(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 400 618 A2

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**24.03.2004 Bulletin 2004/13**

(51) Int Cl.[7]: **D03D 49/60**

(21) Application number: **03255657.3**

(22) Date of filing: **10.09.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
**AL LT LV MK**

(30) Priority: **11.09.2002 JP 2002265517**

(71) Applicant: **TSUDAKOMA KOGYO KABUSHIKI KAISHA**
**Kanazawa-shi Ishikawa-Ken (JP)**

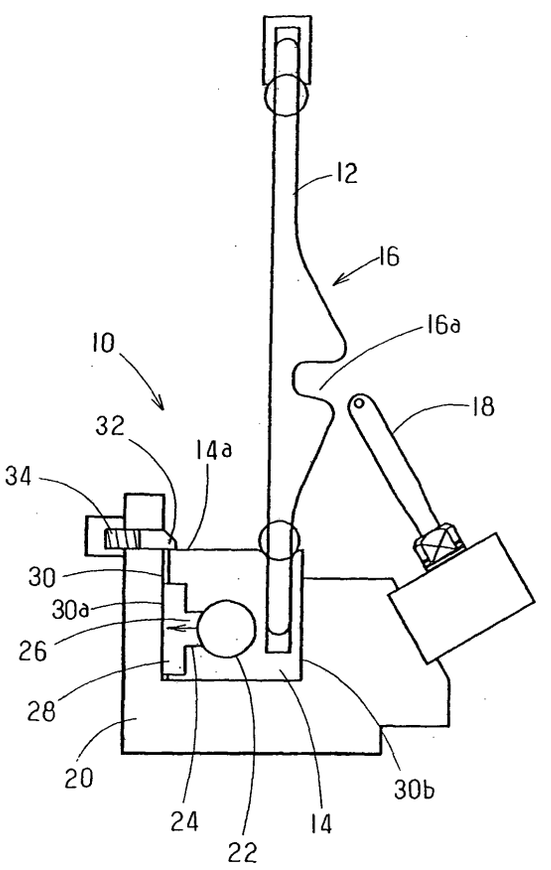
(72) Inventor: **Hashimoto, Toru**
**Komatsu-shi Ishikawa (JP)**

(74) Representative: **Greenwood, John David et al**
**Graham Watt & Co.**
**St. Botolph's House**
**7-9 St. Botolph's Road**
**Sevenoaks Kent TN13 3AJ (GB)**

## (54) Reed retaining device of fluid-jet loom

(57) Included is a pressurizing tube section (22) formed, in a longitudinal direction of a reed (16), between a reed retainer (20) of a loom and a retaining member (14) of a reed dent (12) for accommodating fluid. A piston member (26) being a bias member is provided to move, responding to the fluid pressure applied to the pressurizing tube section (22), in the direction orthogonal to the longitudinal direction of the reed (16). Utilizing the press pressure of the piston member (26), the retaining member (14) is retained between side walls (30a and 30b) of the reed retainer (20).

F I G. 1




EP 1 400 618 A2

## Description

Field of the Invention

**[0001]** The present invention relates to a reed retaining device of a fluid-jet loom for picking through water or air jet.

Description of the Background Art

**[0002]** Generally, attaching a reed to a retainer requires a close attention to make a weaving machine stably operate and obtain high-quality final textile fabrics without streaking in the warp direction. Especially due to recent wider weaving machines, the number of retaining bolts used to securely attach the reed to the retainer has been increased, sometimes to several tens thereof. In textile plants, the time taken for reed change resultantly has been preventing the machine change time from being shorter.

**[0003]** JP-A-2000-136470 has proposed a reed retainer in which a pair of retaining sections provided for retaining a reed are biased in a direction getting closer to each other by a spring member, and the bias force of the spring retains the reed. In this device, a cavity formed to one of the retaining sections is provided with fluid at the time when the retaining sections are opened. In response, the wall plane of a movable member being the other retaining section facing inside of the cavity receives the fluid pressure, which opens the movable member against the bias force of the spring member. In this manner, the reed can be removed. On the other hand, to retain the reed, the fluid pressure is relieved so that the reed is sandwiched between the pair of retaining sections.

**[0004]** The problem is that, the former conventional technology above requires a number of working processes for reed attachment and detachment, and at the time of reed attachment and detachment, there needs to insert a tool to warp, resulting in causing damage to the warp. With the latter conventional technology above, the reed is sandwiched by the spring force. With such a structure, there has been a possibility that the reed would come loose or off at the pair of retaining sections due to the vibrations from the reed shaking at high speed.

