

GARMENT FOR STORING AND/OR CARRYING ITEMS

Field of the Invention

The present invention relates to a garment for storing and carrying items on a wearer's body. The invention particularly relates to a garment for storing and carrying items, such as tools and equipment required to carry out a specific occupation or activity, where the stored items need to be accessed and replaced quickly and easily.

Background of the Invention

In certain occupations and activities, a number of portable items are required in order to carry out the occupation or activity. It can be convenient or even necessary to carry those items on or about the user's person, so that they are readily available when required. Examples of such occupations are law enforcement, the military, tradesmen, firemen, ambulance officers, emergency rescue personnel, etc. While the following discussion will focus on the equipment used by police officers, it will be readily apparent that similar considerations apply to other occupations.

In the case of law enforcement, police officers regularly use a number of "tools of the trade", such as handcuffs, pistol, expandable baton, non-lethal chemical sprays for crowd control such as OC (oleoresin capsicum) or CS spray, rubber gloves, mask and radio handset. Traditionally, many or most of these items are carried on a belt around the waist of the police officer. Such an arrangement is disadvantageous in that it can be impractical to have so many items depending from a single belt: each item is supported only over a limited area, meaning there can be significant instability and movement of each item and a significant strain placed on the belt and on the body of the wearer. Moreover, the means of securing each item to the belt, such as by a belt keeper or an accoutrement pouch complete within press-stud retained covering flap, does not allow the ready accessibility and removal of items by the wearer. This can be especially

problematic where, for example, the police officer is in the process of making an arrest and needs to quickly access his or her handcuffs, possibly with only one free hand if the other hand is restraining the suspect.

Other items regularly used by a police officer may be carried in a pocket of the officer's uniform. However, the material and/or design of the pocket and/or the type of closure used to close the pocket (e.g. buttons, zips) again can often prevent the ready accessibility of the items therein.

There is accordingly a need for a means to store and carry one or more items on the body of a wearer but which does not suffer from the above disadvantages. It is therefore an object of the present invention to provide a garment for storing and/or carrying one or more items which overcomes, or at least alleviates, one or more disadvantages of the prior art.

Summary of the Invention

According to the present invention, there is provided:

- a garment for storing and/or carrying one or more items, including
- a torso receiving portion for wearing on at least part of a wearer's torso;
- and
- one or more receptacles for receiving said item/s, the or each receptacle being at least partially comprised of a semi-rigid polymeric material, the or each receptacle being integrated with said torso receiving portion.

Detailed Description of the Invention

The following discussion will largely focus on the invention as applied to storing and/or carrying items used in law enforcement. However, it is to be clearly understood that the invention is not limited to that application.

Typically the or each receptacle is constructed at least partially from a laminate comprising at least said semi-rigid polymeric material and a flexible material.

The torso receiving portion may also include a laminate of at least said semi-rigid material and a flexible material. The semi-rigid laminate may also include other materials or components imparting desirable properties. For example, the laminate may include armouring materials such as steel mesh or Kevlar in order to impart stab or slash resistance to the garment. Also, the semi-rigid laminate may include fire resistant materials. Further, the semi-rigid laminate may include cooling tubes therein to assist in regulating body temperature of the wearer.

The torso receiving portion typically comprises the major component of the garment for covering a predetermined amount of the wearer's torso. It is typically shaped to substantially conform to at least part of the wearer's torso. It may comprise a plurality of panels joined together, such as by stitching, welding, lamination or other bonding methods, or it may comprise a unitary piece. The respective panels may comprise the same or different materials. Where the panels are of different materials, they preferably include a panel or panels of material including a semi-rigid material and panel or panels of a flexible material. The panel or panels including a semi-rigid material may comprise a laminate of a semi-rigid material and a flexible material.

The flexible material is typically one or more synthetic fabrics having the desired properties commensurate with the intended end use of the garment. Such properties may include, light weight, water resistance, UV resistance, and good mechanical properties. Preferably the flexible material is synthetic, although natural materials such as cotton can be used in some embodiments. Suitable synthetic materials include nylon and polyester containing materials. Other flexible materials include aramids, such as that sold under the trade name of NOMEX. The flexible material may advantageously include two or more layers of fabric, possibly laminated together. In one embodiment, the flexible material is a laminate of nylon and polyester, for example, a laminate of 200 denier nylon and 600 denier polyester cloth. In some embodiments, the flexible material can have a mesh construction. A preferred flexible material is nylon or polyester, preferably woven or knitted nylon or polyester. More preferably, the flexible

material is a knitted nylon, such as that sold by DuPont under the trademark CORDURA®.

The torso receiving portion of the garment typically includes a front region, for at least partially covering the front of the wearer's torso, a back region, for at least partially covering the back of the wearer's torso, two lateral regions, and at least one shoulder region for extending over and being supported by the wearer's shoulders. The torso receiving portion also includes an inner surface for facing the wearer's body and an outer surface. The torso receiving portion also typically includes a fastenable opening which allows the garment to be donned or removed. Preferably the fastenable opening is located in the front region of the garment, for ease of operation. Preferably the opening is fastenable by means of a fastener preferably a zip. More preferably the fastener is adjustable to allow for different thicknesses of clothing underneath. An example of an adjustable fastener is a double zip.

Preferably the torso receiving portion includes two lateral holes through which the wearer's arms may pass. The arm holes are preferably shaped and sized to allow substantially unobstructed movement of the wearer's arms during walking and running. Moreover, preferably the length of the garment is such that when worn, the lower edge of the garment is no lower than the wearer's waist to thereby facilitate unobstructed movement of the wearer's torso during use.

The garment of the invention also includes one or more receptacles for receiving the items for storage and/or carriage. Each receptacle is at least partially constructed from a semi-rigid polymeric material, and is integrated with the torso receiving portion of the garment.

