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(54) Nipper for cotton combers

(57) A nipper of a combing machine usable either for "feeding while detaching" also called "backward feed" and for "feeding before detaching" also called "forward feed", comprises a ratchet system (6, 7, 16, 17) for activating a feed roll (5). This ratchet system consists of a ratchet gear (6) attached to the feed roll (5), one or two ratchet levers (7, 16), one of them with a spring (9) pushing said ratchet lever (7) against said ratchet gear (6), a guide plate (11) fixed to the lower nipper, a pin (10) fixed to the ratchet lever (7), wherein said guide plate and said pin (10) cooperage that the upper nipper may be opened for cleaning and maintaining the feed roll (5) and closed afterwards in a proper way which allows for immediate restart of the comber without any further action. The change from one feed system to the other is achieved by an exchange of the backward feed ratchet gear (6) to forward feed ratchet gear (17) - and vice versa - thus either the one or the other lever (7, 16) is engaged with ratchet gear (6, 17). The described mechanism might be either used as an upgrade for combers already in operation or as enhancement of newly built combers.

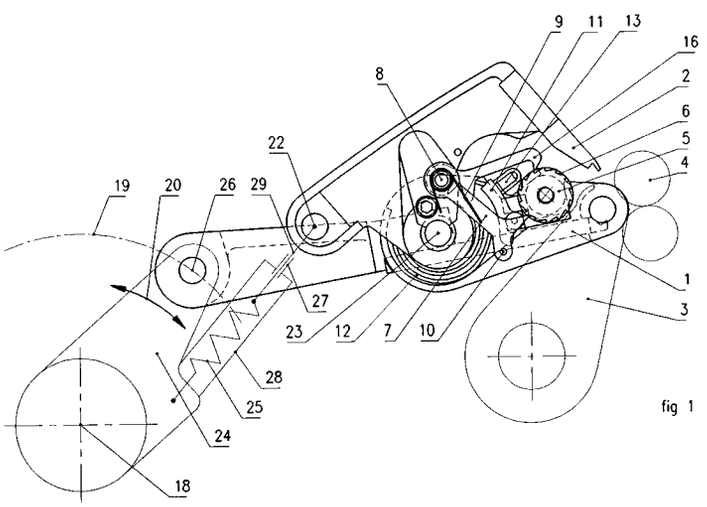

fig 1

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Description

[0001] This invention relates to a nipper of a combing machine.

[0002] Modern combers follow the Nasmyth system, developed around the year 1920. Originally the machine was designed for long staple material, especially for combing of wool.

[0003] It is a well known fact, that design and settings of a comber must take into consideration the staple length of the processed material. Therefore quality combers for different staple sizes differ considerably in the details, even in case their principle function is the same. Combers processing short staple have to be different from those processing long staple fibre material. Ignoring this elementary and to every textile expert well known fact causes insufficient operation of such a misused comber.

[0004] Many combers of elder design still in operation process cotton fibres with a 2.5 % span length of 24 - 28 Millimetres. Actually those elder comber designs were originally intended for long staple cotton like the type of "Pima" which has a 2.5 % span length of 35 - 40 Millimetres. As a consequence the sliver quality of the actually processed cotton is not what it could be. Long - often called "good" - fibres are lost through the extracted noil. This loss of fibres increases the percentage noil extraction without any gain in combing quality and thus has a detrimental effect on the economy of yarn manufacturing.

[0005] Having in mind the numerous combers already in operation under these non-optimum conditions and also taking into account that still combers of the described drawback are manufactured one might easily imagine the tremendous need for a simple and reliable adaptation of this type of combers. The adaptation or upgrade should enhance quality and economy of the combing process but not necessarily the machinery speed.

[0006] It is therefore the object of the present invention to provide a nipper for a combing machine which allows simple and reliable adaptation of already existing combers originally intended for long staple cotton. The nipper of course should be advantageous for newly manufactured combers as well.

