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PATENT SPECIFICATION

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(54) IMPROVEMENTS IN TEXTILE TESTING DEVICES

(71) We, ZELLWEGER USTER LTD, a Swiss company, of CH 8610 Uster, Switzerland, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of and device for increasing the long-term stability of a measuring element of textile testers.

Various kinds of testers are known in the textile industry, comprising a measuring element projecting from the housing of the tester in which certain properties of the material to be tested are made measurable by conversion into a proportional electrical signal in the measuring element.

Such measuring elements are extremely sensitive to changes in the atmosphere surrounding them, such as its temperature, its humidity level and any uncontrolled airflows, and to mechanical changes in their immediate airflows, and to mechanical changes in their immediate surroundings attributable, for example, to the deformation of components of the measuring element due to unstable temperature conditions between the interior and exterior of the tester, and to the deposition of foreign matter on the measuring element itself. Textile machinery in particular is prone to very heavy soiling, because textile materials give off large quantities of dust during processing. Accumulations of fibres can be found at every processing station, being carried away by even gentle airflows only to be deposited again somewhere else. Although the adverse effects of fibre accumulations can be eliminated by suitable measures, and although attempts have been made to avoid marked differences in the immediate surroundings, influences of this kind cannot be completely kept away from the extremely sensitive measuring elements.

It has also been proposed to expose the measuring element to an airstream in order on the one hand to prevent the deposition of

fibres and, on the other hand, to neutralise the effect of the heat produced in the tester and dissipated outwards through the measuring elements. Unfortunately, attempts in this direction have not been altogether successful insofar as, although deposits of fibre dust have been eliminated, expectations of a measuring element with long-term stability have not been fulfilled. Although this failure cannot be entirely explained by plausible arguments, practical experience has shown this proposal to be inappropriate.

The present invention is based on such experience and provides a method of increasing the long-term stability of the measuring instrument of a textile tester of the kind comprising a measuring element operable to convert properties of the textile material to be tested into proportional electrical signals an delivery rollers for advancing the material to be tested through the measuring element, wherein a secondary air stream which helps maintain constant ambient conditions in respect of the measuring element is formed in the vicinity of the measuring element by an artificial primary air stream sweeping away over the top of the measuring element, the airstreams preventing the deposition of loose fibres on the element.

The invention also provides a device for carrying out this method, which comprises a measuring element operable to convert into proportional electrical signals properties of textile material to be tested, delivery rollers for advancing material to be tested through the measuring element, and an air outlet opening above the measuring element, and means for blowing air through the opening over the measuring element to maintain a circulation effect in the ambient air between the components of the measuring element and to prevent the deposition of loose fibres on the element.

Whereas, on the one hand, direct exposure of the measuring element to air issuing from an opening has an adverse

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effect upon the measuring element, and whereas on the other hand the total prevention of airflow in the vicinity of the measuring element does not result in any increase instability either, it has been found that an intermediate solution, in which a weak eddy current feeding exclusively off the ambient air is formed in the vicinity of the measuring element, produces a distinct improvement in long-term stability.

In this way, an airstream issuing from the housing of the tester, which could be uncontrollably heated through electrical components inside the tester and whose relative humidity in this form is indeterminate, is prevented from directly influencing the measuring element. By contrast, the secondary, induced airstream has the same temperature and moisture level as the atmosphere surrounding the tester which can be regarded as sufficiently constant, even in the long term.

Some embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 illustrates a first arrangement, Figure 2 shows another possible embodiment.

The device illustrated in Figure 1 comprises a housing 1 which accommodates a fan which sucks in the surrounding air through an air filter 2 and delivers it into the housing. This results in the formation inside the housing of an excess pressure which attempts to escape through any gaps present and through other openings intentionally provided in the wall of the housing. A measuring element 3, for example a measuring capacitor is arranged outside the housing, a material 4 to be tested is drawn through the element 3 by rollers 5, 6 in known manner.

The wall of the housing above the measuring capacitor is provided with a slot 7 through which the excess pressure prevailing inside the housing 1 flows out substantially horizontally in the direction of the arrows A and blows away any fibre dust which attempts to settle on the top of the test electrodes forming the measuring capacitor. Naturally, the airstream should not be so intense that the material 4 being tested is blown out of the range of the test electrodes.

The airstream sweeping over the top of the test electrodes forms an eddy current in the slots formed by the test electrodes by virtue of the fact that air is carried upwards from below the measuring element between the test electrodes in the direction of the arrows B and kept in constant motion.

It is not only the primary airstream A, but also the secondary air circulation B, which prevents fibre dust from settling in the

vicinity of the measuring element 1. In addition, the circulation of air around the test electrodes (circulation B) has a cooling effect and stabilises the surface temperature of the measuring element 3.

Another effect of the permanent circulation of fresh air inside the housing of the tester is that the components which heat up during operation are permanently cooled, which is another advantage so far as the stability of the measuring element is concerned. Naturally, the air filter 2 has to be periodically cleaned or replaced, although this can readily be done by suitably designing the mountings for the air filter.

A similar effect of the airstream is also obtained if, instead of the airstream issuing from the housing in the direction of the test electrodes as illustrated in Figure 1, it is as illustrated in Figure 2, directed through a suitably angled outlet nozzle 10 with an outlet opening extending parallel to the measuring element to direct the air stream transversely along the front of the housing and over the upper edge of the test electrodes.

In this case, a secondary air circulation B is also directed from the space below the measuring element through its components onto the upper side, producing the already mentioned favourable effects upon the stability of the measuring element.

