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(54) **Title:** DISPENSER FOR OPENING A TAPE-LIKE PACKAGING

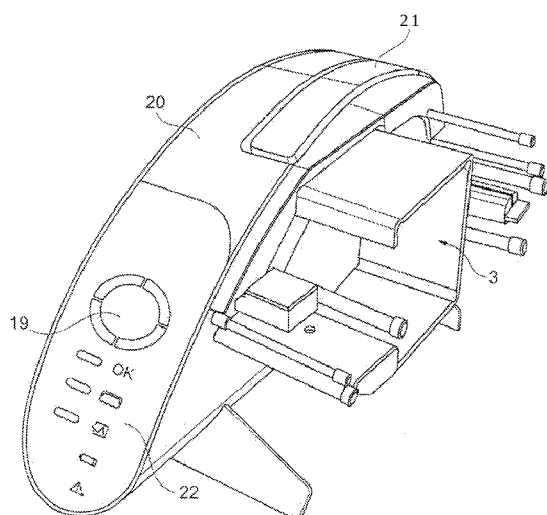


Fig. 1

(57) **Abstract:** A dispenser (100) for opening a tape like packaging (1), which tape like packaging comprises first and second films (10,11) releasably connected to each other and forming envelopes respectively sealed around an object (9) and disposed sequentially with a predetermined pitch. The dispenser comprises a space (3) for holding a container (2) of the tape like packaging (1), guide elements (6, 7, 8, 12, 13, 14, 15, 17, 18) for spreading apart and separating the first and second films (10,11) at an outlet of a separator (6, 7) through which the tape like packaging (1) can be passed, when a pulling force is acting on the first and second films (10,11), thereby opening the envelopes and releasing the objects (9) contained therein, and for guiding the separated films. A receiver element (16) is provided that is rotatably supported and that is adapted to releasably hold and simultaneously wind up both the separated first and second films of the tape like packaging (1), thereby imparting the pulling force on the films (10,11), and a drive unit is provided for rotating the receiver element (16). The provision of the common receiver element to releasably hold and simultaneously wind up both separated films considerably reduces the complexity of the mechanical drive system, and facilitates the loading and unloading of the films.

Dispenser for opening a tape-like packaging

The present application claims the benefit of
priority of European Patent Application No. 11200613,6,
5 filing date December 26, 2011 which is incorporated by
reference herein in its entirety.

The present invention relates to a dispenser for
opening a tape-like packaging, which tape-like packaging
comprises first and second films releasably connected to
10 each other and forming envelopes respectively sealed
around an object and disposed sequentially with a
predetermined pitch.

Dispensers of this type are well-known and are used
in the fields of biotechnology, in the pharmaceutical or
15 beverage industry during testing processes for opening
and offering up in a grasping position sequentially the
objects packaged in such a tape-like packaging,

in these fields the objects are sterile membranes or
other disposable sterile laboratory supplies that are
20 used in laboratory processes in larger numbers.

One type of such dispenser and details of a typical
tape-like packaging for sterile membranes to which the
dispenser of the present invention pertains is described
in EP0585145 A2. This tape-like packaging for such
25 sterile membranes comprises a first continuous film of a
paper base and a second continuous film superposed on the
first film and made of a transparent plastic material.
The envelopes are formed by sealing the first and second
films around the objects (i.e. sterile membranes),
30 thereby forming the envelopes or pockets disposed
sequentially with the predetermined pitch. The envelopes
can be opened and the objects can be released there from
in that the first and second films are pulled apart from
each other, thereby separating the first and second films
35 at the seals. in order to allow the pulling apart of the

first and second films, the films must be resistant to traction along the tape.

An example of an advanced dispenser described in EP0885145 A1 has a pair of rollers which are each driven by a separate motor and which each wind up one of the first and second films after the films have been separated. A detector or sensor is provided for measuring the length of the film wound onto the respective rollers and a control unit is provided and connected to the motors and to the sensors and to a push-button for starting the operation of the motors. When the push-button is operated * the motors are started and controlled on the basis of the information supplied by the sensors so that the rollers turn in synchronicity at the same peripheral winding speed and stop when each has wound on its periphery a length of tape or film equal to the pitch of the envelopes of the tape-like packaging.

The dispenser also has a separator through which the tape-like packaging is passed, wherein the envelopes are opened and the objects are released when the pulling forces acting on the first and second films spread apart the films at an outlet of the separator.

The tape-like packaging is typically shipped and stored in a box-like container in a state folded in a Leporsllo- or accordion-like fashion with the benefit of the individual envelopes and the membranes received therein being kept flat during storage and handling. Another alternative is to simply wind up the tape-like packaging to a roll which may work as well with the common disadvantage of a certain bending of the envelopes and the membranes contained therein.

Another dispenser for a tape-like packaging of this type containing sterile membranes is disclosed in DE29805100 h1. This dispenser likewise has a pair of driven winding rollers for the separated films and the rollers are drivingly coupled through a drive belt with each other and with a pair of drive rollers forming a nip

gap through which the tape-like packaging is conveyed before the films or the tape are spread apart.

