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DISPENSER, PARTICULARLY FOR PASTY MATERIAL.

The invention relates to a dispenser, particularly for pasty material such as toothpaste, the dispenser comprising a tubular housing with a dispensing mouthpiece at one end; and a piston which is displaceable inside the housing towards the mouthpiece to force material out of the mouthpiece by means of an operating hand control located at the mouthpiece end and of a tension member extending in the axial direction of the housing and linking the operating hand control to the piston. Such a dispenser is hereinafter referred to as of the kind described.

In known dispensers of this kind (West German Patent Specification No.26 19 54) the operating hand control consists of a shaft provided with a handle. The shaft is located in the region of the mouthpiece opening, and passes through the latter at right angles. The tension member consists of a strip, the lower end of which is engaged with the piston whilst the end located at the mouthpiece becomes wound around the shaft upon operation of the operating hand control. A slip coupling is provided between the tension member and the shaft, in order to achieve the effect of only allowing the winding motion to occur when the operating handle is rotated in the correct

direction. Such constructions are complicated as regards the manufacturing process needed. Operation of them suffers from disadvantages. In particular, it is not possible to operate them with one hand.

5 Additionally, the loss factor based on the content of the dispenser is high, since the shaft, together with the slip coupling takes up an appreciable amount of paste-filling space and as, even when the piston is at a position corresponding to the fully emptied
10 state, considerable amounts of the container content still remains adhered to these components.

In addition, dispensers for pasty material are known (French Patent Specification No. 797 113), in which a piston is moved in a cylindrical housing by
15 means of a rod, the rod being moved by means of an operating hand control located outside and connected to the piston by means of a ratchet member operative in one direction. This dispenser, having a somewhat simplified construction, can in fact be operated
20 using one hand; it does however suffer from the disadvantage that the operating handle is opposite the mouthpiece opening. This presents a considerable operating disadvantage, particularly in the case of larger dispenser housings. These solutions are also
25 disadvantageous to the extent that, during the working step of the operating handle, i.e. during the dispensing process, the rod is pressure loaded. It must consequently have considerable stability against buckling, which above all means that the rod must
30 have a relatively large cross-section, and this cross-section once again represents a loss in the amount which the dispenser is able to hold.

The aim of the present invention is to provide a dispenser of the kind described having a simplified
35 construction which is more convenient to operate, and,

particularly, easy to operate using one hand.

- According to the present invention a dispenser suitable for dispensing pasty material comprises a tubular housing with a dispensing mouthpiece at one end, a piston inside the housing moveable towards the mouthpiece to force material out of the mouthpiece by means of an operating hand control located at the mouthpiece end of the dispenser and a rod coupled to the piston via a unidirectionally-operating ratchet arrangement and to one arm of a two armed rocking lever which forms the hand control, the other arm of the lever constituting a surface for manual application of operating pressure to rock the lever and thereby draw the rod and piston towards the mouthpiece, to dispense material therethrough, the arm of the rocking lever connected to the rod being provided with a region of reduced cross-section to provide articulation and thus accommodate axial movement of the rod and rocking movement of the lever. The hand control is preferably supported by the housing.

- With this construction, a dispenser is provided which is easy to manufacture and advantageous to use. The tension member, taking the form of a rod, is loaded in tension during the operating step. This has the advantage of allowing such a rod to be of smaller cross-section than a rod which is loaded under compression, when, particularly in the case of appreciable housing lengths, the possibility of bending of the rod cannot be excluded. The reduced cross-section of the rod also meets the need to save on the amount of

material used. Dispensing of the contents takes place in an extremely handy and useful way in small dispensing steps.

5. The rocking lever can be operated like an alternately actuated pump lever, by using the operating finger to press it in alternate directions. As it is possible for the mouthpiece opening to be located in the immediate proximity of the rocking lever, such a manner of operation is immediately possible, and the remaining fingers of the hand can
10. grasp the housing firmly, so that discharge of the contents at accurately located positions is made possible.

15. The rod and the rocking lever may be of one piece construction.

The component is then preferably made of a flexible elastic material.

5. Instead of employing operation of the rocking lever in alternate directions, it is also possible to provide simplified operation of the rocking lever in one direction only, by spring loading the rocking lever towards its rest position. A suitable return spring can be provided in practice, by making use of the resiliency of the material used, and using the simplest of means, by providing for the spring to take the form of a tongue located on the underside of the rocking lever and formed in one piece with the latter. Fitting of this component, which can even be done without tools, may be provided for by locating the rocking lever, in the region of its shorter arm, in a recess provided in a step in an upper end wall of the housing, side walls of the recess being provided with bearing holes for receiving pivot pin ends for the rocking lever, preferably as a snap fit, and by arranging for the longer arm of the rocking lever to project freely over the step in such a way that it overlaps a part of the surface of the housing upper end wall on which the spring bears. In this connection, it is advantageous if the end of the spring projects into a recess in the housing upper end wall.
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30. In order to ensure, using simple means, that forces originating from bouncing of the piston do not displace the bearing for the lever, an advantageous security arrangement may be provided for the rocking lever. Thus, the rocking lever which is snapped downwards into the housing step recess in the axial direction of the rod, is closely covered by a holding-down spigot arranged substantially coaxially with the

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rod, the spigot depending from an inner top surface of a protective cap which fits on top of the housing and closes off the mouthpiece. Such a protective cap can be screwed on using a quick thread arrangement.

