

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 April 2002 (25.04.2002)

PCT

(10) International Publication Number
WO 02/32281 A1

(51) International Patent Classification⁷: **A47K 10/38**,
10/32

(21) International Application Number: PCT/US01/28520

(22) International Filing Date:
12 September 2001 (12.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/659,283 12 September 2000 (12.09.2000) US
09/909,408 19 July 2001 (19.07.2001) US

(71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 401 North Lake Street, Neenah, WI 54956 (US).

(72) Inventors: **NEWMAN, William, Robert**; 807 Louise Road, Neenah, WI 54956 (US). **GAMBARO, Anthony, Mark**; 401 E. Fernwood Lane, Appleton, WI 54913 (US). **KRAUTKRAMER, Robert, Eugene**; 508 Ferncliff

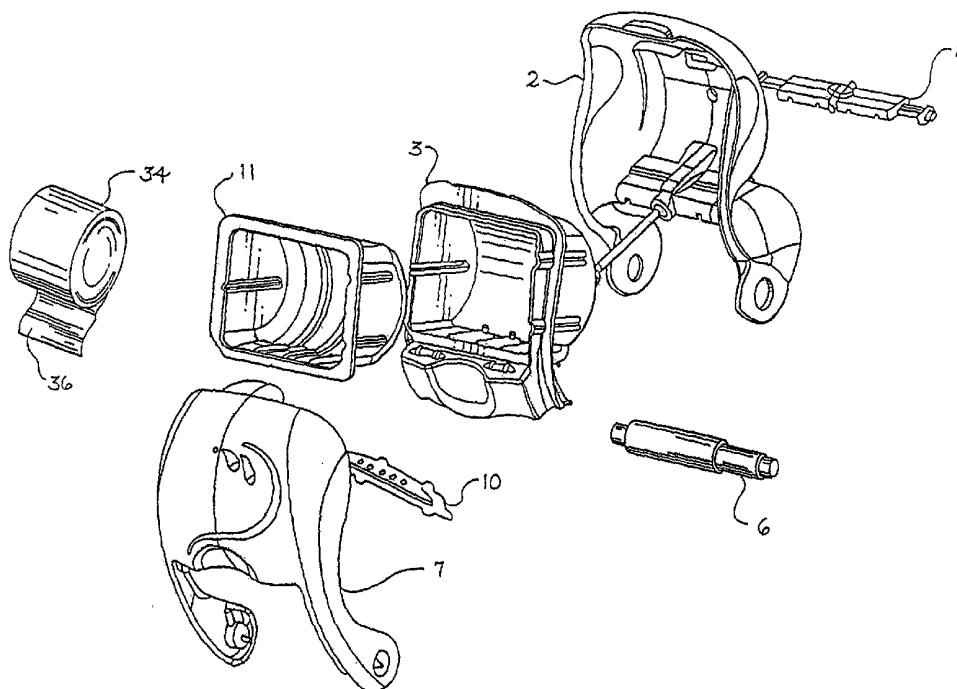
Drive, Kaukauna, WI 54130 (US). **SOSALLA, Gerald, Keith**; 340 West Prospect Avenue, Appleton, WI 54911 (US). **DELLERMAN, Paige, Annette**; 1354 west Harris street, Appleton, WI 54914 (US). **VELAZQUEZ, Herb, F.**; 3142 Westfield Ridge, Neenah, WI 54956 (US). **LIND-SAY, Jeffry, D.**; 20 Diane Lane, Appleton, WI 54915 (US). **HUANG, Yung, Hsiang**; 2420 West Seneca Drive, Appleton, WI 54914 (US). **FAULKES, Michael, John**; 2320 Fiesta Court, Neenah, WI 54956 (US). **DEGREEN, Gerald, P.**; 5569 Mayfield Road, Windsor, OH 44099 (US). **STANCA, Nick, E.**; 27012 Hilliard Boulevard, Westlake, OH 44145 (US).

(74) Agent: **BELVIS, Glen, P.**; Brinks Hofer Gilson & Lione, P.O. Box 10087, Chicago, IL 60610 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

[Continued on next page]

(54) Title: CARTRIDGE FOR WET WIPES DISPENSER



(57) Abstract: There is provided a cartridge for dispensing wet wipes and for use with or in a dispensing system. The system may include a housing, a tray and a cartridge. The cartridge may have a durable cover over a portion of the cartridge opening, which may be covered with a bacterial resistant seal.



WO 02/32281 A1



(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CARTRIDGE FOR WET WIPES DISPENSER
FEUCHTTÜCHERKASSETTE FÜR EINEN FEUCHTTÜCHERSPENDER

5 This application is a continuation in part of pending U.S. application
entitled Container for Wet Wipes, Serial No. 09/659,283, attorney docket no.
659/707 filed September 12, 2000, which is a continuation in part of pending
U.S. application entitled System and Dispenser for Dispensing Wet Wipes,
Serial No. 09/565,227, attorney docket no. 659/648 filed May 4, 2000, which
is a continuation in part of pending U.S. application entitled Dispenser For
Premoistened Wipes, Serial No. 09/545,995, attorney docket no. 659/623,
10 which was filed on April 10, 2000, the disclosures of which are hereby
incorporated by reference.

BACKGROUND

15 Wet products such as wet wipes have many applications. They may
be used with small children and infants when changing diapers, they may be
used for household cleaning tasks, they may be used for cleaning hands, they
may be used as a bath tissue, they may be used as by a caregiver to clean a
disabled or incontinent adult, or they may be used in and for a whole host of
other applications, where it is advantages to have a wipe or towel that has
some wetness or moisture in it.

20 Wet wipes have been traditionally dispensed in sheet form from a tub
like container with a hinged lid on the top. The lid is opened and individual or
singularized sheets of the wipes are removed. Another type of container that
has been used for wet wipes provides a roll of wipes in which the wipes are
pulled from the top of the container in a direction that is parallel to the axis of
the roll. These wipes are pulled from the center of a hollow coreless roll that
25 has perforated sheets. These containers generally have a snap top lid that is
opened to expose a piece of the wipes that can then be pulled to remove the
desired amount of wipes. Once pulled out the wipes can then be torn off,
usually at a perforation, and the lid closed.

30 Wet wipes can be any wipe, towel, tissue or sheet like product
including natural fibers, synthetic fibers, synthetic material and combinations
thereof, that is wet or moist or becomes wet during use or prior to use. Wet

wipes may be dispersible when in contact with water or may be non-dispersible. Examples of wet wipes are disclosed in application serial numbers 09/564,449; 09/564,213; 09/565,125; 09/564,837; 09/564,939; 09/564,531; 09/564,268; 09/564,424; 09/564,780; 09/564,212; 09/565,623 all filed May 4, 2000, and application serial no. 09/223,999 entitled Ion-Sensitive Hard Water Dispersible Polymers And Applications Therefore, filed December 31, 1998 the disclosures of which are incorporated herein by reference. Embodiments of dispensers are described in application serial numbers 09/565,227 and 09/545,995; in application serial numbers 09/659,307; 09/659,295; 09/660,049; 09/659,311; 09/660,040; 09/659,283; 09/659,284; 09/659,306, filed September 12, 2000; in application serial number 09/748,618, filed December 22, 2000; in application serial number 09/841,323, filed April 24, 2001; in application serial number 09/844,731, filed April 27, 2001; and in application serial number 09/849,935, filed May 4, 2001; the disclosures of which are incorporated herein by reference.

There is a need for disposable containers for wet wipes which are used to dispense the wipes which are originally present in the container, and which can be subsequently discarded. Ideally, the disposable container is not used for more than one set of wipes in order to minimize the possibility of contamination of the wipes.

SUMMARY

In an embodiment of the invention there is provided a container for wet wipes, comprising a cartridge comprising a first opening having a first rectangular clearance; the first rectangular clearance having a first length and a first width; a moisture-loss preventing seal; and a permanently attached cover over a portion of said opening; wherein said permanently attached cover forms a second opening having a second rectangular clearance; the second rectangular clearance having a second length and a second width.

These embodiments may further comprise a container wherein the second length is less than about 90% of the first length, the second length is less than about 75% of the first length, the second length is less than about

60% of the first length, and the second length is less than about 50% of the first length; wherein the second width is less than about 90% of the first width, the second width is less than about 75% of the first width, the second width is less than about 60% of the first width, and the second width is less than about 50% of the first width; wherein the second length is less than about 90% of the first length and the second width is less than about 90% of the first width, the second length is less than about 75% of the first length and the second width is less than about 75% of the first width, the second length is less than about 60% of the first length and the second width is less than about 60% of the first width, and the second length is less than about 50% of the first length and the second width is less than about 50% of the first width; and wherein the container further comprises a roll of wet wipes.

In an embodiment of the invention there is provided a container for wet wipes, comprising: a cartridge comprising an interior and an opening; the opening having a first rectangular clearance; the first rectangular clearance having a first length and a first width; a roll of wet wipes in said interior; and a permanently attached cover over a portion of said opening; the permanently attached cover forming a second opening having a second rectangular clearance; the second rectangular clearance having a second length and a second width; wherein the roll is retained in the interior; and the wipes can be removed from the interior by unwinding the roll.

These embodiments may further comprise a container wherein the second length is less than about 90% of the first length, the second length is less than about 75% of the first length, the second length is less than about 60% of the first length, and the second length is less than about 50% of the first length; wherein the second width is less than about 90% of the first width, the second width is less than about 75% of the first width, the second width is less than about 60% of the first width, and the second width is less than about 50% of the first width; wherein the second length is less than about 90% of the first length and the second width is less than about 90% of the first width, the second length is less than about 75% of the first length and the second width is less than about 75% of the first width, the second length is less than

about 60% of the first length and the second width is less than about 60% of the first width, and the second length is less than about 50% of the first length and the second width is less than about 50% of the first width.

These embodiments may yet further comprise a container wherein the permanently attached cover is configured as a strip; wherein the permanently attached cover is configured as a plurality of corner covers; wherein the permanently attached cover is configured as a semicircular cover; wherein the permanently attached cover comprises buttons and the cartridge comprises button holes, the buttons and button holes coordinating to lock the permanently attached cover to the cartridge; wherein the container further comprises a moisture-loss preventing seal; and wherein the moisture-loss preventing seal covers the second opening and is removably adhered to a portion of the permanently attached cover.

In an embodiment of the invention there is provided a container for wet wipes comprising: side walls having a top and a bottom; each side wall having a length and a depth; the tops of the side walls forming an opening having a first length and a first width; two opposed side walls corresponding to the first length of the container; a bottom wall joined to each side wall; the bottom wall having an curved section and a planar section; the curved section having a first side and a second side; the planar section having a first side and a second side; the first side of the curved section being joined to the bottom of a first side wall; the second side of the curved section being joined to the first side of the planar section; the second side of the planar section being joined to the bottom of a second side wall that is opposed to the first side wall; a lip; the lip joined to the top of a side wall; the lip extending outwardly at least about 5 mm from the top of a side wall; a permanently attached cover contacting at least a portion of the lip; and a moisture-loss preventing cover contacting at least a portion of the lip.

These embodiments may further comprise a container wherein the permanently attached cover provides a rectangular clearance having a second length and a second width and wherein the second length is less than about 75% of the first length, the second width is less than about 75% of the

first width, and the second length is less than about 75% of the first length and the second width is less than about 75% of the first width. These embodiments may yet further comprise a container wherein the curvature of the bottom wall is about 42 to about 44 degrees; wherein the curvature of the bottom wall is about 40 to about 45 degrees; wherein the side walls corresponding to the width wise dimension of the container are tapered from the bottom toward the top, such that the distance between them is less at the bottom of the container; wherein the container comprises a rib; and wherein the container comprises a plurality of ribs, the ribs extending along the first wall, the curved bottom section, the planar bottom section and at least partially along the second wall.

In an embodiment of the invention there is provided a dispensing system for wipes, comprising: a dispenser, the dispenser comprising an interior; and a container shaped to fit into the interior; the container comprising a cartridge, a permanently attached cover, a plurality of wet wipes, and a moisture-loss preventing seal.

These embodiments may further comprise a dispensing system wherein the cartridge comprises a first opening having a first rectangular clearance, the first rectangular clearance having a first length and a first width; the permanently attached cover is situated over a portion of said first opening to form a second opening having a second rectangular clearance, the second rectangular clearance having a second length and a second width.

These embodiments may yet further comprise a dispensing system wherein the second length is less than about 90% of the first length and the second length is less than about 60% of the first length; wherein the second width is less than about 90% of the first width and the second width is less than about 60% of the first width; wherein the second length is less than about 75% of the first length and the second width is less than about 75% of the first width; wherein the dispensing system further comprises a roll of wet wipes; wherein the interior and the container are shaped to fit in a single orientation; and wherein the dispenser, the cartridge, and the permanently attached cover

together are capable of maintaining at least 95% of the moisture of wet wipes for a 14 day period at 73 °F and 50% relative humidity.

DRAWINGS

Figure 1 is a perspective view of a dispenser.

5

Figure 2 is an exploded view of a dispenser and cartridge.

Figure 3 is a perspective view of an open dispenser.

Figure 4 is a top view of a dispenser.

Figure 5 is a front view of a dispenser.

Figure 6 is a bottom view of a dispenser.

10

Figure 7 is a side view of a dispenser.

Figure 8 is a back view of a dispenser.

Figure 9 is a perspective view of a dispenser with a wet wipe.

Figure 10 is a perspective view of a dispenser, a cartridge and a roll of wet wipes.

15

Figure 11 is a perspective view of a roll of wet wipes

Figure 12 is a cross section view of a dispenser, a cartridge and a roll of wet wipes.

Figure 13 is a cross section view of a cartridge and a roll of premoistened wipes.

20

Figure 14 is a cross section view of a cartridge.

Figure 15 is a perspective view of the outside of a cover.

Figure 16 is a front view of the outside of a cover.

Figure 17 is a perspective view of the inside of a cover.

Figure 18 is a cross section view of a cover.

25

Figures 19-24 are views of a wiper assembly.

Figure 21 is a cross section view along line A-A of Figure 19.

Figure 23 is a cross section view along line A-A of Figure 22.

Figures 25A and 25B are perspective views of a cartridge having a hinged lid.

30

Figures 26A and 26B are diagrammatic views of a cartridge having a hinged lid.

Figures 27-28 are views of a wiper.

Figures 29-31 are views of a cartridge.

Figure 32 is a top view of a package of cartridges.

Figure 33 is a front plan view of a wiper assembly.

5 Figure 34 is a rear plan view of a wiper assembly.

Figure 35 is a plan view of a wiper blade.

Figure 36 is a cross-sectional view of a wiper blade.

Figure 37 is a perspective view of a wiper blade.

Figure 38 is a cross-sectional view of a dispenser.

10 Figure 39 is a cross-sectional view of a portion of a dispenser.

Figure 40 is a perspective view of the inside of a cover.

Figure 41 is a top view of the inside of a cover.

Figure 42 is a view of a conventional bath tissue holder.

Figure 43 is a view of a conventional bath holder.

15 Figure 44 is a view of a mounting assembly in a conventional bath tissue holder (shown without the dispenser).

Figures 45A and 45B are side cross section views of a cartridge.

Figures 46A and 46B are side cross section views of a cartridge.

Figure 47 is a perspective view of a cartridge.

20 Figures 48-58 are perspective views of a cartridge having a permanently attached cover over a portion of the opening.

DETAILED DESCRIPTION

25 A system and method for dispensing and providing wipes is provided, which in general may have a housing, a cover, and a cartridge having a roll of wet wipes. The cartridge is placed in the housing and then the wipes can be removed from the dispenser.

30 In general there is provided a device for mounting a wet wipes dispenser to another surface. That surface may be, by way of example, a wall in a bathroom, a kitchen wall, or a bathroom vanity wall. The device may be used with, or adapted for use with, most any type of wet wipes dispenser, such as the various dispensers illustrated and disclosed herein. The device is

ideally adapted to work in conjunction with a conventional bath tissue holder to permit a dispenser to be securely, yet removably attached to the wall. A conventional bath tissue holder is the type that is typically found in a home. Such holders have posts that protrude from the wall and a rod or roller that is positioned between the posts. These holders may also be partially recessed into the wall. Such a holder and a holder with a mounting assembly engaged are illustrated in Figures 42-44. The device may also be used in the absence of a conventional bath tissue holder and may be adapted to provide that the dispenser is fixed to the wall.

For example, the system may have a dispenser that has a housing, which is capable of being mounted to a surface, such as a wall, a cabinet, an existing bath tissue dispenser, a toilet, a toilet tank, a stall wall, or a dashboard of an automobile. The dispenser has an interior that holds a cartridge, which contains the wet wipes. These cartridges are sealed and may be grouped in packages of multiple cartridges. Thus, a package of cartridges may be provided to a user. The user may then select and open one of the cartridges, put it in the dispenser, and use the wipes as needed. When the wipes are used up, the user may simply discard the old cartridge and replace it with a new one. Thus, this system enables the user to conveniently obtain and keep several cartridges of wipes on hand and then use the wipes as needed. By using sealed cartridges to refill the dispenser the user is using a new and fresh product each time and a product that is in contact with fresh surfaces. In general the dispenser system illustrated herein can be used with or without conventional dry toilet or bath tissue. If conventional tissue is used with wet wipes it could be positioned in a side-by-side manner, above, or below the wet wipes.

By way of example, referring to Figures 1 through 8, there is provided a dispenser 1, which has a housing 2, a tray 3, a cover 7, and a mounting assembly 8. The tray and the cover form a gap 4, through which a wet wipe can extend. That portion of the wipe extending through the gap may be referred to as a tail. The tray and cover additionally have recesses 5, that form an indentation that provides a finger hold, or point where a user can

grasp the wet wipe to pull it from the dispenser. The housing may further have an opening 28 for receiving a pin 27 on the tray 3. Although optional, this dispenser is also provided with a roller 6 for mounting and dispensing a roll of another product, such as dry or conventional bath tissue. Figures 1 and 4-8 show the dispenser with the cover closed. Figure 2 shows the dispenser and a cartridge in a exploded view. Figure 3 shows the dispenser assembled and in a fully opened condition. The fully opened condition provides access to screw 9.

The housing may be made from any suitable material, such as plastic, wood, ceramic, porcelain, glass, paper, metal, thermoplastic elastomers, or composite materials. For example, polypropylene, polyesters such as polybutylene terephthalate (Pbt), Pbt glass filled, Pbt 15% glass filled, fiberglass, carbon fiber, and acrylonitrile-butadiene-styrene (ABS) may be used to make the housing.

The housing may have different shapes and sizes. When the dispenser is intended for use in a home it is desirable that it be of a size that is similar to conventional bath tissue roller mounts. It is particularly desirable that the dispenser be as compact as possible for home use. Further if the cover is in the range of from about 4-1/2 inches (114.3 mm) to 6-7/8 inches (174.6 mm) in width it will be able to aesthetically fit in or mount to the vast majority of toilet paper holders that are in existing houses. Preferably the width of the cover may be greater than about 3 inches (76.2 mm), less than about 6 inches (152.4 mm), less than about 7 inches (177.8 mm), and less than about 8 inches (203.2 mm). The 4-1/2 inches (114.3 mm) by 6-7/8 inches (174.6 mm) size provides an added benefit of enabling one size of dispenser to be used in the vast majority of applications in the home. Smaller sizes may be desirable for certain applications or aesthetic reasons, such as a small bathroom. The dispenser and its components may have varied colors, such as the almonds and whites that are seen in porcelain bath fixtures or may have any other desirable color. When the housing is used for industrial or institutional purposes or in commercial applications it may be desirable to

make the housing substantially larger and able to hold substantially more rolls of either or both wet and dry wipes and tissue.

The housing may be configured as shown in Figure 1 to mount onto or into a conventional wall mount toilet paper holder. It may also be mounted directly to a wall, for example by way of a screw, through mounting hole 30, or by other means of fixing the housing to a wall or surface, such as glue, nails, screws, rivets, magnetic attachments, staples, engaging brackets and pressure mountings against the sides of a conventional wall mount for toilet tissues. The housing also may have a lock 13 that engages a tab 12 on the cover to keep the cover closed, yet provide an easy way to open the dispenser. Various other ways to lock or fix the cover to the housing may also be employed. For example, a lock and key approach may be desirable in commercial applications or houses where there are small children present.

The cover 7 may be made of any similar material to the housing; it may be the same as or a different material from the housing. The cover may be clear or have a window for viewing the amount of wet wipes that remain in the dispenser. It is noted, however, that because the cover is in direct contact with the wet wipe, the cover forms the top of the cartridge when the cartridge is inserted into the dispenser and the cover closed, and wood or any other material that would support bacterial growth would not be favored. It is preferred that all materials that are in contact with the wet wipes be made from materials that discourage, or do not support bacterial growth.