The or each receptacle typically takes the form of a pocket or holder. Each receptacle extends from the outer surface of the torso receiving portion. The receptacle includes at least one outer wall, and may also include an inner wall. Each receptacle has an opening for receiving the item. At least part of the

material of each receptacle is a semi-rigid polymeric material. Typically, at least part of the outer wall of each receptacle comprises the semi-rigid polymeric material. Preferably the semi-rigid material is moulded or formed into a three dimensional shape. The use of a semi-rigid material gives the outer wall of each receptacle sufficient rigidity to define and maintain the shape of the receptacle, but sufficient flexibility to enable adequate deformation when removing or replacing the corresponding item in the receptacle.

The receptacle may also include a closure for the opening. The closure also preferably includes a formed semi-rigid material.

Where a receptacle includes an inner wall, it may simply comprise part of the underlying torso receiving portion of the garment. However, in other embodiments, the inner wall may be distinct from the torso receiving portion. The inner wall may simply comprise a flexible material. However, some receptacles may advantageously also comprise, at least partially, a semi-rigid material.

In some embodiments, the inner wall at least partially comprises a vented material, such as a mesh, in order to enhance air circulation between the garment and the wearer's body.

The inner wall may advantageously be in a contrasting colour such that it is clearly evident to the wearer when a receptacle is open.

Preferably, the shape of each receptacle complements the shape of the item which it is designed to hold. This, together with the semi-rigid nature of at least part of the outer wall can prevent or minimise excess movement of the item in its receptacle.

The or each receptacle is integrated with the torso receiving portion. This may mean the attachment of the material of the receptacle to or within the material of the torso receiving portion. Such attachment may be by way of stitching, adhesive bonding, or lamination. Alternatively, or in addition, the integration of the or each receptacle with the torso receiving portion is by way of integral forming or moulding. In this method, at least part of the receptacles are formed or moulded together with at least part of the torso receiving portion into one or more integral pieces.

The semi-rigid material is preferably based on a synthetic polymer. More preferably, the semi-rigid material is based on a foamed (expanded) plastic material due to the typical low density and light weight of such materials. More preferably, the semi-rigid material is based on a polyolefin foam, such as a polyethylene foam, or an ethylene vinyl acetate (EVA) foam. A particularly preferred semi-rigid material includes EVA foam. EVA foam exhibits many desirable properties suitable for the present invention, including good weather and chemical resistance, low water absorption, good mechanical properties, excellent thermo and press forming characteristics, softness, resilience, and importantly, strong shape recovery after compression. More preferably, the EVA foam is compressed EVA foam, which is typically formed by applying pressure to the foam during the application of heat. During the compression process, the EVA foam can be formed or moulded into a desired shape. By varying the foam thickness, temperatures and/or pressure, the density and mechanical properties of the resulting moulded EVA foam can be controlled.

The semi-rigid material may comprise a laminate. Where it includes EVA, the semi-rigid laminate preferably includes at least a first layer of fabric bonded to a first side of the EVA layer. Preferably, the semi-rigid laminate of the receptacle includes an outer layer of flexible material. Where the torso-receiving portion of the garment includes one or more panels of flexible material, or of a flexible material laminate, the outer layer of the semi-rigid laminate preferably

corresponds to that flexible material, or to the outer layer of the flexible material laminate, in order to give an overall consistent, and unitary appearance to the garment. Preferably the outer layer of fabric has inherent protective qualities. An example of a suitable material for the first layer is woven or knitted nylon, preferably knitted nylon such as that sold by DuPont under the trade mark CORDURA®.

More preferably, the semi-rigid laminate further includes a second fabric layer bonded to the second side of the EVA layer, thereby producing a three layered structure with a core of EVA. The second fabric layer preferably comprises a liner of the receptacle. Examples of suitable materials for the second fabric layer include polyester, cotton, nylon, polyester cotton and wool. The second fabric layer can advantageously comprise a mesh, such as a nylon mesh, which assists in strengthening the semi-rigid laminate and maintaining its shape.

As previously stated, the many desirable properties of EVA foam include excellent thermo and press-forming characteristics. This enables receptacle walls formed from the EVA foam to be moulded and shaped into three dimensional unitary pieces, which, if desired, conform to the shape of the item to be held in the receptacle. This feature is advantageous because it ensures that each item is securely stored in a desired orientation and can be easily accessed and removed ready for use. It also reduces or eliminates unwanted movement of the item in the receptacle, thus minimising wear and tear on the item and on the garment. Furthermore, it assists the comfort of the wearer.

The above described reduction or absence of unwanted movement of the item stored in the receptacle has another advantage in that, potentially, the receptacle opening does not require a closure. It may be sufficient that the outer and, if present, inner walls of the receptacle hold the item securely in place. However, the receptacle walls by virtue of their semi-rigid nature still have sufficient

flexibility to deform to the requisite extent such as when the wearer's hand is inserted into the receptacle to retrieve the item when required.

Notwithstanding the above, it may still be appropriate to provide a closure on the receptacle opening. The closure may comprise one or more flaps. The closure may be fastenable using conventional fasteners, preferably hook and loop material such as that sold under the trademark VELCRO or a zip. The closure also typically comprises a semi-rigid material. Preferably the closure comprises the same material as that of the outer wall of the receptacle. Accordingly, a preferred material for the closure is EVA foam or an EVA foam laminate.

The receptacles are typically arranged on the front region and may extend to the shoulder region/s of the garment. All the openings of the receptacles are arranged so as to be readily accessed by the wearer's hand/s. Typically, this will mean that the opening of a receptacle located on the upper front region, or on the shoulder region, will have its opening towards its bottom and a receptacle located on the lower front region will have its opening towards its top.

