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(54) **CENTER-FEED ROLL UNIT AND DISPENSER INCORPORATING SUCH CENTER-FEED ROLL UNIT**

ROLLENEINHEIT MIT MITTIGER ZUFUHR UND SPENDER MIT EINER SOLCHEN ROLLENEINHEIT  
MIT MITTIGER ZUFUHR

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**EP-A1- 0 107 487 US-B1- 6 964 395**

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**Description**Field of the Invention

**[0001]** The invention relates to a center-feed roll unit for dispensing a web, especially a web of paper or nonwoven material with the features of the pre-characterizing part of claim 1. Further, the invention relates to a dispenser for a web of material with such a center-feed roll unit.

Background of Art

**[0002]** Center-feed roll units are known in the art. They include center-feed rolls which commonly consist of a web material which is fed from the center of the roll out of the roll. When such center-feed roll unit is installed in a corresponding dispenser, the web material is dispensed through an aperture of the dispenser.

**[0003]** Dispensers with center-feed rolls are often found in public rest rooms, and in hospitals and industry for use as a dispenser for handtowels or for tissues or towels for general cleaning purposes. Further, dispensers with center-feed rolls are used in a home environment, especially in kitchens.

**[0004]** Center-feed rolls encounter the problem that a web taken from the inside of a center-feed roll tends to leave the roll and the corresponding dispenser in a twisted shape. In other words, the paper is wound up from within the roll making a twirl. This twirl lingers in the web material and makes it twisted after dispensing.

**[0005]** EP 0 480 848 B1 relates to a dispenser of paper towel unwinding from the inside and having a chimney-shaped part which is provided around the bottom central opening. This chimney-shaped part extends upwards inside the core of the roll and has the purpose to straighten out the paper which has become twisted and creased during its unwinding from the inside of the roll.

**[0006]** Depending on the vertical extension of the upwards standing roll and depending on the size of the chimney-shaped part around the dispensing hole at the bottom of the roll, the problem of twisting cannot be reliably prevented.

**[0007]** US 6,974,395 B1 discloses a dispenser according to the preamble of claim 1, adapted to dispense a sheet material at a lower end of the dispenser, wherein the dispenser comprises a tubular member having an opening formed therein extending from the center of a top side of the dispenser downward such that the roll of sheet material can be arranged to surround said tubular member. Also when using this dispenser, twisting and/or creasing during the unwinding of the sheet material inside of the roll cannot always be adequately prevented, depending on the choice of sheet material, the size of the roll as well as the dimensions of the dispenser.

**[0008]** EP 0 107 487 A1 discloses a dispenser for dispensing a sheet material comprising a housing containing a web of sheet material separable into sheets along spaced lines of weakness. The housing has a resilient element in one wall having an aperture through which the web is dispensed. The aperture is smaller than a rope of the web material, and as the web is drawn through the aperture in rope form, it deforms the resilient element to allow it to pass through. The resilient element squeezes the rope with sufficient force that the friction between the rope and the element during extraction of the web is less than the breaking strength of the lines of weakness when the web is in the rope, but greater than the breaking strength of the lines of weakness in the flat web. Additionally, this dispenser comprises a spigot, mounted to a top surface of said housing, for supporting the roll of sheet material to be dispensed. The above-described problems can also not be adequately prevented with this dispenser.

Disclosure of the Invention

**[0009]** It is the object of the invention to provide a center-feed roll unit for a dispenser. Incorporating such center-feed roll unit makes a web in such center-feed roll untwist on its own during the dispensing step.

**[0010]** This object is solved by a center-feed roll unit with the features of claim 1 and a dispenser for a web of material with an inventive center-feed roll unit. Additional advantageous features follow from the dependent claims.

**[0011]** The center-feed roll unit according to the invention for dispensing a web, especially a web comprising paper or nonwoven material, has a center-feed roll with an inner center hole having a minimum inner diameter  $D_{min}$  defined before its first use, as well as a length  $L$  of the roll in a longitudinal direction perpendicular to the minimum inner diameter. Consequently, the center-feed roll has a first end and a second dispensing end in a longitudinal direction. The inventive center-feed roll unit is characterized in that the device comprises an untwisting insert element provided in the center hole, the insert element being elongate and extending from the first end essentially along the longitudinal direction; and having an extension  $x$  in the longitudinal direction of

$$0.5 \cdot L < x < 1.5 \cdot L,$$

for dispensing the web from the center of the center-feed roll, the web is affected to a first circular movement, and the untwisting insert element further affects the web to a second movement creating an inner twirl in the opposite direction to the first movement.

**[0012]** In addition, the center-feed roll has a maximum inner diameter  $D_{\max}$  at full consumption of the web, wherein the longitudinal extension  $x$  of the insert element equals at least half of the maximum inner diameter  $D_{\max}$  of the center-feed roll, and the relevant diameter of the insert element is in the range between  $0.6 \cdot D_{\min}$  and  $0.95 \cdot D_{\min}$ , and the insert element has a non-circular shape according to claim 1.

**[0013]** The untwisting insert element extends from the first end of the roll along its longitudinal direction. The first end is opposite to the second dispensing end of the roll. This means that, in case that the center-feed roll unit is placed such that its longitudinal direction is vertically oriented with the dispensing end at the bottom, the untwisting insert element extends from the upper, first end and depends into the inner center hole towards or even beyond the lower dispensing end of the roll. However, it should be noted that the center-feed roll unit can be also arranged such that its longitudinal direction extends in a horizontal or any angular direction.

**[0014]** Such specific arrangement has been found to provide superior effects compared to solutions as given in the prior art.

**[0015]** The dispenser according to US 5,215,211 has an insert stabilizing element which partly extends within the inner center hole of the roll. However, this stabilizer part partially penetrating the hole in the center of the supply of connected sheets serves to stabilize the supply and prevents it from caving in upon itself when most of the sheets have been dispensed from the supply. Such stabilizing element according to US 5,215,211 does not serve the purpose of preventing the paper sheets dispensed from, twisting. The same applies to EP 0 107 487 A1 also disclosing a spigot acting as a support for the roll and maintaining it in position, particularly when a considerable proportion of the roll has been dispensed from the center of the roll. Thus, the spigot counteracts a possible collapsing of the roll.