A similar filter dispenser with a pair of winding rollers is disclosed in US6003722 B. In this dispenser
5 the rotatable rollers for winding up the separated films are mechanically driven and interconnected by a drive belt as well.

One disadvantage of the previously-known dispensers for a tape-like packaging is the relatively complex
10 structure of the winding mechanisms and the drive means because separate winding rollers are used for each respective film of the tape-like packaging.. The complex mechanics and kinematics make it difficult to mount the tape-like packaging and the films and require complex
15 mechanical or electronic means for synchronizing the rotation of the separate winding rollers. In addition, the complex mechanics increases the cost of production and make the dispensers bulky and/or heavy. Furthermore, the complex mechanics make it difficult to clean and/or
20 sterilise the devices in laboratory environments.

To solve at least some of the problems mentioned above is the object of the invention.

The invention accordingly provides a dispenser as defined in claim 1. Preferred embodiments are defined in
25 the dependent claims.

The present invention provides a dispenser for opening a tape-like packaging as discussed above which comprises a space for holding a container of the tape-like packaging, guide elements for spreading apart and
30 separating the first and second films at an outlet of a separator through which the tape-like packaging can be passed, thereby opening the envelopes and releasing the objects contained therein, when a pulling force is acting on the first and second films, and for guiding the
35 separate separated films. The dispenser includes a receiver element that is rotatably supported and that is adapted to releasably hold and simultaneously wind up

both the separated first and second films of the tape-like packaging, thereby imparting the pulling force on the films. A drive unit is provided for rotating the receiver element.

5 The provision of a receiver element that is adapted to releasably hold and simultaneously wind up both separated films of the tape-like packaging considerably reduces the complexity of the mechanical drive system and requires for example only a single motor. Since both
10 separated films of the tape-like packaging are simultaneously wound on the single common receiver element, loading of a tape-like packaging and unloading of the films after use to be discarded is considerably faster and easier to achieve than in previous dispensers
15 having two separated winding rollers for the two separated films.

Furthermore, the drive unit can be essentially reduced to an electronically-controlled servo motor without any intermediate transmission or to an
20 electronically-controlled DC gear motor, if desired. The dispenser of the present invention is thus less costly and more robust since less mechanical parts and fewer parts in motion are involved as compared to existing dispensers with a complex gear or belt transmission.

25 The guide elements of the dispenser are preferably arranged to guide the separated first and second films around the space for holding the container of the tape-like packaging, from a front side of the space where the separator is located to a rear side thereof, where the
30 receiver element is located. All sections of the space for holding the container preferably form a part of the guide elements. With this structure the dispenser can be made considerably more compact than previous dispensers.

35 A control means is preferably provided for controlling the operation of the drive unit such that it selectively rotates the receiver element for a rotational amount corresponding to the predetermined pitch of the

envelopes of the tape-like packaging. Such control means preferably comprises a sensor for detecting a marking on the tape-like packaging that is related to the pitch and/or a timing circuit for limiting operating time of the drive unit.

A switching element can be connected with a control means to activate the operation of the drive unit and such switching element may comprise a mechanically operated switch, e.g. a manually operated switch or a foot switch, a sensor adapted to detect the presence of another element and/or a physical property of such other element, i.e. the presence of a finger of a user, a metal or a plastic material, preferably of a forceps held in the vicinity of a grasping position, or a voice-activated switching mechanism or even combinations thereof to allow multiple modes of activation. Such switching elements reduce the operation of the dispenser to a one-hand or even a hands-free operation.

These and other aspects will become apparent from the description of a preferred embodiment described below in connection with the attached drawing. In this drawing :

Fig. 1 shows a perspective view of an exemplary embodiment of the dispenser of the present invention,

Fig. 2 shows the kinematic concept of guiding the films of the tape-like packaging in the dispenser shown in Figure 1,

Figs. 3 to 5 show the sequence of steps for loading the tape-like packaging into the dispenser of Figure 2, and

Figs. 6 and 7 show an example of a receiver element for use in the dispenser of the invention in a closed and opened clamp position.

The dispenser shown in Figures 1 and 2 comprises a housing 20 with a display section 22 and sensor and/or switch section 19 at a front side of the housing and the kinematic elements for guiding the tape-like packaging 1

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and a space 3 in a compartment for receiving a transport container of this packaging located at a lateral side of the housing. A handle 21 is preferably retractably located at an upper part of the housing and can be unfolded to facilitate handling of the dispenser. The handle may be fixed if cleaning simplicity is an issue because no gaps or interstices are present in such an embodiment ,

The kinematic concept for the tape-like packaging and its elements is shown in detail in Figure 2. In a central part of the lateral side wall there is located the space 3 for holding the transport container of the tape-like packaging (i.e. a cardboard or paper box 2), The tape-like packaging 1 is pulled from the container at a front side and is guided, still in the form a tape, to a separator 6, 7 through which the tape-like packaging 1 is passed.

