The invention concerns a device, such as a box, for storing and dispensing in single-units objects in the form of sheets, wafers, thin strips or platelets, with planar geometry in particular square, rectangular, polygonal, circular, elliptical, enabling said objects to be dispensed individually in single units, comprising: a) storage means such as a container with a lid, containing the objects to be dispensed; stored stacked on one another on a storage surface; said storage means including a surface for guiding the objects to be dispensed and a dispensing opening enabling the objects to be dispensed individually in single units; b) dispensing means bade of a flexible, deformable, mobile driving element, having one of its ends in contact with the object to be driven, along at least one transverse tangential contact line, and whereof the longitudinal cross-section is S- or nearly U-shaped.
DEVELOPMENT FOR STORING AND DISPENSING IN SINGLE UNITS OBJECTS IN THE FORM OF SHEETS OR THIN STRIPS

FIELD OF THE INVENTION

The invention relates to a device for storing and dispensing in single units singularized objects ranging from rigid to flexible, objects in the form of sheets, small plates, thin strips or bands, and the container for singularized objects equipped with such a dispensing device.

Numerous objects in the form of sheets, small plates, thin strips or bands are used as consumables. In particular, such objects are test "strips" in the form of rigid strips or bands used, for example, in the medical field for diagnostic or monitoring purposes. Other relatively flexible objects to be dispensed, having a square or rectangular shape, can also be in the form of a thin sheet, either alone or along with their protective packaging, e.g., bandages, transdermal patches or food products such as chewing gum or the like.

For obvious reasons, hygiene in particular, but also to prevent any degradation and to thus improve the shelf life of the objects, the latter are placed away from outside pollution and/or physicochemical attacks resulting from the level of relative humidity, from light, in particular from UV rays, and other chemical substances, or else degradation due to a mechanical effect.

Likewise for reasons of hygiene, preservation and protection, numerous storage and dispensing devices have been devised in order to enable one-by-one dispensing of objects in the form of sheets, small plates, thin strips or bands, so as to dispense the exact number of objects required and to thereby prevent any contamination due to an involuntary discharge of objects.

When these objects are already prepackaged, the only function to be fulfilled by these storage and dispensing devices is that of containing a specific number of objects and of being capable of dispensing them one at a time without having to open a box constituting the most conventional form of packaging.

Such object-dispensing devices must be simple, inexpensive to produce and easy to use.

Prior art

Numerous devices for storing and dispensing objects having a substantially flat shape are described in technical literature, in particular in that consisting of published patent applications and/or patents.

The simplest of systems for storing and dispensing, which are specifically adapted to sheets or thin bands, operates by combining pressure exerted on the stock of stacked sheets, from the bottom to the top, and by partial opening of a lid, releasing a portion of the sheets to be extracted, extraction of the sheets, one-by-one, being performed manually by one of the user's fingers, which causes the top sheet to slide onto the pack of sheets located in the dispensing device.

Such a device increases the risk of contamination. When grasping on to a sheet or, for example, a test strip, the user's fingers come into contact with this strip or with the immediately adjacent strip, at the risk of degrading or contaminating the active surfaces of these sheets or strips by external pollution.

According to a first document of the prior art (U.S. Pat. No. 4,240,564) a device is described for storing and dispensing leaves of soap in single units.

The storage and dispensing device appears to be composed of a container, a lid with a dispensing slot, a spring device, making it possible to hold the leaves stacked one on top of the other in a position bearing against the lower face of the lid, an ejection system coming to bear against the leaf of soap to be dispensed and actuated by a pushbutton located on the upper face of the lid.

Each leaf is partially translated towards the exterior of the container by means of the ejection system, so as to enable it to be grasped by the user.

This dispensing device has numerous technical drawbacks, one of which, for example, is the fact that it seems incapable of dispensing objects in the form of very thin and/or flexible sheets; because, in this case, several sheets can be pushed out of the container simultaneously.

Furthermore, this device is also complex and relatively costly to produce because it requires the use of a device for extracting the leaves by means of a sliding system, which is equipped with a sliding blade of small thickness, pressing on the leaf to be dispensed, with a spring system for holding the leaves in a position bearing against one another, and with a lid having complex kinematics.

Finally, if several leaves are extracted simultaneously, without being able to control the number thereof, there is some risk of damaging them when they are reintegrated into the container, making the dispensing system even more random.

None of the devices derived from or similar to those of the prior art provide satisfactory results, because these devices do not make it possible to control the number of sheet objects extracted from the container when they are of a very fine thickness. Furthermore, such devices do not make it possible to guarantee the absence of pollution or soiling of sheets extracted unexpectedly and then reintroduced into the container, because, due to their excess number they are unused, thereby deteriorating the quality of the stored sheets.

Another document (FR 2 709 475) describes a card dispenser the card discharge of which is carried out by means of a push-type pin, sliding into a longitudinal opening of the dispenser lid. Said push-type pin is integral with a blade having an elastic memory effect, which is in a near linear position, with an almost infinite radius of curvature when the stack of cards is at its maximum, and which takes the shape of an arc of circle with an increasingly shorter radius of curvature and oriented towards the bottom of the receptacle, when the stack of cards disappears. The end of this blade is provided with an end-piece having a high friction coefficient, and being in contact with the stack of cards.

Thus, the plate equipped with an end-piece having a high coefficient of friction is composed of two materials, and has a relatively pronounced arc of circle shape depending on the thickness of the stack of cards.

