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TEMPERATURE REGULATING APPARATUS FOR HEATED ROLLS

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Fig. 1

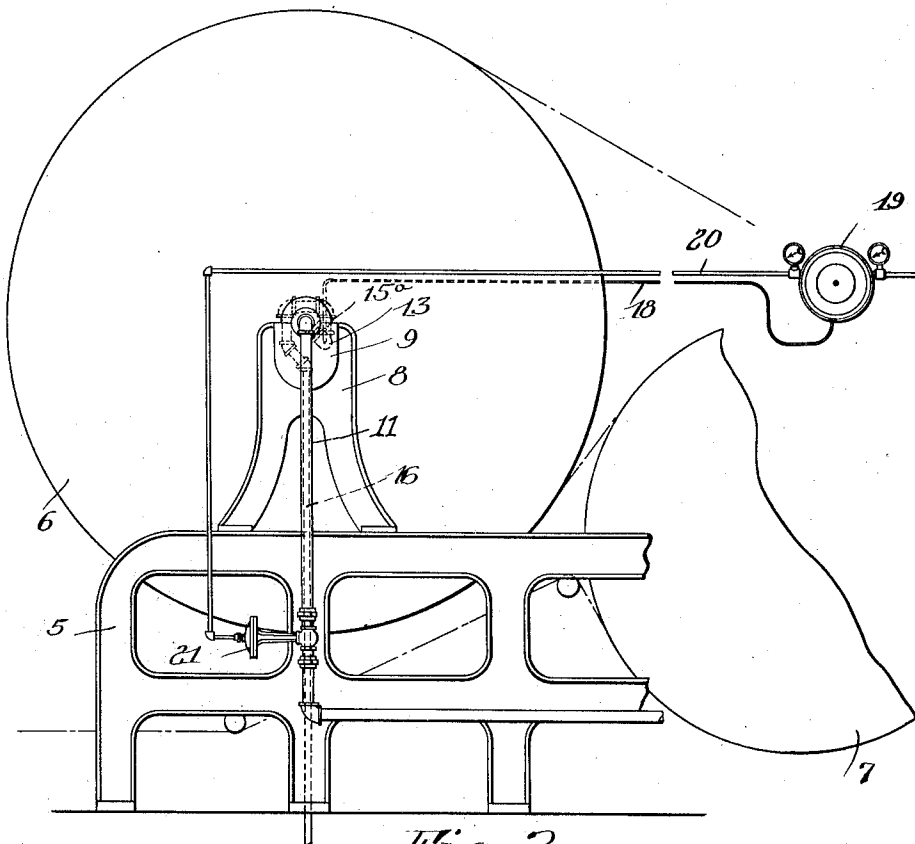
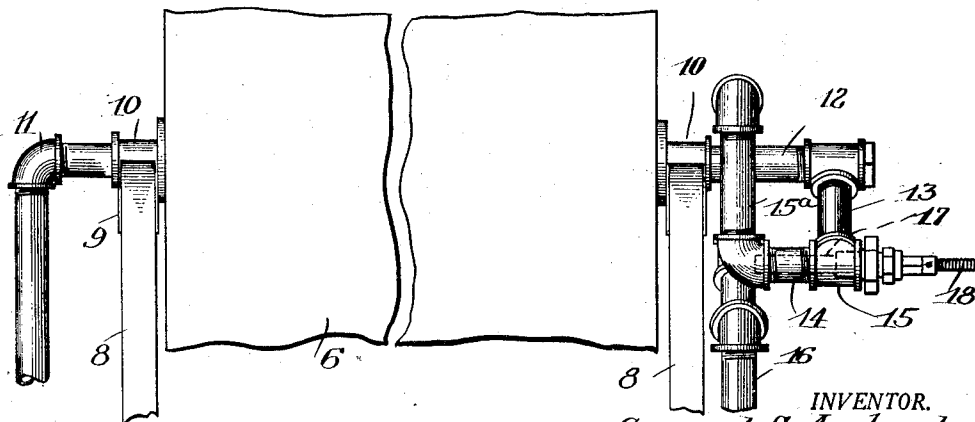


Fig. 2



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TEMPERATURE-REGULATING APPARATUS FOR HEATED ROLLS.

Application filed August 24, 1922. Serial No. 584,152.

To all whom it may concern:

Be it known that I, SAMUEL S. AMDURSKY, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Temperature-Regulating Apparatus for Heated Rolls; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference numerals marked thereon.

This invention relates to apparatus for regulating the temperature of heated rolls and, more particularly, to apparatus for automatically controlling the flow of a temperature controlling medium to heated rolls such as are employed, for example, in the slasher machines used in the cotton textile industry, paper drying machines, calendaring machines, mill rolls and the like, the chief object of the invention being to provide a practical, efficient and inexpensive apparatus for accurately and automatically controlling the temperature of such rolls. To these and other ends the invention consists in certain improvements and combinations of parts all as will hereinafter be more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a view of a portion of a slasher machine showing the rolls in end elevation with the present invention applied thereto;

Figure 2 is an enlarged side elevation of one of the rolls partly broken away and showing the details of this apparatus.

Similar reference numerals throughout the several views indicate the same parts.

The invention is capable of application, as indicated above to a variety of uses, being embodied in the present instance in a slasher machine such as commonly employed in the cotton textile industry. This embodiment, which is disclosed herein, of course, merely by way of illustration, comprises hollow heated rolls over which the warp of the

cloth is passed after being coated with sizing, for drying the same. Such rolls require to be maintained at a sufficient temperature to dry the sizing completely and uniformly, but if overheated produce a premature hardening of the surface of the sizing retarding the drying operation. The rolls are therefore maintained at a temperature within certain definite limits and it is desirable to provide means for automatically governing the supply of temperature controlling medium to the roll in accordance with the temperature thereof to regulate the latter within the desired limits. The rolls are preferably heated by steam admitted to the interior of each roll adjacent one end thereof and discharged adjacent the other end.