**[0005]** The present invention is proposed in view of such conventional problems, and an object thereof is to provide an easily-detachable reed retaining device of a fluid-jet loom weaving machine of a simple structure, capable of securely retaining a reed.

**[0006]** The present invention is as claimed in the claims.

**[0007]** The pressurizing tube section and the bias member may beprovided in the retaining member of the reed dent. Alternatively, the pressurizing tube section and the bias member may be located in an accommodating concave section for accommodating the retaining member of the reed dent of the reed retainer, and provided to a pressurizing member separately from the retaining member.

**[0008]** The reed retainer may have a stopper abutting the retaining member of the reed dent or the pressurizing member, protruding in such a manner as to be orthogonal to the removal direction to prevent removal of the reed. The pressurizing tube section may always receive the fluid pressure from a compressor, or may receive pressure via a check valve to keep the pressurized condition even if the compressor is stopped in operation.

**[0009]** The reed retaining device of the fluid-jet loom of the present invention considerably reduces the number of working processes. This is because fluid pressure application at the time of reed attachment and detachment eases the attachment and detachment. Further, no tool need be inserted into the warp at the time of reed attachment and detachment, causing no damage to the warp. Still further, when the reed is retained, the retaining force is constant in the width direction. Accordingly, this successfully reduces streaking in the warp direction, and improves the quality of the final textile fabrics.

**[0010]** Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

FIG. 1 is a vertical section view of a reed retaining device of a fluid-jet loom in a first embodiment of the present invention;
FIG. 2 is a schematic diagram showing a pipe circuit of the reed retaining device of the fluid-jet loom in the first embodiment of the present invention;
FIG. 3 is a vertical section view of a reed retaining device of a fluid-jet loom in a second embodiment of the present invention; and
FIG. 4 is a vertical section view of a reed retaining device of a fluid-jet loom in a third embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0011]** In the below, embodiments of the present invention are described by referring to accompanying diagrams. FIG. 1 shows a first embodiment of the present invention. Therein, a reed retaining device 10 of a fluid-jet loom is structured, to be a piece, with a reed 16 including a plurality of thin reed dents 12, and a retaining member 14 for retaining these reed dents 12. The reed dents 12 are arranged at regular intervals, and the front and back sides of the reed dent 12 are provided to be parallel to the open surface of the warp. The reed dent 12 of the present embodiment is formed with a weft guiding section 16a, through which the weft passes due to the fluid jet.

**[0012]** The reed retaining device 10 of the fluid-jet loom of the present embodiment is structured, to be a

piece, in the retaining member 14 of the reed 16 attached to a reed retainer 20, which is swingably attached to the loom for swinging motion in a predetermined manner by a driving mechanism (not shown). The retaining member 14 is formed with, along the longitudinal direction of the reed 16, a cylindrical pressurizing tube section 22 to which pressurized compressed air is filled. At a plurality of predetermined positions of the pressurizing tube section 22, formed is a short cylindrical cylinder section 24 laterally extending at predetermined intervals. In the cylinder section 24, a piston member 26 being a bias member is engaged. In the piston member 26, a head section 28 is so formed as to be larger in diameter. The piston member 26 is so structured as to move in the direction orthogonal to the longitudinal direction of the reed 16 responding to the fluid pressure applied to the pressurizing tube section 22.

**[0013]** The reed retainer 20 is formed with an accommodating concave section 30 whose section view looks like substantially laterally-inverted C for accommodating the retaining member 14 of the reed 16 as if to sandwich the same. The head section 28 of the piston member 26 abuts to a side wall 30a of the accommodating concave section 30. The accommodating concave section 30 includes the side wall 30a for receiving the head section 28 of the piston member 26, and another side wall 30b to which the retaining member 14 is pushed in reaction to the force of the head section 28 of the piston member 26. To the outer plane of the side wall 30b, an auxiliary nozzle 18 is attached in the longitudinal direction of the reed retainer 20 at an approximate interval.

**[0014]** Further, the reed retainer 20, to prevent the reed 16 from being off, has a stopper 32 abutting to an upper corner section 14a of the retaining member 14 of the reed dent 12, and protruding in such a manner as to be orthogonal to the direction to which the reed 16 is removed. The stopper 32 is biased by a coil spring 34 to the protruding direction so as to freely movable in and out.

