

Nov. 17, 1959

S. G. HARRISON

2,912,771

PLURAL-PARTS MOLDED SHOE STRUCTURES

Filed Feb. 3, 1959

2 Sheets-Sheet 1

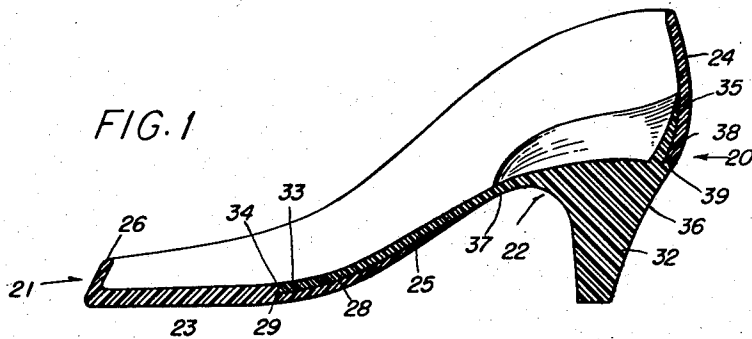


FIG. 2

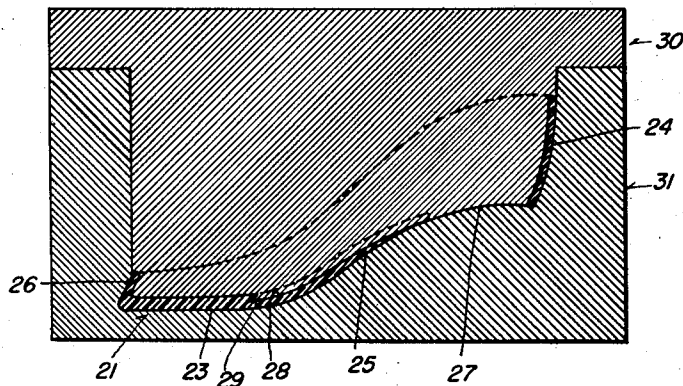
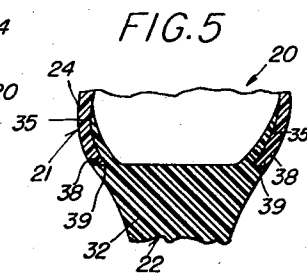
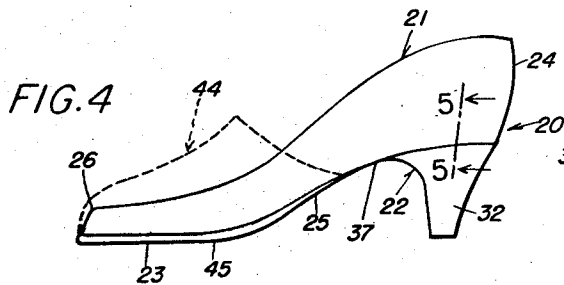
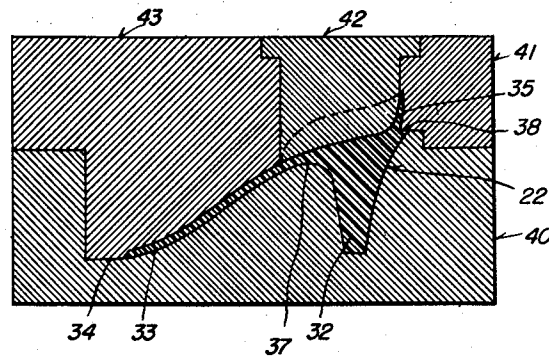


