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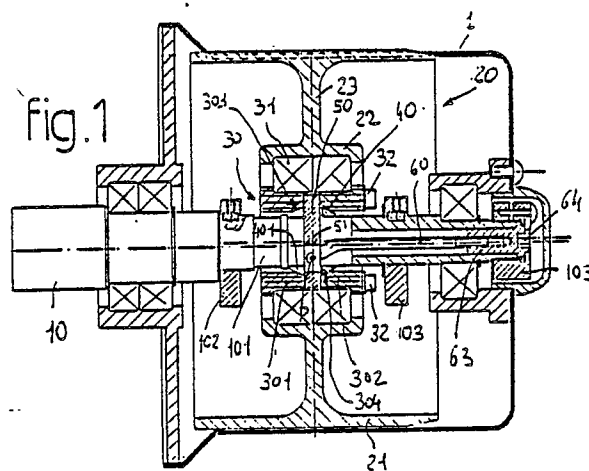
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(54) Improved weft feeder for weaving looms.

(57) The improvement relates to weft feeders equipped with a fixed drum (1) and with a system for advancing the turns of thread wound on the drum (1) which comprises a swift (20) with a plurality of rods (21) partially and variably protruding from axial slots of the drum (1) by virtue of the motion imparted to the swift (20) by a shaft (10) by means of an eccentric bush (30) with inclined axis, and resides in the fact that the bush (30) is formed by two bush portions (301-302) connected by axial tie rods (32). The portions (301,302) abut on one side and on the other side of a ring (40) with a spherical surface, around which the bush (30), moved by an actuation mechanism (50-60-63), rotates in order to vary its inclination with respect to the axis of the shaft (10).



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IMPROVED WEFT FEEDER FOR WEAVING LOOMS

The present invention relates to an improvement in weft feeders for weaving looms.

As known, weft feeders for shuttle-less weaving looms currently in use, such as gripper looms, bullet looms or fluid-jet looms, have a fixed drum, and the thread to be fed to the loom is wound in a plurality of turns at the base of said drum by an appropriate swivelling arm actuated by a motor shaft which traverses said drum.

These turns constitute a reserve of thread which must increase according to the speed of the loom and are unwound from the opposite end, or dome, of the drum; the turns which are progressively removed are replaced by the action of an advancement system which moves them from the base to the dome of the drum and keeps them spaced apart by a given pitch.

The known advancement system currently universally adopted comprises a swift formed by a set of rods partially and variably protruding from axial slots of the periphery of said drum by virtue of the compound motion imparted to the swift by the motor shaft by means of an offset bush mounted eccentrically on the shaft. This motion is substantially produced by combining a sinusoidal motion and an oscillatory motion in the axial plane and imparts an axial advancement component to the turns of thread; the direction of said component depends on the direction of rotation of the motor shaft. Since the turn must always advance from the base to the dome of the drum, when the direction of rotation of the motor shaft is changed to adapt the device to threads with right-handed or left-handed twisting - as is known to the technician in the field - the bush must be correspondingly replaced with another symmetrical one to reverse the inclination of the swift with respect to an end of the shaft.

This operation entails the removal of the swift from the motor shaft, the extraction of one type of bush, the mounting of the other type of bush, and the reassembly of the swift.

Special bushes have been produced in order to obviate this laborious succession of operations; said bushes can more simply be rotated about their own axis and fixed, by means of transverse locking screws, in two symmetrical engagement positions angularly spaced by 180°.

However, these bushes also require the disassembly of the drum in order to gain access to the transverse locking screws and therefore they only partially solve the problem of rapidly adapting the feeder to the different types of thread.

The aim of the present invention is to eliminate these disadvantages by providing an improved weft

feeder for weaving looms, by virtue of which it is possible to vary not only the inclination of the bush but also the amplitude of said inclination.

Within this aim, an object of the invention is to provide an improved weft feeder for weaving looms which permits variation of the inclination of the bush and the amplitude of such inclination by means of a single gradual actuation entirely performed from the outside without removing any part of the feeder.

