

EXHIBIT L – U.S. Patent No. 11,510,456 in View of U.S. Patent No. 7,464,428

U.S. Patent No. 7,464,428 (the “’428 patent”) published on August 4, 2005. It therefore constitutes prior art under at least pre-AIA 35 U.S.C. § 102(b). As shown below, the ’428 patent anticipates and/or renders obvious claims 1-5, 7, 9-15, and 17 of US Patent 11,510,456. The ’428 patent incorporates the following references by reference: U.S. Patent Nos. 4,642,911 (“the ’911 patent”); 4,615,126 (“the ’126 patent”); and 5,025,573 (“the ’573 patent”).

These invalidity contentions are based on Under Armour’s present understanding of the asserted claims and Athalonz’s apparent construction of the claims in its September 14, 2023 Disclosure of Asserted Claims and Infringement Contentions, which is deficient at least insofar as it fails to cite any documents or identify accused structures, acts, or materials in the Accused Products with particularity. Under Armour does not agree with Athalonz’s application of the claims, or that the claims satisfy the requirements of 35 U.S.C. § 112. Under Armour’s contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met by any accused product in any particular way. Under Armour objects to any attempt to imply claim construction from this chart. Under Armour’s prior art invalidity contentions are made in a variety of alternatives and do not represent Under Armour’s agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

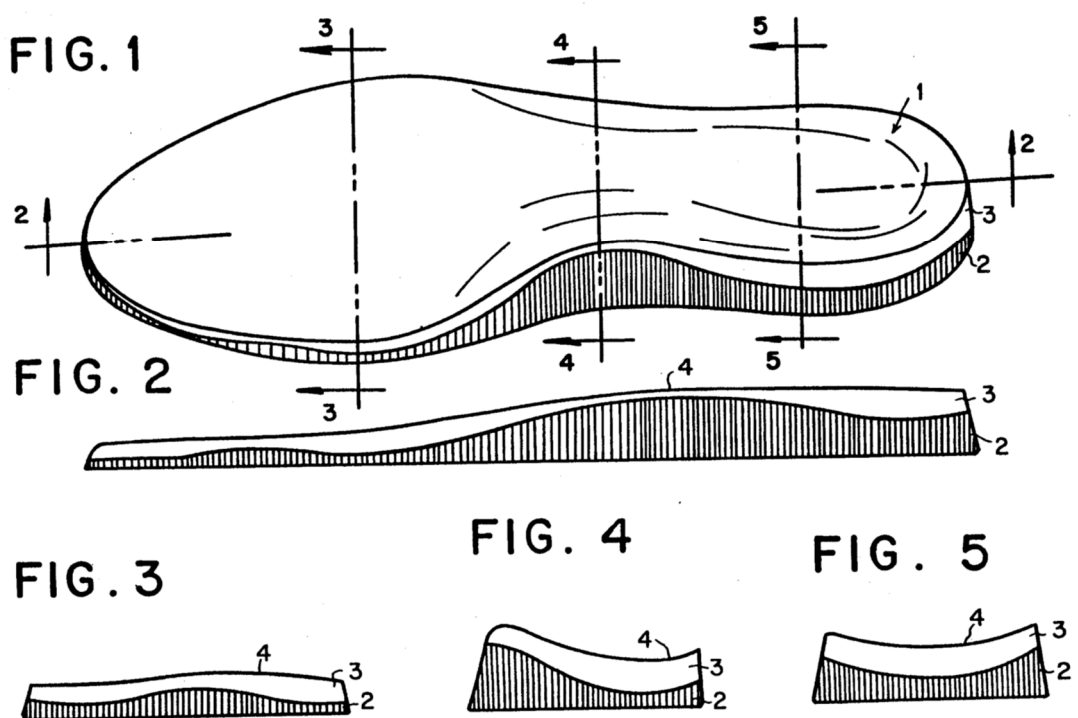
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
1[pre]. An athletic shoe comprises:	The ’428 patent discloses an athletic shoe. “The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62. <u>’911 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“In a running shoe midsole, as exemplified in these particular drawings, the compensations of the present invention are incorporated directly into the midsole 14 with the innersole and outersole being only secondarily effected by the compensations of the midsole itself.” ’911 patent, 20:38-42. <u>’126 patent</u> “Improved footwear for physical exercise, such as running or jogging, in which a segment of the shoe extending beneath the third, fourth and fifth metatarsal phalangeal joints on the lateral side of the shoe is comprised of a crepe or spongy rubber material, which is substantially more flexible than the material which comprises the remainder of the solepiece.” ’126 patent, Abstract. <u>’573 patent</u> “This saves weight in running shoes. The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite. This shoe bottom provides extra firmness and support on the outside edges of the heel to prevent pronation and supination or side-to-side rocking and instability. At the same time, the inner area of the heel is softer because the upper soft layer is thicker. This softens the impact on the heel during walking or running. This further forces the foot's fatty tissue inward beneath the heel to assist the shock absorbing function of the fatty tissue.” ’573 patent, 7:15-26.
1[a] an upper section; and	The ’428 patent discloses an upper shoe section. “The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62.

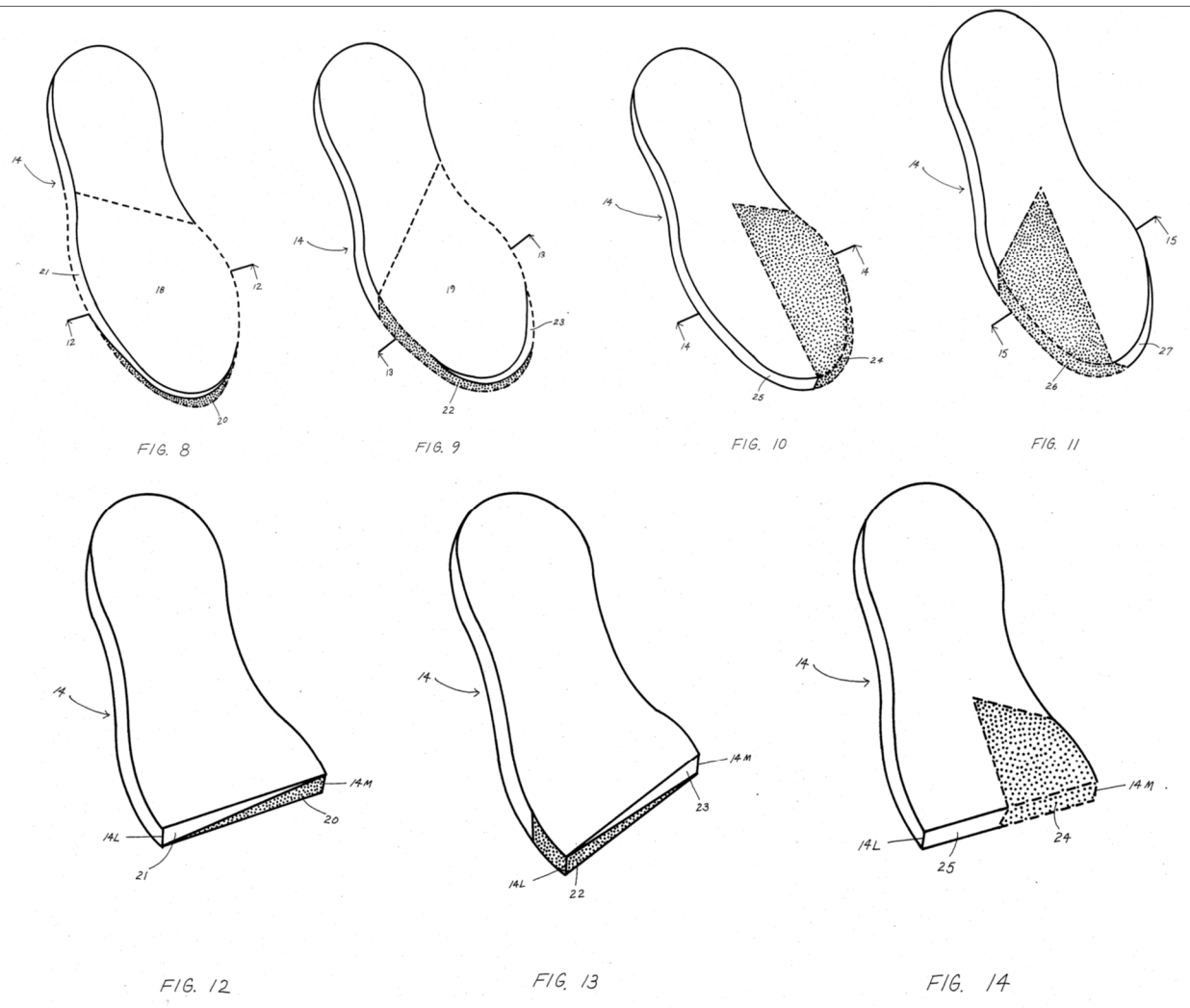
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	<u>'911 patent</u> “Outersoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outersole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outersole itself.” '911 patent, 20:52-57. <u>'126 patent</u> FIG. 1 “Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” '126 patent at Fig. 1, 5:21-25. <u>'573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber outsole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21.
1[b] a sole section coupled to the upper section, wherein the sole section includes:	The ’428 patent discloses a sole section coupled to the upper section. “The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62. <u>’911 patent</u> “Innersoles, midsoles, and/or outsoles may each become an integral part of the present invention either independently or in combinations thereof; depending on the particular type of footwear and the particular fabrication process involved.” ’911 patent, 20:47-51. “Outsoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outsole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outsole itself.” ’911 patent, 20:52-57. <u>’126 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 1 “Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” ’126 patent at Fig. 1, 5:21-25. <u>’573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber outsole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21. “Referring to FIG. 1, there is shown the composite shoe bottom 1 according to the invention. A firm lower layer 2 is shaped to be thicker in areas where the wearer's foot will need extra support. The softer upper layer 3 is in face-to-face engagement with the upper surface of the lower layer 2. The upper layer 3 has an uppermost surface 4 which is contoured to be complementary to the shape of a human foot bottom. As can be seen in FIG. 2, the softer layer is thinnest in the area needing the most support; for example, where the heel of the foot will rest (FIG. 5).” ’573 patent, 6:60-7:2.

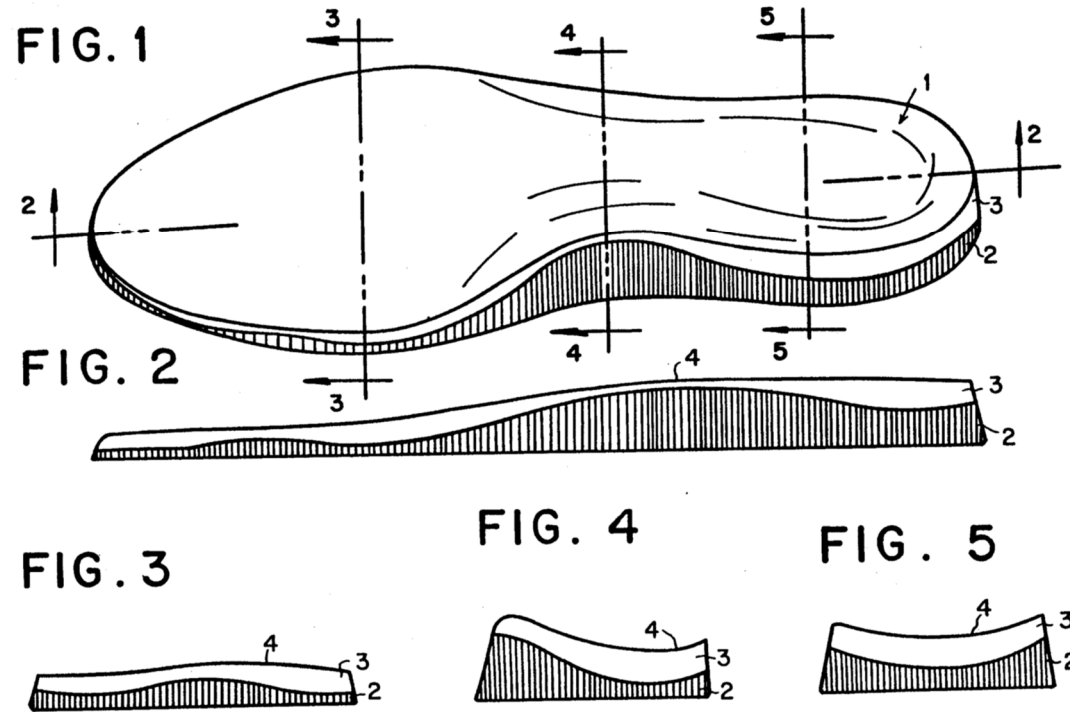
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	
1[c] a heel platform having a first height that is substantial uniform from an inner edge of the sole section to an outer edge of the sole section, wherein the heel platform is constructed of a first material; and	The '428 patent discloses a heel platform having a first height that is substantial uniform from an inner edge of the sole section to an outer edge of the sole section, wherein the heel platform is constructed of a first material. “It is known to manufacture soles or parts of soles from expanded polymers, for example, polyurethane (PU) foams. To this end, the polymer material to be expanded is at first expanded into blocks that are subsequently cut into single preforms (so-called blockers). These blockers are inserted into a forming tool and subsequently formed into the desired shape of the sole element with the application of pressure and heat. A sole element produced in such a way can either have a constant thickness over the area of the foot or, if needed, also be

