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(54) **GARMENT CLOSURE APPARATUS, SYSTEM & METHOD**

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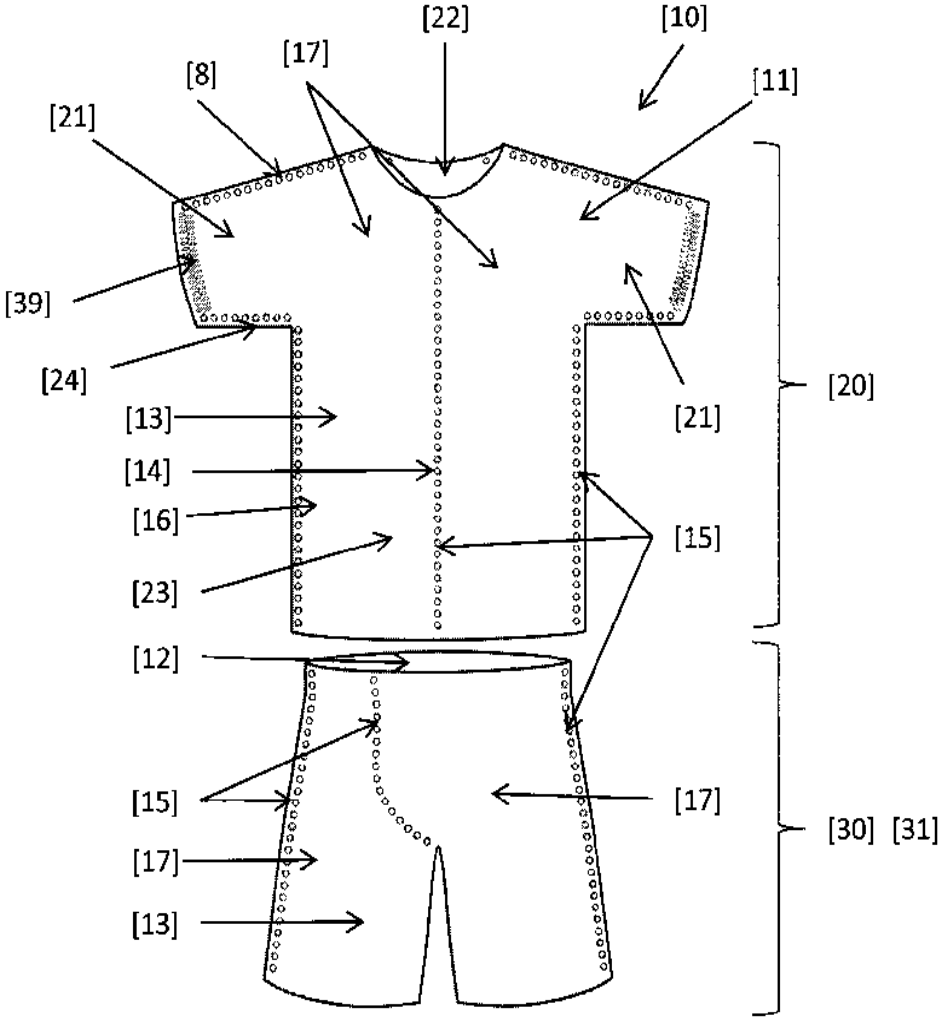
(57) **ABSTRACT**

A versatile garment (**18**) which is a facsimile of normal clothing and which promotes personal well-being, privacy, modesty and euthermia, for use in the hospital environment or as required in the patient-care-giver interaction, which garment beneficially incorporates means (**15**) for versatile garment deconstruction prior to treatment or monitoring allowing patient access and incorporates means for post-treatment reconstruction of the garment in the post-treatment, diagnostic exam or monitoring environment.



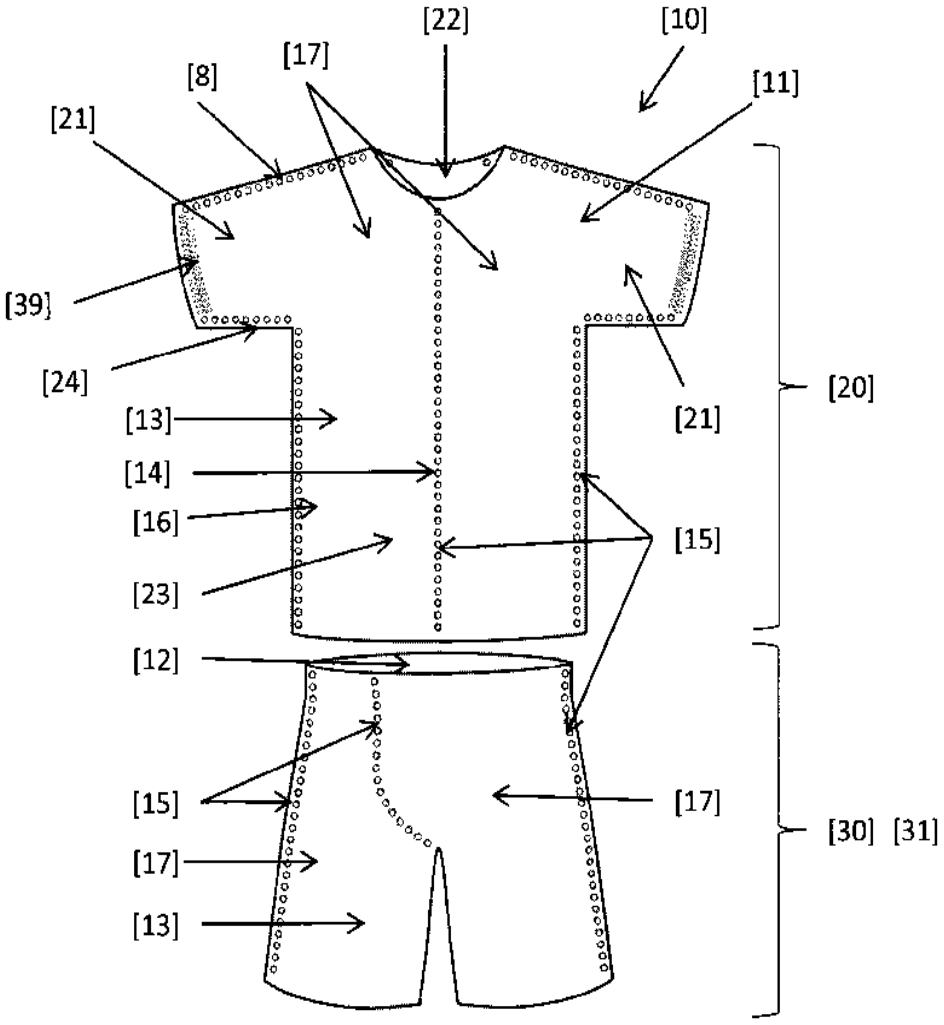


FIGURE 1a.

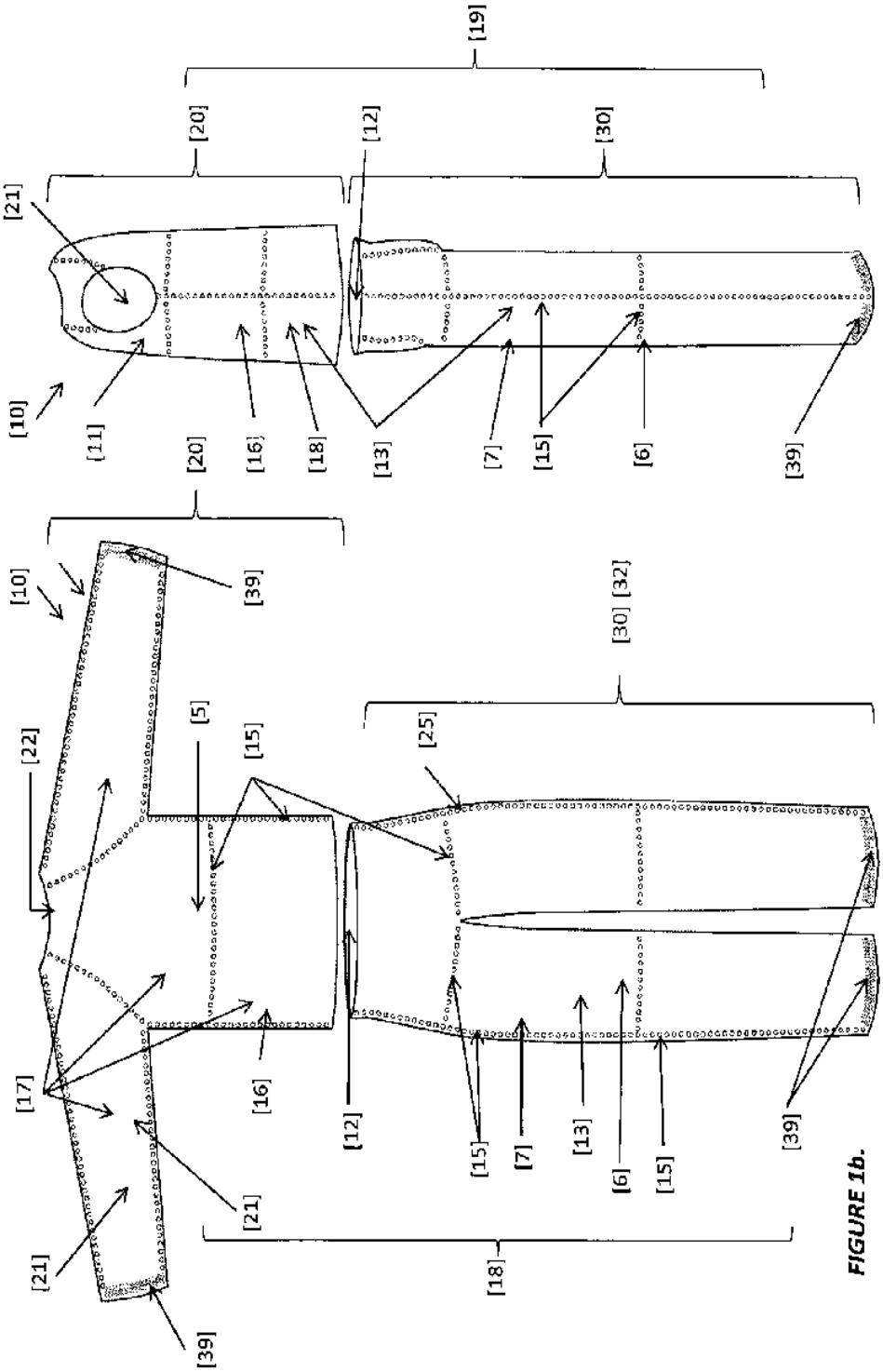


FIGURE 1c.

FIGURE 1b.