Between the container and the separator a pair of opposing blocks 4, 5 are provided through which at least a section of the tape 1 passes. These blocks contain a sensor that is adapted to sense markings on the tape-like packaging in that area of the tape passing through the blocks.

The separator in the embodiment comprises a pair of upper and lower rollers or pins 6, 7 arranged such that the tape-like packaging 1 passes through a nip there between. At the outlet of the nip the first and second films of the tape-like packaging are separated from each other and spread apart whereby the envelopes of the tape-like packaging are opened one after each other and the objects contained therein are released and offered in a grasping posture.

An axis of the lower one 7 of the rollers or pins of the separator is displaced from the axis of the upper one 6 of the rollers or pins in the downstream direction of the tape-conveying or passing direction. This provides the advantage that the lower film 11, e.g. the base

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paper, is supported for a longer distance than the upper film 10, i.e. the plastic foil, so that the object 9, e.g. the sterile membrane, remains supported until the user grips the membrane with a forceps.

Further guide elements are provided to guide the separated films around the space for holding the container of the tape-like packaging from the front side where the separator is located to a rear side where a receiver element 16 is located such as is described further below. As shown in Figure 2 the films are separately guided downstream in a transport direction along upper and lower wall sections 17, 13 delimiting the space 3 or compartment for receiving the container 2, and are then guided around further rollers or pins 12, 13, 14, 15 on the rear side of the receiver element (11) so as to be joined again before the films, joined but separated, are guided together to the single receiver element 16.

The receiver element 16 is rotatably supported on or in the housing 20 and is adapted to releasably hold and simultaneously wind up both separated first and second films 10, 11 of the tape-like packaging on a single axis body and to simultaneously impart the pulling force on both films required to pull the tape from the container at the front side and to spread apart the films at the separator to open the envelopes.

For this purpose the receiver element includes a filing or clamping mechanism 23 for releasably holding the first and second films on it. A possible structure of such fixing or clamping mechanism is shown in Figs. 6 and 7 and includes an opening in the form of a groove 24 formed in an axis body through which the joined films 10, 11 are inserted from an open axial end of the axis body at the beginning of the process, and a winding surface 25 on which the joined films are wound together. An eccentric clamping element 26 is arranged in the opening or groove 24 and can be manually operated, i.e. rotated

via a handle (not shown), to selectively fix/release the films 10, 11 in the groove. The Fig, 6 shows the clamping mechanism in a closed clamp position and Fig, 7 shows the same in an opened clamp position. Another possibility would be to have a form locking or action looking releasable engagement in or on the axis body of the receiver element.

To release the closed films at the end of the process when the films of the tape-like packaging are completely wound up and separated or when another type of packaging is to be loaded into the dispenser, the clamping mechanism is released and the films can be removed together from the single receiver element. Another possible solution is a bobbin or roller drum with an expandable diameter or even a disposable or re-usable carrier that is empty mounted on the axis body of the rotatable receiver element and is removed together with the films wound on it at the end of the process,

A drive unit is provided for rotating the receiver element. Such a drive unit may include an electric motor, preferably a servo motor that is preferably directly coupled to the receiver element 16 and arranged in the housing 20 or that can even be integrated into the axis body of the receiver element. If a servo motor is used, no mechanical transmission may be required.

To control the operation of the drive unit, e.g., the motor, a control means is provided that can selectively rotate the receiver element for a rotational amount corresponding to a predetermined pitch of the envelopes of the tape-like packaging. Such control means may comprise a sensor in the blocks 4, 5 upstream of the separator for detecting the marking on the tape-like packaging, - i.e. a window or **cutout** or any other marking in or on the tape that can be detected by an optical sensor.

Alternatively, or in addition, the control means may include a timing circuit for limiting an operating time

of the drive unit following its activation by a sensor or a switching element. This function may be implemented in order to secure the system and to avoid an unintended continuous opening of envelopes. If the pitch is known, the operating time of the drive unit for opening each envelope may be predefined or may be altered and adapted so that the operation of the drive unit for a certain time with a known speed produces exactly the winding amount necessary for conveying the tape by one pitch and opening only a single individual envelope during each operation cycle. The control means may account for the increase in diameter of the film wound on the single receiver element which leads to an increased pulling length, the larger the diameter becomes. To compensate, the operating time may be successively reduced.

in addition, the control means can be provided with a function that gives the user the possibility to set and finely adjust a starting position of the tape like packaging! for the purpose of adjusting an output position for the objects at the outlet of the separator. This can be done, for example, by providing a potentiometer through which the receiver element can be finely rotated forward or rearward to adjust the output distance of the object (i.e. membrane). If the receiver element is finely rotated to pull the tape the adjustment will be directly visible, if it is rotated in reverse, the adjustment will be visible at the end of the next operation cycle. A scale can be provided to indicate the advancing/retracting rate of the objects.

