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(54) **Weft feeder for weaving looms with improved means for the advancement and separation of the weft reserve turns**

Schussfadentiefervorrichtung für Webmaschinen mit verbesserte Mittel zum Vorschub und Trennen von Schussfadenreservewindungen

Fournisseur de trame pour métiers à tisser avec des moyens améliorés pour l'avancement et la séparation des boucles des fils de réserve

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Description

[0001] The present invention relates to an improvement to weft feeders for textile looms.

[0002] More specifically, the invention relates to weft feeders of the type that comprises a fixed drum on which a windmilling arm winds a plurality of turns of yarn which constitute a weft reserve and from which the turns unwind, when requested by the loom, under the control of a braking element which ensures the necessary mechanical tension of said yarn.

[0003] As it is well-known to the skilled in the art, these weft feeders have a movement device which is suitable to move the turns wound by the windmilling arm from the base to the free end of the drum; said device also separates the turns from each other by an extent, or separation pitch, which can be changed in order to pack or spread out said turns in order to increase or respectively decrease the weft reserve.

[0004] Said conventional device is constituted by a set of movement rods which partially and cyclically protrude from corresponding slots of the drum and are subjected to a movement system suitable to make said rods perform a substantially undulatory motion by virtue of which all the turns are raised cyclically from the surface of the drum and deposited back onto it after being caused to advance longitudinally toward the free end of the drum by an extent which is equal to the preset spacing pitch. The movement rods, arranged parallel to the generatrices of the drum, are individually connected, by means of respective spokes, to a central hub which is rotationally coupled, with a rolling bearing interposed so that the hub is rotationally fixed, to a bush which is rigidly connected to the driving shaft of the feeder and whose axis is oblique with respect to the axis of said driving shaft.

[0005] Usually, in conventional movement systems there is provided a cylindrical bush with an inclined axis which is fitted on an eccentric portion of the driving shaft. This known arrangement has modest radial dimensions but significantly increases the complexity and the cost of the machining of the driving shaft on which the eccentric portion meant to receive the bush must be provided.

[0006] It is also known from prior EP-164,033 to provide the oblique bush by forming it with two hollow bodies, the first one of which is keyed on the driving shaft and is eccentric with respect to the axis of the drum of the feeder, while the second one is mounted so that it can rotate on the first one, with respect to which it can be locked in at least two different angular positions, and has an external surface which is inclined with respect to said axis. This further known configuration of the oblique bush eliminates the need to provide the eccentric portion of the driving shaft, but it has the drawbacks of considerable radial bulk and of a high cost arising from its greater structural complexity and from the need to interpose larger rolling bearings between the bush and the

hub of the movement rods.

[0007] The aim of the present invention is to eliminate the above-mentioned drawbacks of both conventional movement systems.

[0008] Within the scope of this general aim, a main object of the present invention is to provide a weft feeder with means for the advancement and separation of the turns of the weft reserve which are improved so as to require no particular and expensive machinings of the driving shaft and at the same time have extremely modest radial dimensions as well as a considerable structural simplification, with consequent reduced manufacturing and assembly costs.

[0009] According to the present invention, this aim, this main object and others which will become apparent from the detailed description that follows are achieved by an improved weft feeder with means for moving and separating the turns of the weft reserve as specified, characterized in that the oblique bush of said means is constituted by a first bush body, which is substantially semicylindrical and is suitable to be detachably associated with the driving shaft in order to delimit an eccentric portion on said shaft, and by a second bush body, which is cylindrical and hollow and is suitable to be fitted on said eccentric portion of the shaft which is delimited by said first bush body and has an external surface which is inclined with respect to the axis of the driving shaft.

[0010] Advantageously, according to the invention, said first bush body is made of plastics and is provided with a radially protruding pin which is suitable to engage a corresponding radial hole of the driving shaft in order to prevent angular movements of said first body with respect to the shaft, so as to ensure the phasing of said first body with respect to eccentric balancing masses which are associated with said shaft.

[0011] Further characteristics and advantages of the present invention will become apparent from the following detailed description and with reference to the accompanying drawings, wherein:

Figure 1 is a side elevation view of a weft feeder;
 Figure 2 is a partially sectional view of a detail of Figure 1, illustrating the configuration of the improved bush and of the means for moving and separating the turns of weft reserve on the drum of the feeder of Figure 1;
 Figure 3 is a perspective view of the first body of said improved bush;
 Figure 4 is a sectional view, taken along the line IV-IV of Figure 3;
 Figure 5 is a partially sectional perspective view of the general arrangement of the improved bush of Figure 2;
 Figure 6 is a transverse sectional view, taken along the line VI-VI of Figure 5.

