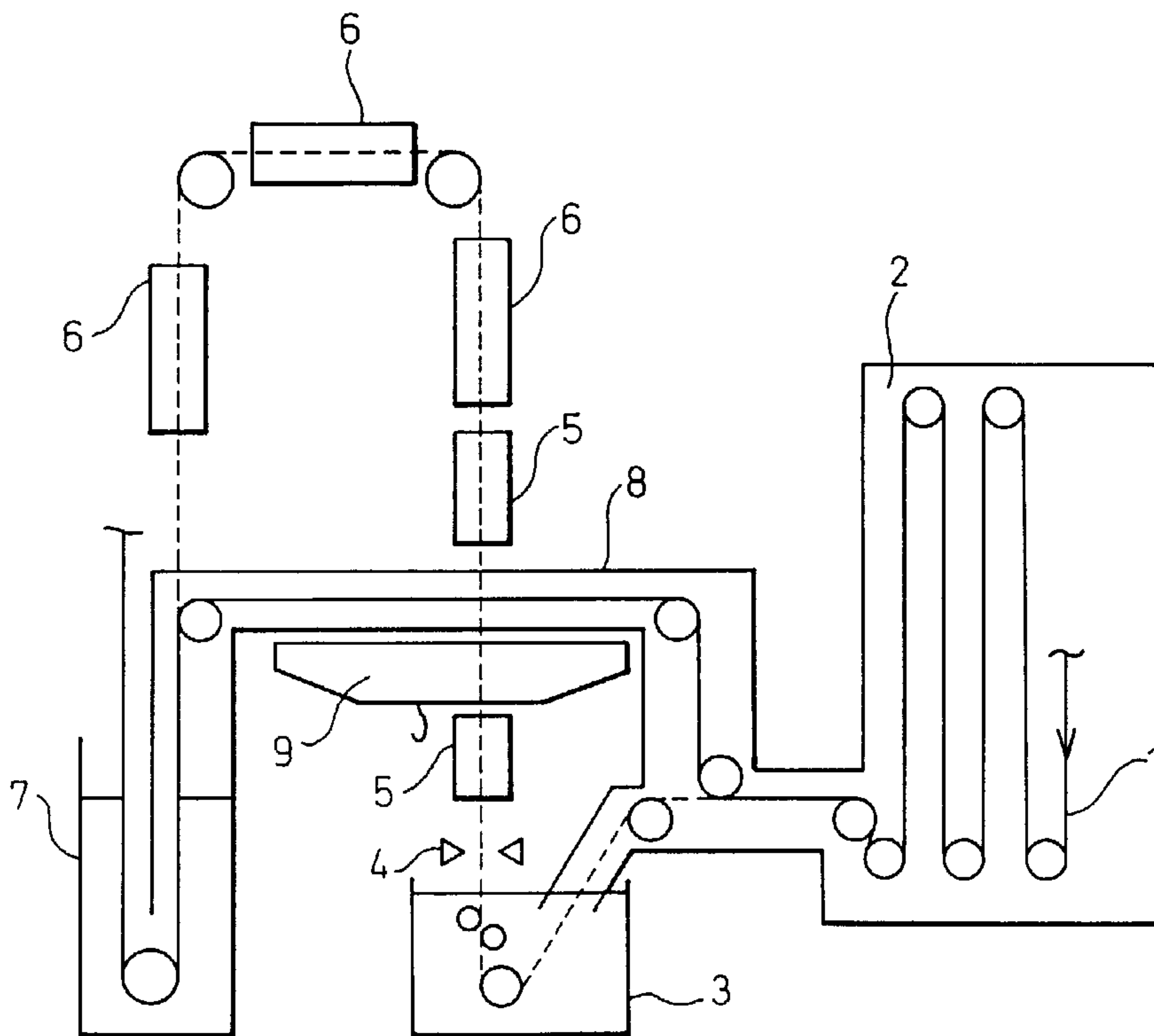




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 (54) Title: DUAL-PURPOSE INSTALLATION FOR CONTINUOUS ANNEALING AND HOT DIP PLATING



