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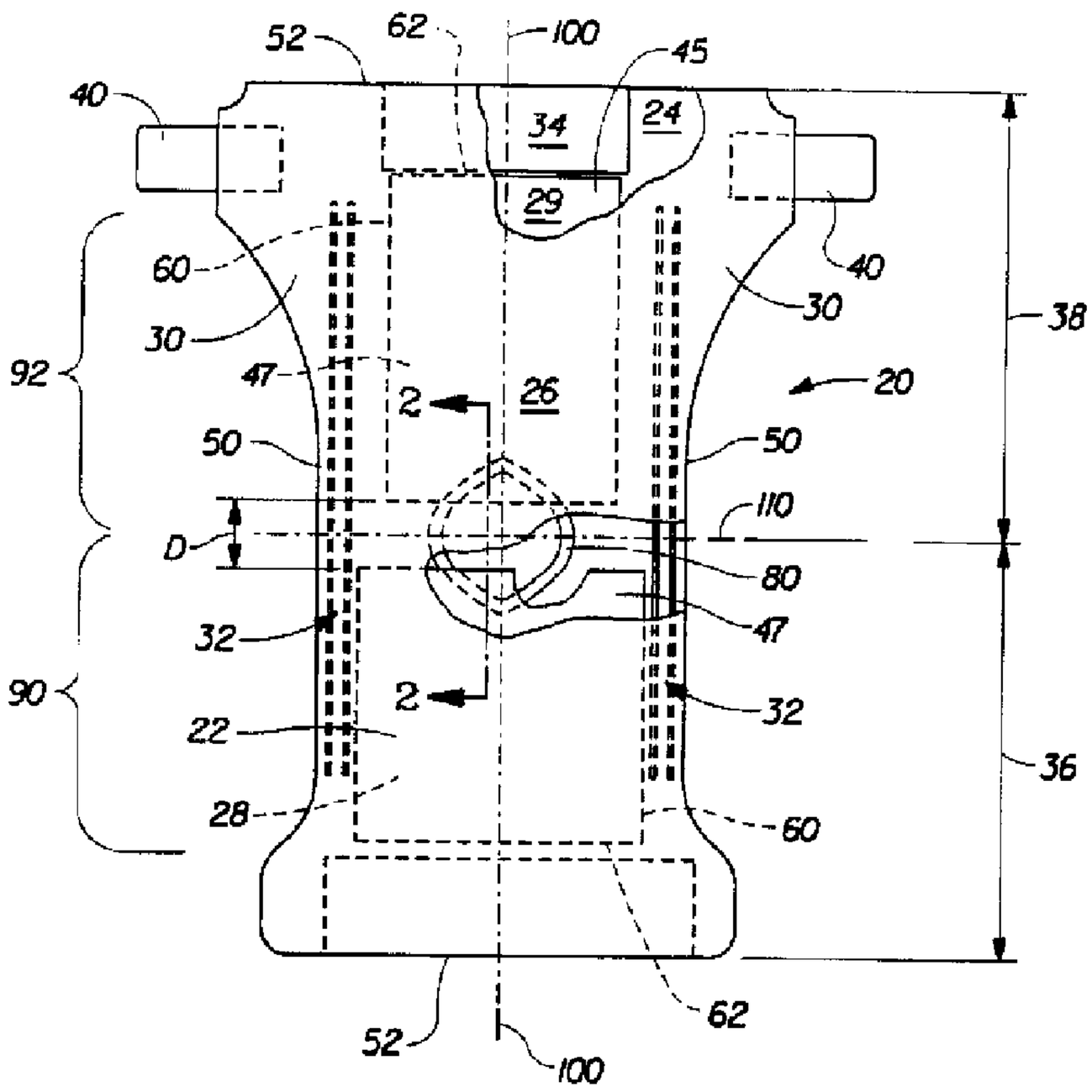

(57) Abrégé/Abstract:
The present invention is directed to an absorbent article having adjustable absorbent assemblies. The absorbent article includes a chassis having a urine collection zone disposed in at least a portion of the front waist region and a feces collection zone disposed in at least a portion of the rear waist region. The chassis includes a first absorbent assembly, at least a portion of which is located in the urine collection zone. The chassis also includes a second absorbent assembly, at least a portion of which is located in the feces collection zone. The chassis further comprises an adjustment member adjustably joining said first absorbent assembly and said second absorbent assembly such that said first absorbent assembly and said second absorbent assembly are moveable relative to each other in at least a direction parallel to said longitudinal centerline.

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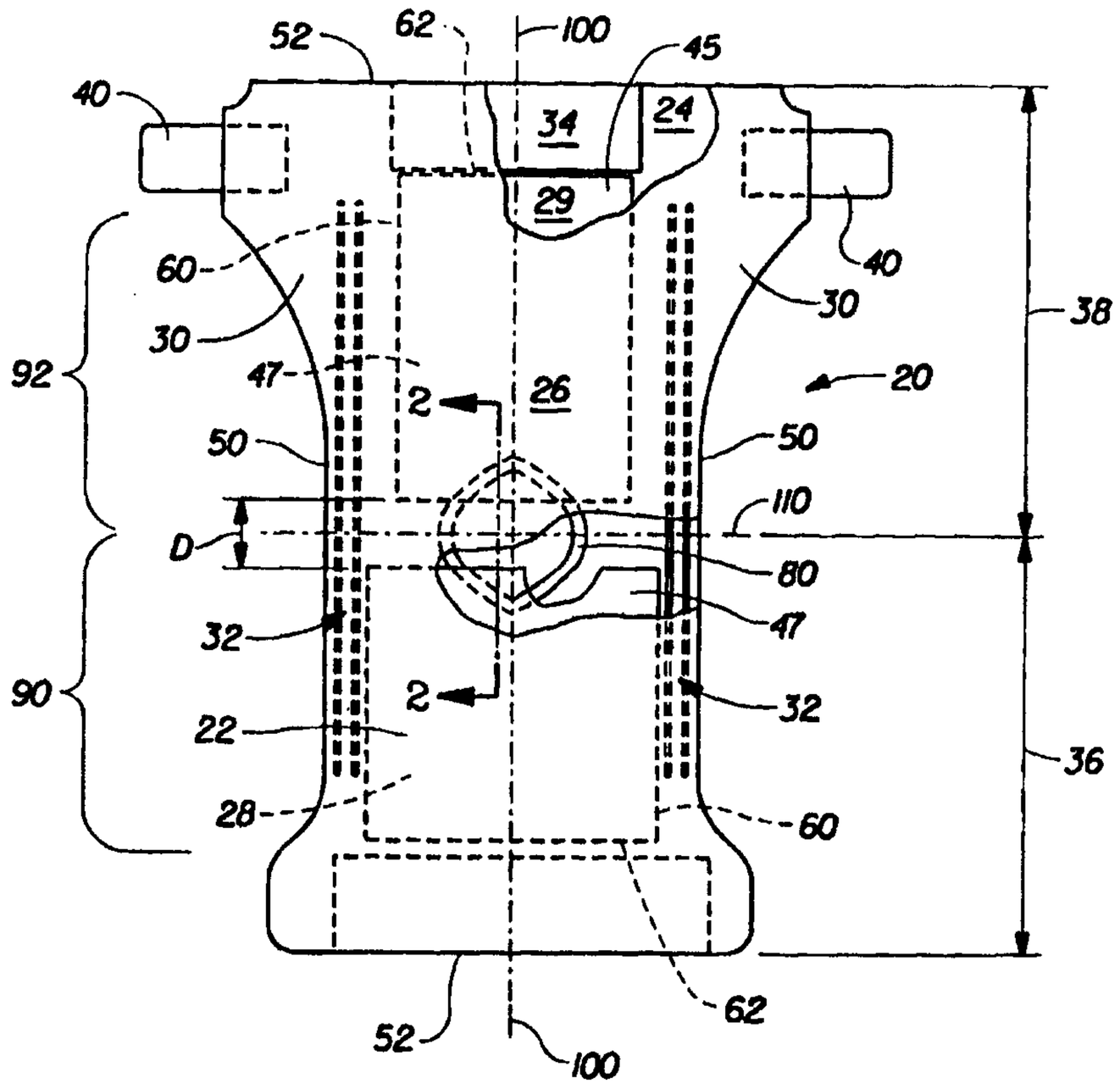
(57) Abstract

The present invention is directed to an absorbent article having adjustable absorbent assemblies. The absorbent article includes a chassis having a urine collection zone disposed in at least a portion of the front waist region and a feces collection zone disposed in at least a portion of the rear waist region. The chassis includes a first absorbent assembly, at least a portion of which is located in the urine collection zone. The chassis also includes a second absorbent assembly, at least a portion of which is located in the feces collection zone. The chassis further comprises an adjustment member adjustably joining said first absorbent assembly and said second absorbent assembly such that said first absorbent assembly and said second absorbent assembly are moveable relative to each other in at least a direction parallel to said longitudinal centerline.



DIAPER HAVING ADJUSTABLE ABSORBENT ASSEMBLIES

FIELD OF THE INVENTION

The present invention relates to articles which absorb and/or contain bodily exudates, including disposable absorbent articles such as diapers, adult incontinence products, sanitary napkins and the like. More particularly, the invention relates to disposable absorbent articles having an adjustable absorbent assembly which provides improved fit and containment characteristics.

