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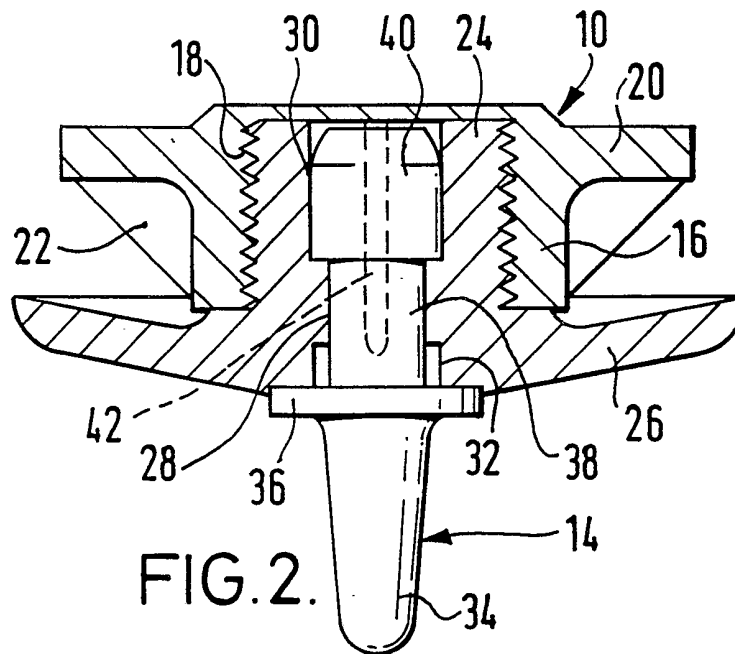
(56) Documents cited
GB 1336646 A GB 1328589 A

(58) Field of search
UK CL (Edition K) A3B
INT CL⁵ A43B, A43C

(54) Studs for sports shoes

(57) The invention relates to studs for sports shoes of the kind in which there is a socket 10, a spigot 26 and a metal spike 14 inserted in the spigot. The invention provides a method of retaining the metal spike in the spigot, which does not involve deforming the spike after it has been inserted. Thus, it is possible to use very hard metals, such as tungsten carbide, for construction of the spike.

The spike 14 has a shank 38 which is received in the spigot 26, but there is either a collar 30 on the shank, so that the spigot has to be distended to allow the spike to be fitted, and when the spigot recovers, it provides shoulders on the shank and the bore of the spigot interengaging to prevent release of the spike, or the spigot provides a collet type gripping action on the shank of the spike due to interengagement of the spigot with the socket.



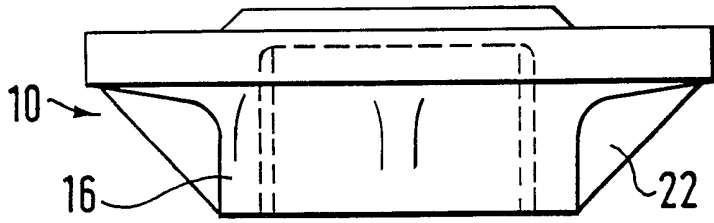


FIG. 1.

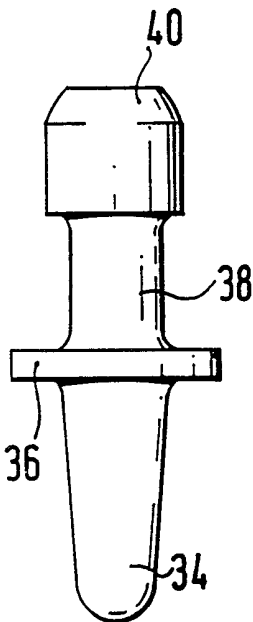
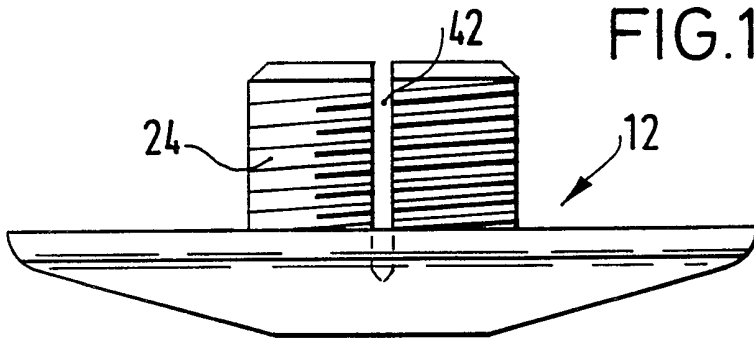


FIG. 3.

