

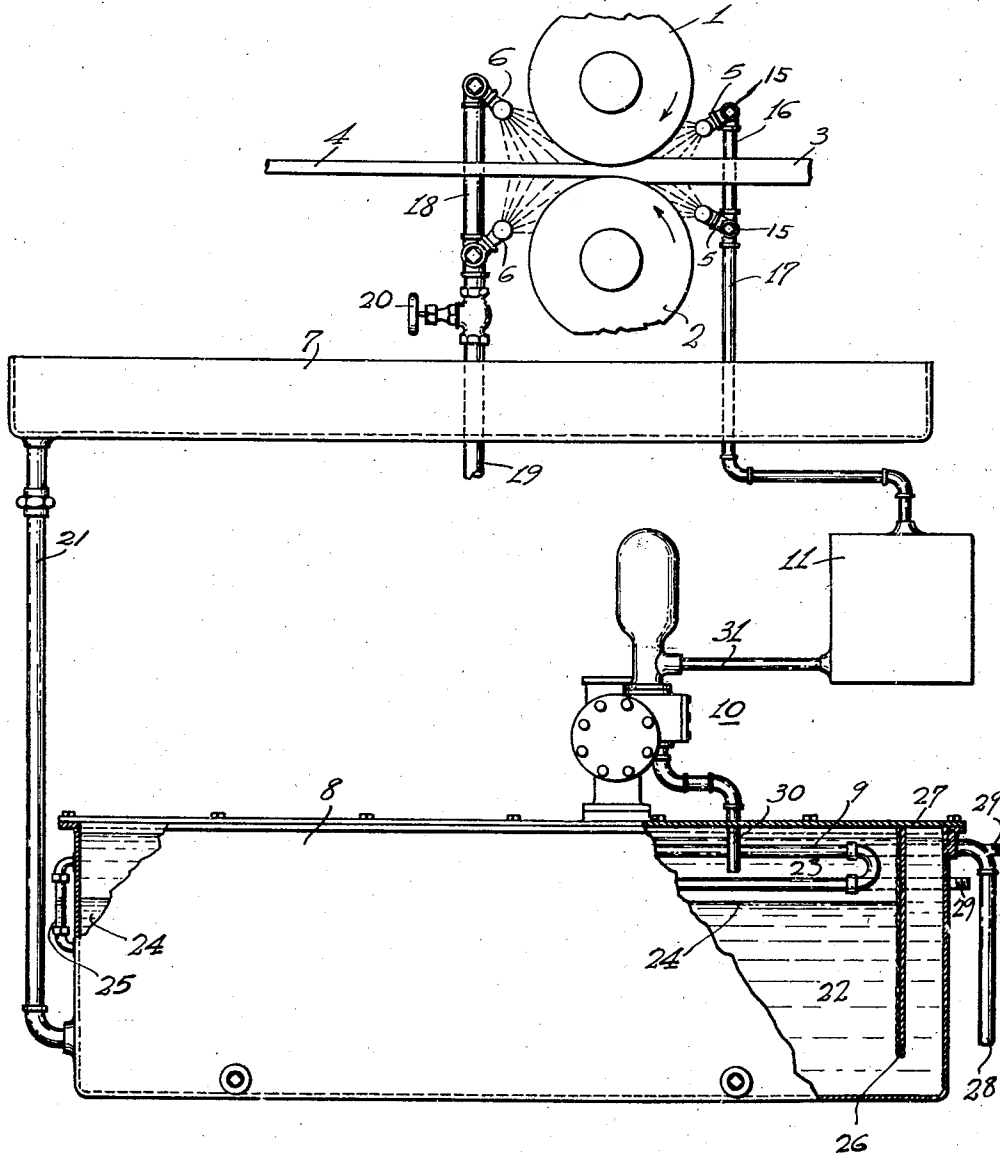
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LUBRICATING AND COOLING SYSTEM FOR ROLLING MILLS

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WITNESS

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LUBRICATING AND COOLING SYSTEM FOR
ROLLING MILLSWilliam T. Hurtt, Wilkinsburg, and Frederick G.
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3 Claims. (Cl. 80—1)

Our invention relates to lubricating and cooling systems and methods for rolling mills and the like and particularly to a continuously operating process and system therefor.

