A refill film for a waste disposal apparatus includes: a film annular body that is formed by a long tubular film folded so as to be compressed in an extending direction thereof; and a wrapping sheet that is made of a material capable of being cut, and wraps the film annular body while keeping a central hole of the film annular body open, and maintains the compressed state. Such a refill film is directly placed in a waste inlet of the waste disposal apparatus.
REFILL FILM FOR WASTE DISPOSAL APPARATUS, REFILL FILM ACCOMMODATING CASSETTE, AND PORTABLE WASTE DISPOSAL BAG

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to waste disposal apparatuses for disposing of waste materials such as soiled diapers, and more particularly to parts that are preferable for replacement, refill, and portable applications.

[0003] 2. Description of the Background Art

[0004] Since waste materials such as soiled diapers give off unpleasant odors, it is desired to dispose of such waste materials at home hygienically and efficiently. A waste storage device disclosed in Japanese Patent Publication No. 2009-96642 of unexamined applications is known as a waste disposal apparatus for implementing such a desire. This waste storage device includes a main body container, and an annular cassette attached to the upper end of the main body container. Tubing is folded and accommodated in the annular cassette. The user pulls out the tubing from the annular cassette, and places a waste material in the tubing, whereby the waste material is stored in the main body container.

SUMMARY OF THE INVENTION

[0005] If the tubing in the cassette runs out, the user typically replaces this used cassette in the waste storage device with a new (refill) cassette having tubing. Note that since some users are not familiar with the replacing operation, the (refill) cassettes are stereotyped.

[0006] That is, cassettes are shaped so as to be easily attached and detached to and from the main body container. Moreover, in cassette manufacturing plants, tubing is accommodated in the cassettes in a preferable manner so that the tubing can be easily pulled out. The cassettes are also shaped so that the user can easily pull out the tubing. The users as end users purchase tubing accommodating cassettes that are available on the market, and replace used cassettes with new ones.

[0007] However, such a conventional waste storage device has the following problems. Although being made of a durable resin material, the cassettes themselves are used only one time and thrown away. Nowadays, efforts are increasingly made to reduce waste, and such disposal of the cassettes is not desirable in terms of waste reduction. Moreover, the user needs to purchase a new cassette every time the tubing runs out. Thus, there is room for improvement in terms of cost.

[0008] In view of the above problems, the present invention is based on a novel idea that is totally different from the related art in which the waste storage device is supplied with refill tubing by replacing a cassette. It is an object of the present invention to provide a technique capable of eliminating the need to dispose of and purchase a cassette upon every replacement.

[0009] In order to achieve the above object, a refill film for a waste disposal apparatus according to the present invention is a refill film that is attached to a waste disposal apparatus for containing a waste material in a tubular film and disposing of the waste material. The refill film includes: a film annular body that is formed by a long tubular film folded so as to be compressed in an extending direction thereof; and a wrapping material that is made of a material capable of being cut, and wraps the film annular body while keeping a central hole of the film annular body open, and maintains the compressed state.

[0010] According to the present invention, the film annular body is wrapped by the wrapping material rather than by a cassette. Thus, the user of the waste disposal apparatus need only purchase the refill film, and does not have to purchase a cassette upon every time the tubular film runs out. This can eliminate the need to dispose of and purchase a cassette many times as in the related art.

[0011] Moreover, since the central hole of the film annular body is kept open, the user of the waste disposal apparatus can easily place the refill film in the waste disposal apparatus.

[0012] The wrapping material is not specifically limited as long as it is made of a material that can be torn with a force of a user’s hand. Possible shapes of the wrapping material include, e.g., a sheet, a string, a belt, and a block that can be easily broken with hand. Preferably, the wrapping material has a cut line for tearing off the wrapping material. According to this embodiment, the user can easily tear off the wrapping material after placing the refill film in the waste disposal apparatus.

[0013] The present invention is not limited to one embodiment, but the wrapping material may cover an outer peripheral surface, an axial end, and the other axial end of the film annular body, and exposes an inner peripheral surface of the film annular body. According to this embodiment, the wrapping material can compress the film annular body from both axial ends thereof, and the film annular body can be held in a compact shape. Thus, the refill film can be reduced in size.

[0014] The wrapping material is made of paper, a fiber material, or a resin film. According to this embodiment, the user can easily tear off the wrapping material after placing the refill film in the waste disposal apparatus.

[0015] As another embodiment, the wrapping material is a plurality of bands that are wound around the film annular body at predetermined intervals in a circumferential direction. This embodiment can further simplify the wrapping material, which is more advantageous in terms of cost.

[0016] The refill film of the present invention may be directly placed in the waste disposal apparatus. Alternatively, the refill film may be placed in a reusable refill film accommodating cassette, and the refill film accommodating cassette may be placed in the waste disposal apparatus.