**[0015]** Referring to FIG. 2, to the pressurizing tube section 22 of the retaining member 14, a pipe 36 located in the plant for compressed air is provided to be connectable. Connection thereof is established to a compressor 42 for the compressed air via a control valve 38, and a check valve 40. Here, without using the check valve 40, the reed 16 may be retained through constant application of pressure. In the case of using the check valve 40 to retain the pressurized condition, a sensor may be provided for detecting the pressure in the pressurizing tube section 22. This is to go through a process of stopping the loom if the retaining pressure is detected as low due to air leakage, for example.

**[0016]** Next, described are the operation and effects of the reed retaining device 10 of the fluid-jet loom of the present embodiment. First, under a condition of the reed dents 12 being provided to the retaining member 14, the piston member 26 is attached to the cylinder section 24 that is passing through from the pressurizing tube section 22. The retaining member 14 is engaged in the accommodating concave section 30 of the reed retainer 20. Then, the pipe 36 for the compressed air is connected to a connector 44 provided at the end of the pressurizing tube section 22 of the retaining member 14. Thereafter, responding to an input made by button depression, for example, an opening/close signal is input to the control valve 38. This opens the control valve 38, and the pressure of the compressed air is applied into the pressurizing tube section 22.

**[0017]** Once the compressed air is applied into the pressurizing tube section 22, the piston member 26 is pushed sideways in the cylinder section 24, and the head section 28 pushes the side wall 30a of the accommodating concave section 30. In such a manner, the other end of the retaining member 14 is pushed to the side wall 30b of the accommodating concave section 30, and thus the retaining member 14 is securely fixed in the accommodating concave section 30.

**[0018]** Further, to engage the retaining member 14 into the accommodating concave section 30, the stopper 32 prevents the retaining member 14 from being removed once moved down into the reed retainer 20, by then protruding, for engagement, from the upper corner section 14a of the retaining member 14 in the condition that the retaining member 14 is engaged in the accommodating concave section 30.

**[0019]** According to the present embodiment, the reed 16 can be securely fixed to the reed retainer 20 with ease and reliability, successfully achieving efficient reed change.

**[0020]** Referring to FIG. 3, next described is a reed retaining device 50 of a fluid-jet loom in a second embodiment of the present invention. Herein, any component similar to that in the first embodiment is provided with the same reference numeral, and not described again. The reed retaining device 50 of the present embodiment uses the reed 16 of a general type, and a retaining member 54 of the reed dents 12 is so structured that the section view thereof looks like substantially laterally-inverted C, which is the general structure.

**[0021]** The accommodating concave section 30 of the reed retainer 20 accommodates, in the longitudinal direction, a long-length pressurizing member 56 including the pressurizing tube section 22. Similarly to the above embodiment, the pressurizing member 56 is formed with, along the longitudinal direction of the reed 16, the cylindrical pressurizing tube section 22 to be pressurized by compressed air. At a plurality of predetermined positions of the pressurizing tube section 22, formed is the short cylindrical cylinder section 24 laterally extending at predetermined intervals. In the cylinder section 24, the piston member 26 being a bias member is engaged. In the piston member 26, the head section 28 is so formed as to be larger in diameter. The piston member 26 is so structured as to move in the direction orthogonal to the longitudinal direction of the reed 16 responding to compressed air pressure to be applied to

the pressurizing tube section 22.

**[0022]** According to this embodiment, the effects same as above first embodiment can be favorably achieved. Further, therewith, the existing reed 16 can be used, and the retaining member 54 for retaining the reed dents 12 does not have to be newly provided. To be newly provided are the reed retainer 20 and the pressurizing member 56, rather easing a manufacturing process.

**[0023]** Referring to FIG. 4, next described is a reed retaining device 60 of a fluid-jet loom in a third embodiment of the present invention. Herein, any component similar to that in the above embodiments is provided with the same reference numeral, and not described again. In the reed retaining device 60 of the present embodiment, a pressurizing tube section 62 arranged in a retaining member 64 of the reed dents 12 is formed in such a manner that the section view thereof is annular, i.e., U-shaped. Provided is a bias member 66 being hollow made of rubber, for example, sealed in the pressurizing tube section 62. The bias member 66 presses the side wall 30a of the accommodating concave section 30, and the other side plane of the retaining member 64 is pushed to the side wall 30b of the accommodating concave section 30, thereby achieving secured fixation.