Moreover, anti-bacterial agents, medicinal, botanical or skin and health agents may be added to the materials that are used to construct the components of the dispenser system, including by way of example the dispenser housing, the tray, the wiper blade, the wiper assembly, the cartridge, the cover and the gaskets. In particular any component that is in contact or associated with the wet wipes may have such an agent added to it.

The cover is designed to cooperate with the cartridge 11 to form a barrier to moisture loss from the wet wipes. The cover may also be designed to cooperate with other components of the dispenser system to form a moisture barrier. The dispenser can maintain wet wipes in a moist condition

when fully closed for at least 1 day, for at least 2 days, for at least 5 days and for at least 14 days, and preferably for more than 14 days at room conditions of 73 °F (22.8°C) and 50% relative humidity. The dispenser when fully closed can maintain at least about 15%, at least about 20%, at least about 25%, at
5 least about 50%, and at least about 95% of the moisture of the wipes for a 14 day period at 73 °F (22.8°C) and 50% relative humidity. These moisture retention values can be obtained with a tail of the wipe protruding through the gap, the tail having a length of not more than 1.5 inches (38.1 mm).

The cover may further be designed to cooperate with the cartridge 11,
10 or other components of the dispenser system, to form a barrier to contamination of the wipes within the dispenser. Thus, the cover in cooperation with the cartridge, or other components of the dispenser system, may form a barrier to dirt, dust, mold spores and bacteria.

The space between the inner surface of the front cover and the surface
15 of the lip of the cartridge may vary between about 2 mm and about 10 mm. In this way there is formed a dome above an open cartridge that at least partially covers that opening, which dome is preferably less than about 15 mm, less than about 10 mm, less than about 5 mm and ideally is less than about 2 mm above the lip of the cartridge. The height of the dome may also be measured
20 from the surface of a full roll of wet wipes in which an additional 2 to 7 mm may be added to the height of the dome. Higher domes may also be employed, but such higher domes may be less aesthetically pleasing and may provide for greater amounts of evaporation or moisture loss from the wet
wipes.

25 The cover may be provided with an inside rim 33 (see, e.g., Figure 3) and a wiper 10 (see, e.g., Figures 2 and 3). The cover inside rim and wiper cooperate with the lip 31 of the cartridge. In this way when the cover is closed the inside rim is brought against the lip of the cartridge and the wiper is similarly brought against the tray including the guides, as well as the lip of the
30 cartridge. In a further embodiment, the cover may be provided with a lip, and the cartridge may be provided with a rim to facilitate the cooperation.

The distance between the inside of the cover where the wiper is located and the tray may be less than the height of the wiper blade. Thus, in this configuration the wiper blade would be placed under compression against the lip, the tray, or the guides 16 or all of them depending on the position of the wiper. Here the wiper blade would exert pressure on the wet wipes. The wiper may also be positioned so that it contacts the wet wipe but does not exert pressure against it, or be positioned so that it is a short distance above the wet wipe. The amount of pressure that the wiper exerts on the wet wipe may vary depending upon several factors, including the purpose for the wiper, the material that the wiper blade is made from, the material that the wet wipe is made from and the material that the cartridge lip 31 is made from.

The tray 3 may be made from any similar material to the housing or cover, and it may be the same material or different material from those of components. The tray may have side walls 22, 23, 80 and 81. Walls 22 and 23 correspond to the sides of the dispenser, wall 80 corresponds to the top of the dispenser, and wall 81 corresponds to the bottom of the dispenser. The tray shown in the figures does not have a back wall, although one may be provided if desired. The side walls may be provided with recesses 24, 25, and 26. These recesses cooperate with protrusions 19, 20 and 21 on the cartridge (19 with 26, 20 with 24 and 21 with 25). In this way the cartridge is securely, yet easily removably held in the dispenser. The tray opening 15 is sized in relation to the cartridge (or the cartridge may be sized in relation to the tray opening) so that the cartridge can easily be slid into and out of the dispenser.

The tray and cartridge together result in a keyed type arrangement that allows the cartridge to be inserted fully or properly in only one orientation into the dispenser. Thus the two elements fit together in a manner similar to a lock and key. This assures that the roll of wipes will unwind from a predetermined orientation, i.e., from the bottom of the roll or the top of the roll. As is apparent from Figure 2 the tray opening and cartridge are not symmetrically shaped. This asymmetry provides for the keyed arrangement. An object is considered symmetrical if there can be a plane which passes

through the object such that the portions on either side of the plane are reflections of each other.

In the embodiment shown in Figure 2 the asymmetry in the vertical plane is obtained by having a different number and location of protrusions and recesses on opposite sides. It is recognized that any suitable means to accomplish asymmetry may be employed, such as notches, tongue and groove, or the shapes of the opening and detents. For example, some of the cartridge walls may be flat while others are rounded, or the cartridge lip may be non-planar. Additionally, labeling or marking of the cartridge, the tray, or both can create the effect of asymmetry. This latter approach requires the effort of the user, whereas the former approach is designed to be "user proof."

The housing may further have guides 16. The guides may be movable or fixed. The guides may have raised surfaces and lowered surfaces. These guides may be made from the same type of material as the housing. They may be integral with the housing. The guides and the housing may be one continuous piece of plastic. The guides may be designed to cooperate with the wiper to prevent or reduce the tendency of the wipe to skate to one side of the dispenser as the wipe is pulled out and torn off. The guides may also cooperate with the wiper to regulate and control the amount of drag. The tray may have barbs 71 to discourage the placement of wet wipes directly into the dispenser without the use of a protective package, a practice which could cause premature drying of the wet wipes or could allow the growth of bacteria and/or mildew in the wipes.

The cartridge may be made out of any suitable material, such as plastic. It is desirable that the cartridge be made from a light weight, inexpensive, disposable and recyclable material. The cartridge has side walls 17, 18, 39 and 40 and bottom wall 41. The cartridge has a lip 31 that forms an opening at the top of the cartridge. The cartridge has ribs 32. The ribs may extend part way or all the way along the sides 39 and 40 and the bottom 41. The ribs 32 may cause grooves or indentations to form in the rolls, depending on the density of the roll and conditions of use. These grooves are not necessary to the use of the dispenser system. The curvature of the

cartridge bottom is between 40 and 45 degrees, preferably between 42 and 44 degrees.

The cartridge may be any shape or size provided that it fits in or cooperates with the dispenser. For example a cartridge that would be useful for application in the home would have side walls 17 and 18 that are less than 105 mm in length and side walls 39 and 40 that are less than 134 mm in length.

Instead of protrusions 19, 20 and 21, the cartridge may have recesses at those locations, and the tray may have corresponding protrusions.

Moreover, the cartridge may have ribs, like rib 32, along side walls 17 and 18.

Figure 9 shows a dispenser in the closed condition with a tail of a wet wipe 36 protruding from gap 4 into the finger hold indentation that is formed by recess 5. In use the tail of the wet wipe would be grasped and pulled generally in the direction of arrow 35 causing the roll to unwind and the wipe to be dispensed from the dispenser. In use the wet wipe may also be subjected to forces tangential and perpendicular to the direction of arrow 35. If these forces occur the guides and the wiper help to prevent the wipe from skating to one side of the gap and bunching up or binding.

Figure 10 is an exploded view of a dispenser, cartridge and roll of wipes 34 showing the relationship of these components.

Figure 11 shows a roll of wipes 34 that has a tail 36 and further defines the axis of the roll as 37. Rolls useful with this dispenser or as part of a dispensing system may contain from as little as a few linear inches (or cm) to more than 450 linear inches (11.43 m), to more than linear 600 inches (15.24 m) to more than a thousand linear inches (25.40 m) of wet wipes. The rolls may have a web of material that may have any number of sheets. Usually, the sheets are separated by perforations that enable the sheet to be easily torn from the web but are strong enough that they will not separate while the web is being pulled from the dispenser. An example of a roll that is particularly useful for applications in the home is one that has a diameter of about 2 inches (50.8 mm) to about 3 inches (76.2 mm), of about less than 5 ½ inches (139.7 mm), and preferably has a diameter of about 3 inches (76.2

mm) and more preferably of about 2-7/8 inches (73.0 mm). This roll has from about 400 linear inches (10.16 m) of wipes to about 1000 linear inches (25.40 m) of wipes. Without limitation, each sheet length may be from about 3 inches (76.2 mm) to about 10 inches (254.0 mm) and preferably are about 4.5 inches (114.3 mm). This roll may further have a density of from about 0.3 g/cc to about 1 g/cc, from about 0.5 g/cc to about 1 g/cc and preferably about 0.62 g/cc. A particular example of a roll may be one having a diameter of about 2 inches (50.8 mm) and containing about 450 linear inches (11.43 m) of wipe. Another particular example of a roll may be one having a diameter of about 3 inches (76.2 mm) and containing 450 linear inches (11.43 m) of wipes.

The preferred form of wet wipes for use with the dispenser system is a solid coreless roll as shown in Figure 11. It is to be understood, however, that cored rolls (hollow cores, solid cores and partially solid cores), hollow coreless rolls, and stacks of sheets may also be used in the dispenser system. When density values are referred to herein, it is for the density of the roll and this would exclude any void, for a coreless hollow roll, or space occupied by a core for a cored roll.

Various tests and observations of physical properties are reported in Tables I, II, III, and IV.

Solution add-on level is the amount of solution by weight divided by the amount of dry wipe by weight multiplied by 100 to provide a percentage value.

Base sheet converting refers to the width of the roll and the sheets in the roll, i.e., along axis 37 of the roll in inches.

Perforation refers to the amount of cutting and the distance between the cuts in the perforation that separates the sheets in a roll. There are three parameters to this measurement: cut length, bond length and bond spacing. The bond spacing is equal to the sum of the cut length plus the bond length. By way of example, perforations that are useful with wet wipes are ones that have a bond length of 0.02 inch (0.51 mm), a cut length of 0.05 inch (1.27 mm), and a bond spacing of 0.07 inch (1.78 mm), or one that has a bond

length of 0.04 inch (1.02 mm), a cut length of 0.09 inch (2.29 mm) and a bond spacing of 0.13 inch (3.30 mm).

Dry basis weight is the basis weight of the wipe before the solution is added to the wipe, i.e., before it is wet.

5 Wet thickness is the thickness of a wet wipe, i.e., after the solution has been added to it, in mm.

Sheet count is the number of sheets in a roll, i.e., the number of sheets created by the perforations.

10 Although all tests are done under TAPPI standard test conditions, the wet wipes are not equilibrated to those conditions. Instead, the wipes are removed from a sealed container or cartridge and tested within a few, generally less than 5-10, minutes after opening. This is about a 5 minute variation in this time period that the wet wipe is exposed to the atmosphere, which does not materially or significantly alter the test results.

15 Tensile, stretch and TEA (total energy absorbed) values were obtained on the wet product following ASTM 1117-80, section 7, with the following modifications: sample dimensions were 1+/- 0.04 inch (25.4 +/- 1.0 mm) wide and 4.25 +/- 0.04 inches (108.0 +/- 1.0 mm) wide; initial gauge length was 3 +/- 0.04 inches (76.2 +/- 1.0 mm); test speed is 12 inches/minute (305.0
20 mm/min).

MD tensile is the peak load before failure per inch width of the sample, as determined in the machine direction. CD tensile is the peak load before failure per inch width of the sample, as determined in the cross direction. MD stretch is the percentage of elongation the wipe has in the machine direction
25 at the peak load. CD stretch is the percentage of elongation of the wipe in the cross machine direction at the peak load. Total Energy Absorbed (TEA) is the area under the force-elongation curve (in units of lb. and ft., respectively) from the start to the failure point divided by the initial surface area of the sample between the upper and lower grips. For these samples, this surface area was
30 3 sq. inches (19.4 cm²). Ten specimens were tested for each code, and the average was calculated and reported. The test can be carried out on a standard tensile tester such as a MTS Sintech 1/G test machine with

TestWorks 3.10 software. Both the Sintech test machine and the TestWorks software are available from MTS Corporation located at 1400 Technology Drive, Eden Prairie, MN.

Detach refers to the force in grams per sheet that is required to break a perforation, i.e., the amount of force required to separate two sheets in a roll along the perforation. These properties were determined using a MTS Sintech 1/G test machine with TestWorks 3.10 software. Two sheets were removed from a roll. The sheets had a width of 4.25 inches (108.0 mm), and were connected by perforations along the width. The sheets were folded in half along the length such that the width of the sample was 2-1/8 inches (54.0 mm). The top and bottom of the sample were placed in grips having an internal spacing of 2 inches (50.8 mm), such that the perforation line was centered between the upper and lower grips. The upper grip was then displaced upward (i.e. away from the lower grip) at a rate of 10 inches/minute (254.0 mm/min) until the sample was broken along the perforations. The applied force and sample elongation were measured throughout the test. The peak load from the force-elongation curve is recorded so that the detach strength is expressed in units of grams/sheet. The average results from ten samples are reported.

Percentage strain at peak load ("% strain @ pk load") was determined from the results of the test described above. The elongation at the peak load is divided by the initial sample length of 2 inches (50.8 mm), and the result is designated the % strain @ peak load. The average results from ten samples are reported.

Wet thickness refers to the thickness of a wipe that is measured while the sample is subjected to a specified load or weight. The wet thickness of wet wipes and wipes before wetting are reported in Table II. These values are based on samples measuring 3x4 inches (76x102mm) that were individually placed under a confining load of 0.05 pounds/square inch (psi) (345 Pa). The region of the sample that was tested was free of wrinkles and folds. A Starrett Comparator Base Model 653G was used to perform these tests available from Starrett, 121 Crescent St., Athol, MA 01331. This base is

precision ground to be flat (tolerance of ± 0.001 inch, ± 0.025 mm). A digital displacement indicator (Sony model U30-1SET) was attached to the base via a cantilevered horizontal control arm supported by a vertical shaft. The indicator measures vertical displacement relative to the comparator base to within 0.001 inch (0.025 mm). The load was applied by an acrylic contact foot attached to a vertically traveling spindle shaft that descended to the comparator base. The foot has a diameter of 3.00 inches (76.2 mm), a height of 0.63 inch (16.0 mm) and is flat on the lower surface to a tolerance of ± 0.001 inch (0.025 mm). The weight of the contact foot, spindle, and the associated hardware, not including the contact force springs in the indicator, is 160.5 ± 0.1 g. The spindle shaft descends to the comparator base with a travel time of 0.5 seconds to 0.75 seconds. The thickness was measured by the indicator as the height of the wipe relative to the surface of the comparator base immediately after the load pressure of 0.05 psi (345 Pa) was applied for 3 seconds. Calibration before testing was performed on a set of standard samples traceable to the National Bureau of Standards.

By way of example and without limitation, wet wipes useful in the present dispensing system may have a dry basis weight from about 10 to about 200 gsm, a dry thickness from about 0.5 to about 2 mm, a wet (i.e., wipe with solution or wetting material added) thickness from about 0.3 to about 0.7 mm, a MD wet tensile at least about 250 g/inch (9.8 g/mm), a CD wet tensile at least about 200 g/inch (7.9 g/mm), a MD wet stretch from about 5% to about 30%, a CD wet stretch from about 5% to about 36%, a TEA MD wet strength of from about 0.5 to 2 ft-lb/sq. inch (0.10 to 0.4 J/cm²), a TEA CD wet strength of from about 0.5 to 2 ft-lb/sq. inch (0.10 to 0.4 J/cm²), and a solution add-on of about 150-350%.

Peel force measures the amount of force in grams/4.25 inches (g/108.0 mm) required to unroll a roll of wet wipes, i.e., the force in grams required to unroll a roll that is 4.25 inches (108.0 mm) wide. Thus, these values could be normalized to apply to any width roll in grams/inch of roll width basis. The peel force, as reported in Table II was the force required to unroll a roll as it was resting in an open cartridge and was measured with an MTS Sintech 1/G

test machine with TestWorks 3.10 software. A 4.5-inch (114.3 mm) wide clamp with rubber surfaces gripped the tail of a roll, with the roll positioned directly underneath the clamp such that the tail would remain vertical as it was unwound from the roll. The clamp was attached to the crosshead, which pulled the tissue web upward at a speed of 100 cm/minute. Peel force was measured by a 50 Newton load cell. The average load to pull 18 to 20 sheets away from the roll was recorded by averaging two runs in which 4 sheets each were separated and two runs in which 5 sheets each were separated. Only the first 18 to 20 sheets from the roll were used to obtain the measurements of Table II.

The dispensing force, which is the force to pull the wet wipes from the dispenser, may also be determined. This force can be measured with a MTS Sintech 1/G test machine equipped with TestWorks 3.10 software. A clamp with rubber surfaces grips the tail of a roll of wet wipes placed in a dispenser. The initial distance between the clamp and the platform where the dispenser sits is about 12 inches (304.8 mm). The dispenser is placed underneath the clamp. The clamp is attached to the crosshead, which pulls the roll upward at a speed of 100 cm/min. The pull force is measured by a 50 Newton load cell. For each run, the pull force as a function of pull distance curve for pulling 4 sheets away from a roll is recorded using the TestWorks 3.10 software. Based on the curve, the average pull force for each run is calculated. The average load of five runs is used to represent the dispensing force of a given roll. Only the first 23 to 25 sheets from the roll were used to obtain the measurement.

Table I sets out types of wet sheets and their properties. In Example 1, the solution was a sufficient amount of commercial (no salt) solution such as that which is used in the commercially available KLEENEX® brand COTTONELLE® flushable moist wipes product of Kimberly-Clark Corporation. In Example 2, the solution was a sufficient amount of 4% salt water solution such as a simple 4% salt water solution with other additives as disclosed in the examples of wet wipe applications discussed previously in the

Background of Invention, all of which have been and are incorporated herein by reference.

Table I

	Non-Dispersible Wet Wipe Example 1		Dispersible Wet Wipe Example 2	
Basis Weight	60 gsm		60 gsm	
Solution	commercial (no salt)		4% salt solution	
Solution Add on level	175%		228%	
Basesheet Converting	4.25" width		4.25" width	
Perforation Bond Spacing	0.11"		0.07"	
	Run Average	Run STDev	Run Average	Run STDev
Dry Basis Weight (gsm)	57	2	66	4
Wet Thickness (mm)	0.56	0.02	0.47	0.01
Sheet Count	99	0.7	99	1.1
Wet tensiles				
MD Tensile (g/in)	380	26	321	30
MD Stretch (% Elongation)	23	1.4	28	1.6
TEA (Ft-Lb/Sq.In)	0.96	0.06	1.02	0.07
CD Tensile (g/in)	329	28	287	29
CD Stretch (% Elongation)	28	1.8	34	3.5
TEA (Ft-Lb/Sq.In)	0.93	0.09	0.97	0.13
Detach (g/sheet)	752	21	853	34
% strain @ pk load	8	0.5	11	1.1

5

Table II contains additional data reflecting the properties of disposable wet wipes. This table shows the effects that changing base sheet and solution variables has on the physical properties of the wipes. The pulp used to make these sheets was Weyerhaeuser CF 405. For this example, the binder was example Code E, Table 15, of serial no. 09/564,531. This binder material had a molecular weight of 610,000 and was made from the following monomers provided in the following weight percents: 60% acrylic acid, 24.5%

10

butacrylic acid, 10.5% 2-ethylhexyl-acrylic acid, and 5% AMPS (2-acrylamido-2-methyl-1-propanesulfonic acid).

Table II

Basesheet Variables	100% pulp / 65gsm	100%pulp / 60gsm	100%pulp / 55gsm	15%PET / 55gsm
	22% binder/ 1.1 mm dry thickness	20% binder/ .76 mm dry thickness	20% binder/ .76 mm dry thickness	20% binder/ .84 mm dry thickness
Solutions	0.5% silicone; 0.25% lanolin			
	Example 3	Example 4	Example 5	Example 6
MD Wet Tensile (g/1")	500	452	383	391
CD Wet Tensile (g/1")	445	403	344	310
wet thickness (mm)	0.46	0.40	0.39	0.41
peel force	167	131	106	
Solutions	1.0% silicone; 0.25% lanolin			
	Example 7		Example 8	Example 9
MD Wet Tensile (g/1")	473		401	416
CD Wet Tensile (g/1")	455		348	350
wet thickness (mm)	0.45		0.40	0.39
peel force	170		120	115
Solutions	1.0% silicone; 0.0% lanolin			
	Example 10			
MD Wet Tensile (g/1")	528			
CD Wet Tensile (g/1")	462			
wet thickness (mm)	0.44			
peel force	162			

Table III sets out the physical properties of rolls of wet wipes and Table IV sets out the theoretical physical properties of rolls of wet wipes.

