(54) Title: PERSON TRANSPORTER FOR EMERGENCY USE

(57) Abstract: A person transporter (1) for emergency use for transporting immobile patients over carpeted areas and the like, the transporter including: a shaped substantially tapered rectangular mat (5) having a lower end (6, 7) sized to fit the legs of a person and an upper end (2) which is broader than the lower end and sized to the body and head of the person; a rear portion of the tapered rectangular mat (5) formed of a material that is strong but has low sliding resistance; and a pulling structure (3) connected to the upper end of the tapered rectangular mat; wherein the pulling structure (3, 4) and the tapered rectangular mat are formed and connected to each other to be sufficiently strong and has low sliding resistance such that the patient can be inserted in the tapered mat and be dragged by the pulling structure with the rear portion sliding along a ground surface.
Person Transporter for Emergency Use

This invention relates to a person transporter for emergency use. It is particularly aimed at transporting invalids from hospitals or nursing homes. It is more particularly aimed at transporting immobile patients over carpeted areas and the like. However it is not limited to these particular uses. It is envisaged that the invention is applicable to many settings; including, for example, aircraft, ships, motor vehicles, schools and hotels and similar accommodation.

Background of the Invention:

The field of use of the invention is primarily hospitals and nursing homes. It is often needed in emergencies to remove immobile people quickly from dangerous situations. There is also a need for such rescue apparatus to be suitable for carpeted areas.

Previously it was standard in hospitals and nursing homes to have all surfaces covered in easy to clean linoleum or other shiny readily cleanable surfaces. Therefore, the idea of dragging a sheet or blanket or other contraption with the patient thereon did not require any particular problems to be overcome. However over time it is now considered that hospitals and nursing homes should not be as cold or forbidding and therefore other surfaces such as carpet are being employed with its sound-damping, warmth and friendliness qualities.

Also over time has been the change of architecture from wide open spaces and doors as needed in a busy casualty hospital to standard domestic structures for long term nursing homes or smaller hospitals. This change in architectural structure improves the cost efficiency of building such facilities but increases the problems with emergency rescue. Large pods such as used in outdoor rescue and used in combination of winches and possibly helicopter lifts cannot be used in the modern facility. Similarly stretchers or the like are not suitable as they require the use of two emergency personnel for each patient and the need to negotiate small doorways and angled hallways.
The major known rescue device for patients in hospitals is designed to remove the patient while still on the mattress. The patient is kept in place by straps, and the apparatus is under the mattress at all times. Not only is this hard to pull, if possible at all by one or two people, it places too much stress and strain on the rescuers, causing danger to their health. It is also a complex task to find the straps from under the bed amongst the sheets and bring these over the patient to secure them and then remove the mattress when time is critical. Also, mattresses do not readily fit through the “average” doorway or hallway now common in nursing homes. Two mattresses can fully block the doorway or hallway by being wedged together and so increasing the dangers in the area being evacuated.

While useful when floors were vinyl, this apparatus is not suitable in many ways for the safety of patients and rescuers in the modern situation. Also due to the complexity this device is only in hospitals leaving nursing homes without any and definitely not suitable emergency transporters.

A number of person transporters for emergency use have been revealed from a search but they are not generally known in Australia.

In US Patent No 5,787,529 there is disclosed a rescue carrier device including a generally pear shaped sheet member. The sheet member is formed of a heat resistant material and adapted for receiving an immobile body. The sheet member has a front side and a back side. The sheet member has a left peripheral edge, a right peripheral edge, a top peripheral edge and a bottom peripheral edge. Also, a pair of support strips is attached to the front side of the sheet member. An elongated securing harness is fixedly attached to the front side of the sheet member in a continuous fashion so as to be adjacent the right peripheral edge and the left peripheral edge. An upper body restraining means is stitchedly attached juxtapose the front side of the sheet member. The upper body restraining means has a first end with a female coupling member and a second end with a male coupling member for coupling with the female coupling member. A pair of short straps is provided forming a left strap and a right strap. The left strap projects angularly outward from the upper body restraining means, the right strap projects angularly outward from the upper body restraining means. Lastly, a waist strap is spaced from the
upper body restraining means and stitchedly attached to the front side of the sheet member.

However this structure requires tight securing of the person in the device by the restraining means. Therefore the apparatus requires substantial force to be applied to the sides of the patient. This might not be suitable for patients of hospitals or elderly care hostels as such force can cause substantial injuries to the person being rescued. It is not practical for a doctor or nurse to be present to assess the patient and advise of correct transport for each patient. Also the rescuer does not have time to assess and might not be suitably qualified. Another major problem is the substantial time needed to fully strap the patient in. Otherwise the patient will slide down and possibly out of the apparatus.

