A. F. DURGIN.

NON-SLIPPING SHOE.

APPLICATION FILED FEB. 4, 1914.

1,123,503. Patented Jan. 5, 1915.

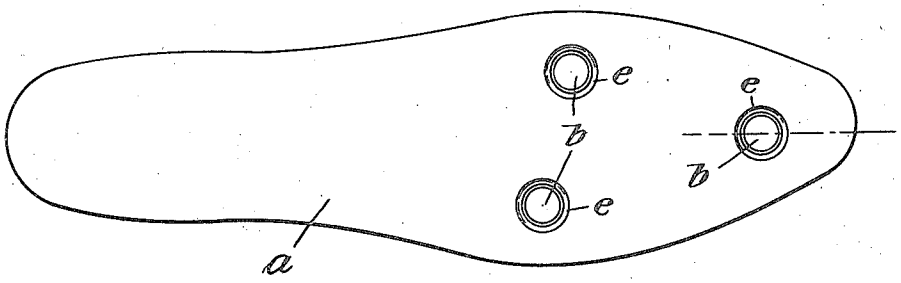


Fig. 1.

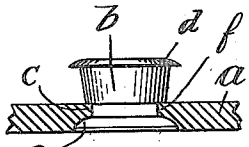


Fig. 4.

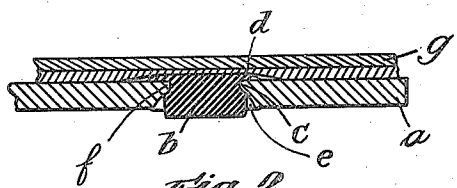


Fig. 2.

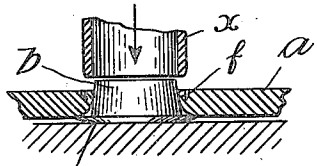


Fig. 5.

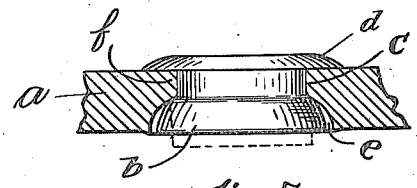


Fig. 7.

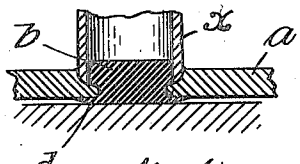


Fig. 6.

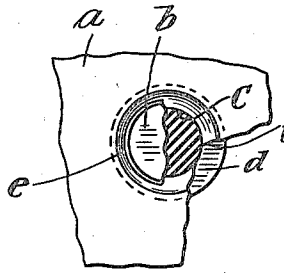


Fig. 3.

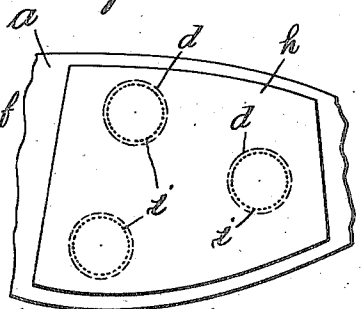


Fig. 8.

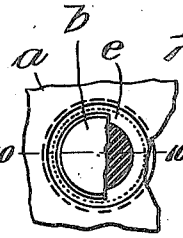


Fig. 9.

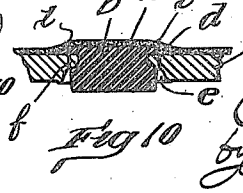


Fig 10

Witnesses:
H. B. Davis.
C. Doyle.

Inventor:
Arthur F. Durgin
by Poyst Hammond
atty's

UNITED STATES PATENT OFFICE.

ARTHUR F. DURGIN, OF HAVERHILL, MASSACHUSETTS.

NON-SLIPPING SHOE.

1,123,503. Specification of Letters Patent. Patented Jan. 5, 1915.

Application filed February 4, 1914. Serial No. 816,463.

To all whom it may concern:

Be it known that I, ARTHUR F. DURGIN, a citizen of the United States, residing at Haverhill, in the county of Essex and State of Massachusetts, have invented an Improvement in Non-Slipping Shoes, of which the following is a specification.

