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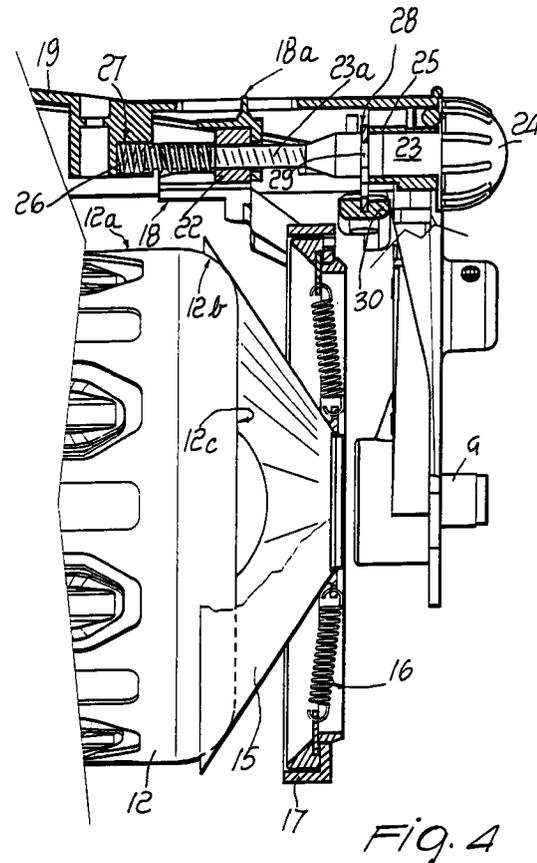
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(54) Quick-release retainer for the brake support of weft feeders for textile machines

(57) A quick-release retainer for the brake support (17) of weft feeders for textile machines, wherein the brake support is rigidly coupled to a slider (18) which is controlled by a precision adjustment system which is constituted by an adjustment screw (23a) which meshes with a female thread (22) which is rigidly coupled to the slider, in order to move the slider and the brake support parallel to the drum (12) of the feeder (10) in order to vary the static tension applied to the thread (F) by the brake (15), and wherein the entire adjustment system can move rigidly with the slider (18) and is subjected to the action of a spring (26) which tends 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). The spring (26) is contrasted by a controlled stop element (28), which engages a corresponding groove (29) of the pin (23) of the screw in order to keep said spring (26) normally loaded and keep the brake (15) in the active position in contact with the drum (11); the disengagement of the stop element (28) causes the snap movement of the slider and of the brake support into the disengagement position of the brake (15).



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## Description

The present invention relates to a quick-release retainer for the brake support of weft feeders for textile machines, particularly weaving looms.

Conventional weft feeders are devices which comprise a fixed drum on which a hollow rotating arm winds, in a windmilling fashion, 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 the loom under the control of a brake which has the purpose of generating mechanical tension in the thread being unwound.

Typically, the brake is constituted by braking means such as a frustum-shaped element made of polymeric material, which is suitably stiffened and optionally provided with highly resistant material, or a ring of bristles or flexible metal lamina.

The braking means are usually suspended elastically or supported by a specifically provided brake support in front of the drum of the feeder in order to elastically engage the thread that advances on the portion that connects the cylindrical surface and the front surface of the drum. The brake support is constituted by a rigid ring, which is in turn supported concentrically with respect to the drum of the feeder by a slider which can slide along guides which are parallel to the axis of the drum. The 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 coupled thereto parallel to the axis of the drum in order to vary the elastic force (the so-called static tension) with which the braking means act on the weft thread.

In the practical use of the weft feeders, it is necessary to periodically remove the brake both for cleaning, particularly to remove the lint that accumulates on the brake owing to the continuous sliding contact of the weft thread, and to possibly replace the brake when it breaks or fails or is worn to an extent which is no longer compatible with its correct operation.

For these purposes, the ring-like support is currently disconnected from the slider of the corresponding adjustment system to which it is connected by means of an arrestor pawl which can be operated by means of a lever or a button and is removed or more simply displaced manually in order to form a gap between the support and the drum of the feeder which is sufficient to allow to act on the braking means.

This system and method for disengaging the support entail in practice drawbacks both from the functional point of view and from the point of view of practicality in use.

From the functional point of view, the conventional engagement and disengagement system based on a pawl does not ensure over time, owing to the development of plays caused by wear, correct connection between the ring-like support and the slider; this can

alter the setting of the static tension even significantly. From the point of view of practical use, the manual operations for displacing or removing and subsequently restoring the position of the support are rather troublesome and require the intervention of specialized personnel.

