(54) Tître : VETEMENT DE SUPPORT D'AVANT-BRAS
(54) Title: FOREARM SUPPORT GARMENT

(57) Abrégé/Abstract:
There is provided a forearm support garment comprising a support portion adapted for resting on at least a portion of a user's upper back and shoulders, and left and right depending portions for supporting a corresponding one of a left forearm and right forearm.
(57) **Abrégé(suite)/Abstract(continued):**
forearm of the user. Each depending portion comprises a forearm receiver connected to the support portion for receiving the corresponding forearm and a suspender extending between the support portion and the forearm receiver for maintaining the corresponding forearm at an angle relative to the corresponding upper arm of the user. The forearm receiver comprises a first receiver end adapted to be located near a corresponding elbow of the user and a second receiver end adapted to be located near a corresponding wrist of the user, the forearm receiver extending continuously between the first receiver end and the second receiver end.
Title: FOREARM SUPPORT GARMENT

Abstract: There is provided a forearm support garment comprising a support portion adapted for resting on at least a portion of a user’s upper back and shoulders, and left and right depending portions for supporting a corresponding one of a left forearm and right forearm of the user. Each depending portion comprises a forearm receiver connected to the support portion for receiving the corresponding forearm and a suspender extending between the support portion and the forearm receiver for maintaining the corresponding forearm at an angle relative to the corresponding upper arm of the user. The forearm receiver comprises a first receiver end adapted to be located near a corresponding elbow of the user and a second receiver end adapted to be located near a corresponding wrist of the user, the forearm receiver extending continuously between the first receiver end and the second receiver end.
FOREARM SUPPORT GARMENT

TECHNICAL FIELD

The invention relates to limb support devices. More particularly, the invention pertains to a forearm support garment.

BACKGROUND

During human locomotion (*i.e.* walking or running), a person utilizes energy to move his/her body forward. Most of this energy is used to move the legs of the person, which must support the person’s weight as well as propel the person forward.

The person also utilizes a significant amount of energy to support his arms which, according to some studies, may make up to 10 or 11% of the total weight of the person’s body. Unfortunately, this energy is wasted, instead of contributing to propel the person forward.

Furthermore, during a walk or a run, a person will typically swing his/her arms. This swinging of the arms, which usually occurs naturally during the walk or the run, may improve stability and energy efficiency, according to some studies. Some suggest that the utilization of energy is optimized during a walk or a run when the user adopts and maintains an optimized running/walking position, in which the arms of the person are maintained at generally 90 degrees and relatively close to the person’s torso while the arms are pivoted at their respective shoulder. Unfortunately, the person will waste energy to support his/her arms in order to maintain his/her arms in this optimized position, as explained above.

Furthermore, as the runner grows tired during the walk or the run, he/she will tend to drop his arms out of this optimized position, which will result in more energy being wasted.

There is therefore a need for a device which will overcome at least one of the above-identified drawbacks.

Features of the invention will be apparent from review of the disclosure, drawings and description of the invention below.
BRIEF SUMMARY

According to one aspect, there is provided a forearm support garment comprising: a support portion adapted for resting on at least a portion of a user’s upper back and shoulders; left and right depending portions for supporting a corresponding one of a left forearm and right forearm of the user, each depending portion comprising: a forearm receiver connected to the support portion for receiving the corresponding forearm, the forearm receiver comprising a first receiver end adapted to be located near a corresponding elbow of the user and a second receiver end adapted to be located near a corresponding wrist of the user, the forearm receiver extending continuously between the first receiver end and the second receiver end; and a suspender extending between the support portion and the forearm receiver for maintaining the corresponding forearm at an angle relative to the corresponding upper arm of the user.

In one embodiment, each suspender comprises a first suspender portion located near the first receiver end and a second suspender portion located near the second receiver end.

In one embodiment, the second suspender portion is disconnectable from the corresponding forearm receiver to enable free movement of the corresponding forearm relative to the corresponding upper arm.

In one embodiment, the first and second suspender portions are adjacent each other and are integrally formed together.

In one embodiment, the first and second suspender portions are distinct and spaced from each other.

In one embodiment, at least one of the first and second suspender portions is integrally formed with the support portion.

In one embodiment, at least one of the first and second suspender portions has an adjustable length.

In one embodiment, the at least one of the first and second suspender portions comprises a buckle and a strap engaging the buckle.
In one embodiment, the at least one of the first and second suspender portions comprises a strip of material adapted to form a loop for receiving the corresponding forearm of the user.

In one embodiment, the strip of material is made of non-stretchable material.

In one embodiment, each depending portion is pivotable relative to the support portion about the corresponding shoulder of the user.

In one embodiment, the support portion and the depending portions are flexible.

In one embodiment, each depending portion is sized and shaped for guiding the corresponding arm of the user in a desired swing path during locomotion.

In one embodiment, each forearm receiver comprises a tubular sleeve.

In one embodiment, the support portion and the suspenders comprise a stretchable material.

In one embodiment, each forearm receiver comprises a thumb opening located near the second receiver end for receiving the corresponding thumb of the user.

In one embodiment, each forearm receiver comprises an elbow opening located near the first receiver end for receiving the corresponding elbow of the user.

In one embodiment, each forearm receiver covers the corresponding elbow of the user.

In one embodiment, the support portion and the left and right depending portions are integrated into an upper garment.

In one embodiment, each suspender is sized and shaped to maintain the corresponding forearm at an angle of 90 degrees relative to the corresponding upper arm.

In one embodiment, the support portion comprises a plurality of reinforced bands for increasing rigidity of the support portion.
BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood, embodiments of the invention are illustrated by way of example in the accompanying drawings.

FIG. 1 is a picture showing a right side view of a user wearing a forearm support garment, in accordance with one embodiment.

FIG. 2 is a picture showing a rear side view of the user wearing the forearm support garment shown in FIG. 1.

FIG. 3A is a picture showing a front side view of the user wearing the forearm support garment shown in FIG. 1, with the user’s left arm swung forward.

FIG. 3B is a picture showing another front side view of the user wearing the forearm support garment shown in FIG. 1, with the user’s right arm swung forward.

