

- [54] **HEATING DEVICE SET IN THE ROLLING MILL**
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| Aug. 11, 1973 | Japan..... | 48-90320 |
- [52] U.S. Cl. **432/45; 266/2.5; 266/3; 432/59; 432/230**
- [51] Int. Cl. **F27b 9/28**
- [58] Field of Search **432/45, 8, 59, 230; 266/2.5, 3**

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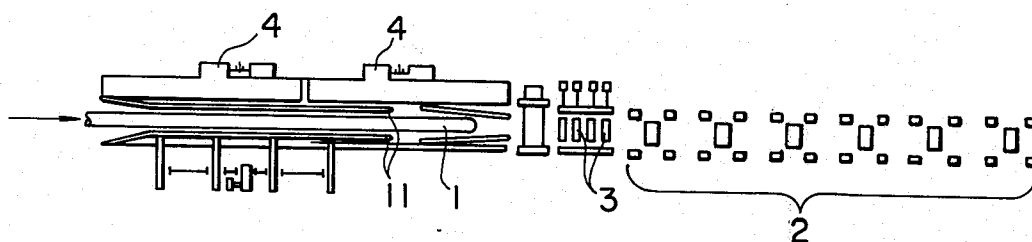
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Attorney, Agent, or Firm—Wenderoth, Lind & Ponack

[57] **ABSTRACT**

Heating device set in the rolling mill for heating rolled materials to be kept from temperature drop, such heating to be made on the edge portion of such materials with burners fixedly set in a plural number on each of a pair of side guides extending along the rolling line respectively on each of both ends of table rollers for leading rolled materials to the rolling mill.

10 Claims, 16 Drawing Figures



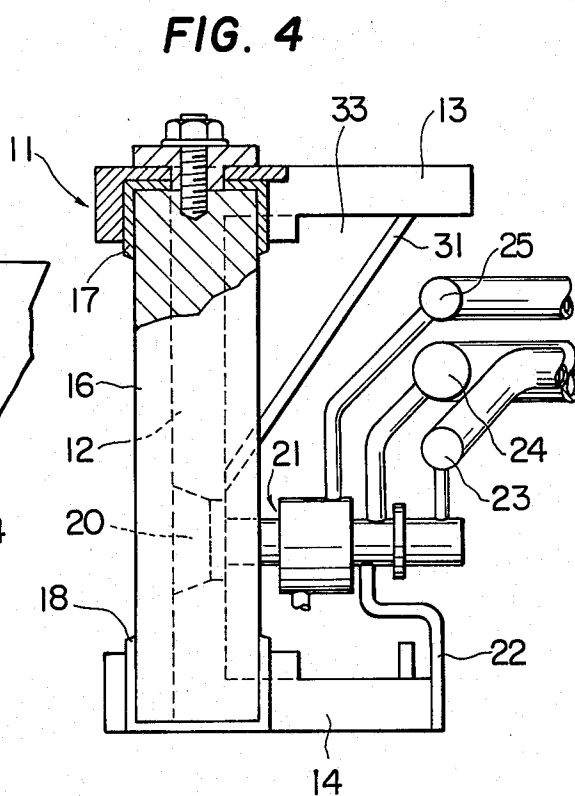
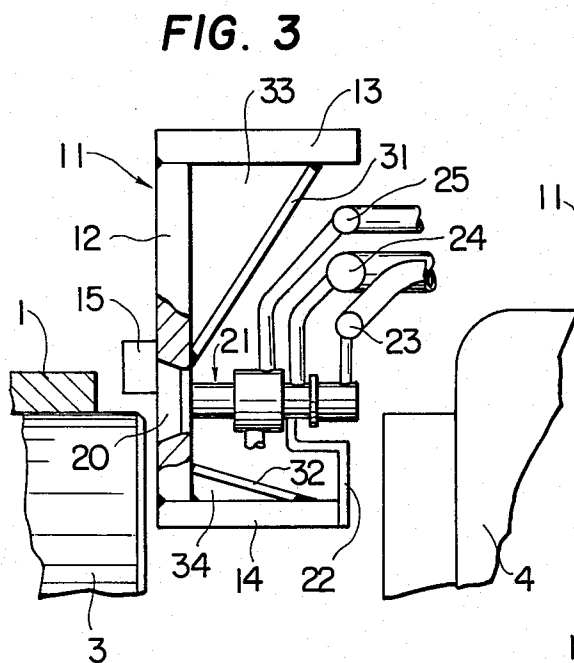
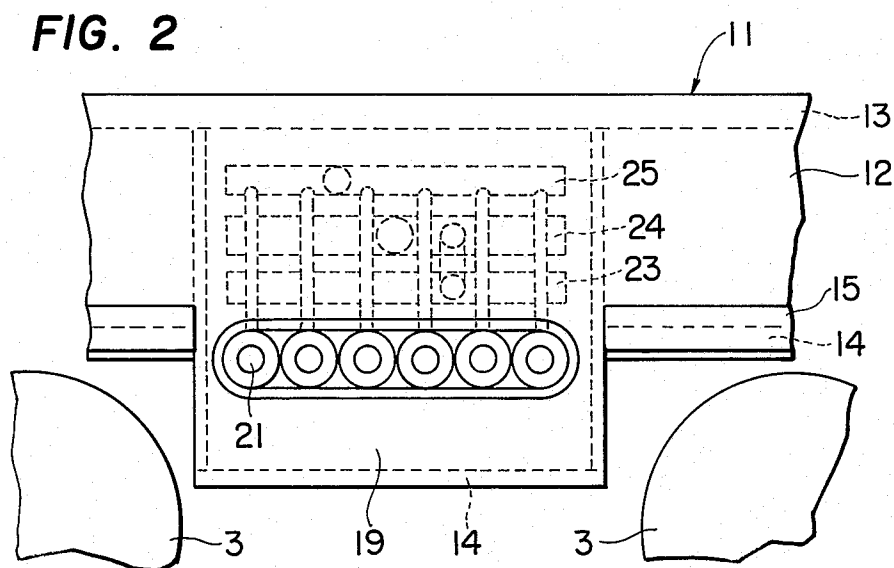
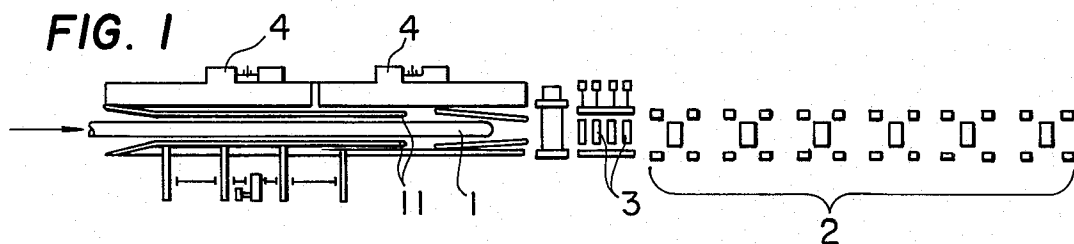