In order to obviate these drawbacks, pneumatic systems have been devised which comprise a double-action fluid-actuated jack which is suitable to rigidly move the support 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 viceversa.

Pneumatic systems of this kind, described in European patent applications no. 446,447, 657,379 and 659,918, in addition to being complicated and expensive, entail providing the feeder with a pneumatic circuit and can therefore be used conveniently only in specific and limited cases, particularly when the feeder is already equipped with such a circuit which is mainly used for pneumatic threading.

The aim of the present invention is to eliminate these and other drawbacks of conventional systems for retaining and releasing the brake support, and within the scope of this general aim the invention has the important particular object of providing a quick-release support retainer which has a simple structure, is highly reliable in operation and very easy to maneuver both during release and when restoring the active position of said support.

Another particular object of the present invention is to provide a device for the quick-release of the brake support which is suitable to preserve the set adjustment of the static tension, so that when the support is returned to the active position after the intervention has been performed, the brake requires no readjustment.

Another important object of the invention is to provide a quick-release device which is capable of producing the automatic translatory motion of the brake support from the active position to the disengagement position without requiring any manual intervention and without requiring the use of fluid-actuated servomechanisms and the like.

According to the present invention, this aim, these objects and others which will become apparent from the following detailed description are achieved by a quick-release brake support retainer which has the specific characteristics stated in the appended claims.

Substantially, the invention is based on the innovative concept of allowing movement of the entire screw-and-nut adjustment system associated with the slider that supports the brake support, of subjecting said entire system to the action of a spring which tends to move the brake support into the disengagement position, in which the brake is spaced from the drum, and of contrasting said spring by means of a stop element which is actuated by a release lever and engages a cor-

responding retention groove of the pin of the adjustment screw in order to keep said spring normally loaded and keep the brake in the active position in contact with the drum of the feeder.

With this arrangement, in accordance with the stated aim and objects, when the stop element is disengaged from the groove of the pin of the adjustment screw, the entire adjustment assembly and the brake support associated therewith, actuated by the spring, performs a snap translatory motion, moving parallel to the drum so as to place the brake in disengagement position and correspondingly move outward the knob for actuating the adjustment system.

The active position of the brake is restored simply by applying to the actuation knob of the adjustment screw an axial pressure so as to make the pin of the screw slide in the opposite direction, in contrast with the action of the spring, until the stop element is again aligned with the retention groove of said pin. The engagement of the stop element in the corresponding groove of the pin also occurs by snap action, by virtue of the action of a spring which correspondingly actuates the actuation lever of said stop element.

Further characteristics and advantages of the device according to the present invention will become apparent from the following detailed description and with reference to the accompanying exemplifying drawings, wherein:

figure 1 is a side elevation view of a weft feeder with the quick-release brake support retainer according to the invention;

figure 2 is a partial bottom perspective view of the front part of the feeder of figure 1, illustrating a detail of the quick-release retainer;

figure 2a is a partial top perspective view of the front part of the feeder of figure 1;

figure 3 is a front view, taken in the direction of the arrows III-III of figure 1;

figure 4 is a partial sectional view, taken along the plane IV-IV of figure 3, illustrating the quick-release retainer in the configuration that corresponds to the active position of the brake support;

figure 5 is a partial sectional view, similar to figure 4, of the configuration of the device in the position for disengaging the brake support;

figure 6 is a perspective view of the detail of the actuation lever of the quick-release retainer.

In the drawings, the reference numeral 10 generally designates a conventional weft feeder, which comprises a fixed footing 11 and a fixed drum 12 on which a hollow rotating arm 13, rigidly coupled to a likewise hollow driving shaft 14, winds in a windmilling fashion a plurality of turns of thread F which constitutes a weft reserve RT. When requested by the loom (not shown), the turns of thread unwind from the drum 12 and unwinding is controlled by a brake, generally designated by the reference

numeral 15, which has the purpose of generating adequate mechanical tension in the thread.

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

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 lies parallel to the axis of the drum 12. For this purpose, the slider 18 has two bushes 20 which slidingly engage corresponding cylindrical guides 21 supported by the arm 19 (figure 2). The slider 18 has a fixed female thread 22 which is rigidly coupled thereto and in which an adjustment screw engages; the adjustment screw is constituted by the threaded end portion 23a of a pin 23 provided with an adjustment knob 24, whereby it is possible to turn the adjustment screw and produce 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 thus adjust the degree of braking applied by said brake to the thread F.