Another document (GB 2 210 603) describes a card dispenser, the discharging of which is carried out by means of a flexible movable drive element, which is composed of a spring-blade and a rubber end-piece, integral with said blade. This flexible movable drive element is actuated by a movable pin sliding in a guide opening of the lid, in a horizontal longitudinal motion. Said spring-blade and the rubber end-piece to which it is joined both bear against the stack of cards, and ensure the extraction of one card on demand.
It can be made noticed that the flexible movable drive element is made from two materials, one of which is rubber. The flexible movable drive element, namely the spring-blade associated with a rubber end-piece, is in a straight position between the stack of cards and the inside face of the lid, the curvature of the spring-blade being pointed in the direction opposite the discharge direction of the cards.

Another document (WO 2004/024593) describes a dispenser for thin sheets, the extraction of which, in single units, is carried out by means of an ejector, formed by a longitudinally movable lid, a flexible portion in the form of a hollow half-sphere integral with said movable lid, and an appendage inside of and integral with said hollow half-sphere. In order to cause a sheet to be dispensed, the user acts by pressing on the ejector, the hollow half-sphere of which, under action of this pressure, is crushed and pushes the appendage out vertically. The downstream end of this appendage comes into contact with the stack of sheets, is deformed thereon, taking an "L" shape in the direction of discharge, thereby pulling along a sheet, owing to the translational movement of the lid, which simultaneously closes the container again.

Originally vertical, it appears that the movable drive element is not in permanent contact with the object being pulled along, that it takes the shape of the letter "L," as soon as it is in contact with said object, and that it requires two simultaneous movements in order to extract the sheet, one vertical and the other horizontal.

Finally, a last document (U.S. Pat. No. 3,517,855) describes a complex dispensing system implementing multiple assembled mechanical parts. A vertically downward movement of a pushbutton is transformed into a horizontal movement, owing to a rack and pinion system. A spring enables the backward return of the pushbutton by exercising a spring force in the upward vertical direction. In this document, it is a matter of a complex mechanical system and not a deformable movable element.

Thus, the prior art reveals that the flexible movable drive element can either be made of several types of materials, or consist of a complex mechanical system. But, these object-dispensing devices appear to be complex in design, expensive to produce, and difficult to handle when the sheets being extracted are of a small thickness and flexible.

**OBJECT OF THE INVENTION**

The problem is to produce a device for dispensing objects in the form of sheets, small plates, strips or thin bands, which can be rigid as well as semi-rigid to flexible, having a planar geometry, in particular substantially square, rectangular, polygonal, circular or elliptical, which makes it possible not only to dispense these objects one-by-one, but also to resolve all or some of the previously stated drawbacks.

As a matter of fact, such objects, by reason of their geometry (small thickness) and their mechanical properties (modulus of rigidity) cannot be dispensed by the devices described in the prior art, i.e., by devices pushing such objects via the rear section in order to ensure the movement thereof.

By small thickness, it is understood to mean objects the thickness of which is less than 2 mm, preferably less than 1 mm and very preferably less than 0.5 mm.

These objects are in the form of a stack arranged inside a storage container and have the ability to slide over one another. They have a static friction coefficient, which is constant and known and of a relatively low value, between the upper surface of one and the lower surface of the other, which is immediately adjacent to it.

By static friction coefficient it is understood to mean the force initially measured for horizontally moving a body of a given weight, which is coated with a particular surface, over another surface, whereas the dynamic friction coefficient corresponds to the measurement of this same force when the sliding movement is initiated. These coefficients vary on the basis of the types of material and the surface states, but also on the basis of temperatures, the time during which the two materials were in contact and the pressure exerted by the moving body on the planar sliding surface. The dynamic friction coefficient is generally lower than the static friction coefficient.

Such a dispensing device can be designed to be able to be operated with a single hand, thereby facilitating its operation, the other hand being free to ensure grasping of the dispensed object. However, in the case where a child safety device might be present, this arrangement does not apply, because both hands are required for the operation.

**SUMMARY OF THE INVENTION**

Consequently, the invention relates to a box-type storage and dispensing device for objects in the form of sheets, small plates, strips or thin bands which can be rigid as well as semi-rigid to flexible, having a planar geometry, in particular substantially square, rectangular, polygonal, circular or elliptical, making it possible to dispense said objects to be dispensed one-by-one, comprising:

a container-type storage means with a lid, containing the objects to be dispensed, stored stacked atop one another on a storage surface, said storage means including a surface for guiding the objects to be dispensed and a dispensing opening enabling the objects being dispensed to pass through one-by-one,

and a dispensing means, characterized in that said dispensing means consists of a flexible, deformable and moveable drive element, one of the ends of which is in contact with the object being driven, along at least one tangential transverse line of contact in relation to the longitudinal axis of discharge of the object, and the longitudinal cross section of which is "S" shaped or nearly "U" shaped.

Another object of the invention is the use of the storage and dispensing device for dispensing objects in the form of sheets, small plates, strips or thin bands, such as test "strips" in the form of rigid strips or bands used, for example, in the medical field for diagnostic or monitoring purposes, or for square or rectangular objects to be dispensed, also possibly in the form of a thin sheet, either alone or along with their protective packaging, in particular bandages, transdermal patches, or food products, in particular chewing gum or the like. Thus, this object-dispensing device is used for separating and dispensing one-by-one a stock of objects to be dispensed which are stored stacked, awaiting use and protected from the outside environment.

