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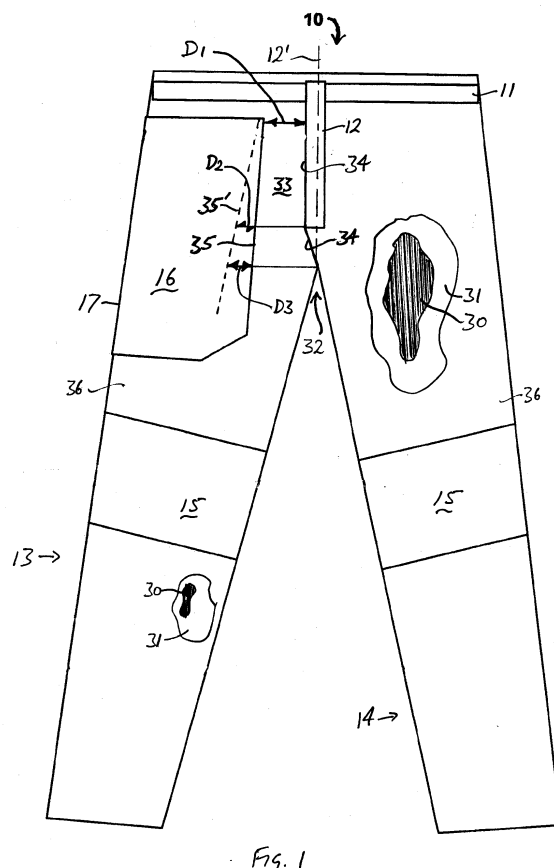
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(54) **Chainsaw Protective Trousers Or Chaps**

(57) Trousers 10, 20 or chaps 40 for use by operators of chainsaws include a shell 36, 36' made from a relatively elastic material such as a warp knitted synthetic fabric, a layered filling 30 of loose protective fibres which may be contained in an envelope 31, and a patch 16, 16' of relatively inelastic heat resistant material such as a meta aramid extending over the front and side of a thigh region of one or each of the legs 13, 14, 13' 14'. Preferably the patch is spaced apart from the crotch 32 and fly 12 by an elastic portion 33 of the shell. The patch provides protection from the chainsaw exhaust without compromising flexibility and comfort.



Description

[0001] This invention relates to protective trousers and chaps for use by operators of chainsaws in operations such as the felling and de-branching of trees, and the sawing of the felled trees and branches.

[0002] In this specification, a "trouser" or "pair of trousers" is construed as any garment comprising portions that separately enclose at least a substantial part of the legs of the wearer and are united at a crotch, i.e. a joint between the legs that faces downwardly in the standing position of the wearer; and the "fly" is defined by a nominal line extending upwardly and centrally in front of the wearer in a vertical plane from the crotch to the waist in the standing position of the wearer. Typically the fly is openable and closable by a zip or other fastening means. A "chaps" or "pair of chaps" is construed as a garment comprising portions that separately cover at least a substantial part of the legs of the wearer, but which are not united at a crotch.

[0003] The principal risk arising from the operation of a chainsaw is that of contact between the moving chain and the operator, in particular the legs. To give some protection for the legs it is customary for the chainsaw operator to wear protective trousers comprising an outer layer, hereinafter referred to as the shell, which encloses a protective filler material comprising long fibres of high strength material such as para-aramid (e.g. Kevlar®) or ballistic nylon, which are loosely arranged, usually in multiple layers. When a chainsaw blade contacts the trousers, the outer layer is immediately cut through but the loose fibres of the filler material are drawn out and entangled by the blade so that they wrap around the chainsaw's drive sprocket, locking it solid and halting the chain, and so limiting damage to the operator's leg. After stopping a saw, the trousers are scrapped, and the saw must be field-stripped to remove the fibres and allow it to run again.

[0004] The filler material may be arranged in a fabric envelope which contains the loose layers of fibres and is sewn to the inside of the shell. This avoids the need to sew the filler material to the shell, which could restrain the fibres of the filler material and hence prevent them from stopping the blade.

[0005] Chainsaw protective trousers in the EU must comply with EN381-5 and are classified in three classes and three types, depending on the quantity and arrangement of the filler material. Class 1, 2 and 3 trousers are rated for use with chainsaws running at speeds up to 20m/s, 24m/s and 28m/s respectively, with the requisite level of protection typically being provided by about 3 to about 12 or even more layers of filler material. In type A and type B trousers the filler material is arranged to cover principally the front of the legs, whereas type C trousers provide filler material that extends around the front and back so as to enclose each leg. In each type, the filler material extends upwardly from the crotch for some distance on each side of the fly, while the seat (the region

behind the wearer between the waist and the legs) is not filled.

