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Refill cartridge for a drink-dispensing device and
device designed for such a cartridge

The invention relates to the field of devices
5 for the automatic dispensing of drinks, sauces or other
fully prepared products on demand. In particular, the
invention is concerned with dispensing devices which
use pulverulent substances, such as soluble powders of
the coffee, tea, chocolate or suchlike type, and which
10 are to be refilled regularly. Advantageously, the
invention is concerned with drink-dispensing devices
used for serving passengers in aircraft, trains or
other means of transport benefiting from a catering
service. The invention also applies to devices for the
15 automatic dispensing of drinks which are installed in
public places and are equipped with a slot machine.

Drink-dispensing devices or the like have to be
supplied with soluble pulverulent substances regularly
and in sufficient quantity to ensure that several
20 consumers can be served in succession. In general,
supply is carried out manually by filling a reservoir
of the dispenser with powder packaged "in bulk", for
example by means of a metering device or a bag. This
method is unsatisfactory, since it takes up work time
25 of the person carrying out this task. It may also be
dirty, above all when the dispenser is installed under
unstable or turbulent conditions, as may be the case in
an aircraft. This may also result in an appreciable
loss of powder. Moreover, the distribution of the
30 powder in the metering system (for example, metering
screw) may be variable, depending on circumstances,
thus possibly leading to considerable variations in the
concentrations of the dispensed products.

There are dispensers designed for receiving
35 cartridges or containers which are filled with soluble
pulverulent substances and which are opened before
being introduced into the dispensing device. The
document GB 1,325,478, for example, teaches such a
principle. In this particular case, the container

comprises an adhesive tape which is delaminated before the container is set up in the device. The disadvantage arises due to the fact that the setting-up operation takes place when the container is completely open, thus
5 resulting in the same disadvantages as those mentioned above.

There are also automatic dispensing devices, such as those disclosed in the patent US-A-5,237,910, where the bag is opened by cutting the bottom of the
10 bag by means of a cutting system housed inside the device. Such a system is relatively complicated, costly and, moreover, too bulky to be capable of being used in restricted spaces, such as in aircraft.

There is a real need, therefore, to have a
15 principle for the refilling of dispensers with substances of the pulverulent type or equivalent, which is simple and quick to use, without any loss of material, and, if appropriate, can be put into practice in a limited available space.

The object of the present invention is,
20 therefore, to fulfil these expectations by proposing a refill element which is designed to release its substance in the device, without the need to carry out the prior opening of the element and without the
25 provision of cutting systems incorporated in the dispensing device.

For this purpose, the invention relates to a food substance refill element for a device for the automatic dispensing of drinks, sauces or other
30 products on demand. The refill element comprises a receptacle containing a predetermined quantity of the substance to be refilled into the device and a closing means cooperating with the receptacle in order to form an enclosed chamber. The closing means comprises means
35 making it possible to detach the closing means at least partially under the effect of the introduction of the refill element into the automatic dispensing device or after the refill element has been put in place in the device.

The opening of the element is thus simplified by virtue of the possibility of exerting, directly on the refill element, an action on the closing means, at the moment when or after the element is introduced into the device. It is to be understood by "directly" that no cutting implement or the equivalent, forming part of the device, is necessary for the opening operation.

In a preferred embodiment, the detachment means are formed from a free portion of the closing means, the said free portion extending, at least partially, beyond the limit of the receptacle on which portion are provided the means making it possible to detach the closing means.

In a first possible embodiment, the free portion of the closing means comprises at least one mechanical catching means intended for engaging with a retaining part of the device, the said retaining part being complementary to the mechanical catching means, so as to keep the free portion in place and thus ensure the at least partial detachment of the closing means from the receptacle when the refill element is being introduced into the dispensing device. Complementarity is understood both in terms of an adaptation of shapes and in terms of the interdependent structure of the catching/retaining means in order to perform the function of keeping the free portion in place.

In an alternative solution, the closing means comprises an actual closing portion of the receptacle and a free portion capable of being reached manually after the refill has been put in place in the device.