The container-type storage means, hereinafter designated as a container, comprises a bottom formed by the combination of two contiguous surfaces, one being the storage surface and the other being the guide surface.

The storage surface, consisting of a supporting surface on which the objects to be dispensed are stacked, is generally planar surface which can be inclined, then forming
an acute angle with the plane formed by the lid when extended in the direction of the dispensing opening or parallel to the plane of the lid; the storage surface is contiguous with the guide surface. This storage surface is preferably inclined so as to pre-orient the objects to be dispensed in relation to the guide surface.

[0037] The guide surface is preferably a developable curvilinear surface, constituting a discharge ramp ending at the dispensing opening, and is more particularly a cylinder segment whose plane of tangency at the connection of the guide surface with the dispensing opening forms an angle with the plane formed by the lid at the opening, of between 10° and 90° and preferably between 45° and 60°.

[0038] The guide surface can also consist of one or more planes inclined in relation to the plane formed by the lid at the dispensing opening, so as to form a hopper making it possible to guide the object being dispensed. When the guide surface forms a single dihedral having a sharp edge consisting of the dispensing slot, the angle of inclination of the guide surface in relation to the plane formed by the lid and passing through the dispensing slot is then generally between 20° and 60° and preferably 45°.

[0039] The guide surfaces can have any other shapes enabling the function of guiding the objects in the direction of the dispensing slot.

[0040] In order to promote the guide function, the guide surfaces are preferably made of rigid materials which enable easy sliding of the objects being dispensed. The guide surfaces for the objects being dispensed can also be treated, e.g., by gritting, so that the coefficient of friction measured between the lower surface of the object being dispensed and the inner face of the container also makes it possible for the last object being dispensed to slide over the inside surface of the container.

[0041] The container also comprises two substantially parallel vertical walls making it possible to partially close the container and to position the objects to be dispensed laterally. The container also comprises a third vertical wall substantially perpendicular to the two lateral walls, depending on aesthetic considerations for the container-dispenser, which is positioned on the side opposite the dispensing opening against which the objects to be dispensed come to bear via their edge.

[0042] According to another embodiment, the two walls making it possible to partially close the container and to position the objects to be dispensed laterally are converging.

[0043] Furthermore, the third wall, which is perpendicular to the two lateral walls, can either form a right angle with the plane of the lid, or form an acute or obtuse angle with the plane of the lid.

[0044] Such a container will advantageously be produced by any injection or thermoforming technique, from thermoplastic materials having a certain degree of rigidity.

[0045] The container is closed at its upper portion by a lid:

[0046] which can be fixed and is then equipped with a slide slot so as to enable the flexible, deformable, movable drive element of the object to be dispensed to be moved in translation inside of this guide opening.

[0047] which can be movable in rotation or in translation in relation to the container.

[0048] In the case where the lid is movable in rotation, it can be hinged completely or partially along an axis positioned on the container.

[0049] When the lid is hinged completely, the axis of rotation, for example of the integral hinge-type, can be placed at one of the ends of the container, on the side of the dispensing opening.

[0050] When the lid is partially hinged, i.e., a portion of the lid is fixed in relation to the container, and the other portion rotates in relation to this container, the axis of rotation, for example of the integral hinge-type, can be placed at a location between the two ends of the lid.

[0051] In the case of a lid movable in rotation, the object to be extracted from the container can be extracted at one or the other of the ends of said container.

[0052] A system for returning the movable part of the lid in rotation may be present in the form of an appropriate means such as, for example, a spring or a deformable integrated strip or others.

[0053] When the lid is movable in translation, it may possibly comprise a protrusion on its upper end surface, enabling the user to slide the lid in relation to the container.

[0054] A system, such as for example a return spring, for returning the movable in translation lid to its initial position, may possibly be present between the lid and the container.

[0055] The lid, whether it be fixed or movable, may possibly comprise a rib on its inside face, so as to hold the flexible, deformable, movable drive element in contact with the upper face of the object to be dispensed. The flexible, deformable, movable drive element may also be permanently held in contact with the upper face of the object to be dispensed owing to its own weight, in particular in the absence of a rib.

[0056] In the case of a fixed lid, the lid may be assembled onto the container by any of the assembly techniques, such as by snapping on or by any other assembly means, e.g., a weld seam. In the case of a movable lid, the fast assembly means, such as snapping on or the like, is associated with a system for guiding in relation to the container.

[0057] A system for snapping on and sliding along tracks with a stop limit device makes it possible to firmly fasten the lid and the container together without thereby restricting the ability of the lid to translate on the container.

[0058] The lid is preferably made of an injection-molded or thermoformed rigid polymer material.

[0059] Desirable polymer materials for producing the container and the lid are generally and not exclusively selected from the group of materials consisting of thermoplastic polymers, including, in particular, polyolefins such as polyethylene, polypropylene, ethylene/propylene copolymers and their mixtures, polyamides (PA), polystyrenes (PS), acrylonitrile-butadiene-styrene (ABS) copolymers, styrene-acrylonitrile (SAN) copolymers, polymethyl methacrylates (PMMA), polyethylene terephthalates (PET), polybutylene terephthalates (PBT), polycetals (POM), polyvinyl chlorides (PVC), polycarbonates (PC).