FIG. 5

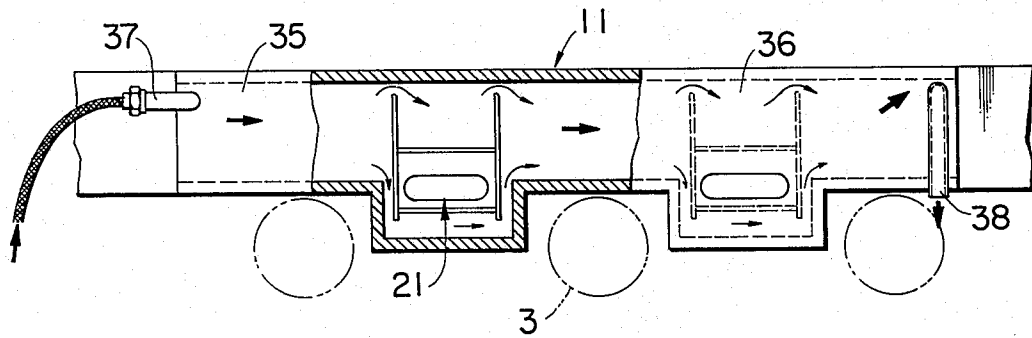


FIG. 6

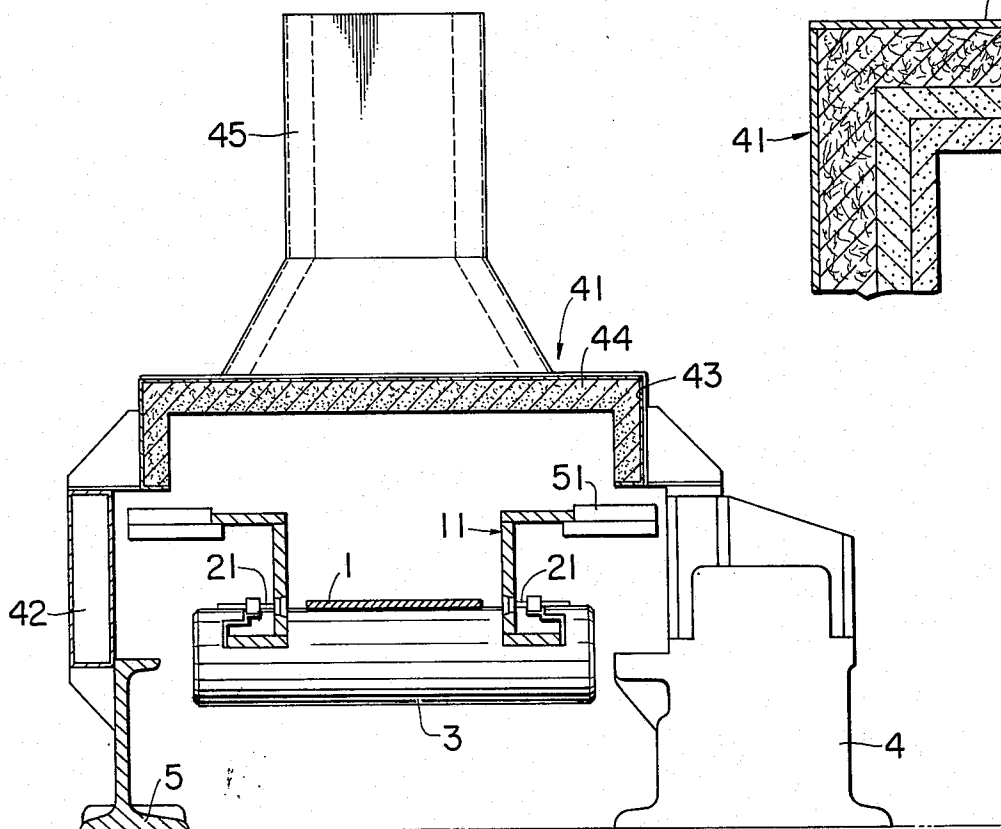


FIG. 7

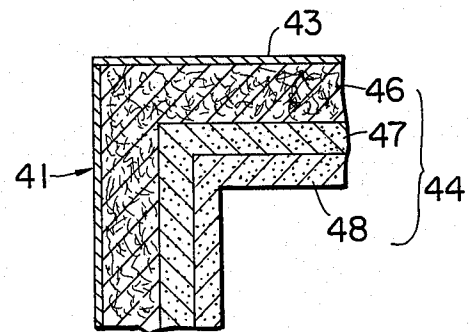


FIG. 8

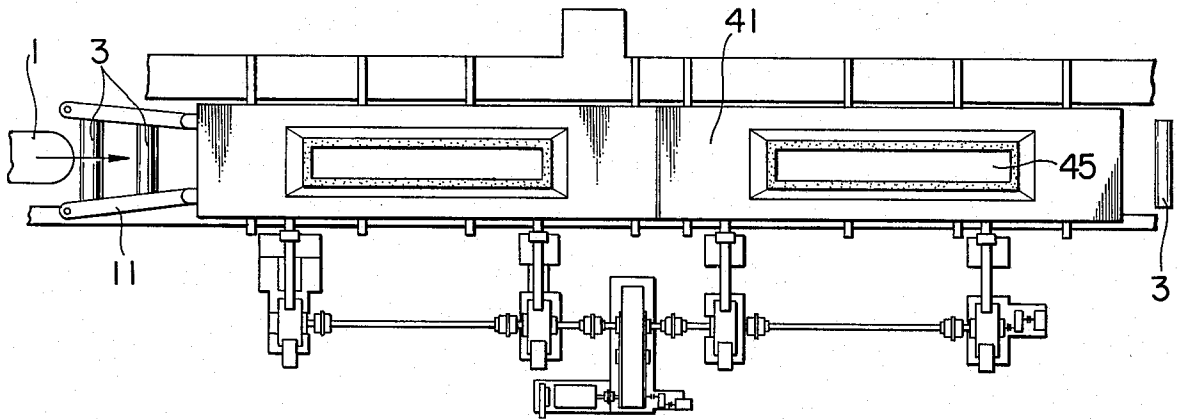


FIG. 14a

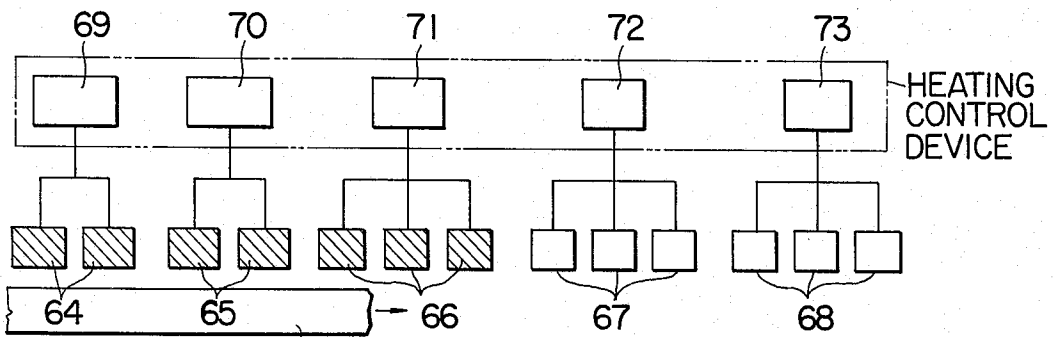


FIG. 14b

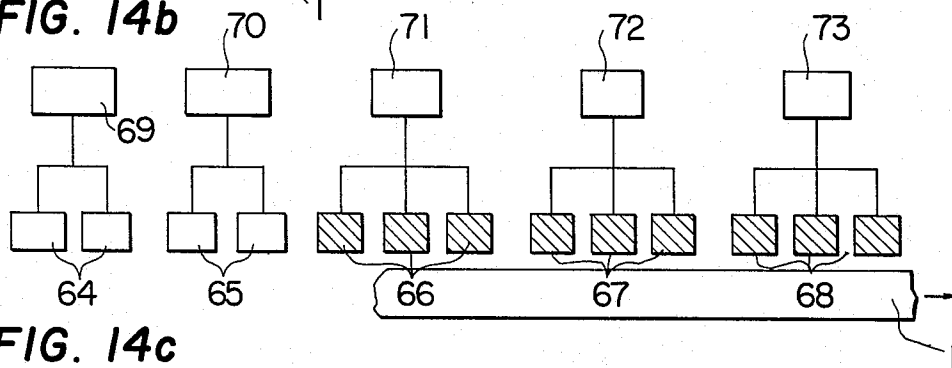


