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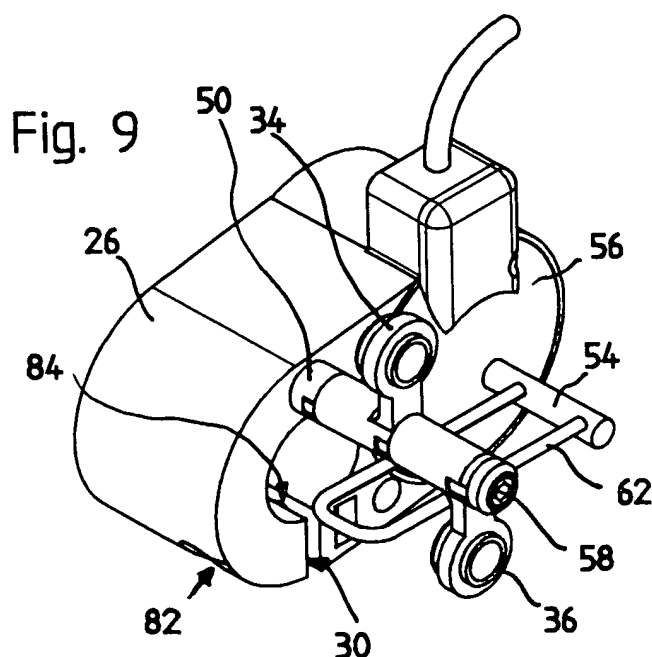
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(54) **Yarn-braking device for textile machines**

(57) A yarn-braking device for textile machines comprises a supporting structure (26) that supports a set of three yarn-guiding bushes (34,36,64), through which the weft yarn can pass, and a U-shaped braking element (62) that is connected to motor means (56) and straddles the central bush. The braking element engages the

yarn in the free regions between the central bush and the end bushes, thereby braking the yarn. The bushes are fixed to supporting means (38,40) whose position can be adjusted in order to modify the mutual position of the bushes so that the deflection of the yarn can be adjusted during braking.



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Description

[0001] This invention relates to a yarn-braking device for textile machines.

[0002] A known braking device, described in IT-A-01303154, comprises a set of three fixed coaxial yarn-guiding bushes, through which the weft yarn passes, tracing a straight path in the region between the bushes. An oscillating lever is connected to a U-shaped braking element, which straddles the central bush in order to engage the yarn, during braking, in the free portions between the central bush and the end bushes. The lever is articulated to the stem of a linear motor which, when actuated, causes its oscillation. The lever, by deflecting the yarn from its straight path, brakes it by friction.

[0003] Although this known device offers an adequate response in terms of reaction to the rapid variations in the mechanical tension of the yarn, it is however unsatisfactory from the point of view of adaptability to various kinds of yarn. Depending on whether the yarn is more or less "dry", a more or less forceful braking action is tolerable, but known devices cannot be adjusted in this regard.

[0004] The aim of the present invention is therefore to overcome this shortcoming of known devices, by providing a yarn-braking device for textile machines that can be configured adequately in relation to the type of yarn, thereby allowing a softer braking action to be generated if required by the characteristics of the yarn.

[0005] An object of the invention is to provide said yarn braking device so that it is simple and straightforward to be adjusted.

[0006] Another object of the invention is to provide said device so that it has a low cost and is simple to manufacture and can be produced by virtue of known equipment and systems commonly used in the field.

[0007] The above object as well as other objects and advantages that will become better apparent hereinafter are achieved by the braking device having the characteristics stated in claim 1, while the subordinate claims define other advantageous characteristics.

[0008] The invention is now described in greater detail with reference to a preferred embodiment thereof and to an alternative embodiment, both illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a lateral elevation view of a weft feeder provided with a braking device according to the invention;

Figure 2 is an exploded enlarged-scale side view of the braking device of Figure 1;

Figure 3 is an exploded perspective view of the braking device of Figure 1;

Figure 4 is an enlarged-scale side view of the brak-

ing device of Figure 1 in the inactive condition, configured for forceful braking;

Figure 5 is a side view of the braking device of Figure 1, configured as in Figure 4 but during operation;

Figure 6 is an enlarged-scale side view of the braking device of Figure 1 in the inactive condition, configured for softer braking;

Figure 7 is a side view of the braking device of Figure 1, configured as in Figure 6 but during operation;

Figure 8 is a perspective view of the braking device of Figure 1, configured as in Figures 4 and 5;

Figure 9 is a perspective view of the braking device of Figure 1, configured as in Figures 6 and 7;

Figures 10 and 11 are a front view and a partially sectional side view, respectively, of an alternative implementation of the braking device according to the invention, configured for a forceful braking;

Figures 12 and 13 are a front view and a partially sectional side view, respectively, of the braking device according to the implementation of Figures 10 and 11, but configured for softer braking.