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	formed with a foot-bed. It was, however, a common feature of the preforms known in the prior art to have either a constant thickness (if the sole element to be produced had a constant thickness) or a variation of the thickness corresponding to the variation of the thickness of the sole to be produced.” ’428 patent, 6:38-51. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided. Furthermore, it is not necessary that the sole element extends in a longitudinal direction (i.e. from the heel to the forefoot part) over the complete sole. It is also possible that a sole element in accordance with the invention is only used in the heel and/or in parts of the forefoot.” ’428 patent, 5:56-67. <u>’911 patent</u> “For example, a sole of a shoe of a particular size, width, and style may incorporate a midsole material that is of an inch in thickness overall.” ’911 patent, 12:1-3



U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 15 Claiming “an article of footwear ... wherein said rearfoot portion is of constant thickness across the width thereof.” ’911 patent, 21:4-23 (Claim 1). <u>’126 patent</u> FIG. 1 FIG. 3b

'573 patent



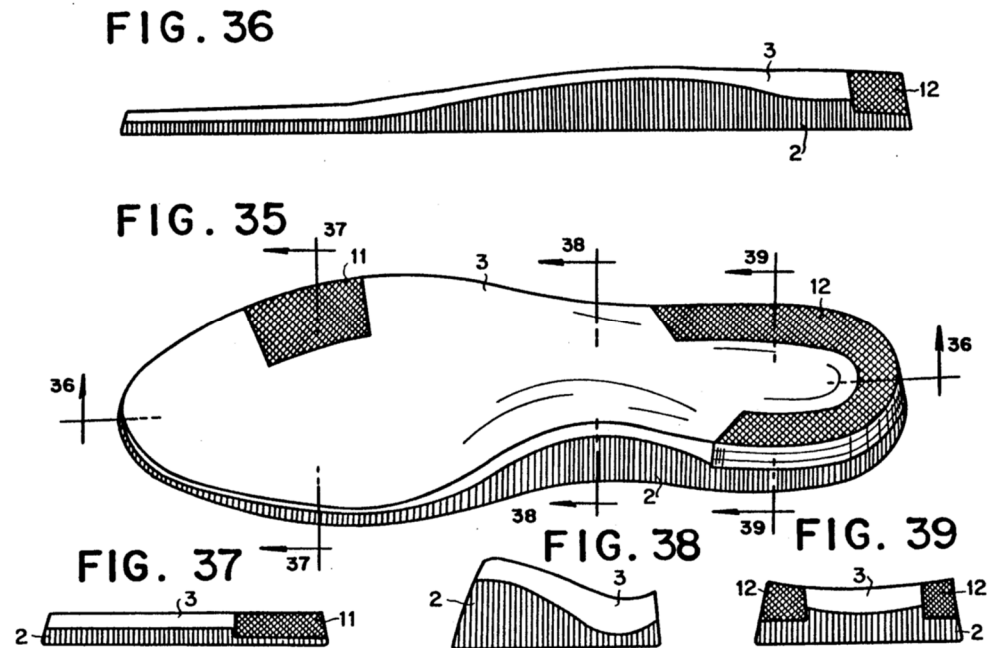


FIG. 48

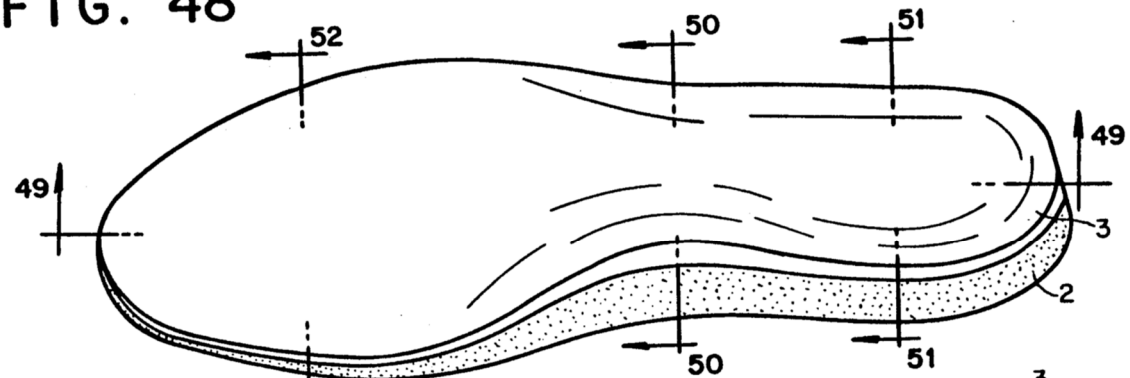


FIG. 49



FIG. 52



FIG. 50

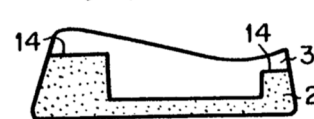


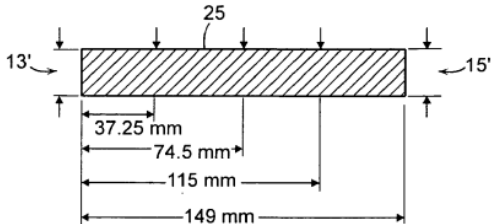
FIG. 51



"The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite." '573 patent 7:16-18.

"Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached"

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber outsole would be cemented onto the unit bottom, as is typically done in running shoes. Eventually, it became known to contour the top surface of the unit bottom to provide a heel cup and slight arch. This made the shoe more comfortable because the foot would rest on a surface similar to its shape as opposed to a flat surface which felt like flat feet on a firm floor.” ’573 patent 1:10-27.
1[d] a forefoot platform juxtaposed to the heel platform, wherein the forefoot platform is constructed of a second material having a gradient compression factor, wherein, when the athletic shoe is worn by an athlete and weight of the athlete is applied to the athlete shoe, the second material compresses to a first level near an outer edge of the sole section and the second material compresses to a second level near an inner edge of the sole section, wherein the second level of compression is greater than the first level of compression.	The ’428 patent discloses a forefoot platform juxtaposed to the heel platform, wherein the forefoot platform is constructed of a second material having a gradient compression factor, wherein, when the athletic shoe is worn by an athlete and weight of the athlete is applied to the athlete shoe, the second material compresses to a first level near an outer edge of the sole section and the second material compresses to a second level near an inner edge of the sole section, wherein the second level of compression is greater than the first level of compression. “Thus, it is an object of the present invention to provide a sole unit for shoes, in particular for sport shoes, that can be produced in a simple and, therefore, convenient manner with respect to the production technology, and still allow a predetermined density variation in a transverse and/or longitudinal direction over a complete area of the sole element. One aspect of one embodiment of the present invention is to not use two different materials with different densities to create the density variation over the sole element and to connect these materials subsequently, but to use a single material being supplied as a preform and having a thickness distribution that is transformed by pressure forming into the desired density distribution.” ’428 patent, 3:3-15. “In one aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material with a thickness varying in the transverse and/or longitudinal direction depending on the specific density distribution desired and press-forming the sole element preform in a forming tool to form the finished sole element from the sole element preform. In one embodiment, the finished sole element has a substantially constant thickness in at least one transverse direction. Additionally, the sole element preform may be subjected to a non-uniform compression during the press-forming step.” ’428 patent, 3:33-15.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428				
	“In another aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material and press-forming the sole element preform in a forming tool with a selective supply of heat to single sections of a surface of the tool to locally selectively expand the sole element preform to form the finished sole element with the desired density distribution from the sole element preform.” ’428 patent, 3:46-56.  FIG. 4B “If such a preform 20 is formed in a conventionally known forming tool, the sole element 25, as shown in FIGS. 4A and 4B, is obtained. As depicted in FIG. 4A, the sole element 25 has a width a’ of about 149 mm, a length b’ of about 250 mm and a constant height h’ of about 13 mm. FIG. 4B shows again a vertical section through the finished sole element 25 in accordance with the invention. If the hardness of the resulting sole element 25 is measured with reference to the distance from the left side 13’, the following values shown in Table 2 are obtained: TABLE 2 Hardness distribution of the shaped sole unit from the medial side 13’ to the lateral side 15’ in one embodiment <table><thead><tr><th>DISTANCE FROM THE MEDIAL</th><th></th></tr><tr><th>SIDE [MM]</th><th>HARDNESS [C]</th></tr></thead></table>	DISTANCE FROM THE MEDIAL		SIDE [MM]	HARDNESS [C]
DISTANCE FROM THE MEDIAL					
SIDE [MM]	HARDNESS [C]				

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	0 60.0 37.25 57.5 74.50 55.0 115.0 52.5 149.0 50.0” ’428 patent, 7:36-58. “As can be seen, the hardness (measured in Shore C) decreases from about 60 C to about 50 C. Therefore, a reduction of about 10 C is obtained (i.e., in the range of about 15% to 20%), if the preform 20 is as described in Table 1 and consists of polyurethane.” ’428 patent, 7:60-64. “The locally varying hardness of the sole unit 25 can be explained by the surplus of material on the left side 13, which is compressed more than the material on the right side 15 during the final forming step in such a way that a continuously varying density distribution is obtained in the sole unit 25. The resulting density, in turn, influences the hardness and therefore the elasticity of the sole unit 25.” ’428 patent 8:12-18.

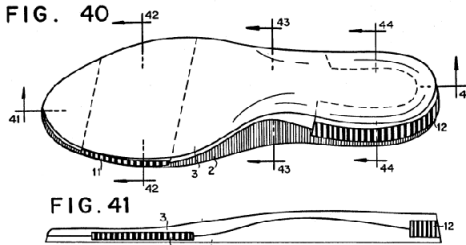
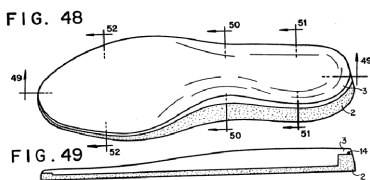
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 5A FIG. 5B FIG. 5C “FIGS. 5A-5C show an alternative embodiment of a preform 20’ in accordance with the invention. This preform 20’ having already the shape of a sole has the special feature that the height does not only vary from the medial (formerly left) side 13” to the lateral (formerly right) side 15”, but also from the rear foot part 28 to

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	the forefoot part 27. The sections along the line 5B-5B (FIG. 5B) and the line 5C-5C (FIG. 5C) show that the surplus of height in the forefoot part 27 is about 8 mm on the medial side 13" and about 3 mm on the lateral side 15"; whereas, in the rear foot part 28, the surplus is about 10 mm on the medial side 13" and about 5 mm on the lateral side 15". With such a preform 20', a modulation of the density and, therefore, of the hardness is not only obtained from the medial side 13" to the lateral side 15", but also from the rear foot part 28 to the forefoot part 27." '428 patent, 8:19-33. <u>'911 patent</u> "The sole forefoot portion is comprised of different compressibilities of materials selected and arranged across the width thereof such that the sole effectively slopes at an angle upwardly from the lateral aspect to the medial aspect when weight-bearing forces are exerted on the forefoot and thereby providing an effective inclined surface of resultant thickness greater at the medial aspect of the forefoot than at the lateral aspect as a result of less compressible material at the medial aspect of the forefoot than at the lateral aspect when the sole of said article of footwear is intended for use by individuals whose feet have a tendency toward compensation in a pronated direction due to their inherent inverted forefoot varus foot type." '911 patent, Abstract. "The present invention is intended for any and all footwear wherein dual-density or dual-compressibility materials or combinations of different materials may be incorporated into either the midsole, outsole, or innersole construction of the footwear. '911 patent, 1:11-18.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 11 FIG. 15 “FIG. 11 is a perspective plan view of a right midsole of the footwear of the present invention, (in this example, a running shoe midsole), showing the area of a medial and lateral half dual-density forefoot valgus compensation in phantom and defined by the outlined broken lines and whereby the dotted shaded area represents a denser material than that of the non-shaded area which represents a less dense material.” ’911 patent, 15:15-22. “The area of the sole of an article of footwear to be compensated by a forefoot valgus compensation of the medial and lateral half dual-density method is shown in FIGS. 7 and 11. FIG. 7 shows the area of this forefoot valgus compensation, as viewed from top to bottom, in its relationship to the metatarsal bones, joints, and toes of a right foot and in its relationship to the median sagittal plane (the midline) and bisection of the foot, line A. The area of a medial and lateral half dual-density fore foot valgus compensation in FIG. 11 is drawn in phantom and shows the shaded area 26 representing a denser material while the non-shaded area 27 represents a less dense material.” ’911 patent, 20:1-13.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 9 FIG. 13 “The 45 degree split dual-density methods are generally preferred to the medial and lateral half dual-density methods because of a more even and gradual alteration of the weight-bearing gravitational forces as they are delivered and directed across the forefoot section of the footwear during the midstance and propulsive phases of gait.” ’911 patent, 12:41-47. “When applying a 45 degree split dual-density fore foot valgus compensation the area of the denser accommodative material effectively slopes upward and toward the lateral aspect of the footwear in all directions from its vertex at the area beneath the medial aspect of the navicular bone. It then radiates from proximally to distally from this vertex and at a 45 degree angle to encompass the following areas of the forefoot: (1) the area beneath the internal (medial) cuneiform and base of the first metatarsal bones; (2) the area diagonal to the longitudinal and transverse arches of the foot and shafts of the metatarsal bones; (3) the