According to the present invention, this aim and object, and other objects which will become apparent from the following detailed description are achieved by an improved weft feeder for weaving looms as defined in claim 1.

Advantageously, the motor shaft has a hollow eccentric part on which a ring with a spherical surface is keyed, and portions of a bush connected by axial tie rods abut on one side and on the other side of said ring and are rotoidally coupled with said ring by means of corresponding spherical seats; each bush portion has an axial hole the diameter whereof is greater than the diameter of the eccentric part of the shaft, so that the bush, moved by actuation means accessible from the outside of the shaft, can rotate on an axial plane and in relation to the spherical-surface ring, so as to tilt to one side or the other with respect to the axis of said shaft.

According to the invention, the bush portions are advantageously connected to an actuation rod oscillably pivoted to the motor shaft and protruding from diametrical through slots of the shaft and of the spherical-surface ring; said rod is actuated by a threaded tie rod arranged inside the shaft, and a female adjustment thread ending at the free end of said shaft co-operates with said tie rod.

Further characteristics, purposes and advantages of the present invention will become apparent from the following detailed description and with reference to the accompanying illustrative, non-limitative drawings, wherein:

figure 1 is a longitudinal sectional view of an improved weft feeder according to the present invention;

figure 2 is an exploded perspective view of said feeder;

figure 3 is a fragmentary enlarged-scale detail view of figure 1;

figure 4 is a sectional view, similar to figure 1, illustrating the bush in its two symmetrical operating positions.

In the drawings, the reference numeral 10 indicates the motor or drive shaft of a per se known

weft feeder and 20 generally indicates the swift of the system for advancing the turns of thread on the fixed drum 1 of the feeder; the swift 20 comprises a plurality of rods 21 connected to a hub 22 by means of respective spokes 23.

In a per se known manner, the shaft 10 is driven by motor means (not illustrated for clarification purposes) so as to rotate inside the fixed drum 1, and the swift 20 is rotatably mounted on the shaft 10, which has an eccentric and hollow portion 101 dynamically balanced by means of counterweights 102, 103; the hub 22 of the swift is mounted on said part 101 and an inclined bush 30 and a bearing 31 are interposed therebetween.

The drum 1 may be fixed through attachment to a stationary member of the loom, and the swift 20 may be maintained rotatively stationary with respect to the drum 1, by being mechanically attached thereto, or by means of magnets associated with the drum and with a stationary part of the loom. Magnets may also be used for maintaining the drum 1 itself stationary.

According to the present invention, the bush 30 is composed by placing two bush portions 301-302 side by side rigidly butt-joined by axial tie rods 32. The bush portions abut on one side and on the other side of an intermediate ring 40 with a spherical surface, rigidly keyed on the portion 101 of the shaft 10 by means of a pin 401, and rotoidally couple to said ring by means of respective spherical seats 303-304. Each bush portion furthermore has an axial cavity 305, respectively 306, substantially greater in diameter than the eccentric part 101 of the shaft 10, which passes through said cavities; the difference between the diameter of the cavities and that of the eccentric part of the shaft is for example comprised between ten and twenty tenths of a millimeter. This allows the two bush portions, rigidly connected by the tie rods 32, to oscillate in a general plane containing the axis of the eccentric part 101 of the shaft 10 by rotating about the center of the spherical-surface ring 40, in order to tilt in one direction or the other with respect to said axis, as schematically shown in figure 4, so as to adapt the weft feeder to threads having opposite twisting directions.

For this purpose, according to the present invention the bush is moved by actuation means which not only allow to vary the direction of its inclination but also graduate said inclination and, consequently, the pitch of the turns wound on the feeder drum.

Said actuation means comprise a transverse rod 50 oscillably coupled to the part 101 of the shaft 10 by means of a diametrical pin 51. The rod 50, accommodated in a through transverse slot 52 of the part 101, protrudes from one side and the other of the spherical-surface ring 40 which also

has corresponding through slots 402.

