coilers with the corresponding functions can be used.

[0096] Uncoiler: made by Taiyuan Heavy Machinery Group Co., Ltd.

Main components: motor, drum, hydraulic driving members, electrical sensing control components;

Function: uncoiling and rewinding the portion of the steel strip to the steel coil.

[0097] Welding machine: made by Oxytechnik of Germany

Model: KONTINUMAT 2000/250/3-B MIG/MAG KONTI-D

Main components: welding gun, electrical sensing control components;
Function: welding the stainless steel strip and the guiding strip;
In the examples of the present invention, other welding machines or individual welding machine separated from the edge digging machine with the corresponding functions can be used.

[0098] Edge digging machine: Made by Oxytechnik of GERMERY, integrated with the welding machine
Main components: hydraulic driving members, cutting blade, electrical sensing control components;
Function: digging out the unwelded portion at the welding seam;
In the examples of the present invention, other edge digging machines or individual edge
digging machine separated from the welding machine with the corresponding functions can be used.

[0099] Straightening machine: made by Taiyuan Heavy Machinery Group Co., Ltd.
Main components: straightening roller, electrical sensing control components, hydraulic driving members;
Function: straightening the steel strip to make it flat.

[0100] In the present invention, it realizes the function of welding guiding strips at both ends of a white coil by means of the common devices of the cutter, the coiler, the uncoiler, the straightening machine, the edge digging machine and the welding machine by effective linking and matching in rhythm with the annealing and pickling line for a raw material and providing the corresponding functions of edge digging.

Claims

1. A method for welding guiding strips for a stainless steel coil, **characterized in that** the method comprises the steps as follows:

   welding a guiding strip for the steel strip head at the end of an annealing and pickling line for a raw material,
   introducing the guiding strip for the head to a coiler, and winding the steel strip with the guiding strip welded thereto into a stainless steel coil,
   conveying the steel coil to an uncoiler,
   uncoiling the outer circle of the steel coil by the uncoiler,
   welding a guiding strip for the outer circle, and
   Rewinding the guiding strip for the outer circle together with the steel coil by the uncoiler.

2. The method for welding guiding strips for a stainless steel coil according to claim 1, **characterized in that** the method further comprises:

   after welding the guiding strip for the steel strip head, and before introducing the guiding strip for the head into the coiler, performing edge digging treatment to the welding seam between the steel strip and the guiding strip for the head.

3. The method for welding guiding strips for a stainless steel coil according to claim 1 or 2, **characterized in that** the material of the guiding strip is a stainless steel plate which is different from that of the stainless steel coil.

4. The method for welding guiding strips for a stainless steel coil according to claim 1 or 2, **characterized in that** the material of the guiding strip is a carbon steel plate.

5. The method for welding guiding strips for a stainless steel coil according to claim 1 or 2, **characterized in that** the material of the guiding strip is a galvanized steel plate.

6. The method for welding guiding strips for a stainless steel coil according to claim 1 or 2, **characterized in that** the material of the guiding strip is an alloy steel plate.

7. A system for welding guiding strips for a stainless steel coil, which comprises a preparation assembling set consisted of an uncoiler and a first welding machine, wherein the uncoiler unwinds the outer circle of the steel coil, the first welding machine welds a guiding strip for the out circle, and the uncoiler rewinds so as to wind the guiding strip for the out circle together with the steel coil after welding, **characterized in that** the system further comprises:

   a second welding machine provided at the end of an annealing and pickling line for a raw material, for welding a guiding strip for the steel strip head,
   a coiler, for introducing the guiding strip for the head and winding the steel strip with the guiding strip for the head welded thereto into a steel coil,
   a conveying apparatus, for conveying the steel coil to the uncoiler.

8. The system for welding guiding strips for a stainless steel coil according to claim 7, **characterized in that** the system further comprises:

   an edge digging machine, after the welding of the second welding machine, the edge digging machine is used for performing the edge digging treatment to the welding seam between the steel strip and the guiding strip for the head.