According to the invention, the closing means is preferably a flexible film joined by adhesion or sealing to the guide edges of the receptacle, in such a way that the closing means is detached as a result of the delamination of at least one portion of the film along the edges of the receptacle. Such an opening principle has the advantage of being reliable and economical, as compared with cutting by means of a tool, and of being conducive to a more uniform

distribution of the substance in the device, especially when the substance falls onto a metering means, such as, for example, a metering screw or other metering means.

5 The invention is also concerned with the actual dispensing device designed for receiving the above-defined refill element. Such a device comprises, in particular, a substance-supply subassembly which itself comprises at least one infeed zone for the refill
10 element, the said infeed zone being provided with a housing arranged for the refill element to slide when the receptacle is in an upturned configuration, the closing means at least partially forming the bottom of the element. In a complementary fashion, the device
15 comprises at least one means for receiving the food substance, the said means being located below the refill element, so as to make it possible to collect the food substance falling due to gravity when the closing means is being opened.

20 In a particular case, the dispensing device comprises a mechanical retaining means, into which engages the mechanical catching means of the closing means of the refill element, the said mechanical retaining means being located at the entrance of the
25 housing. Thus, the execution of the operation of opening the refill element for the purpose of releasing its substance into the device is made easier by means carefully placed at the entrance of the device, in order thereby to benefit from the movement of
30 introduction of the refill element so as to carry out the opening operation.

 These characteristics and advantages, and also others of the invention, will become clear from the detailed description and from the drawings which are
35 given as non-limiting examples and in which:

 Figure 1 illustrates a diagrammatic perspective view of a dispensing device of the invention comprising two partially inserted refill elements;

Figure 2 shows a diagrammatic view of the principle of insertion of the refill element of the invention into the dispensing device, according to a first embodiment;

5 Figure 3 shows a diagrammatic view of the principle of insertion of the refill element of the invention into the dispensing device according to a second embodiment;

10 Figure 4 is a side view of a refill element according to the embodiment of Figure 2;

Figure 5 is a front view of the element of Figure 4;

Figure 6 is a top view of the element of Figure 4;

15 Figure 7 is a top view of the refill element according to the second embodiment corresponding to Figure 3;

20 Figure 8 is a partial view, in longitudinal section, of the dispensing device when the refill element is in place in the device;

Figure 9 is a sectional view, along the line A-A, of the device illustrated in Figure 8;

Figure 10 is a side view of a refill element according to a third possible embodiment;

25 Figure 11 is a front view of the element of Figure 10;

Figure 12 is a top view of the element of Figure 10.

30 The invention is now described in detail by means of examples with references to the drawings.

35 The dispensing device 1, shown in Figure 1 as an illustration of the preferred embodiment, is a machine for dispensing hot drinks of the coffee or suchlike type, which can be installed in a small-size space provided for this purpose, such as, for example, in the reserved space of an aircraft. The device comprises a body 10 forming the frame of the device, an open drink-dispensing zone 11 located at the base of the dispenser, a panel 12 provided with preselection

buttons (not shown) and an infeed zone 13 for the sliding engagement of tray-shaped refill elements 2 according to the invention.

Figures 2 and 4 to 6 illustrate a first embodiment of the invention. The refill element 2 is intended to be inserted into a housing 14 of substantially complementary shape which is formed in the infeed zone 13 of the device. The refill element 2 has a receptacle 20 containing a particular quantity of substance to be refilled of the coffee, tea, milk or suchlike type in pulverulent form. The quantity of substance contained in the receptacle may vary, depending on the dimensions of the receptacle and the specific gravity of the product. The quantity may be determined as a function of the number of individual product portions intended to be provided after metering by a metering means of the device. For example, a number from 1 to 200 individual portions may be considered. The bottom of the refill element is formed from a closing means 25 of the receptacle, in such a way that the mass of substance to be refilled rests directly on the closing means in this configuration. The assembly formed by the receptacle and the closing means defines a hermetically enclosed chamber 23.

