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(54) Weft feeder for weaving machines

(57) A weft feeder for weaving machines, provided with a device for separating the loops on a loom cylinder, comprises a motor housing (11) and a loom cylinder (12) on which a swivel arm (13) operated by a motor winds a plurality of yarn loops (F) forming a weft reserve. The swivel arm (13) is shaped as a rectilinear tube (13) and obliquely projects from a hub (14) keyed to a hollow driving shaft (15) through which the thread (F) runs.

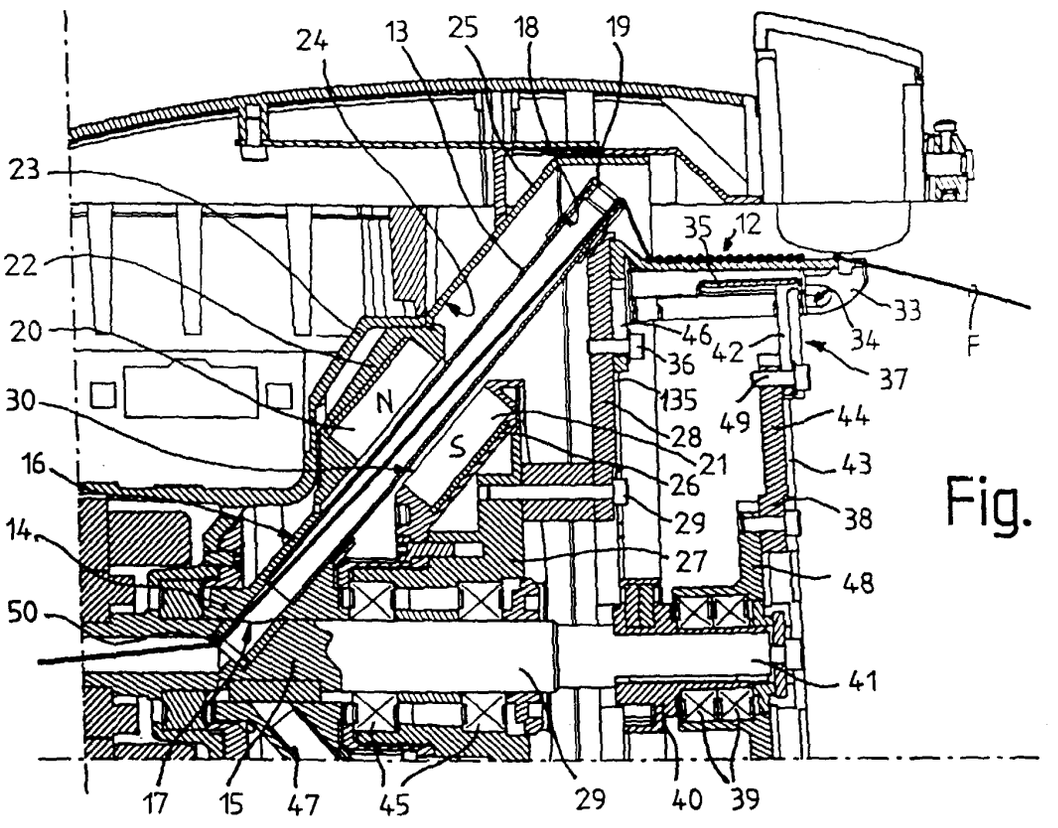


Fig. 2

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Description

[0001] The present invention relates to a weft feeder for weaving machines, provided with a device for separating the loops on the cylinder.

[0002] As well known, weft feeders for weaving machines comprise a stationary cylinder, on which a swivel arm operated by a motor winds a plurality of thread loops forming a weft reserve. To this purpose, the driving shaft is hollow and the thread runs inside it. The thread exits through an outlet made on a middle section of the shaft, passes through a channel extending along a generatrix of a frustoconical plate constituting said weft-winding arm and keyed to the shaft, and then is wound on the cylinder. On request of the loom, the loops are unwound from the cylinder and are fed to the loom via a braking device adapted to keep the tension of the thread substantially constant.