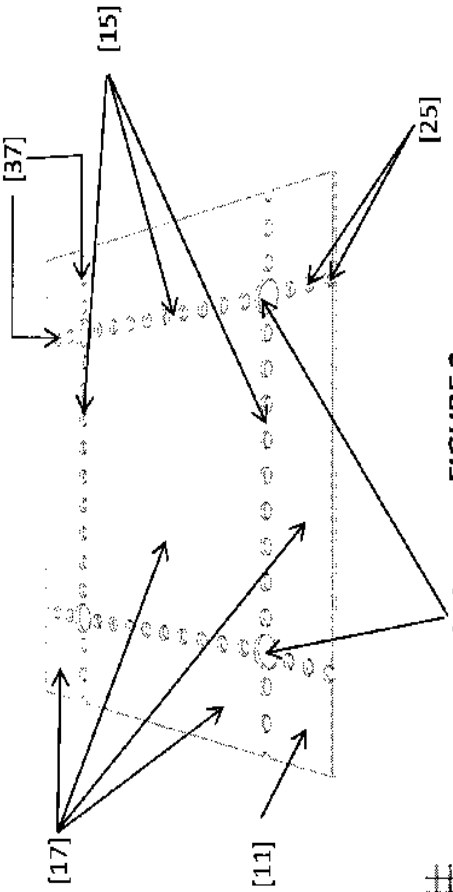


FIGURE 2a.

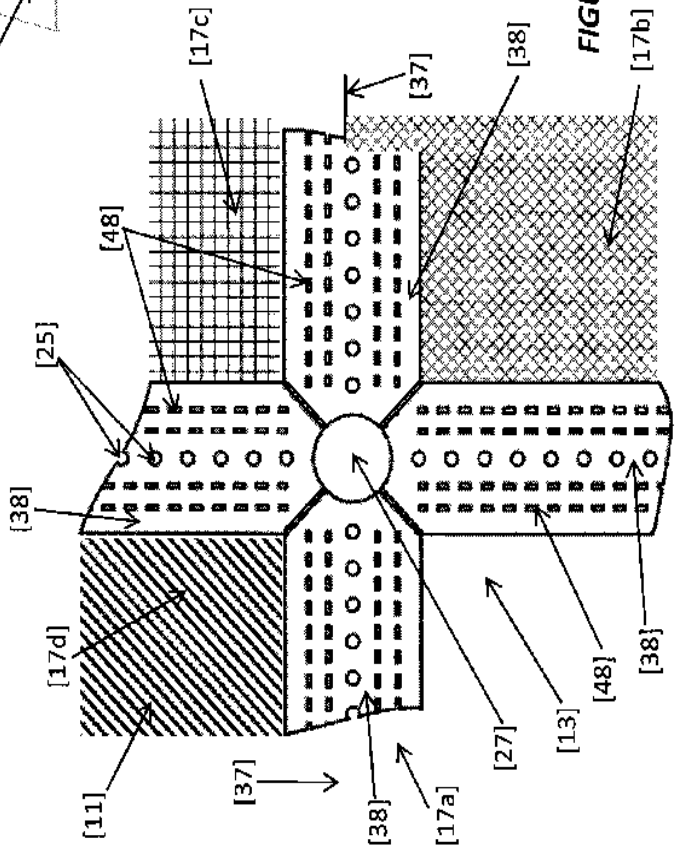


FIGURE 2b.

