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(54) Compensating weft brake

(57) A compensating weft brake, comprising a brake body (20) which is crossed by a thread (F) and to which two oscillating arms (21-22) are articulated; the arms are kinematically coupled and actuated by an elastic means so as to divaricate; each arm has a plurality of ceramic thread guiding rings (24) which form a zigzag thread path. Each ring is rigidly coupled to the respective arm of the brake by a corresponding fork-like support which has a fork opening (26) for inserting the ring; the fork-like supports (25') have at least one continuous annular support wall directed towards the inner side of the arms (21-22) in order to react to the radial forces applied by the respective thread guiding rings (24) and discharge them onto the corresponding arm (21-22) of the brake in order to prevent the accidental separation of the thread guiding ring (24) from the respective support (25').

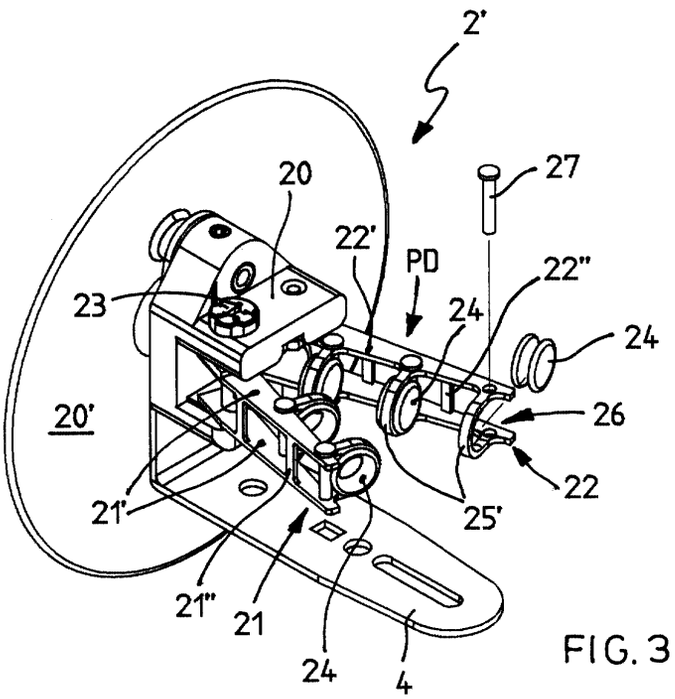

FIG. 3

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Description

[0001] The present invention relates to weft brakes for textile machines and more specifically to the so-called compensating weft brakes which are adapted to be inserted between a spool of weft thread and the weft feeder in order to reduce, or more correctly even out, the variations in the mechanical tension of the thread during its unwinding from the spool.

[0002] Typically, conventional compensating brakes are provided with a rigid body which is crossed by the weft thread and to which two mutually opposite arms are articulated so that they can oscillate; the arms are subjected to the action of a contrast spring which has an adjustable tension and tends to divaricate the arms, which are kinematically coupled by toothed sectors which mesh together so as to oscillate simultaneously but with opposite directions of rotation.

[0003] Each arm is provided with a plurality of ceramic thread guiding rings which are arranged so that the rings of one arm are staggered with respect to the rings of the other arm; the rings are aligned on a single axis only when the arms are arranged mutually adjacent, overcoming the action of the contrast spring.

[0004] However, in the configurations in which the arms of the brake are divaricated, the thread, by passing alternately through the thread guiding rings of either arm, traces a zigzag path that the mechanical tension that acts on the thread tends to straighten, applying force to the contrast spring. Such spring, by reacting elastically, acts as a damping system and cushions the peaks of mechanical tension that act on the thread.

[0005] In conventional structures, the ceramic annular rings are rigidly coupled to the respective arm of the compensating brake by means of fork-like supports which are open towards the inner side of the arm. The supports are capable of retaining the respective ring, which is induced by the thread to disengage from the support towards the inside of the arm, partly by mechanical action, since they apply an elastic action for undercut radial retention to the ring, and partly by adhesion, since the rings are usually glued to the respective fork-like support.

[0006] However, during the weaving process the rings rather frequently separate from the respective support, stopping the process.