[0006] The fibres of the filler material are relatively inelastic. In chainsaw protective trousers it is desirable for the filler material to extend as far as possible over the region of the crotch and fly, since these areas are vulnerable to contact by the chainsaw blade. This is difficult to achieve, due to the complex shape and the concentration of seams at the crotch, and the extreme movement and stretching which occur in that area, particularly when climbing. A gap in the filler material of up to 30mm is therefore often provided at the fly.

[0007] Tree fellers, ground workers and firewood cutters typically select class A trousers because of the low risk of being cut in the back of the leg. Climbers and tree surgeons generally have the chainsaw attached by a lanyard to their climbing harness and select type C, as they will be cutting from a wider variety of positions. Occasional or non-professional users often prefer chaps, which comprise a shell and filler material similar to those of trousers but arranged as two separate leg coverings without a crotch, usually lacking a fly or seat and united by a belt or the like and providing type A protection, and which are worn over conventional trousers.

[0008] The shell of chainsaw protective trousers or chaps is preferably both tough and slippery so that it protects against trivial damage which could compromise the filler material. Kneepatches of an abrasion resistant material such as a para-aramid (e.g. Kevlar®) cloth are usually sewn to the shell to protect the knees.

[0009] In use, the exhaust of an engine driven chainsaw can become very hot. Contact between the hot exhaust and the operator's trousers can lead to burning of, and hence considerable damage to, the material of the shell, thereby reducing the protective quality of the trousers.

[0010] US 2004/0181859 discloses protective garments such as trousers for use particularly by firefighters or the like who may need to use tools such as chainsaws. Such garments may comprise a layer of filler material suitable for chainsaw protection and a shell made from a flame resistant material such as Nomex III®, principally a meta-aramid material. Meta-aramids provide protection against heat and are relatively inelastic, so that a shell made from this material may move comparatively little relative to the filler material but will tend to restrict the movement of the wearer.

[0011] In order to ensure that the shell is comfortable in use and does not unduly restrict the movement of the wearer, particularly when climbing trees, it is preferable to make it from a material, e.g. a warp knitted synthetic fabric, that is elastically stretchable as well as water repellent.

[0012] It is the object of the present invention to provide chainsaw protective trousers or chaps which afford protection and comfort.

[0013] In accordance with the present invention there is provided a pair of trousers or chaps as defined in the

claims.

[0014] The invention recognises that, whereas the shell should be sufficiently elastic so as to provide comfort in use, and whereas heat resistant materials are generally inelastic, professional chainsaw workers in the forestry and like industries, as compared with firefighters or rescue workers, will tend to handle a chainsaw in a predictable and repetitive manner which limits the region of vulnerability to heat damage to the front and outer side of the thigh region of, typically, one leg. It is therefore possible to effectively protect user from the heat of the chainsaw exhaust by providing a relatively inelastic heat resistant material in this limited area, while substantially retaining the elasticity and comfort of a stretchable shell.

[0015] In a particularly preferred embodiment, a pair of chainsaw protective trousers comprise a region of heat resistant material which is spaced apart from the crotch and fly region by a region of elastic shell material sufficient to accommodate the degree of stretch experienced in this area during climbing. This provides optimal comfort while avoiding damage due to stress concentration at the edge of the inelastic heat resistant material.

[0016] Various illustrative embodiments will now be described, purely by way of example and without limitation to the scope of the invention, and with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a trouser in accordance with a first embodiment;

Fig 2 is a front view of a trouser in accordance with a second embodiment;

Figs. 3 and 4 are rear and side views respectively of the embodiment of Fig. 2; and

Fig. 5 shows chaps in accordance with a third embodiment.

[0017] Referring now to Fig. 1, there is shown a pair of trousers 10 for use by a chainsaw operator. The trousers comprise an outer shell 36 made from a shell material, conveniently a synthetic fabric which is tough, slippery, elastically stretchable and water repellent, e.g. a nylon/polyester/elastane blend as known in the art.

[0018] The trousers 10 have a waistband 11 and a fly 12, which defines a line 12' extending upwardly from the crotch 32 and which may be fixed or alternatively may be openable and closable by a zip fastener, buttons or other fastening means. The trousers 10 also have first (right) and second (left) legs or leg portions 13, 14, each having a Kevlar® reinforced kneepatch 15 on the knee region thereof.

[0019] The right leg 13 also has a protective patch 16 of heat resistant material arranged to form an outer surface at the front and outer side of the thigh region thereof, which is to say, the region at the front and outer side of the wearer's leg between the knee and the top of the leg at the level of the crotch; the patch extending downwardly from the waist band 11 and laterally from an outer side seam 17 of the leg 13 of the trousers 10 to cover the front

of the leg 13. The protective patch 16 is of Nomex® or similar heat and flame resistant material, and has greater heat resistance but lesser elasticity than the material of the shell 36. Particularly when a operator has an engine driven chainsaw attached by a lanyard to a climbing harness worn by the operator, contact between the hot exhaust of the chainsaw and the thigh region can readily occur. The location of the protective patch 16 in this thigh region is such as to protect the chainsaw operator from the effect of accidental contact between the hot exhaust of the chainsaw and the trouser leg 13.