(57) Abrégé/Abstract:

The present invention provides a dual-purpose installation for continuous annealing and hot dip plating to produce a continuously annealed steel sheet and a hot dip plated steel sheet by switching process routes in the single installation, and according to the present invention, by installing a bypass facility which leads a steel sheet from a continuous annealing furnace to a water quenching facility without it traveling through a plating pot and a plating facility in the a dual-purpose installation for continuous annealing and hot dip plating, it becomes possible to prevent the steel sheet coming out from the annealing furnace from being exposed to the outside atmosphere and being oxidized during the production of a continuously annealed product and to realize a less expensive dual-purpose installation for continuous annealing and hot dip plating.

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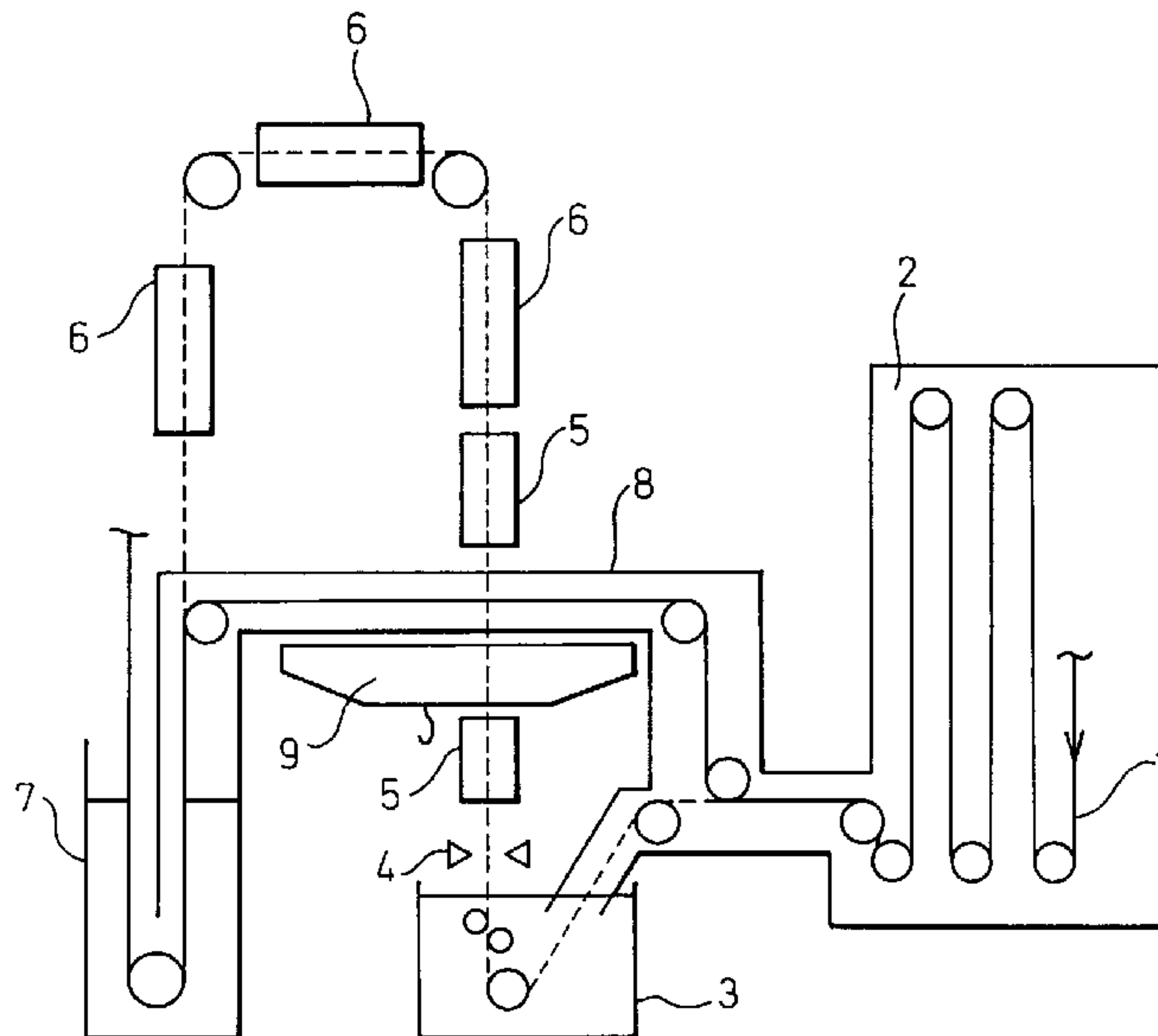
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(54) Title: DUAL-PURPOSE INSTALLATION FOR CONTINUOUS ANNEALING AND HOT DIP PLATING