[0007] Typically, the separation of the rings from the respective supports, which is a severe drawback of conventional types of compensating brake, occurs for the following causes, acting individually or in combination: defective adhesive bonding; deterioration of the adhesive, due to aging or to atmospheric agents; passage of weft threads which have a large diameter or are very strong and in any case require great rigidity of the contrast spring, which is matched by intense radial stresses discharged by the thread onto the ceramic rings.

[0008] The aim of the present invention is substantially to eliminate this severe drawback of conventional compensating brakes, and within the scope of this aim an object of the present invention is to improve the compensating brakes in order to avoid the unwanted separation of the ceramic rings from the supports of the oscillating arms, without however appreciably varying the conventional structure of the brake, so as to substantially improve its already satisfactory functionality, significantly increasing its operating reliability.

[0009] Another object of the invention is to provide a compensating brake which can also be obtained modifying existing compensating brakes by way of the easy replacement of a limited number of components, so as to allow easy upgrading of such brakes and their functional improvement.

[0010] According to the present invention, this aim, these and other objects which will become better apparent from the following detailed description are achieved with an improved compensating weft brake having the specific characteristics stated in the appended claims.

[0011] Substantially, the invention is based on the new and original inventive concept of inverting the orientation of the fork-like supports that are adapted to support, on the oscillating arms, the ceramic thread guiding rings, so that the supports have at least one continuous annular support wall which is directed towards the inside of the arms in order to react to the radial stresses discharged by the rings onto the supports, and of arranging any openings of the forks, which allow the insertion of the rings, preferably so that they are directed towards the outer dorsal part of the respective arm that supports the rings.

[0012] The characteristics, purposes and advantages of the improved compensating brake according to the present invention will become better apparent from the following detailed description and with reference to the accompanying drawings, given by way of non-limitative example, wherein:

Figure 1 is an elevation view of a weft thread feeder with the spool of thread, the compensating brake and the weft feeder;

Figure 2 is a top plan view of the feeder system of Figure 1;

Figure 2A is an enlarged-scale view of a detail of Figure 2;

Figure 3 is a perspective view which shows in particular the improved compensating brake according to one embodiment of the invention;

Figure 4 is a perspective view, similar to Figure 3, illustrating a second embodiment of the improved compensating brake according to the invention;

Figure 5 is a view, similar to Figure 3, of a third embodiment of the improved compensating brake according to the invention.

[0013] Figures 1 and 2 illustrate a conventional system for feeding the weft thread to a weaving loom (not shown) which comprises a spool of thread 1, a compen-

sating brake 2, and a weft feeder 3, to the rear side of which the brake 2 is rigidly coupled by means of a coupling bracket 4.

[0014] The brake 2 comprises, in a per se known manner, a body 20 which is crossed by the thread F and is protected by an anti-balloon shield 20', to which two mutually opposite oscillating arms 21-22 are articulated. The arms are kinematically coupled by respective toothed sectors (not shown) which mesh with each other and are subjected to the tension of a contrast spring (not shown in the figure) which tends to divaricate the arms; the tension of the contrast springs is adjustable by means of a knob 23.

[0015] In a per se known manner, each arm is provided with a plurality of thread guiding rings 24 made of ceramic material (AL_2O_3) which are arranged so that the rings of one arm are staggered with respect to the rings of the other arm and are mutually aligned on a single axis only when the arms 21-22 are arranged mutually adjacent, overcoming the action of the contrast spring.

[0016] However, and as shown schematically in Figures 2 and 2A, in the configurations of the brake 2 in which the arms 21-22 are divaricated, the thread F, by passing alternately through the thread guiding rings of either arm, traces a zigzag path which the mechanical tension that acts on the thread tends to straighten, applying force to the contrast spring which, by reacting elastically, acts as a damping system for the peaks of the mechanical tension.

[0017] The thread guiding rings 24 are rigidly coupled to supports 25 of the respective arm; the supports are shaped like an open fork and allow, by elastic deformation, the snap insertion of the respective rings in the support.