According to the present invention, there is provided a quick-release system which allows to move the brake supporting ring 17 without actuating the knob 24 outward with respect to the feeder 10 and accordingly to move the brake 15 away from the drum 12 in order to move it into the disengagement position of figure 5, in which the brake can be easily accessed for cleaning, replacement and/or maintenance.

For this purpose, the pin 23 of the adjustment system is supported so that it can both rotate and move axially by a corresponding fixed bush 25 which is rigidly coupled to the arm 19, and its threaded portion 23a lies inside a helical spring 26 which is accommodated in a fixed seat 27 of the arm 19 and acts on the female thread 22, pushing the slider 18 and the brake support 17 so as to move them in the disengagement position. This movement is usually prevented by a stop element 28, which engages a corresponding retention groove 29 of the pin 23 (figure 4).

As clearly shown in figure 6, 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 one of its ends 30a (figure 3) and is subjected to the action of a spring 31,

which usually keeps the stop element 28 engaged in the retention groove 29 and accordingly keeps the brake 15 in the active position of figure 4.

When the lever 30 is rotated in contrast with the action of the spring 31 in the direction indicated by the arrow in figure 3, the stop element 28 disengages from the groove 29 and the entire adjustment system performs a consequent snap translatory motion, which moves the brake 15 into the disengagement position of figure 5, in which the knob 24 also protrudes in front of the arm 19.

In order to restore the active position of the brake 15, shown in figure 4, it is therefore sufficient to apply a simple axial pressure PA to the knob 24 in order to slide the pin 23 in its retention bush 25 in contrast with the action of the spring 26 until the stop element 28 is aligned with the groove 29 again; after this, the pin, through the action of the spring 31, engages the groove with a snap action, locking the entire adjustment system in position.

It should be noted that the quick-release and return maneuvers do not alter in any way the set adjustment of the static tension, which accordingly does not require adjustments as a consequence of these maneuvers.

Another important advantage arises from the presence of the spring 26 which, in addition to performing the described function, acts as an element for compensating for plays, ensuring a more correct setting of static tension.

The effects of the present invention of course also cover devices which achieve equal utility by using the same innovative concept defined by the appended claims.

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 quick-release retainer for the brake support (17) of weft feeders (10) for textile machines, wherein the brake support is rigidly coupled to a slider (18) which is controlled by a precision adjustment system which comprises an adjustment screw (23a) which meshes with a female thread (22) which is rigidly coupled to the slider, in order to move the slider and the brake support parallel to the drum (12) of the feeder (10) in order to vary the static tension applied to the thread (F) by the brake (15), characterized in that the adjustment system can move rigidly with the slider (18) and is subjected to the action of a spring (26) which tends 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 said spring (26) is contrasted by a controlled stop element (28) which engages a corresponding groove (29) of the pin (23) of the screw in order to keep said spring (26) normally loaded and keep the brake (15) in the active position in contact with said drum (11), the disengagement of the stop element (28) causing the snap movement of the slider and of the brake support into said disengagement position of the brake (15).
2. A device according to claim 1, characterized in that the pin (23) of the adjustment screw (23a) is provided with a knob (24) and is supported so that it can rotate and move axially by a corresponding fixed bush (25), which is supported by a fixed arm (19) of the feeder (10), and in that the adjustment screw (23a) lies inside said spring (26), which is helical and has an end which is accommodated in a fixed seat (27) of said arm (19) and another end which acts on the female thread (22) of the adjustment system.
3. A device according to claims 1 and 2, characterized in that the stop element (28) is associated with a corresponding actuation lever (30) which can oscillate about one of its ends (30a) and is subjected to the action of a respective spring, which contrasts the oscillation of the lever in order to keep said stop element (28) normally engaged in the corresponding groove (29) of the pin (23) of the adjustment screw.
4. A device according to claim 3, characterized in that the stop element (28) is constituted by the upper portion of an annular bracket (28a) which is rigidly coupled to the actuation lever (30).
5. A device according to the preceding claims, characterized in that in the disengagement position the pin (23) of the adjustment screw and the corresponding adjustment knob (24) protrude outside said fixed arm (19) of the feeder (10) and in that the passage from said disengagement position to the active position, in which the brake (15) is in contact with the drum (11) of the feeder (10), is achieved by applying an axial pressure (PA) to said knob in order to produce the retraction of the pin (23) and the engagement of the stop element (28) with the corresponding groove (29) of the pin (23).