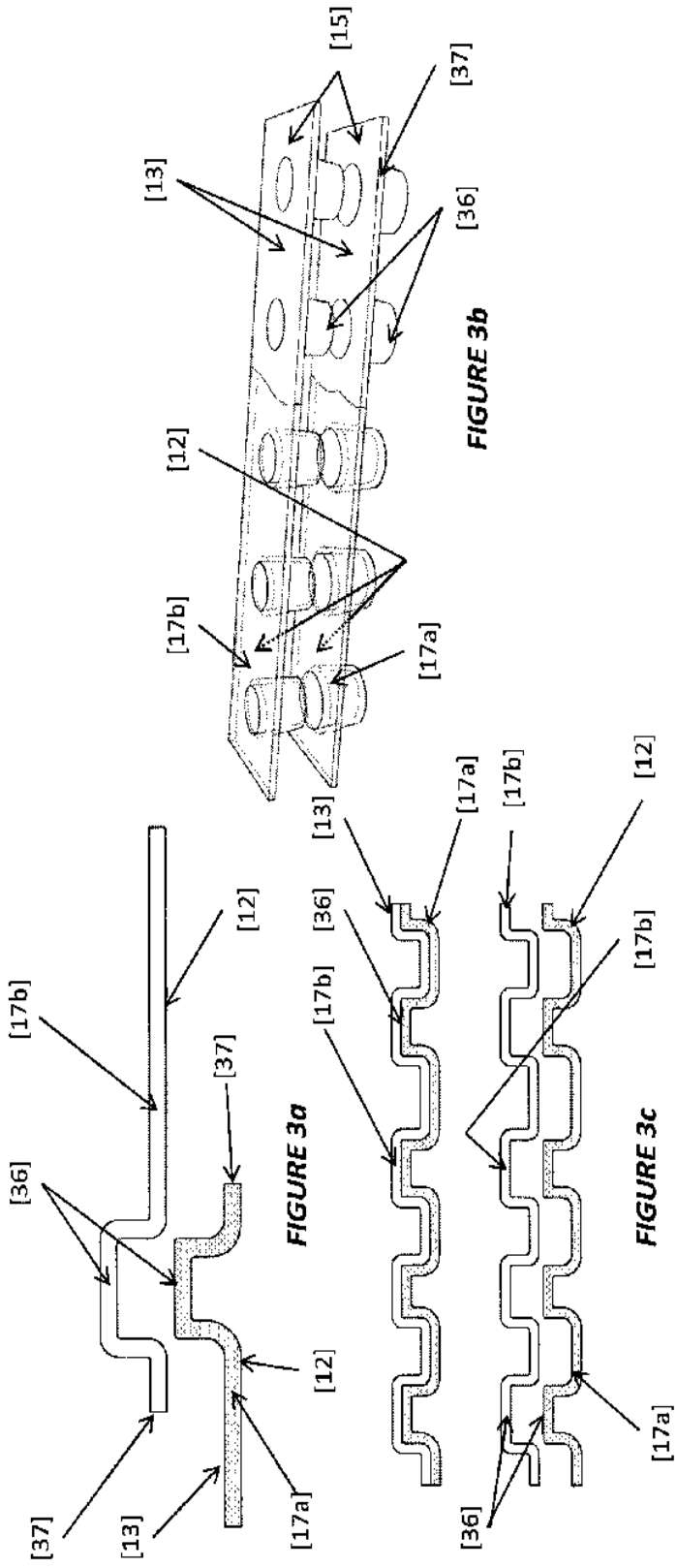


FIGURE 3a

FIGURE 3b

FIGURE 3c

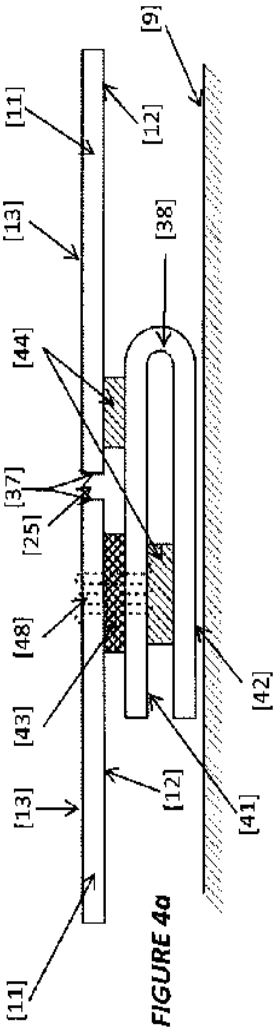


FIGURE 4a

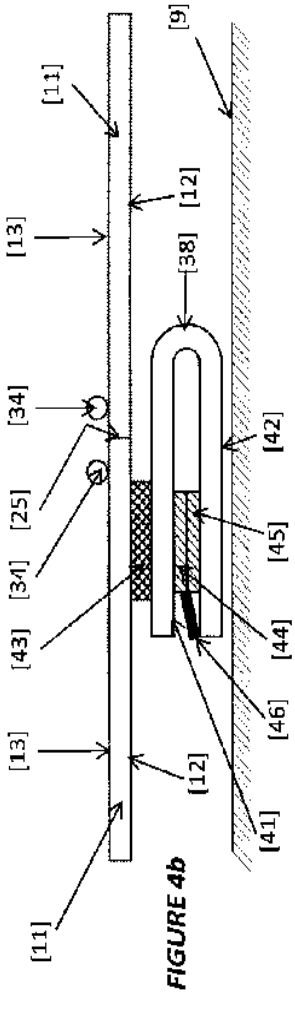


FIGURE 4b

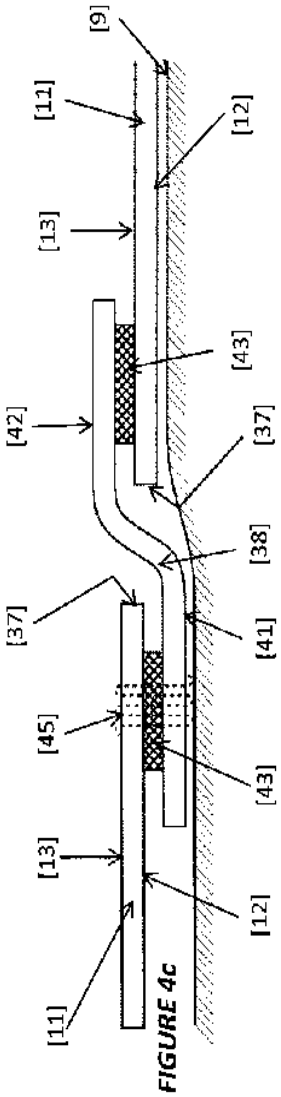


FIGURE 4c

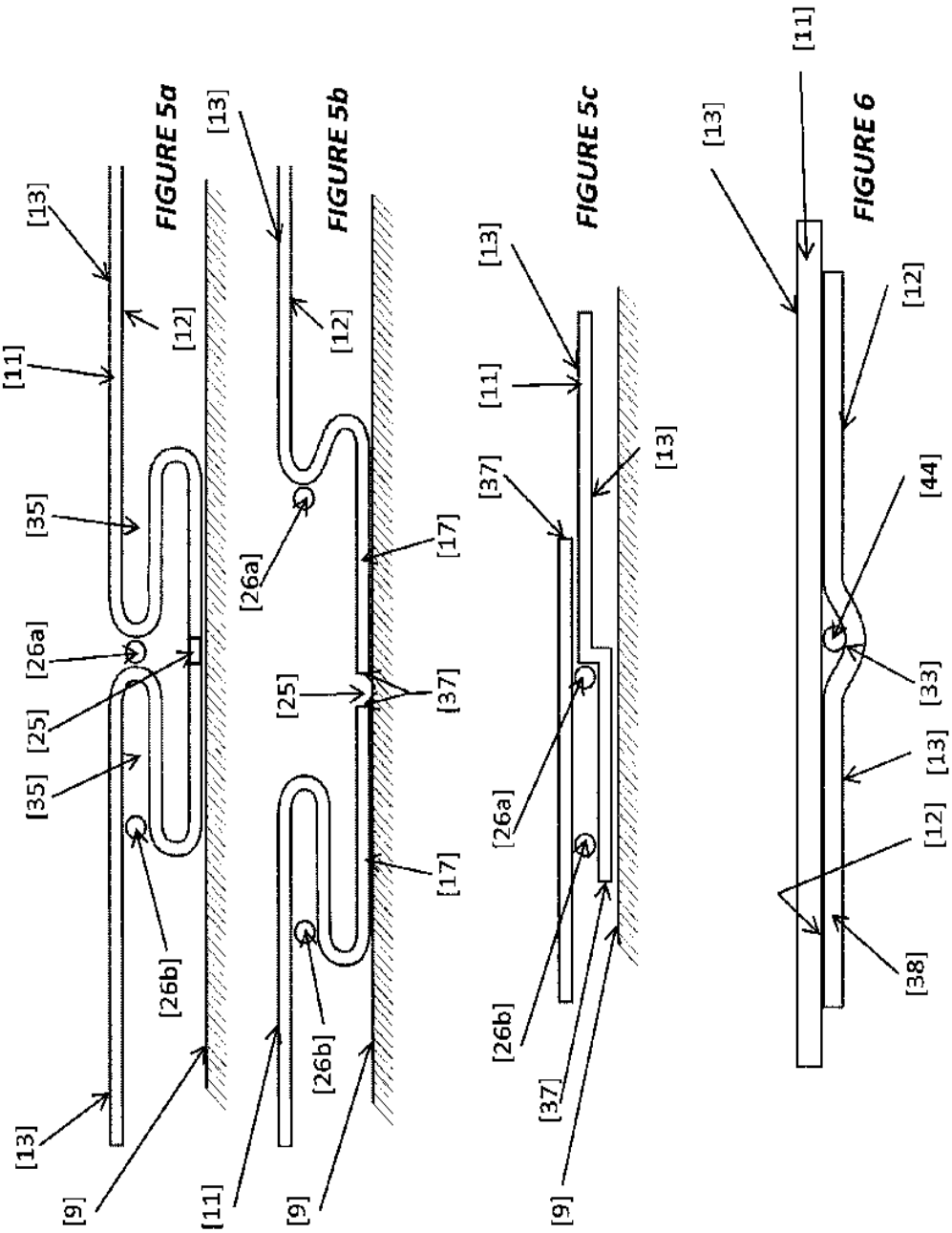


FIGURE 5a
[13]
[11]
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[26a]
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[26b]
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FIGURE 5b
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FIGURE 5c
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FIGURE 6
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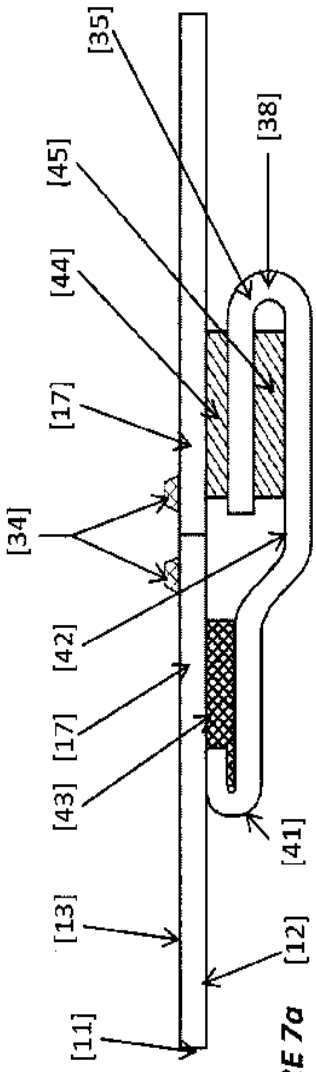

FIGURE 7a

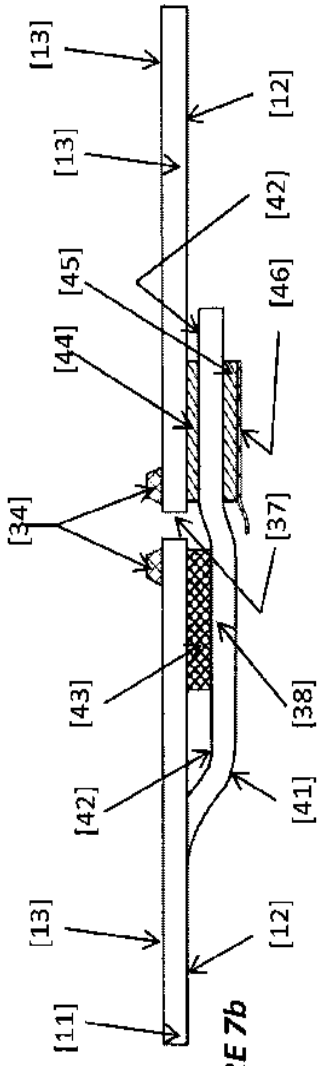

FIGURE 7b

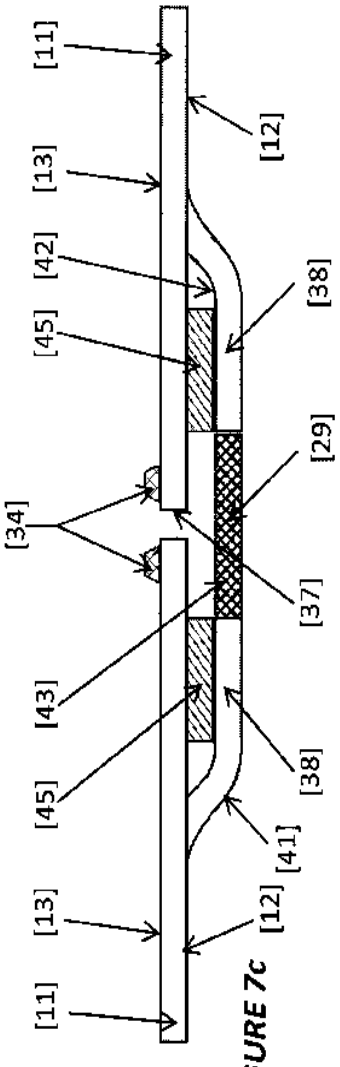

FIGURE 7c

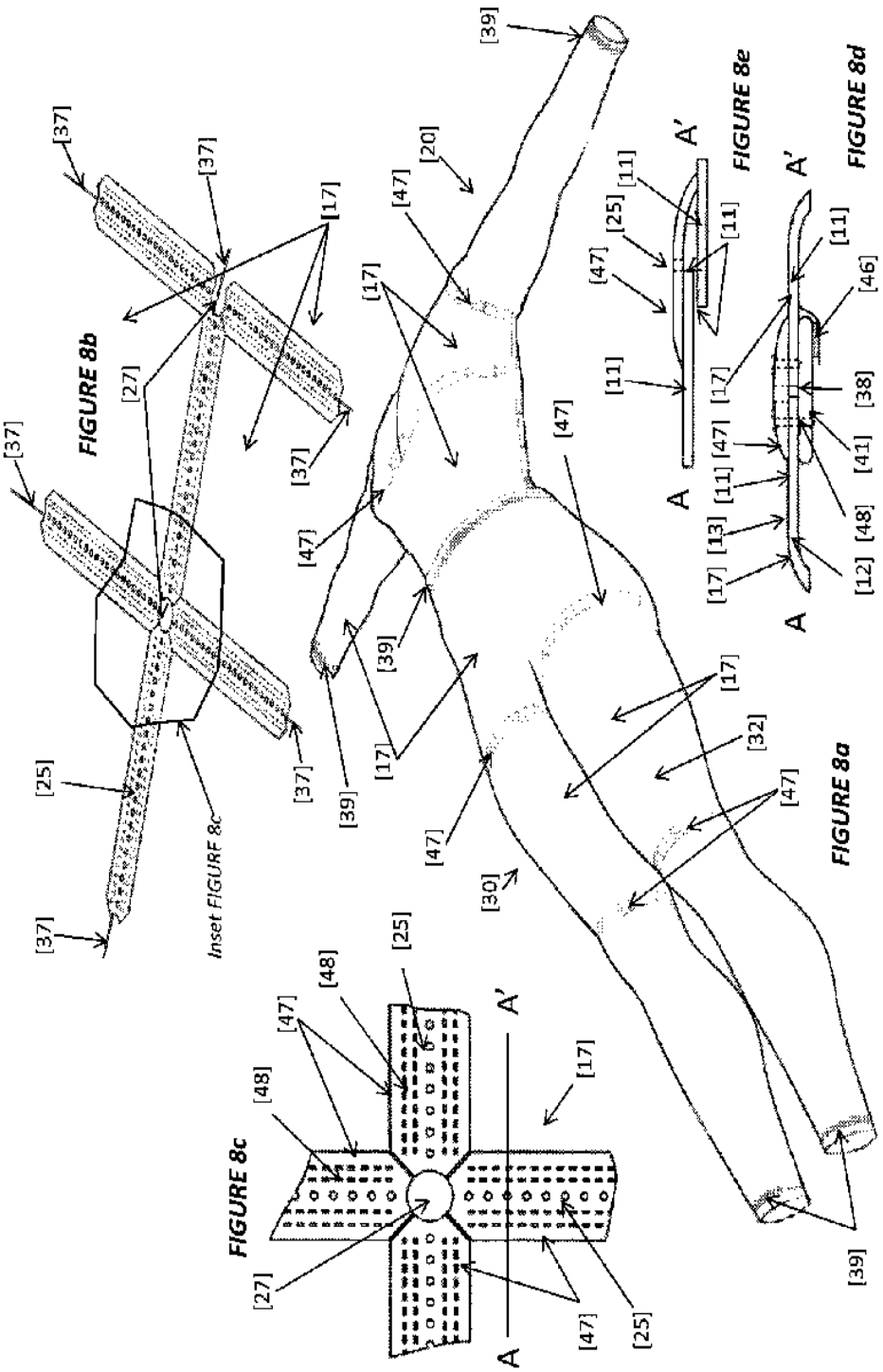
FIGURE 8b
FIGURE 8e
FIGURE 8d
FIGURE 8a
FIGURE 8c
Inset FIGURE 8c
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GARMENT CLOSURE APPARATUS, SYSTEM & METHOD

FIELD OF THE DISCLOSURE

[0001] This disclosure relates generally to garments for patient use in the medical, surgical, therapeutic and/or diagnostic environment.

BACKGROUND OF THE ART

[0002] Although there have been significant advances in medical technology over the past century, in-hospital patient garments. also styled as 'garb' for the purposes of this discussion, have remained essentially unchanged. The original patient hospital gown designs were intended to provide some theoretical practical solution for ease of access and use by medical and ancillary staff. Patient comfort and modesty and a patient centered design was not part of the remit. The overriding design criterion of existing garb is the desirability to easily remove the gown from the patient while the patient is unconscious, uncooperative or of limited mobility. Most conventional gowns are reusable and have a rear opening with posterior ties making it difficult for patients and care givers to remove. In addition, the patient is often forced to wear two gowns, the second being tied in the front so as to cover their buttocks and back. This makes the task of access doubly difficult and negates the original design intentions of the garment. The garment itself. aside from leaving the patient semi-nude and uncomfortable, also fails to provide a familiar garment format that promotes maintenance of body temperature in the ambient hospital environment. So, in summary. the current universal 'garb' fails to take into consideration inherent heat loss characteristics of a garment which has an open face across the majority of one of its long axes, thereby exposing the patient's skin to the ambient temperature of the hospital environment whilst in addition, producing a negative psychological impact to the wearer.