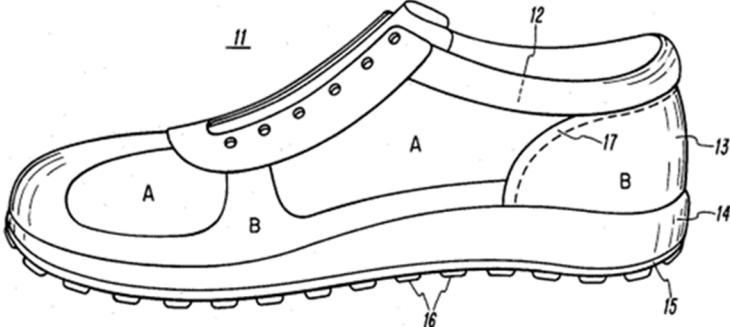
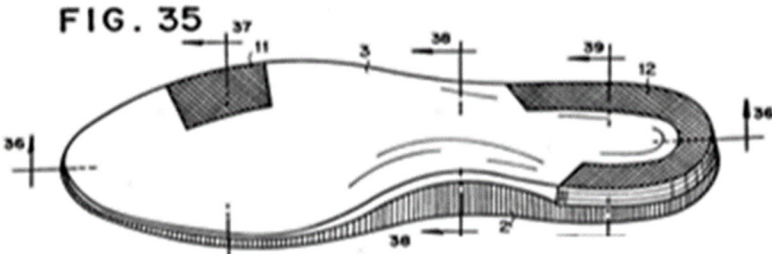
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	areas beneath the five metatarsalphalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68. <u>’126 Patent</u> FIG. 1 and FIG. 3b of Patent '126. FIG. 1 is a side view of a shoe with a sole divided into regions A and B. FIG. 3b is a cross-sectional view of the sole showing a dual-density structure with regions 32, 39, 40, and 41. <u>’573 Patent</u> FIG. 1 and FIG. 2 of Patent '573. FIG. 1 is a side view of a shoe sole with regions 1, 2, 3, 4, 5, and 12. FIG. 2 is a cross-sectional view of the sole showing a dual-density structure with regions 2, 3, 4, and 5.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“Referring to FIG. 1, there is shown the composite shoe bottom 1 according to the invention. A firm lower layer 2 is shaped to be thicker in areas where the wearer’s foot will need extra support. The softer upper layer 3 is in face-to-face engagement with the upper surface of the lower layer 2. The upper layer 3 has an uppermost surface 4 which is contoured to be complementary to the shape of a human foot bottom. As can be seen in FIG. 2, the softer layer is thinnest in the area needing the most support; for example, where the heel of the foot will rest (FIG. 5).” ’573 patent, 6:60-7:2.  “In order to provide a more continuous upper surface and provide padding between the stabilizing inserts and the foot, the upper layer may extend over the stabilizing inserts (FIGS. 40-44). As is seen in FIG. 40, a heel insert 12 extends upward from the lower layer to provide additional support at the outer marginal portions of the heel (FIG. 44). This insert is covered by a portion of upper layer 3 to pad the insert slightly without substantially diminishing the support provided by the insert to the heel. Similarly, insert 11 of FIG. 42 provides support to the ball of the foot and is padded by upper layer 3.” ’573 patent, 9:1-12.  “FIGS. 48-67 show alternate embodiments of the present invention. As is seen in FIGS. 48-52 the contour of the lower layer may be provided by a single step 14 change in height about the perimeter. Beneath the arch the step is higher than around the toe portion of the shoe bottom.” ’573 patent, 9:18-23. <i>See also, ’573 patent, Figs. 1-135.</i>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
2. The athletic shoe of claim 1, wherein the forefoot section comprises: a mid-foot section; and a toe section proximal to the mid-foot section.	The '428 patent discloses a forefoot section comprising a mid-foot section and a toe section proximal to the mid-foot section.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 5A FIG. 5B FIG. 5C “FIGS. 5A-5C show an alternative embodiment of a preform 20' in accordance with the invention. This preform 20' having already the shape of a sole has the special feature that the height does not only vary from the medial (formerly left) side 13" to the lateral (formerly right) side 15", but also from the rear foot part 28 to

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	the forefoot part 27. The sections along the line 5B-5B (FIG. 5B) and the line 5C-5C (FIG. 5C) show that the surplus of height in the forefoot part 27 is about 8 mm on the medial side 13" and about 3 mm on the lateral side 15"; whereas, in the rear foot part 28, the surplus is about 10 mm on the medial side 13" and about 5 mm on the lateral side 15". With such a preform 20', a modulation of the density and, therefore, of the hardness is not only obtained from the medial side 13" to the lateral side 15", but also from the rear foot part 28 to the forefoot part 27." '428 patent, 8:19-33. <u>'911 patent</u> FIG. 9 <u>'126 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	 FIG. 1 <u>'573 patent</u>  FIG. 35
3. The athletic shoe of claim 1, wherein the second material comprises: a resilient material of varying	The '428 patent discloses a resilient material of varying density to provide a compressible gradient to provide the gradient compression factor. “Thus, it is an object of the present invention to provide a sole unit for shoes, in particular for sport shoes, that can be produced in a simple and, therefore, convenient manner with respect to the production technology, and

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
density to provide a compressible gradient to provide the gradient compression factor.	still allow a predetermined density variation in a transverse and/or longitudinal direction over a complete area of the sole element. One aspect of one embodiment of the present invention is to not use two different materials with different densities to create the density variation over the sole element and to connect these materials subsequently, but to use a single material being supplied as a preform and having a thickness distribution that is transformed by pressure forming into the desired density distribution.” ’428 patent, 3:3-15. “In one aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material with a thickness varying in the transverse and/or longitudinal direction depending on the specific density distribution desired and press-forming the sole element preform in a forming tool to form the finished sole element from the sole element preform. In one embodiment, the finished sole element has a substantially constant thickness in at least one transverse direction. Additionally, the sole element preform may be subjected to a non-uniform compression during the press-forming step.” ’428 patent, 3:33-15. “In another aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material and press-forming the sole element preform in a forming tool with a selective supply of heat to single sections of a surface of the tool to locally selectively expand the sole element preform to form the finished sole element with the desired density distribution from the sole element preform.” ’428 patent, 3:46-56. FIG. 4B

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428												
	“If such a preform 20 is formed in a conventionally known forming tool, the sole element 25, as shown in FIGS. 4A and 4B, is obtained. As depicted in FIG. 4A, the sole element 25 has a width a’ of about 149 mm, a length b’ of about 250 mm and a constant height h’ of about 13 mm. FIG. 4B shows again a vertical section through the finished sole element 25 in accordance with the invention. If the hardness of the resulting sole element 25 is measured with reference to the distance from the left side 13’, the following values shown in Table 2 are obtained: TABLE 2 Hardness distribution of the shaped sole unit from the medial side 13’ to the lateral side 15’ in one embodiment DISTANCE FROM THE MEDIAL <table> <tr> <th>SIDE [MM]</th><th>HARDNESS [C]</th></tr> <tr> <td>0</td><td>60.0</td></tr> <tr> <td>37.25</td><td>57.5</td></tr> <tr> <td>74.50</td><td>55.0</td></tr> <tr> <td>115.0</td><td>52.5</td></tr> <tr> <td>149.0</td><td>50.0”</td></tr> </table> ’428 patent, 7:36-58. “As can be seen, the hardness (measured in Shore C) decreases from about 60 C to about 50 C. Therefore, a reduction of about 10 C is obtained (i.e., in the range of about 15% to 20%), if the preform 20 is as described in Table 1 and consists of polyurethane.” ’428 patent, 7:60-64.	SIDE [MM]	HARDNESS [C]	0	60.0	37.25	57.5	74.50	55.0	115.0	52.5	149.0	50.0”
SIDE [MM]	HARDNESS [C]												
0	60.0												
37.25	57.5												
74.50	55.0												
115.0	52.5												
149.0	50.0”												

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“The locally varying hardness of the sole unit 25 can be explained by the surplus of material on the left side 13, which is compressed more than the material on the right side 15 during the final forming step in such a way that a continuously varying density distribution is obtained in the sole unit 25. The resulting density, in turn, influences the hardness and therefore the elasticity of the sole unit 25.” ’428 patent 8:12-18.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 5A FIG. 5B FIG. 5C “FIGS. 5A-5C show an alternative embodiment of a preform 20' in accordance with the invention. This preform 20' having already the shape of a sole has the special feature that the height does not only vary from the medial (formerly left) side 13" to the lateral (formerly right) side 15", but also from the rear foot part 28 to

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	the forefoot part 27. The sections along the line 5B-5B (FIG. 5B) and the line 5C-5C (FIG. 5C) show that the surplus of height in the forefoot part 27 is about 8 mm on the medial side 13" and about 3 mm on the lateral side 15"; whereas, in the rear foot part 28, the surplus is about 10 mm on the medial side 13" and about 5 mm on the lateral side 15". With such a preform 20', a modulation of the density and, therefore, of the hardness is not only obtained from the medial side 13" to the lateral side 15", but also from the rear foot part 28 to the forefoot part 27." '428 patent, 8:19-33. <u>'911 patent</u> "The sole forefoot portion is comprised of different compressibilities of materials selected and arranged across the width thereof such that the sole effectively slopes at an angle upwardly from the lateral aspect to the medial aspect when weight-bearing forces are exerted on the forefoot and thereby providing an effective inclined surface of resultant thickness greater at the medial aspect of the forefoot than at the lateral aspect as a result of less compressible material at the medial aspect of the forefoot than at the lateral aspect when the sole of said article of footwear is intended for use by individuals whose feet have a tendency toward compensation in a pronated direction due to their inherent inverted forefoot varus foot type." '911 patent, Abstract. "The present invention is intended for any and all footwear wherein dual-density or dual-compressibility materials or combinations of different materials may be incorporated into either the midsole, outsole, or innersole construction of the footwear." '911 patent, 1:11-18.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 11 FIG. 15 “FIG. 11 is a perspective plan view of a right midsole of the footwear of the present invention, (in this example, a running shoe midsole), showing the area of a medial and lateral half dual-density forefoot valgus compensation in phantom and defined by the outlined broken lines and whereby the dotted shaded area represents a denser material than that of the non-shaded area which represents a less dense material.” ’911 patent, 15:15-22. “The area of the sole of an article of footwear to be compensated by a forefoot valgus compensation of the medial and lateral half dual-density method is shown in FIGS. 7 and 11. FIG. 7 shows the area of this forefoot valgus compensation, as viewed from top to bottom, in its relationship to the metatarsal bones, joints, and toes of a right foot and in its relationship to the median sagittal plane (the midline) and bisection of the foot, line A. The area of a medial and lateral half dual-density forefoot valgus compensation in FIG. 11 is drawn in phantom and shows the shaded area 26 representing a denser material while the non-shaded area 27 represents a less dense material.” ’911 patent, 20:1-13.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 9 FIG. 13 “The 45 degree split dual-density methods are generally preferred to the medial and lateral half dual-density methods because of a more even and gradual alteration of the weight-bearing gravitational forces as they are delivered and directed across the forefoot section of the footwear during the midstance and propulsive phases of gait.” ’911 patent, 12:41-47. “When applying a 45 degree split dual-density fore foot valgus compensation the area of the denser accommodative material effectively slopes upward and toward the lateral aspect of the footwear in all directions from its vertex at the area beneath the medial aspect of the navicular bone. It then radiates from proximally to distally from this vertex and at a 45 degree angle to encompass the following areas of the forefoot: (1) the area beneath the internal (medial) cuneiform and base of the first metatarsal bones; (2) the area diagonal to the longitudinal and transverse arches of the foot and shafts of the metatarsal bones; (3) the