The receptacles for storing certain items may also be located on either the left or right side of the front region, depending on the handedness of the wearer. For example, a right handed police officer when making an arrest is likely to be restraining a suspect with his or her right hand and so would need to access the handcuffs with his/her left hand. Accordingly, it would be convenient to locate the handcuff receptacle on the wearer's right side for ease of access. The same ergonomic considerations apply also to the location of receptacles on a garment to be used in occupations other than law enforcement.

In a preferred embodiment, the garment includes a receptacle intended to store a set of handcuffs. The handcuff receptacle comprises inner and outer walls and an opening. The shape and size of the handcuff receptacle conforms closely to that of a folded pair of handcuffs with the interior dimensions of the receptacle

preferably being only slightly larger than the handcuffs to ensure a snug fit. The receptacle also preferably includes a generally central hub sized and shaped to be received in the central opening of the folded handcuffs. The hub comprises one or more hub elements extending from either or both inner and outer walls. Preferably, a single hub element extends from the inner wall. Preferably the surface of the or each hub element includes a flexible material. The outer wall of the receptacle is preferably at least partially comprised of a semi-rigid material, preferably a formed plastic, more preferably a formed EVA foam. More preferably it is comprised of EVA foam and an elastomeric material. More preferably, the outer wall is formed of at least one panel each of the semi-rigid material and the elastomeric material. More preferably, the receptacle opening is located in the elastomeric material. The elastomeric material is preferably one of the type that is sold under the trade names LYCRA, ELASTANE or SPANDEX. Alternatively, the elastomeric material is of the type sold, for example, under the trade name NEOPRENE.

The receptacle opening is preferably slightly smaller than the largest dimension of the folded handcuffs. However, by virtue of the opening being formed in the elastomeric material, it is able to stretch sufficiently to allow the handcuffs to pass, then return to its original size. The handcuffs are therefore retained in the receptacle by virtue of the combination of the hub, the semi-rigid nature of at least part of the outer wall and the smaller opening.

The small opening to the handcuffs receptacle has a secondary function of ensuring the low visibility of the handcuffs by third parties and therefore reducing the likelihood of unauthorised removal of the handcuffs.

Where the hub comprises a single hub element extending from either the inner or outer wall there is a small distance between the free end of the hub and the opposing wall. Similarly, where the hub comprises two or more hub elements extending from both the inner and outer walls, there is a small distance between

the free ends of the hub elements. The distance is typically less than the thickness of the folded handcuffs. The interior of the hub element/s is preferably filled with a resilient material, such as a silicone gel. The silicone gel is preferably laminated on one side to the flexible material of the hub surface and on the other side to a backing layer of semi-rigid material. The hub is therefore sufficiently resiliently deformable to allow the thickness of the folded handcuffs to be forced past it.

In one form of the invention, the inner wall of the handcuffs receptacle comprises a laminate of flexible material, such as nylon, and semi-rigid material, such as EVA foam in the area surrounding the hub.

The handcuffs receptacle may be located on the lower front region of the garment, with the opening of the handcuffs receptacle located towards or at its top.

The garment typically includes more than one receptacle. Other items which may be stored in the receptacles include an expandable baton, non lethal chemical spray, first aid items (e.g. rubber gloves and masks), radio handset, journal, mobile phone as well as miscellaneous personal items.

The receptacles intended for storing the expandable baton and chemical spray, are also preferably shaped and sized to complement the shape and size of the respective items, and are therefore typically generally elongate. Furthermore, each receptacle is preferably located and orientated on the garment in such a manner as to maximise accessibility and to ensure that, when accessed, the item is in a ready-to-use orientation. Preferably the outer wall of the receptacles include a semi-rigid material, preferably including EVA foam. The receptacles are preferably located on the upper front section of the garment. Preferably the longitudinal axis of each receptacle is orientated at an oblique angle to the median line of the torso when worn. More preferably, the lower end of each

receptacle is located closer to the median line of the torso than the upper end. More preferably, the opening of each receptacle is located at or towards the lower end thereof. It has been found that such location and orientation enables smooth and rapid removal and deployment of these items in a downward, cross-draw action without interference from the wall/s of the receptacle.

In a particularly preferred embodiment, at least one of the receptacles located on the upper front section of the garment comprises an outer wall, including formed EVA foam, with integral closure located at or towards its lower end. The closure is preferably also constructed from formed EVA foam. The closure is preferably hinged for outward rotational movement from a closed to an open position. It has been found that an outwardly opening closure allows removal of the item from the receptacle with minimum obstruction. The opening of the receptacle may extend from the lower end of the outer wall of the receptacle a substantial distance towards the upper end, to thereby allow sufficient space to access and remove the item. In this case, the integral closure will need to be correspondingly sufficiently large to cover the opening. The closure may include a fastener. Preferably the fastener comprises a hook and loop fastener.

Preferably each closure includes a release flap or tab which can be gripped by the wearer when opening the closure. The release tabs preferably include symbols in relief which indicate the contents of the respective receptacle. Thus the wearer can receive tactile feedback from the release tabs which can be of assistance in ensuring deployment of the correct item in situations of reduced visibility.

The inner surfaces of the receptacles may include gripping means to assist in retaining the item therein. The gripping means may comprise one of a hook or loop material with the other material adhered to the item. Preferably the hook or loop material, if present, is laminated to an inner surface of the receptacle.

Preferably, the garment also includes a receptacle for holding a first aid kit, containing, for example, rubber gloves and a mask. Such a receptacle advantageously has a similar configuration, orientation and construction as those intended to hold the baton and OC spray.

The garment may also optionally include a receptacle for storing various miscellaneous and/or personal items such as journal, wallet, keys etc. Preferably, such a receptacle is located towards the centre of the front region. However, because the items within the miscellaneous receptacle may not need to be rapidly accessed, its construction need not be in accordance with the invention and it may be of conventional design. Preferably, however, the outer wall of the miscellaneous receptacle has an appearance similar to the rest of the garment. Accordingly it may comprise a panel of semi-rigid laminate or of flexible material similar to those materials used elsewhere on the garment. The miscellaneous receptacle advantageously includes an upwardly facing opening such that the wearer can look down into the open receptacle. Preferably the miscellaneous receptacle conceals the fastenable opening in the front region of the garment.

