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Foodstuff refill and device intended to accommodate
such a refill

- 5 The invention relates to the field of devices for metering, dispensing and/or preparing food products such as beverages, sauces or other similar products. The invention is aimed more particularly at a refill comprising a foodstuff which is to supply such devices. The invention may find numerous applications in the
- 10 food service industry, particularly with regard to the dispensing of beverages in public places or in catering services of transport facilities such as aircraft or trains.
- 15 Apparatus for dispensing and/or preparing beverages or other ready-prepared products have to be supplied with foodstuff regularly and in sufficient quantity to be able to provide the consumer with a continuous and uninterrupted service. In general, the devices are
- 20 supplied manually by filling reservoirs with a foodstuff packaged "loosely" in hermetically sealed tins or bags. This method is not satisfactory because it entails handling operations and time needed to perform these handling operations. The handling
- 25 operations make a mess and carry the risk of a significant loss of foodstuff, particularly when the device is installed in unstable or turbulent conditions such as may be the case in an aircraft.
- 30 Devices do exist which are designed to accommodate cartridges or containers filled with soluble powdered substances which are opened before they are introduced into the device. Document GB 1 325 478, for example, teaches such a principle. In this particular instance,
- 35 the container comprises an adhesive strip which is delaminated before the container is assembled into the device. The disadvantage stems from the fact that the refilling operation is performed when the container is

fully open, thus leading to the same disadvantages as those described above.

Application EP 1 028 068 in the name of the Applicant
5 company proposes a solution to these problems and this
solution consists in providing a refill cartridge
designed to refill with foodstuff easily and quickly
and without the risk of losing any foodstuff, and, if
appropriate, which can be used satisfactorily in a
10 demanding environment such as an aircraft compartment.
The cartridge comprises a container containing a
foodstuff and a closure means collaborating with the
container to form an enclosed space. The closure means
comprises means allowing the at least partial
15 detachment of the closure means under the effect of the
refill being introduced into the dispensing device. In
particular, the detachment means comprises a free
portion equipped with mechanical catching means
intended to engage with at least one retaining part of
20 the device, that complements the mechanical catching
means, so as to hold the free portion in place in a
configuration in which the free part is folded back
onto the detachment means and thus ensure the at least
partial detachment of the closure means with respect to
25 the container. In this case, the detachment means thus
forms a portion of the closure or sealing means, which
hangs down freely in the "at rest" configuration and is
capable of being folded back onto the container in the
configuration of engagement into the device.

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A system such as this has numerous advantages in terms
of convenience of use in that the introduction of the
cartridge into the device is essentially enough to open
the refill and therefore refill the device.

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The present invention also relates to a foodstuff
refill designed to release its contents into an
appropriate device without it being necessary for the
refill to be opened beforehand, or it being necessary

to provide integral cutting systems in the accommodating device. The present invention does, however, set its sights on improving the basic principle taught in document EP 1 028 068.

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The present invention wishes to make the refilling operation more reliable and more safe. Thus, one of the objects of the invention is to ensure a better distribution of the forces applied in order to open the
10 refill so as to afford optimum safety on opening under all circumstances such as, for example, in order to avoid any risk of rupture, crumpling or jamming of the means for sealing the refill as it is engaged in the device.

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Another object is to lessen the risk of accidental opening of the refill outside the device and partial or total deterioration and/or damage to the means used to open and/or seal the refill. What happens is that the
20 refill is used as packaging for the foodstuff, and has therefore to be capable of storing it, over time, under vapour-tight and possibly also oxygen-tight conditions. Any inadvertent rupture, however minimal it might be, of the sealing means may have the result of
25 considerably reducing the shelf life of the foodstuff. Likewise, in the event of damage to the opening means, the refill may no longer be able to be opened properly, and the refill may therefore become unusable.

30 Another object is to propose a refill which can easily be stored in quantity, in a rational and compact way without wasting space in a restricted space such as a box, a crate, a drawer, etc.

35 Further objects and advantages of the invention will become apparent in more detail in the remainder of the description.