The closing means 25 is preferably a flexible film joined by adhesion or by sealing to the edges 21 of the receptacle. The folded-back lateral edges 21 extend preferably over the entire periphery of the receptacle forming the tray, so as to assist the support, stability and guidance of the tray in the device. It is advantageous, in this case, to have closing means 25 in the form of a film heat-sealed to the lateral edges of the receptacle.

As shown more particularly in Figure 2, the closing means 25 is prolonged in front of the refill element by a free portion 26 which at least partially extends beyond the receptacle. What is to be understood by "free portion" is a portion having a free end when the receptacle is no longer in engagement in the

device. This portion is flexible in that it can be folded back against the surface of the closing means or film 25. In practice, the portion is simply a prolongation of the film. One of the particular features of the invention is that the portion 26 comprises a mechanical catching means 27 formed from at least one projecting portion 28. The projecting portion 28 forms an abutment intended to come to bear on a complementary edge 140 delimiting the entrance of the housing 14 of the dispensing device. The housing 14 possesses an upper wall 142 which defines, with the lower edge 140, a height H which, bearing in mind the dimensional tolerances, allows the sliding engagement of the refill element 2, with the exception of the catching means 27. Thus, the height H corresponds to the height h of the refill element, including the height of the receptacle together with its edges. The catching means 27 may be a plate made of semi-rigid or rigid plastic adhesively bonded or welded to the flexible film, so as to be resistant to delamination, and interrupted with respect to the edge of the receptacle so as to preserve a non-covered and foldable flexible film zone 29. As shown in Figure 4, the catching means 27 comprises two abutments 28 spaced laterally from one another. In a variant which is not illustrated, the said catching means could be a continuous projecting edge extending over the entire width of the free portion 26 or any other equivalent means.

Installing the refill element 2 is particularly simple, since it involves putting the front of the element in place at the entrance of the housing, so as to cause the free portion 26 to be folded back along the flexible zone 29 and thus to make it possible to apply the projecting portion 28, facing downwards, opposite the edge 140 of the receptacle, and then exert sufficient force to drive the refill element into its housing, the closing means 25 being detached as a result of the effect of delaminating the film along the

sealed edges 21 of the receptacle. Delamination may be obtained on only a portion of the length of the receptacle. In this case, delamination may be completed manually. Alternatively, delamination may be carried
5 out over the entire length of the receptacle. It should be noted that, as delamination occurs, the substance is released into the device due to gravity, in an internal position with respect to the transverse edge 140. There is therefore no risk of spillage outside the device.

10 As shown in Figures 5 and 6, the receptacle is in the form of an elongate tray having a cross section of substantially trapezoidal shape, the larger base being prolonged in a substantially identical plane by lateral edges, to which the closing means 25 is
15 connected detachably. The specific cross-sectional shape of the tray is adapted to the shape of the housing, so as to allow only a single direction of engagement, whilst at the same time eliminating any risk of engagement error.

20 Figures 3 and 7 show another embodiment of the invention, in which the mechanical catching means comprises at least one hole 22 formed in the free portion 26 of the catching means and intended for
25 engaging onto a complementary rod portion 141 of the dispensing device. The opening of the receptacle is therefore based on a principle similar to that of the previous case.

According to one characteristic of the invention, the flexible film is preferably produced
30 from moisture-resistant and tear-resistant material. The film is preferably a laminate comprising an aluminium film lined on the inside with a film of heat-meltable material, so as to assist in joining the said film to the edges of the receptacle.

35 As regards the receptacle 20, it is preferably formed, based on plastic employed by a method selected from the following: thermoforming, injection, extrusion blow-moulding and injection blow-moulding.

Figures 8 and 9 illustrate an example of a dispensing device to which the invention refers.

The device comprises a subassembly 7 for the supply of pulverulent substance. The subassembly
5 includes an infeed zone 13 which forms the upper part of the body of the device and in which is arranged the housing 14 for receiving the refill element 2. The element 2 is slid in the upturned position into the housing, which means that the receptacle has its
10 opening directed downwards when it is freed of its closing means. The housing has a configuration of shape and/or dimensional configuration such that the element cannot be introduced in the other direction, that is to say with the closing means directed upwards.