As clearly illustrated in figure 1, the end portions of the rod 50 which protrude beyond the ring are accommodated in corresponding radial seats of the bush portions 301-302 and are rigidly clamped between said bush portions by virtue of the action of the axial connecting tie rods 32.

The bush 30 consequently oscillates rigidly together with the rod 50 in the axial plane perpendicular to the pivoting pin 51.

A tie rod 60 is articulated, with one of its ends 61, to a point P of the bar, said point being eccentric with respect to the axis of the pivoting pin 51. The tie rod 60 passes through the axial cavity of the shaft 10 and its other appropriately threaded end 62 engages in a female thread 63 which is retained freely rotatable between an end shoulder 102 of the shaft 10 and a retention collar 103 mounted at the end of said shaft and locked by means of a dowel 65. The female thread 63 is advantageously made of polymeric material to compensate the coupling play between the meshing threads, and has a seat 64, for example a hexagonal seat, for the insertion of a corresponding tool which rotates the female thread, consequently moving the tie rod and correspondingly oscillating the rod 50 and the bush 30. It is easily understood that by rotating the female thread 63 in one direction or the other it is not only possible to reverse the inclination of the bush 30 in relation to the axis of the shaft 10, moving it from one of the symmetrical positions to the other, both of which are illustrated in broken lines in figure 4, but it is also possible to vary the amplitude of the angle of inclination for each of these positions; this, in accordance with the stated aim and objects, allows to adapt the weft feeder device to threads which differ in twisting direction and count.

The details of execution and the embodiments may naturally be extensively varied with respect to what is described merely by way of non-limitative example without thereby altering the concept of the invention or abandoning the scope of the invention.

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 scope of each element identified by way of example by such reference signs.

Claims

1. Improved weft feeder for weaving looms, characterized in that it comprises a stationary drum (1), a shaft (10) rotatable within said drum (1) about

an axis, a swift (20) rotatably mounted on said shaft (10), means for maintaining said swift (20) rotatively stationary with respect to said drum (1), means for converting rotational movement of said shaft (10) into oscillation of said swift (20), and adjustment means (50,60,63) for varying the degree of oscillation of said swift (20), said adjustment means being externally accessible, whereby the degree and amplitude of inclination of the swift with respect to the axis can be varied for adapting the weft feeder to different threads.

2. Improved weft feeder for weaving looms comprising a fixed drum and a system for advancing the turns wound on the drum comprising a swift with a plurality of rods partially and variably protruding from axial slots of the drum by virtue of motion imparted to the swift by a motor shaft by means of a bush with an inclined axis, characterized in that it consists in providing the motor shaft with a hollow eccentric part to which a spherical-surface ring is keyed, bush portions abutting on one side and the other of said ring and coupling rotoidally therewith by means of corresponding spherical seats, each of said bush portions having an axial hole which is greater in diameter than the eccentric part of the shaft, so that the bush, moved by actuation means accessible from the outside of the shaft, can rotate in an axial plane and in relation to the ring to tilt on one side or on the other with respect to the axis of said shaft.

3. Improved weft feeder according to claim 1, characterized in that said bush portions are connected to an actuation rod which is oscillably pivoted to said motor shaft, protrudes from through diametrical slots of the shaft and of the spherical-surface ring and is actuated by a threaded tie rod internal to the shaft, a female adjustment thread, ending at the free end of said shaft, co-operating with said threaded tie rod.

4. Improved weft feeder according to claims 1 and 2, characterized in that said tie rod is articulated, with its end opposite to said threaded end engaged by said female thread, at a point of the actuation rod which is eccentric with respect to the pivoting axis of said rod.

5. Improved weft feeder according to one or more of the preceding claims, characterized in that the actuation rod has end portions protruding beyond the spherical-surface ring and adapted to be accommodated in corresponding radial seats of the bush portions arranged side by side, said end parts being rigidly clamped between said bush portions by the action of the tie rods which mutually connect said portions.