Table III - Coreless Roll Measurements and Calculations

Roll	Measured	Unwound	Calculated	Calculated	
Number	Diameter	Wet	Roll	Effective	Compression
	(inches)	Thickness	Density	Thickness	Factor
		(mm)	(g/cm ³)	(mm)	(%)
1	2.77	NA	0.621	0.340	71%
2	2.83	0.41	0.595	0.355	74%
3	2.86	NA	0.583	0.362	76%
4	2.90	NA	0.567	0.373	78%
5	2.96	0.478	0.544	0.388	81%
6	2.86	NA	0.583	0.362	76%
7	2.98	NA	0.537	0.393	82%
8	2.88	NA	0.575	0.368	77%
9	2.94	NA	0.552	0.383	80%
10	2.86	0.448	0.583	0.362	76%
11	2.86	NA	0.583	0.362	76%
12	2.84	NA	0.591	0.357	74%
13	3.00	NA	0.530	0.399	83%
14	2.86	NA	0.583	0.362	76%
15	2.86	NA	0.583	0.362	76%

Initial sheet length = 5 inches

Initial sheet width = 4.125 inches

Number of sheets in roll = 90

Dry basesheets basis weight = 65 gsm

Target solution add-on = 225 %

Calculated roll weight = 253 grams

Assumed wet thickness prior to winding = 0.48 mm

Compression factor = calculated effective thickness (wound)/assumed wet thickness prior to winding

Calculated Roll Density = $\text{weight}/\pi d^2/4 \times \text{width}$ (calculated roll weight/ $\pi \cdot \text{measured diameter}^2/4 \cdot \text{initial sheet width}$)

Calculated Effective Thickness - calculated thickness of sheet in roll under pressure of winding.

Table IV - Theoretical Roll Density Possibilities

Dry		Calculated	Assumed	Assumed	Calculated	Calculated	
Basesheet	Solution	Roll	Pre-wound	Compression	Roll	Roll	
Weight	Add-on	Weight	Wet Thickness	Factor	Diameter	Density	Footnote
(gsm)	(%)	(grams)	(mm)	(%)	(inches)	(g/cm ³)	
65	225	253	0.48	1.300	3.75	0.34	(1)
65	225	253	0.48	1.150	3.53	0.38	
65	225	253	0.48	1.000	3.29	0.44	(2)
65	225	253	0.48	0.900	3.12	0.49	
65	225	253	0.48	0.800	2.94	0.55	
65	225	253	0.48	0.710	2.77	0.62	(3)
65	225	253	0.48	0.600	2.55	0.73	
65	225	253	0.48	0.500	2.33	0.88	(4)
65	225	253	0.48	0.440	2.18	1.00	
65	225	253	0.48	0.405	2.09	1.09	(5)
65	300	311	0.48	1.300	3.75	0.42	
65	300	311	0.48	1.150	3.53	0.47	
65	300	311	0.48	1.000	3.29	0.54	
65	300	311	0.48	0.900	3.12	0.60	
65	300	311	0.48	0.800	2.94	0.68	
65	300	311	0.48	0.700	2.75	0.77	
65	300	311	0.48	0.600	2.55	0.90	
65	300	311	0.48	0.500	2.33	1.08	
50	225	195	0.48	1.300	3.75	0.26	
50	225	195	0.48	1.150	3.53	0.29	
50	225	195	0.48	1.000	3.29	0.34	
50	225	195	0.48	0.800	2.94	0.42	
50	225	195	0.48	0.600	2.55	0.56	
50	225	195	0.48	0.400	2.08	0.85	
50	225	195	0.48	0.313	1.84	1.08	
50	150	150	0.48	1.300	3.75	0.20	(6)
50	150	150	0.48	1.000	3.29	0.26	
50	150	150	0.48	0.800	2.94	0.33	
50	150	150	0.48	0.600	2.55	0.43	
50	150	150	0.48	0.400	2.08	0.65	
50	150	150	0.48	0.300	1.80	0.87	
50	150	150	0.48	0.240	1.61	1.09	

Initial sheet length = 4.5 inches

Initial sheet width = 4.125 inches

Number of sheets in roll = 100

Total roll length = 37.5 feet

Footnotes – Table IV

- (1) A very loose roll, no compression, lots of air spaces, giving an overall low density
- (2) A roll that theoretically has no compression; this density and volume for roll vs. unrolled would be equal
- (3) A roll that has been produced, with this compression and roll density
- (4) Estimate of maximum compression achievable before product failure from in-wound tension exceeding strength of sheets or perforations
- (5) Physical limitation of the maximum density achievable based on incompressibility of water
- (6) Low end density achieved by a loose roll, low dry basis weight and low %Add-on

The dispensing force should be ideally considerably less than the detach force for a roll of perforated wipes. In this way it is assured that the wipes will be able to be pulled from, or removed from, the dispenser without inadvertently breaking the perforation. Thus, a dispensing force of from about 100g to about 600g is contemplated, a dispensing force of from about 150g to 250g is further contemplated and ideally a dispensing force of less than 200g is desirable, with forces based on g/4.25 inches (g/108.0 mm). Normalized, these forces are 23.5 g/inch (0.93 g/mm) to 141.2 g/inch (5.56 g/mm), 35.3 g/inch (1.39 g/mm) to 58.8 g/inch (2.32 g/mm), and 47.1 g/inch (1.85 g/mm).

Generally a peel force of from 80g - 300g (per 4.25 inches, 108.0 mm) is contemplated, although lower peel forces may be obtained with different types of wipe products. The cartridge adds minimal resistance to the roll as it is unwound. Thus, the force required to unwind a roll is not materially increased by the cartridge.

Figure 12 shows the roll 34 as it is placed in a cartridge in a dispenser. The spiral line 38 is intended to represent the manner in which the roll is wound and depicts in that configuration a roll that is being unwound from the bottom. That figure further shows the relationship of the wiper 10 to the wet web. Figure 13 shows the roll 34 in cartridge 11, with spiral line 38 indicating the wind of the roll. This figure shows the relationship of the roll and the ribs 32. As can be seen from this figure the roll is lifted off of the side and bottom walls of the cartridge by rib 32. Thus, the amount of surface area of the roll that is in contact with the cartridge is reduced. This reduces the drag that the roll experiences from friction with the cartridge when the roll is turned, thus contributing to a reduced dispensing force.

Figure 14 shows a portion of a cartridge 11, the lip 31 of the cartridge, and the side walls 39 and 40. The angle at which the cartridge is positioned has an effect on how well the dispenser will perform. The angle will have a tendency to increase or reduce the drag associated with pulling the wipe out. It will have an effect on the amount of siphoning, wicking or drying that may take place in the wet wipe. It may also have an effect on how the roll acts as it is unwound, becoming smaller and smaller in the cartridge. The angle of the cartridge can be measured by the angle that the lip 31 forms with a true vertical axis, shown as 42. For a dispenser system as shown in Figures 1-12, the angle 43 that the lip 31 has with a true vertical axis 42 should be from about 10 degrees to about 80 degrees, from about 20 degrees to about 70 degrees, at least greater than 20 degrees, at least smaller than 60 degrees, and preferably about 30 degrees.

Further the angle may be selected such that it balances the forces between the peel forces associated with unrolling the roll and the weight of the roll forcing it down against the ribs. Thus the wipe can be unrolled without having excessive movement of the roll within the cartridge, which in turn overcomes the tendency of the roll to translate toward the gap and bind or jam the dispenser. Additionally, the selection of the angle may play a role in reducing the drying of the wet wipe. As the angle 43 is increased the difference between the height of the top of the roll and the tail is decreased, thus decreasing any siphoning driving force.

Figures 15 through 18 show various views of an example of a cover. In this example the cover 7 has cover mounts 29, a recess 5 for forming part of a finger hold indentation, an inside rim 33, which has a top inside rim section 45 and side inside rim sections 46 (of which only one can be seen in Figure 17), leg sections 72, and posts 44. In this example the posts are used to connect the wiper to the cover.

In a further example of the tray, the tray is fixed to the housing. This may be accomplished by having the housing and tray being made out of a single piece of material or having the housing and tray joined together by a permanent bonding means, such as welding, heat bonding or gluing. In yet a

further example the tray may be attached to the housing so that it cannot rotate with respect to the housing, yet still may be removable.

Wiper blades may be made out of any flexible material, such as thermoplastic elastomers, foam, sponge, plastic, or rubber having a shore A durometer hardness value ranging about 0 to 80, from about 15 to about 70 and preferably from about 30 to about 60. It is further preferred that the wiper blades be made from a material that will form a good moisture and contamination barrier. Examples of preferred types of material are SANTOPRENE®, Kraton®, silicone, or styrene ethylene/butylene styrene (SEBS). The wiper blade is designed to function with the guides and the tray and to a limited extent the lip of the cartridge. Depending on the placement of the wiper, it could have greater or lesser interaction with these components of the dispensing system. The gap between the end of the wiper blade and the tray may be varied depending upon the thickness of the wet wipes and how much drag is needed for the dispensing system to function as desired. The wiper blade can help to hold the tail of the wipe in place and thus keep the tail from falling back through the gap and into the cartridge. The wiper blade material has a Gurley stiffness value (ASTM D 6125-97) between about 100 mg and 8000 mg, preferably between about 200 mg and 6000 mg, and more preferably between about 400 mg and 3000 mg.

The force applied to the wipe by the wiper blade when pulling the wipe from the dispenser should not be greater than the tensile strength of the wipe in the non-perforated region and not greater than the perforation tensile strength of a perforated wipe. If the wipes are made such that they are dry in storage and become wet during use, the blade may be configured to exert pressure on the wipe. In this case, the dispensing of a sheet or sheets causes sufficient shear to be applied to the wipe to permit the moisture to be released. For example, this force or shear may be sufficient to cause microcapsules of fluid to burst or may be sufficient to rupture a protective emulsion which contains the fluid.

Figures 19 through 24 show an example of a wiper assembly. In this example the wiper assembly 10 comprises a chassis 48, and a blade 50 that

has fingers 49. In this example the fingers are designed to cooperate with the lowered surfaces of the guides 16 on the housing. In this example the blade is made of SANTOPRENE® and the chassis is made of polypropylene.

Figures 27 through 28 show an example of a wiper blade. In this example the wiper blade is formed of a single piece (see Figure 27) of material that is folded over to form the wiper blade (see Figure 28). The wiper blade has raised portions 51 that reduce the amount of surface area of the wiper blade that contacts the sheet and raised areas 53 and lowered areas 52 that cooperate with the raised and lowered areas of the guides.

Figures 38 to 41 illustrate dispensers 1 that have a rounded member 95 or rounded ridges 96. These components are shown as being part of or attached to the wiper blade assembly 99 and adjacent the wiper blade 74. These components prevent or reduce the tendency of the roll from binding in the gap as the size of the roll decreases.

Figures 33 through 37 show an example of a wiper assembly. In this example the wiper comprises a chassis 73, and a wiper blade 74 (74a shows sections of blade engaging and protruding through the chassis) that has fingers 75. In this example the fingers are designed to cooperate with the lowered surfaces of the guides 16 in the dispenser. In this example the blade is made of SANTOPRENE® and the chassis is made of polypropylene. This embodiment contains raised or thicker areas 97 of the wiper. These raised areas cooperate with the guides 16 on the tray.

Figure 42 depicts a conventional bath tissue holder 85 that is the partially recessed type, having posts 86. Figure 43 depicts a conventional bath tissue holder 85 that is not recessed and having posts 86 and a roller 6. Figure 44 illustrates the holder of Figure 43 with the roller removed and a mounting assembly 8 engaged with the post 86. In actual use the mounting assembly would be joined with a dispenser, as shown for example in Figure 2.

Alternative mountings may also be employed. These mountings may be fixed or removable. They may include by way of example such fastening systems as cable ties, wing nuts, anchor bolts, click and grooves and snap and lock mechanisms.

Figures 29 – 31 show an example of a cartridge. In this example the cartridge has protrusions 69 on its side walls.

Figure 32 shows an example of a package of cartridges. In use this package would be filled with rolls of wet wipes, one for each cartridge. The cartridges would then be sealed, by placing a removable seal over the lips 31. The seal is preferably moisture and bacterial resistant. The consumer would then purchase the package and remove a cartridge, open the dispenser and place the cartridge in the dispenser. The seal can be removed either before placing the cartridge in the dispenser or after it is inserted in the dispenser. The end of the roll of wet wipes is then pulled out and over the tray and guides and the cover is then closed, thus providing an efficient system for dispensing wet wipes.

The cartridge and the seal cooperate to prevent the loss of moisture from the wipes. The cartridge and seal may independently be made of a suitable material such as plastic, metal foil, or paper, and they may be made of a single piece of material or they may be laminated. For example, suitable materials include metal foil; plastic-lined metal foil; plastic-coated paper; plastic-coated cardboard; and plastics including high impact polystyrene (HIPS), polyethylene, polypropylene, polyvinyl chloride, and laminates of plastics such as HIPS/polyvinyl chloride/HIPS laminates.

The cartridge may have a lid or cover with a removable strip. Removal of this strip would result in a space through which the wipes can be dispensed. In this configuration, it may be useful to attach the tail of the wipes to the strip. In this way, removal of the strip facilitates the threading of the wipes through the gap. The cartridge may also have a removable seal over the lid or cover.

Referring to Figures 48-58, the cartridge may have a permanently attached cover over a portion of the cartridge opening. The permanently attached cover and the cartridge opening may be covered by a removable moisture-loss preventing seal. A permanently attached cover is fixedly attached to the cartridge such that the cartridge and the cover cannot be separated as a result of the intended use of the wipes cartridge. The

attachment between the cover and the cartridge is of sufficient strength that the cartridge and/or cover must be deformed, damaged, or subjected to extreme environmental conditions in order to separate the cartridge from the attached cover.

5 The cartridge opening has a rectangular clearance, which is defined as a rectangle of the maximum length and width which will fit into the opening when in the plane of the opening. The permanently attached cover reduces the rectangular clearance of the opening such that the roll can be removed only by unrolling the sheets or by damaging the cartridge and/or cover. The
10 reduction in the rectangular clearance serves to convert the cartridge opening into a modified, or second, opening. For some configurations of the permanently attached cover, the original cartridge opening may be converted into more than one second opening.

 The reduced rectangular clearance, of the second opening, may have
15 a length that is less than about 90% of the length of the rectangular clearance of the cartridge opening. Preferably, the reduced rectangular clearance has a length that is less than about 75% of the length of the rectangular clearance of the cartridge opening, more preferably less than about 60%, more preferably less than about 50%. The reduced rectangular clearance may have a width
20 that is less than about 90% of the width of the rectangular clearance of the cartridge opening. Preferably, the reduced rectangular clearance has a width that is less than about 75% of the width of the rectangular clearance of the cartridge opening, more preferably less than about 60%, more preferably less than about 50%. The reduced rectangular clearance may have both a length
25 and a width that are independently less than about 90% of the corresponding length and width of the rectangular clearance of the cartridge opening. For example, for a cartridge having an opening with a rectangular clearance of length 114mm and width 76mm, the length and width of the reduced rectangular clearance of a second opening, formed by the presence of a
30 permanently attached cover, may independently be less than about 102mm and 69mm respectively, may independently be less than about 85mm and

57mm respectively, may independently be less than about 69mm and 46mm respectively, and may be less than about 57mm and 38mm respectively.

The permanently attached cover may, for example, be configured as a strip such as 200 (Figure 48), 201 (Figure 49), and 202 (Figure 50).

5 Permanently attached covers such as these serve to divide the cartridge opening into two openings, each having a reduced rectangular clearance. The permanently attached cover may be configured as a plurality of corner covers such as 204 (Figure 52) and 205 (Figure 53), which reduce both the width and the length of the cartridge opening. The permanently attached
10 cover may provide only a single opening across the length of the cartridge, reducing only the width of the rectangular clearance. Further examples include semicircularly shaped permanently attached covers 206 (Figure 54) and permanently attached covers 203 and 208 (Figures 51 and 55) which expose the top or bottom half of the roll which is provided within the cartridge.

15 It is desirable that the permanently attached cover has a shape, size, and orientation such that the tail of a roll of wipes which is contained in the cartridge can be easily accessed by a user. For this reason, it may be desirable for the permanently attached cover to provide access to more than half of the width of the opening (see Figures 48-50, and 52-54). Access to the
20 tail of a roll of wipes may be especially desirable when the package of wipes is first opened, or when a portion of the wipes has been separated from the roll in such a way that the tail of the roll of wipes is contained within the cartridge and is not visible along the entire length of the second opening.

25 The permanently attached cover may be rigid or flexible; it may be transparent, opaque, or translucent. The permanently attached cover may further contain printing or embossing 210 (Figure 56), such as for a design, directions, or other indicia. For example, the permanently attached cover 209 (Figure 56) may occupy the opening such that the wipes are only exposed by way of a strip along the bottom of the cartridge, through which they may be
30 dispensed. In another example, the permanently attached cover 211 (Figure 57) provides a space for dispensing the wipes at the bottom portion of the opening of the cartridge. The removable seal 212 (shown in a partially

removed state) cooperates with the permanently attached cover to provide a bacterial resistant seal until the removable seal is separated from the cartridge. Referring to Figure 58, the permanently attached cover may be initially present as a layer 213 over the entire opening. This layer can be perforated 214, and a bottom portion treated with an adhesive 215. A moisture-loss preventing seal 216 can then be placed over the layer, contacting the adhesive. When the moisture-loss preventing seal is removed, the portion of the layer which is adhered to the seal is removed from the rest of the layer due to tearing of the perforations. Referring to Figures 59 and 60, the permanently attached cover may be a rigid lid 217 which can be hingedly attached to the cartridge. The lid can be closed and snapped shut to provide a slit through which the wipes can be dispensed. For example, the lid may have buttons 218 (Figure 59), and the cartridge may have button holes 219 such that the mating of the lid and the cartridge causes the lid to be locked onto the cartridge.

The permanently attached cover may be attached to the cartridge by a variety of methods. For example, the attachment may be by way of adhesives, heat welding, thermal bonding, ultrasonic sealing, RF sealing, or mechanical attachment such as crimping. The moisture-loss preventing seal may be attached to the cartridge and the permanently attached cover by way of adhesives, bonding, or sealing. It is desirable that the strength of the bond between the moisture-loss preventing seal and the cartridge and the strength of the bond between the moisture-loss preventing seal and the permanently attached cover is less than the strength of the bond between the cartridge and the permanently attached cover. In this way, the consumer can easily remove the moisture-loss preventing seal without removing the permanently attached cover. Both the permanently attached cover and the moisture-loss preventing seal contact the lip around the cartridge.

The cover reduces the opening of the cartridge, and this may be sufficient to prevent a roll of wipes from passing through the opening. Such a configuration discourages a consumer from placing another roll or stack of wet wipes in the cartridge after the original roll has been fully dispensed.

Although the wet wipes preferably contain preservatives and antimicrobial agents, prolonged use of a single cartridge with two or more rolls of wet wipes may compromise the sterility of the dispenser, depending on the surrounding environment. The configuration also discourages the removal of the roll of
5 wipes from the cartridge. Wipes that are removed from the dispenser can become contaminated and/or can lose their moisture content.

Figures 45A and 45B depict end views of one version of an asymmetrical cartridge 11. Figure 45A is a view of a first end of the cartridge 11, looking into the axis of the roll 34 and showing a substantially rectangular wall having side walls 39, 40 and a bottom wall 41 with an opening sealed by
10 an impervious barrier 140 attached to a cartridge lip 31 that surrounds the opening. Figure 45B provides a view from the second end of the cartridge 11, showing a curved wall with side portions 39, 40 and a curved bottom wall 41. The cartridge 11 is keyed to fit into the housing of a dispenser (not shown) in a manner that ensures proper orientation of the roll of wet wipes 34 within the
15 housing, and specifically ensures that the tail 36 of the roll 34 is toward the bottom of the housing when the cartridge 11 is placed therein. For the cartridge 11 to be keyed to the housing of the dispenser (not shown), the housing (not shown) should have an asymmetrical shape corresponding to that of the cartridge, with one end being rounded and the other end
20 substantially rectangular. The transition between the rounded and rectangular shapes may be gradual (e.g., morphing from one shape to the other) or sudden. When viewed directly from above (i.e., looking down on the cartridge 11 with the opening and impervious barrier 140 facing the viewer), the shape of the cartridge is asymmetrical with respect to rotation of the cartridge by 180
25 degrees about the axis of sight (an axis normal to the axis of the roll 34, passing from the center of the impervious barrier 140 to the bottom wall 41). Thus, the cartridge 11 is asymmetrical for the purposes of the present invention. When used with a housing adapted to receive the shape of the
30 cartridge 11 in a keyed manner, the cartridge 11 will only fit completely into the housing when it is placed therein with the correct orientation.

