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(54) Yarn-braking device in weft feeders for textile machines

(57) The device comprises a pair of linear actuators (26, 28) provided with respective driving rods (26a, 28a) parallel to the axis of the drum of the weft feeder. A hollow braking member (32) having a circular profile is anchored to the driving rods (26a, 28a) and is axially biased with its inner surface against the outer surface of the drum (12). The driving rods (26a, 28a) and the hollow braking member (32) are mutually connected by magnetic interconnection means (38, 44) acting in a direction parallel to the axis of the drum.

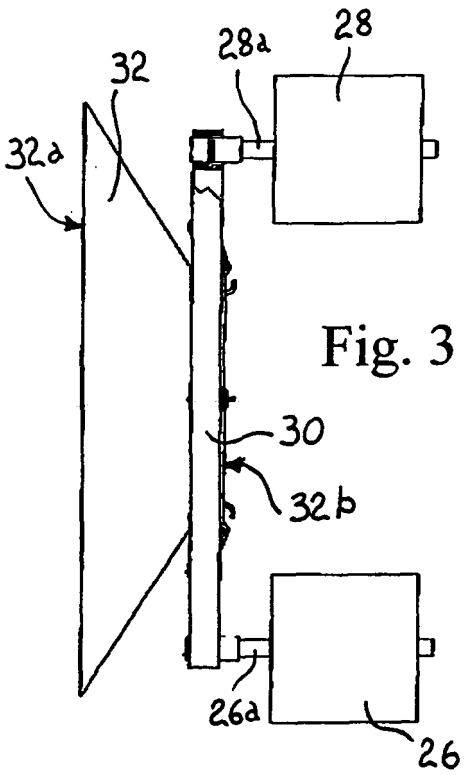

Fig. 3

EP 1 717 181 A1

Description

[0001] The present invention relates to a yarn-braking device in weft feeders for textile machines.

[0002] As known, weft feeders for textile machines comprise a stationary drum on which a motorized, swivel arm winds a plurality of yarn loops forming a weft reserve. Upon request from the loom, the loops are unwound from the drum and are fed to the loom via a braking assembly which controls the tension of the yarn in order to keep it substantially constant.

[0003] In the weft feeders of the above kind, which are intended to be known to the person skilled in the art, the braking assembly typically comprises a frustoconical, hollow member which is coaxially supported with its larger end facing the drum, and is biased with its inner surface against the free end of the drum, which has a beveled edge, from which the loops are unwound. Thus, the unwinding yarn runs between the drum and the frustoconical member, which applies the desired braking action upon the yarn.

[0004] It is known from EP -A- 1 059 375 of Applicant to modulate the pressure applied upon the drum by the cone, and consequently the braking action upon the unwinding yarn, by operatively connecting the braking assembly to one or more linear actuators supplied by a current that is modulated in relation to the variations of the yarn tension, which tension is measured by sensors.

[0005] However, in case of a braking assembly connected to a plurality of equally spaced actuators arranged around the axis of the frustoconical member, it may happen that the actuators are not exactly aligned, due to the unavoidable tolerances, or that their actions are not exactly synchronized. These circumstances frequently give rise to stress and to reacting forces in the areas where the driving rod is connected to the braking assembly, which affect the operation of the actuator and, consequently, the accuracy and the uniformity of the braking action.

[0006] Therefore, it is a main object of the present invention to provide a braking device of the above type provided with a plurality of linear actuators that modulate the action of the braking assembly, which is improved to be not influenced by any misalignment or mistiming of the actuators, in order to provide very accurate and uniform braking actions.

[0007] The above object and other advantages, which will better appear below, are achieved by a yarn-braking device having the features recited in claim 1, while the other claims state other advantageous, though secondary, features of the invention.

[0008] The invention will be now described in more detail with reference to a few preferred, non-exclusive embodiments, shown by way of non-limiting example in the attached drawings, wherein:

Fig. 1 is a view in side elevation of a weft feeder provided with a yarn-braking device according to the invention;

Fig. 2 is a perspective view of the yarn-braking device of Fig. 1;

Fig. 3 is a broken-away view in side elevation of the yarn-braking device of Fig. 2;

Fig. 4 shows a detail to an enlarged scale of Fig. 3;

Fig. 5 is a view similar to Fig. 3, showing an alternative embodiment of the yarn-braking device according to the invention.