**[0024]** According to this embodiment, the effects same as above first embodiment can be favorably achieved. Further, therewith, the bias member 66 is a slim and long member sealed as rubber, for example, to evenly apply the retaining force in the longitudinal direction, thereby biasing the retaining member 64 in its entirety towards the side wall 30b of the accommodating concave section 30. Herein, as shown in FIG. 3, in the reed retaining device 60 of the fluid-jet loom of the present embodiment, the retaining member 64 of the reed 16 may be shaped by separating from the pressurizing tube section 62. This allows the existing reed 16 to be used.

**[0025]** It should be noted herein that, the reed retaining device of the fluid-jet loom of the present invention is not restrictive to the above embodiments, and any fluid used for pressurization may be hydraulic pressure other than compressed air, and any fluid will do as long as appropriate.

## Claims

1. A reed retaining device of a fluid-jet loom including a reed retainer (20) for sandwiching a retaining member (14,54,64) of a reed (16), the device comprising:

   a pressurizing tube section (22) formed between the retaining member (14) of a reed dent (16) and the reed retainer (20) in a longitudinal direction of the reed (16) for filling with a pressurizing fluid; a bias member (26) capable of being displaced in a direction orthogonal to the longitudinal direction of the reed (16) in response to fluid pressure applied to the pressurizing tube section (22) and a reception section (30) for retaining the retaining member (14) of the reed dent in response to a force of the bias member (26).

2. The reed retaining device of the fluid-jet loom according to claim 1, wherein the pressurizing tube section (22) and the bias member (26) are provided in the retaining member of the reed dent.

3. The reed retaining device of the fluid-jet loom according to claim 1, wherein the pressurizing tube section (22) and the bias member are located in an accommodating concave section for accommodating the retaining member of the reed dent of the reed retainer, and provided to a pressurizing member (56) separately from the retaining member (54).

4. The reed retaining device of the fluid-jet loom according to claim 2 or 3, wherein the reed retainer (14) is provided with a stopper (34) abutting the retaining member (14) of the reed dent or the pressurizing member, and protruding in such a manner as to be orthogonal to a removal direction to prevent the reed (16) from being removed.