FIG. 3



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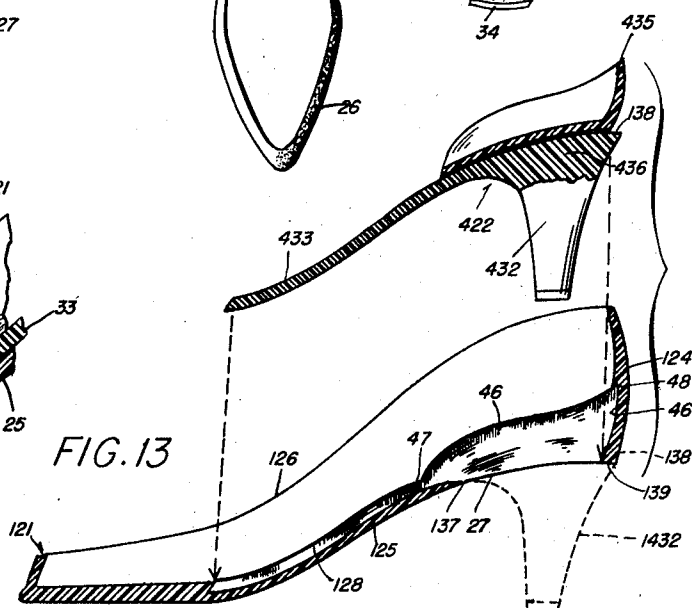
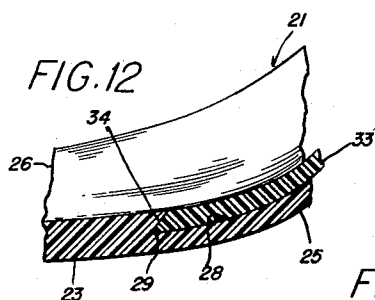
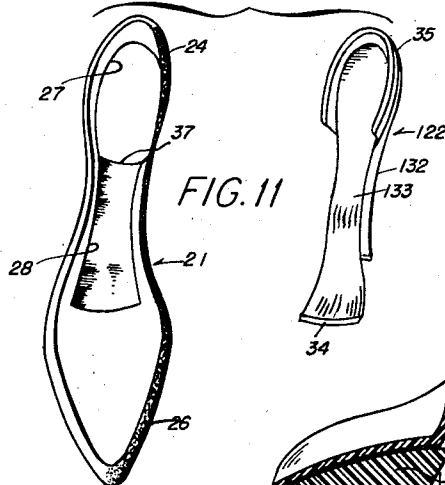
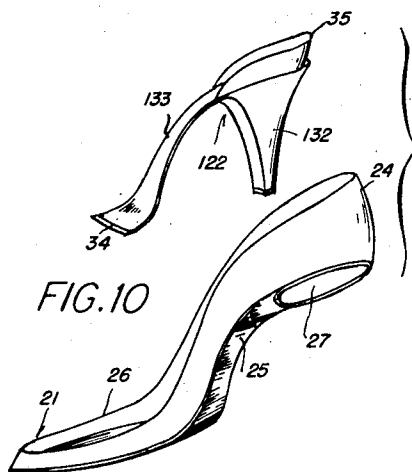
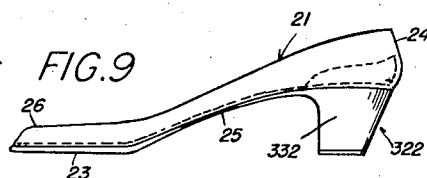
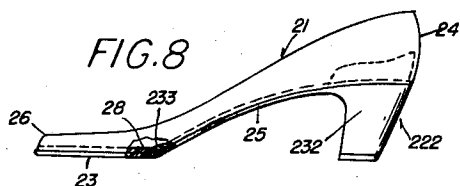
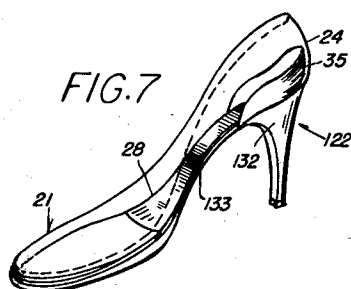
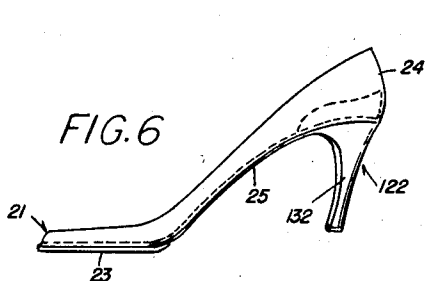
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2 Sheets-Sheet 2



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PLURAL-PARTS MOLDED SHOE STRUCTURES

Schuyler G. Harrison, Short Hills, N.J.

Application February 3, 1959, Serial No. 790,880

7 Claims. (Cl. 36—2.5)

The present invention relates to shoes for men, women and children and, more particularly, to a shell and heel assembly of molded parts.

A general object of the present invention is to provide shell and heel assemblies of footwear, either in the form of a foundation unit or as a complete shoe, which has strong and rigid molded load-supporting portions connected to and interfitted with molded elastic and flexible portions assuring excellent fit and maximum comfort, the parts being readily produced economically in mass production and easily assembled in a variety of styles requiring changes in less than the total number of parts of the finished shoes.