FIG. 14c

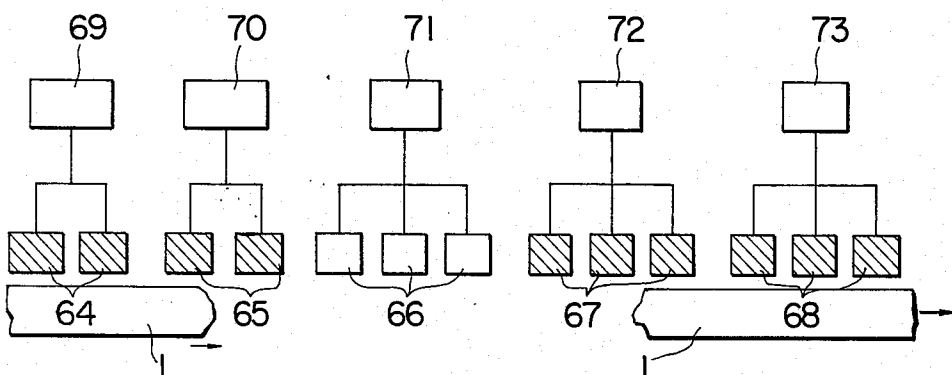


FIG. 9

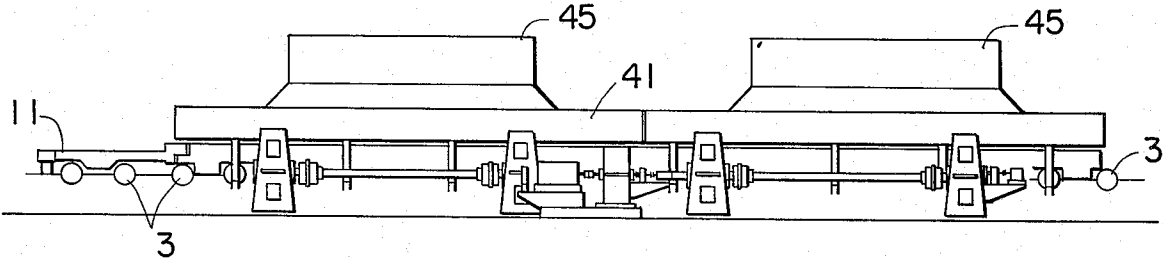


FIG. 10

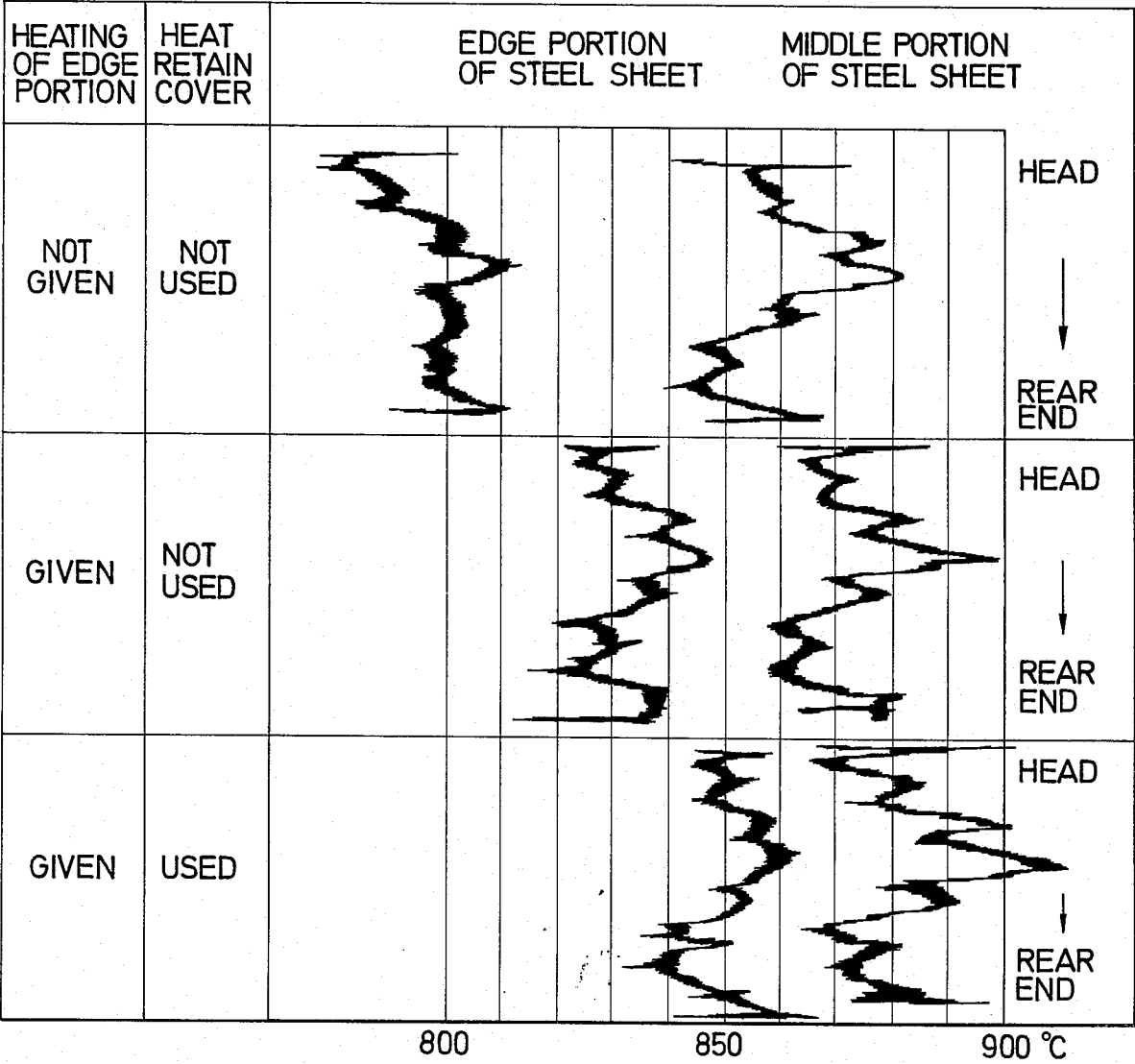


FIG. 11

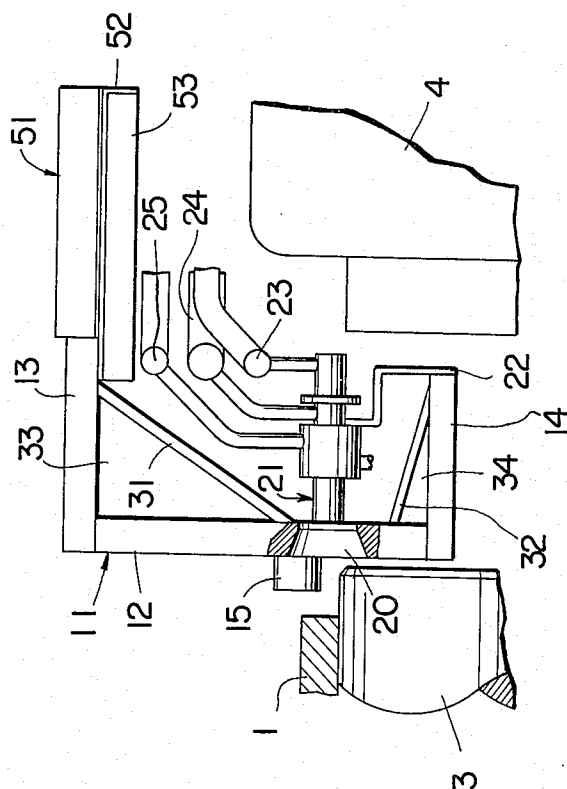


FIG. 12

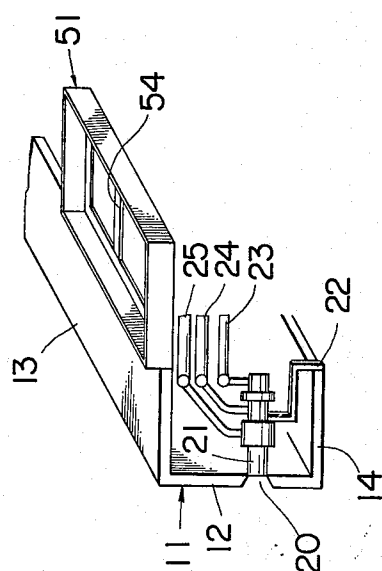
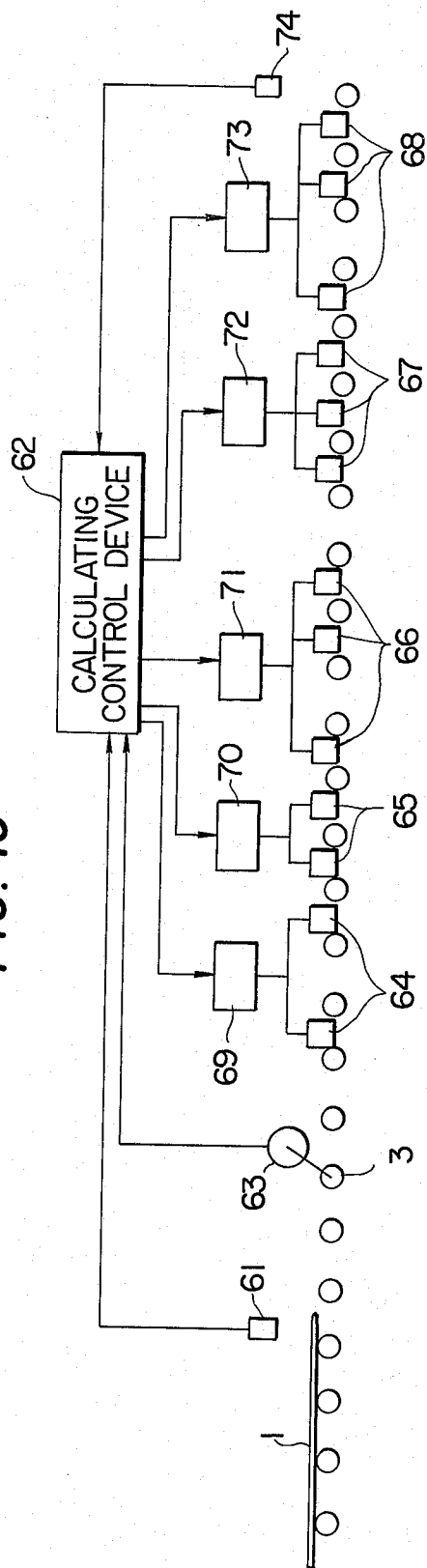


FIG. 13



HEATING DEVICE SET IN THE ROLLING MILL

BACKGROUND OF THE INVENTION

The present invention relates to a heating device set in a rolling mill and, more particularly to a device for heating the edge portion of hot rolled materials as they are running along the rolling line.