In US Patent No. 5,189,746 there is shown an emergency patient evacuation system, which relates to an apparatus for evacuating persons of decreased mobility from a building, such as a hospital, in the event of emergency. It provides a device for moving a supine person by lifting or sliding. The device comprises an elongated, planar, rigid base portion on which the person lies and a lower surface provided with a layer of carpeting for sliding on a surface, flaps having adjustable straps for securing the person on the base portion, handles attached to each end of the base portion whereby the device may be pulled from either end, and handles attached to both sides of the base portion whereby the device may be lifted from said both sides. This device relies on the planar rigid base and therefore is merely a rigid stretcher with a cover. Such a device is not suitable for dragging as it cannot withstand having the rigid support base at an angle. This device also has the problem like many others of requiring an enveloping of the patient by a substantial number of straps. The time taken to fully encase the patient is too long to be useful in an emergency evacuation procedure and is more suitable to an emergency injury situation such as hiking accident or cliff fall or the like.

US Patent No. 5,978,989 discloses a flexible patient transporter with foot pocket including an oblong PVC fabric sheet having two substantially parallel side edges and two substantially curved end edges. An edge reinforcing web is attached to the sheet
with monofilament stitching so that it extends substantially around all edges of the sheet. A pair of end handles is attached to each of the curved end edges of the sheet and a plurality of side handles attached to the side edges of the sheet. Each of the handles is equally spaced around the perimeter of the sheet and includes a PVC tube with a strap extending through the tube and attached at each end to an edge of said sheet. A loop is attached near an apex of at least one of the end edges, and at least one fastener, is secured to each of the side edges of the sheet, said fasteners being adapted to be releasably secured to at least one of the loops, to thereby form a foot pocket at an end of the sheet, which pocket would prevent a patient from sliding out of the transporter. However the flexible patent transporter of this patent has very detailed reinforcement webbing and therefore would incur huge drag factor if pulled along and particularly over a carpeted surface. This device has the disadvantage that it takes considerable time to adjust the foot pocket to fit patient and this is not available in emergency evacuations.

US Patent No. 4,442,557 shows a carrier apparatus for use by fire fighters to carry fire hose, and to serve as a personnel carrier; a carrier body of flaccid material about five feet long has a bottom and side walls, and at one end there is an end wall, and portions of the side walls adjacent the end wall being perpendicular to the bottom and end wall. Handles and securing straps are provided. A continuous length of fire hose is placed in two side by side stacks, with a connecting portion from one stack to the other; a strap with hook and pile type fastener, such as sold under the trademark Velcro fastener extends around one stack and is released by force applied through the connecting portion of the fire hose. This device has the fundamental problem of the patient able to slide off the mat. As the patient is probably in nightwear and therefore of low resistance it is more inclined to slide off the material. Further if the material of the carrier apparatus is high resistance then such is not suitable for dragging over carpeted areas as is required in modern facilities.

In US Patent No. 5,839,137 discloses roll-up emergency personnel carrier which comprises a tough fabric portion longer than a large human adult and wide enough to be wrapped around such a person. A pouch on the foot end of the device receives the person's feet. A strap adjacent the foot end of the device ties the person's feet together in
an upright position so the feet do not splay apart and snag on an obstruction when the
device is moved. Transverse straps wrap the portion about the individual and, at the head
end of the portion, preferably are crossed to pull the person's shoulders downwardly and
inwardly thereby making the person's shoulders less apt to snag on an obstruction when
the device is pulled along an underlying surface.

US Patent No. 5,333,335 shows a patient support device comprising a flexible support
means, the support means having a pair of ends each of which includes a pair of hand
holds, the hand holds being formed by an aperture which is dimensioned to receive the
palm of a user's hand when lifting a patient and flap means hinged to one edge of the
aperture permitting the flap means to engage the palm of the user's hand when lifting a
patient, each of the hand holds being aligned with a respective hand hold so that, during
use, the flap means may be nested together to form an integral handle with a folded cross
section, the support means being formed of reinforced sheet material having sufficient
rigidity to enable the integral handle to resist collapse, the support means being
dimensioned to position the hand holds above a floor surface in order to minimize
discomfort experienced by a user when lifting a patient.

