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(54) PNEUMATIC DEVICE FOR THE REMOVAL OF WRONG WEFTS FROM THE GRIPPER PATH IN A GRIPPER WEAVING LOOM AND METHOD

(57) A device for the removal of wrong wefts from the gripper path in a gripper weaving loom, comprising one or more compressed-air supplied nozzles which are controlled in opening and closing by at least one electrovalve (1). The nozzles are arranged on said loom in an area comprised between the weft-presenting levers (F) and the edge of the fabric being formed and are oriented so as to form an air jet oriented in a direction away from the carrying gripper guide (G). The invention also includes a method for the removal of wrong wefts that makes use of such a device.

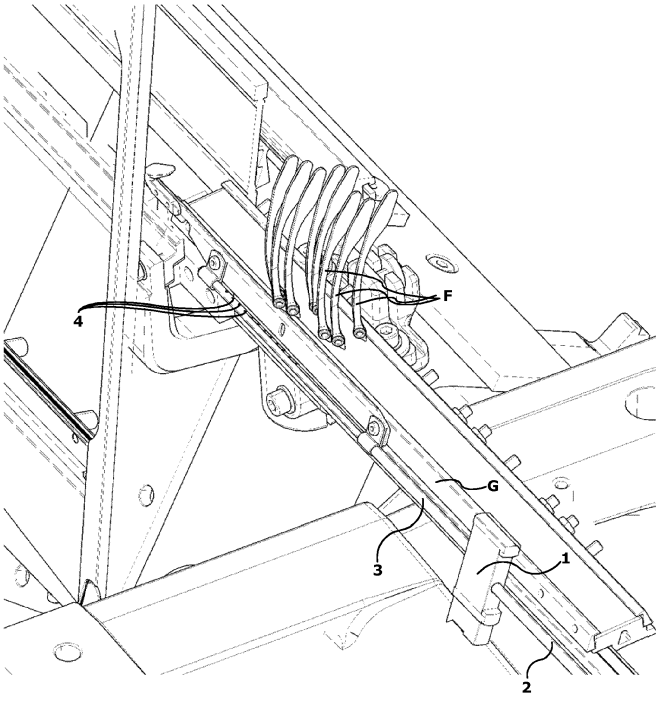


Fig. 2

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Description

[0001] The present invention relates to a device for the removal of wrong wefts from the gripper path in a gripper weaving loom and to a method for the removal of wrong wefts that makes use of such a device.

[0002] More particularly, the invention relates to a device as above which temporarily removes wrong wefts, outside the shed, during the stop transient of the loom as a result of the insertion of a wrong weft.

BACKGROUND OF THE INVENTION

[0003] During regular operation of the loom, it can happen that the insertion of the weft thread takes place only partially, as the weft regularly inserted from one side of the loom does not reach the other side thereof. This malfunction may be due to a defect of the weft or to an excessive stress imparted to the weft during insertion, causing the mechanical breakage of the weft while being carried into the shed, or to an early release of the weft out of the carrying gripper or of the drawing gripper, or again to a failure of the drawing gripper to pick the weft when exchanging it with the carrying gripper in the middle of the shed. In short, the above three cases of irregular weft insertion are indicated as:

- broken weft,
- lost weft,
- missed exchange between the grippers,

or, in general, as "wrong wefts".

[0004] When occurring one of these irregular weft insertions, the loom central control unit detects it immediately, due to the absence of the weft passage through a specific sensor, arranged at the receiving side of the loom, and causes the piloted stop of the loom.

[0005] This stop, however - due to the inertia of the loom moving parts and depending on when the stop due to wrong weft occurs, on the speed of the machine and its height - often does not end within the same weft insertion cycle wherein the wrong weft occurred but rather during a subsequent cycle. Thus, once the stop is determined, it is necessary to drive the loom in reverse direction for the needed number of cycles (usually one or two) to bring it back to the same position in which the wrong weft was inserted, to manually or automatically remove that weft, and then restart the loom.

[0006] In the above transient period in which loom stopping is performed, it is possible that a drawback arises because the wrong weft - which front end has only reached an intermediate point of the shed - is more or less loose, therefore forming loops partly inside and partly outside the shed.

