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(54) **Spray unit.**

(57) A rolling mill has a number of spray units (14) for spraying lubricant liquid on to the rolls (12, 13) and the work (15) being rolled. Each unit consists of a header tank (16) carrying and communicating with an array of spray nozzles (17). In addition to being supplied with heated lubricant liquid, the header tank (16) is supplied with steam via 26 in order that any blocked nozzle (17) may be cleared. The header tank (16) also has mounted therein a steam heating pipe (22) which serves to keep contained lubricant liquid at elevated temperature should the tank be temporarily isolated from the liquid supply.

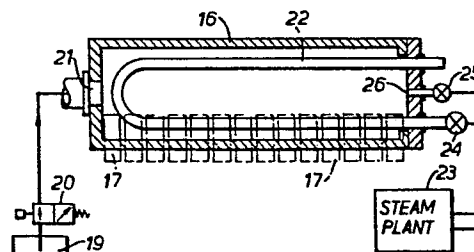


Fig. 4.

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SPRAY UNIT

This invention relates to a spray unit for discharging liquid at a rolling mill and for cooling or heating, and lubricating the rolls and material being rolled. The invention also relates to a rolling mill, particularly for rolling metal, having one or more such spray units.

When producing tin plate gauges, a water/oil emulsion is used. The emulsion is relatively unstable, the oil phase having a high fat content and a high setting temperature. If allowed to cool, the emulsion thus tends to separate into its component water and oil phases.

In order to camber the rolls thermally to control the strip shape, the temperature across a roll or rolls is varied by having a series of spray nozzles spaced along the roll barrel and selectively controlling the nozzles by isolating valves between the nozzles and a header tank from which the nozzles are supplied. The emulsion is circulated from a heated storage reservoir to the spray header tank or tanks at the mill stand and returned via the mill sump back to the reservoir. When strip is not being passed through the mill, the emulsion supply from the reservoir is isolated from the header tank or tanks and the emulsion remaining in each header tank loses temperature and separates into its component phases. There is then a danger that the valves of the spray nozzles may become inoperable due to build-up of fatty oil.

In the present invention, the header tank is provided with means enabling the spray-nozzles to be cleared should they become obstructed.

Thus, the present invention relates to a spray unit
5 for a rolling mill comprising a header tank which is adapted to be mounted adjacent the mill rolls and which has connection means by which spray liquid can be supplied to the header tank, and a plurality of spray nozzles connected to the header tank for selectively discharging spray liquid
10 from the header tank towards the mill rolls and is characterised in that there are additionally means and connections for supplying a gaseous fluid under pressure to the header tank for clearing any obstructed nozzle. The gaseous fluid is preferably steam which is effective in
15 removing from any obstructed nozzle any oil-based accretion.

Advantageously the header tank has heating means for heating spray liquid therein. Those means may be an immersion tube within the tank for the passage of a heating
20 medium, such as steam. By the use of the heater means, emulsion within the header tank may be kept at a temperature above that at which separation of the oil phase occurs.

Steam directed to the header tank and through the
25 nozzles may be employed to preheat the rolls and/or to camber the roll or rolls thermally.

The invention includes a rolling mill installation comprising a rolling mill having at least two rolls forming

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therebetween a roll gap, and a plurality of spray units as set out above mounted with their nozzles directed towards the roll gap, and means for supplying heated lubricant spray liquid to each of those spray units.

5 The invention will be more readily understood by way of example from the following description of a roll mill spray unit in accordance therewith, reference being made to the accompanying drawing, in which

 Figures 1 and 2 show a rolling mill stand
10 diagrammatically in end view and side view respectively, and

 Figures 3 and 4 are respectively a vertical section through a spray unit and a section on the line IV - IV of Figure 3.

15 In Figures 1 and 2, the rolling mill stand is represented by work rolls 12 and back-up rolls 13. Four spray units 14 are mounted on the two sides of the stand and above and below the strip 15 to direct emulsion into the roll gap. Each spray unit extends over the full barrel
20 length of the work rolls as shown in Figure 2.

 Each spray unit 14 consists of a header tank 16 (Figures 3 and 4) carrying a linear array of spray nozzles 17 pointed into the roll gap and communicating with the header tank interior through individual control valves 18
25 which are remotely controlled. Emulsion is pumped from a heated reservoir 19 through an isolating valve 20 to an

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input port 21 at one end of the header tank and is directed through nozzles 17 at the rolls 12 and strip 15.

