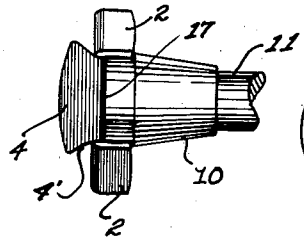
Oct. 15, 1963 A. F. BALL 3,106,791

REINFORCING HEEL INSERT AND HEEL

Filed Nov. 16, 1960

Fig. 2



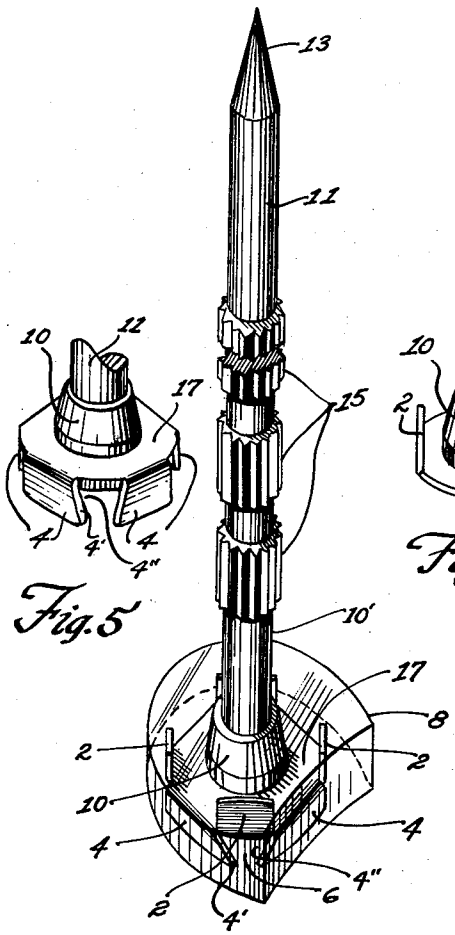


Fig. 1

Fig. 5

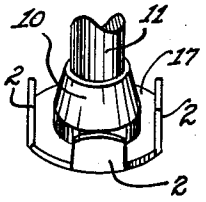


Fig. 4

Fig. 3

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REINFORCING HEEL INSERT AND HEEL

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The present invention relates to reinforced heels for shoes and the like and reinforcing components thereof, being more particularly directed to plastic heels.

In my copending application, Serial No. 731,040, filed April 25, 1958, for "Reinforced Heel, Insert and Method," there is disclosed a novel insert or dowel that provides structural rigidity to thin-stem plastic heels and the like, with insurance that the reinforcing dowel employed therein cannot move in any direction within the stem, and with the added feature of securing a toplift to the heel that cannot separate or move relative to the heel and its reinforcing dowel. While this invention has been found to work admirably well in practice, there are occasions where certain materials that are particularly impact-stretchable are employed as toplifts, markedly increasing the tendency for the loosening or deterioration of the toplift itself, during use.

It is to this problem that the present invention is primarily directed, dealing with a new and improved reinforcing dowel or insert of the type disclosed in the said co-pending application that is more particularly adapted for utilization with molded plastic lifts and the like, particularly where plastic materials are employed that are of the types that tend to stretch upon impact.

A further object of the invention is to provide a new and improved heel-reinforcing dowel.

Still an additional object is to provide a new and improved heel of the character described.

Other and further objects will be explained hereinafter and will be more particularly pointed out in connection with the appended claims.

In summary, however, from perhaps its broadest point of view, the present invention involves the employment of a longitudinally extending reinforcing dowel of hard metal and the like for a relatively fragile heel, the dowel being provided at one end with a head of cross-dimension large compared with that of the body of the dowel and provided along the periphery of the head with longitudinally extending separated projections. Preferred constructional details are set forth hereinafter.

The invention will now be described in connection with the accompanying drawing, FIG. 1 of which is a perspective view of a reinforcing dowel or insert embodying the invention in preferred form, and secured to a toplift;

FIG. 2 is a fragmentary longitudinal view of the lower end of the dowel;

FIG. 3 is a view similar to FIG. 1, upon a somewhat reduced scale, of a heel strengthened by the insert of FIGS. 1 and 2 and provided with a toplift secured thereto through the medium of that insert; and

FIGS. 4 and 5 are fragmentary views, similar to FIG. 1, of modification.

