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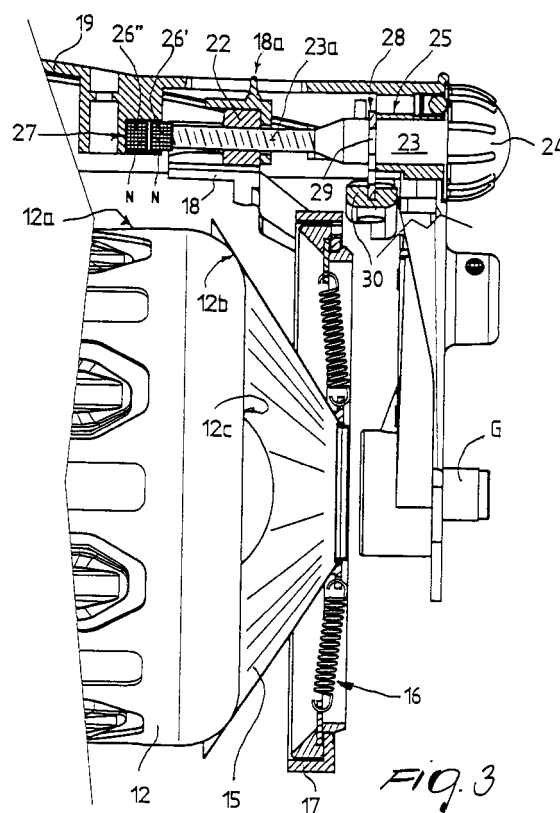
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(54) **Releasable retainer for the brake support of weft feeders for textile machines**

(57) The releasable retainer comprises an adjustment screw element (23) which engages a female threaded element (22) which is rigidly coupled to a slider (18) which supports the brake support (17), and the entire adjustment system, which can move rigidly with the slider (18), is subjected to the action of at least one pair of permanent magnets (26'-26'') which are mutually opposite and whose identical poles face each other so as to repel each other in order to move the brake support (17) into a disengagement position in which the brake (15) is spaced from the drum (11) of the feeder (10).



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Description

[0001] The present invention relates to a releasable retainer for the brake support of weft feeders for textile machines, particularly weaving looms.

[0002] It is known that weft feeders are devices which comprise a fixed drum on which a hollow rotating arm winds, like a fishing reel, a plurality of turns of thread which constitute a weft reserve and which, when requested by the loom, unwind from the drum in order to feed said loom under the control of a brake which is meant to generate a mechanical tension on the thread being unwound.

[0003] Typically, the brake is constituted by braking means such as a frustum-shaped element made of polymeric material which is appropriately stiffened and optionally provided with high-resistance material, or a ring of bristles or elastically flexible metallic laminas.

[0004] Said braking means are usually suspended elastically and are supported by an appropriately provided brake support, in front of the drum of the feeder, in order to elastically engage the thread that slides on the portion that blends the cylindrical surface with the front surface of said drum. The brake support is constituted by a rigid ring which is in turn supported concentrically to the drum of the feeder by a slider which can slide on guides which run parallel to the axis of the drum. Said slider is controlled by a precision adjustment system of the screw-and-nut type, provided with an actuation knob, which allows to move the slider and the supporting ring rigidly coupled thereto in a direction which is parallel to the axis of said drum in order to vary the elastic force — the so-called static tension — with which the braking means act on the weft thread.

[0005] In the practical use of said weft feeders, it is necessary to periodically remove the brake both for cleaning, particularly in order to remove the lint that accumulates on the brake due to the continuous sliding contact of the weft thread, and for optionally replacing said brake when it breaks or fails or is worn to an extent which is no longer compatible with its correct operation.

[0006] So-called quick-release systems have already been provided for these purposes which are adapted to move the entire screw-and-nut adjustment system in order to shift the brake support and provide, between said support and the drum of the feeder, a gap which is sufficient to allow intervention on the braking means.

[0007] In particular, pneumatic quick-release systems are known which comprise a double-acting fluid-actuated jack which is adapted to move the support rigidly together with the corresponding supporting slider or the entire adjustment system from an active position, in which the brake is in contact with the drum, to a disengagement position, in which the brake is spaced from the drum for maintenance, and vice versa.