In order to secure quality uniformity and shape stability of rolled materials, it is considered to be necessary to keep rolled materials from temperature drop at the edge portion and other portions thereof during hot rolling operations. A variety of devices are used for attaining this purpose by heating with gas burners or otherwise, including a heating device equipped with burners for directly heating rolled materials running on roller tables between the roughing mill and the finishing mill set movable separately from side guides for guiding the rolled materials so as not to derail from the rolling line.

However, heating devices of conventional type for this purpose are not free from demerits, including the following: The distance between the edge portion of rolled materials and the burner head is adjusted by using a screw mechanism for forwarding or taking back the burner head horizontally for the adjustment of the reach of flames from the nozzle; in case of the nosing of a rolled material, a change in the reach of flames from the nozzle occurs, making uniform heating impossible; and the burner is not protected from high temperature, mechanically or otherwise.

In spite of the necessity of cooling side guides which are subjected to high temperature, currently there are no designs for this purpose, but merely a device made on side guides in the hot strip mill to provide a clearance of relief for thermal expansion which takes place due to heat transmitted from rolled materials, to cause no troubles in subsequently possible heat equilibrium. Such device, however, has nothing to do with a cooling device.

Also, in the case of the burner heating device equipped with side guides and additionally with a heat retaining cover, thermal expansion of the side guides will be so great that the structural coverage of such thermal expansion cannot be other than increasing the clearance of relief. However, a great clearance of relief for the prevention of contact between rolled materials and table rollers will cause, in high frequency, such troubles as thrusting or mis-rolling of the rolled materials to take place in such case as the bending of the tip of a rolled material.

As for the burners of the heating device of conventional type, there are considered the following compositions: As they are heated to high temperature by heat radiation from the high-temperature solid walls of the heat retaining cover, as well as by contact with exhaust gas of high temperature, there is a possibility that such burner as is made of a copper alloy, of low melting point and high heat conductivity, may melt even though said burner is cooled with water. Moreover, the use of steel as pipe material for the burners will cause oxidizing reaction of the steel with oxygen which is used as combustion gas, at a high temperature.

A variety of means have been developed for combining a heat retaining device with the heating device in the field of hot rolling of metal. Such means, however, is exclusively for the purpose of retaining heat. Structurally, they are all independent means each for

the purpose of preventing heat radiation from rolled materials as a whole; such as a means to send heat radiated by rolled materials back to the same materials through reflection on the heat retaining device, a means to send to rolled materials solid radiation of heat generated at the heat retaining device by heating with gas burners, by electric resistance or otherwise, or a means to supply directly to rolled materials the radiation of heat generated at the heat source for the heat retaining device.

No conventional means and technologies have heretofore been developed which incorporate economies of utilizing the heat of exhaust gas which is still of high temperature after being used for the edge portion of rolled materials running along the rolling line, in preference of the waste of energy dissipated without reuse.

Furthermore, conventional heating devices work in such mechanically simple manner that they are unadjustable in the consumption of fuels or in the supply of electricity to their own heater functioning as the heat source or they are forced to operate, when even a small bit of rolled material is in their working range. When using such devices, people cannot avoid wasteful consumption of fuels, but have to leave out of consideration thermal shock produced by heating the whole device at the same time.

In order to detect rolled materials as they are entering and leaving, there are presented conventionally a means to use a great number of rolled material detectors or that which uses a controller consisting of a timer combined with a rolled material detector. However, the former means has such inconveniences as high investment cost and restrictions on installation conditions; and the latter means such inconveniences as errors in the detection of entering and exit of rolled materials to occur in case the moving speed of rolled materials changes.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a heating device set in the rolling mill for heating rolled materials to a uniform temperature distribution, during rolling operations. Another object of the present invention is to provide a heating device set in the rolling mill equipped with side guides subjected to efficient and un-failing cooling.

A further object of the present invention is to provide a heating device set in the rolling mill having its burners and pipe therefor free of resistant to high temperatures. A still further object of the present invention is to provide a heating device for directly heating the edge portion of rolled materials with gas burners of high temperature and velocity, beyond the mere prevention of heat radiation, and also to provide a heat retaining device equipped with heat retaining cover for the prevention of heat radiation from rolled materials by using solid radiation heat from the inside wall thereof by heating said wall, thereby positively preventing temperature drop from taking place in the edge portion of rolled materials running along the rolling line, making it possible to obtain product of uniform quality and high shape stability.

A still further object of the present invention is to provide a heating device set in the rolling mill and which operates with a small consumption of fuels, causing no over-heating of rolled materials and making it

easier to control temperature with respect to one piece of rolled material over any points thereof.

These and other objects of the present invention will be made clearer by reference to the following detailed description and preferred embodiment of the present invention.

In order to achieve the abovementioned objects, the heating device of the present invention is so characterized that burners are fixedly set to the side guide; the side guide is provided with water cooled jackets, and thereon with burners and guard member for burner pipes, these being for protecting the device and its members. A heat retaining cover is provided over rolled materials and the side guides; and the device is separated into a plurality of sections for combustion control of burners, thereby raising heat efficiency of the device and preventing over-heating of rolled materials.

BRIEF DESCRIPTION OF THE DESCRIPTION

FIG. 1 is a schematic view of the heating device according to the present invention set before the finishing mill in the rolling line of hot strip mill.

FIGS. 2 and 3 are enlarged front and side views, respectively, of part of the heating device of FIG. 1.

FIG. 4 is a side view of the side guide having a roller guide.

FIG. 5 shows a schematic construction of the front side the cooling device of the side guide of the present invention.

FIG. 6 is a cross-sectional view of the heating device equipped with heat retaining cover of the present invention.