[0012] First with reference to Figure 1, reference sign 10 generally designates a conventional weft feeder

which comprises a fixed base 11 and a fixed drum 12 on which a hollow arm 13, actuated by the hollow driving shaft 14 of the feeder 10, winds in a windmilling fashion a plurality of turns of yarn F which constitute a weft reserve RT.

[0013] When requested by the loom or other textile machine, the turns of the reserve RT unwind from the free end of the drum in the advancement direction DS under the control of a braking means (not shown) which is supported by a supporting ring 15, whose axial position can be changed by means of a knob 16 in order to adjust the braking action.

[0014] A movement system is associated with the drum 12 and is suitable to move the turns wound by the windmilling arm 13 from the base toward the free end of the drum 12, keeping them separated by an extent s , termed separation pitch, which can vary within preset limits.

[0015] In a per se known manner, said movement system is constituted by a set of movement rods 17 which partially and cyclically protrude from corresponding slots 18 provided in the cylindrical surface of the drum 12. The rods 17 are individually connected, by means of respective spokes 19, to a hub 20 which is rotationally coupled, with a rolling bearing 22 interposed, to a bush which is keyed to the driving shaft 14 and whose axis is oblique with respect to the axis "a" of said driving shaft.

[0016] According to the present invention, there is provided an improved bush, generally designated by the reference numeral 30, which comprises a first bush body 31 which is substantially semicylindrical (Figures 3 and 4) and a second bush body 32 which is cylindrical and hollow and whose external surface 32a is inclined with respect to the axis of the driving shaft 14. The first bush body 31 is adapted to be detachably associated on a recessed part of the driving shaft 14 in order to delimit on said shaft an eccentric portion 14a which is suitable to receive the second cylindrical and hollow bush body 32 fitted thereon. For this purpose, the first bush body 31 has, in cross-section, a crescent-shaped profile (Figures 4 and 6) which is internally delimited by a portion of the external circumference C_e of the driving shaft 14 and externally delimited by a portion of the internal circumference C_i of the second bush body 32; the two circumferences are tangent in a point P which is diametrically opposite to the part of the shaft portion 14 that receives said first bush body 31.

[0017] Advantageously, according to the invention the first bush body 31 is made of plastics, typically chosen in the group that comprises acetal resins and the material known by the acronym ABS (acrylonitrile-butadienestyrene) and has a pin 33 which protrudes radially toward the concave part of said body. A corresponding radial hole 34 of the shaft 14 cooperates with said pin and receives it in order to prevent said first bush body 31 from performing angular movements, maintaining and therefore ensuring its phasing with respect to eccentric balancing masses 35 provided in the shaft 14

(Figure 2).

[0018] The effects of the present invention of course also cover models which achieve an equal utility by using the same inventive concept.

[0019] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A weft feeder (10) for weaving looms of the type that comprises a fixed drum (12) on which a windmilling arm (13) winds a plurality of turns of yarn which constitute a weft reserve (RT) and wherein there is provided a movement device for moving the turns from the base to the free end of the drum; said device comprising rods (17) which are associated with a central hub (20) which is rotationally coupled, with a rolling bearing (22) interposed, to an oblique bush (30) which is keyed on the driving shaft (14) of the feeder (10), **characterized in that** said oblique bush (30) is constituted by a first bush body (31), which is substantially semicylindrical and is adapted to be detachably associated with the driving shaft (14) in order to delimit an eccentric portion (14a) on said shaft, and by a second bush body (32), which is cylindrical and hollow and is suitable to be fitted on said eccentric portion (14a) which is delimited by said first bush body and has an external surface (32a) which is inclined with respect to the axis of the driving shaft (14).
2. The weft feeder according to claim 1, **characterized in that** the first bush body (31) has, in cross-section, a crescent-shaped profile which is internally delimited by a portion of the external circumference (C_e) of the driving shaft (14) and is externally delimited by a portion of the internal circumference (C_i) of the second bush body (32); the two circumferences (C_e - C_i) being tangent in a point (P) which lies diametrically opposite to the part of the shaft portion (14) that receives said first bush body (31).
3. The weft feeder according to claims 1 and 2, **characterized in that** the first bush body (31) is made of a plastic material chosen among acetal resins and ABS.
4. The weft feeder according to claims 1 to 3, **characterized in that** the first bush body (31) has a pin (33) which protrudes radially toward the concave part of said body and is suitable to engage a corresponding radial hole (34) of the driving shaft (14) in

order to prevent angular movements of said first body (31) with respect to said shaft (14) and ensure the angular phasing of the first body (31) with eccentric balancing masses (35) associated with said driving shaft (14).

