Dec. 22, 1959 E. L. BECKWITH ET AL 2,917,840

HEEL AND BASE ASSEMBLY

Filed Oct. 23, 1958

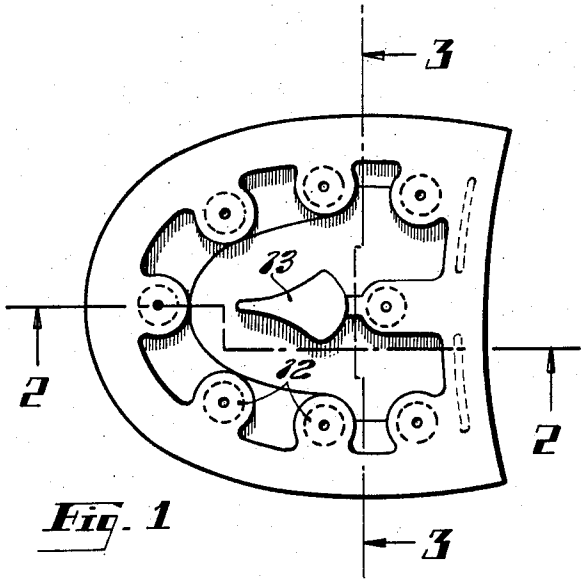


Fig. 1

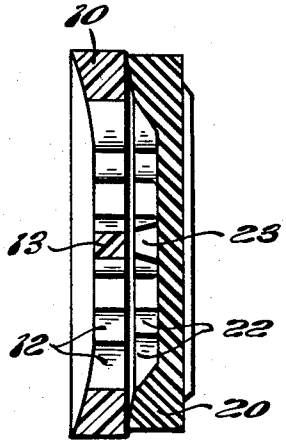


Fig. 3

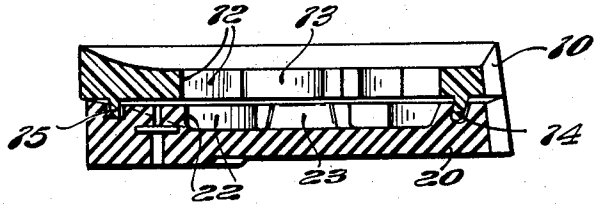


Fig. 2

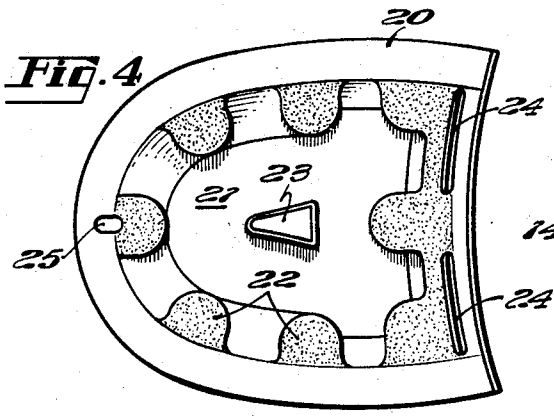


Fig. 4

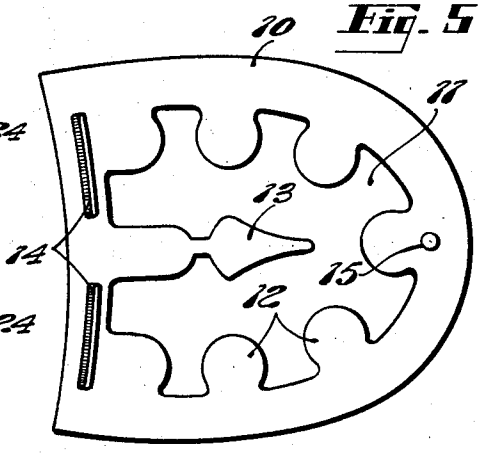


Fig. 5

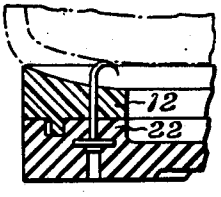


Fig. 6

INVENTOR.
Edwin L. Beckwith et al
Charles P. Macdover.
by Kenway, Jenney, Witter & Hildreth
Attys.

United States Patent Office 2,917,840
Patented Dec. 22, 1959

2,917,840

HEEL AND BASE ASSEMBLY

Edwin L. Beckwith, Newton, and Charles P. MacIver, Stow, Mass., assignors to Beckwith-Arden Inc., Watertown, Mass., a corporation of New Hampshire

Application October 23, 1958, Serial No. 769,150

4 Claims. (Cl. 36—35)

This invention comprises a new and improved heel assembly including as its components a base of resinous composition and a rubber heel section. These components, in accordance with our invention, are provided with interlocking recesses and projections which register their breast walls in flush relation and so obviate or greatly reduce the trimming operation that has been heretofore necessary after treatment to the shoe bottom.