[0003] Changes to hospital practices and the increase in the use of disposable products for draping and gowning in the hospital or therapeutic environment have also failed to influence the design of hospital garments in either medical. surgical, therapeutic and/or diagnostic setting or to change the basic premise of the hospital gown which is that the patient's comfort is subordinated to the requirements of the medical, surgical, therapeutic and/or diagnostic environment.

[0004] The sole purpose of hospitals is to improve patient health care and one of their continuing tasks and goals is to improve quality and delivery of care while simultaneously reducing patient hospital days. Primary objectives include shortening patient stay, reducing hospital based complications and morbidity such as infection and metabolic dysfunction which have a negative effect on quality and delivery of care. The recent economic recession has resulted in significant budgetary cuts in State contributions to Health Care in the United States as well as in other developed systems such as the United Kingdom. The economic pressure to deliver more at less cost is paramount. Therefore the economic impact of reducing patient days carries significant financial benefits. The inventors observe that enhancing patient well-being and normalising their body temperature in the medical and hospital environment is of paramount importance in positively influencing the patient's autonomic response, which is. in itself, a significant contributor to patient recovery and hospital stay.

[0005] The patient's immediate physical and psychological environment are a significant element of the patient-care equation and the inventors believe that the significance of improving patient garb design may have unexpected and far-reaching consequences, extending to sustained beneficial homeostatic response and substantive improvement to the patient's physiological and autonomic response recovery time.

[0006] The inventors perceive that existing garb serves to create two separate problems for the patient, which their invention seeks to address: the first problem is psychological and the second physiological.

[0007] The instant invention therefore seeks to remedy the problems created by existing garb through 1) amending the garment form such that it has the facsimile of normal, everyday, clothing and 2) creating improved garment functionality through the use of materials which have the requisite insulative and heat-retentive characteristics. Furthermore, the medical, surgical, therapeutic and/or diagnostic functionality of the garments should favourably compare with existing garb. having equal or improved utility in the hospital environment and allowing medical staff uninhibited access to various sites, as required. and accordingly this is a complementary goal of the invention. Therefore the objective is the creation of garments which are equally beneficial to both medical. surgical, therapeutic and/or diagnostic staff as well as the patient. This is contrary to the current status in which the garment is designed to be maximally beneficial to the caregivers only whilst in reality proving to be a encumbrance to them as well.

[0008] In summary, one facet of improving the patient's hospital and medical, surgical. therapeutic and/or diagnostic environment is the provision of comfortable, insulative, disposable, single-use, garb which is conducive to the patient's modesty and which does not conspire to place them in a real or perceived physical or psychologically vulnerable situation.

[0009] The inventors believe that the inter-relationship between psychological stress and the resulting negative response of the patient's autonomic nervous system has been inadequately characterized. The patient's adrenal response, which results from psychological stress, may be a significant element in contributing to hypothermia in the ambient hospital environment. Clothing patients in alien, uncomfortable and forbidding garments contributes to psychological stress; therefore one way of diminishing the adrenal response is through provision of insulative garments whose appearance conforms to more standard clothing designs and formats. There is a synergistic relationship between stress and hypothermia, each one aggravating the other.

[0010] The patient's psychological reaction to the alien and forbidding nature of the hospital environment creates autonomic responses to fear and physical embarrassment which are counter-productive to optimal patient care. A major component of the patient's response to the hospital environment may be manifested by a subconscious adrenalin induced "flight-and-fight" response and the alien nature of traditional garb may therefore be a contributor in causing adrenalin induced vasoconstriction.

[0011] It is well known that adrenalin is a potent vasoconstrictor and that peripheral vasoconstriction and redirection of the circulation to the body core is a standard physiological response to stress. When combined with the inadequacies of a garb which leaves significant areas of the patient's skin exposed to ambient air temperature, the ability of the body to

maintain a homeothermic environment is compromised and, especially in the pre-treatment environment, the patient is predisposed to hypothermia.

[0012] Hypothermic events in the hospital environment are classified as either transient or persistent. The definition for persistent hypothermia is a reduction of core temperature to <36° C. for a period in excess of 24 hours.

[0013] Inducing hypothermia in a mammal is relatively simple, however, its reversal presents a significantly higher level of complexity. This is ably summarized by Christensen. U. S. 2011/0172749: "Vasoconstriction of the peripheral blood vessels may arise under hypothermia in order to prevent further heat loss by limiting blood flow to the extremities and reducing heat transfer away from the thermal core of the body. However, vasoconstriction makes it much more difficult to reverse a hypothermic state since vasoconstriction impedes the transfer of heat from the body surface to the thermal core and makes it difficult to simply apply heat to the surface of the body. This physiological impediment to heat transfer is referred to as a vasoconstrictive blockage to heat exchange." For this reason it is preferable to prevent hypothermia, rather than attempting to correct for it in the post-examination/diagnostic/surgical environment. The instant invention has the prevention of hypothermia as a principal objective.

[0014] Over the last decade, hospital induced hypothermia has been the subject of many learned. technical publications. Without exception, these studies concluded that persistent hypothermia impaired innate immune system functionality, resulting in the development of sequelae such as coagulopathy. increased incidence of wound infection and increased morbidity. Untreated persistent hypothermia was found to also significantly increase the risk of death.

[0015] Conversely, heating the patient, correlates with an increase in blood flow and oxygen tension at the tissue level, a reduction in infection rate and a corresponding reduction in the requirement to use prophylactic antibiotics. Wherever statistics are quoted significant improvements to patient recovery times result from the maintenance of patient core temperature. In summary, these benefits result in reductions in patient risk. hospital days and treatment complexity. The foregoing confirms both the physical benefit to the patient and economic benefit to the hospital system.

[0016] A significant proportion of the post-operative. recovery process effort is devoted to aiding recovery of the body core temperature. The process of restoring euthermia is by no means simple. and represents a time consuming. complex and sometimes contradictory environment where individual patient metabolic response varies considerably between patients. Sub-optimal patient response can lead to prolonged patient recovery time.

[0017] Existing intra-operative mechanical and electronic devices which are used to restore or prevent hypothermia are designed to apply heat to the torso through provision of active heat mechanisms and additional insulative material layers. These layers are typically in addition to existing medical garments and seek to restore euthermia, rather than preventing it. The inventors note that existing systems and methods also provide significant practical difficulties in the hospital environment. The inventors therefore believe that providing garments with superior insulative properties is an effective means of preventing hypothermia. In the hospital environment this results in a simpler, more effective and versatile approach which yields significant physiological, psychological and financial benefits.

Existing Garment Format

[0018] Piraka, U.S. Pat. No. 7,181,773 "Hospital Gown" usefully summarizes the practical and psychological drawbacks of existing designs; "The standard hospital gown has several drawbacks. One drawback is that the body areas which are generally considered "private areas" are exposed when they are uncovered for injections, suture removals, heart monitoring, telemetry hook-ups and feed line insertions. Exposure of "private areas" embarrasses many patients, particularly female and religious patients. and causes unnecessary stress.

Another drawback is that during many examinations and procedures patients must be elevated or turned to release neck or waist ties and raise hospital gowns. Elevating and turning patients are not easy tasks, particularly when only a single nurse is available and patients are heavy and/or have limited mobility. In some cases examinations or procedures are delayed until sufficient resources are available for lifting and turning patients. Another drawback is that elevating and turning patients causes discomfort in some patients. Still yet another drawback is that large body areas are needlessly exposed to contamination and infection."

[0019] Prior art in the field therefore. proposes the use of a single piece garment. In practice, the garment is impractical as there is no easy way to partially disrobe the patient. The inventors perceive that this contributes significantly to accelerated patient heat-loss and they therefore propose a two piece garment construction as being a fundamental element of their invention.

[0020] Furthermore, prior art relies on garment closure via fasteners which require either ties, buttons, single fastener specific point-to-point, or landing zone specific fasteners, all of which. the inventors note, present significant impediments to garment functionality.

[0021] The inventors conclude that making an exact alignment between male and female fasteners or between buttons and button-holes or aligning the two sides of a zipper is impractical when dressing a third-party especially when the patient is unconscious. uncooperative or marginally responsive, and unable to assist, such as in the post medical, surgical, therapeutic and diagnostic environment.

[0022] Ties. buttons and point fasteners leave incomplete seams which discontinuous securing means allow for significant reductions in patient comfort and promote and result in undesirable patient heat loss. The inventors note the inherent practical limitations of fasteners which are manipulated using two hands. and observe that knots frequently present unwanted, time consuming, complications when disrobing a patient. Knots and buttons also leave open large areas of traditional garb resulting in unwanted heat loss to the patient. The most frequently used garments currently in use, have ties which result in knots which pose problems in untying often requiring cutting in emergency situations. Knots also present an added hazard, creating a pressure point with resultant tissue necrosis in the immobile, semi-mobile or uncooperative patient.

[0023] The practical difficulties of aligning snaps and re-adjusting garment-fabric tensions which are encountered when re-clothing an unconscious or uncooperative patient, are further complicated when potentially bulky dressings

have to be incorporated within the garment. Additionally, pressure required for re-attachment of the press-studs. may be considered undesirable, particularly in the vicinity of a medical, surgical, therapeutic and/or diagnostic site.

[0024] While hook and loop fastenings are generally accepted practical solutions to garment closure, the difficulties of re-fastening a single continuous strip of hook and loop on a three dimensional shape such as the human torso frequently results in incorrect or incomplete alignment of the landing surfaces, which misalignment reduces the effectiveness of the attachments and can result in the undesirable possibility of the garment inadvertently falling open, or being partially open, causing exposure of the patient and heat loss. There is also the added risk of creases and folds resulting from mis-alignment of closure which can serve as pressure points and potential hazards for snagging joints and digits. with resultant injury. Hook and loop fasteners also have the potential to abrade the skin in a patient who is unconscious or unaware of stimuli due to paralysis or diminished level of consciousness. Furthermore, the closure of a garment with non-continuous hook and loop fastenings promotes undesirable body heat loss which is detrimental to the patient and therefore rejected as inadequate for the inventors' purposes.

[0025] Finally, the inventors observe that the use of zippers fails to deliver the garment versatility which the hospital environment demands while adding significantly to garment costs. Zippers have initial alignment difficulties, pose the risk of potential injury to skin and the functional limitation of closing the zipper either completely or not at all.

[0026] Therefore, the instant invention ideally removes the requirement to accurately align mating fastener fixtures or surfaces which represents a further significant practical benefit in the hospital environment, particularly when the patient is unable to assist in the process of robing or disrobing.