[0009] With initial reference to Figs. 1, 2, a weft feeder 10 for textile machines comprises a stationary drum 12 on which a swivel arm 14 driven by a motor 16 winds a plurality of yarn loops forming a weft reserve RT. The delivery edge of drum 12 is beveled in 12a. Upon request from the loom (not shown), the yarn F is unwound from drum 12 and is fed the loom. A stationary drum 17 projects parallel to the axis of drum 12 and supports a braking assembly 18 at its free end, which controls the tension of the yarn in order to maintain it substantially constant.

[0010] Braking assembly 18 comprises a frame 20 supported on a slide 22 which is slidable along stationary drum 17 under control of a worm-screw mechanism (not shown) operable by a knob 24. Frame 20 supports a pair of linear actuators 26, 28 which are arranged with their respective driving rods 26a, 28a parallel to the axis of the drum at respective, diametrically opposed positions. An annular support 30 coaxial to the drum is supported at the free ends of the driving rods. A frustoconical hollow member 32 is coaxially supported, with its larger end 32a facing the drum and its inner surface biased against beveled edge 12a, at the center of annular support 30 by elastic means comprising a spider-assembly of springs 34 each having one end anchored to the annular support and the other end anchored to a ring 36 attached to the smaller end 32b of the frustoconical member. The frustoconical member may be made, e.g., of a metal plate or tissue or laminated plastic impregnated with a polymeric resin.

[0011] In a known way, the yarn F unwound from drum 12 runs between the beveled edge of the drum and frustoconical member 32, which applies the desired braking action upon the yam. The static contact pressure applied upon the drum by the frustoconical member is adjustable by means of knob 24.

[0012] According to this invention, and having now reference to Figg. 3, 4, in order to anchor annular support 30 to driving rods 26a, 28a, each driving rod has a cylindrical metal element 38 attached to the connection end of the rod, which is received with a clearance fit in a respective dead hole or cavity 40 formed on the surface 30a of annular support 30 facing away from the drum. Seats 42 aligned to cavities 40 are formed on the surface 30b facing the drum and are separated from the holes

by a thin wall 30c defining the bottom of both blind hole 40 and the seat 42 aligned thereto. Each seat 42 has a magnetic insert 44 received therein, which is in relation of magnetic attraction with a respective one of the metal elements 38 attached to the end of the driving rods.

[0013] As the person skilled in the art will appreciate, with the anchor system according to the invention, annular support 30 moves integrally with driving rods 26a, 28a, while the clearance fit between metal elements 38 and their respective cavities 40 allows annular support 30 to shift at right angles to the axis of the actuators, thereby compensating any misalignment or mistiming of the actuators without giving rise to stress and reacting forces which, on the contrary, would rise with a rigid connection.

[0014] Another important advantage of the invention is that, with the above magnet-based anchor system, the frustoconical member can be easily and quickly dismounted, e.g., for replacements due to wear of the braking member.

[0015] An alternative embodiment of the invention is described in Fig. 5, wherein the driving rods are directly connected to a mounting ring 136 integral with the smaller end of frustoconical member 32, by means of a magnetic connection similar to the connection described in the first embodiment. In particular, metal elements 138 are attached to the connection ends of driving rods 26a, 28a and are received with a clearance fit in respective cavities 140 formed on a surface of ring 136 facing away from the drum. Seats 142 aligned to holes 40 are formed on the surface of ring 136 facing the drum, and are separated from the holes by a thin wall 130c defining the bottom of both cavity 40 and seat 142 aligned thereto. Each seat 142 has a magnetic insert 144 received therein, which is in relation of magnetic attraction with a respective one of metal elements 138 attached to the end of the driving rods.