[0008] However, pneumatic systems of this type, disclosed in published European patent applications

No. 446.447, 657.379, and 659.918, are complicated and expensive and require fitting the feeder with a pneumatic circuit; therefore they can be used conveniently only in specific and limited cases, particularly when the feeder is already provided with a similar circuit which is used mainly for pneumatic threading.

[0009] Quick-release systems are also known in which the entire adjustment system can move rigidly with the slider of the brake support and is subjected to the action of a spring which tends to move the slider and the support into a disengagement position, in which the braking means is spaced from the drum of the weft feeder. The spring is contrasted by a stop element which keeps it normally loaded and keeps the braking means in the active position in contact with the drum; disengagement of the stop element produces the snap movement of the slider and of the brake support into the disengagement position of the braking means. These known spring-loaded systems, disclosed in EP-0862619 and in international application WO 97/03908, have functional drawbacks. In particular, the preloading of the springs can have a negative effect on the ease of operation of the actuation knobs of the static tension adjustment system, leading to difficulty in correctly setting said static tension.

[0010] The aim of the present invention is to eliminate these and other drawbacks of conventional systems for retaining and disengaging the brake support, and within the scope of this aim it has the particular object of providing a releasable retainer for the support which has a simple structure and is highly reliable in operation and very easy to maneuver both during disengagement and during the return of said support to the active position.

[0011] Another object of the present invention is to provide a device for disengaging the brake support which does not affect the ease of operation of the static tension adjustment knob and is also suitable to maintain the setting of the static tension, so that after the intervention has been performed the support is returned to the active position and the brake requires no correction of the setting.

[0012] According to the present invention, these and others objects which will become better apparent from the detailed description that follows are achieved with a releasable retainer for the brake support having the specific characteristics stated in the appended claims.

[0013] Substantially, the invention is based on the innovative concept of subjecting the entire screw-and-nut adjustment system associated with the movable slider that supports the brake support to the action of at least one pair of mutually opposite permanent magnets, whose identical poles are juxtaposed so as to repel each other; and of contrasting the mutual repulsion of said magnets with a stop element, actuated by a disengagement lever, which engages a corresponding retention groove of the pivot of the adjustment screw in order

to keep said magnets and the brake normally in the active position, the magnets being in mutual contact and the stop element being in contact with the drum of the feeder.

[0014] With this arrangement, in accordance with the stated aim and objects, when the stop element is disengaged from the groove of the pivot of the adjustment screw, the entire adjustment assembly, with the brake support associated therewith, actuated by the repulsion of the mutually opposite magnets, moves parallel to the drum by an extent which is sufficient to move the brake into the disengagement position, correspondingly moving outward the adjustment system actuation knob, which can thus be gripped in order to manually complete the movement of said brake into the position suitable for allowing interventions on said brake.

[0015] As may be noted, the displacement of the brake after the releasing action on the retainer is advantageously carried out by means of two successive disengagement movements or strokes for displacing said brake from its active braking position into a disengagement position suitable for allowing intervention on the brake, i.e. a first movement or stroke caused by the repulsion action of the mutually opposite magnets and a subsequent hand-operated movement or stroke.

[0016] Also the active position of the brake is restored through two distinct return movements or strokes by applying to the adjustment screw actuation knob an axial pressure which is adapted to make the pivot of the screw slide in the opposite direction. During the first hand-operated return movement or stroke the repulsion effect of the opposite magnets is not effective owing to the gap between the opposite magnets exceeding the threshold of the magnetic effect. The second return movement or stroke occurs instead in contrast with the repulsion of said mutually opposite magnets, until the stop element is returned into alignment with the retention groove of said pivot.

[0017] Further characteristics and advantages of the device according to the invention will become better apparent from the detailed description that follows and with reference to the accompanying exemplifying drawings, wherein:

Figure 1 is a lateral elevation view of a weft feeder with the releasable retainer for the brake support according to the invention;

Figure 2 is a front view, taken in the direction of the arrows II-II of Figure 1;

Figure 3 is a partial sectional view, taken along the plane III-III of Figure 2, of the releasable retainer in the configuration that corresponds to the active position of the brake support;

Figure 3a is a sectional view, similar to Figure 3, of the configuration of the device in the disengaged position of the brake support;

Figures 4 and 4a are sectional views, similar to Figures 3 and 3a, of a different embodiment of the

device which achieves equal utility.