FIG. 4 is a picture showing an enlarged view of the user wearing the forearm support garment shown in FIG. 1.

FIGS. 5A to 5J are pictures showing steps for putting on the forearm support garment shown in FIG. 1.

FIG. 6 is a schematic drawing showing a pattern for manufacturing the forearm support garment shown in FIG. 1, in accordance with one embodiment.

FIG. 7 is a picture showing a left side view of a user wearing a forearm support garment, in accordance with an alternative embodiment.

FIG. 8A is a drawing showing a partial rear perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 8B is a drawing showing a partial right perspective view of the user wearing the forearm support garment shown in FIG. 8A.

FIG. 9 is a drawing showing a partial right perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.
FIG. 10 is a drawing showing a partial right perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 11A is a drawing showing a partial rear perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 11B is a drawing showing a partial right perspective view of the user wearing the forearm support garment shown in FIG. 11A.

FIG. 12A is a drawing showing a partial right perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment, with the forearm support garment engaging the user’s forearm.

FIG. 12B is a drawing showing another partial right perspective view of the user wearing the forearm support garment shown in FIG. 13, with the forearm support garment partially stored in a storage compartment.

FIG. 13A is a drawing showing a partial rear perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 13B is a drawing showing a partial right perspective view of the user wearing the forearm support garment shown in FIG. 13A.

FIG. 14 is a drawing showing a partial right side perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 15 is a drawing showing a front perspective view of a user wearing a forearm support garment, in accordance with yet another embodiment, with the forearm support garment in an operative position.

FIG. 16 is a drawing showing another front perspective view of the user wearing the forearm support garment shown in FIG. 15, with the forearm support garment in a stored position.

FIG. 17 is a drawing showing a front perspective view, with enlargement, of the user wearing the forearm support garment shown in FIG. 15, to better show the connection of the triangular panel to the garment portion.
FIG. 18 is a drawing showing another front perspective view, with enlargement, of the user wearing the forearm support garment shown in FIG. 15, to better show the zipper connection of the triangular panel to the corresponding sleeve.

FIG. 19 is a drawing showing another front perspective view, with enlargement, of the user wearing the forearm support garment shown in FIG. 15, with the forearm support garment in a stored position to better show the zipper connection of the triangular panel to the garment portion.

FIG. 20 is a drawing showing a front elevation view of a user wearing a forearm support garment, in accordance with yet another embodiment.

FIG. 21 is a drawing showing a right side elevation view of the user wearing the forearm support garment shown in FIG. 20.

FIG. 22 is a drawing showing a rear elevation view of the user wearing the forearm support garment shown in FIG. 20.

Further details of the invention and its advantages will be apparent from the detailed description included below.

DETAILED DESCRIPTION

In the following description of the embodiments, references to the accompanying drawings are by way of illustration of an example by which the invention may be practiced. It will be understood that other embodiments may be made without departing from the scope of the invention disclosed.

Referring first to FIGS. 1 to 4, there is shown a user wearing a forearm support garment 100, in accordance with one embodiment.

The user has a left arm and a right arm. In the following description, the term “arm” designates the portion of the user’s body extending between a shoulder and a corresponding wrist of the user. The term “right arm” therefore refers to the portion of the user’s body extending between the right shoulder and the right wrist of the user, while the term “left arm” refers to the portion of the user’s body extending between the left shoulder and the left wrist of the user.
Each arm of the user therefore comprises a corresponding shoulder 150, a corresponding upper arm 152, a corresponding elbow 154, a corresponding forearm 156 and a corresponding wrist 158. The term "corresponding" is used to refer to elements located on a common side of the user's body. For instance, the "corresponding" forearm of the left arm designates the left forearm.

The term "upper arm" designates the portion of the arm extending between the shoulder and the corresponding elbow of the user, and the term "forearm" designates the portion of the arm extending between the elbow and the corresponding wrist of the user.

It will be understood that the term "shoulder" as used hereinafter refers generally to the region of the user's body joining the user's arm to the user's torso, and that the term "wrist" as used hereinafter refers generally to the region of the user's body joining the user's arm and the user's corresponding hand.

The forearm support garment 100 comprises a support portion 102 which is adapted to rest on at least a portion of a user's upper back and shoulders and left and right depending portions 104 which are secured to the support portion 102 and which are adapted for supporting a corresponding one of the left and right forearms of the user. In this configuration, the support portion 102 acts as a yoke such that the weight of the forearms is supported by the user's back and shoulders.

Each depending portion 104 comprises a forearm receiver adapted for receiving at least a portion of the user's corresponding forearm 156. In the embodiment illustrated in FIGS. 1 to 4, the forearm receivers comprises left and right tubular sleeves 106, which extends continuously along a portion of the user's corresponding forearm 156 between a first receiver end or sleeve end 108 located near the corresponding elbow 154 of the user and a second receiver end or sleeve end 110 located near the corresponding wrist 158 of the user.

Still in the embodiment illustrated in FIGS. 1 to 4, each sleeve 106 extends slightly above the corresponding elbow 154, such that the first sleeve end 108 is located between the corresponding elbow 154 and the corresponding shoulder 150, but still near the corresponding elbow 154. In an alternative embodiment, the sleeve 106 could instead be shorter such that the first sleeve end 108 is instead located between the corresponding
elbow 154 and the corresponding wrist 158 of the user, but still near the corresponding elbow 154.

Still in the embodiment illustrated in FIGS. 1 to 4, the forearm support garment 100 comprises a flexible panel 112 made of a textile material. The flexible panel 112 is adapted to extend behind the user’s back and to rest on the user’s shoulders and upper back when the forearm support garment 100 is worn by the user. When the forearm support garment 100 is worn by the user, the flexible panel 112 includes a central portion 113 which defines the support portion 102 and side portions 117 which are wrapped around the user’s shoulders and which are connected to the sleeves 106. Each side portion 117 defines a suspender which extends between the support portion 102 and the corresponding sleeve 106 for maintaining the corresponding forearm 156 at an angle relative to the corresponding upper arm 152 of the user.