FIG. 1

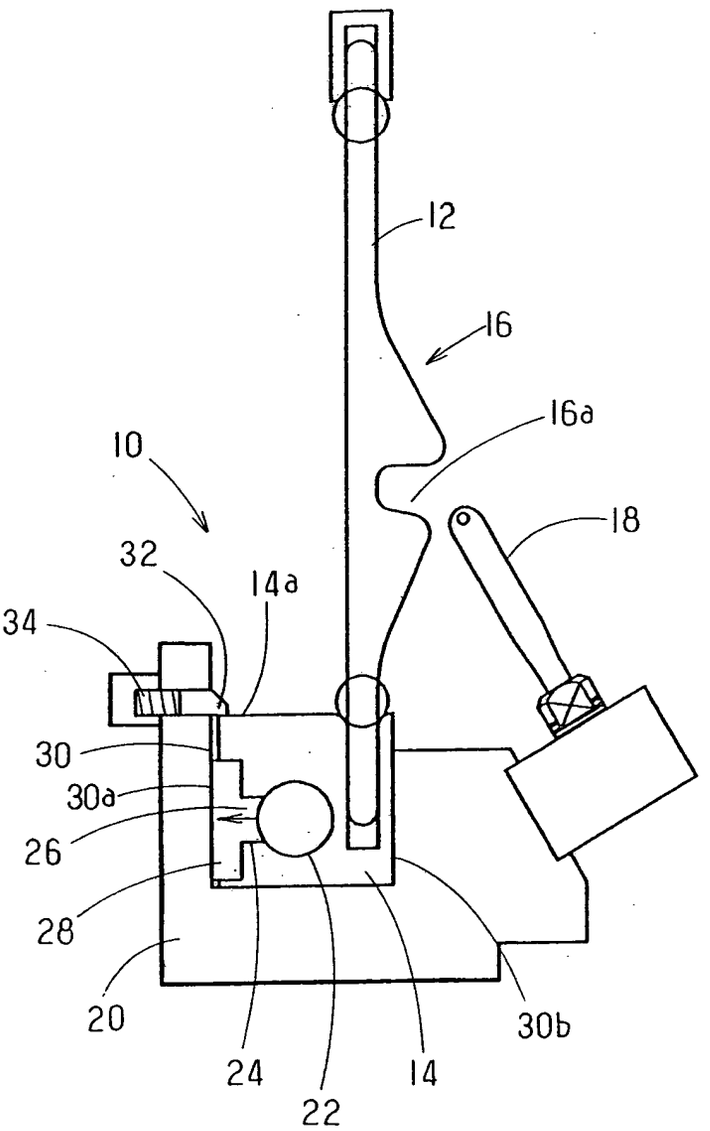


FIG. 2

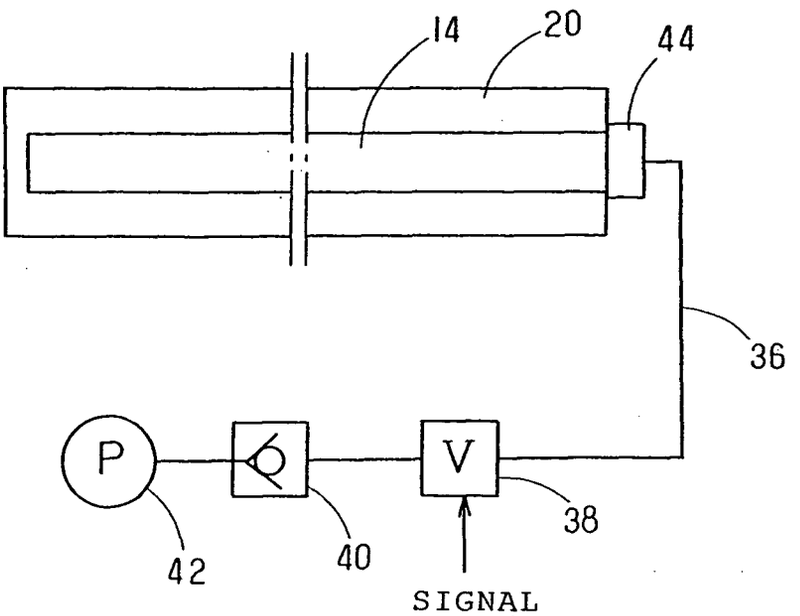


FIG. 3

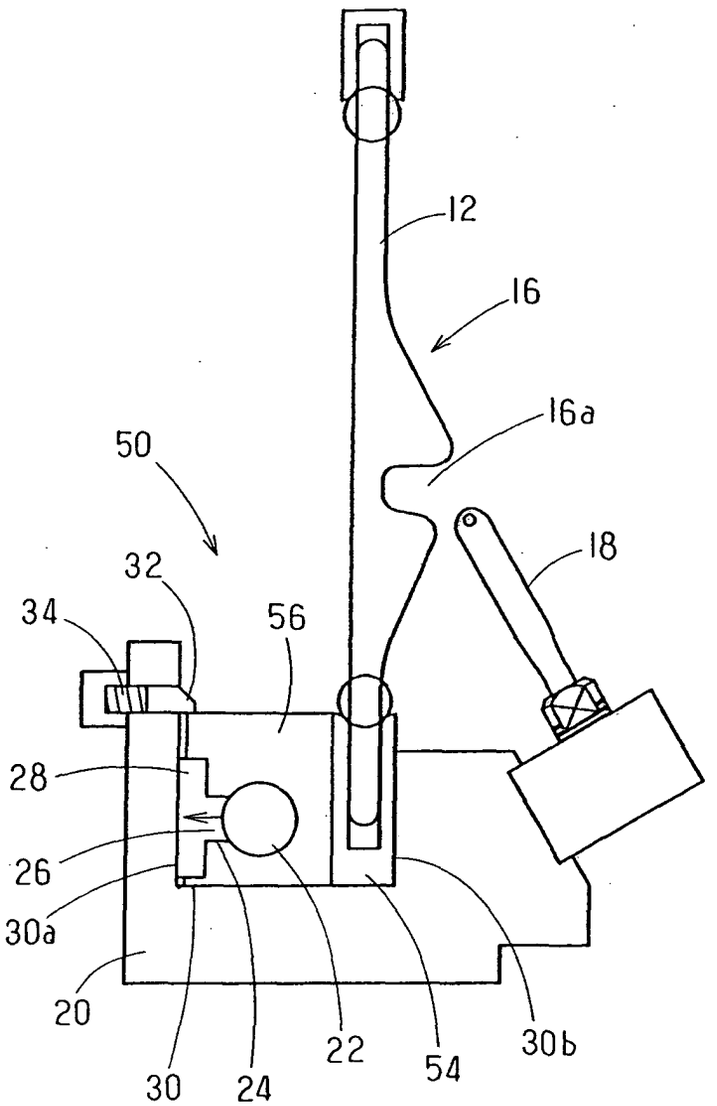


FIG. 4