[0018] In the drawings, the reference numeral 10 generally designates a conventional weft feeder which comprises a fixed base 11 and a fixed drum 12 on which a hollow rotating arm 13, rigidly coupled to a driving shaft 14 which is also hollow, winds like a fishing reel a plurality of turns of thread F that constitutes a weft reserve RT. When requested by the loom (not shown), the turns of thread unwind from the drum 12 and the unwinding is controlled by a brake, generally designated by the reference numeral 15, which is meant to produce adequate mechanical tension on the thread.

[0019] The nature of the brake 15 is beyond the scope of the present invention. However, for the sake of better comprehension, the description relates to a conventional cone-type brake. Said brake comprises a continuous frustum-shaped body which is suspended elastically, by means of a radial set of springs 16, from a brake support 17 and is pushed against the portion 12b where the cylindrical surface 12a of the drum blends with the front surface 12c in order to elastically engage, for braking, the thread F that passes, in its unwinding motion, over said blending surface in order to reach an output thread guiding ring G.

[0020] As clearly shown in the figure, the brake support 17 is constituted by a rigid ring which is rigidly coupled to a slider 18 which is supported, so that it can move in a straight line, by a fixed arm 19 of the feeder which runs parallel to the axis of the drum 12. For this purpose, the slider 18 is provided with two bushes (not shown) which slidably engage corresponding cylindrical guides (not shown) which are supported by an arm 19. A female threaded element 22 is rigidly coupled to the slider 18, and an adjustment screw engages therein; said screw is constituted by the threaded end portion 23a of a pivot 23 which is provided with an adjustment knob 24 by means of which it is possible to turn the adjustment screw without any axial movement thereof and produce by virtue of the non-rotating female threaded element 22 axial precision movements of the slider 18 and of the brake support 17. These movements, indicated by an indicator 18a of the slider which moves along a graduated scale of the arm 19, allow to adjust the elastic pressure, known as static tension, with which the brake 15 acts on the drum and therefore the degree of braking action applied by said brake to the thread F.

[0021] According to the present invention, there is provided a disengagement system which allows to move the brake support ring 17 toward the outside of the feeder 10 without actuating the knob 24 and accordingly to move the brake 15 away from the drum 12 in order to move it into the disengagement position of Figures 3a-4a, in which the braking means is accessible both for cleaning and for replacement and/or maintenance.

[0022] For the purpose, the pivot 23 of the adjust-

ment system is supported by a cooperating fixed bush 25 so that the pivot 23 can always rotate about its axis and can also be axially moved when a stop element 28 is released. The fixed bush 25 is rigidly coupled to the arm 19 and the axial movement of the pivot 23 is obtained by the rotation of pivot 23 about its axis and the screw thread engagement with female threads of the fixed bush 25.

[0023] Said pivot 23 has, at its end, a permanent magnet 26', preferably made of a material with high magnetic hysteresis, such as samarium-cobalt and neodymium, having a preset N-S magnetic polarity as shown in the figure. A similar magnet 26" is arranged co-axially to the magnet 26', lies opposite thereto, and is accommodated in a hollow seat 27 of the arm 19. The N-S polarity of the magnet 26" is orientated in reverse with respect to the polarity of the magnet 26', and therefore the two magnets have juxtaposed identical poles, so as to repel each other. In this manner, the magnets 26'-26" actuate the slider 18 and the brake support 17 so as to move into said disengagement position. Said movement is normally prevented by a stop element 28 which engages a corresponding retention groove 29 of the pivot 23 (Figures 2 and 3).

[0024] As clearly shown in Figure 2, the stop element 28 is constituted by the upper portion of an annular bracket 28a which is rigidly coupled to an actuation lever 30, which is pivoted to the arm 19 at an end 30a and is subjected to the action of a spring 31 which normally keeps the stop element 28 engaged in the retention groove 29 and accordingly keeps the brake 15 in the active position of Figures 3 and 4.

[0025] When the lever 30 is turned in contrast with the action of the spring 31 in the direction indicated by the arrow in Figure 2, the stop element 28 disengages from the groove 29 and the entire adjustment system accordingly performs a translatory motion and, actuated by the repulsion force of the magnets 26'-26", moves into a position which is sufficient to make the knob 24 protrude in front of the arm 19. The knob can thus be gripped in order to manually complete the movement of the brake 15 into the disengagement position.