A steam heating element in the form of a U-shaped pipe 22 is mounted in the other end of the header tank 16 and 5 extends as shown through the header tank interior. The heating element is connected with a supply of steam 23 through a control valve 24. During rolling and between rolling operations, steam is passed through the pipe 22 to maintain the liquid within the header tank at a temperature 10 above the setting temperature of the oil phase of the emulsion and thereby to prevent solid fatty particles separating out and causing blocking of the nozzles 17 and valves 18. The flow of emulsion to the header tank is controlled by valve 20 and may be on or off as required 15 during rolling.

When rolling is discontinued the header tank 16 and nozzles 17 may be cleaned out by opening the valves 18 and introducing steam from the supply 23 through a second steam valve 25 and an auxiliary inlet duct 26 into the header 20 tank interior.

Steam may also be introduced through duct 26 and discharged through nozzles 17 in order to preheat the rolls prior to rolling. Also, when the header tanks are not in use for spraying coolant, steam may be directed by nozzles 25 17 at the rolls during rolling so that, by selective operation of the valves 18, the temperature of the rolls 12 can be varied along their lengths in order to control strip shape by thermal cambering of the rolls.

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CLAIMS

1. A spray unit for a rolling mill comprising a header tank which is adapted to be mounted adjacent the mill rolls and which has connection means by which spray liquid can be supplied to the header tank, and a plurality of spray nozzles connected to the header tank for selectively discharging spray liquid from the header tank towards the mill rolls,

characterised in that there are additionally means and connections for supplying a gaseous fluid under pressure to the header tank for clearing any obstructed nozzle.

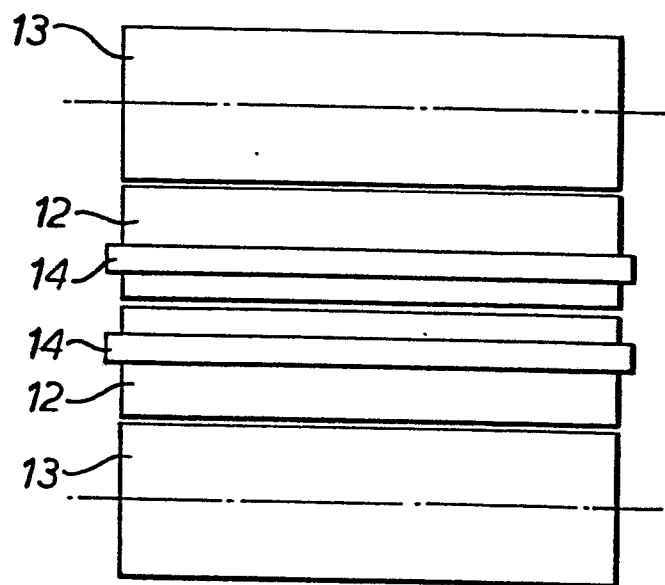
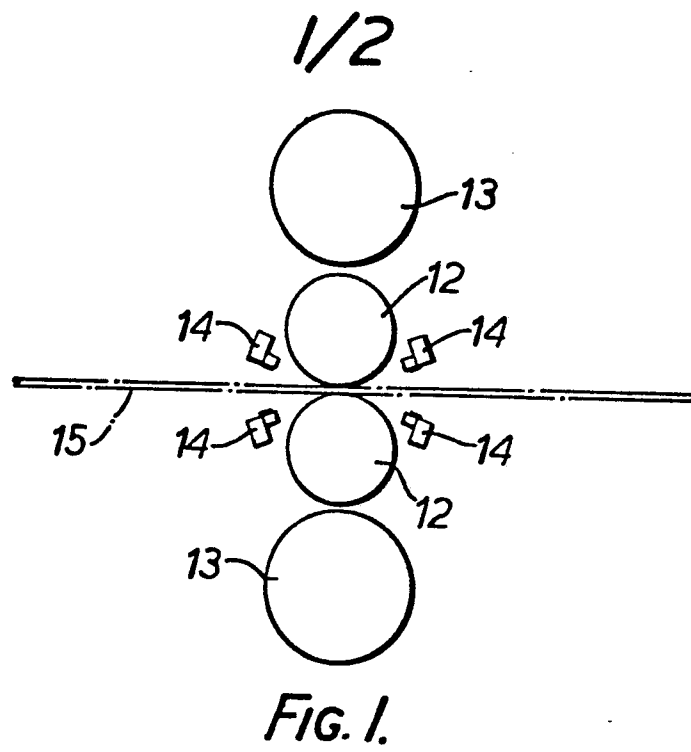
2. A spray unit according to claim 1, characterised in that the header tank has heating means for heating spray liquid therewithin.