BACKGROUND OF THE INVENTION

The major function of absorbent articles such as disposable diapers and adult incontinence briefs, is to absorb and contain body exudates. Such articles are also intended to prevent body exudates from soiling, wetting, or otherwise contaminating clothing or other articles, such as bedding, that come in contact with the wearer. Disposable diapers, such as those disclosed in U.S. Pat. No. 3,860,003 issued to Kenneth Barclay Buell on Jan. 14, 1975, generally have topsheet, a backsheet, an absorbent core. However, despite the effectiveness of such structures, body exudates often leak or are stored in the diaper in such a way that the exudates may irritate the skin of the wearer. Although it is generally known that urine and feces (BM) have significantly different physical properties and forms, current diapers do not have distinct zones configured for the collection and processing of urine and feces (BM).

While attempts have been made to separate the wastes by incorporating various fecal barriers into diapers, these attempts suffer because a single, nonadjustable absorbent assembly is used to collect both urine and BM. Since humans vary considerably in terms of size and dimensions even within a given weight range, (for example, the distance between the urethra and anus), it has been found to be advantageous to provide urine and BM collection zones with separate absorbent assemblies which are adjustable relative to each other.

Thus, it is an object of an aspect of the present invention is to provide a diaper having an adjustable chassis.

It is yet a further object of an aspect of the present invention is to provide a diaper having separate urine and feces (BM) collection zones.

Another object of an aspect of the present invention is to provide a diaper having separate urine and feces collection zones having separate absorbent assemblies wherein the relative spacing between the absorbent assemblies is adjustable.

A further object of an aspect of the present invention is to provide a diaper having separate urine and BM collection zones having separate absorbent assemblies wherein the relative position of the absorbent assemblies relative to the body of the wearer is adjustable.

A still further object of an aspect of the present invention is to provide an adjustment member joined to the separate absorbent assemblies which is elastically adjustable.

A still further object of an aspect of the present invention is to provide an adjustment member joined to the separate absorbent assemblies which is inelastically adjustable

A still further object of an aspect of the present invention is to provide an adjustment member joined to the separate absorbent assemblies which is reversibly inelastically adjustable.

SUMMARY OF THE INVENTION

The present invention is directed to an absorbent article having a front waist region, a rear waist region, a longitudinal centerline and a lateral centerline perpendicular to said longitudinal centerline. The absorbent article comprises a chassis having a urine collection zone disposed in at least a portion of the front waist region and a feces collection zone disposed in at least a portion of the rear waist region. The chassis includes a first absorbent assembly wherein at least a portion of the first absorbent assembly is located in the urine collection zone. The chassis also includes a second absorbent assembly, wherein at least a portion of the second absorbent assembly is located in the feces collection zone. The article further comprises an adjustment member adjustably joining the first absorbent assembly and

the second absorbent assembly such that the first absorbent assembly and the second absorbent assembly are moveable relative to each other in at least a direction generally parallel to said longitudinal centerline.

In accordance with one embodiment of the present invention, there is provided an absorbent article having a front waist region, a rear waist region, a longitudinal centerline and a lateral centerline perpendicular to said longitudinal centerline, the absorbent article comprising:

a chassis preferably including a topsheet and a backsheet joined to said topsheet and having a urine collection zone disposed in at least a portion of said front waist region and a feces collection zone disposed in at least a portion of said rear waist region; said chassis comprises:

a first absorbent assembly, at least a portion of said first absorbent assembly located in said urine collection zone;

a second absorbent assembly, at least a portion of said second absorbent assembly located in said feces collection zone; and

one or more adjustment members adjustably joining said first absorbent assembly and said second absorbent assembly such that said first absorbent assembly and said second absorbent assembly are moveable relative to each other in at least a direction parallel to said longitudinal centerline.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the present invention, it is

believed that the description will be better understood from the following descriptions which are taken in conjunction with the accompanying drawings in which like designations are used to designate substantially identical elements, and in which:

Figure 1 is a plan view of an absorbent article embodiment of the present invention having portions cut away to reveal the underlying structure, the garment-facing surface of the diaper facing the viewer;

Figure 2 is an enlarged fragmentary cross-sectional view taken along section line 2-2 of Figure 1;

Figure 3 is an enlarged fragmentary cross-sectional view of an alternative embodiment of the invention;

Figure 4 is a plan view of an absorbent article embodiment of the present invention having portions cut away to reveal the underlying structure, the garment-facing surface of the diaper facing the viewer;

Figure 5 is a plan view of an absorbent article embodiment of the present invention having portions cut away to reveal the underlying structure, the garment-facing surface of the diaper facing the viewer;

Figure 6 is a plan view of an alternative embodiment of the present invention having portions cut away to reveal the underlying structure, the garment-facing surface of the diaper facing the viewer; and

Figure 7 is a plan view of an alternative embodiment of the present invention having portions cut away to reveal the underlying structure, the garment-facing surface of the diaper facing the viewer.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, the term "absorbent article" refers to devices which absorb and contain body exudates, and, more specifically, refers to devices which are placed against or in proximity to the body of the wearer to absorb and contain the various exudates discharged from the body. The term "disposable" is used herein to describe absorbent articles which are not intended to be laundered or otherwise restored or reused as an absorbent article (i.e., they are intended to be discarded after a single use and, preferably, to be recycled, composted or otherwise disposed of in an environmentally compatible manner). (As used herein, the term "disposed" is used to mean that an element(s) of the diaper is formed (joined and positioned) in a particular place or position as a unitary structure with other elements of the diaper or as a separate element joined to another element of the diaper.) A "unitary" absorbent

article refers to absorbent articles which are formed of separate parts united together to form a coordinated entity so that they do not require separate manipulative parts like a separate holder and liner. A preferred embodiment of an absorbent article of the present invention is the unitary disposable absorbent article, diaper 20, shown in Figure 1. As used herein, the term "diaper" refers to an absorbent article generally worn by infants and incontinent persons that is worn about the lower torso of the wearer. It should be understood, however, that the present invention is also applicable to other absorbent articles such as incontinence briefs, incontinence undergarments, diaper holders and liners, feminine hygiene garments, and the like.

Figure 1 is a plan view of the diaper 20 of the present invention in its flat-out, uncontracted state (i.e., with elastic induced contraction pulled out) with portions of the structure being cut-away to more clearly show the construction of the diaper 20 and with the portion of the diaper 20 which faces away from the wearer oriented towards the viewer. As shown in Figure 1, the diaper 20 preferably comprises a liquid pervious topsheet 24; a liquid impervious backsheet 26 joined with the topsheet 24; a first absorbent assembly 28, a second absorbent assembly 29, each of which is preferably positioned between the topsheet 24 and the backsheet 26; side panels 30; elasticized leg cuffs 32; an elastic waist feature 34; and a fastening system generally designated 40. The diaper 20 is shown in Figure 1 to have a front waist region 36, a rear waist region 38 opposed to the front waist region 36 and a periphery which is defined by the outer edges of the diaper 20 in which the longitudinal edges 50 run generally parallel to the longitudinal centerline 100 of the diaper 20 and the end edges 52 run between the longitudinal edges 50 generally parallel to the lateral centerline 110 of the diaper 20.

Figure 1 shows a preferred embodiment of the diaper 20 in which the topsheet 24 and the backsheet 26 have length and width dimensions generally larger than those of the first and second absorbent assemblies 28 and 29. The topsheet 24 and the backsheet 26 preferably extend beyond the edges of the first and second absorbent assemblies 28 and 29 to thereby form the periphery of the diaper 20. The chassis 22 of the diaper 20 comprises the main body of the diaper 20. The chassis 22 comprises at least one absorbent assembly and preferably an outer covering layer comprising the topsheet 24 and the backsheet 26. When the absorbent article comprises a separate holder and a liner, the chassis 22 generally comprises the holder and the liner (i.e., the chassis 22 comprises one or more layers of material to define the holder while the liner comprises an absorbent composite such as a topsheet, a backsheet, and an absorbent core.) For unitary absorbent articles, the

chassis 22 comprises the main structure of the diaper with other features added to form the composite diaper structure. While the topsheet 24, the backsheet 26, and the chassis 22 may be assembled in a variety of well known configurations, preferred diaper configurations are described generally in U.S. Patent 3,860,003 entitled "Contractible Side Portions for Disposable Diaper" which issued to Kenneth B. Buell on January 14, 1975; and U.S. Pat. No. 5,151,092 issued to Buell on September 9, 1992; and U.S. Pat. No. 5,221,274 issued to Buell on June 22, 1993.

Figure 2 is a fragmentary cross-sectional view of the diaper 20 taken along section line 2-2 of Figure 1. As shown in Figure 2, one embodiment of the diaper 20 of the present invention includes a first absorbent assembly 28 and a second absorbent assembly 29 adjustably joined by the adjustment member 80. (As used herein, the term "joined" encompasses configurations whereby an element is directly secured to another element by affixing the element directly to the other element, and configurations whereby an element is indirectly secured to another element by affixing the element to intermediate member(s) which in turn are affixed to the other element.). As shown in Figure 1, the absorbent assemblies 28 and 29 have longitudinal edges 60, a garment surface 45 and a body surface 47.