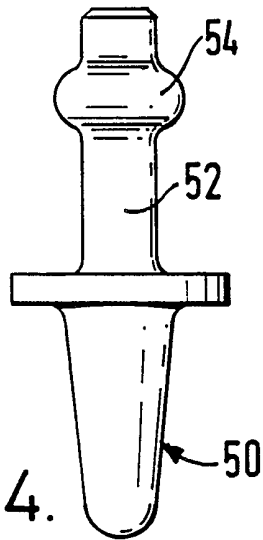


FIG. 4.

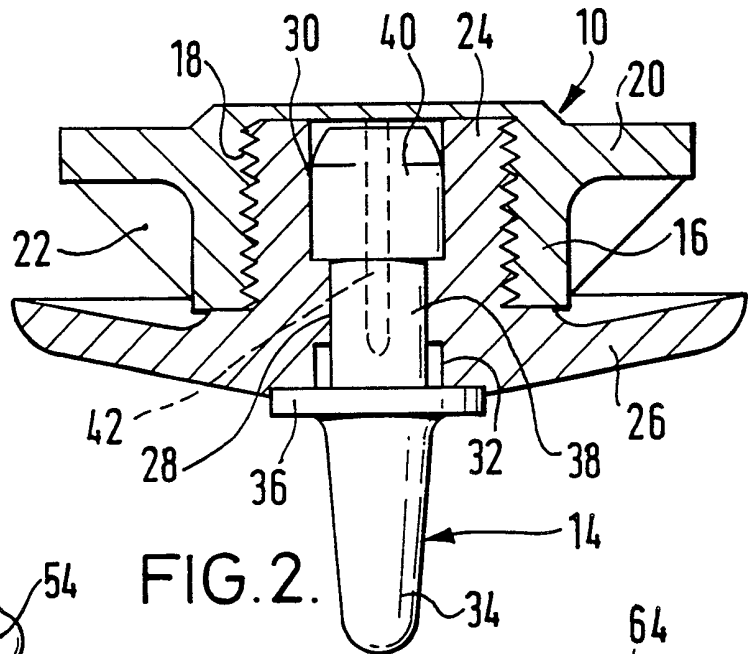


FIG. 2.

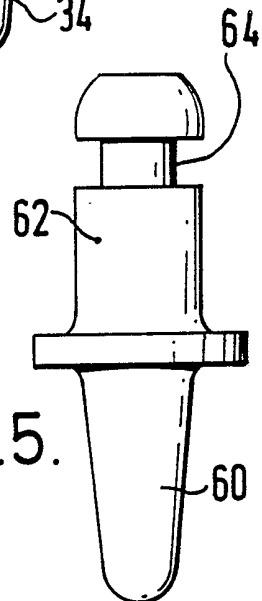


FIG. 5.

STUDS FOR SPORTS SHOES

The invention relates to studs for sports shoes and more particularly, to spiked studs, as used for example in cricket; hockey; golf; running and angling.

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Conventionally, a spiked stud for a sports shoe comprises a socket which is embedded in or attached to the shoe sole or heel and a spigot member adapted for releasable connection into the socket, there being a metal spike projecting below the body of the spigot member. The spike may be made integral with
10 the body of the spigot member, but more frequently, the body is made in plastics material and the spike has a shank fitted into a bore of the body. In the case of a separate spike, a shoulder on the spike engages with the underside of the body, and the upper end of the spike is formed into a shank, which enters the spigot. After the shank has been fitted into the bore of the
15 spigot, the upper end of the shank is deformed (punched, peened or spun) to form a projecting lid on the top end of the shank, which prevents withdrawal of the spike from the spigot body. The invention is concerned with studs of the kind having separate metal spikes fixed in a spigot, but it is to be understood that the spigot is not necessarily made in plastics material.

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For certain purposes, it is desirable to make the spike in very hard metal (e.g. tungsten carbide) but it is not then possible to deform the upper end of the spike, to retain it in the spigot. In any event, deforming the upper end of the spike is an additional manufacturing step and adds to the cost of manufacture.
25 It is an object of the invention to provide a stud for a sports shoe of the kind in which a separate metal spike is secured in a spigot, which obviates the necessity for deforming the spike during manufacture of the stud.

According to a first aspect of this invention, a stud for a sports shoe comprises a socket; a spigot for releasable engagement in the socket; a separate spike having a shank received in a bore in the spigot and projecting from the spigot; there being interengaging parts of the shank and the spigot which prevent withdrawal of the shank from the spigot and which can only be engaged by temporarily distorting the spigot during the insertion of the spike shank into the spigot.

