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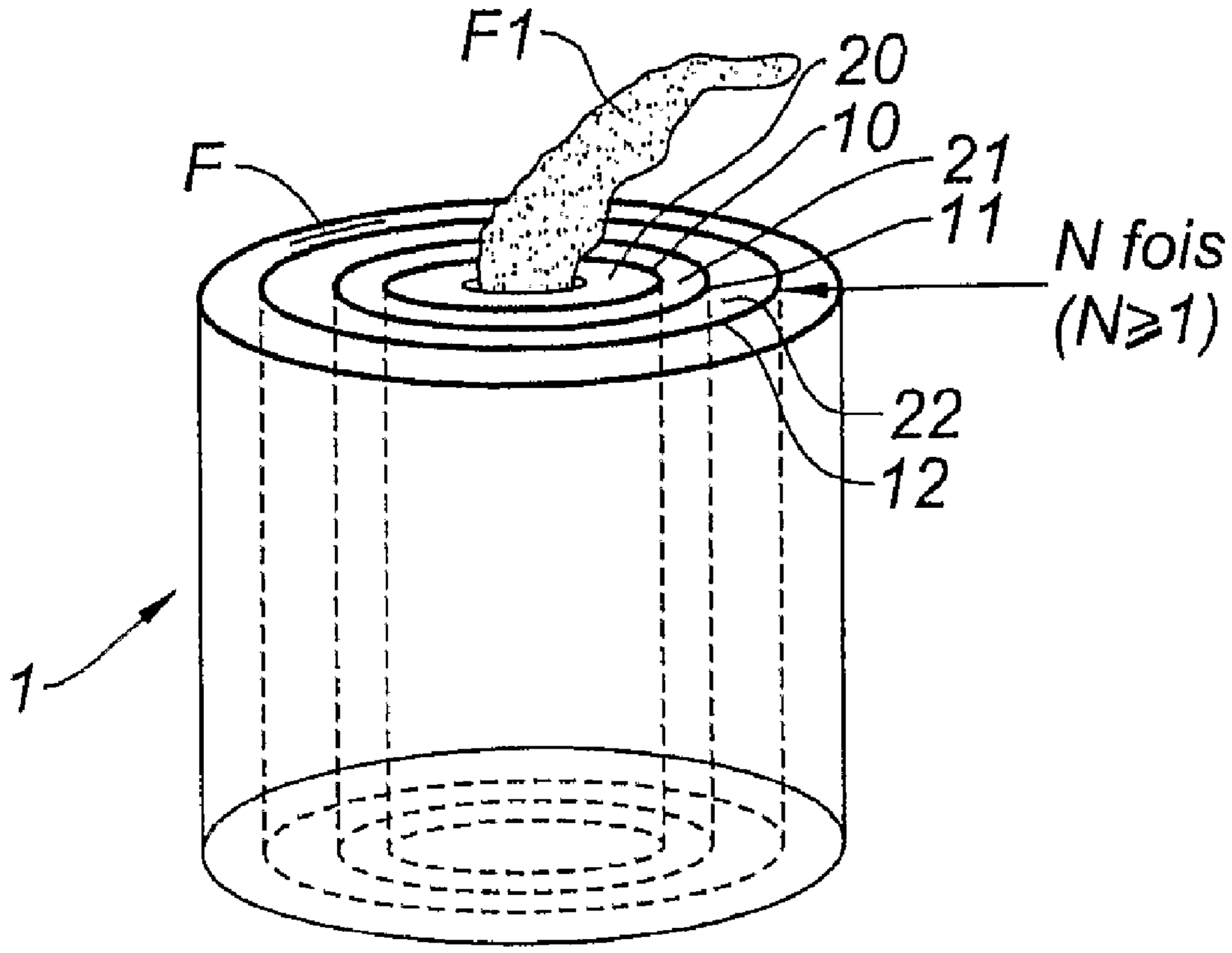

(57) Abrégé/Abstract:
The invention relates to a roll including a sheet (F) made of a flexible material, such as an absorbent fibrous material, formed by winding the sheet around a winding axis while creating a hole in the center and that presents a first set (10) of windings bonded to each other. The roll is characterized by the fact that it includes a second set (20) of windings that are not bonded to each other, between the center hole and the first set (10). The roll, according to the invention, holds up well throughout its use and is easily placed into service, in particular in the case of a roll of the center pull type.

