

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an adjusting device of a circular knitting machine, and more particularly to a cam adjusting device of a circular knitting machine for fine tuning the displacement of a cam.

BACKGROUND OF THE INVENTION

[0002] In general, a conventional cam adjusting device is a device comprising a sliding member disposed on the main body of a saddle seat, wherein the sliding member has a spring at its bottom for support and a blocking plate disposed at its top for connecting; the cam is connected to the sliding member by screws, and an adjusting bolt is coupled to the sliding member. However, when it is necessary to adjust the corresponding height and position of the cam and the latch needle of the weaving needle for such a cam adjusting device, the blocking plate and the adjusting bolt are first rotated and loosened, and then the vertical position of the sliding member is adjusted visually, finally the blocking plate and the adjusting bolt are rotated and tightened individually. Since there are over one hundred cam adjusting devices on a circular knitting machine, it is necessary to repeat the foregoing procedure for both disassembling and assembling. Such an application is not just complicated but also inaccurate since the adjustments are made visually. If a measuring tool is employed, it becomes consuming and inconvenient.

[0003] Please refer to FIG. 1 for another conventional cam adjusting device, which comprises a saddle seat 11, a sliding member 12 disposed on the saddle seat 11 having a plurality of cams 16 coupled thereon, a fine tune section 13 disposed on the saddle seat 11, and such fine tune section 13 having a screw thread disposed at the upper edge of the saddle seat 11 and a spring 15 disposed between a limit member 14 at the lower edge of the saddle seat 11 and the sliding member 12.

[0004] The fine tune section 13 has an aslant guide surface 131 at one end extending into a groove 121 of the sliding member 12, and keeping in contact with an aslant guide surface 1211 of the groove 121. If the fine tune section 13 is rotated, the fine tune section 13 will rotate out of the saddle seat 11 along its screw thread, and then the fine tune section 13 will press and control the sliding member 12, so that a force is produced between the aslant guide surface 131 at one end of the fine tune section 13 and the aslant guide surface 1211 of the sliding member 12. Furthermore, the sliding member 12 shifts downward along the aslant guiding surface 131 of the fine tune section 13. On the other hand, when the fine tune section 13 is rotated in the opposite direction, the aslant guide surface 131 at one end of the fine tune section 13 and the aslant guide surface 1211 of the

sliding member are detached, the fine tune section 13 will rotate into the saddle seat 11, and then the spring 15 disposed between the limit member 14 and the sliding member 12 at the lower edge of the saddle seat 11 will shift the sliding member 12 upwards along the aslant guide surface 131 of the fine tune section 13.

[0005] The spring 15 disposed between the limit member 14 and the sliding member 12 at the lower edge of the saddle seat 11 will wear out due to extensive use over a long duration, and furthermore produces defective fabrics from the circular knitting machine since the sliding member 12 is unable to obtain an accurate position when making adjustments through back and forth movements.

[0006] Therefore, another conventional cam adjusting device as disclosed in the R.O.C. Patent No. 491298 describes a first adjusting member and a second adjusting member that are disposed between the sliding member and the saddle seat, wherein the first adjusting member has a fine-tune wheel disposed on the saddle seat and the second adjusting member is screwed onto the sliding member. Such a conventional cam adjusting device makes use of the rotating adjusting wheel to produce a horizontal shift for the first adjusting member, so that the aslant guide surface of the first adjusting member presses against the aslant guide surface of the second adjusting member to shift the sliding member downwards. On the other hand, when the adjusting wheel is rotated in the opposite direction, another aslant guide surface of the first adjusting member presses against the aslant guide surface on the sliding member to shift the sliding member upwards.