[0017] Such a refill film accommodating cassette according to the present invention is an accommodating cassette that is attached to a waste disposal apparatus for containing a waste material in a tubular film to dispose of the waste material, and accommodates the refill film. The refill film accommodating cassette includes: a cylindrical portion that is inserted in the central hole of the film annular body; and an outward flange that is formed at one axial end of the cylindrical portion to prevent the film annular body from coming off from the refill film accommodating cassette.

[0018] According to the present invention, the refill film accommodating cassette can be repeatedly used, which eliminates the need to dispose of and purchase a cassette many times as in the related art.

[0019] As a preferred embodiment, the refill film accommodating cassette further includes an annular holding member that is detachably coupled to the other axial end of the cylindrical portion to prevent the film annular body from coming off from the refill film accommodating cassette. The
A tubular film that is pulled out from the film annular body is inserted through the central hole of the cylindrical portion beyond the holding member. According to this embodiment, the film annular body is immovably held from both axial sides. This can eliminate the possibility that the film annular body may come off from the refill film accommodating cassette.

A portable waste disposal bag according to the present invention is a portable bag includes a tubular body that is made of a bendable material. The tubular body surrounds an outer periphery of the refill film accommodating cassette, and an outer surface of the tubular film that is pulled out from the refill film accommodating cassette and passes through a central hole of the film accommodating cassette. One longitudinal end and the other longitudinal end of the tubular body are capable of being opened and closed, the refill film accommodating cassette is detachably attached to the one longitudinal end, and the tubular body is long enough that the other longitudinal end can be twisted by 360° or more with respect to the one longitudinal end.

According to the present invention, the user can dispose of waste materials hygienically and efficiently even at outdoor locations as at indoor locations.

Preferably, the portable waste disposal bag further includes a fastening device for restricting the length of the tubular body. According to this embodiment, the waste disposal bag can be adjusted to any length, which increases the convenience of carrying the waste disposal bag.

As described above, the refill film for the waste disposal apparatus according to the present invention includes: a film annular body that is formed by a long tubular film folded so as to be compressed in an extending direction thereof; and a wrapping material that is made of a material capable of being cut, and wraps the film annular body while keeping a central hole of the film annular body open, and maintains the compressed state. Thus, the user can repeatedly use the refill film for the waste disposal apparatus. This eliminates the need to dispose of and purchase a cassette, whereby waste reduction and cost reduction can be achieved.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**FIG. 1** is an overall perspective view of a waste disposal apparatus to which a refill film for the waste disposal apparatus and a refill film accommodating cassette according to an embodiment of the present invention are attached.

**FIG. 2** is a side cross section of the waste disposal apparatus of **FIG. 1**.

**FIG. 3** is a side cross section of the waste disposal apparatus of **FIG. 1**.

**FIG. 4** is an exploded perspective view of the accommodating cassette and a film annular body of the waste disposal apparatus of **FIG. 1**.

**FIG. 5** is a perspective view of the accommodating cassette of the embodiment.

**FIG. 6** is a perspective view of the refill film of the embodiment.

**FIG. 7** is a longitudinal cross section of the refill film of **FIG. 6**.

**FIG. 8** is a perspective view of the accommodating cassette of **FIG. 5** having the refill film of **FIG. 6** placed thereon.

**FIG. 9** is a perspective view of the accommodating cassette of **FIG. 8** with a wrapping sheet removed from the refill film.

**FIG. 10** is a perspective view of a refill film according to another embodiment of the present invention.

**FIG. 11** is a longitudinal cross section of the refill film of **FIG. 10**.

**FIG. 12** is an overall perspective view of a waste disposal bag according to an embodiment of the present invention.

**FIG. 13** is a perspective view illustrating how an outer ring is attached to a refill film accommodating cassette.

**FIG. 14** is a perspective view illustrating how a refill film and the refill film accommodating cassette are attached to the waste disposal bag of the embodiment.

**FIG. 15** is a perspective view of the waste disposal bag of the embodiment when in use.

**FIG. 16** is a side cross section illustrating how the film and waste materials are pulled out of the waste disposal bag of the embodiment.

**FIG. 17** is a perspective view of the waste disposal bag of the embodiment compressed to a compact size.

**DESCRIPTION OF THE PREFERRED EMBODIMENTS**

**FIG. 1** is an overall perspective view of a waste disposal apparatus to which a refill film for the waste disposal apparatus and a refill film accommodating cassette according to an embodiment of the present invention are attached. In **FIG. 1**, a film annular body and the refill film accommodating cassette are shown as being removed from the waste disposal apparatus. FIGS. 2 and 3 are side cross sections of the waste disposal apparatus of **FIG. 1**. FIG. 2 shows the waste disposal apparatus when a sealing door is closed, and FIG. 3 shows the waste disposal apparatus when the sealing door is open.