ABSTRACT

The invention relates to a roll including a sheet (F) made of a flexible material, such as an absorbent fibrous material, formed by winding the sheet around a winding axis while creating a hole in the center and that presents a first set (10) of windings bonded to each other. The roll is characterized by the fact that it includes a second set (20) of windings that are not bonded to each other, between the center hole and the first set (10). The roll, according to the invention, holds up well throughout its use and is easily placed into service, in particular in the case of a roll of the center pull type.

CENTRE DISPENSING ROLL WITH ENHANCED ROLL INTEGRITY

The invention relates to the field of products made of absorbent paper, tissue paper, or other similar material such as a nonwoven, the products being presented as rolls and intended for drying. The invention relates in particular to the field of products for sanitary or household use, such as rolls of paper for drying, hand towel rolls, or toilet paper rolls.

For these applications, the rolls are made up of a continuous sheet that includes one or several plies. The sheet is optionally pre-cut into successive sections in the winding direction, and is rolled up axially, preferably around a support, a spindle for example, that may or may not support a core; thus the roll may or may not include a central core.

The sheet of the outer winding can be unwound from the periphery of the roll, in the winding direction. In this case, it is said that this is a roll for tangential unwinding. After having, if applicable, removed the core, the sheet of the inner winding can be unwound through the inside, from the center, in the axial direction, perpendicular to the winding direction of the roll. In the latter case, the roll is a center pull type roll.

As regards coreless rolls, the collapsing of the walls of the central hole can create a problem. Indeed, due to the more or less strong pull exerted on the sheet during rolling up and due to the elasticity of the sheet, a tightening occurs which tends to ease up in the central area upon extraction of the roll from the support that was used for winding. This collapsing can also occur in the event of saw cutting or during roll handling. This is also known to happen with rolls from which the core was previously extracted.

This makes the product particularly difficult to use in the case of center pull rolls, because after the collapsing, little room remains for grabbing the first sheet. The user is thus led to grab several sheets, which is a source of waste. In the case of a roll for tangential unwinding, the lack of a central hole makes it difficult to mount onto a supporting axis of a dispenser.

In the case of a coreless center pull product, a solution was proposed by the applicant in patent applications WO2005/005295 published January 25, 2005 and FR 2 869 891 published November 11, 2005. The solution includes forming a leader for grabbing purposes by laterally moving the free end of the sheet, in such a way that it juts out of one of the sides of the roll.

However, this solution can prove inefficient if the roll was defined with poor precuts and if the central hole is deformed or, even worse, fully collapsed. Indeed, the first pre-cut sheet can then become detached during extraction of the leader, with the next sheets then becoming difficult, if not impossible, to access.

In addition, during utilization of the roll for center pulling in a suitable dispenser, and if the walls of the roll are not held in place, the walls can collapse at any time and result in the forming of a jamming around the dispensing aperture, thus preventing its continuous use.

Other solutions relate to the use of a bonding agent, water, additive, glue, or any other material, so as to maintain the hole formed after extraction of the reel from its winding support, until it is used. However, these solutions are not entirely satisfactory either.

A bonding agent applied onto the first windings of a reel makes it possible to create a well-formed hole, whose aspect is dependent on the profile of the spindle. For example, spindles with a polygonal, grooved, or cylindrical section are used. These spindles lead to the forming of a hole with a corresponding profile. However, as these first windings are connected to each other, it is not possible to extract the first sheet alone. It is often impossible to avoid pulling them off all at once which inevitably generates waste. Furthermore, beyond these first connected windings, the walls are no longer held in place; thus they can collapse during use or at any other time.

The depositing of a bonding agent onto the first windings, but only in the median area of the sheet, while leaving the edges free of glue, has been considered. The grabbing of the first sheet is thus facilitated, but the problem of collapsing is not fully resolved, in particular during its use.

As taught by U.S. Patent 6,179,235, a bonding agent can be applied onto at least one of the two vertical sides of a roll, or onto at least one of the edges of a sheet. However, these means can not efficiently avoid collapsing during dispensing, in particular for large size products.

The invention proposes a solution that avoids the disadvantages of the previous solutions.

According to the invention, a coreless roll, comprising a flexible material sheet, such as an absorbent fibrous material, formed by winding of the sheet around a winding axis that creates a hole in the center and that presents a first set of windings bonded to each other, is characterized by the fact that it includes a second set of non bonded windings, between the center hole and the first set.