[0027] The fabric quality of garb which is equipped with traditional closures must have significant tensile and tear strength properties. such that premature failure at the point of fastening may be avoided. Premature failure of a fastening element renders the garment useless. Therefore, either the garment fabric must have inherently high tensile strength properties or be locally strengthened through the addition of gussets, folds, webs. material patches or other fabric strengthening features. These detailing features represent additional constructional complexity and incremental cost which the inventors intend to substantially reduce, or eliminate, in the instant invention.

[0028] Garments in use are traditionally one piece three quarter length with short sleeves and are applied by placing on the patient from the front and by tying once behind the neck and once at the lower back followed by a secondary overlap. if present. at the lower back with a third tie at the side of the body. In addition. there is no convenient or simple way to remove the garment or to disrobe the upper body whilst leaving the lower body covered.

[0029] Pants, if supplied, are made of transparent paper product with elasticated edges which achieve neither of their intended benefits which is to cover the 'private parts' or to provide a comfortable lower body garment which also promotes heat retention. In the case of the pants, these are complicated to apply and remove. requiring the legs to be placed through them and then be pulled up. This is a simple matter in a standing cooperative patient and a logistical nightmare requiring two care-givers in the supine uncooperative patient. There is also no method to remove the panties other than time tested method of tearing them apart. In addition the elasticated edges can abrade open wounds.

[0030] In contrast. the invention implicitly integrates the concept of a two piece garment always allowing integrity of closure of the upper and lower halves of the body as separate identifiable goals without detracting from the use of the upper body garment as being of variable length depending on the needs and preferences of the care givers and the patient.

[0031] Because of the versatility of the material, the possibility of adding design elements to the fabric such as patterns and colors should not be minimised. selecting different colors and patterns for male and female and selecting garments with cartoon prints for children etc., even allowing for sponsorship and advertising on garments.

BRIEF DESCRIPTION OF THE INVENTION

[0032] The invention, takes the form of a two piece garment of traditional construction: that is to say that. unlike traditional garb or prior art in the field it has no open or partially open seams, except for neck, arm and leg holes.

[0033] The garment for the upper body generally takes the form of a blouse/T-shirt and for the lower body. shorts or trousers. Alternatively. dependent on regional custom. a dress with short or long sleeves may be preferred. The patient's limbs may be partially or fully covered, as required. For the lower limbs, socks may be incorporated into the garment. The dress may be of any length, waist upper thigh, mid-thigh or ankle length.

[0034] For Islamic countries a head dress may also be incorporated as a separate or integrated attachment, with or without a facial cover.

[0035] The design format. construction and choice of garments for an individual, can be altered to factor in the therapeutic needs of the patient, the specific treatment area of the hospital, the ambient air temperature, the patient's anticipated metabolic response and the proposed duration of the treatment.

[0036] The garment is constructed from fabric which may comprise one or more layers, in order to formulate the appropriate structural, insulative or textural properties, as may be required. Any fabric type. whether woven. knitted or non-woven may be used. however. preference, is given to cellulose based, disposable, single-use fabrics which are capable of being recycled. The use of cellulose based fabrics results in reduced handling, laundering, sterilization and storage requirements which has significant economic benefit.

[0037] The surgical and therapeutic utility of the garment is enhanced through the strategic placement of seams which are positioned such that sites of specific surgical interest can be exposed. The garment seams are largely positioned along traditional lines, with the seams being stitched, glued. welded or attached by any other conventional or unconventional means, as required. The versatility imparted by the seams is further enhanced by collaborative juxtaposition with fasteners which are used to close the garment. Preferentially, the closure mechanisms should be of continuous as opposed to intermittent construction so as to leave the garment relatively air-tight, thereby beneficially reducing patient heat loss and protecting patient modesty.

[0038] In summary, rather than requiring site specific placement fastenings which require orientation and create a discontinuous junction in the garment fabric, the instant invention improves over prior art through the preferential use of a re-sealable fastener which attaches directly to the fabric,

to form a continuous seam. By comparison with prior art, the re-sealing elements of the instant invention, do not require precise alignment of mating materials and therefore beneficially allow for minor alterations to the post-intervention fitting and accommodation of the garment.

[0039] As a result of the types of closure which are incorporated into the instant invention, tensile loading of the garment fastening mechanism is distributed across the entire length of the separable seams, thereby avoiding point loading and resulting in the ability to reduce the tensile strength of the material as a whole. Preferably, inter-garment structural reinforcements may be dispensed with completely. A benefit of being able to construct the garment with reduced material tensile strength is the opportunity to construct utilizing different materials and fabric properties than has hitherto been possible.

[0040] The garment may also be modified to incorporate active chemical heat inserts to provide active heating during interventions which carry the risk of excessive body loss and resultant hypothermia such as protracted surgical procedures.

[0041] In summary, the instant invention improves the cosmetic appearance, quality, structural and insulative character of hospital garments adding significant and quantifiable benefit in increasing patient comfort and reducing recovery time, without increasing garment unit costs or negatively impacting the therapeutic requirements within the hospital environment.

DETAILED DESCRIPTION OF THE INVENTION

[0042] A detailed description of the invention now follows: the detailed description will, follow the structure, mechanisms and detail for the garb and the person learned in the art will appreciate that the description contained herein is not intended to provide a constraint or limitation on the design or deployment of the invention, but rather to describe the features and benefits of the invention.

[0043] Therefore, the illustrations contained herein are intended to disclose the key elements of the design. Persons skilled in the art will appreciate that the embodiments of the invention disclosed herein have been particularly described for the purposes of disclosing the invention and it is not the inventors' intention to limit the invention to the described embodiments, since other embodiments may be developed from this disclosure by persons skilled in the art.

[0044] FIG. **1***a* is a schematic plan view of the front side of the present invention as configured with short-sleeved and short trouser-legs, illustrating potential configurations for placement of perforations. FIG. **1***b* is a schematic plan view of the front side of the present invention as configured for long sleeved and long trouser-legs, illustrating alternative potential configurations for placement of perforations. FIG. **1***c* is a three-dimensional schematic showing placement of opening seams on a side elevation.

[0045] FIG. **2***a* shows an alternative configuration for garment fabric indicating enlarged perforations which act as place-markers and stop-perforations. FIG. **2***b* illustrates the partial internal construction of a webbing strip used for closing garment seams which has comparable features.

[0046] FIGS. **3***a* to **3***c* illustrates cross-sectional and isometric drawings of an alternative configuration of the garment seam structure comprising a press-fit seam.

[0047] FIGS. **4***a*, **4***b*, and **4***c* present cross sectional views illustrating one configuration of the garment fabric and underlying web.

[0048] FIG. **5***a* illustrates a cross-sectional view of the garment and closure system prior to deployment.

[0049] FIG. **5***b* illustrates a cross-sectional view of the garment and closure system post deployment during patient treatment and FIG. **5***c* illustrates the garment re-sealed in the post-treatment environment.

[0050] FIG. **6***a* illustrates an cross-sectional alternative configuration of the garment closure system.

[0051] FIG. **7***a* through **7***c*: shows an alternative garment closure mechanism, particularly illustrating alternative structural configurations of the internal closure mechanism to the opening seam.

[0052] FIG. **8***a* illustrates the position of seams on one particular garment configuration; FIGS. **8***b* and **8***c* illustrate webbing layouts and relative positions on the garment, emphasising sectional capability and FIGS. **8***d* and **8***e* are cross-sectional illustrations of potential seam configurations.

[0053] Commencing with FIG. **1**, the garment generally **10**, is constructed from fabric **11**, which has an interior surface, **12** and an exterior surface, **13**. The interior surface **12**, is proximate the patient's skin and the exterior surface **13**, is exposed to the air. The fabric, **11**, may be constructed from any of a class of materials which have the desired attributes of insulation, moisture wicking, elasticity, support and permeability as may be required in order to create a suitable garment for the wearer. The insulative properties of the material **11** are selected based on a number of criteria: for example, the anticipated ambient temperature of the hospital environment: the duration of the surgical or diagnostic or therapeutic intervention and the homeostatic characteristics of the patient. For example, in the case of an elderly patient undergoing an operation of some duration and complexity, a higher degree of corporeal heat retention may be sought, resulting in selection of a garment **10** constructed from fabric **11** with significantly higher insulative properties.

[0054] The material, **11**, may be woven, knitted, or spun and may be formed from natural or man-made materials as required. Fabric threads may be coated or be natural, according to preference and the dictates of regulatory bodies, as required. Wherever possible, it is the inventors' preference to utilize fabrics made from natural fibers which have the added economic benefit of being both disposable and recyclable. A preferred material **11** for the construction of the body of the garb is cellulose which may be manufactured with inherently heat-retentive quilted structures. Beneficially, cellulose materials are low-cost, commercially available, recyclable and have other desirable mechanical properties which are of interest in the construction of the garment, **10**.

[0055] Also, for example, fabrics which are constructed from the products of bamboo are of interest. Such plants are fast growing and need little or no chemical intervention in terms of fertilisers or pesticides and are therefore beneficial to the environment. In addition, fabric constructed from bamboo is known to have both wicking and anti-bacterial properties which increases its attractiveness in the field of hygiene materials.

[0056] However, it will be understood that any type of fabric, whether man-made or natural, coated or raw fiber, disposable or re-usable, may be used without departing from the spirit of the invention.

[0057] Generally, for ease of construction, the garments **10**, are symmetrical about their longitudinal midlines, although this is not intended to present a constraint on the design. The garb for the upper body **20** has the appearance of an everyday

garment, complete with sleeves **21**, neck-hole **22**, and body **23**. The upper body garment **20** may be also sleeveless without departing from the spirit of the invention, but preference is given to the incorporation of sleeves **21** for purposes of retaining the patient's body heat. The sleeves **21** may be of any length, as determined by the ambient environment and patient specific requirements and may further be equipped with elasticated cuffs **39** to further enhance retention of body heat. The key differentiator from prior art in the field is that, as all of the major garment panels **17** are continuously attached to adjacent panels **17**, the patient's body **9** is not exposed to the open air and therefore not subject to high levels of body core heat loss. Furthermore, the semi-fitted nature of the garb **10** does not allow for a significant volume of air-flow between the patient's body **9** and the ambient environment.

[0058] The garment for the lower body **30**, takes the form or shorts **31** or, preferably, leggings **32**. If the latter, these may be equipped with socks or bootees.

[0059] Although there is a simplicity in producing a garment from a single fabric piece, in practice, the majority of garments are constructed from multiple panels **17**. Such multi-panelled garments lend themselves to more convenient and economically beneficial methods of constructing garb with separable panels.

[0060] Another requirement is that the garments **10** provide medical staff with easy and unfettered access to the patient which results in the garb being readily segmented. Therefore, the fabric **11** which is used in the construction of the garment, **10**, is equipped with separable seams **15** which are used to segment the garment **10**. The separable seams **15** may correspond with seam locations used in traditional garment panel placement, or, alternatively, may be specifically configured to suit particular medical, surgical, therapeutic and/or diagnostic requirements.