In preferred embodiments the backsheet 26 is impervious to liquids (e.g., urine) and comprises a thin plastic film, although other flexible liquid impervious materials may also be used. (The term "flexible" as used herein to refer to films and other suitable backsheet materials refers to materials which are compliant and will readily conform to the general shape and contours of the human body.) The backsheet 26 generally prevents the exudates absorbed and contained in the absorbent assemblies 28 and 29 from wetting articles which contact the diaper 20 such as bedsheets and undergarments. Thus, the backsheet 26 may comprise a woven or nonwoven material, polymeric films such as thermoplastic films of polyethylene or polypropylene, or composite materials such as a film-coated nonwoven material. Preferably, the backsheet is a thermoplastic film having a thickness of about 0.012 mm (0.5 mil) to about 0.051 mm (2.0 mils). Particularly preferred materials for the backsheet include blown films and cast films as manufactured by Tredegar Industries, Inc. of Terre Haute, IN, under the trade names RR8220 and RR5475, respectively. The backsheet 26 may be embossed and/or matte finished to provide a more cloth like appearance. Further, the backsheet 26 preferably permits vapors to escape from the diaper 20 while still preventing exudates from passing through the backsheet 26 (i.e., backsheet is breathable).

The backsheet 26, or any portion thereof, may be elastically extensible in one or more directions. In one embodiment, the backsheet 26 may comprise a structural elastic-like film (SELF) web. A structural elastic-like film web is an extensible material that exhibits an elastic-like behavior in the direction of elongation without the use of added elastic materials. The SELF web includes a strainable network having at least two contiguous, distinct, and dissimilar regions. Preferably, of the regions is configured so that it will exhibit resistive forces in response to an applied axial elongation in a direction parallel to the predetermined axis before a substantial portion of the other region develops significant resistive forces to the applied elongation. At least one of the regions has a surface-pathlength which is greater than that of the other region as measured substantially parallel to the predetermined axis while the material is in an untensioned condition. The region exhibiting the longer surface-pathlength includes one or more deformations which extend beyond the plane of the other region. The SELF web exhibits at least two significantly different stages of controlled resistive force to elongation along at least one predetermined axis when subjected to an applied elongation in a direction parallel to the predetermined axis. The SELF web exhibits first resistive forces to the applied elongation until the elongation of the web is sufficient to cause a substantial portion of the region having the longer surface-pathlength to enter the plane of applied elongation, whereupon the SELF web exhibits second resistive forces to further elongation. The total resistive forces to elongation are higher than the first resistive forces to elongation provided by the first region. SELF webs suitable for the present invention are more completely described in U.S. Patent No. 5,518,801 entitled Web Materials Exhibiting Elastic-Like Behavior, which issued to Chappell, et, al. on May 21, 1996. In alternate embodiments, the backsheet 26 may comprise elastomeric films, foams, strands, or combinations of these or other suitable materials with nonwovens or synthetic films.

The backsheet 26 is generally positioned adjacent at least a portion of the garment surface 45 of the absorbent assemblies and is preferably joined thereto by attachment means 70 such as those well known in the art. For example, the backsheet 26 may be secured to one or more of the absorbent assemblies by a uniform continuous layer of adhesive, a patterned layer of adhesive, or an array of separate lines, spirals, or spots of adhesive. One preferred attachment means comprises an open pattern network of filaments of adhesive as disclosed in U.S. Patent 4,573,986 entitled "Disposable Waste-Containment Garment", which issued to Minetola et al. on March 4, 1986. More preferably the attachment means will

include several lines of adhesive filaments which are swirled into a spiral pattern, as is illustrated by the apparatus and methods shown in U.S. Patent 3,911,173 issued to Sprague, Jr. on October 7, 1975; U.S. Patent 4,785,996 issued to Ziecker, et al. on November 22, 1978; and U.S. Patent 4,842,666 issued to Werenicz on June 27, 1989. Adhesives which have been found to be satisfactory are manufactured by H. B. Fuller Company of St. Paul, Minnesota and marketed as HL-1258. Alternatively, the attachment means may comprise heat bonds, pressure bonds, ultrasonic bonds, dynamic mechanical bonds, or any other suitable attachment means or combinations of these attachment means as are known in the art.

The topsheet 24 is preferably positioned adjacent the body surface 47 of the absorbent assemblies and is preferably joined thereto and to the backsheet 26 by attachment means such as those well known in the art (not shown). Suitable attachment means are described with respect to means for joining the backsheet 26 to other elements of the diaper 20. In one preferred embodiment of the present invention, the topsheet 24 and the backsheet 26 are joined directly to each other in some locations and are indirectly joined together in other locations by directly joining them to other elements of the diaper 20.

The topsheet 24 is preferably compliant, soft feeling, and non-irritating to the wearer's skin. Further, the topsheet 24 is preferably liquid pervious, permitting liquids (e.g., urine) to readily penetrate through its thickness. A suitable topsheet 24 may be manufactured from a wide range of materials, such as porous foams; reticulated foams; apertured plastic films; or woven or nonwoven webs of natural fibers (e.g., wood or cotton fibers), synthetic fibers (e.g., polyester or polypropylene fibers), or a combination of natural and synthetic fibers. Preferably, the topsheet 24 is made of a hydrophobic material to isolate the wearer's skin from liquids contained in the absorbent assemblies. There are a number of manufacturing techniques which may be used to manufacture the topsheet 24. For example, the topsheet 24 may be a nonwoven web of fibers spunbond, carded, wet-laid, meltblown, hydroentangled, combinations of the above, or the like. One preferred topsheet 24 comprises a web of staple length polypropylene fibers such as is manufactured by Veratec, Inc., a Division of International Paper Company, of Walpole, Massachusetts under the designation P-8.

The diaper 20 preferably further comprises at least one elastic waist feature 34 that helps to provide improved fit and containment. The elastic waist feature 34 is intended to elastically expand and contract to dynamically fit the wearer's waist.

The elastic waist feature 34 preferably extends at least longitudinally outwardly from at least the waist edge 62 of one of the absorbent assemblies and generally forms at least a portion of the end edge 52 of the diaper 20. However, disposable diapers are generally constructed so as to have two elastic waist features, one positioned in the front waist region 36 and one positioned in the rear waist region 38. Further, while the elastic waist feature 34 or any of its constituent elements can comprise a separate element affixed to the diaper 20, the elastic waist feature 34 is preferably constructed as an extension of other elements of the diaper 20, such as the backsheet 26, the topsheet 24, or both the backsheet 26 and the topsheet 24.

The elastic waist feature 34 may be constructed in a number of different configurations including those described in U.S. Patent 4,515,595 issued to Kievit et al. on May 7, 1985 and the above referenced U.S. Pat. No 5, 151,092 issued to Buell on September 9, 1992; and U.S. Pat. No. 5,221,274 issued to Buell on June 22, 1993.

The diaper 20 preferably also comprises a fastening system 40. The fastening system 40 preferably maintains the front waist region 36 and the rear waist region 38 in an overlapping configuration so as to provide lateral tensions about the circumference of the diaper 20 to hold the diaper 20 on the wearer. The fastening system 40 preferably comprises tape tabs and/or hook and loop fastening components although any other known means are generally acceptable. Exemplary fastening systems are disclosed in U.S. Patent 4,846,815 entitled "Disposable Diaper Having An Improved Fastening Device" issued to Scripps on July 11, 1989; U.S. Patent 4,894,060 entitled "Disposable Diaper With Improved Hook Fastener Portion" issued to Nestegard on January 16, 1990; U.S. Patent 4,946,527 entitled "Pressure-Sensitive Adhesive Fastener And Method of Making Same" issued to Battrell on August 7, 1990; U.S. Patent 3,848,594 entitled "Tape Fastening System for Disposable Diaper" issued to Buell on November 19, 1974; U.S. Patent B1 4,662,875 entitled "Absorbent Article" issued to Hirotsu et al. on May 5, 1987; and the herein before referenced U.S. Pat. No. 5,151,092 issued to Buell on September 9, 1992; and U.S. Pat. No. 5, 221.274 issued to Buell on June 22, 1993.

The diaper 20 may also comprise side panels 30. The side panels 30 may be elastic or extensible to provide a more comfortable and contouring fit by initially conformably fitting the diaper 20 to the wearer and sustaining this fit throughout the time of wear well past when the diaper 20 has been loaded with exudates since the elasticized side panels 30 allow the sides of the diaper 20 to expand and contract.

The side panels 30 may also provide more effective application of the diaper 20 because even if the diaperer pulls one elasticized side panel 30 farther than the other during application (asymmetrically), the diaper 20 will "self-adjust" during wear.

While the diaper 20 of the present invention preferably has the side panels 30 disposed in the rear waist region 38; the diaper 20 may be provided with side panels 30 disposed in the front waist region 36 or in both the front waist region 36 and the rear waist region 38. The side panels 30 may be constructed in any suitable configurations. Examples of diapers with elasticized side panels are disclosed in U.S. Patent 4,857,067, entitled "Disposable Diaper Having Shirred Ears" issued to Wood, et al. on August 15, 1989; U.S. Patent 4,381,781 issued to Sciaraffa, et al. on May 3, 1983; U.S. Patent 4,938,753 issued to Van Gompel, et al. on July 3, 1990; the herein before referenced U.S. Pat. No. 5,151,092 issued to Buell on September 9, 1992; and U.S. Pat. No. 5,221,274 issued to Buell on June 22, 1993; U.S. Patent No. 6,004,306 issued to Robles, et al., on December 21, 1999.