A waste disposal apparatus **11** includes: a waste inlet **16** for inserting a waste material **D** such as a soiled diaper therethrough; a tubular film **15** extending downward from the waste inlet **16** and having its lower end closed by a knot **26**; a waste accommodating main body **13** for receiving the waste material **D** inserted through the waste inlet **16**, together with the film **15**; and a lid **23** that covers the waste inlet **16** from above. The lid **23** pivots and rises about a lid hinge **30** as a fulcrum, and opens the waste inlet **16**.

The long tubular film **15** is attached to the waste inlet **16**. The tubular film **15** extends downward so as to cover the opening of the waste inlet **16**. Note that the tubular film **15** is accommodated in the waste inlet **16** so that the film **15** can be pulled out as described later. The waste inlet **16** is formed by the inner peripheral surface of a cylindrical portion **27**. A film annular body **15a** is coaxially attached to the outer peripheral surface of the cylindrical portion **27**. The film annular body **15a** is formed by the tubular film **15** folded so as to be compressed in the extending direction thereof. The cylindrical portion **27**, a film holding flange **29** provided at one axial end of the cylindrical portion **27**, and an outward flange **27t** provided at the other axial end of the cylindrical portion **27** are components of the accommodating cassette **14**.
The accommodating cassette 14 that accommodates the film annular body 15, is used to supply the tubular film 15 thereon. As shown by arrow in FIG. 1, the accommodating cassette 14 is detachably fitted on a ring-shaped attachment portion 19r formed in an upper part 19 of the waste accommodating main body 13. The attachment portion 19r contacts the outward flange 27f of the accommodating cassette 14 to support the accommodating cassette 14 from beneath. Since the attachment portion 19r is tilted downward toward the front face of the waste disposal apparatus 11, the waste inlet 16 is also tilted downward toward the front face of the waste disposal apparatus 11 and faces upward. The attachment portion 19r is thus tilted so that the front side thereof is located lower than the back side thereof, and a sealing door receiving portion 35 is positioned immediately below the front, lower region of the attachment portion 19r.

The waste accommodating main body 13 is a hollow container for storing waste materials D that are placed in the tubular film 15, and is divided into a lower part 17 and the upper part 19. The lower part 17 of the waste accommodating main body 13 has a bottom 17b at its lower end, and has an opening 17c at its upper end. The upper part 19 of the waste accommodating main body 13 covers, at its lower end, the opening 17c located at the upper end of the lower part 17, and has the waste inlet 16 at its upper end.

The upper part 19 of the waste accommodating main body 13 is pivotally attached to the lower part 17 thereof by a main body hinge 31. The main body hinge 31 is positioned on the back face of the waste accommodating main body 13. The opening 17c can be opened by pivoting the upper part 19 of the waste accommodating main body 13 backward.

As shown in FIG. 2, an open/close sealing door 33 and the sealing door receiving portion 35 are attached inside the upper part 19 of the waste accommodating main body 13. The sealing door 33 and the sealing door receiving portion 35 nip the tubular film 15 at a position between the waste inlet 16 and the stored waste material D to seal a space below the nipped portion of the tubular film 15 from a space above the nipped portion of the tubular film 15. The sealing door 33 advances and withdraws as it is guided by a guide member 37 provided inside the upper part 19 of the waste accommodating main body 13. The sealing door 33 is biased toward the sealing door receiving portion 35 by a spring 39, and in a normal state, is closed in an engaged state with the sealing door receiving portion 35.

When disposing of a waste material D, as shown in FIG. 3, the user of the waste disposal apparatus 11 first opens the lid 23 to place the waste material D into the tubular film 15 from the waste inlet 16. Then, the user inserts his/her hand into the waste inlet 16, and pushes the tubular film 15 down together with the waste material D to open the sealing door 33. The waste material D thus pushed down, together with the tubular film 15, passes between the opened sealing door 33 and the sealing door receiving portion 35. The waste material D then drops downward along the tubular film 15, and is stored in the waste accommodating main body 13. As soon as the user drops the waste material D to a position below the sealing door 33 and the sealing door receiving portion 35, and removes his/her hand from the waste inlet 16, the sealing door 33 closes to nip the tubular film 15. Since a new length of the tubular film 15 is pulled out from the waste inlet 16, the waste inlet 16 is always supplied with a new length of the tubular film 15.

By disposal of waste materials such as soiled diapers into the tubular film 15, the waste materials are accumulated in the tubular film 15, and upon each disposal, the tubular film 15 is pulled out from the outer diameter side of the cylindrical portion 27 beyond the film holding flange 29 so as to extend downward through the waste inlet 16. Thus, the user can successively dispose of waste materials into the waste accumulating main body 13.

The tubular film 15 is a consumable item. Thus, if the tubular film 15 attached to the waste inlet 16 runs out, the user places a refill film accommodating portion 15f on the outer periphery of the waste inlet 16.

