

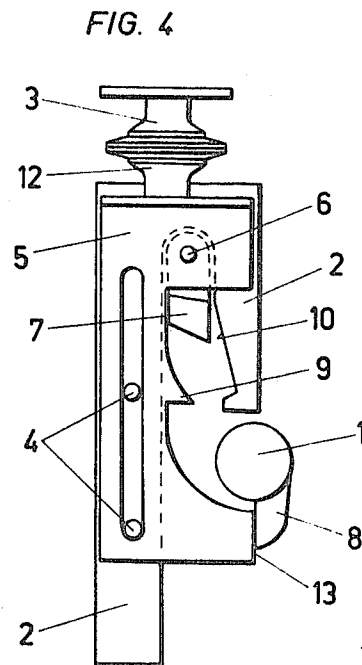
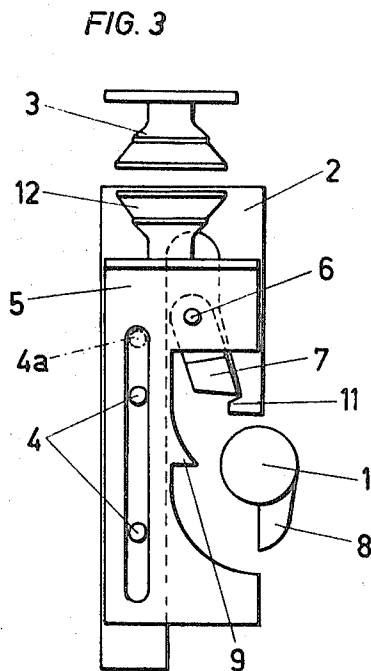
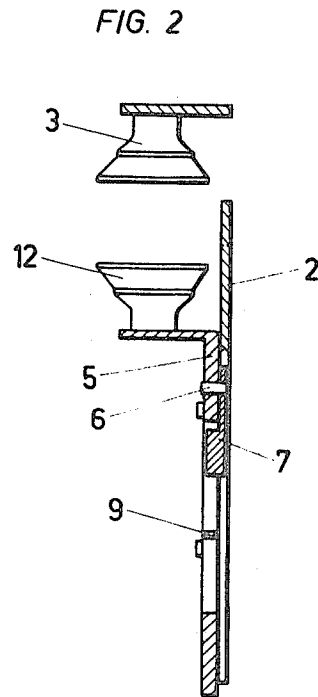
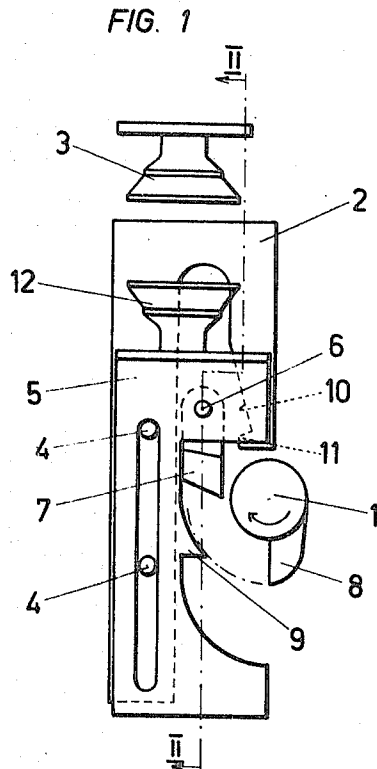
Oct. 19, 1971

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APPARATUS FOR TEMPORARILY LOCKING A SPINDLE, PARTICULARLY
IN A HAND TOWEL DISPENSER