Referring particularly to FIG. 4, the flexible panel 112 comprises left and right panel edges 114, each panel edge 114 being secured to the corresponding sleeve 106. In the illustrated embodiment, each panel edge 114 is sewn to the corresponding sleeve 106 and thereby defines an elongated seam 400, which is oriented longitudinally relative to the sleeve 106. Therefore, when the corresponding forearm 156 is inserted in the sleeve 106, the elongated seam 400 extends parallel to the corresponding forearm 156.

Still in the embodiment illustrated in FIG. 4, a band of reflective material 402 is further sewn along the elongated seam 400. This enables the user wearing the forearm support garment 100 to be more easily seen in a relatively dark environment, such as on a public road at night for instance.

Each sleeve 106 may further comprise means to maintain the corresponding hand in a desired orientation. In the embodiment illustrated in FIG. 4, each sleeve 106 comprises a loop 404 which extends away from the second sleeve end 110, near the elongated seam 400. The loop 404 is adapted to receive the thumb of the corresponding hand to thereby help maintain the corresponding hand with its palm facing towards the user’s torso. The loop 404 also supports the corresponding hand to help prevent deviation of the corresponding wrist 158 (i.e. bending of the wrist such that the thumb moves towards or away from the corresponding forearm), thereby relaxing the corresponding wrist 158. A skilled person will appreciate that this position has been recognized in the art as a
preferred hand position for running, which may further improve performance of the user
during a walk or a run.

Referring back to FIGS. 1 to 4, the flexible panel 112 is further sized and shaped such
that when the forearm support garment 100 is worn by the user, each forearm 156 is
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generally maintained at a predetermined angle relative to its corresponding upper
arm 152. In the present embodiment, the flexible panel 112 therefore has a length, i.e. the
distance between the left and right panel edges 114, which is selected to maintain the
forearms 156 in the predetermined angle when the flexible panel 112 is placed over the
user’s upper back and shoulders 150. In one embodiment, the flexible panel 112 is sized
and shaped to maintain each forearm 156 at about 90 degrees relative to its corresponding
upper arm 152.

When the forearm support garment 100 is worn by the user, the user lets his forearms 156
hang down and the weight of the user’s forearms 156 exerts tension on the flexible
panel 112, which rests on the user’s back and shoulders 150. The forearms 156 of the user
are therefore suspended from the user’s back and shoulders 150.

The forearm receiving portions 104 are further pivotable relative to the support
portion 102 to enable swinging of the arms. In the embodiment illustrated in FIGS. 1 to 4,
the flexibility of the flexible panel 112 enables the arms of the user to travel in a swinging
motion along a restricted, arcuate path S. This enables the user to walk or run while
swinging his arms, with the weight of his forearms being supported by his/her back and
shoulders.

It will further be appreciated that the forearms 156 of the user, when suspended from
his/her back and shoulders using the forearm support garment 100, will tend to hang close
to the user’s torso, substantially in vertical alignment with the user’s shoulders 150, as
25 best shown in FIGS. 3A and 3B. This improves comfort of the user during a walk or a
run. In certain conditions, this may also significantly reduce the amount of energy utilized
by the user during the walk or run.

In one embodiment, the flexible panel 112 is made of a stretchable material. This further
provides comfort to the user, and also enables the forearm support garment 100 to be
adjustable to conform to a user’s particular body shape. For instance, if a user has
relatively wide shoulders, the flexible panel 112 could be stretched to still wrap snugly around the user's shoulders and back.

In the embodiment illustrated in FIGS. 1 to 4, the flexible panel 112 further comprises front and rear elastic bands 116, 118 which extend between the left and right panel edges 114 of the flexible panel 112 to respectively define front and rear edges of the flexible panel 112. As best shown in FIG. 1, the front elastic band 116 passes in front of the user's shoulders 150 when the user is wearing the forearm support garment 100. Furthermore, the elastic bands 116, 118 are less stretchable than the flexible panel 112 to still enable the flexible panel 112 to stretch according to the user's particular body shape while the front elastic band 116 prevents the flexible panel 112 from slipping rearwardly from the user's shoulders 150.

Still in the embodiment illustrated in FIGS. 1 to 4, the flexible panel 112 is further made of a mesh material which provides ventilation and comfort to the user.

Now referring to FIGS. 5A to 5I, a method for putting on the forearm support garment 100 will be described, in accordance with one embodiment.

As shown in FIGS. 5A to 5D, the user first inserts each forearm 156 in the corresponding sleeve 106. At this stage, the flexible panel 112 is positioned in front of the user.

As shown in FIG. 5E, the user then raises his arms to position the flexible panel 112 generally behind his head.

As shown in FIGS. 5F and 5G, the user then lowers his arms while generally maintaining the flexible panel 112 in the same vertical plane until the flexible panel 112 contacts the shoulders 150 of the user. It will be appreciated that to perform this step, the arms are lowered and moved away from each other, thereby stretching the flexible panel 112, as best shown in FIG. 5F.

As shown in FIGS. 5H to 5J, the user then brings his/her forearms 156 back towards each other and in front of him/her. Simultaneously, the user lowers his/her forearms 156 until they are suspended from the user's back and shoulders 150 and are no longer supported by their corresponding arm. The weight of the user's forearms 156 may slightly stretch the flexible panel 112. In this position, the flexible panel 112 rests snugly on the user's...
back and shoulders 150 and the front elastic band 116 passes in front of the user's shoulders 150. The user may now run or walk, with the forearm support garment 100 supporting the weight of his/her forearms 156, maintaining his/her forearms 156 at a predetermined angle and maintaining his/her arms close to his/her body, substantially in vertical alignment with the corresponding shoulder 150.

Now referring to FIG. 6, there is shown a pattern 600 for manufacturing the forearm support garment 100, in accordance with one embodiment.

It will be understood that to manufacture a garment or any other item made from textile material using a pattern, the pattern or each piece of the pattern is placed on the textile material and is traced. The textile material is then cut along the tracing to thereby from a textile piece. A plurality of textile piece formed in this manner may be sewn together to form the garment or the item.

In the illustrated embodiment, the pattern 600 comprises a pattern forearm piece 602, a pattern rear support piece 604 and a pattern side support piece 606.