A more specific object of the present invention is to provide, in a variety of sizes, as an upper or major part thereof a standardized flexible and elastic molded shell of suitable material, such as elastic plastic, into which may be readily assembled and fastened a variety of types of shank and heel sub-assemblies or units having sufficient rigidity and strength effectively to support the load of the weight of wearers and to contribute support and comfort to the foot.

Another object of the invention is to provide such a molded elastic and flexible upper member having sufficient stiffness as to retain its shape well while being adaptable to feet of different shapes to assure comfort, the elasticity thereof permitting ready insertion down through a hole in the heel area thereof of the heel portion of a shank and heel sub-assembly to secure interengagement for locking and fastening together in an effective manner.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a longitudinal section of an embodiment of shoe structure of the present invention;

Fig. 2 is a longitudinal vertical section of a mold which is suitable for molding the shell of the shoe structure shown in Fig. 1, and depicting therein the latter;

Fig. 3 is a longitudinal vertical section of a mold suitable for molding a shank and heel sub-assembly, showing the latter in section, employable with the shell of Fig. 2 to form the shoe structure of Fig. 1;

Fig. 4 is a side elevational view of a shoe structure produced by assembly of the shank and heel sub-assembly of Fig. 3 into the shell of Fig. 2 to produce a shoe structure of the type illustrated in Fig. 1, a forepart vamp which may be added thereto being illustrated in dotted lines;

Fig. 5 is an enlarged transverse section, with parts broken away, taken substantially on line 5—5 of Fig. 4;

Fig. 6 is a side elevational view to smaller scale of a shoe structure of the present invention employing the shell shown in Fig. 2 and illustrated in Figs. 1 and 4, with which has been assembled a heel and shank sub-assembly of a different type to provide a "high heel" adaptable to use in the construction of pumps and the like;

Fig. 7 is a perspective view with parts in phantom illustration of the structure shown in Fig. 6;

Fig. 8 is a side elevational view similar to Fig. 6, but with parts broken away and in section, of the same shell assembled with a different type of heel and shank sub-assembly featuring a "medium heel";

Fig. 9 is a side elevational view similar to Fig. 6 showing the same shell assembled with a still different type of heel and shank sub-assembly employable in the production of footwear having a "low heel";

Fig. 10 is a view showing in side perspective the shell and the heel and shank sub-assembly of the shoe structure shown in Figs. 6 and 7, prior to the insertion of the sub-assembly into the shell;

Fig. 11 is a view showing in top perspective the units shown in Fig. 10;

Fig. 12 is an enlarged sectional detail, with parts broken away, of the portion of Fig. 8 which is shown in section; and

Fig. 13 is an enlarged longitudinal section of a modified form of shell and modified form of heel and shank sub-assembly prior to insertion of the latter into the former, with the position of the heel in the assembled condition being indicated in dotted lines.

Prior to the present invention, it has been proposed to mold from suitable plastic material a basic shoe unit to which vamp or upper portions of various types might be added to provide different styles of shoes, as proposed in the United States patent to Muller 2,798,312 of July 9, 1957. The present invention is an improvement on the proposal thereof so as to provide footwear which may have different heels which vary widely as to height, thickness, contour and design without requiring change in the shell upper. Such a foundation unit assembly may then be readily converted into a completed shoe of various styles or types by the addition of portions of uppers, such as toe vamps, straps, etc. However, it is to be understood that the present invention may be practiced in a form wherein the shell is provided with an integral forepart vamp molded therewith.

The shell unit of the shoe structure of the present invention is to have some flexibility and elasticity, being suitably molded from material as to have the pliability of leather conventionally employed in the uppers or vamps of various types of leather shoes, such as pumps, etc. For this purpose it may be molded from suitable elastic plastic, rubber-like composition, such as synthetic rubbers, or other materials having similar characteristics insofar as use in the present invention is concerned. For example, the shell may be molded from a suitable synthetic polymer composition to have leather-like characteristics, which may be a suitable polyvinyl chloride composition, plasticized, if desired, in which may be incorporated any suitable coloring or opaquing material. Such elastic plastic material which is employed in the molding of the shell may be of the thermoplastic type and conventional molding apparatus and techniques may be employed in the construction thereof.

