

PATENT SPECIFICATION

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(54) A TABLET DISPENSER

(71) We, HERMES SUSSSTOFF AG., a Swiss Company of Ankerstrasse 53, 8004 Zurich, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to tablet dispensers. The word "tablet" is intended to include, for example, articles such as medicinal tablets, capsules and pills, sweetener tablets and food "cubes" such as soup cubes, and sugar cubes.

The invention provides a dispenser from which tablets can be dispensed individually in a simple manner under the action of gravity in response to rotary motion applied to the dispenser.

A tablet dispenser according to the present invention comprises:

a body part providing a container, having an open end and a closed end, for holding randomly disposed tablets to be dispensed;

an insert part in the open end of the container to define an annulus with the body part and rotatable on the axis of said annulus relative to the body part, the insert part being shaped to orientate the tablets to be dispensed in the annulus when the insert part is rotated relative to the body part with the open end held downwards;

means defining pockets in said annulus into which the tablets can drop; and

a cover part closing said annulus at the open end of the container; the cover having a tablet ejection aperture therein allowing gravitational release of orientated tablets from the pockets of the annulus individually when said relative rotation is set up.

The invention will now be described further with reference to the accompanying drawings in which:—

Fig. 1 shows the principle of a dispenser according to the invention, the dispenser being illustrated diagrammatically in a longitudinal section;

Fig. 2 shows a section along the line II—II of Fig. 1;

Fig. 3 shows the principle of another dispenser according to the invention, the dispenser being illustrated diagrammatically in a longitudinal section;

Fig. 4 shows a section along the line IV—IV of Fig. 3;

Fig. 5 shows diagrammatically a longitudinal section through the body part of one form of dispenser according to the invention;

Fig. 6 shows the body part of Fig. 5 assembled with an insert part and a cover part;

Fig. 7 shows the assembled parts of Fig. 6 inverted and ready for use;

Fig. 8 shows in detail a longitudinal section through the lower part of the assembly of Fig. 7;

Fig. 9 shows a section along the line IX—IX of Fig. 8;

Fig. 10 shows a section along the line X—X of Fig. 8;

Fig. 11 shows a longitudinal section through another form of dispenser according to the invention;

Fig. 12 shows a longitudinal section through a sleeve part of the dispenser shown in Fig. 11;

Fig. 13 shows a plan view of the sleeve part of Fig. 12;

Fig. 14 shows a longitudinal section through the body part of the dispenser according to Fig. 11;

Fig. 15 shows a plan view of the body part shown in Fig. 14.

The principle of the arrangement and functioning of the dispenser emerges from Figs. 1 to 4.

A cylindrical body part or cup 1 has an upper closed end 1a and a lower open end. An insert part 2, herein called an 'insert', has a conical nose and cylindrical shank and is located in the cup so that the cup 1 and insert 2 together define a space 3, whose cross section is circular in the upper regions of cup 1 and is annular in the lower regions and eventually defines a constant "thickness" sleeve-shaped annulus 4. This thickness is such that the annulus will accommodate a tablet to be dispensed when in the upright

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(edge-on) position. The annulus 4 is closed by a cover 5 which has at least one ejection aperture 6. The cup 1 and insert 2 are rotatable relative to each other on the axis of annulus 4. The cover 5 may be fixed either to the insert 2 (as in Fig. 1) or to the cup 1 (as in Fig. 3). Directly above the cover 5 there is arranged a first ring 7 of projections or cams 7a, which move relative to aperture 6 when cup 1 and insert 2 rotate relative to each other. The cams 7a project into the annulus 4 and partially close it. These cams 7a are fixed on the cup 1 when the cover 5 is connected to the insert 2 (Fig. 1) or are fixed on the insert 2 when the cover 5 is connected to the cup 1 (Fig. 3). Between consecutive cams 7a gaps 8 exist whose arc length is such that a tablet to be dispensed can be accommodated in a gap 8. Each gap 8 acts, in conjunction with the cup 1, the insert 2 and the cover 5, as a pocket into which tablets to be dispensed can drop. Thus a tablet pocket region is defined in the annulus 4. To ensure that tablets drop regularly into these pockets (also numbered "8"), there is provided between the upper regions of space 3 and the pockets, means whereby the tablets can be orientated. Orientation takes place in this way:

