

[54] **METHOD AND APPARATUS FOR
CLEANING CALIBRATED NOZZLES**

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[22] Filed: **Oct. 25, 1970**

[21] Appl. No.: **84,632**

[30] **Foreign Application Priority Data**

Nov. 25, 1969 Switzerland..... 17508/69

[52] U.S. Cl..... **134/37, 15/316, 73/37.7,
73/160**

[51] Int. Cl. **B08b 5/02, G01b 13/04**

[58] Field of Search..... **73/37, 160, 37.5-37.9,
73/182; 15/316; 134/37**

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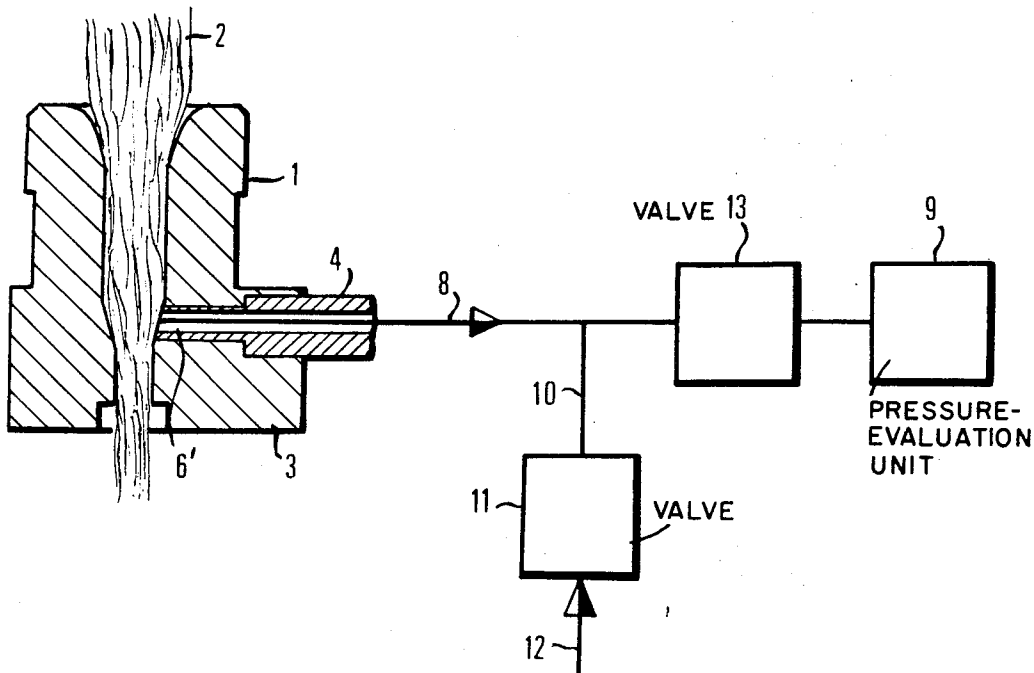
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ABSTRACT

Method and apparatus for cleaning of calibrated nozzles for obtaining measurements corresponding to the substance cross-section of a sliver of textile material, wherein the sliver is guided through a constricted nozzle with pneumatic pressure being evaluated as the measured quantity. The method of cleaning includes introducing a pressure surge into a measuring line leading to the nozzle with a pressure-evaluation unit so as to blow out deposits blocking the nozzle. The apparatus includes a second line leading into the measuring line and admitting a pressure surge into the measuring line.

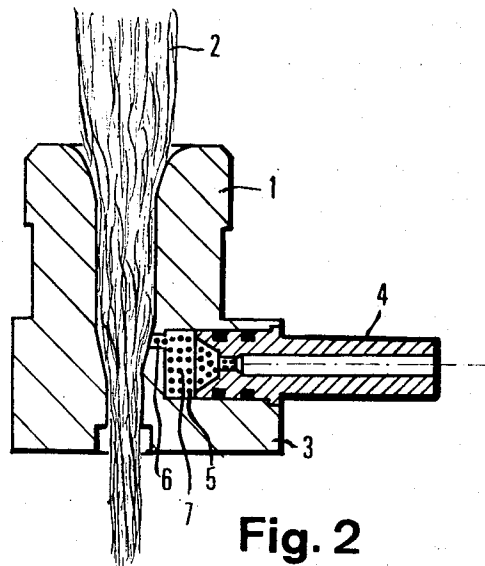
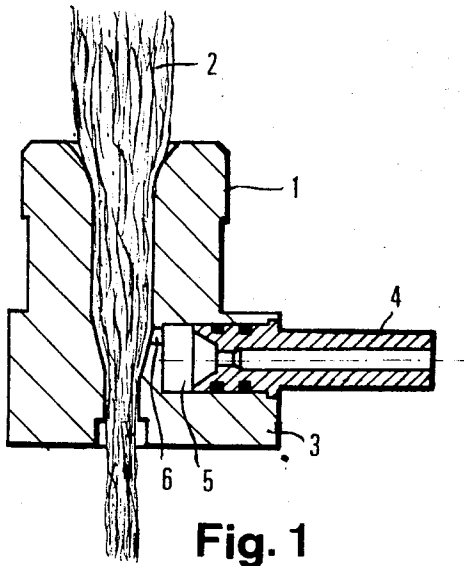
7 Claims, 5 Drawing Figures



