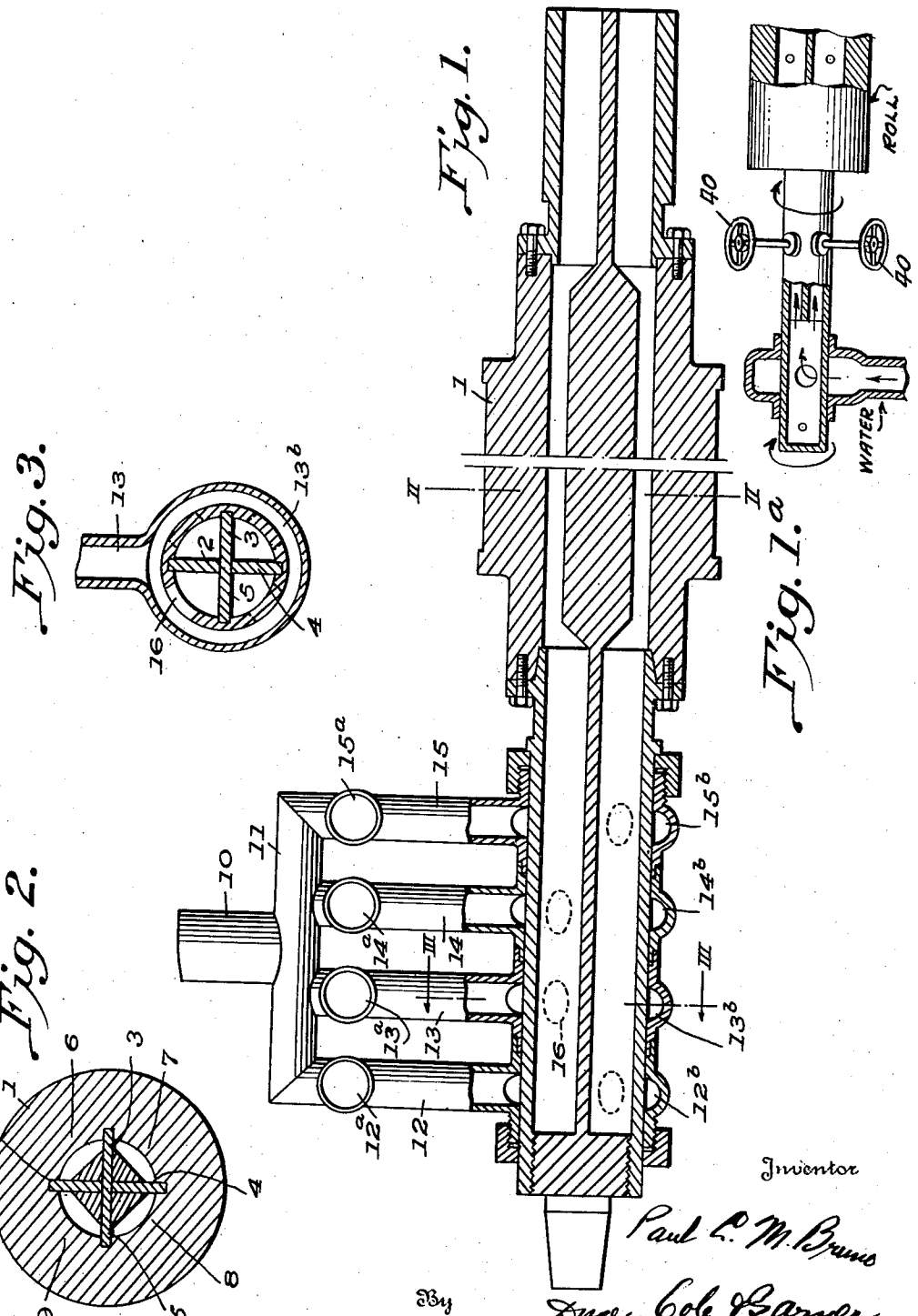
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APPARATUS FOR CONTROLLING THE DISTORTION OF ROLLS

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APPARATUS FOR CONTROLLING THE DISTORTION OF ROLLS

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In the glass industry, and particularly in the continuous manufacture of glass plate, use is made of a train of metal rollers, the temperature of which is generally regulated by a current of water traversing the interior of the one or more of the rollers

Known cooling devices are attended with a certain number of defects. It often occurs that the rollers, by reason of their constitution, their method of manufacture, the thermal shocks to which they are subjected, or for any other reason, become expanded or distorted through the action of the heat of the glass, and the expanded portions are not the same between the different longitudinal zones of the rolls.

These differences in longitudinal expansion result in serious deformations which render the operation of the rollers inefficient. For example, if the rolls of a machine for rolling plate glass are involved the latter will be of irregular or uneven thickness.