FIG. 4 is an exploded perspective view of the accommodating cassette 14 and the film annular body 15f. FIG. 5 is a perspective view of the accommodating cassette of the embodiment. The accommodating cassette 14, which forms the waste inlet 16 and accommodates the film annular body 15, is detachably attached to the waste disposal apparatus 11. Specifically, the accommodating cassette 14 is detachably attached to the upper part 19 of the waste accommodating main body 13, and forms the outline of the waste inlet 16. The accommodating cassette 14 is made of a resin that is not easily deformed, and has the cylindrical portion 27, the outward flange 27f, and the film holding flange 29. The cylindrical portion 27 is inserted through a central hole of the film annular body 15, so that the outer peripheral surface of the cylindrical portion 27 contacts the film annular body 15f. The inner peripheral surface of the cylindrical portion 27 forms the waste inlet 16. The outward flange 27f is integrally connected to the lower end of the cylindrical portion 27. The outer flange 29 is fitted and fixed to the upper end of the cylindrical portion 27. The outer diameter of the film holding flange 29 is smaller than that of the film annular body 15f. This allows the tubular film 15 to be easily pulled out beyond the film holding flange 29.

FIG. 6 is a perspective view of a refill film 18 that is attached to the accommodating cassette 14. FIG. 7 is a longitudinal cross section of the refill film 18 of FIG. 6. The refill film 18 includes the film annular body 15f, which is formed by the long tubular film 15 folded so as to be compressed in the extending direction thereof, and a wrapping sheet 21, which wraps the film annular body 15f with its central hole 15g open to maintain the shape of the film annular body 15f.

The film annular body 15f is formed by accordion folding the long tubular film 15, and has a cylindrical shape having a thickness in the radial direction.

The wrapping sheet 21 is a wrapping material made of thick paper, and has a cylindrical portion 21f that covers the outer peripheral surface of the film annular body 15f, one annular end 21b that covers one axial end of the film annular body 15f, and the other annular end 21c that covers the other axial end of the film annular body 15f. Thus, an inner peripheral surface 15g of the film annular body 15f is exposed.

FIG. 8 is a perspective view of the refill film accommodating cassette 14 of the present embodiment having the refill film 18 of the present embodiment placed thereon. FIG. 9 is a perspective view of the refill film accommodating cassette 14 of FIG. 8 with the wrapping sheet 21 removed from the refill film 18.

The axial dimension of the refill film 18 is smaller than that of the accommodating cassette 14, that is, smaller than the distance from the film holding flange 29 to the outward flange 27f. Thus, the user can easily place the refill film 18 on the accommodating cassette 14.
The wrapping sheet 21 of the refill film 18 has cut lines 21a extending from the one end 21b to the other end 21c along the cylindrical portion 21a. The cut lines 21a are perforated lines, and are provided at regular intervals in the circumferential direction of the wrapping sheet 21. After placing the refill film 18 on the accommodating cassette 14, the user tears off the wrapping sheet 21 along the cut lines 21a, whereby the film annular body 15k is exposed as shown in FIG. 9.

The film annular body 15k is accommodated between the film holding flange 29 and the outward flange 27f. Note that when removing the wrapping sheet 21, the film annular body 15k may slightly expand axially. However, even if the wrapping sheet 21 is removed, the film annular body 15k is prevented from coming off axially from the accommodating cassette 14 by the film holding flange 29 and the outward flange 27f; and the compressed state of the film annular body 15k is maintained.

The operation of placing the film annular body 15k on the accommodating cassette 14 is completed in this manner. The accommodating cassette 14 and the film annular body 15k are attached to the upper part 19 of the waste accommodating main body 13 as described above with reference to FIG. 1. Every time the film annular body 15k runs out, the accommodating cassette 14 is removed from the upper part 19 of the waste accommodating main body 13, and a new refill film 18 is placed on the removed accommodating cassette 14. In this manner, the accommodating cassette 14 is repeatedly attached to the upper part 19 of the waste accommodating main body 13.

Note that in order to more efficiently place the refill film 18 in the waste disposal apparatus 11, the cylindrical portion 27 and the outward flange 27 are kept attached to the attachment portion 19a of the upper part 19 of the waste accommodating main body 13, so that only the film holding flange 29 can be attached and detached to and from the waste disposal apparatus 11. When placing the refill film 18, the user first opens the lid 23, and then removes the film holding flange 29 to insert the refill film 18 onto the cylindrical portion 27 fixed to the upper part 19 of the waste accommodating main body 13. Then, the user attaches and fixes the film holding flange 29 to the cylindrical portion 27, and tears off the wrapping sheet 21. In this manner, the refill film 18 can be directly placed in the waste disposal apparatus 11.

The refill film 18 of the present embodiment includes the film annular body 15k that is formed by the long tubular film 15 folded so as to be compressed in the extending direction thereof, and the wrapping sheet 21 that is made of thick paper and wraps the film annular body 15k with the central hole 15b open to maintain the compressed state of the film annular body 15k. Thus, the user can repeatedly use the accommodating cassette 14 for the waste disposal apparatus 11. This eliminates the need to dispose of the accommodating cassette 14 and to purchase a new accommodating cassette 14, whereby waste reduction and cost reduction can be achieved.