[0003] Since the arm, during its thread-winding rotation, swivels between the cylinder and the motor housing, the latter cannot be connected to each other by rigid means such as screws, bolts, or the like. Accordingly, in order to fasten the cylinder to the motor housing, two complementary, frustoconical crowns are employed, in which are agglomerated respective permanent, counter-polarized magnets. One of the crowns is frontally fastened to the motor housing, the other one to the cylinder. By drawing the cylinder, supporting its respective magnetic crown, near the motor housing provided with the other magnetic crown, a firm connection of these parts is attained, as well as a gap between them, as necessary for the passage of the arm while winding the thread on the cylinder.

[0004] Certain small-sized feeders in which, e.g., the circle followed by the outlet of the weft-winding arm is under 200 mm in diameter, are provided with a transport system adapted to progressively shift the loops, during unwinding, from the base to the head of the cylinder, thereby separating the loops from one another. The system substantially comprises a reel of rods adapted to cyclically rise through corresponding longitudinal slots of the cylinder. The rods are driven by a skew bush keyed to the driving shaft. However, the rocking motion of the device affects the cylinder's motion and causes the latter to be deviated from its angular position about the motor housing. Thus, neodymium-based magnets have been introduced whose magnetic force, for equal sizes, is three to five times as large as the traditional, ferrite-based magnets.

[0005] In large-sized weft feeders, e.g. over 250 mm in diameter, the inertial force upon the weft-winding arm must be reduced. However, at the same time, the arm must be rigid in order to prevent any collisions or frictions while swiveling between the crowns, due to the centrifugal force or vibrations. Accordingly, such arms are made of aluminum, but this measure prevents providing such feeders with the device for separating the loops. In fact, the neodymium-based magnets, which are used for firmly fastening the cylinder to the motor housing in the presence of such device, cannot be used in that they generate high induced currents in the aluminum arm, thereby causing the arm to be heated up to over 60 °C, which heating is harmful for the thread.

[0006] Therefore, a main object of the present invention is to remove such drawback of the known devices by providing a weft feeder for weaving machines, which is provided with a device for separating the loops on the cylinder, in which the cylinder is firmly secured to the motor housing independently of its size. This object is particularly desirable with large-size weft-feeders, e.g. over 250 mm in diameter.

[0007] Another object of this invention is to provide a weft feeder which is unexpensive and may be manufactured easily and by means of equipment commonly employed in this field.

[0008] The above mentioned objects and advantages, which will better appear below, are achieved by the weft-feeding device having the features recited in claim 1, while the dependent claims state other advantageous features.

[0009] The invention will now be described in more detail with reference to a preferred, non-exclusive embodiment, shown by way of non limiting example in the attached drawings, wherein:

Fig. 1 is a perspective view of a weft feeder according to this invention;

Fig. 2 is a partial, longitudinal section view of the weft feeder of Fig. 1;

Fig. 3 is a front view of the motor housing with swivel arm of the weft feeder of Fig. 1.

[0010] With reference to the above mentioned figures, a weft feeder 10 comprises a motor housing 11 and a cylinder 12 on which a rectilinear, tubular swivel arm 13 winds a plurality of yarn loops forming a weft reserve. Swivel arm 13 obliquely projects from a hub 14 keyed to a driving shaft 15. Driving shaft 15 is hollow and the thread F runs inside it. Tube 13 is made of a composite material obtained by pultrusion, and one of its ends engages an oblique channel 16 of hub 14. The channel terminates into an opening 17 made on a middle section of shaft 15. Accordingly, the thread passes through driving shaft 15, exit through opening 17, runs inside tube 13 and exits through the free end 18 of the latter to be wound on cylinder 12. In order to reduce the friction of the thread coming out of tube 13, a ceramic bush 19 with beveled edges engages the free end 18 of tube 13. Similarly, in order to reduce the friction of the thread exiting driving shaft 15, a further ceramic bush 50 engages opening 17. In order to balance driving shaft 15 when swiveling, hub 14 supports a false tube 47 that is symmetrically arranged with respect to tube 13. Weight, shape and inertia of false tube 47 are equal to tube 13.

On request of the loom (not shown), the loops unwind from cylinder 12 and are fed to the loom via breaking device (also not shown) adapted to keep the tension of the thread F substantially constant.