[0060] The container and the lid may also accommodate, between said container and said lid, an indicator of the container having been opened prior to the first opening. This tamperproof means or else tamperproof seal, consists, for example, of micro-ties joining all or a portion of the lower peripheral surface of the lid to all or a portion of the upper peripheral surface of, for example, a ring or collar or any anchoring system fastening the lid onto the container. These micro-ties are micro-points of connection, separate from one another, but which form a periphery or a single toothed connecting area between the movable lid and the ring or collar or
system fastening the lid to the container or between the flexible movable drive element and the container or the integral lid.

[0061] These micro-points are broken during the first opening via application of a tearing force exerted in the horizontal direction on the lid or on the flexible, deformable, movable drive element.

[0062] The flexible, deformable, movable drive element is made of at least one flexible material and is capable of bending without permanent deformation. It may have an “S” or near “U” shape when viewed as a longitudinal cross section. It may have various shapes such as, for example:

[0063] that of a finger having a circular, elliptical or polygonal cross section, the downstream end of which being provided with a transverse bar perpendicular to its longitudinal axis,

[0064] or that of a thin blade.

The length of said transverse bar or the width of said thin blade can be at most equal to that of the container.

[0065] When the flexible, deformable, movable drive element is a thin blade, the width of the thin blade can be constant over the entire length of the flexible element or else have an even or uneven narrowing.

[0066] The shapes of the flexible element are preferably rectangular, triangular, or “T” shaped.

[0067] When the flexible element is a rectangle, its width providing the transverse tangential contact is at most equal to a value very slightly lower than the width L of the container.

[0068] When the flexible element is a triangle, the large base of the triangle at least forms the transverse tangential line of contact with the object to be extracted.

[0069] When the flexible element has the shape of the letter “T”, the transverse bar of the “T” at least forms the transverse tangential line of contact with the object to be dispensed, and this bar has a length at most equal to a value very slightly lower than the width L of the container.

[0070] This flexible, deformable, movable drive element has the characteristic of being in permanent contact with the object to be driven, during the movement along at least one transverse tangential line of contact in relation to the longitudinal axis of discharge of said object, and of thereby having the ability to translate the object to be dispensed, while continuing to bear against its surface.

[0071] According to the invention, the transverse tangential contact in relation to the longitudinal axis of discharge of the object may be extended to a contact surface with the object to be dispensed, according to the “surface-to-surface” mode.

[0072] Thus, the transverse tangential line of contact or the “surface-to-surface” type transverse tangential contact surface with the object to be dispensed, in relation to the longitudinal axis of discharge of the object, have a length of between 0.25 times the length L of the container and a length very slightly less than the width L of the container. Said length is preferably between 0.6 L. and 1 L.

[0073] The surface of the flexible, deformable, movable drive element also has the characteristic of having a static friction coefficient, when determined with respect to the upper face of the object to be driven, which is greater than the static friction coefficient existing between the two opposing surfaces of the two contiguous objects (a) and (n–1) to be dispensed. It may or may not be integral with the lid, depending on whether the latter is movable or not, i.e., the flexible, deformable, movable drive element is integral with the lid when said lid is movable and is independent from the lid when said lid is fixed.

[0074] In the case of a lid movable in rotation in relation to the container, the flexible, deformable, movable drive element is integral with the movable portion of the lid.

[0075] In the case of a lid movable in translation in relation to the container, the flexible, deformable, movable drive element is integral with the movable lid.

[0076] When the flexible, deformable, movable drive element is independent from the lid, it is then equipped with a shoe sliding inside the opening of the fixed lid, the shoe being moved manually via a back-and-forth movement of the user’s finger.

[0077] The flexible, deformable, movable drive element may be made from at least one material coming from the group of materials having characteristics peculiar to elastomeric compositions, i.e., having a modulus of rigidity close to those of elastomers, an ability to recover its initial shape without hysteresis, a coefficient of friction greater than that generally obtained on rigid thermoplastics, and a “Shore” hardness also less than those considered for rigid thermoplastics.

[0078] The flexible, deformable, movable drive element may be a mono-material, i.e., formed from a single formulated elastomeric thermoplastic material, in the form of a suitable composition, in terms of mechanical properties and coefficient of friction properties, using at least one thermoplastic elastomer and another rigid thermoplastic compound, preferably of the olefinic type or may be multi-material, i.e., including a core made of one type of material and a skin made of another type of elastomeric-type material, so as to separate the mechanical properties from the surface properties, and thus be capable of possibly being obtained via other techniques such as coating. The areas made of elastic materials may then be formed from at least one thermoplastic elastomer of natural or synthetic origin. The elastomer or elastomers used may be selected preferably from the group consisting of elastomers of the natural rubber type, synthetic rubber, in particular mono-olefin rubbers, e.g., such as isobutylene/isoprene polymers, ethylene-vinyl acetate (EVA), ethylene propylene (EPR), ethylene-propylene-diene (EPDM), ethylene-acrylic esters (EAA), fluoro-polymers, diene rubbers, e.g., such as polybutadiene, styrene-butadiene rubber copolymers (SBR), condensation product-based rubbers, e.g., such as polyester and polyurethane thermoplastic rubbers, silicones, styrene rubbers, such as styrene-butadiene-styrene (SBS), styrene-isoprene-styrene (SIS), styrene-ethylene-butadiene-styrene (SEBS) and other block copolymers, used alone or in a mixture, formulated or not.

