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(54) **Locking system for a pump dispenser**

Verriegelungssystem für Spenderpumpen

Système de verrouillage pour distributeurs à pompe

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## Description

**[0001]** The present invention relates to a locking system for a pump dispenser, comprising a collar and a plunger rod movably received therein according to the features of the preamble of claim 1. These features are known from US 5 899 363.

**[0002]** Pump dispensers are widely known in the art. Such devices are used, for example, for dispensing a predetermined amount of liquid soap, skin cream, or other liquid substances. By means of a spring, the plunger rod is held in a highest position in relation to the collar, and such as to allow the plunger rod to be moved downward against the spring action. A general disadvantage of such pump dispensers is that each time a dispenser head that is attached to the plunger rod is pressed, an amount of the liquid is dispensed. Whereas this is desirable when in use, it is generally not desirable during transport. A solution for this problem is placing an intermediate member between the dispenser head and the collar in order to make it impossible for the dispenser head to be moved downward and thus for any of the liquid to be dispensed. The disadvantage with this is, however, that such an intermediate member is simply discarded after the initial use, making a subsequent convenient transport of the complete pump dispenser impossible. Such a system has the additional disadvantage that in the locked position, the dispenser takes up much space. There are also pump dispensers on the market of which the dispenser head at its bottom side near the plunger rod is provided with an external thread for screwing it onto the collar, which is provided with intermating internal thread. However, a disadvantage of this system is that several rotational movements are necessary in order to retain the dispenser head and the plunger rod in a downward position.

**[0003]** The pump dispensers according to the prior art therefore have the general disadvantage that due to a safeguard being provided, the dispenser takes up much space, or that various operations are necessary in order to put the dispenser into the locked condition.

**[0004]** The object of the present invention is to provide an improved locking system for a pump dispenser. To this end the plunger rod of the locking system for a pump dispenser is provided with at least one rib longitudinally extending over a distance from a first to a second end, and the collar is provided with at least one groove for guiding the rib therein, and for preventing a rotational movement of the plunger rod in relation to the collar, the first end of the rib, when having been brought into a down position, being removable from the groove in order to allow a rotational movement of the plunger rod in relation to the collar.

**[0005]** When the rib during the downward movement of the plunger rod is guided into the groove in the collar, such that the highest part of the rib is guided under the bottom end of the groove, the plunger rod becomes rotatable. The spring action subsequently causes the

plunger rod to be pushed upward, until the first end of the rib abuts to the underside of the collar. This prevents the plunger rod from moving upward again, unless the rib is being guided into the groove through the collar.

**[0006]** In order to prevent the rib being guided into the groove due to rotation of the plunger rod, which might occur through a movement against the dispenser head, and then being pushed upward again by the spring action, it is preferred for the collar to be provided with at least one cavity, which is only accessible from below and which is moved axially in relation to the at least one groove. Rotating the plunger rod such that the rib is positioned underneath said cavity will cause the rib to be pushed by the spring action into the cavity with the result that a rotational movement is no longer possible. To remove the rib from this locked position, the plunger rod must first be pushed slightly downward and subsequently rotated until the rib can be guided into the groove.

**[0007]** According to a further preferred embodiment, it is advantageous for the wall part at both sides of the access at the bottom side of the groove, and optionally at both sides of the access at the underside of the cavity, to be rounded. This makes it easy for the rib to be guided into the groove or the cavity, respectively.

**[0008]** According to yet another preferred embodiment, it is advantageous for the second end of the rib, which is at a lower position on the plunger rod than the first end, to be positioned near the bottom end of the plunger rod, such that the same is in the groove when the plunger rod, due to the spring action, is in the highest position. Firstly, this prevents the plunger rod when it is being pushed downward from rotating in relation to the collar. Secondly, it will enable the plunger rod on the downward, to make its maximal stroke, while this would not be the case if in the rest position the second end were at a higher position than the collar and if with the downward movement of the plunger rod, said end were not guided into the groove. Thirdly, this always provides a good starting position when the plunger rod is pushed downward in order to subsequently allow the same to be locked.

**[0009]** According to a further embodiment, the second end of the rib may be positioned closer to the first end. In that case it is possible to, when in use, turn the dispenser knob to any desired position. The second end needs then to be positioned high enough to allow the plunger rod to be pushed down sufficiently to be able to dispense a required amount of liquid when the second end, instead of being guided in the groove touches the top side of the collar.

**[0010]** Other possibilities and advantages as well as variations will become clear from the description of the invention following below, with reference to the figures.

**[0011]** The figures show a preferred embodiment of the invention.

Figure 1 shows a side view of a portion of a pump dispenser, part of which is represented in cross sec-

tion.