The pattern forearm piece 602 is used to manufacture the sleeves 106. It will be understood that since both sleeves 106 are similar, the pattern forearm piece 602 may be used to manufacture both sleeves 106 one after the other.

In the embodiment illustrated in FIG. 6, the pattern forearm piece 602 is longer than the sleeve 106. In this embodiment, once a corresponding textile forearm piece is manufactured using the pattern forearm piece 602, a plurality of transversal band portions located at the second sleeve end 110 of the sleeve 106 may be folded back along transversal folding lines to increase the thickness of the sleeve 106 at the second sleeve end 110. This provides increased support for the corresponding wrist 158 of the user, as one skilled in the art will appreciate.

The corresponding textile forearm piece is then configured in an elongated tubular shape to form one of the sleeves 106.

The pattern rear support piece 604 and the pattern side support piece 606 are used to manufacture the flexible panel 112. In the embodiment illustrated in FIGS. 1 to 4, the flexible panel 112 comprises three distinct pieces of fabric which are assembled together,
by sewing or any other textile material assembly technique known to the skilled addressee. The pattern rear support piece 604 is used to manufacture a corresponding textile rear support piece 120 and the pattern side support piece 606 is used to manufacture a left textile side support piece 122 and a right textile side support piece 124. When the flexible panel 112 is assembled, the textile rear support piece 120 extends between the left and right textile side support pieces 122, 124, as will become apparent below.

Still referring to FIG. 6, the pattern rear support piece 604 comprises a convex left edge 608, a convex right edge 610, a concave upper edge 612 and a slightly concave lower edge 614. The pattern rear support piece 604 is generally symmetrical relative to a central symmetry axis A extending between the center of the concave upper edge 612 and the center of the slightly concave lower edge 614.

The pattern side support piece 606 comprises an upper convex edge 616, a lower straight edge 618, a front, generally straight edge 620 and a rear concave edge 622. When the flexible panel 112 is assembled, the edge of the right textile side support piece 124 corresponding to the upper convex edge 616 of the pattern side support piece 606 is sewn to the edge of the textile rear support piece 120 corresponding to the convex right edge 610 of the pattern rear support piece 604, along the entire length thereof. The lower straight edge 618 of the pattern side support piece 606 is used to define the corresponding panel edge 114 of the flexible panel 112, which is secured to the corresponding sleeve 106 as explained above.

The textile left side support piece 122 is a mirror image of the textile right side support piece 124 and is similarly sewn to the textile rear support piece 120, symmetrically to the textile right side support piece 124 about the central symmetry axis A.

It will be appreciated that in this configuration, the flexible panel 118 defines a non-planar configuration which substantially follows the curves of the user's shoulders 150 in order to better fit the user's shoulders 150, as best shown in FIGS. 5A and 5D. This improves comfort of the user when the forearm support garment 100 is worn and further prevents the flexible panel 118 from slipping rearwardly from the user's shoulders when used.
In an alternative embodiment, the flexible panel 112 of the forearm support garment 100 may instead comprise a single piece of fabric.

Now referring to FIG. 7, there is shown a forearm support garment 700, in accordance with an alternative embodiment.

In this alternative embodiment, the forearm support garment 700 comprises a pair of sleeves 702 for receiving the forearms 156 of the user and a flexible panel 704 connecting together the sleeves 702 and adapted for resting on the user’s back and shoulders 150. Each sleeve 702 extends along the user’s arm between a first sleeve end 706 and a second sleeve end 708 located near the user’s wrist 158.

This forearm support garment 700 is substantially similar to the forearm support garment 100 shown in FIGS. 1 to 4, except that the first sleeve end 706 is located near the corresponding shoulder 150, instead of near the corresponding elbow 154, such that the flexible panel 704 overlaps the sleeves 702. In this embodiment, each sleeve 702 therefore covers a larger portion of the corresponding arm. The forearm support garment 700 may thus be used when the forearm support garment 700 is worn outside in relatively cold temperature, for instance.

In the embodiment illustrated in FIG. 7, each sleeve 702 of the forearm support garment 700 is further provided with a wrist support 710 which is secured to the second sleeve end 708 of the sleeve 702. The wrist support 710 covers the corresponding wrist and part of the corresponding hand. Similarly to the loop 404 of the forearm support garment 100, the wrist support 710 receives the thumb of the corresponding hand and thereby helps maintain the corresponding hand with its palm facing towards the user’s torso.

Still in the illustrated embodiment, the wrist support 710 is made of a material which is relatively robust. For instance, the wrist support 710 may be made of fabric which is configured to be about four times thicker than the sleeve 702. This helps prevent bending of the corresponding wrist in both deviation (i.e. bending of the wrist such that the thumb moves towards or away from the corresponding forearm) and flexion (i.e. bending of the wrist such that the palm moves towards or away from the corresponding forearm) to thereby further help maintaining the corresponding hand in the correct hand position for running, as explained above.
Now referring to FIGS. 8A and 8B, there is shown a forearm support garment 800, in accordance with yet another embodiment.

In this embodiment, the forearm support garment 800 comprises a support portion 802 and a forearm receiving portion 804 which includes a pair of sleeves 806, similarly to the forearm support garment 100 shown in FIGS. 1 to 4 and the support garment 700 shown in FIG. 7.

In the embodiment shown in FIGS. 8A and 8B, the support portion 802 comprises a harness 808 which is adapted for being worn by the user on his/her torso 850.

In one embodiment, the harness 808 is adapted to be worn over a garment such as a shirt. Alternatively, the user could wear the harness 808 directly on his/her skin.

The harness 808 is generally symmetrical and comprises a left harness portion 810 and a right harness portion 812 which are mirror images of each other. The left and right harness portions 810, 812 are connected together by a front connecting strip 814 which extends horizontally against the user’s chest and a rear connecting strip 816 which extends horizontally against the user’s back.

The harness 808 comprises a pair of arm openings 813 through which the user may extend his/her arms when wearing the forearm support garment 800. A connecting panel 815 made of flexible material further extends below each arm opening 813 to connect the sleeves 806 to the harness 808. The connecting panel 815 acts as a suspender between the harness 808 and the corresponding sleeve 806 to maintain the corresponding forearm of the user at an angle relative to the corresponding upper arm. The flexibility of the connecting panel 815 further enables the user to swing his arms, as explained above.