A reinforcing dowel insert of the general type described in the said copending application is illustrated at 11, as of hardened steel and the like, intermediately provided with ridge means 15 for driving into the walls of a recess 9 in the thin stem 5 of a plastic or similar heel 1, FIG. 3. The recess 9 extends from the lift end 7 of the heel toward the heel seat 3. The ridge means 15 is shown in the preferred form of a plurality of separated sections, though continuous ridge means or other securing means may be employed, as disclosed in the said copending application; in all cases, the ridge means 15 being of slightly greater diameter than the body of the dowel 11 and

slightly greater than the corresponding diameter of the recess 9 in the heel stem 5, in order that the driving of the insert 11 into the recess 9 will secure the dowel against all possible longitudinal, circular or other movement therein.

The longitudinally extending dowel 11 is provided with a head 17 which is of diameter much larger than that of the ridges 15, and that protrudes below the lift-receiving region 7 of the heel stem 5, when the dowel is driven into the recess 9. The periphery of the dowel head 17 is provided with alternately upwardly and downwardly longitudinally extending projections 2 and 4. The projections of the set of upwardly extending projections 2 are spaced or separated from one another circumferentially about the periphery of the head 17, as are the downward projections of the set of projections 4, with the projections 2 being interlaced between the projections 4 and extending upward from the space between adjacent downwardly extending projections 4, for an important purpose, later described.

It has been found that when impact-stretchable plastic of the type before mentioned is molded about the head 17 and the sets of projections 2 and 4, it is necessary not only to provide sufficient locking and securing to the plastic, but sufficient points of resistance to the tendency of the plastic to stretch upon impact and the like, as well. To this end, experimentation has demonstrated that the shape of one of the sets of projections, shown as the downwardly extending projections 4, is preferably made substantially rhombic, which term is intended to connote generically diverging or converging side edges 4' for the projections. In FIG. 1, the spaces between the projections 4 will also define substantially rhombic areas 6. Above these substantially rhombic areas 6, the preferably substantially rectangular projections 2 extend upwardly from the periphery of the head 17. This construction may readily be obtained by bending upwardly successive segments of a peripheral flange of a larger-diameter head 17 to form the projections or prongs 2, and then bending downwardly the remaining peripheral portions adjacent thereto, as at 4, in manner so as to provide nonparallel diverging or converging side edges 4'. The projections 4 are preferably also bent either inwardly or outwardly to provide a somewhat arcuate, rather than straight right-angular, locking pocket 4'' between the inner surfaces thereof and the head 17.

The dowel 11 is then ready for insertion within a jig, not shown, that receives the lower ridged portion of the dowel and seats the toplift end 17 thereof in a cavity that is to be filled with the plastic material from which the toplift 8 is to be molded. A somewhat tapered section 10 is provided, preferably of greater diameter than that of the ridges 15, and converging slightly from the head 17 to insure that, when the head 17 is seated in the mold cavity, the free edges of the projections 2 are free of the bottom wall of the cavity and thus can be adequately covered-over with the plastic lift-producing material. Successive concentric regions 10 and 10' are thus provided between the head 17 and the ridges 15 that are, respectively, of greater and less diameter than the ridges 15, and the upper projections 2 at least in part overlap portions of the region 10. Through this technique, it is insured that the molded plastic not only covers the complete extent of the upward and downward projections 2 and 4, but extends within and locks between the inner surfaces of the projections 2, the upper face of the head 17 and the adjacent portion of the dowel 11, as well as within the rectangular spaces between projections 2 and the intermediate lower substantially rhombic spaces 6 between the projections 4, and within the volume bounded between the projections 4 and the lower face of the head 17.

Under these circumstances, it has been found that even the type of stretchable plastic materials above referred to, are imbued with a sufficient and appropriate distribution of points or regions of resistance to spreading or stretching provided by this geometrical configuration, in accordance with which the upper rectangular volumes between projections 2 are interlaced between the lower substantially rhombic volumes between projections 4, so as to enable even these plastics to be successfully employed in accordance with the present invention.