3,613,478

Filed June 10, 1970

2 Sheets-Sheet 1



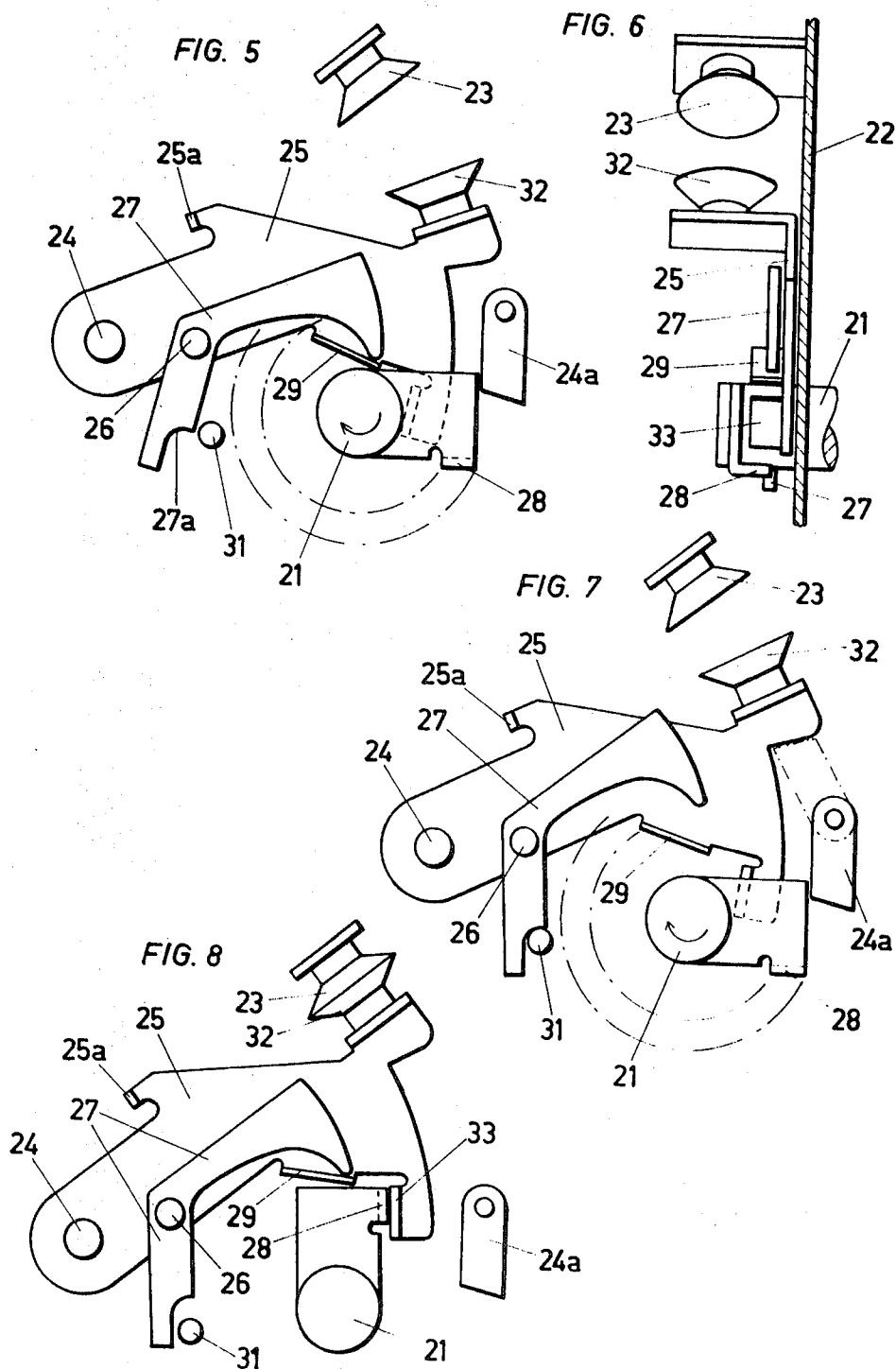
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APPARATUS FOR TEMPORARILY LOCKING A SPINDLE, PARTICULARLY IN A HAND TOWEL DISPENSER

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5 Claims

ABSTRACT OF THE DISCLOSURE

There is disclosed an arrangement for temporarily locking a spindle, particularly in a hand towel dispenser, after two or more complete revolutions for a period of time determined by a suction cup held by suction against a counter element. The suction cup is carried on a movable member and it cooperates with the counter element when the movable member is in an end position in which it stops the spindle. During a first revolution of the spindle a cam piece connected to the spindle engages a first abutment on said member for moving the latter from a starting position into an intermediate position in which it is retained by a pawl mechanism. During at least one succeeding revolution of the spindle said cam piece engages at least one further abutment on said member for moving it into further intermediate positions and finally into its end position. Limiting means may be provided for selectively preventing complete restoration of said member to its starting position so that the spindle is then locked after fewer than a maximum number of revolutions.

BACKGROUND OF THE INVENTION

It is known and commonplace to provide in a hand towel dispenser an arrangement by means of which a roller, over which the dispensed hand towel runs, can be temporarily locked after a predetermined length of hand towel has been issued.