(57) Abstract: The present invention provides a dual-purpose installation for continuous annealing and hot dip plating to produce a continuously annealed steel sheet and a hot dip plated steel sheet by switching process routes in the single installation, and according to the present invention, by installing a bypass facility which leads a steel sheet from a continuous annealing furnace to a water quenching facility without it traveling through a plating pot and a plating facility in the a dual-purpose installation for continuous annealing and hot dip plating, it becomes possible to prevent the steel sheet coming out from the annealing furnace from being exposed to the outside atmosphere and being oxidized during the production of a continuously annealed product and to realize a less expensive dual-purpose installation for continuous annealing and hot dip plating.

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## DESCRIPTION

DUAL-PURPOSE INSTALLATION  
FOR CONTINUOUS ANNEALING AND HOT DIP PLATING

5

## TECHNICAL FIELD

The present invention relates to a dual-purpose installation for continuous annealing and hot dip plating to produce a continuously annealed steel sheet as well as a hot dip plated steel sheet by switching process routes in the single installation.

## BACKGROUND ART

While a continuously annealed steel sheet and a hot dip plated steel sheet, especially a hot dip galvanized steel sheet, have so far been produced, in general practice, using different installations designed for the respective purposes, a dual-purpose installation for continuous annealing and hot dip plating or hot dip galvanizing to produce a continuously annealed steel sheet as well as a hot dip plated steel sheet in the single installation is proposed in Japanese Unexamined Patent Publication No. S55-6469 or Japanese Patent Application No. H11-5298.

Japanese Unexamined Patent Publication No. S55-6469 discloses a dual-purpose installation used for a hot dip plating line and a continuous annealing line, wherein a steel sheet coming out from a continuous annealing furnace is cooled in the normal atmosphere without being dipped into a plating pot when producing a continuously annealed steel sheet. However, since a steel sheet just coming out from a continuous annealing furnace has a high temperature, there is a problem in that the surfaces of the steel sheet will become oxidized if no countermeasures are taken. An idea has been proposed of installing a pickling apparatus for removing the oxide

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films on the surfaces. However, this requires additional equipment investment, the necessity of newly installing a waste liquor treatment facility and increased operational loads.

5 Japanese Patent Application No. H11-5298 discloses an apparatus to sufficiently lower the temperature of a steel sheet at the exit from a continuous annealing furnace so as to prevent the steel sheet from oxidizing when it comes out from the continuous annealing furnace  
10 and is exposed to the outside atmosphere. However, cooling a steel sheet to a temperature where it does not become oxidized when exposed to the normal atmosphere requires a larger cooling apparatus in the continuous annealing furnace and resultant increased equipment  
15 investment.

#### SUMMARY OF THE INVENTION

The present invention proposes measures to solve the above problems and make a dual-purpose installation for  
20 continuous annealing and hot dip plating or hot dip galvanizing to produce a steel sheet without incurring a large increase in equipment costs.

The gist of the present invention to solve the above problems is as follows:

25 (1) A dual-purpose installation for continuous annealing and hot dip plating wherein at least a continuous annealing furnace, a coating pot, a coating facility and a water quenching facility are arranged in the form of a processing line along the travelling  
30 direction of a steel sheet, characterized by having a bypass facility enabling a steel sheet to be led from the continuous annealing furnace directly to the water quenching facility without being exposed to the outside atmosphere and the interior of the bypass facility being  
35 kept filled with a non-oxidizing atmosphere.