[0079] The mode of production may also be that of the injection molding of thermoplastics or the extrusion and cutting out of a sheet via any extrusion or calendaring technique.

[0080] However, and in one preferred embodiment, when the flexible, deformable, movable drive element is integral with the movable lid, it is then preferable to consider the bi-material injection molding techniques for producing, in a single operation, the assembly consisting of the flexible, deformable, movable drive element and the lid. The lid is then made of a rigid thermoplastic material, and the flexible movable drive element of a composition formulated from thermoplastic elastomers combined with polyolefins, for example.

[0081] When the flexible, deformable, movable drive element is independent from the fixed lid and has a guide shoe,
then the shoe is made of a rigid material and a part such as this is obtained via bi-material injection molding; it may also be made of a mono-material formulated so as to obtain a compromise between the need to slide the shoe inside its groove and the need for a suitable coefficient of friction with respect to the object to be dispensed, which it must drive along.

[0082] The dispensing opening enabling the objects to be dispensed to pass through one-by-one is preferably a slot-type opening the edges of which form open lips, possibly having the ability of being concealed by a flexible flap, for the purpose of making the entire device reasonably tight, without requiring a high pressing force in order to open it.

[0083] The geometry of the lips of the dispensing opening may be such that it promotes the discharge of the object to be dispensed, i.e., that it is in the form of a chamfer, a bevel or an offset of one of the lips in relation to the other.

[0084] The dispensing opening preferably has a slot shape, with dimensions that enable the passage of a single object at a time. However, when the lid is pulled back in order to then be closed again, the dispensing opening may be formed by this gap between the container and lid in the process of being closed. When the dispensing opening is of the slot type, its width and its thickness are generally slightly greater than the width and the thickness of the object to be dispensed.

[0085] The slot-shaped opening can be an integral part of the container, an integral part of the lid or be formed at the intersection of the two portions of the container-dispenser, container and lid, during the assembly thereof.

[0086] When a flexible flap of small thickness conceals the dispensing slot, the flexible flap will advantageously be formed from molded elastomeric materials, via bi-material injection molding techniques, at the same time as may be the flexible, deformable, movable drive element.

[0087] A child safety opening system may possibly be associated with the device for storing and dispensing objects in single units.

[0088] Said child safety opening for making the lid closure difficult or even impossible for children to open, may be installed plumb over the lid. This device may be a pushbutton forming an integral part of the lid and making it possible, by combining a sustained vertical pressure and a simultaneous translational movement, to unlock the safety system and to ensure operation of the dispenser. The pushbutton is in perfect alignment with the lid when said button is in locked position, and is slightly protruding in relation to the upper end surface of the lid when it is in unlocked position.

[0089] In the case where a child safety opening system is present, the user unlocks it by exerting vertical pressure on the pushbutton. The system can also comprise separable micro-points indicating a first opening, which are positioned between the pushbutton and its housing.

[0090] Products particularly sensitive to ambient moisture are numerous and may more precisely be for example, medicated materials which may also be in the form of test strips or the like.

[0091] The device may then comprise a desiccant container and/or a desiccant lid and/or a desiccant flexible, deformable, movable drive element to the extent that a certain degree of leak-tightness for storing products sensitive to ambient moisture is possible when the dispensing opening has the capability of being re-closed either by means of a flap or when closed by a closure made integral or not with the device.

[0092] These containers are made desiccant by at least one of the means consisting of an internal coating of the bottom of the container and/or of the internal surface of the wall of the container and/or of the lid by means of a desiccant thermoplastic polymer composition, the introduction of an insert into said container-dispenser, the coating of the flexible, deformable, movable drive element with a desiccant elasticomer composition, and/or the introduction of a desiccant material placed inside a special housing on the inside surface of the container and/or the lid.

[0093] All of these desiccant means are installed separately or simultaneously, in order to increase the effectiveness of their dehydrating action by mass effect.

[0094] During the dispensing operation, by exerting a translational movement on the flexible, movable drive element, in relation to the container, either directly, if the lid is fixed, or by means of the movable lid, when said flexible means is integral with the lid, the object n which is situated at the top of the stack will be enabled to slide over the object positioned immediately underneath n–1, the object n thus selected being guided to the discharge slot, owing to the guide surface formed by the curvilinear bottom of the container. The selected object n thus guided is pushed partially outward from the slot in order to enable the user to grasp on it.

[0095] By reversing the direction of translation of the flexible, deformable, movable drive element, the drive element resumes its initial position, but cannot move the object n–1 because the object n–1 abuts against the wall of the container opposite the side on which the dispensing slot is situated. The dynamic friction coefficient between the flexible movable drive element and the upper face of the object n–1 is sufficiently low so as to not cause a risk of deforming the object n–1, when the latter abuts against the wall of the container.

[0096] Other advantages of the dispenser for objects in the form of very thin, rigid, semi-rigid or flexible sheets, small plates, strips or small strips or bands according to the invention, will become apparent upon reading the detailed exemplary embodiment of the invention, while referring to the drawings given for illustrative purposes, in which:

[0097] FIG. 1 shows a perspective view of a storage and dispensing device equipped with its dispensing device;

[0098] FIG. 2 shows a sectional view of a storage and dispensing device in its neutral position;

[0099] FIG. 3 shows a sectional view of a storage and dispensing device in its open position;

[0100] FIG. 4 shows a sectional view of a storage and dispensing device in its once again closed position, after translation of the object being dispensed.