[0018] With reference to the detailed view of Figure 3, it can be noted that the compensating brake 2' according to the invention is provided with fork-like annular supports 25' in which a respective fork opening 26, which allows the insertion of the rings, is directed towards a dorsal outer part Pd of the arms 21-22. Moreover, the arms have a lattice-like structure which is formed by longitudinal members 21'-22' and cross-members 21"-22" which form, on the dorsal part of the arms, wide gaps which allow the easy passage of the rings 24 and their insertion in the annular supports through the openings 26.

[0019] The retention of the thread guiding rings 24 in the respective fork-like supports 25' is ensured by retention pins 27 which have an expanded head and are accommodated in corresponding retention holes provided in the longitudinal members of the structure of the arms 21-22; the retention pins 27 block the respective fork openings 26 in order to retain the rings 24 in place.

[0020] It is evident that the force discharged by the thread F onto the rings 24, which tends to move the rings radially towards the inner side of the arms 21-22, is fully and effectively contrasted by the supports 25', which react to such force, which can be discharged directly onto the arms 21-22, thus avoiding an accidental separation of the thread guiding rings 24 from the respective supports 25'.

[0021] The embodiment of Figure 4 differs from what has been described above in that the arms 21a-22a of the brake 2' have an open dorsal region, i.e. they do not have the cross-members 21"-22" and have a continuous dorsal opening which accommodates a cover 29 which supports half-cradles 30 for retaining the thread guiding rings 24 in the respective fork-like supports 25'. In the supports, too, the respective fork openings 26 for inserting the rings are directed towards the open dorsal region of the respective oscillating arm.

[0022] The cover 29 is provided with protruding pins 31 which engage by snap action, in order to retain the cover, holes 32 of the longitudinal members 21'-22' of the arms, thanks to the elastic deformability of said longitudinal members, which are typically made of polymeric material, like the cover 29.

[0023] In the further embodiment of Figure 5, the fork-like supports 25 of the arms 21-22 of the brake 2' have instead the opening 26 for the insertion of the ring 24 directed towards the inner side of the arms, but the anchoring of the individual rings to the corresponding support is provided by way of removable means which block the fork openings 26.

[0024] As clearly shown in the figures, such removable means are advantageously constituted by elastic annular retention elements 40 of the 0-Ring type, which are fitted over the arm and engage a positioning and retaining groove 24a of the ring 24; the annular elements 40 react to the radial forces applied by the thread F to the thread guiding rings 24, discharging them onto the respective oscillating arm 21-22 of the brake.

[0025] Without altering the concept of the invention, the details of execution and the embodiments may of course be altered extensively with respect to what has been described and illustrated by way of non-limitative example without thereby abandoning the scope of the invention.

[0026] The disclosures in Italian Patent Application No. TO99A001008 from which this application claims priority are incorporated herein by reference.

[0027] 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 compensating weft brake, comprising a brake body (20) which is crossed by a thread (F) and to which two oscillating arms (21-22) are articulated, said arms being kinematically coupled and actuated

by an elastic means so as to divaricate, each one of said arms having a plurality of ceramic thread guiding rings (24) which form a zigzag thread path; each ring being rigidly coupled to a respective arm of the brake by means of a corresponding fork-like support having a fork opening (26) for inserting said ring; characterized in that said fork-like supports (25') have at least one continuous annular support wall which is directed towards an inner side of the arms (21-22) in order to react to radial forces applied by the respective thread guiding rings (24) and discharge said forces onto the corresponding arm (21-22) of the brake in order to prevent an accidental separation of the thread guiding ring (24) from the respective fork-like support (25').

2. The weft brake according to claim 1, characterized in that said fork-like supports (25') have fork openings (26), designed for the insertion of the thread guiding rings (24), directed towards an outer dorsal wall (PD) of the respective oscillating arms (21-22) of the brake (2').

3. The weft brake according to claim 2, characterized in that the oscillating arms (21-22) of the brake (2') have a lattice-like structure which is formed by longitudinal members (21'-22') and cross-members (21"-22") which form, on said dorsal wall of the arms, wide gaps for the passage of the thread guiding rings (24), in order to allow to fit said rings in the respective fork-like supports (25').