To activate the drive unit the control means is cooperating with a switching element. This switching element may be a mechanically operated switch that is provided on the housing of the dispenser or on a foot pedal, a sensor adapted to detect - with or without physical contact (contactless) - the presence of another element and/or a physical property of another element, for example the presence of a finger of the user, a metal

or a plastic material, preferably a forceps for grasping the sterile membranes released from the envelope and presented by the dispenser at the separator. Such a sensor is preferably located in the vicinity of the outlet of the separator for immediate grasping of the membrane.

Another option is a voice-activated switching mechanism allowing the dispenser to be controlled by spoken commands (voice control).

The above-mentioned types of switching elements may be either provided alone or in combination to allow multiple modes of operation and activation of the dispenser. The advantages are that the dispenser may be operated by one hand or even in a hands-free mode.

In the preferred embodiment the dispenser includes a rechargeable battery as a power supply for the drive unit, e.g. the motor, and any included electronics circuitry. The provision of the rechargeable battery allows a cordless operation and an autonomous use without additional power supply. This is of particular advantage since the power cable normally in the way on the working desk can be dispensed with. In the preferred embodiment the battery can be charged while the dispenser is operating. In alternative embodiments the dispenser may be charged in a docking station or by means of a USB connection with a personal computer.

The Figures 3 to 5 show a sequence of steps for loading a tape-like packaging into the dispenser of the present invention,

At the beginning a transport container, preferably a disposable box of cardboard or paper, holding the tape-like packaging as known in the art is placed in the space 3 of the compartment on the side of the dispenser. Then, the tape 1 is purled out of its container and the forward end is passed between the blocks 1, 5 with the sensor and then through the nip between the rollers or pins 6, 7 constituting the separator. Depending on the tape-like

packaging the user has to manually peel the first envelopes of the tape in order to manually separate the first and second films of the tape (e.g. the plastic film on the top and the paper base film on the bottom) for a certain length and this initial film length will be used for the loading of the system. Alternatively, a tape-like packaging may be provided with a starting length of unconnected films without envelopes facilitating the loading of the tape into the dispenser.

Downstream of the separator, the upper film 10, i.e. the plastic film is wound around the upper roller or pin 6 of the separator and is pulled rearward and slid along a top surface 13 of the container compartment, is then wound around a pair of rollers or pins 12 and 13.

Symmetrically, the lower film 11, i.e. the paper film, is wound around the lower roller or pin 7 of the separator, is pulled rearward and is slid along the bottom surface 17 of the container compartment before it is also wound around a pair of roller or pins 15 and 14 on the rear side of the dispenser.

At the second rollers or pins 13 and 15 the two films 10 and 11 are joined together and are, together, inserted through a fixing member, i.e. the groove 24, of the receiver element 16. A clamping mechanism of the receiver element 16, for example one as described above in connection with Figs. 6 and 7, is closed, for example by operating a handle.

To operate the dispenser, a request is input through the switching element as described above and the motor of the drive unit is driven for a predefined distance and pulled through the separator or until a marking on the tape is detected by a sensor placed in the blocks 4, 5. Then, the drive unit stops the rotation of the receiver element. The same sequence is repeated for each cycle and each cycle consequently delivers one object, i.e. one sterile membrane, at the outlet of the separator.

The controller of the drive unit effects an acceleration of the motor from a still stand until it reaches a targeted speed. The rotation is then maintained at a constant speed until the motor stops when the hole or marking is detected on the tape-like packaging or the motor has been rotating for a predetermined maximum of time allowed.

During the pulling of the tape the two films are laterally held in place and guided by shoulders on the rolls or pins and by guiding surfaces on the upper and lower surfaces of the container compartment and/or the various guide elements on which the tape and the separated films are guided.

Additional guide elements can be provided (for example in the form of the pin or roller 8 shown in the drawing) and certain of the described guide elements can be integrated. Further, their structure and location is to be adapted to the particular location of the receiver element.

Claims

What is claimed:

1, A dispenser (100) for opening a tape like packaging (1), which tape like packaging (1) comprises first and second films (10,11) releasably connected to each other and forming envelopes respectively sealed around an object (9) and disposed sequentially with a predetermined pitch, wherein said dispenser (100) comprises:

a space (3) for holding a container (2) of said tape like packaging (1);

guide elements (6,7,8,12,13,14,15,17,18) for spreading apart and separating said first and second films (10,11) at an outlet of a separator (6,7) trough which said tape like packaging (1) can be passed, when a pulling force is acting on said first and second films (10,11), thereby opening said envelopes and releasing the objects (9) contained therein, and for guiding the separated films (10,11);

a receiver element (16) that is rotatably supported and that is adapted to releasably hold and simultaneously wind up both said separated first and second films (10,11) of the tape like packaging (1), thereby imparting the pulling force on said films (10,11);

a drive unit for rotating said receiver element (16) .

2, The dispenser of claim 1, comprising means for controlling the operation of said drive unit such that it selectively rotates the receiver element (16) for a rotational amount corresponding to the predetermined pitch of the envelopes of the tape like packaging (1).