6. Improved weft feeder according to the preceding claims, characterized in that the actuation rod and the bush obtained by placing side by side and coupling said bush portions rotate in the plane

which passes through the axis of the eccentric portion of the motor shaft and is orthogonal to the axis of the rod's pivoting pin.

7. Improved weft feeder according to claims 1 and 2, characterized in that said female thread which co-operates with the internal tie rod of the shaft is made in polymeric material in order to recover play between the meshed threads.

8. Improved weft feeder according to one or more of the preceding claims, characterized in that said female thread is retained freely rotatable between an end shoulder of the motor shaft and a retention collar fitted to said end and has a seat for engaging a corresponding tool by means of which said female thread is rotated and the tie rod is consequently moved, causing the corresponding oscillation of the rod and of the bush.

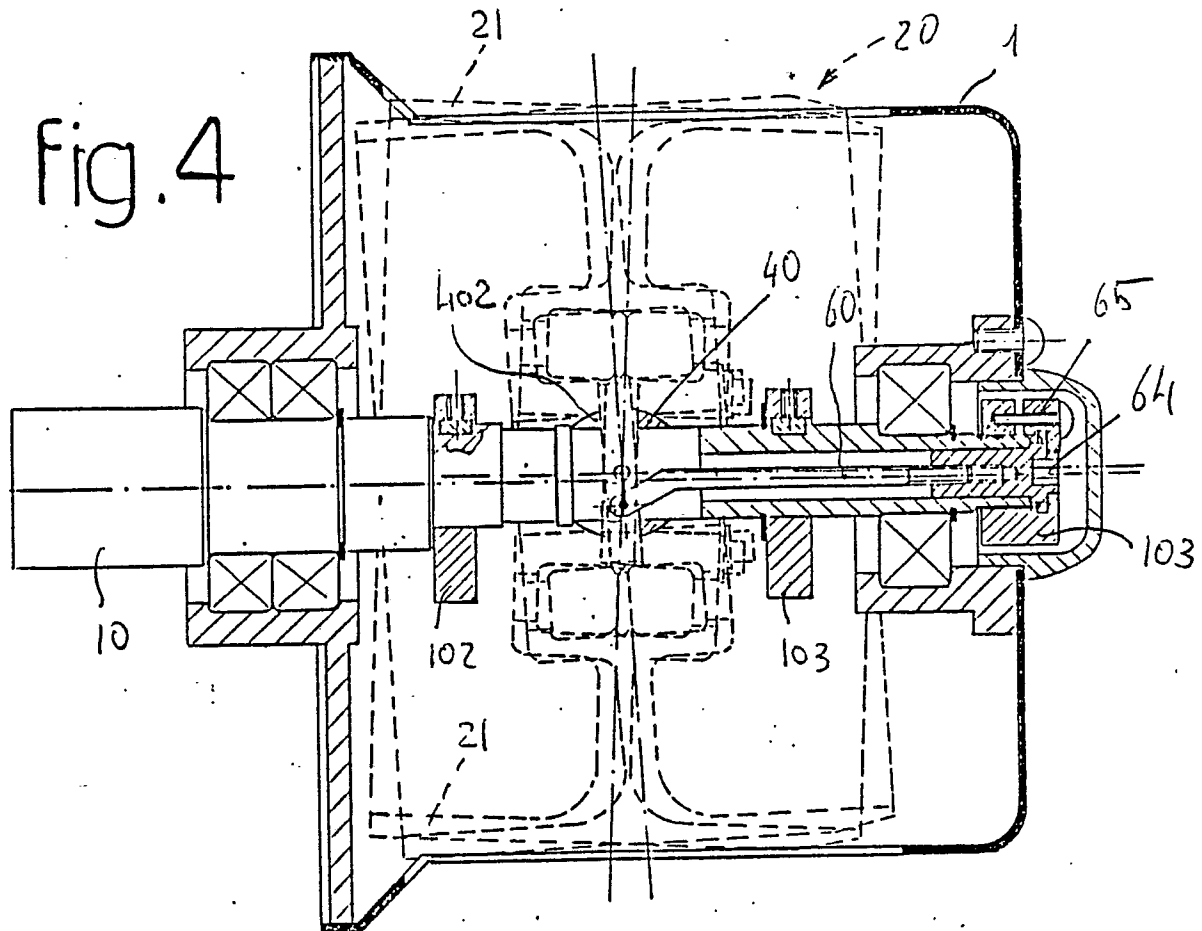
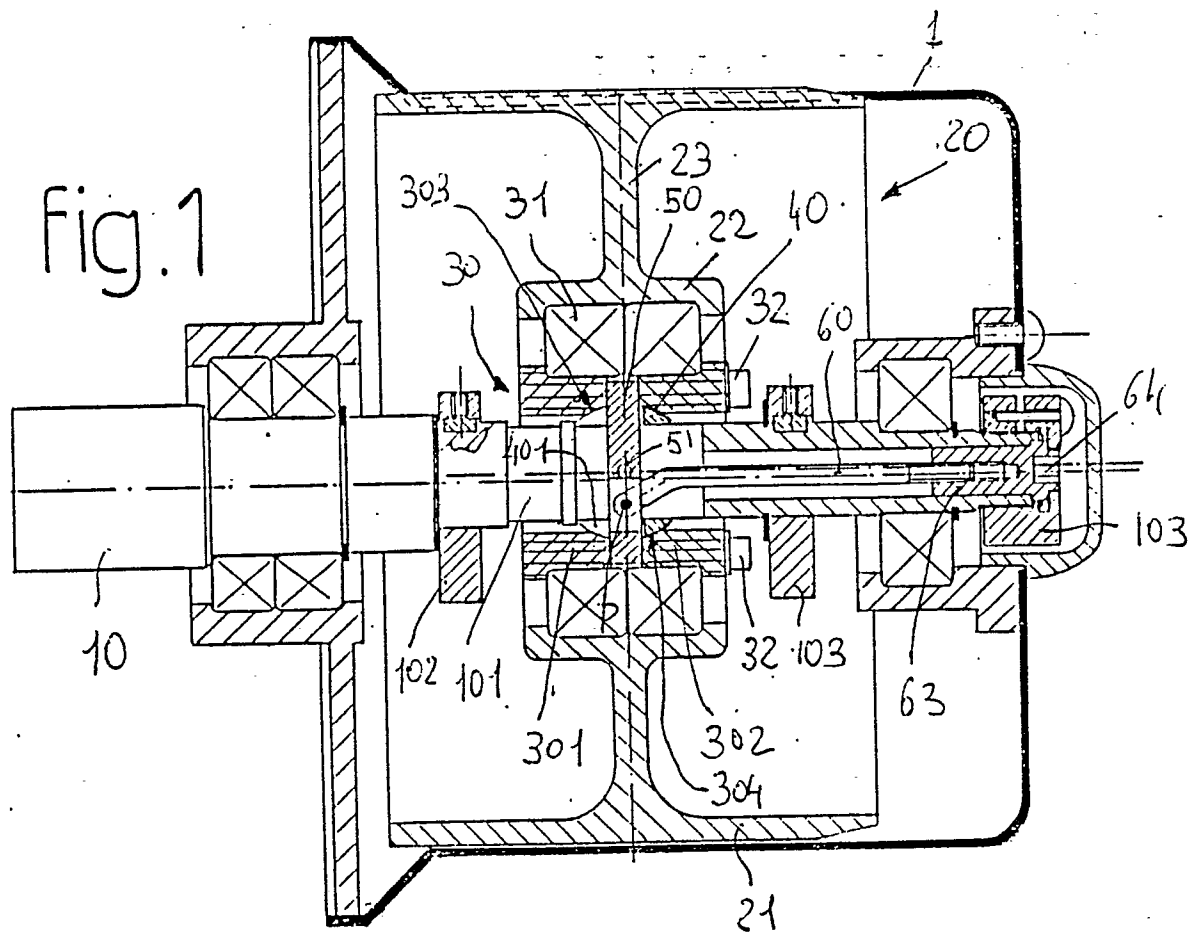