[0007] According the present invention there is provided a nipper of a combing machine comprising a lower nipper with a nipper plate and an upper nipper with a knife, jointed on said lower nipper, a feed roll with a ratchet gear arranged on said lower nipper, a backward feed ratchet lever jointed on said upper nipper, a spring forcing said backward feed ratchet lever against said ratchet gear, first guide means arranged on said lower nipper, second guide means arranged on said backward feed ratchet lever, wherein said first guide means and said second guide means co-operate during opening and closing movement of said upper nipper, restricting upward movement of said backward feed ratchet lever during opening movement and guiding said backward feed ratchet lever to pass said ratchet gear during closing movement, wherein said first guide means and said second guide means being out of contact in the closed operating position of said upper nipper.

[0008] According the present invention there is further provided a nipper of a combing machine comprising a lower nipper with a nipper plate and an upper nipper with a knife, jointed on said lower nipper, a feed roll with a ratchet gear arranged on said lower nipper, and a forward feed ratchet lever located above said ratchet gear and engaging said ratchet gear.

[0009] The nipper of the present invention shifts the lap feed roll forward in the direction of the knife and closer to the detaching rolls. Thus the clamping distance between the feed roll and the rear detaching rolls is advantageously adapted to the reduced staple length. A ratchet mechanism for activating the feed roll is used which takes into account the limited availability of space.

[0010] In a preferred form of the invention the nipper comprises said backward feed ratchet lever and said forward feed ratchet lever, wherein said ratchet gear is engaged by either said backward feed ratchet lever or said forward feed ratchet lever.

[0011] It is further preferred that the ratchet gear is of cylindrical shape, one part at one axial end of the cylindrical surface being provided with teeth for engagement with one ratchet lever and the other part on the other axial end being smooth defining a sliding surface for the other ratchet lever.

[0012] This makes is possible to change the function of the feed mechanism from feed while detaching, also known as "backward" feed, to feed before detaching, also known as "forward" feed, simply by exchanging the ratchet gear.

[0013] For easy removal of the feed roll the knife may be opened and closed again without any further attention of the operator to the ratchet mechanism. Doing this the feed roll can be taken out and the change from one kind of feed operation to another kind is possible in a simple and straightforward manner.

[0014] The inventive mechanism might be adapted to equipment already in use or to newly manufactured ones.

[0015] A preferred application of the invention will now be described by way of example with reference to the accompanying schematic drawings. In the drawings

- Fig. 1 is a side view of the ratchet mechanism in operation position,
- Fig. 2 is a side view of the ratchet mechanism in open position,
- Fig. 3 is a top view of the ratchet mechanism for backward feed, and
- Fig. 4 is a top view of the ratchet mechanism for forward feed.

[0016] Fig. 1 shows a side view of a nipper and a

ratchet mechanism which drives a feed roll 5. The nipper comprises a lower nipper with a nipper plate 1 and an upper nipper with a knife 2 pivotable about axis 23 on the lower nipper. The lower nipper is guided by a front support 3 and driven by a rear support 24 oscillating about axis 18 along line 19 and arrow 20. Rear support 24 further is connected through a spring 25 to the upper nipper. The spring 25 is connected to the upper nipper by a rod 29 and a bolt passing through bore 22 at the backward end of upper nipper. The other end of the spring 25 is connected to the rear support 24. The rod 29 is guided in a slide 27, whereas said slide 27 is attached to rear support 24 by a rigid tube 28.

[0017] While the nipper swings forward and backward it approaches detaching rolls 4 and remotes from them. Fig. 1 shows the nipper in the most forward position. In this position the knife 2 is opened. When the nipper moves backward the knife 2 will be closed and thus clamping the lap to be processed. When the nipper swings back and the detaching rolls 4 move forward the lap is detached.

[0018] A feed roll 5 moves the lap (not shown) passing between feed roll 5 and nipper plate 1 forward in a discontinuous way. Backward feed or feeding while detaching means that the feed roll 5 is turning while the nipper swings back and the knife 2 is closing. Forward feed or feeding before detaching means that the feed roll 5 is turning while the nipper swings forward and the knife 2 is opening.