The device according to the invention is not confined in its application to capacitive measuring elements, but instead can also be effectively used for example in optical or acoustic measuring elements operable to convert properties of textile material being tested into proportional electrical signals.

WHAT WE CLAIM IS:—

1. A method of increasing the long-term stability of the measuring instrument of a textile tester of the kind comprising a measuring element operable to convert properties of the textile material to be tested into proportional electrical signals and delivery rollers for advancing the material to be tested through the measuring element, wherein a secondary air stream which helps maintain constant ambient conditions in respect of the measuring element is formed in the vicinity of the measuring element by an artificial primary air stream sweeping away over the top of the measuring element, the airstreams preventing the deposition of loose fibres on the element.

2. A method as claimed in claim 1, wherein the primary airstream is guided parallel to and over the measuring element.

3. A method as claimed in claim 1, wherein the primary airstream is guided laterally over the measuring element.

4. A method of increasing the long term stability of the measuring element of textile testers substantially as described with

effect upon the measuring element, and whereas on the other hand the total prevention of airflow in the vicinity of the measuring element does not result in any increase instability either, it has been found that an intermediate solution, in which a weak eddy current feeding exclusively off the ambient air is formed in the vicinity of the measuring element, produces a distinct improvement in long-term stability.

In this way, an airstream issuing from the housing of the tester, which could be uncontrollably heated through electrical components inside the tester and whose relative humidity in this form is indeterminate, is prevented from directly influencing the measuring element. By contrast, the secondary, induced airstream has the same temperature and moisture level as the atmosphere surrounding the tester which can be regarded as sufficiently constant, even in the long term.

Some embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 illustrates a first arrangement, Figure 2 shows another possible embodiment.

The device illustrated in Figure 1 comprises a housing 1 which accommodates a fan which sucks in the surrounding air through an air filter 2 and delivers it into the housing. This results in the formation inside the housing of an excess pressure which attempts to escape through any gaps present and through other openings intentionally provided in the wall of the housing. A measuring element 3, for example a measuring capacitor is arranged outside the housing, a material 4 to be tested is drawn through the element 3 by rollers 5, 6 in known manner.

The wall of the housing above the measuring capacitor is provided with a slot 7 through which the excess pressure prevailing inside the housing 1 flows out substantially horizontally in the direction of the arrows A and blows away any fibre dust which attempts to settle on the top of the test electrodes forming the measuring capacitor. Naturally, the airstream should not be so intense that the material 4 being tested is blown out of the range of the test electrodes.

The airstream sweeping over the top of the test electrodes forms an eddy current in the slots formed by the test electrodes by virtue of the fact that air is carried upwards from below the measuring element between the test electrodes in the direction of the arrows B and kept in constant motion.

It is not only the primary airstream A, but also the secondary air circulation B, which prevents fibre dust from settling in the

vicinity of the measuring element 1. In addition, the circulation of air around the test electrodes (circulation B) has a cooling effect and stabilises the surface temperature of the measuring element 3.

Another effect of the permanent circulation of fresh air inside the housing of the tester is that the components which heat up during operation are permanently cooled, which is another advantage so far as the stability of the measuring element is concerned. Naturally, the air filter 2 has to be periodically cleaned or replaced, although this can readily be done by suitably designing the mountings for the air filter.

A similar effect of the airstream is also obtained if, instead of the airstream issuing from the housing in the direction of the test electrodes as illustrated in Figure 1, it is as illustrated in Figure 2, directed through a suitably angled outlet nozzle 10 with an outlet opening extending parallel to the measuring element to direct the air stream transversely along the front of the housing and over the upper edge of the test electrodes.

In this case, a secondary air circulation B is also directed from the space below the measuring element through its components onto the upper side, producing the already mentioned favourable effects upon the stability of the measuring element.

The device according to the invention is not confined in its application to capacitive measuring elements, but instead can also be effectively used for example in optical or acoustic measuring elements operable to convert properties of textile material being tested into proportional electrical signals.

WHAT WE CLAIM IS:—

1. A method of increasing the long-term stability of the measuring instrument of a textile tester of the kind comprising a measuring element operable to convert properties of the textile material to be tested into proportional electrical signals and delivery rollers for advancing the material to be tested through the measuring element, wherein a secondary air stream which helps maintain constant ambient conditions in respect of the measuring element is formed in the vicinity of the measuring element by an artificial primary air stream sweeping away over the top of the measuring element, the airstreams preventing the deposition of loose fibres on the element.

2. A method as claimed in claim 1, wherein the primary airstream is guided parallel to and over the measuring element.

3. A method as claimed in claim 1, wherein the primary airstream is guided laterally over the measuring element.

4. A method of increasing the long term stability of the measuring element of textile testers substantially as described with

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reference to the accompanying drawings.

5. A device for carrying out the method claimed in claim 1, comprising a measuring element operable to convert into proportional electrical signals properties of textile material to be tested, delivery rollers for advancing material to be tested through the measuring element, and an air outlet opening above the measuring element, and means for blowing air through the opening over the measuring element to maintain a circulation effect in the ambient air between the components of the measuring element and to prevent the deposition of loose fibres on the element.

6. A device as claimed in claim 5, comprising an air outlet extending transversely

over the measuring element.

7. A device as claimed in claim 5, comprising an angled air outlet nozzle whose outlet opening extends parallel to the measuring element.

8. A device for increasing the long-term stability of the measuring elements of textile testers substantially as described with reference to the accompanying drawings.

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