

[54] METHOD AND APPARATUS TO PREVENT MELTED YARN WHEN STOPPED IN A HIGH TEMPERATURE YARN TEXTURING JET

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[58] Field of Search 28/1.4, 62, 63, 64, 71.3, 28/72.12

[56] **References Cited**

UNITED STATES PATENTS

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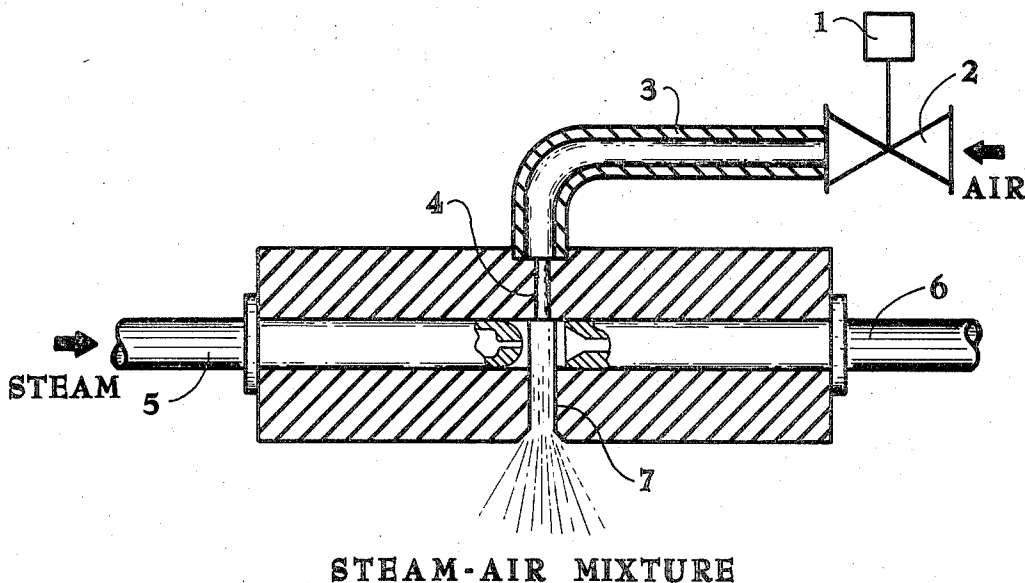
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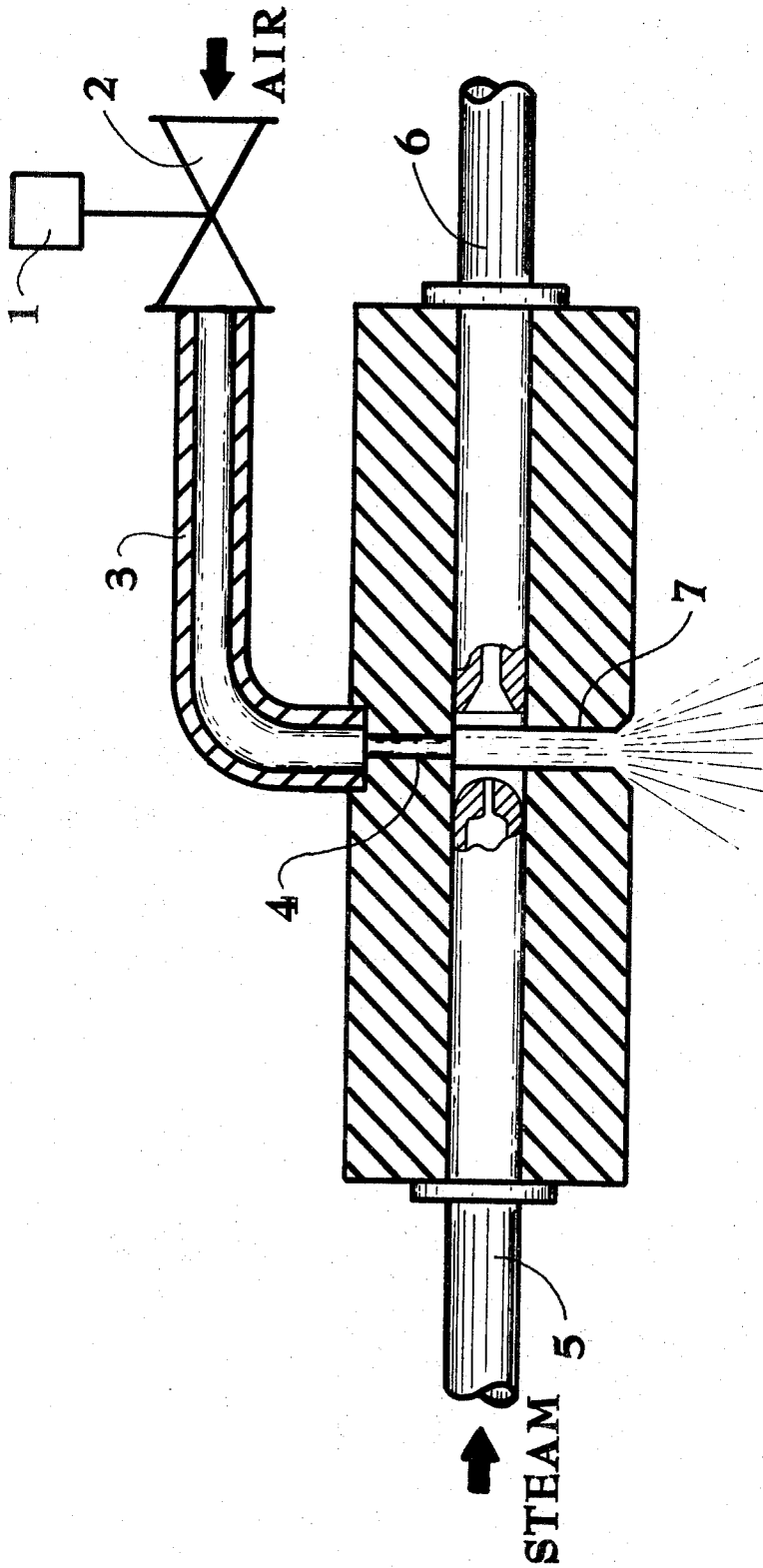
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[57] **ABSTRACT**