The other unit of the shoe structure of the present invention comprises a heel and shank sub-assembly which, if desired, may be molded as a unitary structure, or parts thereof may be separately formed or molded and suit-

ably joined or secured together by any conventional method, such as cementing or heat fusion. Since advantages may be obtained by molding the heel and shank sub-assembly as a unit with an integral counterbrace the present invention readily permits realization of such advantages.

Referring to the drawings, in which like numerals identify similar parts throughout, it will be seen that one embodiment of the present invention is in the form of a plural-parts foundation assembly 20 consisting of a molded shell unit 21 and a heel and shank sub-assembly or unit 22. As is indicated in Figs. 1 to 5 inclusive, shell 21 may be provided in a form to have a forepart outer or tread sole portion 23, a counter portion 24, which may be in a form to provide a heel-supporting marginal rear full counter, and an intervening shank portion 25. Since the foundation assembly 20 of Figs. 1 to 5 inclusive is intended to have added thereto additional upper parts, such as a forepart vamp, the tread sole portion is provided with an upstanding vamp foxing 26 marginally thereof which extends back along the sides of the shank portion 25 to merge with the counter portion 24. In accordance with the present invention, the bottom of the shell 21 is provided in the rear section or heel area thereof with an enlarged hole 27 within or flanked on the sides and back by the counter 24 and with marginal edges thereof preferably juxtaposed to the counter side walls and the back end of the shank portion 25. Since a part of the heel and shank sub-assembly 22 is to overlap a part or major portion of the upper surface of the shank portion 25 of the shell 21, the latter preferably is provided with a relatively long and wide, longitudinally-extending recess 28, which may be undercut at its front end 29 in the vicinity of the rear of the forepart sole 23 for interlocking engagement to assure secure anchorage of parts together.

As is indicated in Fig. 2, the elastic plastic shell 21 may be molded in conventional pressure mold structure comprising complementary mold parts 30 and 31 which, when interfitted, define between opposed surfaces thereof a cavity in which the upper may be molded by suitable heat and pressure to form a waterproof unitary structure having comfort-contributing but limited flexibility and some elasticity to be adaptable to the shapes of different feet while being self-shape-retaining without discomfort to the wearer and, when embodied in a shoe construction, will have sufficient stiffness to give proper support while being of good wearing quality and substantially scuff-proof. The mold cavity surfaces may, if desired, be plated and buffed to provide a smooth finish of high polish so that at least external surfaces of the shell will have a finished appearance which may be similar to that of fine patent leather or high-grade kid or calf skin. The forepart sole portion 23 preferably is made thicker than the remaining portions of shell 21 so as to have greater stiffness where less flexibility is desired.

The heel and shank sub-assembly 22 preferably is in the form of a molded unitary structure and is rigid and strong to bear the weight of a person without undue deformation while giving adequate support to the instep. For this purpose, it may be molded from a suitable thermoplastic material having desired rigidity after production such, for example, as polystyrene, methyl methacrylate resin, and the like, in which may be incorporated, if desired, any suitable coloring or opaquing material. The heel and shank sub-assembly or unit 22 includes a heel 32, which may be of conventional design, and a forwardly-extending shank stiffening member 33 rigidly anchored to and extending forward from the top portion of the heel, the shank stiffening member being shaped to fit snugly in the recess 28 of the shell 21. The shank stiffening member 33 of the heel and shank unit 22 may have its front end 34 tapered or shaped complementary to the undercut front end 29 of the shell recess 28 for interlocking engagement therein. If desired, the rigidity

and strength of the shank stiffening member 33 may be increased by an elongated reinforcing insert or overlay of sheet metal, such as steel, which can be placed in the mold cavity to be partially or wholly surrounded by the plastic material from which the heel and shank portions are molded.