**[0016]** The function of the untwisting insert element can be described as follows. When the web is dispensed from the center of the center-feed roll, there is a circular movement affecting the web material. This movement is either in clockwise direction or counter clockwise direction depending on which side of the roll is used for dispensing. This first movement is kept in the web and makes the tail twisted. In addition to this first movement, there is a second circular movement creating an inner twirl in the opposite direction to the first movement. When using the elongate untwisting insert element according to the invention, this insert element comes to be in the center of the inner twirl and stabilizes the inner twirl and its movement opposite to the first movement all the way to the dispensing opening of the roll just before the web is dispensed. In such a way, the web is forced to untwist after dispensing because the two twisting movements in opposite directions neutralize each other.

**[0017]** Good results of the untwisting effect can be achieved if the extension  $x$  in the longitudinal direction of the insert element is

$$0.6 \cdot L < x < 1.5 \cdot L$$

and preferably

$$0.8 \cdot L < x < L.$$

**[0018]** The center-feed roll can have a maximum inner diameter at or close to full consumption of the web, wherein the longitudinal extension  $x$  of the insert element equals at least half of the maximum inner diameter of the center-feed roll. This adds a further requirement with regard to the longitudinal extension of the insert element. It is often automatically fulfilled by the subject matter of claim 1. However, in cases in which a roll having a relatively large thickness of the material wound is used, the geometrical situation when dispensing the web can differ significantly between the first use of the center-feed roll and the situation at the final consumption of the roll. In such a case, the minimum longitudinal extension of the insert element should also fulfill the above requirement with respect to the maximum inner diameter of the center-feed roll.

**[0019]** The relevant diameter of the insert element is larger than  $0.1 \cdot D_{\min}$  and smaller than  $0.99 \cdot D_{\min}$ , preferably in the range between  $0.6 \cdot D_{\min}$  and  $0.95 \cdot D_{\min}$  and most preferably in the range between  $0.8 \cdot D_{\min}$  and  $0.9 \cdot D_{\min}$ . It can be seen that the length of the insert element is more important than the diameter of the insert element and that even a relatively small space between the web to be dispensed and the insert element extending inside the center hole can be provided as long as it is still possible to dispense the web without problems. In this context, the term "relevant diameter" is defined as the inner diameter of the smallest tube which can still house the insert element.

**[0020]** The insert element may be made of disposable material, preferably cardboard. This is especially advantageous

in case that the insert element does not form part of the dispenser but is part of the replacement rolls for a dispenser. In such a case, the insert element can be disposed of after the final consumption of each center-feed roll.

**[0021]** The insert element may be made of glass, wood, silicone, rubber, metal or plastic material. This list of possible material shows that there is a broad range of possible materials that can be used for the insert element. This broad range of materials shows that it is mainly the position and geometry of the insert element which is important, whereas its material is of smaller importance. Nevertheless, some material characteristics are also important because the web to be dispensed slides over the surface of the insert element. Therefore, depending on the material of the web to be dispensed, the surface of the insert element should be suitable, e.g. in order to prevent undesired abrasion and dusting effects in the dispenser. In order to avoid such problems, the insert element according to a further embodiment has a smooth surface.

**[0022]** The insert element can have a cross-sectional shape which is circular, semi-circular, elliptical, crescent-shaped or prismatic, especially triangular. Tests conducted with different cross-sectional shapes of the insert element revealed that the cross-sectional shape has a smaller impact on the overall performance of the untwisting operation achieved by the insert element compared to the length of the insert element. However, the above given shapes all prove to provide good results.

**[0023]** The insert element can also consist of separate parallel rods.

**[0024]** Further, an insert element can be used which is a flat elongate strip. This has the advantage that the insert element is easy to manufacture, especially if it is made of disposable material like cardboard.

**[0025]** The dispenser may be characterized in that the insert element is removably attached to the dispenser close to the first end of the center-feed roll loaded into the dispenser. If the first end of the center-feed roll is its top end, the longitudinal direction or the center-feed roll is essentially vertical. This is a quite common orientation of the center-feed roll within a dispenser. The center-feed roll is inserted such that its longitudinal direction is essentially vertical and the insert element is lowered from the upper end of the roll into the hollow core of the roll. A removable attachment of the insert element simplifies the exchange of the roll. In such a case, it is possible to remove the insert element and to attach it again to the housing of the dispenser once a new roll has been correctly inserted in the dispenser.

**[0026]** Alternatively, the insert element may be attached to the dispenser by means of a form-fit connection, snap fit, slide-in connection or by an adhesive means like double-sided adhesive.

**[0027]** However, the insert element can also be hingedly attached to the dispenser. This has the advantage that the insert element needs not to be removed when replacing the center-feed roll. The attachment of the insert element by means of a hinge is especially advantageous if the insert element is made of a flexible material so that it can be bent during its insertion into the center hole of the roll.

**[0028]** The insert element may be provided as a separate part insertable into the center-feed roll before its loading into the dispenser. In that case, different designs are possible. According to a first alternative, the insert element is not attached to the housing of the dispenser but forms part of the center-feed roll unit. In this case, a possible design of such insert element could be a plate-like flange element to which the elongated shaped insert to be placed into the center hole of the roll is attached. The insert extends in a direction perpendicular to the main surfaces of the plate-like flange. The flange element has to be shaped such that it rests on the center-feed roll up to the point of time when it has been completely used up.

**[0029]** According to a second alternative, the insert element as described with respect to the first alternative, forms part of a replacement kit together with an exchange roll. After the replacement kit has been loaded into the dispenser, the flange element of the insert element is attached to the dispenser body. When the center-feed roll has been used up, the insert element is detached from the dispenser body and disposed together with the center-feed roll.

#### Brief Description of the Drawings

**[0030]** In the following, the invention will be described in more detail by way of example only with reference to the following embodiments in which

Fig. 1 schematically shows a dispenser including a center-feed roll inserted therein and with an untwisting insert element;

Fig. 2 and Fig. 3 schematically shows a center-feed roll in order to show the dimensions used for determining the optimum dimensions of the insert element;

Fig. 4 shows an example of an insert element;

Fig. 5 shows possible cross-sectional shapes of an insert element; and

Fig. 6 and Fig. 7 are schematic cross-sectional views of a center-feed roll without an insert element and a center-feed roll with an insert element to show the untwisting effect of the insert element.

#### Description of Preferred Embodiments

**[0031]** In the following embodiments throughout the drawings the same elements will be denoted by the same reference numerals.