In the embodiment illustrated in FIGS. 8A and 8B, the left and right harness portions 810, 812 and the front and rear connecting strips 814, 816 are all integrally formed together.

In the embodiment illustrated in FIGS. 8A and 8B, the harness 808 and the sleeves 806 are further integrally formed together.

In one embodiment, the harness 808 is made of a stretchable material such as spandex or the like.
More specifically, in the embodiment illustrated in FIGS. 8A and 8B, the harness 808 is made of a relatively heavy spandex material, but comprises a plurality of integrated patches 818 which are made of a mesh spandex material to provide ventilation to the user in predetermined areas.

Now referring to FIG. 9, there is shown a forearm support garment 900, in accordance with yet another embodiment.

The forearm support garment 900 comprises a harness 902 adapted to be worn by the user on his/her torso and a pair of sleeves 904 pivotably connected to the harness 902 via a flexible connecting panel 905, which forms a suspender between the harness and the corresponding sleeve 904.

The forearm support garment 900 is substantially similar to the forearm support garment 800 shown in FIGS. 8A and 8B, except that the harness 902 further comprises relatively rigid binding 906 disposed along the edges of the harness 902 to increase structural stiffness of the harness 902. Similar binding material may be sewn on the harness 902 itself, between edges of the harness 902. This further contributes to maintaining the forearms at an angle relative to the corresponding upper arm, especially if the material used to manufacture the harness 902 is relatively highly stretchable.

In the embodiment illustrated in FIG. 9, each sleeve 904 extends from a first sleeve end 908 located near the user's corresponding elbow and a second sleeve end 910 located near the user's wrist, and comprises a zipper 912 which extends from the first sleeve end 908 toward the second sleeve end 910. It will be appreciated that this zipper 912 may enable the user to easily put on the sleeve 904 while the zipper 912 is open and, by zipping the zipper 912 closed once the user's forearm in inserted in the sleeve 904, may help prevent the sleeve 904 from moving relative to the forearm during a walk or a run.

Now referring to FIG. 10, there is shown a forearm support garment 1000, in accordance with yet another embodiment.

The forearm support garment 1000 comprises a harness 1002 and a pair of sleeves 1004. The harness 1002 comprises a left harness portion, not shown, and a right harness portion 1006, which are mirror images of each other. An arm opening 1008 is defined in each harness portion to enable a corresponding arm to extend through the harness 1002.
Each connecting portion further comprises a connecting panel 1010 made of a flexible material which extends below the arm opening 1008 to connect the corresponding sleeve 1004 to the harness 1002 while enabling movement of the corresponding sleeve 1004 relative to the harness 1002. The connecting panel 1010 acts as a suspender between the harness 1002 and the corresponding sleeve 1004 to maintain the corresponding forearm at an angle relative to the corresponding upper arm.

In the embodiment illustrated in FIG. 10, the harness 1002 comprises only a rear connecting strip, not shown, which extends horizontally against the user's back between the left harness portion and the right harness portion 1006, while the left and right harness portions are unconnected together at the front.

Furthermore, the harness 1002 is made of a plurality of material assembled together. More specifically, the right harness portion 1006 comprises an inner edge portion 1012 made of a relatively heavy spandex material and a stretchable binding sewn 1014 on the perimeter of the arm opening 1008, the rest of the harness 1002 being made of mesh spandex material to further provide ventilation and comfort to the user. The heavy spandex material and the mesh spandex material may be jointed together using flat lock stitches, or any other sewing techniques known to a skilled person.

As stated above, the left harness portion of the harness 1002 is a mirror image of the right harness portion 1006 and is thus configured generally similarly.

Still in the embodiment illustrated in FIG. 10, the sleeve 1004 extends along the forearm of the user between a first sleeve end 1016 located near the corresponding elbow of the user and a second sleeve end 1018 located near the corresponding wrist of the user. A zipper 1020 extends from the second sleeve end 1018 towards the first sleeve end 1016 to facilitate insertion of the forearm into the corresponding sleeve 1004.

The sleeve 1004 further comprises a clamp mechanism 1022 to increase friction between the sleeve 1004 and the corresponding forearm to prevent the sleeve 1004 from moving relative to the corresponding forearm during a walk or a run. In the embodiment illustrated in FIG. 10, the clamp mechanism 1022 comprises a pair of rigid C-shaped jaws 1024 which are positioned opposite each other to define a cylindrical opening and which are secured to the sleeve 1004 at the first sleeve end 1016. The C-shaped jaws 1024 are spaced apart but resiliently connected by an elastic band 1026.
The clamp mechanism 1022 is designed to have a slightly smaller diameter than the user’s corresponding forearm, such that the rigid C-shaped jaws 1024 are resiliently pushed apart when the user inserts his/her corresponding forearm in the sleeve 1004. It will be appreciated that the elastic band 1026 will tend to pull back the rigid C-shaped jaws 1024 towards each other, thereby effectively clamping on the corresponding forearm and preventing the sleeve 1004 from slipping from the corresponding forearm.

In one embodiment, the rigid C-shaped jaws 1024 are made from a relatively rigid material such as EVA using a known manufacturing technique such as molding or the like. This material would provide the required level of rigidity to clamp the user’s forearm, while also providing comfort to the user.

Alternatively, other rigid materials such as PVC or the like may be used. These other materials may be coated with a friction-increasing material such as rubber or the like to further prevent the sleeve 1004 from slipping from the corresponding forearm.

Now referring to FIGS. 11A and 11B, there is shown a forearm support garment 1100, in accordance with yet another embodiment.

The forearm support garment 1100 comprises a harness 1102 adapted for being worn by the user on his/her torso and a pair of sleeves 1104 for receiving the user’s forearms, each sleeve 1104 being pivotably connected to the harness 1102 via a corresponding connecting panel 1105 made of flexible material.

