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METHOD OF TREATING ROLLS FOR USE IN THE MANUFACTURE OF ORNAMENTAL FLAT GLASS

Filed June 24, 1931

Fig. 1.

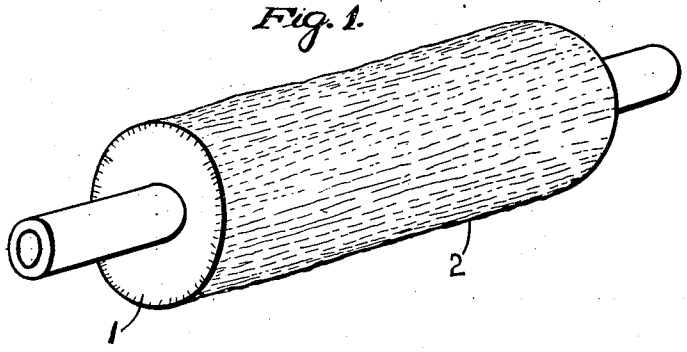


Fig. 2.

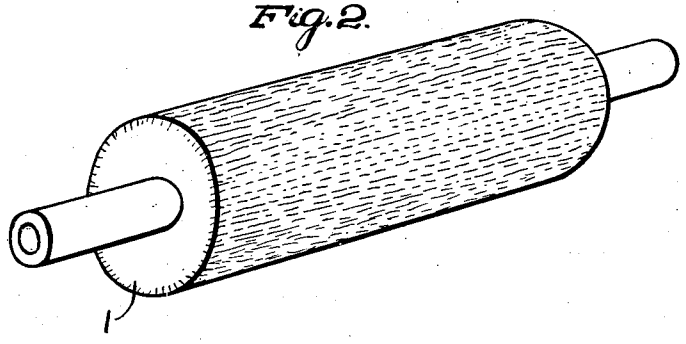
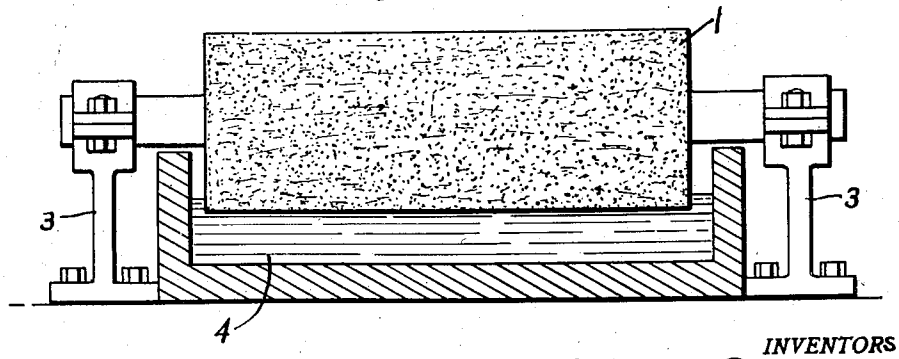


Fig. 3.



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METHOD OF TREATING ROLLS FOR USE IN THE MANUFACTURE OF ORNAMENTAL FLAT GLASS

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6 Claims. (Cl. 29—148.4)

The invention relates to a method of making rolls for use in the process of the Gelstharp patent No. 1,531,089 of March 24, 1925. Such process had as its objective the manufacture of a certain type of ornamental flat glass by a rolling process wherein the surface configuration of the rolls was applied to the surface of the glass sheet being rolled. In order to secure the desired surface on the rolls, such rolls were kept in service in the regular manufacture of rough plate glass (subsequently ground and polished) until their surfaces became worn and assumed a granular or pebbled appearance, and it is this appearance which is produced on the glass sheet passing between the rolls. This wearing condition has been referred to as "bringing out the grain of the metal," and while this may not be correctly descriptive of what happens in the wearing operation, it serves in giving a conception as to the desired surface condition of the rolls.

One of the difficulties incident to the formation of the rolls in the manner described in the patent, is the long period of time required to produce rolls having the desired surface ornamentation, many months' service being required to produce the necessary roughening or graining, and in this long period of service, the rolls often become cracked or warped so as to be unserviceable for the desired purpose. Another difficulty arises in making two successive sets of rolls having substantially the same surface configuration, so that it is hard to maintain a uniform product or to match up glass made at different periods.

