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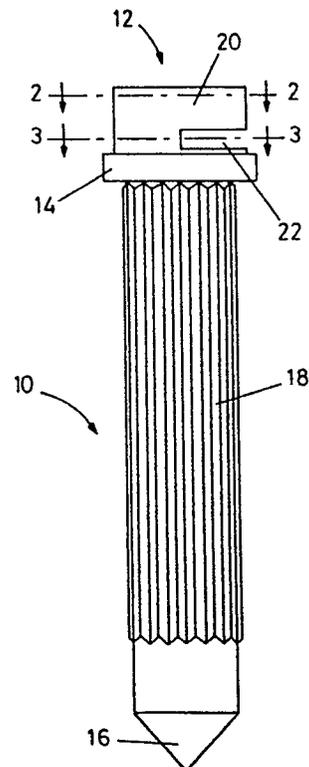
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⑤④ **Heel pins for ladies' shoes.**

⑤⑦ A heel pin is provided for attaching a top piece to the heel of a ladies' shoe. The pin comprises a shank 10 separated from a head 12 by a collar 14, the head being of a small size relative to the diameter of the shank so that the heel pin is suitable for use in particularly slender heels. The head 12 contains a cup 26 with at least one aperture 22 cut through a side of the head to the cup, so that the plastics material of the top piece 28 or of a cap 24 passes through the aperture to provide a mechanical interlock with the head 12.



**FIG.1**

**EP 0 379 345 A1**

## Heel Pins for Ladies' Shoes

### Technical Field

In the manufacture of high heels for ladies' shoes, the main body of a heel is usually made of a light, rigid plastics material such as polystyrene. It is then necessary to provide a top piece of a more durable material to protect from wear the surface of the heel that is in contact with the ground. Such a top piece may be fastened to the heel by means of a heel pin having a head embedded in the material of the top piece and a shaft wedged tightly in a reinforced hole in the body of the heel.

Fashion often dictates that high heels should be as slender as possible and consequently the small area of the top piece is subjected to high pressure and increased wear, requiring a highly resilient material if the top piece is to have a satisfactorily long useful life. Another problem to be overcome in the design of a top piece is the tendency of the top piece to be levered away from the heel pin if the heel becomes somehow trapped during use.

### Background Art

Metal top pieces which overcome the above problems are known but their rigidity allows for no absorption of the impact of the footfall and so the foot is uncomfortably jarred on each step. Therefore it has been found preferable to use plastics materials for top pieces. However, the steel heel pin generally used for securing a plastic top piece to a heel has a jagged head to improve its bond with the plastic. When wear causes the pin head to be exposed to the walking surface of the top piece, its sharp edges can cause great damage to floor surfaces and particularly to those made of wood.

One known method of making a plastic top piece which avoids some of the aforementioned problems is to surround the head of the heel pin with a highly resilient plastic cap and to construct the rest of the top piece from a more flexible material which cushions the footfall, is less prone to skidding on smooth surfaces and causes less damage to floors.

Wear is accentuated on that portion of a plastic top piece that lies below the pin head in use because there is a reduced thickness of plastic in that portion to absorb the impact of each footfall. Thus a small pin head is desirable for prolonging the life of a top piece because of its small area of accentuated wear and the extra thickness of plastic it accommodates.

Patent Specification GB 1024185 discloses a heel dowel for attaching a lift to the heel of a woman's shoe, wherein the shank of the dowel extends substantially the full height of the heel. The dowel has an enlarged head in the form of a slotted, cylindrical cup through and around which the lift material is moulded to form a mechanical interlock.

Patent Specification GB 936597 discloses a heel lift with a similarly elongated metallic pin member having a head embedded in the lift body and openings in the side walls of the head through which an elastic material forms a mechanical bond.

In each of these documents the described construction of the head portion requires that it be of a greater diameter than the shank. Thus the head must inevitably be large, especially since in the described embodiments the shank is long enough and thick enough to provide the heel's strength. This prevents the manufacture of heels as slender as might be desired and gives poor resistance to wear.