It has been customary for the operator of the heel nailing machine to assemble the components of the heel by hand in presenting them to the machine and subsequently their peripheral walls are brought into registration by a trimming operation removing an average of at least 1 gram per base. Dealing with bases of polyethylene this means a waste of at least $1.10 per thousand bases.

We have found that there is inevitably a variable amount of expansion in different rubber heel sections in the attaching operation and consequently it is impossible to insure flush registration of the entire peripheral surfaces of the two components. However, we have discovered that by novel interlocking provision, it is possible to establish and retain accurate and precise registration of the heel breast surfaces of the base and rubber heel sections. An important advantage of this is that thus the heel breasting operation is obviated and what trimming remains to be done involves only the curved periphery of the rubber section or of both sections, a step that is entirely compatible with the routine rand trimming step.

By eliminating the heel breasting and scouring operations, we also avoid the danger of incidental damage to the outsole which has often occurred in the past, and facilitate the employment of prefinished outsoles.

We secure the desired results by interlocking the two components together in a location closely adjacent to their breast surfaces, thus positively locking them in flush relation and with a minimum of rubber disposed between the locking means and the breast surface.

Our invention has other outstanding advantages, however. It points the way to further reductions in weight of both the base and rubber heel sections by providing internal cavities into which areas of mutual support project, and the registration of the areas is made possible by the accurate interlocking engagement of the two components of the heel effected at the time of their preliminary engagement.

In molding the base it is advantageous to utilize a central gate for injection into the mold of the viscous polyethylene or other synthetic resin, and accordingly the sprue formed below this gate is utilized as a central supporting abutment and the heel is provided with a mating abutment in its otherwise hollow interior.

Further, the accuracy introduced into the assembly permits the nail-receiving abutments of the base section to be reduced in their dimensions thus reducing the weight of plastic in the assembly but at the same time insuring sufficient stock to hold the heel securely. The assembly thus includes two components both having large internal

cavities but with cooperating and registering abutments and lugs that support each other and give stability to the unbroken tread surface of the rubber heel section.

The saving in material above outlined may amount to as much as 10 or 15% of the cost established in the industry. Additional advantages accrue in the following respects. The amount of waste removed in trimming is entirely eliminated at the breast of the heel and an exceptionally true gauging surface is provided for trimming the rand, which is probably all that the trimmer will have to deal with. Labor cost may thus be reduced and the breast-trimming operation eliminated. The total weight of the heel assembly is reduced and the quality of the shoe thus improved.

These and other features and advantages of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a plan view of the base and heel assembly,

Fig. 2 is a view in longitudinal section on the line 2—2 of Fig. 1,

Fig. 3 is a view in cross-section on the line 3—3 of Fig. 1,

Fig. 4 is a plan view of the rubber heel section,

Fig. 5 is an inverted plan view of the base, and

Fig. 6 is a fragmentary view in section.

The base **10** as herein shown is molded of polyethylene or other suitable synthetic resin and as such is tough, moisture-proof and of light weight. Furthermore, in molding its peripheral wall takes a high degree of finish and may be polished without any intermediate trimming steps. The peripheral wall of the base defines and surrounds an internal recess or cavity **11** which extends entirely through the base, its wall therefore being of annular character. A series of spaced abutments **12** project inwardly into the recess **11** in position to receive the attaching nails and to underlie corresponding lugs which are formed in the rubber heel section.

The base also contains a centrally disposed arrow-shaped post **13** which is in effect part of the sprue formed below the gate in the upper mold used in molding the base. The post **13** is connected through a neck to an abutment which projects inwardly from the breast wall of the base. In molding the base the plastic resin is forced into the mold in the location of the post **13**. It flows forwardly into the breast wall portion of the base and spreads rearwardly uniting at the rear end of the heel. It has been found that this molding procedure insures a highly satisfactory surface finish particularly throughout the rear curved wall of the base.

The upper surface of the base as shown in Figs. 2 and 3 is concave while the lower face is flat except that in the breast portion thereof is formed a pair of aligned projecting ribs **14** slightly tapering in cross-section and extending parallel to the breast edge of the base as best shown in Fig. 5. An upstanding pin **15** projects from the flat face of the base adjacent to its curved rear end.

The rubber heel section **20** as shown particularly in Fig. 4 is molded with its peripheral wall corresponding to that of the base so that when the two components are assembled in substantial registration there is little necessity for trimming. The peripheral walls of the heel surround an interior cavity **21** corresponding in general to the cavity **11** of the base but closed by the tread portion of the heel. Into the recesses **21** project a series of spaced lugs **22** arranged to register and be supported by the abutments **12** of the base and each properly located to receive an attaching nail and for that purpose being provided with a washer as indicated in dotted lines. The rubber heel also has a central post **23** rising from the solid tread portion in alignment with the post **13** of the

base. Both faces of the rubber heel section are substantially flat and in its upper face as shown in Figs. 2 and 4 is formed a pair of transverse slots or grooves **24** extending parallel to the breast edge and shaped to receive the ribs **14** of the base with a close fit which will insure accurate registration of the breast faces of the two components in flush relation.

