A boot assembly for use with a dry suit includes an external boot assembly and a dual-layered insert. The external boot comprises a reinforced upper portion and a back portion having a reinforced outside surface and an inside surface. The boot is connected to a pant leg by a top connecting cuff. The dual-layered insert comprises an inner fabric sock for over-foot wear and a waterproof outer elastomeric sock for nesting in the inner fabric sock in a water-tight manner.
BOOT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application No. 61/106,574 filed in the USPTO on Oct. 18, 2009.

FIELD OF THE INVENTION

This invention relates to the field of boots, shoes and leggings and more particularly to a boot assembly used in diving.

BACKGROUND OF THE INVENTION

Diving boots are often fixed to diving pants in a permanent combination. The diving boot will often experience greater wear than the pant because it is the base upon which diver stands. Furthermore, the diver will be placing fins on and off the boot which will cause additional wear. In situations where the boots are permanently fixed to the diving pant leggings, the boots cannot be replaced without cutting them off of the pant leggings and fixing a new pair of boots to the pant leggings. This is a costly and time-consuming process. Additional problems arise in trying to find a set of new boots of the proper size for the diver. Therefore, there is a continuing need for a diving boot assembly that can be used as replacements for worn boots and come in a size that is adaptable to most divers.

SUMMARY OF THE INVENTION

To overcome the deficiencies in the prior art and to provide a boot assembly for use with a dry suit comprising an outer pant and an inner pant my invention comprises a boot assembly comprising an external boot assembly and a dual-layered insert. The external boot comprises a reinforced upper portion and a back portion having a reinforced outside surface and an inside surface. The external boot has a durable outer sole, an inner sole, a reinforced outer heel portion and an inner heel. The boot is connected to a pant leg by a top connecting cuff. The dual-layered insert comprises an inner fabric sock for over-foot wear and a waterproof outer elastomeric sock for nesting in the inner fabric sock in a water-tight manner. The waterproof outer elastomeric sock includes a cuff connected to the dry suit inner pant leg bottom cuff creating a water-tight seal between the waterproof outer elastomeric sock and the dry suit inner pant leg bottom cuff so that said inner fabric sock remains dry when the assembly is submerged in water. In one embodiment of the invention the outer sock is sewn to the pant cuff. In another embodiment of the invention a temporary connection can be used such as one of a hook and loop connection means; a zipper, a magnetic connection or a quick disconnect ring-seal. In one embodiment of the invention, the outer elastomeric sock nests within the external boot and creates an intermittent void between them. This void is water filled when the boot assembly is submerged.

Further objects and advantages of the invention will become apparent from a consideration of the ensuring description and drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram of a diver wearing a diving suit having diving boots.

FIG. 2 is a side external view of one embodiment of the invention.

FIG. 3 is a top perspective view of one embodiment of the invention showing the inside of the boot.

FIG. 4 is a top view of one embodiment of the invention.

FIG. 5 is a side view of one embodiment of the invention.

FIG. 6 is a cross-sectional side view of one embodiment of the invention.

FIG. 7 is a sectional side view of another embodiment of the invention.

FIG. 8 is a view of one embodiment of a sole.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 and one embodiment of the invention is illustrated comprising a boot assembly 14 for use with a dry suit 12 worn by a diver 10. A dry suit 12 comprises a waterproof inside portion and a permeable outside portion. The inside portion keeps the diver 10 warm and dry and the outside portion provides for a thermal and physical barrier between the water and the inside portion. The dry suit is typically a single piece suit having the torso and legs joined as a single unit. The dry suit pants will have the same waterproof inside pant leg and water permeable outside pant leg.

Referring to FIG. 2, in this illustrated embodiment of the invention the boot assembly 14 comprises an external boot 15 comprising a reinforced upper portion 17 and a back portion 19 having a reinforced outside surface 20. There is a tensioning strap 16 for tightening the upper portion of the boot around the lower leg and ankle of the diver. The external boot further comprises a durable outer sole 26 and an inner sole, a reinforced outer heel portion 24 and an inner heel. There is also a top connecting cuff 28 for connecting by first connection means 30 to the dry suit 12 outer pant leg 13 bottom cuff 11. Above the outer sole 26 there is positioned a drainage port 22 for draining water from inside the boot.