In the molding of the heel and shank sub-assembly 22 as a unitary structure, it may be provided with a shaped or arcuate counterbrace 35 having a C-shaped upstanding side wall contoured to fit snugly against the inner surface of the shell counter 24 at the base thereof as is apparent from Figs. 1 and 5. The top portion 36 of the heel 32 and the shank stiffening member 33 are merged together at a point 37 at the front edge of the hole 27, and the back end of the recess 28 in the shell 21 is there preferably defined by a feather edge of the shell shank 25 for smooth merge of parts. It will be noted from Figs. 1, 3 and 5 that at the heel top portion 36, where it is joined with the base of the counterbrace 35, an external lateral marginal outer side shoulder or ledge 38 preferably is provided outwardly of the back and sides of the counterbrace on which may seat the lower edge 39 of the side wall of the counter 24 adjacent the side edges and back end of the hole 27. It will be seen therefrom that the inner sides of counter wall bottom edge 39 extend laterally inward so as snugly to engage in the angle between shoulder 38 and the outer face of the counterbrace C-shaped upstanding side wall 35. This provides secure interlocking engagement in supplement to that provided by the undercut 29 of shank recess 28 and the oblique front edge 34 of the shank stiffening member 33. The rigid counterbrace 35 is of a shape snugly to seat against the inner face of the base of the shell counter 24, the side wall thereof preferably being sloped upwardly and outwardly as shown, and it may have its upper edge tapered for smooth merge with inner wall of the shell counter as may be apparent from Figs. 1 and 5.

As will be understood from Fig. 3, the heel and shank sub-assembly 22 may be molded as a unitary structure in a suitable conventional mold having opposed complementary parts, such as those indicated at 40, 41, 42, and 43, which together define therebetween a cavity of the desired shape of the heel and shank unit, and the latter may be molded with the use thereof in accordance with conventional practice.

Let it be assumed that the elastic plastic shell unit 21 and the relatively rigid plastic heel and shank unit 22 have been suitably molded, such as in the manners indicated. These parts are then assembled together to provide the foundation assembly of Fig. 1 by inserting the heel and shank unit into the shell unit with the heel 32 projected down through the hole 27 and with the shank stiffening member 33 seated in the recess 28. The oblique or tapered tip 34 of shank stiffening member 33 may first be inserted into the undercut 29 at the front end of the recess 28 and then the heel 32 swung down through the hole 27 with stretch of the side walls of the counter 24 to permit passage therethrough to the position of relative location and snug engagement of counterbrace 35, at which time the lower edge 39 of the counter will snap up over and inwardly above the shoulder 38 for secure interlock of the parts. In order to assure that these units will remain securely anchored together a suitable glue or cement may be spread on such surfaces as may be opposed in the final assembly, such as the top face of recess 28 and bottom surface of stiffening member 33, the top surface of the ledge or shoulder 38 and the bottom edge 39 of the counter, the outer face of the counterbrace 35 and the inner face of the bottom portion of the wall of counter 24. Such secure anchorage of course, may be attained by suitable heat sealing practice or other desired manner which will readily occur to one skilled in the art.

In order to employ the foundation assembly 20 in a completed shoe construction, suitable upper parts may be added thereto, such as a forepart vamp which is indicated

in dotted lines in Fig. 4 and, of course, such upper parts may be varied almost endlessly to provide different styles of shoes. The vamp foxing 26 provides a suitable anchorage for such upper parts which may be of a variety of materials, such as plastic, a rubber composition, leather, cloth, and the like, suitably secured thereto in any desired manner, such as by stitching, gluing, stapling, heat sealing, etc. It will also be seen from Fig. 4 that in the molding of the shell 21, the bottom thereof may be provided with an external bead 45 which may simulate the edge of a separate outsole. The ornamental appearance of such footwear may be enhanced by using contrasting colors in the compositions of the shell 21 and heel and shank sub-assembly 22. A conventional sock lining may be employed to conceal the joint formed by seat of the shank stiffening member 33 in the recess 28.

It will be noted from Figs. 6 and 7 that the shell 21 may be assembled with a heel and shank sub-assembly 122 which features a high heel 132 and the elasticity and flexibility of the walls of the shell adapt themselves to complementary assembly therewith. The highly arched shank stiffening member 133 will dictate such shaping when seated and fastened in the shell recess 28 with the top portion of the high heel 132 snapped and anchored into position in the shell hole.

For similar reasons, the shell 21 may be assembled with a different type of heel and shank sub-assembly, such as 222 of Fig. 8, featuring a heel 232 of medium height and different shape and a shank stiffening member 233 of flatter contour seated and anchored in recess 28 of the shell.

Fig. 9 illustrates that the shell 21 may be assembled with a further variation of the heel and shank sub-assembly 322, featuring a lower heel 332 of different thickness.