[0007] While the loose weft inside the shed does not cause any inconvenience, since it is immediately caught by the crossing of the warp threads and the beating up of the reed, the loose weft outside the shed, on the contrary, arranges itself along a random path; there is therefore the high risk that it is incidentally hooked by the carrying gripper performing its idle stop transient and misplaced by such a gripper within the shed, possibly causing textile defects. As a matter of fact, since the presentation and weft-cutting devices have been turned off simultaneously with the loom stopping command, the wrong weft has not been cut yet and moreover is still caught by the crossed warp threads. Therefore, depending on the toughness of the weft, such a drawback can turn out as a significative one, in case the wrong weft dragged by the carrying gripper cuts or rips a certain number of warp threads, thus increasing the drawback gravity and extending repair time.

PRIOR STATE OF THE ART

[0008] The above described problem has not been satisfactorily addressed so far by the prior art, wherein mechanical gripping devices are proposed, in the form of electrically or pneumatically-driven weft-catching hooks, which complicate the loom structure in an area already crowded with a great number of devices, and whose rate and effectiveness of intervention are unsatisfactory. As a matter of fact, the available time between the loom stop signal and the successive entrance of the carrying gripper into the shed during the loom stop transient is very short; moreover, the wrong weft is loose, thus it is not easy to make a mechanical hook catch it.

SUMMARY OF THE INVENTION

[0009] The object of the present invention is therefore to provide a device having a completely different conception and operation, compared to conventional ones, which can simply and effectively solve the above described drawback, securely preventing the wrong weft from being positioned across the carrying gripper entrance path during the loom stop transient.

[0010] This object is achieved by means of a pneumatic wrong weft removal device and a related method of application having the features defined in the attached claims 1 and 8. Other preferred features of such a device and its related method of application are defined in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Further features and advantages of the pneumatic wrong weft removal device according to the present invention and of the related application method will anyhow become more evident thanks to the following detailed description of a preferred embodiment of the same, given as a mere and non-restrictive example and illustrated in the attached drawings, wherein:

Fig. 1 is a perspective view of the wrong weft removal device according to the present invention, detached from the loom;

Fig. 2 is a perspective view, from outside the loom (weft insertion side) of the wrong weft removal device of Fig. 1 mounted in place; and

Fig. 3 is a perspective view, from inside the loom (weft insertion side) of the wrong weft removal device of Fig. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] The composition of the device for the removal of wrong wefts according to the present invention, as clearly shown in Fig. 1, is particularly simple and includes an electrovalve 1, controlled by the loom control unit, to which a compressed-air supply 2 and a small tube for air distribution 3 are connected, respectively upstream and downstream, the small tube 3 having a series of holes 4 on its side surface, acting as nozzles for the emission of compressed-air jets.

[0013] The electrovalve 1 has a small size and a very small thickness and can therefore be positioned without problems at the side of the sliding guide G of the carrying gripper strap, as shown in Fig. 2, so that the small tube 3 is to be arranged parallel to the same guide G (Fig. 3) in the area comprised between the weft-guiding levers F of the weft presenting machine - through which the wefts to be diverted onto the gripper path for insertion into the shed are selected - and the edge of the forming fabric, i. e. the shed entrance. Obviously, the electrovalve 1 can be replaced with any other remotely operated valve type.

[0014] The small tube 3 is fixed along the guide G in such a way that the holes 4 are arranged to direct the compressed-air jet vertically away from the carrying gripper guide G, and preferably upwards. Said holes can be longitudinally aligned along the small tube 3 or also be slightly laterally staggered from each other, e.g. alternately, to provide respectively a plurality of compressed-air jets lying on a same plane parallel to the carrying gripper guide G , or a plurality of jets alternately angled with respect to said plane so that altogether they form an air flow with a desired opening angle.

[0015] Alternatively, the small tube 3 can be replaced with a specific channel, formed inside the carrying gripper guide G, wherein holes 4 are opened for the formation of the desired air jets.

[0016] The device operation is also particularly simple and effective. The device program, included into the loom central control unit provides that, when the loom central control unit detects the presence of a wrong weft, in addition to starting the usual loom stop procedure - which involves braking and stopping the grippers movement, in one/two cycles, and simultaneously deactivating the weft presenting machine so that said cycles are carried out idly, i.e. without insertion of wefts - the activation of the electrovalve 1 into the open position is also immediately controlled, so that a compressed air flow is ejected from the holes 4 of the small tube 3, causing a lifting action on the loose weft which is positioned in that area.

[0017] The wrong weft affected by the aforementioned compressed air flow lifts upwards, spreading itself from the thread guide of the relative weft presenting machine lever F and the fabric being formed to which it is still connected, thus quickly and sharply moving away from the carrying gripper path along its guide G. In subsequent idle cycles of the grippers, any risk of interference between said wrong weft and the carrying gripper is thus eliminated, fully achieving the object of the invention.