[0019] Coaxially attached to the feed roll 5 is a backward feed ratchet gear 6. The ratchet gear 6 is activated by a backward feed ratchet lever 7. The backward feed ratchet lever 7 is pivoted by means of a bolt 8 to the upper nipper with knife 2 and thus follows the movement of said knife 2. A spring 9 forces the ratchet lever 7 towards the ratchet gear 6. While knife 2 is closing the backward feed ratchet lever 7 turns the ratchet gear 6 forward by one tooth. This gives the feed roll 5 a turn of defined angle thus delivering a defined length of the lap. The ratchet gear 6 is interchangeable with ratchet gears of different number of teeth thus allowing different amounts of lap feed.

[0020] The backward feed ratchet lever 7 comprises at its bottom end a pin 10. A guide plate 11 is attached to the lower nipper with nipper plate 1. During normal operation of combing the pin 10 is not in contact with the guide plate 11.

[0021] A spiral spring 12 comprises at one end an extension 13. This extension 13 is forced by spring 12 towards the feed roll 5 thus holding the feed roll 5 in place and clamping the lap (not shown). The other end of spiral spring 12 is connected to the upper nipper.

[0022] The system further incorporates a forward feed ratchet lever 16 pivoted by the bolt 8 to the upper nipper and positioned above ratchet gear 6. The forward feed ratchet lever 16 is held on ratchet gear 6 by gravity. This forward feed ratchet lever 16 may act on a ratchet gear 17 similar to its counterpart backward feed ratchet lever 7. Anyhow those two levers 7, 16 are not in engagement with ratchet gear 6 at the same time. This is accomplished by exchange of ratchet gear 6, as is explained later with reference to Fig. 3 and 4.

[0023] Fig. 2 shows the same side view as Fig. 1 but the upper nipper with knife 2 is now in an entirely opened position. This however is not a normal operating and combing position, respectively, but a service position. The spiral spring 12 with extension 13 is rotated through the action of a pin 15 engaging a bent end 14 of spiral spring 12 projecting from extension 13. Pin 15 is attached to the upper nipper with knife 2. While the upper nipper with knife 2 is opened pin 15 activates the spiral spring 12 in the manner shown in Fig. 2. Feed roll 5 with ratchet gear 6 may now be easily removed by an operator (not shown). This operation of removal of the feed roll 5 is advantageous for easy cleaning and maintaining the feed roll 5 and exchange of ratchet gear 6.

[0024] During this open movement of the upper nipper with knife 2 the backward feed ratchet lever 7 is raised and pushed upwards by spring 9. Pin 10 of backward feed ratchet lever 7 is now guided by the guide plate 11 sliding on surface 21 of guide plate 11. Thus the angle of rotation of the backward feed ratchet lever 7 is limited. Without guide plate 11 the ratchet lever 7 would be on top of the ratchet gear 6 thus preventing to close the nipper and operate the feed roll properly. The upper nipper with knife 2 may now easily be closed and the backward feed ratchet lever 7 is automatically placed in correct position by pin 10 sliding along surface 21.

[0025] The forward feed ratchet lever 16 is also lifted in the shown open position of the upper nipper.

[0026] Fig. 3 is a top view of the backward feed ratchet gear 6. The backward feed ratchet gear 6 has teeth cut only partially as shown on its cylindrical surface. Therefore only the backward feed ratchet lever 7 can engage ratchet gear 6 while the forward feed ratchet lever 16 is in contact with the smooth cylindrical surface part. Therefore the forward feed ratchet lever 16 does not activate the backward feed ratchet gear 6 and might be omitted.

[0027] In Fig. 4 the backward feed ratchet gear 6 has been replaced by a forward feed ratchet gear 17. Now the situation is reversed. The forward feed ratchet gear 17 has teeth cut only partially on the other side of its cylindrical surface as shown. Therefore only the forward feed ratchet lever 16 actually can engage forward feed ratchet gear 17 while the backward feed ratchet lever 7 is in contact with the smooth cylindrical surface part. Therefore backward feed ratchet lever 7 does not activate the forward feed ratchet gear 17 and might be omitted.

[0028] In practical mill operation it is advantageous to keep the levers not used in place. This allows for fast change from forward to backward feed - and vice versa - just by exchange of the ratchet gear. This is the advantage of having both levers attached but using only one at a time.