[0020] The shell 36 is partially cut away in the illustration to show the envelope 31 containing the filler material 30 which is arranged within the shell 36. The filler material comprises multiple layers of long, loose fibres which are arranged to be drawn out and entangled by contact with a chainsaw blade so as to arrest movement of the blade in accordance with the conventional art earlier described. The envelope surrounds the filler material, and comprises an inner layer of fabric (adjacent the user's body) and an outer layer of fabric (adjacent the shell) between which the filler material is arranged. The trousers may be manufactured as required in accordance with Type A, B or C and Class 1, 2 or 3. The filler material may be incorporated into the shell without an envelope if preferred.

[0021] The first and second leg portions are united by a seam at the crotch 32. The fly 12 extends upwardly from the crotch along a nominal vertical line 12', and the patch extends upwardly above the first leg portion 13 and is preferably spaced apart from the crotch and the fly (which is to say, from the stitch line 34 at which the seam defining the crotch and the zip fastener or other structure forming the fly are attached to the shell material) as shown by an elastic portion 33 of the shell.

[0022] Preferably the patch 16 is spaced apart from the fly 12 (which is to say, from the stitch line 34) by the elastic portion 33 of the shell by a minimum distance D1 (measured horizontally in the standing position of the user) of at least 25mm, more preferably 40mm, most preferably at least 50mm. Conveniently the elastic portion 33 is part of the shell material 36, although it could be made from a different, more elastic material.

[0023] The edge 35 of the patch in the stretched condition is indicated by the dotted line 35' in Fig. 1, representing the movement in this region that may occur when the user is, for example, climbing a tree. Preferably the elastic portion of the shell allows the patch to be stretched away from the fly (which is to say, from the stitch line 34) through a distance D2 (measured horizontally in the standing position of the user) of at least 10mm, more preferably at least 15mm, still more preferably at least 20mm, most preferably at least 25mm.

[0024] Preferably the elastic portion of the shell allows the patch to be stretched away from the crotch through a distance D3 (measured horizontally in the standing position of the user) of at least 25mm, more preferably at least 40mm, still more preferably at least 50mm.

[0025] In the embodiment shown, the second leg por-

tion 14 is not provided with a heat resistant patch.

[0026] Preferably the shell material is elastically stretchable by at least 40% of its length in all directions.

[0027] The filler material 30 is arranged in an envelope 31, which is arranged inside the shell 36, to which it is attached by spaced bar tacks and by stitch lines, the stitch lines being arranged at the waist and at the seam 17 that extends along the outer side of the leg portion. Since relatively little flexure occurs at this outer seam 17, this allows the shell to move comparatively freely relative to the envelope 31. The filler material is loosely tacked to the envelope so that it remains in place but can be freely drawn out by contact with a chainsaw blade. Movement between the filler material and the envelope, and to a greater extent between the envelope and the shell, allows for the shell to stretch relative to the filler material in use.

[0028] By spacing the patch apart from the fly and the crotch, stitching in the region of the crotch can be minimised so that the envelope containing the filler material can be more readily attached to protect this area.

[0029] Referring now to Figs. 2 to 4, there is shown trousers 20 which are of similar construction in most respects to the trousers 10 shown in Fig. 1, and similar parts are identified by the same reference numerals. However, in this case the protective patch 16 extends upwardly above the first leg 13 to the waistband 11, and downwardly to the reinforcing kneepatch 15 which forms the outer surface of the knee region of the leg 13, and laterally from the outer side seam 17 of the leg 13 to an inner side seam 18 extending along the inner side of the leg 13 and facing the second leg 14. The protective patch 16 does not extend along the inside seam 18 up to the crotch 32 and fly 12, but tapers towards the waistband 11 so as not to restrict a chainsaw operator's mobility particularly when tree climbing. This is because the Nomex® (or other similar heat resistant material) of the patch 16 typically has little or no stretch properties, so that the elastic portion 33 of the shell, which preferably provides stretch and dimensional characteristics as described above in relation to the first embodiment, allows the wearer to move freely without causing damage in the region of the fly. The trousers 20 are also shown having pockets 19, which may be provided in trousers 10 if required.

[0030] The protective patch 16 may extend to the rear of the trousers 10 or 20 if desired.