In the embodiment illustrated in FIGS. 11A and 11B, the sleeves 1104 are integrated with the harness 1102. More specifically, the forearm support garment 1100 comprises two O-shaped heavy spandex material pieces 1106, each defining a central opening 1108. Each O-shaped piece 1106 is disposed and stitched over the harness 1102 and over one of the sleeves 1104 such that only the corresponding upper arm of the user is visible through the central opening 1108 of the corresponding O-shaped piece 1106. The O-shaped piece 1106 is stitched over the corresponding shoulder, down along a front portion 1110 of the harness 1102 and over the corresponding sleeve 1104. In the rear, the O-shaped piece 1106 is stitched down along an upper rear portion 1112 of the harness 1102 and passes behind the corresponding upper arm towards the corresponding elbow so as to define an elbow cup portion 1114 which holds the corresponding elbow of the user.
this configuration, the elbow is thus supported by the corresponding shoulder via the O-
shaped piece 1106.

In the embodiment illustrated in FIGS. 11A and 11B, bands of rigid material 1116, such
as laminated TPU or the like, are further sewn into the O-shaped piece 1106 to increase
structural rigidity of the harness 1102.

Now referring to FIGS. 12A and 12B, there is shown a forearm support garment 1200, in
accordance with yet another embodiment.

In the embodiment illustrated in FIGS. 12A and 12B, the forearm support garment 1200
is substantially integrated into a shirt or a jersey such as a running jersey.

More specifically, the forearm support garment 1200 comprises an upper garment
portion 1202 which substantially covers the user’s torso and a pair of side supporting
portions 1204, each one being stitched over a corresponding shoulder and each one being
adapted for suspending the corresponding forearm from the corresponding shoulder.

More specifically, each side supporting portion 1204 comprises an upper connecting
portion 1206 and a lower flap portion 1208. The upper connecting portion 1206 is
stitched to the upper garment portion 1202 and has an arm opening 1210 to enable a user
to extend his arms out of the upper garment portion 1202.

The lower flap portion 1208 extends downwardly from the upper connecting portion 1206
and is not sewn to the upper garment portion 1202. In this embodiment, the lower flap
portion 1208 wraps around the underside of the corresponding elbow and of the
corresponding forearm. In this configuration, the lower flap portion 1208 defines an
elbow cup 1212, as described above in relation to the forearm support garment 1100.

As shown in FIG. 12A, a relatively narrow strip 1214 from the lower flap portion 1208
fully wraps around the corresponding wrist of the user, but the rest of the forearm of the
user is substantially exposed from the top.

FIG. 12A shows the forearm support garment 1200 in an operative configuration. Each
forearm is received in its corresponding lower flap portion 1208 of the corresponding side
supporting portion 1204.
FIG. 12B shows the forearm support garment 1200 in a storage configuration, in which the forearm support garment 1200 can be used as a regular upper body garment. In the embodiment shown in FIG. 12B, a pocket 1216 is defined in each side of the upper garment portion 1202. More specifically, the pocket 1216 is located just below the upper connecting portion 1206 and is sized and shaped to receive and store the corresponding lower flap portion 1208. With both lower flap portions 1208 hidden from view, the forearm support garment 1200 now has the appearance of a regular upper body garment and can be used as such.

It will be appreciated that since most of the forearm is exposed from the top when the forearm is received in its corresponding lower flap portion 1208, the removal of the forearm from the corresponding lower flap portion 1208 to change the configuration of the forearm support garment 1200 from the operative configuration to the storage configuration is relatively easy.

Now referring to FIGS. 13A and 13B, there is shown a forearm support garment 1300, in accordance with yet another embodiment.

The forearm support garment 1300 is substantially similar to the forearm support garment 1100 shown in FIGS. 11A and 11B. The forearm support garment 1300 comprises a harness 1302 and a pair of sleeves 1304 for receiving the forearms of the user.

In the embodiment illustrated in FIGS. 13A and 13B, each sleeve 1304 is suspended from the user's corresponding shoulder via a suspender 1306. The suspender 1306 is relatively elongated and narrow and comprises a front end portion 1308, a rear end portion 1310 and a central portion 1312 which extends between the front end portion 1308 and the rear end portion 1310.

The central portion 1312 is stitched to the top of the corresponding shoulder, to an upper front portion 1310 of the harness 1302 and to an upper rear portion of the harness 1302.

The rear end portion 1310 extends downwardly from the central portion 1312 at the rear, passes behind the corresponding upper arm and is secured to the corresponding sleeve 1304 near the corresponding elbow, thereby defining an elbow cup for holding the corresponding elbow.
The front end portion 1308 extends downwardly from the central portion 1312 at the front, and is not stitched to the harness 1302. Instead, the front end portion 1308 defines a loop 1314 which receives the corresponding sleeve 1304. In one embodiment, the loop 1314 is stitched to the sleeve 1304 to prevent the sleeve 1304 from sliding inside the loop 1314 during a run or a walk.

In this configuration, each sleeve 1304 is suspended from the corresponding shoulder by only two relatively narrow strips of material, i.e. the front and rear end portions 1308, 1310 of the suspender 1306. It will be appreciated that this facilitates the swinging of the arms, since there is relatively little textile material to deform to move the sleeve 1304 relative to the harness 1302.

Now referring to FIG. 14, there is shown a forearm support garment 1400, in accordance with yet another embodiment.

The forearm support garment 1400 comprises a pair of sleeves 1402, each sleeve being adapted to engage one of the left and right arms of the user and each sleeve being distinct from each other. Each sleeve 1402 comprises a front sleeve portion 1404 adapted for receiving the corresponding forearm and a rear sleeve portion 1406 adapted for receiving the corresponding upper arm of the user.

The forearm support garment 1400 further comprises a retaining member 1408 which prevents the corresponding forearm to be angled away from the corresponding upper arm over a predetermined angular limit.

In the embodiment illustrated in FIG. 14, the retaining member 1408 comprises a flexible material web 1410 which generally defines a triangular shape. The flexible material web 1410 has a first side edge 1412 which is sewed or stitched to the front sleeve portion 1404 and a second side edge 1414 which is stitched to the rear sleeve portion 1406.