Figure 2 shows a top view of the plunger rod in the collar on the line of the arrows II-II in Figure 1.

Figure 3 shows a side view of a pump dispenser, partially cut-away.

Figure 4, shows a bottom view of the pump dispenser according to the invention on the line of the arrows IV-IV of Figure 3.

Figure 5, shows a bottom view of a pump dispenser on the line V-V of Figure 1.

Figure 6, shows a top view on the line of the arrows VI-VI in Figures 3.

Figure 7, shows a cross section of the collar on the line of the arrows VII-VII in Figure 2.

Figure 8, shows a cross section of the collar on the line of the arrows VIII-VIII in Figure 6.

**[0012]** In Figure 1, a portion of a pump dispenser is shown in which the dispenser head 1, the plunger rod 2, a collar 3, as well as a cylinder 4 and a spring 5 are clearly visible. On the plunger rod 2, two longitudinal ribs 6 are provided at 180° in relation to each other. In the position represented, a widened portion attached to the bottom side of the plunger rod 2 abuts to the underside of the collar 3. The spring 5 ensures that there is a firm contact between said widened portion and the collar 3.

**[0013]** In Figure 2, a top view of the collar 3 is shown on the line of the arrows II-II of Figure 1. The collar 3, the plunger rod 2, and the two ribs 6 are clearly visible in this figure. The ribs 6 are guided through grooves 7 in the collar 3. The figures clearly show that during a downward movement and in rest, the ribs 6 make a rotational movement of the plunger rod in relation to the collar impossible.

**[0014]** When the plunger rod is pushed downward, a first end 11 of the rib 6 will be guided through, and as far as under the groove 7 in the collar 3. When the first end 11 has been guided under the collar, it is possible to make a rotational movement with the collar. When subsequently releasing the plunger rod, the upward force exerted by the spring 5 on the plunger rod will cause the first end 11 of the ribs 6 to be pushed against the underside of the collar 3. This makes a further upward movement of the plunger rod 2 impossible. The plunger rod is thus fixed in the lowest position.

**[0015]** Figure 3 shows the pump dispenser according to Figure 1, with the plunger rod in the lowest position, and the top end of the rib 6 being lodged in a cavity 8 provided at the underside of the collar 3. The plunger rod 2 is rotated 90° in relation to the position as represented in Figure 1. In this Figure 3, the dispenser head 1 is shown from the rear, whereas the collar 3 is shown from the same side as in Figure 1. Thus the cavity 8 is turned 90° in relation to the groove 7. This Figure 3 clearly shows that the portion at the underside of the collar and at both sides of the access of the cavity 8 is slightly rounded. This facilitates positioning the first end 11 of the rib 6 into the cavity 8. The provision of the cavity 8 ensures that it is not possible to simply rotate the dispenser head 1,

which would cause the end 11 of the rib 6 to be guided into the groove 7, which would result in the aggregate being pushed upward again by the spring 5.

**[0016]** Figure 4 shows a cross section on the line of the arrows IV-IV in Figure 3, clearly showing the grooves 7 and the cavities 8. It is also clearly visible that the ribs 6 are positioned in the cavities 8.

**[0017]** Figure 5 shows a cross section on the line of the arrows V-V in Figure 1, and corresponds broadly speaking with the view represented in Figure 4, but the plunger rod 2 is rotated 90°. In this case the ribs 6 are received in the grooves 7 and the cavities 8 are vacant.

**[0018]** Figure 6 shows a view on the line of the arrows VI-VI of Figure 3 in which the grooves 7 are vacant, and in which the ribs 6 (not shown) are located under the cover plate 3 of the collar.

**[0019]** Figure 7 shows a cross section of the collar 3 on the line of the arrows VII-VII of Figure 2. In this figure the plunger rod 2 and the ribs 6 have been omitted. The cavity 8 is clearly visible in this figure, as well as the rounded rim portions 10 at the underside of the collar and at both sides thereof.

**[0020]** Figure 8 shows a cross section on the line of the arrows VIII-VIII of Figure 6, with the groove 7 being clearly visible. The groove 7 is similarly provided with rounded, in fact tapering, wall portions (9) at both sides of the access at the bottom of the groove 7. This facilitates a simple positioning of the first end 11 of the rib 6 from below.

**[0021]** Optionally, the ribs 6 may be embodied shorter than represented in the figures. A particular possibility is, for example, to position the second end 12 closer to the first end 11. In that situation, the plunger rod and the dispenser head 1 attached thereto are freely rotatable. If the second end 12 is positioned high enough, there is adequate room for the plunger rod 2 and the dispenser head 1 attached thereto to be pushed down a distance such as to pump up a desirable amount of liquid.