The garment typically also includes a receptacle for holding a radio handset. Preferably the radio receptacle includes a guide which may simply comprise an open ended holder which receives and holds the radio handset in a desired orientation. Preferably however, the radio receptacle also includes a pocket component depending from the open end of the guide. Preferably the guide is comprised of a semi-rigid material. More preferably it is comprised of the same semi-rigid material as the other above described receptacles. The pocket component may comprise the same material as the guiding support. However, preferably it comprises a flexible material, such as an elasticised webbing. An appropriate material is a 3 dimensional mesh preferably a padded mesh such as one including a foam component so as to protect the radio from damage. The pocket component may be contiguous with the holder, where both are of the

same material, or may be attached thereto such as by stitching or bonding. Preferably the pocket component is substantially freely suspended from the open end of the holder.

The garment of the present invention may advantageously include a number of other features.

Preferably the garment includes a lighting means. The lighting means preferably includes a flexible light mounted to the garment. Preferably the flexible light comprises a flexible arm having a light source provided at one end thereof. The other end of the flexible arm is mounted to the garment. The operation and intensity of the light source is manually controllable by the wearer preferably using one or more switches provided on the flexible light. The one or more switches may be conveniently located near the light source. In a preferred embodiment, the flexible arm is mounted on a shoulder region and extends down towards the upper front region of the garment. The arm may be secured along its length by securing means, such as hook and loop fasteners. Preferably the arm extends from a reinforced aperture in the garment, in order to minimise damage to the garment due to use of the flexible light. The power source for the light is preferably rechargeable and integral with the garment. The power source may be solar, or a rechargeable battery, such as a lithium battery.

The garment may also advantageously include garment illumination means to improve the visibility of the wearer at night time or during periods of poor visibility. Preferably the garment illumination means comprises one or more light emitting members integrally formed with the garment. More preferably, the or each light emitting member comprises a transparent window or tube which transmits and emits light. The light emitting member may comprise a window containing a number of light emitting diodes. The garment illumination means is preferably powered by a rechargeable power source which can conveniently be the same power source as that used to power the lighting means, discussed

above. Operation of the garment illumination means is preferably also controlled by a switch located on the lighting means.

The garment illumination means may alternatively or additionally include areas of reflective material. Preferably these comprise strips of reflective material provided on the back region of the garment. Preferably the garment includes means for covering the reflective areas if desired, such as a flap.

The garment of the invention may include ventilation means to allow air to circulate between the garment and the wearer's body. The ventilation means typically comprises openings in the torso receiving portion. The openings preferably comprise vents provided in the flexible material of the torso receiving portion. The vents may be independently formed in the flexible material, or advantageously may comprise separate panels of integral vent containing material, such as a mesh. The ventilation means are advantageously provided in the areas of the garment which coincide with areas of a user's body subject to high perspiration, for example, around the neck and on the back.

In one form of the invention, the ventilation means further includes micro jet fans embedded into the garment to assist in the circulation of air between the garment and the wearer's body.

The garment of the invention further preferably includes size adjustment means for adjusting the size of the garment to fit the size of the particular wearer's torso. Preferably there are adjustment means provided on each lateral side of the garment. Preferably each adjustment means comprises first and second adjustment members, with the first adjustment member provided on the front region and the second adjustment member provided on the back region of the garment. The first and second adjustment members of each adjustment means are releasably detachable and moveable relative to each other in order to increase or decrease the lateral spacing of the front and back regions.

Preferably the first and second adjustment members of each adjustment means comprise mutually attachable flaps, with a first flap provided on the lower lateral front region and a second flap provided on a corresponding lower lateral back region. The first and second flaps are mutually attachable, preferably by hook and loop fasteners, although other types of fasteners such as buckles or press-studs could also be used. More preferably, at least one of the first and second flaps includes size indicators which indicate the appropriate relative position of the first and second flaps when attached in order to achieve a particular garment size. The size indicators may be printed or embossed on the first and/or second flaps. In a preferred embodiment, the size indicators are welded or hot stamped into the hook or loop fastener region of each second flap.

The garment of the invention may further include anchoring means for securing the garment to a wearer's belt or similar article of clothing. The anchoring means typically comprises one or more adjustable straps extending from the lower end of the garment and connectable to the wearer's belt. The adjustable straps are preferably extendible and retractable, such that when not in use they are retracted above the lower end of the garment. The adjustable straps preferably include an elasticised webbing.

The garment of the invention may optionally additionally include facilities for connecting thereto various devices, such as a pistol holster, taser, hydration pack, radio pack, reflective strips, shoulder epaulettes, GPS pack and emergency beacon. The connection facilities may comprise flaps with hook and loop fasteners, or areas of fabric compatible with hook and loop fasteners. Preferably said areas of compatible fabric are laminated onto the material of the garment.

The garment also preferably includes audio and/or visual recording device/s. Preferably, the recording device is a digital camera. The digital camera is preferably receivable in a front, substantially central location on the garment. A

convenient location is on or within the miscellaneous receptacle, such as within a recess in the receptacle closure.

The inner surface of the garment may be provided with raised areas which distance the inner surface of the garment from the wearer's body, thereby facilitating and enhancing air circulation therebetween. These areas may be padded to enhance the wearer's comfort. Moreover, the raised areas may include impact resistant material to enhance protection of the wearer. The raised areas are preferably located on the shoulder regions and the front region of the inner surface. The raised areas on the shoulder regions are preferably padded and advantageously comprise integral pads containing a cushioning filling, especially a gel, such as a silicone gel. The raised areas on the front region preferably coincide with the breast and rib areas of the wearer's torso. The raised areas are preferably segmented in order to minimise contact between the garment and the wearer's body. The raised areas on the front region are also preferably padded and advantageously include an impact resistant material to provide the wearer with physical protection against injury or assault. An example of such a material is 3 dimensional impact mesh. (3D mesh is raised in profile as opposed to flat and fabric-like in profile.)