4. The weft brake according to claim 3, characterized in that it comprises retention pins (27) which have an enlarged head, are accommodated in retention holes of said lattice-like structure of the oscillating arms (21-22) and are adapted to ensure a retention of the thread guiding rings (24) in the respective fork-like supports (25'); the retention pins (27) blocking the respective fork openings (26).

5. The weft brake according to claim 3, characterized in that it comprises oscillating brake arms (21a-22a) which have an open dorsal region and are formed by a structure which has a continuous dorsal opening, and in that said continuous dorsal opening accommodates a cover (29) which is provided with half-cradles (30) for retaining the thread guiding rings (24) in the respective fork-like supports (25'), the fork opening (26) of said supports being directed towards the continuous dorsal opening of the respective oscillating arm (21a-22a).

6. The weft brake according to claim 5, characterized in that said cover (29) is provided with protruding pins (31) which engage with a snap action, in order to retain the cover, holes (32) provided in the longitudinal members (21'-22') of the oscillating arms (21a-22a); said snap engagement being allowed by the elasticity of the polymeric material of which the oscillating arms are made.

7. The weft brake according to claim 1, characterized in that said oscillating arms of the brake comprise fork-like supports (25) for retaining the thread guiding rings (24) which have fork openings (26) directed towards the inside of the oscillating arms (21-22), and removable means for anchoring said thread guiding rings, which block said fork openings (26) and react to the radial forces applied by the thread to the thread guiding rings (24).

8. The weft brake according to claim 7, characterized in that said removable anchoring means of the thread guiding ring (24) are constituted by elastic retention rings (40) of the O-Ring type fitted over the oscillating arm (21-22) of the brake and engage retention and positioning grooves (24a) of the thread guiding rings (24).