Referring to FIG. 3, there is shown a top perspective view of the boot assembly 14 comprising an external boot 15 comprising a reinforced upper portion 17 and a back portion 19 having a reinforced outside surface 20. There is a tensioning strap 16 for tightening the upper portion of the boot around the lower leg and ankle of the diver. The external boot further comprises a durable outer sole 26 and an inner sole, a reinforced outer heel portion 24 and an inner heel. There is also a top connecting cuff 28 for connecting by first connection means 30 to the dry suit 12 outer pant leg 13 bottom cuff 11. Above the outer sole 26 there is positioned a drainage port 22 for draining water from inside the boot. This top perspective view of the boot assembly also illustrates the inside surface 34 of the boot.

Referring to FIG. 4 there is shown a top view of the boot assembly 14 comprising an external boot 15. The external boot further comprises a durable outer sole 26 and an inner sole. There is also a top connecting cuff 28 for connecting by first connection means 30 to the dry suit 12 outer pant leg 13 bottom cuff 11. This top view of the boot assembly also illustrates the inside surface 34 of the boot and the inner sole 40 of the boot.

Referring now to FIG. 5, there is illustrated one embodiment of the dual-layered insert 42 comprising an inner fabric sock 44 (not illustrated in this diagram) that is worn over the foot of the diver and a waterproof outer elastomeric
sock 46 for nesting the inner fabric sock 44 in a water-proof manner. The waterproof outer elastomeric sock 46 includes a cuff 48 connected by second connection means 50 to the dry suit inner pant leg 52 bottom cuff 54. Second connection means 50 affords a water-tight seal between the waterproof outer elastomeric sock 46 and the dry suit inner pant leg 52 bottom cuff 54 so that the inner fabric sock on the foot of the diver remains dry when the assembly is submerged in water. Referring to FIGS. 1 to 5 inclusive, in one embodiment of the invention the first connection means 30 comprises a permanent sewn connection. In another embodiment of the invention the first connection means comprises a temporary connection means comprising one of a hook and loop connection means; a zipper, a magnetic connection or a quick disconnect ring-seal. Other suitable connection means can be used as long as they are adapted for underwater applications. For example, in the embodiment shown in FIG. 2, the tab shown at 30 could have hooks on its inside surface adapted to mate with loops on the outside surface of the diving suit pant leg. As well, the diving suit lower cuff 54 inside surface could have hooks adapted to mate with loops around the outside surface of the top cuff of the boot shown at 28.

In one embodiment of the invention second connection means 60 comprises a permanent sewn connection. In another embodiment of the invention second connection means comprises a temporary connection comprising one of a hook and loop connection means, a zipper, a magnetic seal or a quick disconnect ring-seal. Other connections means can be used as long as they are suitable for underwater use. Referring now to FIG. 6, there is shown in this embodiment the elastomeric sock 46 nested within the external boot 15. The elastomeric sock conforms substantially to the shape of the external boot. The elastomeric sock when nested within the external boot creates an intermittent void 60 between them. The void is intermittent because it will shift as the diver moves his foot inside the external boot. The void will be filled with water when the assembly is submerged. To quickly drain the assembly when it is lifted out of the water, the external boot 15 further comprises at least one drainage port 22 proximate to the durable sole portion 26.

Referring back to FIG. 5, the outer elastomeric sock 46 comprises a cuff 48, a heel 62 having an outside surface 64, a back panel 66 having an outside surface 68, a sole 70 having an outside surface 72 and a toe 74.