Figures 46A and 46B depict a related embodiment for an asymmetrical cartridge 11, wherein both ends of the cartridge are rounded and asymmetry is provided by the presence of a recess 142 on one end of the cartridge 11. The corresponding housing (not shown) would have a protrusion on one end that could fit into the recess 142. Thus, the cartridge 11 would be keyed to fit into the housing of a dispenser in only one orientation. Figure 47 is a projection view of one version of the cartridge 11 shown in Figures 46A and 46B, wherein the recess 142 on one side of the cartridge 11 linearly tapers away to provide an opposing side without a recess.

5

10

CLAIMS

1. A container for wet wipes, comprising:
a cartridge comprising a first opening having a first rectangular
clearance;
5 the first rectangular clearance having a first length and a first
width;
a moisture-loss preventing seal; and
a permanently attached cover over a portion of said first
opening;
10 wherein said permanently attached cover forms a second
opening having a second rectangular clearance;
the second rectangular clearance having a second length and a
second width.
2. The container of claim 1, wherein the second length is less than
15 about 90% of the first length.
3. The container of claim 1, wherein the second length is less than
about 75% of the first length.
4. The container of claim 1, wherein the second length is less than
about 60% of the first length.
- 20 5. The container of claim 1, wherein the second length is less than
about 50% of the first length.
6. The container of claim 1, wherein the second width is less than
about 90% of the first width.
7. The container of claim 1, wherein the second width is less than
25 about 75% of the first width.
8. The container of claim 1, wherein the second width is less than
about 60% of the first width.

9. The container of claim 1, wherein the second width is less than about 50% of the first width.

10. The container of claim 1, wherein the second length is less than about 90% of the first length and the second width is less than about 90% of the first width.

11. The container of claim 1, wherein the second length is less than about 75% of the first length and the second width is less than about 75% of the first width.

12. The container of claim 1, wherein the second length is less than about 60% of the first length and the second width is less than about 60% of the first width.

13. The container of claim 1, wherein the second length is less than about 50% of the first length and the second width is less than about 50% of the first width.

14. The container of claim 1, further comprising a roll of wet wipes.

15. A container for wet wipes, comprising:

a cartridge comprising an interior and an opening;

the opening having a first rectangular clearance;

the first rectangular clearance having a first length and a first width;

a roll of wet wipes in said interior; and

a permanently attached cover over a portion of said opening;

the permanently attached cover forming a second opening having a second rectangular clearance;

the second rectangular clearance having a second length and a second width;

wherein the roll is retained in the interior; and the wipes can be removed from the interior by unwinding the roll.

16. The container of claim 15, wherein the second length is less than about 90% of the first length.

17. The container of claim 15, wherein the second length is less than about 75% of the first length.

5 18. The container of claim 15, wherein the second length is less than about 60% of the first length.

19. The container of claim 15, wherein the second length is less than about 50% of the first length.

10 20. The container of claim 15, wherein the second width is less than about 90% of the first width.

21. The container of claim 15, wherein the second width is less than about 75% of the first width.

22. The container of claim 15, wherein the second width is less than about 60% of the first width.

15 23. The container of claim 15, wherein the second width is less than about 50% of the first width.

24. The container of claim 15, wherein the second length is less than about 90% of the first length and the second width is less than about 90% of the first width.

20 25. The container of claim 15, wherein the second length is less than about 75% of the first length and the second width is less than about 75% of the first width.

25 26. The container of claim 15, wherein the second length is less than about 60% of the first length and the second width is less than about 60% of the first width.

27. The container of claim 15, wherein the second length is less than about 50% of the first length and the second width is less than about 50% of the first width.

28. The container of claim 15, wherein the permanently attached cover is configured as a strip.

29. The container of claim 15, wherein the permanently attached cover is configured as a plurality of corner covers.

30. The container of claim 15, wherein the permanently attached cover is configured as a semicircularly shaped cover.

31. The container of claim 15, wherein the permanently attached cover comprises buttons and the cartridge comprises button holes;
the buttons and button holes coordinating to lock the permanently attached cover to the cartridge.

32. The container of claim 15, further comprising a moisture-loss preventing seal.

33. The container of claim 32, wherein the moisture-loss preventing seal covers the second opening and is removably adhered to a portion of the permanently attached cover.

34. A container for wet wipes comprising:
side walls having a top and a bottom;
each side wall having a length and a depth;
the tops of the side walls forming an opening having a first length and a first width;
two opposed side walls corresponding to the first length of the container;
a bottom wall joined to each side wall;
the bottom wall having an curved section and a planar section;
the curved section having a first side and a second side;

the planar section having a first side and a second side;
the first side of the curved section being joined to the bottom of
a first side wall;
the second side of the curved section being joined to the first
5 side of the planar section;
the second side of the planar section being joined to the bottom
of a second side wall that is opposed to the first side wall;
a lip;
the lip joined to the top of a side wall;
10 the lip extending outwardly at least about 5 mm from the top of a
side wall;
a permanently attached cover contacting at least a portion of the
lip; and
a moisture-loss preventing cover contacting at least a portion of
15 the lip.

35. The container of claim 34, wherein the permanently attached
cover provides a rectangular clearance having a second length and a second
width.

36. The container of claim 34, wherein the second length is less
20 than about 75% of the first length.

37. The container of claim 34, wherein the second width is less than
about 75% of the first width.

38. The container of claim 34, wherein the second length is less
than about 75% of the first length and the second width is less than about
25 75% of the first width.

39. The container of claim 34, wherein the curvature of the bottom
wall is about 42 to about 44 degrees.

40. The container of claim 34, wherein the curvature of the bottom
wall is about 40 to about 45 degrees.

41. The container of claim 34, wherein the side walls corresponding to the width wise dimension of the container are tapered from the bottom toward the top, such that the distance between them is less at the bottom of the container.

5 42. The container of claim 34, comprising a rib.

43. The container of claim 34, comprising a plurality of ribs, the ribs extending along the first wall, the curved bottom section, the planar bottom section and at least partially along the second wall.

10 44. A dispensing system for wipes, comprising:
a dispenser, the dispenser comprising an interior; and
a container shaped to fit into the interior;
the container comprising a cartridge, a permanently attached
cover, a plurality of wet wipes, and a moisture-loss preventing seal.

15 45. The dispensing system of claim 44, wherein
the cartridge comprises a first opening having a first rectangular
clearance, the first rectangular clearance having a first length and a first width;
the permanently attached cover is situated over a portion of said
first opening to form a second opening having a second rectangular
clearance, the second rectangular clearance having a second length and a
20 second width.

46. The dispensing system of claim 44, wherein the second length is less than about 90% of the first length.

47. The dispensing system of claim 44, wherein the second length is less than about 60% of the first length.

25 48. The dispensing system of claim 44, wherein the second width is less than about 90% of the first width.

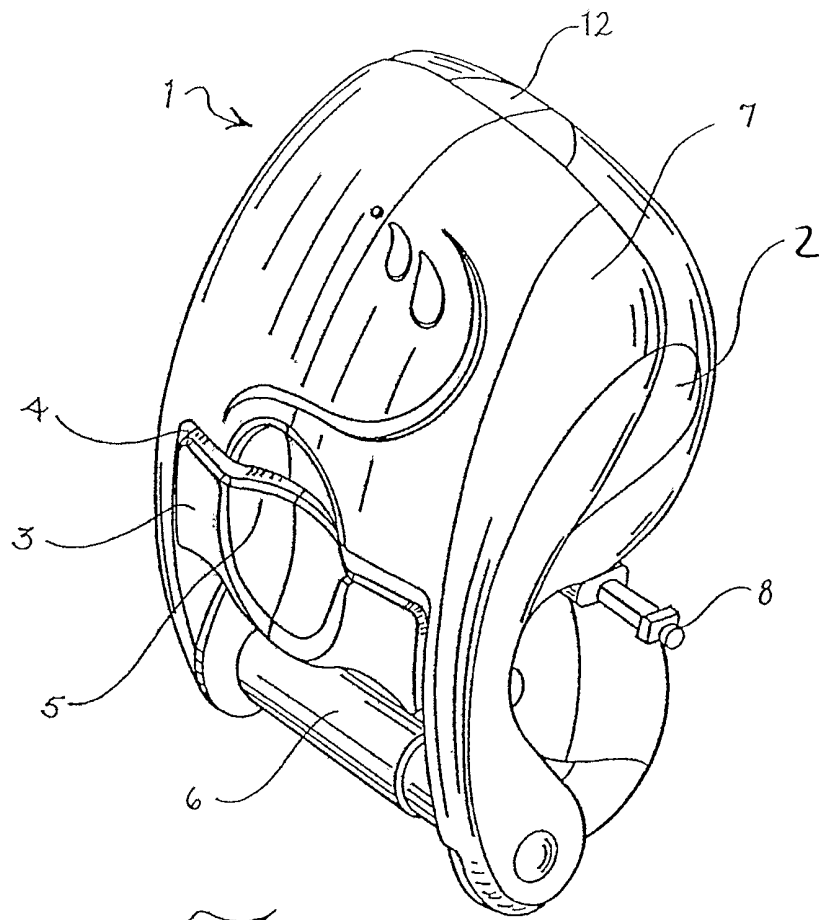
49. The dispensing system of claim 44, wherein the second width is less than about 60% of the first width.

50. The dispensing system of claim 44, wherein the second length is less than about 75% of the first length and the second width is less than about 75% of the first width.

5 51. The dispensing system of claim 44, further comprising a roll of wet wipes.

52. The dispensing system of claim 44, wherein the interior and the container are shaped to fit in a single orientation.

10 53. The dispensing system of claim 44, wherein the dispenser, the cartridge, and the permanently attached cover together are capable of maintaining at least 95% of the moisture of wet wipes for a 14 day period at 73 °F and 50% relative humidity.

*Fig. 1*

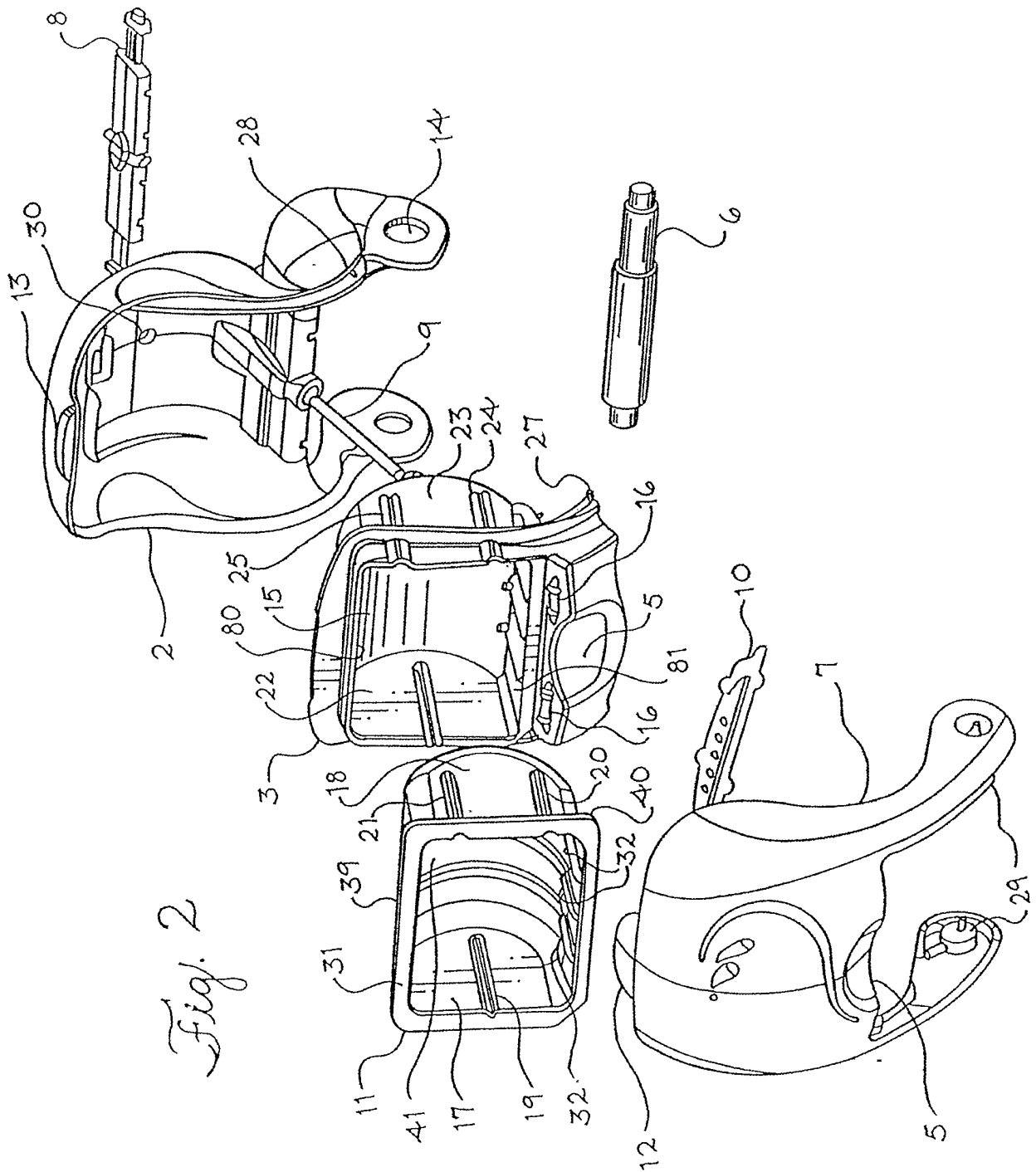
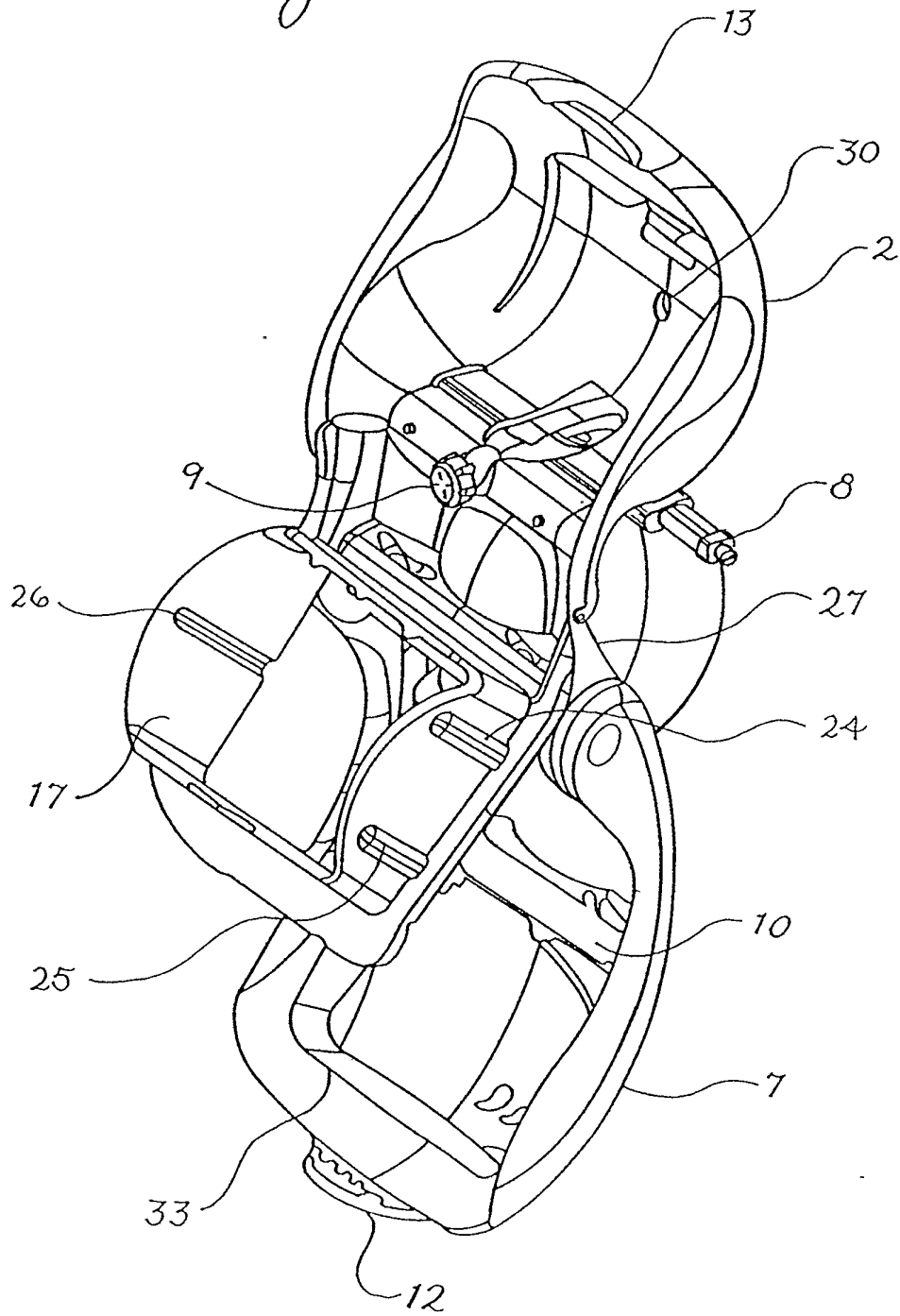


Fig 3

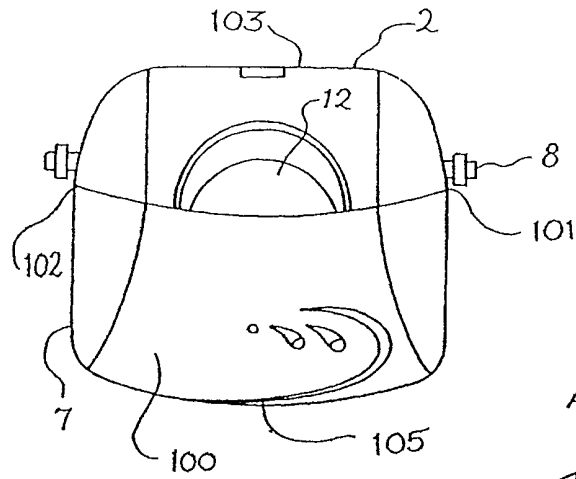


Fig. 4

Fig. 5

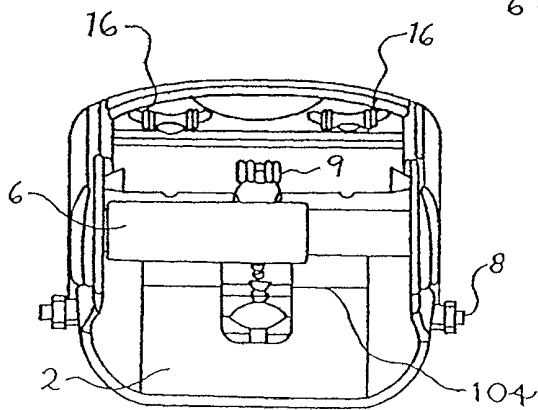
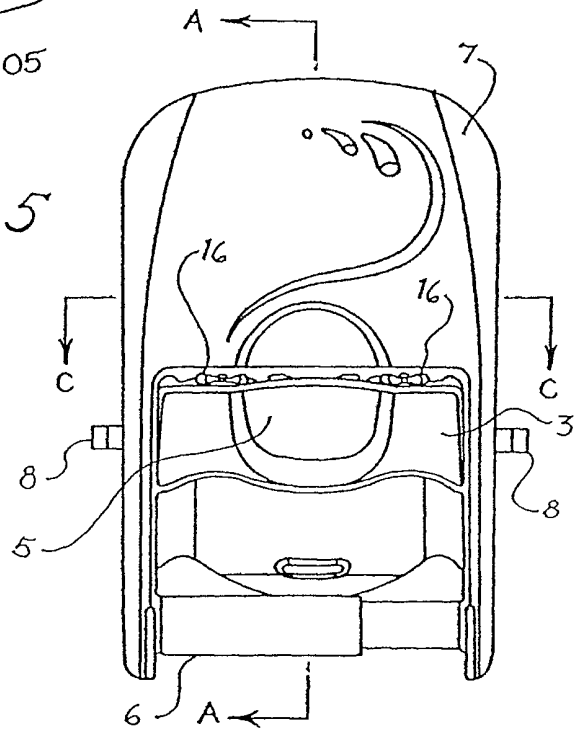