Known arrangements for this purpose have a suction cup carried by a member which is movable by a cam piece connected to the roller or its spindle into an end position to press the suction cup against a counter element, the member holding the spindle when in its end position. After a predetermined lapse of time the suction cup detaches from the counter element and the movable member returns to a bottom position under the action of weight and/or springs, in which the roller is released again. The aforesaid cam piece can be arranged directly on the spindle of the roller; the roller will then be temporarily stopped after each single rotation thereof. If it is desired to dispense at any one time a length of hand towel which is more than is represented by one rotation of the roller, the cam piece may be arranged on a special spindle which is connected to the roller through appropriate gearing. This however involves a complication of the apparatus.

The object of this invention is to obtain a simple inexpensive arrangement by means of which a spindle can be temporarily locked after every two or more complete rotations.

SUMMARY OF THE INVENTION

The invention provides an arrangement for the temporary locking of a spindle, particularly in a hand towel dispenser, after two or more complete rotations for a period of time determined by a suction cup held by suction against a counter element, the suction cup being carried by a member which is movable into an end position against spring and/or gravity action by a cam piece

connected to the spindle, to urge the suction cup against the counter element, the member located in the end position holding the spindle. According to the invention this arrangement is characterised by the fact that the movable member has at least two abutments which are arranged one behind another with respect to the direction of movement of the member in such a way that, starting from a bottom position of the member, the said cam piece engages a first one of the said abutments during a first rotation of the spindle to bring the member into an intermediate position, and during a succeeding rotation of the spindle engages a last one of the said abutments to bring the member into the end position and thus to press to suction cup against the counter element; and that a pawl cooperating with a stop means is provided for retaining the member in the intermediate position, this pawl moving into the effective range of said stop means concomitantly with the movement of the member into its intermediate position and being moved out of this effective range when the member is moved into its end position.

With this arrangement the possibility is also offered of limiting the adjustability of said member, if desired, with the assistance of a releasable or adjustable limiting means, so that the member may not completely return to the starting position after the suction cup has been released but only to the intermediate position (or one of the intermediate positions) so that it correspondingly sooner reaches the end position again.

Advantageously the aforesaid pawl may be pivotally mounted on the adjustable member and cooperate with a fixed stop. The pawl may be disposed in the path of travel of a part, connected to the spindle, which turns the pawl into the effective range of the fixed stop during the first rotation of the spindle. Preferably, to reduce the number of parts required, the pawl may simultaneously form the aforesaid first abutment on the adjustable member, and the cam piece can at the same time constitute the aforesaid part which turns with the spindle to operate the pawl.

DESCRIPTION OF PREFERRED EMBODIMENTS

Two embodiments of the arrangement according to the invention are described below, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a diagrammatic elevational view of the first embodiment,

FIG. 2 is a section on the line II—II of FIG. 1,

FIGS. 3 and 4 are views similar to that of FIG. 1 but with the parts in changed positions,

FIG. 5 is a diagrammatic elevation of a second embodiment of the invention,

FIG. 6 is another view of the second embodiment, taken from the righthand side of FIG. 5, and

FIGS. 7 and 8 are views similar to that of FIG. 5 but showing the parts in different positions.

The arrangement illustrated in FIGS. 1 to 4 can be used for the temporary locking of a spindle 1 after each two rotations. It comprises a guide plate 2 and a suction cup 3 which are stationary in relation to the axis of the spindle. This spindle 1 may for example be the shaft of the roller in a hand towel dispenser over which the drawn off towel runs. In this event the spindle would be rotatably mounted in a side plate of the hand towel dispenser and the guide plate and the relatively-fixed suction cup 3 would be secured to this side plate.

Guide plate 2 has two pins 4 projecting into a slot in a member 5 which is thus guided for vertical movement on the guide plate 2. Member 5 is biased downwards by gravity and/or spring means (not shown) into its starting or bottom position illustrated in FIG. 1, in which the upper pin 4 bears against the upper end of the slot in the member 5.

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Member 5 carries a pawl 7 which is pivotable on a pin 6. The lower edge of pawl 7 constitutes a first abutment for a cam piece 8 secured to spindle 1. A second abutment 9 for cam piece 8 is provided on member 5 below pawl 7, that is to say behind the pawl in relation to the direction of movement of this member.

This arrangement operates as follows: All parts being in the starting position seen in FIG. 1, spindle 1 is turned in the clockwise direction. During the first rotation of spindle 1 the cam piece 8 strikes the pawl 7 as a result of which the member 5 is raised against the action of gravity and/or the spring action imposed thereon. At the same time the pawl 7 is pivoted to some extent to the righthand side, again by cam piece 8, until its righthand edge abuts against a guide edge 10 on plate 2 and its lower edge is disposed above a stop 11 provided on this plate. Cam piece 8, which is flush with the member 5, passes away over abutment 11, but member 5 is held in a raised intermediate position by the application of pawl 7 against the stop 11. This position of the parts, reached after one rotation of spindle 1, is illustrated in FIG. 3.