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According to the invention, the abovementioned objects are achieved by producing a foodstuff refill intended to be inserted in a foodstuff supply zone of a device for metering, dispensing and/or preparing beverages or the like; the refill comprising a container for containing a quantity of foodstuff; a passage for releasing the foodstuff; edges of the device, including at least one pair of first opposed edges, a means of sealing the passage to form an enclosed space; a means of detaching the sealing means; the said detachment means comprising at least one catching means intended to engage over a retaining means of the device when the refill is being engaged in the device. According to an essential particularity of the invention, the detachment means is secured to the sealing means and is able to be connected slidably along the refill, preferably along the said first edges, so as to cause the at least partial opening of the sealing means in response to the engagement of the refill in the device.

Thus, the refill becomes more reliable on opening because the slidable mounting of the detachment means has the effect of evenly distributing the forces needed to detach the sealing means. Detachment occurs more uniformly, minimizing the risks of rupturing the sealing means; if this were not the case, the aperture needed to release the entirety of the foodstuff contained in the container could be impeded.

Thus, the detachment means preferably comprises means of connection with the said first edges which are flexible so that the detachment means can be arranged between a disengaged position and a connection position folded back onto the sealing means thus forming the position of engagement in sliding along the said sliding edges. A configuration such as this has the advantage of it being possible for the detachment means to be placed in the operational position of sliding along the sliding edges of the refill at any moment,

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for example, either during the manufacture of the refill or just prior to loading the refill into the device intended to accommodate it.

- 5 As a preference, the catching means of the detachment means, intended to engage in retaining means belonging to the device, are arranged in such a way as to form at least one abutment zone extending transversely with respect to the direction in which the refill is engaged
10 in the device. As a preference, the direction of engagement of the refill corresponds to the longitudinal direction of this refill.

According to the invention, the sealing means is
15 preferably a flexible film sealed onto the edges of the refill. The term "sealing" is to be understood as meaning any appropriate means of connection between the film and the edges and which has the characteristic of being able to be broken under the effect of sufficient
20 mechanical traction. An action such as this is generally described by the terms "delamination" or "peeling". The sealing may thus comprise bonding, welding or a combination of these two means.

- 25 The invention also relates to the assembly comprising a device for metering, dispensing and/or preparing beverages or other food products comprising a supply zone and at least one foodstuff refill intended to take up position in the said zone; the refill comprising a
30 container containing the foodstuff and a film capable of forming the bottom of the refill, the film being assembled on the edges of the container in such a way that it can be delaminated, the film being secured to a detachment means; the said detachment means comprising
35 at least one mechanical catching means; the supply zone comprising a housing for accommodating the refill and at least one retaining means which collaborates with the singular or plural catching means at the time of introduction of the refill into the housing;

characterized in that the detachment means comprises means allowing the connection of the detachment means slidably with respect to the refill, and in that the detachment means is capable of sliding in such a way that the movement of introducing the refill into the device causes the at least partial delamination of the film and releases the foodstuff into the supply zone.

Certain features and advantages of the device may be partially described in application EP 1 028 068, the entirety of the content of which is to be considered as forming a part of the current application.

The detailed description which follows is given by way of nonlimiting example, in which:

Figure 1 depicts a perspective view of a refill according to the invention;

Figure 2 shows a side view of the refill of Figure 1;

Figure 3 shows a detail on section A-A of Figure 1;

Figure 4 depicts a view from above of the refill according to the invention in the mode where the detachment means is not folded back;

Figure 5 shows a side view of Figure 4;

Figure 6 shows a detailed perspective of Figure 4;

Figure 7 shows a schematic front view of the refill in the position of engagement in the preparing or dispensing device;

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Figure 8 shows, in perspective from underneath, the principle involved in opening the refill as it is engaged in the device;

Figure 9 shows a detail of Figure 7 in section B-B;

Figures 10 to 12 show the operation of engagement into the device for refilling with foodstuff at various stages of engagement;

Figure 13 shows part of the refill during manufacture;

Figure 14 shows a schematic sectional view of an alternative form of the refill;

Figure 15 shows a schematic sectional view of the alternative form of the refill of Figure 14 after it has been introduced into the device.

The invention is now described in detail through examples with reference to the drawings.

The refill 2 according to the invention as depicted in Figures 1 to 3 has a container 20 containing a predetermined quantity of foodstuff for refill purposes. A foodstuff such as this is preferably a powdered substance of the coffee, tea or soluble milk type. The capacity of the container may vary and is determined according to the type of device to be refilled and according to the number of individual doses to be supplied after metering via metering means belonging to the device. For example, the container may comprise an amount of foodstuff equivalent to a number n of individual doses, it being possible for n to vary between 1 and 200.