**[0032]** In Fig. 1, a center-feed roll 10 inserted in a dispenser 20 is schematically shown. The dispenser 20 is only shown schematically because the invention can be used in a wide variety of different dispensing devices as long as they house a center-feed roll and are provided with a suitable dispensing opening through which the web to be dispensed, particularly a web comprising one or more plies of paper or nonwoven material, can be removed. The web can be provided with transverse perforations so that a user can easily remove a desired length of the web. As an alternative or in addition to this, the dispensing opening of the dispenser 20 can be provided by means for severing the web, like teeth with tear edges which penetrate the web and weaken the web to an extent that a user can easily remove a desired length from the web.

**[0033]** Further, the dispenser 20 can usually be opened in a suitable way so that service personnel gains access to the interior of the dispenser. The cover element of the dispenser can be hingedly attached to the backside wall which usually is attached to a wall in a room. However, it is also possible that the cover can be removed by lifting it in a vertical direction upwards or downwards. Such different arrangements to open the dispenser are not shown in Fig. 1 because they are known in the field of dispensing devices. The same applies for a suitable support structure to hold the center-feed roll thereon. This can be a plate-like element with a center hole which supports the lower end 12 of the center-feed roll. However, alternative means like gripping arms are also possible. The center-feed roll 10 is provided with a center hole 14 which has an essentially cylindrical shape and extends along the longitudinal axis of the center-feed roll 10 from the lower end 12 to the upper end 16 of the roll. As will be shown later, the size of the center hole 14 depends on the degree of consumption of the web and ranges between a minimum diameter and a maximum diameter.

**[0034]** As can be seen in Fig. 1, there is an untwisting insert element 30 which is arranged inside the center hole 14 and, in the specific example as shown in Fig. 1, is attached at the hinge 32 to a housing part of the dispenser. However, this only serves as an example and it will be apparent to a person skilled in the art that alternative ways to attach the insert element to the dispenser are also possible, like a form-fit connection, e.g. a hook-in attachment, a snap fit, a slide-in connection or a clamping connection, but also an adhesive connection e.g. by using double sided adhesive. An easy to use connection is the use of velcro strips.

**[0035]** In the example as shown in Fig. 1, the insert element 30 extends essentially along the whole length of the center-feed roll between the upper end 16 and lower end 12. The web product e.g. paper product 18 leaving the dispenser is schematically shown together with arrows A indicating the direction in which a user tears the tail end of the web in order to dispense a suitable length of web material.

**[0036]** As can be seen in Fig. 2, the center-feed roll 10 has an overall length L in its longitudinal direction between the upper end 16 and lower end 12. Although, in this special embodiment, the longitudinal direction of the center-feed roll is in a vertical direction, any other angular orientation can be used as well. Before its first use, the center hole 14 has a diameter  $D_{\min}$  which is the minimum diameter that is continuously increased during the dispensing of the web product. This is again exemplified in Fig. 3 showing a cross-sectional view from the upper end 16 of the center-feed roll 10. Before its first use, the center hole 14 has the minimum diameter  $D_{\min}$  and when the web wound into the roll has been completely used up, the diameter has increased up to its maximum diameter  $D_{\max}$  as shown in Fig. 3. The center hole might not have a circular cross-section, but could be deformed e.g. to an elliptical shape. In such a case, the minimum diameter is defined as the maximum outer diameter of a cylindrical element which can be introduced into the center hole before the first use of the roll.

**[0037]** Fig. 4 shows the untwisting insert element 30 which, in the example case according to Fig. 4 differs from that as shown in Fig. 1. The insert element 30 according to Fig. 4 can be used without attaching it to a dispenser. It simply has to be inserted from the upper end 16 of a center-feed roll 10 such that the flange element 32 as schematically shown in Fig. 4 rests on the upper end 16 of a center-feed roll, whereas the elongate portion 36 of the insert element 30 extends into the center hole of a center-feed roll.

**[0038]** As can be seen in Fig. 4, the elongate portion 36 has a length x and a diameter  $\phi$ , the range of which will be specified below.

**[0039]** In order to achieve the desired untwisting effect, the length x ranges between  $0.5 \cdot L$  and  $1.5 \cdot L$ . However, the optimum range was found to be close to the length L of the center-feed roll so that the insert element should extend almost all the way from the first end to the dispensing end of the roll. The optimum length of the elongate portion follows from the following equation:

$$0.8 \cdot L < x < L.$$

**[0040]** A further geometrical requirement relates to the minimum length X in case that the maximum inner diameter of the center-feed roll is relatively large. This can be the case for rolls having a high material thickness. In such a case, the following equation should also be fulfilled:

$$x > D_{\max}/2$$

**[0041]** In other words, the length of the insert element should be more than half of the maximum diameter of the center-feed roll so that, also in case of a relatively large center hole, the desired effect of the untwisting insert element can still be realized.

**[0042]** As regards the diameter of the elongate portion of the untwisting insert element, it has to be smaller than the minimum diameter so that, also in case of a web material having a relatively high flexibility and compressibility, the web material can still be removed without undue force. Even if in some cases it could be possible to provide an elongate portion of an insert element with a diameter slightly exceeding  $D_{\min}$ , such dimension should be avoided because the web material can tear at the very start of the dispensing operation and, the service personnel could damage the web material when inserting the insert element.

**[0043]** As regards the diameter of the elongated portion of the insert element, a relatively high range of diameters is possible:

$$0.1 D_{\min} < \varnothing < 0.99 D_{\min}$$

**[0044]** However, in order to achieve better results, the following range should be selected:

$$0.6 D_{\min} < \varnothing < 0.95 D_{\min}$$

**[0045]** The optimum results have been obtained within the following range:

$$0.8 D_{\min} < \varnothing < 0.9 D_{\min}$$

**[0046]** If the length of the insert element is long enough, the diameter can be selected to be relatively small.

**[0047]** In the above equations, a diameter of the elongate portion of the insert element was given. However, as can be seen in Fig. 5, different cross-sectional shapes of the elongate portion of the insert element are possible. Therefore, the diameter as used in the above equations is defined to be the inner diameter of the smallest possible tube which can be used to pass over the elongate portion of the insert element.

**[0048]** As can be seen in Fig. 5, very different cross-sectional shapes of the insert element can be used. These are, starting from the top in the left column of Fig. 5 a circular shape, a semicircular shape, a triangular shape or plate-like shape as exemplified in Fig. 1.