Apparatus and method are disclosed to prevent melted yarn when stopped in a high temperature texturing jet device having high temperature fluid (such as steam) flowing across a yarn entry slot. The invention comprises sensing yarn stoppage with a sensor and actuating a valve in a high pressure conduit communicating with an orifice opposite the yarn entry in the texturing jet device and diverting and diluting the high temperature fluid (such as steam) flowing across the yarn entry slot out of the texturing jet device through the yarn entry slot with high pressure fluid (such as air) so that elements in the texturing jet device downstream from the yarn entry are no longer heated by high temperature fluid.

4 Claims, 1 Drawing Figure





STEAM-AIR MIXTURE

METHOD AND APPARATUS TO PREVENT MELTED YARN WHEN STOPPED IN A HIGH TEMPERATURE YARN TEXTURING JET

BACKGROUND OF THE INVENTION

This invention relates to apparatus and method to prevent melted yarn when stopped in a high temperature yarn texturing jet such as the one shown in U.S. Pat. No. 3,409,956 to Longbottom, et al., hereby incorporated by reference.

The prior art high temperature fluid, such as steam, texturing jets such as the above-mentioned Longbottom jet are presently used to texture a continuous running length of nylon yarn to bulk it so that it can be tufted or woven into carpets. These prior art jets use superheated steam at a temperature greater than the yarn melting point. When the yarn is in motion, heat transfer to the yarn is insufficient to melt it. However, process interruptions due to many different causes can occur. Any process interruption which causes the yarn to stop in the jet may cause the yarn to melt in the jet. The jet must then be removed and cleaned to remove the melted polymer by solvent or other means. The melted yarn causes prolonged down time of a portion of the continuous yarn texturing process in addition to the expense of cleaning the jet.