The diaper 20 preferably further comprises leg cuffs 32 which provide improved containment of liquids and other body exudates. Leg cuffs may also be referred to as leg bands, side flaps, barrier cuffs, or elastic cuffs. U.S. Patent 3,860,003 describes a disposable diaper which provides a contractible leg opening having a side flap and one or more elastic members to provide an elasticized leg cuff (gasketing cuff). U.S. Patent 4,909,803 entitled "Disposable Absorbent Article Having Elasticized Flaps" issued to Aziz et al. on March 20, 1990, describes a disposable diaper having "stand-up" elasticized flaps (barrier cuffs) to improve the containment of the leg regions. U.S. Patent 4,695,278 entitled "Absorbent Article Having Dual Cuffs" issued to Lawson on September 22, 1987, describes a disposable diaper having dual cuffs including a gasketing cuff and a barrier cuff.

In preferred embodiments, the leg cuffs 32 extend generally longitudinally from the front waist region 36 through the crotch region 37 to the rear waist region 38. Although the cuffs 32 may extend from one end edge 52 of the diaper 20 to the opposite end edge 52, it is not necessary that they do so. Further, although the cuffs 32 are preferably structurally mirror images of each other, the cuffs 32 may be configured differently. In any case, preferably the leg cuffs 32 extend laterally outwardly from the longitudinal edges 60 of the absorbent assemblies 28 and 29.

The diaper 20 preferably has a urine collection zone 90 and a feces collection zone 92. The urine collection zone 90 is that portion of the diaper intended to

collect and contain the majority of urine deposited into the diaper 20. (However, embodiments are also known in which the urine collection zone 90 collects BM or less than a majority of the urine.) Thus, the urine collection zone 90 is generally located in the front waist region 36 and is generally coordinated with the location of the opening to the urethra. However, the urine collection zone 90 may comprise any portion of the front waist region 36 or the rear waist region 38 of the diaper 20. The urine collection zone 90 may be detachably affixed to the chassis 22 of the diaper 20 and may be constructed using flushable materials. In preferred embodiments, the urine collection zone 90 preferably comprises at least a portion of the first absorbent assembly 28.

The feces collection zone 92 is that portion of the diaper 20 intended to collect and contain the majority of feces deposited into the diaper 20. (However, embodiments are also known in which the feces collection zone collects urine or less than a majority of the feces.) Thus, the feces collection zone 92 is generally located in the rear waist region 38 and is generally coordinated with the location of the opening to the anus. However, the feces collection zone 92 may comprise any portion of the rear waist region 38 or the front waist region 36 of the diaper 20. In preferred embodiments, the feces collection zone 92 preferably comprises at least a portion of the second absorbent assembly 29.

The feces collection zone 92 may comprise similar materials and construction as the urine collection zone 90. Alternately, the feces collection zone 92 may comprise a design and/or materials specific to the processing or storage of feces. For example, if the feces collection zone 92 is intended to absorb low viscosity feces (e.g., from a breast-fed infant) the diaper 20 may comprise a topsheet 26 having one or more apertures in at least the feces collection zone 92. If, on the other hand, more highly viscous feces are to be stored, features having sufficient open void volume may be employed in this zone. The feces collection zone 92 may be detachably affixed to the chassis 22 of the diaper 20 and may be constructed using flushable materials. Exemplary absorbent cores and other structures for collection of feces are described in detail in U.S. Pat. No. 5,342,338 entitled "Disposable Absorbent Article For Low-Viscosity Fecal Material" issued to Roe on August 30, 1994.

The diaper 20 may also comprise pockets for receiving and containing waste, spacers which provide voids for waste, barriers for limiting the movement of waste in the article, compartments or voids which accept and contain waste materials deposited in the diaper, and the like, or any combinations thereof. Examples of

pockets and spacers for use in absorbent products are described in U.S. Patent 5,514,121 issued to Roe et al. on May 7, 1996, entitled "Diaper Having Expulsive Spacer"; U.S> Patent 5,171.236 issued to Dreier et al on December 15, 1992, entitled "Disposable Absorbent Article Having Core Spacers"; PCT Application WO 96/07382 published March 14, 1996, entitled "Absorbent Article Having Pocket Cuff With An Apex"; and PCT Application WO 93/25172 published December 3, 1993, entitled "Spacers For Use In Hygienic Absorbent Articles And Disposable Absorbent Articles Having Such Spacer". Examples of compartments or voids are disclosed in U.S. Patent 4,968,312, entitled "Disposable Fecal Compartmenting Diaper", issued to Khan on November 6, 1990; U.S. Patent 4,990,147, entitled "Absorbent Article With Elastic Liner For Waste Material Isolation", issued to Freeland on February 5, 1991; U.S. Patent 5,062,840, entitled "Disposable Diapers", issued to Holt et al on November 5, 1991; and U.S. Patent 5,269,775 entitled "Trisection Topsheets For Disposable Absorbent Articles And Disposable Absorbent Articles Having Such Trisection Topsheets", issued to Freeland et al on December 14, 1993. An example of a diaper having a transverse barrier is described in PCT Application WO 94/14395, published July 7, 1994, entitled "Absorbent Article Having An Upstanding Transverse Partition".

The absorbent assemblies 28 and 29 may comprise any absorbent means which is generally compressible, conformable, non-irritating to the wearer's skin, and capable of absorbing and retaining liquids such as urine and other certain body exudates The absorbent assemblies may be manufactured in a wide variety of sizes and shapes (e.g., rectangular, hourglass, "T"-shaped, asymmetric, etc.) and may comprise a wide variety of liquid-absorbent materials commonly used in disposable diapers and other absorbent articles such as comminuted wood pulp, which is generally referred to as airfelt. Examples of other suitable absorbent materials include creped cellulose wadding; meltblown polymers, including coform; chemically stiffened, modified or cross-linked cellulosic fibers; tissue, including tissue wraps and tissue laminates; absorbent foams; absorbent sponges; superabsorbent polymers; absorbent gelling materials; or any other known absorbent material or combinations of materials.

The configuration and construction of the absorbent assemblies may also be varied (e.g., the absorbent core(s) or other absorbent structure(s) may have varying caliper zones, a hydrophilic gradient, a superabsorbent gradient, or lower average density and lower average basis weight acquisition zones; or may comprise one or

more layers or structures). However, the total absorbent capacity of the absorbent assemblies should be compatible with the design loading and the intended use of the diaper 20.

The first and second absorbent assemblies 28 and 29 may comprise the same general materials and construction, or may be designed differently. For example, a preferred absorbent assembly for the collection of urine is specifically configured so as to best absorb and contain urine whereas a preferred absorbent assembly for the collection of feces is designed to effectively contain and process BM. The first and second absorbent assemblies may comprise absorbent cores which are very similar in size and shape, or the absorbent cores may be different sizes or shapes and may include different materials. Further, each absorbent assembly may include additional elements such as topsheets, backsheets, acquisition zones, barriers, etc.

The first and second absorbent assemblies 28 and 29 may be spaced apart longitudinally, may abut one another, or may have portions which overlap (as shown in Fig. 3). (As used herein, the term "spaced apart longitudinally" refers to a relative spacing between elements wherein the elements are spaced apart in a direction preferably parallel with the longitudinal centerline 100 of the diaper 20.) The longitudinal spacing between the first absorbent assembly 28 and the second absorbent assembly 29 is approximated by the letter D, as shown in Figure 2. The spacing D between the absorbent assemblies 28 and 29 may be adjusted and readjusted by the caretaker in order to provide the best fit and containment characteristics for the particular wearer at any particular time during use. For example, the first absorbent assembly 28 may be adjusted so as to be in an ideal location for absorbing and containing urine and the second absorbent assembly 29 may be adjusted to be in an ideal location for absorbing and/or containing BM.

In one preferred embodiment, the spacing D between the absorbent assemblies may be adjusted anywhere from at least about -1cm (overlapping) to about 1cm for average medium size babies (between about 12 and about 25 pounds). Adult incontinence garments, however, may have much larger ranges for the spacing of the absorbent assemblies due to their generally larger chassis. (For example, incontinence garments may have spacing between the absorbent assemblies anywhere from at least about -20cm to about 20cm.) More preferably, the spacing D between the first absorbent assembly 28 and the second absorbent assembly 29 may be adjusted from at least about -5cm to about 5cm, or between at least about -10cm and about 10 cm. Of course, the first absorbent assembly 28 may be positioned to abut the second absorbent assembly 29 such that the spacing D would be adjustable

from 0cm to anywhere between about -10cm to about 10cm or anywhere between about -20cm or 20cm. Thus, the ranges of spacing may be varied depending on the intended use and may include embodiments where the spacing ranges from abutting to a positive spacing or from abutting to an overlapping spacing. Other embodiments may be adjustable only in positive spacing ranges (i.e., the assemblies are always spaced apart) or adjustable only in negative spacing ranges (i.e., the assemblies are always at least partially overlapping).

With reference to Figures 1, 4 and 5-7 the diaper 20 preferably comprises a first absorbent assembly 28 generally located toward the front of the diaper 20, a second absorbent assembly 29 located toward the rear of the diaper 20, and a adjustment member 80 joined or operatively associated with both the first absorbent assembly 28 and the second absorbent assembly 29.

Exemplary absorbent structures for use as the absorbent assemblies are described in U.S. Patent 4,610,678 entitled "High-Density Absorbent Structures" issued to Weisman et al. on September 9, 1986; U.S. Patent 4,673,402 entitled "Absorbent Articles With Dual-Layered Cores" issued to Weisman et al. on June 16, 1987; U.S. Patent 4,888,231 entitled "Absorbent Core Having A Dusting Layer" issued to Angstadt on December 19, 1989; and U.S. Patent 4,834,735, entitled "High Density Absorbent Members Having Lower Density and Lower Basis Weight Acquisition Zones", issued to Alemany et al. on May 30, 1989. An exemplary embodiment of a suitable absorbent structure is disclosed in U.S. Pat. No. 5,137,537 issued to Herron et al.