**[0049]** Besides these shapes, also good results could be achieved with an insert element, the cross-sectional shape of which resembles the letters C or S. Moreover, it could be seen that the elongate portion of the insert element can consist of several independent elements like three rods 38 which are oriented in a geometric arrangement of a triangle with each side having the same length.

**[0050]** The insert element and especially its elongate portion can be manufactured from a wide variety of materials like wood, glass, plastic materials, rubber, metal or silicones. However, it is also possible to use a disposable material e.g. made of cardboard. Such disposable material is especially advantageous in case of an insert element as shown in Fig. 4 which is not attached to the dispenser body but supported by the center-feed roll so that each replacement roll can already be provided with an insert element and service personnel can easily replace the center-feed rolls without the need for further steps.

**[0051]** Figs. 6 and 7 schematically show the function of the untwisting insert element 30. In the example as shown in Fig. 6, there is no insert element in the center hole 14 of the roll. During the dispensing of the web, the web of material is wound off the wall of the center hole 14, in the example as shown in Fig. 6 in the clockwise direction 40. Whether this movements is in a clockwise or counter clockwise direction only depends on the fact which side up the center-feed roll

is used for dispensing the web. However, for the description of the twisting and untwisting effect, the direction is not important as long as all directions as stated herein are simply reversed.

[0052] Besides the first clockwise direction 40, a twirl 42 is formed on the inside of the center hole 14. This twirl is formed by a second movement in the opposite direction, in the specific example in the counter clockwise direction 44. This leads to a web of material dispensed which is twisted in the first direction 40. If an insert as shown in Fig. 7 is used, the web 18 is wound off the wall again in a clockwise direction 40. Again, a twirl 42 is formed on the inside of the center hole 14 in the opposite direction which, in the specific case, is a counter clockwise direction. This twirl 42 is stabilized and "stored" by the insert element 30 all the way over its length x towards the dispensing end of the roll. After the web 18 has left the end x of the insert element, the two movements in a counter clockwise direction and in clockwise direction neutralise each other so that the paper automatically untwists after dispensing.

[0053] The provision of an untwisting insert element of an elongated shape which extends from the first end of a center-feed roll almost all the way to the dispensing end leads to the astonishing effect that, although the web dispensed also performs two different movements in two different rotational twisting directions, these two opposite twisting directions neutralise themselves so that a web of material can be removed which is essentially untwisted. When the user pulls out a paper it is still twisted but when the user releases the tail before tearing the web, the web "remembers" the two twisting directions imposed on the web and untwists by itself so that a user is presented by a much wider tail of the web to tear off compared to conventional center-feed dispensing systems.

## Claims

- Center-feed roll unit for dispensing a web (18), especially a web of paper or nonwoven material, comprising a center-feed roll (10) with the web (18) having an inner center hole (14) with a minimum inner diameter  $D_{\min}$  defined before its first use and a length L of the roll (10) in a longitudinal direction perpendicular to the minimum inner diameter  $D_{\min}$  with a first end (16) and a second dispensing end (12) of the roll (10); the center-feed roll unit comprises an untwisting insert element (30) provided in the center hole (14), the insert element (30) being elongate and extending from the first end (16) essentially along the longitudinal direction; and having an extension x in the longitudinal direction of

$$0.5 \cdot L < x < 1.5 \cdot L,$$

wherein,

for dispensing the web from the center of the center-feed roll (10), the web (18) is affected to a first circular movement, and the untwisting insert element (10) further affects the web to a second movement creating an inner twirl in the opposite direction to the first movement, and the center-feed roll (10) having a maximum inner diameter  $D_{\max}$  at full consumption of the web (18), wherein the longitudinal extension x of the insert element (30) equals at least half of the maximum inner diameter  $D_{\max}$  of the center-feed roll (10), **characterized in that:**

the relevant diameter of the insert element (30) is in the range between  $0.6 \cdot D_{\min}$  and  $0.95 \cdot D_{\min}$ , and wherein the insert element (30) has a non-circular cross-sectional shape from the following list:

- semi-circular, elliptical, crescent-shaped or prismatic, especially triangular,
- plate-like shape or a cross-sectional shape of which resembles the letters C or S.

- Center-feed roll unit according to claim 1, the untwisting insert element (30) having an extension x in the longitudinal direction of

$$0.6 \cdot L < x < 1.5 \cdot L$$

and preferably

$$0.8 \cdot L < x < L.$$

3. Center-feed roll unit according to claim 1 or 2,  
**characterized in that**  
the relevant diameter of the insert element (30) is in the range between  $0.8 \cdot D_{\min}$  and  $0.9 \cdot D_{\min}$ .
- 5 4. Center-feed roll unit according to claims 1 or 2,  
**characterized in that**  
the insert element (30) is made of glass, wood, silicone, rubber, metal or plastic material.
- 10 5. Center-feed roll unit according to any of the claims 1 to 3,  
**characterized in that**  
the insert element (30) is made of disposable material, preferably cardboard.
- 15 6. Center-feed roll unit according to one of the preceding claims,  
**characterized in that**  
the insert element (30) has a smooth surface.
- 20 7. Center-feed roll unit according to one of the claims 1 to 6,  
**characterized in that**  
the insert element (30) comprises separate parallel rods (38).
8. Center-feed roll unit according to one of the preceding claims,  
**characterized in that**  
the insert element (30) is a flat elongate strip.
- 25 9. Dispenser for a web of material, especially a web (18) comprising paper or nonwoven material, with a center-feed roll unit (10, 30) according to any of the preceding claims.
- 30 10. Dispenser according to claim 9, **characterized in that**  
the insert element (30) is removably attached to the dispenser (20) close to the first end (16) of the center-feed roll (10) loaded into the dispenser (20).
- 35 11. Dispenser according to claim 10, **characterized in that**  
the insert element (30) is attached to the dispenser (20) by means of a form-fit connection, snap fit, slide-in connection or by an adhesive means.
- 40 12. Dispenser according to claim 10 or 11  
**characterized in that**  
the insert element (30) is hingedly (32) attached to the dispenser (20).
- 45 13. Dispenser according to claim 9,  
**characterized in that**  
the insert element (30) is provided as a separate part insertable into the center-feed roll (10) before its loading into the dispenser (20).