Finally US Patent No. 4,124,908 discloses a rescue and transportation device constructed
of flexible cloth-like material and including a bottom portion for receiving a victim, the
bottom portion having a head end and a foot end with longitudinally extending first and
second side flaps, the foot end and side flaps being configured for substantially
surrounding the body. The foot end includes reinforcing members and the head end
includes a head restraining device. Reinforcing webbing encircles the body lengthwise
with spaced lateral webbing providing support adjacent the jointed portions of the body,
the webbing when fastened, in conjunction with the head restraining device and foot
supporting end, substantially immobilizing the body to create body rigidity utilizing the
body's own weight and physical characteristics for transporting the victim. Again this
device also has the problem like many others of requiring an enveloping of the patient by
a substantial number of straps. The time taken to fully encase the patient is too long to be
useful in an emergency evacuation procedure and is more suitable to an emergency injury situation such as hiking accident or cliff fall or the like.

Objects of the Invention:

It is therefore an object of the invention to provide an improved person transporter for emergency use, which overcomes or at least ameliorates the problem of the prior art. In particular it is an aim of the invention to provide a person transporter for emergency use by a single user for transporting an immobile patient over carpeted areas and the like.

In accordance with the invention there is provided a person transporter for emergency use able to be used for transporting immobile patients over carpeted areas and the like, the person transporter including:

a shaped substantially tapered rectangular mat having a lower end sized to fit the legs of a person and an upper end which is broader than the lower end and sized to fit the body and head of the person;

a rear portion of the tapered rectangular mat formed of a material that is strong but has low sliding resistance; and

a pulling structure connected to the upper end of the tapered rectangular mat;

wherein the pulling structure and the tapered rectangular mat are formed and connected to each other to be sufficiently strong and at least the rear portion of the tapered rectangular mat is formed of a material that is sufficiently strong but has low sliding resistance such that a person can be inserted in the tapered rectangular mat and be dragged by the pulling structure with the rear portion sliding along the ground surface.

The shaped substantially tapered rectangular mat can include a head part being a narrower insert within the upper end for supporting the head of the person. The shaped substantially tapered rectangular mat can further include a substantially cylindrical foot casing with a base located and fixed to the lower end of the shaped substantially tapered rectangular mat and formed to receive the feet of the person in a standing form relative to the legs. The foot casing can include reinforcement. In this way the weight of the person
can be transferred at least to the feet and spine of the person and thereby minimise injury to the person.

The foot casing can also form a container for the shaped substantially tapered rectangular mat in a rolled up form so that it can be readily stored alongside the bed of a patient of a hospital or nursing home.

The structure of the transporter can closely follow the shape of a person except for a wide top of the upper end. The shaping and particularly the narrowing from the upper end to the lower end is sufficient to provide a partial enveloping of the person and thereby form a resistive cocoon of the person such that the reactive force to the dragging force by the rescuer is transferred to a large portion of the person and thereby minimises forces on any one area.

The partial cocooning can be created by connections of the sides at the lower end and top end of the mat; the sides of the lower end of the mat extending partially up around a substantially cylindrical foot casing. The top end has a strap extending between lateral sides of the top end with the strap shorter than the linear length of material between the connection points. In this way the top and bottom of the mat are partially folded over. By the shape of the mat following substantially the shape of the person a natural cocoon occurs. This can be further augmented by straps extending between opposing sides.

The structure can be further enhanced by the material forming the mat being shaped to leave the longitudinal length of the mat, from the connection point of a strap or harness, being the shortest linear length of the mat across its width. In this way this shortest linear length forms a tensile chord from which is suspended the cocooning shape of the mat. This provides the further benefit that this tensile chord can be reinforced to withstand substantially all of the tensile dragging forces.

The pulling structure can include a connection to a harness to be worn by the rescuer for dragging the person in or on the tapered rectangular mat with the connection simply
attaching and detaching. The connection can be a clip structure for ready one handed attachment/detachment. The pulling structure can include a strap extending from opposing sides substantially at or adjacent to the top of the upper end of the tapered rectangular mat. The pulling structure can include a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

The shaped substantially tapered rectangular mat can further include at least two straps extending from opposing sides or ends of the shaped substantially tapered rectangular mat such that two people can lift the person in the shaped substantially tapered rectangular mat for particularly transporting the person up or down stairs.

Handles can be included on opposing laterally spaced top underside of the mat to enable lifting by two persons if required. A further handle is located at the end of the foot casing which can be used with the other two handles or the harness to allow the patient to be readily transported up or down stairs.