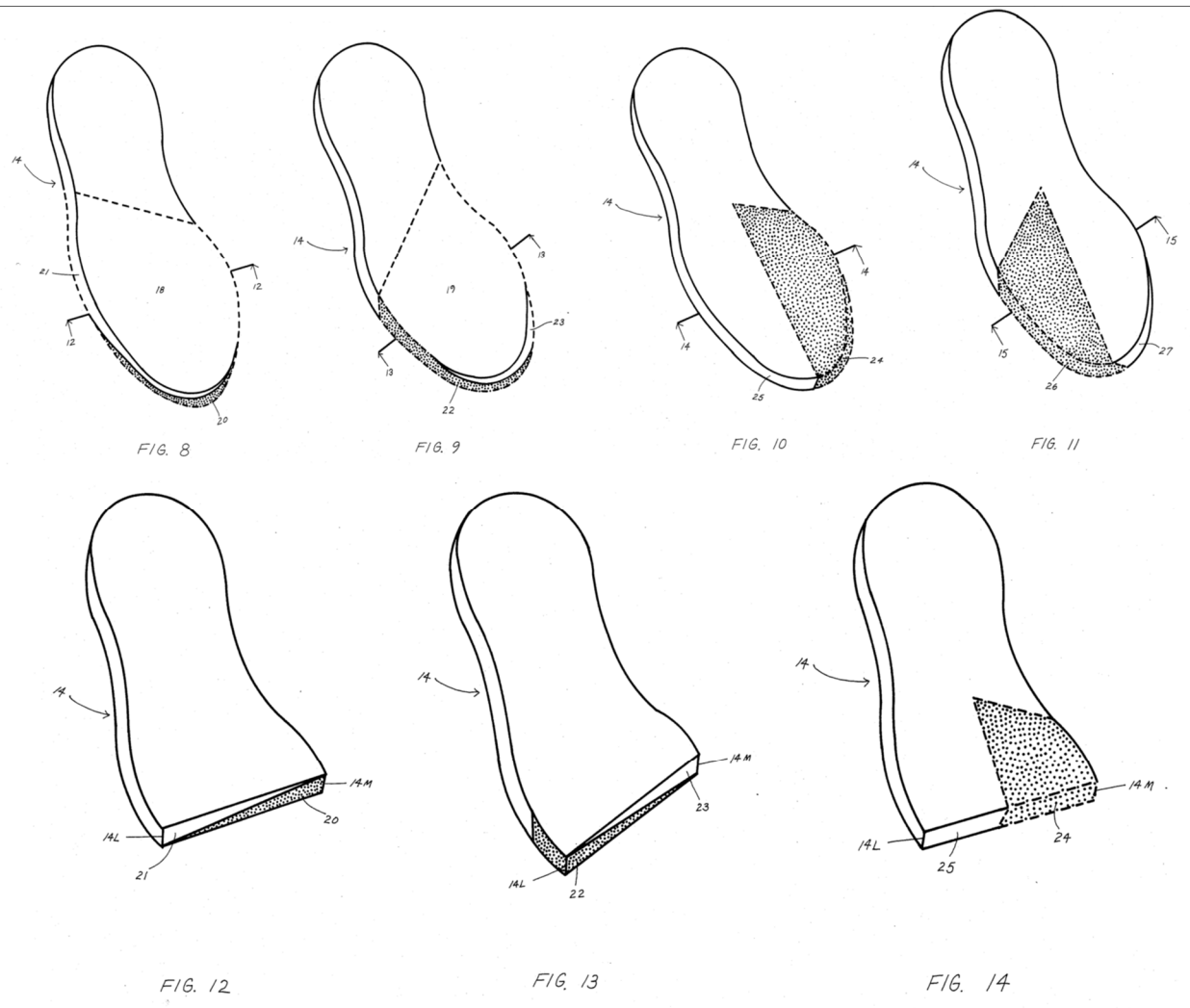
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	areas beneath the five metatarsal phalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68.
4. The athletic shoe of claim 3, wherein the resilient material comprises one or more of: a rubber, a gel, a foam, a synthetic material.	The ’428 patent discloses a resilient material comprising one or more of: a rubber, a gel, a foam, or a synthetic material. “In another aspect, an embodiment of the invention relates to a sole element for a shoe. The sole element includes a homogeneous polymer material including a portion having a locally varying density. The homogeneous polymer material may include ethylene vinyl acetate.” ’428 patent, 3:57-61. “One embodiment of a preform 20 in accordance with the invention is shown in FIGS. 3A and 3B. In one embodiment, the preform is made from ethylene vinyl acetate (EVA); however, other foamed materials are also useful, such as polyurethane (PU).” ’428 patent, 6:56-60. ’911 “In these examples of a running shoe midsole, usually ethyl vinyl acetate (EVA) or polyurethane are the materials commonly utilized in their construction.” ’911 patent, 18:45-47.
5. The athletic shoe of claim 1, wherein the second material comprises: a plurality of material configured to provide a shape of the forefoot platform and to provide the gradient compression factor.	To the extent Athalonz contends the ’428 patent does not anticipate a particular claim, the ’428 patent also renders the claim obvious for the reasons discussed in the Obviousness Chart. <u>’911 patent</u> “The sole forefoot portion is comprised of different compressibilities of materials selected and arranged across the width thereof such that the sole effectively slopes at an angle upwardly from the lateral aspect to the medial aspect when weight-bearing forces are exerted on the forefoot and thereby providing an effective

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	inclined surface of resultant thickness greater at the medial aspect of the forefoot than at the lateral aspect as a result of less compressible material at the medial aspect of the forefoot than at the lateral aspect when the sole of said article of footwear is intended for use by individuals whose feet have a tendency toward compensation in a pronated direction due to their inherent inverted forefoot varus foot type.” ’911 patent, Abstract. “The present invention is intended for any and all footwear wherein dual-density or dual-compressibility materials or combinations of different materials may be incorporated into either the midsole, outersole, or innersole construction of the footwear.” ’911 patent, 1:11-18. FIG. 11 FIG. 15 “FIG. 11 is a perspective plan view of a right midsole of the footwear of the present invention, (in this example, a running shoe midsole), showing the area of a medial and lateral half dual-density forefoot valgus compensation in phantom and defined by the outlined broken lines and whereby the dotted shaded area represents a denser material than that of the non-shaded area which represents a less dense material.” ’911 patent, 15:15-22.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“The area of the sole of an article of footwear to be compensated by a forefoot valgus compensation of the medial and lateral half dual-density method is shown in FIGS. 7 and 11. FIG. 7 shows the area of this forefoot valgus compensation, as viewed from top to bottom, in its relationship to the metatarsal bones, joints, and toes of a right foot and in its relationship to the median sagittal plane (the midline) and bisection of the foot, line A. The area of a medial and lateral half dual-density fore foot valgus compensation in FIG. 11 is drawn in phantom and shows the shaded area 26 representing a denser material while the non-shaded area 27 represents a less dense material.” ’911 patent, 20:1-13. FIG. 9 is a top-down view of a shoe sole. It shows a dashed line representing the median sagittal plane (line A) bisecting the sole into medial (left) and lateral (right) halves. A shaded area, labeled 22, is located in the forefoot region of the medial half. A dashed line, labeled 19, outlines the shape of the sole. Other labels include 14 for the outer edge, 13 for the heel area, and 23 for the lateral edge of the sole. FIG. 13 is a side view of the shoe sole. It shows the sole's profile with a shaded area, labeled 22, in the forefoot region. A dashed line, labeled 14L, indicates the lateral edge of the sole. Other labels include 14 for the outer edge, 14M for the medial edge, and 23 for the heel area. “The 45 degree split dual-density methods are generally preferred to the medial and lateral half dual-density methods because of a more even and gradual alteration of the weight-bearing gravitational forces as they are delivered and directed across the forefoot section of the footwear during the midstance and propulsive phases of gait.” ’911 patent, 12:41-47.

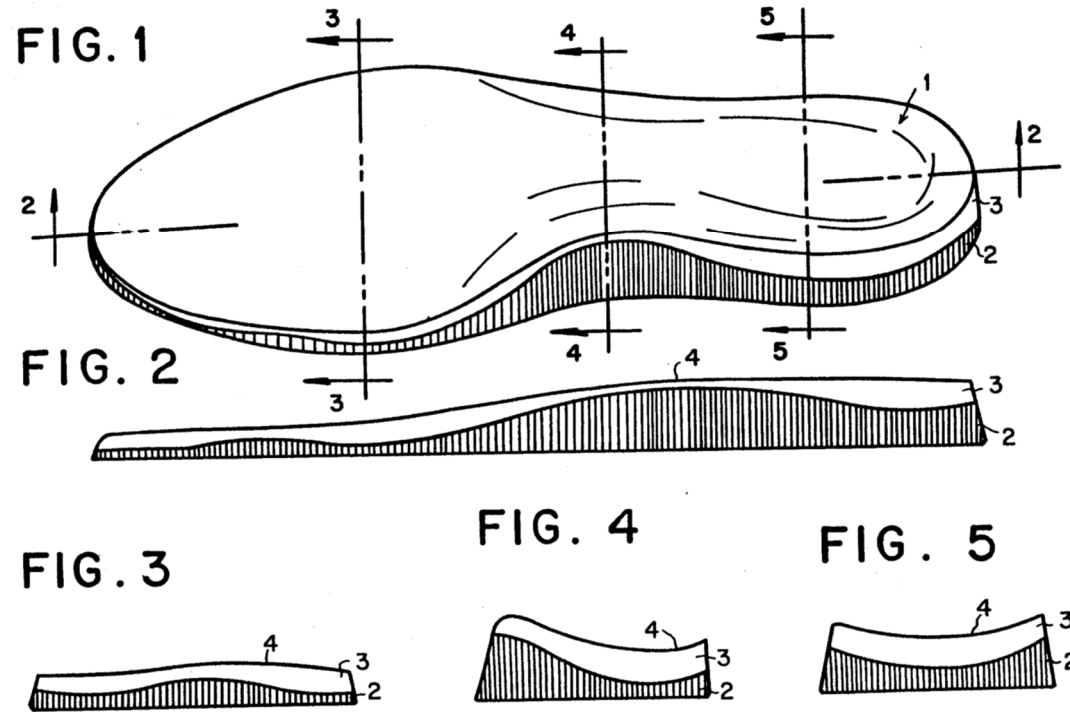
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“When applying a 45 degree split dual-density fore foot valgus compensation the area of the denser accommodative material effectively slopes upward and toward the lateral aspect of the footwear in all directions from its vertex at the area beneath the medial aspect of the navicular bone. It then radiates from proximally to distally from this vertex and at a 45 degree angle to encompass the following areas of the forefoot: (1) the area beneath the internal (medial) cuneiform and base of the first metatarsal bones; (2) the area diagonal to the longitudinal and transverse arches of the foot and shafts of the metatarsal bones; (3) the areas beneath the five metatarsal phalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68.
7. The athletic shoe of claim 1, wherein the heel platform further comprises: the first material having a first compression factor.	The ’428 patent discloses a first material having a first compression factor. “It is known to manufacture soles or parts of soles from expanded polymers, for example, polyurethane (PU) foams. To this end, the polymer material to be expanded is at first expanded into blocks that are subsequently cut into single preforms (so-called blockers). These blockers are inserted into a forming tool and subsequently formed into the desired shape of the sole element with the application of pressure and heat. A sole element produced in such a way can either have a constant thickness over the area of the foot or, if needed, also be formed with a foot-bed. It was, however, a common feature of the preforms known in the prior art to have either a constant thickness (if the sole element to be produced had a constant thickness) or a variation of the thickness corresponding to the variation of the thickness of the sole to be produced.” ’428 patent, 6:38-51. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided. Furthermore, it is not necessary that the sole element extends in a longitudinal direction (i.e. from the heel to the forefoot part) over the complete sole. It is also possible that a sole element in accordance with the invention is only used in the heel and/or in parts of the forefoot.” ’428 patent, 5:56-67.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	<u>'911 patent</u> “For example, a sole of a shoe of a particular size, width, and style may incorporate a midsole material that is of an inch in thickness overall.” ’911 patent, 12:1-3



U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 15 Claiming “an article of footwear ... wherein said rearfoot portion is of constant thickness across the width thereof.” ’911 patent, 21:4-23 (Claim 1). <u>’126 patent</u>

'573 patent



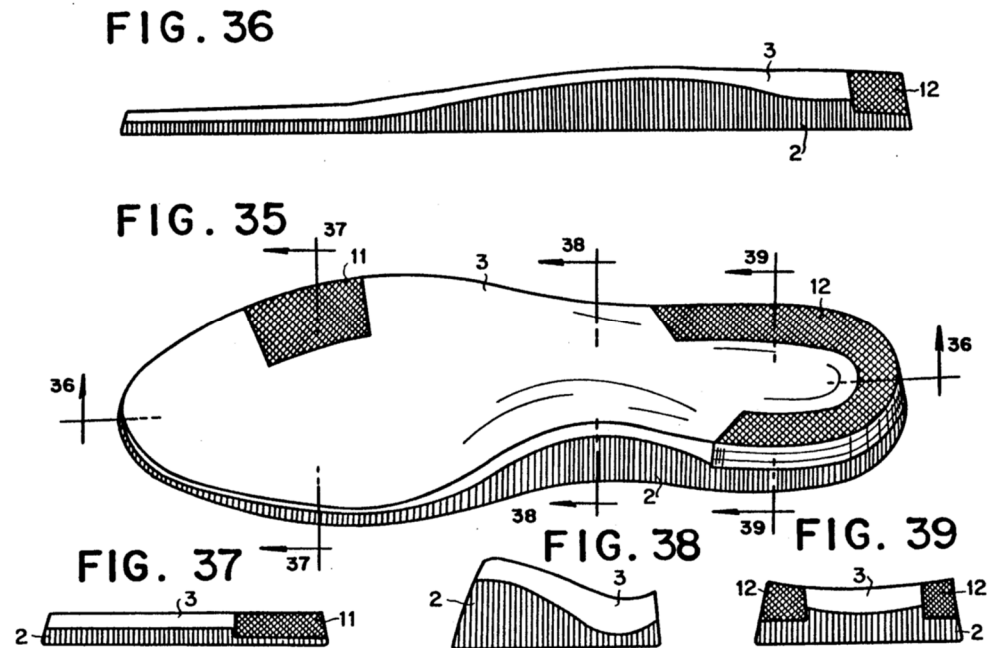


FIG. 48

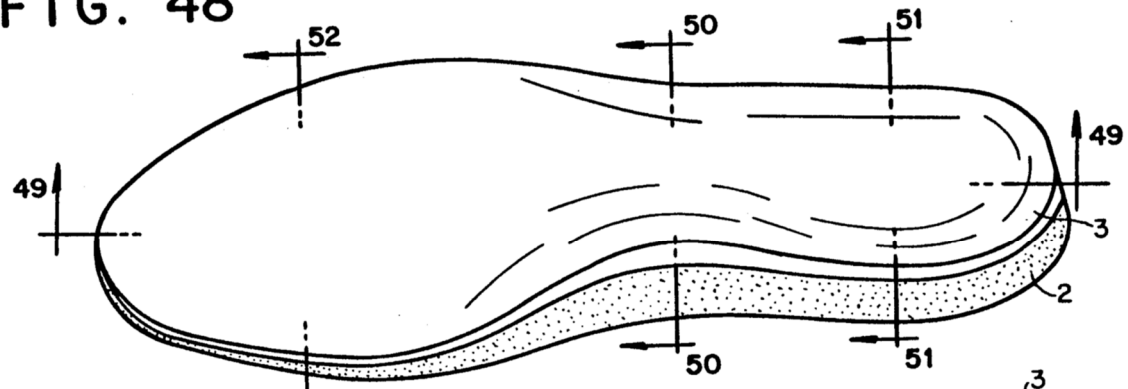


FIG. 49



FIG. 52



FIG. 50

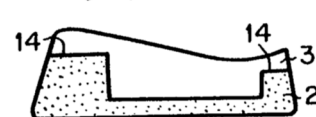
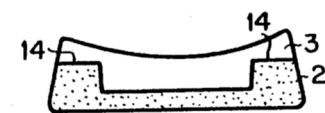