In a first mode, the container 20 has the shape of an elongate tray extending in a longitudinal direction I, equipped with a top 23, walls 22 forming the sides of the tray which are extended by edges 21 more or less at right angles to the walls 22. The edges 21 form an approximately flat peripheral portion. The edges 21 thus delimit a passage 24 when the sealing means is

absent. The edges have first opposed lateral edges 210a, 210b, arranged in the longitudinal direction I and second transverse edges, namely a front edge 211a and a rear edge 211b.

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The opening of the container is covered by a sealing means 25 which forms the bottom of the refill and closes the passage 24 so that in this configuration, the mass of foodstuff constituting the refill can rest
10 directly on the sealing means 25. The assembly formed by the container and the sealing means defines a hermetically enclosed space 26. The term "hermetically" means that the passage is selective to at least one element chosen from: water, water vapour and oxygen.

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The edges 21 of the container extend around the perimeter of the container forming an approximately flat base more or less inscribed in a plane P, or sealing plane, so as to encourage both sealing of the
20 sealing means 25 and the resting, stability and guidance of the refill in the device as will be explained in greater detail later.

As a preference, the sealing means is a flexible film
25 sealed onto the edges 21 of the container, forming a closed continuous peripheral line 27. It is advantageous to provide a sealing means in the form of a heat-sealed film along the peripheral edges of the container. The film is preferably chosen from tear-
30 resistant film or, in any case, films which have a resistance to tearing greater than the resistance to delamination of the sealing line when a force F is applied in a longitudinal direction parallel to the sealing plane P as illustrated in Figure 3.

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The sealing means 25 is secured to a detachment means 3. For that, the sealing means comprises, outside of the sealing zone defined by the line 27 and at the front of the refill, a portion 250 which is folded or

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bent back onto a sealed portion at the front of the sealing means.

5 The detachment means 3 is mounted slidably with respect to the opposed longitudinal edges 210a, 210b. It preferably consists of a component which is somewhat rigid or semi-rigid with respect to the sealing film. The detachment means has an internal contact surface 30 to which the sealing film adheres by bonding, fusion, 10 welding or any other means. On its external face 31, the detachment means comprises mechanical catching means 4 intended to collaborate in abutment with retaining elements belonging to the device as will be explained later on. The detachment means 3 finally has 15 sliding means 33, 34, preferably forming lateral ends which are curved in the direction of the edges of the container when the portion is in the position in which it is folded back onto the sealing means. These sliding means 33, 34 provide the connection between the 20 detachment means and the sliding edges 210a, 210b of the container. More particularly, they allow the detachment means to slide in a plane parallel to the sealing plane P and in the longitudinal direction I which corresponds to the direction of engagement of the 25 refill in the device. Likewise, they provide certain resistance to disengagement in the direction O; that is to say in the direction normal to the plane of sealing P.

30 When the detachment means is moved in the direction F as indicted in Figure 3, the slideway means prevent any sideways movement of the detachment means with respect to the longitudinal direction I, and this has the effect of distributing the delamination forces almost 35 identically on each side of the lateral edges 210a, 210b. The result of the forces being balanced in this way is that delamination occurs simultaneously along each edge and therefore engenders a lower risk of the sealing means becoming torn.

Figures 4 to 6 show a configuration of the refill when the detachment means is deployed forming a part extending beyond the container. A configuration such as this corresponds to a configuration for the mounting of the refill. The detachment means 3 is secured to the sealing means by the portion 250 which has at least one fold zone (or even a simple line) 250a adjacent to the front edge 211a of the container. The detachment means is set in place by folding the free part 250 back at the fold zone. To do that, the connecting means 33, 34 have to be flexible enough to be able to move apart beyond the distance D corresponding to the width of the edges 210a, 210b from their initial dimension d. Engagement is therefore achieved by exerting sufficient force on the two sides of the detachment means against the lateral edges so as to cause the curved portions to part, as by manual clipping, for example.