Although not shown in the figures, as a modification of the cylindrical portion 27 and the outward flange 27 may be fixedly attached to the upper part 19 of the waste accommodating main body 13, and only the film holding flange 29 may be detachable from the upper part 19 of the waste accommodating main body 13. According to this modification, the user need only place the refill film 18 in the upper part 19 of the waste accommodating main body 13 and tear off the wrapping sheet 21 each time the tubular film 15 runs out. Thus, waste reduction and cost reduction can be achieved.

Note that the wrapping sheet 21 may be made of paper other than the thick paper, or may be made of fibers such as cloth, or a resin film.

The accommodating cassette 14 of the present embodiment is used to accommodate the refill film 18. The accommodating cassette 14 includes the cylindrical portion 27 that is inserted into the central hole 15b of the film annular body 15k, the outward flange 27 that is formed at one axial end of the cylindrical portion 27 to prevent the film annular body 15k from coming off from the accommodating cassette 14, and the annular film holding flange 29 that is detachably coupled to the other axial end of the cylindrical portion 27 to prevent the film annular body 15k from coming off from the accommodating cassette 14. The tubular film 15, which is pulled out from the film annular body 15k, is inserted through the waste inlet 16 as a central hole of the cylindrical portion 27 beyond the film holding flange 29. According to the present embodiment, the tubular film 15 can be pulled out while maintaining the compressed state of the film annular body 15k.

Another embodiment of the present invention will be described below. FIG. 10 is a perspective view of a refill film 18 according to this embodiment. FIG. 11 is a longitudinal cross section of the refill film 18 of this embodiment. In this embodiment, structures common to those of the above embodiment are denoted by the same reference characters, and description thereof will be omitted. Structures different from those of the above embodiment will be described below.

In this embodiment, bands 22 are wound around the film annular body 15k at predetermined intervals in the circumferential direction. The bands 22 are wrapping sheets for maintaining the compressed state of the film annular body 15k. The bands 22 have cut lines 21a as perforated lines.

This embodiment simplifies wrapping of the refill film 18, whereby further cost reduction can be achieved. Moreover, the user needs to prepare only a new refill film 18 when the tubular film 15 runs out, namely when the film annular body 15k in the accommodating cassette 14 runs out. Thus, the accommodating cassette 14 can be repeatedly used for the waste disposal apparatus 11. This eliminates the need to dispose of the accommodating cassette 14 and to purchase a new accommodating cassette 14, whereby waste reduction and cost reduction can be achieved.

The waste disposal apparatus 11 of the present embodiment includes the film accommodating cassette 14, which has the cylindrical portion 27 that forms the waste inlet 16 at its upper end, and which accommodates the film annular body 15k that is compressed in a cylindrical shape so as to surround the cylindrical portion 27. The waste disposal apparatus 11 further includes: the waste accommodating main body 13, which has the film accommodating cassette 14 positioned in its upper region, and which receives a waste material, which is placed into the tubular film 15 pulled out into the waste insert 16, together with the tubular film 15, and an open/close sealing mechanism that nips the tubular film 15 at a position between the film accommodating cassette 14 and the lower part 17 of the waste accommodating main body 13 to seal a space below the nipped portion of the tubular film 15 from a space above the nipped portion of the tubular film 15.

This sealing mechanism has the sealing door 33 and the sealing door receiving portion 35. When the sealing door 33 is closed and engages with the sealing door receiving......
portion 35 to nip the tubular film 15, the sealing door 33 and the sealing door receiving portion 35 laterally bend the nipped portion of the tubular film 15. More specifically, each of the sealing door 33 and the sealing door receiving portion 35 has a convexo-concave shape that laterally bends an imaginary straight line that connects upper and lower ends of the nipped portion of the tubular film 15.

According to this embodiment, sealing the waste material D placed and stored in the tubular film 15 from the waste inlet 16 is implemented by nipping of the tubular film 15 by the sealing door 33 and the sealing door receiving portion 35. Moreover, since the nipped portion of the tubular film 15 is not bent linearly but laterally with respect to the imaginary straight line, the tubular film 15 is subjected to a high tension at a bent portion. Such a tension narrows a path in the tubular film 15 which causes leakage of odors, whereby a capability of blocking passing of odors, namely, an odor-sealing capability, can be increased.

In the present embodiment, each of the contact surfaces of the sealing door 33 and the sealing door receiving portion 35, which are formed when the sealing door 33 is closed and engages with the sealing door receiving portion 35, has two or more flat surfaces having different normals. Thus, the bent portion is reliably formed in the nipped portion, and the odor-sealing capability can further be increased.