[0026] In order to restore the active position of the brake 15, it is sufficient to apply, by hand, first a slight axial return pressure to the knob 24 during which the repulsion effect of the magnets is not sensed and afterwards make the pivot 23 slide in its retention bush 25 in contrast with the action of the magnets 26'-26" until the stop element 28 is aligned with the groove 29, which the stop element engages with a snap action by way of the action of the spring 31.

[0027] It should be noted that both the disengagement maneuvers and the reengagement maneuvers in no way alter the setting of the static tension, which accordingly does not require corrections because of these maneuvers.

[0028] The embodiment of Figures 4 and 4a, which achieves the same utility, differs only in that it comprises

two or more magnets 26a accommodated in respective hollow seats 27a provided on the abutment of the mushroom-shaped head of the knob 24 and, correspondingly, two or more mutually opposite magnets 26b accommodated in corresponding hollow seats 27b provided on the bush 25 which is rigidly coupled to the arm 19. Also in this case, the polarities of the magnets are opposite, so that their identical poles are juxtaposed.

[0029] The protection of the present invention of course also extends to embodiments that achieve equal utility by using the same innovative concept defined by the appended claims.

[0030] The disclosures in Italian Utility Model Application No. TO99U000081 from which this application claims priority are incorporated herein by reference.

[0031] 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. A releasable retainer mechanism in combination with the brake support (17) of weft feeders (10) for textile machines, wherein the weft feeders are of the type having a drum (12) about which a weft reserve (RT) is wound and wherein the drum is cooperating with a brake (15) carried by said brake support (17), said brake support (17) being carried by a slider (18) the position of which with respect to said drum is controlled by a precision adjustment system, said system comprising two co-axially arranged elements (22, 23), the reciprocal axial position whereof is adjustable upon actuation of one (23) of said elements, another (22) of said elements being in engagement with said slider (18) and being adapted, upon adjustment actuation, to adjust the position of said slider (18) and of said brake support (17) with respect to said drum (12) of the feeder (10) in order to vary the braking action of the brake (15) carried by said brake support and consequently the static tension applied to the thread (F) unwound from said weft reserve (RT), characterized in that the entire adjustment system can move rigidly with the slider (18) and is subjected to the action of at least one pair of permanent magnets (26'-26") which are mutually opposite and whose identical poles are juxtaposed so as to repel each other in order to move the brake support (17) into a disengagement position in which the brake (15) is spaced from the drum (11) of the feeder (10), and in that the mutual repulsion of said magnets (26) is contrasted by a controlled stop element (28) which engages one (23) of said elements of the adjustment system in order to keep the brake

(15) normally in the active position in contact with said drum (11); the disengagement of the stop element (28) producing a translatory motion of the slider and of the brake support and a corresponding outward movement of a knob (24) of the adjustment system, which are sufficient to allow to grip said knob and manually complete the movement of said brake (15) into the disengagement position (Figures 3a-4a).