Fig. 6

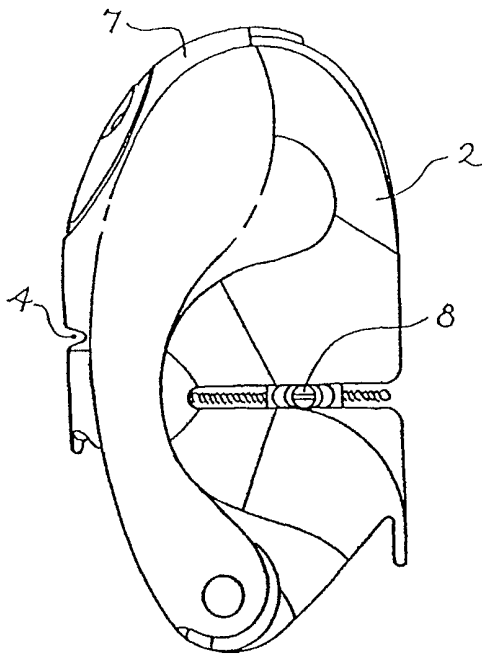


Fig. 7

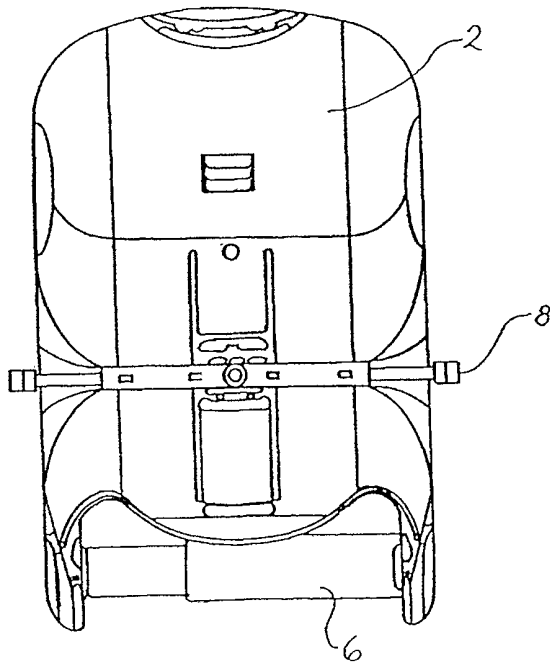
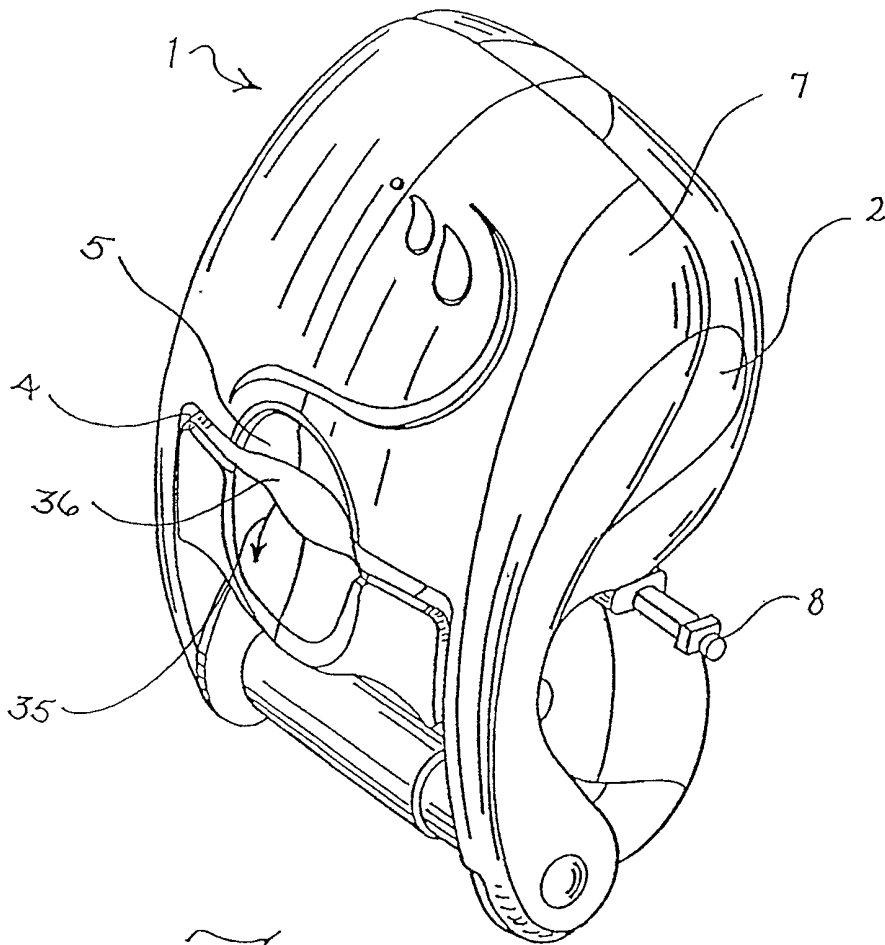
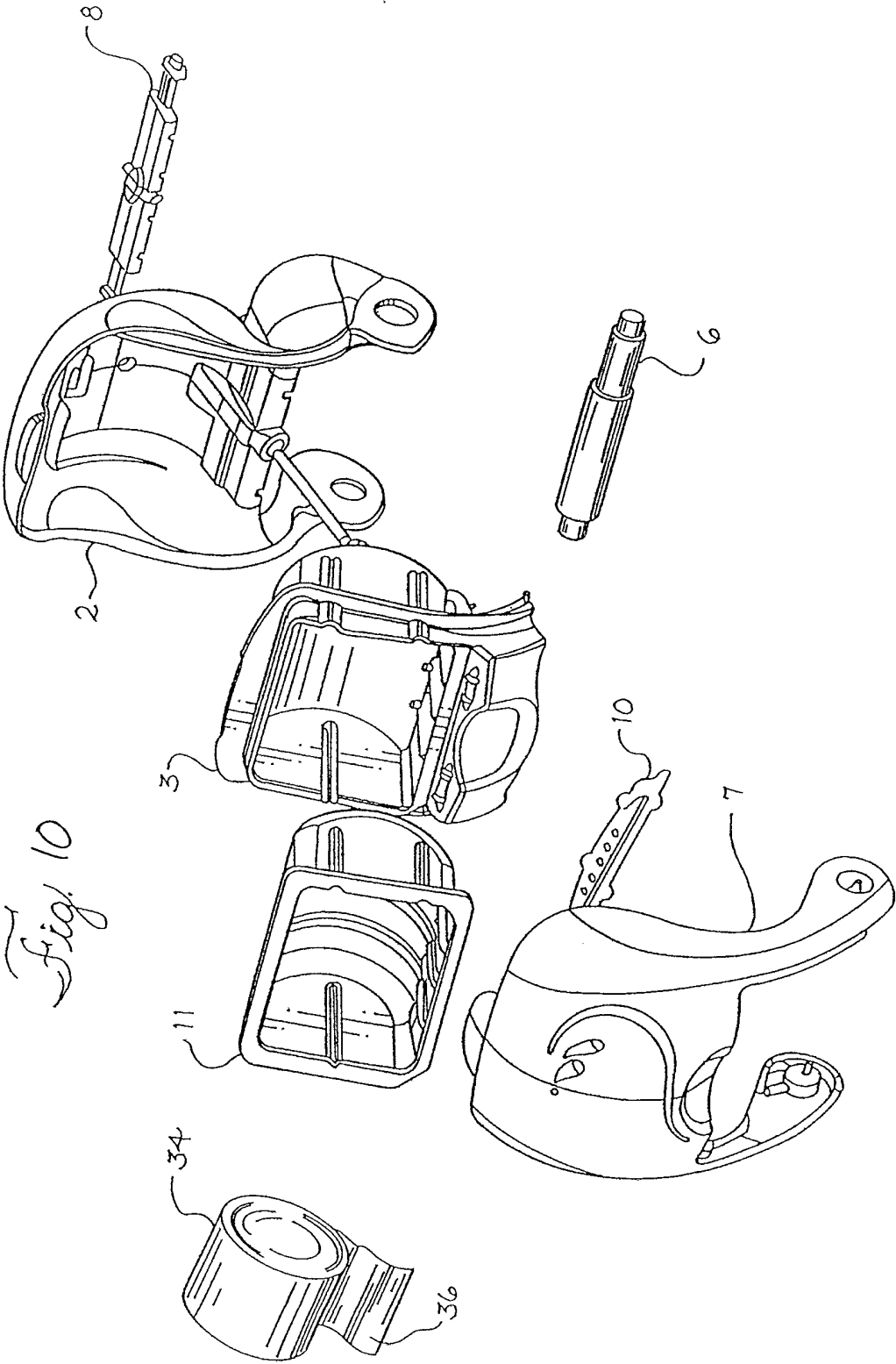
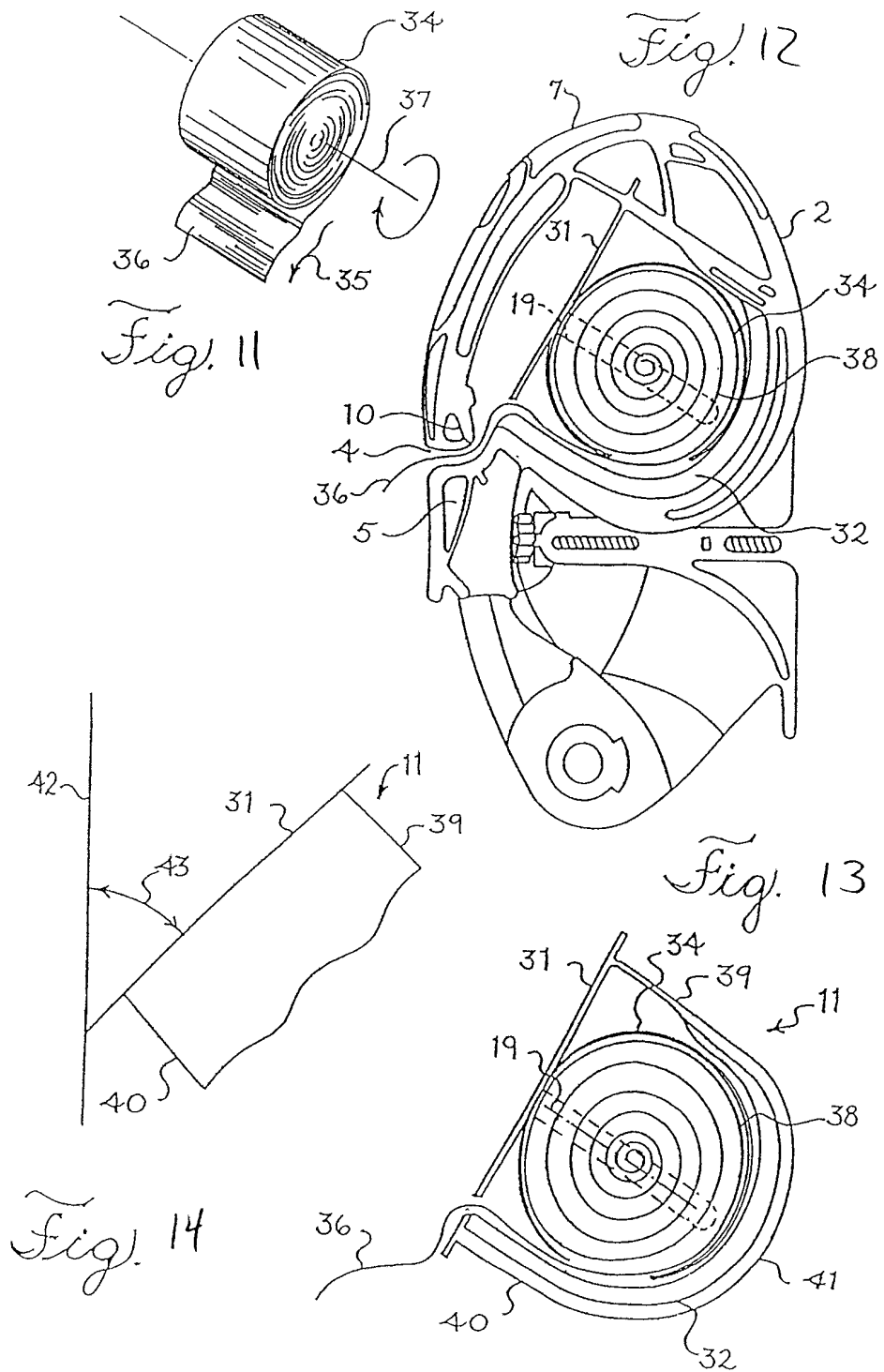


Fig. 8

*Fig. 9*





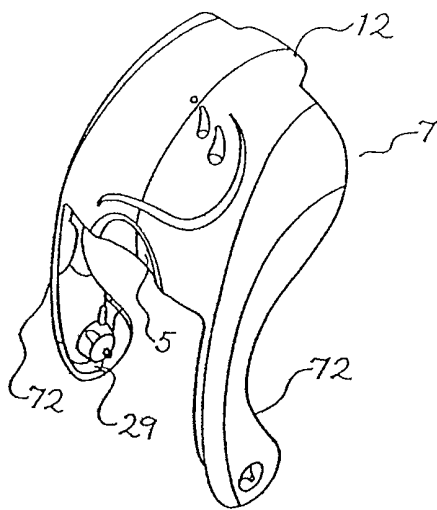


Fig. 15

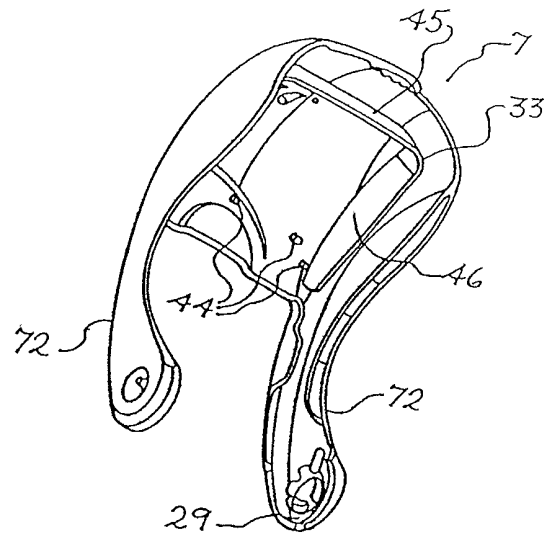


Fig. 17

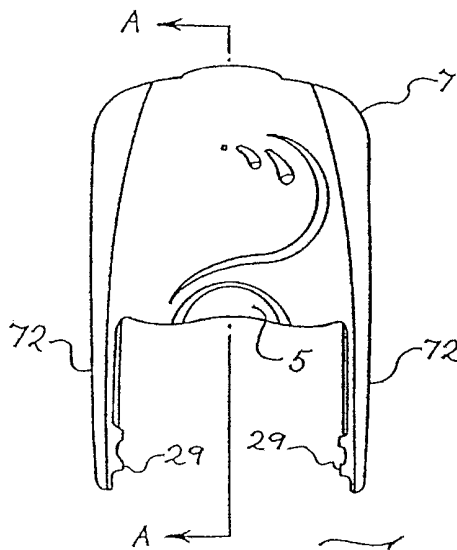


Fig. 16

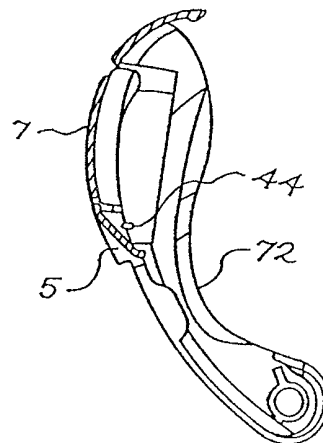
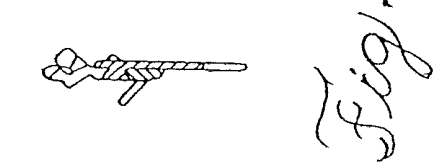
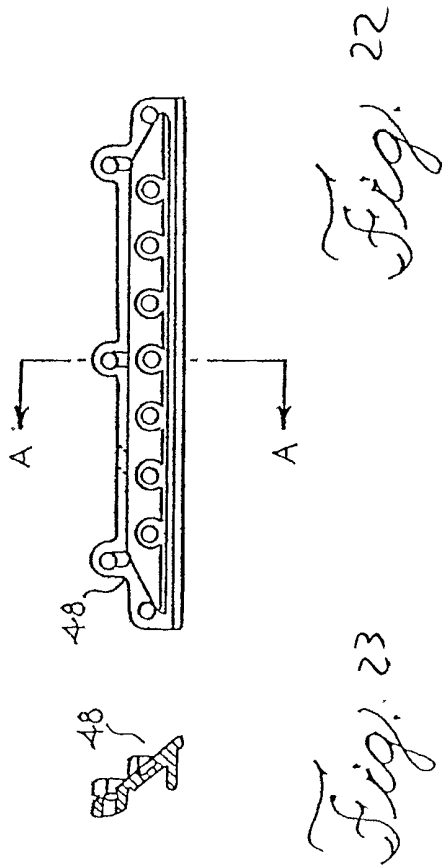
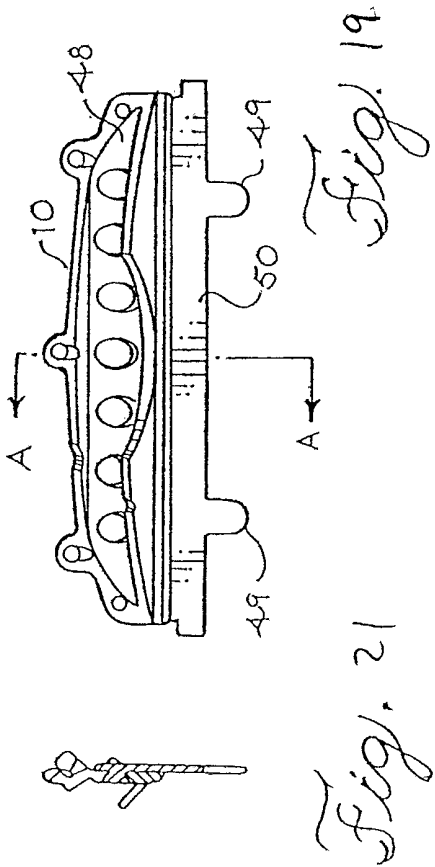
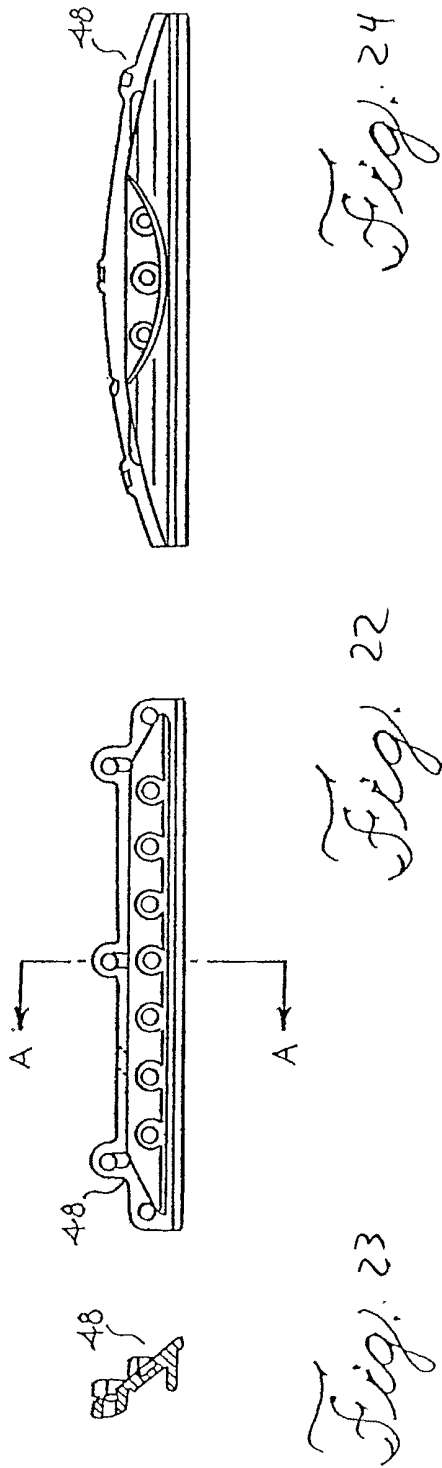
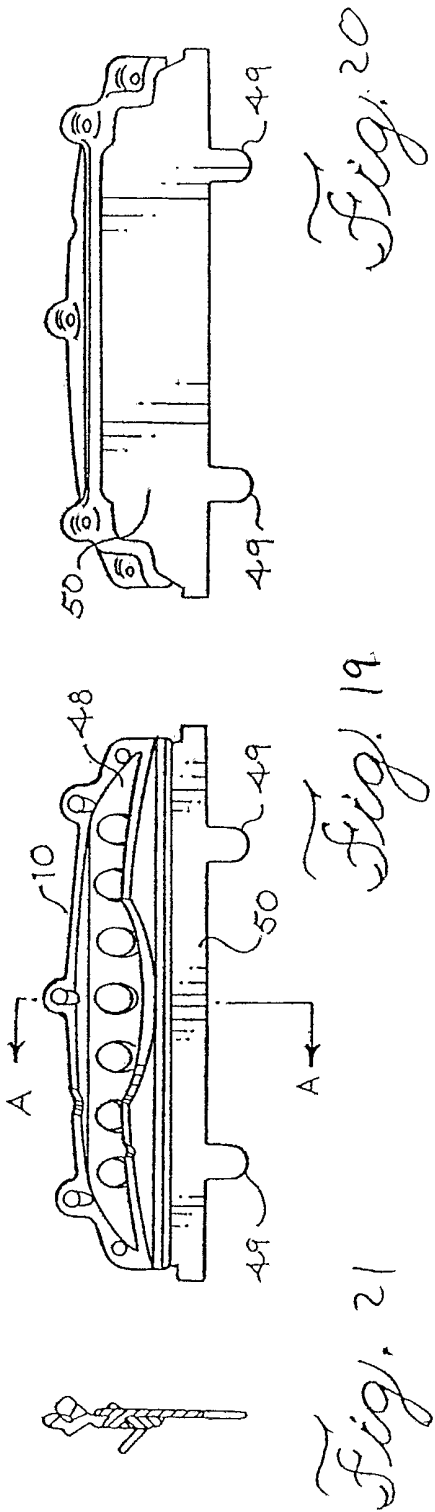