### The Invention

The invention provides a heel pin for securing a top piece on a ladies' shoe heel, which pin comprises a knurled shank for driving into a reinforcement tube moulded in the heel, a collar around an end of the shank, a head above the collar, a cup formed in the top of the head, and an aperture through a side of the head to the cup.

The invention further provides for such a heel pin further comprising a cap of plastics material moulded around the head and within the cup and connecting through the aperture to form a mechanical interlock between the cap and the head of the pin.

This construction allows for the head of the pin to be relatively small compared with the diameter of the shank and so top pieces may be attached to more slender heels than was previously possible, without reduction in the strength with which they are attached. Also, the extra thickness of plastic accommodated by a small pin head provides longer and more even wear.

### The Drawings

Figure 1 is an elevation of a heel pin according to the invention;

Figure 2 is a section on line 2-2 of Figure 1;

Figure 3 is a section on line 3-3 of Figure 1;

Figure 4 is a plan view of a heel pin including a plastic cap, showing its location in a top piece; and

Figure 5 is a section on line 5-5 of Figure 4.

**Best mode for carrying out the invention**

Figure 1 shows a heel pin comprising a shank 10 and a head 12 separated by a collar 14 around the circumference of the shank. In the illustrated embodiment, the shaft 10 has a conical point 16 at the end remote from the head 12, for ease of insertion into a reinforcement tube in a shoe heel. The shank 10 is also provided with a knurled portion 18 in the form of ridges extending longitudinally along the shaft from the collar 14. When, in use, the heel pin is located in the reinforcement tube, the ridges engage the inner surface of the tube to prevent relative rotation of the heel pin and the heel.

The sections of Figures 2,3 and 5 help to illustrate the structure of the head 12 of the pin. The head 12 is formed on the collar 14 such that the outer diameter of the head is smaller than the diameter of the collar. Within the head 12 a cup 26 is formed so as to be surrounded by a cylindrical wall 20. At least one aperture is cut through the wall 20 to the cup 26 and in the preferred embodiment the aperture is in the form of a single transverse slot 22, extending approximately halfway around the circumference of the wall 20 as shown in Figure 3.

Figures 4 and 5 illustrate a cap 24 made of a plastics material surrounding the head 12 of the pin. The cap 24 is moulded around the head 12 when the plastic is in a liquid state, enabling the liquid plastic to fill the cup 26, to surround the outer surface of the wall 20 and to flow through the slot 22, thereby connecting together the plastic within the cup 26 and the plastic outside the wall 20. This ensures that, when the plastic is set, there is a mechanical interlock between the cap 24 and the head 12 so that the cap can only be detached by breaking the plastic.

For use in particularly slender heels, the cap 24 may constitute the whole of the top piece but more usually the cap will be located in a hole in a separate top piece 28 of more flexible material, as illustrated. The shank 10 of the heel pin is driven into a reinforcement tube in a shoe heel and the cap 24 is shaped so as to hold the top piece 28 firmly to the heel, with the walking surface 30 of the cap 24 lying flush with the walking surface 32 of the top piece 28. The cap 24 may be provided with protrusions 34 to hinder relative rotation between the cap and the top piece 28 during use. Alternatively, the material of the top piece 28 may be chosen to have a slightly higher melting point

than that of the cap 24. Then, if the top piece 28 is moulded around the cap 24, there will be some melting of the material of the cap where it contacts the material of the top piece, forming a strong bond between the two.