FIG. 7 is a partially enlarged sectional view of the heat retaining cover of FIG. 6.

FIG. 8 and FIG. 9 are respectively a plan and a front view of the device of FIG. 6.

FIG. 10 is a graph illustrating effect of the heat retaining cover.

FIG. 11 and FIG. 12 are a side view and a perspective view of the side guide equipped with burner pipe guard member of the present invention.

FIG. 13 is a block diagram illustrating the system of burner combustion control according to the present invention.

FIG. 14 (a, b, c) is a schematic diagram illustrating the function of the system shown in FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The following is detailed description of the present invention by reference to the drawings:

As shown in FIG. 1, the heating device according to the following embodiment of the present invention, is installed before finishing mills 2 of the hot strip mill. Also before the finishing mills 2, there are provided a great number of table rollers 3 supported by bearings (not shown) contained in gear boxes 4.

On both sides of the table rollers 3, side guide 11 is provided extending along the rolling line. This pair of side guides 11 are used for leading rolled material 1 to the finishing mills 2. Referring to FIG. 2 and FIG. 3, the guide 11 is constructed in a frame-like manner such that side plate 12 has upper plate 13 and lower plate 14 set respectively at the upper end and the lower end thereof, both extending from respective set positions outwardly; that is, in a direction furthering from the

table rollers 3. On the rolling line side of each of the side guides 11, a bar-shaped guide piece 15 is fixed extending along the rolling line at the position corresponding in height to the rolled material 1. Thus, the rolled material 1 is led by the guide pieces 15 on both sides as it contacts these pieces, which further function, as the same time, to keep a suitable distance, say, 100 mm, between the rolled material 1 and the below-mentioned burner 21. In place of the guide pieces 15, there can be used guide rollers 16, as shown in FIG. 4. The guide roller 16 is set for free rotation around the vertical axis between sleeves 17 and 18 fixed respectively on the upper plate 13 and the lower plate 14. In this case, a great number of such rollers are provided along the rolling line. On the side plate 12 of the side guide 11, there is a burner holding portion 19 provided between any two adjacent table rollers 3, such portion having openings 20 for the burner 21. At the rear end of the lower plate 14, there are fixed provided a plurality of burner supports 22.

On each burner support 22, a plurality of burners 21 are set at the position for the nozzle of each of them to face the edge portion of the rolled material 1, for heating the rolled material 1 horizontally.

As for the size of the burner 21, while any type will do, it should be as short as possible, after taking into consideration investment cost, maintainability, fuel consumption, utilization of heat, space for installation and other factors. That is, it should be most compact for the capacity. Besides, it should be such a burner as to produce flames of high velocity and temperature. If such burners are used, it is possible to have several burners 21 installed, each between two table rollers 3, as shown in FIG. 2.

As for the position of the burners 21, it depends on the temperature distribution of the rolled material 1 to be heated thereby. In this embodiment, for example, the burner is intended to heat the edge portion of the rolled material 1 from above and/or below or from the side. But taking into consideration the gist of the present invention, burners 21 are fixed, each between two adjacent table rollers 3 supporting the rolled material 1, so as to heat the rolled material 1 from the side, nearly horizontally, thereby removing the danger of a collision between the burner 21 and the head or the rear of the rolled material 1 and troubles in maintenance such as the clogging of burners. In this case, the provision of burners 21 is restricted by that of table rollers 3, such demerit to be made up with a merit that the rolled material 1 is heated from the edge portion which is subjected to quicker temperature drop, making higher heat efficiency. If heating cannot be made on the edge portion from the side in view of various accessories occupying the space for the heating device, it might be able to be achieved by slanting upwardly or downwardly. In this case, however, it will become necessary to have burners 21 move according to the change in thickness and width of the rolled material 1, as the distance between the burner 21 and the rolled material 1 is a great factor influencing heat efficiency, while the rolled material 1 is not necessarily constant in thickness and width. Therefore, conventionally, the support of the burner is made movable by using a driving device. According to the present invention, burner supports 22 are provided in the side guide 11, solving the abovementioned problem. More specifically, the thickness of the rolled material 1 at the heating position is some-

thing between 20 and 30 mm, meaning a change in the range of about 10 mm, such extent of the change calling for no change in vertical position setting of the burner 21 according to the change of thickness of the rolled material 1, though this does not mean that no driving device should be added even in need thereof. In the case of the present invention, no mechanism for adjusting the height of the burner 21, is provided. As mentioned above, the distance between the rolled material 1 and the burner 21 can be kept constant by providing the guide piece 15 or roller guides 16 over more than two positions of the side guide 11, this also preventing the tip of the rolled material 1 from impinging on the burner 21 due to possible bending of the head of the rolled material 1. In this case, it is recommended to additionally use a known edge position controller (EPC) for higher exactness in keeping constant said distance. Numeral 23 denotes fuel feed pipe; numeral 24 denotes a oxygen gas feed pipe; and numeral 25 denotes a cooling water feed pipe.

The following is explanation of the cooling device of the side guides 11 by reference to FIG. 3 and FIG. 5.

Outside the side plate 12 of the side guide 11 (back of the side of the side plate facing the rolled materials 1), that is, at the positions where there can be no contact with or no influence of heat radiation from the rolled materials 1, there are fixed jacket walls 31 and 32 so as to form a triangular-prism-like space respectively between the side plate 12 and the upper plate 13 and between the side plate 12 and the lower plate 14. The so provided jacket walls 31 and 32 are free from heat radiation. Said two triangular-prism-like space form water cooled jackets 33 and 34.

Said jacket 33 and 34 are connected with water cooled jackets 35 and 36 fixed on the parts of the side guide 11 which have no burners set (See FIG. 5). Numeral 37 denotes a cooling water inlet pipe set on the water cooled jacket 35. Numeral 38 denotes a cooling water outlet pipe on the side of the water cooled jacket 36. From the cooling water inlet pipe 37 to the cooling water outlet pipe 38, cooling water runs through the jackets 35, 33, 34 and 36, so as to effectively cool the side guide 11.

As the case may be, the cooling water pipe 23 which is provided for another purpose, may be connected to the jackets 33 and 34 of the side guide 11, so that the cooling water used for cooling the burner can be used for cooling the side guide 11.

Without using such jackets as mentioned above, there is available a means to spray cooling water directly to the back side of the side guide 11. However, this means is not recommendable, as cooling water causes the burners 21 and such accessories as burner-setting bolts to deteriorate.