The mat may be formed in a multi-layered composite construction. A suitable construction includes a corrugated structure such as corrugated polypropylene board, as is known in the art. Such material and construction adds overall stability to the mat, is hard—wearing on abrasive surfaces and absorbs concussion during travel thus aiding patient comfort. Polypropylene board has suitably low sliding resistance over many types of surface including, but not limited to, carpet, concrete, tiles, timber, gravel and grass. Significantly, the polypropylene board has a heat resistance of 80°C; enabling the mat to be taken safely across fire-affected surfaces.
Also in accordance with the invention there is provided a person transporter for emergency use able to be used for transporting immobile patients over carpeted areas and the like, the person transporter including:

a shaped substantially tubular bag-like structure having a lower end sized to fit the legs of a person and an upper end which is broader than the lower end and sized to fit the body and head of the person;

a rear portion of the tubular bag-like structure formed of a material that is strong but has low sliding resistance; and

a pulling structure connected to the upper end of the tubular bag-like structure;

wherein the pulling structure and the tubular bag-like structure are formed and connected to each other to be sufficiently strong and at least the rear portion of the tubular bag-like structure is formed of a material that is sufficiently strong but has low sliding resistance such that a person can be inserted in the tubular bag-like structure and be dragged by the pulling structure with the rear portion sliding along the ground surface.

The shaped substantially tubular bag-like structure can include a head part being a narrower insert within the upper end for supporting the head. A front portion opposite the standard position of the head within the upper end of the shaped substantially tubular bag-like structure can be porous and possibly translucent allowing the patient ready breathing and possible viewing. The front portion can include a filtering means for filtering out smoke or particulate matter.

The shaped substantially tubular bag-like structure can further include a foot casing at the base of the lower end and formed to receive the feet in a standing form relative to the legs. The foot casing can include reinforcement. In this way the weight of the person can at least be transferred to the feet and spine of the person and thereby minimise injury.

The foot casing can also form a container for the shaped substantially tubular bag-like structure in a rolled up form so that it can be readily stored alongside the bed of a patient of a hospital or nursing home.
In a particular form of the invention, the shaped substantially tubular bag-like structure closely follows the shape of a person except for a wide mouth at the top of the upper end. The shaping and particularly the narrowing from the upper end to the lower end is sufficient to provide resistive cocoon of the person such that the reactive force to the dragging force by the rescuer is transferred to a large portion of the person and thereby minimises forces on any one area.

The pulling structure can include a connection to a harness to be worn by the rescuer for dragging the patient in the tubular bag-like structure with the connection simply attaching and detaching. The connection can be a clip structure for ready one handed attachment/detachment. The pulling structure can include a strap extending from opposing sides of the top or near the top of the upper end of the tubular bag-like structure. The pulling structure can include a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

The shaped substantially tubular bag-like structure can further include at least two straps extending from opposing sides or ends of the shaped substantially tubular bag-like structure such that two people can lift the person in the shaped substantially tubular bag-like structure for particularly transporting the person up or down stairs.

Handles can be included on opposing laterally spaced top underside of the transporter to enable lifting by two persons if required. A further handle is located at the end of the foot casing which can be used with the other two handles or the harness to allow the patient to be readily transported up or down stairs.

As discussed above in relation to the mat; the substantially tubular bag-like structure may be formed in a multi-layered composite construction.
Description of the Drawings:

In order that the invention may be more readily understood, two embodiments will be described, by way of illustration only, with reference to the drawings wherein:

Figure 1 is an upper plan view of person transporter in accordance with a first embodiment of the invention;

Figure 2a is a diagrammatic side view of a person transporter according to the invention in use with handles for carriage by a rescuer;

Figure 2b is a diagrammatic side view of a person transporter according to the invention in use with a harness for a rescuer, illustrating the freedom of use of the hands;

Figure 3 is an upper plan view of a person transporter in accordance with a second embodiment of the invention;

Figure 4 is a lower plan view of the person transporter of Figure 3, illustrating a composite construction of corrugated polypropylene board;

Figure 5 is a side elevation view of the person transporter of Figure 3 rolled and stowed into its case; and

Figure 6 is a front elevation view of Figure 5.

Detailed Description of the Preferred Embodiments:

Referring to Figures 1 and 2, there is shown a person transporter (1) for emergency use able to be used for transporting immobile patients over carpeted areas. The person transporter includes a shaped substantially tapered rectangular mat (2). This is a tapered shape like a drinking glass or beer glass having a lower end sized to fit the legs of a person and an upper end which is broader than the lower end and sized to fit the body and head of the person.