[0101] FIG. 5 shows a perspective view of a storage and dispensing device according to another embodiment.

[0102] FIG. 6 shows a perspective view of a storage and dispensing device according to another embodiment.

[0103] FIG. 7 shows a sectional view of a storage and dispensing device according to the embodiment of FIG. 6, in its neutral position.

[0104] FIG. 8 shows a sectional view of a storage and dispensing device according to the embodiment of FIG. 6, in its actuated position.

[0105] FIG. 9 shows a perspective view of the storage and dispensing device according to another embodiment.

[0106] FIG. 10 shows a sectional view of the storage and dispensing device of FIG. 9, in its actuated position.

DETAILED DESCRIPTION OF THE INVENTION

[0107] FIG. 1 shows a perspective view of the storage and dispensing device 1 including a container 2, a lid 3 equipped
on its upper end surface with a protuberance 4 enabling the user to slide the lid, and with a child safety opening system 5.

[0108] This storage and dispensing device 1 consists of a open container-type storage means 2 including a bottom 6 formed by an inclined planar storage surface 7 inside the container, on which the objects to be dispensed 8 are stacked, and by a so-called guide surface 10 still inside the container and contiguous with the storage surface 7. This storage surface 7, forming a supporting surface for the objects to be dispensed 8, is inclined so as to pre-orient the objects to be dispensed in relation to the developable, curvilinear guide surface 10, forming a sort of exit ramp.

[0109] The container also comprises two parallel vertical walls 11 and 12 making it possible to partially close the container and to position the objects 8 laterally. The container also comprises a third vertical wall 13 perpendicular to the first ones, positioned on the side opposite the slot-shaped dispensing opening 9 on which the objects to be dispensed come to bear via their edge.

[0110] As mentioned previously, the objects to be dispensed 8 are, in this particular descriptive case, test strips frequently used in the field of medical diagnostics or chemical analyses.

[0111] FIGS. 2 to 4 show the various steps resulting in the extraction of a thin strip.

[0112] According to the invention, FIG. 2 shows a sectional view of the storage and dispensing device in its neutral position: the storage and dispensing device 1 including a container 2 containing the objects 8 to be dispensed through the dispensing slot 9, a lid 3 and a flexible, deformable, movable drive element 14 integral with the lid 2.

[0113] The storage and dispensing device 1 comprises a rib 15 on the inside face of the lid, so as to hold the flexible, deformable, movable drive element 14 in contact with the upper face of the object to be dispensed 8.

[0114] The flexible, deformable, movable drive element 14 consists of a tongue made of a flexible material and is capable of bending without permanent deformation. It has the shape of an “S” when viewed as a cross section. This flexible movable drive element 14 has the characteristic of being in contact with the object to be driven 8, and of having the capability of translating while at the same time remaining pressed against the surface of the object to be dispensed. It also has the characteristic of possessing a surface having a static friction coefficient, when determined with respect to the upper face of the object to be driven, which is higher than the static friction coefficient existing between the two surfaces opposite the two contiguous objects n and n-1 to be dispensed. It is integral with the movable lid.

[0115] The storage surface forming a supporting surface on which the objects to be dispensed are stacked 7, is an inclined planar surface and is contiguous with a preferably developable curvilinear so-called guide surface 10. This storage surface is inclined so as to pre-orient the objects to be dispensed in relation to the preferably developable curvilinear guide surface 10, itself forming a sort of exit ramp for the objects to be dispensed 8.

[0116] FIG. 3 shows a sectional view of a storage and dispensing device 1 in its open position, after unlocking of the child safety opening system. The lid 3 is then translated in the opposite direction from the side where the dispensing slot is located, driving the flexible, deformable, movable drive element 14, which is integral with it, the flexible, deformable, movable drive element 14 still remaining in contact with the upper face of the object to be dispensed 8, owing to the presence of a rib 15 situated on the inside face of the lid.

[0117] FIG. 4 shows a sectional view of a storage and dispensing device 1 in its once again closed position after translation of the object to be dispensed. Thus, by reversing the direction of the translational movement exerted on the lid 3 integral with the flexible, deformable, movable drive element 14, the lid 3 resumes its initial closed position and the flexible movable drive element 14 drives the object to be dispensed n towards the dispensing slot 9. When the flexible movable drive element 14 arrives at end of travel, the selected object to be dispensed n is pushed partially outward from the slot 9, in order to enable the user to grasp on it to.

[0118] FIG. 5 shows a perspective view of the storage and dispensing device 1 including a container 2, a lid equipped on its upper surface with a shoe having a handling knob 16, which slides inside the opening 17 and enables the user to translate the flexible deformable movable drive element. The container 2 comprises a guide surface 10, not shown on the inside, its external shape being parallelepiped.

[0119] FIG. 6 shows a perspective view of the storage and dispensing device 1 including a container 2, a lid 3 hinged along an axis 18 positioned on one of the ends of the container 2, on the dispensing opening side 9, this axis of rotation being of the integral hinge type, for example.

[0120] FIG. 7 shows a sectional view of the storage and dispensing device 1 according to the embodiment of FIG. 6, in its neutral position.

[0121] FIG. 8 shows a sectional view of the storage and dispensing device 1 according to the embodiment of FIG. 6, in its actuated position. According to this embodiment, the lid 3 is hinged completely, the axis of rotation 18, for example of the integral hinge-type, being placed on one of the ends of the container 2, on the dispensing opening side 9.