In the course of a second rotation of spindle 1 cam piece 8 contacts the second abutment 9 on member 5 and lifts the latter into the end position thereof depicted in FIG. 4. As a result of this a suction cup 12 secured to member 5 is pressed against the fixed complementary suction cup 3. At the same time the pawl 7 is turned back by the inclined guide surface 10 into its vertical position (assuming that gravity is not sufficient to bring about this return pivoting movement). When spindle 1 has completed its second rotation, cam piece 8, as shown in FIG. 4, contacts an abutment surface 13 on member 5, lying in the path of the cam piece when member 5 has assumed its end position. This surface 13 prohibits further rotation of the spindle 1.

This spindle remains locked against rotary movement until the cups 3 and 12, held together by suction, are released again from one another. When this occurs member 5 drops downwards under gravity action (and, where used, with spring assistance). Since the pawl 7 as it pivots back does not make contact with stop 11, member 5 returns to the starting or bottom position illustrated in FIG. 1. The spindle 1 is thus free again and the cycle of operations can begin afresh.

The predetermined lapse of time for which the suction cups 3 and 12 remain pressed together, and spindle 1 remains locked can, if required, be set by an adjustable air-inlet valve (not shown) in a manner which per se is known.

With the arrangement which has been described the spindle 1 is temporarily locked after each two complete rotations. If desired a releasable or adjustable limiting element can be provided which, in its effective position, holds the member 5 in the intermediate position of FIG. 3, preventing it from reaching the bottom position shown in FIG. 1. Member 5 will then only move between the positions shown in FIGS. 3 and 4 and the spindle 1 be temporarily locked after each rotation thereof. Spindle 1 could thus be optionally set for single-rotation locking or two-rotation locking by bringing the limiting element into and out of effective position. An additional pin 4a, as shown in broken lines in FIG. 3, is admirably suited for example as a limiting element of this kind, this being detachably fastened in the guide plate 2 and also projecting into the slot in member 5.

It will be apparent that, based on the construction described above, an arrangement can also be set up which will enable the spindle to be temporarily locked after three or more complete rotations. For this purpose it is only necessary to cater for raising of the adjustable member in three or more steps from the bottom position to its end position. For this purpose three or more abutments for cam piece 8 would be arranged in succession on the adjustable member 5 and means provided for retaining

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this member in its various intermediate positions. These latter means could moreover be such that the upper abutments are in the form of pawls, similar to pawl 7, which cooperate with the fixed guide plate abutment 11. Also in a modification of this character limiting elements could, if desired, be provided to allow for the spindle to be temporarily locked optionally after a few or after a maximum number of rotations.

The embodiment of the arrangement according to the invention illustrated in FIGS. 5 to 8 is in principle similar as regards construction and operation to the arrangement illustrated in FIGS. 1 to 4, with the exception that a pivotable member 25 is used instead of the vertically-displaceable member 5. The arrangement shown in FIGS. 5 to 8 is used for the temporary locking of a spindle 21 after each two rotations. The spindle 21 may for example be that of a roller in a paper hand towel dispenser and be rotatably mounted in a side plate 22 (FIG. 6) of such a dispenser. Secured to this plate 22, that is to say fixed in relation to the axis of spindle 21, are a suction cup 23, a pivot pin 24 and a stop pin 31 (FIGS. 5, 7, 8).

Pivotally disposed on pin 24 is a member 25. This member is biased to turn, by the action of a spring (not shown) applied against a projection 25a of member 25 to pull it downwards, to its starting or bottom position which is shown in FIG. 5 and in which an abutment part 29 thereof is applied against spindle 21.

Pivoted on a pin 26 on member 25 is a pawl 27 in the form of a two-armed lever. The righthand arm of the pawl lever 27 is substantially heavier than the lefthand arm so that the pawl is gravity-biased in the clockwise direction until its right arm is applied against the abutment part 29 of member 25 (FIGS. 5 and 8). The righthand arm of pawl 27 constitutes a first abutment for a cam piece 28 mounted on spindle 21, and the abutment part 29 on member 25 constitutes a second abutment for this cam piece 28, the second abutment 29 being arranged after the first abutment 27, as regarded in the direction of travel of member 25 (in the counterclockwise direction from the starting position shown in FIG. 5).