#### Patentansprüche

1. Rolleneinheit für ein mittige Zufuhr zum Abgeben einer Bahn (18), insbesondere einer Bahn aus Papier oder einem Vliesmaterial, die eine Rolle für eine mittige Zufuhr (10) mit der Bahn (18), einem inneren mittigen Loch (14) mit einem minimalen Innendurchmesser  $D_{\min}$ , der vor ihrer ersten Verwendung definiert ist, und einer Länge L der Rolle (10) in einer Längsrichtung senkrecht zu dem minimalen Innendurchmesser  $D_{\min}$  mit einem ersten Ende (16) und einem zweiten Abgabeende (12) der Rolle (10) aufweist;  
wobei die Rolleneinheit für eine mittige Zufuhr ein aufdrehendes Einsatzelement (30) aufweist, das in dem mittigen Loch (14) vorgesehen ist, wobei das Einsatzelement (30) länglich ist und sich von dem ersten Ende (16) im Wesentlichen entlang der Längsrichtung erstreckt und eine Ausdehnung x in der Längsrichtung von

$$0,5 \cdot L < x < 1,5 \cdot L \text{ aufweist,}$$

wobei zum Abgeben der Bahn von der Mitte der Rolle für eine mittige Zufuhr (10) die Bahn (18) zu einer ersten Kreisbewegung gebracht wird und das aufdrehende Einsetzelement (10) die Bahn zu einer zweiten Bewegung bringt, die ein inneres Aufdrehen in der zu der ersten Bewegung entgegengesetzten Richtung erzeugt, und die Rolle für eine mittige Zufuhr (10) einen maximalen Innendurchmesser  $D_{\max}$  bei einem vollständigen Verbrauch der Bahn (18) aufweist, wobei die Längsausdehnung  $x$  des Einsetzelements (30) mindestens der Hälfte des maximalen Innendurchmessers  $D_{\max}$  der Rolle für eine mittige Zufuhr (10) gleicht,

**dadurch gekennzeichnet, dass:**

der relevante Durchmesser des Einsetzelements (30) in dem Bereich zwischen  $0,6 \cdot D_{\min}$  und  $0,95 \cdot D_{\min}$  ist, und

das Einsetzelement (30) eine nicht kreisförmige Querschnittsform aus der folgenden Liste aufweist:

- halbkreisförmig, elliptisch, sichelförmig oder prismatisch, insbesondere dreiecksförmig,
- plattenähnliche Form oder eine Querschnittsform, die dem Buchstaben C oder S ähnelt.

2. Rolleneinheit für eine mittige Zufuhr nach Anspruch 1, bei der das aufdrehende Einsetzelement (30) eine Ausdehnung  $x$  in der Längsrichtung von

$$0,6 \cdot L < x < 1,5 \cdot L$$

und vorzugsweise

$$0,8 \cdot L < x < L$$

aufweist.

3. Rolleneinheit für eine mittige Zufuhr nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der relevante Durchmesser des Einsetzelements (30) in einem Bereich zwischen  $0,8 \cdot D_{\min}$  und  $0,9 \cdot D_{\min}$  ist.

4. Rolleneinheit für eine mittige Zufuhr nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Einsetzelement (30) aus Glas, Holz, Silikon, Kautschuk, Metall oder Kunststoffmaterial hergestellt ist.

5. Rolleneinheit für eine mittige Zufuhr nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** das Einsetzelement (30) aus einem Einwegmaterial, vorzugsweise Pappe, hergestellt ist.

6. Rolleneinheit für eine mittige Zufuhr nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Einsetzelement (30) eine glatte Fläche aufweist.

7. Rolleneinheit für eine mittige Zufuhr nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** das Einsetzelement (30) getrennte parallele Stäbe (38) aufweist.

8. Rolleneinheit für eine mittige Zufuhr nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Einsetzelement (30) ein flacher länglicher Streifen ist.

9. Spender für eine Materialbahn, insbesondere eine Bahn (18), die Papier oder ein Vliesmaterial aufweist, mit einer Rolleneinheit für eine mittige Zufuhr (10, 30) nach einem der vorstehenden Ansprüche.

10. Spender nach Anspruch 9,  
**dadurch gekennzeichnet, dass**  
das Einsetzelement (30) entfernbar an dem Spender (20) nahe dem ersten Ende (16) der Rolle für eine mittige Zufuhr (10) angebracht ist, die in den Spender (20) geladen ist.
11. Spender nach Anspruch 10,  
**dadurch gekennzeichnet, dass**  
das Einsetzelement (30) an dem Spender (20) mittels einer Formschlussverbindung, einer Schnappverbindung, einer Einschiebeverbindung oder durch ein Haftmittel verbunden ist.
12. Spender nach Anspruch 10 oder 11,  
**dadurch gekennzeichnet, dass**  
das Einsetzelement (30) über ein Gelenk (32) an dem Spender (20) angebracht ist.
13. Spender nach Anspruch 9,  
**dadurch gekennzeichnet, dass**  
das Einsetzelement (30) als getrenntes Teil bereitgestellt ist, das in die Rolle für eine mittige Zufuhr (10) vor deren Laden in den Spender (20) einführbar ist.

## Revendications

1. Unité de rouleau à alimentation centrale pour distribuer une bande (18), notamment une bande de papier ou de matériau non tissé, comprenant un rouleau à alimentation centrale (10) avec la bande (18) ayant un trou central intérieur (14) ayant un diamètre intérieur minimum  $D_{\min}$  défini avant sa première utilisation et une longueur L du rouleau (10) dans une direction longitudinale perpendiculaire au diamètre intérieur minimum  $D_{\min}$  avec une première extrémité (16) et une deuxième extrémité, ou extrémité de distribution, (12) du rouleau (10) ;  
l'unité de rouleau à alimentation centrale comprend un élément formant insert de détorsion (30) placé dans le trou central (14), l'élément formant insert (30) étant allongé et s'étendant depuis la première extrémité (16) essentiellement le long de la direction longitudinale ; et ayant une étendue x dans la direction longitudinale qui vérifie :

$$0,5 \cdot L < x < 1,5 \cdot L,$$

dans laquelle, pour distribuer la bande depuis le centre du rouleau à alimentation centrale (10), on donne à la bande (18) un premier mouvement circulaire, et l'élément formant insert de détorsion (10) donne en outre à la bande un deuxième mouvement qui crée une torsion interne dans la direction opposée au premier mouvement, et le rouleau à alimentation centrale (10) ayant un diamètre intérieur maximum  $D_{\max}$  à la consommation totale de la bande (18), où l'étendue longitudinale x de l'élément formant insert (30) est égale à au moins la moitié du diamètre intérieur maximum  $D_{\max}$  du rouleau à alimentation centrale (10),  
**caractérisée en ce que :**

le diamètre pertinent de l'élément formant insert (30) est compris dans l'intervalle de  $0,6 \cdot D_{\min}$  à  $0,95 \cdot D_{\min}$ , et dans laquelle l'élément formant insert (30) a une forme de section transversale non circulaire choisie dans la liste suivante :

- semi-circulaire, elliptique, en forme de croissant ou de prisme, notamment triangulaire,
- forme plate ou forme de section transversale qui ressemble à la lettre C ou S.