[0031] Referring to Fig. 5, an alternative embodiment provides chaps 40 with a shell 36' defining first and second leg portions 13', 14' depending from a waistband 11 and joined by a belt 38, kneepatches 15, outer 17' and inner 18' leg side seams, a pocket 19, the legs being partially cut away to reveal a filler material 30 which is arranged inside the shell 37 and retained by an inner lining without any envelope, and a heat resistant patch 16' on each of the leg portions, each patch being of a heat resistant material having greater heat resistance and lesser elasticity than the shell material and arranged to form an outer surface at a front and outer side of a

thigh region of each leg portion similarly to the foregoing embodiments.

[0032] In summary, preferred embodiments provide trousers 10, 20 or chaps 40 for use by operators of chainsaws include a shell 36, 36' made from a relatively elastic material such as a warp knitted synthetic fabric, a layered filling 30 of loose protective fibres which may be contained in an envelope 31, and a patch 16, 16' of relatively inelastic heat resistant material such as a meta aramid extending over the front and outer side of a thigh region of one or each of the legs 13, 14, 13' 14'. Preferably the patch is spaced apart from the crotch 32 and fly 12 by an elastic portion 33 of the shell. The patch provides protection from the chainsaw exhaust without compromising flexibility and comfort.

[0033] Other embodiments of trouser in accordance with the invention will be readily apparent to persons skilled in the art.

[0034] The heat resistant material of the patch 16, 16' may be a high-temperature resistant and inherently flame-retardant synthetic fabric, and may be an aramid polymer, preferably a meta-aramid, and may be Nomex®. High-temperature resistant and inherently flame-retardant materials other than meta-aramids may be used if preferred. For example, the patch may be made from glass, ceramic, basalt, wool, carbon, rubber, leather, high temperature resistant polymer or other suitable fibres or sheet materials as well as other materials that have been treated, e.g. impregnated so as to provide the required properties.

[0035] The shell material may be a 4-way stretch fabric, for example, a warp knitted polyester or mixed synthetic fabric, and the reinforcing patches at the knees may be a para-aramid (e.g. Kevlar®) reinforced material.

[0036] The term "patch" is to be construed as a portion of material defining a local region of the garment, and does not imply a layered construction with respect to the shell material. The patch of heat resistant material can either be applied over the shell material, or it can be joined to the edges of the shell material so that the shell material does not extend beneath it.

[0037] The patch can be provided on only one of the two legs of the trousers or chaps, in which case the product can be supplied in left- and right-handed versions, corresponding to the side on which the operator customarily operates the chainsaw, which provides economy and maximum flexibility. Alternatively, two patches may be provided, one on each leg.

[0038] The novel trousers or chaps may advantageously be used in any situation requiring localised protection from hot objects, particularly when using any type of hand held engine driven tool in the horticultural, agricultural, arboricultural or other industries.

Claims

1. Trousers (10, 20) or chaps (40) for use by a chainsaw

operator, comprising:

- an outer shell (36, 36') made from a shell material and including first and second leg portions (13, 14; 13', 14') for accommodating the user's legs, and
 a filler material (30) arranged within the shell, the filler material comprising fibres arranged to be drawn out and entangled by contact with a chainsaw blade so as to arrest movement of the blade;
characterised in that a patch (16, 16') of heat resistant material having greater heat resistance and lesser elasticity than the shell material is arranged to form an outer surface at a front and side of a thigh region of the first leg portion (13; 13').
2. Trousers or chaps according to claim 1, **characterised in that** two said patches are provided, one on each of the first (13, 13') and second (14, 14') leg portions.
 3. Trousers or chaps according to claim 1, **characterised in that** the second leg portion (14, 14') is not provided with a said patch.
 4. Trousers or chaps according to any preceding claim, **characterised in that** the shell material is elastically stretchable by at least 40% of its length in all directions.
 5. Trousers or chaps according to any preceding claim, **characterised in that** the filler material is arranged in an envelope (31), and the envelope is attached to the shell.
 6. Trousers or chaps according to any preceding claim, **characterised in that** the patch (16, 16') extends from an outer seam (17, 17') arranged along an outer side of the first leg portion (13, 13').
 7. Trousers or chaps according to claim 6, **characterised in that** the patch extends from the outer seam (17, 17') to an inner seam (18, 18') arranged along an inner side of the first leg portion.
 8. Trousers or chaps according to any preceding claim, **characterised in that** the patch extends upwardly above the first leg portion to a waistband (11, 11').
 9. Trousers or chaps according to any preceding claim, **characterised in that** the patch extends downwardly to a reinforcing kneepatch (15) which forms an outer surface of a knee region of the first leg.
 10. Trousers or chaps according to any preceding claim, **characterised in that** the patch is made from an

aramid polymer.