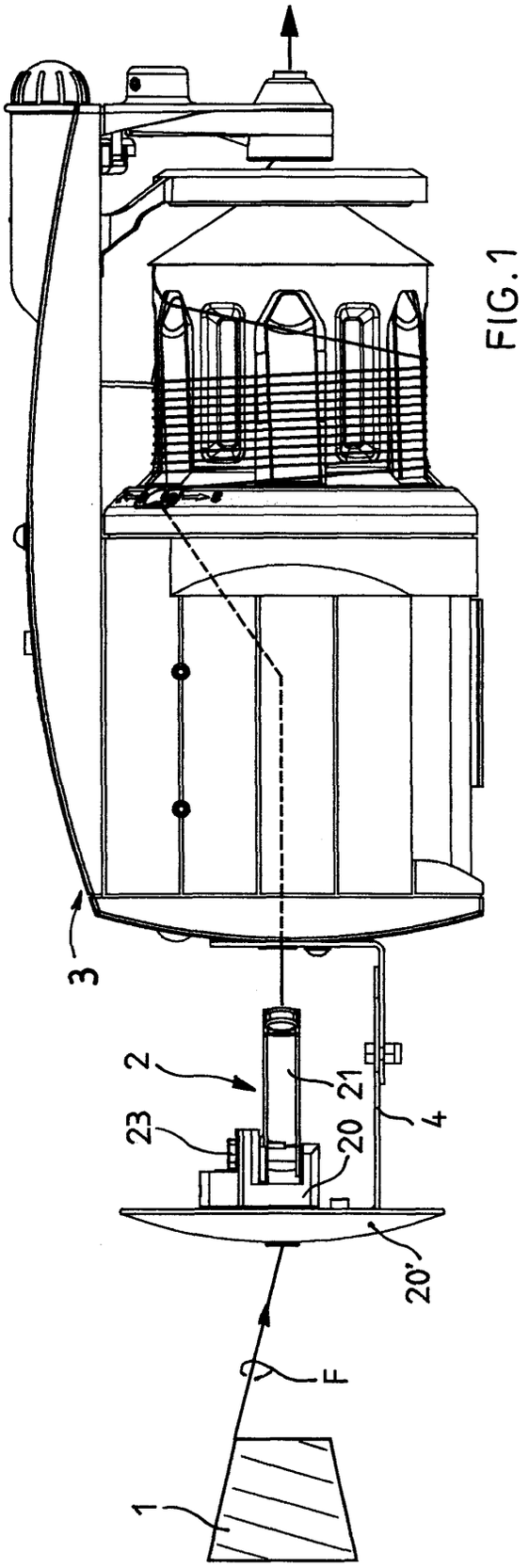


FIG. 1

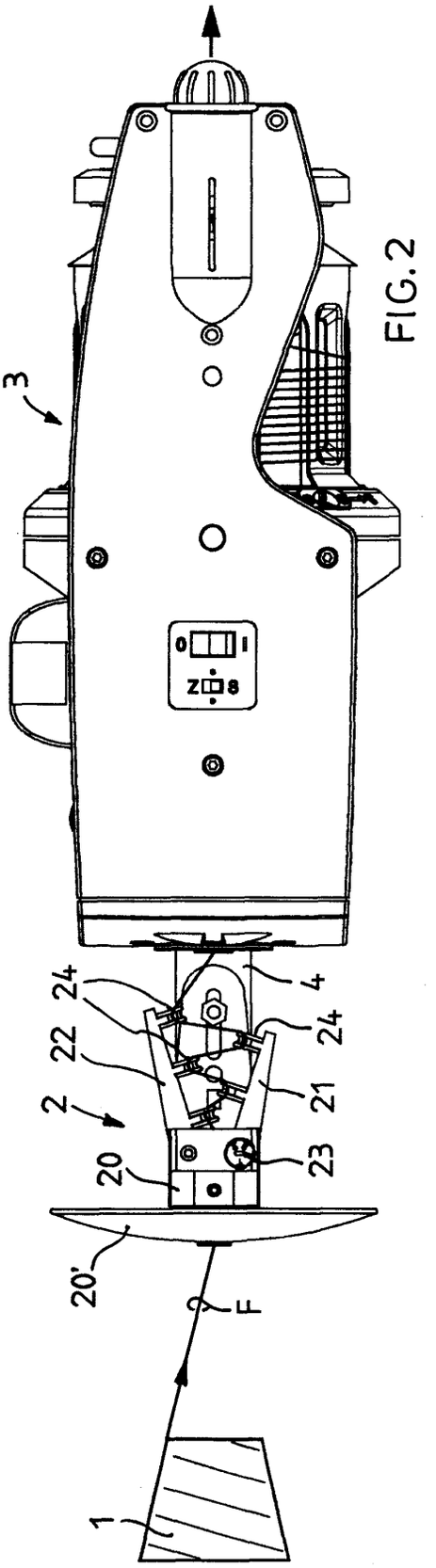
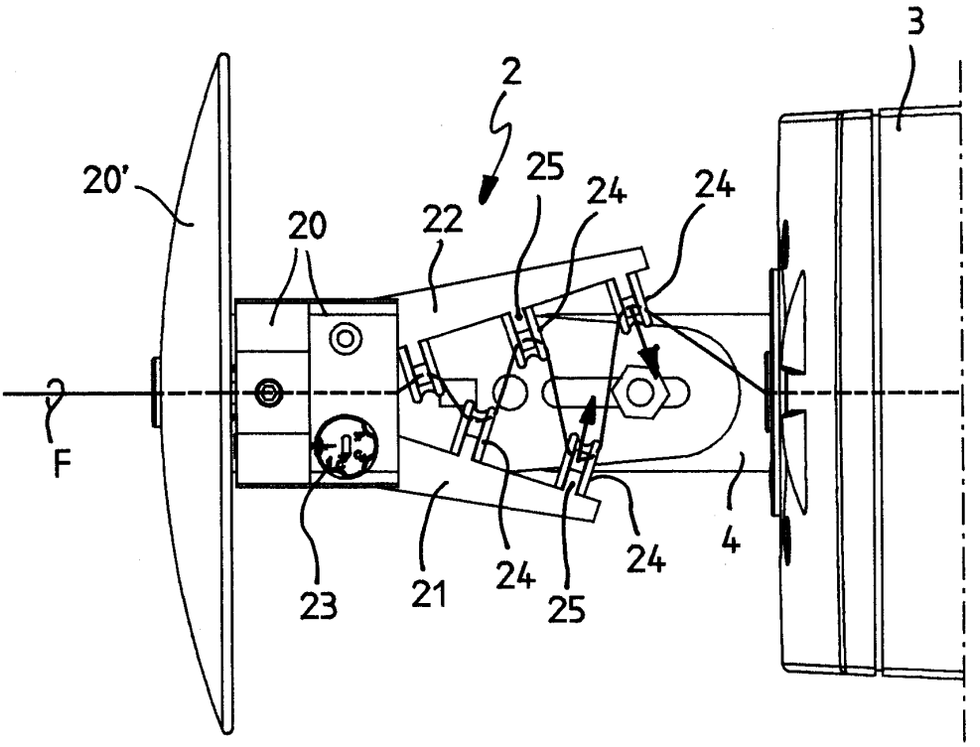