The purpose of the present invention is to provide a process of making or preparing the rolls whereby the desired surface can be made within a reasonable time and whereby one set of rolls can be easily made to conform in surface with that of another set of rolls, so that a standard of ornamentation, when once established, can be maintained. The invention is illustrated in the accompanying drawing in which Fig. 1 is a perspective view showing in a greatly exaggerated degree the roughened surface of the roll, which is also filled with fine cracks or checks after being used in service. Fig. 2 is likewise a perspective view showing the roll after it has been machined to remove the film of oxide formed thereon in service but leaving the fine checks or cracks. And Figure 3 is a side view partially in elevation and partially in section showing the roll supported in a bath of acid where it is etched to develop the desired surface configuration.

The best results are secured by the use of gray cast iron as the material of the rolls 1 and by using a relatively low annealing temperature, preferably below 1100 degrees F., although the invention is not limited to these particular conditions. The cast iron rolls first have their surfaces machined, after which they are put in service sizing a glass sheet as it emerges from a tank, the rolls being water cooled in the usual way during this period of service. In the course of time, usually two to three months, the surface of the rolls become worn rough and covered with fine checks which clearly show the grain or crystallization of the iron. This surface condition is indicated at 2 in Fig. 1 in a greatly exaggerated manner.

The rolls are now transferred to the machine shop and placed in a lathe where the surface is turned up smooth, Fig. 2, thus removing a thin film of oxide which forms on such surface during the period of service. This gives a smooth surface, but one which is still penetrated by the fine checks or cracks due to the previous use of the roll in service. The next step in the procedure is an acid etching one, the rolls being mounted for rotation, as indicated at 3 in Fig. 3, so that their lower surfaces are dipped into an acid bath 4. The acid used is commercial strength muriatic acid, but the invention is not limited to the use of this particular acid. The period of contact with the acid is continued long enough to develop the desired degree of corrosion, the acid penetrating the fine checks and producing an etching effect which would not otherwise be secured. The rolls are finally washed with clean water, using a fiber scrubbing brush to aid in cleaning and the roll is mopped and dried by heat.

What we claim is:

1. A method of treating rolls of ferrous composition for use in the manufacture of glass, which consists in first rolling glass in sheet form with said rolls until the rolls are roughened so as to show the grain of the metal, removing the rolls from service and machining their surfaces to remove the film of oxide formed thereon, but leaving the fine cracks developed therein and then etching the rolls by rotating them in a bath of acid which penetrates into said checks or cracks.

2. A method of treating rolls of ferrous composition for use in the manufacture of glass, which consists in first rolling glass in sheet form with said rolls until the rolls become worn rough and covered with fine checks or cracks showing the grain or crystallization of the metal, removing the rolls from service and turning them up smooth to remove the film of oxide formed there-

on, but leaving the checks or cracks developed therein, and then etching them in a bath of acid which penetrates into said checks or cracks.

3. A method of treating rolls of ferrous composition for use in the manufacture of glass, which consists in first rolling glass in sheet form with said rolls until the rolls become worn rough and covered with fine checks or cracks showing the grain or crystallization of the metal, removing the rolls from service and turning them up smooth to remove the film of oxide formed thereon, but leaving the checks or cracks developed therein, and then etching them in a bath of acid by rotating them therein, said acid penetrating into the checks or cracks.

4. A method of treating rolls of ferrous composition for use in the manufacture of glass, which consists in first rolling glass in sheet form with said rolls until the rolls are roughened so as to show the grain of the metal, removing the rolls from service and turning them up smooth to remove the film of oxide formed thereon, but leaving the checks or cracks developed therein and finally etching the rolls in a bath of acid which penetrates into the checks or cracks.

5. A method of forming a roll which consists in casting it of gray cast iron, rotating the roll in contact with molten glass until the roll is roughened so as to show the grain or crystallization of the metal, removing the rolls from service and machining their surfaces to remove the film of oxide formed thereon, but leaving the checks or cracks developed therein and then etching the rolls by rotating them in a bath of acid which penetrates into the checks or cracks.

6. A method of forming a roll which consists in casting it of gray cast iron, annealing the roll at a temperature below 1200 degrees F., rotating the roll in contact with molten glass until the roll is roughened so as to show the grain or crystallization of the metal, removing the rolls from service and machining their surfaces to remove the film of oxide formed thereon, but leaving the checks or cracks developed therein and then etching the rolls by rotating them in a bath of acid which penetrates into the checks or cracks.

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