[0009] With reference to Figure 1, a generic weft feeder 10 comprises a motor body 12 to which a fixed drum 14 is connected. An arm 15, swiveling in a fishing-reel fashion and actuated by a motor located in body 12, winds onto the drum 14 multiple turns of yarn F, which constitute a weft reserve.

[0010] A braking device 20, provided according to the invention and shown in greater detail in Figures 2 to 9, is supported at the end 22 of a fixed arm 16, which protrudes from the motor body 12 parallel to the axis of the drum 14.

[0011] In order to fix the device to the arm 16, the end 22 of said arm is curved radially toward the axis of the drum 14 and rigidly supports a hollow pivot 24, on which the supporting structure 26 of the braking device 20 is clamped in a vise-like fashion. For this purpose, the supporting structure 26 has a cylindrical cavity 28, whose diameter matches the diameter of the pivot 24 and is suitable to form a seat for said pivot. The wall of the cylindrical cavity 28 has a longitudinal slit 30, and the braking device 20 is locked onto the pivot 24 by virtue of fixing screws, which are inserted in a tangential hole 82 formed in an edge of the slit and engage in corresponding threaded holes 84 formed in the opposite edge (Figures 3, 8 and 9).

[0012] Two sleeves 38 and 40, which support respective yarn guiding bushes 34 and 36 whose axis is parallel

and spaced with respect to the axis of the sleeves, are pivoted on a bush supporting pivot 42, which is parallel to the hollow pivot 24 and is accommodated in a protruding cylindrical seat 50 of the supporting structure 26. The distance between the axis of the bushes 34 and 36 and the axis of the sleeves 38 and 40 is substantially equal to the distance between the axis of the bush supporting pivot 42 and the axis of the hollow pivot 24. The sleeves 38 and 40 are arranged in head-to-head contact on the bush supporting pivot 42, and the end sleeve 40 has, at the annular surface that makes contact with the central sleeve 38, teeth 44 in diametrically opposite positions, which can engage in corresponding seats 46 formed in the adjacent edge of the central sleeve 38. Likewise, said central sleeve is in head-to-head contact with the cylindrical seat 50 and has, on the annular surface that lies opposite the surface that contacts the end sleeve 40, teeth 48 that can engage in corresponding seats 52 formed in the edge of the cylindrical seat 50. The central sleeve 38 is clamped in a pack-like fashion between the cylindrical seat 50 and the end sleeve 40, so that the teeth 44, 48 engage in the respective seats 46 and 52 by virtue of locking screws 58 and 60 which are engaged at the appropriately threaded opposite ends of the pivot 42 and abut respectively against the end sleeve 40 and against the base of the cylindrical seat 50. The outlet of the hollow pivot 24 also forms a final bush 64 for the yarn F.

[0013] A U-shaped braking element 62 straddles the central bush 34 and is fixed radially to the shaft 54 of a rotary motor 56 that is rigidly coupled to the supporting structure 26.

[0014] In operation, the weft yarn F that unwinds from the drum 14 passes inside the hollow pivot 24 and through one or both of the yarn guiding bushes 34 and 36, depending on the configuration of the device as will become better apparent hereinafter, tracing a straight path when the brake is inactive. By activating the rotary motor 56, the braking element 62 is made to oscillate and therefore deflects the yarn F from its straight path and brakes it by friction.

[0015] By arranging the central bush 34 in the active configuration for forceful braking, coaxially to the end bush 36 (Figures 4, 5 and 8), the braking element 62 deflects the yarn in three regions 70, 72 and 74 in the portion that lies between the outlet of the hollow pivot 24 and the final bush 36.

[0016] If one wishes to configure the device for softer braking, the locking screws 58 and 60 are loosened in order to disengage the teeth 44, 48 of the sleeves from the respective seats 46 and 52, the central bush 34 is turned over through 180°, placing it in a passive position, and the assembly constituted by the sleeves and the cylindrical seat is again tightened in a pack-like fashion. In this manner, the braking element 62 deflects the yarn in only two regions 76 and 78, in the portion between the outlet of the hollow pivot 24 and the end bush 36, and this deflection is furthermore much less drastic

than in the preceding case (Figures 6, 7 and 9). One thus obtains a softer braking action, which is particularly suitable for certain types of yarn.