As mentioned above, according to the present invention, it is possible to guide rolled materials with the distance being kept as prescribed in any case between the rolled materials and the burners; to protect the burners from high temperature and mechanical complications; and to use a means to heat the edge portion of rolled materials from side horizontally or nearly horizontally, thereby enhancing heating efficiency.

It was found in one embodiment of the present invention that by heating for 15 seconds, the temperature of rolled products was raised by 160°C in case the distance between the burner and the rolled material is kept constant at 100 mm, while the temperature rise is

only by about 100°C in case the distance fluctuates to 150 mm though the nosing of the rolled material. In another embodiment of the present invention it was found that when the edge portion of rolled materials is heated horizontally the side for 15 seconds, the temperature rise was by 40°C lower on the upper surface, by 80°C higher on the bottom surface and by about 30°C on an average, compared with the heating from above with a slant angle of 45°.

Also, according to the present invention, it is possible to cool the side guides so efficiently and exactly, that their thermal expansion can be made small and handled smoothly and without mechanical complications.

As for the position of the side guide equipped with the burners of the present invention, it can be set anywhere between the heating furnace and the group of finishing mills, according to accommodations and operation conditions, in the of the hot strip mill which operates under strict temperature control. In general case, it is recommended as most efficient to provide such side guide between the group of roughing mills and the group of finishing mills, more particularly closer to the group of finishing mills in the abovementioned range. In some case, it can be set between mills of the group of roughing mills.

Then, the edge portion having the temperature drop of rolled materials 1, which runs on table rollers 3 supported by gear boxes 4, is heated by the edge portion heating device consisting of side guides 11 equipped with gas burners 21. In order to utilize the of high temperature exhaust gas for heating all of the rolled materials 1 and retaining the heat thereabout, there is provided heat retaining cover 41 immediately above the side guide 11 equipped fixedly with gas burners 21.

As shown in FIG. 6, the heat retaining cover 41 is shaped like a box and opens downwardly, so as to cover the side guide 11. Said cover 41 is set, by support 42, on table roller bearing frames 5. As one method for the fixation of the heat retaining cover 41, there is presented in the drawing the use of the support 42 which, however, can be substituted by a driving device for cover tilting which is equipped with an oil pressure cylinder or the like.

The heat retaining cover 41 is provided, at the upper part, with exhaust stacks 45 at an appropriate distance between each other. The box-shaped frame 43 of the heat retaining cover 41 has an inside lined with a lagging material 44. As shown in FIG. 7, the lagging material 44 is a laminate of a felt layer 46, kaolin wool layer 47 and kaolin wool layer 48. As the inside wall of the heat retaining cover 41 is heated to a high temperature with radiation heat from exhaust gas and rolled materials, it is useful in the prevention of further heat radiation from the rolled materials. Because of the heat retaining cover 41, exhaust gas cannot go up directly, though it is heated and made lighter. The gas, in fact, flows within the heat retaining cover 41 toward the exhaust stack 45. Heat convection and heat radiation from the exhaust gas and the rolled materials 1 raise the surface temperature of the rolled materials 1.

So far as such troubles with rolling operations as contact with rolled materials 1 running along the rolling line, the shorter the distance between the heat retaining cover 41 and such rolled materials 1 for raising flow velocity of exhaust gas, the better. Also, the exhaust stack 45 is advisable to be made smaller in cross-section, so far as this gives no influence to such other

parts as the table rollers 3 and the side guides 11. As for the cross-sectional area of the exhaust stack 45, it can be adjusted by the provision of a damper therein or thereon.

FIG. 10 shows the temperature distribution of steel plate recorded as the result of the abovementioned embodiment of the present invention. When heating a rolled steel plate 2.0 mm thick, by using liquefied petroleum gas at a flow rate of 350 m³ per hour and a heat retaining cover 15 m long, the resulting heating effect was a temperature rise of 30° to 40°C at the edge portion of the plate and an additional increase of 10° to 20°C because of the heat retaining cover. Thus, the produced steel plate of as good a quality and as stable a form as hoped for was obtained.

The coverage of the side guides 11 with the heat retaining cover 41 as mentioned above, however, may possibly cause over-heating of the burners 21, the fuel gas pipe 23, the oxygen gas pipe 24 and the burner cooling water pipe 25. Against this danger of over-heating, the burners 21 are thermally protected by the upper plate 13 of the side guides 11; and all these pipes are shielded from radiation heat of the heat retaining cover 41 and heat of exhaust gas by the guard member 15.

It may be possible as one means for the protection of these pipes to extend the side guide 11 over them. In such case, however, the upper plate 13 and the lower plate 14 of the side guide 11 should be as similar in size as possible, since these plates should be balanced so as to minimize thermal distortion in view of the fact that the side guide 11 and the plates are directly subjected to heat. Speaking more about the lower plate 14, it cannot be made too long, because of the table roller bearing supports 5 and the gear boxes 4, and otherwise.

Taking the abovementioned into consideration, it is so devised according to the present invention that the upper plate 13 of the side guide 11 is provided with the burner pipe guard member 51 extending horizontally from the rear end of the plate outwardly, so as to cover the burner pipes, and the guard member 51 is lined with a heat insulating material, thereby protecting the burners 21 and the burner pipes from heat.

As shown in FIG. 11 and FIG. 12, the burner pipe guard member 51 constitutes a frame 52 shaped angle steel or otherwise, containing a heat insulating material 53. In case the guard member 51 is too large to hold the heat insulating material 53, this is held by a supporting beam 51 provided across the guard member 54 or by an iron sheet or the like placed to support it.

Together with the burner pipe guard member 51 there can be used an air-purging means, which will purge exhaust gas in the vicinity of the side guide 11, thereby furthering cooling operation. As for the cooling of the side guides 11 themselves, water cooled jackets 33 and 34 are provided for each, as mentioned above.

As a result of the abovementioned cooling means according to the present invention, the burners 21 and the burner pipes are protected from high temperature, making it possible to avoid melting or other complications due to the rise of their temperature. Moreover, even in case oxygen is supplied through the pipe for efficient combustion of fuel gas, which oxygen may easily react to cause an accident at high temperature, there will be no such danger if the means of the present invention are used.

Another merit is that as the extension of the upper and the lower plates of the side guide is not used, such cooling means of the present invention makes these plates subjected to smaller thermal distortion makes the side guide weighing lighter, therefore placing smaller load on the driving device.