One winding corresponds to one rotation inside the roll. The bonded windings are windings that are connected to each other by any bonding means, including water, but whose separation from one another remains easily accomplished under normal usage conditions for the unwinding.

The solution under the invention has the advantage that it can be implemented very simply, by placing the bonding means, for example spraying a liquid substance, in an appropriate manner during winding of the sheet. No additional arrangement needs to be provided. Preferably, the liquid substance is water or an aqueous adhesive substance.

Advantageously, the number of non bonded windings of the second set is higher than or equal to two. It is preferably less than the number of windings corresponding to 10% of the roll length.

The solution under the invention applies in particular to rolls of the tight winding type, which permit the manufacture of dense rolls called compact rolls. Such rolls can be manufactured for use under center pull conditions, preferably with one free end of the first winding from the central hole, exceeding the side of the roll, or for use under tangential unwinding conditions.

According to another characteristic of the invention, the roll comprises at least one additional set of windings bonded to each other, between the first set of bonded windings and the periphery of the roll, these sets of bonded windings being separated from each other by non bonded windings. This succession of non bonded windings and sets of bonded windings can be repeated at will based on needs, and depending on the non-collapsibility of the winded material and on the greater or smaller size of the reel. This solution also presents the advantage of avoiding the collapse of the walls when a large part of the roll has already been used up and when the hole has become sizeable.

The bonding agent application can vary between each roll and between each bonded winding of the same roll, both as to the nature of the bonding agent, the area covered, the quantity, the length and as to the position of the bonding agent.

An object of the invention is also a roll manufacturing process, wherein a sheet is winded around a winding axis, and a bonding agent is applied so as to bond windings to each other, after forming a specific number of windings that are not bonded to each other. The non bonded windings are the first windings formed upon winding around the winding axis.

The invention shall be better understood, and additional advantages shall appear, upon reading the following description. The description details an embodiment with reference to the attached drawings, wherein:

FIGURE 1 represents, in diagram form, a paper roll as claimed by the invention,

FIGURES 2 to 4 show a manufacturing process for rolls based on a parent roll,

FIGURE 5 shows a means for forming a center pulling leader.

FIGURE 1 shows a roll 1 lying on one of the lateral sides forming one of its "flanks." For example, this can be a drying paper roll for center pulling, from which the core, if any, was removed. Sheet F is rolled up continuously starting at the center. The FIGURE represents the inner end of the roll with the first sheet F1 partially extracted. In the absence of a means for holding the windings at the axis, the central hole will have a natural tendency to close. It then becomes difficult to grab the end of the first sheet alone. It is already known in the prior art that the sheets can be glued to each other near the first windings. However, while the windings that form the periphery of the central hole are consolidated, there remains, in this interconnected area, the difficulty of individually grabbing the sheet constituting the first winding.

According to the invention, the risk of collapse is reduced by forming a bonded area, but by leaving the sheets of the very first windings bonding-free, so that the user will find it easy to start off the reel. The bonded area is defined so as to guarantee a sufficient cohesiveness between the windings to ensure that the roll holds up well while permitting an easy separation of these windings under normal unwinding conditions. In the example of FIGURE 1, an initial set 10 is shown in thick lines where the windings are bonded to each other.

Between the central hole and this first set 10, there are non bonded windings. These form a second set 20.

Thanks to this particularly simple solution, the walls of the central hole are reinforced by bonding a number of windings to each other, however, the first sheet(s) constituting at least the first two windings remain(s) free and can thus be grabbed without any difficulty.

In the extreme, only the first two windings are unconnected; all other windings of the roll are bonded to each other, thus forming a single set of bonded windings.

According to another possibility, in order to lower the risks of seeing the central hole close up, the walls of the reel are consolidated with at least one, or preferably several, additional and noncontiguous set(s) (11, 12) of bonded windings; their number essentially depends on the dimensions of the roll. The sets of noncontiguous bonded windings (10, 11, 12) are separated from each other by non bonded windings (21, 22).

In particular, the one or several set(s) of bonded windings comprise a number of windings ranging from 4 to 20.

Even more particularly, for a drying product with a diameter of 20 cm, the first 20 windings will be kept free and a single first set of 15 bonded windings will be necessary.

A manufacturing process of the discontinued type, commonly called "stop & go" by the expert is described, in connection with FIGURES 2, 3, and 4.