Patented Aug. 14, 1973

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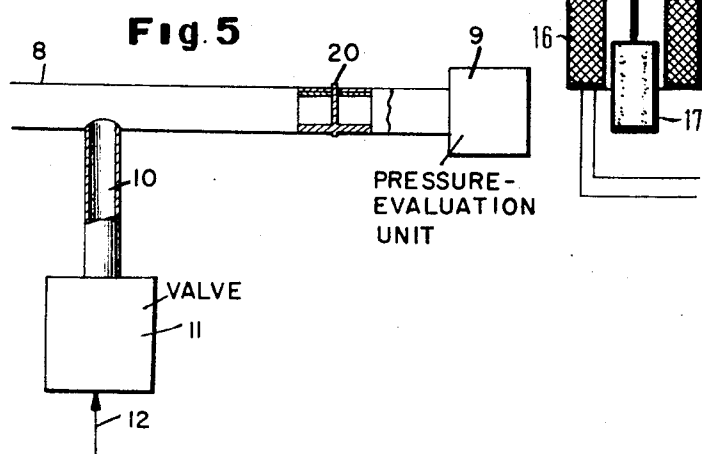
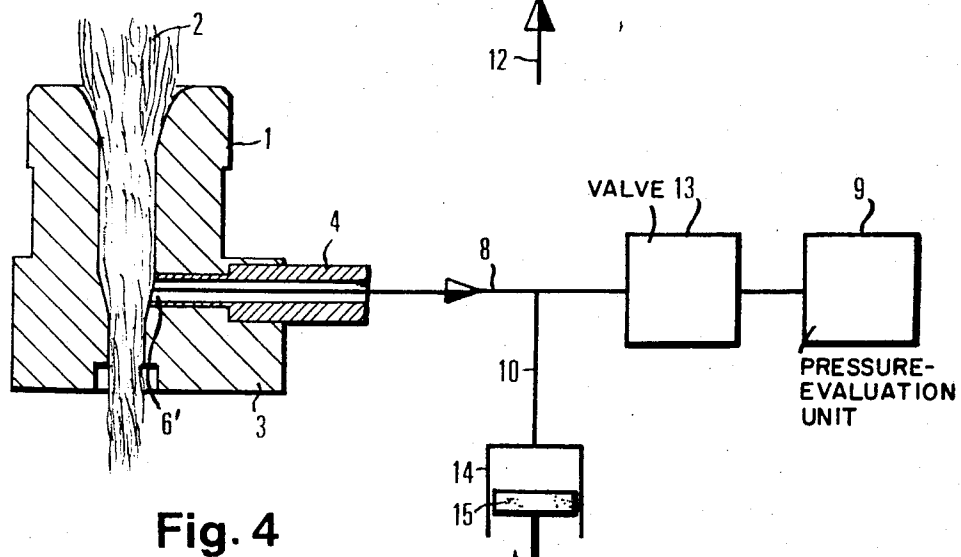
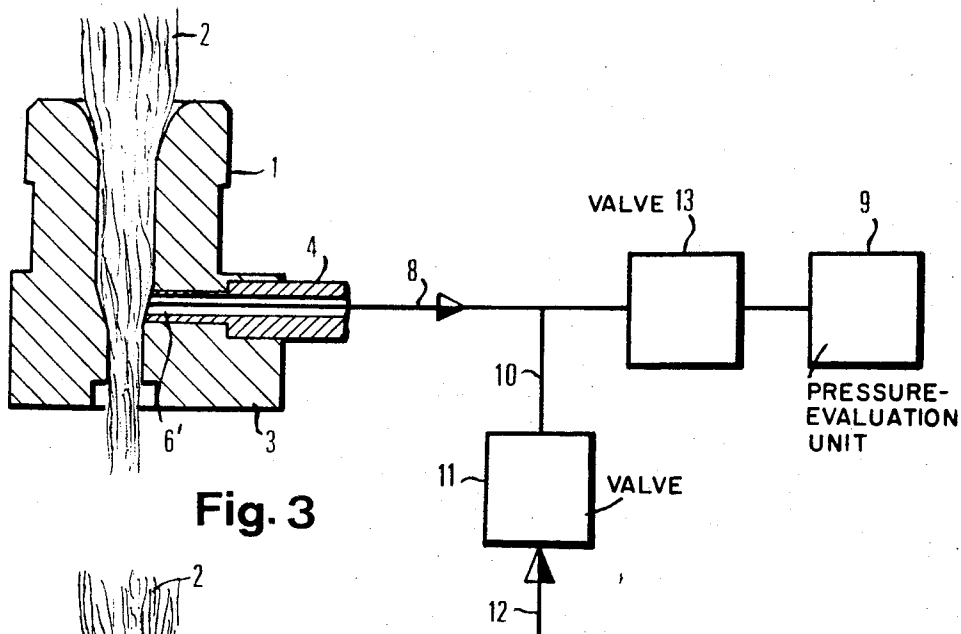
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METHOD AND APPARATUS FOR CLEANING CALIBRATED NOZZLES