11. Trousers according to any preceding claim, **characterised in that** the first and second leg portions are united at a crotch (32), and a fly (12) extends upwardly from the crotch, and the patch (16) extends upwardly above the first leg portion and is spaced apart from crotch and the fly by an elastic portion (33) of the shell.
12. Trousers according to claim 11, **characterised in that** the patch is spaced apart from the fly by the elastic portion of the shell by a distance (D1) of at least 25mm.
13. Trousers according to claim 11, **characterised in that** the patch is spaced apart from the fly by the elastic portion of the shell by a distance (D1) of at least 40mm.
14. Trousers according to claim 11, **characterised in that** the elastic portion of the shell allows the patch to be stretched away from the fly through a distance (D2) of at least 10mm.
15. Trousers according to claim 11, **characterised in that** the elastic portion of the shell allows the patch to be stretched away from the crotch through a distance (D3) of at least 25mm.

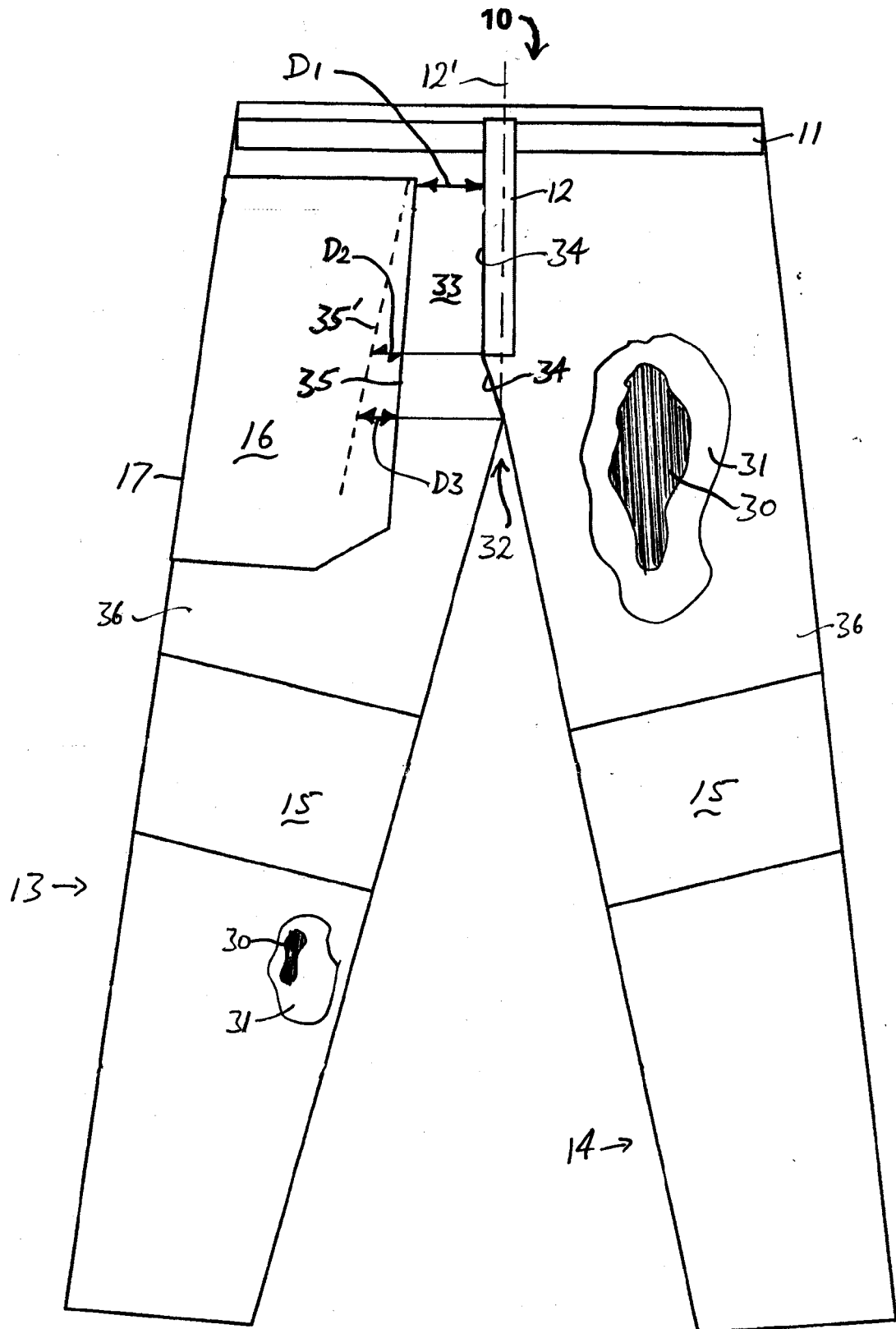


Fig. 1

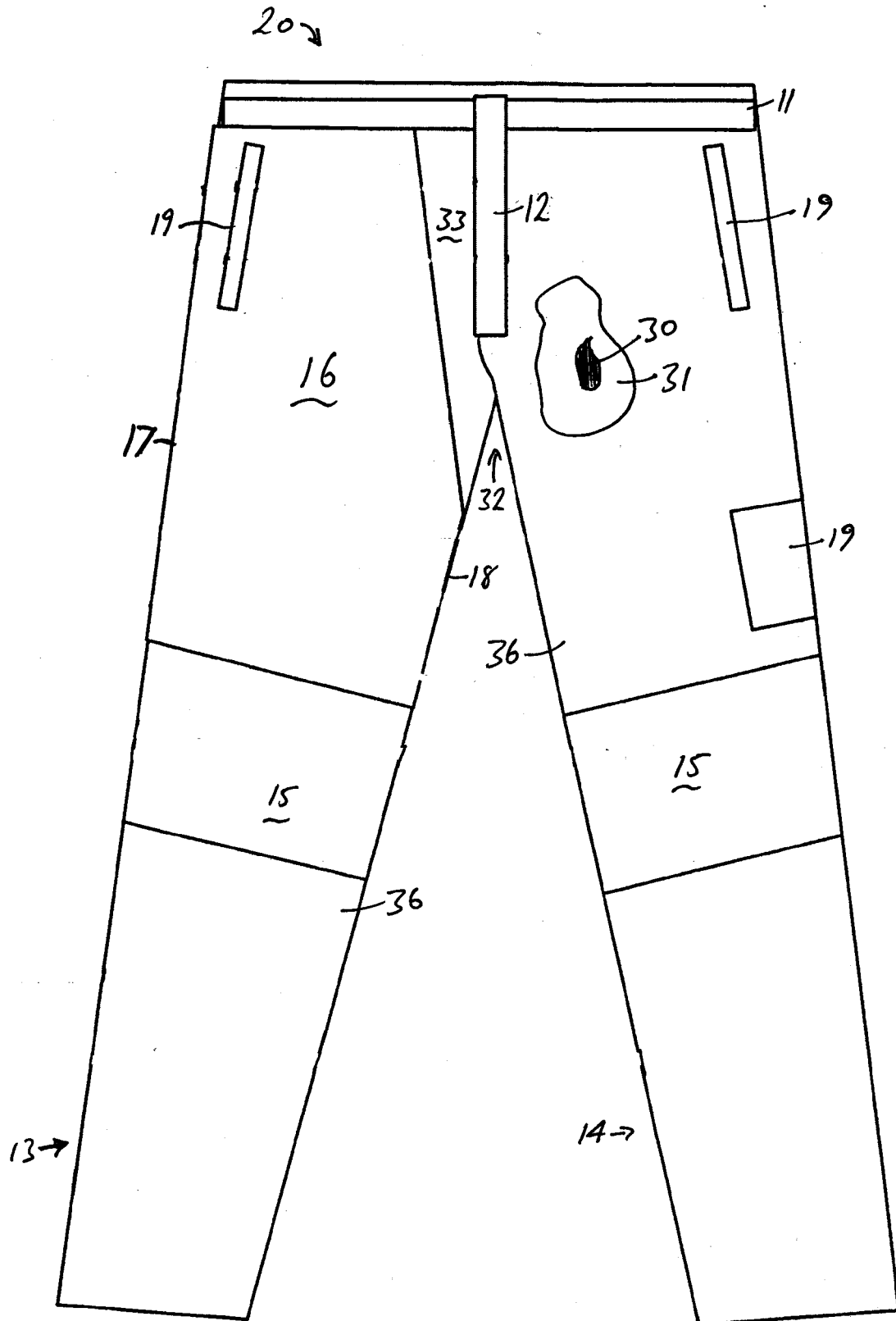


Fig. 2

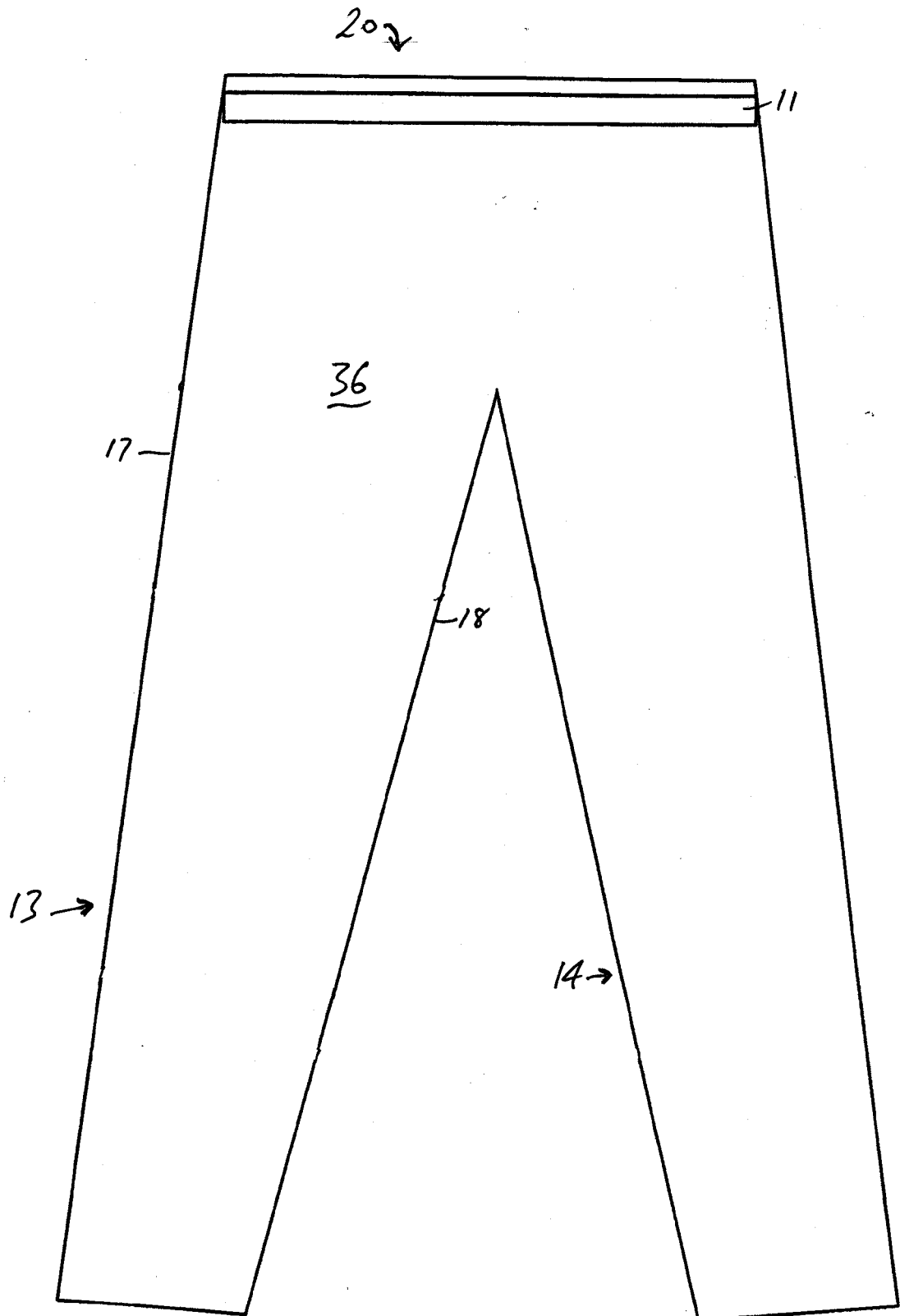
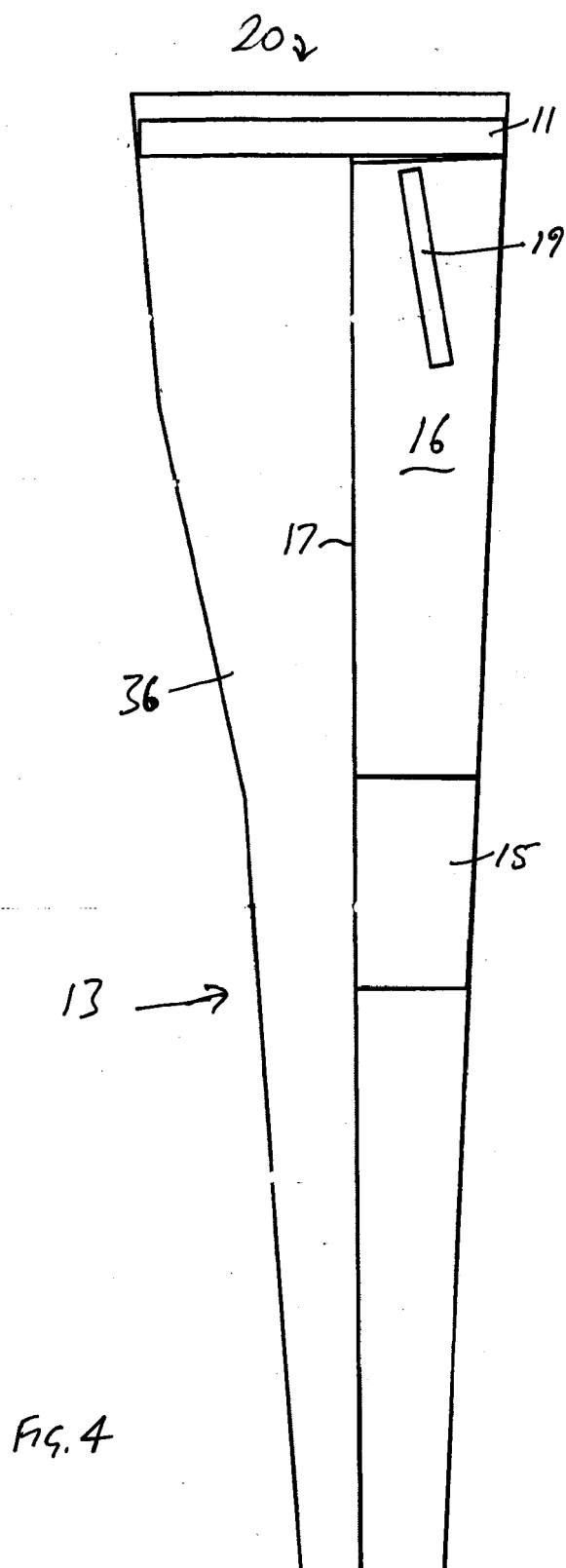
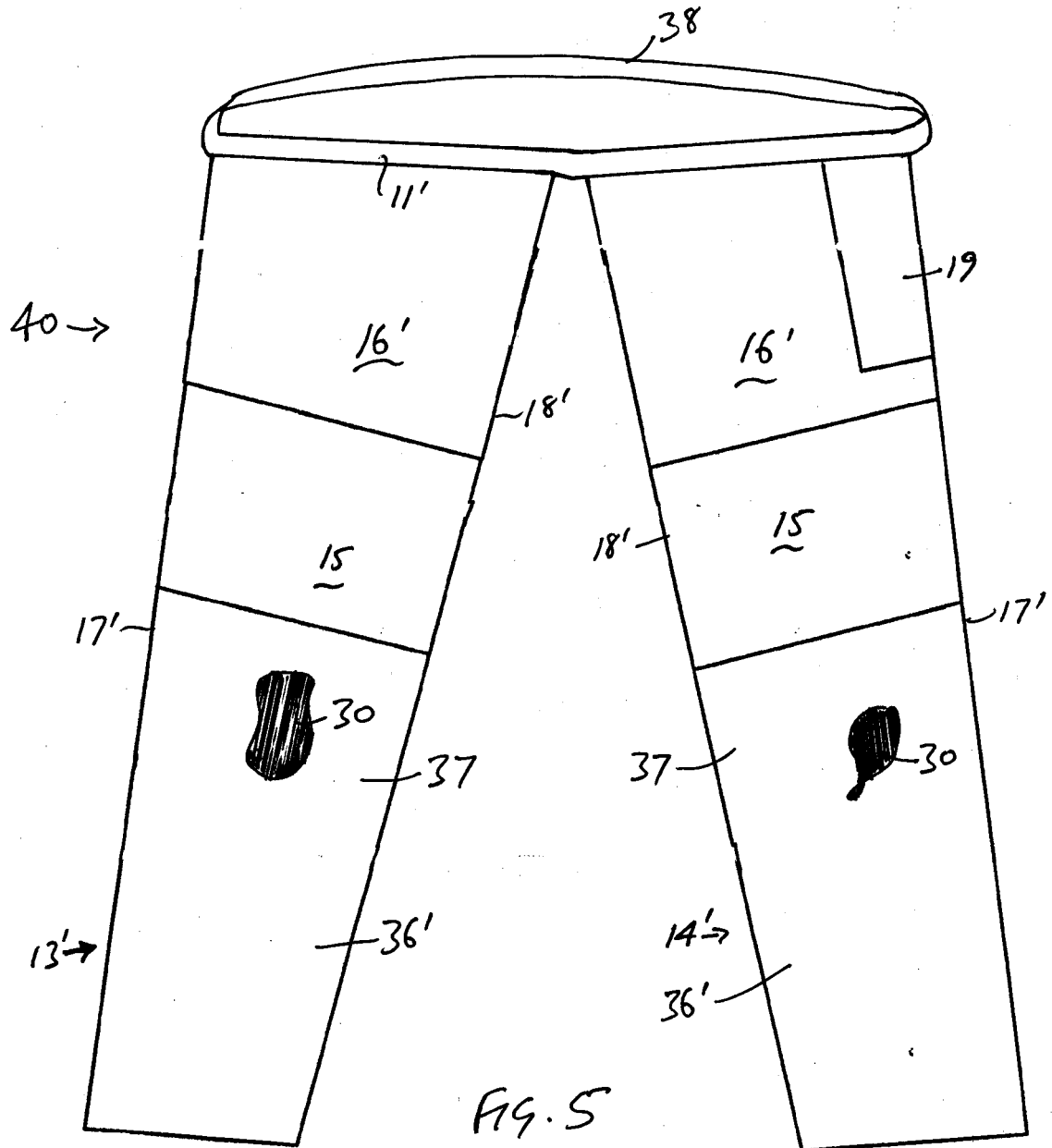


FIG. 3





REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20040181859 A [0010]