It is a common expedient, in the manufacture of shoes, more usually dancing slippers, to insert one or more rubber plugs in the leather soles to prevent slipping of the wearer. One method has been to form an aperture through the sole and to fit the plug closely therein throughout the entire thickness of the sole, the outer end of the plug usually being made flush with the sole surface, so that the bottom of the shoe is continuous. The plug has usually been held in position in such case by a thin flange or sheet, on its inner end, which is interposed between the outer sole and the inner sole. From practical tests I have ascertained that a rubber plug which is fitted in an aperture through the sole throughout the entire thickness of the latter, is, to a large extent, ineffective for the purpose intended, and is open to various objections, to some of which reference will be made. I have ascertained that, under these conditions of use, the surface of the rubber soon becomes glazed over with dirt, so that practically all the frictional qualities of the rubber are lost, this being due to the fact that the rubber is rigidly held by the leather so that the dust becomes forced into the grain of the rubber. If it is attempted to obviate these objections by extending the rubber plug beyond the surface of the sole, the weight of the wearer will, to an extent, be supported on the plug, thus causing the plug to be forced inward either independently of, or with the sole, so that the plug is pressed against the foot of the wearer, or, in other words, the weight of the wearer is supported on the plugs, (of which at least three are commonly employed), instead of on the entire surface of the shoe bottom. This renders the shoe so uncomfortable to wear that to extend the plugs beyond the surface of the sole is considered impractical, and, in any event, the projecting ends would soon become worn, or chipped off in use, as the plugs are firmly held by the sole. I have further ascertained that when the plug fits the sole throughout the entire thickness of the latter, the direct lateral pressure on the leather, by the plug, causes the aperture in the sole to become enlarged, so that the plug becomes loose therein and may easily be forced inward.

The object of my invention is to arrange one or more rubber plugs in a sole, or toplift of a heel, in such a manner that the surface of the plugs will not become slippery from wear, and the effectiveness with which the plugs hold the shoe from slipping will be greatly increased, while at the same time, the wear thereon will be greatly reduced, and further, the objections attendant to the projection of the plugs beyond the surface of the sole will be avoided.

Another object is to provide an effective means for holding the plugs in place in a sole, so that, when worn, they can be neither pressed inwardly nor outwardly, and will not become loosened by the enlargement of the holes in which they are placed, and so that leakage of water past the plugs will be prevented.

I accomplish these objects by forming an aperture through the sole of materially less diameter than that of the rubber plug to be inserted therein, and by recessing or counterboring the outer end of said aperture, so that, when a plug is inserted therein, its outer end-portion will be free to spread and yield transversely in all directions and its tread surface will not become glazed, or its frictional qualities become impaired, and so that its ability to resist wear will be much greater than that of the rigidly held plug, above referred to, and the tendency which the latter has to become worn concave at its end will be avoided.

For a further understanding of my invention reference is made to the accompanying drawing, in which,

Figure 1 is a plan view of a sole of a shoe provided with my invention. Fig. 2 is a sectional view of a portion of the shoe bottom. Fig. 3 is a plan view, partly broken-away, of the outer side of the plug arranged in the sole. Figs. 4, 5 and 6 are detail sectional views showing the process of inserting a plug. Fig. 7 is a sectional view, on an enlarged scale, illustrating the action thereof in use. Fig. 8 is a view of the inner side of the sole of a turned shoe, and illustrating a modification of my invention.

Fig. 9 is a plan view, partly broken away, of a portion of the outer side thereof, and, Fig. 10 is a sectional view on the line 10—10 of Fig. 9.

In Fig. 1 of the drawing the outer-sole *a* of a shoe is illustrated as having a series of rubber, cylindrical-shaped plugs *b*, preferably three in number, arranged at advantageous points, as shown, the particular number and location of said plugs constituting no part of my invention. While the advantages attendant the use of my invention in the sole fore-part are greater than when used in the top lift of a heel, yet it is also advantageous when used in the latter relation.