[0017] Figures 10 to 13 illustrate a constructive variation of the braking device according to the invention, in which the similar parts, designated by the same reference numeral as in the preceding figures increased by 100, are not described further. The central bush 134 can perform a radial translational motion in a vertical direction and has an oval shape, its major axis being parallel to the direction of radial translational motion. For this purpose, said bush rigidly supports a threaded seat 86, in which a screw 88 is engaged; said screw is accommodated rotationally in a receptacle 90 formed in a block 100 that is mounted detachably on a pivot 142 that is rigidly coupled to the supporting structure 126, and said screw is in abutment on said receptacle 90. There are also retention guides (not shown), of a kind that is obvious to the person skilled in the art, which are suitable to prevent the rotation of the central bush 134 with respect to the supporting structure, particularly during adjustment. The central bush 134 can be locked in an end position in which no interference occurs during braking with the yarn that passes through it. The end bushes 164, 136 are supported by respective bushings 200, 202 mounted on the pivot 142.

[0018] By acting on the screw 88 it is possible to offset axially by the chosen extent the central bush 134 with respect to the end bushes 164 and 136, accordingly varying the extent of the deflection applied to the yarn by the U-shaped braking element and therefore the force of the braking action. Moreover, by moving the central bush 134 into its lower end position (Figures 12 and 13), it does not interfere at all, during braking, with the yarn that passes through it, thus providing a softer braking action that is equivalent to the action that would be obtained by removing the central bush.

[0019] In practice, it has been found that the invention fully achieves the intended aim and objects, since it provides a weft yarn braking device that can be adjusted for more or less forceful braking depending on the type of yarn. Moreover, the adjustment of said braking device is simple and straightforward to perform and requires no particular care or refinements.

[0020] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept, and all the details may furthermore be replaced with other technically equivalent elements. For example, the rotary motor suitable for moving the U-shaped braking element 62, 162 can be replaced with an apparatus that has a linear motor and lever systems of the type described in the prior patent cited above.

Claims

1. A yarn-braking device for textile machines, com-

prising a supporting structure (26) that supports a set of three yarn-guiding bushes (34, 36, 34) through which the weft yarn (F) can pass, and a U-shaped braking element (62) that is connected to motor means (56) and straddles the central bush (34) in order to engage the yarn (F), during braking, in the free regions between the central bush (34) and the end bushes (36, 64), thereby braking the yarn (F) by friction, **characterized in that** said bushes (34, 36, 64) are fixed to supporting means whose position is adjustable in order to modify the mutual position of the bushes (34, 36, 64).

2. The device of claim 1, **characterized in that** said supporting means can be locked selectively in a first position, in which the central bush (34) is substantially coaxial to the end bushes (36, 64) and is crossed by the yarn (F), or in a second position, in which the central bush (34) is axially offset with respect to the end bushes (36, 64) and is not crossed by the yarn (F).
3. The device of claim 2, **characterized in that** said supporting means comprise sleeves (38, 40) whose axis is parallel and spaced with respect to the axis of the respective bushes (34, 36), said sleeves being pivoted on a bush supporting pivot (42) that is rigidly coupled to the supporting structure (26).
4. The device of claim 3, **characterized in that** said sleeves (38, 40) are arranged in head-to-head contact on the bush supporting pivot (42) and one of them is in abutment on a base (50) of the pivot that is rigidly coupled to the supporting structure (26).
5. The device of claim 4, **characterized in that** said sleeves (38, 40) and said base (50) of the pivot have, at the annular surfaces where mutual contact occurs, means for mutual interlocking (44, 46, 48, 52), which can be locked selectively in one of said first or second positions.
6. The device of claim 5, **characterized in that** said mutual interlocking means comprise teeth (44, 48) protruding from said contact surfaces and can engage in corresponding seats (46, 52) formed on the adjacent contact surfaces.
7. The device of claim 5, **characterized in that** the central sleeve (36) is clamped in a pack-like fashion between said base (50) and the end sleeve (38), said mutual interlocking means being mutually engaged, by virtue of a pair of clamping screws (58, 60) engaged at the opposite threaded ends of the bush supporting pivot (42) and in abutment respectively on the end sleeve (36) and on the base (50).
8. The device of claim 4, **characterized in that** said

base is a protruding cylindrical seat (50) of the supporting structure (26) which accommodates said bush supporting pivot (42).