[0061] The utility of the garment **10** may be enhanced by placing the separable seams **15** so as to accommodate not only the site of intervention, but also to create minor panel openings (not illustrated) which accommodate the access requirements for ancillary equipment such as catheters, cannulae, biometric and telemetry units, which access points may be located outside the immediate therapeutic site and which may require both upper and lower body garments **20**, **30**, to be opened in order to obtain more complete access to the patient **9**. These sites, specifically, would be in the abdominal area for colostomy bags, or open abdominal wounds; in the perineal area for catheterisation of the urinary system, in the back shoulder, anterior and lateral chest for telemetry and central lines, in the extremities (ventral aspect of wrist, dorsum of hand or foot, ankle, groin or ante-cubital fossa for intravenous, intra-arterial and central line access or in any other site-specific location as may be desired. This description is not designed so as to limit the different configurations of the garment, since other treatment, therapeutic or diagnostic procedures may require exposure of any part of the body e.g. ultrasound examination of an abscess, Wound-Vac™ management of an open wound, mammography, etc.

[0062] An additional requirement and advantage of the garment **10** is that it should not be radio-opaque or in any way interfere with Magnetic Resonance Imaging or Computer Assisted Tomography or Radiographic procedures. However, no limitation is intended by this statement as to the potential for inclusion of radio-opaque panels, such as in the area of the reproductive organs.

[0063] The inventors conceive that different versions of the garment **10** may be created, each having therapeutic or surgical site specific practicality, without departing from the spirit of the invention. Accordingly, the illustrations contained herein, illustrate embodiments of the invention which embodiments are designed to accommodate medical, surgical, therapeutic and/or diagnostic intervention on the torso or extremities, as required.

[0064] Therefore, the seam boundaries **15** may be of any length or positioned in any position on the garment **10** which, by design, may be site-specific for the treatment or diagnostic modality which is to be conducted. The seam boundaries **15** may preferentially be opened through the use of lines of weakness which are formed within the fabric **11** of the garment. One such configuration of single-use garment opening is the use of perforations **15**, which may be incorporated into the garments **10**, in such a manner as to run longitudinally, circumferentially, or diagonally with respect to the patient's body, or in any orientation or combinations of orientations as desired.

[0065] For greater surgical versatility, for example, as illustrated in FIG. **1**A, a preferred configuration of the garment incorporates seams separable **15** along the patient's mid-lateral access **16**, along the superior or caudal aspect of the shoulders **8**, the axillary and medial arm area, **24** and also along a longitudinal midline **14** on anterior **18** and posterior **19** aspects of both upper **20** and lower garments **30**. This configuration allows access to the torso for medical, surgical, therapeutic and diagnostic manoeuvres.

[0066] In an alternate long-sleeved configuration, which also provides cover for the whole of the lower body, as illustrated in FIG. **1**B, the garment has anterior **18** and posterior elevations **19** which are circumferentially divided into panels by separable seams **15** in the garment fabric **11** for example, at mid-thorax level, **5** and at upper thigh **7** and knee levels **6** for the purposes of allowing patient access to the torso for medical, surgical, therapeutic and/or diagnostic manoeuvres.

[0067] The position of the separable seams **15** is such that they operate either independently or in collaboration, thereby creating greater garment versatility. The creation of an opening **17** within the garb does not, of necessity, require the detachment of a garment panel **17** as the primary intention is to fold the panels, exposing the site of intervention such that the panel opening **17** in the garb **10** may be closed after completion of the medical, surgical, therapeutic and/or diagnostic procedure.

[0068] Turning now to FIG. **2**, the method of construction of the separable seams **15** is such that the shear strength of the materials **11** which are used to bridge the interstices **37** between garment panels **17** is intentionally compromised, resulting in the ability to manually dissect the seam **15**, thereby allowing segmentation of the garment **10**. The seam **15** should, however, be of sufficient strength that garment integrity is maintained when the patient is putting on the garment **10**.

[0069] The required reduction in tensile strength may be accomplished by any practicable means, as required, for example, as partially illustrated in FIG. **1**, and FIG. **2**, through the use of perforations **25** formed within the garment fabric **11**, which effectively decrease the intra-fabric structural strength, or as illustrated in FIG. **3***b*, by constructing a garment seam **15** which is constructed by overlapping two panel sections **17***a*, **17***b* and separable weakened junction **15** at the seam. FIG. **3** illustrates one potential configuration which

comprises adjacent cellulose garment segments **17***a*, **17***b*, which are overlapping and feature pressed or embossed **36** sections which are bonded so as to form a separable seam **15**. Alternatively, as illustrated in FIGS. **4** through **8**, a reduced shear strength joint **15** may be formed, for example, by creating an interval of weakness within the fabric structure **11** along the principal seam axis **15** such that once the separable seam opening **15** has been created, the separation of the seam **15** results in the creation of two adjacent fabric section margins **37** each located on two adjoining, but separated, garment panels **17**.

[0070] Therefore, as illustrated in FIGS. **2**, **4**. **7** and most particularly, FIG. **8**, perforations **25** form intra-garment boundaries **15** which sectionalise the garment into convenient panels, **17** allowing access for both medical, surgical, therapeutic and/or diagnostic equipment. Perforations **25** may be of any diameter and spacing necessary to accomplish the goal of reducing the strength of the fabric joint **15** without compromising garment structural integrity in the pre-treatment environment. This method is particularly suited to garb constructed from cellulose pulp products such as paper. It will be understood by those practised in the art that the perforations described and illustrated herein are indicative of one particular embodiment of the invention and that any shape, form, configuration or arrangement of perforations is considered to be within the scope of the invention.

[0071] A further useful adaptation to the perforations **25** is illustrated in FIGS. **2***a*, **2***b* and FIG. **8** whereby larger diameter perforations **27** are used to more clearly define the marginal limits **37** of particular garment panels **17**. Therefore these large diameter perforations **27** both act to prevent the uncontrolled run of perforations, providing tear-open limits and serving to more clearly define panel **17** seam boundaries **37** for the purposes of identifying the location of garment **10** re-sealing means **26**, as will be explored later. FIG. **2***a* illustrates the principle of perforations **25** as applied directly to the fabric **11** itself, illustrating the resulting individual panels **17**. and the separable seams **15**—in this configuration they are perforated, but any reduced strength joint may be used to achieve garment panel **17** separation. FIG. **2***a* further illustrates the use of enlarged perorations **27** as garment panel intersection **17** markers and because the fabric pictured is still intact—the potential resulting panel **17** margins **37**.

[0072] FIG. **2***b*, by comparison illustrates the principle of providing indirect garment panel **17** perforation means, **25**, via a fabric strip **47** which is mounted on the internal surface **13** of the fabric **11**. The separate panels of the garment **17***a*. **17***b*, **17***c*. **17***d* have been shaded to illustrate the relative positions of fabric strip **47** with respect to individual garment panels and also to illustrate the utility in defining individual garment panels **17** by co-location of the internal strip **38** across the margins **37** of the separable panels **17**. The implication here is that the practical garment construction remains concealed from the patient, as the panel construction means are within the garment structure. The garment panel margins **37** are defined internally by the location of internally positioned fabric strips **38**. which panel sizes **17** may be of any dimension and located according to specific medical, surgical, therapeutic and/or diagnostic purposes, and that garb **10** can therefore be customized to suit specific procedures. This feature is of benefit because the patient can be clothed in the gown and then the appropriate panels **17** can be selected in order to expose the appropriate medical, surgical, therapeutic and/or diagnostic site, without unnecessarily inducing unwanted patient heat loss. In FIG. **2***b*, the internal fabric strips **38** are attached to the panels **17** by means of stitching, **48**, however, clearly any other attachment means can be used without departing from the spirit of the invention. Alternative cross-sectional configurations of FIG. **2***b* are illustrated in more detail in FIG. **7**.

[0073] Conversely, as illustrated in FIG. **8**. fabric strips **47** could be located on the outer surface **13** of the garment fabric **11**. In This configuration has some merit because it aids surgical staff in locating the required garment openings. In exemplary FIG. **2***b*. the panels **17** are co-located in such a manner as to have adjacent edges **37**. however, it may be desirable to have the margins **37** of the panels **17**, overlap so as to provide both greater structural integrity and enhanced euthermic properties and clearly this is depicted in FIGS. **8***d* and **8***e* and also lies within the scope of the instant invention.

[0074] In an alternative arrangement, illustrated in FIG. **3**, which removes the requirement for perforations to be made in the fabric **11** and which may increase the available range of materials used in the construction of the garment **10**, the individual sections **17** of the garment are cut from separate pieces of material **11** which pieces are press-bonded together to form a draft-proof garment **10** seam **15**.

[0075] FIG. **3***a* through **3***c*, therefore, illustrate both a sectional and isometric view of a garment seam **15** configuration. This may require the margins **37** of the fabric sections. **17** to be chemically treated so as to give the necessary adhesive and form retentive properties to both sections **17**. Therefore the margin of the garment **37** may be treated with adhesives, or starch or some form of stiffening in such a manner that, post manufacture, when the garment fabric **11** treatment is complete the shape of the embossed sections **36** is retained. By pressing the fabric sections **17** to form raised surfaces **36** a tensile bond between fabric sections **17** may be made which is sufficient to withstand everyday handling, such as that which is encountered during dressing, but is not so strong as to create an impediment to hospital staff when disrobing the patient.

[0076] The inventors note that any garment which is configured with panels **17** has the potential to create undesirable heat loss in a patient **9**. The use of perforations **25** as a means of sectioning the garment **10** results in unwanted exposure of the patient's skin **9** and presents the potential for heat loss. Therefore, as illustrated in FIG. **4**, the garment **10** may on the interior surface **12**, of the fabric, **11** immediately beneath the perforations **25**. preferentially be equipped with an internal fabric strip, or web of material, **38**.

[0077] The internal webbing strip **38** serves multiple purposes. Prior to the treatment or intervention, it prevents patient skin **9** heat loss via the perforations **25**. It may also replace the perforated boundary **15** fabric and be used to maintain garment seam **15** integrity prior to the operation. It serves, therefore, as a logical boundary defining the location of the medical, surgical, therapeutic and/or diagnostic intervention and. finally it acts as a mechanism for post-treatment re-connection of garment sections **17**, being used to re-seal the open margins **37** of the separable seams **15** in order to effect closure of the garment panels **17** and re-form the garment post-operatively.

[0078] The fabric web **38**. as depicted in FIG. **4**, FIG. **7** and FIG. **8***d*. has an interior surface. **41** and an exterior surface **42**. For purposes of identification, the interior surface **41**. of the fabric web **38**, is the surface which is in closest proximity to the patient's skin **9** when the fabric strip is being used as a

garment **10** closure means. The fabric web **38** is assembled within the garment **10** such that it runs coaxially with the separable seam **15** boundaries **37**, bridging the axis of separable seam **15**, in such a fashion that a continuous, draught-proof, seam construction **15** is created, thereby reducing convective and radiative patient heat loss. The web **38** is therefore connected so as to run coaxially, parallel to the separable seams **15**. Despite the requirement for continuity at the seam boundaries **37**, nothing prevents the use of multiple sections of internal fabric strips **38**, as illustrated in FIGS. **2***b*, and **8***a* through **8***e*, in order to improve the versatility of the garment **10** construction. For preference these sealing strips **38** are featured so as to conveniently overlap the garment panel margins **37**, creating air-tight garment panels **17** without creating significant additional bulk in the garment **10** construction.