[0122] Thus, pressure exerted by the user’s hand on the hinged lid 3, on the side opposite the side comprising the dispensing opening 9, makes it possible to move the flexible, deformable, movable drive element 14 and to drive the object to be dispensed 8 in the direction of the dispensing opening 9, said slot-type dispensing opening 9 itself also having a beveled form facilitating the guiding of the object to be dispensed 8 towards the exit.

[0123] FIG. 9 shows a perspective view of the storage and dispensing device 1 according to another embodiment. According to this other embodiment, the lid is partially hinged, i.e., one portion of the lid 3 is fixed in relation to the container 2, and the other portion rotates in relation to this container 2, the axis of rotation 18, for example of the integral hinge-type, being placed at a location between the two ends of the lid.

[0124] FIG. 10 shows a sectional view of the storage and dispensing device 1 according to the embodiment of FIG. 9, in its actuated position. The user opens the movable portion of the lid 3 by rotating it upward, thereby releasing the dispensing opening 9 of the container 2. The rotating movement of the movable portion of the lid 3, integral with the flexible, deformable, movable drive element 14, will enable the object 8 situated at the top of the stack to be pulled and guided up to the discharge opening 9.

1. A box-type storage and dispensing device for objects in the form of sheets, small plates, strips or thin bands having a planar geometry, the device capable of dispensing said objects one-by-one, comprising:
a container-type storage means with a lid, containing the objects to be dispensed, stored stacked on top of one another on a storage surface, said storage means including a guide surface for guiding objects to be dispensed and a dispensing opening enabling the objects being dispensed to pass through one-by-one, and a dispensing means,

wherein said dispensing means comprises a flexible, deformable and movable drive element, the contact of an end of the flexible, deformable and movable drive element with the upper face of the object to be dispensed being a transverse surface-to-surface contact along at least one tangential line, having a static friction coefficient higher than the static friction coefficient existing between two facing surfaces of two contiguous objects to be dispensed, and a longitudinal cross section of the flexible, deformable and movable drive element being “S” shaped or nearly “U” shaped.

2. The storage and dispensing device of claim 1, wherein the flexible, deformable drive element takes the shape of a finger having a circular, elliptical or polygonal cross section, the downstream end of which is equipped with a transverse bar perpendicular to a longitudinal axis, ensuring transverse surface-to-surface contact with the object to be dispensed, along at least one tangential line.

3. The storage and dispensing device of claim 2, wherein the flexible, deformable drive element is a thin blade, of a constant width over the entire length of said flexible element, or having an even or uneven narrowing.

4. The storage and dispensing device as claimed in claim 1, wherein the flexible, deformable, movable drive element is preferably triangular, rectangular or “T” shaped.

5. The storage and dispensing device of claim 4, wherein, when the flexible, deformable, movable drive element has a rectangular shape, and a width at most equal to a value very slightly lower than the width L of the container.

6. The storage and dispensing device of claim 4, wherein, when the flexible, deformable, movable drive element has a triangular shape, the base of the triangle forming a transverse contact with the object to be extracted.

7. The storage and dispensing device of claim 4, wherein, when the flexible, deformable, movable drive element has a “T” shape, a transverse bar of the “T” forms a transverse contact with an object to be dispensed, wherein the bar has a length at most equal to a value very slightly lower than the width L of the container.

8. The storage and dispensing device as claimed in claim 1, wherein the transverse contact surface with an object to be dispensed has a width between 0.25 times the width L of the container and a length very slightly less than said width L of the container.

9. The storage and dispensing device of claim 8, wherein the length is preferably between 0.6 L and a length very slightly less than said width L of the container.

10. The storage and dispensing device as claimed in claim 1, wherein the container-type storage means comprises a bottom formed by the combination of two contiguous surfaces, one being the storage surface and the other being the guide surface.

11. The storage and dispensing device as claimed in claim 1, wherein the storage surface, forming a supporting surface on which the objects to be dispensed are stacked, is a generally planar inclined surface forming an acute angle with the plane formed by the lid, and is contiguous with the guide surface.

12. The storage and dispensing device as claimed in claim 1, wherein the storage surface forming a supporting surface on which objects to be dispensed are stacked is a surface parallel to the plane of the lid and is contiguous with the guide surface.

13. The storage and dispensing device as claimed in claim 1, wherein the guide surface is a developable curvilinear surface forming an exit ramp and ending at the dispensing opening.

14. The storage and dispensing device as claimed in claim 1, wherein the guide surface consists of one or more inclined planes in relation to the plane formed by the lid at the dispensing opening, so as to form a hopper.

15. The storage and dispensing device as claimed in claim 1, wherein the container comprises two substantially parallel vertical walls and a third vertical wall substantially perpendicular to the two lateral walls, the third vertical wall positioned on a side opposite the dispensing opening.

16. The storage and dispensing device as claimed in claim 15, wherein the two walls are converging.

17. The storage and dispensing device as claimed in claim 1, wherein the container is closed at an upper portion by a fixed lid equipped with a slide opening so as to enable the flexible, deformable, movable drive element of the object to be dispensed to be moved in translation inside of the slide opening.

18. The storage and dispensing device as claimed in claim 1, wherein the container is closed at an upper portion by a lid movable in translation in relation to the container.