A pulling structure in the form of a strap (3) extends from the outer edges of the upper end of the mat and is securely attached to be sufficiently strong to cope with the dragging strain of a rescuer dragging a person on the mat by the strap. At the connection is an elastic webbing (4) forming part of the strap such that the variations in the drag strain are
dissipated. To facilitate the attachment of a harness (if required), an attachment ring (8) is threaded onto the strap (3).

The entire material of the mat is formed of a material that is strong but low sliding resistance so that there is a rear portion that engages and slides along the ground when in use. That material can be PVC coated, canvas, plastic, tin, vinyl or other metal, Teflon™ or Teflon coating. If desired, the material can be a multi-layered composite. However it is flexible in order to at least partially envelope the person being transported along the sides. To enhance this effect the mat can include side panels. A silicone treatment can be undertaken on the material to further increase its slippery characteristics.

The pulling structure and the tapered rectangular mat are formed and connected to each other to be sufficiently strong and at least the rear portion of the tapered rectangular mat is formed of a material that is sufficiently strong but low sliding resistance such that a person can be placed on the tapered rectangular mat and be dragged by the pulling structure with the rear portion sliding along the ground surface.

Handles (5) can be included on opposing laterally spaced top underside of the mat to enable lifting by two persons if required. A further handle (6) is located at the end of the foot casing (7) which can be used with the other two handles or the harness to allow the patient to be readily transported up and down stairs.

It can be seen that the invention provides an emergency transporter to remove people quickly from dangerous situations. The need for this rescue apparatus is due to the technology of carpet in hospitals and nursing homes for patient comfort. The idea of the emergency transporter is to minimise structure and costs so that every bed is equipped with a unit. The transporter is a shaped mat of "easy slip" material to enable it to be pulled easily along carpet or similar surfaces and it envelops the patient securely. It is pulled along the floor with the patient lying on their back. The "pulling strap" at the end of the emergency transporter lifts the patient’s head off the ground and gathers the top of the mat to support the head. The foot end is sewn into a casing for the feet to sit in to
ensure the patient does not move off the mat. The rescuer wears a harness (9) that attaches to the attachment ring (8) by a spring-clip (10) to enable the patient to be dragged on the mat quickly and easily to maintain them free from harm. This also allows the rescuer’s hands to be free to open doors and to crawl if necessary.

In use when a hazard such as a fire or gas leak occurs, the correct procedure for alerting authorities should be followed. Once this is achieved, evacuation may begin. The rescuer can fit the harness to their person while walking to the affected area. When the rescuer is in the room, he or she will remove the emergency transporter from a wall mount located beside a patient’s bed and, using the handle by which it is held to the mount, step two paces backwards while undoing the Velcro™ strap that is around the casing. The emergency transporter is then thrown while still holding onto it with the handle so that it will unroll from the casing beside the bed on the floor. The patient is moved from the bed onto the emergency transporter. The patient’s feet are located in the casing (they should slip in there automatically). The rescuer then attaches the emergency transporter to the back of the harness and turns to the exit with the patient following head first in the emergency transporter. Once the patient is at a safe location, the rescuer unattaches the emergency transporter and goes back to rescue more. The rescued patient is left on the mat, for protection from road/footpath surfaces etc and also in case they need to be moved quickly once more. If stairs need to be negotiated, using the carry straps at either end, two rescuers can lift and carry the patient up or down the stairs whereupon one rescuer can continue with transporting the patient out of the affected area.

Referring to Figures 3 to 6, there is shown an alternative embodiment of a person transporter (101) incorporating a panel of corrugated polypropylene board and having variations of the pulling and lifting structure and incorporating restraining straps.

The manufacture of the mat is much the same as the above described embodiment but with the addition of the extra straps. These are assembled and attached to the mat as follows:
During the assembly of the main mat, 2 square cm of Velcro™ (102, 102a, 103, 103a) are stitched on the edge of the mat as the tabs which hold the body straps (104, 104a, 105, 105a) in place when not in use. There are four of these. Body straps have Velcro™ (106, 106a) sewn on the webbing and are then sewn on to the mat in the correct position. They are reinforced with extra material under the initial connection when being sewn onto the mat for added strength.

Handles (107, 108) are pre-cut to required lengths and then assembled and positioned on the mat. As they overlap in their positions (at the corner of the mat on either side) they are sewn in the one process with the other end of the side handles (which are positioned parallel to edge of mat) being sewn in position last.

The corrugated polypropylene board (109) is the final assembly required. The polypropylene board is pre cut to size of 300mm wide by 1950mm long with its flutes running across-wise (the correct way to be creased for product design). The board is creased (110) every 20mm to allow it to roll with the mat for storage. The board is centred on the mat and stitched (111) onto the mat around the perimeter of the polypropylene board.

