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DRAWINGS ATTACHED

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(54) IMPROVEMENTS RELATING TO FOOTWEAR

(71) I, JOSEPH FRANCIS DYMOND, of "Rosendale", Eveswell Park Road, Newport, Monmouthshire, a British Subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to footwear, and particularly but not exclusively, to sporting footwear such as football, hockey and like boots, and golf and tennis shoes for example. The invention may also have application to ballroom dancing shoes and other kinds of footwear.

It has previously been proposed to provide a boot or shoe with a set of studs mounted on a plate which is rotatably fixed to the sole, so that when the studs embed in e.g. turf, the sole can pivot relative to the studs. This enables the wearer to pivot about e.g. the ball of the foot whilst providing security against slipping. However, when it is attempted to translate this idea into practical articles it is found that either the whole sole is made rigid and inflexible which is not suitable or convenient for field sports for example, or if the more usual flexibility is retained then turf and mud tend to accumulate between the sole and the plate and either wedge the latter against rotation or make the footwear uncomfortable and impractical.

The object of the invention is to provide a solution to this problem.

According to the invention, a ground engaging device for use on or forming part of the sole and/or heel of an article of footwear, comprises an annulus mounted for rotation relative to the device, a base forming part of the device or of the sole or heel and extending around and beyond the periphery of said annulus, said annulus being resilient and being deformed against its resilience by a retainer plate located generally within the inner periphery of the annulus and secured to said base to be fast against rotation relative to the base, whereby the outer periphery of the annulus is maintained urged against said base when the latter flexes away from the annulus.

The annulus may conveniently be arranged for retention on the base by co-operation of inclined surfaces on the retainer plate and annulus, and the annulus may conveniently be provided with ground-engaging studs or spikes, or other non-skid devices such as ribs.

In order that the invention may be more fully understood, an embodiment in accordance therewith will now be described by way of example, with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of an article of footwear embodying the invention, and

Figure 2 is an enlarged cross-sectional elevation of part of the sole of an article of footwear showing one embodiment of the rotatable device.

Referring to the drawings, Figure 1 shows an article of footwear in the form of a football or hockey boot 1 for example, having a rotatable portion 2 on the relatively thin sole thereof. The possibility of a further or alternative rotatable portion at the heel of the boot is shown in broken lines at 3.

Figure 2 shows a portion of the sole proper 4, and this may be of leather or a moulded composition. The sole 4 is provided on its outer surface with a circular raised portion 5, and a circular retainer plate 6 moulded from plastics material, such as P.V.C. polypropylene or the material sold under the Trade Mark "Rigidex" for example, is secured to the raised portion by screws 7 engaged in bosses 8 formed on the retainer. Instead of the screws passing from inside the boot into the sole, it is also possible for them to extend in the opposite direction through the retainer 6 and engage in threaded bushes, as of brass for example embedded in the raised portion 5.

The edge 9 of the raised portion 5 is inclined towards the centre of the portion in a direction away from the sole, and the edge

10 of the retainer is inclined away from its centre in a direction away from the sole. The inclinations of the two edges 9, 10 are such that they include approximately a right angle.

Annulus 11 having ground engaging studs 12 distributed around it has a pair of approximately mutually perpendicular surfaces 13, 14 at its inner peripheral edge arranged so as closely to engage respectively with the inclined surfaces of the sole and retainer. The annulus, in its unconstrained state before attachment to the boot, has an outer edge portion curved out of the general plane thereof in the manner shown in broken lines at the right-hand side of Figure 2.

The studded annulus is assembled to the boot by placing it around the raised portion and taking its inclined surface 13 into mating relationship with the corresponding surface 9 on the sole, and placing the retainer 6 aaginst the sole with its inclined surface 10 in mating relationship with the other inclined surface 14 and screwing the retainer to the sole by means of the screws 7. When the retainer is screwed up into position with the edge 15 of the annulus in contact with the sole, or preferably with the base of a shallow circular groove 16 in the sole, the curved edge portion is resiliently deformed to the position shown at the left hand side of Figure 2 so that it is continuously resiliently urged against the sole or into the groove 16, even during flexing of the sole when worn, to form a seal which may very largely prevent dirt from entering behind the element and hindering rotation. The raised portion 5 of the sole may be hollowed or dished in one or more regions to increase flexibility and thus that of the sole in those regions and to minimise weight. The retainer 6 may also be cut away in one or more regions for the same reasons. The annulus 11 has a number of transverse ribs 11*a*, and the retainer 6 has a lip 6*a*, a portion 6*b* of the outer surface of which is normally in contact with the adjacent ends of the ribs. This arrangement provides additional security against the inclined surfaces of the element and retainer becoming disengaged during flexing of the sole.