Fig. 18



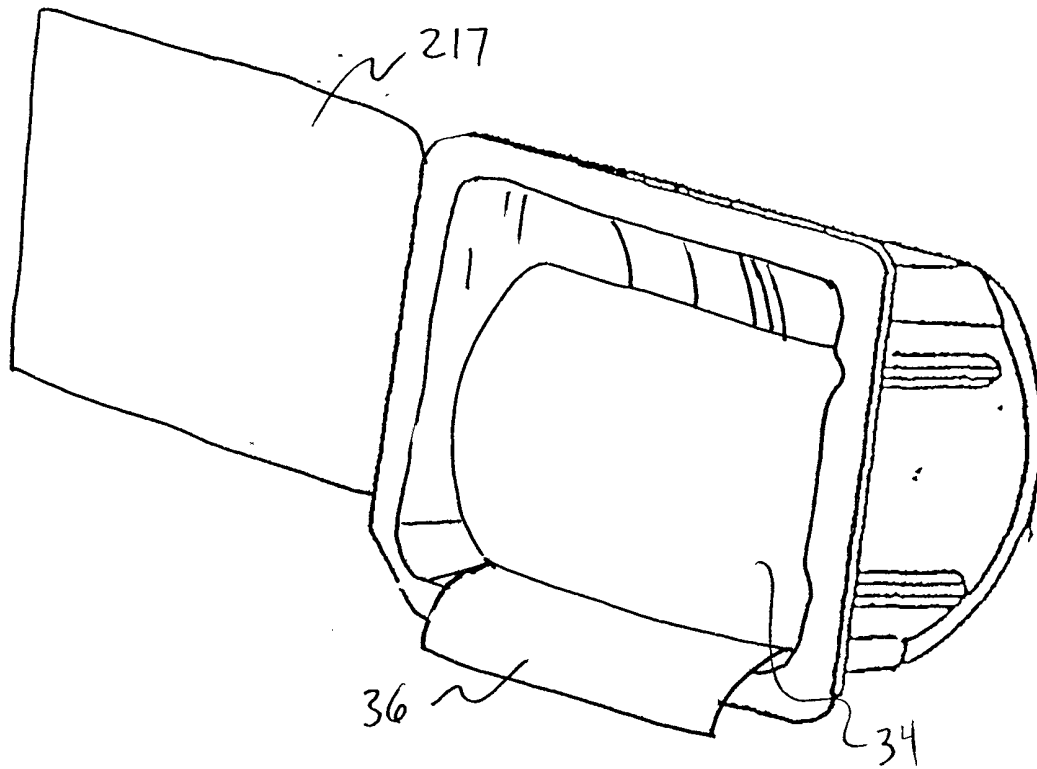


Fig 25-A

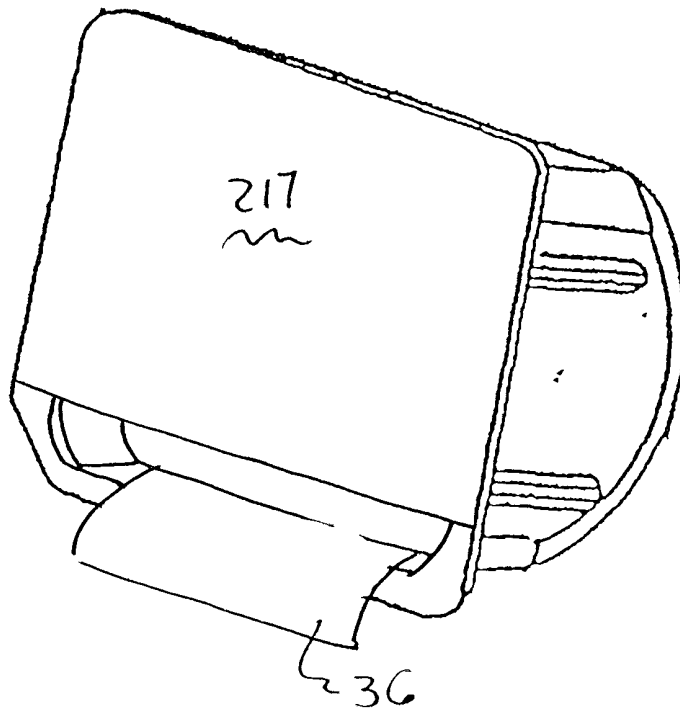
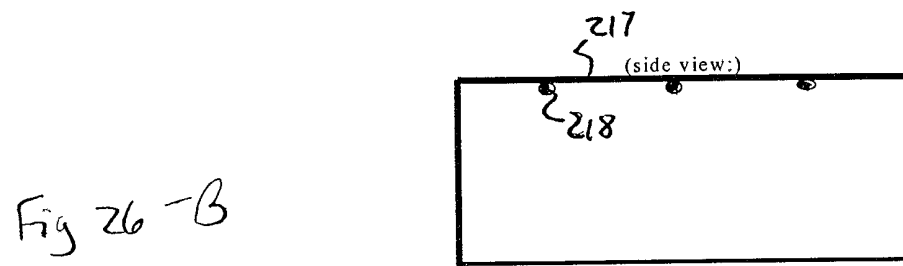
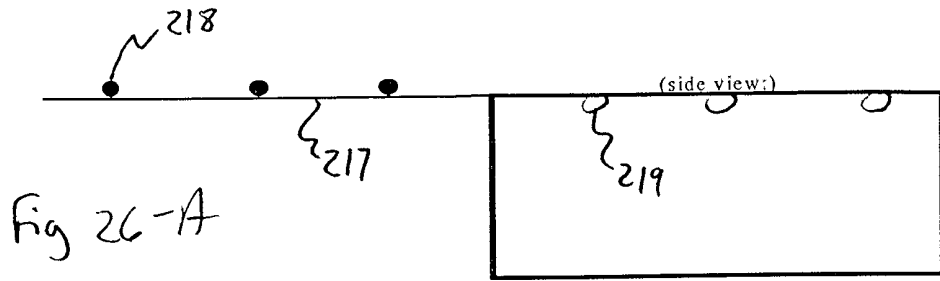


Fig 25-B



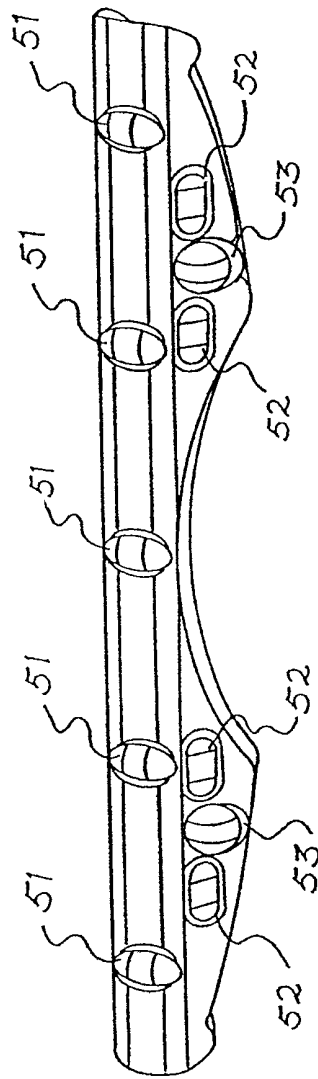


Fig. 27

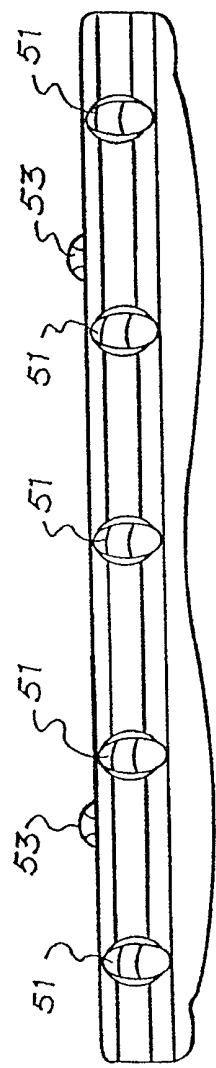
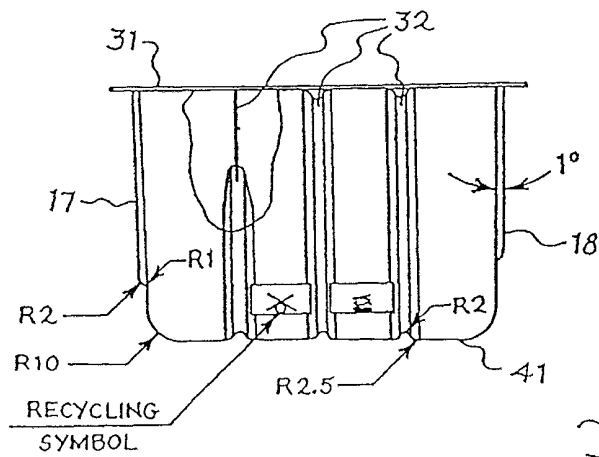
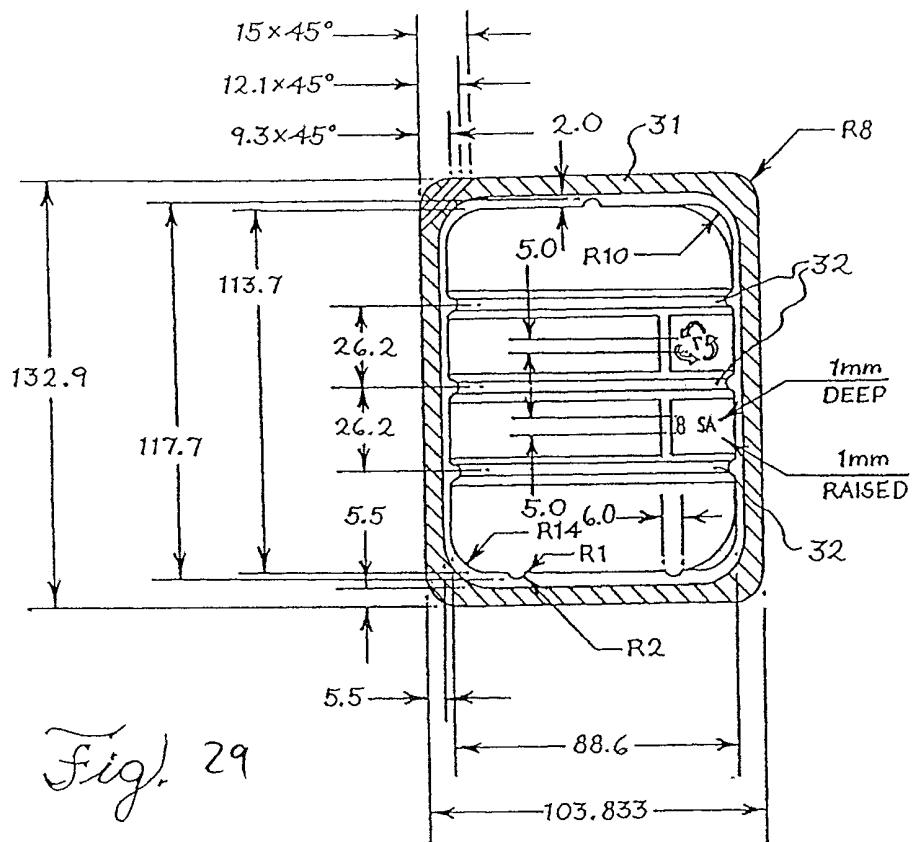
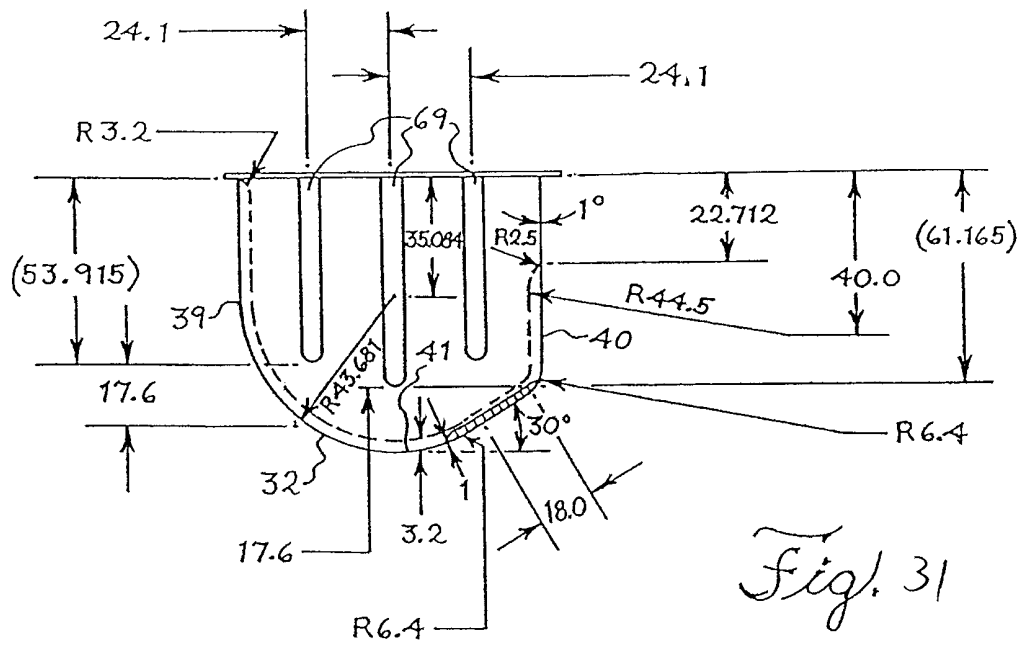
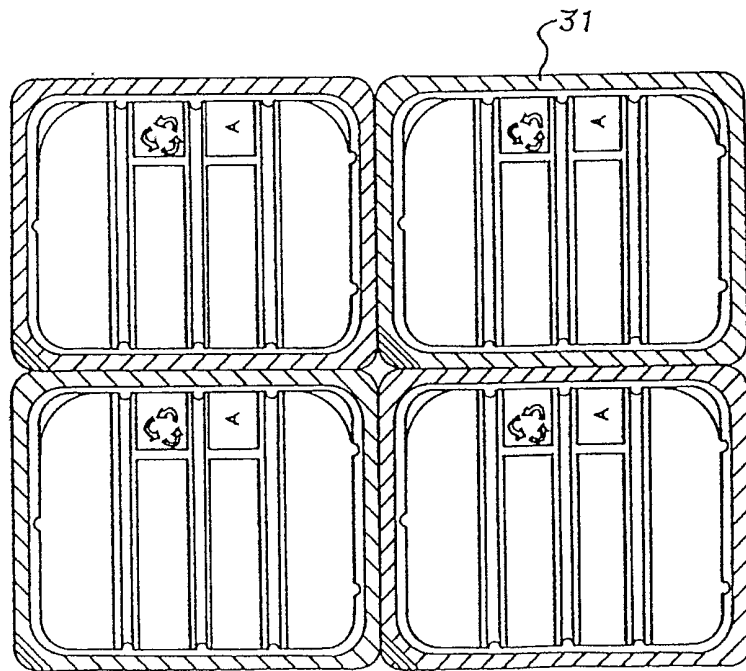
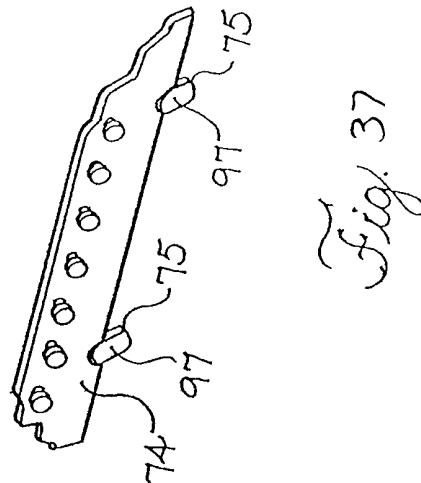
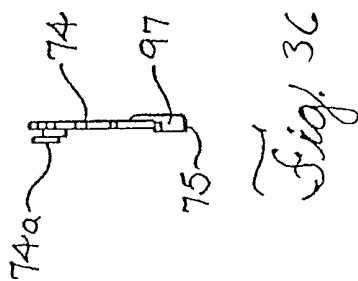
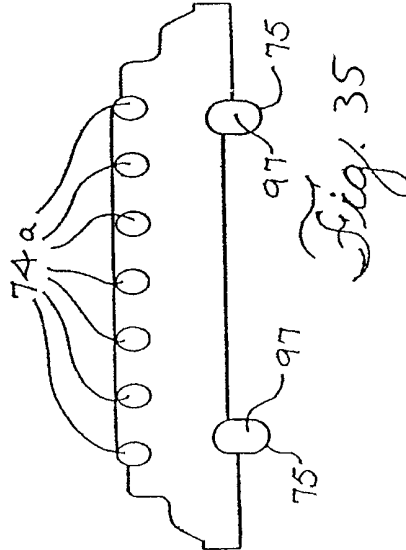
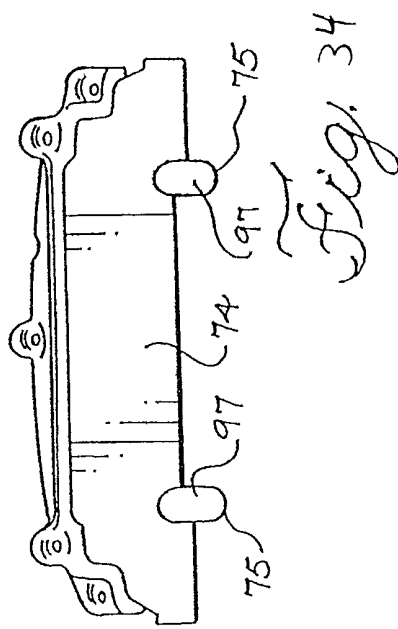
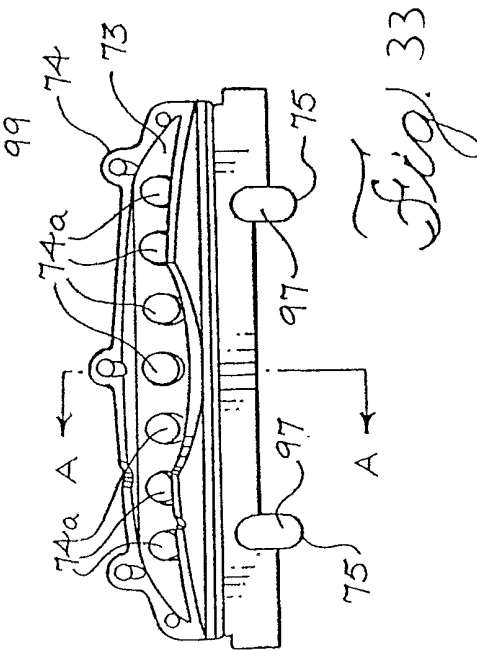