FIGURE 2 shows the diagram of a manufacturing process for rolls. A parent roll 103, made of tissue paper for example, is unwound at its support. Sheet F is driven toward the roll forming station. The parent roll 103 has a width of 2.60 m for example. The sheet is cut longitudinally in relation to its running direction by means of knife blades 105. Thus, a sheet with a width of 2.60 m can be cut into 13 strips 100 that are 20 cm wide. The strips 100 are guided to make them come to a set of two cylinders 107 and 109 that are laid out side by side. Once the downstream ends 100A have passed cylinder 109, a spindle 111, that may or may not be outfitted with cores, is placed onto strips 100, near the hollow created between the two cylinders 107 and 109, upstream of the downstream ends 100A. A means 115 displaces the ends 100A of strips 100 above the spindle 111 that may or may not be outfitted with a core. Preferably, this means comprises air jets that are suitably directed. It can be seen from FIGURE 3 that the end is in the process of being flipped back. Next there is lowered a supporting cylinder 113, whose function is to hold the ends 100A onto the spindle 111 that may or may not be outfitted with cores, as well as spindle 111 that may or may not be outfitted with cores onto the two cylinders 107 and 109, and to compress the sheet during winding. The rotary drive of at least one of cylinders 107, 109 or 113 is commanded; this drives spindle 111 as well as strips 100. Rewinding starts and rolls 110' are formed.

In accordance with the invention, we placed on the path of strips 100 a bonding agent applying means 118 for connecting the windings to each other. This bonding agent can be water, but an adhesive substance can also be used. This means is for example placed upstream from cylinders 107 and 109, and applies the bonding agent on the surface of sheets 100. In the case of a liquid agent, the applying means is preferably a sprayer. The surface of the sheet that receives the sprayed liquid, the amount applied, the continuous or discontinuous application

mode, in particular, are determined according to need. Due to the pressure exerted onto the sheet during winding, water for example permits, in the areas of contact of the windings between each other, the forming of bonds between the tissue fibers. These bonds permit the connecting of the windings. However, this connection is accomplished in such a way as to ensure an easy separation of the bonded windings during normal unwinding operation either through the center or tangentially.

The applying of the bonding agent may or may not be interrupted until the rolls are formed.

According to another characteristic of the invention, the applying of the bonding agent is temporarily interrupted and subsequently resumed so as to form another set of bonded windings, separated from the first one by a set of non bonded windings. This succession of non bonded and bonded windings may be repeated at will. It is understood that the selection of the number of bonded winding sets depends on the targeted objective, on their frequencies, and on the dimensions of the roll. A wide roll with a large diameter shall incorporate several areas to accommodate the unwinding and to prevent the walls from collapsing when in use or at any other time.

According to another characteristic of the invention, the bonding agent application varies between each roll or between each bonded winding of the same roll, according to at least one of the following parameters: nature of the bonding agent deposited, its quantity, its position in relation to the sheet, the surface, or the shape covered.

Upon reaching the desired diameter, the spindle-and-rolls set is taken away. The plurality of strips 100 is cut by means of a transversal knife. After winding of the end of strips 100, the rolls are extracted. In the case of a coreless roll, this operation will be facilitated by the use of a conical spindle or, as is known from the prior art, by the use of a mechanized spindle with an adjustable diameter. In order to permit an easier extraction, these spindles may or may not be coated with a coating that reduces their coefficient of friction.

According to another manufacturing process, a cylinder without any longitudinal cutting 105 is formed upstream from the winding. Upon extraction of the winding support, this cylinder is sawn off into individual rolls.

According to another characteristic of the invention, the technique detailed in the two patent applications mentioned above, filed on behalf of this applicant, namely WO2005/005295 and FR 2 869 891, is applied. According to this technique, the objective is to create a leader for grabbing purposes by displacing, laterally in relation to the running direction, the end of sheet 100A constituting the first winding. This portion then juts out from the roll and ensures that the sheet will be extracted without any problem.

Another process for forming a leader for unwinding purposes is represented on FIGURE 5. A cylinder 200 with a diameter less than that of the central hole has perforations 210. It is connected to a vacuum source not shown in the FIGURE. After having formed the rolls according to the invention and after having removed the core, if any, cylinder 200 is introduced

into the central hole and the inside of the cylinder is placed in the suction mode. As the first winding is free, it is drawn against cylinder 200 due to the suction. Cylinder 200 is then rotated by a fraction of a rotation on itself in a predetermined direction, it is then extracted from the roll. The sheet is then driven by the movement. When the extracted sheet exceeds the desired length from the side of the roll, the vacuum is cut and the cylinder is taken away. The roll is thus ready for use.