FIG. 51

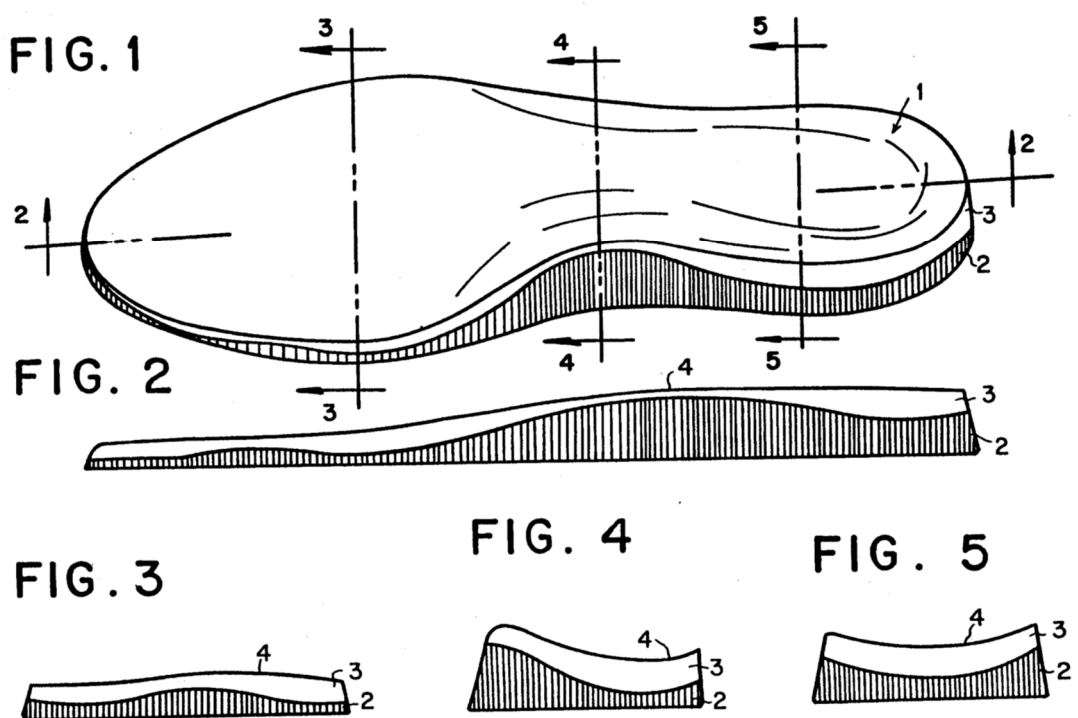


"The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite." '573 patent 7:16-18.

"Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached"

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes. Eventually, it became known to contour the top surface of the unit bottom to provide a heel cup and slight arch. This made the shoe more comfortable because the foot would rest on a surface similar to its shape as opposed to a flat surface which felt like flat feet on a firm floor.” ’573 patent 1:10-27.
9. The athletic shoe of claim 1, wherein the sole section comprises one or more of: an insole; a mid-sole; and an out-sole.	The ’428 patent discloses a sole section comprising one or more of: an insole, a mid-sole, and an out-sole. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided.” ’428 patent, 5:56-63. <u>’911 patent</u> “Innersoles, midsoles, and/or outsoles may each become an integral part of the present invention either independently or in combinations thereof; depending on the particular type of footwear and the particular fabrication process involved.” ’911 patent, 20:47-51. “Outsoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outsole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outsole itself.” ’911 patent, 20:52-57. <u>’126 patent</u>

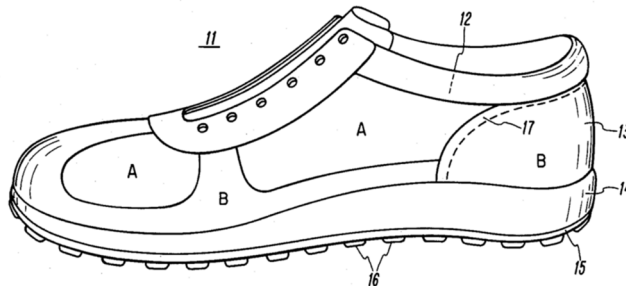
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 1 “Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” ’126 patent at Fig. 1, 5:21-25. <u>’573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21. “Referring to FIG. 1, there is shown the composite shoe bottom 1 according to the invention. A firm lower layer 2 is shaped to be thicker in areas where the wearer's foot will need extra support. The softer upper layer 3 is in face-to-face engagement with the upper surface of the lower layer 2. The upper layer 3 has an upper most surface 4 which is contoured to be complementary to the shape of a human foot bottom. As can be seen in FIG. 2, the softer layer is thinnest in the area needing the most support; for example, where the heel of the foot will rest (FIG. 5).” ’573 patent, 6:60-7:2.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	 FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5
10[pre]. An athletic shoe comprises:	The '428 patent discloses an athletic shoe. “The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding

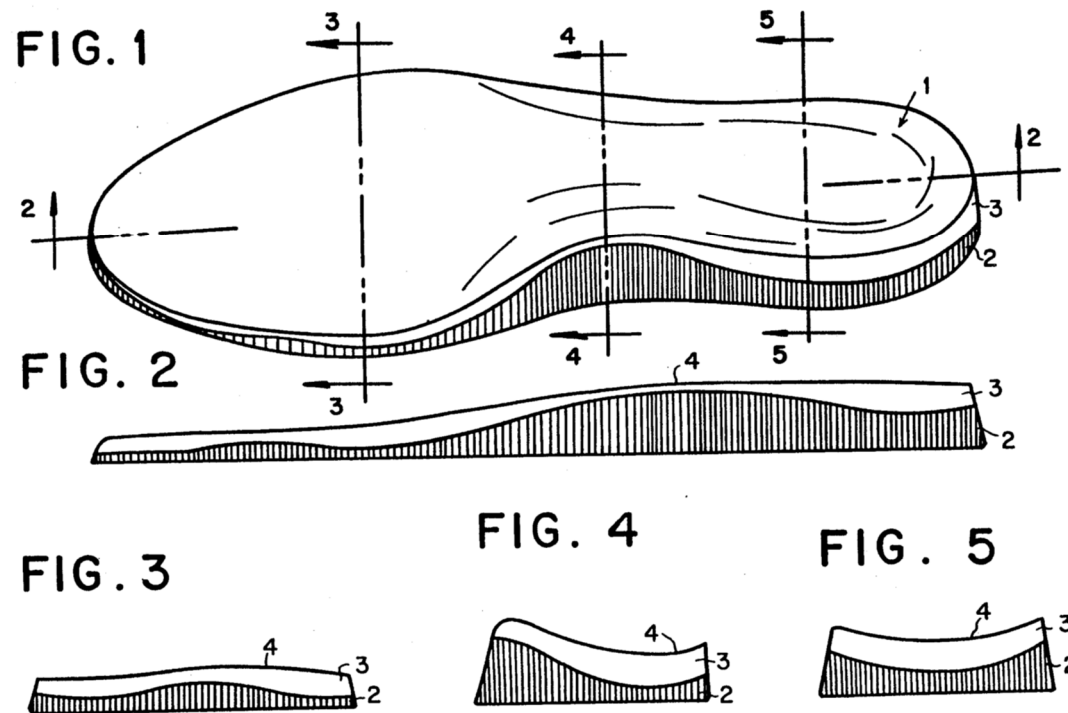
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62. ’911 patent “In a running shoe midsole, as exemplified in these particular drawings, the compensations of the present invention are incorporated directly into the midsole 14 with the innersole and outersole being only secondarily effected by the compensations of the midsole itself.” ’911 patent, 20:38-42. ’126 patent “Improved footwear for physical exercise, such as running or jogging, in which a segment of the shoe extending beneath the third, fourth and fifth metatarsal phalangeal joints on the lateral side of the shoe is comprised of a crepe or spongy rubber material, which is substantially more flexible than the material which comprises the remainder of the solepiece.” ’126 patent, Abstract. ’573 patent “This saves weight in running shoes. The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite. This shoe bottom provides extra firmness and support on the outside edges of the heel to prevent pronation and supination or side-to-side rocking and instability. At the same time, the inner area of the heel is softer because the upper soft layer is thicker. This softens the impact on the heel during walking or running. This further forces the foot's fatty tissue inward beneath the heel to assist the shock absorbing function of the fatty tissue.” ’573 patent, 7:15-26.
10[a] an upper section; and	The ’428 patent discloses an upper shoe section.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62. <u>’911 patent</u> “Outersoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outersole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outersole itself.” ’911 patent, 20:52-57. <u>’126 patent</u> FIG. 1

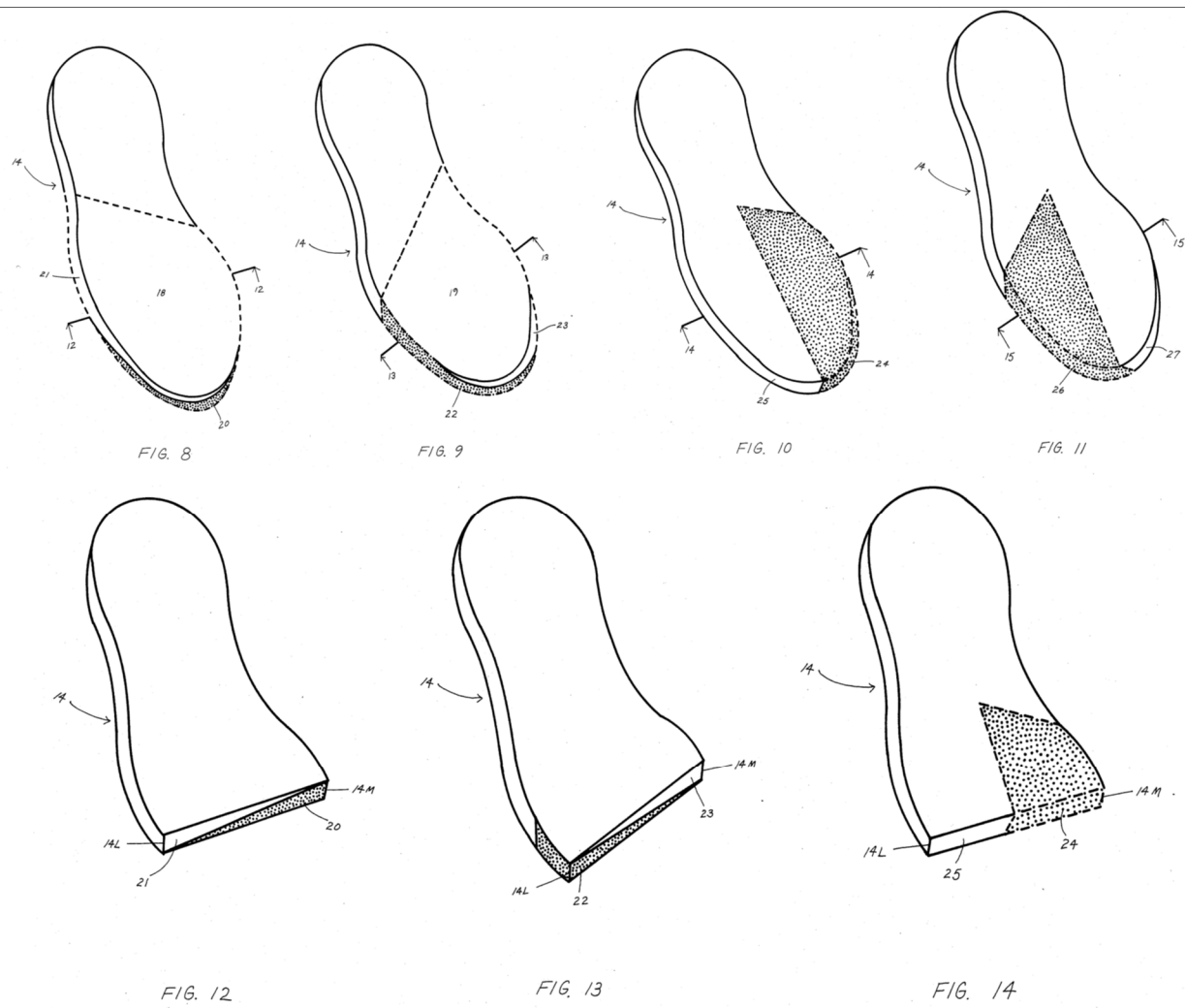
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” ’126 patent at Fig. 1, 5:21-25. <u>’573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21.
10[b] a sole section coupled to the upper section, wherein the sole section includes:	The ’428 patent discloses a sole section coupled to the upper section. “The invention relates to sole elements and methods for manufacturing sole elements for shoes, in particular for sport shoes, with a specific density distribution in a transverse and/or longitudinal direction.” ’428 patent, Abstract. “Additional embodiments include a sole element manufactured in accordance with the preceding methods and a sole for an article of footwear that includes a sole element manufactured in accordance with the preceding methods. In one embodiment, the invention relates to an article of footwear including an upper and a sole including a sole element manufactured in accordance with the preceding methods.” ’428 patent, 4:56-62. <u>’911 patent</u> “Innersoles, midsoles, and/or outsoles may each become an integral part of the present invention either independently or in combinations thereof; depending on the particular type of footwear and the particular fabrication process involved.” ’911 patent, 20:47-51.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“Outsoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outsole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outsole itself.” ’911 patent, 20:52-57. <u>’126 patent</u>  FIG. 1 “Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” ’126 patent at Fig. 1, 5:21-25. <u>’573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21.

