Sept. 16, 1941. W. M. QUIGLEY 2,255,859

METHOD OF CLEANING AND DRYING STRIP OR SHEETS

Filed April 28, 1939

FIG. 1.

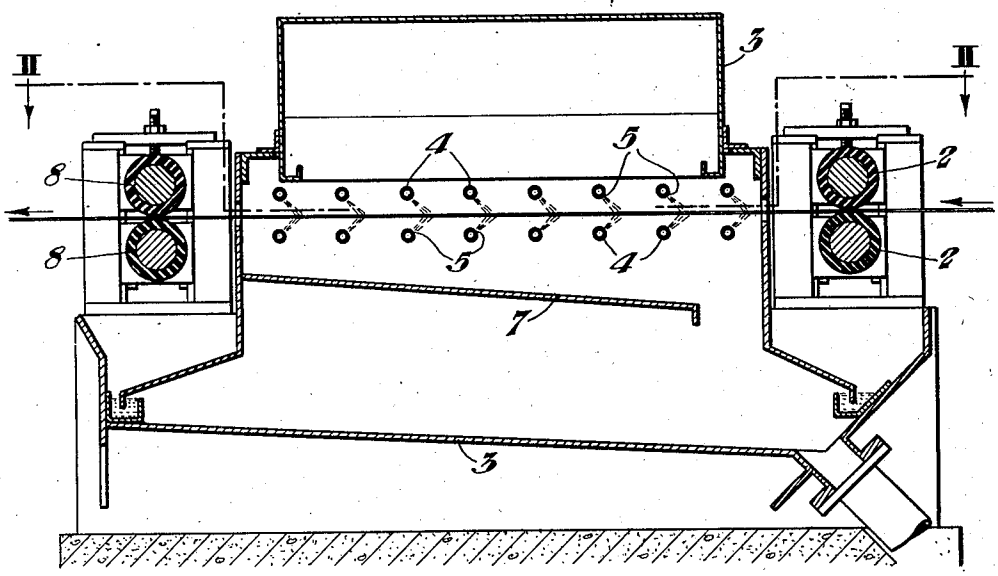
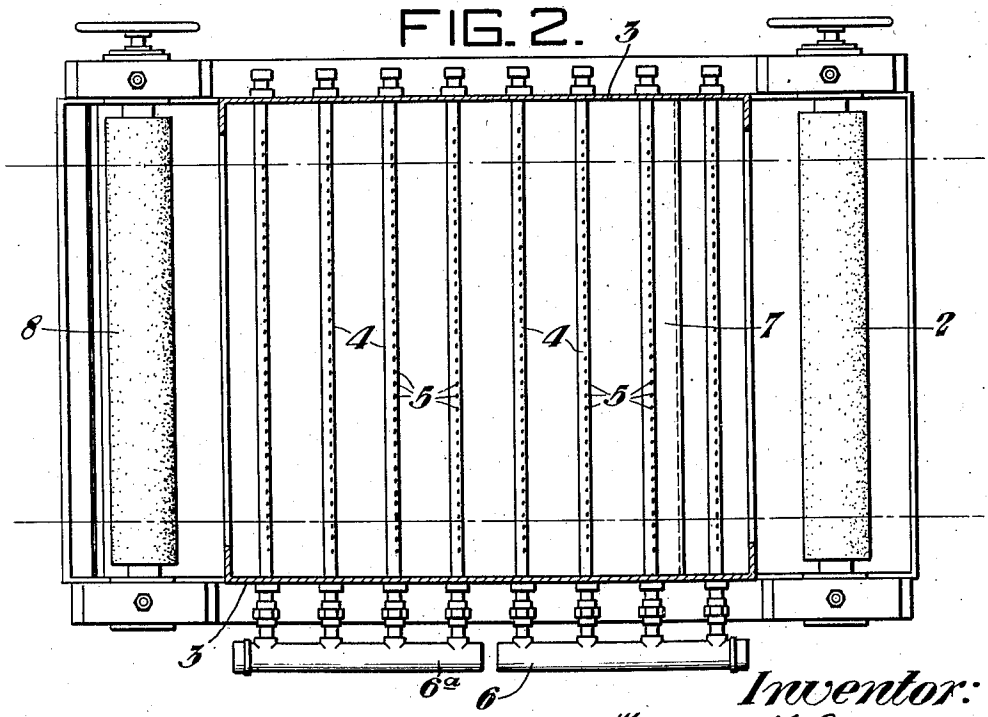


FIG. 2.



