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FILLING GRATE FOR LOOMS

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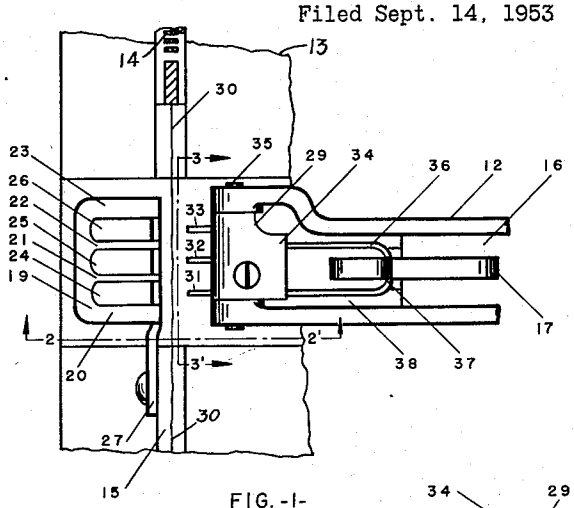


FIG.-1-

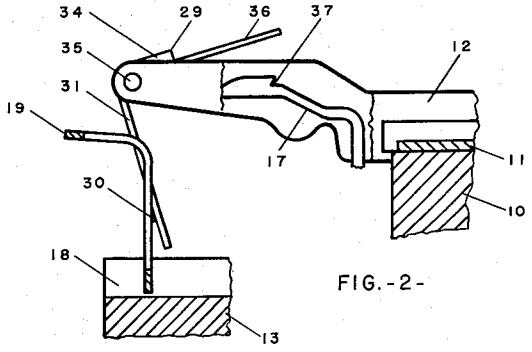


FIG.-2-

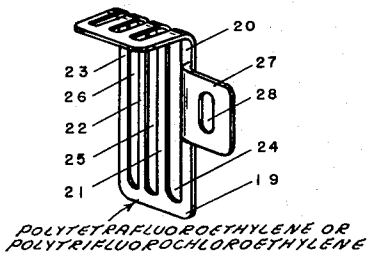


FIG.-4-

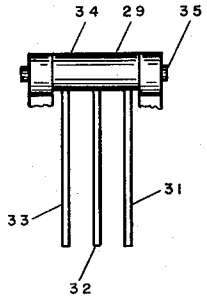


FIG.-3-

INVENTOR.
ROBERT M. INGHAM, JR.
BY Walter E. Mueller
ATTORNEY

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FILLING GRATE FOR LOOMS

Robert M. Ingham, Jr., Spartanburg, S. C., assignor to Deering Milliken Research Trust, near Pendleton, Oconee County, S. C., a nonprofit trust of Maine

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5 Claims. (Cl. 139—379)

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This invention relates to automatic looms and more especially to an improved filling detecting device of the type having a pivoted fork which is adapted to be displaced by the filling yarn being pressed against a stationary grate on beat-up strokes of the lay and adapted to indicate the absence of a filling yarn on the failure of the filling fork being displaced which, in turn, effects the operation of usual devices for stopping the loom or effecting a bobbin transfer. The present invention is more particularly concerned with the construction of the grate against which the filling yarn is pressed by the pivoted fork.

As is well known to those skilled in the art, after continued operation of a loom a considerable amount of lint collects in the openings of the grate constituting a part of the filling detecting device. In normal operation, if the filling yarn has become broken or is not present for other reasons, the prongs of the filling detecting fork will enter the openings of the grate and thus will not be displaced in the usual manner so that the operation of the loom is automatically stopped. If, however, sufficient lint has collected in the openings of the grate, the tines of the fork will be displaced as a result of their inability to enter the openings as intended thus giving a false test for the presence of a filling yarn. The loom will then continue to operate in an improper manner until the absence of filling in the cloth is detected by the loom operator. As it is customary for the loom operator to tend a large number of looms, it may be a considerable length of time before the absence of a filling is noticed and this results in considerable delay since the warp and woven cloth must be pulled back to the proper position.