**Claims**

- 10 1. A heel pin for securing a top piece on a ladies' shoe heel, which pin includes a knurled shank (10) for driving into a reinforcement tube moulded in the heel, and is characterized in having: a collar (14) around an end of the shank (10), a head (12) above the collar (14), a cup (26) formed in the top of the head, and an aperture through a side of the head to the cup.
- 15 2. A heel pin according to claim 1 wherein the aperture through the side of the head (12) to the cup (26) is a transverse slot.
- 20 3. A heel pin according to claim 1 or claim 2 further including a cap (24) of plastics material moulded around the head (12) and within the cup (26) and connecting through the aperture to form a mechanical interlock between the cap (24) and the head (12) of the pin.
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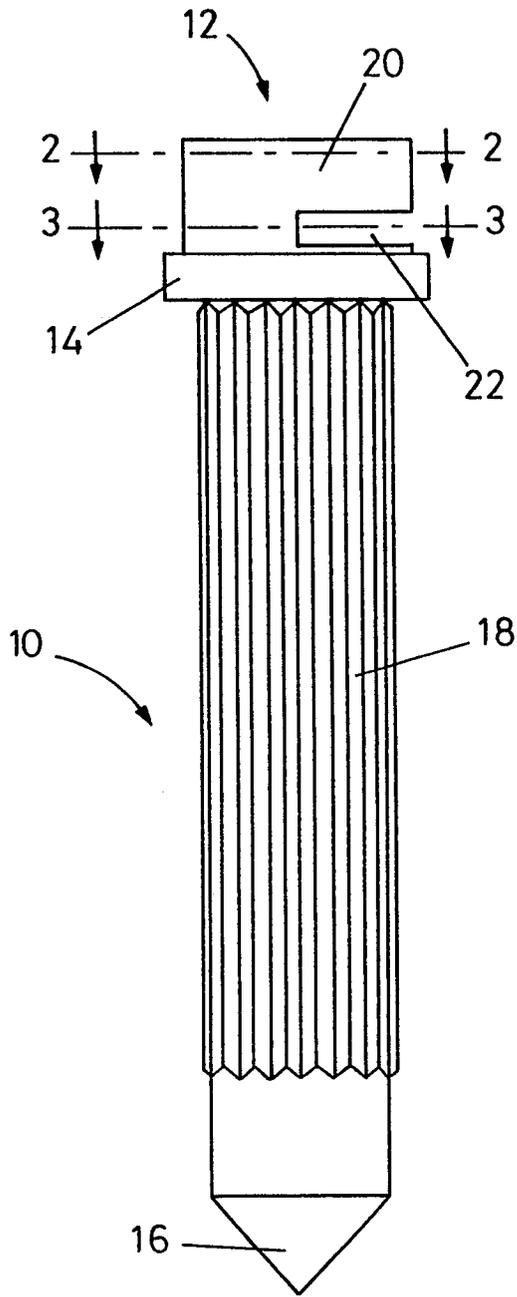