Description of the Drawings

The invention will now be described in greater detail with reference to an embodiment illustrated in the accompanying drawings in which:

Figure 1 shows the front of a first embodiment of a garment in accordance with the present invention.

Figure 2 shows the back of the garment in Figure 1.

Figure 3 is a cross-sectional view of the receptacle for holding a pair of handcuffs shown in Figure 1.

Figure 4 is a detailed view of the receptacle for holding a baton shown in Figure 1.

Figure 5 shows the back of the first embodiment of the garment including a hydration pack.

Figure 6 shows the reverse side of front of the first embodiment of the garment.

Figure 7a is a front view of a second embodiment of the garment of the invention.

Figure 7b shows the directions of opening and closing the receptacles of the second embodiment.

Figure 8 is a back view of the second embodiment of the invention.

Figures 9(a) and 9(b) show the unitary moulded pieces used to make the second embodiment.

Figure 10 shows detail of the camera function in the second embodiment.

Turning now to Figures 1 and 2, a garment of the invention comprises a vest 10 which is shown being worn by a wearer 12. The vest 10 includes a torso receiving portion 14 comprising both a semi-rigid material and a generally flexible material. The vest 10 also includes a number of receptacles 16, 18, 20, 22, 24 and 25 which are each at least partially constructed from a semi-rigid material. The semi rigid material includes a compressed EVA foam and is preferably a laminate of compressed EVA foam at least with an outer layer of polyester material. Each of the receptacles 16, 18, 20, 22, 24 and 25 is integrated with the torso receiving portion 14.

The vest 10 includes a front region 26 (shown in Figure 1), for at least partially covering the front of the wearer's 12 torso, a back region 28 (Figure 2) for at least partially covering the back of the wearer's 12 torso, two lateral regions 30, 32 and two shoulder regions 34, 36. The front region 26 of the torso receiving portion 14 also includes a fastenable opening 38 allowing the vest 10 to be donned or removed.

The receptacle 16 is located on the lower front region 26 of the vest 10 and includes an opening 44 near its top. The receptacle 16 is intended to hold a set of handcuffs and accordingly has a shape and size to conform closely to that of a folded set of handcuffs. Figure 3 is a cross sectional view of the handcuffs receptacle 16 taken along the line III-III of Figure 1. The handcuffs receptacle 16 includes an outer wall 40, an inner wall 42 and an opening 44. The outer wall 40 includes a semirigid component 46, comprising a moulded laminate of at least compressed EVA foam and a polyester outer layer, and an elastomeric component 48 comprising an elastomeric material available under the trademark LYCRA. The opening 44 is located in the elastomeric component 48 and is slightly smaller than the largest dimension of the folded handcuffs 50.

The inner wall 42 also comprises a laminate of a layer of flexible material 43 with an underlying layer 45 of EVA foam. The inner wall 42 includes a generally central hub comprising a hub element 52 which is sized and shaped to be received in the central opening of the folded handcuffs 50. The hub element 52 is hollow and filled with silicone gel 54 which has been laminated to the overlying layer 43. The smallest distance between the hub element 52 and the inner surface 56 of the outer wall 40 is less than the thickness of the folded handcuffs 50. However, by virtue of the hub element 52 being filled with silicone gel, the hub element 52 is sufficiently resiliently deformable to allow the folded handcuffs 50 to be forced past it.

In use of the handcuffs receptacle 16, by virtue of the opening 44 being provided in the elastomeric component 48 of the outer wall 40, the opening 44 can be stretched sufficiently to allow the folded handcuffs to pass and the handcuffs are then retained in the receptacle by virtue of the combination of the hub, the semirigid component 46 of the outer wall 40 and the smaller opening 44.

The receptacles 18, 20 and 22 are for holding an expandable baton, OC spray and first aid kit containing rubber gloves/mask, respectively. As the features of each of these receptacles are similar, the following discussion will focus on the baton receptacle 18 and it should be understood that similar features are shared by the receptacles 20 and 22.

As shown in Figure 1, the baton receptacle 18 is generally elongate and is located on the upper front region 26 of the vest 10. The baton receptacle 18 is shaped and sized to complement the shape and size of an expandable baton. It is located and orientated on the vest 10 such that its longitudinal axis is orientated at an oblique angle to the median line X-X of the wearer's torso. The baton receptacle 18 has an upper end 62 and a lower end 64 and the lower end 64 is located closer to the median line X-X than the upper end 62.

Figure 4 shows a perspective view of the baton receptacle 18 holding a baton 58, of which only the handle is visible. It includes an outer wall 60 made from formed compressed EVA foam laminated on its outer surface with polyester. The baton receptacle 18 is integrated with the torso receiving section 14 by being integrally formed therewith during the moulding process. An arched opening 66 extends from the lower end 64 a substantial distance towards the upper end 62, to thereby allow sufficient space to access and remove the baton. The baton receptacle further includes a formed closure 68 which is shaped and sized to cover the opening 66. The closure 68 is hinged to the lower end 64 for outward rotational movement from a closed position (shown in Figure 1) to an open

position (shown in Figure 4). The closure 68 further includes a hook and loop fastener 70 for retaining the closure 68 in its closed position.