[0007] However, as with the prior-art, the cam adjusting member rotates the fine tune adjusting wheel first, and then the aslant guide surface of the first adjusting member is pressed against the aslant guide surface of the second adjusting member, finally the second adjusting member drives the sliding member to shift downward. Since such prior art requires a second adjusting member to drive the sliding member to shift, and cannot adjust the displacement of the sliding member directly, which will cause a relatively larger error during adjustment. Furthermore, the structure of the prior-art's cam adjusting device is complicated, which is a disadvantage for manufacture.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to overcome the aforementioned shortcomings and avoid the deficiency by providing a cam adjusting device to move the cam to a precise position and avoid unwanted movement, twists, or collisions between components or affect the weaving quality, so that the circular knitting machine can have a smoother and more accurate weaving process.

[0009] To achieve the foregoing objectives, the cam adjusting device of a circular knitting machine according

to the present invention is installed on a saddle board having an aslant surface, which comprises: a sinker cap, having an indispensable fixed member and a cam, and the fixed member having an aslant surface movably disposed on the saddle board; an adjusting member disposed at the bottom of the sinker cap, and the adjusting member drives the sinker cap by an adjusting mechanism for precise but slight movement; the adjusting mechanism comprises a screw rod coupled to the adjusting member and a fixing pin for fixing the position of the screw rod; the screw rod has an adjusting wheel at one end; the adjusting wheel has a hexagonal hole disposed at the top of the adjusting wheel, a dial scale for marking the change of rotation of the adjusting wheel, a gear wheel ring disposed at the bottom of the dial scale, and a ring section enclosing a circular space with the gear wheel ring.

[0010] By means of the scale on the adjusting wheel, other adjusting wheels can be adjusted to the same calibration according to the rotary graduation of the dial scale when an adjusting wheel is rotated to adjust each cam to the correct position instead of determining the position visually.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a planar view of the structure of a prior-art cam adjusting device.

FIG. 2 is a perspective view of the cam adjusting device according to the present invention.

FIG. 3 is another perspective view of the cam adjusting device according to the present invention.

FIGS. 4A~4B are views of the movement of the cam adjusting device according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] The detailed description and technical characteristics of the present invention are described together with the drawings as follows.

[0013] Please refer to FIGS. 2 and 3 for perspective views of the cam adjusting device of the present invention. This invention makes use of an adjusting mechanism to drive a sinker cap 2 to shift slightly, which comprises a screw rod 316 and a fixing pin 32, wherein the screw rod 316 has an adjusting wheel 31 at one end, the adjusting wheel 31 having a hexagonal hole 311 at its top for being rotated by a hexagonal wrench, and a dial scale 312 for marking the change in rotation. A gear wheel ring 313 is connected to the bottom of the dial scale 312, and a ring section 315 encloses a circular space 314 with the gear wheel ring 313. One end of the fixing pin 32 is fixed to the sinker cap 2 and the other end presses against the circular space 314 to fix the po-

sition of the screw rod 316, so that when the adjusting wheel 31 is rotated, the screw rod 316 will not produce a corresponding displacement.

[0014] The sinker cap 2 comprises an indispensable cam 21, a fixed member 22, and an adjusting member 23 is disposed in a groove 25 at the bottom of the sinker cap 2, wherein the adjusting member 23 has a protruded member 231, and an oval-shaped hole 24 is disposed on the fixed member 22 of the sinker cap 2, and movably coupled onto a saddle board 6 with a screw rod 5 (see FIG. 4A). The screw rod 316 passes through a protruded member 231 extended from the adjusting member 23. When the adjusting wheel 31 is rotated, the screw rod 316 drives the adjusting member 23 to displace accordingly and shift the position of the sinker cap 2.

[0015] In addition, a ball bearing 4 being in contact with the gear wheel ring 313 is disposed at a position corresponding to the adjusting wheel 31 of the gear wheel ring 313, wherein the ball bearing 4 is coupled to one end of a resilient member 41 (which could be a spring), and the other end of the resilient member 41 is fixed to the sinker cap 2. When the adjusting wheel 31 is rotated, the ball bearing 4 of the sinker cap 2 is latched onto the gear section of the gear wheel ring 313 by the pressing the resilient member 41. The ball bearing 4 will shift from one gear section to another gear section as the user rotates the adjusting wheel 31 by graduation to assure the precision of adjustment for the dial scale 312.