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2. A mechanism according to claim 1, characterized in that one (23) of said co-axially arranged elements is an adjustment screw element (23) and the other (22) of said co-axially arranged elements is a female threaded element (22).
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3. A mechanism according to claims 1 and 2, characterized in that said mutually opposite magnets (26'-26''-26a-26b) are made of a material having high magnetic hysteresis, typically samarium-cobalt and neodymium.
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4. A mechanism according to claims 1-3, characterized in that the end of said adjustment screw element (23) is provided with a permanent magnet (26') which is arranged coaxially and opposite a similar permanent magnet (26'') which is accommodated in a hollow seat (27) provided in the fixed arm (19) that supports the sliding guides of said slider (18).
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5. A mechanism according to claims 1-3, characterized in that it comprises at least two magnets (26a) which are accommodated in respective hollow seats (27a) provided in the head of the knob (24) for actuating the adjustment screw element (23) and, correspondingly, at least two mutually opposite magnets (26b) which are accommodated in corresponding hollow seats (27b) provided on the bush (25) that retains the adjustment screw element (23) that is rigidly coupled to the fixed arm (19) that supports the sliding guides of said slider (18).
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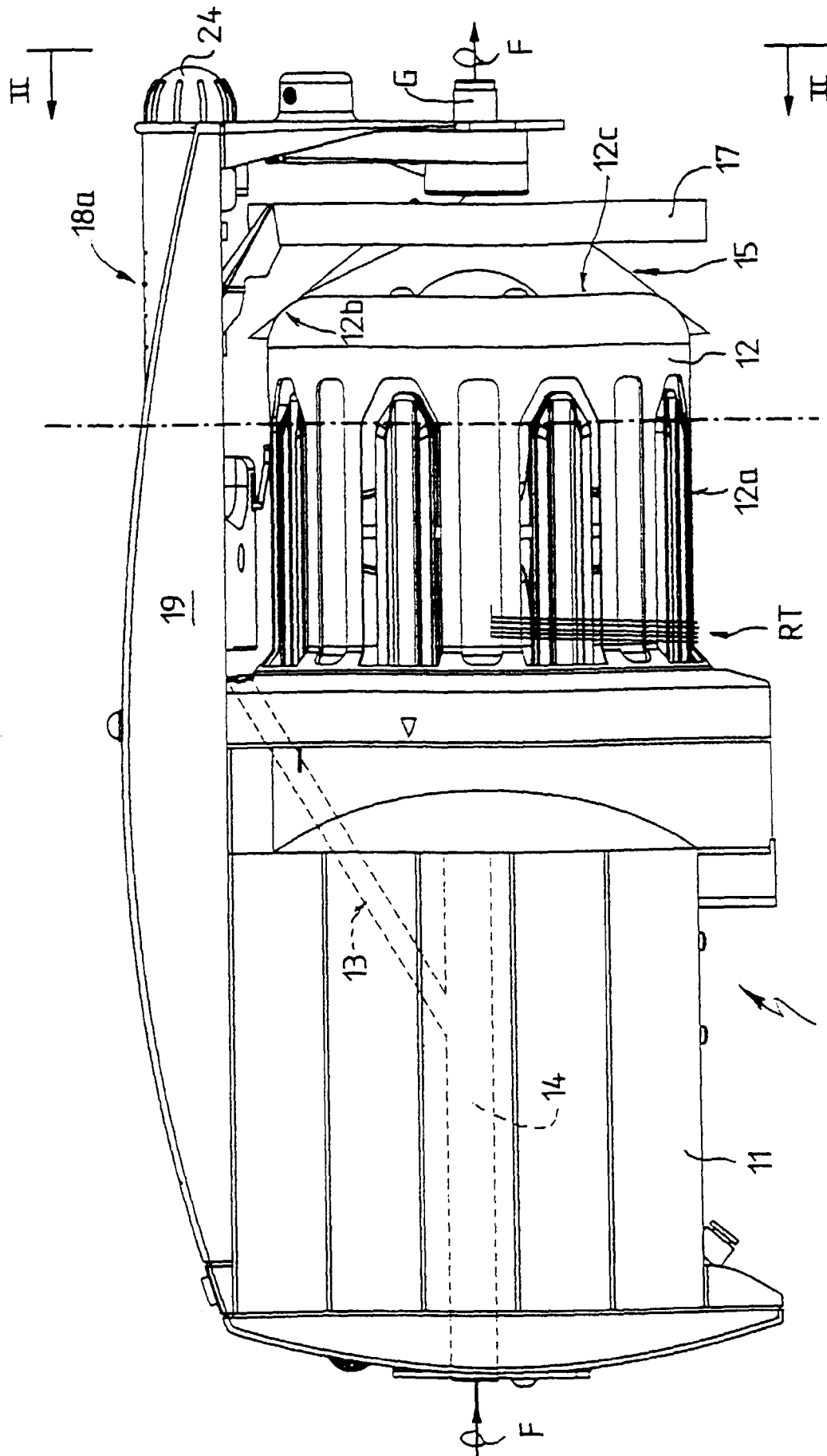