As Figure 4 shows, the front edge 211a of the container comprises a sealing portion 270 which is subjected to the delamination forces right at the start of the cycle of introducing the refill. As a preference, provision is made for this portion to have a non-linear shape with an apex 271 pointing forwards and in the direction of the free portion and situated more or less in alignment with the longitudinal axis I. A configuration such as this of the front portion 270 makes it possible to offer lower resistance to delamination at the time of starting the delamination by comparison with a portion that was linear and transverse to the longitudinal axis I. The portion may adopt different shapes, such as the shape of an inverted V or U, or some other shape.

Figures 7 to 12 show the refill as it is being introduced into a supply zone 6 of a metering and/or dispensing device 1 designed for this purpose. One of the particular features of the invention lies in the

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fact that the detachment means has mechanical catching means 4 formed of at least one abutment zone extending transversely to the longitudinal direction of the refill corresponding to the direction of engagement (Fig. 8). In the example illustrated, the mechanical catching means comprise projecting portions 40 intended to bear transversely against a complementary edge 140 delimiting the entry to a housing 14 of the supply zone 6 of the device. The housing 14 has an upper edge 142 which, with the lower edge 140, defines a height H which, given the dimensional tolerances, allows the refill 2 to be engaged in sliding with the exception of the detachment means 3 which is kept outside the housing because of the collaboration in abutment between the projecting portions 40 and the lower edge 140. Thus, the height H is designed to be slightly greater, to within the tolerances, than the height H_0 of the refill comprising the edges and the loop portion 250 of the sealing film that forms a double thickness of film as shown in Figure 9, but less than the height H_1 including the overall height of the refill including the thickness of the mechanical catching means.

Advantageously, the sliding means 33, 34 may also form catching means in engagement with lateral edges 143, 144 of the housing belonging to the device. Thus, all that is required is to ensure that the width L_1 of the detachment means exceeds the width L of the housing (width separating the edges 143, 144) and that the width L_0 separating the sliding edges of the refill is less than the width L of the housing. Such an arrangement has the advantage of concentrating the forces along the sides of the refill; that is to say near the lateral sealing lines, thus encouraging delamination without the risk of rupturing the film.

As shown in Figures 10 to 12, installing a refill 2 causing unloading is particularly simple and quick because it consists in arranging the refill at the

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entry to the housing, offering up the front edge of the
refill comprising the detachment means in the position
in which it is folded back onto the sealing surface (in
the configuration according to Figure 1), and applying
5 the catching means 4 facing the corresponding edge 140
of the housing, then in exerting sufficient force in
the longitudinal direction of the refill to push it
into the housing, delamination of the sealing means
thus occurring along the edges of the refill. It should
10 be noted that as delamination occurs, the foodstuff is
released under gravity into the supply zone of the
device, towards a metering system 5, for example,
without it being possible for there to be a risk of
spillage outside the device. The sealing means or film
15 thus forms a folded-back portion 250, the length of
which increases as the refill is introduced into the
housing. Because the film is folded back in the form of
a loop, the length of the folded-back portion
approximately corresponds to half the length of the
20 refill engaged in the housing so that when the
container is fully introduced into the housing, the
passage 24 of the container is approximately half
uncovered. At this moment, complete delamination until
such time as the sealing means or film is separated
25 from the container is obtained by pulling the
detachment means manually as shown in Figure 12.

A device for dispensing beverages or sauces designed to
accommodate such a refill is described in detail in
30 application EP 1 028 068 A1. Reference can be made
thereto in order to understand, by way of example, the
general principle of operation of such a device.

According to one feature of the invention, the sealing
35 means is preferably a flexible film made of a material
resistant to tearing and to moisture. This may be
either a single-layer or multi-layer plastic film,
possibly metallized, or a laminate consisting of a
layer of aluminium internally lined with one or more

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layers of thermally fusible plastic. In the case of soluble coffee, for example, a metallized plastic film is preferred as this confers properties of impermeability to vapour and to gases. Plastic films are generally metallized by condensing aluminium or other metal vapours onto the surface of the film under vacuum. The operation is carried out in a sealed chamber where a very strong vacuum is created. The metallization layer is very thin, of the order of 300 angström. It may be covered with a protective lacquer or with complexing with another film bonded onto the metal side. In any event, the film, metallized or otherwise, will have an internal layer capable of forming a sealing line when pressure and heat are applied to the edges of the container so as to form a heat-sealed line.