15 Below the refill element 2 is located a means 4 for receiving the food substance, the said receiving means serving for collecting the substance falling into the device due to gravity. Preferably, this receiving means is a hopper (also called a "canister") provided
20 with widened edges 40, 41, 42. When particularly sticky substances are being used, it may be necessary to provide straight edges in order to avoid any undesirable caking of substance. An accessory system intended for breaking up the powder may, of course, be
25 added, if necessary, such as a gearwheel driven by meshing with the screw.

The receiving means leads the pulverulent substance directly onto a metering means 5, the function of which is to meter the desired quantity of
30 substance into a mixing chamber 6. The metering means preferably consists of a metering screw, known in the art, located at the bottom of the hopper. The screw may be of the spiral type, that is to say comprising a wire in the form of a helical spiral. It may also be a screw
35 comprising a solid core structured externally with a helical rib of predetermined pitch.

According to an advantageous aspect of the invention, the metering screw is arranged horizontally and is substantially oriented in the vertical plane in

which the refill element 2 extends longitudinally. Such a relative arrangement of the screw and of the refill element contributes to a good distribution of the pulverulent substance in the device at the moment when
5 it is released, and therefore consequently improves the metering accuracy.

The screw is mounted on a shaft portion 50 supported by a bearing 51. The shaft portion is connected to a stub 52 intended for associating with a
10 motorized drive device (not illustrated). A support element 53 is provided at the opposite end of the screw for holding the latter, the said support element comprising an orifice 53 for pouring the powder. The element is connected to the front wall 45 of the hopper
15 by fastening means.

As shown in Figure 9, a plurality of supply subassemblies 7a, 7b are arranged in parallel, thus making it possible to accommodate a plurality of refill elements 2 capable of containing different pulverulent
20 substances in the device and communicating with a common mixing bowl 6. The refill elements 2 may have different volumes. The refill elements 2 are guided in their housing by guide means 43, 44 in the form of laterally spaced rails, thus ensuring sliding in a
25 substantially horizontal plane. These means 43, 44 may, as illustrated, have horizontal wall portions ensuring planar support on the edges 21 of the refill elements and vertical portions ensuring longitudinal guidance, the horizontal and vertical portions being wide-angled.

The mixing bowl 6 is supplied with water 60 by
30 means of a supply. It is possible to provide a separate supply of hot and cold water. The device may also comprise its own water-heating system (not illustrated). Baffle and separation elements 61 may
35 advantageously be provided for assisting the mixing of the various substances.

The bowl is prolonged downwards by a mashing (or beating) chamber 8 which comprises an agitation means. The agitation means takes the form of a rotary

member provided with a rotor 80 and with blades 81. The mashing chamber is generally enclosed. Its function is to produce a layer of froth on the surface of the dispensed drink. The agitation means may be deactivated
5 for some preparations where the production of froth is not desired.

The prepared product is subsequently dispensed through an outlet duct 9 located at the bottom of the device.

10 In one possible variant, not illustrated, of the device, an assembly of a plurality of refill elements in a vertically stacked configuration may be provided, each element being engaged according to the same principle as that just described. In this case,
15 any element comprising an element covering it will have an orifice in its upper surface to allow the passage of the substance from the element located above it. The orifice in its upper surface may thus be provided according to the same principle as the part forming the
20 closing means. In this case, the receptacle may have two opposite closing means, one forming the upper surface of the element and the other forming the lower surface of the receptacle. The advantage of having a plurality of elements is a greater flexibility afforded
25 in the ability to supply the dispensing device according to requirements.

Figures 10 to 12 show variants in which the closing means 25 comprises an actual closing portion 250 of the receptacle and a free portion 26 superposed
30 with respect to the closing portion and having a first end 251 located on the side on which the element is introduced into the device, the said end 251 being connected to the closing portion so as to form a folded-back edge, and an opposite end 252 prolonging
35 the receptacle and being capable of being reached manually after the refill has been put in place in the device.