The rotary movement of the roll complicates the problem of measuring its temperature as a part of the function of such regulating apparatus, and various constructions have been suggested for solving this problem which have generally proven, however, either impractical in construction or inaccurate in operation. It has been found, however, that the desired result may be accomplished in accordance with the present invention by a simple and effective form of mechanism, sufficiently accurate for practical purposes, in which the temperature of the roll is measured by measuring the temperature of the controlling medium discharged from the roll adjacent the latter and regulating this supply of medium to the roll in accordance with such temperature.

Referring more particularly to the drawings there is shown at 5, Figure 1, one side frame of a slasher machine on which heated rolls 6 and 7 are rotatably mounted as by means of pairs of bearing pedestals 8. As the invention may be applied to any number of rolls in the same manner, the application to a single roll 6 described in the present instance. The pedestals 8 are provided with bearing blocks 9 in which are rotatably supported trunnions 10 extending from the ends of the roll. The temperature controlling medium is preferably supplied to the

roll at one end and discharged therefrom at the opposite end and in the present instance this is accomplished by utilizing hollow trunnions for the roll and supplying the temperature controlling medium, or steam, to the interior of the roll at one end through a conduit 11 passed through the bore of the corresponding trunnion 10. The steam is discharged at the opposite end of the roll through a conduit or pipe 12 having its end inserted through the bore of the corresponding trunnion, so that the steam is supplied to the interior of the roll at one end, passes therethrough to heat the same and is discharged therefrom at its opposite end through conduit 12.

For the purpose of measuring the temperature of the medium discharged through conduit 12, the latter is preferably extended first downwardly a short distance and then upwardly to form a trap, passing thence downwardly to the exhaust or other disposition. For this purpose conduit 12 has connected therewith a conduit or pipe section 13 extending downwardly and to one side as shown and connected at its lower end with a horizontal section 14 by means of a T-connection 15 in which the temperature measuring element is located as more particularly described hereafter. The other end of pipe 14 is connected with an upwardly extending section 15^a which is continued by means of suitable connections over the pipe 12 and downwardly through a pipe 16 carried to the point of disposal.

The connection 15 of the trap described above is provided with a nipple or other fitting adapting it for the reception of a thermometer bulb 17 inserted and lying in the pipe section 14, or in other words in the bottom of the trap. The bulb has connected therewith a capillary tube 18 forming part of a transmission system preferably of the expansive fluid filled variety for producing a thermostatic effect at a point remote, if so desired, from the location of the bulb. It is to be understood, of course, that the exhaust steam discharged from the roll passes through pipe 14 in contact with the bulb or else is condensed and collected in the trap in the form of water having substantially the temperature of the discharged steam and of the interior of the roll.

The regulating device may be of any suitable variety, being preferably of the type shown and described in the Letters Patent to George Karst, No. 1,351,426 granted Aug. 31, 1920, for valve mechanism. Such regulating devices are well known in the art, requiring no description in detail further than to say that actuating means such as a fluid pressure line 20 is regulated by an auxiliary valve therein (not shown) operated by thermostatic means including the sensitive element or bulb 17, as well understood

in the art. The fluid pressure line 20 communicates with an automatic valve, in the present instance of the familiar diaphragm variety, shown at 21. This valve is interposed in the steam supply conduit 11 to govern the supply of steam through the roll to the latter.

In operation the steam or other medium is supplied to the roll through conduit 11 and after heating the latter is discharged therefrom through conduit 12 and its trap in which it comes in contact with the sensitive thermostatic element 17 located in the latter. This element influences the regulating device to open or close the valve 21 governing the supply of medium to the roll, so that when the latter becomes cool the valve 21 is open to increase the volume of medium supplied and vice versa.

The invention is applicable of course to apparatus involving the use of other temperature controlling mediums, such as hot water, and also the use of a cooling medium as employed in conjunction with the mill rolls where the roll is heated by the work and requires cooling. As apparent from the description the present apparatus is practical and inexpensive in character, obviating the necessity for inserting the thermostatic element within the rotating drum or otherwise connecting the same with a moving part and the location of the element is close enough to the drum itself to measure the temperature of the latter with sufficient accuracy for all practical purposes.

I claim as my invention:

1. The combination of a revoluble roll to be regulated, means for supplying a temperature controlling medium to the interior thereof, means for discharging said medium therefrom, governing means for said supply means, and an automatic regulating device comprising a temperature responsive element subjected to the temperature of said discharge means and connected with said governing means for regulating the latter in accordance with said temperature.

2. The combination of a revoluble roll to be regulated, a conduit for supplying a temperature controlling medium to the interior thereof, a conduit for discharging said medium therefrom, an automatic valve governing said supply conduit, and a regulating device comprising a sensitive thermostatic element located in said discharge conduit and a connection with said valve for automatically governing said supply conduit in accordance with the temperature of the medium discharged from said roll.

3. The combination of a revoluble hollow roll to be regulated, trunnions on the ends of said roll having passages therethrough communicating with the interior of the latter, bearings for said trunnions, a conduit for supplying a temperature controlling

medium through the trunnion at one end of said roll, a conduit for discharging said medium from the trunnion at the other end of said roll, an automatic valve governing said supply conduit, a sensitive thermostatic element located in said discharge conduit, and a regulating device actuated by said sensitive element and connected with said valve for actuating the latter and automatically governing the supply of said medium in accordance with the temperature of the medium discharged. 10

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