“Referring to FIG. 1, there is shown the composite shoe bottom 1 according to the invention. A firm lower layer 2 is shaped to be thicker in areas where the wearer's foot will need extra support. The softer upper layer 3 is in face-to-face engagement with the upper surface of the lower layer 2. The upper layer 3 has an uppermost surface 4 which is contoured to be complementary to the shape of a human foot bottom. As can be seen in FIG. 2, the softer layer is thinnest in the area needing the most support; for example, where the heel of the foot will rest (FIG. 5).” ’573 patent, 6:60-7:2.

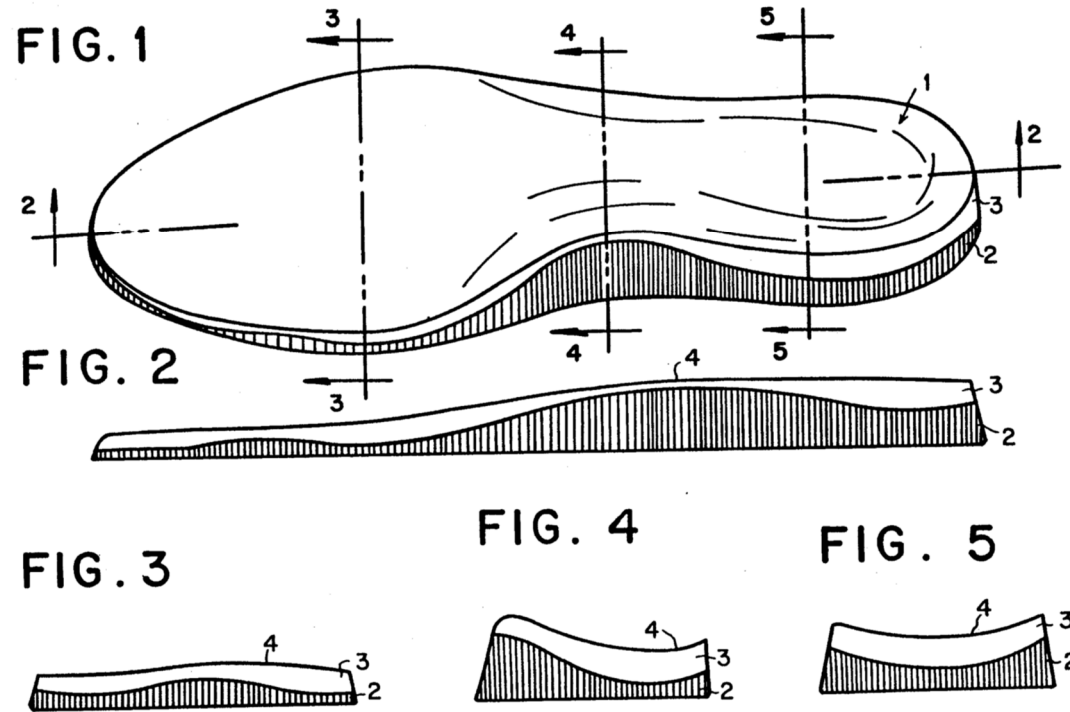


U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
10[c] a heel platform having a first height that is substantial uniform from an inner edge of the sole section to an outer edge of the sole section, wherein the heel platform is constructed of a first material; and	The '428 patent discloses a heel platform having a first height that is substantial uniform from an inner edge of the sole section to an outer edge of the sole section, wherein the heel platform is constructed of a first material. “It is known to manufacture soles or parts of soles from expanded polymers, for example, polyurethane (PU) foams. To this end, the polymer material to be expanded is at first expanded into blocks that are subsequently cut into single preforms (so-called blockers). These blockers are inserted into a forming tool and subsequently formed into the desired shape of the sole element with the application of pressure and heat. A sole element produced in such a way can either have a constant thickness over the area of the foot or, if needed, also be formed with a foot-bed. It was, however, a common feature of the preforms known in the prior art to have either a constant thickness (if the sole element to be produced had a constant thickness) or a variation of the thickness corresponding to the variation of the thickness of the sole to be produced.” ’428 patent, 6:38-51. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided. Furthermore, it is not necessary that the sole element extends in a longitudinal direction (i.e. from the heel to the forefoot part) over the complete sole. It is also possible that a sole element in accordance with the invention is only used in the heel and/or in parts of the forefoot.” ’428 patent, 5:56-67. <u>’911 patent</u> “For example, a sole of a shoe of a particular size, width, and style may incorporate a midsole material that is of an inch in thickness overall.” ’911 patent, 12:1-3.



U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 15 Claiming “an article of footwear ... wherein said rearfoot portion is of constant thickness across the width thereof.” ’911 patent, 21:4-23 (Claim 1). <u>’126 patent</u> FIG. 1 FIG. 3b

'573 patent



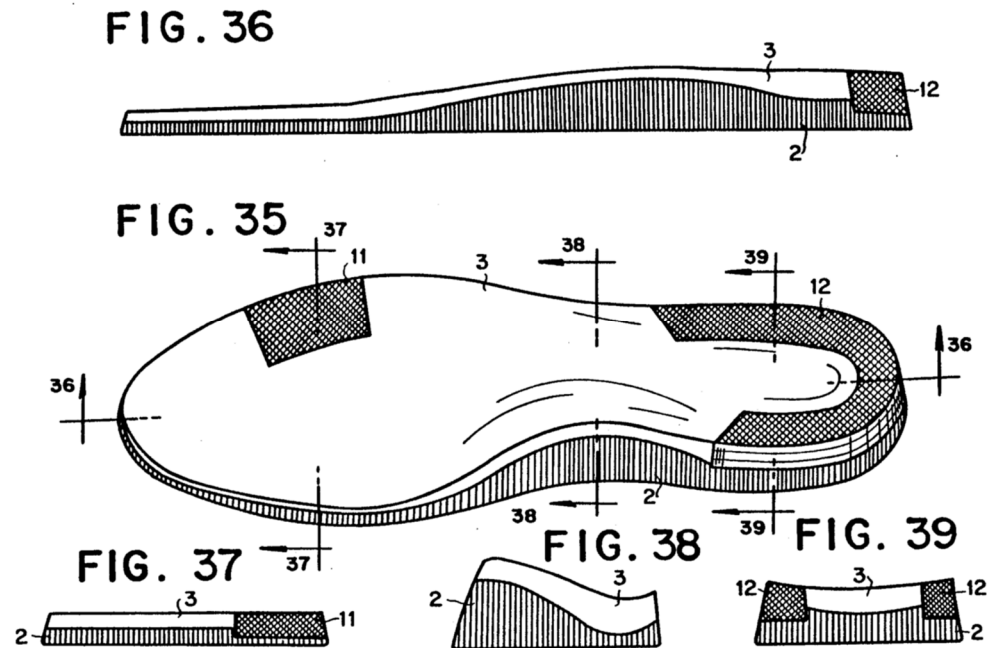


FIG. 48

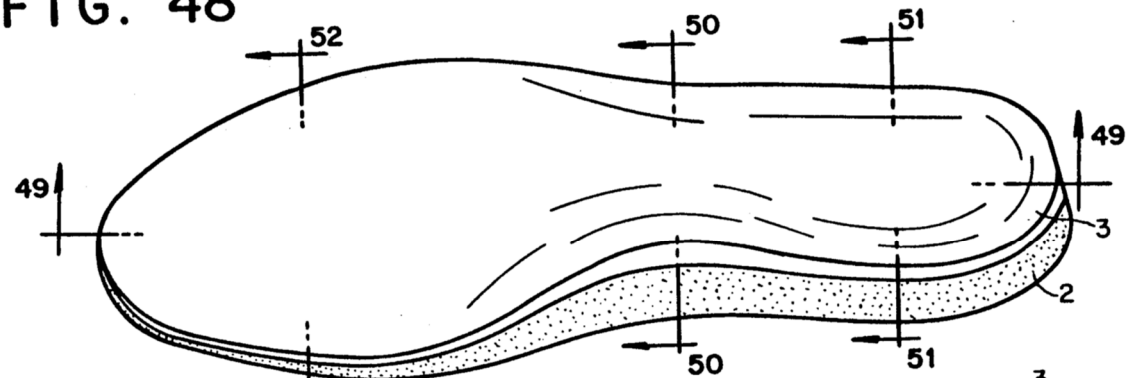


FIG. 49



FIG. 52



FIG. 50

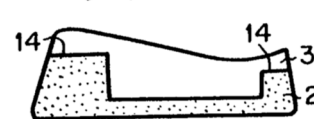
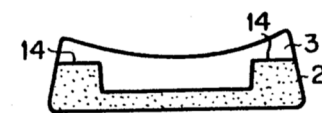


FIG. 51



"The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite." '573 patent 7:16-18.

"Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached"

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes. Eventually, it became known to contour the top surface of the unit bottom to provide a heel cup and slight arch. This made the shoe more comfortable because the foot would rest on a surface similar to its shape as opposed to a flat surface which felt like flat feet on a firm floor.” ’573 patent 1:10-27.
10[d] a forefoot platform juxtaposed to the heel platform, wherein the forefoot platform is constructed to have a first level of compression proximal to the outer edge of the shoe and a second level of compression proximal to an inner edge of the shoe, wherein the second level of compression is greater than the first level of compression.	The ’428 patent discloses a forefoot platform juxtaposed to the heel platform, wherein the forefoot platform is constructed to have a first level of compression proximal to the outer edge of the shoe and a second level of compression proximal to an inner edge of the shoe, wherein the second level of compression is greater than the first level of compression. “Thus, it is an object of the present invention to provide a sole unit for shoes, in particular for sport shoes, that can be produced in a simple and, therefore, convenient manner with respect to the production technology, and still allow a predetermined density variation in a transverse and/or longitudinal direction over a complete area of the sole element. One aspect of one embodiment of the present invention is to not use two different materials with different densities to create the density variation over the sole element and to connect these materials subsequently, but to use a single material being supplied as a preform and having a thickness distribution that is transformed by pressure forming into the desired density distribution.” ’428 patent, 3:3-15. “In one aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material with a thickness varying in the transverse and/or longitudinal direction depending on the specific density distribution desired and press-forming the sole element preform in a forming tool to form the finished sole element from the sole element preform. In one embodiment, the finished sole element has a substantially constant thickness in at least one transverse direction. Additionally, the sole element preform may be subjected to a non-uniform compression during the press-forming step.” ’428 patent, 3:33-15. “In another aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428				
	polymer material and press-forming the sole element preform in a forming tool with a selective supply of heat to single sections of a surface of the tool to locally selectively expand the sole element preform to form the finished sole element with the desired density distribution from the sole element preform.” ’428 patent, 3:46-56. FIG. 4B “If such a preform 20 is formed in a conventionally known forming tool, the sole element 25, as shown in FIGS. 4A and 4B, is obtained. As depicted in FIG. 4A, the sole element 25 has a width a’ of about 149 mm, a length b’ of about 250 mm and a constant height h’ of about 13 mm. FIG. 4B shows again a vertical section through the finished sole element 25 in accordance with the invention. If the hardness of the resulting sole element 25 is measured with reference to the distance from the left side 13’, the following values shown in Table 2 are obtained: TABLE 2 Hardness distribution of the shaped sole unit from the medial side 13’ to the lateral side 15’ in one embodiment DISTANCE FROM THE MEDIAL <table> <thead> <tr> <th>SIDE [MM]</th><th>HARDNESS [C]</th></tr> </thead> <tbody> <tr> <td>0</td><td>60.0</td></tr> </tbody> </table>	SIDE [MM]	HARDNESS [C]	0	60.0
SIDE [MM]	HARDNESS [C]				
0	60.0				

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	37.25 57.5 74.50 55.0 115.0 52.5 149.0 50.0” ’428 patent, 7:36-58. “As can be seen, the hardness (measured in Shore C) decreases from about 60 C to about 50 C. Therefore, a reduction of about 10 C is obtained (i.e., in the range of about 15% to 20%), if the preform 20 is as described in Table 1 and consists of polyurethane.” ’428 patent, 7:60-64. “The locally varying hardness of the sole unit 25 can be explained by the surplus of material on the left side 13, which is compressed more than the material on the right side 15 during the final forming step in such a way that a continuously varying density distribution is obtained in the sole unit 25. The resulting density, in turn, influences the hardness and therefore the elasticity of the sole unit 25.” ’428 patent 8:12-18.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 5A FIG. 5B FIG. 5C “FIGS. 5A-5C show an alternative embodiment of a preform 20' in accordance with the invention. This preform 20' having already the shape of a sole has the special feature that the height does not only vary from the medial (formerly left) side 13" to the lateral (formerly right) side 15", but also from the rear foot part 28 to

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	the forefoot part 27. The sections along the line 5B-5B (FIG. 5B) and the line 5C-5C (FIG. 5C) show that the surplus of height in the forefoot part 27 is about 8 mm on the medial side 13" and about 3 mm on the lateral side 15"; whereas, in the rear foot part 28, the surplus is about 10 mm on the medial side 13" and about 5 mm on the lateral side 15". With such a preform 20', a modulation of the density and, therefore, of the hardness is not only obtained from the medial side 13" to the lateral side 15", but also from the rear foot part 28 to the forefoot part 27." '428 patent, 8:19-33. <u>'911 patent</u> "The sole forefoot portion is comprised of different compressibilities of materials selected and arranged across the width thereof such that the sole effectively slopes at an angle upwardly from the lateral aspect to the medial aspect when weight-bearing forces are exerted on the forefoot and thereby providing an effective inclined surface of resultant thickness greater at the medial aspect of the forefoot than at the lateral aspect as a result of less compressible material at the medial aspect of the forefoot than at the lateral aspect when the sole of said article of footwear is intended for use by individuals whose feet have a tendency toward compensation in a pronated direction due to their inherent inverted forefoot varus foot type." '911 patent, Abstract. "The present invention is intended for any and all footwear wherein dual-density or dual-compressibility materials or combinations of different materials may be incorporated into either the midsole, outsole, or innersole construction of the footwear." '911 patent, 1:11-18.