- a) The upright position of the tablets is enforced by the "thickness" of the annulus 4;
- b) The relative rotation of the cup 1 and insert 2 causes a loosening between the individual tablets in space 3 due to the friction arising between them and the tablets in the upper regions of space 3 are caused to enter the annulus 4;
- c) Directly above the ring 7 of cams at least one driving projection or cam 10 is arranged so that cam 10 describes a relative movement in relation to the cams 7a when the dispenser is operated. The driving cams 10 cause several actions to occur:
 - c1) The driving cams 10 communicate their movement to the tablets in annulus 4.
 - c2) The tablets in annulus 4 are formed into layer of rings.
 - c3) The ring of tablets which is set in motion by the driving cams 10 communicates its movement to the ring immediately above with a certain slippage and this ring communicates movement with slippage to the next ring above, and so on. The slippage acts on the tablets in a relaxing and loosening manner.
 - c4) The driving cams 10 move tablets ahead of them so that the tablets drop into the pockets 8, the tablets approaching the pockets with each rotary step of movement between cup 1 and insert 2. The driving cams 10 are disposed in

the annular clearance 4 and have an arc length such that they cover at least the larger part of the ejection apertures 6. Thus, if during the relative rotation between cup 1 and insert 2, a pocket 8 in ring 7 of cams passes over an ejection aperture 6 and ejects the tablet therein as a result, then a driving cam 10 stands above the upper entrance of the pocket 8 and prevents, by this means, further tablets above the ejected tablet from dropping from the dispenser. The dispenser assuming it has only one aperture 6, can thus eject with one rotary step only the contents of the pocket 8.

- c5) The cams 7a may have inclined faces (as shown in Figs. 7 and 14). Viewed in elevation (that is, radially from the axis of annulus 4) the cams 7a are, at their highest point, somewhat higher than the "upright" dimension of the tablet to be dispensed and, at their lowest point, lower than this dimension. This avoids cam 7a pushing hard against tablets in the ring of tablets immediately above the cam. The highest point is, as it were, "dragged behind" and tablets in the ring above gradually run up to this point. This running-up, and consequent dropping back results in a periodical lifting movement, which is passed on to the tablets which are higher up and thus exerts an additional relaxing influence on the bulk of tablets and thus aids orientation of the tablets.

The principle and functioning of dispensers described above to reference to Figs. 1 to 4 can be incorporated into dispensers in which a stepwise rotary motion between cups and inserts can be derived from an applied reciprocating motion, which may be manned or powered. Reference is now made to Figs. 5 to 7.

The cup 1, which is of elongate form, is partly filled with tablets S (such as saccharin tablets), a space of height h being left unfilled. Onto this cup 1 there is placed the cover 5 carrying the insert 2. The insert 2 has a cylindrical shank with a nose which tapers (in the direction away from the cover 5) at first slightly and then in a more pronounced manner. The height of the insert 2 corresponds approximately to the height h so that when the cover 5 is placed on the cup the insert 2 enters the cup 1 until it approximately touches the tablets S.

In the position of use (Fig. 7), the cover 5 is at the bottom and the tablets are at the top of the dispenser. The cover 5 serves as a foot or pedestal. In this position, a portion of the tablets, drops into the annulus 4 in the upright (or edge-on) orientation. When the cup 1 and the insert 2 are rotated relative

to one another the friction between the tablets and the walls of the cup 1 and the insert 2 helps to release jammed and wedged tablets and consequently to place the tablets into the required upright orientation in the annulus 4.