Preferably the construction of the interengaging parts of the shank and the spigot is such that the spigot is distended during the insertion of the spike shank. The spigot may be constructed of material having a sufficient degree of resilience to permit the distortion required to allow the shank and spigot to be interengaged but to ensure recovery of the spigot after insertion of the shank, which provides the spike-retaining interengagement of the shank and spigot.

In the preferred construction, the spigot is constructed so that it can distend to allow insertion of the shank, and the socket is adapted to constrain the spigot when the latter is engaged in the socket to ensure the spike-retaining interengagement of the shank and the spigot.

According to a preferred feature of the invention, the spigot is divided along part of its length to facilitate distention of the split part of the spigot, the spike-retaining formation in the spigot bore being in the divided portion of the spigot. The spigot may be divided by one or more radial slits.

In one construction, the shank of the spike is cylindrical, but there is a collar formed on the shank and the spigot has a bore which includes a counterbore

to receive the collar, so that the lower face of the collar and the bottom annular face of the counterbore provide the required spike-retaining interengaging parts of the spike and spigot.

5 In a second construction, similar to the first, the collar on the shank is an annular protuberance, the radial cross-section of which is substantially that of a sector of a circle, there being a correspondingly shaped annular recess in the bore of the spigot to receive the collar.

10 In a third construction, the shank of the spike is cylindrical, but an annular recess is formed in it and there is a corresponding annular excrescence in the bore of the spigot.

The spike may be made of hard metal, e.g. high carbon steel; tungsten
15 carbide or tungsten, vanadium or chromium steel.

According to a second aspect of the invention, a stud for a sports shoe comprises a socket; a spigot for releasable engagement in the socket; a separate spike having a shank received in a bore in the spigot and projecting
20 from the spigot; the spigot being deformable and the connection between the spigot and socket being such that the socket is compressed onto the shank of the spike, whereby the spike is retained in the bore of the spigot by friction.

This provides an alternative to the interengaging parts of the shank and spigot
25 of the first aspect of the invention, because the shank and bore of the spigot can be parallel sided, since reliance is placed on the gripping action due to compression of the spigot by the socket for retaining the shank of the spike in the spigot.

Preferably the spigot is divided along part of its length to facilitate compression of the divided part of the spigot as the means of gripping the shank of the spike. The spigot may be divided by one or more radial slits.

5 It is further preferred that the part of the spigot which is received in the socket is tapered, the lower portion being an interference fit in the bore of the socket, so that drawing the spigot into the socket produces the compression of the spigot onto the shank of the spike.

10 As in the first aspect of the invention, the spike may be made of hard metal, e.g. high carbon steel; tungsten carbide or tungsten, vanadium or chromium steel.

A stud for a sports shoe in accordance with the invention and some variations
15 will now be described by way of examples only, with reference to the accompanying drawings, in which:-

Figure 1 shows in elevation a socket and a spigot member separated from each other,

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Figure 2 is a cross-section through a completed stud,

Figure 3 is an elevation of the spike used in the stud illustrated in Figure 2,
and

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Figures 4 and 5 illustrate alternative forms of spike for use in a sports stud.

The stud which is illustrated in Figures 1, 2 and 3 of the drawings is intended for use in a sports shoe such as a cricket shoe, and essentially comprises a socket member 10, a spigot member 12 and a spike 14. Both the socket member 10 and the spigot member 12 are moulded in plastics material such as polyethylene or polyurethane, and it is in any case desirable that the spigot member 12, should be formed in a material which has a degree of deformability and resilience.

As is more clearly shown in Figure 2, the socket member 10 comprises a boss 16 formed with a blind bore 18 which is screw-threaded, this bore being open on the underside, a flange 20, and a series of angularly spaced fillets 22. In use, the socket 10 is moulded into the sole or heel (not shown) of the shoe, and frequently the sole or heel of the shoe is made of the same plastics material as the socket 10. The moulding is such that the bottom surface of the boss 16 lies flush with or just above the bottom surface of the sports shoe itself.

The spigot member 12 comprises a central cylindrical spigot 24, which is screw-threaded for engagement in the screw-threaded bore 18 of the socket 10, and a relatively large flange 26. The spigot is itself bored through from top to bottom at 28, but there is a deep counterbore 30 from the upper end, and a relieving counterbore 32 at the lower end. As illustrated in Figure 2, when the spigot 12 is screwed into the socket 10, the flange 26 eventually engages with the bottom face of the boss 16, and in this position, the periphery of the flange 26 lies slightly above the bottom face of the boss 16. However, in practice, this means that when the spigot 12 is screwed into the socket 10, the flange 26 comes into engagement with the undersurface of the

sole or heel, and is deflected downwardly, thereby ensuring that the flange 26 grips tightly onto the underface of the sole or heel.