[0018] Once the loom has been stopped - or even before it effectively stops just as soon as the carrying gripper has finished its entry travels into the shed - the electrovalve 1 is closed and it is therefore possible to start performing usual wrong weft repairing and loom restarting operations.

[0019] It is anyhow meant that the invention is not to be considered as limited to the particular embodiment above illustrated, that is just one possible preferred exemplary application, but that different variants are possible, for example concerning the shape and arrangement of the devices which cause said air flow as well as the fact that the air flow is sent directly rather than indirectly towards the area of interest, by means of conveyor or baffle elements. All such modifications are within the reach of a skilled in the art and therefore they fall within the scope of protection of the invention itself, which is solely defined by the following claims.

Claims

1. Device for the removal of wrong wefts from the gripper path in a gripper weaving loom, **characterised in that** it comprises one or more compressed-air flows controlled in opening and closing by at least one valve (1), said compressed-air flows being arranged on said loom in an area comprised between the weft presenting levers (F) and the edge of the fabric being formed and being oriented so as to form an air jet apt to move the wrong weft away from the carrying gripper guide (G).

2. Device for the removal of wrong wefts as in claim 1, wherein said air flows are arranged near the carrying gripper guide (G) .

3. Device for the removal of wrong wefts as in claim 2, wherein said air flows are ejected by a plurality of openings (4) provided crosswise in on the lateral wall of a small tube (3) axially supplied with compressed air through an electrovalve (1) and associated with the carrying gripper guide (G) so that said openings (4) face upwards.

4. Device for the removal of wrong wefts as in claim 3,

wherein said openings (4) are aligned along a line parallel to the small tube (3) axis.

5. Device for the removal of wrong wefts as in claim 3, wherein said openings (4) are alternatively staggered on one side and the other with respect to a line parallel to the small tube (3) axis.

6. Device for the removal of wrong wefts as in claims 3, 4 or 5, wherein said openings consist of continuous or discrete holes or slits for air passage.

7. Device for the removal of wrong wefts as in claim 2, wherein said air flows are ejected by a plurality of openings provided in a channel of the carrying gripper guide (G).

8. Method for the removal of wrong wefts from the gripper path in a gripper weaving loom, of the kind in which a loom central control unit starts a loom quick stopping procedure when a wrong weft insertion is detected, **characterised in that** it furthermore comprises- simultaneously or immediately after the start of said loom quick stopping procedure- the activation of one or more compressed-air flows arranged on said loom in an area comprised between the weft-presenting levers (F) and the edge of the fabric being formed, said flows being oriented so as to form an air jet apt to move the wrong weft away from the carrying gripper guide (G).

9. Method for the removal of wrong wefts as in claim 8, wherein the activation of said compressed-air flows lasts at least until the carrying gripper has completed its entry travel into the shed.

10. Method for the removal of wrong wefts as in claim 9, wherein said compressed-air flows are originated in the proximity of the carrying gripper guide (G) or directly from said guide (G) and are directed upwards.