**[0022]** It is also possible to embody the rib 6 as an integral part of the plunger rod 2, for example, by making the plunger rod 2 oval, with the largest diameter at either side of the plunger rod 2 forming the two ribs 6. Above the first end 11, the plunger rod may be cylindrical. In that case the collar 3 comprises an opening having a corresponding oval cross section, so that when the oval portion has been moved into the downward position, it is located under the collar, thereby allowing the same to be rotated. In this case also, the first end 11 will abut to the bottom side of the collar 3.

**[0023]** The embodiments represented in these figures are not to be understood to limit the scope of the invention. A person skilled in the art is well capable of making adaptations and improvements to the embodiments represented in the drawings and described above. The protective scope of the invention is determined solely by the appended claims.

**Claims**

## 1. A locking system for a pump dispenser, comprising:

- a collar (3) and
- a plunger rod (2) movably received therein,
- the plunger rod (2) being provided with at least one rib (6) longitudinally extending over a distance from a first end (11) to a second end (12), and
- the collar being provided with at least one groove (7) for guiding the rib (6) therein,
- the first end (11) of the rib (6), when having been brought into a down position, being removable from the respective groove (7) in order to make a rotational movement of the plunger rod (2) in relation to the collar (3) possible, the collar (3) in which the rib (6) is moved axially in relation to the at least one groove (7), being provided with at least one cavity (8), **characterized in that** the cavity (8) is accessible for the rib (6) only from below.

## 2. A locking system for a pump dispenser according to claim 1, with the wall portion at both sides of the access at the bottom side of the groove (7) being rounded.

## 3. A locking system for a pump dispenser according to claim 1 or 2, with the wall portion at both sides of the access of the cavity (8) being rounded.

## 4. A locking system for a pump dispenser according to one of the preceding claims, with the second end (12) of the rib (6) being in a position such that the same is in the groove (7) when the plunger rod (2) is in a highest position.

**Patentansprüche**

## 1. Verriegelungssystem für einen Pumpspender, wobei das Verriegelungssystem

- einen Bund (3) und
- eine in ihm beweglich aufgenommene Kolbenstange (2) aufweist,
- die Kolbenstange (2) mit wenigstens einer Rippe (6) versehen ist, die sich in Längsrichtung über eine Entfernung von einem ersten Ende (11) bis zu einem zweiten Ende (12) erstreckt,
- der Bund mit wenigstens einer Nut (7) zum Führen der Rippe (6) in ihr versehen ist,
- das erste Ende (11) der Rippe (6), wenn es in eine untere Position gebracht ist, aus der jeweiligen Nut (7) entfernbar ist, um eine Drehbewegung der Kolbenstange (2) bezüglich des Bundes (3) zu ermöglichen, und

- der Bund (3), in welchem die Rippe (6) axial bezüglich der wenigstens einen Nut (7) bewegt wird, mit wenigstens einem Hohlraum (8) versehen ist,

**dadurch gekennzeichnet,**

- **dass** der Hohlraum (8) für die Rippe (6) nur von unten her zugänglich ist.

## 2. Verriegelungssystem für einen Pumpspender nach Anspruch 1, bei welchem der Wandabschnitt an beiden Seiten des Zugangs an der unteren Seite der Nut (7) abgerundet ist.

## 3. Verriegelungssystem für einen Pumpspender nach Anspruch 1 oder 2, bei welchem der Wandabschnitt auf beiden Seiten des Zugangs des Hohlraums (8) abgerundet ist.

## 4. Verriegelungssystem für einen Pumpspender nach einem der vorhergehenden Ansprüche, bei welchem das zweite Ende (12) der Rippe (6) eine solche Position einnimmt, dass es sich in der Nut (7) befindet, wenn die Kolbenstange (2) auf der höchsten Position ist.

**Revendications**

## 1. Système de verrouillage pour distributeur à pompe, comprenant :

- une bague de butée (3) et
- une tige de piston plongeur (2) reçue dans celle-ci de manière mobile,
- la tige de piston plongeur (2) étant pourvue d'au moins une nervure (6) s'étendant longitudinalement sur une certaine distance à partir d'une première extrémité (11) jusqu'à une seconde extrémité (12),
- la bague de butée étant pourvue d'au moins une rainure (7) destinée à guider la nervure (6) dans celle-ci,
- la première extrémité (11) de la nervure (6), une fois amenée en position basse, pouvant se dégager de la rainure respective (7) afin de permettre un mouvement de rotation de la tige de piston plongeur (2) par rapport à la bague de butée (3), et
- la bague de butée (3), dans laquelle la nervure (6) est déplacée axialement par rapport à au moins une rainure (7), étant pourvue d'au moins une cavité (8),