The rotatable portion of the footwear may be provided with any convenient form of skid resistant device or formation depending on the type of footwear concerned; for example, studs, spikes, ribs or brushes or various combinations thereof may be used.

The sole may be ribbed, grooved or otherwise shaped to minimise the area of contact with the part 11. Moreover, the sole may be made of for example two layers, the lower of which may be apertured to receive the rotatable portion, and the retainer secured to the upper of the soles. Where any form of fastening device is secured through the upper surface of the sole or soles, a sock or lining may be located over the fastenings.

An alternative embodiment of the general kind shown in Figure 2 uses a retainer having a peripheral rib, preferably of generally domed section which co-operates with a complentary groove on an annular stud-carrying part generally similar to 11 in Figure 2. The rib and groove replace the inclined surface on retainer and element and the retainer is secured in position as shown in Figure 2 or by a central securing means. The outer edge of the studded element is resiliently engaged with the boot sole or a base in similar manner to that shown in Figure 2.

In another alternative, the raised portion 5 is omitted in order to give maximum flexibility; the bosses 8 may then be omitted also, and the annulus 11 may then be held in place and under its deformation solely by co-operation between the retainer 6 and the surfaces 10, 14. These may be inclined at a flatter angle in this event, i.e. the included angle between surface 10 and the axis of rotation may be greater than illustrated.

Fig. 2 illustrates, in chain-dot lines, how the annulus will follow the sole during flexing of the same to exclude dirt.

WHAT I CLAIM IS:—

1. A ground engaging device for use on or forming part of the sole and/or heel of an article of footwear, comprising an annulus mounted for rotation relative to the device, a base forming part of the device or of the sole or heel and extending around and beyond the periphery of said annulus, said annulus being resilient and being deformed against its resilience by a retainer plate located generally within the inner periphery of the annulus and secured to said base to be fast against rotation relative to the base, whereby the outer periphery of the annulus is maintained urged against said base when the latter flexes away from the annulus

2. A device as claimed in Claim 1 wherein the annulus is located within a recess formed in said base.

3. A device as claimed in Claim 1 or Claim 2, wherein the base and retainer plate have co-operating inclined surfaces and the annulus has complementary surfaces.

4. A device as claimed in any of Claims 1 to 3 wherein the annulus is provided with a plurality of studs for ground engagement.

5. An article of footwear incorporating a ground engaging device substantially as

10 of the retainer is inclined away from its centre in a direction away from the sole. The inclinations of the two edges 9, 10 are such that they include approximately a right angle.

Annulus 11 having ground engaging studs 12 distributed around it has a pair of approximately mutually perpendicular surfaces 13, 14 at its inner peripheral edge arranged so as closely to engage respectively with the inclined surfaces of the sole and retainer. The annulus, in its unconstrained state before attachment to the boot, has an outer edge portion curved out of the general plane thereof in the manner shown in broken lines at the right-hand side of Figure 2.

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The rotatable portion of the footwear may be provided with any convenient form of skid resistant device or formation depending on the type of footwear concerned; for example, studs, spikes, ribs or brushes or various combinations thereof may be used.

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Fig. 2 illustrates, in chain-dot lines, how the annulus will follow the sole during flexing of the same to exclude dirt.

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2. A device as claimed in Claim 1 wherein the annulus is located within a recess formed in said base.

3. A device as claimed in Claim 1 or Claim 2, wherein the base and retainer plate have co-operating inclined surfaces and the annulus has complementary surfaces.

4. A device as claimed in any of Claims 1 to 3 wherein the annulus is provided with a plurality of studs for ground engagement.

5. An article of footwear incorporating a ground engaging device substantially as

hereinbefore described and illustrated in the accompanying drawing.

6. A ground engaging device for an article of footwear substantially as hereinbefore described with reference to the accompanying drawings.

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