In the present embodiment, when the sealing door 33 moves in the closing direction, the nipping portion of the sealing door 33 moves toward the nipping portion of the sealing door receiving portion 35. When the sealing door 33 moves in the opening direction, the nipping portion of the sealing door 33 moves away from the nipping portion of the sealing door receiving portion 35. In a cut-away view of the nipping portions of the sealing door 33 and the sealing door receiving portion 35 along a vertical plane including the opening and closing directions, at least two surfaces of each of the contact surfaces of the sealing door 33 and the sealing door receiving portion 35 cross each other to form an L-shaped corner. Thus, when nipped by the sealing door 33 and the sealing door receiving portion 35, the tubular film 15 is bent in an L shape at least at one position. The tubular film 15 is pulled downward at the L-shaped corner by the weight of the waste material D. That is, the tubular film 15 is subjected to a tension at the L-shaped corner. This narrows a path in the tubular film 15, whereby the odor-sealing capability can further be increased. Such L shapes can be easily formed when mass producing the sealing door 33 and the sealing door receiving portion 35 by a die molding method. Thus, the present invention is advantageous in terms of mass production of products.

In the present embodiment, the waste disposal apparatus 11 further includes the spring 39 for biasing the sealing door 33 in the closing direction. This increases the force for nipping the tubular film 15, whereby the odor-sealing capability can further be increased. The spring 39 may be in other form as long as it is an elastic member.

In the present embodiment, in the waste disposal apparatus 11 placed on the floor in a room, the cylindrical portion 27 is supported by the waste accommodating main body 13 so that the axis of the cylindrical portion 27 crosses a vertical plane at a predetermined angle. This makes it easy for mothers to insert the waste material D through the waste inlet 16 without standing up after changing diapers while sitting on the floor.

In the present embodiment, the cylindrical portion 27 is supported in a tilted state by the waste accommodating main body 13 so that the axis of the cylindrical portion 27 crosses the vertical plane at the predetermined angle and the front side of the cylindrical portion 27 is located lower than the rear side thereof. Moreover, the contact surfaces of the sealing door 33 and the sealing door receiving portion 35, which are formed by engagement between the sealing door 33 and the sealing door receiving portion 35, are positioned near the lower region of the lower surface of the tilted outward flange 27. Thus, the tubular film 15, which is accommodated so as to be able to be pulled out from the waste inlet 16, passes vertically downward through the cylindrical portion 27 supported in a tilted state, and is accommodated together with the waste material D in the waste accommodating main body 13. The upper side of the tubular film 15 is pulled vertically downward by the weight of the waste material D placed and stored in the lower part of the tubular film 15 due to the gravity.

The tubular film 15 is drawn forward by this gravity and the tilt of the cylindrical portion 27. The sealing mechanism is positioned so that the tubular film 15 is tilted at a position near the lower region of the lower surface of the outward flange 27 to which the tubular film 15 is naturally drawn. This ensures nipping of the tubular film 15 by the sealing mechanism, whereby odor-sealing efficiency can be increased.

In the present embodiment, the sealing door 33 is supported at a predetermined angle with respect to a horizontal plane, and advances and withdraws to and from the sealing door receiving portion 35. Thus, mothers can easily push the sealing door 33 open without standing up after changing diapers in a sitting posture. This facilitates the operation of placing the waste material D into the waste disposal apparatus 11.

The accommodating cassette 14 of the present invention having the refill film 18 placed thereon is attached not only to the waste disposal apparatus 11 placed on the floor in a room, but also to a portable waste disposal bag that can be carried outside.

FIG. 12 is an overall perspective view of a waste disposal bag according to an embodiment of the present invention. FIGS. 13-14 are diagrams illustrating how to attach an accommodating cassette to the waste disposal bag of the embodiment. FIG. 15 is a perspective view of the waste disposal bag of the embodiment when in use. FIG. 16 is a side cross section illustrating how a film and waste materials are pulled out of the waste disposal bag of the embodiment. FIG. 17 is a perspective view of the waste disposal bag of the embodiment compressed to a compact size.

A waste disposal bag 51 includes a tubular body which is made of bendable cloth such as chemical fibers. The tubular body is main body of the waste disposal bag 51 and the tubular body is formed in a tubular shape. The bendable cloth is a material that blocks passing of odors. Alternatively, this cloth is coated with a material that blocks passing of odors. Lids 52, 53 are provided at both ends of the waste disposal bag 51 to seal the space inside the waste disposal bag 51 from the outside. Zippers 54, 55 are provided at both ends of the waste disposal bag 51. Both ends of the waste disposal bag can be opened by opening the zippers 54, 55 and lifting the lids 52, 53. The zipper 54 at one end is provided to open a waste inlet by lifting the lid 52. A handle 56 is sewn on the surface of the lid 52 so that the user can conveniently carry the waste dis-
posal bag 51. A fixing belt 58 is wound around the one end of the waste disposal bag 51. Two fastening members 60, which are rectangular rings, are attached to the circumferential fixing belt 58 at intervals in the circumferential direction.