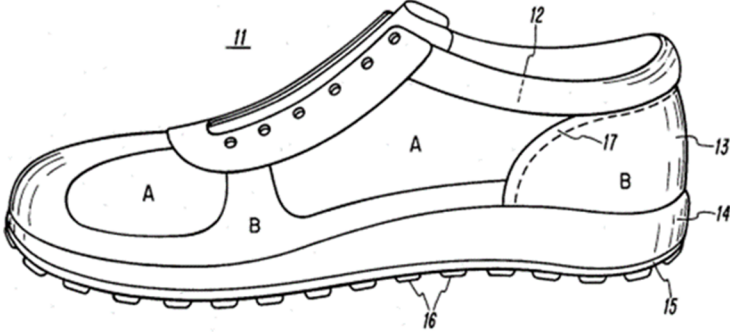
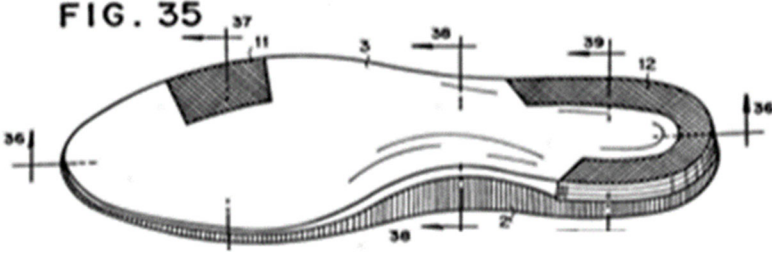
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 11 FIG. 15 “FIG. 11 is a perspective plan view of a right midsole of the footwear of the present invention, (in this example, a running shoe midsole), showing the area of a medial and lateral half dual-density forefoot valgus compensation in phantom and defined by the outlined broken lines and whereby the dotted shaded area represents a denser material than that of the non-shaded area which represents a less dense material.” ’911 patent, 15:15-22. “The area of the sole of an article of footwear to be compensated by a forefoot valgus compensation of the medial and lateral half dual-density method is shown in FIGS. 7 and 11. FIG. 7 shows the area of this forefoot valgus compensation, as viewed from top to bottom, in its relationship to the metatarsal bones, joints, and toes of a right foot and in its relationship to the median sagittal plane (the midline) and bisection of the foot, line A. The area of a medial and lateral half dual-density fore foot valgus compensation in FIG. 11 is drawn in phantom and shows the shaded area 26 representing a denser material while the non-shaded area 27 represents a less dense material.” ’911 patent, 20:1-13.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 9 FIG. 13 “The 45 degree split dual-density methods are generally preferred to the medial and lateral half dual-density methods because of a more even and gradual alteration of the weight-bearing gravitational forces as they are delivered and directed across the forefoot section of the footwear during the midstance and propulsive phases of gait.” ’911 patent, 12:41-47. “When applying a 45 degree split dual-density fore foot valgus compensation the area of the denser accommodative material effectively slopes upward and toward the lateral aspect of the footwear in all directions from its vertex at the area beneath the medial aspect of the navicular bone. It then radiates from proximally to distally from this vertex and at a 45 degree angle to encompass the following areas of the forefoot: (1) the area beneath the internal (medial) cuneiform and base of the first metatarsal bones; (2) the area diagonal to the longitudinal and transverse arches of the foot and shafts of the metatarsal bones; (3) the

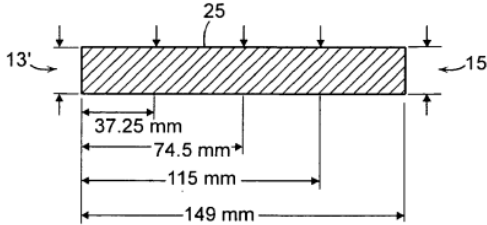
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	areas beneath the five metatarsalphalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68.
11. The athletic shoe of claim 10, wherein the forefoot section comprises: a mid-foot section; and a toe section proximal to the mid-foot section.	The ’428 patent discloses a forefoot section comprising a mid-foot section and a toe section proximal to the mid-foot section.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 5A FIG. 5B FIG. 5C “FIGS. 5A-5C show an alternative embodiment of a preform 20’ in accordance with the invention. This preform 20’ having already the shape of a sole has the special feature that the height does not only vary from the medial (formerly left) side 13” to the lateral (formerly right) side 15”, but also from the rear foot part 28 to

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	the forefoot part 27. The sections along the line 5B-5B (FIG. 5B) and the line 5C-5C (FIG. 5C) show that the surplus of height in the forefoot part 27 is about 8 mm on the medial side 13" and about 3 mm on the lateral side 15"; whereas, in the rear foot part 28, the surplus is about 10 mm on the medial side 13" and about 5 mm on the lateral side 15". With such a preform 20', a modulation of the density and, therefore, of the hardness is not only obtained from the medial side 13" to the lateral side 15", but also from the rear foot part 28 to the forefoot part 27." '428 patent, 8:19-33. <u>'911 patent</u> <u>'126 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	 FIG. 1 <u>'573 patent</u>  FIG. 35
12. The athletic shoe of claim 10, wherein the forefoot platform comprises:	The '428 patent discloses a resilient material of varying density to provide a compressible gradient to provide the gradient compression factor.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
a resilient material of varying density to provide a compressible gradient to provide the gradient compression factor.	“Thus, it is an object of the present invention to provide a sole unit for shoes, in particular for sport shoes, that can be produced in a simple and, therefore, convenient manner with respect to the production technology, and still allow a predetermined density variation in a transverse and/or longitudinal direction over a complete area of the sole element. One aspect of one embodiment of the present invention is to not use two different materials with different densities to create the density variation over the sole element and to connect these materials subsequently, but to use a single material being supplied as a preform and having a thickness distribution that is transformed by pressure forming into the desired density distribution.” ’428 patent, 3:3-15. “In one aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material with a thickness varying in the transverse and/or longitudinal direction depending on the specific density distribution desired and press-forming the sole element preform in a forming tool to form the finished sole element from the sole element preform. In one embodiment, the finished sole element has a substantially constant thickness in at least one transverse direction. Additionally, the sole element preform may be subjected to a non-uniform compression during the press-forming step.” ’428 patent, 3:33-15. “In another aspect, an embodiment of the invention relates to a method of manufacturing a sole element for a shoe, where the sole element has a varying density distribution in at least one direction, for example a transverse and/or longitudinal direction. The method includes manufacturing a sole element preform from a polymer material and press-forming the sole element preform in a forming tool with a selective supply of heat to single sections of a surface of the tool to locally selectively expand the sole element preform to form the finished sole element with the desired density distribution from the sole element preform.” ’428 patent, 3:46-56.

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428								
	 FIG. 4B “If such a preform 20 is formed in a conventionally known forming tool, the sole element 25, as shown in FIGS. 4A and 4B, is obtained. As depicted in FIG. 4A, the sole element 25 has a width a' of about 149 mm, a length b' of about 250 mm and a constant height h' of about 13 mm. FIG. 4B shows again a vertical section through the finished sole element 25 in accordance with the invention. If the hardness of the resulting sole element 25 is measured with reference to the distance from the left side 13', the following values shown in Table 2 are obtained: TABLE 2 Hardness distribution of the shaped sole unit from the medial side 13' to the lateral side 15' in one embodiment DISTANCE FROM THE MEDIAL <table> <tr> <th>SIDE [MM]</th><th>HARDNESS [C]</th></tr> <tr> <td>0</td><td>60.0</td></tr> <tr> <td>37.25</td><td>57.5</td></tr> <tr> <td>74.50</td><td>55.0</td></tr> </table>	SIDE [MM]	HARDNESS [C]	0	60.0	37.25	57.5	74.50	55.0
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U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
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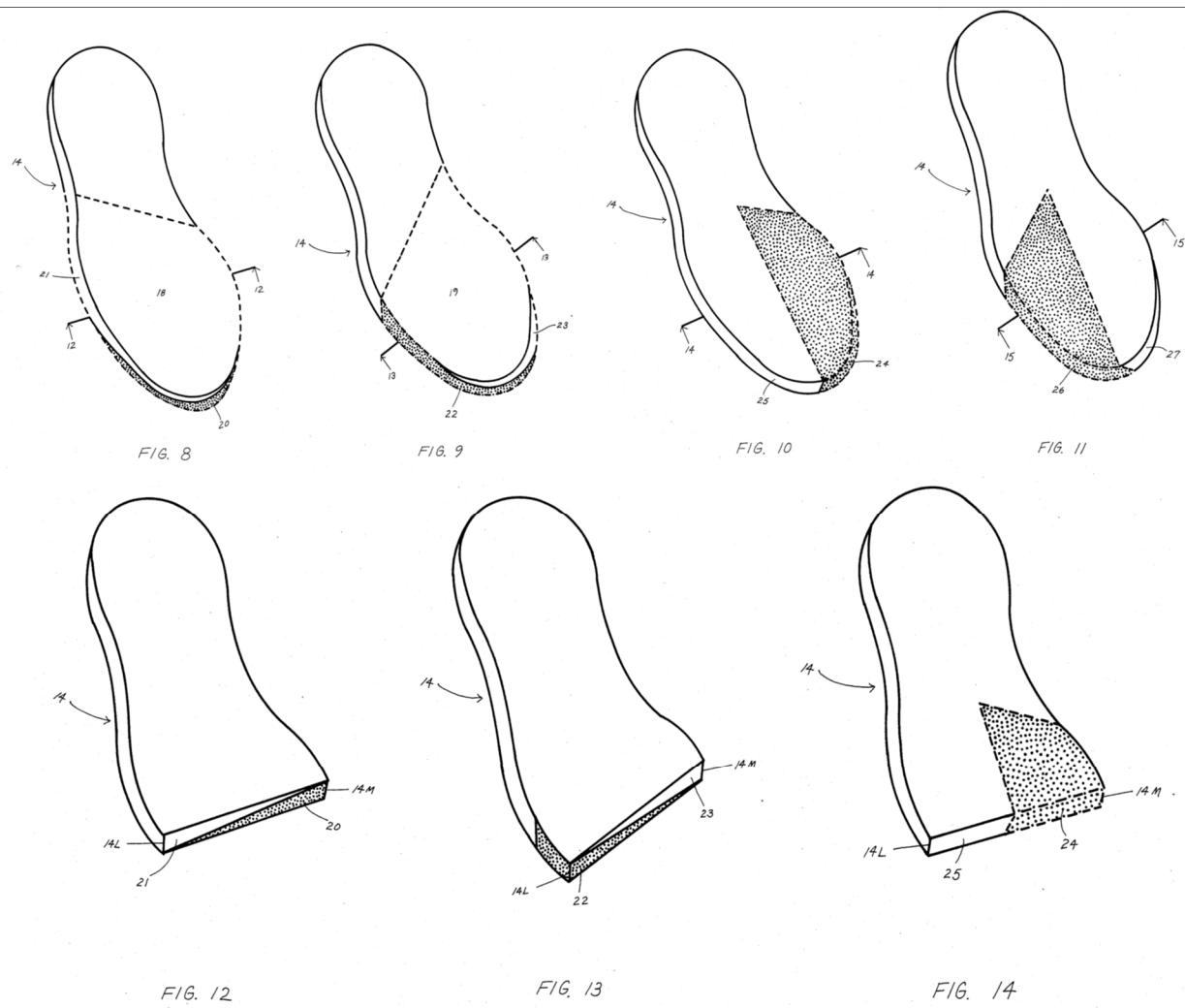
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	areas beneath the five metatarsalphalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68.
13. The athletic shoe of claim 12, wherein the resilient material comprises one or more of: a rubber, a gel, a foam, a synthetic material.	The ’428 patent discloses a resilient material comprising one or more of: a rubber, a gel, a foam, or a synthetic material. “In another aspect, an embodiment of the invention relates to a sole element for a shoe. The sole element includes a homogeneous polymer material including a portion having a locally varying density. The homogeneous polymer material may include ethylene vinyl acetate.” ’428 patent, 3:57-61. “One embodiment of a preform 20 in accordance with the invention is shown in FIGS. 3A and 3B. In one embodiment, the preform is made from ethylene vinyl acetate (EVA); however, other foamed materials are also useful, such as polyurethane (PU).” ’428 patent, 6:56-60. <u>’911 patent</u> “In these examples of a running shoe midsole, usually ethyl vinyl acetate (EVA) or polyurethane are the materials commonly utilized in their construction.” ’911 patent, 18:45-47.
14. The athletic shoe of claim 10, wherein the forefoot section comprises: a plurality of material configured to provide a shape of the forefoot platform and to provide	To the extent Athalonz contends the ’428 patent does not anticipate a particular claim, the ’428 patent also renders the claim obvious for the reasons discussed in the Obviousness Chart. <u>’911 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
the gradient compression factor.	“The sole forefoot portion is comprised of different compressibilities of materials selected and arranged across the width thereof such that the sole effectively slopes at an angle upwardly from the lateral aspect to the medial aspect when weight-bearing forces are exerted on the forefoot and thereby providing an effective inclined surface of resultant thickness greater at the medial aspect of the forefoot than at the lateral aspect as a result of less compressible material at the medial aspect of the forefoot than at the lateral aspect when the sole of said article of footwear is intended for use by individuals whose feet have a tendency toward compensation in a pronated direction due to their inherent inverted forefoot varus foot type.” ’911 patent, Abstract. “The present invention is intended for any and all footwear wherein dual-density or dual-compressibility materials or combinations of different materials may be incorporated into either the midsole, outersole, or innersole construction of the footwear.” ’911 patent, 1:11-18. FIG. 11 FIG. 15 “FIG. 11 is a perspective plan view of a right midsole of the footwear of the present invention, (in this example, a running shoe midsole), showing the area of a medial and lateral half dual-density forefoot valgus compensation in phantom and defined by the outlined broken lines and whereby the dotted shaded area