3. The dispenser of claim 2, wherein said control means comprises a sensor (4,3) for detecting a marking on said tape like packaging (15) that is related to said pitch and/or a timing circuit for limiting an operating time of the drive unit.

4. The dispenser of any one of claims 1 to 3, further comprising a switching element {19} functionally coupled with said control means for activating the operation of the drive unit,

5. The dispenser of claim 4, wherein said switching element (19) comprises a mechanically operated switch, a sensor adapted to detect the presence of another element and/or a physical property of another element, a voice activated switching mechanism or combinations thereof,

6. The dispenser of claim 1, wherein said sensor is adapted to detect the presence of a finger, a metal or a plastic material, preferably a forceps, wherein said sensor is preferably a contact less sensor and is preferably located in the vicinity of the outlet of the separator (6,7).

7. The dispenser of any one of claims 1 to 6, wherein said guide elements are arranged to guide the separated first and second films (10,11) around said space (3) for holding the container of said tape like packaging (1) from a front side where said separator (6,7) is located to a rear side where said receiver element {16} is located,

8. The dispenser of claim 7, wherein said guide elements are arranged so as to guide said first film (10) along a top side of said space (3) and to guide said second film (11) along a bottom side of said space (3) *

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9, The dispenser of claim 7 or 8, wherein said guide elements include wall sections (17,16) delimiting said space (3) for holding the container of said tape like packaging (1).

10, The dispenser of any one of claims 1 to 9, wherein said receiver element (16) includes a clamping mechanism (23) for releasably fixing both said first and second films (10,11),

11. The dispenser of claim 10, wherein said clamping mechanism comprises an opening (24), preferably in the form of a groove open to an axial end of an/the axis body of said receiver element (16), through which said first and second films (10,11) can be inserted, and a clamping element (26) arranged to be manually operated to selectively fix/release said films (10,11) in said opening (24),

12. The dispenser of any one of claims 1 to 11, wherein said drive unit includes an electric motor, preferably a servo motor or an electronically-controlled DC gear motor, drivingly coupled to said receiver element (16); and preferably integrated into an/the axis body of said receiver element,

13. The dispenser of any one of claims 1 to 12, wherein said dispenser includes a rechargeable battery as a power supply for said drive unit.

14. The dispenser of any one of claims 1 to 13, wherein said separator comprises a pair of upper and lower rollers or pins (6,7) arranged such that said tape like packaging passes through a nip there between and wherein an axis of the lower one (7) of said rollers or pins is displaced from the axis of the upper one (6) of said

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rollers or pins in the downstream direction of the tape passing direction.

15. The dispenser of claim 2, wherein said control means is arranged to allow setting of a starting position of the tape like packaging {1} to adjust an output position for the objects at the outlet of the separator (6,7),