[0079] The internal fabric strip **38** as illustrated in FIGS. **2***b*, **4**, **7** and **8***d* and **8***e*, is preferentially permanently attached **43** parallel and adjacent to one margin **37** of a garment panel **17**, in a continuous fashion. The permanent connection **43** means may be selected from a group of conventional or non-conventional fabric fixing methods, i.e. as illustrated, by stitching. However, gluing, laser bonding or any other method or combination of methods which are determined by the choice of garment fabric **11** and the required bond strength between internal fabric strip **38** and garment fabric **11**, may be selected, as required. The central portion of the strip, **29** however, remains detached from the inner surface **12** of the fabric, **11**.

[0080] As illustrated in FIG. **4***a*, for the improved comfort of the patient and to avoid transit damage to the sealing web means **38**, a second, optional attachment **44** of the internal fabric strip **38**, using temporary bonding means **44** to affix the un-attached margin of the fabric web **38** to the inner surface **12** of the fabric **11** of the adjacent panel **17** may be made. This temporary attachment **44** may be dispensed with entirely, as in FIG. **4***b*, if the material characteristics of fabric **11** and web **38** allow for the web **38** to structurally self-support across the junction **15** between two adjacent garment panels **17**.

[0081] FIG. **4***a* therefore illustrates a cross section of the internal fabric web strip **38** and the garment fabric **11**. The web **38**, has two, continuous axes of attachment, **43**, **44**, running parallel to the garment panel margins **37**, which panel margins are created by separable seam **15** or perforated boundary **25** within the garment fabric **11**. The construction of each of these internal web strip attachments is different. One of the attachments **43** is designed to be permanently attached to the inner surface **12** of the garment fabric **11**. The opposite margin of the internal fabric strip **38** is affixed using detachable means **44** to the inner surface **12** of the garment fabric **11**: that is to say the shear strength of the temporary attachment method **44** which is used to attach the webbing **38** to the interior surface **12** of the garment fabric **11** is inferior to the tensile strength of the fabric **11** which is used to create the garment **10**. This, results in a webbing strip **38** which is capable of selective detachment from the garment **10**. In a garment which is configured with perforated seams, **25** preferentially the webbing **38** is affixed to the interior surface **12** of the fabric **11** such that it detaches from the inner surface **12** of the garment **10** simultaneously when the separable seams **15** are detached.

[0082] Self-evidently the garment **10** could be constructed which had the option of both internal fabric strip **38** margins being detachable, and this is considered to be within the scope of the invention, however, the inventors observe that, potentially, this would create additional work for the hospital staff in terms of determining which web margin **38** to leave connected to the garment **10** and result in unnecessary complexity concerning the selection of panel closure means to be used in the post-treatment environment. Therefore, by having one margin of the web **38** permanently attached, garment misapplication issues and complications are thus avoided.

[0083] Therefore, when the garment **10** is in use, the separable seam **15** is opened, revealing the inner fabric strip **38**: at this point in the procedure, as illustrated in FIG. **4***a*, the garment **10** still encompasses the patient's torso **9**. The temporary adhesive strip **44** which connects the web **38** to the inner surface **12** of the fabric **11** by low shear strength glue, or by other suitable means, is detached, thereby exposing the patient's torso **9**. The resulting garment sub-sections **17** are then folded back, revealing the site for treatment modality and allowing the procedure or monitoring to be carried out. In manufacturing the detachable margin **44** of the internal fabric web **38** preference is given to the use of reusable tack adhesive glue which is capable of re-attachment and which is commonly used for re-attaching cellulose or paper goods, although clearly any manner of adhesive can be used.

[0084] In FIG. **4***b*, an alternative configuration is shown whereby the fabric web **38**, although overlapping the separable seam boundary so as to create a draught proof seam, remains substantially and permanently attached only along a single margin **43**. In configuration, FIG. **4***a*, on detaching the perforations **25**, the bond between web **38** and adhesive section **44** becomes the weak element in retaining connectivity between the two margins **37** of the now separable garment **10** and when detached, allows hospital personnel access to site for treatment modality. In the configuration illustrated in FIG. **4***b*, once the perforations **25** are detached, the entire garment is immediately open, allowing access to the site of treatment. Whichever garment configuration is adopted, either FIG. **4***a* or **4***b*, FIG. **4***c* illustrates the post intervention configuration. In FIG. **4***c*, the temporary adhesive strip **44** is secured to the outer fabric surface **13** of the garment fabric **11**, thus providing garment closure means.

[0085] In the post intervention mode, illustrated in FIG. **4***c*, the garment **10** is closed, covering the patient's skin **9**, thereby preventing additional, unwanted heat loss. The temporary adhesive strip **44** is configured either by means of using reduced strength glue or by altering the adhesive properties of either or both of the exterior surfaces of the fabric **12** or the interior surface **41** of the fabric web **38**, or by altering the strength of the adhesive, or by some combination of these factors. It is important, from a practical perspective, that the re-attachment mechanism **45** remains inactive until the procedure is completed and there is a requirement to close the garment **10**. This may be accomplished by a number of means, including having a "tear-off" protective strip **46**, as illustrated in FIGS. **4***b*, **7***b* and **8***d*, which controls access to the adhesive layer, or by varying the properties of the garment fabric **11** along specific margins which are to be used for adhesion, or by adjusting the fixative properties of the adhesive mechanism, or by any other means as required.

[0086] An alternative construction of the garment separable seam **15** and closure mechanism is illustrated in cross-sectional schematics in FIGS. **5***a* through **5***c*. FIG. **5***a* illustrates the separable seam **15** in the pre-operative environment. It depicts an over-folded pleat **35**, which serves to conceal perforated seam margins **25**. The form of the pleat in FIG. **5***a*

is retained by use of a temporary adhesive joint, **26***a* which may be either continuous or intermittent in nature. The adhesive joint **26***a* also serves to conceal the perforated seam margins **25** providing additional insulation, thereby preventing body heat loss via the perforations **25**. In order to better retain the form of the over-folded pleat **35**. an additional optional adhesive strip **26***b* is illustrated. FIG. **5***b* illustrates the separable seam as deployed. having separated the adhesive joint **26***a* the perforations **25** are revealed, allowing the garment **10** to be sectioned and the patient **9** to be exposed as previously described. At this point, adhesive strip **26***b* is still concealed within the remaining garment pleat. FIG. **5***c* illustrates the garment **10** in the post-operative environment with the garment closed around the patient. This configuration utilizes both of the adhesive strips **26***a*, **26***b* deployed as a means of closing the garment.

[0087] The embodiment illustrated in FIG. **5** is beneficial in its simplicity. requiring only the insertion of a reduced strength fabric section **11** thereby creating a seam and the addition of temporary adhesive means **26** with which to conceal the separable margins **37**. As previously disclosed, the preferred means for constructing the weakened element **15** of the fabric **11** is by linearly arranged perforations **25**, although other means may be used as practicable. The temporary adhesive strip **26***a*, may be located by markings on the exterior surface **13** of the fabric **11**. or by means of piping (not shown). affixed to the outer surface **13** of the fabric **11**, or by other means as applicable. This reduces the complexity of garment construction such that the only elements which are required are fabric **11** and adhesive elements **26**. It also paves the way for the use of more sophisticated adhesive means which are responsive only to specifically treated fabric types yet which do not have active viscid properties and which would therefore be ideally suited to the hospital environment.

[0088] Therefore, in FIG. **5**, in the vicinity of the desired perforation **25** boundaries **15**, the outer surface of the garment. **13** contains a reduced strength element in the construction of the fabric **11** which, when dislocated, allows the perforations **25** to be exposed, and, as illustrated in FIG. **5***b*, creates two separate panels **17** with adjacent margins **37** thus enabling the garb **10** to be opened as has hitherto been described. The weak point **15** is preferentially constructed using reduced strength adhesives **44**, but any manner of fabric fusion, stitching or adhesive methods which create an impermanent bond, or reduced-strength seam, may be used without departing from the spirit of the invention.

[0089] The advantages of this garment closure configuration are clear: they allow simplification of the garment **10** construction, without the requirement for separate internal **38** or external sealing strips **44**. The concealed nature of temporary sealing strip **26***b* prevents the adhesive surface **26***b* from becoming prematurely and incorrectly affixed. The fabric over fold **35** may be further encouraged to retain its form within the garment structure by virtue of surfaces which are treated such that they tack-bond the pleat to the interior surface **12** of the garment fabric **11**. or, alternatively, bond the fabric overfold **35** to itself on its internal surface or by any other means which achieves the required objective.

[0090] After the medical, surgical, therapeutic and/or diagnostic intervention is completed. as illustrated in FIG. **5***c*, the garment opening is then closed by opening the over fold pleat **35** and revealing the adhesive strip **26***b* which is used to re-attach the adjacent fabric panels **17**, restoring garment functionality and preventing further patient heat loss. Further garment closure strength may be achieved by utilizing more than one adhesive bonding margin, for example as illustrated in FIG. **5***c* where adhesive strips **26***a* and **26***b*, act mutually to provide additional bond strength to the garment closure thereby creating a more secure bond.

[0091] Alternatively, as in simplified FIG. **6**, the adhesive **44** may be re-usable and may be set directly onto the inner surface **12** of the fabric **11**, or may be particularly inserted into a groove **33** embossed into either the cellulose garment fabric **11** or, alternatively, as illustrated in FIG. **6**, into an internal fabric strip **38**, as desired. The inventors perceive that inserting the adhesive in a bead format into a pre-formed channel **33** which is embossed in the web **16** substrate is advantageous both in manufacturing and deployment as it constrains the adhesive **44** to pre-determined positions and orientations. This makes placement of the adhesive during manufacture more precise as it prevents the adhesive **44** from encroaching on the surrounding substrates **12**. **13**. In addition. depending on the type of adhesive used, it may be covered with a protective strip (not illustrated) in order to maintain its adhesive qualities or prevent premature and unwanted adhesion. Such adhesive protective strips are frequently used in stationery products for similar purposes.

[0092] If a style or fabric format is selected which is incapable of being perforated, or if it is desired to completely conceal the garment closure mechanism from casual observation, an alternative configuration is illustrated in FIG. **7***a* through **7***c*. The location of the seam **15**, may be indicated through positioning by means of a line drawn on the material, or piping **34**, or more appropriately, twin parallel piping **34**, which indicates the margins **37** (illustrated in FIG. **7***b*) of adjacent fabric panel sections **17**. or by any other means which provides clear indication of the position of the garment opening seams **15**. Located on the inner surface **12** of the fabric **11** and to one side of the opening seam **15** is a self-contained re-sealing strip **38**. This configuration may be considered advantageous in circumstances where the over-riding concern is pre-operative garment integrity, or where the appearance of the garment is a significant design criteria. The remainder of the features illustrated in FIG. **7** are similar to those detailed in FIG. **4**. however. it is desirable to manufacture the garment such that the tension on the internal fabric web **38** should preferably match the tension of the garment fabric **11** so as to provide stress relief on the opening seam **15**.