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Patentansprüche

1. Schussfaden-Zuführgerät (10) für Webmaschinen vom Typ mit einer feststehenden Trommel (12), auf die ein Windmühlenarm (13) eine Vielzahl von Garnwindungen wickelt, die eine Schussfadenreserve (RT) bilden, und bei dem eine Bewegungsvorrichtung zum Bewegen der Windungen von der Basis zum freien Ende der Trommel vorgesehen ist, wobei die Vorrichtung Stäbe (17) enthält, die mit einer zentralen Nabe (20) verbunden sind, die unter Zwischenschaltung eines Wälzlagers (22) mit einer schiefen Buchse (30) drehgekoppelt ist, die auf der Antriebswelle (14) des Zuführgerätes (10) verkeilt ist, **dadurch gekennzeichnet, dass** die schiefe Buchse (30) durch einen ersten Buchsenkörper (31), der im wesentlichen halbzyllindrisch ist und dafür eingerichtet ist, abnehmbar mit der Antriebswelle (14) verbunden zu werden, um einen exzentrischen Teil (14a) auf der Welle abzugrenzen, und durch einen zweiten Buchsenkörper (32) gebildet wird, der zylindrisch und hohl ist und geeignet ist, auf den exzentrischen Teil (14a) der Welle gesteckt zu werden, der durch den ersten Buchsenkörper abgegrenzt wird, und eine Außenfläche (32a) hat, die in Bezug auf die Achse der Antriebswelle (14) schief ist.
2. Schussfaden-Zuführgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Buchsenkörper (31) im Querschnitt ein halbmondförmiges Profil hat, das innen durch einen Teil des Außenumfanges (Ce) der Antriebswelle (14) abgegrenzt wird und außen durch einen Teil des Innenumfanges (Ci) des zweiten Buchsenkörpers (32) abgegrenzt wird; die zwei Umfänge (Ce-Ci) sind in einem Punkt (P) tangential, der dem Teil des Wellenteils (14), der den ersten Buchsenkörper (31) aufnimmt, diametral entgegengesetzt liegt.
3. Schussfaden-Zuführgerät nach den Ansprüchen 1 und 2, **dadurch gekennzeichnet, dass** der erste Buchsenkörper (31) aus einem Kunststoffmaterial besteht, nämlich einem der Materialien Acetalharz und ABS.
4. Schussfaden-Zuführgerät nach den Ansprüchen 1 bis 3, **dadurch gekennzeichnet, dass** der erste Buchsenkörper (31) einen Stift (33) enthält, der radial gegen den konkaven Teil des Körpers vorsteht und geeignet ist, in ein entsprechendes radiales

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Loch (34) der Antriebswelle (14) einzugreifen, um Winkelbewegungen des ersten Körpers (31) in Bezug auf die Welle (14) zu verhindern und die Winkelphasenlage des ersten Körpers (31) zu exzentrischen Wuchtmassen (35) sicherzustellen, die mit der Antriebswelle (14) verbunden sind.

Revendications

1. Fournisseur de trame (10) pour des métiers à tisser, du type qui comprend un tambour fixe (12) sur lequel un bras à autorotation (13) enroule une pluralité de spires de fil qui constituent une réserve de trame (RT) et dans lequel il est prévu un dispositif à mouvement pour déplacer les spires de la base vers l'extrémité libre du tambour ; ledit dispositif comprenant des tiges (17) qui sont associées à un moyeu central (20) qui est couplé de façon rotative, avec un roulement (22) interposé, à une douille oblique (30) qui est clavetée sur l'arbre d'entraînement (14) du fournisseur (10), **caractérisé en ce que** ladite douille oblique (30) est constituée par un premier corps de douille (31), qui est sensiblement hémicylindrique et est adapté pour être associé, de façon amovible, à l'arbre d'entraînement (14) de façon à délimiter une portion excentrique (14a) sur ledit arbre, et par un second corps de douille (32), qui est cylindrique et creux et est approprié pour s'adapter sur ladite portion excentrique (14a) qui est délimitée par ledit premier corps de douille et présente une surface externe (32a) qui est inclinée par rapport à l'axe de l'arbre d'entraînement (14).
2. Fournisseur de trame selon la revendication 1, **caractérisé en ce que** le premier corps de douille (31) présente, en coupe transversale, un profil en croissant qui est délimité intérieurement par une portion de la circonférence externe (Ce) de l'arbre d'entraînement (14) et est délimité extérieurement par une portion de la circonférence interne (C1) du second corps de douille (32) ; les deux circonférences (Ce - Ci) étant tangentes en un point (P) qui se trouve diamétralement opposé à la partie de la portion d'arbre (14) qui reçoit ledit premier corps de douille (31).
3. Fournisseur de trame selon les revendications 1 et 2, **caractérisé en ce que** le premier corps de douille (31) est réalisé en une matière plastique choisie parmi des résines acétals et l'ABS.
4. Fournisseur de trame selon les revendications 1 à 3, **caractérisé en ce que** le premier corps de douille (31) présente un ergot (33) qui fait saillie radiale-