CLAIMS

1. A roll comprising a sheet of flexible material, the roll being wound around a reeling axis with a hole in the center of the roll and including a first set of windings bonded to each other, the roll including a second set of windings that are not bonded to each other, between said center hole and the first set.

2. A roll according to claim 1, wherein the flexible material is absorbent fibrous material.

3. A roll according to claim 1 or 2, wherein a number of windings of the second set is greater than or equal to 2.

4. A roll according to any one of claims 1 to 3, wherein a number of windings of the first group is greater than or equal to 2.

5. A roll according to any one of claims 1 to 4, including a succession of sets of noncontiguous bonded windings, which sets are separated from each other by non bonded windings.

6. A roll according to any one of claims 1 to 5, wherein the bonded windings incorporate a bonding agent.

7. A roll according to claim 6, wherein the bonding agent is a liquid substance.

8. A roll according to claim 7, wherein the liquid substance is water or an adhesive substance.

9. A roll according to any one of claims 6 to 8, wherein the bonding agent, between each bonded winding of the same roll, varies according to at least one of the following parameters: nature of the bonding agent deposited, quantity of the bonding agent deposited, position of the bonding agent deposited, surface or shape covered.

10. A roll according to any one of claims 1 to 9, wherein the roll is of the tight winding type.

11. A roll according to any one of claims 1 to 9, wherein the roll is of the center pull type.

12. A roll according to claim 11, wherein a free end of the first winding from the center hole is laterally staggered.

13. A roll according to any one of claims 1 to 9, wherein the roll is of the tangential unwinding type.

14. A manufacturing process for a roll according to any one of claims 1 to 13, comprising the steps of winding a sheet around a winding axis and applying a bonding agent to bond the windings of the first set to each other, after forming a specific number of windings that are not bonded to each other.

15. A process according to claim 14, wherein the bonding agent application is accomplished by projecting a liquid substance.

16. The process according to claim 15, wherein the liquid substance is water or an adhesive substance.

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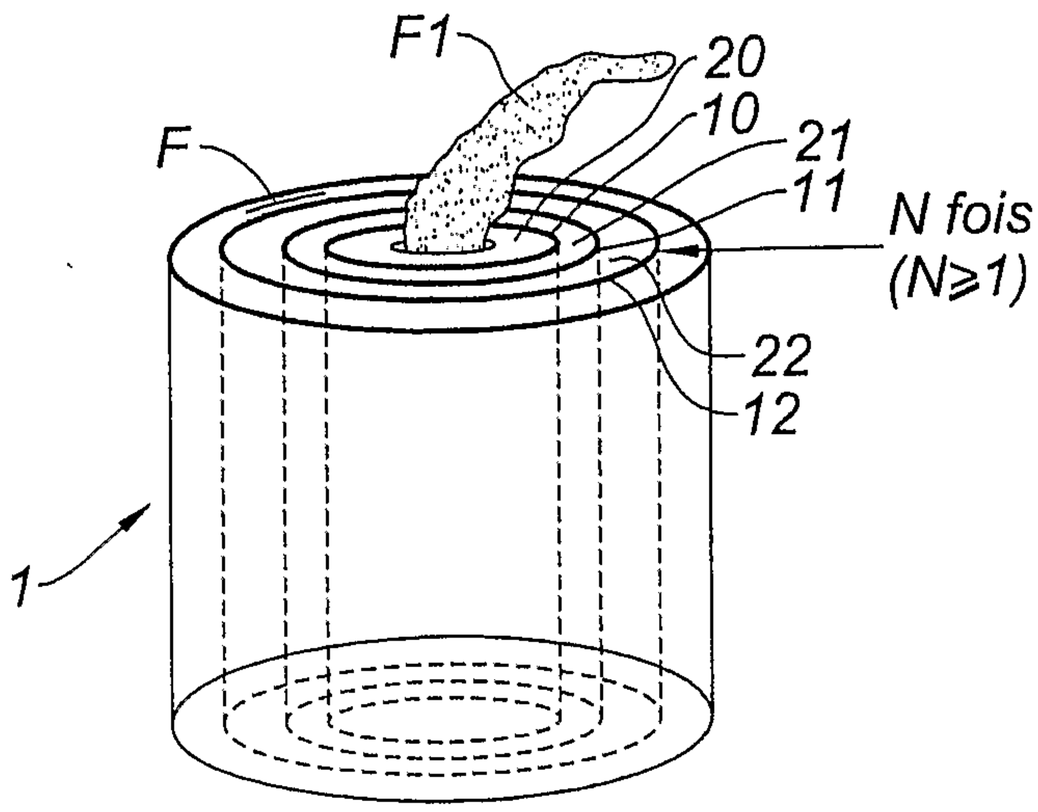