The vest 10 further includes a receptacle 24 for holding a radio handset 72. The radio receptacle 24 includes a guiding support comprising an open ended holder 74 made from moulded, compressed EVA foam laminated with polyester which is integrated with the torso receiving section 14 by being integrally formed therewith during the moulding process. The receptacle 24 further includes a pocket component 76 suspended from the lower end of the open ended holder 74. The pocket component 76 comprises an elasticised mesh. The receptacle 24 further includes a flap closure 78 which is fastenable by a hook and loop fastener (not shown).

The vest 10 also includes a lighting means including a flexible light 80 comprising a flexible arm 82 mounted at one end thereof on a shoulder region 36 and having a light source 84 at the other end thereof extending down towards the upper front region 26 of the vest 10. The flexible light 80 includes a manual controller (not shown) to enable the wearer to control the operation and intensity of the light source 84. The flexible arm 82 is secured along its length by a securing means comprising a flexible strap 86 secured to the torso receiving section 14 by a hook and loop fastener. The lighting means also includes a rechargeable power source 86 which is integrally formed with the vest 10 and comprises a rechargeable lithium battery.

A further feature of the vest 10 is a garment illumination means comprising a light emitting member 88 located on the back region 28. The light emitting member 88 is an integral transparent polymeric window having a flexible PCB therein with a bank of LED lights mounted on its surface. It is also powered by the rechargeable power source 86, being connected thereto by an embedded flexible printed circuit board 87 having strain relief means 89 therein to avoid strain induced damage thereto.

The vest 10 further includes ventilation means comprising panels of integral vent containing material, such as a mesh, 90a, 90b, 90c, 90d and 90e, provided in the torso receiving section 14. The panels of integral vent containing material are located in areas of the vest 10 which correspond to areas of the wearer's body subject to high perspiration, for example, as shown in Figures 1 and 2, panels 90a and b are located about the wearer's neck and panels 90c,d and e are located on the wearer's back.

The vest 10 additionally includes size adjustment means 92 provided on each lateral region 30, 32. Each size adjustment means comprises releasably attachable first and second adjustment members comprising mutually attachable flaps 94, 96. The flaps 94, 96 are attachable by hook and loop fasteners, with the hook component provided on flaps 94 and the loop component provided on the flaps 96. The flaps 96 further include size indicators shown generally at reference numeral 98. The size indicators 98 comprise spaced size lines 100 and associated wearer's chest dimensions embossed into the flaps 96 that outline the relative positions of the respective flap 94 required to achieve particular sizes of the vest 10. The size indicators are provided on the lowermost of the attached flaps 94, 96 in such a location that the particular size line 100 corresponding to the wearer's chest size is visible when the two flaps 94, 96 are attached.

A further feature of the vest 10 is anchoring means comprising two adjustable straps 102, for securing the vest 10 to the wearer's belt 104. Figure 6 shows the adjustable straps 102 in greater detail. They each comprise a retractable component 106 attached to the lower edge of the vest 10 and a connecting component 108 for attachment to the wearer's belt 104. Each retractable component 106 and its corresponding connecting component 108 are mutually attachable by a hook and loop attachment means indicated by 110 a and b. Each retractable component 106 includes an elasticised portion 112 which functions to retract the retractable component 106 above the lower edge of the vest 10 when not in use.

Figure 5 shows a modified version of the vest 10 which includes a hydration pack 112 for attachment to the back region 28. The hydration pack 112 includes a fluid conduit 114 which extends over the shoulder region 34 for access by the wearer's mouth. The hydration pack 112 is attached to the vest 10 by means of hook and loop fasteners and to this end the vest 10 includes attachment tabs 116a, 116b and 116c having a hook component thereon for attachment to loop material on the hydration pack 112.

Figure 6 shows the reverse side of the front of the vest 10. A number of raised, padded areas 120 a, b, c and d and 122a, b and c are provided on the inner surface 118 of the vest 10 in order to distance the inner surface 118 from the wearer's body, thereby facilitating and enhancing air circulation therebetween. The raised areas 122a, 122b and 122c on the shoulder regions 34, 36 comprise integral pads containing a cushioning silicone gel filling which enhances the wearer's comfort. The raised areas 120 a, b, c and d are set out in a segmented pattern coinciding with the breast and rib areas of the wearer's torso. These are also padded and further include an impact resistant material comprising 3 dimensional impact mesh, thereby enhancing both the comfort and physical protection of the wearer.

A second embodiment of the invention is illustrated in Figures 7a and b and 8. In these drawings, like reference numerals refer to like parts of the first embodiment, such that each reference numeral in Figures 7 and 8 is 200 higher than its corresponding reference numeral in Figures 1 to 6. The following discussion will largely focus on those aspects of the second embodiment which differ from those of the first embodiment.

The vest 210 includes a torso receiving portion 214 and a number of receptacles 216, 218, 220, 222 and 224. The torso receiving portion 214 includes moulded, semi-rigid panels 215a, 215b and 215c, as well as flexible panels of mesh material 290a, 290b, 290c, 290d and 290e. The semi-rigid panels 215a, 215b

and 215c comprise a formed laminate of EVA foam and a nylon material available under the trade mark of CORDURA®. For ease of manufacture, the semi-rigid panel 215a is moulded together with at least part of the receptacles 216, 220 and 222 and the semi-rigid panel 215b is moulded together with at least part of the receptacles 218 and 224, such that each semi-rigid panel 215a and 215b and its respective receptacle parts form a unitary, moulded piece. Figures 9a and 9b respectively show each of the unitary moulded pieces 230 and 232 which respectively make up the semi-rigid panels 215a and 215b together with the corresponding receptacle parts.

In Figure 9a, the unitary moulded piece 230 includes the semi-rigid panel 215a together with the outer walls of receptacles 216 and 220. In the case of the outer wall 240 of receptacle 216, the unitary moulded piece 230 also includes an area 216(a) outlined in white which would be cut out and replaced by the elastomeric component 248 during the vest manufacturing process. Similarly, the outer wall of receptacle 220 includes an area 220(a) outlined in white which would be cut out and form part of the opening for the receptacle. The unitary moulded piece 230 also includes the inner wall 348 of central receptacle 225 and a portion 350 for extending over one of the wearer's shoulders.