9. The device of claim 1, **characterized in that** said central bush (134) can perform a radial translational motion and can be locked in an axially offset position with respect to the end bushes (136, 164).
10. The device of claim 9, **characterized in that** said supporting means comprise a threaded seat (86), which is rigidly coupled to the central bush (134) and in which a screw (88) can engage, said screw being engaged rotatably in a receptacle (90) that is rigidly coupled to the supporting structure (26) and in abutment against the receptacle (90).
11. The device of claim 10, **characterized in that** said receptacle (90) is formed in a block (100) that is mounted detachably on a pivot (142) that is rigidly coupled to the supporting structure (126).
12. The device of claim 11, **characterized in that** the end bushes (164, 136) are supported by respective bushings (200, 202) mounted on the pivot (142).
13. The device of one of claims 9 to 12, **characterized in that** it comprises retention means that are suitable to prevent the rotation of the central bush (134) with respect to the supporting structure (26).
14. The device of one of claims 9 to 13, **characterized in that** the central bush (134) can be locked in an end position in which no interference occurs during braking with the yarn (F) that passes through it.
15. The device of one of claims 9 to 14, **characterized in that** the central bush (134) is oval and its major axis is parallel to the direction of radial translational motion.
16. The device of one of the preceding claims, for use on a generic weft feeder (10) comprising a motor body (12), **characterized in that** said supporting structure (26, 126) comprises means (16, 24, 28) for fixing to the motor body (12).
17. The device of claim 16, **characterized in that** said fixing means comprise a fixed arm (16) that protrudes from the motor body (12) and rigidly supports, at one end (22), a hollow pivot (24) that is inserted detachably in a complementary seat (28) of the supporting structure (26, 126).
18. The device of claim 17, **characterized in that** said complementary seat (28) has a longitudinal slit (30) on its wall, and **in that** the locking of the supporting structure (26, 126) on the hollow pivot (24) is

achieved by virtue of fixing screws, which are inserted in a tangential hole (82) formed in an edge of the slit (30) and engage in corresponding threaded holes (84) provided on the opposite edge.

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- 19.** The device of claim 17, **characterized in that** one of said end bushes is the outlet (64) of the hollow pivot (24).