Fig. 1

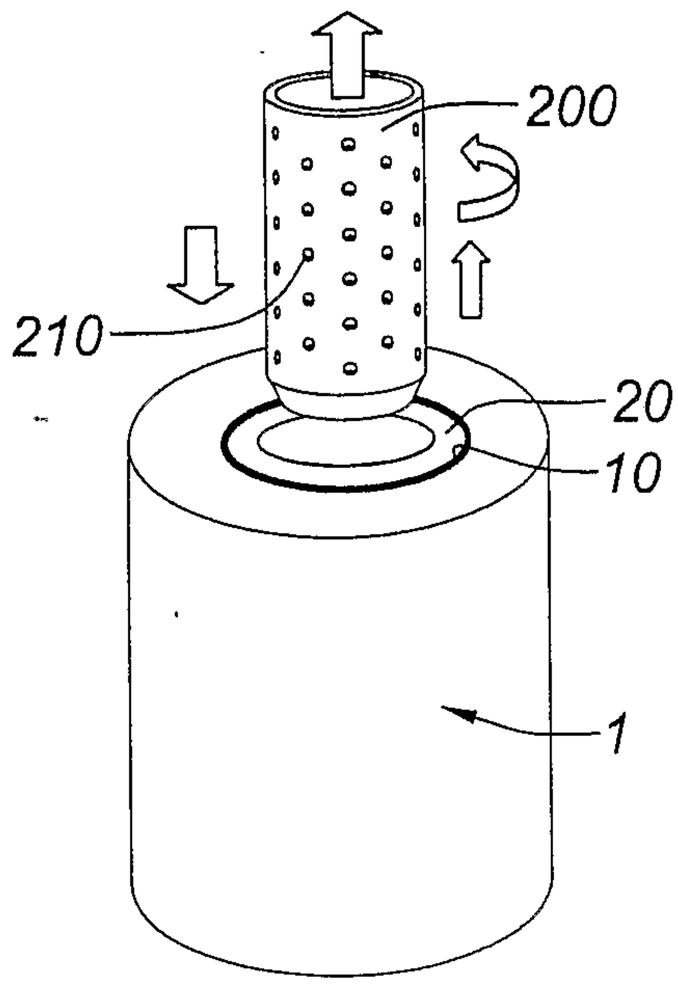


Fig. 5

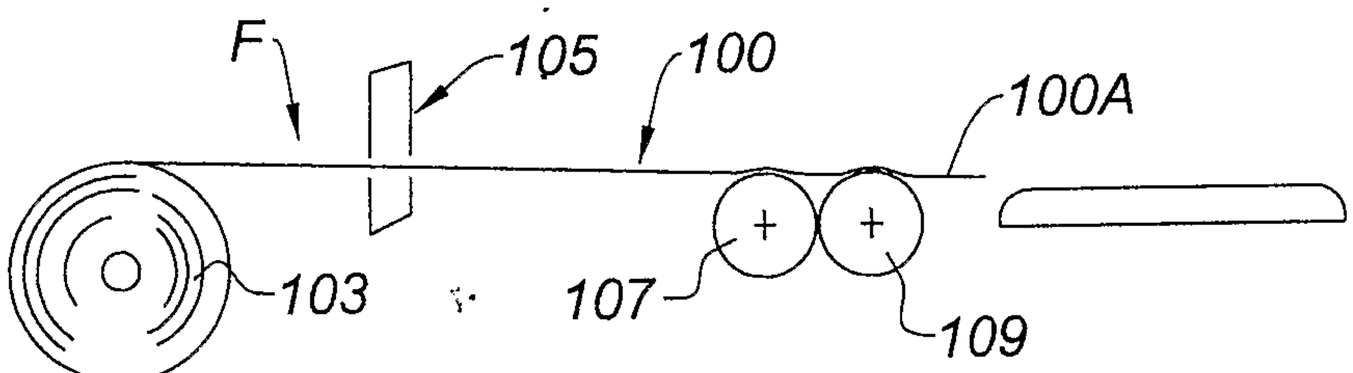