In one embodiment of the invention the outer elastomeric sock 46 and the external boot 15 are temporarily fixed together by fixing means. In one embodiment of the invention the temporary fixing means comprises a hook and loop fastening system. For example, in FIG. 5, panel 66 outside surface 68 could comprise hooks adapted to mate with loops on the inside surface of the boot. A similar placement of hooks and loops could be placed on the outside surface 72 of the sole of the elastomeric sock and the inside surface of the sole of the boot.

In FIG. 5, and in one embodiment of the invention the external boot 15 inner sole 40 is covered in hooks and the outer elastomeric sock 46 sole 70 outside surface 72 is covered in loops from heel 74 to the toe 74. The back portion inside surface 80 (FIG. 3) of the external boot 15 could include a strip of hooks running from the cuff 28 to the heel 24. The back panel 66 outside surface 68 of the outer elastomeric sock 46 could include a strip of loops running from the cuff 48 to the heel 62. Hence, when the outer elastomeric sock is inserted into the external boot the hooks on the boot and the loops on the elastomeric sock mesh to hold the elastomeric sock to the boot. This prevents the sock from lifting as the diver walks and permits the diver to remove her foot from the sock without pulling the sock out of the boot.

Referring to FIG. 7, and in one embodiment of the invention the external boot 15 top connecting cuff 28 first connection means 30 comprises a circumferential outer ring of hooks 90 and a plurality of tabs 92 spaced radially around the connecting cuff. Each of the tabs 92 has an inside surface comprising fastening hooks and a clean outside surface. The dry suit outer leg 13 bottom cuff 11 comprises a circumferential ring of loops disposed on the dry suit bottom cuff inside and outside surfaces. The circumferential ring of loops inside surface meshes with the outer ring of hooks on the cuff of the external boot. The circumferential ring of loops outside surface meshes with the inside surfaces of the plurality of tabs 92 thereby creating a temporary connection between the external boot and the outer leg of the dry suit.

Referring to FIG. 8, and in one embodiment of the invention the outer elastomeric sock 46 includes a stiffening insole 96 inserted into the sock. The stretched sole of the elastomeric sock will engage the adjacent inside surfaces of the external boot 15 and provide resistance to lifting of the elastomeric sock within the external boot. The diver will be able to remove her foot from the assembly without pulling the elastomeric sock from the external boot.

In one embodiment of the invention the external boot further includes a tightening strap 16 on the outer surface thereof for constricting the upper portion.

In another embodiment of the invention there is contemplated a boot assembly for wearing as an all weather boot, winter boot or fishing boot. In this embodiment there is a boot assembly comprising an external boot comprising a reinforced upper portion and a back portion having a reinforced outside surface and an inside surface. The boot has a durable outer sole and an inner sole, a reinforced outer heel portion and an inner heel. The boot further has a top connecting cuff for connection by connection means to a dual-layered insert. The dual layer insert comprises an inner fabric sock for over-foot wear and a waterproof outer elastomeric sock for nesting the inner fabric sock in a water-tight manner. The waterproof outer elastomeric sock includes a cuff connected by connection means to the external boot thereby affording a water-tight seal between the external boot and the outer elastomeric sock.

Although the description above contains many specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the present preferred embodiments of the invention. The scope of the invention should be determined by the appended claims and their legal equivalents rather than by the examples given.

What is claimed is:

1. A boot assembly for use with a dry suit, said dry suit comprising an outer pant and an inner pant, said assembly comprising:

   a. An external boot comprising:
   i. A reinforced upper portion and a back portion having a reinforced outside surface and an inside surface;
   ii. A durable outer sole and an inner sole;
   iii. A reinforced outer heel portion and an inner heel; and,
   iv. A top connecting cuff for connection by first connection means to said dry suit outer pant leg bottom cuff; and,
b. a dual-layered insert comprising:
   i. An inner fabric sock for over-foot wear;
   ii. A waterproof outer elastomeric sock for nesting said inner fabric sock in a water-tight manner;
   iii. Wherein said waterproof outer elastomeric sock includes a cuff connected by second connection means to said dry suit inner pant leg bottom cuff; and,
   iv. Wherein said second connection means affords a water-tight seal between the waterproof outer elastomeric sock and the dry suit inner pant leg bottom cuff so that said inner fabric sock remains dry when the assembly is submerged in water.