**caractérisé en ce que** la cavité (8) n'est accessible pour la nervure (6) que par le dessous.

2. Système de verrouillage pour distributeur à pompe selon la revendication 1, dans lequel la partie de paroi au niveau des deux côtés de l'accès au fond de la rainure (7) est arrondie.
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3. Système de verrouillage pour distributeur à pompe selon la revendication 1 ou 2, dans lequel la partie de paroi au niveau des deux côtés de l'accès de la cavité (8) est arrondie.
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4. Système de verrouillage pour distributeur à pompe selon l'une des précédentes revendications, dans lequel la seconde extrémité (12) de la nervure (6) est dans une position telle qu'elle se trouve dans la rainure (7) quand la tige de piston plongeur (2) est dans la position la plus élevée.
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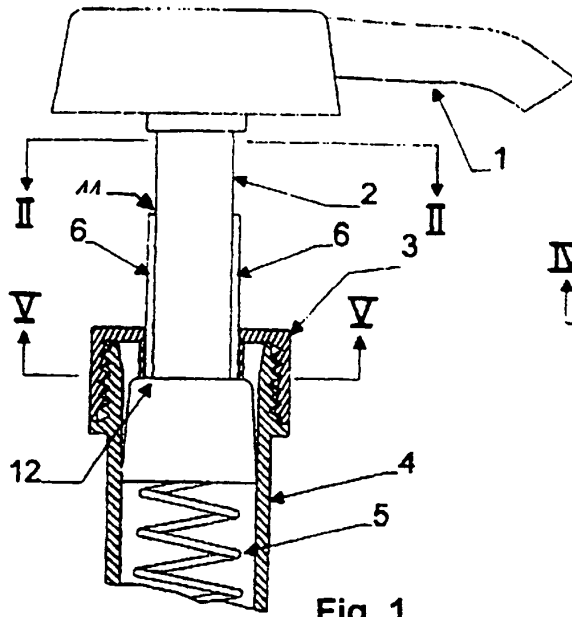


Fig. 1

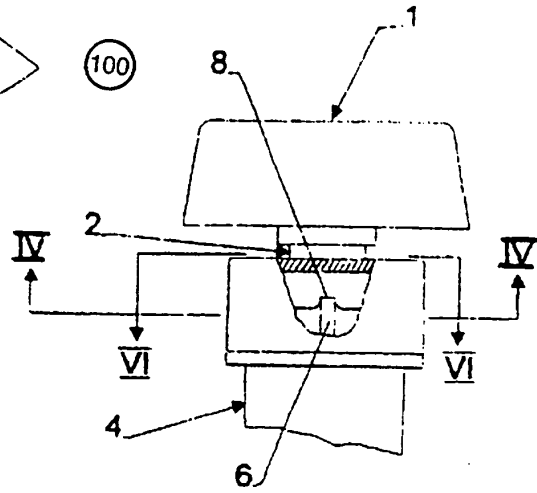


Fig. 3

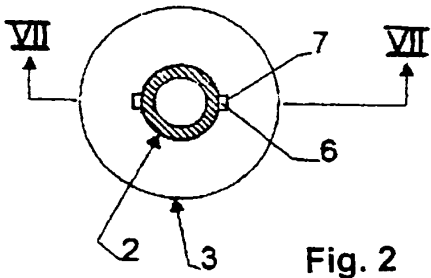


Fig. 2

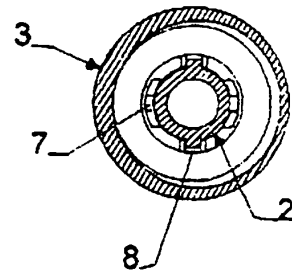


Fig. 4

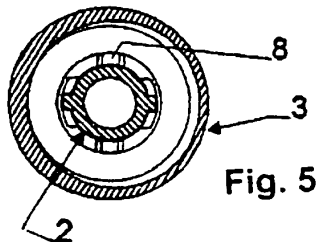


Fig. 5

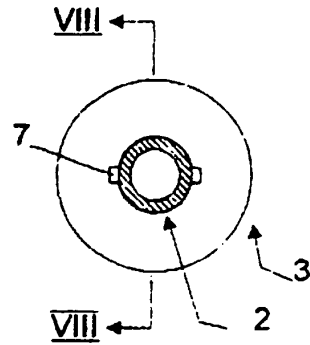


Fig. 6

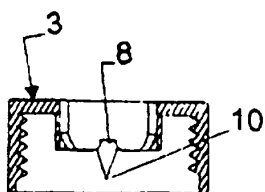


Fig. 7

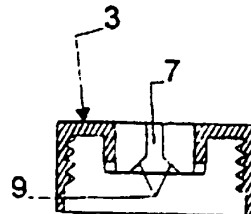


Fig. 8