ment vers la partie concave dudit corps et est approprié pour engager un trou radial correspondant (34) de l'arbre d'entraînement (14), de façon à empêcher des mouvements angulaires dudit premier corps (31) par rapport audit arbre (14) et à assurer la mise en phase angulaire du premier corps (31) avec des masses d'équilibrage excentriques (35) associées audit arbre d'entraînement (14).

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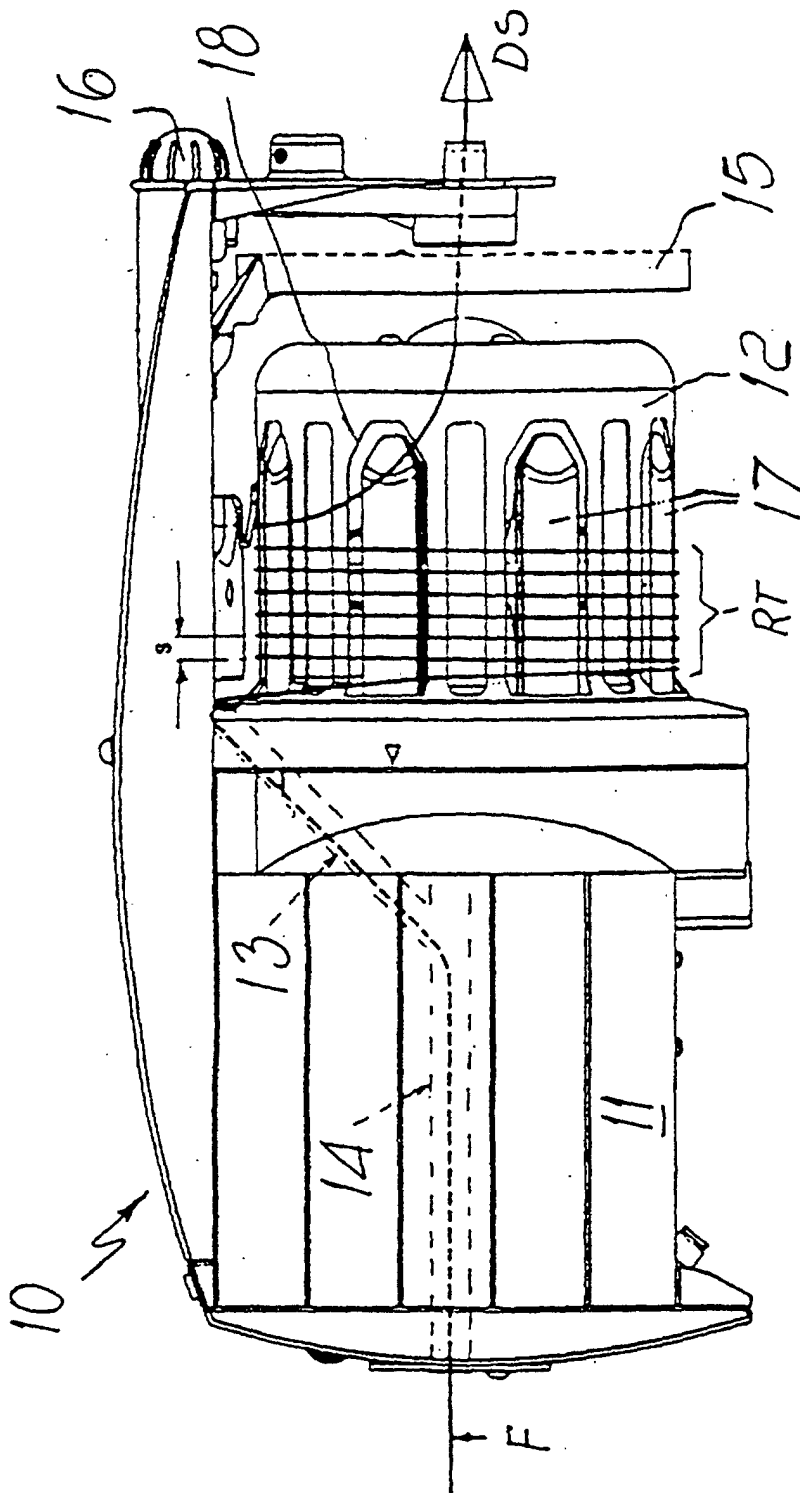