Fig. 1

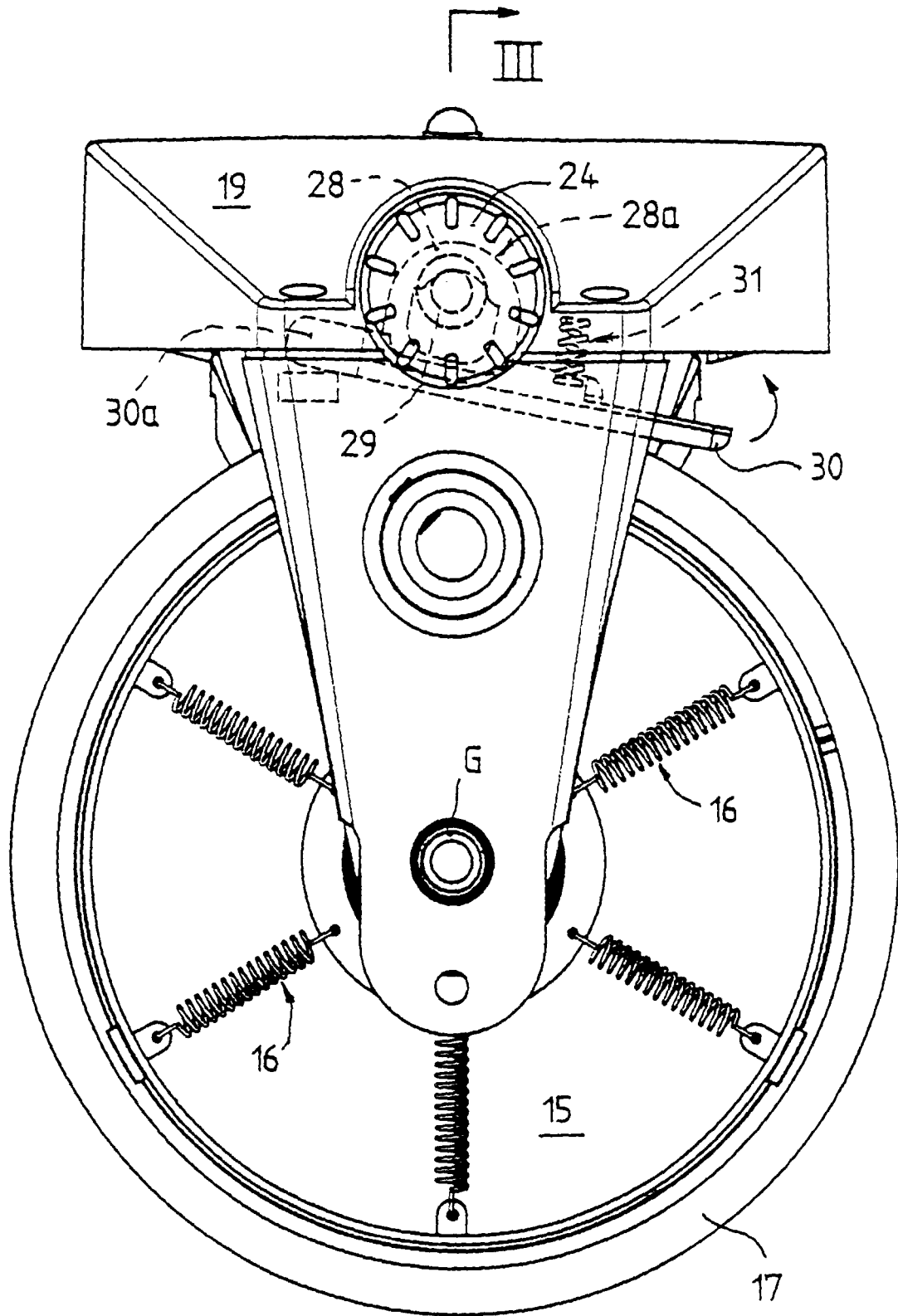