[0029] For easy installation and satisfying operation of the new inventive nipper the following dimensioning is advantageous: the ratchet gears 6 and 17 have an outer diameter of approximately 20 to 30 millimetres and approximately 12 to 18 teeth. The spring 9 acts with a force of approximately 1 Newton towards the ratchet lever 7.

Claims

1. A nipper of a combing machine comprising a lower nipper with a nipper plate (1) and an upper nipper with a knife (2), jointed on said lower nipper, a feed roll (5) with a ratchet gear (6) arranged on said lower nipper, a backward feed ratchet lever (7) jointed on said upper nipper, a spring (9) forcing said backward feed ratchet lever (7) against said ratchet gear (6), first guide means (11) arranged on said lower nipper, second guide means (10) arranged on said backward feed ratchet lever (7), wherein said first guide means (11) and said second guide means (10) co-operate during opening and closing movement of said upper nipper, restricting upward movement of said backward feed ratchet lever (7) during opening movement and guiding said backward feed ratchet lever (7) to pass said ratchet gear (6) during closing movement, wherein said first guide means (11) and said second guide means (10) being out of contact in the closed operating position of said upper nipper.

2. A nipper of a combing machine comprising a lower nipper with a nipper plate (1) and an upper nipper with a knife (2), jointed on said lower nipper, a feed roll (5) with a ratchet gear (17) arranged on said lower nipper, and a forward feed ratchet lever (16) located above said ratchet gear (17) and engaging said ratchet gear (17).

3. A nipper as claimed in Claim 1 and 2, comprising said backward feed ratchet lever (7) and said forward feed ratchet lever (16), wherein said ratchet gear (6, 17) is engaged by either said backward feed ratchet lever (7) or said forward feed ratchet lever (16).

4. A nipper as claimed in Claims 3, wherein the ratchet gear (6, 17) is of cylindrical shape, one part at one axial end of the cylindrical surface being provided with teeth for engagement with one ratchet lever (7, 16) and the other part on the other axial end being smooth defining a sliding surface for the other ratchet lever (16, 7).

5. A nipper as claimed in any of the Claims 1 to 4, wherein the ratchet gear (6, 17) has a diameter of approximately 20 to 30 mm.

6. A nipper as claimed in any of Claims 1 to 5, wherein the said spring 9 biasing said ratchet lever (7) with a force of approximately 1 Newton towards the ratchet gear (6).

7. A nipper as claimed in any of Claims 1 to 6, comprising a spiral spring (12) acting on said feed roll (5), said spiral spring (12) comprising an extension 13 abutting said feed roll (5).