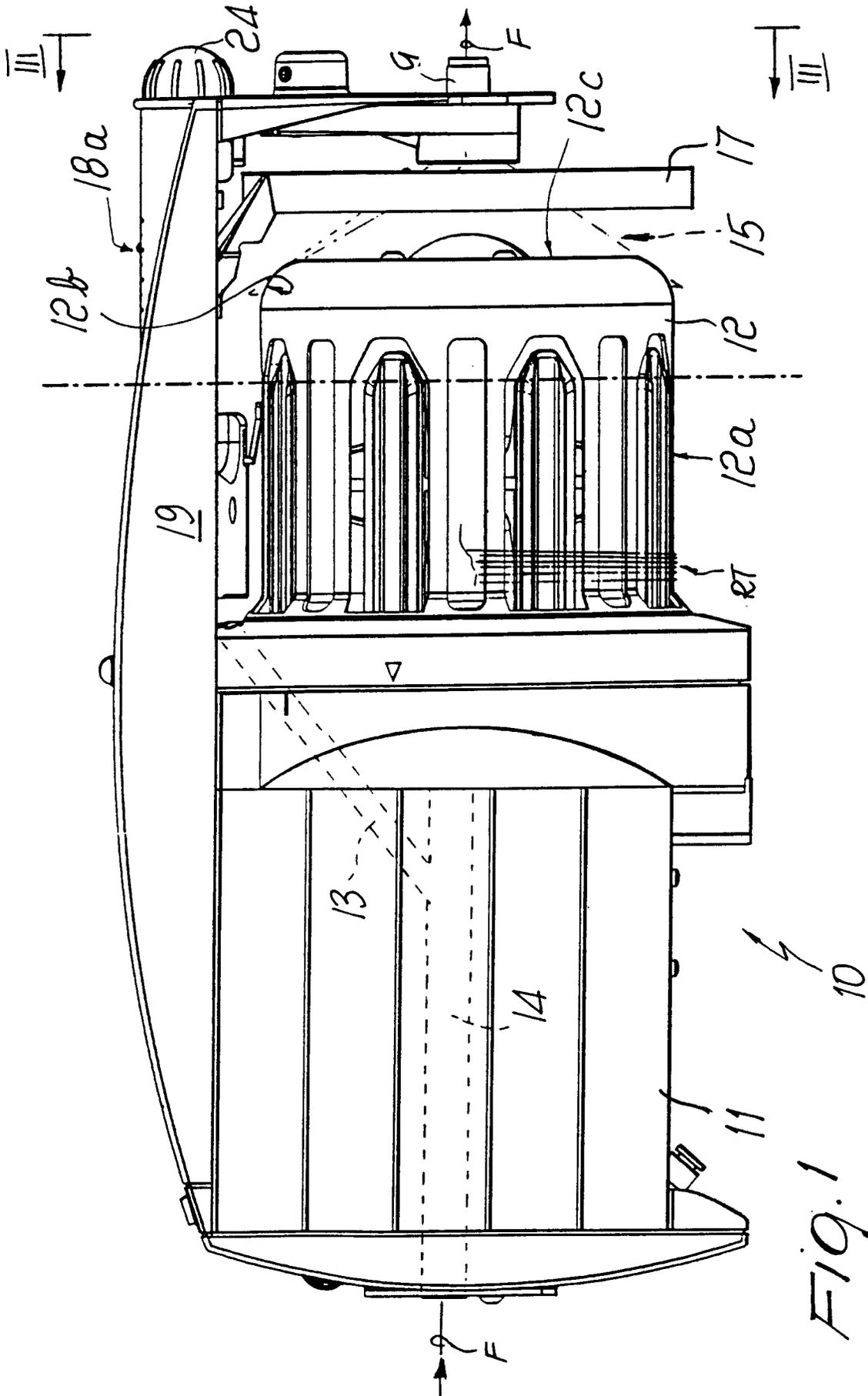


Fig. 1