[0093] FIG. **8***a* illustrates one configuration a preferred embodiment of the garment **10** as worn by a patient. This figure illustrates an embodiment of the garment **10**, utilizing a segmented approach to configuring the separable fabric strips **38**, **47**. In order to simplify the concept, FIG. **8***a* illustrates external fabric strips **47**. however. it will be understood that internal fabric strips **38**, may be equally as effective. Cross sectional depictions of internal fabric strips **38** are contained in FIGS. **4**, **7** and **8***d*. The garb **10**, as illustrated, is long sleeved with elasticated cuffs **39** at the wrist and, preferentially, some form of heat-retentive elasticated band at the waist **39**. The garment separable seams **15** are located beneath the external fabric strips **47** and collaborate to define garment panels **17** which are of utility in the medical, surgical, therapeutic and/or diagnostic environment. The illustrations are not intended to provide constraint or limitation on the placement of panel seams **15** which may be of any dimension and in any location, as may be required.

[0094] The garment, **10** as illustrated in FIG. **8***a* is divisible into segments **17** as originally illustrated in FIG. **1***b*, although

clearly it could be segmented in other ways, as desired. However, unlike FIG. **1***b*. the garment segments' **17** outer surface **13** fabric margins **37** are each overlain by a narrow textile layer **47**, which is affixed to the outer surface **13** of the garment material **11**. If desired, in order to prevent heat loss from the patient, the garment fabric layers **11** may be configured so as to overlap as in FIG. **8***d*.

[0095] FIG. **8***a* shows the outer textile layer **47** being affixed to the garment exterior surface **13** by means of stitching **48**, however, any appropriate fabric fastening method. including, but not limited to stitching, gluing, laser bonding etc., may be used as desired. The narrow textile webbing layer **47**, is equipped with perforations **25** which run along the longitudinal axis of the webbing **47** for the purposes of providing separation means between garment panels **17** and thus providing openings in the garment **10**. Larger diameter perforations, **27**, as illustrated in expanded drawings **8***b* and **8***c*, are inserted into the row of perforations, **25**. As previously disclosed. these act as both garment panel **17** margin **37** markers and also to provide effective limits to perforation openings, thereby more clearly defining garment panels for the medical, surgical, therapeutic and/or diagnostic staff. Clearly there is nothing in the design which prevents additional panel openings being made as the medical. surgical. therapeutic and/or diagnostic procedure progresses, should this become necessary and the seam construction is such that it may be removed in its entirety if an emergency arises. It should be noted that the attachment between the opposing margins of the web **47** differs between in its connection to adjacent margins **37** of the fabric panels **17** which comprise the garment **10**. On one median the stitching passes through textile layer **47**. garment fabric **11** and internal fabric strip **38**. thus binding all three elements as illustrated in sectional FIG. **8***d*. On the opposing median, the outer textile layer **47** and garment fabric **11** are bound by stitching, however, the internal web **38** remains free from attachment. In this manner, once the adjacent garment panels **17** are separated. the internal web has a degree of freedom which allows the garment **10** to be opened and the patient's skin **9** exposed.

[0096] FIG. **8***b* and inset FIG. **8***c*. illustrate isometric representations of the intersection of several panels **17** showing the detail of the webbing **47**, the outer textile layer **13** and its application to the fabric panels **17**. Adjacent panels **17**. intersect at margins **37** which margins are contiguously overlain by an external fabric strip **47**. which is permanently affixed to the external surface **13** of the fabric **11** along both margins of the strip. The external fabric strip **47** is equipped with means of separation **15**. which are illustrated as perforations **25** and for preference equipped with extra-large perforations **27** which act to define and delineate panels **17** such that panel boundaries **37** can be easily identified.

[0097] FIG. **8***d* shows a cross sectional view across A-A1 from FIG. **8***c*. It illustrates adjoining fabric panels **17** which are overlaid on their outer surface **13**, by an external fabric strip **47**, and lined on the inner surface **12**. by an internal web **38**. In the embodiment illustrated, the external fabric strip **47** and internal web **38** are ideally attached through the garment fabric **11** along a single margin. Along the opposing margin, the external fabric strip **47** is only attached to the fabric **11** and not to the internal web **38**, thereby allowing the garment panels **17** to be separated. As previously disclosed. the internal web **38** is preferentially equipped with adhesive **45** means enabling the garment panels **17** to be closed following treatment. Such adhesive re-attachments may be protected, as illustrated. by a protective cover **46**.

[0098] FIG. **8***e* shows an alternative embodiment of the seam element **15** of the garment **10** showing overlapping adjacent garment panels **17** which configuration is advantageous as it minimizes patient heat loss through the perforated **25** section margins **37**.

[0099] In summary, the illustrations and detailed description of the invention provide indications of some modes of construction and are not intended to provide a constraint on the invention. For example, the seam locations indicated in the Figures explore only a few of the potential garment seam configurations. There are also clearly many alternatives for carrying out the reattachment of the garment which may incorporate alternative configurations of adhesive means and methods of enhancing the performance of the adhesive means prior to, during and after garment deployment and these means are considered to be within the scope of the invention. In a similar manner, the selection of fabric type and chemical treatment or finishing of the fabric may vary according to different operational. environmental or patient specific requirements and these variations too are considered within the scope of the invention. Equally, differential chemical or physical treatments may be applied to longitudinal sections of the web or garment fabric in order to create variations in adhesive characteristics or create other configurations which are selected for practical, hygienic or sanitary reasons, without departing from the spirit of the invention.

CLAUSES

[0100] CLAUSE 1: A versatile garment which is a facsimile of normal clothing and which promotes personal well-being, privacy, modesty and euthermia. for use in the hospital environment or as required in the patient-care-giver interaction, which garment beneficially incorporates means for versatile garment deconstruction prior to treatment or monitoring allowing patient access and incorporates means for post-treatment reconstruction of the garment in the post-treatment, diagnostic exam or monitoring environment.

[0101] CLAUSE 2: The garment according to Clause 1 which is equipped with means for the provision of easily removable. segmentable or detachable and re-attachable panels which re-attachable means are non-site specific, thereby conferring superior re-dimensioning and re-configurable properties to the garment. The separable margins of the panels beneficially allow for selective disassembly of the garment. as required

[0102] CLAUSE 3: The garment according to Clause 1 or for use in pre-diagnostic, medical, surgical, therapeutic and/or diagnostic or any other type or modality of intervention as required in the patient-care-giver interaction. whether in the home, during patient transport. outdoors. in the healthcare facility or chronic-health care facility. Use may made in any location for any purpose deemed appropriate and these definitions are not intended to limit the scope or further adaptability of the invention as it becomes utilized.

[0103] CLAUSE 4: The garment according to Clause 1, which promotes a single use clean or sterile application, for use in the hospital environment or in any setting, in or out of a medical facility, as required in the patient-care-giver interaction

[0104] CLAUSE 5: A garment, according to Clause 1, allowing for secure, appropriate and independent coverage of the upper and lower body. The garment may either be wholly

removed or, preferentially, partially disassembled, in order to fulfil modality specific requirements.

[0105] CLAUSE 6: A garment. according to Clause 1. which is compatible with other health-care devices and systems, according to Clause 1 which promotes patient euthermia, which euthermic properties can be augmented through the use of external heat sources.

[0106] CLAUSE 7: A versatile garment. according to Clause 1, which allows access in the abdominal area for colostomy bags or open abdominal wounds; in the perineal area for catheterisation of the urinary system, in the back shoulder. anterior and lateral chest for telemetry and central lines. in the extremities (ventral aspect of wrist. dorsum of hand or foot, ankle, groin or ante-cubital fossa for intravenous, intra-arterial and central line access, or which may be specifically configured to accommodate any other intervention as may be required. Furthermore, the garment configuration is unconstrained, such that diagnostic specific configurations may be fabricated, allowing site or equipment specific treatment, therapeutic or diagnostic procedures to be performed on any part of the body e.g. ultrasound examination of an abscess, Wound-Vac™ management of an open wound. mammography, etc.

[0107] CLAUSE 8: The garment of Clause 1 which is further formed from materials and incorporating fixtures, processes and structures, such that it is not rendered radio-opaque nor provides interference with Magnetic Resonance Imaging or Computer Assisted Tomography or radiography or other diagnostic modalities, or, alternatively, may contain radio opaque panels to protect the reproductive organs.

[0108] CLAUSE 9: The garment of Clause 1 which may be modified through the use of color. pattern or markings enabling rapid patient status identification, enhancing the patient-care-giver process.

1. A garment as a facsimile of normal clothing for use in the hospital environment or as required in the patient-care-giver interaction, which garment comprises means for versatile garment deconstruction prior to treatment or monitoring allowing patient access and incorporates means for post-treatment reconstruction of the garment in a post-treatment, diagnostic exam or monitoring environment.

2. The garment according to claim **1**, equipped with means for the provision of easily removable, segmentable or detachable and re-attachable panels.

3. The garment according to claim **2**, wherein the re-attachable means are non-site specific.

4. The garment according to claim 1, having re-dimensioning and/or re-configurable properties.

5. The garment as claimed in claim **1**, having panels with separable margins allowing selective disassembly of the garment.

6. The garment according to claim **1** adapted for use in pre-diagnostic, medical, surgical, therapeutic and/or diagnostic or any other type or modality of intervention as required in the patient-care-giver interaction. whether in the home, during patient transport, outdoors, in the healthcare facility or chronic-health care facility.

7. The garment as claimed in claim **1**. as a single use clean or sterile garment.

8. The garment, according to claim 1, adapted to be wholly removable and/or partially disassembled during use.

9. The garment. according to claim 1, which is adapted to accommodate health-care devices and systems.

10. The garment according to claim 1, adapted to promote patient euthermia, which euthermic properties can be augmented through the use of external heat sources.

11. The garment according to claim **1**, which is adapted to allow access to the abdominal area of a wearer.

12. The garment according to claim **1**, which is adapted to allow access the perineal area of a wearer.

13. The garment according to claim **1**, which is adapted to allow access to the back shoulder and/or anterior and/or lateral chest for telemetry and central lines.

14. The garment according to claim **1**, adapted for access in the extremities such as ventral aspect of wrist, dorsum of hand or foot. ankle, groin or ante-cubital fossa for intravenous, intra-arterial and central line access.

15. The garment according to claim 1, configured such that the garment configuration is unconstrained, such that diagnostic specific configurations may be fabricated, allowing site or equipment specific treatment, therapeutic or diagnostic procedures to be performed on any part of the body.

16. The garment according to claim **15**, adapted to allow ultrasound examination of an abscess and/or Wound-Vac™ management of an open wound and/or mammography.

17. The garment according to claim 1 which is further formed from materials and incorporating fixtures, processes and structures, such that it is not rendered radio-opaque nor provides interference with Magnetic Resonance Imaging or Computer Assisted Tomography or radiography or other diagnostic modalities.

18. The garment according to claim 1, further comprising radio opaque panels.

19. The garment according to claim 1. further modified through the use of color, pattern or markings enabling rapid patient status identification.

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