3. A spray unit according to claim 2, characterised in that the heating means include an immersion tube within the tank for the passage of a heating medium.

4. A rolling mill installation comprising a rolling mill having at least two rolls forming therebetween a roll gap, and a plurality of spray units according to any one of the preceding claims mounted with their nozzles directed towards the roll gap, and means for supplying heated lubricant spray liquid to each of those spray units.

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5. A rolling mill installation according to claim 4, characterised in that the gaseous fluid is steam.



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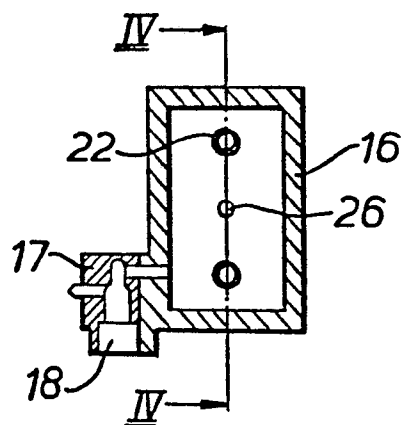


FIG. 3.

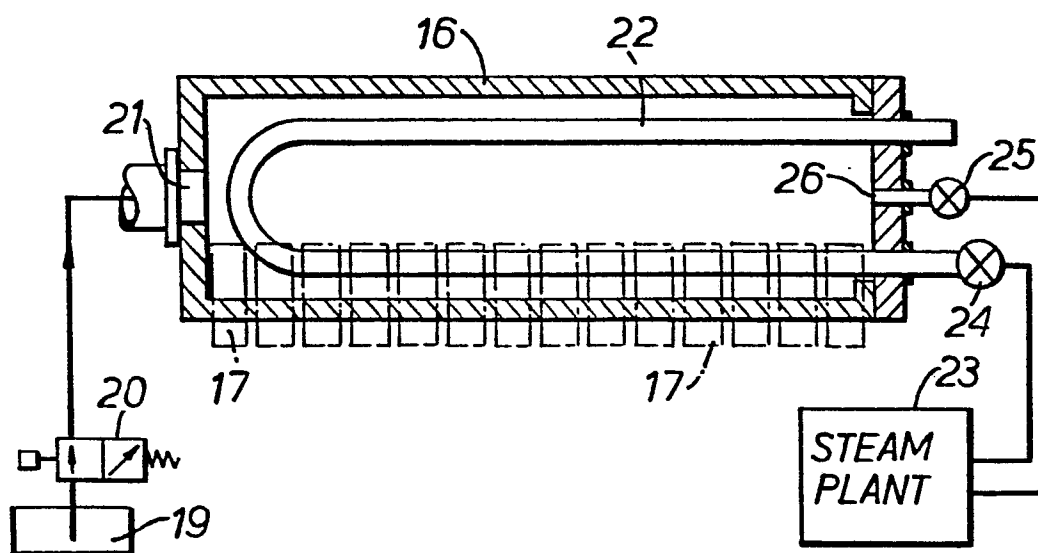


FIG. 4.



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>GB - A - 1 336 997 (FISONS)</u> * Page 1, lines 10-19; claims 1,6 * --	1,5	B 21 B 27/10 B 05 B 15/02// B 21 B 45/02
	<u>DE - C - 191 709 (KRAUTZBERGER)</u> * Claim * --	1-3,5	
	<u>US - A - 3 523 437 (BALES)</u> * Claim 1; figure 2 * --	2-5	TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
A	<u>FR - A - 2 380 083 (C.R.M.)</u> * Figures 3,4 * --	1,4	B 21 B B 05 B
A	<u>DE - A - 2 063 878 (SCHMID)</u> * Claim 1, figure 1 * --	1	
A	<u>GB - A - 1 433 490 (BRITISH STEEL)</u> * Claims 1,7 * --	1	
A	<u>US - A - 3 373 762 (KORCHAK)</u> * Claims 1,2 * ----	1	CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
☒ The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search		Date of completion of the search	Examiner
The Hague		16-09-1980	VERMEESCH