It will thus be understood from Figs. 6 to 9 inclusive that the shell 21 may constitute a basic unit well adapted for incorporation into a variety of styles of footwear without change in design or construction and merely by assembly with a suitably contoured and constructed heel and shank sub-assembly and selected stylizing upper parts. The shell 21 is readily constructed in a simple manner by mass production molding practice and at low cost so that duplicates thereof may be incorporated by simple procedure with economically produced heel and shank sub-assemblies or units and upper parts to permit marketing at unusually low prices of highly attractive footwear in a vast variety of styles.

It is to be understood that the present invention may be practiced with considerable variation in structural details. For example, as is illustrated in Fig. 13, the shank stiffening member 433 and the heel 432 of such heel and shank sub-assembly 422 may be, if desired, molded as a unit from rigid plastic and the shaped counterbrace 435 may likewise be molded as a separate part from such rigid plastic, these parts then being suitably assembled together by means selected from a variety of types of fastening techniques, such as cement between opposed surfaces. It will also be seen from Fig. 13 that the molded shell may be provided with additional features of interlocking engagement with parts of the heel and shank sub-assembly, such as that illustrated at 422. For example, shell 121 may have the inner or inside face of the curved wall of counter 124 provided in the back and along the sides with a depressed area or recess 46 shaped complementary to the external surface of the counterbrace 435 so that the latter may be nested therein. If desired, the counterbrace 435 may seat flush in the counter recess 46 with the inside face of the counterbrace merging smoothly with the inside face of the counter therebeyond. Such recess 46 may also merge with side grooves 47 in the inner face of vamp foxing 126 on both sides to form lateral extensions of the shank stiffening member-receiving recess 128 in the shell shank 125. Of course in such case, the shank stiffening member 433 will be wider than that illustrated at 33 in the other em-

bodiments so that side edges thereof may snap into such side grooves 47 as this member seats down into the recess 128 with nest of the counterbrace 435 in the counter side wall recess 46. Also the top edge of counterbrace 435 may be tapered upwardly and outwardly to snap into a complementary groove formed by undercutting the top edge of the recess 46, as is indicated at 48 in Fig. 13. Fig. 13 illustrates by dotted arrows the insertion of the heel and shank sub-assembly 422 into the shell 121 and the final position of the heel 432 is indicated in dotted lines at 1432 with the lower edge 139 of counter 124 snapped up over shoulder or ledge 138. Of course, these modified interfitting parts may be provided with supplementary anchoring means such as those attainable by employing glue, cement or heat sealing, and the like. It is also to be understood that, if desired, the top edge at the back of the counterbrace may be higher than is indicated at 48, thereby reducing the amount of the flexible shell counter 124 above the counterbrace at the back which is not reinforced thereby. This will minimize tendency for the flexible counter to become misshapen in handling and storage. Although it may be desirable to form the hole 27 in the molding of the shell 21 it may, of course, be provided by die cutting after the shell is molded with the heel sole area closed by an integral web.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a shoe structure having uppers and sole structure, the combination comprising; a unitary seamless molded shell of elastic and flexible material having at least a forepart outer sole, a heel-supporting marginal rear counter and an intervening shank portion having a top surface, both of said counter and shank portion being integral with said outer sole, said shell having a bottom hole in its heel area within the counter; and a heel and shank sub-assembly anchored in said shell and comprising a rigid heel having a top portion and an elongated, substantially rigid shank stiffening member rigidly anchored to and extending forward from the top portion of the heel to the forepart outer sole; the top portion of the heel being inserted into the bottom hole in said shell and surrounded laterally by and fastened to the edges of the shell defining the hole with the remaining portion of the heel extending therebelow and with the shank stiffening member lapped over the top surface of the shank portion of said shell and fastened thereto.

2. In a shoe structure having uppers and sole structure, the combination comprising; a unitary seamless molded shell of elastic and flexible material having at least a forepart outer sole, a counter heel-supporting marginal rear and an intervening shank portion having a top surface, both of said counter and said shank portion being integral with said outer sole, said shell having a bottom hole in its heel area within the counter; and a heel and shank sub-assembly anchored in said shell and comprising a rigid heel having a top portion, a rigid elongated shank stiffening member superposed on and made integral with the top portion of the heel and extending forward to the forepart outer sole, and a counterbrace including a C-shaped upstanding side wall superposed on and anchored to said heel top portion above said shank stiffening member; the top portion of the heel being inserted into the

bottom hole in said shell and surrounded laterally by and fastened to the edges of the shell defining the hole with the remaining portion of the heel extending therebelow and with the shank stiffening member lapped over the top surface of the shank portion of said shell and fastened thereto, said counterbrace being nested in said shell counter snugly juxtaposed to the inner face of the latter for stiffening support thereof.