The following is explanation of a combustion controller of the present invention;

The entrance and exiting of rolled material 1 from the heating device is detected by rolled material detector using a high temperature detector, thermometer, etc. and is converted into a detection signal, which is applied to calculating-control device 62. Rolled material moving speed signals generated in a speed transmitter 63 (such as puls generator) are applied to said calculating-control device 62, where the distance between said rolled material detector 61 and the tip or the rear end of the rolled material 1 is calculated, and ignition signal and extinction signals are issued therefrom and sent to respective heating control devices 69-73 so that the heating burners 64-68 may be respectively ignited when the rolled material has travelled from the first part of the section of respective burners, and the burners may be extinguished when the rolled material has travelled out of the last of the section of respective burners.

In case a considerable time is required from the reception of ignition signal or extinction signal, respectively, to the actual ignition or extinction of the heating burner, such length of time should be taken into account for the abovementioned calculation. In case of the reverse rolling, there may be provided two sets of rolled material detectors, respectively, before and after the heating device.

For heating both edge portions of steel plate, there are provided two series of heating burners, only one series numbered from 64 to 68 being shown in FIG. 14, as the other series is just the same as the one shown. In the drawing, there is shown one case where there are thirteen heating sections. Though each section may have its own controlling system, these sections are divided into five groups, containing 2, 2, 3, 3 and 3 sections respectively, each group to be covered by one controlling system. That is, the heating control devices 69-73 are respectively for the heating burners 64-68. Further division of burner group would only result in the increase of investment and operation costs.

The abovementioned case is such that though used one after another, all the burners are to be used. But there are some cases where not all the burners or none of them are to be used. Burners of some section, say, the burners 64 may not be used even when rolled material passes by. In case no heating is necessary, all the sections are left unused.

In case it is necessary to control temperature change per one piece of rolled material for uniform distribution of quality and good shape of product, according to temperature, moving speed and kind of such material, heating control is so made that temperature transmitter or transmitters 74 provided at the outlet side of or both at the outlet and the inlet sides of the heating device, produce the detected temperature value, and the speed transmitter produces the detected speed value. Both values are applied to the calculating-control device 62, where the so applied signals are compared with the prescribed temperature pattern, so as to calculate the required heat input at various points in the rolling direc-

tion of rolled material, thereby making possible selection from the sections of the burners 64-68 and control of flow of fuel supply to such burners.

Referring to FIG. 14a, the burners 64, 65 and 66 shown hatched section, are ignited, and the burners 67 and 68 are not yet in operation when rolled material 1 enters. Referring to FIG. 14b, showing the case where the rolled material is being delivered, the burners 66, 67 and 68 are still in operation, and the burners 64 and 65 are in a position to be extinguished.

In the case of FIG. 14c, where one piece of rolled material is entering and another is being delivered from the heating device, the burners 64 and 65 and 67 and 68 constitute respective combustion zones. Thus, a very accurate heating can be expected.

Referring to the drawings, each of the thirteen sets of burners may comprise one or more than two burners.

As for the division of the burners into five sections, each constituting a combustion zone, it may be so designed in terms of heating control that some zone operates all the time, so far as rolled material is passing by; a plurality of zones have one controlling system.

As mentioned above, the division of burners into sections is not limited to the manner of the embodiment of the present invention, but may be designed after comparison of various cases in terms of investment, fuel consumption, maintenance and the conditions to be controlled.

By using the controlling system used in the embodiment of the present invention, fuel consumption can be decreased by 20 percent compared with the consumption when using the all-burner-all-time-operation system. Moreover, the heating according to the present invention is easily adjustable in temperature, making it possible to prevent over-heating. Again as for the adjustability of temperature, according to the present invention, this is due to the combustion zone selection system, which is far superior in this respect to the all-burner-full-fuel-supply system.

Therefore, it is made easier according to the present invention to control temperature variation with one and the same piece of rolled materials.

The merits of the present invention are not limited to the abovementioned concerning heating burners, but there is a merit of power consumption reduction expectable from the division into combustion zones in the case of induction heating or resistance heating.

The above-mentioned is the explanation of the embodiment in the operation of the hot strip mill, but the heating device of the present invention can be applied to hot rolling of thick steel and non-ferrous metals.

What is claimed is:

1. In a heating device used in a rolling mill for heating edge portions of rolled materials traveling through said rolling mill and specifically positioned along a steel sheet hot rolling line comprised of a series of roughing rolling mills and finishing rolling mills, the improve-

ments which comprise a pair of side guides positioned along said hot rolling line for guiding said rolled materials, said side guides being movable mounted for movement in a direction perpendicular to the direction of travel of said rolled materials, and a plurality of burners positioned on both of said side guides and adapted for heating edge portions of said rolled materials.

2. The improved device of claim 1, wherein each of said side guides is comprised of a perpendicular side plate extending along said rolling line and bar-shaped spacing members extending from said side plates at positions corresponding to the height of rolled material.

3. The improved device of claim 1 wherein each of said side guides is comprised of a perpendicular side plate extending along the rolling line and a plurality of guide rollers mounted on shafts for free rotation and extending from said side plates.

4. The improved device of claim 1, wherein table rollers are provided along the rolling line and nozzles of said burners are directed laterally toward the edge portions of the rolled material from positions intermediate adjacent table rollers.

5. The improved heating device of claim 1, wherein each of said guides further comprises a water cooling jacket positioned therewithin.

6. The improved heating device of claim 1 further comprising a box-shaped heat-retaining cover having an inside lining of refractory material, said cover being positioned over said side guides.

7. The improved heating device of claim 6 further comprising exhaust stacks extending upwardly from said heat retaining cover.

8. The improved heating device of claim 6, further comprising a burner pipe guide member for thermally protecting the burners and burner pipes, and positioned on the upper portion of said side guide.

9. The improved device of claim 1 wherein said burners are grouped into more than two sections and further comprising heating control device coupled to said burners for independently controlling said sections.

10. The improved device of claim 8, further comprising at least one rolled material detector and speed transmitter positioned at least before said heating device along the rolling line, said rolled material detector generating an entrance signal and exit signal, said speed transmitter generating a speed signal, a calculation controlling means operatively coupled to said detector and speed transmitter for computing the distance between said rolled material detector and one of the tip and rear end of the rolled material, said calculation controlling means coupled to said heating device and generating an output signal when the tip of the rolled material enters each section and when the rear end leaves each section, thereby selectively activating and deactivating said burners.

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