In Figure 9b, the unitary moulded piece 232 includes the semi-rigid panel 215b together with the outer wall 260 of receptacle 218 and the open ended holder component 274 of the radio receptacle 224. The outer wall 260 of receptacle 218 also includes an area 260(a) outlined in white which would be cut out and form part of the opening of the receptacle 218 during the vest manufacturing process. The unitary moulded piece 232 also includes a portion 352 for extending over the other of the wearer's shoulders. It includes an integral moulded pouch 354 for receiving the rechargeable lithium battery case 286.

During construction of the vest 210, the two semi-rigid shoulder portions 350, 352 are joined to a flexible back panel 356 and these, together with the mesh panels 290c and 290d, make up the back region 228 of the vest 210.

Returning to Figures 7a and b, it can be seen that the relative locations of the receptacles 218, 220 and 222 in the second embodiment are reversed compared with those of the first embodiment. Also, the position of the hinges connecting each of the formed closures 268, 221 and 223, respectively, thereto have moved relative to the first embodiment as is evident from Figure 7b, in which the direction of opening and closing of the various closures is indicated by the arrows. In the case of the formed closures 268 and 221, (both shown in their open positions in Figure 7a), they are each hinged along an outer, lateral side of the respective receptacles 218 and 220. In the case of the first aid receptacle 222, its closure 223 (shown in its closed position in Figure 7a) is hinged to an upper side of the receptacle 222, in the region indicated generally by reference numeral 227. All formed closures are retained in their closed position by hook and loop fasteners (not shown).

Each formed closure 268, 221 and 223 includes a release tab 268a, 221a and 223a which can be gripped by the wearer in order to open the corresponding closure. Each release tab includes an embossed symbol indicating the contents of the particular receptacle, for example the release tab 223a includes an embossed first aid cross to indicate that the contents of the receptacle 222 is a first aid kit.

The radio receptacle 224 differs from the radio receptacle 24 in the respective means of closure. Unlike the radio receptacle 24 which includes a flap 78 fastened by hook and loop fasteners, the radio receptacle 224 is closed by means of a zip 279.

The flexible light 280 includes a manual controller comprising switches 285 which control the operation of both the light source 284 and the light emitting member 288 located on the back region 288 of the vest 210. The flexible arm 282 extends from moulded aperture 287, which assists in reducing wear and tear to the arm 282.

The central receptacle 225, for holding general or personal items such as a journal, wallet, keys, etc, also includes a formed closure 229 which is hinged along the lower edge of the receptacle 225 in the general region indicated by reference numeral 231. The outer face of the formed closure 229 is embossed within a logo or insignia, in this case signifying a particular police force.

The central receptacle's formed closure 229 also includes means to internally accommodate a digital camera as is illustrated in Figure 10. A camera 340 is shown in dotted outline and is receivable in a complementary recess 342 (also in dotted outline) provided within the closure 229. When received in the recess 342, the camera's lens 344 coincides with an aperture 346 provided in the closure 229. The centralised location of the camera enables adequate framing and minimises instability of the image due to movement of the wearer. The internal accommodation of the camera conceals it from view and assists in its protection from damage. The camera is manually operable by the wearer to record stills and video footage when required. The camera 340 can be removed from the vest 210 when required and images recorded by it downloaded either directly from the camera or from its memory card. A system may be established at police headquarters whereby downloaded information is recorded against the relevant police officer's name and date. The camera is then recharged and returned to the vest 210.

Finally, it is to be understood that various other modifications and/or alterations may be made without departing from the spirit of the present invention as outlined herein.

CLAIMS

1. A garment for storing and/or carrying one or more items, including
a torso receiving portion for wearing on at least part of a wearer's torso;
and
one or more receptacles for receiving said item/s, the or each receptacle
being at least partially comprised of a semi-rigid polymeric material, the or each
receptacle being integrated with said torso receiving portion.
2. The garment of claim 1, wherein the or each receptacle is constructed at least
partially from a laminate comprising at least said semi-rigid polymeric material
and a flexible material.
3. The garment of claim 1, wherein the torso receiving portion also includes a
laminate of at least said semi-rigid material and a flexible material.
4. The garment of claim 1, wherein said garment is shaped to substantially
conform to at least part of the wearer's torso.
5. The garment of claim 1, wherein said flexible material is nylon or polyester,
preferably woven or knitted nylon or polyester, more preferably a knitted nylon,
such as that sold by DuPont under the trademark CORDURA®.
6. The garment of claim 1, wherein the torso receiving portion of the garment
includes a front region, for at least partially covering the front of the wearer's
torso, a back region, for at least partially covering the back of the wearer's torso,
two lateral regions, and at least one shoulder region for extending over and being
supported by the wearer's shoulders.
7. The garment of claim 1, wherein the torso receiving portion includes two
lateral holes through which the wearer's arms may pass and are shaped and

sized to allow substantially unobstructed movement of the wearer's arms during walking and running.

8. The garment of claim 1, wherein the length of the garment is such that when worn, the lower edge of the garment is no lower than the wearer's waist to thereby facilitate unobstructed movement of the wearer's torso during use.

9. The garment of claim 1, wherein the or each receptacle typically takes the form of a pocket or holder and extends from the outer surface of the torso receiving portion.

10. The garment of claim 1, wherein each receptacle includes at least one outer wall and has an opening for receiving the item.

11. The garment of claim 1, wherein at least part of the outer wall of each receptacle comprises the semi-rigid polymeric material which is moulded or formed into a three dimensional shape.

12. The garment of claim 1, wherein the receptacle also includes a closure for the opening which includes a formed semi-rigid material.