2. The assembly of claim 1 wherein said first connection means comprises a permanent sewn connection

3. The assembly of claim 1 wherein said first connection means comprises a temporary connection means comprising one of a hook and loop connection means; a zipper, a magnetic connection or a quick disconnect ring-seal.

4. The assembly of claim 1 and claim 2 wherein the second connection means comprises a permanent sewn connection.

5. The assembly of claim 1 and claim 2 wherein the second connection means comprises a temporary connection comprising one of a hook and loop connection means, a zipper, a magnetic seal or a quick disconnect ring-seal.

6. The assembly of claims 1 to 5 wherein the outer elastomeric sock conforms substantially to the shape of the waterproof external boot.

7. The assembly of claim 6 wherein the outer elastomeric sock nested within the external boot creates an intermittent void between them, and wherein said intermittent void is water filled when the assembly is submerged.

8. The assembly of claim 7 wherein the external boot comprises at least one drainage hole proximate to said durable sole portion thereof, said at least one drainage hole adapted for draining said water from the intermittent void when the assembly is removed from water.

9. The assembly of claim 8 wherein the outer elastomeric sock comprises a cuff, a heel having an outside surface, a back panel having an outside surface, a gusset, a sole having an outside surface, a toe and an instep.

10. The assembly of claim 9 wherein the outer elastomeric sock and the external boot are temporarily fixed together by fixing means.

11. The assembly of claim 10 wherein said temporary fixing means comprises a hooks and loops fastening system.

12. The assembly of claim 11 wherein said external boot inner sole is covered in said hooks and said outer elastomeric sock outside surface is covered in said loops from said heel to said toe.

13. The assembly of claim 12 wherein said inside surface of said external boot back portion includes a strip of hooks running from the cuff to the heel and wherein said back panel outside surface of the outer elastomeric sock includes a strip of loops running from the cuff of the outer elastomeric sock to the heel of the outer elastomeric sock.

14. The assembly of claim 13 wherein the outer elastomeric sock is inserted into the external boot so that the hooks on the boot and the loops on the elastomeric sock mesh to hold the elastomeric sock to the boot.

15. The assembly of claim 1 wherein said external boot top connecting cuff first connection means comprises a circumferential outer ring of hooks and a plurality of tabs spaced radially around the connecting cuff, wherein each of said tabs has an inside surface comprising fastening hooks and a clean outside surface.

16. The assembly of claim 15 wherein the dry suit outer leg bottom cuff comprises a circumferential ring of loops disposed on the dry suit bottom cuff inside and outside surfaces.

17. The assembly of claim 16 wherein said circumferential ring of loops inside surface meshes with said outer ring of hooks and wherein said circumferential ring of loops outside surface meshes with said inside surfaces of the plurality of tabs thereby creating a temporary connection.

18. The assembly of claim 1 wherein the outer elastomeric sock includes a stiffening insole inserted therein so that the sole of the outer elastomeric sock will engage the adjacent inside surfaces of the external boot and provide resistance to lifting of the elastomeric sock within the external boot.

19. The assembly of claim 1 wherein the external boot further includes a tightening strap on the external surface thereof for constraining said upper portion.

20. A boot assembly comprising:
   a. An external boot comprising:
      i. A reinforced upper portion and a back portion having a reinforced outside surface and an inside surface;
      ii. A durable outer sole and an inner sole;
      iii. A reinforced outer heel portion and an inner heel; and,
      iv. A top connecting cuff for connection by connection means to;
   b. a dual-layered insert comprising:
      i. An inner fabric sock for over-foot wear;
      ii. A waterproof outer elastomeric sock for nesting said inner fabric sock in a water-tight manner;
      iii. Wherein said waterproof outer elastomeric sock includes a cuff connected by said connection means to said external boot thereby affording a water-tight seal between the external boot and said outer elastomeric sock.

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