5 The corresponding hold-down spigot can easily be formed on the cap during an injection moulding manufacturing operation. The protective cap hence fulfills a range of functions, comprising that of preventing
10 accidental contact with the operating arm, that of ensuring that the rod cannot be displaced in the axial direction during the filling operation, and that of closing off the mouthpiece, so that the dispenser contents are not able to dry out or form a dry skin.

15 An example of a dispenser constructed in accordance with the invention is illustrated in the accompanying drawings, in which:-

Figure 1 is a perspective view of the upper end of the dispenser;

20 Figure 2 is a perspective view of a component constituting the rocking lever and the rod; and,

Figure 3 is a broken axial section through the complete dispenser, with the dispensing mechanism located in its rest position.

25 The dispenser takes the form of a tubular housing 1, with a smooth rod 2 passing centrally through it. A piston 3 forming a bottom pressure surface runs on the rod. A sliding surface 3' of the piston is guided by a cylindrical inner wall 1' of the
30 housing.

The housing 1 forms an off-centre mouthpiece 4, in the region of its upper end wall 1", and the mouthpiece tapers down in size to form a mouthpiece opening 4'.

35 A housing upper end wall 1" has a central

aperture 5 through which the rod 2 passes the
outside. The rod then joins a rocking lever W. The
twin-armed arrangement of the rocking lever is
arranged in such a way that its shorter arm 6 is
5 connected to the axially displaceable rod via a
projection 7 on the rocking lever followed by a
point of articulation 8.

The other, longer arm 9 of the rocking lever W
has the purpose of providing the surface for
10 application of operating pressure. In order to
increase grip, the top of the surface is grooved as
shown at 10.

The point of articulation 8 takes the form of
a flexing zone of reduced cross-section arranged in
15 the form of a film hinge between the projection 7
and the rod 2. The length of this flexing region
of reduced cross-section is designed to take into
account slight transverse displacement arising from
the tilting movements of the rocking lever which are
20 produced as a result of the rocking lever following
a curved path.

The axis of pivoting of the rocking lever is
indicated by the line x - x. As a result of depressing
the rocking lever W in the region of the surface to
25 which pressure is applied, the rod becomes axially
displaced within the dispenser arrangement. It is
consequently loaded under tension during the operating
step. This leads to the piston 3 being moved along
with the rod, so that the pasty content F can be
30 portioned out through the mouthpiece opening 4'. The
length of stroke in each case is about 1-2mm.

The piston has a unidirectionally-operating
ratchet arrangement associated with it. The latter
consists of a spring plate 12 located on one broad
35 face of the piston 3. The plate has inwardly directed

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5 tongues 13. The tongues 13 are equiangularly arranged and are inclined with respect to the transverse plane corresponding to the position of the piston in such a manner, that their forward edges 13' bear under spring force against the outer surface of the rod 2 at a position which is displaced from this plane. Their inclination is directed away from the mouthpiece end. The piston 3 is consequently only carried along when the rod 2 is urged in the axial sense towards the mouthpiece as a result of depressing the longer arm 9 of the rocking lever W.

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When the rocking lever W is subsequently released, the lever and rod return under spring force to their rest position. A spring 14 is formed on the lower side of the rocking lever, i.e. on the lower side of the longer arm 9, and this takes the form of a tongue formed in one piece with the lever. The base of the tongue is at the free end of this arm, and it then follows an arcuate path towards the rod 2. The spring 14 may be slightly pre-tensioned. In order to define its rest position exactly, the rod 2, which is of relatively thin cross-section, has, in the region of the opening 5 in the end wall 1" of the housing, a thickened portion 15 in the form of a truncated cone which fits inside a funnel-shaped extension of the opening 5, arranged to match the shape of the thickened portion.

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During this movement in the opposing sense to the working step, the piston 3 is not carried along. Rather, when pressure on the operating surface has been released, the rod, as a result of the force from the spring 14, returns to its original position alone. The reason for this is, firstly, that the piston "adheres" to the dispenser content and, secondly, the peripheral friction surface impedes a corresponding

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carrying-along of the piston. During this, the tongues 13 which bear under spring pressure on the rod 2, are free to slide over the outer surface of the latter.

5 Since the piston 3 further forms, at its face directed towards the mouthpiece opening, a sealing lip 16 which extends up to the outer surface of the rod 2, passage of the dispenser contents F to the opposite sides of the piston is securely prevented,
10 so that no losses occur. The suitably reverse drawn sealing lip 16 is continued after the section forming the actual piston sliding surface 3' by a pocket 17 provided at the opposite side with respect to the direction of dispensing, and this is provided for
15 carrying the spring plate 12. Snap-in tongues can be used here. The spring plate 12 can obviously also be moulded as part of the piston body.