FIG. 1

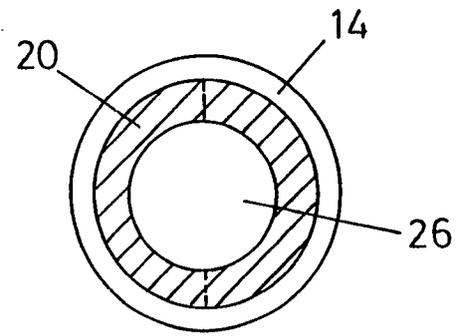


FIG. 2

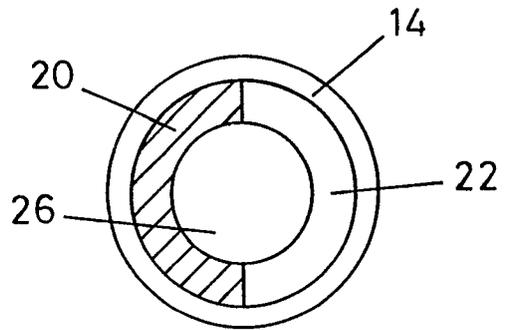


FIG. 3

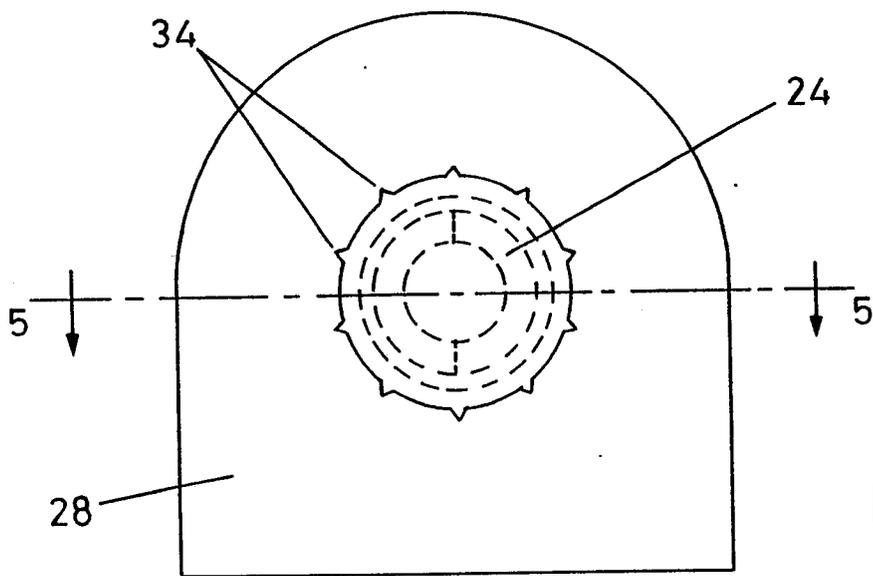


FIG. 4

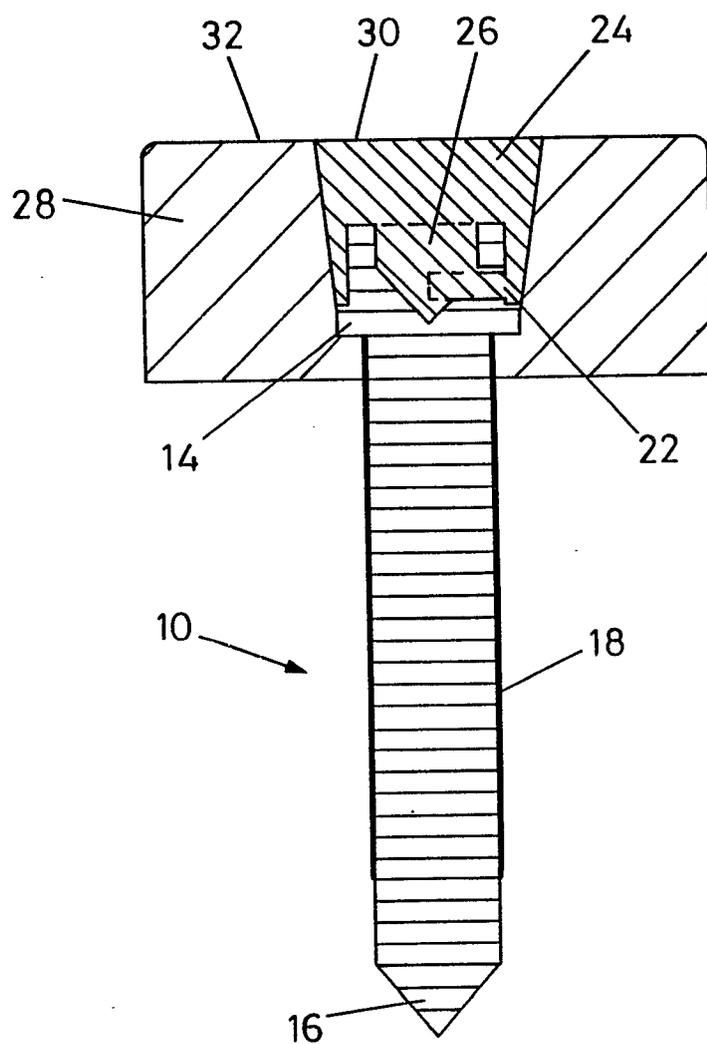


FIG. 5



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 076 632 (ABBEY PLASTICS) ----	1	A 43 B 21/42
A	GB-A-1 096 664 (G. LUFF) ----	1	
A	US-A-3 119 192 (F. RONCI) ----	1	
A	US-A-3 074 187 (N. KLEIN) ----	1	
A	FR-A-1 431 039 (E. VAUX) ----	1	
A	FR-A-1 409 879 (E. VAUX) ----	1	
A	US-A-4 403 426 (S. KAPLAN) -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A 43 B A 43 C
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>11-05-1990</b>	Examiner <b>DECLERCK J.T.</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	