The inner peripheral surface of the portion of the waste disposal bag 51, to which the fixing belt 58 is attached, surrounds the film annular body 15k and the accommodating cassette 14 which are described above with reference to FIG. 9. More specifically, as shown in FIG. 13, an end of the tubular film 15 is first pulled out from the film annular body 15k. This end of the tubular film 15 passes beyond the film holding flange 29 through the central hole of the cylindrical portion 27 (the waste inlet 16), and a knot 26 is tied at this end. Then, as shown by arrow in FIG. 13, an outer ring 24 is placed on the outer periphery of the film annular body 15k so that one axial end 25 of the outer ring 24 is fitted on the outer edge of the outward flange 27r. The outer ring 24 is cylindrical in shape having openings at both ends, and has an inner diameter dimension large enough to surround the outer periphery of the film annular body 15k. The outer ring 24 is formed by a durable, strong resin. Circumferential ribs 28 are formed in two parallel rows in the outer peripheral surface of the outer ring 24. The distance between the two rows of the ribs 28 is the same as the width dimension of the fixing belt 58.

Then, as shown in FIG. 14, the zipper 54 is opened, and the lid 52 is lifted open. In this state, the accommodating cassette 14, which has a refill film placed thereon and is fitted in the outer ring 24, is inserted together with the tubular film 15 and the knot 26, which have passed through the central hole (the waste inlet 16), in the direction shown by arrow, and is thus attached to the waste disposal bag 51. Thereafter, the fixing belt 58 is fastened to firmly attach the film annular body 15k and the accommodating cassette 14 to one end of the waste disposal bag 51. The fixing belt 58 is latched between the two parallel rows of the ribs 28, 28 via the fabric of the waste disposal bag 51, and is wound around the outer periphery of the outer ring 24. Thus, the waste disposal bag 51 surrounds the outer peripheries of the film annular body 15k and the accommodating cassette 14, and the outer wall of the tubular film 15 that is pulled out from the accommodating cassette 14 and passes through the central hole of the accommodating cassette 14 (the waste inlet 16).

Note that as another embodiment, the outer ring 24 may be omitted, and the outward flange 27r may be detachably and directly attached and fixed to the inner wall of the waste accommodating bag 51.

Alternatively, as still another embodiment, the outer ring 24 may be omitted, and only one end 21b (FIG. 7) of the wrapping sheet 21 may be removed and the cylindrical portion 21a of the wrapping sheet 21 may be left when tearing off the wrapping sheet 21. Then, the fixing belt 58 may be wound around the outer wall of the cylindrical portion 21a of the wrapping sheet 21 so that the film annular body 15k and the accommodating cassette 14 are attached to the waste disposal bag 51.

The knot 26, which is tied at the end of the tubular film 15 that is pulled out from the accommodating cassette 14 so as to pass through the waste inlet 16, reaches the other end of the waste disposal bag 51 from one end thereof through the inside of the waste disposal bag 51. Thus, waste materials such as soiled diapers can be placed and stored in the tubular film 15.

While the zipper 54 is closed, the lid 52 seals the waste inlet 16. Thus, odors of the waste materials do not leak out of the waste disposal bag 51.

The waste disposal bag 51 of the present embodiment is preferable for portable applications, and enables the user to hygienically and efficiently dispose of waste materials such as soiled diapers. The waste disposal bag 51 is long enough that the other longitudinal end of the waste disposal bag 51 can be twisted by 360° or more with respect to one longitudinal end thereof. First, the user twists the waste disposal bag 51 by 360° or more as shown in FIG. 15 to prevent odors of stored waste materials D from leaking out of the waste disposal bag 51. Then, the user opens the zipper 54 to place a waste material D through the waste inlet 16, and finally closes the zipper 54. Disposal of the waste material D is completed in this manner. According to the waste disposal bag of the present embodiment, the user can successively dispose of waste materials D. Since the waste materials D are covered by the tubular film 15, and are sealed by the waste disposal bag 51, the waste disposal bag 51 is hygienic.

When the waste disposal bag 51 is filled with waste materials D, the user opens the zipper 55 at the other end of the waste disposal bag 51 as shown in FIG. 16, and removes the waste materials D together with the tubular film 15 from the other end of the waste disposal bag 51. After removing all the waste materials D from the other end of the waste disposal bag 51, the user ties a knot, and cuts the bag of the tubular film 15 at the knot. The waste disposal bag 51 is thus emptied, and is ready for reuse. Note that at this time, a new length of the tubular film 15 is pulled out from the accommodating cassette 14, and thus the waste disposal bag 51 is always hygienic. The greater the overall length of the waste disposal bag 51 is, the more waste materials the waste disposal bag 51 can store.