At present no attempt is being made in rolling mills and the like to recover a lubricant after it has become mixed with a coolant during the operation of the mill and both these materials are thus wasted, thereby encouraging the use of cheap unsatisfactory lubricants.

One object of our invention, therefore, is to lubricate and cool the rolls of rolling mills or similar apparatus with separate liquids or other suitable material and retrieve and use one of the liquids, preferably the lubricant, over again, thus permitting economical use of high-grade oil or other lubricant to thereby lengthen the life of the rolls, provide a better finish on the metal rolled, and require less power for operating the mill.

Another object of our invention is to provide a continuous process of lubrication and cooling by reclaiming the lubricant, such as oil, after separation from the coolant, such as water, and using the lubricant repeatedly.

A further object of our invention is to provide a simple and inexpensive apparatus for applying, by spraying or otherwise, both a lubricant and a coolant to a sheet of metal being rolled and to the rolls therefor, suitable apparatus being provided for collecting the combined liquid and separating the one ingredient from the other, the separated lubricant then being re-applied to the rolls and metal being rolled.

Another object of our invention is to provide an apparatus of the character set forth in which a lubricant, such as oil, and a liquid coolant, such as water, having different specific gravities, are separately applied to the rolling mill or the like, the combined liquid delivered therefrom being collected in a suitable tank to permit the oil to float on top of the water or heavier liquid, the oil then being pumped off to be re-applied to the rolling mill or the like.

Still another object of our invention is to provide an apparatus of the character set forth in which oil or other lubricant is applied at the entering side of the rolls and water or other coolant is applied at the leaving side of the rolls, the combined liquids drained off being collected and separated from each other and the more valuable lubricant then being returned to be applied again at the entering side of the rolls.

Other objects of our invention will become evident from the following detailed description taken

in conjunction with the accompanying drawing, wherein the single figure is a view in end elevation of an apparatus organized in accordance with our present invention for applying a lubricant and a coolant and reclaiming the lubricant for further use.

Referring to the drawing, the apparatus there shown comprises a pair of mating rolls 1 and 2 of a rolling mill, for example, which act upon a strip, sheet or bar of metal 3 to reduce its thickness, as indicated at 4, a plurality of devices 5 being provided for applying, preferably in the form of spray, a lubricant such as oil on the rolls and metal 3 to be rolled at the entering side of the rolls, while a plurality of devices 6 for applying a coolant such as water, preferably in the form of a spray, are provided at the leaving side of the rolls for cooling them and the reduced metal member 4.

A suitable pit or trough 7 may be provided for receiving or collecting the combined liquid delivered or drained from the metal member 3, 4, this combined liquid being delivered to a suitable settling tank 8 to permit the oil or other lubricant of relatively low specific gravity to float on top of the water or other coolant of higher specific gravity, a heating device 9 being inserted in the layer of oil, if desired, which is drawn up by a suitable pump 10 and passes through a suitable filter 11 to be re-applied to the rolls and metal member 3 through the sprays 5. It will be understood that any other apparatus for reconditioning the reclaimed oil may be introduced in the system, if desired.

While we have shown only a single pair of rolls 1, it will be understood that our invention may be readily applied to multiple sets of rolls in tandem, or to any other roll arrangement of a rolling mill as desired, and the metal 3 being passed through the rolls for the purpose of reducing the thickness and improving the surface thereof may be of any usual form or character, as will be understood.

For applying the oil or other lubricant to the metal member 3 and the rolls 1 and 2 at the entering side thereof, a plurality of spray heads 5 may be connected to suitable manifolds 15 extending parallel to each roll, the lubricant being supplied under pressure to such manifolds through pipes 16 and 17, the latter communicating with oil filter 11.

Suitable spray devices 6 for spraying water or other coolant on the reduced metal 4 and the rolls 1 and 2 at the leaving side thereof may be of a perforated type and extend as desired par-

allel to the surfaces of the rolls. Water or other coolant is supplied through pipes 18 and 19, the flow thereof being controlled by a suitable valve 20, for example.