The adjustment member 80 which generally joins the absorbent assemblies 28 and 29, directly or indirectly, provides a means for adjusting the relative spacing and orientation of the first and second absorbent assemblies 28 and 29. (In some preferred embodiments, the adjustment member 80 may be joined to either the first absorbent assembly 28 or the second absorbent assembly 29. However, the adjustment member 80 may be joined to the topsheet 24, the backsheet 26, both the topsheet 24 and the backsheet 26 or any other element of the diaper 20.) The adjustment member 80 provides the caretaker with the ability to achieve improved relative longitudinal positioning of the urine and feces collection zones 90 and 92 based on the anatomy of the specific wearer. (The term "longitudinally positioning" as used herein refers to the location of a specific element or elements along the longitudinal centerline 100 of the diaper 20 or along another similarly situated, generally parallel axis.) Additionally, the adjustment member 80 may provide the

caretaker with the ability to change the fit and overall length of the diaper 20 without losing the correct relative positioning of the urine and feces collection zones 90 and 92. As mentioned above, this is beneficial due to the significant variation in specific dimensions between humans having the same general size and weight. For infants especially, the ability to change the size of the diaper 20 and the orientation of the urine collection zone 90 and the feces collection zone 92 relative to one another is important due to their rapidly changing body size and weight as well as the quite extreme differences between babies of the same age.

In preferred embodiments, the adjustment member 80 provides for "continuous adjustment" throughout a particular range. (As used herein, the term "continuous adjustment" refers to the ability of elements of the diaper to be positioned relative to each other in an infinite number of "settings" or configurations along a predetermined path or paths.) For example, the adjustment member 80 may provide an infinite number of configurations with different spacings (or overlap) between the absorbent assemblies within a certain range (e.g. -20cm to 20cm). Alternatively, the adjustment member 80 may have a defined number of "settings" or positions to which it can be intermittently adjusted. An example of this type of intermittent would be an adjustment member which has only two settings or positions, such as where the absorbent assemblies are either abutting or are spaced apart a predetermined distance. It is generally preferred to increase the caretaker's flexibility by increasing the number of available settings of positions to which the diaper can be adjusted.

The adjustment member 80 may be a single element or may include any number of separate or joined elements and may include absorbent or non-absorbent materials. As used herein, the term "absorbent" refers to materials which receive and contain body fluids. The term "non-absorbent" refers to materials which do not receive and contain body fluids, but rather tend to be hydrophobic and/or allow fluids to pass through them without containing them.

The adjustment member 80 may have elastic, inelastic, or reversible inelastic extension properties, or a combination of the above. As used herein, the terms "elastic", "elastically extensible" and "elastomeric" refer to elements which, if extended maintain a return force that tends to return the element to substantially its original dimensions and configuration. Preferred elastic adjustment members 80 may comprise any elastic, elastomer or elastically extensible material known in the art, including but not limited to elastomeric strands, films, nonwoven materials woven materials, laminates, scrims, springs, foams, adhesives, and the like, or any

combination thereof.

The adjustment member 80 may comprise all or a portion of the backsheet 26. In one preferred embodiment, as shown in Figure 3, the backsheet 26 includes at least a portion 86 which is elastically extensible. The elastically extensible portion 86 is preferably at least partially located longitudinally inboard of the attachment means 70 joining the absorbent assemblies to the backsheet 26. The extensible portion 86 of the backsheet 26 may be the adjustment member 80 or may be one element in a multiple element adjustment member 80.

In embodiments wherein, the adjustment member 80 is relatively "inelastic", little or no return force is generated when the adjustment member 80 is subjected to an elongation or contractive force. Thus, the adjustment member 80 does not tend to want to return to its original dimensions or configuration when the force is removed, but rather tends to maintain its new shape or configuration. In one embodiment, the first and second absorbent assemblies 28 and 29 may be joined by an inelastically extensible material, such as a carded polypropylene nonwoven designated P-8 or P-11 from Veratec Nonwoven Group of the International Paper Company of Walpole, Massachusetts or any other inextensible material that can be adjusted to configure the absorbent assemblies.

The inelastic adjustment member 80 may be "reversible". As used herein the term "reversible" means the structure, once extended, contracted or adjusted, may be restored to substantially its original dimension or configuration upon the application of a force generally opposite to the force that resulted in the original extension, contraction or adjustment. In one embodiment, the adjustment member 80 comprises a thin relatively inelastic wire-like element which joins the first and second absorbent assemblies 28 and 29. (As used herein, the term "wire-like" is not meant to limit the materials which the adjustment member 80 may comprise, but rather is used to describe one embodiment of the invention having an adjustment member 80 which has a cross section relatively shorter than the overall length of the member.) In other embodiments, the adjustment member 80 may include an inelastic corrugated material, or the like, which may be extended or contracted.

As shown in Figure 5, the adjustment member 80 allows for the elongation of the diaper 20 and the separation of the first absorbent assembly 28 and the second absorbent assembly 29 upon the application of a tensile force generally in the longitudinal direction of the diaper 20. Another force generally along the same axis may result in restoration of the structure to its original configuration or to any other configuration limited only by the characteristics of the adjustment member 80 or any

other element of the diaper 20. As shown in Figures 4 and 5, the adjustment member 80 may bend or deform in some way to provide the adjustment between the absorbent assemblies. However, alternative embodiments are contemplated wherein the adjustment member does not bend or deform.

One exemplary embodiment of the present invention having an adjustment member 80 which is slideable and thus, does not necessarily deform to provide adjustment, is shown in Figures 6 and 7. (Figure 6 shows the diaper 20 in a more extended configuration than that shown in Figure 7.) The adjustment member 80 may be slidably joined with either the first absorbent assembly 28, the second absorbent assembly 29 or both. In a preferred embodiment, the adjustment member 80 includes at least one slideable member 82 which is aperturely associated with at least one of the absorbent assemblies. In other preferred embodiments, a chamber 84 is provided for the slideable member 82 to move within. Embodiments are also contemplated wherein the slideable member 82 does not slide into one of the absorbent assemblies or a chamber within the absorbent assembly, but rather slides within or along another element of the diaper.

The slideable member 82, the chamber 84 or any other operatively associated structure may include an element or elements for restricting the motion of the slideable member relative to the other structure. One nonlimiting example would be a slideable member having ridges which slide past complementary ridges or other suitable structure associated with the chamber 84 such that the absorbent assemblies 28 and 29 are intermittently adjustable over a larger range of adjustability. (As used herein, the term "intermittently adjustable" refers to the ability of elements to be positioned with respect to each other in such a way that certain predetermined settings or configurations can be obtained by the application of forces to portions of the product. This is in contrast to the infinite number of configurations available in continuously adjustable embodiments, as described above.)

In another preferred embodiment, the diaper 20 comprises urine and feces collection zones 90 and 92 overlapping each other and having one or more relatively low friction slip element 49 disposed between the zones. An example of a preferred slip element 49 comprises a plastic film such as the 1.0 mil polypropylene film designated 1401 manufactured by Clopay Corporation of Cincinnati, Ohio. The slip element 49 preferably reduces the friction between the overlapping portions of the absorbent assemblies such that they may be adjusted relative to one another more easily. However, embodiments are contemplated wherein the slip element(s) 49 provide for reduced friction when the absorbent assemblies are adjusted in at least

one direction and provides for greater friction when the absorbent assemblies are adjusted in another directions. Thus, the slip element 49 may be used to help maintain the configuration of the absorbent assemblies once they have been adjusted relative to one another. Since the friction between elements is generally material dependent, embodiments are contemplated wherein no slip element is required or even desired.

The diaper 20 may also comprise an upstanding transverse barrier 75, as shown in Figures 4 and 5, that prevents exudates from migrating from the rear waist region 38 to the front waist region 36 of the diaper 20, or vice versa. The transverse barrier 75 is preferably joined to the chassis 22 and located adjacent the longitudinal centerline 100, although other configurations are contemplated. Other examples of suitable transverse barriers are described in U.S. Pat. No. 5,554,142 entitled "Absorbent Article Having Multiple Effective Height Transverse Partition" in the name of Dreier et al.; and in PCT Patent WO 94/14395 entitled "Absorbent Article Having An Upstanding Transverse Partition" published July 7, 1994 in the name of Freeland, et al.

The diaper 20 is preferably applied to a wearer by positioning one of the waist regions, preferably the rear waist region 38, under the wearer's back and drawing the remainder of the diaper 20 between the wearer's legs. The other waist region, preferably the front waist region 36, is positioned across the front of the wearer. The diaperer then wraps the side panels 30 around the wearer such that the front waist region 36 and the rear waist region 38 are in an overlapping configuration. The side panels 30 will typically be extended and tensioned during this operation so as to conform to the size and shape of the wearer. The fastening system is secured to effect a side closure.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

WHAT IS CLAIMED IS:

1. An absorbent article having a front waist region, a rear waist region, a longitudinal centerline and a lateral centerline perpendicular to said longitudinal centerline, the absorbent article comprising:

a chassis preferably including a topsheet and a backsheet joined to said topsheet and having a urine collection zone disposed in at least a portion of said front waist region and a feces collection zone disposed in at least a portion of said rear waist region; said chassis comprises:

a first absorbent assembly, at least a portion of said first absorbent assembly located in said urine collection zone;

a second absorbent assembly, at least a portion of said second absorbent assembly located in said feces collection zone; and

one or more adjustment members adjustably joining said first absorbent assembly and said second absorbent assembly such that said first absorbent assembly and said second absorbent assembly are moveable relative to each other in at least a direction parallel to said longitudinal centerline.