The first and second side edges 1412, 1414 are adjacent each other, such that the predetermined maximum angle between the forearm and the corresponding upper arm corresponds to the angle W between the first and second side edges 1412, 1414 of the flexible material web 1410.
In one embodiment, the angle $W$ between the first and second side edges 1412, 1414 is of about 90 degrees.

It will be appreciated that the weight of the user’s forearms will tend to make him/her drop his/her forearms, thereby increasing the angle between each forearm and the corresponding upper arm until the angle $W$ is reached. The flexible material web 1410 then prevents the forearms from dropping further, thereby maintaining each forearm at the predetermined angle relative to the corresponding upper arm.

Now referring to FIGS. 15 to 19, there is shown a forearm support garment 1500, in accordance with yet another embodiment.

15 The forearm support garment 1500 is integrated in an upper garment, such as a jacket, and more particularly a sports jacket. In the embodiment illustrated in FIGS. 15 to 19, the forearm support garment 1500 comprises a garment portion 1502 which is substantially similar to a regular sports jacket. The garment portion 1502 substantially covers the user’s torso and is supported by the user’s shoulders.

15 The garment portion 1502 further has left and right long sleeves 1504, 1506 which each receive a corresponding forearm of the user. More specifically, each sleeve has an upper sleeve portion 1508 which covers the user’s upper arm and a lower sleeve portion 1510 which covers the user’s forearm.

The forearm support garment 1500 further comprises a pair of retaining members 1512, which define suspenders between the garment portion 1502 and the corresponding sleeve 1504 to maintain the corresponding forearm of the user at an angle relative to the corresponding upper arm.

More specifically, each retaining member 1512 comprises a triangular panel 1514 made of flexible material. The triangular panel 1514 is stitched at a first end 1516 to the garment portion 1502 near the shoulder of the user.

Still in the embodiment illustrated in FIGS. 15 to 19, the triangular panel 1514 has a first side edge 1520, a second side edge 1522 and a third side edge 1524. The first and second side edges 1520, 1522 are connected to the corresponding sleeve 1504, 1506 by a zipper 1526. More specifically, a single zipper track 1528 runs along the corresponding
sleeve 1504, 1506 between a front end 1530 of the corresponding sleeve 1504, 1506 and the first end 1516 of the triangular panel 1514. The zipper 1526 may be used to disconnect the triangular panel 1514 from the corresponding sleeve 1504, 1506 to enable free movement of the corresponding forearm of the user relative to the corresponding upper arm, as will become apparent below.

The first and second side edges 1520, 1522 are adjacent each other, such that the predetermined maximum angle between the forearm and the corresponding upper arm corresponds to the angle Z between the first and second side edges 1520, 1522 of the triangular panel 1514.

In one embodiment, the angle Z between the first and second sides 1520, 1522 is of about 90 degrees.

In the embodiment illustrated in FIGS. 15 to 19, the third side edge 1524 is not sewn to the garment portion 1502 for the most part. It will be appreciated that when the forearm support garment 1500 is in its operative position, the weight of the corresponding forearm will cause greater tension in the third side edge 1524 than anywhere else, because the third side edge 1524 is attached near the front end 1530 of the corresponding sleeve 1504, 1506. The third side edge 1524 may thus be reinforced with a binding material to further increase its resistance to tension.

In the embodiment illustrated in FIGS. 15 to 19, the forearm support garment 1500 may selectively be configured in a stored configuration, in which the forearm support garment 1500 can be used as a regular jacket. To pass from the operative configuration shown in FIG. 15 to the stored position shown in FIG. 16, the user simply unzips the zipper 1526 to free the first and second side edges 1520, 1522 of the triangular panel 1514 from the corresponding sleeve 1504, 1506.

The triangular panel 1514 is then flipped such that the first and second side edges 1520, 1522 are located away from the corresponding sleeve 1504, 1506, as shown in FIG. 16. The triangular panel 1514 is placed against the garment portion 1502, and the zipper 1526 is then used to lock the second side edge 1522 with a corresponding zipper track 1532 provided on the front of the garment portion 1502.
Now referring to FIGS. 20 to 23, there is shown a forearm support garment 2000, in accordance with yet another embodiment.

The forearm support garment 2000 comprises a support portion 2002 adapted for resting on at least a portion of a user's upper back and shoulders, and left and right depending portions 2004, 2006 for supporting a corresponding one of a left forearm and right forearm of the user.

Each depending portion 2004, 2006 comprises a forearm receiver 2008 connected to the support portion 2002 for receiving the corresponding forearm 156 and a suspender extending between the support portion 2002 and the forearm receiver 2008 for maintaining the corresponding forearm 156 at an angle relative to the corresponding upper arm 152 of the user.

Each forearm receiver 2008 comprises a first receiver end 2010 adapted to be located near a corresponding elbow 154 of the user and a second receiver end 2012 adapted to be located near a corresponding wrist 158 of the user. To provide optimal support to the corresponding, each forearm receiver 2008 extends continuously between the first receiver end 2010 and the second receiver end 2012.

In the embodiment illustrated in FIGS. 20 to 23, the suspender comprises two distinct portions spaced from each other: a first suspender portion 2014 located near the first receiver end 2010 and a second suspender portion 2016 located near the second receiver end 2012. This configuration enables the forearms to be optimally supported, while urging both the wrists and the elbows of the user towards the user's body to maintain the user's forearms in a vertical plane during locomotion, as explained above.

Alternatively, the first and second suspender portions 2014, 2016 could be adjacent each other and integrally formed together to define a single piece of material, such as the triangular panel 1514 of the embodiment shown in FIGS. 15 to 19.

Still in the embodiment illustrated in FIGS. 20 to 23, the first suspender portion 2014 is integrally formed with the support portion 2002. Specifically, the first suspender portion 2014 forms an extension of the support portion 2002 which is adapted to extend along the corresponding upper arm 152 of the user. The first suspender portion 2014 is
further integrally formed with the forearm receiver 2008, such that the forearm receiver 2008 forms an extension of the first suspender portion 2014.

In this embodiment, each forearm receiver 2008 defines a sleeve which is not fully tubular, but which instead comprises an open top 2017 such that the inside of the elbow is not covered when the forearm support garment 2000 is worn.