FIG. 1

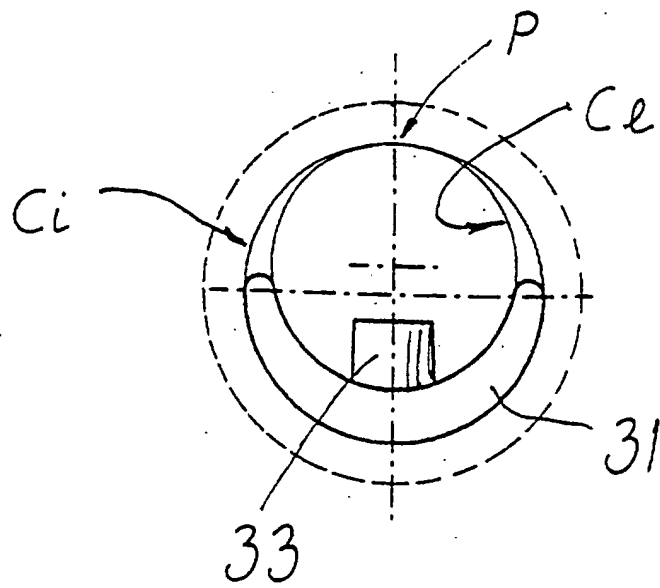
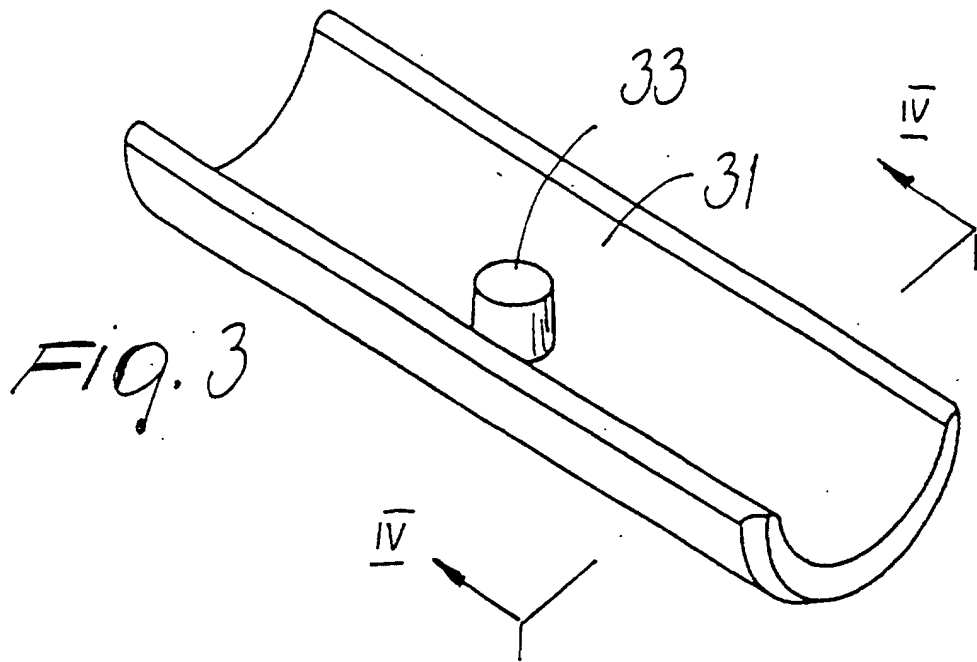