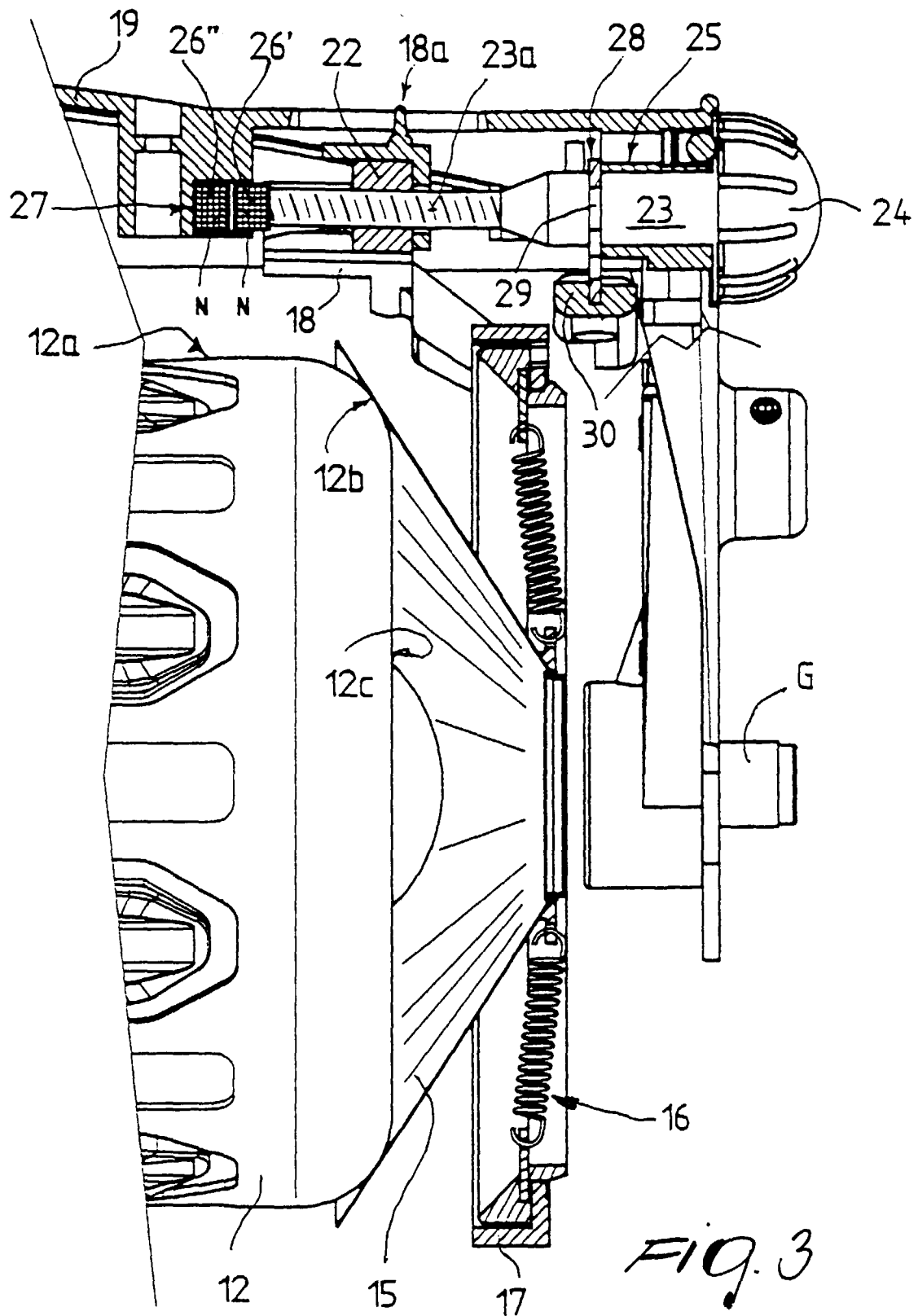