In the upper face of the section **20** near its rear end is formed a longitudinal slot **25** corresponding in width to the diameter of the pin **15** of the base section and being of sufficient length to afford lost motion of the pin longitudinally of the heel assembly and thus to allow for variations in the expansion of this section in relation to its breast which is positively fixed in position by the interlocking of the ribs **14** with the grooves **24**.

The precise shape and location of the interlocking projections and cavities on the contiguous faces of the two components is of secondary importance so long as they are adequate to insure the desired breast registration of the components. The same is true of the abutments and post of the base and the nail-receiving lugs of the rubber heel section. Their contour may be designed with consideration for the function they perform in the assembly and their pleasing appearance as articles of commerce. The internal walls of the cavities **11** and **21** may be beveled or sloped if desired to a greater degree than suggested in Figs. 2 and 3.

While the most important advantages of the present invention are realized in composite heel assemblies that include a cushion heel section of rubber or other resilient material, the saving in weight and the elimination of the heel breasting operation are advantages that are found in dealing with heel sections of non-resilient materials.

It has been found that the expansion of a cushion section due to pressure of the attaching nails tends to modify the contour of the section and it is therefore important to compensate for this expansion in the design of the section and reduce it to a minimum. For example, if longitudinal expansion of a rubber heel section is in the order of .010 inch per inch the expansion of the rubber between the grooves **24** and the breast edge of the section will be only .0012 inch if the grooves for the ribs **14** are located ⅛ inch in from the breast edge. Similarly, the heel attaching nails may displace laterally the material at the corners of the heel breast and therefore the initial breast curvature is made slightly more pronounced than that of the corresponding resinous base.

The superposition of the rubber lugs **22** upon resinous abutments **12** improves the cushion effect of the rubber section by giving the lugs free space into which they may expand when subjected to pressure. This permits the employment of a harder and longer-wearing rubber composition than would otherwise be required for equal cushion effect.

The advantages of the present invention may be summarized as follows: (1) saving in rubber, (2) saving in resinous plastic, (3) elimination of heel breasting and scouring operations, (4) obviates the danger of damage to the outsole shank, and (5) improves the cushion effect of the assembly.

Having thus disclosed our invention and described in detail an illustrative embodiment thereof, we claim as new and desire to secure by Letters Patent:

1. A heel assembly comprising a base of resinous composition having a breast wall and curved walls surrounding an internal cavity, a series of spaced abutments formed integrally with said walls projecting into said cavity, and a rubber heel section having a breast wall and curved walls, a series of nail-receiving lugs formed integrally with said walls and spaced to register with said abutments of said base, and interlocking connections between said base and rubber heel section registering their breast faces in flush relation.

2. A heel assembly comprising, in combination, a base of relatively light-weight, tough, resinous composition, and a rubber heel section, said base having a finished peripheral wall, a breast edge and a hollow interior, a series of supporting abutments formed integrally with said peripheral wall and projecting inwardly into said hollow interior, said base having a lower flat face, a rib projecting downwardly from said lower flat face and positioned substantially parallel to its breast edge; said rubber heel section also having a finished peripheral wall, a breast edge and a hollow interior, a series of nail-receiving lugs formed integrally with said peripheral wall and projecting into said hollow interior, said lugs underlying said abutments and flat face of said base, said heel section having a groove positioned adjacent said breast edge shaped to receive said rib of said base and to register said base and rubber heel section with their breast faces in flush relation.

3. In a heel assembly, a base of resinous composition having a curved breast edge wall merging into a U-shaped peripheral wall defining an internal cavity in the base, a rib projecting downwardly from said breast edge wall, a central abutment connected to said breast edge wall at a point behind the rib, and a pin projecting downwardly from the peripheral wall near the rear of the base, said rib and pin being adapted to interlock with grooves formed in a heel section.

4. In a heel assembly, a rubber heel section having a peripheral wall rising from a flat tread portion and defining an internal cavity, and a central post rising from the tread portion and of substantially the same height as the peripheral wall, the peripheral wall having an elongated transverse slot in its breast portion and an elongated longitudinal slot in its rear portion, said transverse slot and said longitudinal slot being adapted to interlock, respectively, with a rib and pin projecting downwardly from a base.

References Cited in the file of this patent

UNITED STATES PATENTS

666,201	Litchfield	Jan. 15, 1901
2,033,399	Romano	Mar. 10, 1936
2,156,342	Litschert	May 2, 1939
2,234,390	Taylor	Mar. 11, 1941
2,312,008	Tobey	Feb. 23, 1943