9. The system for welding guiding strips for a stainless steel coil according to claim 7 or 8, **characterized in that** the conveying apparatus is a liftable steel coil car.

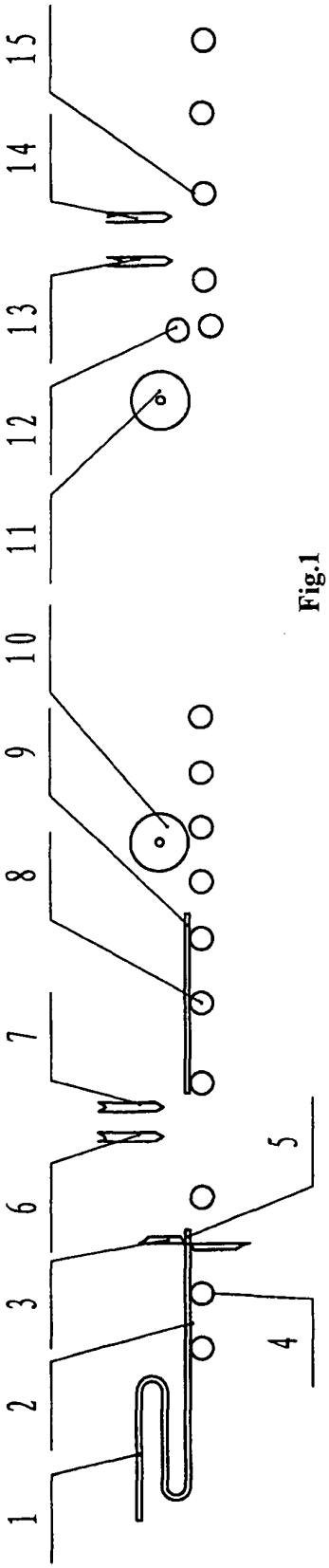

Fig.1

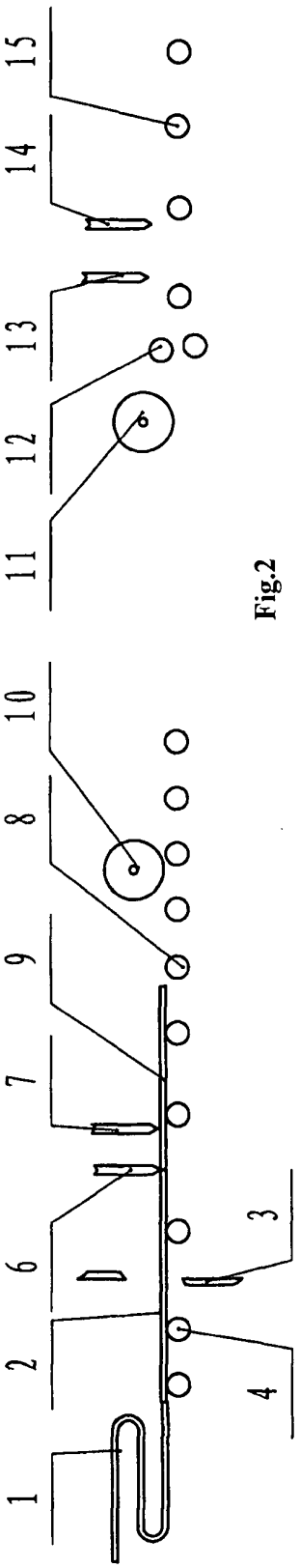

Fig.2

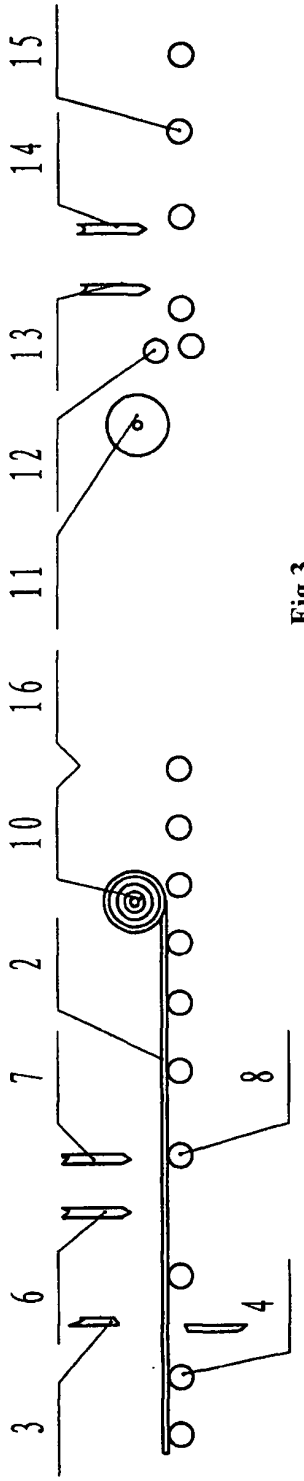

Fig.3

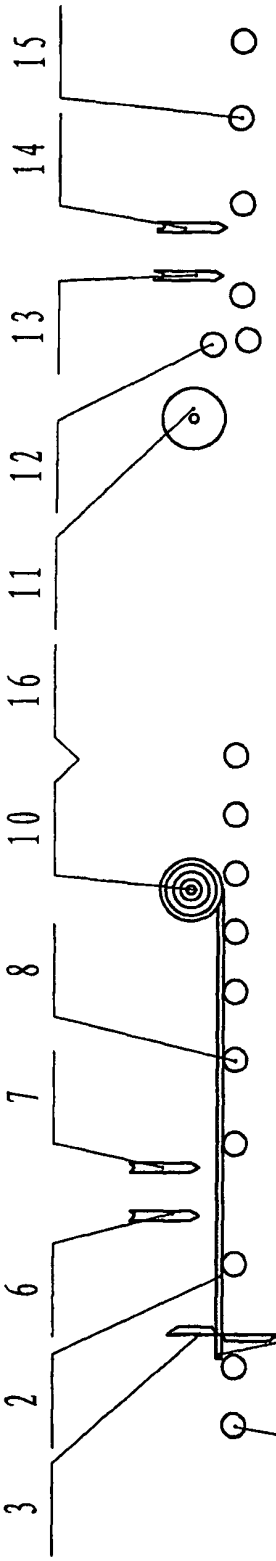

Fig.4

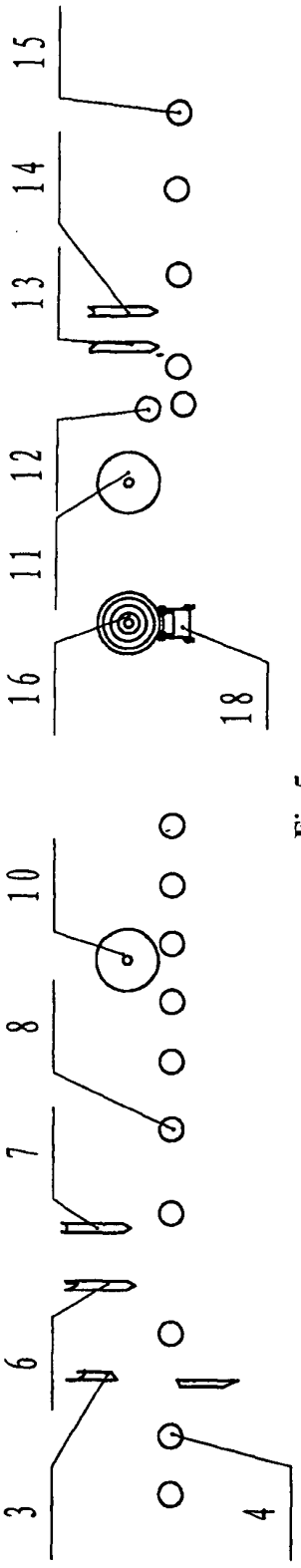

Fig.5

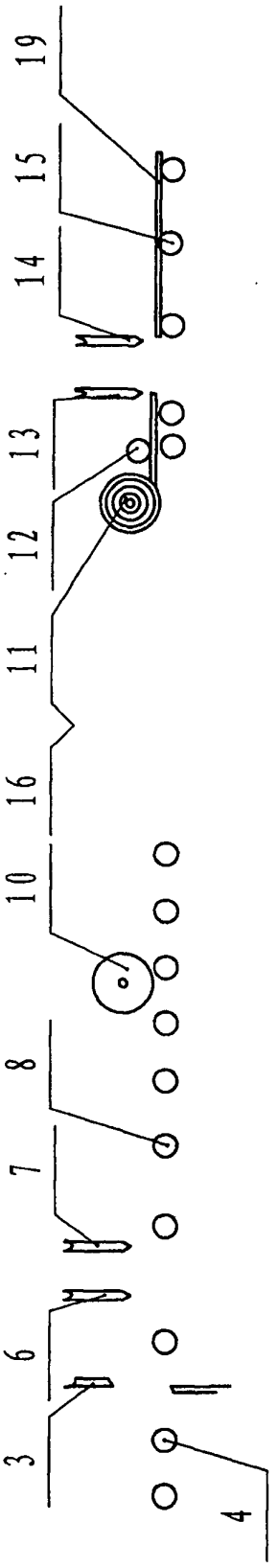

Fig.6

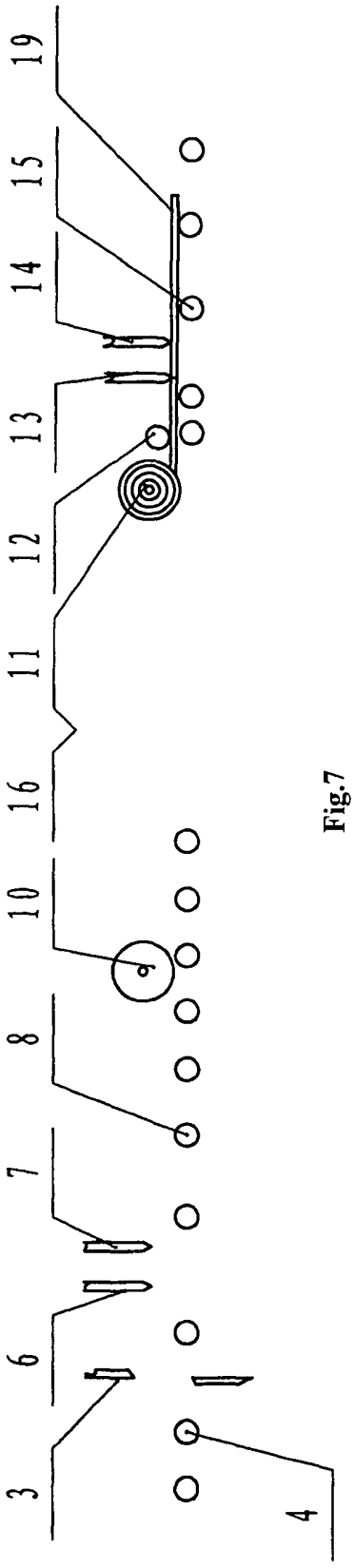