5 A separate receiving pit or trough 7 for the combined lubricant and coolant delivered from or drained off the metal members 3 and 4 and the rolls 1 and 2 may be provided, as shown. In the drawing, a pipe 21 is shown as delivering the liquid from pit or trough 7 to tank 8. The size of tank 8 should be sufficient to hold, for example, a 10 five-minute supply of cooling water as passed over the metal member and the rolls. It will be understood that the larger the tank or pit 8 the longer will be the separating period for the 15 mixed oil and water.

As indicated in the showing of tank 8, the coolant or water 22 being of higher specific gravity settles toward the bottom of the tank, while the oil or other lubricant 23 being of lighter specific gravity rises to the top and floats above the layer of water 22. The line of demarcation between the layer of oil 23 and of water 22 is indicated by the reference character 24. In order to readily 25 indicate where the layer of oil ends and the layer of water begins, a suitable gauge glass 25 is provided at one side of the tank, having its upper and lower inlet respectively above and below the level 24 constituting the lowermost level of the oil 23. 30

The amount of oil in the system should be sufficient to insure that the end suction of the pump 10 working through the intake pipe 30 is a desirable distance above the surface 24 of water 22. 35

Since under ordinary conditions it is not necessary or economical to attempt to use the cooling water 22 over again, the excess volume of such water may be automatically drained off, as indicated, through the use of a vertical baffle 26 40 extending from the top plate 27 of tank 8 down to within a relatively short distance of the bottom of the tank, while a drain pipe 28 communicates with the tank 8 near the top thereof at the end beyond the baffle 26. In this way, all of the oil in the tank floats to the top of the water at one side of the baffle 26, whereas the excess water passes underneath the baffle, up the adjacent side 45 of the tank and thence into the drain pipe 28.

50 In some cases, it may be desirable to heat the oil 23 in the tank 8 before attempting to re-apply it to the rolls and metal being rolled, and to this end, a coil of steam pipes 9 having suitable external connections 29 may be utilized, if desired.

55 As previously noted, the suction intake pipe 30 of the pump 10 extends through the cover plate 27 of the tank 8 into the layer of oil 23, terminating a suitable distance above the top level 24 of the water 22, and the pump 10, which may be

of any suitable character, delivers this separated oil through a pipe 31 into oil filter 11, or other reconditioning device, if such is employed, and thence through pipes 17 and 16 to the oil spraying devices 5, thus using the separated oil over again 5 for lubrication purposes.

It will thus be seen that we have provided a relatively simple but extremely effective apparatus and method for lubricating and cooling rolls and metal to be rolled, for example, the combined 10 fluid resulting from the application of the lubricant and coolant being then separated in a settling tank and the oil used over again. In this way, it is economical to employ high grade roll oils, while at the same time the lubricating efficiency of the oil is not impaired, since it floats 15 to the top of the layer of water in tank 8 and only oil is drawn off said tank. The use of this better grade of roll oil will serve to lengthen the life of the rolls, provide better finish on the metal being rolled and require less power for operating the mill. 20

We do not desire to be restricted to the specific structural details or arrangement of parts herein set forth, as various modifications thereof may be effected without departing from the spirit and scope of our invention. We desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims. 25

We claim as our invention:

1. The combination with a rolling mill roll, of means for respectively applying both a lubricant and a coolant directly to the rolling surface of said roll, means for receiving the combined lubricant and coolant delivered from said rolling surface and for separating said lubricant and coolant, and means for delivering one of them to the corresponding first means. 30 35

2. The combination with a pair of rolls for rolling material passing therebetween, of means for respectively applying both a lubricant and a coolant directly to the rolling surfaces said rolls and said material, means for receiving the combined lubricant and coolant delivered from said rolling surfaces and said material and for separating said lubricant from said coolant, and means for delivering one of them to the corresponding applying means. 40 45

3. The combination with a pair of rolls for rolling material passing therebetween, of means for respectively applying both a lubricant and a coolant on said material, means for receiving the fluid comprising the combined lubricant and coolant delivered from said material, means for separating said lubricant out of said fluid, and means for redelivering such separated lubricant to the corresponding applying means. 50 55

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CERTIFICATE OF CORRECTION.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 42, claim 2, before the word "said" insert of; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of February, A. D. 1939.

Henry Van Arsdale.

(Seal)

Acting Commissioner of Patents.