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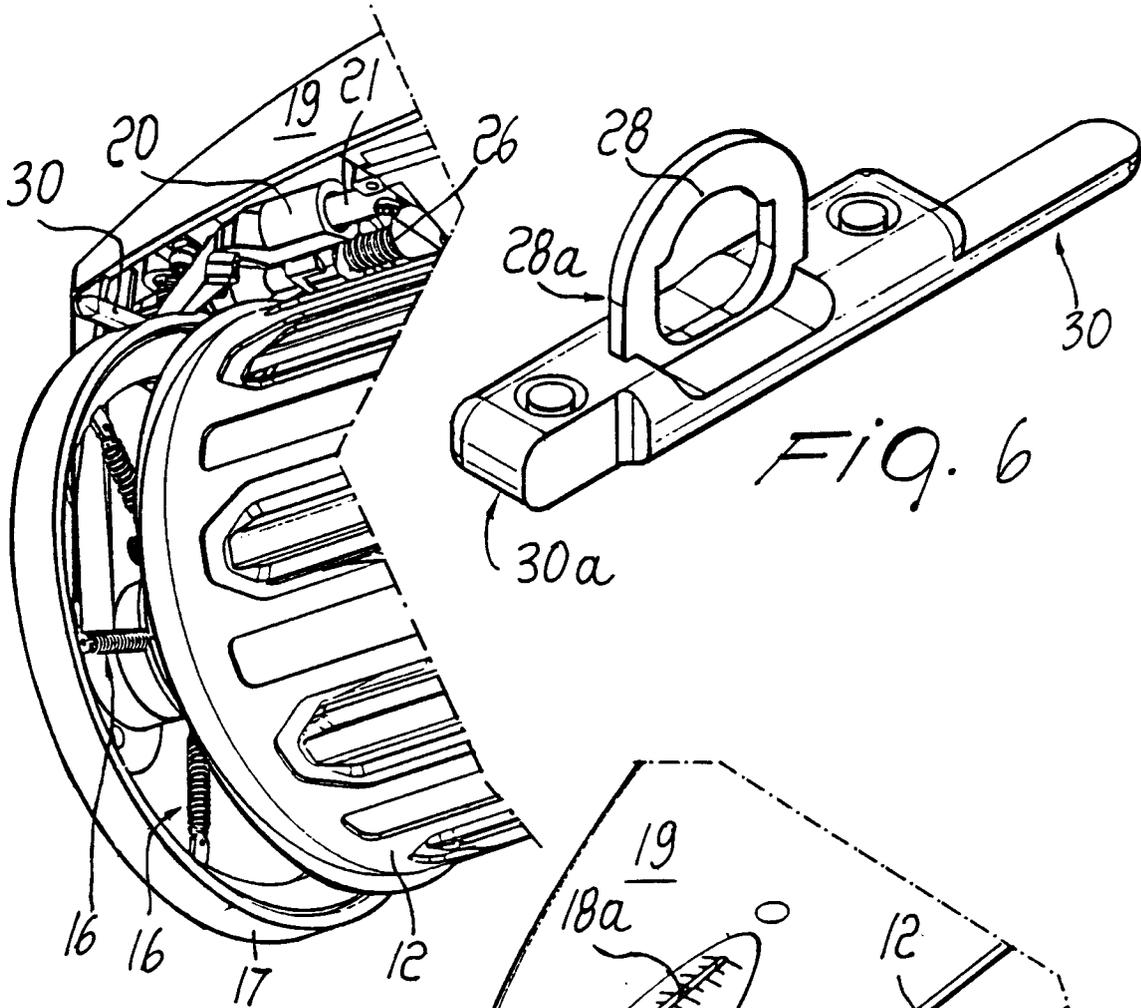