As best shown in FIG. 20, each forearm receiver 2008 further comprises an elbow opening 2018 located near the first receiver end 2010 for receiving the corresponding elbow 154 of the user. Each forearm receiver 2008 further comprises a thumb opening 2020 located near the second receiver end 2012 for receiving the corresponding thumb of the user.

It will be appreciated that when the corresponding thumb is received in the thumb opening 2020 and the corresponding elbow 154 is received in the elbow opening 2018, the corresponding forearm is substantially prevented from moving relative to the forearm receiver 2008.

Alternatively, each forearm receiver could instead cover the corresponding elbow 154, as shown in the embodiments illustrated in FIGS. 1 to 7 and 11A to 19.

Still in the embodiment illustrated in FIGS. 20 to 23, the second suspender portion 2016 comprises a buckle 2022 and a strap 2024 engaging the buckle 2022. In one embodiment, the buckle 2022 is a standard bar buckle and the strap 2024 comprises standard webbing to provide the necessary friction to retain the strap 2024 in engagement with the buckle 2022. Alternatively, the second suspender portion 2016 may instead comprise other length adjusting means.

Still in the embodiment illustrated in FIGS. 20 to 23, the strap 2024 further defines a strip of material which forms a loop 2026 for receiving the corresponding forearm 156. Specifically, the loop 2026 receives the corresponding forearm 156 near the corresponding wrist 158 to support the corresponding forearm 156 and maintain the corresponding forearm 156 at an angle relative to the corresponding upper arm 152.

In one embodiment, the forearm receiver 2008 simply rests against the strap 2024 inside the loop 2026 and the loop 2026 is prevented from moving along the forearm
receiver 2008 by friction against the forearm receiver 2008. Alternatively, the forearm receiver 2008 may be attached to the strap 2024 inside the loop 2026 by gluing, sewing, using a hook-and-loop fastener or using any other fastener or fastening technique.

In one embodiment, the forearm receiver 2008 is detachable from the strap 2024 to enable free movement of the corresponding forearm 156 relative to the corresponding upper arm 152. In this configuration, the forearm support garment 2000 can therefore be used as a regular garment.

Still in the embodiment illustrated in FIGS. 20 to 23, the support portion 2008 comprises a plurality of reinforced bands 2028 for increasing rigidity of the support portion 2002, and thereby provide additional support. In one embodiment, the reinforced bands 2028 may comprise stretchable spandex material folded over to form tunnels in which are received elastic bands. Alternatively, other types of reinforced bands may be used.

The forearm support garment therefore provides support for the user’s forearms, while being relatively lightweight and flexible to allow the user to swing his arms during locomotion. The garment is further configured to maintain the user’s forearms at an angle relative to the corresponding upper arms with relatively little effort from the user. In some circumstances, this position has been found to be relatively optimal for walking or running.
CLAIMS

1. A forearm support garment comprising:

   - a support portion adapted for resting on at least a portion of a user’s upper back and shoulders;

   - left and right depending portions for supporting a corresponding one of a left forearm and right forearm of the user, each depending portion comprising:

      - a forearm receiver connected to the support portion for receiving the corresponding forearm, the forearm receiver comprising a first receiver end adapted to be located near a corresponding elbow of the user and a second receiver end adapted to be located near a corresponding wrist of the user, the forearm receiver extending continuously between the first receiver end and the second receiver end; and

      - a suspender extending between the support portion and the forearm receiver for maintaining the corresponding forearm at an angle relative to the corresponding upper arm of the user, the suspender being flexible to guide the corresponding arm of the user in a desired swing path during locomotion.

2. The forearm support garment as claimed in claim 1, wherein each suspender comprises a first suspender portion located near the first receiver end and a second suspender portion located near the second receiver end.

3. The forearm support garment as claimed in claim 2, wherein the second suspender portion is disconnectable from the corresponding forearm receiver to enable free movement of the corresponding forearm relative to the corresponding upper arm.

4. The forearm support garment as claimed in any one of claims 2 and 3, wherein the first and second suspender portions are adjacent each other and are integrally formed together.

5. The forearm support garment as claimed in any one of claims 2 and 3, wherein the first and second suspender portions are distinct and spaced from each other.

6. The forearm support garment as claimed in claim 5, wherein at least one of the first and second suspender portions is integrally formed with the support portion.
7. The forearm support garment as claimed in claim 5, wherein at least one of the first and second suspender portions has an adjustable length.

8. The forearm support garment as claimed in claim 7, wherein the at least one of the first and second suspender portions comprises a buckle and a strap engaging the buckle.

9. The forearm support garment as claimed in any one of claims 5 to 8, wherein the at least one of the first and second suspender portions comprises a strip of material adapted to form a loop for receiving the corresponding forearm of the user.

10. The forearm support garment as claimed in claim 9, wherein the strip of material is made of non-stretchable material.

11. The forearm support garment as claimed in any one of claims 1 to 10, wherein each depending portion is pivotable relative to the support portion about the corresponding shoulder of the user.

12. The forearm support garment as claimed in claim 11, wherein the support portion and the depending portions are flexible.

13. The forearm support garment as claimed in any one of claims 1 to 12, wherein each forearm receiver comprises a tubular sleeve.

14. The forearm support garment as claimed in any one of claims 1 to 13, wherein the support portion and the suspenders comprise a stretchable material.

15. The forearm support garment as claimed in any one of claims 1 to 14, wherein each forearm receiver comprises a thumb opening located near the second receiver end for receiving the corresponding thumb of the user.

16. The forearm support garment as claimed in any one of claims 1 to 15, wherein each forearm receiver comprises an elbow opening located near the first receiver end for receiving the corresponding elbow of the user.

17. The forearm support garment as claimed in any one of claims 1 to 15, wherein each forearm receiver covers the corresponding elbow of the user.
18. The forearm support garment as claimed in claim 1, wherein the support portion and the left and right depending portions are integrated into an upper garment.

19. The forearm support garment as claimed in any one of claims 1 to 18, wherein the support portion comprises a plurality of reinforced bands for increasing rigidity of the support portion.