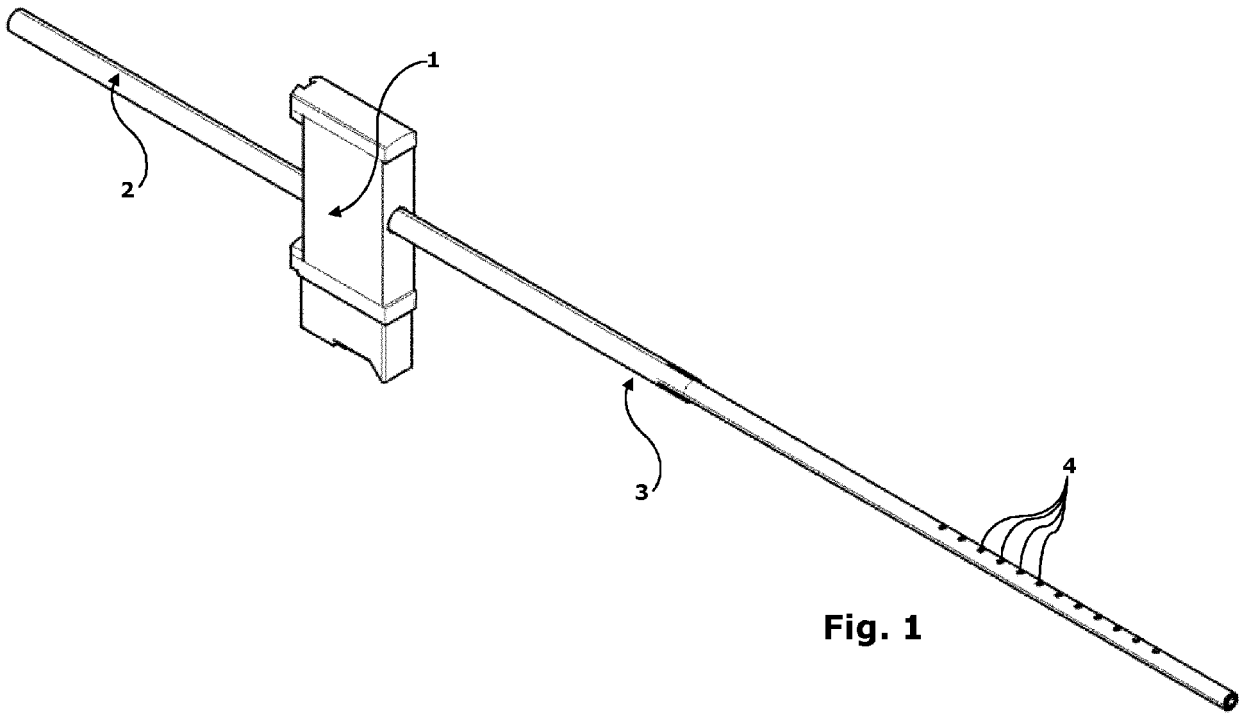


Fig. 1

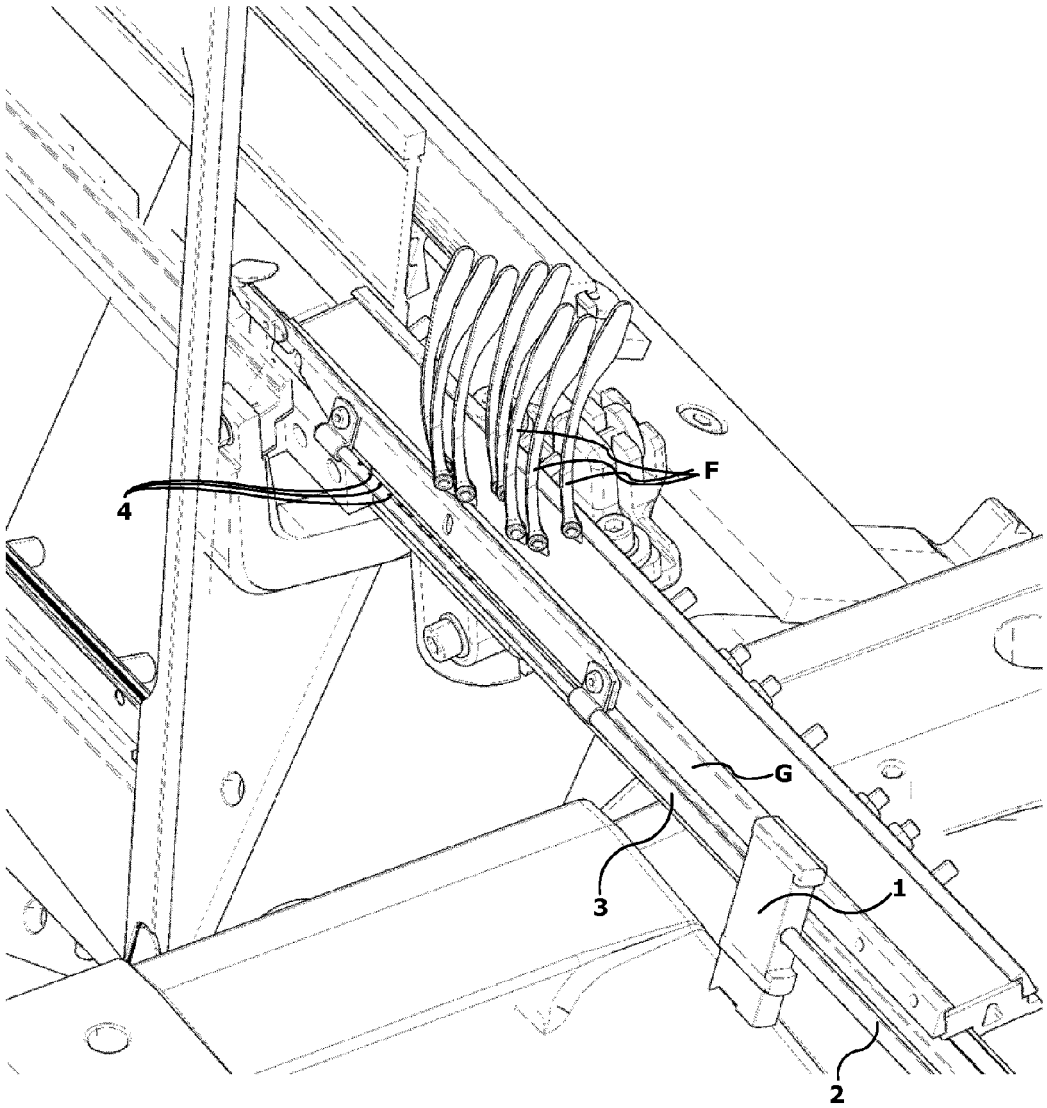


Fig. 2

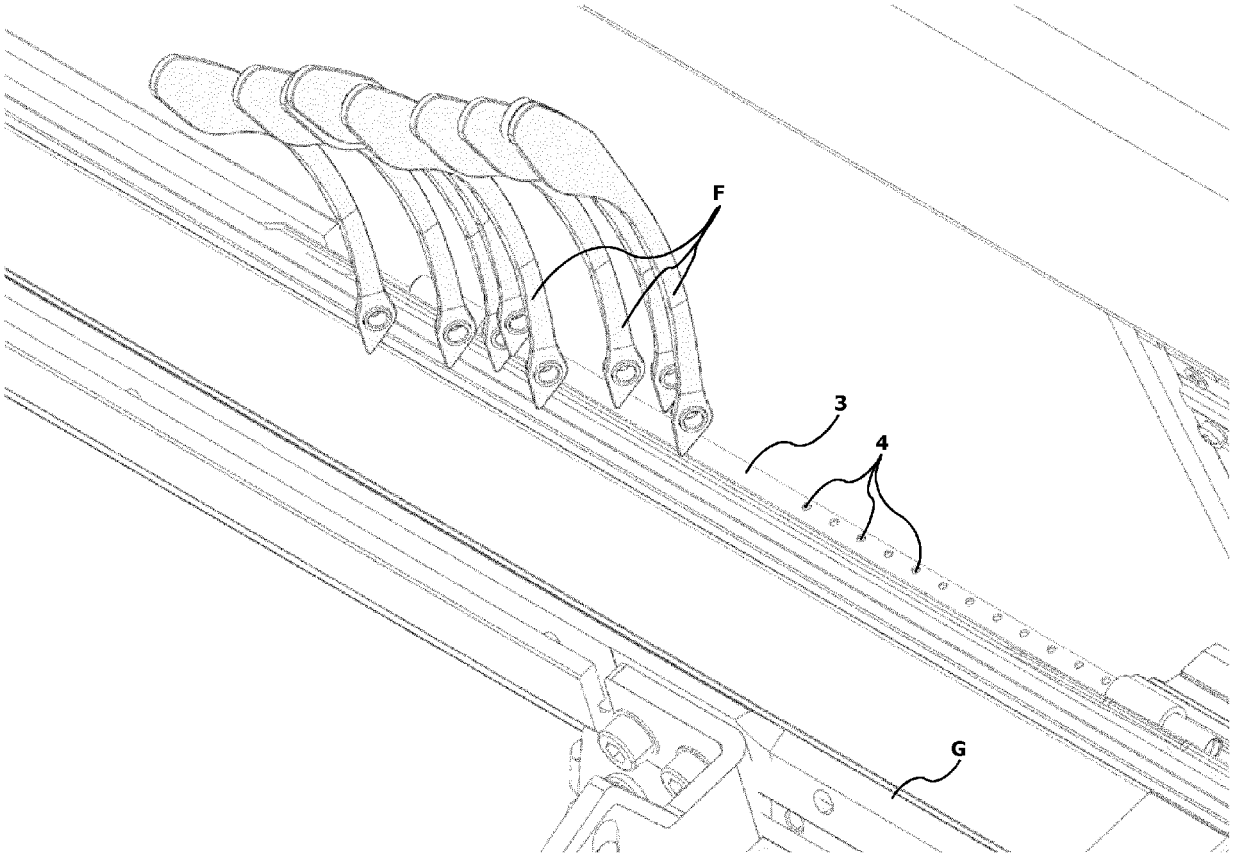


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 3466

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* paragraph [0032] - paragraph [0038] * * figures 2-4 *	3-7	

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A	* page 2, paragraph 2 - page 4, paragraph 2 * * page 6, paragraph 2 - page 8, paragraph 1 * * figure 2 *	3-7,9,10	

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TECHNICAL FIELDS SEARCHED (IPC)

D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 November 2016	Hausding, Jan

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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