As the problem of lint collecting on filling detector grates has been present ever since the advent of the automatic loom, numerous attempts have in the past been made to design grates that would not collect lint; to design automatic apparatus which would remove the lint collected on the grate before it reached such an accumulation as to cause trouble; or to devise filling detecting apparatus which would not give false readings even in the presence of a substantial accumulation of lint. That these efforts have been, to a large extent, unsuccessful is evident from the fact that in most textile mills

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today a number of employees have the sole duty of progressing from loom to loom and manually brushing the accumulation of lint from the filling detector grates.

It is an object of the present invention to eliminate the necessity for manually brushing the accumulation of lint from filling detector grates by providing a grate on which lint does not accumulate.

The above as well as other objects are accomplished by an improved grate with exterior surfaces composed of a polymeric material selected from the group consisting of polytetrafluoroethylene and polytrifluorochloroethylene. It has been surprisingly found that for unknown reasons lint does not adhere to grate surfaces composed of these materials with sufficient tenacity that it cannot be removed by the routine air-hosing operations performed in the mill. Looms equipped with filling detector grates having external surfaces of polytetrafluoroethylene or polytrifluorochloroethylene can be operated for weeks or even longer without the necessity of brushing the lint from the openings in the grate whereas with the grates now commonly employed, it is necessary to stop the loom every few hours in order that the accumulation of lint on the filling detector grate can be manually removed.

The exact reasons for the success of the new apparatus of this invention is not fully understood for the simple reason that it has never been fully known why lint adhered to the usual smooth surface metal grate with such tenacity that it was necessary to manually remove the same by brushing. One theory has been that the usual metal grates in the high humidity of the ordinary weaving room collected sufficient moisture to result in the lint becoming rigidly affixed to the metal. This theory has, however, apparently been somewhat disproved by tests in which grates coated with silicone resins were substituted for the ordinary grates having a smooth metal surface. As is well known, silicone resins do not ordinarily collect a surface layer of moisture, and if the above theory were correct, there should be no lint collected by silicone coated grates. It was found, however, that grates coated with silicone resins were no improvement over grates with a polished metal surface. Another theory

has been that the metal surface of the grate during operation of the loom becomes coated with a nonconducting coat of size and that static electrical forces then operate to result in the collection of lint. This would apparently, however, not explain why lint should adhere firmly to grates with external surfaces of a silicone resin but not to grates with external surfaces composed of a polymeric material from the group consisting of polytetrafluoroethylene and polytrifluorochloroethylene.

According to this invention the grate for the filling device can be molded entirely of polytetrafluoroethylene or polytrifluorochloroethylene or the grates can be predominantly formed from a more rigid material, such as steel, and have only an external coating of polymeric material. It apparently, is only important that all external surfaces be composed of either polytetrafluoroethylene or polytrifluorochloroethylene.

Polytetrafluoroethylene and polytrifluorochloroethylene are commercially available in the form of molding powders which can be molded by any one of several techniques. If the improved grates of this invention are to be formed entirely of polymeric material, they can be produced in quantity at a relatively low per unit cost by injection molding. On the other hand, grates having a metal core are usually more desirable from the standpoint of rigidity and, since aqueous emulsions of polytetrafluoroethylene and polytrifluorochloroethylene, suitable for coating metal, are also commercially available, one can simply coat the usual metal filling detector grate with polymeric material with satisfactory results. The actual technique of coating comprises simply spraying, brushing, or the like, the emulsion on the grate and then heating to fuse the polymeric material. A temperature of about 750° F. applied for a period of 10 to 20 minutes is usually preferred for coating with polytetrafluoroethylene, but lower temperatures, for instance, 460–480° F. applied for a period of 30 minutes to an hour, generally give better results with polytrifluorochloroethylene. A single coat generally gives a film thickness of approximately .001 inch and this is sufficient although additional coats can be applied if desired.

One embodiment of the invention will now be described in greater detail with reference to the accompanying drawing in which:

Figure 1 is a top plan view of a small portion of a loom showing the filling detecting device.

Figure 2 is a fragmentary elevation looking substantially along line 2—2 in Figure 1 and showing the grate and filling detector fork in the relative position assumed when the lay is in beat-up position.

Figure 3 is a fragmentary elevation of the filling detector fork substantially along line 3—3 in Figure 1.

Figure 4 is a view in perspective of the grate.

Referring more specifically to the drawings, there is illustrated a loom frame 10 on which the base 11 of the filling detecting device is secured. Mounted on the base 11, in a conventional manner, is a filling fork slide 12 free to move longitudinally. The filling fork slide has an extension, not shown, which is operatively connected with conventional means for stopping the loom.