2. The absorbent article of Claim 1 wherein said topsheet comprises one or more apertures in at least said feces collection zone.

3. The absorbent article of claim 1 or 2 wherein said adjustment member comprises an elastically adjustable member, or an inelastically adjustable member such as a wire-like member or a corrugated member.

4. The absorbent article of any one of claims 1 to 3 wherein said first absorbent assembly is adjustably joined with said second absorbent assembly such that said first absorbent assembly can be spaced apart from said second absorbent assembly from at least about -1cm to about 1cm.

5. The absorbent article of any one of claims 1 to 3 wherein said first absorbent assembly is adjustably joined with said second absorbent assembly such that

said first absorbent assembly can be spaced apart from said second absorbent assembly from at least about -5cm to about 5cm.

6. The absorbent article of any one of claims 1 to 5 further comprising a slip element joined with the garment surface of the first absorbent assembly, said slip element providing a low friction surface such that at least a portion of said first absorbent assembly can be positioned over at least a portion of said second absorbent assembly in an overlapping configuration or wherein said slip element provides reduced friction between said first absorbent assembly and said second absorbent assembly when said absorbent assemblies are adjusted relative to each other in a first direction and said slip element provides increased friction between said first absorbent assembly and said second absorbent assembly when said absorbent assemblies are adjusted relative to each other in a second direction.

7. The absorbent article of any one of claims 1 to 6 wherein said adjustment member provides for continuous adjustment or provides for intermittent adjustment.

8. The absorbent article of any one of claims 1 to 7 wherein said adjustment member includes a slideable member which slideably joins said first and said second absorbent assemblies.

9. The absorbent article of claim 8 wherein said slideable adjustment member is slideably joined to a chamber formed in at least one of said first or said second absorbent assemblies.

10. The absorbent article of any one of claims 1 to 9 further comprising a transverse barrier joined with said chassis, at least a portion of which is generally adjacent said lateral centerline.

11. An absorbent article having a front waist region, a rear waist region, a

longitudinal centerline and a lateral centerline perpendicular to said longitudinal centerline, the absorbent article comprising:

a chassis having a topsheet, a backsheet joined with said topsheet, a urine collection zone disposed in at least a portion of said front waist region and a feces collection zone disposed in at least a portion of said rear waist region; said chassis comprises:

a first absorbent assembly disposed at least partially between said topsheet and said backsheet, at least a portion of said first absorbent assembly located in said urine collection zone; said first absorbent assembly being joined with said backsheet at a first location;

a second absorbent assembly located at least partially between said topsheet and said backsheet, at least a portion of said second absorbent assembly located in said feces collection zone; and an adjustment member as claimed in any one of claims 1 to 10.