Inventor:
WINFRED M. QUIGLEY,
by: John E Jackson
his Attorney.

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METHOD OF CLEANING AND DRYING STRIP OR SHEETS

Winfred M. Quigley, West View, Pa., assignor to Carnegie-Illinois Steel Corporation, a corporation of New Jersey

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1 Claim. (Cl. 15—269)

The present invention relates to a method of cleaning and drying strip or sheets, and particularly those which are made of metal.

Heretofore, it has been the general practice to rinse foreign matter from the surface of metallic strip or sheets by means of water immersion or sprays, which step was followed by removing the excess water by squeegee rolls or wipers and the material then dried in one of several manners, for example, by means of the blast of hot air or by passing the material through a drying oven. The water available for said rinsing purpose generally contains in solution therein small amounts of salts, for example, carbonates etc., either present from natural sources or added in softening treatments of the same. During the drying step, such materials remain on the surface of the strip material and result in a stained appearance which, in a great many cases, is objectionable in a finished product.

An object of the present invention is to subject the surface of strip or sheets, and particularly those which are made of metal, to the action of a hot vapor for removing any foreign matter therefrom, and imparting such surface characteristics that they will immediately produce a dry surface free from drying stains.

Another object of the present invention relates to removing from the surface of strip or sheets any substance such as water containing dissolved salts and/or any traces of residual matter resulting from previous processing steps.

Still another object of the present invention is to subject the strip or sheets to successive stages of steam treatment to remove the foreign matter from the surfaces thereof, and at the same time gradually heat the same so that upon exposure to the atmosphere, any remaining moisture is immediately evaporated.

Other objects and advantages will become apparent as the description proceeds and reference is had to the accompanying drawing, in which:

Figure 1 is a sectional elevation of a form of apparatus which may be used to practice the method of the present invention; and,

Figure 2 is a sectional view on the line II—II of Figure 1.

The continuous strip or sheet being treated under the present invention may be fed from a brushing and scrubbing device (not shown) and enters the present apparatus for treatment by passage between rubber coated pinch rolls 2 positioned at the entrance end of the apparatus.

The improved drying apparatus of the present invention comprises a hood-like structure 3, within which are positioned a plurality of feeder pipes 4 arranged transversely of the travel of the material through the apparatus so as to direct steam on both surfaces of the strip material. These pipes are each provided with a plurality of nozzles or openings 5, whereby steam is ejected onto both surfaces of the material at such an angle as to impinge upon the surface of the material countercurrent to the passage of the strip material. This maintains a desired sweeping action on the surface of said material so as to remove the condensate resulting from the action of the steam ejected from the preceding pipes.

From the nozzles or openings of each pipe, steam which is ejected against the surface of the strip or sheet in the most effective manner condenses to provide a rinsing medium consisting of relatively pure water. This film of water resulting from the condensed steam, is swept from the surface by the impingement of the steam from the next succeeding jet. Under such a treatment, the strip or sheet is gradually heated by the transfer of heat from the steam as it passes through the successive stages of steam treatment, so that upon emerging from the apparatus, it contains sufficient heat to immediately evaporate the final film of moisture remaining on its surface.

Referring more particularly to Figure 2, it will be perceived that the pipes 4 which are adjacent the entry end of the hood-like structure are supplied with wet steam through a leader 6 to provide maximum condensation and washing effect on the surface of the material, while those pipes 4 which are adjacent the exit side of the hood-like structure may be supplied with dry steam through a leader 6a to provide maximum heating and drying effect upon the strip or sheet. This arrangement of a two-stage effect provides a maximum rinsing effect of the material adjacent the entry side of the hood structure and a maximum drying action to the material as it exits from said hood structure, thus minimizing the amount of moisture carried out of the hood structure on the surface of the material.

To take care of the condensed steam which may gather within the hood structure, an inclined catch basin 7 is provided beneath the lower feed pipes 4. Any conventional type of construction may be provided for catching and withdrawing the condensate.

At the exit end of the hood, there are provided rubber covered pinch rolls 8 which serve the purpose of substantially removing any moisture

which may remain on the material after passing the last set of nozzles.

While I have shown and described a certain specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claim.

I claim:

The method of cleaning and drying strip material or sheets which includes passing the same between a pair of squeegee rolls, applying to the surface thereof a film of low pressure wet steam directed at an angle which is countercurrent to its direction of movement, subsequently applying to the strip or sheet a film of high pressure steam at an angle which is countercurrent to its movement, and then passing the strip or sheet between a second pair of squeegee rolls.

WINFRED M. QUIGLEY.