FIG. 2


3
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20'
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24
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F
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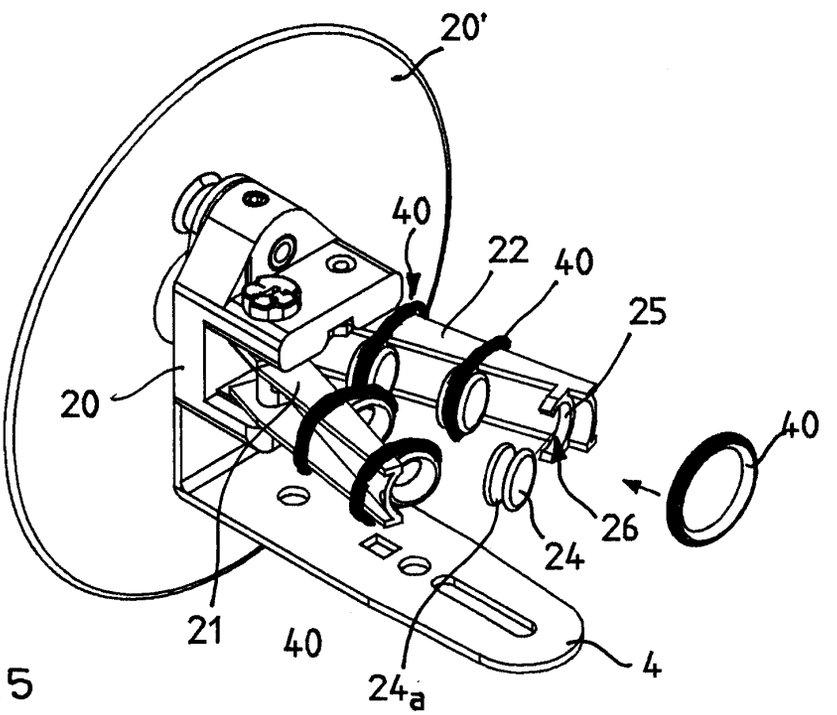
4