(2) A dual-purpose installation for continuous

annealing and hot dip plating characterized by having an alloying furnace, a steel sheet cooling unit, or both of them proceeding to a coating pot and a coating facility and being equipped with the bypass facility according to the item (1).

(3) A dual-purpose installation for continuous annealing and hot dip plating according to the item (1) or (2), enabling the coating facility and the equipment in the coating pot to be transported and repaired and the production efficiency to be improved by installing the coating pot, the coating facility and a crane beneath the bypass facility.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic illustration showing a dual-purpose installation for continuous annealing and hot dip plating to which the present invention is applied.

#### THE MOST PREFERRED EMBODIMENTS

The present invention is explained in detail hereafter based on an example.

Fig. 1 is a schematic illustration of the annealing furnace portion of a dual-purpose installation for continuous annealing and hot dip plating or hot dip galvanizing to which the present invention is applied. A steel sheet 1 is annealed in a continuous annealing furnace 2. When producing a plated or galvanized product, the steel sheet 1 is fed to a coating pot 3 and plated after going through the continuous annealing furnace 2 as shown by dotted lines. Then, after the coating weight is controlled by a coating facility 4, the steel sheet is subjected to alloying treatment in an alloying furnace 5, as required, cooled by steel sheet cooling units 6, and then cooled further to near room temperature in a water quenching facility 7. The above sequence of process steps is exactly the same as the normal process sequence for

producing a hot dip plated or hot dip galvanized product.

When producing a continuously annealed steel sheet, the steel sheet 1 has to be cooled to near room temperature by the water quenching facility 7, without going through the coating pot 3, the coating facility 4, the alloying furnace 5 and the cooling units 6. However, if the steel sheet 1 is exposed to the outside atmosphere after going through the continuous annealing furnace 2, the surfaces of the steel sheet become oxidized. To avoid oxidization, a bypass facility 8 is installed in the present invention so that the steel sheet can travel from the continuous annealing furnace 2 directly to the water quenching facility 7 without being exposed to the outside atmosphere.

Since the interior of the bypass facility 8 is kept filled with a non-oxidizing atmosphere having, for example, a composition of 5 to 10% of  $H_2$  and 95 to 90% of  $N_2$ , which is the same atmosphere as that in the continuous annealing furnace, the steel sheet 1 can be transferred to the water quenching facility 7 and cooled without being oxidized. Further, by installing the coating pot 3, the coating facility 4 and a crane 9 beneath the bypass facility 8, it becomes possible to transport and repair the coating pot, the coating facility or the equipment in the coating pot during the production of a continuously annealed product, thus enhancing production efficiency.

#### INDUSTRIAL AVAILABILITY

As explained above, by applying the present invention to a dual-purpose installation for continuous annealing, hot dip plating and hot dip galvanizing, it becomes possible to eliminate a pickling facility for removing oxide films on the surfaces of a steel sheet after annealing. Further, it is also possible to transport and repair a coating pot, a coating facility and the equipment in the coating pot using a crane during

the production of a continuously annealed product, and thus enhance production efficiency.

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CLAIMS

1. A dual-purpose installation for continuous annealing and hot dip plating wherein at least a continuous annealing furnace, a coating pot, a coating facility and a water quenching facility are arranged in the form of a processing line along the travelling direction of a steel sheet, characterized by having a bypass facility enabling a steel sheet to be led from the continuous annealing furnace directly to the water quenching facility without being exposed to the outside atmosphere and the interior of the bypass facility being kept filled with a non-oxidizing atmosphere.

2. A dual-purpose installation for continuous annealing and hot dip plating characterized by having an alloying furnace, a steel sheet cooling unit, or both of them proceeding to a coating pot and a coating facility and being equipped with the bypass facility according to claim 1.

3. A dual-purpose installation for continuous annealing and hot dip plating according to claim 1 or 2, enabling the coating facility and the equipment in the coating pot to be transported and repaired and the production efficiency to be enhanced by installing the coating pot, the coating facility and a crane beneath the bypass facility.

1/1

Fig.1