[0016] A few preferred embodiments of the invention have been described herein, but of course many changes may be made by a person skilled in the art within the scope of the inventive concept. In particular, the material of the magnetic inserts, as well as the thickness of the wall that separates the inserts from the ends of the driving rods, will be chosen in such a way that the attraction force is capable both to make the frustoconical member move integrally with the driving rods, and to allow the metal elements to slide on the bottom of cavities 140 for the above-mentioned aims. Furthermore, the metal elements may be replaced by other magnetically attractable elements, such as magnetic elements having an opposite polarity with respect to the inserts mounted on annular support 30 - in the first embodiment - or on mounting ring 136 - in the second embodiment - e.g., in order to provide a higher attraction force. Moreover, the braking assembly could also be provided with a higher number of equally spaced actuators arranged around the axis of the frustoconical member and each connected to the annular support, or to the ring, at the same way as described above. In addition, although the braking member described in the above embodiments is frustoconical and has a continuous surface, of course, it forms part of the inventive concept to use other types of braking members having a circular profile and biased against the outer surface of the drum, such as frustoconical members made of a plurality of blades, rings of radial bristles, and the like, which are known to the person skilled in the art.

Claims

1. A yarn-braking device for weft feeders provided with a yarn-storing drum (12) from which the yarn (F) is unwound to be fed to a textile machine, the yarn-braking device comprising at least a pair of linear actuators (26, 28) provided with respective driving rods (26a, 28a) parallel to the axis of the drum, and a hollow braking member (32) having a circular profile, which is anchored to the driving rods (26a, 28a) and is axially biased with its inner surface against an outer surface of the drum (12), **characterized in that** said driving rods (26a, 28a) and said hollow braking member (32) are mutually connected by magnetic interconnection means (38, 44) acting in a direction parallel to the axis of the drum.

2. The device of claim 1, **characterized in that** said braking member consists of a frustoconical hollow member (32) arranged with its larger end facing the drum (12) and biased with its inner surface against a delivery edge (12a) of the drum (12).

3. The device of claim 1 or 2, **characterized in that** said magnetic interconnection means comprise, per each of said actuators (26, 28), a magnetic member (44) which is in integral engagement with one of said braking member (32) and driving rod (26a, 28a) and is in relation of magnetic attraction with a respective attractable element (38) that is in integral engagement with the other one of said braking member and driving rod.

4. The device of claim 3, **characterized in that** said attractable element (38) is attached to one end of said driving rod (26a, 26b) and said magnetic element (44) is in integral engagement with said hollow braking member (32).

5. The device of claim 4, **characterized in that** said hollow braking member (32) is supported on a support (30) made of a non-magnetic material, and **in that** said attractable element (38) is received with a clearance fit in a respective hole (40) formed on a first surface (30a) of said support (30) at right angles to the axis of the braking member.

6. The device of claim 5, **characterized in that** said

magnetic element (44) engages a second surface (30b) of the support (30) facing away from the first surface.

7. The device of claim 6, **characterized in that** said magnetic element (44) is received within a seat (42) formed on said second surface (30b) of the support (30), which seat is aligned to the hole (40) and is separated from the hole by a thin wall (30c).

8. The device of any of claims 3 to 7, **characterized in that** said attractable element consists of a metal element (38).

9. The device of any of claim 4 to 7, **characterized in that** said attractable element (38) consists of a magnetic element having an opposite polarity with respect to the magnetic element which is in integral engagement with said hollow braking member (32).

10. The device of any of claims 5 to 9, **characterized in that** said support consists of an annular support (30) and said hollow braking member (32) is supported at the center of said annular support (30) by elastic means (34).

11. The device of any of claim 5 to 9, **characterized in that** said support (136) is integral with the braking member (32).