19. The storage and dispensing device of claim 18, wherein the device is equipped with a system for returning the lid to its initial position, the system being located between the lid and the container.

20. The storage and dispensing device of claim 18, wherein the lid movable in translation in relation to the container comprises a protuberance on an upper end surface, enabling the user to slide the lid in relation to the container.

21. The storage and dispensing device as claimed in claim 1, wherein the container is closed at an upper portion by a lid movable in rotation in relation to the container.

22. The storage and dispensing device of claim 21, wherein the lid is hinged completely, an axis of rotation being placed on one end of the container.

23. The storage and dispensing device of claim 21, wherein the lid is partially hinged, a portion of the lid being fixed in relation to the container, and another portion of the lid rotating in relation to the container, the axis of rotation being placed at a location between two ends of the lid.

24. The storage and dispensing device as claimed in claim 1, wherein the lid comprises a rib on an inside face, so as to hold the flexible, deformable, movable drive element in contact with an upper face of an object to be dispensed.

25. The storage and dispensing device of claim 18, wherein the lid is assembled onto the container by a system for snapping on and sliding along tracks with a stop limit device, the system capable of fastening the lid and the container together without restricting the ability of the lid to translate on the container.

26. The storage and dispensing device of claim 17, wherein the fixed lid is assembled onto the container by a snap-on system.
27. The storage and dispensing device as claimed in claim 1, wherein the storage and dispensing device comprises a slot-type dispensing opening having edges forming open lips enabling objects to be dispensed to pass through one-by-one.

28. The storage and dispensing device of claim 27, wherein the lips of the dispensing opening are in the form of a chamfer, a bevel or an offset of one of the lips in relation to the other.

29. The storage and dispensing device as claimed in claim 27, wherein the slot-type dispensing opening is either an integral part of the container, or an integral part of the lid, or is formed at the intersection of the container and lid, during the assembly thereof.

30. The storage and dispensing device as claimed in claim 1, wherein a flexible flap is capable of concealing the dispensing opening.

31. The storage and dispensing device as claimed in claim 1, wherein the container and the lid are made of polymer materials selected from the group of materials consisting of thermoplastic polymers, polyolefins, polyethylenes, polypropylenes, ethylene/propylene copolymers, polyamides (PA), polystyrenes (PS), acrylonitrile-butadiene-styrene (ABS) copolymers, styrene-acrylonitrile (SAN) copolymers, poly-methyl methacrylates (PMMA), polyethylene terephthalates (PET), polybutylene terephthalates (PBT), polyacetals (POM), polyvinyl chlorides (PVC), and polycarbonates (PC).

32. The storage and dispensing device as claimed in claim 1, wherein the flexible, deformable, movable drive element is integral with the movable portion of the lid when said lid is movable.

33. The storage and dispensing device of claim 17, wherein the flexible, deformable, movable drive element is independent from the lid when said lid is fixed.

34. The storage and dispensing device of claim 33, wherein the flexible, deformable, movable drive element is equipped with a shoe sliding inside an opening of the fixed lid.

35. The storage and dispensing device as claimed in claim 32, wherein the flexible, deformable, movable drive element is made with at least one material selected from the group of materials having the characteristics peculiar to elastomeric compositions.

36. The storage and dispensing device as claimed in claim 32, wherein the flexible, deformable, movable drive element is a mono-material formed from a single formulated elastomeric thermoplastic material the thermoplastic material comprising at least one thermoplastic elastomer and a rigid thermoplastic compound.

37. The storage and dispensing device as claimed in claim 32, wherein the flexible, deformable, movable drive element (14) is a multi-material, and further comprises a core and a skin comprising an elastomeric-type material.

38. The storage and dispensing device (1) as claimed in claim 36, wherein elastomer material or materials are preferably selected from the group consisting of elastomers of natural rubber, synthetic rubber, mono-olefin rubbers, diene rubbers, condensation product-based rubbers styrenic rubbers, and other block copolymers, used alone or in a mixture, formulated or not.

39. The storage and dispensing device as claimed in claim 1, wherein a child safety opening system is associated with the device for storing and dispensing objects.

40. The storage and dispensing device of claim 39, wherein the child safety opening system is a pushbutton forming an integral part of the lid capable of combining a sustained vertical pressure and a simultaneous translational movement to unlock the safety system and to ensure operation of the dispensing device.

41. The storage and dispensing device as claimed in claim 1, wherein the container and the lid are between said container and said lid with an indicator of the container having been opened prior to the first opening.

42. The storage and dispensing device as claimed in claim 39, wherein the child safety opening system comprises separable micro-points indicating a first opening, the micro-points positioned between the pushbutton and a pushbutton housing.

43. The storage and dispensing device as claimed in claim 1, wherein said storage and dispensing device is made desiccant by at least one of the means comprising an internal coating of the bottom of the container and/or of the internal surface of the wall of the container and/or of the lid by means of a desiccant thermoplastic polymer composition, the introduction of an insert into said storage and dispensing device, the coating of the flexible, deformable, movable drive element with a desiccant elastomeric composition, and/or the introduction of a desiccant material placed inside a special housing on the inside surface of the container and/or the lid.

44. A method for dispensing objects comprising: obtaining the storage and dispensing device as claimed in claim 1; and using the device to dispense the objects in the form of sheets, small plates, strips or thin bands, in the form of rigid strips or bands.