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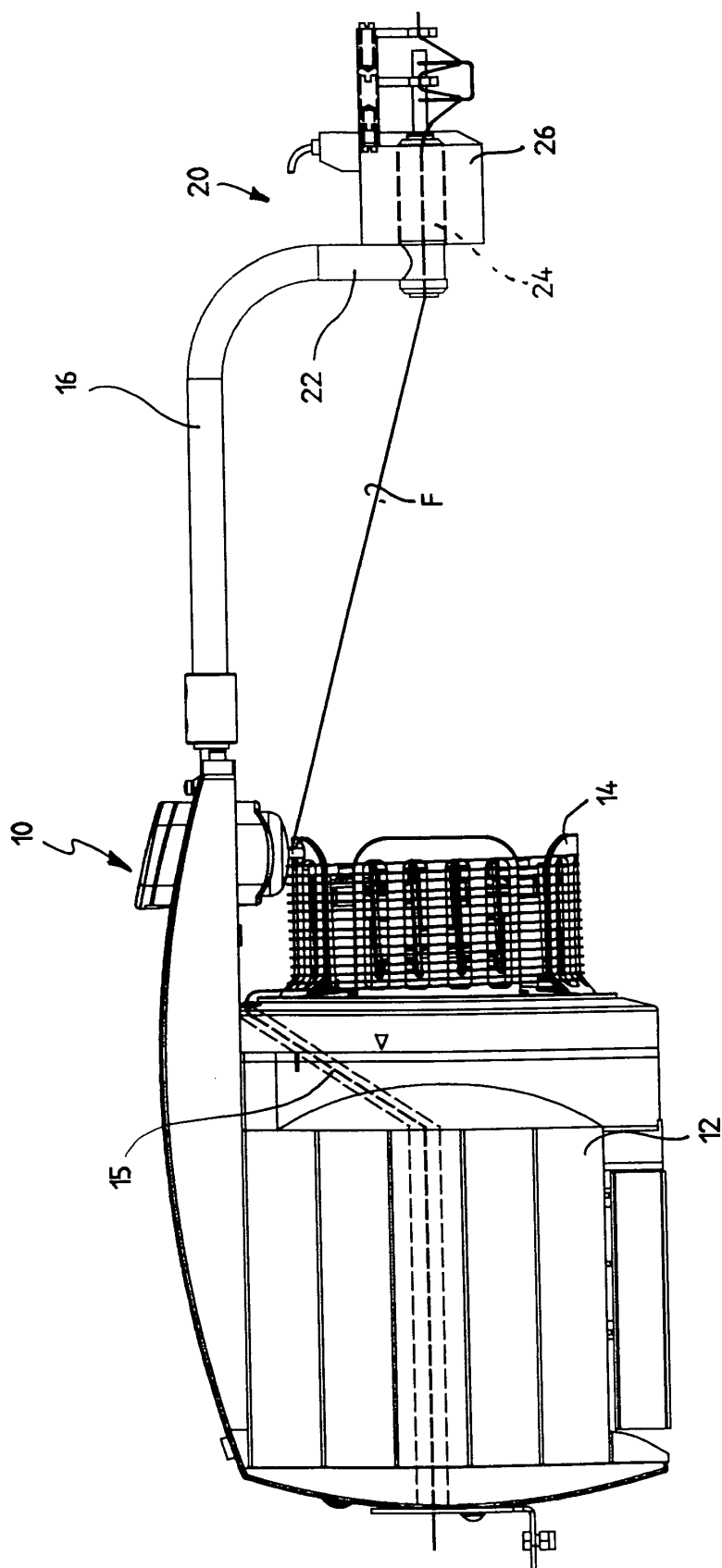
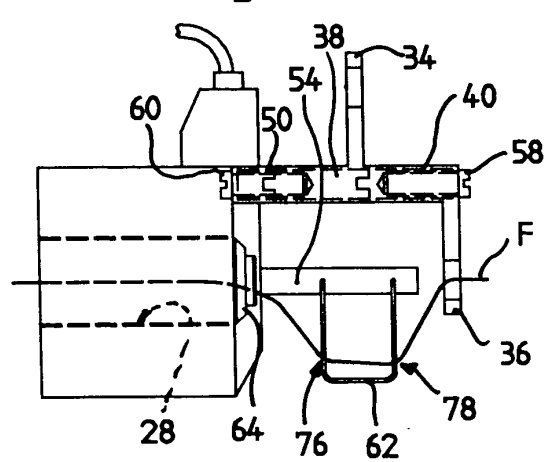
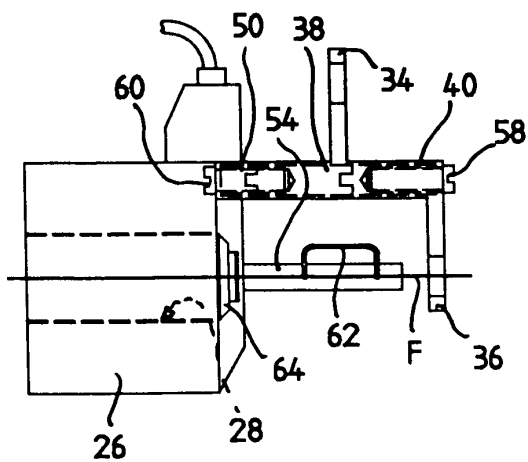
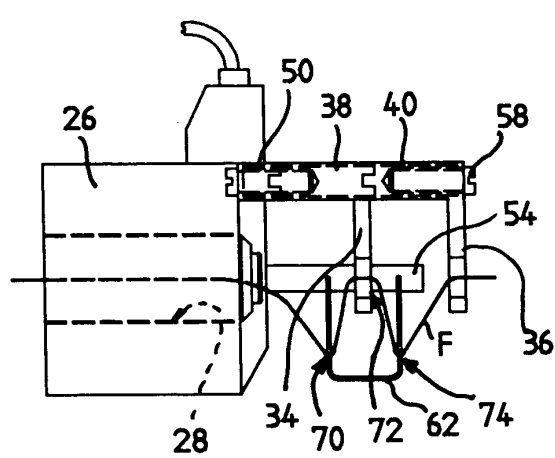