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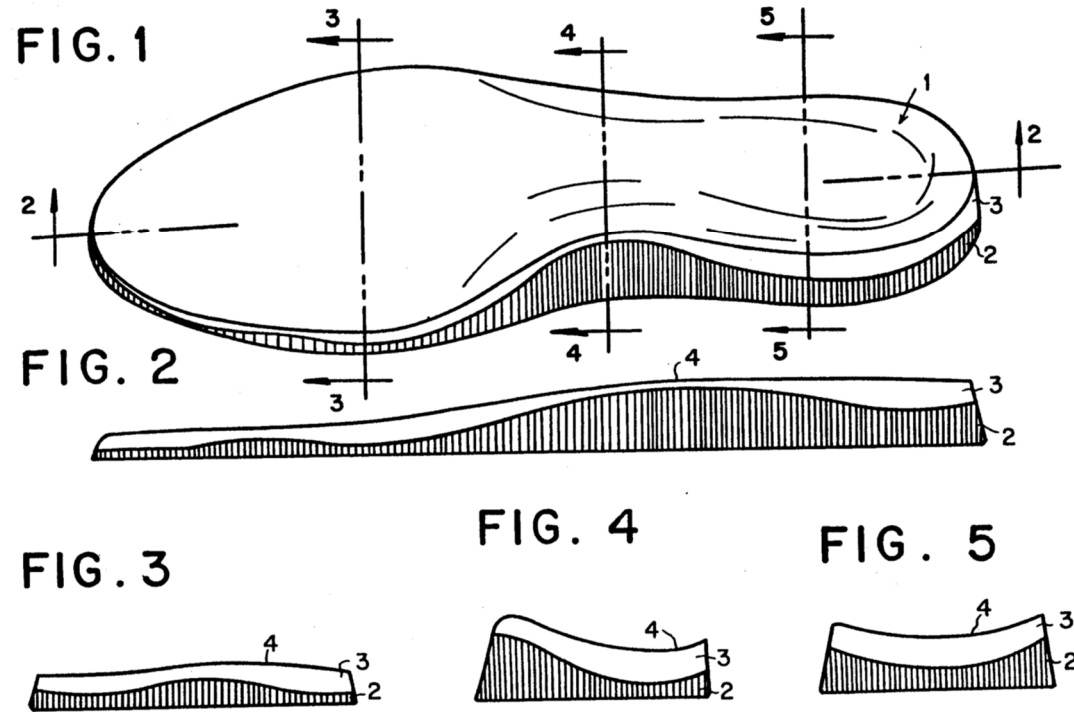
U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	“The 45 degree split dual-density methods are generally preferred to the medial and lateral half dual-density methods because of a more even and gradual alteration of the weight-bearing gravitational forces as they are delivered and directed across the forefoot section of the footwear during the midstance and propulsive phases of gait.” ’911 patent, 12:41-47. “When applying a 45 degree split dual-density fore foot valgus compensation the area of the denser accommodative material effectively slopes upward and toward the lateral aspect of the footwear in all directions from its vertex at the area beneath the medial aspect of the navicular bone. It then radiates from proximally to distally from this vertex and at a 45 degree angle to encompass the following areas of the forefoot: (1) the area beneath the internal (medial) cuneiform and base of the first metatarsal bones; (2) the area diagonal to the longitudinal and transverse arches of the foot and shafts of the metatarsal bones; (3) the areas beneath the five metatarsalphalangeal joints (the ball of the foot) and; (4) the area beneath all of the toes.” ’911 patent, 11:42-55. “In a medial and lateral half dual-density forefoot valgus compensation, the material employed on the lateral half of the forefoot is denser than the material used on the medial half of the forefoot.” ’911 patent, 11:64-68.
15. The athletic shoe of claim 10, wherein the heel platform further comprises: the first material having a first compression factor.	The ’428 patent discloses a first material having a first compression factor. “It is known to manufacture soles or parts of soles from expanded polymers, for example, polyurethane (PU) foams. To this end, the polymer material to be expanded is at first expanded into blocks that are subsequently cut into single preforms (so-called blockers). These blockers are inserted into a forming tool and subsequently formed into the desired shape of the sole element with the application of pressure and heat. A sole element produced in such a way can either have a constant thickness over the area of the foot or, if needed, also be formed with a foot-bed. It was, however, a common feature of the preforms known in the prior art to have either a constant thickness (if the sole element to be produced had a constant thickness) or a variation of the thickness corresponding to the variation of the thickness of the sole to be produced.” ’428 patent, 6:38-51. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided. Furthermore, it

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	is not necessary that the sole element extends in a longitudinal direction (i.e. from the heel to the forefoot part) over the complete sole. It is also possible that a sole element in accordance with the invention is only used in the heel and/or in parts of the forefoot.” ’428 patent, 5:56-67. <u>’911 patent</u> “For example, a sole of a shoe of a particular size, width, and style may incorporate a midsole material that is of an inch in thickness overall.” ’911 patent, 12:1-3



U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 15 Claiming “an article of footwear ... wherein said rearfoot portion is of constant thickness across the width thereof.” ’911 patent, 21:4-23 (Claim 1). <u>’126 patent</u>

'573 patent



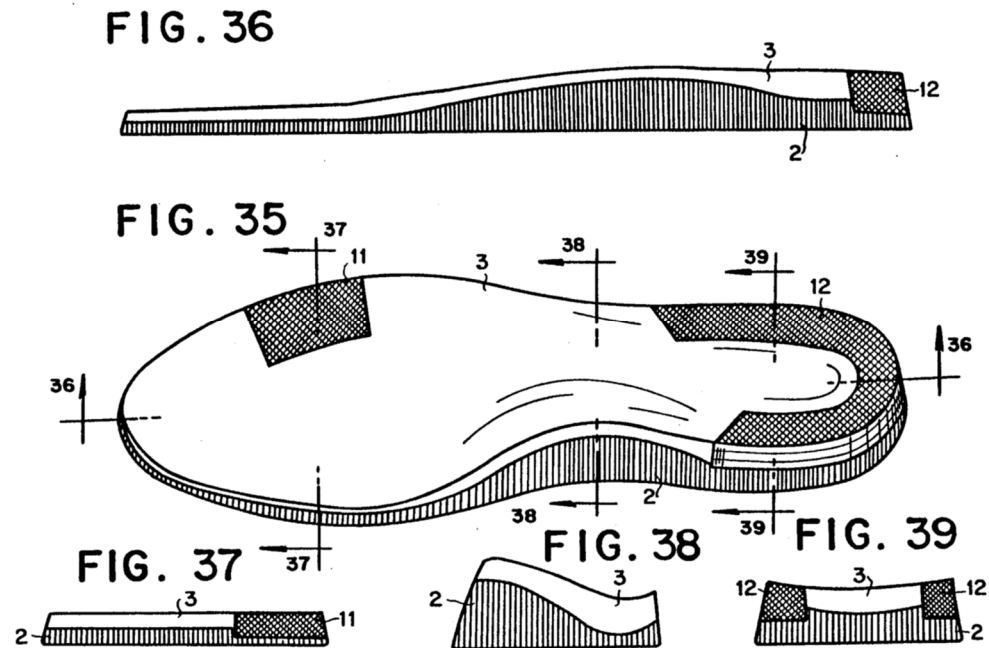


FIG. 48

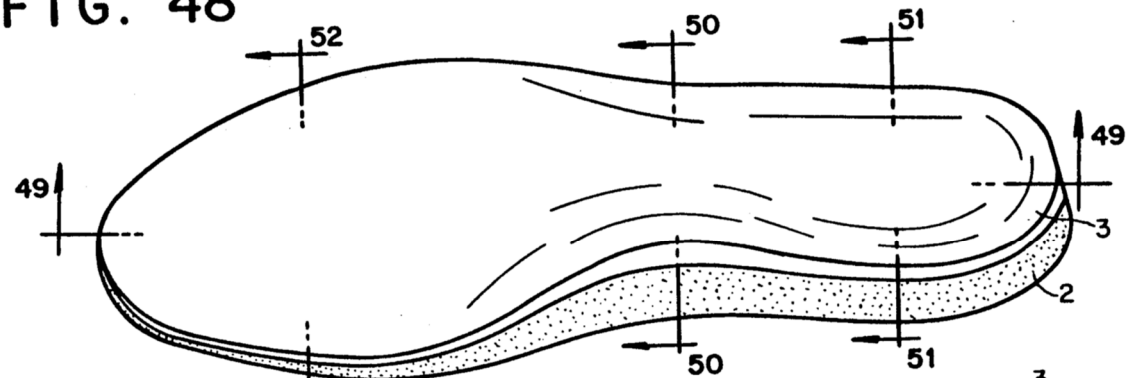


FIG. 49



FIG. 52



FIG. 50

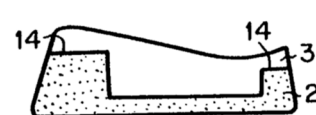
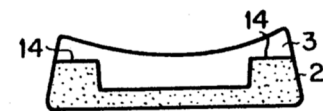


FIG. 51



"The heel portion (FIG. 5) has a cup shape provided in the lower layer and less drastic cup shape of the softer layer in composite." '573 patent 7:16-18.

"Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached"

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes. Eventually, it became known to contour the top surface of the unit bottom to provide a heel cup and slight arch. This made the shoe more comfortable because the foot would rest on a surface similar to its shape as opposed to a flat surface which felt like flat feet on a firm floor.” ’573 patent 1:10-27.
17. The athletic shoe of claim 10, wherein the sole section comprises one or more of: an insole; a mid-sole; and an out-sole.	The ’428 patent discloses a sole section comprising one or more of: an insole, a mid-sole, and an out-sole. “In the following description, various embodiments of the methods in accordance with the invention relate to a sole element. It should, however, be noted that a sole element in accordance with the invention is typically used as part of a sole ensemble. That is, the sole element in accordance with the invention is typically formed as a midsole, where an outsole and an insole for improving comfort are additionally provided.” ’428 patent, 5:56-63. <u>’911 patent</u> “Innersoles, midsoles, and/or outsoles may each become an integral part of the present invention either independently or in combinations thereof; depending on the particular type of footwear and the particular fabrication process involved.” ’911 patent, 20:47-51. “Outsoles may have gripping surfaces in which case the compensations of the present invention are employed to the top portion of the outsole closest to the conventional upper portion of an article of footwear; rather than interfering in any way with the outer bottom and gripping surfaces of the outsole itself.” ’911 patent, 20:52-57. <u>’126 patent</u>

U.S. Patent No. 11,510,456	U.S. Patent No. 7,464,428
	FIG. 1 “Referring now to FIG. 1, a shoe 11 typically used for running and jogging is comprised of a lightweight upper member 13, which includes an enclosure 12 for enveloping the wearer's foot, a midsole member 14 and a tread member 15.” ’126 patent at Fig. 1, 5:21-25. <u>’573 patent</u> “Historically, shoe bottoms have consisted primarily of flat surfaces on both their top and bottom. These bottoms were normally made of single density polyurethane (PU) or blown polyvinylchloride (PVC) type material. The upper of the shoe would be glued onto the top of the sole or the upper could be "direct attached" through a molding process which would capture the upper in the molded sole. The bottom could be the lowermost layer of the sole if the urethane was sufficiently abrasion resistant, or alternatively a rubber out sole would be cemented onto the unit bottom, as is typically done in running shoes.” ’573 patent, 1:10-21. “Referring to FIG. 1, there is shown the composite shoe bottom 1 according to the invention. A firm lower layer 2 is shaped to be thicker in areas where the wearer's foot will need extra support. The softer upper layer 3 is in face-to-face engagement with the upper surface of the lower layer 2. The upper layer 3 has an uppermost surface 4 which is contoured to be complementary to the shape of a human foot bottom. As can be seen in FIG. 2, the softer layer is thinnest in the area needing the most support; for example, where the heel of the foot will rest (FIG. 5).” ’573 patent, 6:60-7:2.