Fig. 2

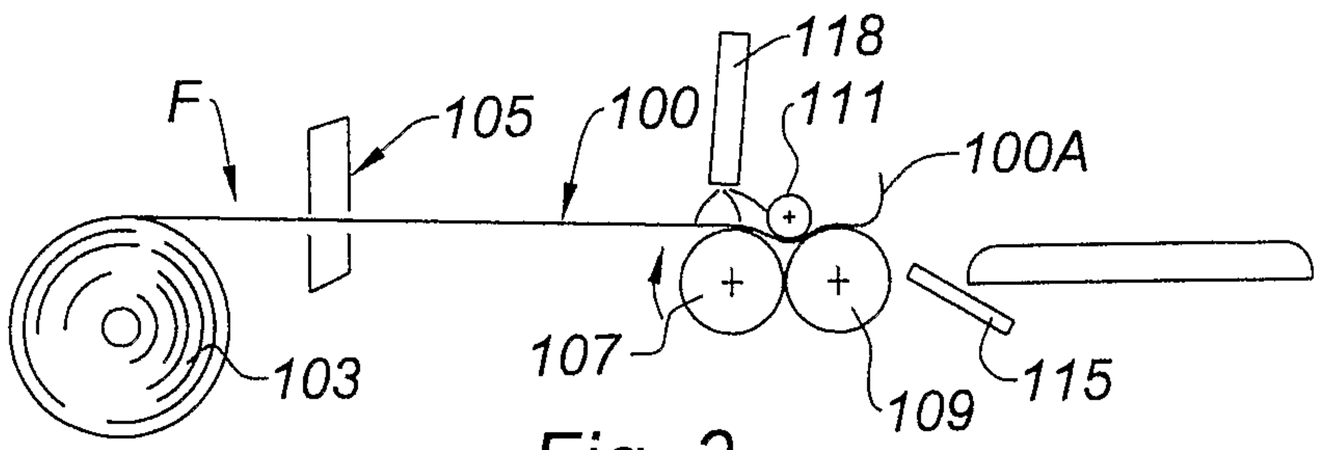


Fig. 3

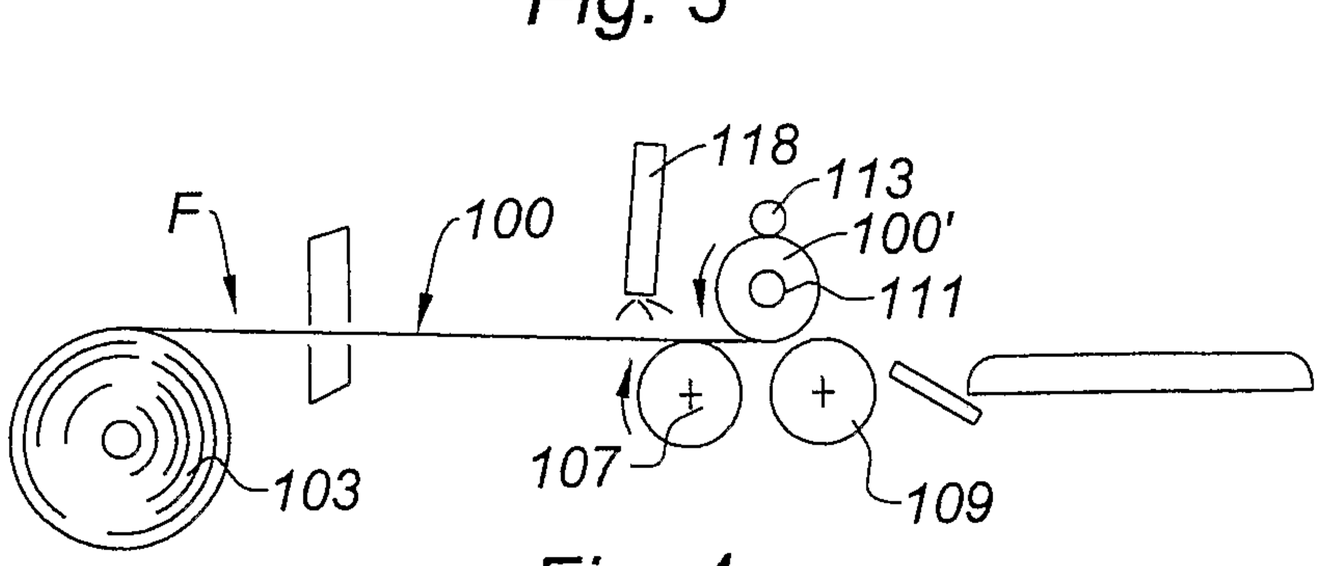