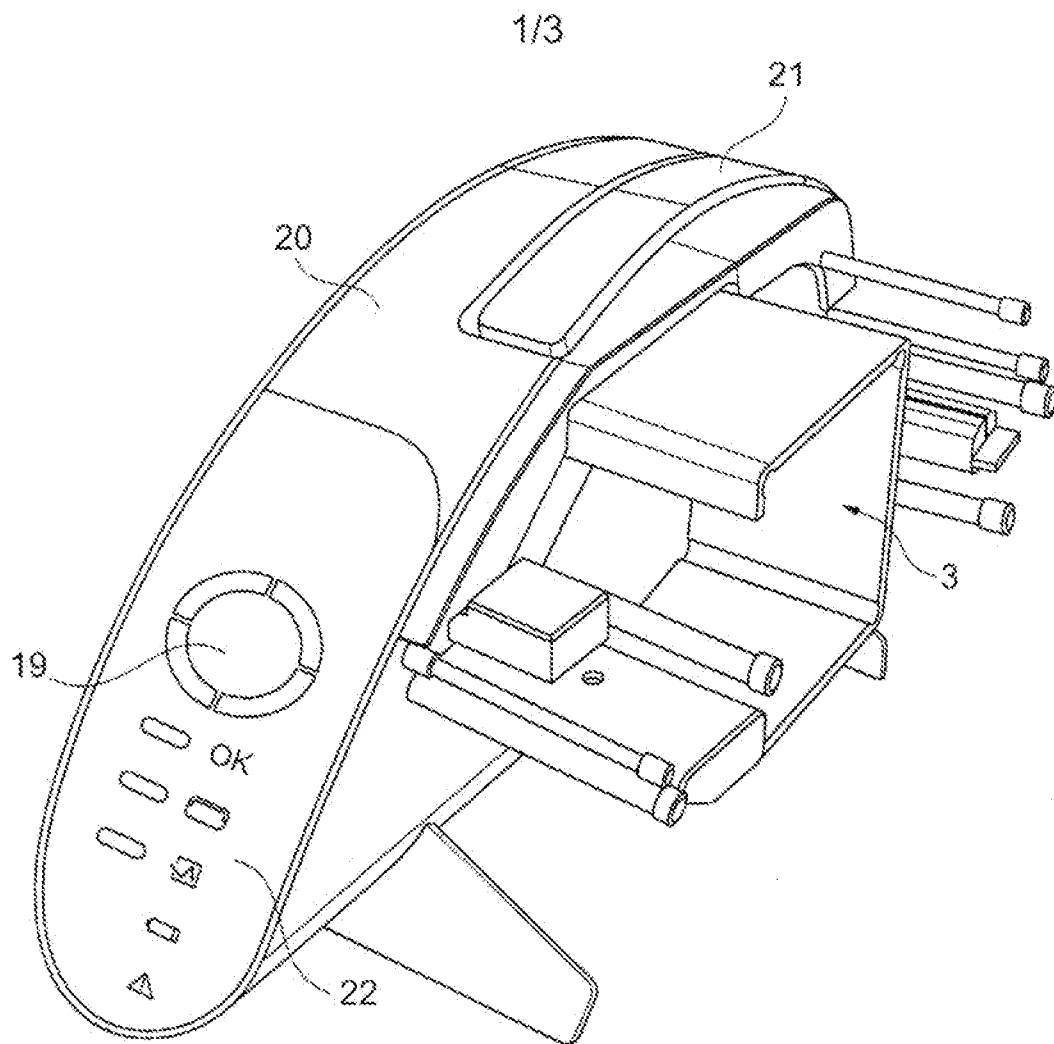


Fig. 1

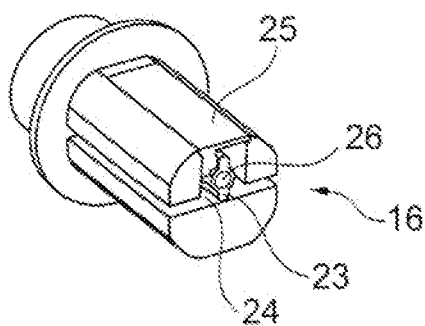


Fig. 6

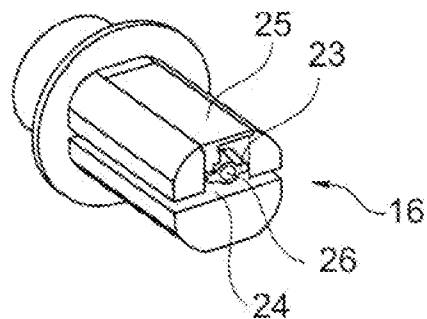


Fig. 7

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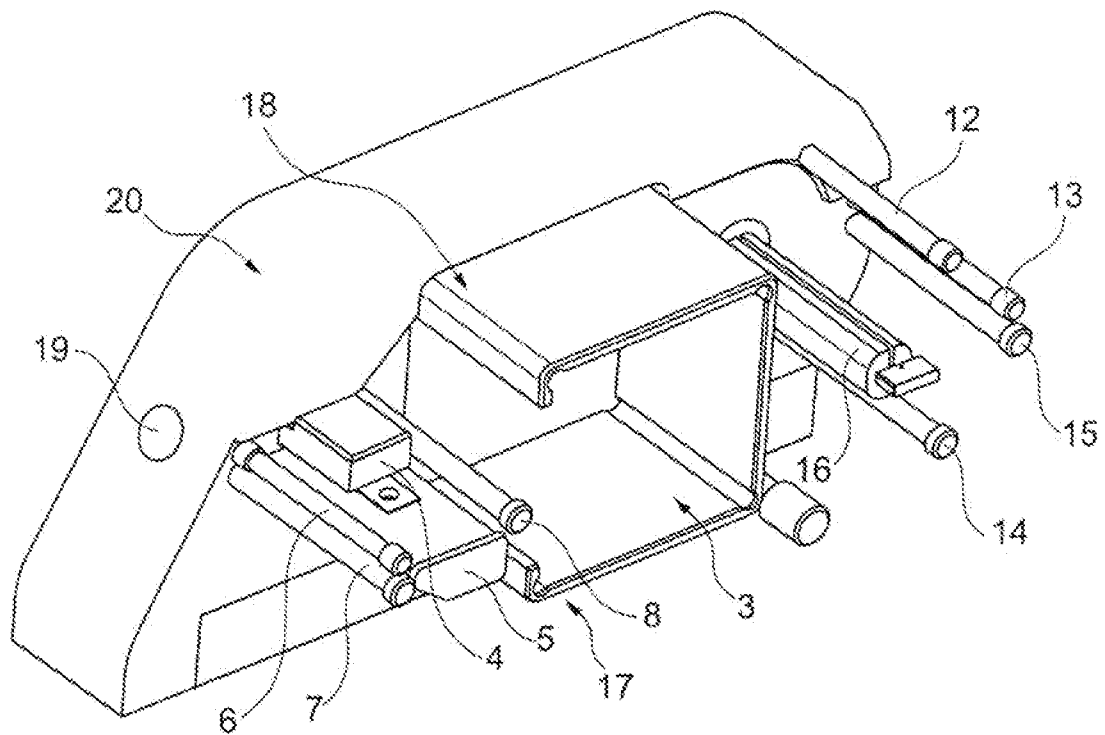