fig. 2

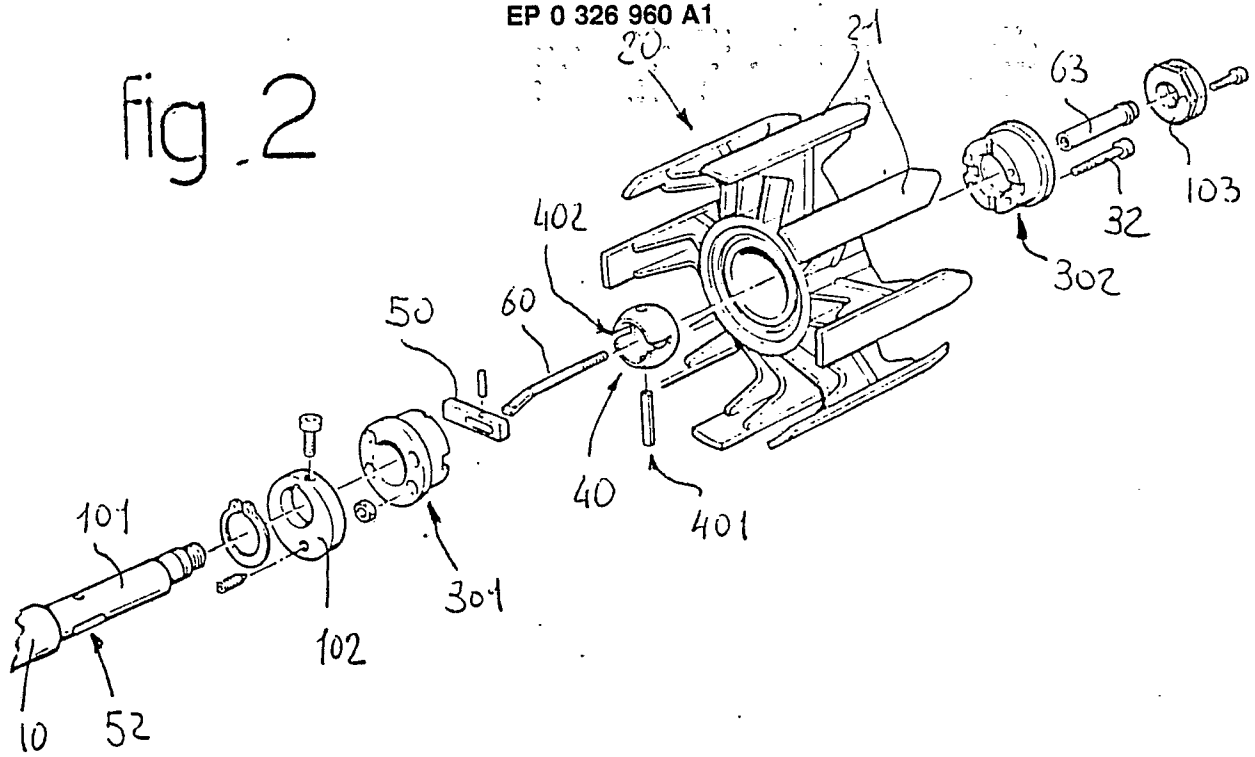
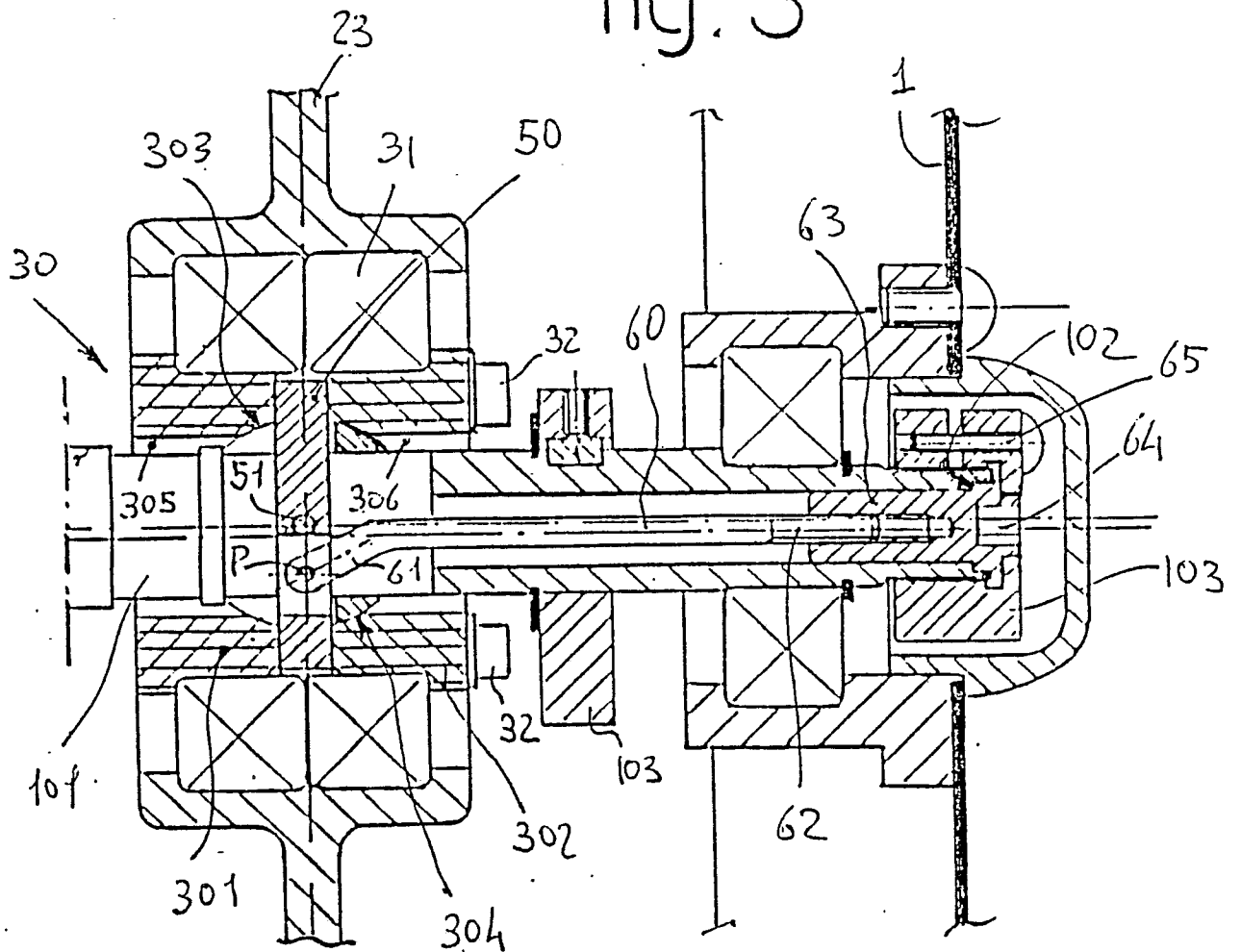


fig. 3





EP 89 10 1446

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.4)
X	EP-A-0 244 511 (SARFATI VISCHIANI) * Columns 5,6; figures 1,3 * ---	1,2	D 03 D 47/34 B 65 H 51/22
A	EP-A-0 164 032 (ROJ ELECTROTEX) * Figure 1 * ---	1	
A	EP-A-0 164 033 (ROJ ELECTROTEX) * Figure 1 * ---	1	
A	FR-A-2 374 244 (SAVIO) * Figures * ---	1	
A	EP-A-0 170 798 (SOBREVIN) * Figures 1-3 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D 03 D B 65 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18-05-1989	Examiner REBIERE J-L.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			