3. In a shoe structure having uppers and sole structures, the combination comprising; a unitary seamless molded shell of elastic and flexible plastic material having at least a forepart outer sole, a heel-supporting marginal rear counter and an intervening shank portion having an upper surface, both of said counter and said shank portion being integral with said outer sole, said shell having a bottom hole in its heel area within said counter, the upper surface of said shell shank portion having a longitudinally-extending recess formed therein extending forward from the hole; and a rigid plastic heel and shank sub-assembly anchored in said shell and comprising a rigid heel having a top portion, an elongated rigid plastic shank stiffening member integral with and extending forward from the top portion of said heel, and a relatively stiff counterbrace in the form of a C-shaped upstanding side wall superposed on and anchored to the top portion of said heel; the top portion of said heel being inserted into the bottom hole in said shell and surrounded laterally by and fastened to the bottom edge of the shell counter defining edges of the hole with the remaining portion of the heel extending therebelow and with the shank stiffening member seated in the recess of said shell shank portion and fastened into the latter, said counterbrace being nested in said shell counter and snugly juxtaposed to the inner face of the latter for stiffening support thereof.

4. The shoe structure as defined in claim 3 characterized by said shank stiffening member and said shell having engaged interlocking means in the form of undercut side wall structure of said shell recess and interfitting portions of said shank stiffening member.

5. The shoe structure as defined in claim 4 characterized by said heel and shank sub-assembly having a ledge at the top portion of said heel at the base of and about said counterbrace in the form of a depressed and lateral marginal outer side shoulder over which the bottom edge of said shell counter which defines the back and side edges of the hole are snapped.

6. In a shoe structure having uppers and sole structure, the combination comprising; a unitary shell of elastic plastic material having limited flexibility with the parts thereof all made integral with each other and including a heel-supporting, marginal, full rear counter in the form of a C-shaped upstanding side wall, a forepart outer sole, an intervening shank portion having an upper surface and a vamp foxing providing an upwardly-extending wall along the marginal edges of said sole and shank portion

merged with said counter, said shell having a bottom hole in its heel area within said counter with the side and back edges thereof constituting the bottom edge of the counter side wall and with the inner sides of this edge extending laterally inward, the upper surface of said shell shank portion having a longitudinally-extending depressed recess formed therein extending forward from the hole to the vicinity of the back portion of said forepart sole; and a unitary heel and shank sub-assembly of substantially rigid plastic material with the parts thereof all made integral with each other and anchored in said shell, said heel and shank sub-assembly including a substantially rigid heel having a top portion, an elongated shank stiffening member having a raised back portion superposed on the heel top portion and a fore portion with said member shaped complementary to the hole and recess and seated therein, and an arcuate, cupped, relatively rigid counterbrace in the form of a C-shaped upstanding side wall extending upwardly from the marginal edges of the raised back portion of said shank stiffening member with its outer surface snugly juxtaposed to the inner face of said counter for stiffening support thereof, said heel and shank sub-assembly having a C-shaped ledge at the top portion of said heel in the form of a depressed and lateral marginal outer side shoulder flanking the marginal edges of the raised back portion of said shank stiffening member and the base of said counterbrace with laterally inwardly-extending sides of the bottom edge of said counter side wall snapped into the angle between said counterbrace and shoulder and with these edges seated upon the latter.

7. The shoe structure as defined in claim 6 characterized by the provision of a recess in the inside face of said shell counter extending along the sides and to the rear of the shell bottom hole with said counterbrace seated flush in said recess and fastened to said counter, the side wall of said counterbrace being sloped upwardly and outwardly to a C-shaped top edge with the top edge of the counter recess being undercut and snapped over the top edge of the counterbrace, the forward end of the shell shank portion extending transversely and being undercut with the forward end of said shank stiffening member being tapered and interfitted into this undercut.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,912,771

November 17, 1959

Schuyler G. Harrison

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 63, strike out "counter" and insert the same after "rear" in line 64; line 72, for "foreport" read -- forepart --; column 7, line 7, before "snugly" insert -- and --.

Signed and sealed this 31st day of May 1960.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON

Commissioner of Patents