As to the container, it may have varying shapes and consist of one or more separate parts assembled. However, preference is given to a solution in the form of an elongate tray made of one single piece including the sealing edges.

The refill may be based on plastic used in a forming process chosen from the following: thermoforming, injection, extrusion-blow-moulding. The material or materials forming the container may be chosen from various plastics belonging to the group consisting of: polypropylene (PP), polyethylene, polystyrene, PVC, cellulose acetate, EVOH, polyester and polyamides. The container may be a single layer or a multi-layer. It may comprise specific barrier films with low permeability which are impermeable with respect to water vapour and/or oxygen. It may also comprise films having improved welding properties to improve the welding of the edges.

The following various solutions may be given by way of preferred examples:

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The container 20 and the detachment means 3 are formed by one-piece injection moulding as illustrated in Figure 13 and are then separated by cutting or rupturing lines 220 as lines of weakness, for example, formed between the two parts. An opening 221 may be provided between the two parts so as to limit the length of the cutting or rupture lines. A sealing film may be sealed prior to separation of the detachment means and of the container. Preference is given to a material of the PP type, which has good permeability to water vapour, good weldability and is relatively inexpensive. By contrast, polypropylene alone is relatively porous to oxygen and is not suited to food products which are sensitive to oxidation, such as powdered milk. A solution such as this is also economical because just one mould is used to manufacture two parts that can be separated by breaking or cutting.

In one possible alternative form, the container is formed by thermoforming a single layer such as one made of PP or a multi-layer such as one made of PP/EVOH/PP. The slideway is formed by injection-moulding of PP or some other appropriate plastic such as polystyrene, polyethylene, etc. Thermoforming the container has the advantage of being economical and of being able to produce a container based on multi-layer plastic sheets incorporating one or more barrier layers such as EVOH which is a barrier to oxygen. Thermoforming does not, however, make it possible to obtain a single part comprising the container and the detachment means in as much as the latter has fold or deformation zones in the opposite direction to the direction of forming (in this case, portions bent upwards whereas the forming of the tray is downwards).

In yet another alternative form, the container and the detachment means are formed separately by injection

moulding a plastic such as PP. The advantage of injection moulding the container by comparison with thermoforming, stems from the possibility of injecting edges precisely and to the desired shapes without forming off-cuts. It is also suited to stiffening the container and preventing it from warping once the film has been sealed. The appearance is also improved.

Figures 14 to 15 illustrate an alternative form of the invention, in which the refill 2 comprises a container formed of a flexible pouch 28 and of a relatively more rigid end piece 29 which is attached to the flexible pouch by appropriate connecting means 280 such as welding, adhesion by adhesive, or the like. The end piece is equipped at its base with sealing edges, in a similar way to what was described earlier, on which a detachment means 3 capable of sliding along the lateral edges 210a, 210b is mounted. Figure 15 shows the base of the end piece in engagement with a guide means belonging to the housing of the device in which the refill is intended to be lodged. The guide means is formed of a lower edge 140, of lateral edges 143, 144 and of upper edges 142a, 142b, all this forming a rail intended to guide the lateral edges 210a, 210b of the end piece along a guide plane P of the supply zone. The dimensions of the guide means are designed to be smaller than the dimensions of the detachment means 3 so that introducing the end piece into the guide means causes the detachment means to stop at the entry to the guide means and therefore causes the sealing film covering the opening of the container to delaminate. A refill in the form of a flexible pouch and of a sealed end piece and a device intended to receive such a refill are described in detail in Patent Application US/SN 09/518661, the content of which is incorporated into the current application by reference.

The refill of the invention is suited to storing foodstuffs used to refill various types of devices for

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dispensing, preparing and/or metering food products prepared from these foodstuffs. The foodstuffs envisaged are essentially powdered substances involved in making beverages. Such substances are preferably
5 chosen from roasted ground coffee, soluble instant coffee, tea, milk, chocolate, chicory, plants or vegetables and natural or artificial flavourings and mixtures of these products in any proportions.