Fig. 28



*Fig. 31**Fig. 32*



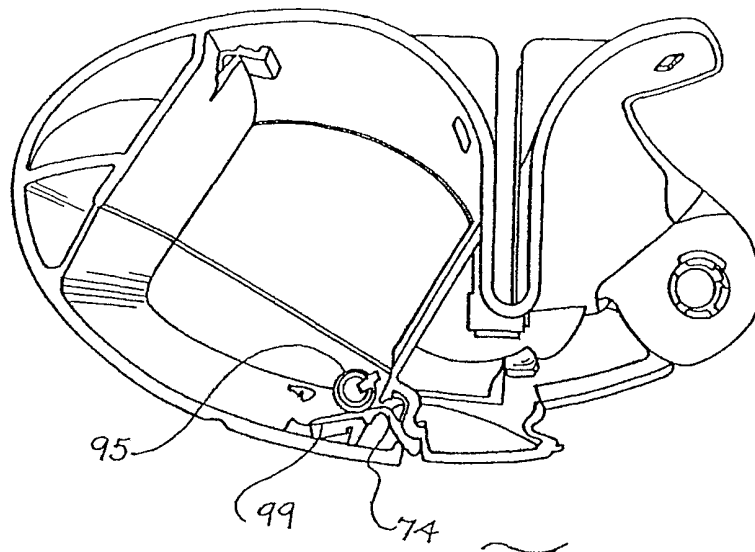


Fig. 38

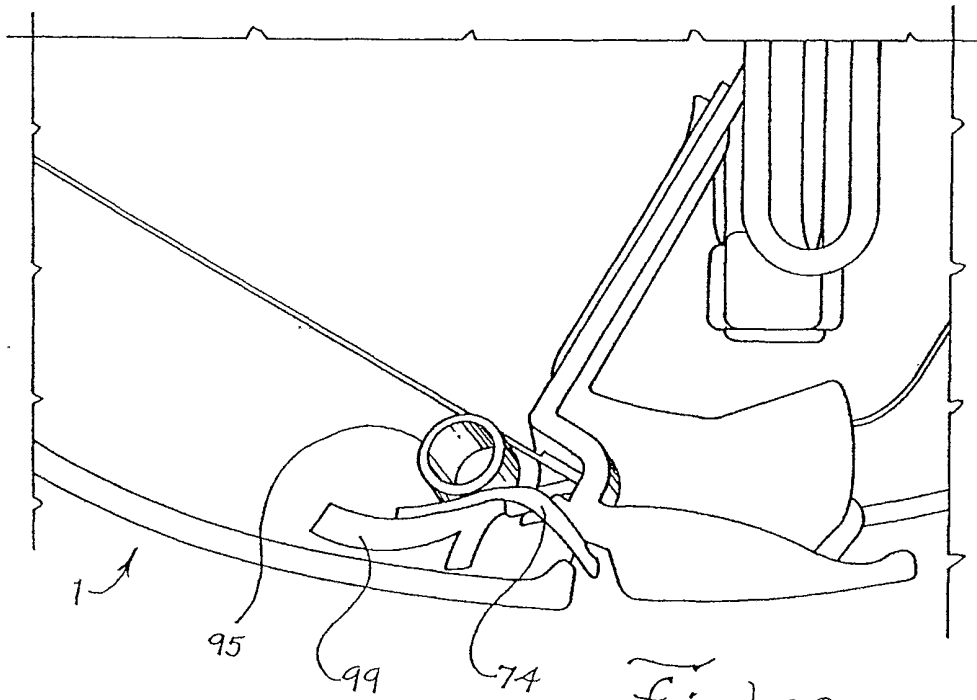
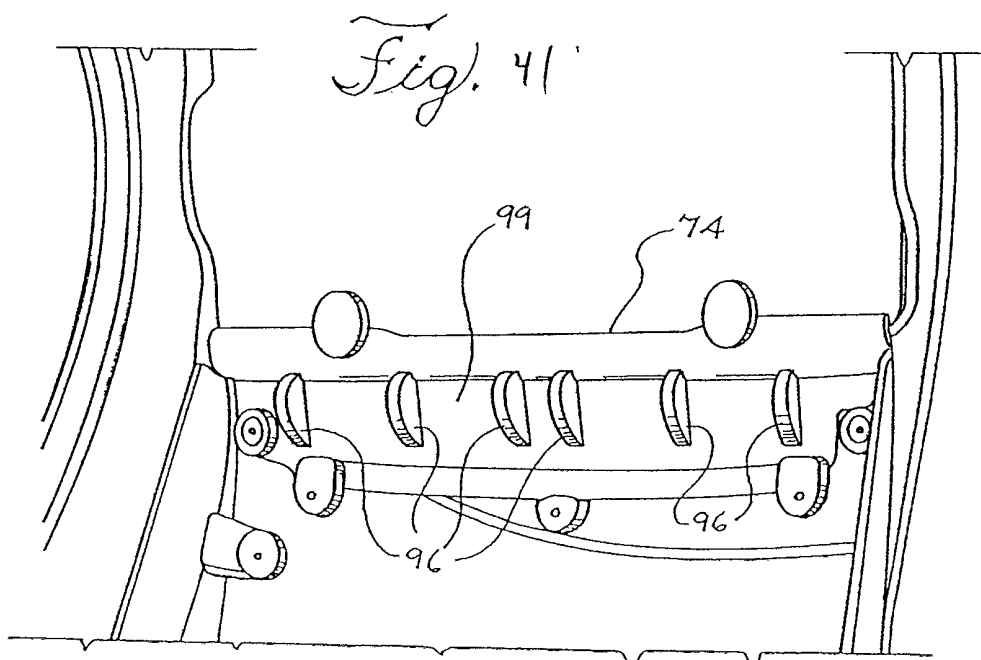
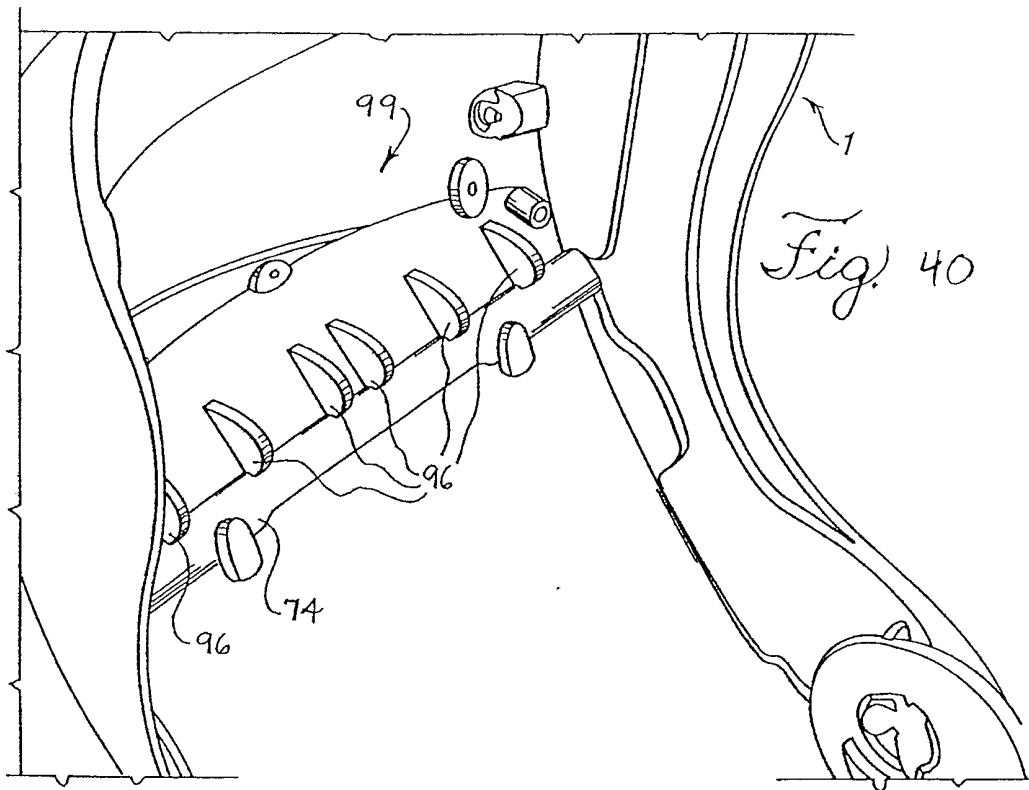


Fig. 39



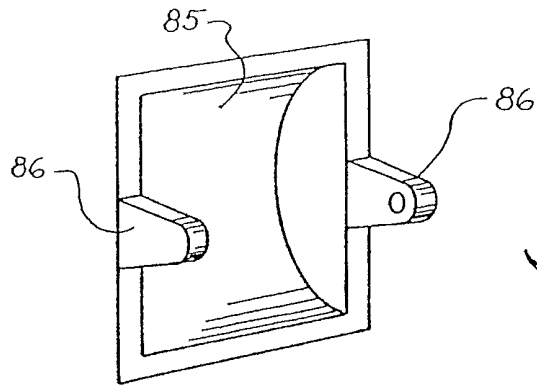


Fig. 42

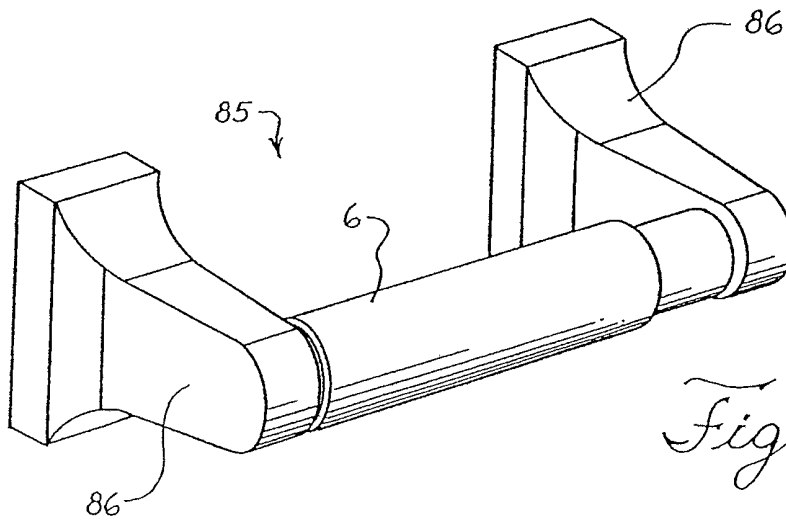


Fig. 43

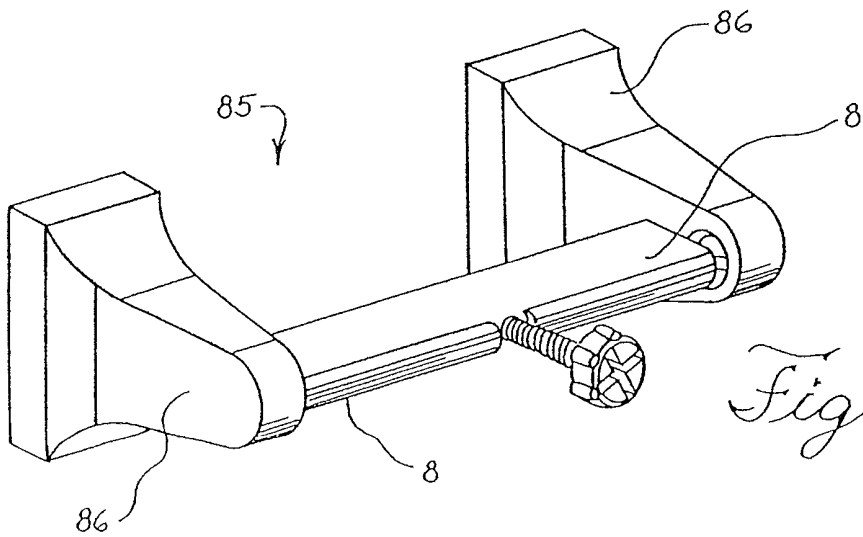


Fig. 44

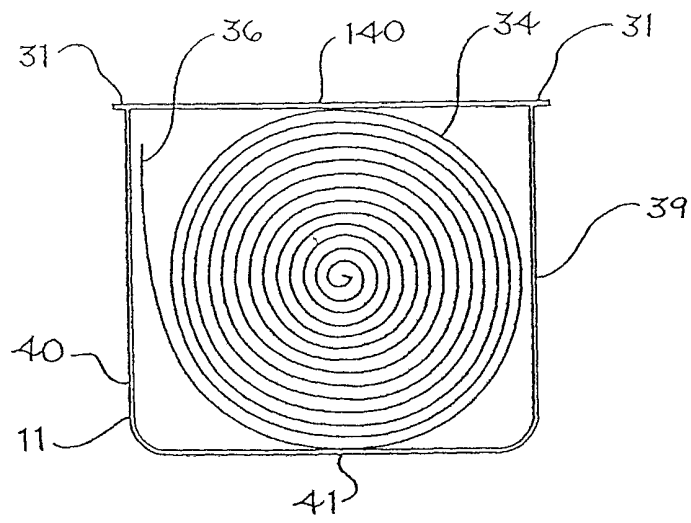


Fig. 45A

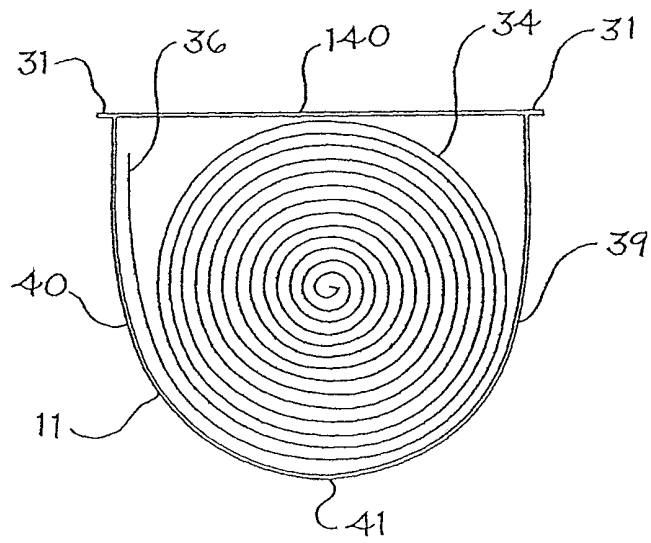
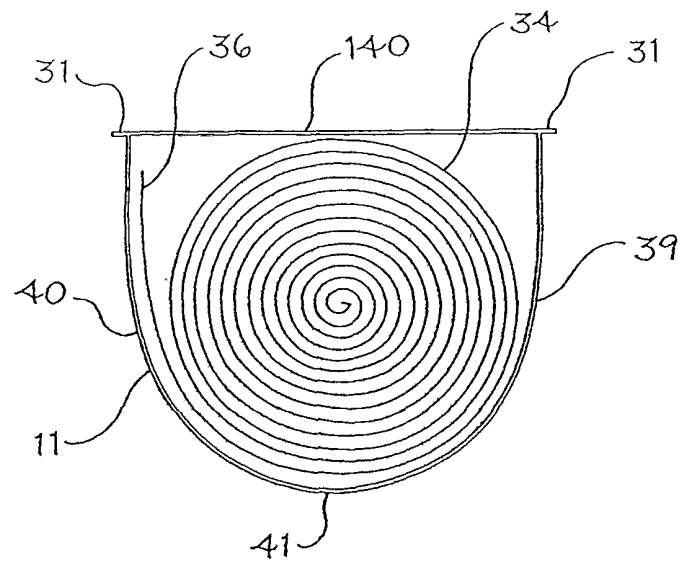
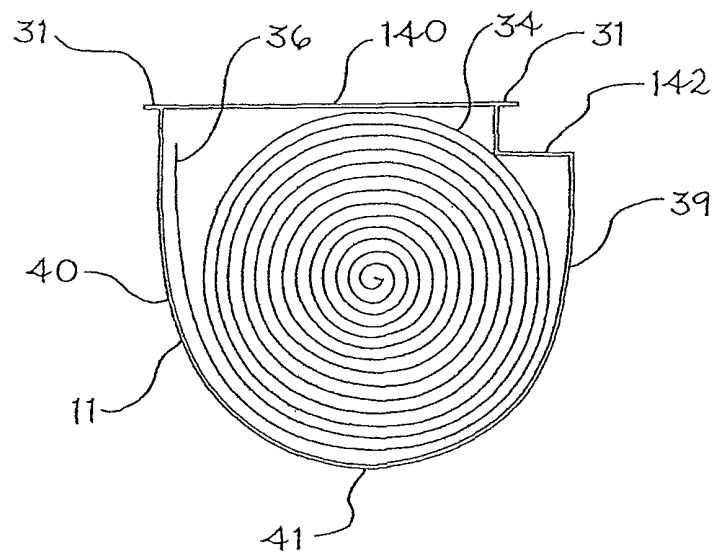