FIG. 2





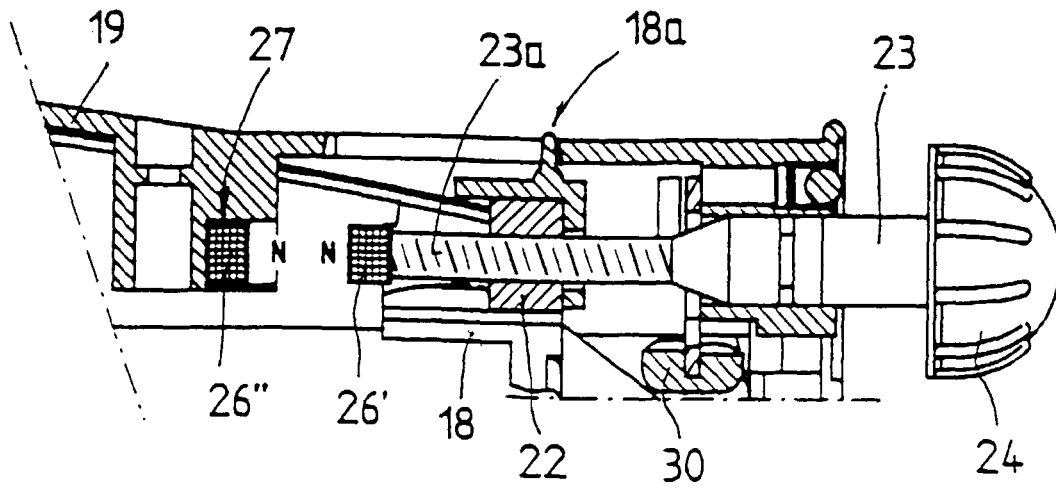


Fig. 3a

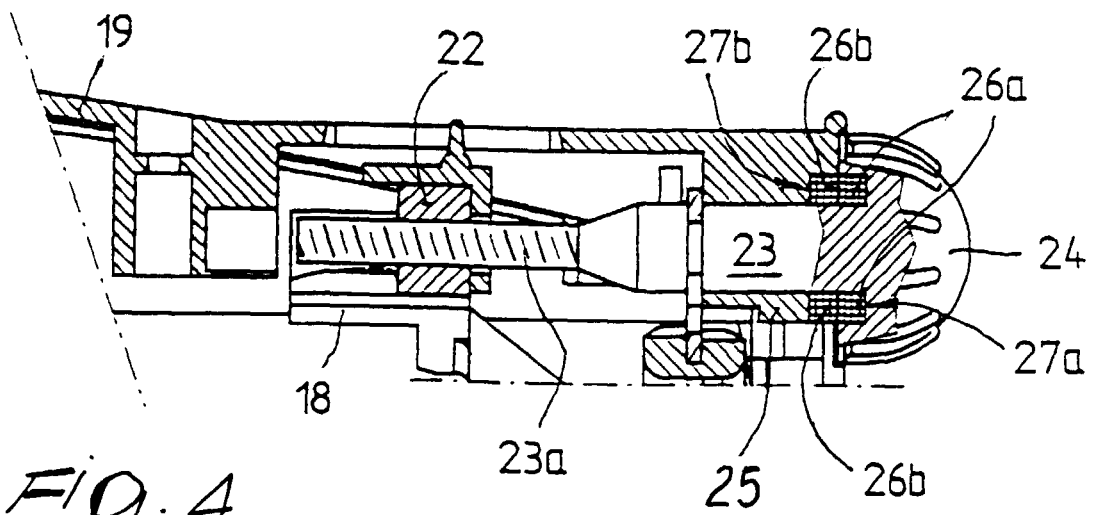


Fig. 4

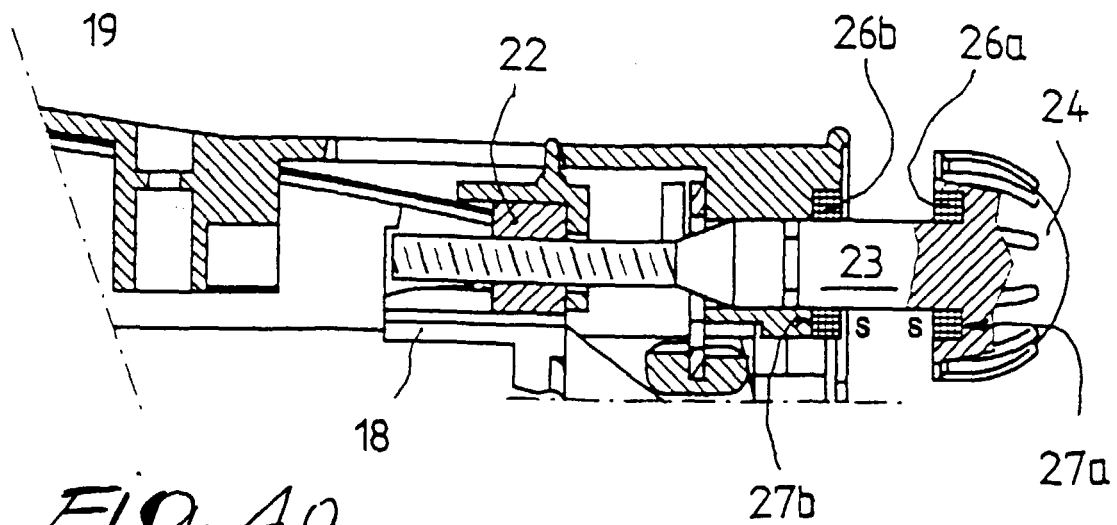


Fig. 4a