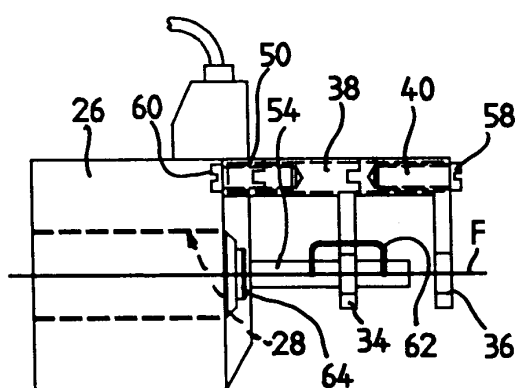
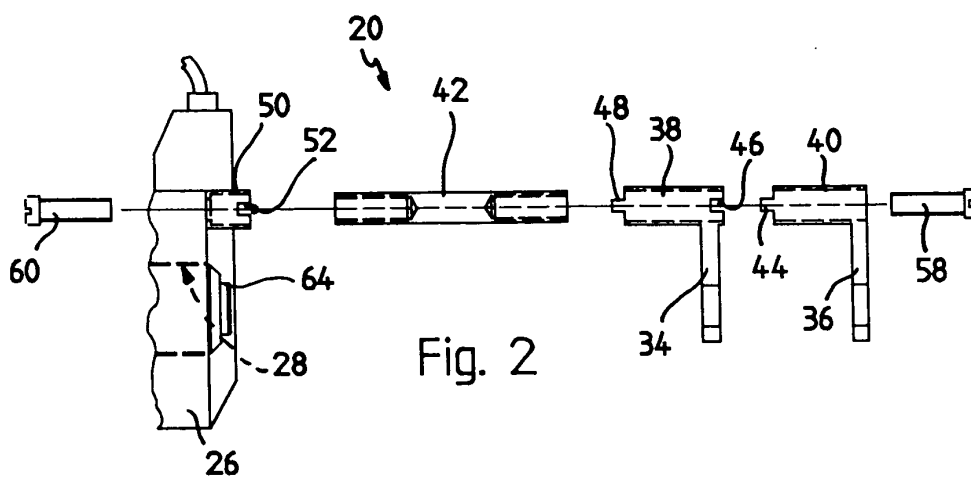
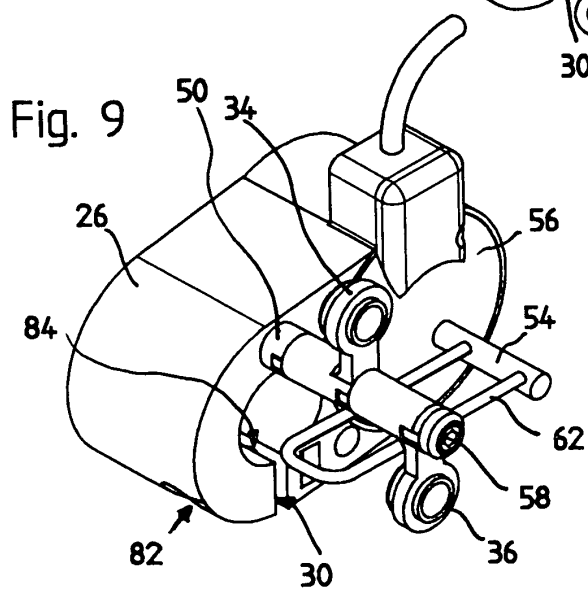
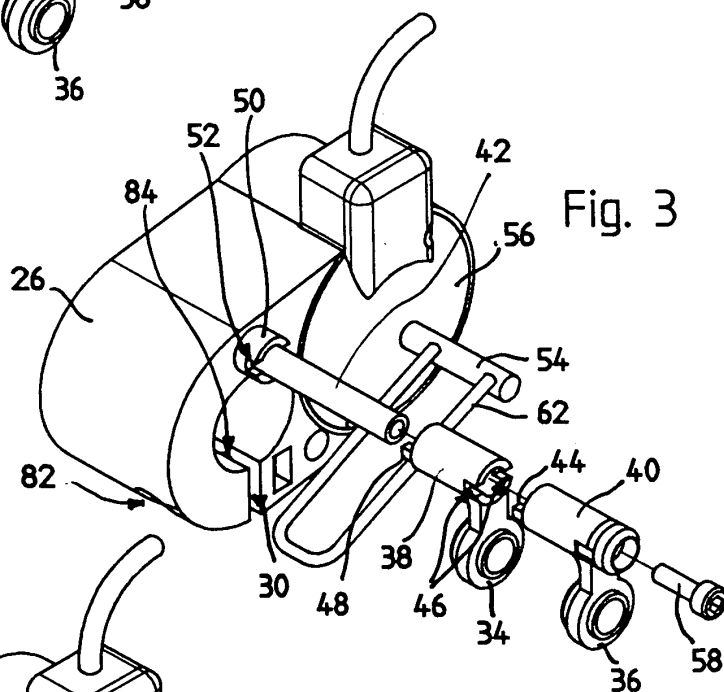
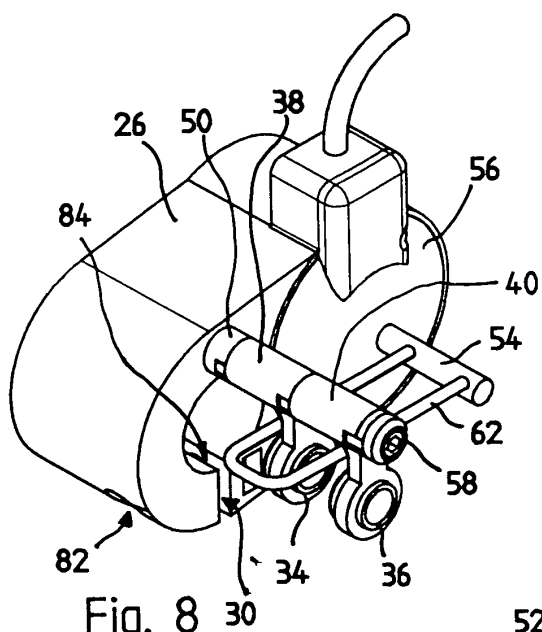