The present invention relates to a method of cooling the rollers whereby the defects of known apparatus are eliminated. This method consists in varying the cooling action from one longitudinal zone of the roller to another, the different zones thus differentiated from the cooling standpoint also being selected and changed as desired. The cooling can also be regulated in each zone.

By the means and method of cooling the rollers in accordance with the present invention it is possible to regulate the cooling so as to cool the more highly heated zones to a greater degree and thus obviate the differences in longitudinal expansion.

Figure 1 is a sectional view of a form of the device in which the interior of the roll is subdivided into compartments.

Figure 1ª is a view illustrating a system of controlling the admission of cooling fluid to the rolls.

Figures 2 and 3 are sectional views on II—II and III—III, respectively, of Figure 1.

The roll 1 is rotated by means of the gears 1ª and 1ᵇ or any other suitable means. The end of the roll remote from the water source 10 is continued outwardly beyond the roll 1 and terminates in a water exit as shown in Figure 1, delivery of the cooling fluid being made to a trough or other appropriate means.

In the embodiment shown on Figures 1 to 3, the interior of the roll 1 is subdivided into four parts by the longitudinal partitions 2, 3, 4 and 5, so as to form four distinct passages for the cooling water, respectively, along the longitudinal zones 6, 7, 8 and 9 of the roll. These four passages are regulated individually as to their cooling action, by acting for example on the rate of circulation of the fluid in each of them.

As shown on the embodiment of Figure 1, this individual regulation may be realized by having a common water source 10 feeding a manifold 11 from which pass the pipes 12, 13, 14 and 15, which in turn feed the four cooling passages of the roller. The pipes are provided with valves 12ª, 13ª, 14ª and 15ª for effecting the desired regulation.

In order to feed each cooling circuit of the roller continuously while permitting rotation of the latter, use may be made of an arrangement such as that shown, in which pipes 12, 13, 14 and 15 empty into hollow annular members 12ᵇ, 13ᵇ, 14ᵇ and 15ᵇ interfitting at their edges like stuffing boxes and encompassing the outer portion of the roller. The inner chamber of each of these members communicates individually with one of the passages of the roller through openings such as 16, Figs. 1 and 3.

By means of the valves 12ª, 13ª 14ª and 15ª the cooling effect can be regulated in the longitudinal zones 6, 7, 8 and 9. This effect may also be modified during the course of operation, whereby it is possible to neutralize deformations due to unequal longitudinal expansion which occurs unexpectedly.

In order to facilitate these regulating operations the different compartments defined in part by the partitions 2, 3, 4 and 5, as well as the corresponding water inlets, may be marked off. A mark is likewise provided on the glass at each revolution of the roller so as to determine the exact position of the generatrice or the deformed zone with respect to the position of the roller compartments.

The device disclosed can obviously be constructed with numerous modifications. The different cooling passages may be fed from a common source as shown, or each passage may be provided with a valve or closure member at its inlet or exit as shown in Figure 1ª. In the latter case the closure members 40 rotate with the roll but as the rotational rate of the latter is low it is possible therefore to actuate the closing members to modify the cooling regulation during the operation of the rolling machine. This construction is particularly applicable where the interior of the roll is divided into a plurality of compartments and analogous to the system shown in Figure 1.

Moreover, instead of acting on the circulation of the cooling fluid, action may be exerted on its temperature, character, etc.

It is to be understood that the present invention is not limited to the constructions shown and described by way of example only, but includes all modifications based on the same principle.

In the case of coupled rolls with parallel axes co-operating for working glass, for example, rolling glass plate, the two rollers may be constructed so as to be cooled according to the method of the invention. It is, however, possible to have only one roller cooled according to this method, the other being constructed in the usual manner. The latter may become deformed in any manner, and the roller of the present invention is given a deformation corresponding to that of the ordinary roller, whereby the interval which separates the two rollers may be maintained constant and a glass plate free from defects produced.

Finally, the invention is applicable not only to rotating members employed in the manufacture or treatment of glass objects, but also to other rotary members, for example rotary molds of the type employed for the centrifugal casting of pipes, and rolling mills in the steel industry.

It may also be used where the rotating members, instead of being traversed by a cooling fluid, are traversed by a heating fluid, for example, steam, oil, etc.

What is claimed is:

1. In apparatus for controlling the distortion of rotating rolls due to the application of heat thereto, the combination of a hollow rotating roll, longitudinal partitions within the roll dividing the interior thereof into a plurality of chambers, means for introducing a temperature controlling fluid to each of said chambers and means for variably controlling the rate of flow of the fluid in one or more of said chambers.

2. In apparatus for controlling the distortion of rotating rolls due to the application of heat thereto, the combination of a hollow rotating roll, partitions within the roll dividing the interior thereof into a plurality of chambers, means for individually introducing a temperature controlling fluid to each of said chambers, a header common to said means, and means for variably controlling the rate of flow of the fluid in each of said chambers.

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