 The free end of the rod is carried in a central sleeve 19 formed on a bottom cover 18 of the
20 container 1, and this sleeve has a height which is appropriate to the axial stroke of the rod, so that axial guiding can also be maintained, when the piston 3 has been displaced in the direction of dispensing.

 The cover 18 may be attached using a snap-in
25 arrangement. It also has a pressure equalisation opening which is not shown in detail.

 The axis of tilting x - x is provided by stub shafts 11, forming pivot pin ends, located on the side of the rocking lever W. The latter, when the rocking
30 lever is being assembled, snap into corresponding bearing holes 20 provided on the sides 21 of a recess 22. The corresponding recess 22 is located in the region of a step St in the upper end wall 1" of the housing. The horizontal bearing arrangement for the
35 rocking lever, which runs transversely to the rod 2

and is offset with respect to the rod, is provided in the upper region of the recess 22, so that a free operating space for lowering of the longer arm 9 is provided as a result of the presence of the step causing a section 1''' of the end wall to be located at a lower level than the region of the recess. The longer arm correspondingly projects over the step St. As can be clearly seen in Figure 1, a portion of the housing end wall 1" over which the longer arm extends is provided with a recess 23, into which the free end of the spring 14 seats.

The bearing holes 20 are preceded by lead in grooves 20' which are open at the top and increase in width in the plane of the side wall of the recess 22, so that assembly of the rocking lever takes place under practically self-centering conditions. The open ends of the grooves adjacent to the bearing hole are however of lesser width than that of the diameters of the bearing holes 20, so that the snap-in fitting is provided.

In order to allow for emptying of the contents without leaving any remaining, the region of the housing at the dispensing end can essentially be shaped so as to correspond to the contour of the sealing lip 16 of the piston.

The whole dispenser head is covered by a protective cap 24, which is fitted until it bears against a shoulder 25 located at the height of the housing end wall 1".

All the components are advantageously made of thermoplastics material and are produced by injection moulding.

The protective cap 24 is provided with a holding-down spigot N (see Figure 3) which projects integrally from the inner surface 24' of the cap. The end face of

the conical spigot terminates immediately over the arm 6 of the rocking lever W. The reason for this arrangement is to prevent, when bouncing of the piston occurs, the stub shafts 11 formed on the rocking lever from becoming pressed out of the recess 22. The possibility of this happening can in some cases not be excluded, where the snap-in forces, resulting from possible varying tolerances, are not adequate to maintain the snap-in location in the axial direction of the rod. In such cases, the holding-down spigot forms a thrust surface which is able to withstand the corresponding forces.

The protective cap 24 itself is, for example, located on the housing by means of a short screw thread.

As can further be seen in Figure 3, the protective cap has a high degree of chamfer in the area of its top corner zone. This is adapted to fit the curvature of the edge of the mouthpiece opening, so that a tight seal is achieved at this point to prevent drying out of the dispenser contents.

The holding-down spigot N is arranged coaxially with the rod 2, which itself runs centrally through the housing.

CLAIMS

1. A dispenser suitable for dispensing pasty material comprising a tubular housing with a dispensing mouthpiece at one end, a piston inside the housing moveable towards the mouthpiece to force material out of the mouthpiece by means of an operating hand control located at the mouthpiece end of the dispenser and a rod coupled to the piston via a unidirectionally-operating ratchet arrangement and to one arm of a two armed rocking lever which forms the hand control, the other arm of the lever constituting a surface for manual application of operating pressure to rock the lever and thereby draw the rod and piston towards the mouthpiece, to dispense material therethrough, the arm of the rocking lever connected to the rod being provided with a region of reduced cross-section to provide articulation and thus accommodate axial movement of the rod and rocking movement of the lever.
2. A dispenser according to Claim 1 in which the rod and the rocking lever are of a one-piece construction.
3. A dispenser according to any of the preceding claims in which the rocking lever is spring loaded towards its rest position.
4. A dispenser according to Claim 3, in which the spring takes the form of a tongue located on the underside of, and formed in one piece with, the rocking lever.

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5. A dispenser according to Claim 4, in which the shorter arm of the rocking lever lies in a recess in a step in an upper end wall of the housing of the dispenser, side walls of the recess being provided with bearing holes for receiving pivot pin ends for the rocking lever; and in which the longer arm of the rocking lever projects freely over the step so as to extend over a part of the surface of the housing upper end wall on which the spring bears.

6. A dispenser according to Claim 5, in which the end of the spring seats into a recess in the housing upper end wall.

7. A dispenser according to Claim 5 or Claim 6, in which the rocking lever, which is snapped downwards into the housing step recess in the axial direction of the rod, is closely covered by a holding-down spigot arranged substantially coaxially with the rod, the spigot depending from an inner top surface of a protective cap which fits on top of the housing and closes off the mouthpiece.

8. A dispenser substantially as described herein with reference to the accompanying drawings.

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