The arrangement illustrated in FIGS. 5 to 8 operates as follows: With all parts in the starting position shown in FIG. 5, spindle 21 is turned in the clockwise direction. Cam piece 28 strikes the righthand arm of pawl lever 27 in the course of the first rotation of spindle 21. As a result the pawl lever is first turned to a small amount in the counterclockwise direction until its lefthand arm bears against stop pin 31. The pawl lever 27 will then be lifted along with member 25, that is to say this latter will be pivoted around pivot pin 24 in the counterclockwise direction against its spring bias. Eventually the fixed stop pin 31 will be accommodated in a recess 27a in the end of the lefthand arm of pawl lever 27. This will prevent the pawl lever 27 and the member 25 dropping back when cam piece 28 has left the righthand end of the pawl lever; thus member 25 will be held in the intermediate position illustrated in FIG. 7 after one complete rotation of spindle 21.

In the course of the second rotation of spindle 21, cam piece 28 contacts the second abutment 29 on member 25 and raises the latter further until it reaches its end position illustrated in FIG. 8. This causes a suction cut 32, secured to member 25, to be pressed against the fixed suction cup 23. At the same time pawl 27 will rock back into its starting position under the action of gravity as soon as the lefthand arm thereof has left stop pin 31. Then, also in the course of the second rotation, cam piece 28 contacts an abutment part 33 on member 25 as shown in FIG. 8. As can there be seen, the abutment part 33 lies in the path of travel of cam piece 28, when the member 25 is in its end position. Thus abutment part 33 prohibits further rotation of spindle 21.

This spindle 21 remains locked until the cups 23 and 32, which are held together by suction are released from one another. Member 25 then turns under its spring bias

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into the bottom position illustrated in FIG. 4, the lefthand arm of pawl 27 running past abutment pin 31. Spindle 21 is thus free again and a fresh cycle can begin.

The arrangement illustrated in FIGS. 5 to 8 can also be so set, if desired, that the spindle 21 will be held after each single rotation, instead of each two. For this purpose, the member 25 can be retained in its intermediate position shown in FIG. 7 by means of an adjustable lever element in the form of a pivotal pawl member 24a (which has been omitted in FIG. 6 so as not to confuse the drawing), whereby member 25 is prevented from returning into its bottom position shown in FIG. 5 and can only move from the intermediate position into the end position and back. In the position thereof illustrated in full lines in FIG. 7 the pawl member 24a does not affect the remaining parts of the arrangement. If, however, this pawl member 24a is turned into the position thereof which has been indicated in dotted lines in FIG. 7, it then holds up member 25, as it falls back, in the intermediate position illustrated. Thus by moving the pawl element 24a into effective position, or by retracting it from this position, the spindle 21 can be locked selectively after each rotation or after each two rotations.

What I claim is:

1. Apparatus for temporarily locking a spindle, particularly in a hand towel dispenser, after an integral number of complete revolutions for a predetermined period of time, said integral number being greater than one, comprising:

- a movable member;
- a suction cup carried on said member;
- a cam piece connected to said spindle for moving said member from a starting position into an end position against the action of a biasing force, said member being adapted in said end position to stop said spindle;
- a counter element cooperating with said suction cup in the end position of said member for holding the suction cup and member by suction during said predetermined period of time;
- at least two abutments mounted on said member one behind another with respect to the direction of move-

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ment of the member, a first one of said abutments being arranged to engage said cam piece during a first revolution of said spindle, when said member is in said starting position, for moving the member into an intermediate position, and a last one of said abutments being arranged to engage said cam piece during a succeeding revolution of said spindle for moving the member into said end position to press said suction cup against said counter element; and a pawl cooperating with a stop means for retaining said member in said intermediate position, said pawl being movable into the effective range of said stop means concomitantly with the movement of said member into its intermediate position, and being movable out of this effective range concomitantly with the movement of the member into its end position.

2. Apparatus as claimed in claim 1, wherein said pawl is pivotally mounted on said member and wherein said stop means is a stationary stop.

3. Apparatus as claimed in claim 2, wherein said pawl is located in the path of travel of said cam piece connected to said spindle, said cam piece being arranged to turn the pawl into the effective area of the cooperating stationary stop during said first revolution of said spindle.

4. Apparatus as claimed in claim 3, wherein said pawl also forms said first abutment on said member.

5. Apparatus as claimed in claim 1, further comprising a limiting means which is movable from an ineffective position into an effective position for preventing restoration of said member from said intermediate position to said starting position.

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