What is understood by "automatic dispensing device" is any type of dispensing device activating a

cycle for the reconstitution of food preparations ready for consumption.

5 The invention is suitable for refilling pulverulent food substances involved in the composition of drinks selected from roasted and ground coffee, soluble coffee, tea, chocolate-containing drinks, milk, flavoured drinks based on fruits, herbs, sugar, leguminous plants and natural or artificial aromas and also mixtures of these products in any proportion.

10 The invention is not, of course, limited only to the embodiments described, but may also relate to variants which may be considered as equivalents or which come within the scope of the following claims.



CLAIMS:

1. Food substance refill element for a device for the automatic dispensing of drinks, sauces or other products on demand, the refill element (2) comprising a receptacle (20) containing a predetermined quantity of the substance to be refilled into the device and a closing means (25) cooperating with the receptacle (20) to form an enclosed chamber, characterized in that the closing means (25) comprises means (22, 26, 27, 28, 29) making it possible to detach the closing means (25) at least partially under the effect of the introduction of the refill element (2) into the automatic dispensing device or after the refill element has been put in place in the device.

2. Food substance refill element according to Claim 1, characterized in that the detachment means are formed from a free portion (26) of the closing means (25), the said free portion extending, at least partially, beyond the limit of the receptacle (20), on which portion are provided the means (27, 28) making it possible to detach the closing means.

3. Food substance refill element according to Claim 2, characterized in that the free portion (26) of the closing means (25) comprises at least one mechanical catching means (27) intended for engaging with a retaining part (140, 141) of the device, the said retaining part being complementary to the mechanical catching means, so as to keep the free portion (26) in place and thus ensure the at least partial detachment of the closing means (25) from the receptacle (20) when the refill element (2) is being introduced into the dispensing device (1).

4. Food substance refill element according to Claim 3, characterized in that the mechanical catching means (27) comprises at least one projecting portion (28) forming an abutment intended to come to bear on a complementary edge (140) of the dispensing device (1).





5. Food substance refill element according to Claim 4, characterized in that the mechanical catching means (27) comprises at least one hole (22) formed in the free portion (26) of the catching means and intended for engaging onto a complementary rod portion (141) of the dispensing device (1).

6. Food substance refill element according to Claim 1 or 2, characterized in that the closing means (25) comprises an actual closing portion (250) of the receptacle and a free portion superposed with respect to the closing portion and having a first end (251) located on the side on which the element is introduced into the device, the said end being connected to the closing portion so as to form a folded-back edge, and an opposite end (252) prolonging the receptacle and being capable of being reached manually after the refill has been put in place in the device.

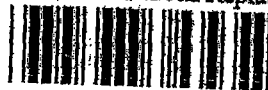
7. Food substance refill element according to any one of the preceding claims, characterized in that the closing means (25) is a flexible film joined by adhesion or sealing to the guide edges (21) of the receptacle, in such a way that the closing means is detached as a result of the delamination of at least one portion of the film along the edges of the receptacle (20).

8. Food substance refill element according to Claim 7, characterized in that the flexible film is produced from moisture-resistant and tear-resistant material.

9. Food substance refill element according to any one of the preceding claims, characterized in that the receptacle (20) is in the form of an elongate tray having a cross section of substantially trapezoidal shape, the larger base being prolonged in a substantially identical plane by lateral edges (21), to which the closing means (25) is connected detachably.

10. Food substance refill element according to Claim 9, characterized in that the lateral edges (21)





extend over the entire periphery of the receptacle (20) forming the tray.

11. Food substance refill element according to Claim 9 or 10, characterized in that the closing means
5 (25) comprises a flexible film heat-sealed to the lateral edges (21) of the receptacle.

12. Food substance refill element according to any one of the preceding claims, characterized in that the receptacle (20) is formed from plastic by a method
10 selected from the following techniques: thermoforming, injection, extrusion blow-moulding and injection blow-moulding.