FIG. 2A


20'
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22
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25
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26
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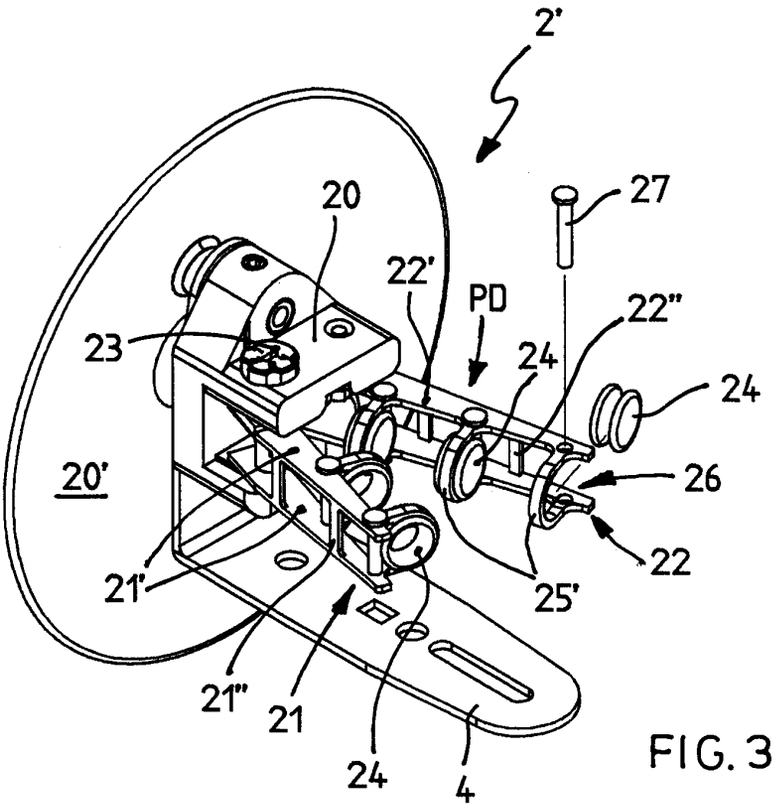
21
40
4
24a

FIG. 5


2'
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27
22'
PD
22"
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21"
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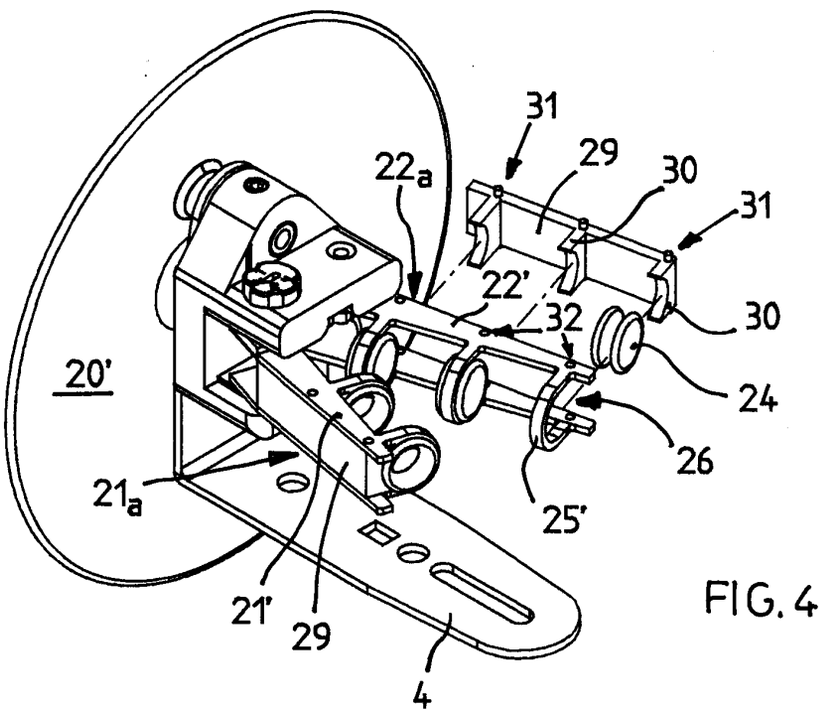
24
4

FIG. 3


31
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30
22a
31
22'
32
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20'
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26
21a
25'
21'
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4

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 4236

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)
A	WO 91 05728 A (IRO) 2 May 1991 (1991-05-02) * page 11, line 27 - page 12, line 26 * * page 14, line 6 - line 12; figures 1,4,5 * ---	1,7	D03D47/34 B65H59/28
A	CH 259 403 A (GUJER) 31 January 1949 (1949-01-31) * the whole document * -----	1,7	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

D03D
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 February 2001	Boutelegier, C

CATEGORY OF CITED DOCUMENTS

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28-02-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9105728 A	02-05-1991	DE 59004368 D	03-03-1994
		EP 0495920 A	29-07-1992
		JP 2932099 B	09-08-1999
		JP 5502002 T	15-04-1993
		KR 191653 B	15-06-1999
		US 5368244 A	29-11-1994
CH 259403 A	31-01-1949	NONE	

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