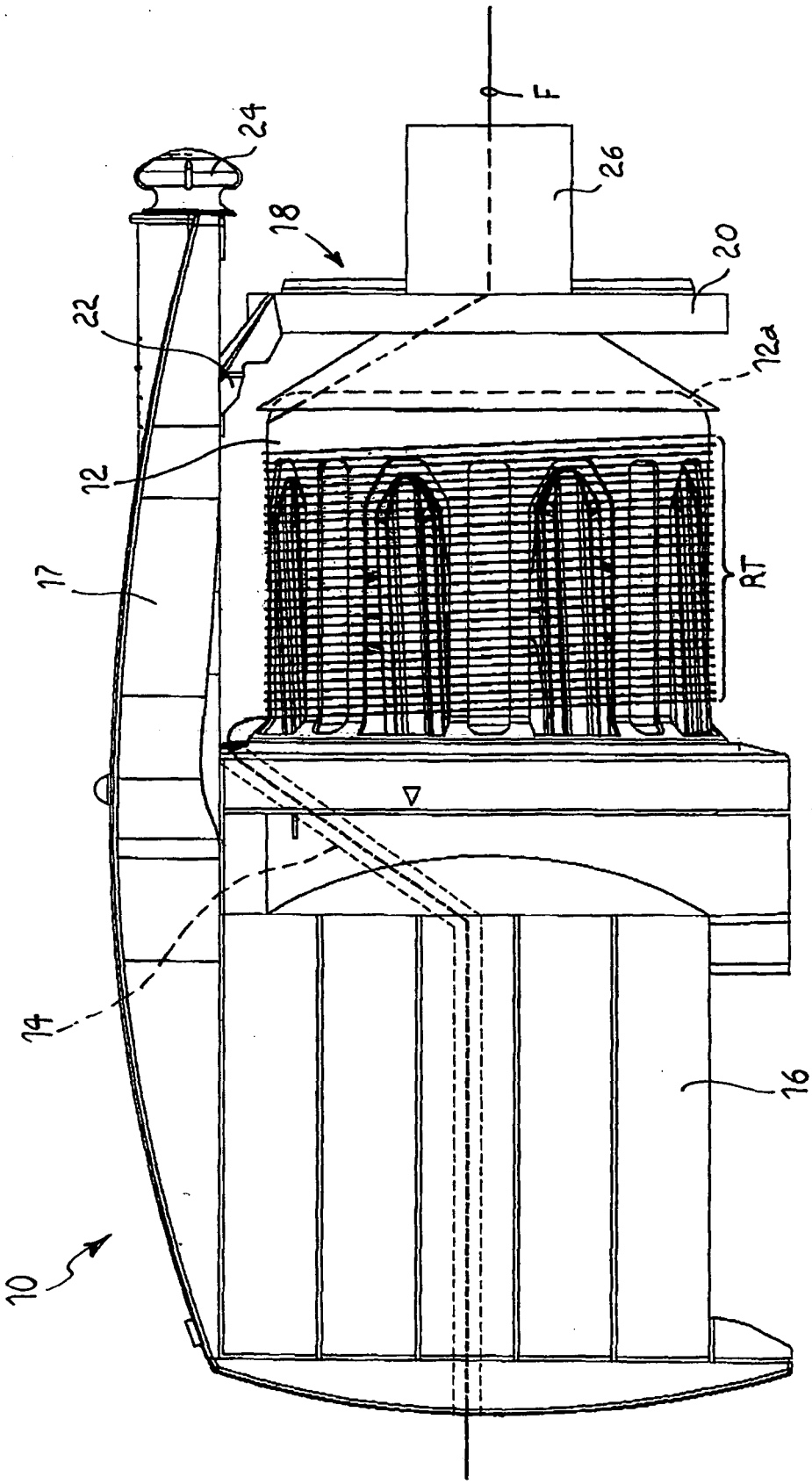

Fig. 1

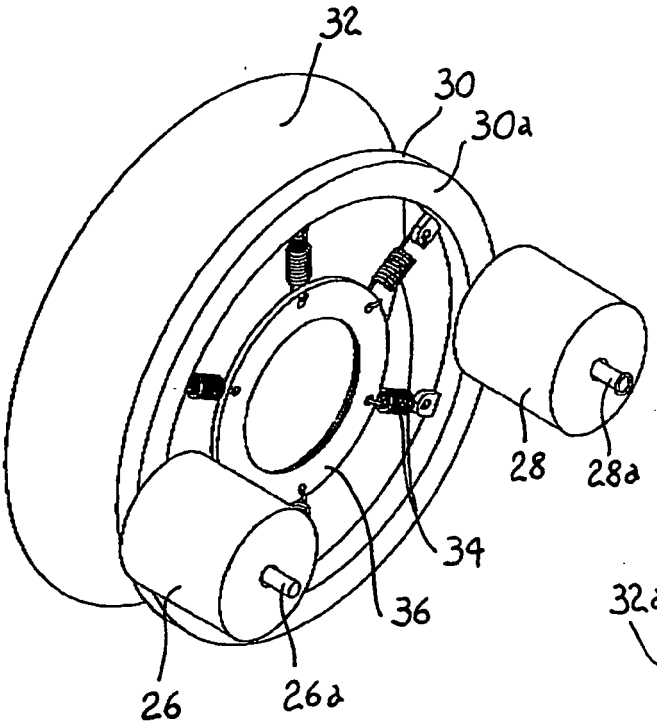

Fig. 2

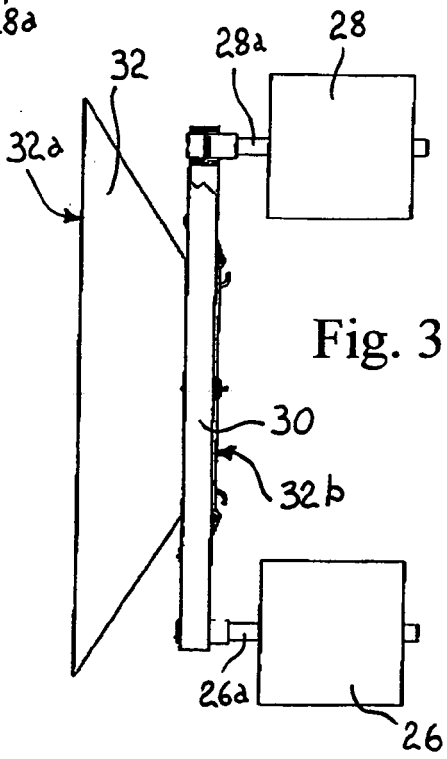

Fig. 3

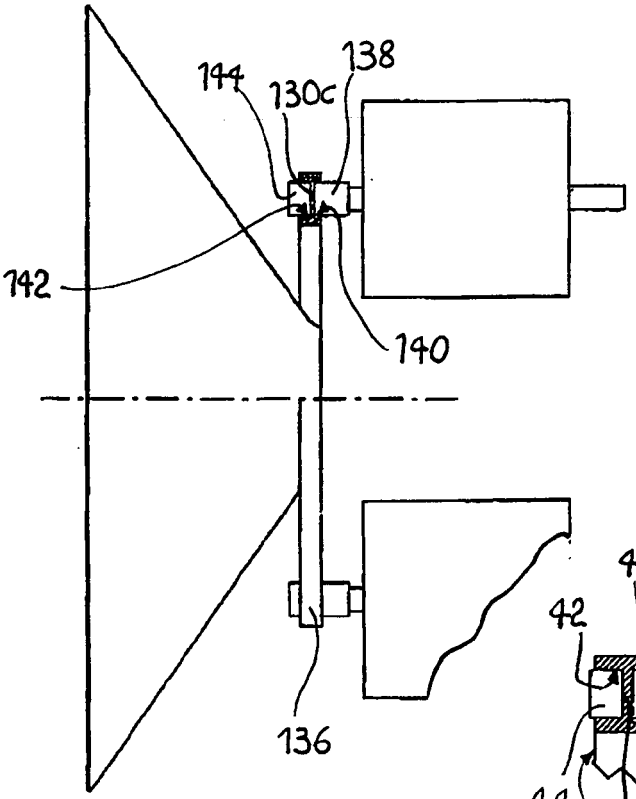

Fig. 5

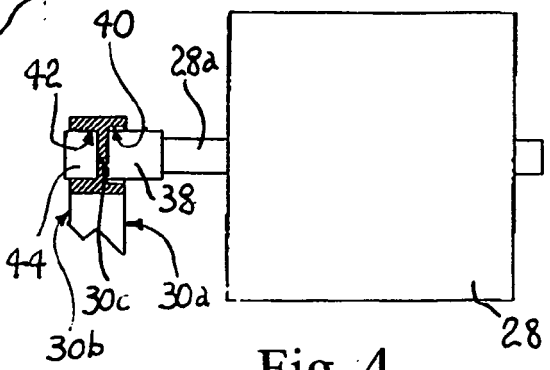

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 06 00 3897

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

B65H
D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 March 2006	Kising, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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