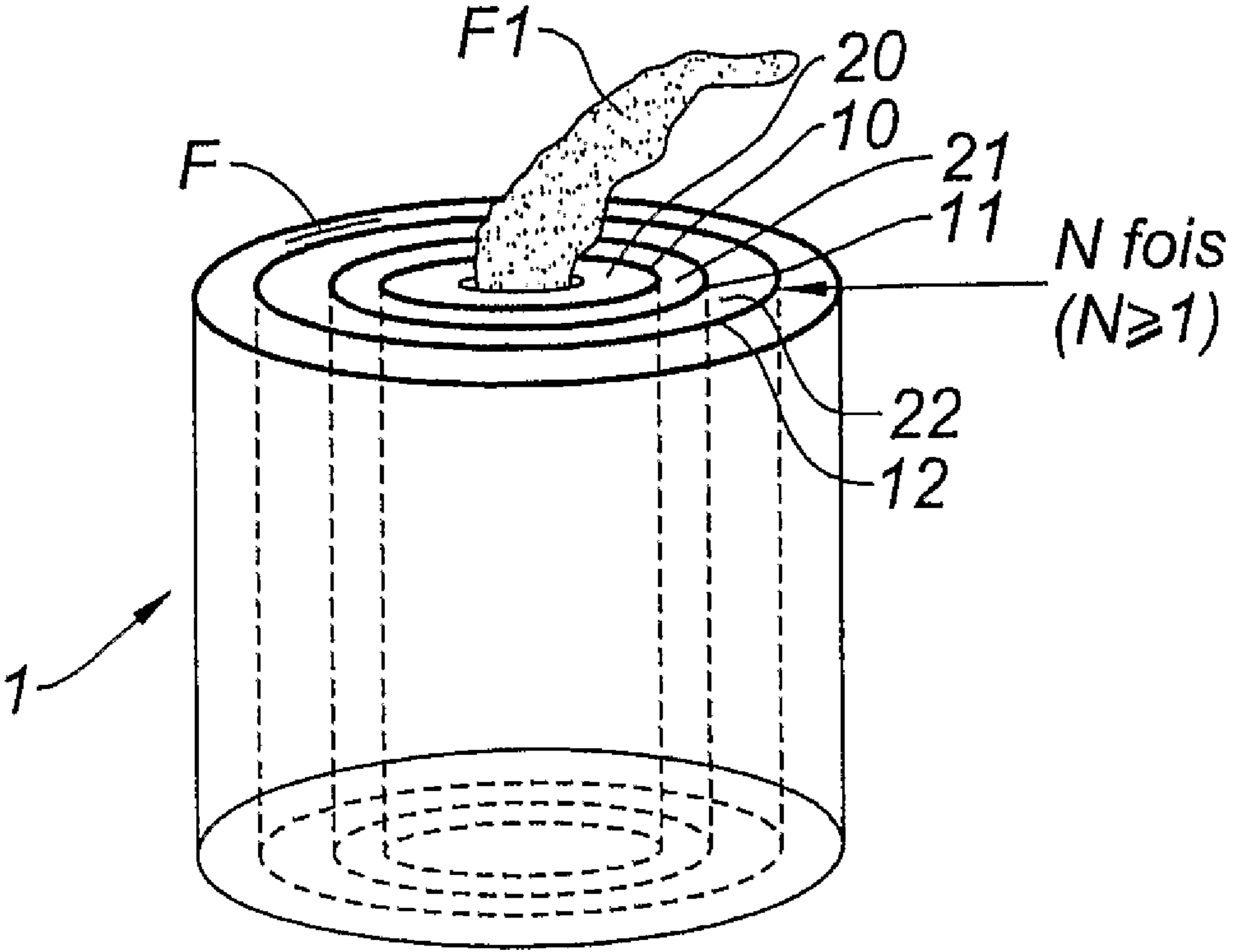


Fig. 4


F1
20
10
21
11
F
N fois
(N≥1)
22
12
1