The pin 14 in this particular example is made of sintered tungsten carbide. This means that the pin is very hard, and is well able to withstand severe wear. Consequently, the stud is superior to conventional studs in terms of its wear resisting qualities. However, as has been pointed out earlier, it is not possible to deform a stud made of tungsten carbide as part of the fitting process.

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The lower portion of the spike 14 comprises the conventional tapered spike element 34 with a hemispherical lower end, a flange 36 which engages in a very shallow recess in the underface of the flange 26 of the spigot member, and a shank 38. The latter is generally cylindrical, but at its upper end, it is formed with a boss or collar 40, of appreciably larger diameter than the lower portion 38 of the shank. The lower portion 38 is a tight fit within the bore 28 of the spigot 12, and the collar 40 is a tight fit in the counterbore 30 of the spigot.

20 The central boss 24 of the spigot member 12 is formed with a diametral slit 42 (see especially Figure 1).

25 During construction of the stud, the shank of the spike 14 is forced into the bore of the spigot member 12 from the underside. It will be noted that the upper end of the collar 40 is tapered, and when this tapered portion of the collar 40 engages with the lower end of the part of the spigot surrounding the bore 28, the spike can only be further progressed upwardly by forcing the collar 40 through that part of the bore of the spigot, and this can only be

achieved by distending the spigot. Distension of the spigot is facilitated by the diametral slit 42, which effectively divides the boss of the spigot into two semi-cylindrical parts. Once the collar 40 has arrived entirely in the counterbore 30 of the spigot member - by which time, the collar 40 will be engaged in the shallow recess on the underside of the flange 26 - the resilience of the boss 24 causes the latter to spring inwardly, so that the counterbore 30 engages tightly around the collar 40. It will be appreciated, therefore, that in effect, the construction of the bore of the spigot and the shank of the spike provides a snap-in type fitting for the shank of the spike in the spigot member.

Once the spike has been fitted into the spigot, it is then possible to screw the spigot into the socket of the shoe, in the ordinary way. However, the interference between the collar 40 and the bore of the boss 24 may be such that the boss 24 remains somewhat outwardly distended. In that case, when the boss 24 is screwed into the socket 10, the socket will itself grip the boss 24 and force it inwardly, thereby compressing the spigot onto the shank of the spike, thus ensuring that, once the spigot has been fitted into the socket, it is impossible for the spike to be detached, because it is no longer possible for the boss 24 to be distended outwardly. Since the socket is required to constrain the spigot, it may be reinforced against radial expansion. Also, to ensure that the socket applies a sufficient inward force on the spigot, the threads of the spigot and socket screw connection may be other than the conventional V-cross-section.

Figure 4 illustrates a spike 50, which is generally similar in construction to the spike 14, excepting that it has a shank 52 which is parallel sided throughout most of its length, there being an annular protuberance 54 near to

the upper end of the shank, the radial cross-section of which is that of a sector of a circle. This spike would be used with a spigot member similar to that shown at 12 in Figures 1 and 2, excepting that, instead of the counterbore 30 at the upper end of the spigot, the bore of the spigot may simply be undercut with a groove of corresponding cross-section to the protuberance 54, to receive that protuberance when the spike is inserted into the spigot.

Turning now to Figure 5, there is illustrated yet another spike 60, which again is of similar construction to the spike 14, but in this case, its shank 62 is of approximately the same diameter as the collar 40 shown in Figure 3, but there is an annular recess 64 formed in the shank 62. With this construction of spike, the bore of the spigot 12 is a tight fit on the main portion 62 of the shank, but internally of that bore, there is an annular excrescence or rib, which is of corresponding shape to the annular recess 64 in the spike. This annular rib engages in the recess 64 when the spike is forced into the spigot.

In an alternative construction which is not illustrated, the screw-threaded bore of the socket member is tapered, and the socket 24 is correspondingly tapered, the lower portion of the boss 24 being a considerable interference fit in the bore of the socket 10. As with the construction illustrated in Figure 1, there may be a diametral slit 42 formed in the boss, or there may be two or more diametral slots, dividing the boss into a series of segments.

The shank of the spike is completely parallel sided, so that there is no snap-in fitting effect. It is, however, a tight fit in the parallel sided bore of the spigot, and the shank may be knurled or otherwise roughened to increase the gripping effect of the spigot on the shank.