BACKGROUND OF THE INVENTION

The present invention relates to the cleaning of calibrated nozzles and is an improvement in or modification of the invention described in British Pat. No. 1,137,297 or Canadian Pat. 989,281 or U.S. Pat. No. 3,435,673.

The aforementioned patents describe a method of obtaining measurements corresponding to the substance cross-section of textile material, slivers in particular, wherein the textile material is guided through a nozzle having a constriction with pneumatic pressure generated at the constriction being evaluated as the measured quantity.

The above patents also describe an apparatus for carrying out this method, comprising a nozzle through which the textile material travels and which tapers in cross-section in the direction of travel of the textile material, wherein the nozzle comprises a chamber between two planes lying one behind the other in the direction of travel, extending vertically of its axis, and a manometer connected to the chamber.

Unfortunately, it has been found that, dirt and fiber particles from the textile material can be deposited in the opening of the above-described nozzle which communicates with a manometer with the result that this opening becomes blocked over a period of time. This in turn results in increasing falsification of the measured quantity. Accordingly, the nozzle has to be removed for cleaning at certain intervals, thereby substantially interrupting the production cycle.

SUMMARY OF THE INVENTION

An object of the present invention is to obviate the above-mentioned problems and disadvantages by providing that the present invention, which is an improvement in the above-described method, introduces a pressure surge into a measuring line leading to the nozzle with a pressure-evaluation unit, by which deposits blocking the calibrated nozzle are blown out.

The present invention also provides an improvement in the apparatus of the above-cited patents comprising a measuring line leading to the nozzle and a second line leading into the measuring line through which a pressure surge can be admitted into the measuring line.

BRIEF DESCRIPTION OF THE DRAWING

These and further objects and features of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawing which shows, for purposes of illustration only, several embodiments in accordance with the present invention and wherein

FIG. 1 is a sectional view illustrating a calibrated nozzle and connecting socket for a measuring line.

FIG. 2 is the same view of the measuring nozzle with extraneous matter deposited in the connecting socket.

FIG. 3 is a view of the calibrated nozzle with measuring line and a pressure-medium line.

FIG. 4 is a modification of the arrangement shown in FIG. 3.

FIG. 5 is a partial view of a further modification of the arrangement shown in FIG. 3.

DETAILED DESCRIPTION OF THE DRAWING

Referring now to the drawing and, in particular, to FIG. 1, there is shown a calibrated nozzle 1 with sliver 2 passing through it. A lateral extension 3 has a connecting socket 4 to which a manometer or pressure gauge can be coupled through a hose such as shown, for example, in FIG. 3. A bore 6 establishes a connection between a channel forming the calibrated nozzle 1 and a chamber 5 for accommodating the connecting socket 4. FIG. 2 shows how after a certain period of operation the bore 6 and the chamber 5 become, to some extent, filled with dirt and fiber particles 7 so that the pressure conditions prevailing in the bore 6 cannot be propagated freely and, in some cases, only with delay into the measuring line coupled to the socket 4.

FIG. 3 shows the measuring nozzle with the measuring line 8 connected to it and a diagrammatically illustrated pressure-evaluation unit 9. According to the invention, a line 10 communicating through a valve 11 with a pressure medium 12 carrying compressed air, for example, is introduced into the measuring line 8. The bore 6 and chamber 5 as shown in FIGS. 1 and 2 are replaced by a bore 6' of constant diameter with the result that any deposits of dirt obstructing this bore 6' are ejected as a whole into the sliver. By opening the valve 11, compressed air is admitted through the line 10 and the measuring line 8. The compressed air escaping towards the calibrated nozzle 1 forces the deposits of dirt 7 in the chamber 5 and the bore 6' into the sliver 2 by which they are carried away. The quantity of impurities blown out is so small that they do not affect the sliver 2 in any way. The measuring line 8 is now free again and measuring can proceed without interruption. In the event of continuous sliver passage the surge of compressed air must, of course, be very brief because no measurements can be made during this period.