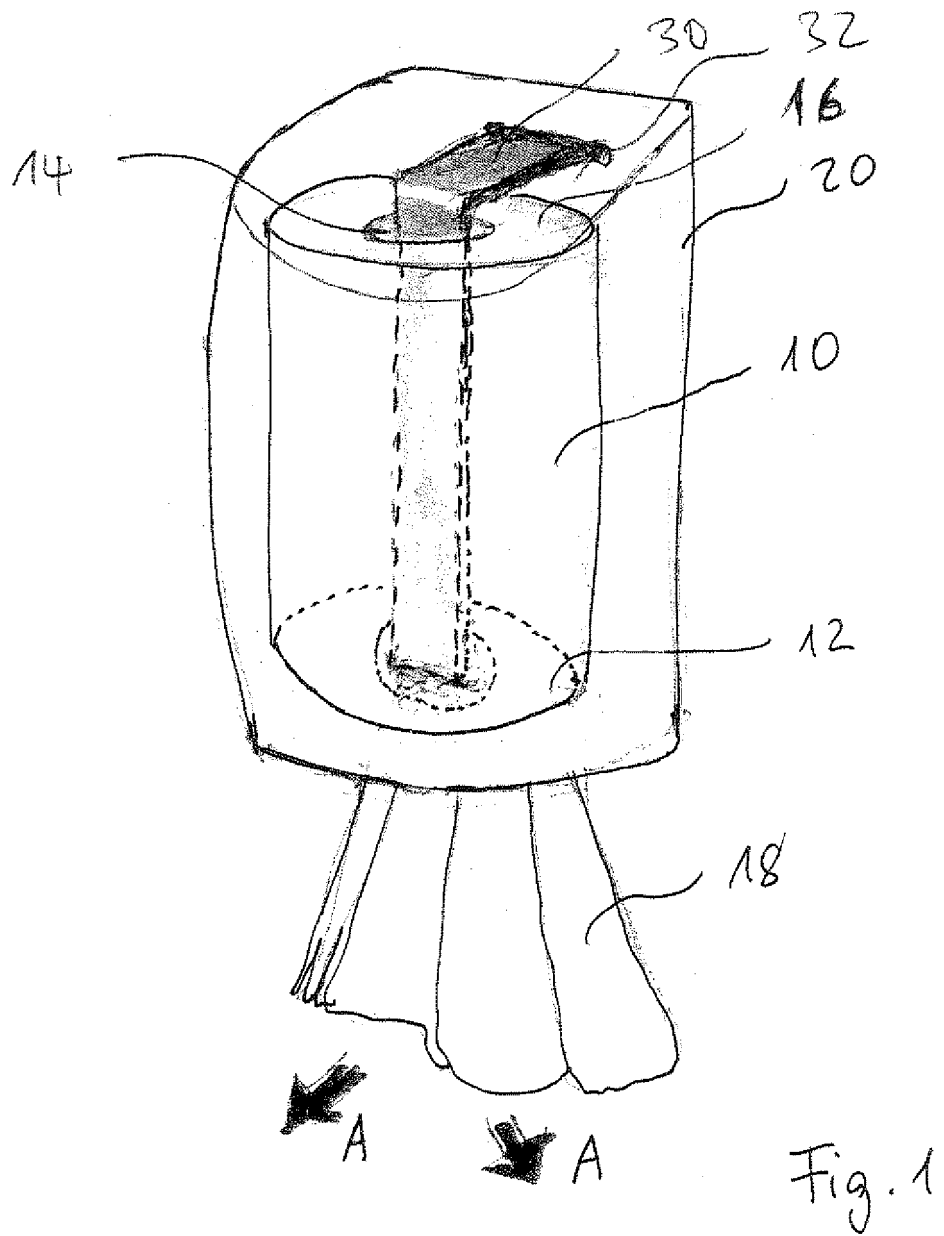
2. Unité de rouleau à alimentation centrale selon la revendication 1, dans laquelle l'élément formant insert de détorsion (30) a une étendue x dans la direction longitudinale qui vérifie :