13. Food substance refill element according to any one of the preceding claims, characterized in that it
15 contains a pulverulent food substance for the preparation of drinks selected from roasted and ground coffee, soluble coffee, tea, chocolate-containing drinks, milk, flavoured drinks based on fruits, herbs, sugar, leguminous plants and natural or artificial
20 aromas and also mixtures of these products in any proportion.

14. Device for the automatic dispensing of drinks or sauce or other product on demand, specifically designed for receiving a refill element (2) defined
25 according to any one of Claims 1 to 12, the device having at least one substance-supply subassembly (7), the said subassembly comprising:

At least one infeed zone (13) for the refill element (2), the said infeed zone comprising a housing
30 (14) arranged for the refill element (2) to slide when the receptacle is in an upturned configuration, the closing means (25) at least partially forming the bottom of the element;

At least one means (4) for receiving the food
35 substance, the said receiving means being located below the refill element, so as to make it possible to collect the food substance falling due to gravity when the closing means (25) is being opened.





15. Device according to Claim 14, characterized in that it furthermore comprises:

A means (5) for metering the quantity of substance emerging from the receiving means (4);

5 A mixing bowl (6) which is supplied with water and into which the metered quantity of substance is dispensed;

A dispensing outlet (9) making it possible to dispense the mixture.

10 16. Device according to Claim 15, characterized in that the metering means (5) is a metering screw arranged horizontally and substantially oriented in the vertical plane in which the refill element (2) extends longitudinally.

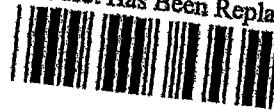
15 17. Device according to any one of Claims 14 to 16, characterized in that the housing serving for the infeed of the refill element (2) comprises guide means (43, 44) in the form of two laterally spaced rails ensuring that the refill element slides in a
20 substantially horizontal plane.

18. Device according to any one of Claims 14 to 16, characterized in that it comprises a mechanical retaining means (140, 141), into which engages the mechanical catching means (27) of the closing means
25 (25) of the refill element, the said mechanical retaining means (27) being located at the entrance of the housing.

19. Device according to Claim 18, characterized in that the mechanical retaining means takes the form of
30 at least one transverse edge portion (140), in which the catching means (27) comes into abutment when the refill element is being introduced into the housing.

20. Device according to Claim 18, characterized in that the mechanical retaining means takes the form of
35 at least one rod portion in relief (141), onto which the catching means engages when the refill element is being introduced into the housing (14).





21. Device according to any one of Claims 14 to 20, characterized in that the means (4) for receiving the substance is a hopper having widened edges or a funnel.

22. Device according to any one of Claims 14 to 21,
5 characterized in that it comprises a plurality of supply subassemblies (7a, 7b) arranged in parallel and making it possible to accommodate a plurality of refill elements (2) containing different substances in the device and communicating with a common mixing bowl (6)
10 supplied with water.

23. Device according to Claim 22, characterized in that it comprises, furthermore, a mashing chamber (8) comprising an agitation means for the production of froth, the said chamber being located between the
15 mixing bowl (6) and the outlet (9) for dispensing the product on demand.

24. Device according to any one of Claims 14 to 23, characterized in that it comprises an arrangement of a plurality of elements arranged in a vertical stack.

20 25. Drink-dispensing device comprising a dispensing device (1) and at least one cartridge (2) for the refilling of pulverulent substance, characterized in that

the cartridge (2) comprises an elongate receptacle (20)
25 containing the pulverulent substance and a peelable film (25) forming the bottom of the cartridge, the film being previously joined by sealing or adhesive bonding to the edges (21) of the receptacle, the film comprising a foldable free front portion (26) provided
30 with mechanical catching means (27),

and in that the dispensing device (1) comprises a housing (14) for receiving the cartridge and retaining means (140, 141) which engage at the moment when the cartridge (2) is introduced into the housing (14), in
35 such a way that the movement of introducing the cartridge into the housing causes the delamination of the film (25) and consequently the release of the substance into the dispensing device due to gravity.