The various pulling straps are available to the rescuer ensuring their safety at all times. All are positioned at the head end of the patient and allow for one or two rescuers to assist in the evacuation of the patient. The options are listed below:

A two metre plain webbing strap (112, 112a) is sewn either side of the mat which creates a cocooning effect/support for the patient’s head. This can be used by tall people who can lift the patients head and shoulders slightly off the ground while travelling or for shorter people who want to pull away from patient so that the patient is entirely on the ground. It also allows for enough leverage if two people are required to perform the evacuation.
There is also a strap (113) that is just the width of the mat which acts in the same way as the two metre strap only is more aimed at the shorter rescuer who can then lift the patient's head and shoulders off the ground and perform the evacuation with minimum strain on the rescuer's body.

The handles (107, 108) either side of the mat that are parallel to the mat are positioned on the edge of mat and enable a lift of the patient while on the mat (using the handle (114) at the foot end with a person each end). The handles support the head and shoulders while the rigidity of the polypropylene board prevents sagging of the patient's body; so a lift down stairs or the like is possible. These handles are also very beneficial (and recommended) if two people are performing the evacuation of the one patient. One rescuer on either side of the patient prevents any tangling up of the rescuers and allows for head and shoulders to be lifted off the ground. Each rescuer has a hand free and is not straining their body.

In this embodiment the harness and attachment have been eliminated. In this case, the plain webbing straps (in a fluorescent yellow) have been found to be easier for the rescuer to manoeuvre the patient when on the mat.

The two straps (104, 104a and 105, 105a) have been sewn into the design at approx chest and knee positions when a patient is on the mat. This is an added safety benefit in the instance of panicky patients as they are literally strapped onto the mat. The straps are sewn parallel in line with the edge of the mat and are held in place with Velcro\textsuperscript{TM} tabs (102, 102a, 103, 103a). This ensures ready availability of the straps in comparison to straps that are positioned horizontal across the mat as a patient may be lying on the straps, which makes it extremely hard to access them. The straps connect from side to side and are fasted by Velcro\textsuperscript{TM} (106, 106a). The length of the strap and Velcro\textsuperscript{TM} and positioning of straps ensures a strong bond making it difficult for the patient to undo themselves.
As with the other embodiment, described hereinabove, the person transporter (101) has an integrated case (115) into which the mat is rolled for storage and which serves as the foot casing. When the mat is rolled into the case, it is held in place by a strap (116) and Velcro™ tabs (117, 117a).

It should be understood that the above description is of preferred embodiments and is provided by way of illustration only and by no means is limiting of the scope of the invention. Clearly a person skilled in the art will understand the invention and without any inventiveness understand possible variations. These are included within the scope of the invention.
Claims:

I CLAIM:

1. A person transporter for emergency use able to be used for transporting immobile patients over carpeted areas and the like, the person transporter including:
   a shaped substantially tapered rectangular mat having a lower end sized to fit the legs of a person and an upper end which is broader than the lower end and sized to fit the body and head of the person;
   a rear portion of the tapered rectangular mat formed of a material that is strong but has low sliding resistance; and
   a pulling structure connected to the upper end of the tapered rectangular mat;
   wherein the pulling structure and the tapered rectangular mat are formed and connected to each other to be sufficiently strong and at least the rear portion of the tapered rectangular mat is formed of a material that is sufficiently strong but has low sliding resistance such that a person can be inserted in the tapered rectangular mat and be dragged by the pulling structure with the rear portion sliding along the ground surface.

2. A person transporter according to claim 1, in which the substantially tapered rectangular mat includes a head part being a narrower insert within the upper end for supporting the head of the person.

3. A person transporter according to claim 2, including a substantially cylindrical foot casing with a base located and fixed to the lower end of the shaped substantially tapered rectangular mat and formed to receive the feet of the person in a standing form relative to the legs.

4. A person transporter according to claim 3, in which the foot casing includes reinforcement such that the weight of the person is transferred at least to the feet and spine of the person, thereby minimising injury to the person.
5. A person transporter according to claim 4, in which the foot casing forms a container for the shaped substantially tapered rectangular mat in a rolled up form so that it can be readily stored alongside the bed of a patient of a hospital or nursing home.

6. A person transporter according to claim 5, in which the structure of the transporter closely follows the shape of the person except for a wide top of the upper end and the shaping and particularly the narrowing from the upper end to the lower end is sufficient to provide a partial enveloping of the person and thereby form a resistive cocoon of the person such that the reactive force to the dragging force by the rescuer is transferred to a large portion of the person and thereby minimises forces on any one area.