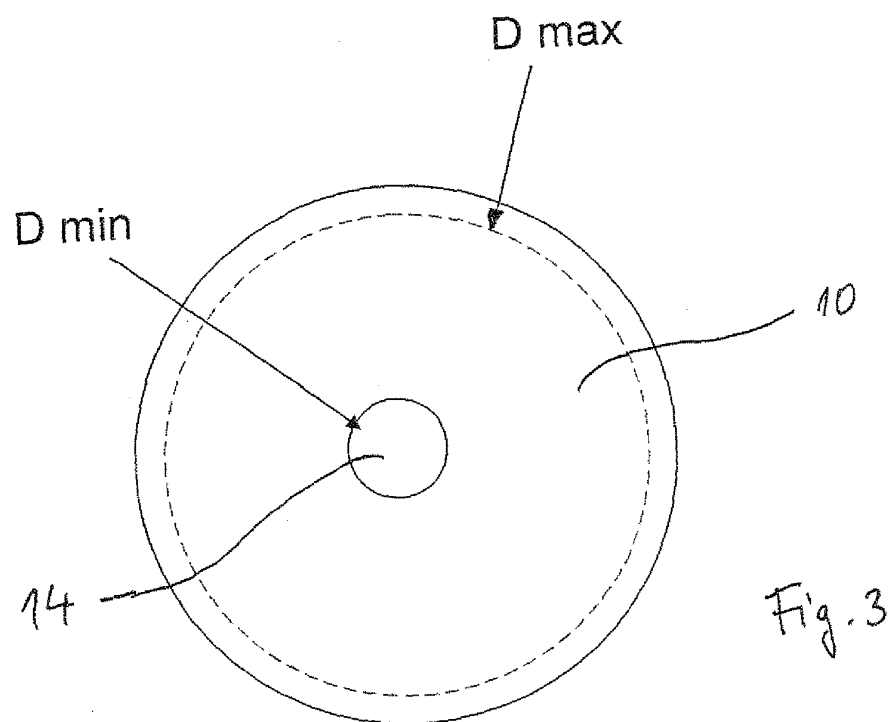
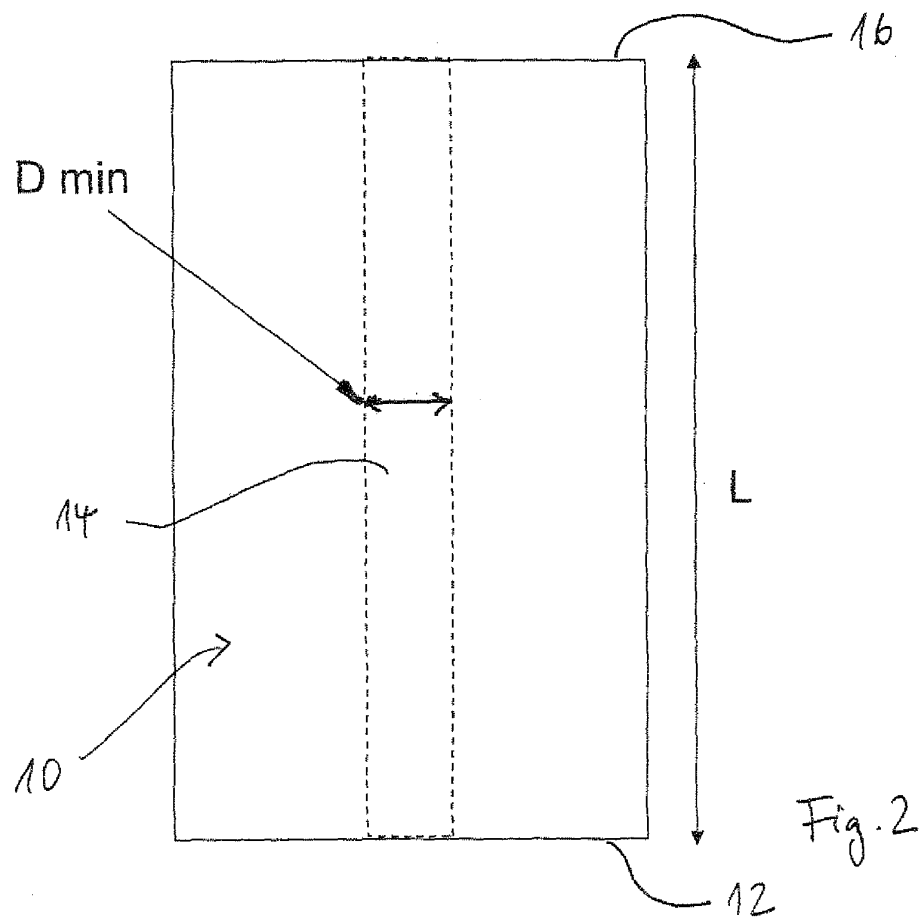
$$0,6 \cdot L < x < 1,5 \cdot L$$

et de préférence

$$0,8 \cdot L < x < L.$$

- 5      3. Unité de rouleau à alimentation centrale selon la revendication 1 ou 2, **caractérisée en ce que** le diamètre pertinent de l'élément formant insert (30) est compris dans l'intervalle de  $0,8 \cdot D_{\min}$  à  $0,9 \cdot D_{\min}$ .
- 10     4. Unité de rouleau à alimentation centrale selon la revendication 1 ou 2, **caractérisée en ce que** l'élément formant insert (30) est en verre, bois, silicone, caoutchouc, métal ou en matière plastique.
- 15     5. Unité de rouleau à alimentation centrale selon l'une quelconque des revendications 1 à 3, **caractérisée en ce que** l'élément formant insert (30) est fait d'un matériau jetable, de préférence du carton.
- 20     6. Unité de rouleau à alimentation centrale selon l'une des revendications précédentes, **caractérisée en ce que** l'élément formant insert (30) a une surface lisse.
- 25     7. Unité de rouleau à alimentation centrale selon l'une des revendications 1 à 6, **caractérisée en ce que** l'élément formant insert (30) comprend des tiges parallèles distinctes (38).
- 30     8. Unité de rouleau à alimentation centrale selon l'une des revendications précédentes, **caractérisée en ce que** l'élément formant insert (30) est un ruban allongé plat.
- 35     9. Distributeur pour une bande de matériau, notamment une bande (18) comprenant du papier ou un matériau non tissé, avec une unité de rouleau à alimentation centrale (10, 30) selon l'une quelconque des revendications précédentes.
- 40     10. Distributeur selon la revendication 9, **caractérisé en ce que** l'élément formant insert (30) est fixé de manière amovible au distributeur (20) près de la première extrémité (16) du rouleau à alimentation centrale (10) placé dans le distributeur (20).
- 45     11. Distributeur selon la revendication 10, **caractérisé en ce que** l'élément formant insert (30) est fixé au distributeur (20) au moyen d'une connexion par adéquation de forme, d'un assemblage par pression, d'une connexion encastrée ou par un moyen adhésif.
- 50     12. Distributeur selon la revendication 10, **caractérisé en ce que** l'élément formant insert (30) est fixé de manière articulée (32) sur le distributeur (20).
- 55     13. Distributeur selon la revendication 9, **caractérisé en ce que** l'élément formant insert (30) est fourni sous la forme d'une pièce distincte pouvant être insérée dans le rouleau à alimentation centrale (10) avant sa mise en place dans le distributeur (20).