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Claims

1. Foodstuff refill (2) intended to be inserted in a foodstuff supply zone of a device for metering, dispensing and/or preparing food products; the refill comprising a container (20) for containing a quantity of foodstuff; a passage (24) for releasing the foodstuff; edges (21) of the device, including at least one pair of first opposed edges (210a, 210b), a means (25) of sealing the passage to form an enclosed space (26); a means (3) of detaching the sealing means; the said detachment means comprising at least one catching means (4) intended to engage over a retaining means of the device when the refill is being engaged in the device; characterized in that the detachment means (3) is secured to the sealing means (25); the detachment means (3) being able to be connected to the refill in such a way as to be movable in sliding along the said first edges and cause the at least partial opening of the sealing means (25) in response to the engagement of the refill in the device.

2. Refill according to Claim 1, characterized in that the catching means (4) associated with the detachment means is arranged in such a way as to form at least one abutment zone extending transversely with respect to the longitudinal direction (I) of the refill corresponding to the direction in which the refill is engaged in the device.

3. Refill according to Claim 1, characterized in that the detachment means (3) comprises means (33, 34) of connection with the opposed edges (210a, 210b) which are flexible so that the detachment means can be arranged between a disengaged position and a connection position in which a portion (250) of the sealing means is folded back, thus forming the position of engagement in sliding along the opposed edges (210a, 210b).

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4. Refill according to Claim 3, characterized in that the connecting means (33, 34) comprise curved ends of the detachment means (3), allowing folding in the position of engagement along the edges (210a, 210b) by elastic deformation when a force is applied to the said ends.
5. Refill according to Claim 3, characterized in that it comprises a pair of second opposed edges (211a, 211b), and in that the sealing means is a flexible film assembled on the first and second edges (21, 210a, 210b, 211a, 211b) of the refill by a sealing line (27) so that the sealing means is detached by delaminating at least a portion of the sealing line on the first and second edges of the container.
6. Refill according to Claim 5, characterized in that the second edges comprise a front edge (211a) adjacent to the free portion of the sealing means which is equipped with a sealing portion of non-linear shape forming an apex pointing towards the free portion.
7. Refill according to Claim 6, characterized in that the said sealing portion is approximately in the shape of an inverted V or U.
8. Refill according to any one of the preceding claims, characterized in that the container has the shape of an elongate tray and in that the edges form an integral part of the tray.
9. Refill according to any one of Claims 1 to 7, characterized in that the container comprises a flexible pouch (28) extended by a more or less rigid end piece (29) comprising the sealing edges (210a, 210b).
10. Assembly comprising a device for metering, dispensing and/or preparing beverages (1) comprising a

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supply zone (6) and at least one foodstuff refill (2) intended to take up position in the said zone (6); the refill comprising a container (20) containing the foodstuff and a film (25) capable of forming the bottom
5 of the refill, the film (25) being assembled on the edges (21) of the container in such a way that it can be delaminated, the film being secured to a detachment means (3); the said detachment means comprising at least one mechanical catching means (4, 40, 33, 34);
10 the supply zone (6) comprising a housing (14) for accommodating the refill (2) and at least one retaining means (140, 142, 142a, 142b, 143, 144) which collaborates with the singular or plural catching means (4, 40, 33, 34) at the time of introduction of the
15 refill into the housing; characterized in that the detachment means (3) comprises means (33, 34) allowing the connection of the detachment means (3) slidably with respect to the refill, and in that the detachment means is capable of sliding in such a way that the
20 introduction movement causes the at least partial delamination of the film (25) and releases the foodstuff into the supply zone (6).

**FOODSTUFF REFILL AND DEVICE INTENDED TO ACCOMMODATE
SUCH A REFILL**ABSTRACT

The invention relates to a foodstuff refill (2) intended to be inserted in a foodstuff supply zone of a device for metering, dispensing and/or preparing food products; the refill comprising a container (20) for the foodstuff; a passage (24) for releasing the foodstuff; edges (21) of the device, including at least one pair of first opposed edges (210a, 210b), a means (25) of sealing the passage to form an enclosed space (26); a means (3) of detaching the sealing means; the said detachment means comprising at least one catching means (4) intended to engage over a retaining means of the device when the refill is being engaged in the device; characterized in that the detachment means (3) is secured to the sealing means (25); the detachment means (3) being able to be connected to the refill in such a way as to be movable in sliding along the said first edges (210a, 210b) and cause the at least partial opening of the sealing means (25) in response to the engagement of the refill in the device.

FIGURE 1