Fig. 45B

*Fig. 46A.**Fig. 46B*

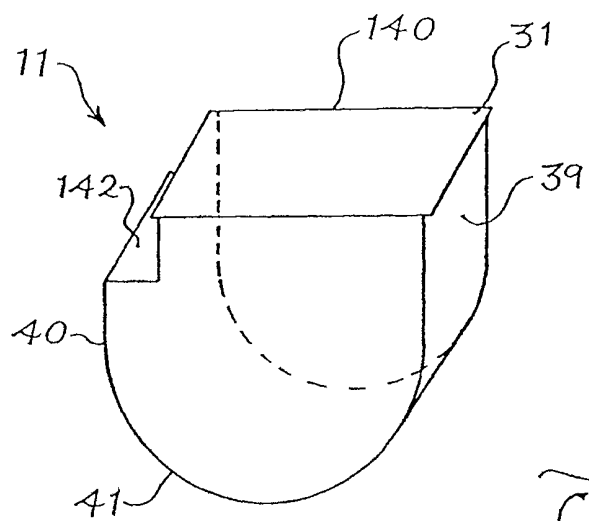


Fig. 47

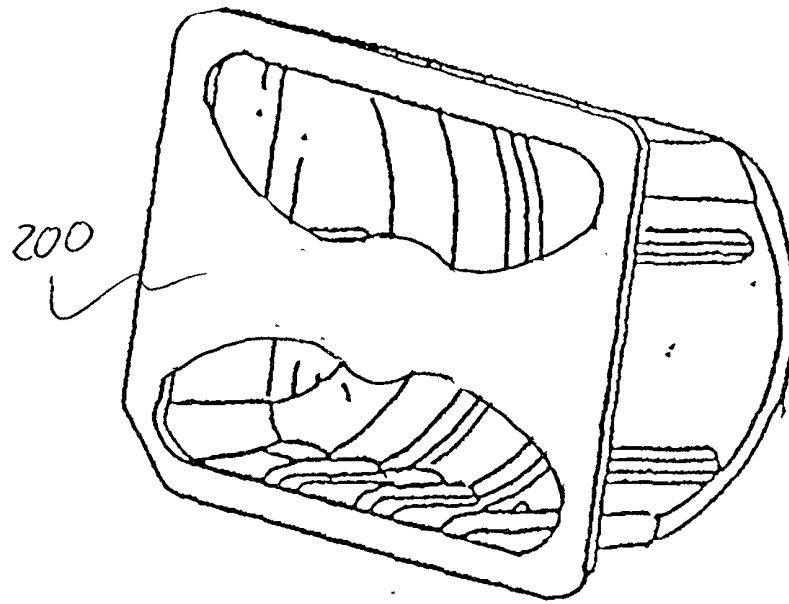


Fig. 48

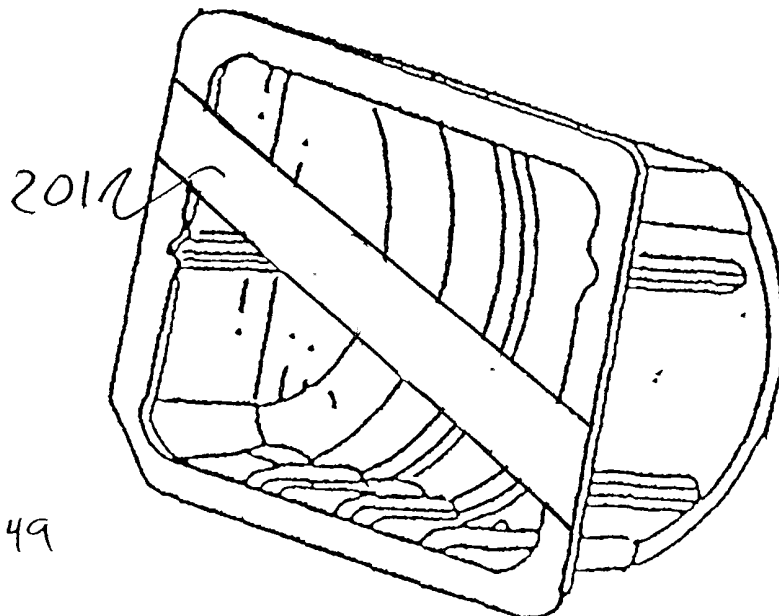


Fig. 49

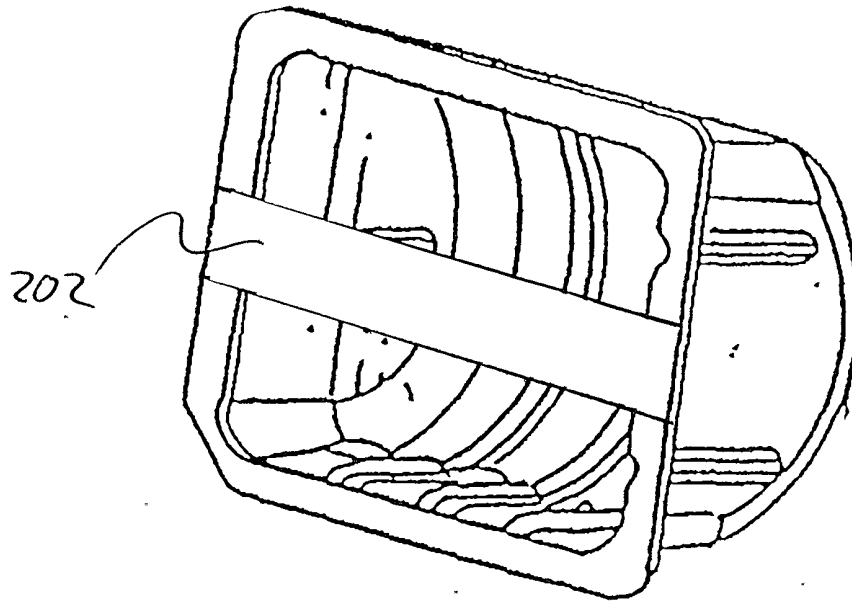


Fig. 50

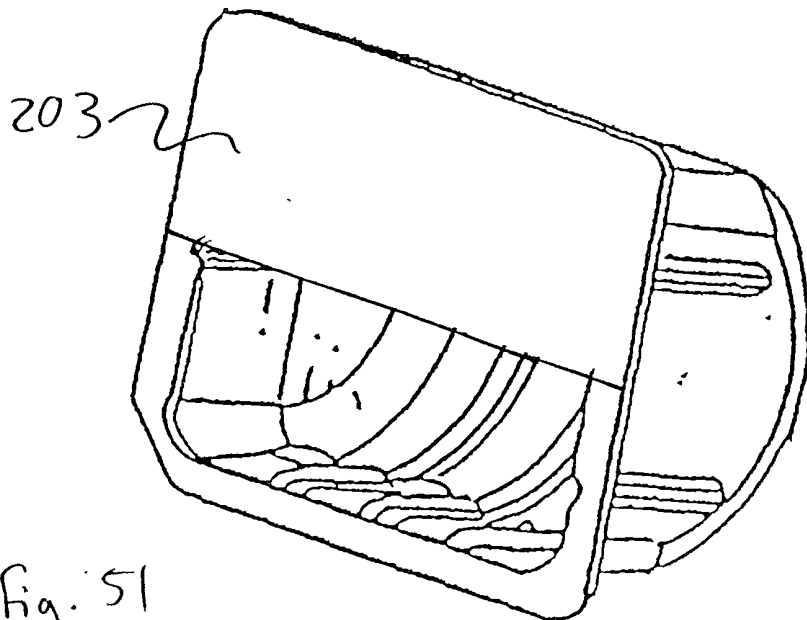


Fig. 51

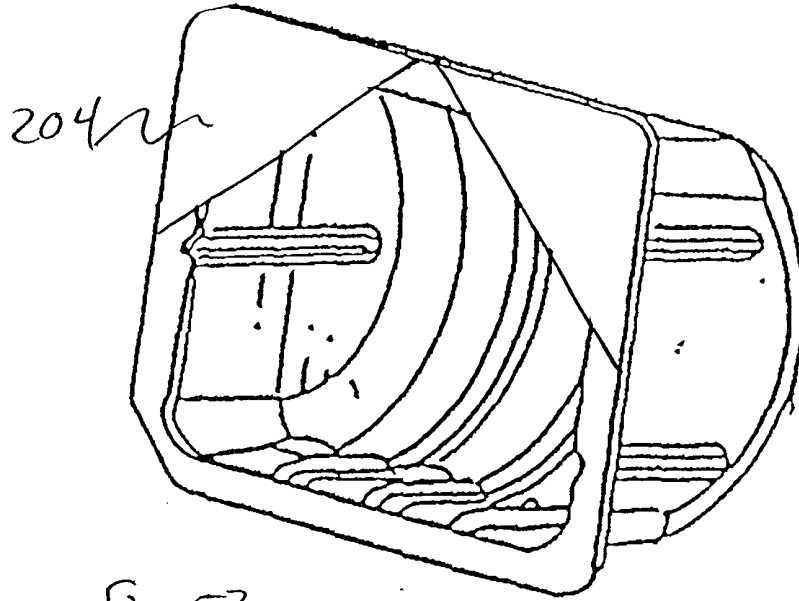


Fig. 52

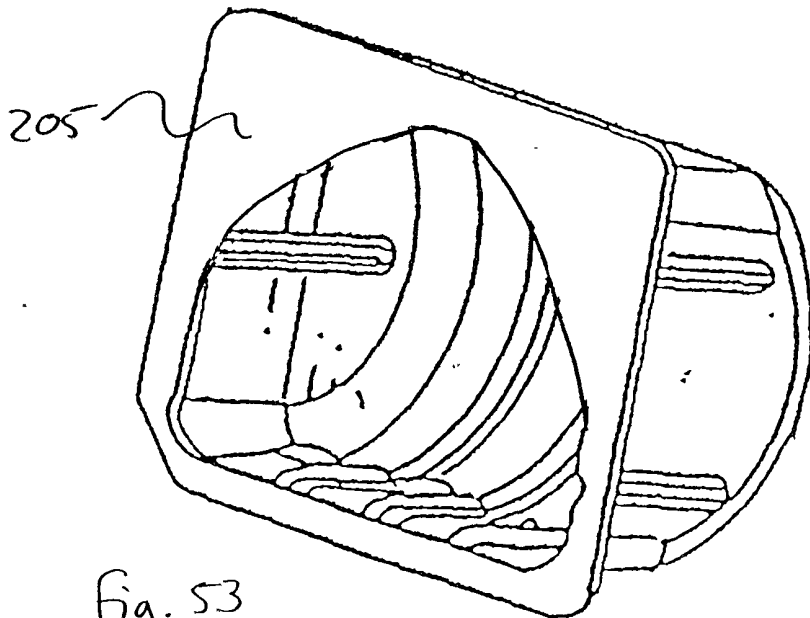


Fig. 53

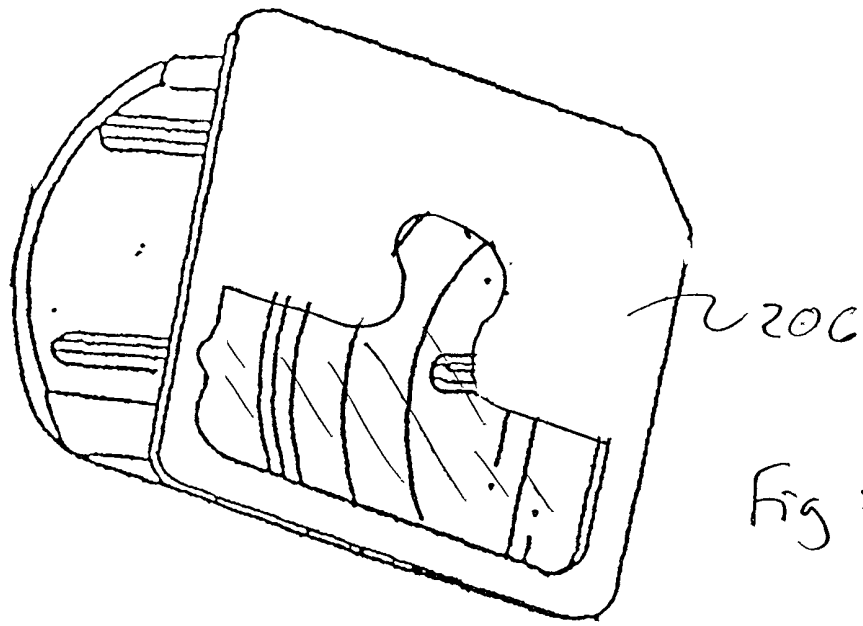


Fig 55

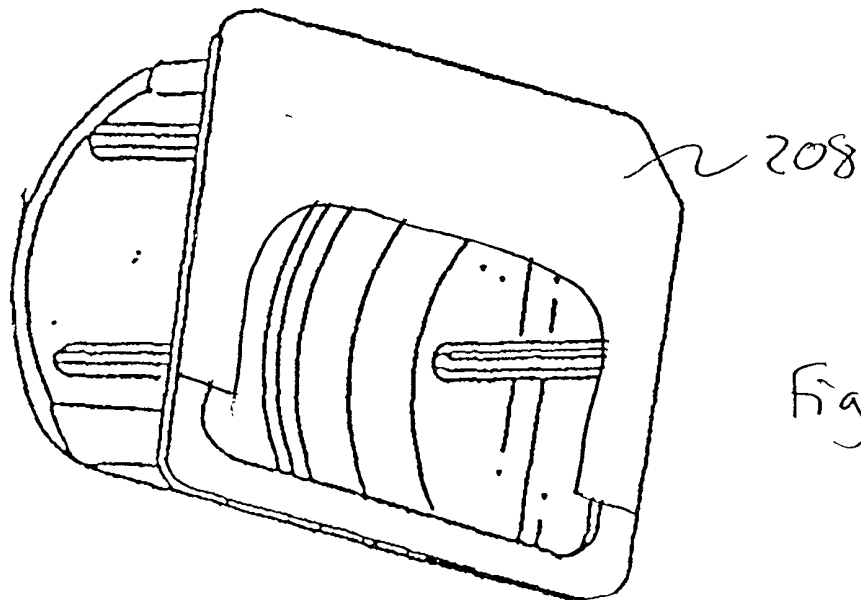
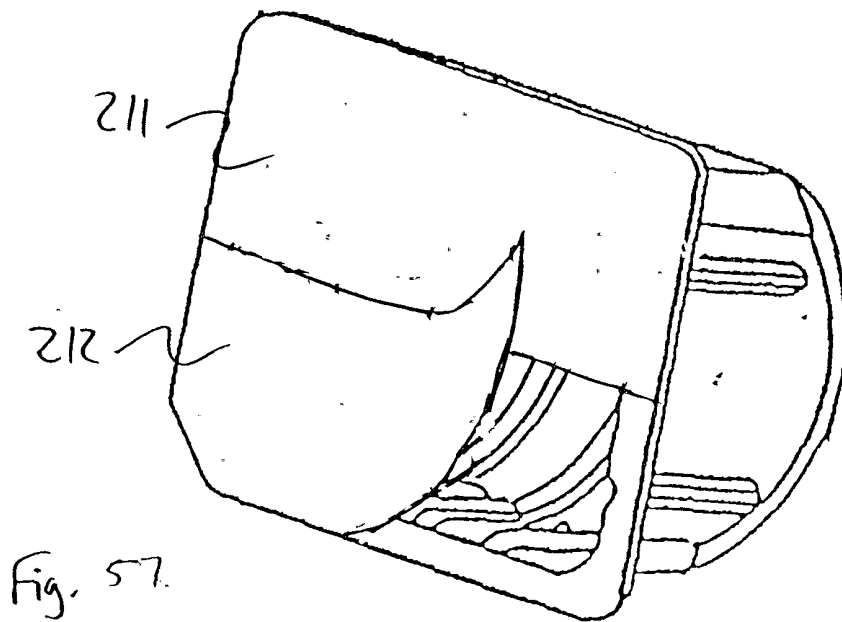
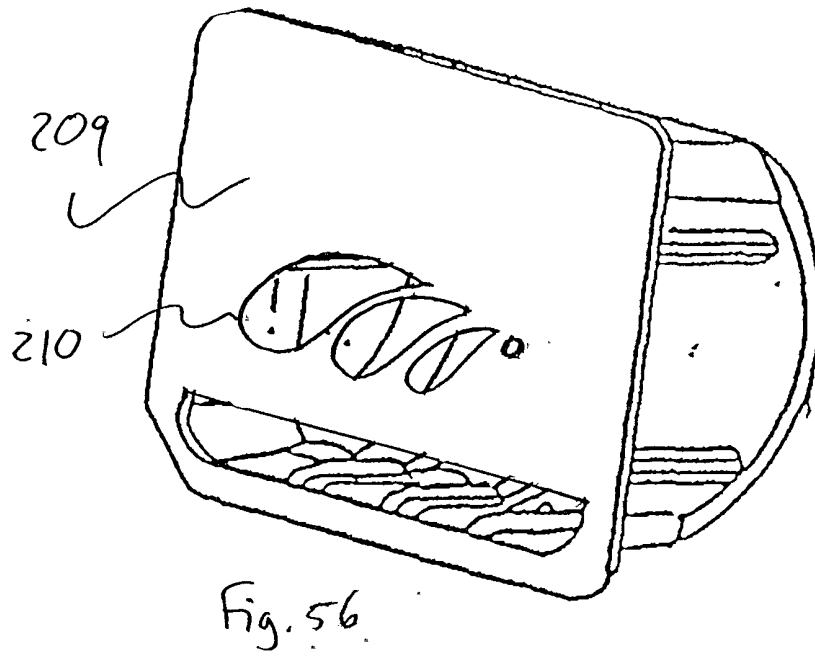


Fig 54



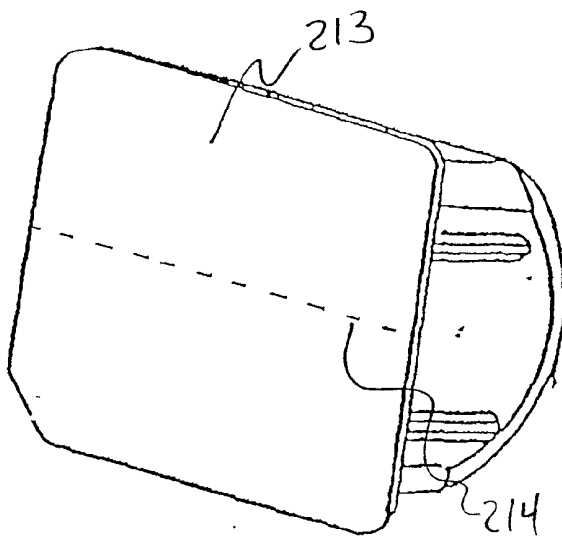


Fig 58-A

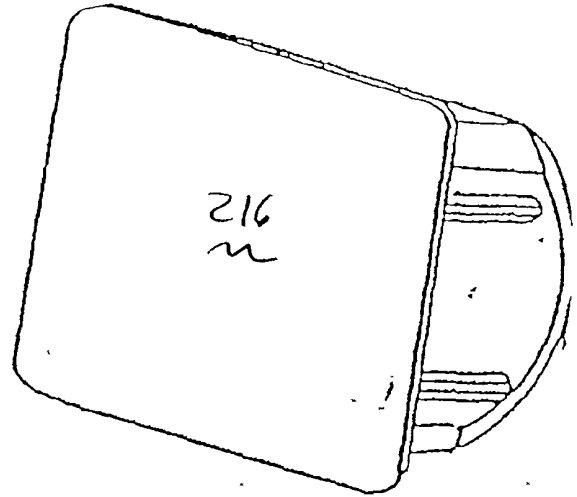


Fig 58-C

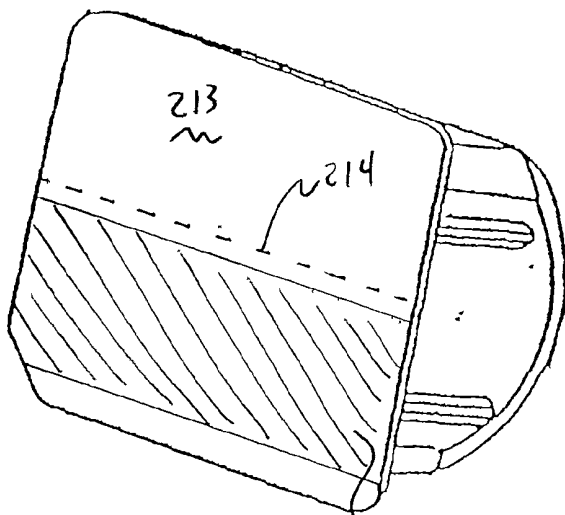


Fig 58-B

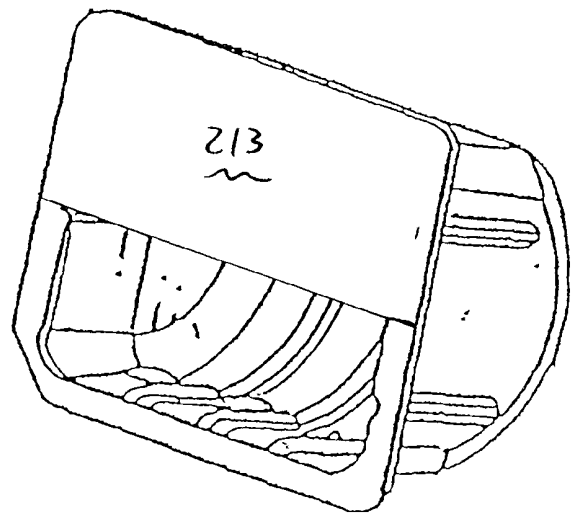


Fig 58-D

INTERNATIONAL SEARCH REPORT

Inte Application No

PC 1/US 01/28520

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A47K10/38 A47K10/32

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47K

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

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

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 784 055 A (ANDERSON J) 8 January 1974 (1974-01-08)	1,44, 46-50, 52,53
Y	column 1, line 59 -column 3, line 17 column 3, line 54 -column 4, line 25; figures 1,2,5,6	14
X	EP 0 251 103 A (NAKAMURA KENJI) 7 January 1988 (1988-01-07)	1,44-50, 52,53
Y	page 8, line 3 - line 5; figures 1-4	51
X	US 4 535 912 A (BONK JOSEPH P) 20 August 1985 (1985-08-20)	15,32
Y	column 4, line 23 -column 6, line 36; figures 1-5	14,51
	--- -/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

25 February 2002

Date of mailing of the international search report

04/03/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Zuurveld, G

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/28520

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>EP 1 048 257 A (HAKLE KIMBERLY DE GMBH) 2 November 2000 (2000-11-02) paragraphs '0021!, '2225!; figures 1, 2, 4-6, 10</p> <p style="text-align: center;">-----</p>	<p>34, 35, 39-42</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/28520

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3784055	A	08-01-1974	NONE	
EP 0251103	A	07-01-1988	AT 50226 T	15-02-1990
			AU 593358 B2	08-02-1990
			AU 7468587 A	24-12-1987
			CA 1292451 A1	26-11-1991
			DE 3761649 D1	15-03-1990
			EP 0251103 A1	07-01-1988
			GR 3000455 T3	28-06-1991
			HK 94594 A	16-09-1994
			JP 2074640 C	25-07-1996
			JP 7102868 B	08-11-1995
			JP 63152577 A	25-06-1988
			JP 2780931 B2	30-07-1998
			JP 8113268 A	07-05-1996
			KR 9500593 B1	26-01-1995
			US 4790436 A	13-12-1988
US 4535912	A	20-08-1985	US 3986479 A	19-10-1976
			AT 341714 B	27-02-1978
			AT 814674 A	15-06-1977
			AU 7424974 A	15-04-1976
			BE 820967 A1	03-02-1975
			BR 7408486 A	04-11-1975
			CA 1035329 A1	25-07-1978
			DE 2448042 A1	17-04-1975
			DK 534274 A	09-06-1975
			ES 223544 Y	16-04-1977
			ES 224553 Y	16-06-1977
			FR 2257253 A1	08-08-1975
			FR 2262505 A1	26-09-1975
			IE 41616 B1	13-02-1980
			IT 1021757 B	20-02-1978
			JP 1156131 C	15-07-1983
			JP 50078469 A	26-06-1975
			JP 57049213 B	20-10-1982
			NL 7413447 A	15-04-1975
			NO 743647 A	05-05-1975
			NZ 180744 A	25-09-1978
			PH 14594 A	02-10-1981
			SE 7412754 A	14-04-1975
			US 4101026 A	18-07-1978
			ZA 7406456 A	26-05-1976
EP 1048257	A	02-11-2000	DE 19919637 A1	02-11-2000
			EP 1048257 A2	02-11-2000