FIG. 4

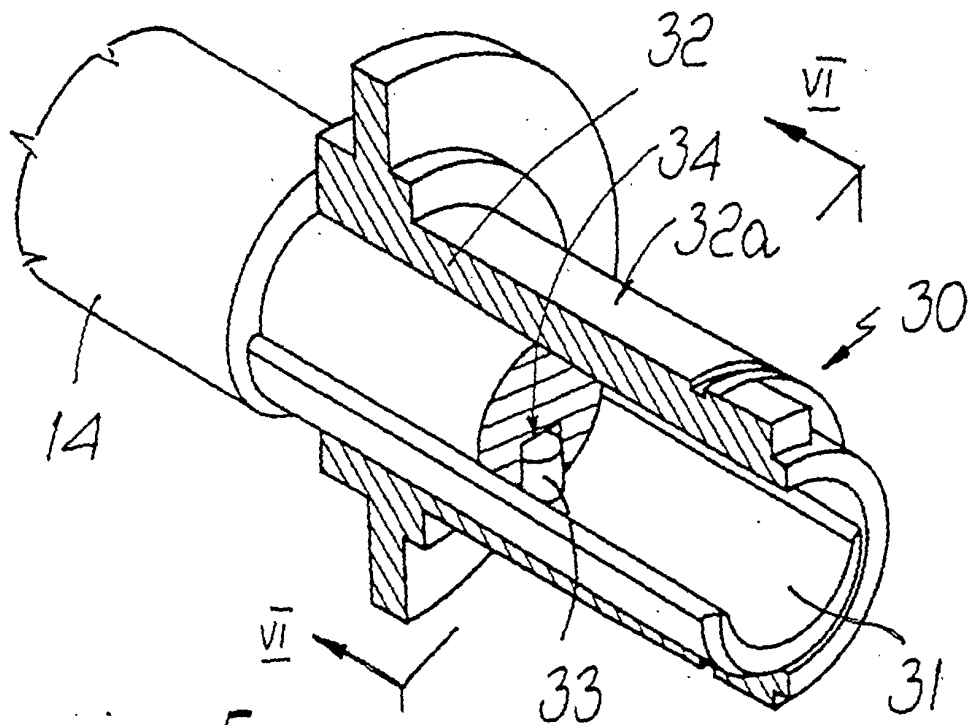


FIG. 5

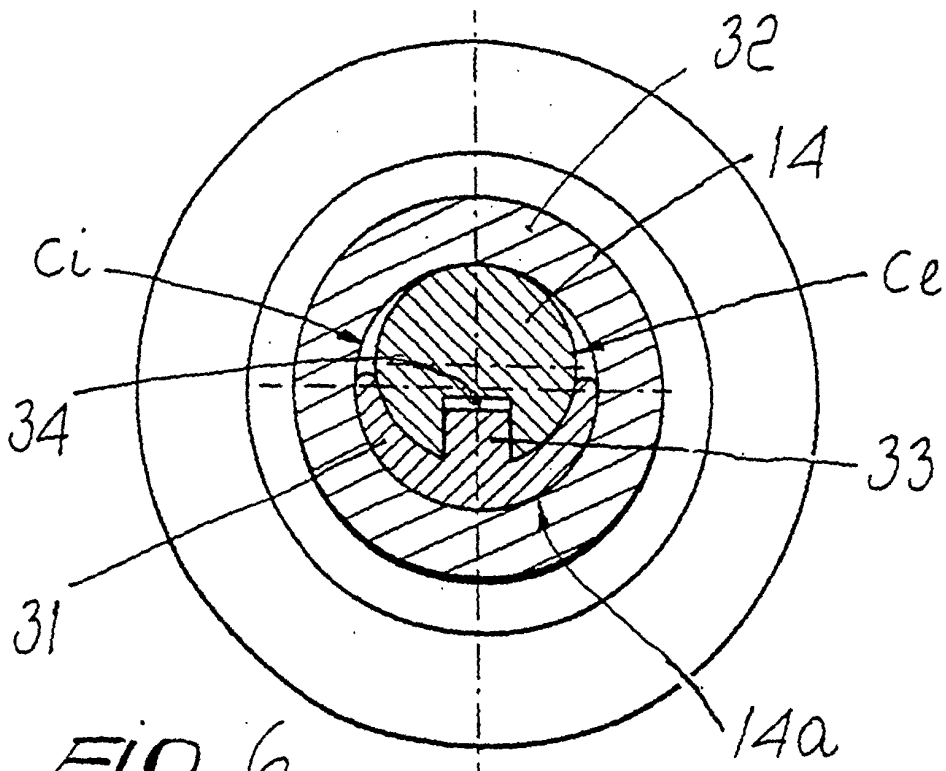


FIG. 6