[0016] Please refer to FIGS. 4A and 4B. The sinker cap 2 of this invention has a saddle board 6 with an aslant surface 61, and the fixed member 22 of the sinker cap 2 also has an aslant surface 26 to operate in conjunction with the aslant surface 61 of the saddle board 6, so that the sinker cap 2 and the saddle board 6 work closely with each other. Therefore, the sinker cap 2 can have a more stable shift on the saddle board 6 when an adjustment is made.

[0017] Please refer to FIG. 3. The screw rod 5 is first loosened from the oval-shaped hole 24, and then a regular hexagonal wrench is rotated in the hexagonal hole 311 of the adjusting wheel 31 in order to rotate the adjusting wheel 31. Since one end of the fixing pin 32 is fixed to the sinker cap 2 and the other end presses against the circular space 314 to fix the screw rod 316, therefore the screw rod 316 fixed by the fixing pin 32 drives the adjusting member 23 to rotate out along the screw thread of the screw rod 316 when the adjusting wheel 31 is rotated, and then the adjusting member 23 moves back and forth on the screw rod 316 and further drives the sinker cap 2 to shift slightly as to fine tune the cam 21 of the sinker cap 2.

[0018] Furthermore, a resilient member 317 (which could be a spring) is disposed on the screw rod 316, and this resilient member 317 can be disposed between a side of the saddle board 6 through where the screw rod 316 passes and the adjusting member 23 to provide enough resistance to prevent the adjusting member 23 from excessively moving back and forth on the screw

rod 316 thus reducing the error produced by rotating the screw rod 316.

[0019] While the invention has been described by way of example and in terms of a preferred embodiment, it is to be understood that the invention is not limited thereto. To the contrary, it is intended to cover various modifications and similar arrangements and procedures, and the scope of the appended claims therefore should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements and procedures.

Claims

1. A cam adjusting device of circular knitting machine, being installed on a saddle board having an aslant surface, comprising:

a sinker cap, having an indispensable fixed member and a cam, and said fixed member having an aslant surface and being movably installed onto said saddle board;
 an adjusting member, disposed at the bottom of said sinker cap;
 an adjusting mechanism, being installed on said saddle board and having a screw rod coupled to said adjusting member and a fixing pin for fixing the position of said screw rod for driving said sinker cap for precise but slight movement.

2. The cam adjusting device of circular knitting machine according to claim 1, wherein said screw rod comprises an adjusting wheel at one end, and said adjusting wheel having a hexagonal hole at its top, a dial scale for marking the change in rotation of said adjusting wheel, a gear wheel ring disposed under said dial scale, and a ring section enclosing a circular space with said gear wheel ring.
3. The cam adjusting device of circular knitting machine according to claim 1, wherein said adjusting member has a protruded member for receiving said screw rod.
4. The cam adjusting device of circular knitting machine according to claim 2, wherein said fixing pin having one end fixed to said sinker cap and the other end pressing against said circular space.
5. The cam adjusting device of circular knitting machine according to claim 2, wherein said sinker cap having a ball bearing in contact with said gear wheel ring and coupled to a resilient member is disposed at a position corresponding to the gear wheel ring of said adjusting wheel for constantly keeping said ball bearing in contact with said gear wheel ring.

6. The cam adjusting device of circular knitting machine according to claim 5, wherein said resilient member is a spring.

7. The cam adjusting device of circular knitting machine according to claim 1, wherein said screw rod has a resilient member disposed between a side through where said screw rod passes and said adjusting member for providing resistance to reduce the error when said screw rod rotates.

8. The cam adjusting device of circular knitting machine according to claim 7, wherein said resilient member is a spring.

9. The cam adjusting device of circular knitting machine according to claim 1, wherein said fixed member has an oval-shaped hole therein and coupled to said saddle board by a screw rod.