As a typical illustration, a dowel 11 for a spike plastic heel may be made of No. 1039 steel wire hardened to 45–48 on the Rockwell-C scale, having a body diameter of about 0.141 inch, ridges 15 of about 0.145 inch diameter, a head 17 about 0.250 inch in diameter, projections 2 and 4 of overall width about 0.1 inch, and a tapered section 10 reducing to a diameter about 0.148 inch. Such a dowell 11 has been found extremely satisfactory for use with urethane, polyurethane and other impact-stretchable plastic lifts, including, also, some forms of nylon and the like, which, however, unlike the urethane, are much more resistant to stretching under impact.

In all cases, the height of the molded lift 8 will be slightly greater than the over-all height of the oppositely extending projections 2 and 4.

In some instances, only the downward projections 4 may be desired, as in the embodiment of FIG. 5; whereas, in other applications the set of upward projections alone may be used, FIG. 4. The downward and upward sets of projections may also be interchanged, if desired, and the projections 4 may alone be used as upward projections. When the downward projections alone are used, however, as in FIG. 5, the same advantages as exist in the embodiment of FIG. 1 obtain wherein the downwardly extending projections serve also to assist as wearing surfaces as the plastic heel becomes worn away.

Further modifications will occur to those skilled in the art and all such are considered to fall within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A longitudinally extending reinforcing dowel of hard metal and the like, for a relatively fragile heel, provided at one end with an integral head of cross dimension large compared with that of the body of the dowel and provided at a plurality of spaced regions along the periphery of the head with a corresponding plurality of longitudinally extending projections, said projections diverging from said head about bending lines which are substantially circumferential with respect to the axis of said dowel and being separated from the body of said dowel with their major inner surfaces facing said axis.

2. The invention of claim 1, said head having at a plurality of spaced regions interlaced with the first-mentioned spaced regions another plurality of projections, the projections of the first-mentioned plurality extending in a direction opposite to the direction of the other plurality.

3. The invention of claim 2, the projections of one plurality having greater area than the projections of the other.

4. The invention of claim 2, said dowel having a lift of plastic material that tends to stretch under impact molded over said head, with plastic received within the spaces between and locking to the projections, the head, and the adjacent portion of the body of the dowel, the height of said lift being only slightly greater than the overall height of said oppositely extending projections.

5. The invention of claim 1, said major surfaces being substantially rhombic.

6. The invention of claim 1, the body of said dowel being intermediately provided with ridge means of predetermined diameter, the portion of the dowel disposed between said head and said ridge means having first and second successive regions of diameter greater and less than the said predetermined diameter, respectively.

7. The invention of claim 1, said dowel being provided with a convergingly tapered section adjacent said head.

8. In combination, a fragile plastic heel having a narrow longitudinal stem recessed from a lift-receiving end upward to a heel seat, a reinforcing dowel of hard metal being intermediately provided with ridge means of cross-dimension slightly larger than that of said recess and being driven into said recess and locked within the walls thereof, said dowel having at one end an integral head located below the lower end of said recess, said head being of larger cross-dimension than said ridge means and having at a plurality of spaced regions along its periphery a corresponding plurality of longitudinally extending projections, said projections diverging from said head about bending lines which are substantially circumferential with respect to the axis of said dowel and being separated from the body of said dowel with their major inner surfaces facing said axis, and a lift of plastic material that tends to stretch under impact molded over said head and projections with the plastic received within the spaces between and locking to the projections, the head, and the adjacent portion of the body of the dowel, the upper surface of the lift contacting the lift-receiving end of the heel stem.

References Cited in the file of this patent

UNITED STATES PATENTS

2,937,461	Trela	May 24, 1960

FOREIGN PATENTS

1,227,916	France	Mar. 7, 1960
1,238,402	France	July 4, 1960
826,006	Great Britain	Dec. 23, 1959
847,575	Great Britain	Sept. 7, 1960
853,118	Great Britain	Nov. 2, 1960