FIG. 6

FIG. 2

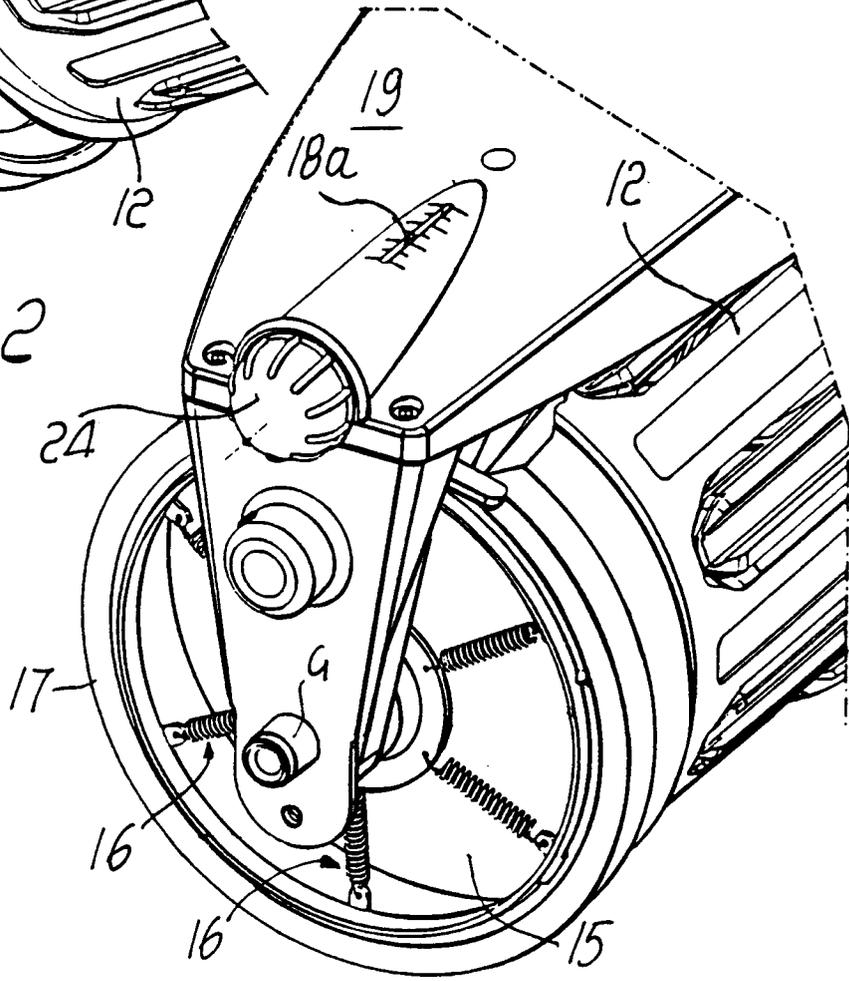


FIG. 2a

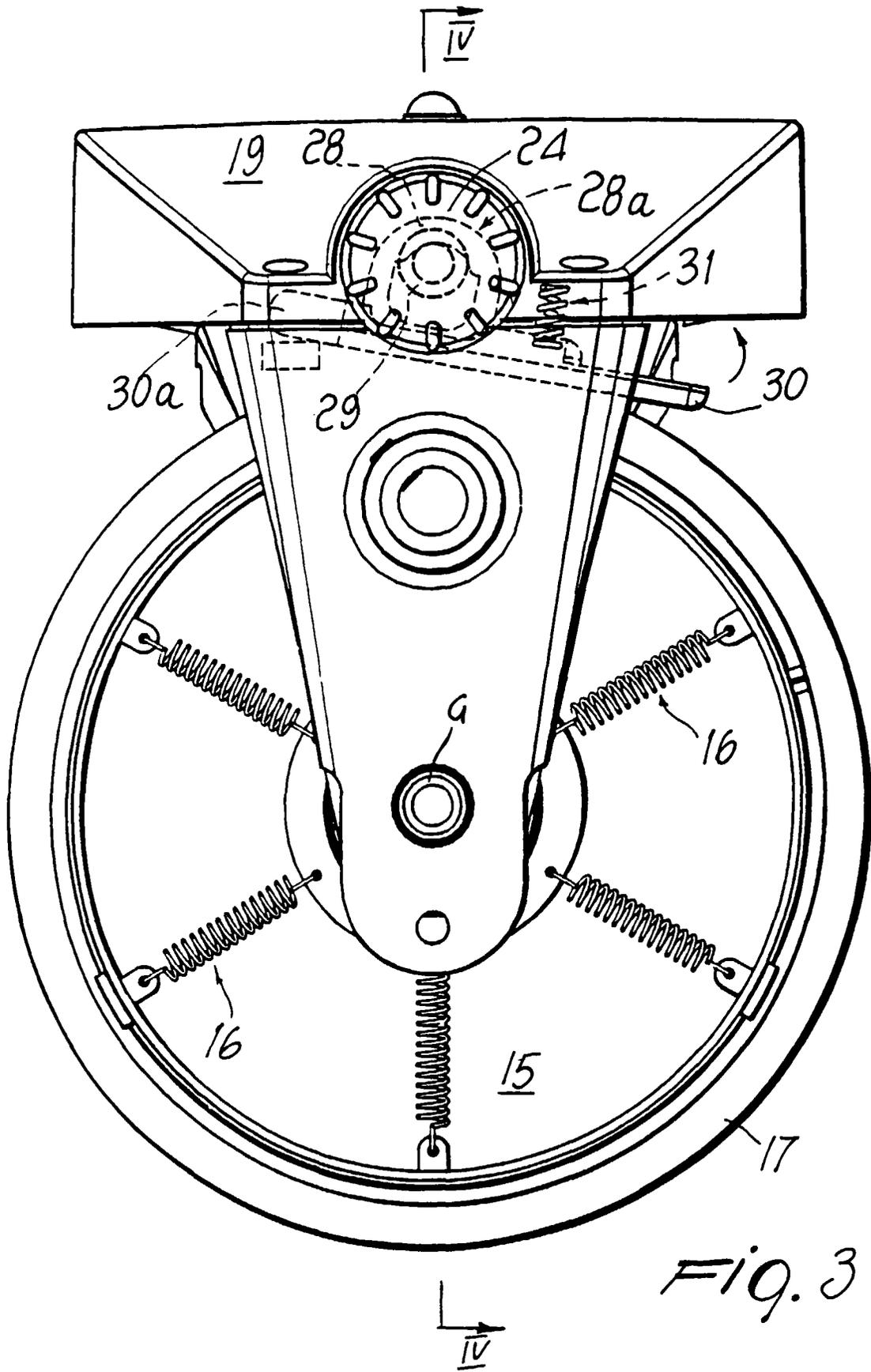


FIG. 3

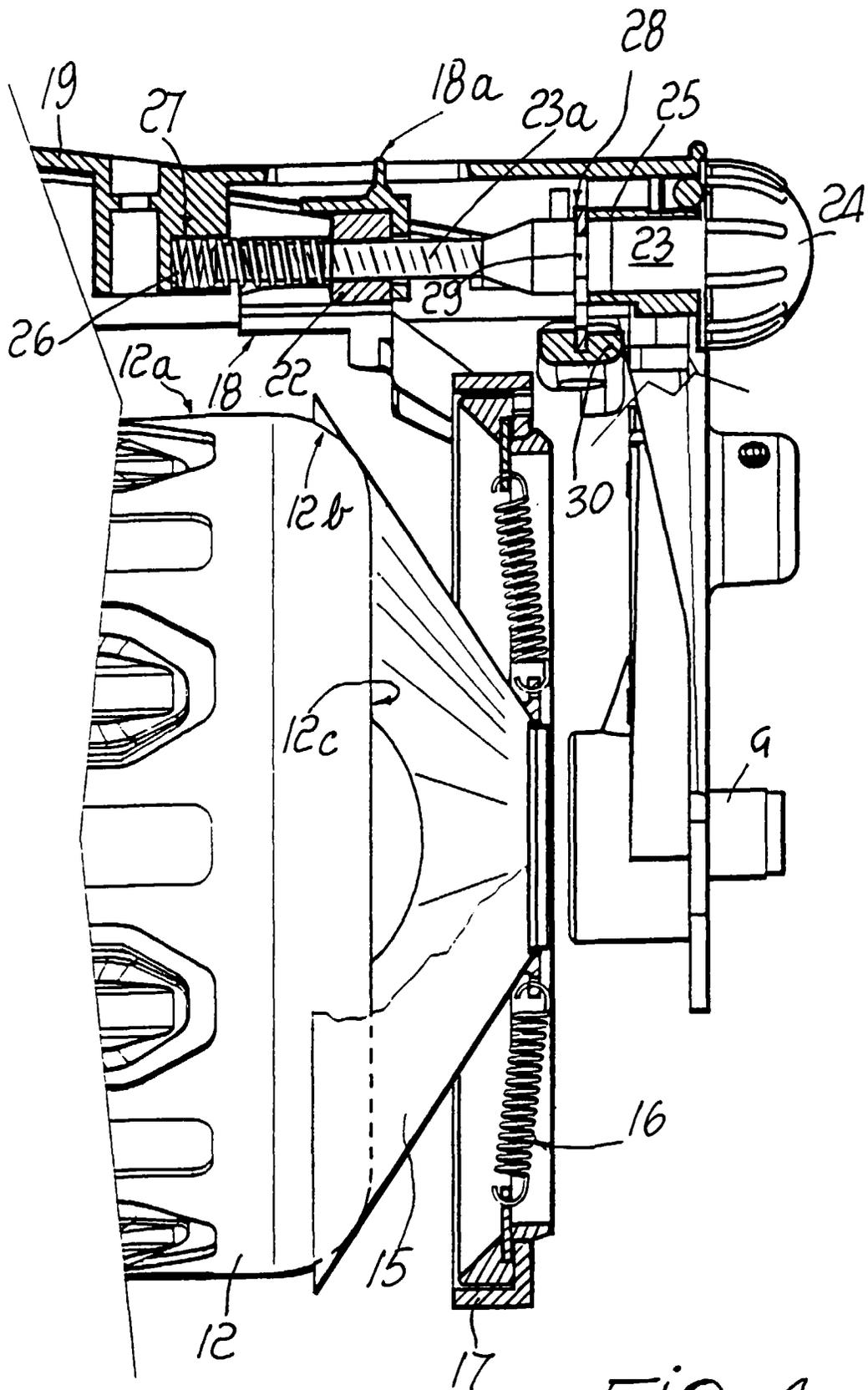


Fig. 4

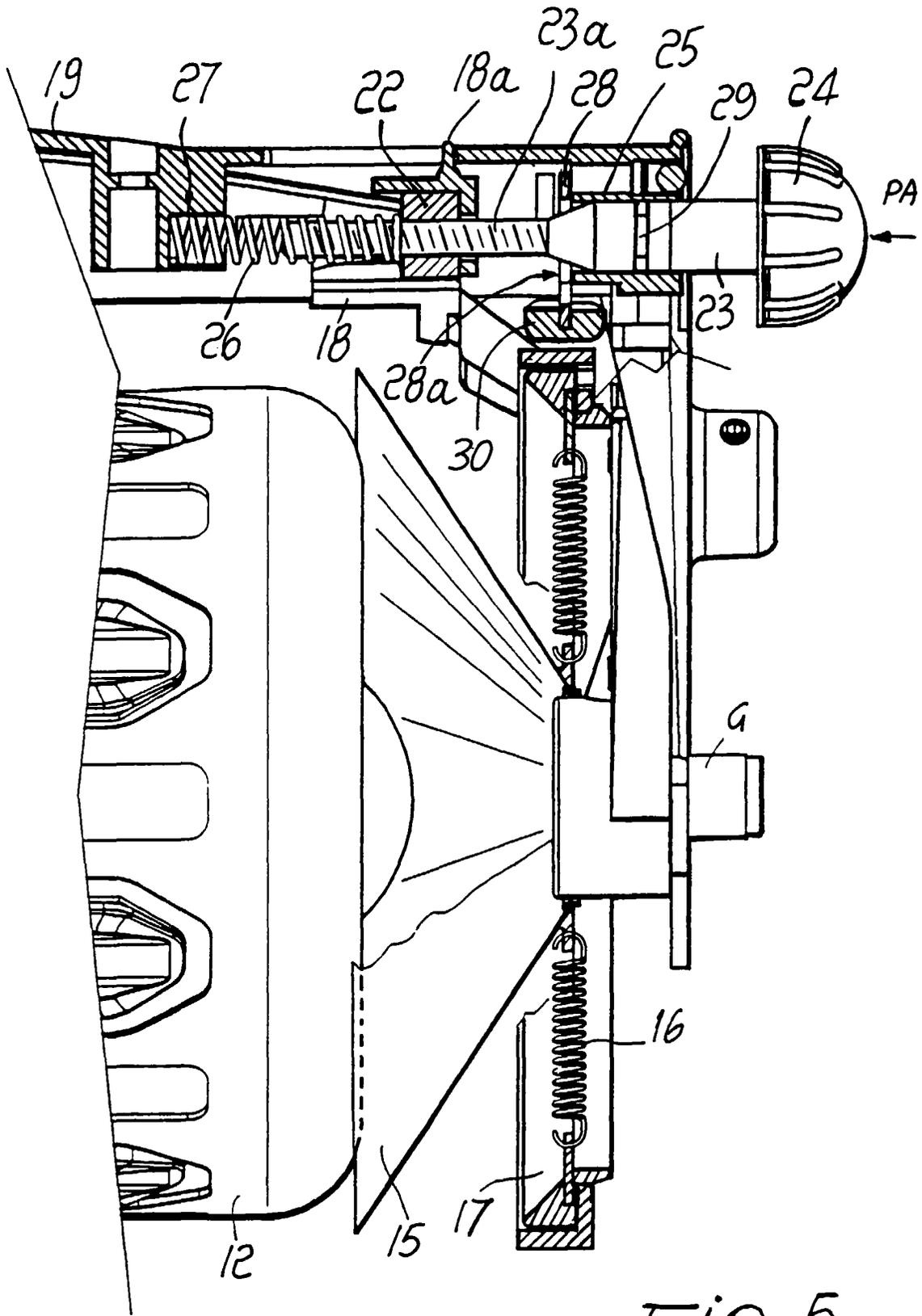


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number  
EP 97 11 4832

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	EP 0 652 312 A (L.G.L. ELECTRONICS) * column 3, line 40 - line 48; figure 1 *	1
A,D	EP 0 446 447 A (SOBREVIN)	
A,D	EP 0 657 379 A (SOBREVIN)	
A,D	EP 0 659 918 A (SOBREVIN)	
The present search report has been drawn up for all claims		
Place of search		Examiner
THE HAGUE		Boutelegier, C
Date of completion of the search		
5 December 1997		
<p>CLASSIFICATION OF THE APPLICATION (Int.Cl.6)</p> <p>B65H51/22 D03D47/34</p> <p>TECHNICAL FIELDS SEARCHED (Int.Cl.6)</p> <p>B65H D03D</p>		
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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                      .....                      &amp; : member of the same patent family, corresponding document</p>		

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