As shown in FIG. 17, the user can compress the waste disposal bag 51 to a compact size when carrying the empty waste disposal bag 51. That is, fastening bands 62 are sewn on the lid 53. The fastening bands 62 are radially arranged on the outer edge of the surface of the circular lid 53. In the present embodiment, two fastening bands 62 are provided at intervals in the circumferential direction. A pair of hook-and-loop fasteners 64 is sewn in the central part of each fastening band 62.

The fastening members 60 and the fastening bands 62 are fastening devices for restricting the length of the waste disposal bag 51. The waste disposal bag 51 can be compressed to a compact size by first inserting the fastening bands 62 through the fastening members 60, namely the rectangular rings, and then folding back ends 62c of the fastening bands 62 and pressing the hook-and-loop fasteners 64 together. Thus, the user can carry the waste disposal bag 61 in a preferred size. Moreover, the waste disposal bag 51 can be adjusted to any length by selecting the pressing positions of the hook-and-loop fasteners 64, which increases the convenience of carrying the waste disposal bag 51.

After using the waste disposal bag 51, the user can loosen the fixing belt 58 to separate the accommodating cassette 14 from the waste disposal bag 51. Then, the user attaches the accommodating cassette 14 to the attachment portion 19r of the waste disposal apparatus 11. Note that when placing the refill film 18 on the accommodating cassette 14, the cylindrical portion 27 and the outward flange 27r of the accommodating cassette 14 may be kept attached to the attachment portion 19r. In this case, only the film holding flange 29 can be detached when placing the refill film 18 on
the accommodating cassette 14. According to the present embodiment, since the refill film 18 can be directly placed in the waste disposal apparatus 11, the accommodating cassette 14 need not be thrown away when placing the refill film 18 on the accommodating cassette 14.

[0093] Although the embodiments of the present invention are described above with reference to the drawings, the present invention is not limited to the illustrated embodiments. Various modifications and variations can be made to the illustrated embodiments within a scope that is the same as, or equivalent to the present invention.

[0094] For example, the film holding flange 29 can be omitted in the case where the film annular body 15 is maintained in the compressed state even after removing the wrapping sheet 21, and is stationarily placed in this state on the outer periphery of the cylindrical portion 27. If the tubular film 15 is neatly accordion folded to form the film annular body 15, the tubular film 15 is sequentially pulled out from the accommodating cassette 14 and passes through the central hole of the cylindrical portion 27 to cover the waste inlet 16, even if the film holding flange 29 is not provided.

[0095] The refill film, the accommodating cassette, and the like according to the present invention are advantageously used in waste disposal apparatuses.

What is claimed is:

1. A refill film for a waste disposal apparatus, which is attached to said waste disposal apparatus for containing a waste material in a tubular film and disposing of said waste material, comprising:
a film annular body that is formed by a long tubular film folded so as to be compressed in an extending direction thereof; and
a wrapping material that is made of a material capable of being cut, and wraps said film annular body while keeping a central hole of said film annular body open, and maintains said compressed state.

2. The refill film according to claim 1, wherein said wrapping material has a cut line for tearing off said wrapping material.

3. The refill film according to claim 1, wherein said wrapping material covers an outer peripheral surface, one axial end, and the other axial end of said film annular body, and exposes an inner peripheral surface of said film annular body.

4. The refill film according to claims 1, wherein said wrapping material is made of paper, a fiber material, or a resin film.

5. The refill film according to claim 1, wherein said wrapping material is a plurality of bands that are wound around said film annular body at predetermined intervals in a circumferential direction.

6. A refill film accommodating cassette that is attached to a waste disposal apparatus for containing a waste material in a tubular film to dispose of said waste material, and accommodates said refill film according to claims 1, comprising:
a cylindrical portion that is inserted in said central hole of said film annular body; and
an outward flange that is formed at one axial end of said cylindrical portion to prevent said film annular body from coming off from said refill film accommodating cassette.

7. The refill film accommodating cassette according to claim 6, further comprising:
an annular holding member that is detachably coupled to the other axial end of said cylindrical portion to prevent said film annular body from coming off from said refill film accommodating cassette, wherein said tubular film that is pulled out from said film annular body is inserted through said central hole of said cylindrical portion beyond said holding member.

8. A portable waste disposal bag, comprising a tubular body which is made of a bendable material, wherein said tubular body surrounds an outer periphery of said refill film accommodating cassette according to claim 6, and an outer surface of said tubular film that is pulled out from said refill film accommodating cassette and passes through a central hole of said film accommodating cassette, one longitudinal end and the other longitudinal end of said tubular body are capable of being opened and closed, said refill film accommodating cassette is detachably attached to said one longitudinal end, and said tubular body is long enough that the other longitudinal end can be twisted by 360° or more with respect to said one longitudinal end.

9. The portable waste disposal bag according to claim 8, further comprising:
a fastening device for restricting the length of said tubular body.

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