The orientating action of this rotary movement is aided by the cams 10 as above described. To further aid orientation the insert 2 carries on its surface a helical, groove-like depression 11, whose pitch and hand are such that any tablets which come into engagement with this depression 11 when the insert 2 is rotated are lifted and are thereby released from a position in which they are jammed with other tablets. In this way, the tablets which are disposed in a random manner at the top are progressively orientated as they travel towards the bottom, where they form as closed ring layers of upright tablets.

The dispenser of Fig. 7 will now be described in more detail with reference to Figures 8 to 10.

The pocket-forming cam ring 7 is arranged beneath the driving cam 10, which projects from the insert 2 into the annulus 4. Spread around the annulus 4, there are tablets to be dispensed.

This ring 7 of cams rotates co-axially relative to the insert 2 and annulus 4 upon operation of the dispenser. The ring 7 is mounted to move, relative to the insert 2 by means of connections 14 engaging in cup 1 when the insert 2, comprising the cover 5, is superimposed on the cup 1. The ring 7 thus rotates with the cup 1. The height of the ring 7 of cams is not much greater than the "upright" dimension of tablets to be dispensed.

The arc length of the cams 7a is such that, with the selected number of cams, there are gaps or pockets 8 between the cams 7a, whose arc length is such that one tablet to be dispensed can be accommodated therein without any possibility of being jammed. The cam inclined profile is seen in Fig. 7. The cover 5 directly abuts the bottom of the ring 7 of cams. This cover comprises a disc 5a, which closes the annulus 4 and which rotates relative to the cam ring 7, upon operation of the dispenser.

In the present example, the cover 5 is placed over the free edge 1b of the cup 1 and is connected to the body of the insert 2 in a rotation-proof and axially fixed manner by means of interlocks 19. The disc 5a comprises at least one ejection aperture 6. During rotation of cup 1 relative to cover 5 and insert 2 this ejection aperture 6 comes to lie below a pocket 8 and the pocket 8 is, thereby opened and its contents are ejected. When the cup 1 and the cover 5 are further rotated relative to each other then the next pocket 8 is opened and releases its contents.

The cam ring 7 carries on a sleeve 7b a pawl arm 15 which can engage in notches 16

of the insert 2 to define a stepped indexed rotation of cup 1 relative to insert 2.

Thus the dispenser is operated by rotating it from stop to stop. A locking lever 17, also on sleeve 7b, acts in co-operation with a tothing 12 on the insert 2 to prevent rotation in the incorrect sense. (Fig. 10.)

For the purpose of checking the tablet supply, the cup 1 may be manufactured from a transparent material. The handling of the cup is facilitated by ribs 18, which extend in the axial direction on the part of the cup which can be grasped with the hand.

A second embodiment of the invention will now be described with reference to figures 11 to 15.

This embodiment is characterised by a step-wise rotary motion derived from an applied reciprocating axial linear motion. The operation of the dispenser is effected by hand and consists in the axial displacement of one structural part against another, in the same way as, for example, the point of a ball-point pen, protruding at the top from the pen sleeve, is pushed into the sleeve which is encircled by the hand.

Apart from the structural parts 13, 21, 22, 27 intended for this axial displacement the basic construction of the dispenser corresponds to the generally demonstrated principle. The cup 1 comprises in this case a separate base 1a, which is recommended for reasons relating to manufacturing, fitting and filling.

The annular cover 5 with the ejection aperture 6 is secured to the insert 2 and consequently the cams 7a of the ring 7 of cams are fixed on the cup 1, whilst the driving cams 10, which are disposed thereabove, are fixed on the insert 2. In this example, the part of the insert 2 which projects into the cup 1 has a cylindrical shank and a cone-shaped nose.

In order to generate the rotary movement between cup and insert, which (in Figs. 8 to 10 for example) has to be implemented with both hands, by a reciprocating axial movement, which can be produced with one hand, the cup 1 and the insert 2 are located in a sleeve 13 which projects below the cup 1 but which terminates short of the top of the cup so that the cup projects from the sleeve.