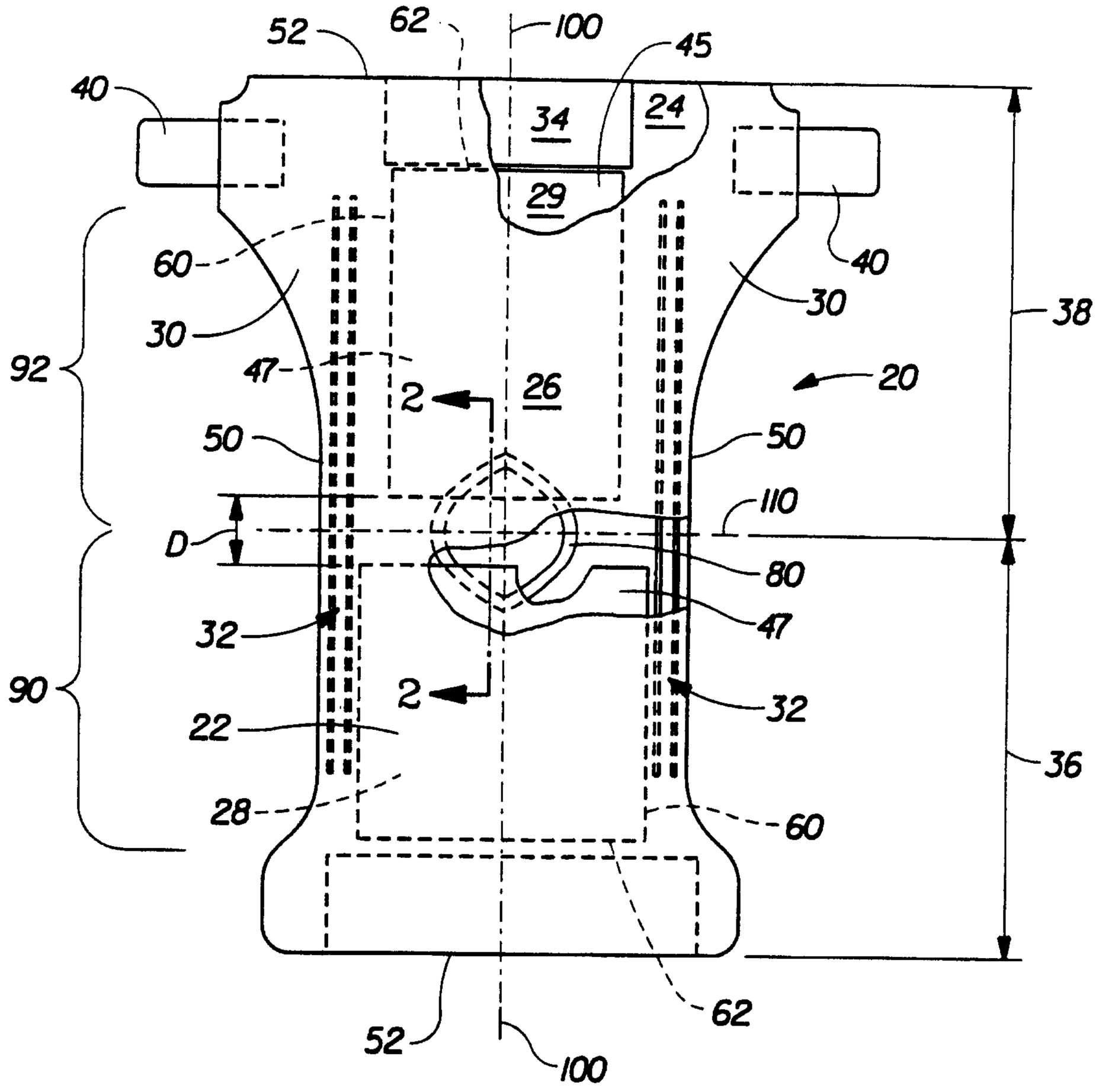

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Fig. 1

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Fig. 2

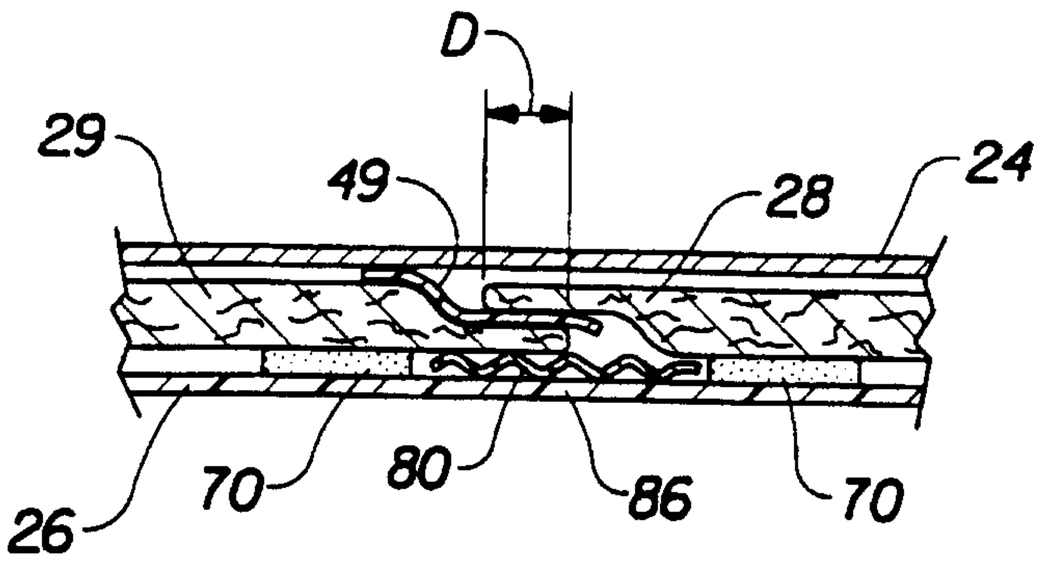

Fig. 3

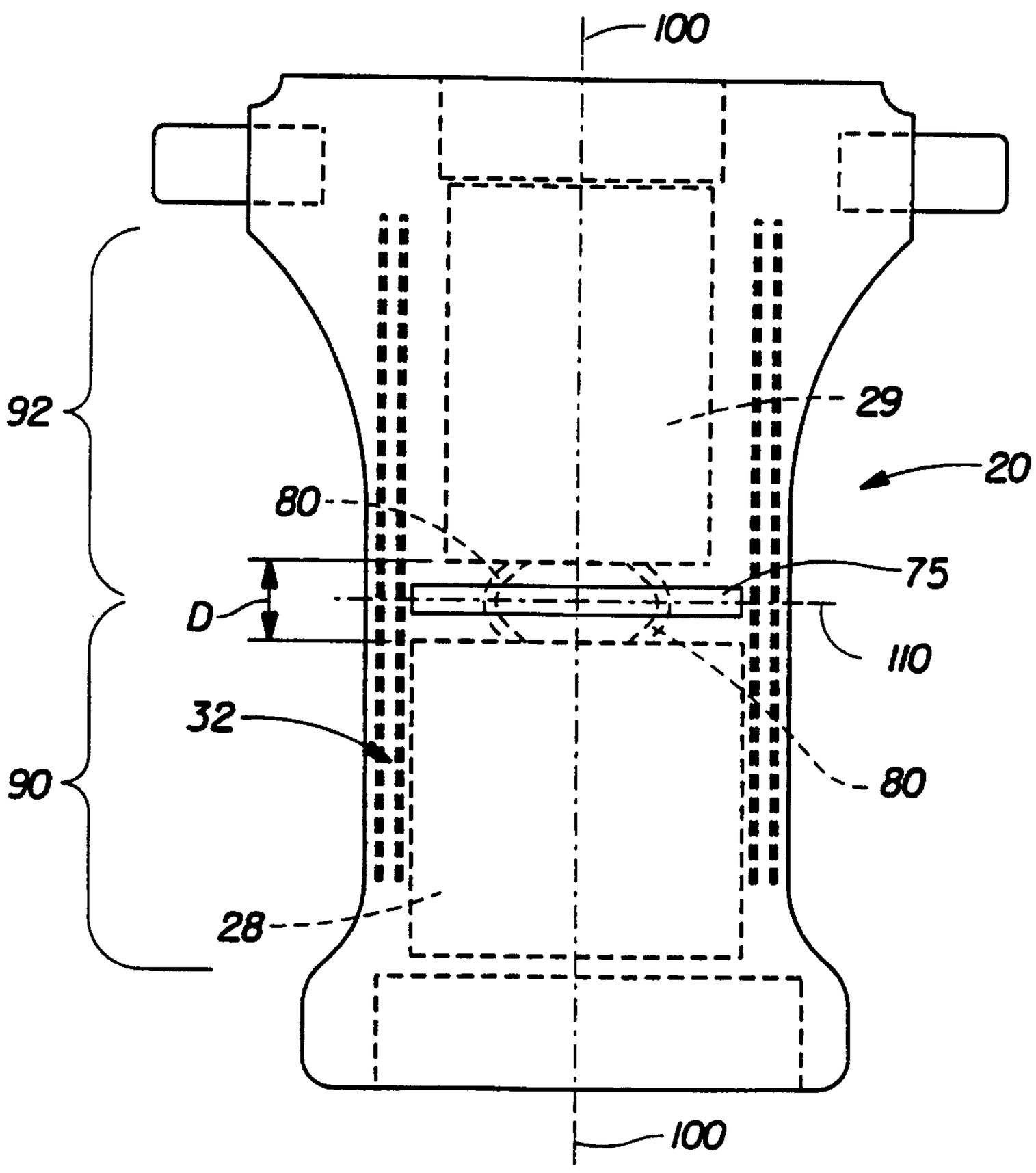

Fig. 4