7. A person transporter according to claim 6, in which the cocoon is substantially created by connections of the sides at the lower end and top end of the mat, the sides of the lower end of the mat extending partially up around a substantially cylindrical foot casing and the top end having a strap extending between lateral sides of the top end with the strap shorter than the linear length of material between the connection points, such that the top and bottom of the mat are partially folded over and by the shape of the mat following substantially the shape of the person a natural cocoon occurs.

8. A person transporter according to claim 7, including straps extending between opposing sides.

9. A person transporter according to claim 8, in which the material forming the mat is shaped to leave the longitudinal length of the mat, from the connection point of a strap or harness, being the shortest linear length of the mat across its width such that the shortest linear length forms a tensile chord from which is suspended the cocooning shape of the mat.

10. A person transporter according to claim 9, in which the tensile chord is reinforced to withstand substantially all of the tensile dragging forces.
11. A person transporter according to claim 10, in which the pulling structure includes a detachable connection to a harness to be worn by the rescuer for dragging the person in or on the tapered rectangular mat.

12. A person transporter according to claim 11, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

13. A person transporter according to claim 10, in which the pulling structure includes a strap extending from opposing sides substantially at or adjacent to the top of the upper end of the tapered rectangular mat.

14. A person transporter according to claim 13, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

15. A person transporter according to claim 11 or claim 13, including at least two straps extending from opposing sides or ends of the shaped substantially tapered rectangular mat such that two people can lift the person in the shaped substantially tapered rectangular mat for particularly transporting the person up or down stairs.

16. A person transporter according to claim 15, including handles on opposing laterally spaced top underside of the mat to enable lifting by more than one person.

17. A person transporter according to claim 16, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.

18. A person transporter according to claim 15, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.
19. A person transporter according to claim 1, in which the mat is formed in a multi-layered composite construction.

20. A person transporter according to claim 19, in which the multi-layered composite construction includes a corrugated structure.

21. A person transporter according to claim 20, in which the corrugated structure includes corrugated polypropylene board.

22. A person transporter according to claim 21, in which the substantially tapered rectangular mat includes a head part being a narrower insert within the upper end for supporting the head of the person.

23. A person transporter according to claim 22 including a substantially cylindrical foot casing with a base located and fixed to the lower end of the shaped substantially tapered rectangular mat and formed to receive the feet of the person in a standing form relative to the legs.

24. A person transporter according to claim 23, in which the foot casing includes reinforcement such that the weight of the person is transferred at least to the feet and spine of the person, thereby minimising injury to the person.

25. A person transporter according to claim 24, in which the foot casing forms a container for the shaped substantially tapered rectangular mat in a rolled up form so that it can be readily stored alongside the bed of a patient of a hospital or nursing home.

26. A person transporter according to claim 25, in which the structure of the transporter closely follows the shape of the person except for a wide top of the upper end and the shaping and particularly the narrowing from the upper end to the lower end is sufficient to provide a partial enveloping of the person and thereby form a resistive
cocoon of the person such that the reactive force to the dragging force by the rescuer is transferred to a large portion of the person and thereby minimises forces on any one area.

27. A person transporter according to claim 26, in which the cocoon is substantially created by connections of the sides at the lower end and top end of the mat, the sides of the lower end of the mat extending partially up around a substantially cylindrical foot casing and the top end having a strap extending between lateral sides of the top end with the strap shorter than the linear length of material between the connection points, such that the top and bottom of the mat are partially folded over and by the shape of the mat following substantially the shape of the person a natural cocoon occurs.

28. A person transporter according to claim 27, including straps extending between opposing sides.

29. A person transporter according to claim 28, in which the material forming the mat is shaped to leave the longitudinal length of the mat, from the connection point of a strap or harness, being the shortest linear length of the mat across its width such that the shortest linear length forms a tensile chord from which is suspended the cocooning shape of the mat.

30. A person transporter according to claim 29, in which the tensile chord is reinforced to withstand substantially all of the tensile dragging forces.

31. A person transporter according to claim 30, in which the pulling structure includes a detachable connection to a harness to be worn by the rescuer for dragging the person in or on the tapered rectangular mat.

32. A person transporter according to claim 31, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.
33. A person transporter according to claim 30, in which the pulling structure includes a strap extending from opposing sides substantially at or adjacent to the top of the upper end of the tapered rectangular mat.