Since the compressed air surge admitted through line 10 into the measuring line 8 naturally spreads out to both sides, the pressure-evaluation unit 9 has to be protected in some cases by another valve 13. This valve 13 is controlled in such a way that it closes when the valve 11 opens and after the valve 11 has closed remains closed for a predetermined period until the excess pressure prevailing in the measuring line 8 has collapsed through the bore 6 into the calibrated nozzle 1.

However, other solutions are also conceivable in which, instead of another valve, the line leading to the pressure-evaluation unit simply contains a diaphragm as seen in FIG. 5. Following this diaphragm, a self-controlling excess-pressure valve is installed in the line. In this way, the pressure surge spreading out towards the pressure evaluation unit can be damped and rendered harmless by blowing out from the excess pressure valve.

If no pressure medium line 12 is available, a pressure surge can be produced locally by an arrangement shown in FIG. 4. To this end, a cylinder 14 with a piston 15 is connected to a plunger magnet 17 which is surrounded by a coil 16. The plunger magnet 17 is raised by exciting the coil 16 so that the plunger 15 displaces the air present in the cylinder 14 through the line 10 into the measuring line 8. In this case too, the other valve 13 can be actuated by a control means in such a manner that the pressure generated by the piston 15 is not active towards the pressure-evaluation unit 9.

Local production of a compressed air surge as illustrated in FIG. 4 can be applied both to each individual calibrated nozzle and also in the form of a common auxiliary unit for example to an installation comprising several calibrated nozzles.

Apparatus as described in the above-cited patents are preferably used in machines of the kind found in the spinning industry, especially drawing frames. In these machines, the processed fiber material is deposited into cans which have to be changed after they have been filled to a certain extent. To this end, the output of the spinning station in question is also interrupted. It is of particular advantage to blow out the calibrated nozzles during these brief stoppage periods because in this way measuring and monitoring of the continuously produced sliver do not have to be additionally interrupted.

The ejection of deposits in the bore 6' can also be carried out while the sliver 2 is passing through the calibrated nozzle. To this end, the measurement has to be briefly interrupted, wherein the measurement obtained immediately before the interruption being stored and the measurement continued after pressure has been equalized in the measuring line 8.

While I have shown and described several embodiments in accordance with the present invention, it is to be clearly understood that the same is susceptible of numerous changes and modifications as will be apparent to one skilled in the art. I, therefore, do not wish to be limited to the details shown and described herein, but intend to cover all such changes and modifications as are encompassed by the scope of the present invention.

I claim:

1. Method for cleaning of calibrated nozzles for obtaining measurements corresponding to the substance cross-section of a sliver of textile material, comprising admitting a pressure surge into a measuring line connecting the nozzle to a pressure-evaluation unit through first valve means, blowing out the deposits blocking a bore of the nozzle by means of the pressure surge, and blocking the measuring line by second valve means in the direction of the pressure-evaluation unit at least for the duration of the pressure surge.

2. Method according to claim 1 further including the step of keeping the second valve closed, on completion of the pressure surge, until excess pressure produced by the pressure surge in the measuring line has diminished.

3. Method according to claim 1, wherein the pressure surge is admitted at times when the actual measurement is interrupted for an operational purpose.

4. In combination with at least one calibrated nozzle connected to a pressure-evaluation unit by way of a measuring line for obtaining measurements corresponding to the substance cross-section of a sliver of textile material passing therethrough, apparatus for cleaning said calibrated nozzle comprising a source of surge pressure, line means for selectively admitting said surge pressure from said source to said measuring line, first valve means arranged in said measuring line means between the pressure evaluation unit and the admitting line means and second valve means arranged in said admitting line means for selective connection of said source to the measuring line means, said first and second valve means being operationally associated with each other for synchronous operation.

5. Apparatus according to claim 4, wherein the second valve means closes when the first valve means is opened and remains closed, after the first valve means is closed, for a predetermined period until the excess pressure in the measuring line means has collapsed.

6. Apparatus according to claim 4, wherein the second valve means closes when the first valve means is opened and remains closed, after the first valve means is closed, for a predetermined period until the excess pressure in the measuring line means has collapsed.

7. In combination with at least one calibrated nozzle connected to a pressure-evaluation unit by way of a measuring line for obtaining measurements corresponding to the substance cross-section of a sliver of textile material passing therethrough, apparatus for cleaning said calibrated nozzle comprising a source of surge pressure and line means for selectively admitting said surge pressure from said source to said measuring line, wherein diaphragm means is provided in the measuring line means between the admitting line means and the pressure-evaluation unit.

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