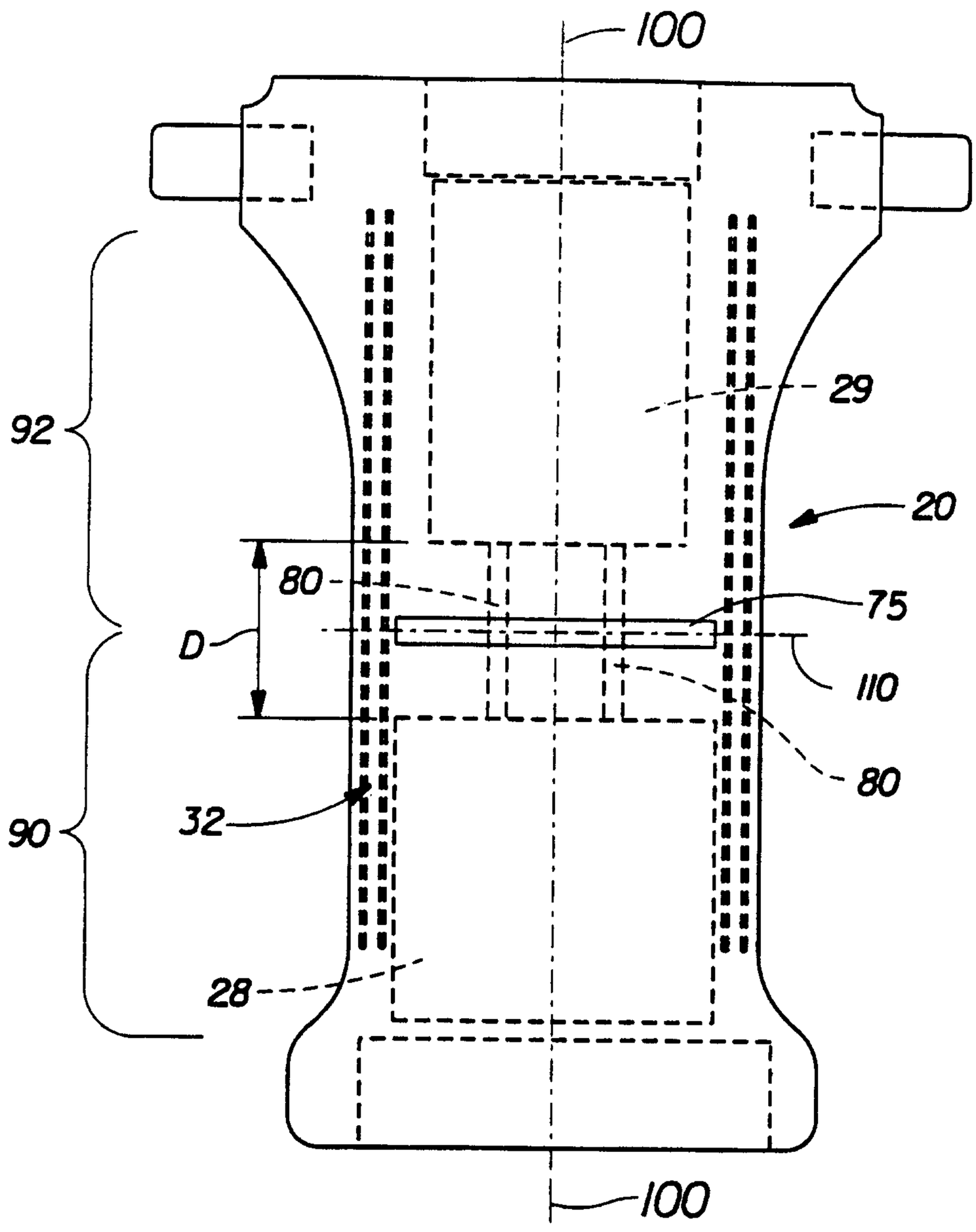

Fig. 5

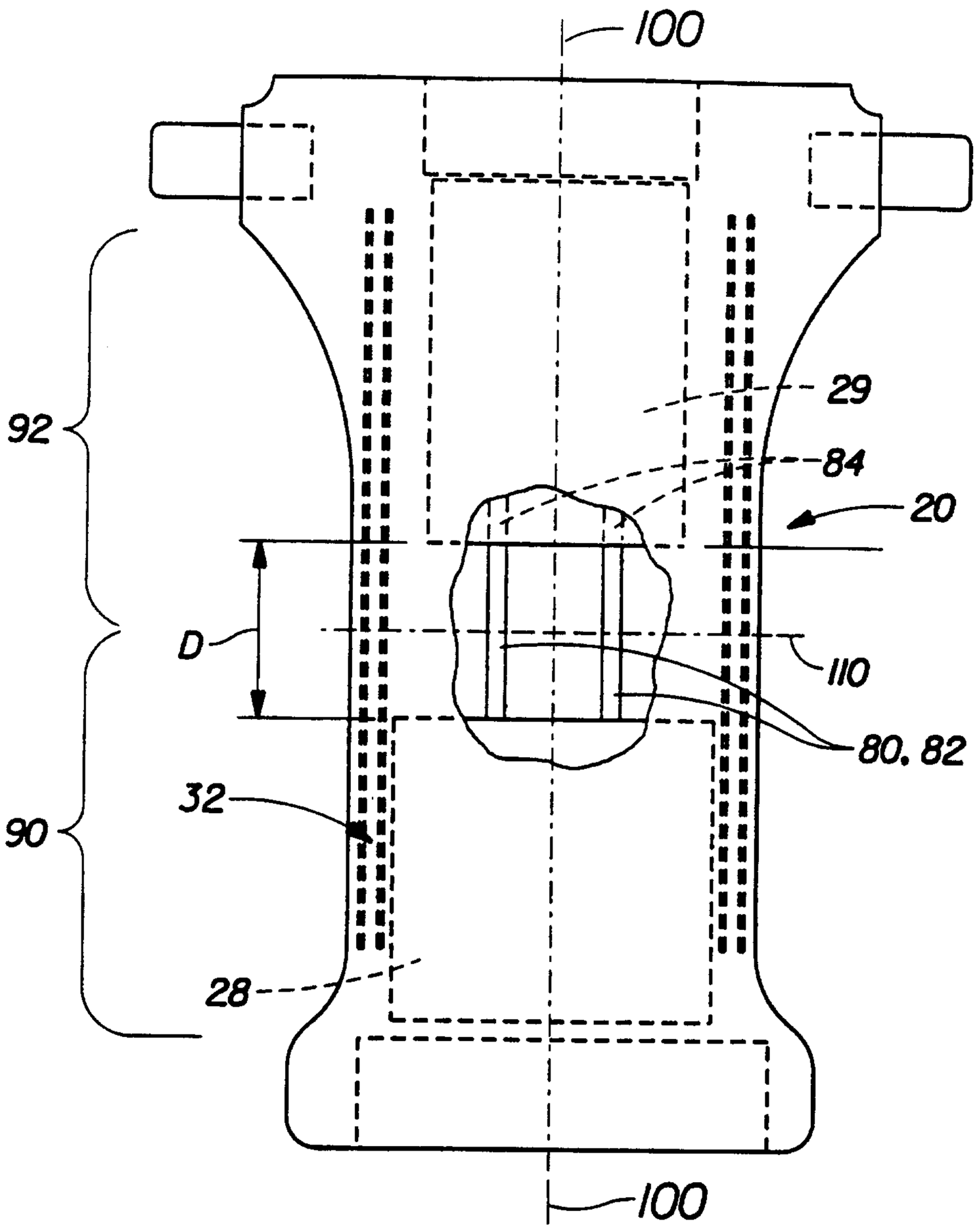

Fig. 6

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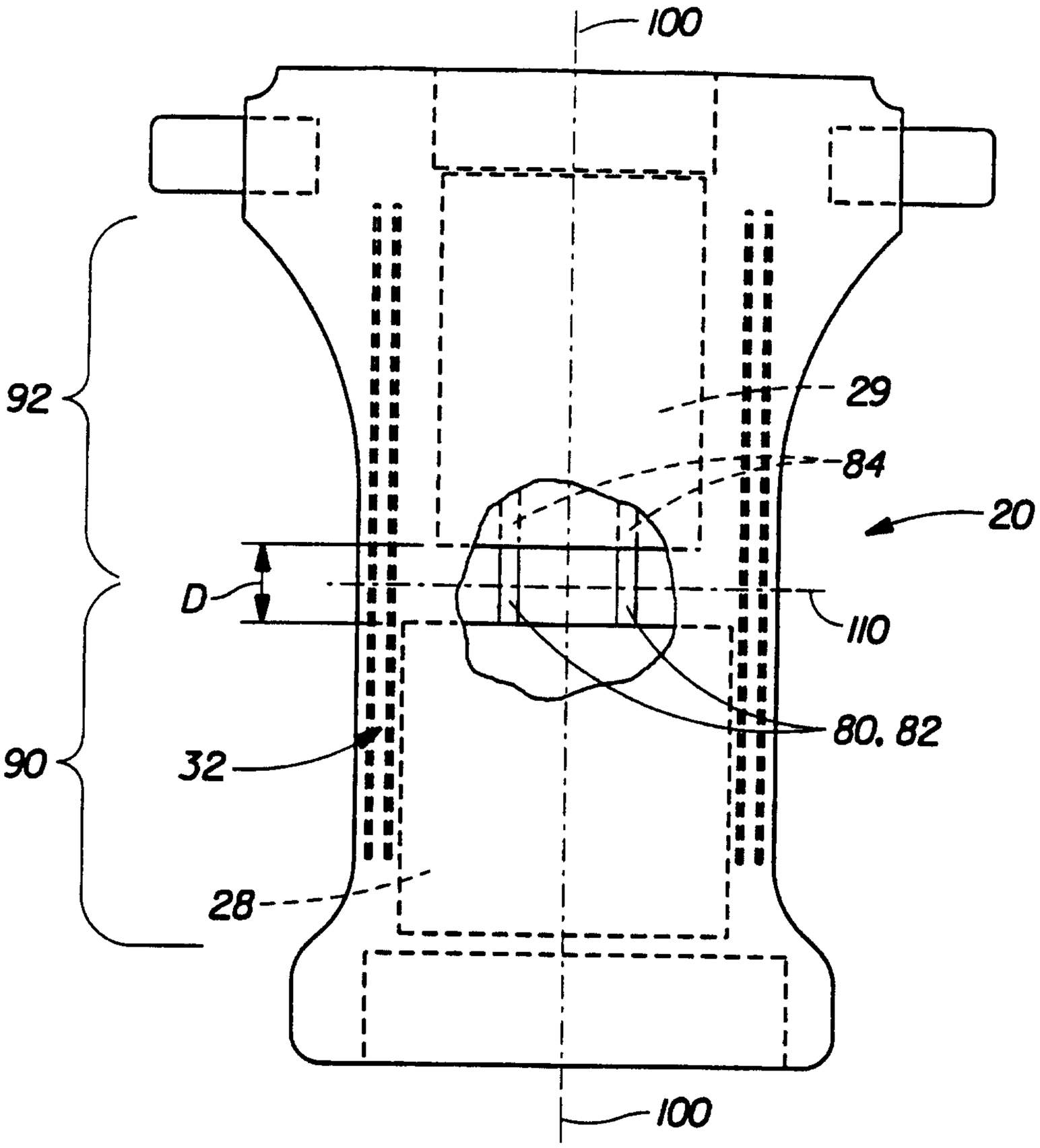
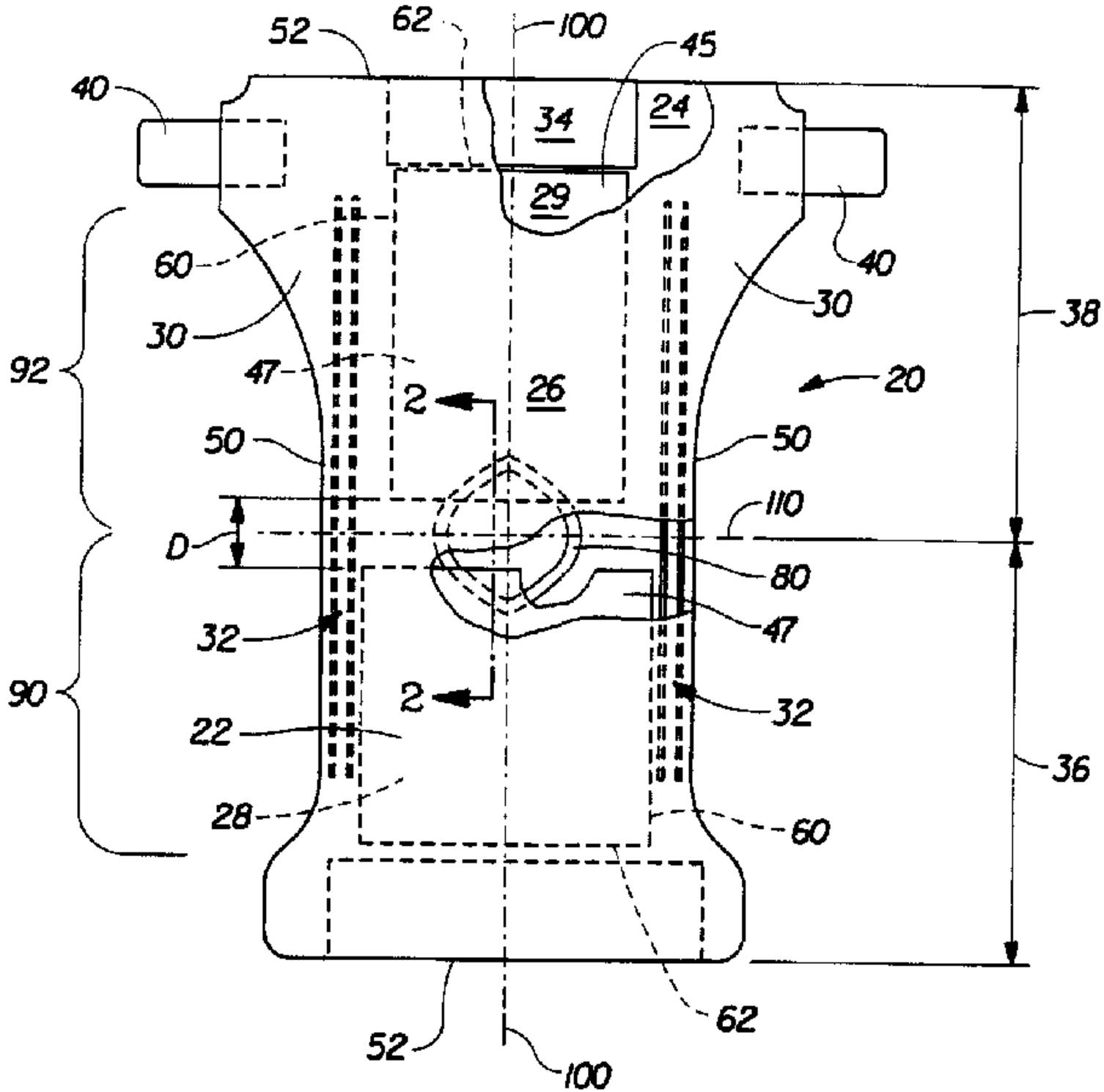


Fig. 7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