The loom is also provided with a conventional lay 13 which moves back and forth with respect to the base 11. The loom is also equipped with

a conventional reed 14 and conventional shuttle box 15, only partially illustrated.

The filling fork slide is provided with a longitudinally extending slot 16 and moving within the slot is a conventional goose neck 17 actuated by well known means, not shown.

The lay 13 is provided with the usual well or groove 18 in which grate 19 is partially positioned. The grate 19 is conventional in appearance and is provided with bars 20, 21, 22 and 23 which form openings 24, 25 and 26. The bar 20 is provided with an extension 27 which in turn is provided with an aperture 28 for attaching the grate to some portion of the lay such as the shuttle box 15.

Pivotally mounted in the end of the filling fork slide 12 is a filling detector fork 29 so positioned to cooperate with grate 19 in detecting the presence of a filling yarn 30 extending across the front faces of the bars 20, 21, 22 and 23 on alternate picks. The filling detector fork 29 is provided with tines 31, 32 and 33 adapted to enter openings 24, 25 and 26 in grate 19 unless prevented from doing so by the presence of the filling yarn 30. The filling detector fork tines 31, 32 and 33 are rigidly affixed to block 34 which in turn is pivotally mounted, by means of pin 35, slot 16 of the filling fork slide 12. Attached to the block 34 at approximately right angles to the tines 31, 32 and 33 is a loop member 36 adapted to engage a notch 37 in goose neck 17. The loop 36 being free to pivot by virtue of pivot pin 35, normally rests on projections 38 extending from the inner sides of slot 16.

Conventional means, not illustrated, are also provided for moving the goose neck 17 longitudinally in slot 16 toward block 34 on alternate picks when the shuttle is on that side of the lay adjacent the filling detecting device. As the lay approaches full beat-up position the tines 31, 32 and 33 contact the filling yarn 30 and are pivoted about pivot pin 35 thereby raising loop 36 so that it fails to engage notch 37 in goose neck 17 when the goose neck is otherwise in proper position for engagement. On the other hand if there is no filling yarn present, the tines 31, 32 and 33 enter openings 24, 25 and 26 in grate 19, so that the filling detector fork 29 is not pivoted and loop 36 engages notch 37 in goose neck 17. When the goose neck 17 moves toward the front of the loom, it thereby, by virtue of its engagement with loop 36, slides the filling fork slide 12 forward which stops the operation of the loom. The operator can then determine for what reason there is no filling yarn present.

From the above description of the operation of the filling yarn detector it can be seen that if for any reason the tines 31, 32 and 33 are prevented from entering openings 24, 25 and 26 in grate 19, the yarn detector will fail to operate even though there is no filling yarn in front of grate 19. In prior art apparatus it was found that lint soon collected on bars 20, 21, 22 and 23 of grate 19 to such an extent that it prevented tines 31, 32 and 33 from entering openings 24, 25 and 26 even though the filling yarn 30 was not present, and in such instances the loom continued to operate until the absence of the filling yarn was visually noticed by the operator. By virtue of the improvement of this invention, the grate 19 fails to collect sufficient lint to give a false test for the filling yarn and the trouble previously encountered for this reason is eliminated.

I claim:

1. In a filling detecting device for a loom said

device comprising a grate and a pivoting fork having a number of tines designed to cooperate with said grate by pressing a filling yarn against the face of the grate, the fork thereby being pivoted to indicate the presence of said filling yarn, and by passing said tine through the openings of said grate when no filling yarn is present, the fork thereby not being pivoted to indicate the absence of a filling yarn, the improvement which comprises a grate having external surfaces composed of a synthetic polymeric material selected from the group consisting of polytetrafluoroethylene and polytrifluorochloroethylene.

2. The improvement of claim 1 wherein the grate comprises a metal body having a surface coating of polytetrafluoroethylene.

3. The improvement of claim 1 wherein the grate is molded of polytetrafluoroethylene.

4. The improvement of claim 1 wherein the grate comprises a metal form with a surface coating of polytrifluorochloroethylene.

5. The improvement of claim 1 wherein the grate is molded of polytrifluorochloroethylene.

ROBERT M. INGHAM, JR.

No references cited.