According to my invention, I bore or cut a series of holes *c* through the sole, the diameter of which is materially smaller (in practice about ⅛ of an inch smaller), than that of the outer end of the plug, which plug tapers outwardly or increases in diameter inwardly, as indicated in Fig. 4, and has a flat head or projecting flange *d* on its inner end, which is adapted to rest against the inner side of the sole. Each aperture *c* is then counterbored from the outer side of the sole, about one-half the thickness of the sole, forming an annular recess *e*. The particular form of the bottom of the counterbore is not essential, although it is preferably of dish-form, or somewhat flattened at the bottom. The outer end portion of the aperture is, however, substantially enlarged in diameter and a lip *f* of approximately half the thickness of the sole is formed about the aperture *c*.

Before placing the plug in the aperture, the sole is placed in temper, or moistened, so that it is soft and pliable, and then the plug is forced into the aperture by suitable mechanical means, until the flange *d* is pressed against the inner side of the sole. In doing this the lip *f* will be pressed outward into the recess *e*, nearly filling the same, as illustrated in Fig. 5. The inner side of the sole is then placed on a support, and a tube *x*, of the same internal diameter as the average diameter of the plug is placed on the protruding end of the plug and pressed against the outwardly turned lip, so that the lip is forced back into place and pressed into the rubber of the plug, as indicated in Fig. 6. The plug is thus locked securely in position, as if it were a button, and firmly held from outward movement by its flange *d* and from inward movement by the portion which spreads out over the lip *f*, which latter closely pinches or grasps the intermediate portion of the plug, so that any tendency to push the plug inward is effectively resisted.

The purpose of forming the plug tapering is to permit it to be more readily inserted than would be the case if the end of the plug were of the same diameter as the portion which is directly engaged by the lip *f*, after said lip is pressed back into position. In fact, by forming the plug on a taper I am not only enabled to insert the plug more easily, but am able to secure a more forcible engagement of the lip therewith, than I can with any other method of which I am aware, and thereby avoid all possibility of leakage of water past the plug.

The length of the plug is preferably such that it projects a short distance beyond the surface of the sole, although the plug will still be effective if its end is flush with the sole surface.

When the plug extends a short distance beyond the surface of the sole, as shown, and pressure is applied to the end thereof, the end portion of the plug will be pressed in flush with the sole surface and spread out into the annular recess *e*, as indicated in Fig. 7.

The full advantage of having the plug project beyond the surface of the sole is thereby secured without the attendant disadvantages previously referred to. The plug may not only be pressed inward, but may also be pressed laterally in any direction. That is, the surface of the plug may yield in all directions, so that it does not slide or rub on the surfaces against which it is pressed, and it thus more effectively performs the functions for which it is intended, and the extent to which the rubber is worn away is greatly reduced. Dirt or dust also does not become forced into the end surface of the plug, so that it becomes glazed over or slippery. Its frictional qualities are thereby retained.

While my invention, as thus far described, is adapted for use in connection with welted and McKay shoes, where an inner-sole *g*, of substantial thickness, is employed, it cannot, I believe, be satisfactorily employed in an ordinary turned shoe without some modification.

In employing the invention in connection with a turned shoe, the method already described is employed, but, as a turned shoe does not usually have an inner-sole which will protect the foot from the inner end, or head of the plug, and which will prevent the slight tendency, which exists, to cause inward bending of the lip *f*, and consequent inward movement of the plug sufficient to cause discomfort to the wearer, I have found it necessary to provide additional means to prevent such occurrence.

As illustrated in Figs. 8, 9 and 10, I provide a backing *h*, preferably a sheet of a stout, textile material, which extends over the heads of all the plugs with which the sole is provided and attach said backing to the sole and to each plug by fastening means which extend through the lip *f*,

which extends about the sole aperture and through the flange *d* and the backing. While I may employ small metal staples, or the like, for this purpose, I preferably employ stitches *i*, as shown, that is, I place the backing *h* in position on the inner side of the sole, as shown in Fig. 8, and then sew, with an ordinary sewing machine, about each plug in the surrounding recess *e*. The plug is thus securely and tightly fastened to the sole closely adjacent the base of the lip, and the backing *h* is securely fastened down over the inner end, or head of the plug, so that inward pressing of the plug will be prevented practically as effectively as if an inner-sole of substantial thickness were employed.