34. A person transporter according to claim 33, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

35. A person transporter according to claim 31 or claim 33, including at least two straps extending from opposing sides or ends of the shaped substantially tapered rectangular mat such that two people can lift the person in the shaped substantially tapered rectangular mat for particularly transporting the person up or down stairs.

36. A person transporter according to claim 35, including handles on opposing laterally spaced top underside of the mat to enable lifting by more than one person.

37. A person transporter according to claim 36, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.

38. A person transporter according to claim 35, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.

39. A person transporter for emergency use able to be used for transporting immobile patients over carpeted areas and the like, the person transporter including:

   a shaped substantially tubular bag-like structure having a lower end sized to fit the legs of a person and an upper end which is broader than the lower end and sized to fit the body and head of the person;

   a rear portion of the tubular bag-like structure formed of a material that is strong but has low sliding resistance; and
a pulling structure connected to the upper end of the tubular bag-like structure; wherein the pulling structure and the tubular bag-like structure are formed and connected to each other to be sufficiently strong and at least the rear portion of the tubular bag-like structure is formed of a material that is sufficiently strong but has low sliding resistance such that a person can be inserted in the tubular bag-like structure and be dragged by the pulling structure with the rear portion sliding along the ground surface.

40. A person transporter according to claim 39, in which the shaped substantially tubular bag-like structure includes a head part being a narrower insert within the upper end for supporting the head of the person.

41. A person transporter according to claim 40, in which a front portion opposite the standard position of the head within the upper end of the shaped substantially tubular bag-like structure is porous and/or translucent allowing the patient ready breathing and possible viewing.

42. A person transporter according to claim 41, in which the front portion includes a filtering means for filtering out smoke or particulate matter.

43. A person transporter according to claim 40, including a substantially cylindrical foot casing with a base located and fixed to the lower end of the shaped tubular bag-like structure and formed to receive the feet of the person in a standing form relative to the legs.

44. A person transporter according to claim 43, in which the foot casing includes reinforcement such that the weight of the person is transferred at least to the feet and spine of the person, thereby minimising injury to the person.

45. A person transporter according to claim 44, in which the foot casing forms a container for the shaped tubular bag-like structure in a rolled up form so that it can be readily stored alongside the bed of a patient of a hospital or nursing home.
46. A person transporter according to claim 45, in which the shaped substantially tubular bag-like structure closely follows the shape of the person except for a wide mouth at the top of the upper end and the shaping and particularly the narrowing from the upper end to the lower end is sufficient to provide a resistive cocoon of the person such that the reactive force to the dragging force by the rescuer is transferred to a large portion of the person and thereby minimises forces on any one area.

47. A person transporter according to claim 46, in which the pulling structure includes a detachable connection to a harness to be worn by the rescuer for dragging the person in or on the tapered rectangular mat.

48. A person transporter according to claim 47, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

49. A person transporter according to claim 46, in which the pulling structure includes a strap extending from opposing sides substantially at or adjacent to the top of the upper end of the shaped substantially tube-like structure.

50. A person transporter according to claim 49, in which the pulling structure includes a resilient or elastic element such that the variations in the dragging force are partially softened to provide a smoother passage for the person being transported.

51. A person transporter according to claim 47 or claim 49, including at least two straps extending from opposing sides or ends of the shaped substantially tube-like structure such that two people can lift the person in the shaped substantially tube-like structure for particularly transporting the person up or down stairs.

52. A person transporter according to claim 51, including handles on opposing laterally spaced top underside of the mat to enable lifting by more than one person.
53. A person transporter according to claim 52, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.

54. A person transporter according to claim 51, including a handle located at the end of the foot casing which can be used to allow the person to be readily transported up or down stairs.

55. A person transporter according to claim 39, in which the tubular bag-like structure is formed in a multi-layered composite construction.

56. A person transporter according to claim 55, in which the multi-layered composite construction includes a corrugated structure.

57. A person transporter according to claim 56, in which the corrugated structure includes corrugated polypropylene board.
Fig. 1
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.?: A61G 1/00, A61G 7/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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

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

DWPI & IPC A61G 1/- and key words: emergency, rescue, transport, person, patient, drag, pull, compact and similar terms.

ESP@CE.NET & key words: emergency, rescue, device and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No.</th>
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<td>Claims 1 &amp; 39 at least</td>
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* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
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  "P" document published prior to the international filing date but later than the priority date claimed
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  "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search
14 January 2004

Date of mailing of the international search report
20 JAN 2004

Name and mailing address of the ISA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pat@ipaustria.gov.au
Facsimile No. (02) 6285 3929

Authorized officer
AMOD PRADHAN
Telephone No: (02) 6283 2510

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