[0011] The connection between cylinder 12 and motor housing 11 must allow arm 13 to freely swivel between them. Accordingly, such system comprises a plurality of first, neodymium-based, permanent magnets 20 fastened to motor housing 11, and second neodymium-based, permanent magnets 21, which are counter-polarized with respect to the first ones and are fastened to cylinder 12. First magnets 20 are housed in respective first seats 24, along a circumferential groove 23 made on a concave surface 24 of a substantially frustoconical crown 25, which is coaxially fastened to motor housing 11. Second permanent magnets 21 are housed in respective second seats such as 26, which are attached to a support 27 fastened to a base 28 of cylinder 12 by screws 29, and face the first magnets. Accordingly, second permanent magnets 21 define a convex, frustoconical surface 30 matching the internal surface 24 of crown 25. Support 27 is pivotally supported on a middle portion 29 of driving shaft 15 by means of bearings 45.

[0012] Feeder 10 is provided with a device for separating the loops on cylinder 12. To this purpose, the latter consists of six sections 33 each provided with four longitudinal grooves 34, through which cyclically rise respective rods 35 adapted to progressively displace the loops from the base to the head of cylinder 12. Each section 33 is fastened to base 28 by means of a tongue 46 engaging a corresponding radial groove 135 frontally made on base 28. Tongue 46 is lockable at predetermined radial positions by means of screws 36, for adjustment of diameter of cylinder 12.

[0013] Rods 35 are assembled in sets of four rods, thereby forming six combs such as 37 which are supported on a star-shaped support 38 which is fastened do a flange 48. The latter is pivotally supported on a skew bush 40 by means of bearings 39. Skew bush 40 is keyed to the end portion 41 of driving shaft 15. Each comb 37 holds a spoke 42 engaging a respective radial groove 43 frontally made along a beam 44 of star-shaped support 38. Each spoke is lockable in its radial position by means of screws 49, so that the reel of combs can be adjusted in diameter in relation to the diameter of cylinder 12. The rotation exerted by driving shaft 15 upon skew bush 40 causes support 38 to rock without rotating, and each set of rods 35 to cyclically rise through respective grooves 34.

[0014] It has been found in practice that the invention achieves the stated object by providing a weft feeder for weaving machines, provided with a device for separating the loops on the cylinder, in which the cylinder is firmly fastened to the motor housing independently of the size of the feeder. Particularly, tube 13, being made of a composite material obtained by pultrusion and having a high mechanical rigidity and low electrical conductivity, avoids the generation of induced currents. Consequently, neodymium-based magnets can be used and the device for separating the thread loops can be also employed in large-size weft feeders, e.g. over 250 mm in diameter.

[0015] A further advantage of the device according to this invention is that it is easy and cheap to manufacture, because the materials obtained by pultrusion are manufactured in large scale in continuous production lines.

[0016] The invention can be changed in different ways within the scope of its inventive concept, and all the details can be replaced with other technically equivalent elements.

[0017] In practice the materials, provided that compatible with the specific use, as well as the shapes and sizes can be different, depending on the requirements.

Claims

1. A weft feeder for weaving machines including a device for separating the loops on a loom cylinder, comprising a motor housing (11) and a loom cylinder (12) on which a swivel arm (13) operated by a motor winds a plurality of yarn loops (F) forming a weft reserve, **characterized in that** said swivel arm (13) is shaped as a rectilinear tube (13) obliquely projecting from a hub (14) keyed to a hollow driving shaft (15) through which the thread runs.

2. The feeder of claim 1, **characterized in that** the tube (13) is made of a composite material obtained by pultrusion.

3. The feeder of claim 1 or 2, **characterized in that** one of the ends of the tube (13) engages an oblique channel (16) of the hub (14), the channel terminating into an opening (17) of the shaft (15) from which the thread (F) comes out.

4. The feeder of any of the above claims, **characterized in that** it comprises a ceramic bush (19) having beveled edges and engaging the free end (18) of tube (13).

5. The feeder of any of the above claims, **characterized in that** it comprises a ceramic bush (50) having beveled edges and engaging opening (17).

6. The feeder of any of the above claims, **characterized in that** it comprises a balancing tube (47) fastened to the hub (14) and symmetrically arranged with respect to the tube (13), the weight, shape and inertia of balancing tube (47) being equal to tube (13).