Fig.7

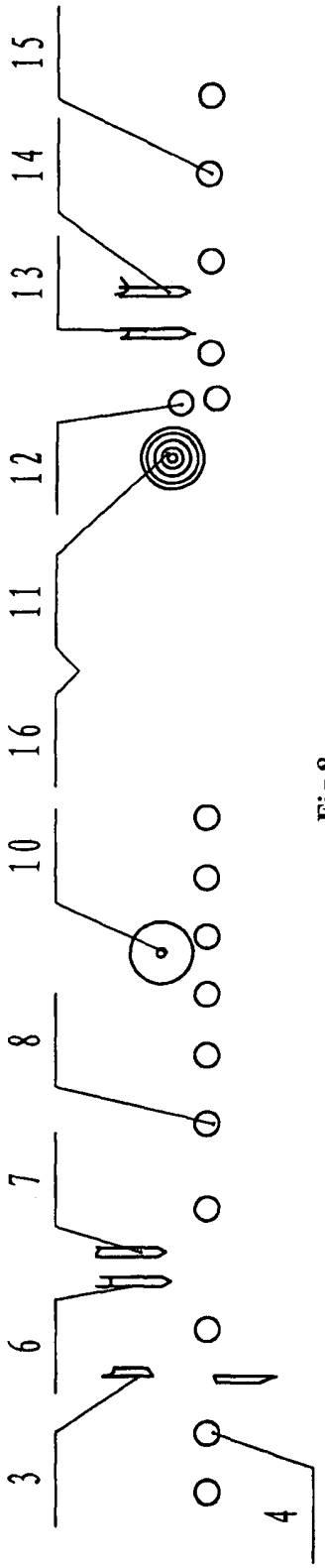

Fig.8

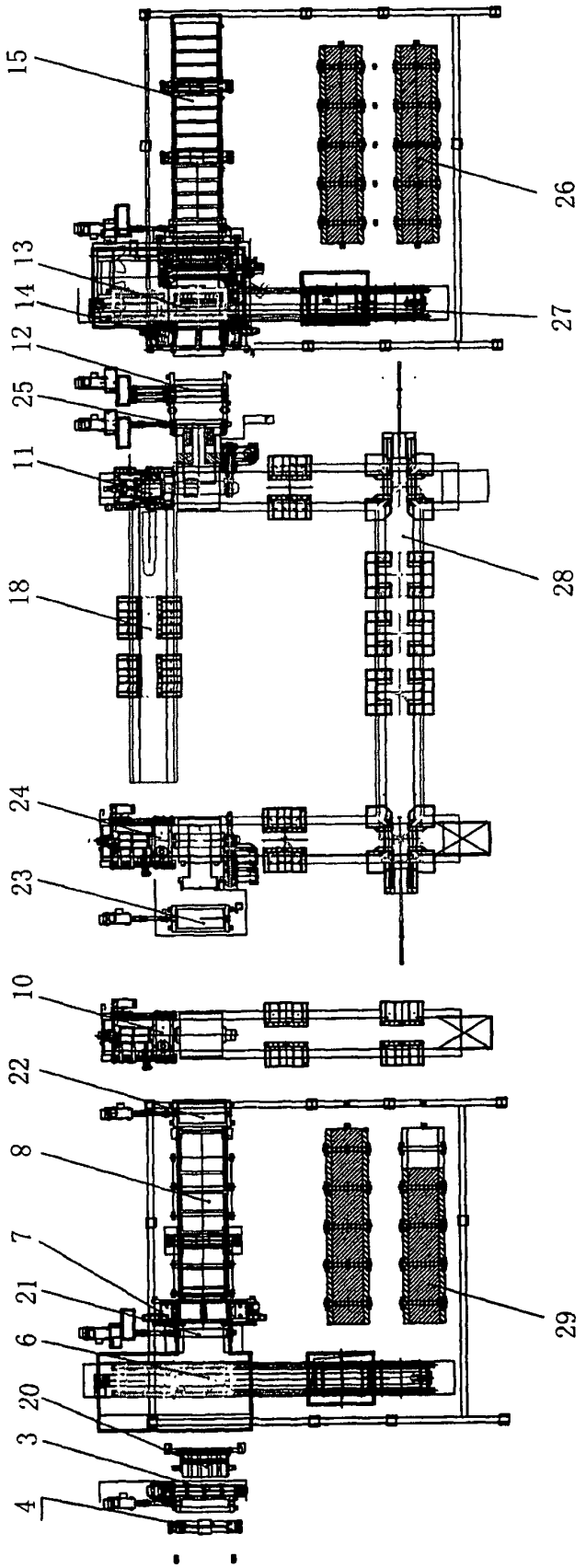

Fig.9

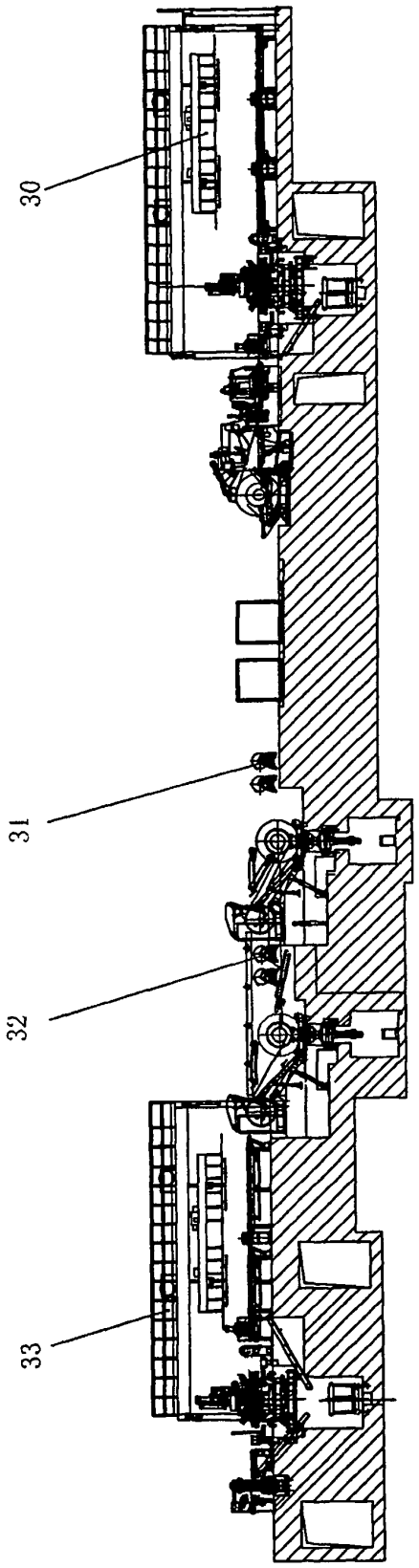

Fig.10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2007/071019

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B21B 1/22-1/36, B23P 23/-, B21B 15/-, B21C 47/-, B21B 3/-

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ, EPODOC, CNPAT, CNKI: guiding or leader or dummy, strip, pickl+, annealing, stainless, weld+, coil+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR20040056327A (POSCO) 30 Jun. 2004(30.06.2004) See description's pages 2-4, figure 1	1-9
Y	JP7-9028A (SUMITOMO METAL IND LTD) 13 Jan. 1995(13.01.1995) See description's paragraphs 0009-0019, figure 1	1-9
Y	JP6-277703A (SUMITOMO METAL IND LTD) 04 Oct. 1994(04.10.1994) See the whole document	1-9
A	JP4-172105A (HITACHI LTD el al.) 19 Jun. 1992(19.06.1992) See the whole document	1-9
A	CN1303747A (KAWASAKI STEEL CORP) 18 Jul. 2001(18.07.2001) See the whole document	1-9
A	US4938049A (NIPPON KOKAN KK) 03 Jul. 1990(03.07.1999) See the whole document	1-9
A	JP5-269526A (KAWASAKI STEEL CORP) 19 Oct. 1993(19.10.1993) See the whole document	1-9

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 Jan. 2008(25.01.2008)	**28 Feb. 2008 (28.02.2008)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer YU, Hanzheng Telephone No. (86-10)62085400

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2007/071019

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
KR20040056327A	30.06.2004	None	
JP7-9028A	13.01.1995	JP2730454B2	25.03.1998
JP6-277703A	04.10.1994	JP2692527B2	17.12.1997
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		WO8911349A	30.11.1989
		EP0392009A	17.10.1990
JP5-269526A	19.10.1993	None	

Form PCT/ISA/210 (patent family annex) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2007/071019

CLASSIFICATION OF SUBJECT MATTER:

B21B 1/36 (2006.01) i

B21B 3/00 (2006.01) i

B21C 47/26 (2006.01) i

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 200710061655X **[0001]**