13. The garment of claim 1, wherein the receptacle includes an inner wall.

14. The garment of claim 13, wherein the inner wall includes a vented material.

15. The garment of claim 13, wherein the inner wall is in a contrasting colour such that it is evident to the wearer when the receptacle is open.

16. The garment of claim 1, wherein the shape of each receptacle complements the shape of the item which it is intended to hold.

17. The garment of claim 1, wherein the integration of the or each receptacle with the torso receiving portion is by way of integral forming or moulding in which at least part of the receptacles are formed or moulded together with at least part of the torso receiving portion into one or more integral pieces.

18. The garment of claim 1, wherein the semi-rigid material is based on a foamed (expanded) plastic material.

19. The garment of claim 1, wherein the semi-rigid material is based on a polyolefin foam, such as a polyethylene foam, or an ethylene vinyl acetate (EVA) foam, and is preferably a layer of compressed EVA foam.

20. The garment of claim 19, wherein the semi-rigid material comprises a semi-rigid laminate of at least a first layer of fabric bonded to a first side of the EVA layer.

21. The garment of claim 20, wherein said first layer of fabric is the same as said flexible material.

22. The garment of claim 20, wherein said semi-rigid laminate includes a second layer of fabric bonded to a second side of the EVA layer, to thereby form a liner of said receptacle.

23. The garment of claim 22, wherein said second fabric layer comprises a mesh to assist in strengthening the semi-rigid laminate.

24. The garment of claim 1, wherein the semi-rigid material of the receptacle has sufficient flexibility to allow the receptacle to deform sufficiently to enable the wearer's hand to be inserted into the receptacle to retrieve the item.

25. The garment of claim 1, wherein the openings of the receptacles are arranged so as to be readily accessed by the wearer's hands.

26. The garment of claim 1, wherein one of said receptacles is a handcuff receptacle having a shape and size conforming closely to a folded pair of handcuffs, and including inner and outer walls and a generally central hub sized and shaped to be received in the central opening of said folded pair of handcuffs.

27. The garment of claim 26, wherein said hub comprises a hub element extending from said inner wall of the handcuff receptacle, wherein the interior of the hub element is filled with a silicone gel.

28. The garment of claim 26, wherein the outer wall of the handcuff receptacle is comprised of EVA foam and an elastomeric material and the receptacle opening is located in said elastomeric material.

29. The garment of claim 28, wherein said receptacle opening is slightly smaller than the largest dimension of the folded handcuff said opening being able to elastically stretch sufficiently to allow the handcuffs to pass therethrough.

30. The garment of claim 1, including one or more elongate receptacles for storing an expandable baton and/or chemical spray and/or a first aid kit, said one or more receptacles being located on the upper front section of the garment with the longitudinal axis of each receptacle being orientated at an oblique angle to the median line of the torso when worn and the opening of each receptacle being located at or towards the lower end thereof.

31. The garment of claim 30, wherein the or each elongate receptacle comprises an outer wall, including formed EVA foam, with an integral closure located at or towards its lower end and hinged for outward rotational movement from a closed to an open position.

32. The garment of claim 30, wherein the or each closure includes a release flap or tab which can be gripped by the wearer when opening the closure, said release tabs including symbols in relief which indicate the contents of the respective receptacle.

33. The garment of claim 1, wherein the inner surfaces of the receptacles include gripping means to assist in retaining the item therein.

34. The garment of claim 1, wherein one of said receptacles, for receiving a radio handset, includes a guide constructed from said semi-rigid material and a flexible pocket depending therefrom.

35. The garment of claim 34, wherein said flexible pocket is constructed from a three dimensional mesh.

36. The garment of claim 1, further including a flexible light mounted thereto, wherein said flexible light includes a flexible arm having a light source provided at one end thereof and the other end of the flexible arm is mounted to the garment on a shoulder region and extends down towards the upper front region of the garment.

37. The garment of claim 36, wherein the power source for the light is rechargeable and integral with the garment.

38. The garment of claim 1 including garment illumination means to improve the visibility of the wearer at night time or during periods of poor visibility wherein the garment illumination means comprises one or more light emitting members integrally formed with the garment.

39. The garment of claim 38, wherein the light emitting member comprises a window containing a number of light emitting diodes.

40. The garment of claim 38, wherein the garment illuminates means is powered by a rechargeable power source.

41. The garment of claim 1, further including lateral size adjustment means for adjusting the size of the garment to fit the size of the particular wearer's torso, wherein each adjustment means comprises first and second adjustment members, with the first adjustment member provided on the front region and the second adjustment member provided on the back region of the garment.

42. The garment of claim 41, wherein the first and second adjustment members of each adjustment means comprise mutually attachable flaps, with a first flap provided on the lower lateral front region and a second flap provided on a corresponding lower lateral back region.

43. The garment of claim 42, wherein at least one of the first and second flaps includes size indicators which indicate the appropriate relative position of the first and second flaps when attached in order to achieve a particular garment size.

44. The garment of claim 43, wherein the first and second flaps are mutually attachable by hook and loop fasteners and the size indicators are welded or hot stamped into the hook or loop fastener region of each second flap.

45. The garment of claim 1, further including anchoring means for securing the garment to a wearer's belt or similar article of clothing, said anchoring means comprising one or more adjustable straps extending from the lower end of the garment and connectable to the wearer's belt, wherein said adjustable straps are extendible and retractable, such that when not in use they are retracted above the lower end of the garment.

46. The garment of claim 1, wherein the inner surface of the garment may be provided with raised areas which distance the inner surface of the garment from the wearer's body, thereby facilitating and enhancing air circulation therebetween.

47. The garment of claim 46, wherein said raised areas are padded and/or include impact resistant material.

48. A garment for storing and/or carrying one or more items, substantially as herein described with reference to either embodiment shown in the accompanying drawings.