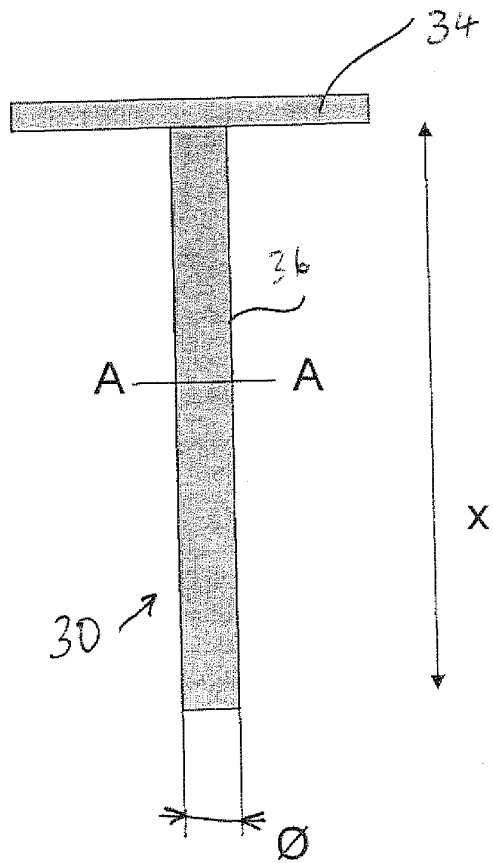


Fig. 4

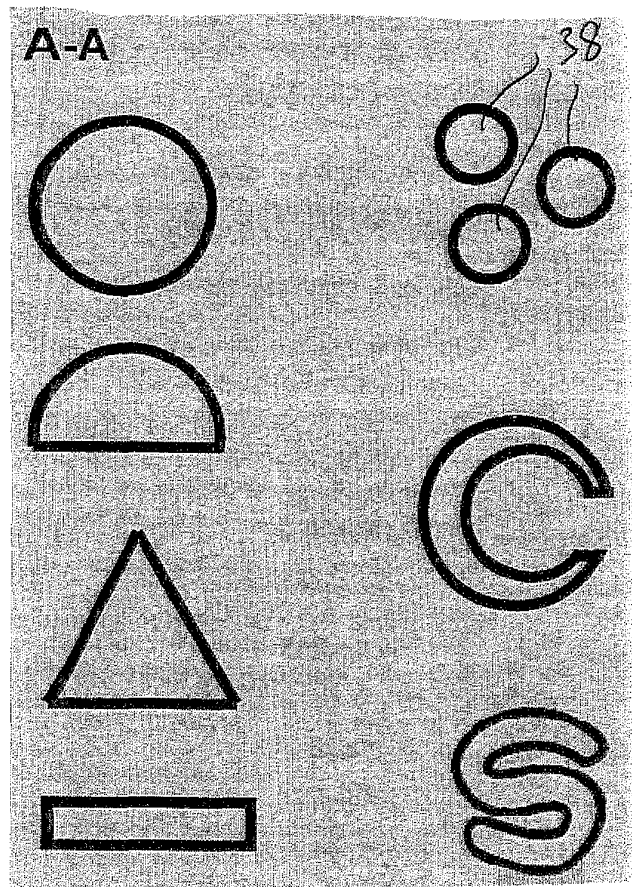


Fig. 5

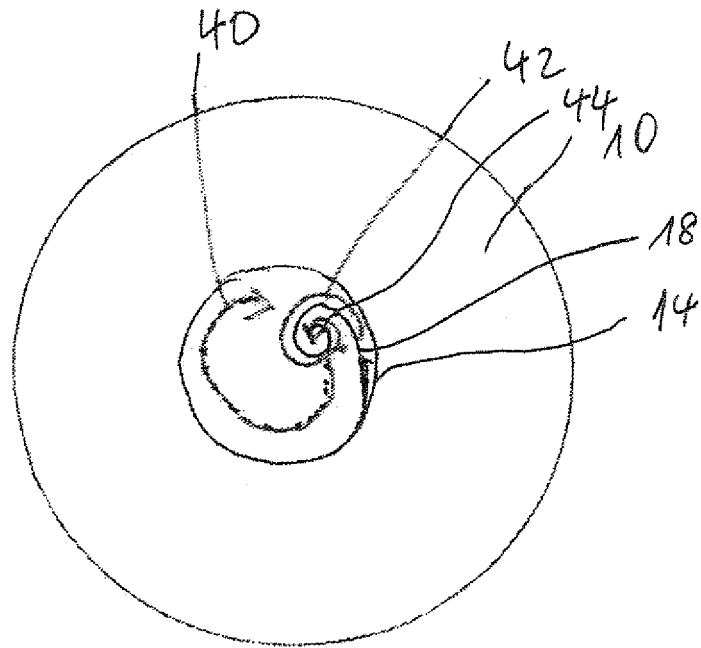


Fig. 6

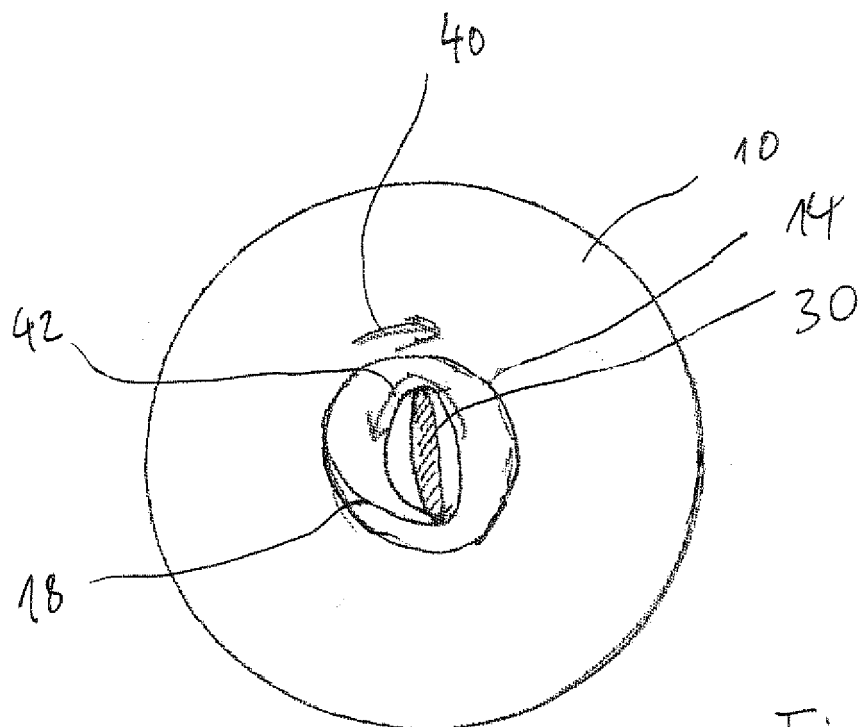


Fig. 7

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 0480848 B1 [0005]
- US 6974395 B1 [0007]
- EP 0107487 A1 [0008] [0015]
- US 5215211 A [0015]