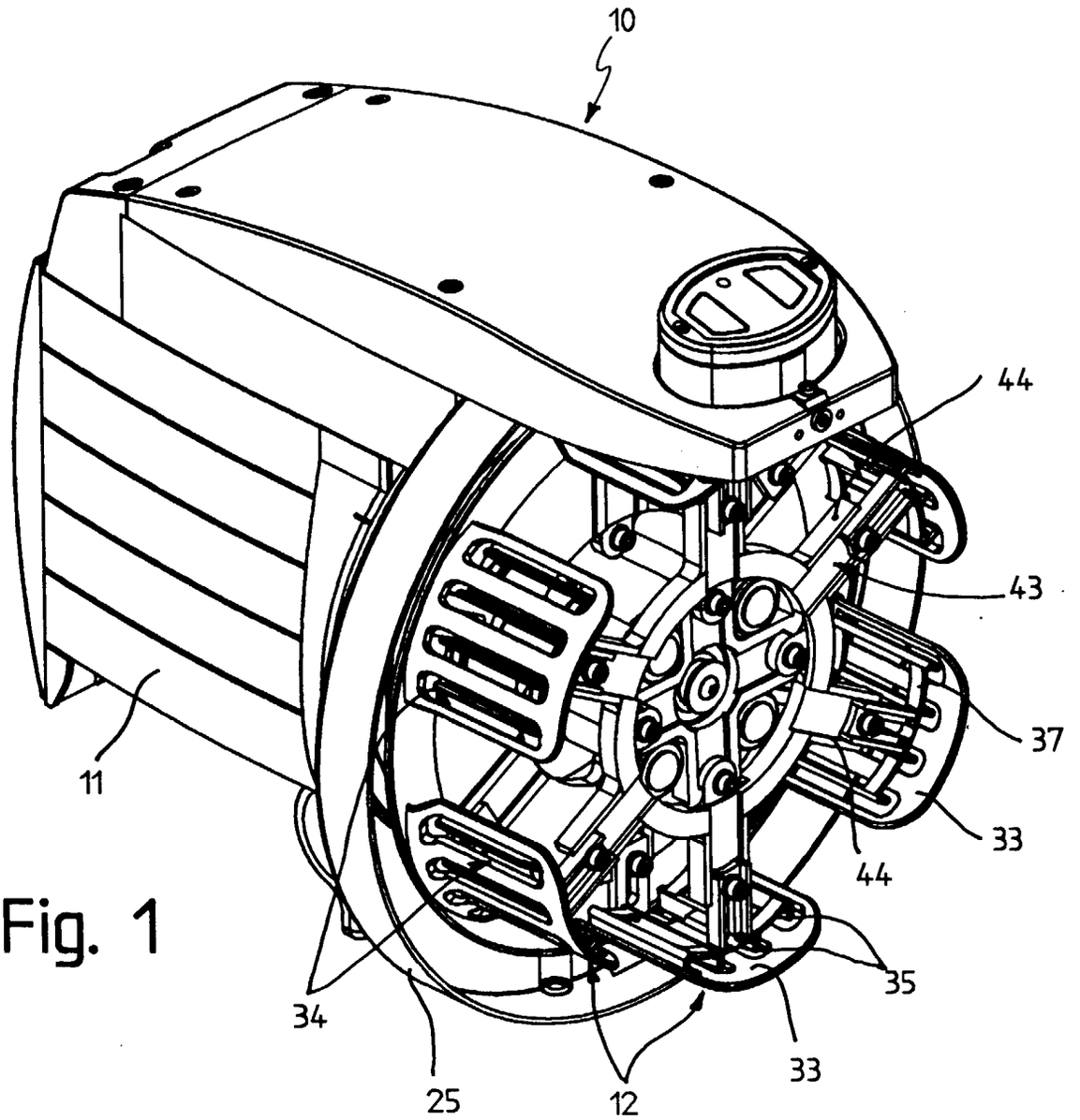


Fig. 1

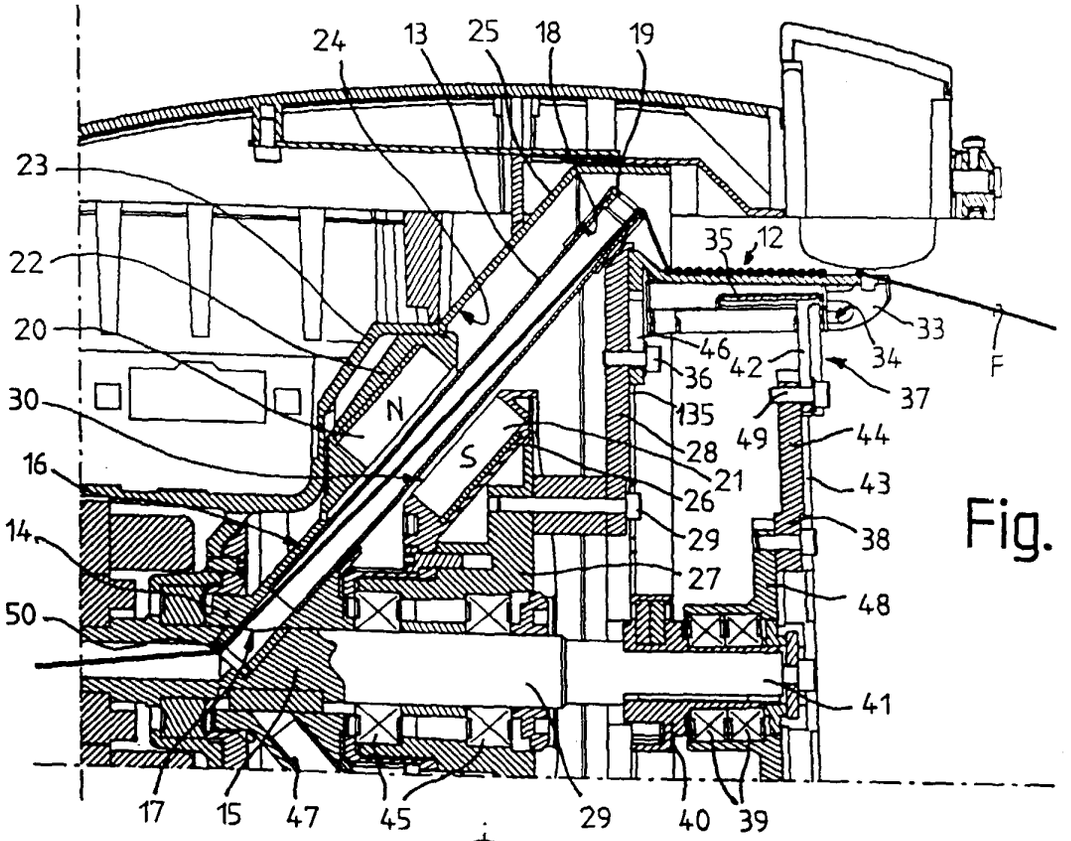

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Fig. 2

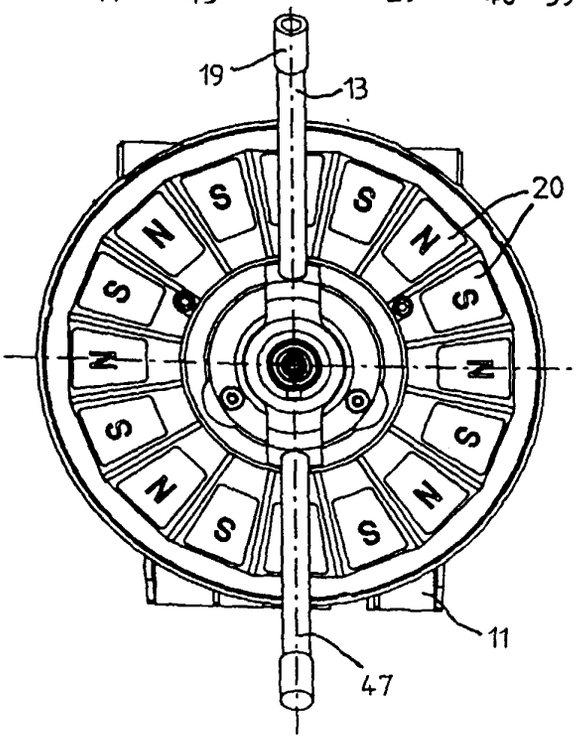

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Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 1582

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	EP 0 469 527 A (ROY ELECTROTEX SPA) 5 February 1992 (1992-02-05) * column 5, line 30-43; figures 1,3 *	1,3,6	B65H51/22 D03D47/34 D04B15/48
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65H
D03D
D04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	20 August 2003	Dreyer, C

CATEGORY OF CITED DOCUMENTS

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