The advantages of the invention may thus be secured in a turned, as well as a welted or McKay shoe.

I claim:—

1. A shoe having a leather bottom provided with an aperture therethrough and a rubber plug inserted in said aperture and terminating adjacent the surface of said bottom, said aperture being enlarged at its outer end to provide a recess about the outer end portion of said plug, into which lateral movement of said end-portion is permitted, substantially as described.

2. A shoe having a leather bottom provided with an aperture therethrough and a rubber plug inserted in said aperture and terminating adjacent the surface of said bottom, said aperture being enlarged at its outer end to provide an annular recess about the outer end-portion of the plug, into which said end-portion may yield, substantially as described.

3. A shoe having a leather bottom provided with an aperture therethrough, said aperture having its outer end-portion enlarged, forming an encircling lip at the inner end-portion thereof, and a rubber plug of materially greater diameter than the diameter of said inner portion of said aperture, and into which said lip is forced to hold the plug against inward movement in said aperture, substantially as described.

4. A shoe having a leather bottom provided with an aperture therethrough, said aperture having its outer end-portion enlarged, forming an encircling lip at the inner end-portion thereof, and a rubber plug of materially greater diameter than the diameter of said inner portion of said aperture and into which said lip is forced to hold the plug against inward movement in said aperture, said plug having a projecting flange at its inner end to hold the plug against outward movement, substantially as described.

5. A shoe having a leather bottom provided with an aperture therethrough and a friction plug of flexible, yielding material extending through said aperture and having its outer end-portion terminating adjacent the tread surface of said bottom, said bottom having an annular recess encircling and leading to said aperture from said tread surface to provide a space into which said end-portion of said plug may yield, substantially as described.

6. A shoe having a leather bottom provided with an aperture therethrough and a friction plug of flexible, yielding material disposed in said aperture and projecting beyond the tread surface thereof, said bottom being recessed about said plug from said surface to said aperture in which the plug is located, to provide a space into which the projecting end of the plug may yield, substantially as described.

7. A shoe having a leather bottom provided with an aperture therethrough and a rubber plug of truncated conical form disposed in said aperture and having a projecting flange or head at its larger end engaging the inner side of said bottom, said aperture being of materially smaller diameter, at its inner end, than the normal diameter of the plug at its inner end and of materially greater diameter at its outer end, than the normal diameter of the plug at its outer end, the leather bottom at the inner end of the aperture being forced into the body of the plug to hold the same against inward movement therein, substantially as described.

8. A shoe sole having an aperture therethrough, a friction plug extending through said aperture and having a projecting flange engaging the inner side of the sole, said sole having a recess extending about said plug and leading from its outer surface to said aperture forming an encircling lip at the inner end of the aperture, and fastening means extending through said lip and said flange to attach the plug to the sole, substantially as described.

9. A shoe sole having an aperture therethrough, a friction plug extending through said aperture and having a projecting flange engaging the inner side of the sole, said sole having a recess extending about said plug and leading from its outer surface to said aperture forming an encircling lip at the inner end of the aperture, a backing sheet extending over the inner end of said plug and its said flange and resting thereon, and fastening means extending through said lip, flange and backing to hold the plug against inward movement in said aperture, substantially as described.

10. The method of securing a rubber plug in a leather sole which consists in forming an aperture through the sole of less diameter than the plug and enlarging the outer end of said aperture to form a flexible lip at the inner end, forcing said plug through

said aperture from the inner end and causing said lip to be turned outwardly into said recess and then forcing said lip inwardly, so that its edge is pressed into the plug to hold the same from inward movement in said aperture.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ARTHUR F. DURGIN.

Witnesses:
L. H. HARRIMAN,
H. B. DAVIS.