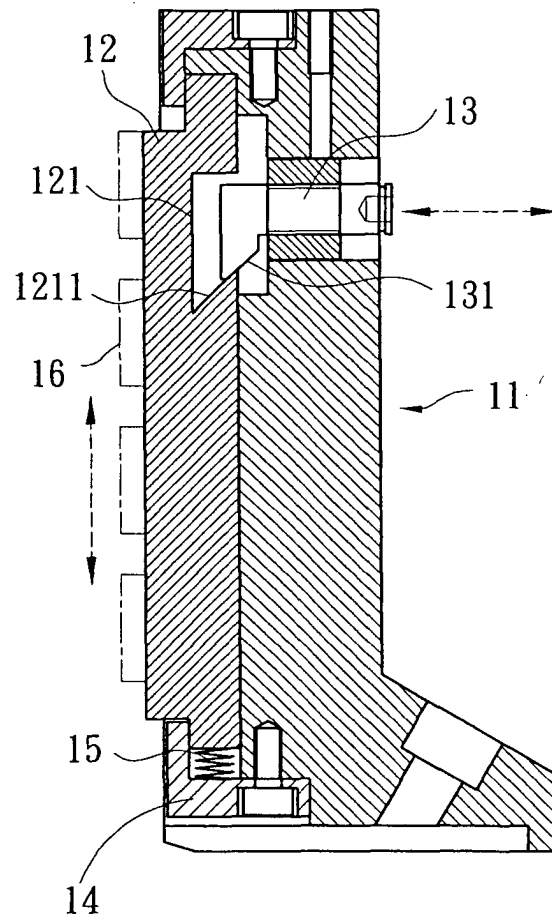


Fig.1 PRIOR ART

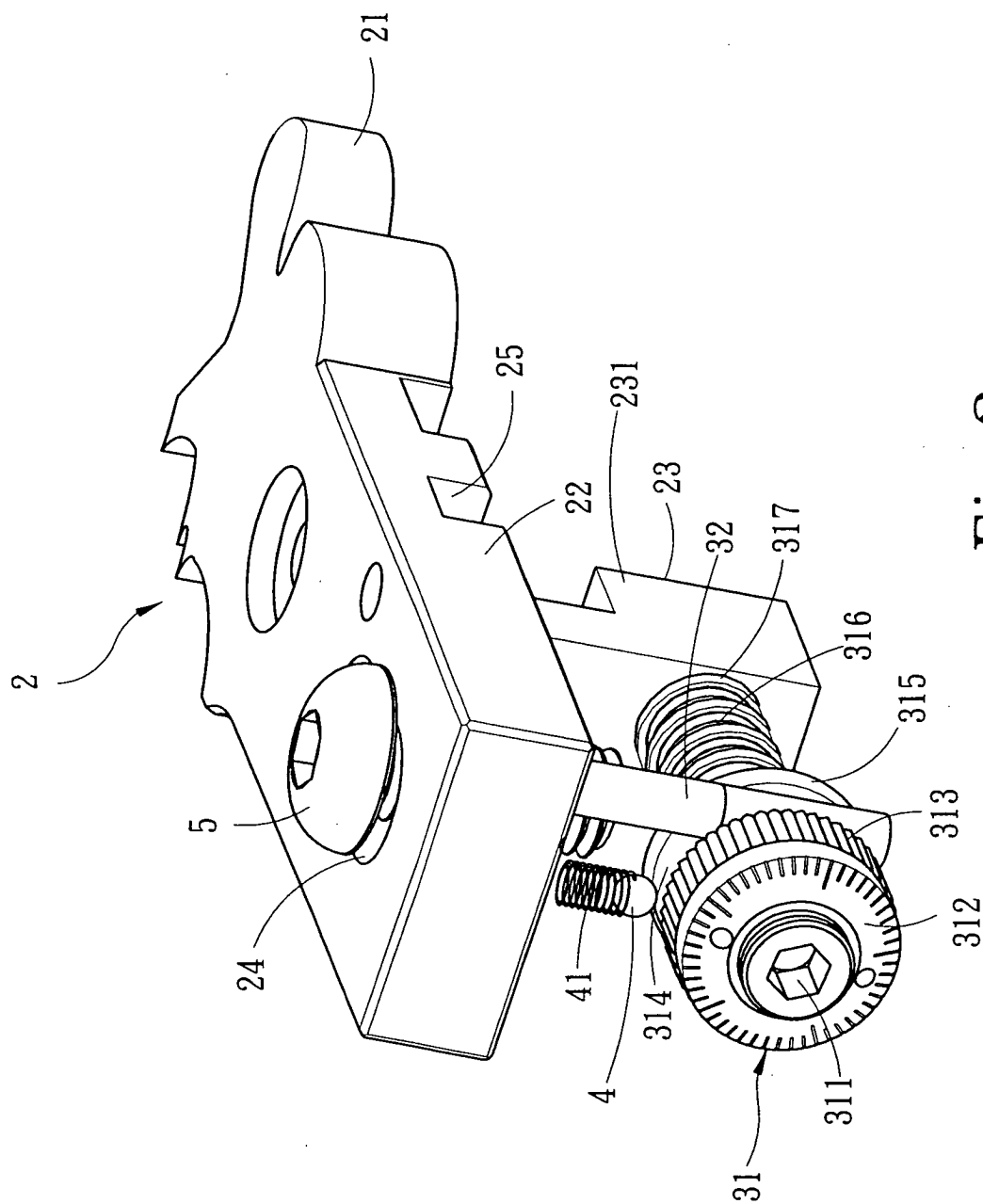


Fig. 2

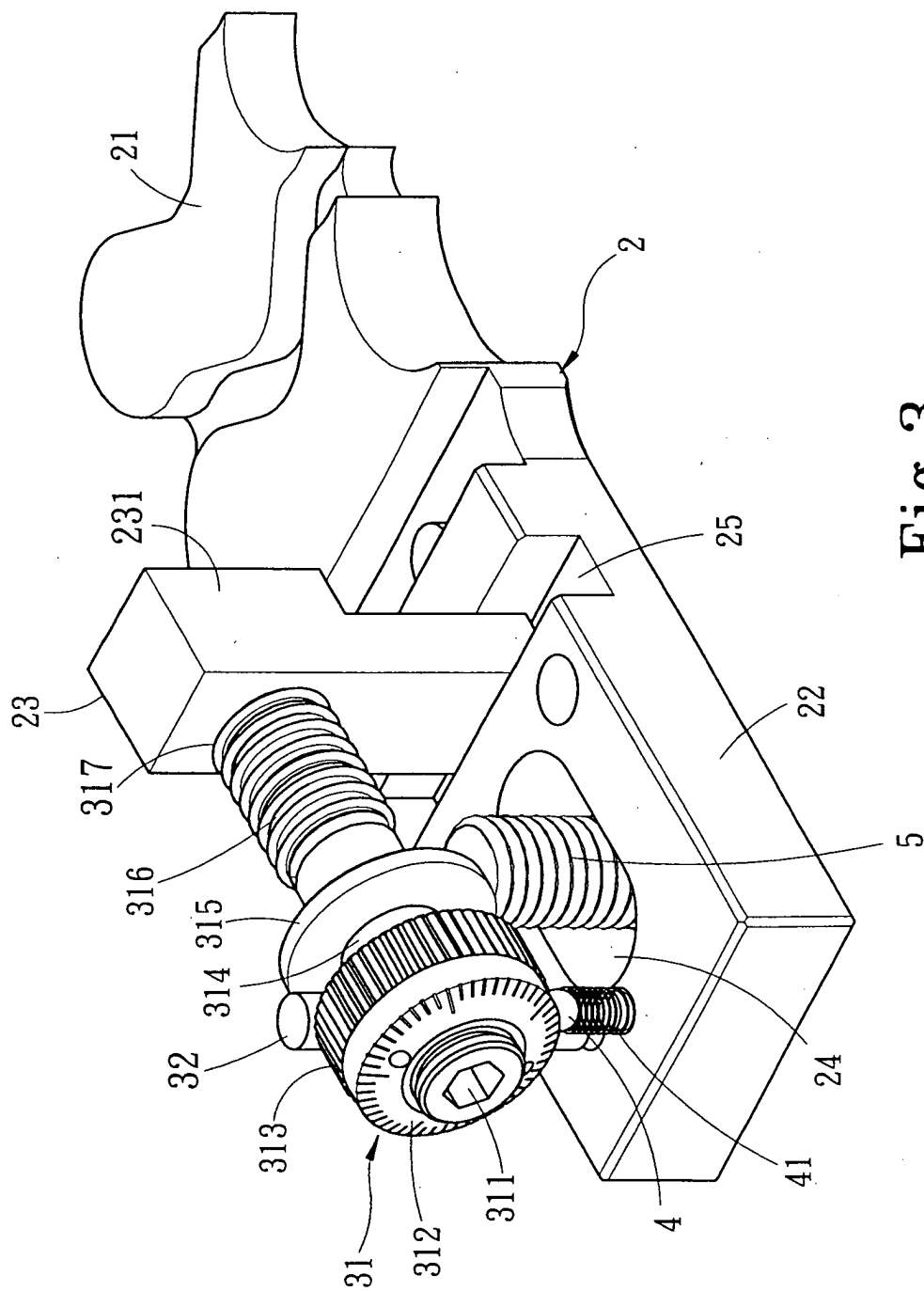


Fig.3

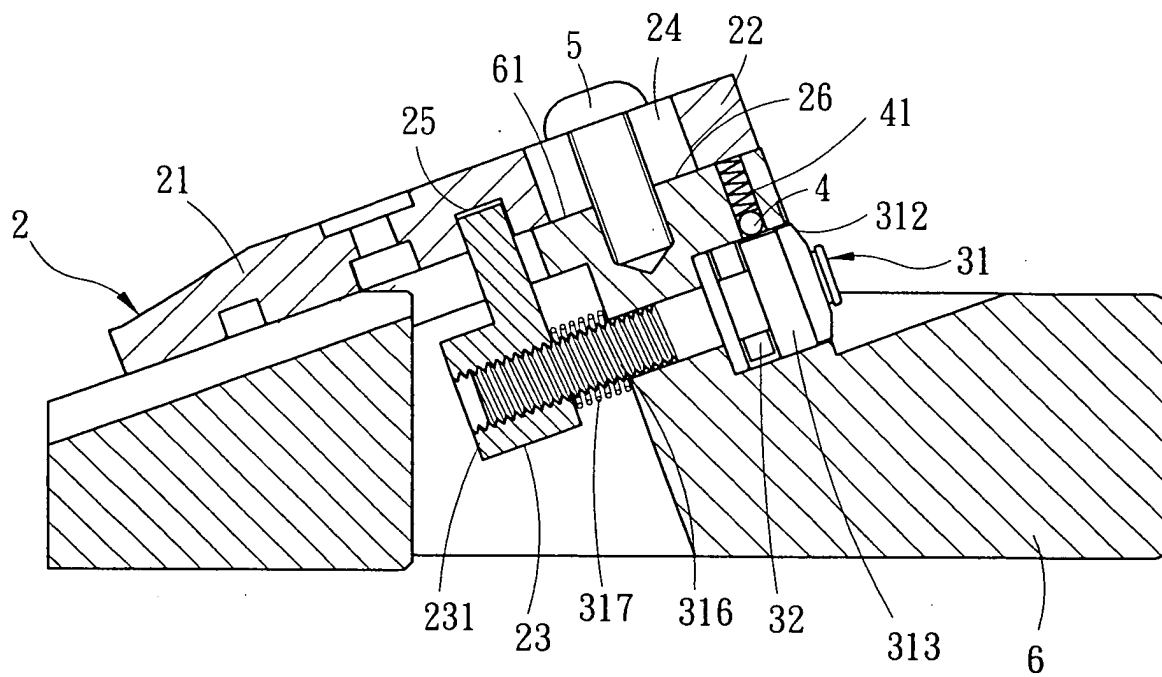


Fig.4A

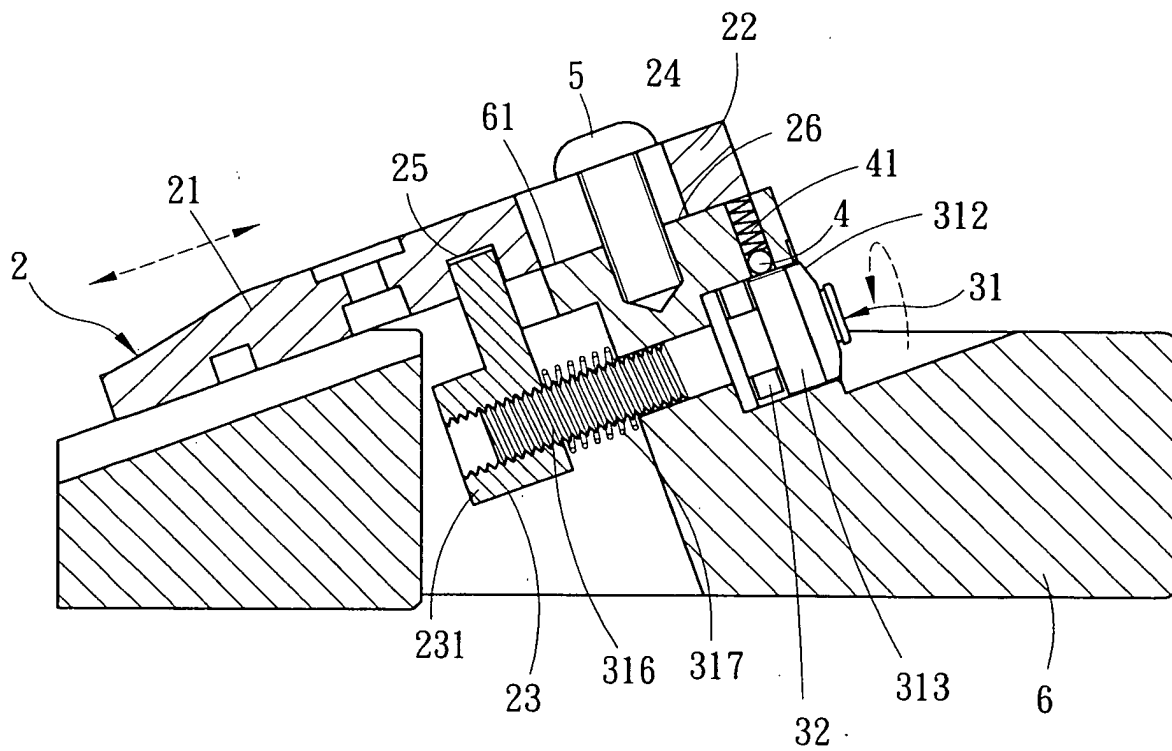


Fig.4B



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 00 1383

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	US 1 829 094 A (ADOLPHUS INGALLS WILLIS) 27 October 1931 (1931-10-27) * page 2, line 115 - page 3, line 40; figures 2,4 *	1	D04B15/32
A	US 3 387 467 A (BECKENSTEIN LEONARD A) 11 June 1968 (1968-06-11) * column 2, line 58 - column 3, line 7; figure 3 *	1	
A	GB 324 764 A (GEORGE BLACKBURN & SONS LTD; JOHN HENRY GLENN BAYLES) 6 February 1930 (1930-02-06) * page 3, lines 8-56; figures 1,2 *	1	
A	US 3 525 239 A (AGULNEK HARRY) 25 August 1970 (1970-08-25) * column 2, lines 7-48; figures 1,2 *		
A	US 3 388 563 A (SAM MISHCON) 18 June 1968 (1968-06-18) * column 1, line 71 - column 2, line 51; figure 2 *		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			D04B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 June 2004	Examiner Dreyer, C
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 00 1383

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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28-06-2004

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82