At the lower end of the sleeve 13, radially extending webs 20 support a centre piece 21, which is intended for a multiple function. Firstly, it provides an abutment for a spring 22 which acts on the insert 2 and causes stops 23 on the cup 1 to abut stops 24 of the sleeve 13.

Secondly, the centre piece 21 provides a guide bush 25 for the lower end of a pillar 26 which emerges monolithically from the insert 2.

Thirdly, the centre piece 21 supports pointed tongues 27, and arcuate walls 28 for

deriving rotary motion between cup 1 and insert 2 from an applied axial movement between cup 1 and sleeve 13. The tongues 27 are resilient in the radial direction (Fig. 13).

The inner surface of insert 2 has alternate ribs 31 and helical grooves 32. The grooves 32 act as guides for the points of tongues 27 when the cup 1 of the dispenser is pressed into the sleeve 13 against the pressure of the spring 22. As a result of the co-operation between these tongues 27 and the grooves 32, the insert 2 rotates one step in the cup 1 for each full depression of the cup 1. A tablet is dispensed through each aperture 6 for each full depression of cup 1. The axial movement in which the cup enters further into the sleeve 13 is limited by stops 35, on the interior of the sleeve 13 which abut against corresponding stops 23 on the cup.

The axial movement of the cup 1 in the sleeve 13 is guided by the stops 24 engaging grooves 33.

For the purpose of checking the supply of particles, the cup 1 and the jacket 13 may be manufactured from a transparent material, for example plastics material.

WHAT WE CLAIM IS:—

1. A tablet dispenser comprising a body part providing a container, having an open end and a closed end, for holding randomly disposed tablets to be dispensed, an insert part in the open end of the container to define an annulus with the body part and rotatable on the axis of said annulus relative to the body part, the insert part being shaped to orientate the tablets to be dispensed in the annulus when the insert part is rotated relative to the body part with the open end held downwards, means defining pockets in said annulus into which the tablets can drop, and a cover part closing said annulus at the open end of the container; the cover having a tablet ejection aperture therein allowing gravitational release of orientated tablets from the pockets of the annulus individually when said relative rotation is set up.

2. A tablet dispenser as claimed in Claim 1 in which the insert part has a cone-shaped nose and a cylindrical-shaped shank, the nose being inserted so as to be innermost in the body part.

3. A tablet dispenser as claimed in Claim 1 in which the insert part has a nose with a

helical groove-like depression so that on relative rotation of body part and insert part tablets engaging the depression are lifted and loosened from adjacent tablets.

4. A tablet dispenser as claimed in Claims 1 or 2 in which said means defining said pockets comprise a ring of spaced bodies, the spaces therebetween defining, with the cover part, the insert part and the body part, said pockets.

5. A tablet dispenser as claimed in Claim 4 in which a tablet driving projection is provided to rotate over said pockets as the body part and insert part rotate relative to each other, said driving projection having an arc length such that the projection covers at least the larger part of the ejection apertures.

6. A tablet dispenser as claimed in any preceding claim including a pawl arm engageable in a notch to define a stepped rotation of the body part relative to the insert part.

7. A tablet dispenser as claimed in any preceding claim including means allowing relative rotation of the body part relative to the insert part in one direction only.

8. A tablet dispenser as claimed in Claim 4 in which said spaced projections have, when viewed in a direction radially to the axis of the annulus, inclined upper faces so that, upon operation of the dispenser, tablets in the annulus are lifted to aid orientation of tablets in the dispenser.

9. A tablet dispenser as claimed in any preceding claim having a sleeve which is co-axial with the body part and in which the body part can move axially, and means arranged so that when the body part and the sleeve move axially relative to each other the insert part is caused to rotate relative to the body part.