SUMMARY OF THE INVENTION

This invention consists of a device attached to a high temperature yarn texturing jet such as the one disclosed in the above-mentioned Longbottom et al. patent. The device provides a blast of high pressure fluid, such as air, to divert the high temperature fluid, such as steam, out of the jet texturing device. The method to prevent melted yarn when stopped in the high temperature yarn texturing jet device having high temperature fluid, such as steam, flowing across a yarn entry comprises: sensing the yarn stoppage with a sensor and actuating a valve in a high pressure fluid conduit communicating with an orifice opposite the yarn entry in the texturing jet device and diverting the high temperature fluid flowing across the yarn entry with a blast of high pressure fluid, such as air, so that the high temperature fluid, such as steam, is diverted out of the texturing jet device through the yarn entry. Some of the high temperature fluid (steam) may continue across the yarn slot, but is diluted and cooled by the high pressure fluid (air). Thus, the elements in the texturing jet device downstream from the yarn entry, as shown in the Longbottom patent, above, are no longer heated by the high temperature fluid (steam) when the yarn stops. This prevents yarn, which is trapped in the high temperature texturing jet device when the yarn stopped, from melting. The preferred high pressure fluid is air and the preferred high temperature texturing fluid is steam. Other fluids such as nitrogen or carbon dioxide could replace steam and water, nitrogen or any cooling fluid could replace air. The apparatus to prevent melted yarn when stopped in a high temperature texturing jet device having a high temperature fluid flowing across a yarn entry comprises: a sensor to detect yarn stoppage which actuates a valve in a high pressure fluid conduit communicating with an orifice drilled opposite the yarn entry in the high temperature texturing device so that upon actuation of the valve by the sensor a blast of high pressure fluid, such as air, diverts any

high temperature fluid, such as steam, flowing across the yarn entry in the texturing jet device out of the jet texturing device through the yarn entry. The preferred sensors are a feeler arm or roller situated to contact the continuous running length of yarn as set forth in U.S. Pat. No. 3,438,188 to Boggs, hereby incorporated by reference, or a device sensing roll stoppage. The sensor may be coupled electrically or by other means to a solenoid valve or similar means for controlling the flow of high pressure fluid to the orifice in the texturing jet. Other means of sensing yarn stoppage are optical or electrical capacitance sensors well known in the art. By "orifice" is meant a single orifice or a series of orifices arranged to divert and dilute the high temperature fluid out of the texturing jet device. By yarn "entry" is meant a slot, hole or any opening to allow entrance of yarn to the texturing jet device.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE shows a cross section view of the device of this invention attached at the proper position opposite the yarn entry of a yarn texturing jet device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The FIGURE shows the apparatus of this invention attached in its proper position, opposite the yarn entry slot in a jet texturing device such as that shown in the above-mentioned Longbottom patent. The device in the Longbottom patent is modified by leaving off the yarn entry tube and providing only a yarn entry slot 7. The device of this invention is located so that orifice 4 is directly opposite yarn entry slot 7 on a line which substantially intersects the flow of high temperature fluid. The sensor 1, such as a feeler arm described in the above mentioned Boggs patent, senses when the yarn is stopped and actuates a valve 2 in high pressure fluid conduit 3, thereby providing a blast of high pressure fluid, such as air, through orifice 4 to divert and dilute any high temperature fluid such as steam flowing from steam entry tube 5 across yarn slot 7 out through yarn entry slot 7 as a steam and air mixture rather than downstream into energy tube 6. Thus, any yarn stopped in energy tube 6 or other elements (not shown) downstream from yarn slot 7 will no longer be heated so that the yarn can cool rather than melt after it stops.

An extended trial with the device of this invention using a texturing jet similar to the above mentioned Longbottom jet but without the yarn entry tube and only a yarn entry slot which is that shown in the FIG. 7, compared to the prior art device, shows an improvement in the jet replacement rate of from 15 percent of the stoppages down to only 3 percent replacement of jets due to melted yarn in the jet after stoppage.

I claim:

1. A method to prevent melted yarn when stopped in high temperature yarn texturing jet device having a high temperature fluid flowing across the yarn entry comprising
 - sensing yarn stoppage with a sensor, and
 - actuating a valve in a high pressure fluid conduit communicating with an orifice opposite said yarn entry in said texturing jet device, and
 - diverting and diluting any undiverted said high temperature fluid flowing across said yarn entry out of

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said texturing jet device through said yarn entry with said high pressure fluid so that elements in said texturing jet device downstream from said yarn entry are no longer heated by said high temperature fluid.

2. The method of claim 1 wherein said high pressure fluid is air and said high temperature fluid is steam.

3. An apparatus to prevent melted yarn when stopped in a high temperature yarn texturing jet device having a high temperature fluid flowing across a yarn entry comprising

a sensor to detect yarn stoppage which actuates a

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valve in a high pressure fluid conduit communicating with an orifice drilled opposite

said yarn entry in said high temperature texturing jet device so that upon actuation of said valve by said sensor a blast of high pressure fluid diverts and dilutes any undiverted said high temperature fluid flowing across said yarn entry in said texturing jet device out of said texturing jet device through said yarn entry.

4. The apparatus of claim 3 wherein said sensor is a feeler arm situated to contact said yarn.

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