Fig. 2a

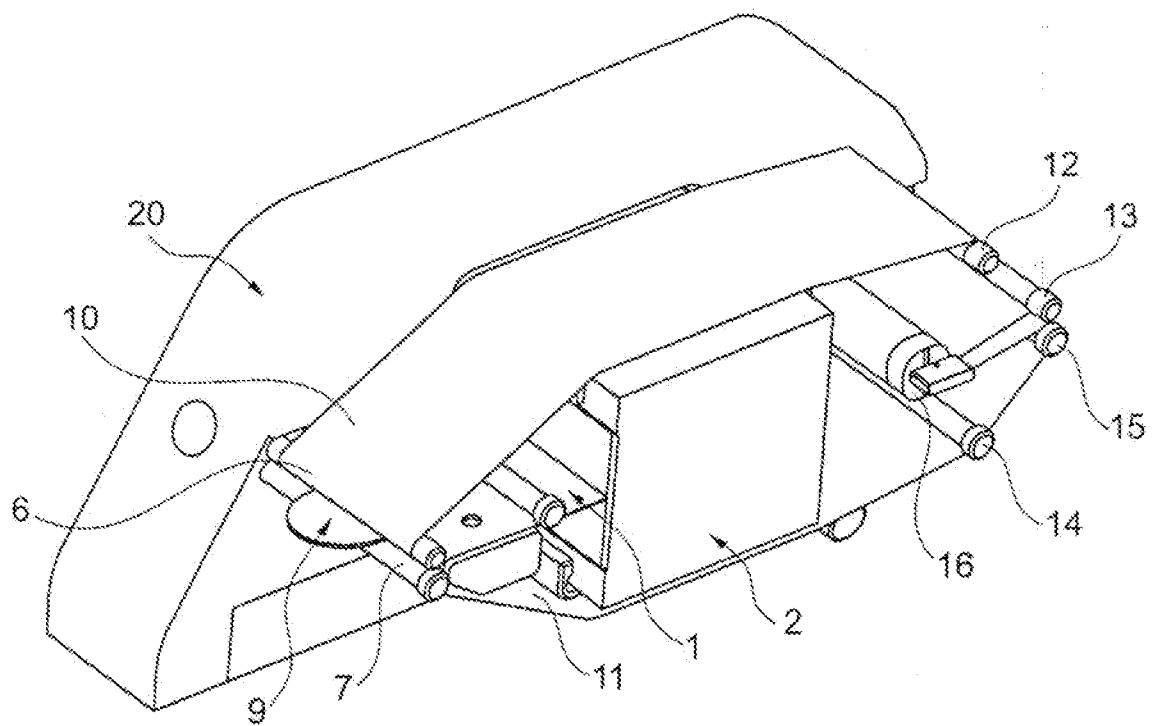
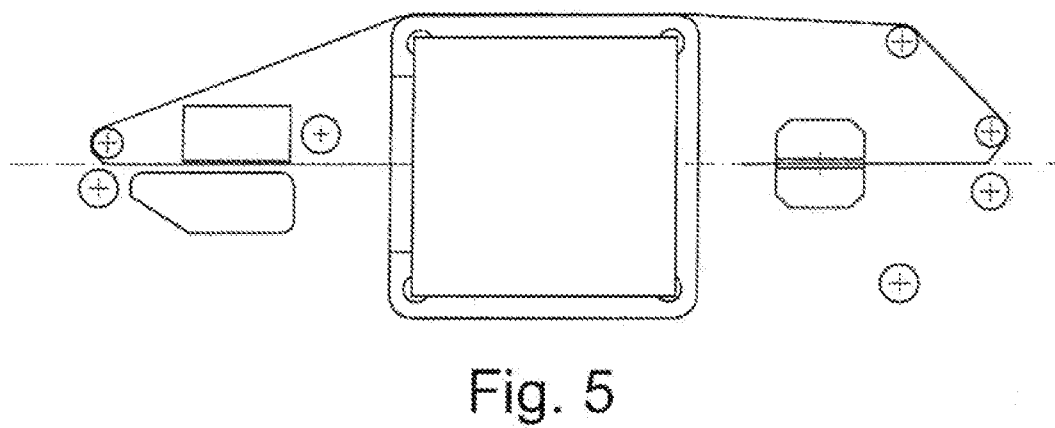
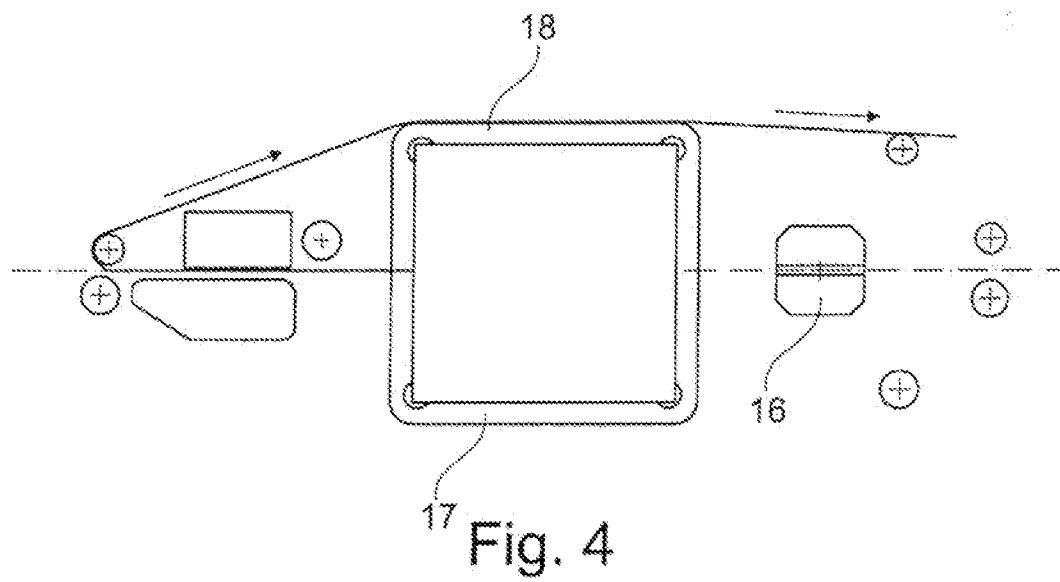
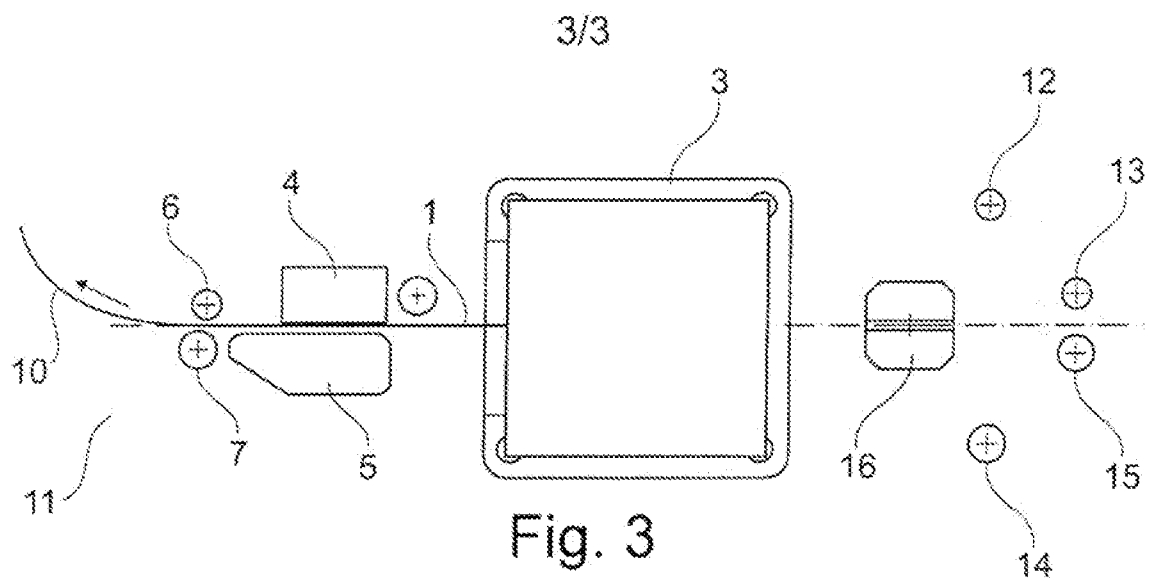


Fig. 2b



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/068752**A. CLASSIFICATION OF SUBJECT MATTER*****B65H 37/04(2006.01)i, B65B 33/00(2006.01)1, B65H 35/07(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65H 37/04; B65H 75/18; A61F 13/00; B65H 5/28; B65G 59/00; B65H 3/00; G07F 11/66; B65H 5/00; B65H 3/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: dispenser, tape, package, guide, receiver, and drive unit

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 2009-0218364 A1 (BIZZELL, DANIEL LEE et al.) 03 September 2009 See paragraphs [0085]-[0099] and figures 6A, 6B, 7, 9-11.	1, 7-9, 12-14 2-6, 10, 11, 15
Y	US 7683235 B2 (WENDORF, JOHN W.) 23 March 2010 See column 6, lines 58-65 and figure 9.	1, 7-9, 12-14
A	US 7077289 B2 (ROSS, NADINE) 18 July 2006 See column 3, lines 53-64 and figure 4.	1-15
A	US 6439289 B1 (SCHLOTTHAUER, JOSEPH P.) 27 August 2002 See abstract and figure 1A.	1-15
A	US 6786360 B2 (VÖGT, REINHARD et al.) 07 September 2004 See abstract and figure 1.	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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