10. A tablet dispenser as claimed in Claim 9, in which said means includes tongues, movable when the sleeve moves axially relative to the body part, to engage in helical grooves in the insert part of the dispenser.

11. A tablet dispenser substantially as hereinbefore described with reference to Figs. 5 to 10 or Figs. 11 to 15 of the accompanying drawings.

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deriving rotary motion between cup 1 and insert 2 from an applied axial movement between cup 1 and sleeve 13. The tongues 27 are resilient in the radial direction (Fig. 13).

5 The inner surface of insert 2 has alternate ribs 31 and helical grooves 32. The grooves 32 act as guides for the points of tongues 27 when the cup 1 of the dispenser is pressed into the sleeve 13 against the pressure of the spring 22. As a result of the co-operation between these tongues 27 and the grooves 32, the insert 2 rotates one step in the cup 1 for each full depression of the cup 1. A tablet is dispensed through each aperture 6 for each full depression of cup 1. The axial movement in which the cup enters further into the sleeve 13 is limited by stops 35, on the interior of the sleeve 13 which abut against corresponding stops 23 on the cup.

20 The axial movement of the cup 1 in the sleeve 13 is guided by the stops 24 engaging grooves 33.

25 For the purpose of checking the supply of particles, the cup 1 and the jacket 13 may be manufactured from a transparent material, for example plastics material.

WHAT WE CLAIM IS:—

30 1. A tablet dispenser comprising a body part providing a container, having an open end and a closed end, for holding randomly disposed tablets to be dispensed, an insert part in the open end of the container to define an annulus with the body part and rotatable on the axis of said annulus relative to the body part, the insert part being shaped to orientate the tablets to be dispensed in the annulus when the insert part is rotated relative to the body part with the open end held downwards, means defining pockets in said annulus into which the tablets can drop, and a cover part closing said annulus at the open end of the container; the cover having a tablet ejection aperture therein allowing gravitational release of orientated tablets from the pockets of the annulus individually when said relative rotation is set up.

50 2. A tablet dispenser as claimed in Claim 1 in which the insert part has a cone-shaped nose and a cylindrical-shaped shank, the nose being inserted so as to be innermost in the body part.

55 3. A tablet dispenser as claimed in Claim 1 in which the insert part has a nose with a

helical groove-like depression so that on relative rotation of body part and insert part tablets engaging the depression are lifted and loosened from adjacent tablets.

4. A tablet dispenser as claimed in Claims 1 or 2 in which said means defining said pockets comprise a ring of spaced bodies, the spaces therebetween defining, with the cover part, the insert part and the body part, said pockets.

5. A tablet dispenser as claimed in Claim 4 in which a tablet driving projection is provided to rotate over said pockets as the body part and insert part rotate relative to each other, said driving projection having an arc length such that the projection covers at least the larger part of the ejection apertures.

6. A tablet dispenser as claimed in any preceding claim including a pawl arm engageable in a notch to define a stepped rotation of the body part relative to the insert part.

7. A tablet dispenser as claimed in any preceding claim including means allowing relative rotation of the body part relative to the insert part in one direction only.

8. A tablet dispenser as claimed in Claim 4 in which said spaced projections have, when viewed in a direction radially to the axis of the annulus, inclined upper faces so that, upon operation of the dispenser, tablets in the annulus are lifted to aid orientation of tablets in the dispenser.

9. A tablet dispenser as claimed in any preceding claim having a sleeve which is coaxial with the body part and in which the body part can move axially, and means arranged so that when the body part and the sleeve move axially relative to each other the insert part is caused to rotate relative to the body part.

10. A tablet dispenser as claimed in Claim 9, in which said means includes tongues, movable when the sleeve moves axially relative to the body part, to engage in helical grooves in the insert part of the dispenser.

11. A tablet dispenser substantially as hereinbefore described with reference to Figs. 5 to 10 or Figs. 11 to 15 of the accompanying drawings.

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