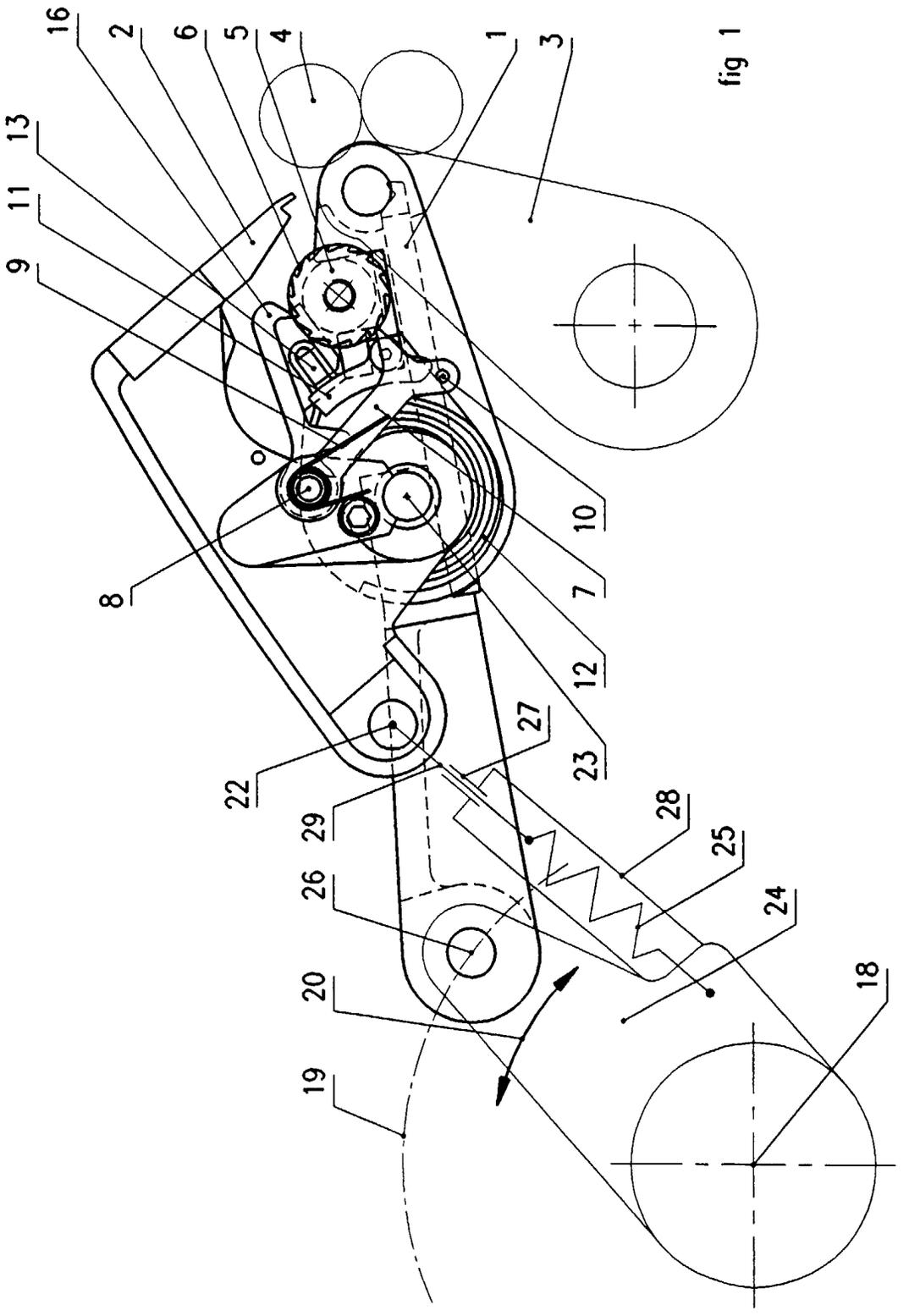

fig 1

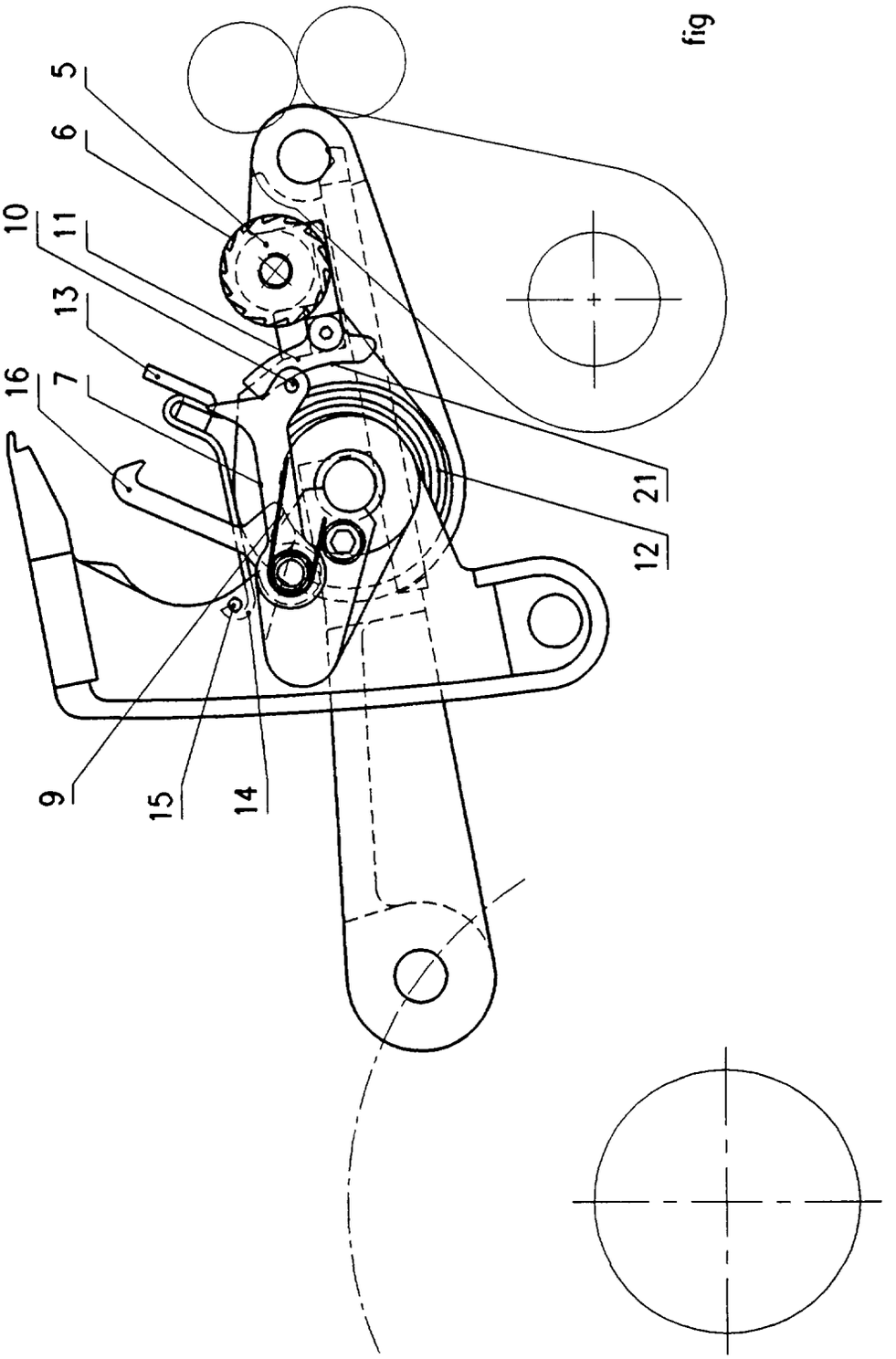

fig 2

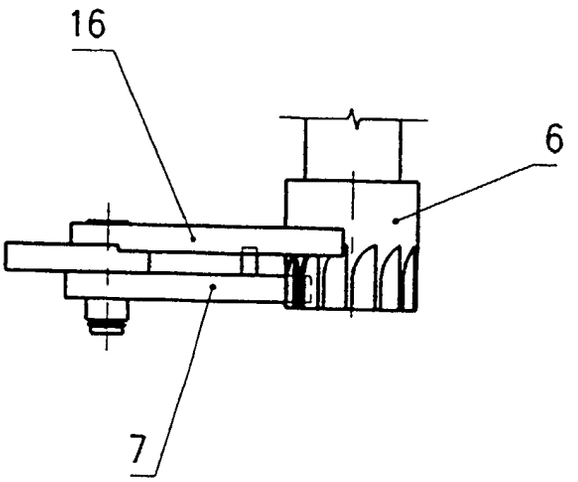

fig 3

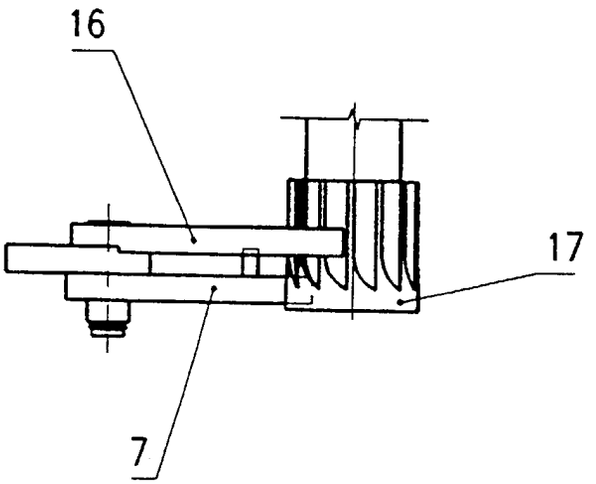

fig 4

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EUROPEAN SEARCH REPORT

Application Number
EP 99 89 0120

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 October 1999	Munzer, E

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