Fig. 1





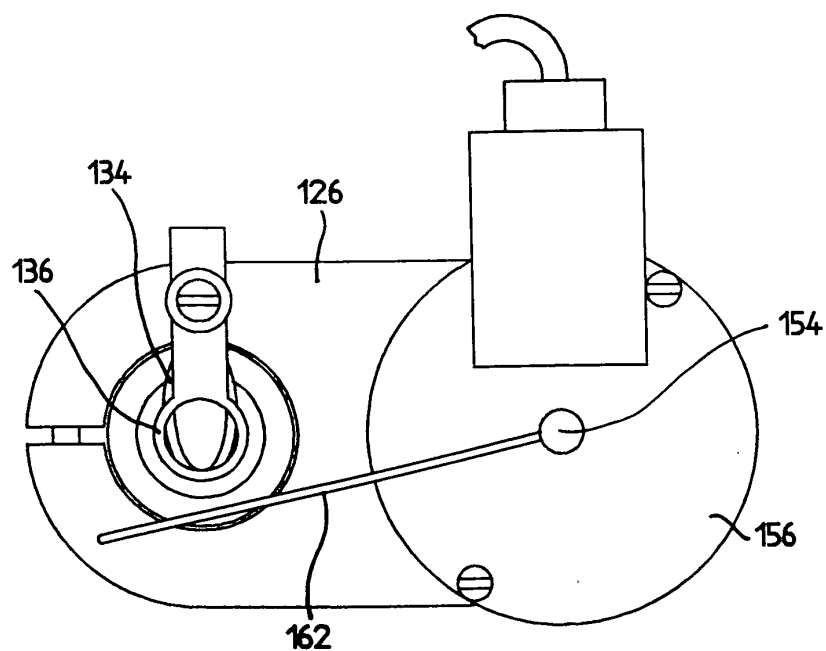


Fig. 10

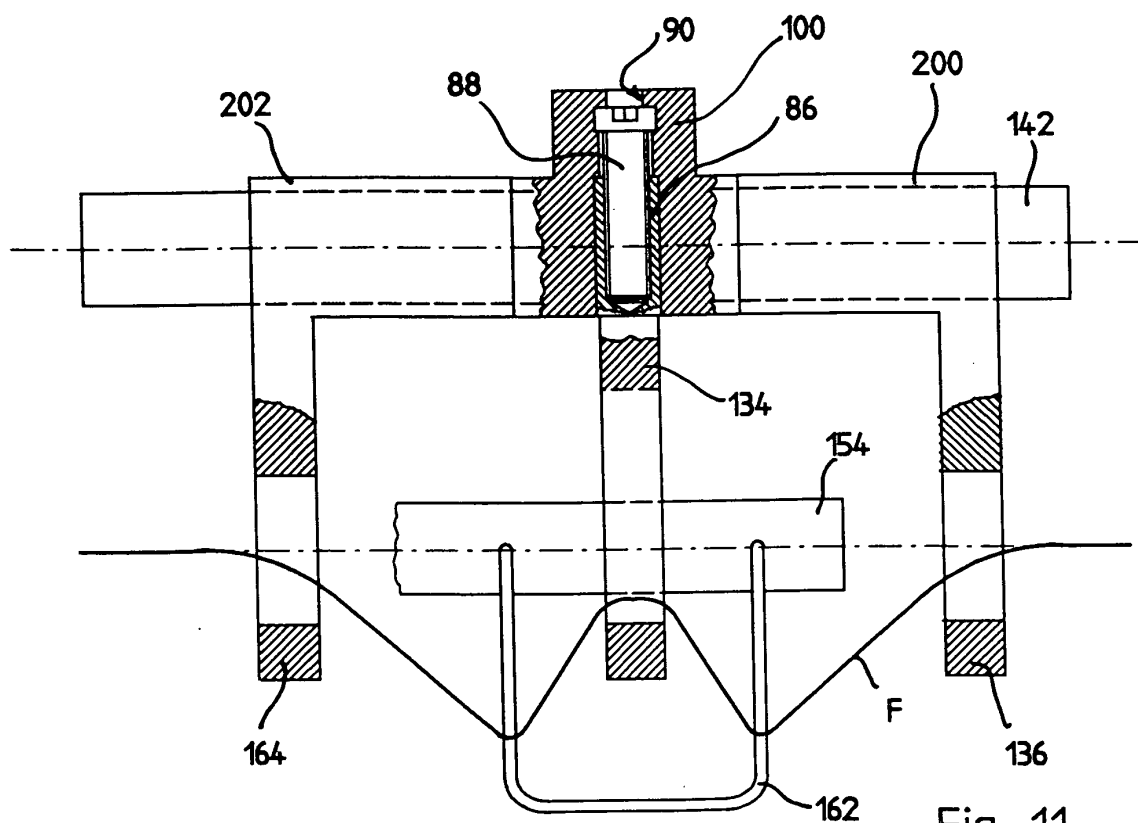


Fig. 11

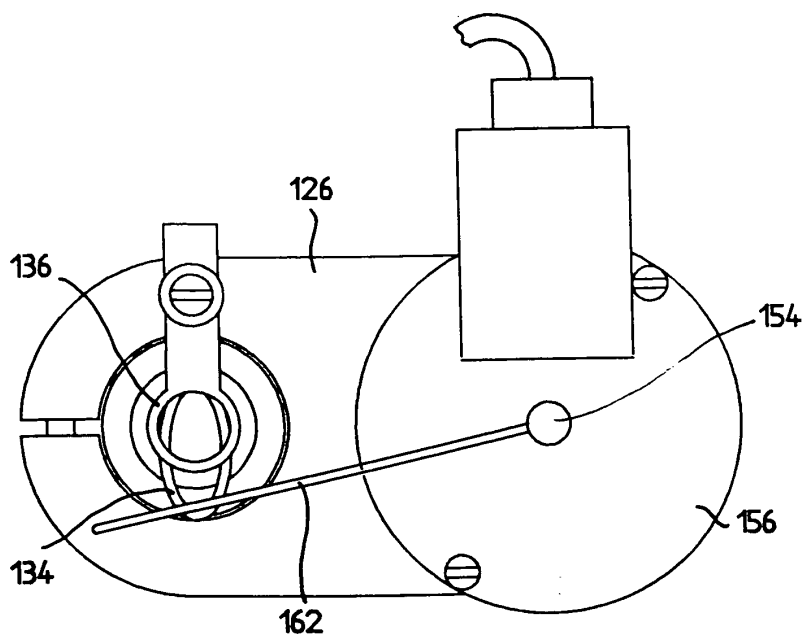


Fig. 12

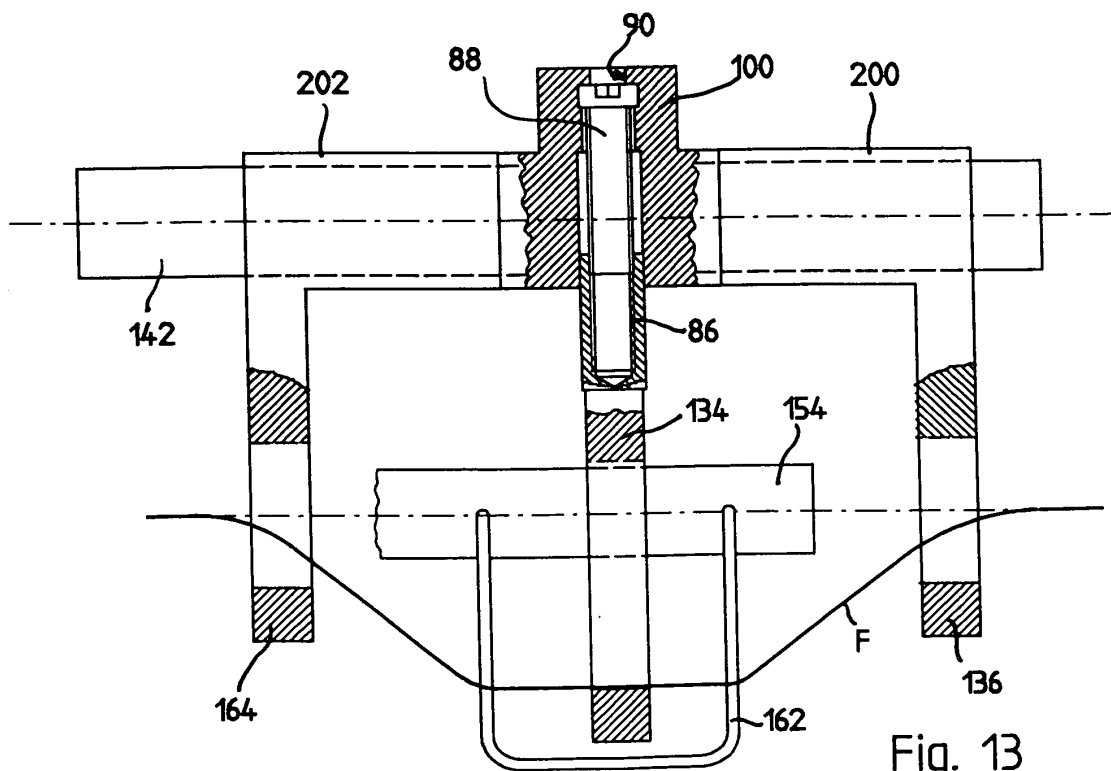


Fig. 13



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EUROPEAN SEARCH REPORT

Application Number
EP 03 00 8241

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)
D,A	EP 0 972 734 A (LGL ELECTRONICS SPA) 19 January 2000 (2000-01-19) * column 2, line 46 - column 3, line 3 * -----	1	D03D47/34 B65H59/32
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			D03D B65H
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 3 September 2003	Examiner Sterle, D
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