With this construction the shank of the spike is forced into the bore of the spigot, but when the spigot is tightened into the socket, towards the end of that tightening action, because of the interference fit between the spigot and the socket, the segments of the boss are deformed inwardly by the socket, so that they grip on the shank of the spike after the manner of a collet. There are thus no spike retaining interengaging shoulders in this construction (whereby it differs from the construction illustrated in Figures 1, 2 and 3) but the spike is retained entirely by the compression force applied to the boss of the spigot by the interconnection between the spigot and the socket.

CLAIMS

1. A stud for a sports shoe comprising a socket; a spigot for releasable engagement in the socket; a separate spike having a shank received in a bore in the spigot and projecting from the spigot; there being interengaging parts of the shank and the spigot which prevent withdrawal of the shank from the spigot and which can only be engaged by temporarily distorting the spigot during the insertion of the spike shank into the spigot.
2. A stud for a sports shoe as claimed in Claim 1, in which the construction of the interengaging parts of the shank and the spigot is such that the spigot is distended during the insertion of the spike shank.
3. A stud for a sports shoe as claimed in Claim 1 or Claim 2, in which the spigot is constructed of material having a sufficient degree of resilience to permit the distortion required to allow the shank and spigot to be interengaged but to ensure recovery of the spigot after insertion of the shank which provides the spike-retaining interengagement of the shank and spigot.
4. A stud for a sports shoe as claimed in any one of Claims 1 to 3, in which the spigot is constructed so that it can distend to allow insertion of the shank, and the socket is adapted to constrain the spigot when the latter is engaged in the socket, to ensure the spike-retaining interengagement of the shank and the spigot.

5. A stud for a sports shoe as claimed in any one of Claims 1 to 4, in which the spigot is divided along part of its length to facilitate distortion of the divided part of the spigot, the spike retaining formation in the spigot bore being in the divided portion of the spigot.
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6. A stud for a sports shoe as claimed in Claim 5, in which the spigot is divided by one or more radial slits.
7. A stud for a sports shoe as claimed in any one of Claims 1 to 6, in which the shank of the spike is cylindrical but there is a collar formed on the shank and the spigot has a bore which includes a counterbore to receive the collar, so that the lower face of the collar and the bottom annular face of the counterbore provide the required spike-retaining interengaging parts of the spike and spigot.
- 10
8. A stud for a sports shoe as claimed in any one of Claims 1 to 6, in which the collar on the shank is an annular protuberance, the radial cross-section of which is substantially that of a sector of a circle, there being a correspondingly shaped annular recess in the bore of the spigot.
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9. A stud for a sports shoe as claimed in any one of Claims 1 to 6, in which the shank of the spike is cylindrical, but an annular recess is formed in it and there is a corresponding annular excrescence in the bore of the spigot.
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10. A stud for a sports shoe as claimed in any one of Claims 1 to 9, in which the spike is made of hard metal, such as high carbon steel; tungsten carbide or tungsten, vanadium or chromium steel.
- 5 11. A stud for a sports shoe comprising a socket; a spigot for releasable engagement in the socket; a separate spike having a shank received in a bore in the spigot and projecting from the spigot, the spigot being deformable and the connection between the spigot and socket being such that the socket is compressed onto the shank of the spike, 10 whereby the spike is retained in the bore of the spigot by friction.
12. A stud for a sports shoe as claimed in Claim 11, in which the spigot is divided along part of its length to facilitate compression of the divided part of the spigot as the means of gripping the shank of the 15 spike.
13. A stud for a sports shoe as claimed in Claim 12, in which the spigot is divided by one or more radial slits.
- 20 14. A stud for a sports shoe as claimed in any one of Claims 11 to 13, in which that part of the spigot which is received in the socket is tapered, the lower portion being an interference fit in the bore of the socket so that drawing the spigot into the socket produces the compression of the spigot onto the shank of the spike.
- 25 15. A stud for a sports shoe as claimed in any one of Claims 11 to 14, in which the spike is made of hard metal, such as high carbon steel; tungsten carbide or tungsten, vanadium or chromium steel.

16. A stud for a sports shoe constructed and arranged substantially as herein described with reference to Figures 1, 2 and 3 or Figures 1, 2 and 3 as modified by Figure 4 or as modified by Figure 5 of the accompanying drawings.

Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

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Relevant Technical fields

- (i) UK Cl (Edition K) A3B
- (ii) Int CL (Edition 5) A43B A43C

Search Examiner

J GRAHAM

Databases (see over)

- (i) UK Patent Office
- (ii)

Date of Search

28 APRIL 1992

Documents considered relevant following a search in respect of claims

1-16

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1336646 (WHITE KNIGHT) whole document	1-8, 9-13 15
X	GB 1328589 (BRU&Y) see page 2 lines 23, 24 and lines 34-37	1-4 10, 11, 15

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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