US012383021B1

(12) **United States Patent**
Jayavel

(10) **Patent No.: US 12,383,021 B1**
(45) **Date of Patent: Aug. 12, 2025**

(54) **SHOE SOLE AND METHODS OF MAKING SAME**

(71) Applicant: **Cole Haan LLC**, Greenland, NH (US)

(72) Inventor: **Narendran Jayavel**, Hai Phong (VN)

(73) Assignee: **COLE HAAN LLC**, Greenland, NH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **18/940,412**

(22) Filed: **Nov. 7, 2024**

(51) **Int. Cl.**
A43B 13/02 (2022.01)
A43D 8/16 (2006.01)

(52) **U.S. Cl.**
CPC ***A43B 13/02*** (2013.01); ***A43D 8/16*** (2013.01)

(58) **Field of Classification Search**
CPC A43B 13/02; A43D 8/16
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,161,083	A *	6/1939	Owen	A43B 23/16 524/274
2012/0324619	A1 *	12/2012	Drago	A43B 3/0084 428/199
2016/0128433	A1 *	5/2016	Downing	A43D 8/16 264/400
2017/0027277	A1 *	2/2017	Anthony	A43B 7/1463
2018/0242694	A1 *	8/2018	Webster	B32B 5/024
2018/0289098	A1 *	10/2018	Downing	B23K 26/364
2020/0346485	A1 *	11/2020	Briner	A43B 3/0078

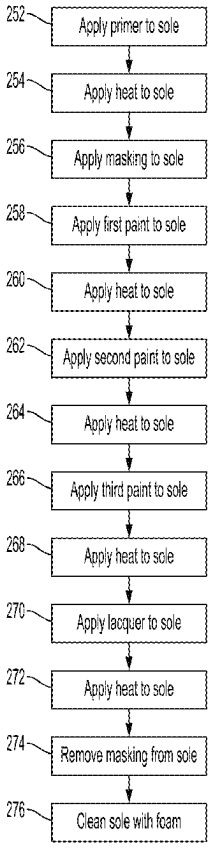
* cited by examiner

Primary Examiner — Bao-Thieu L Nguyen
(74) *Attorney, Agent, or Firm* — Thompson Coburn LLP

(57) **ABSTRACT**

A method of forming a shoe sole having the appearance of leather. A masking is applied to a peripheral margin of a shoe sole. After applying the masking to the peripheral margin, a first paint is applied to the sole edge. The first paint is of a first color. After applying the first paint, a second paint is applied to the sole edge. The second paint is of a second color. After applying the second paint, a third paint is applied to the sole edge to form a sole edge pattern. The third paint is of a third color different from the first and second colors. After applying the third paint, a lacquer finish is applied to the sole edge. The sole edge pattern has the appearance of leather.

24 Claims, 7 Drawing Sheets



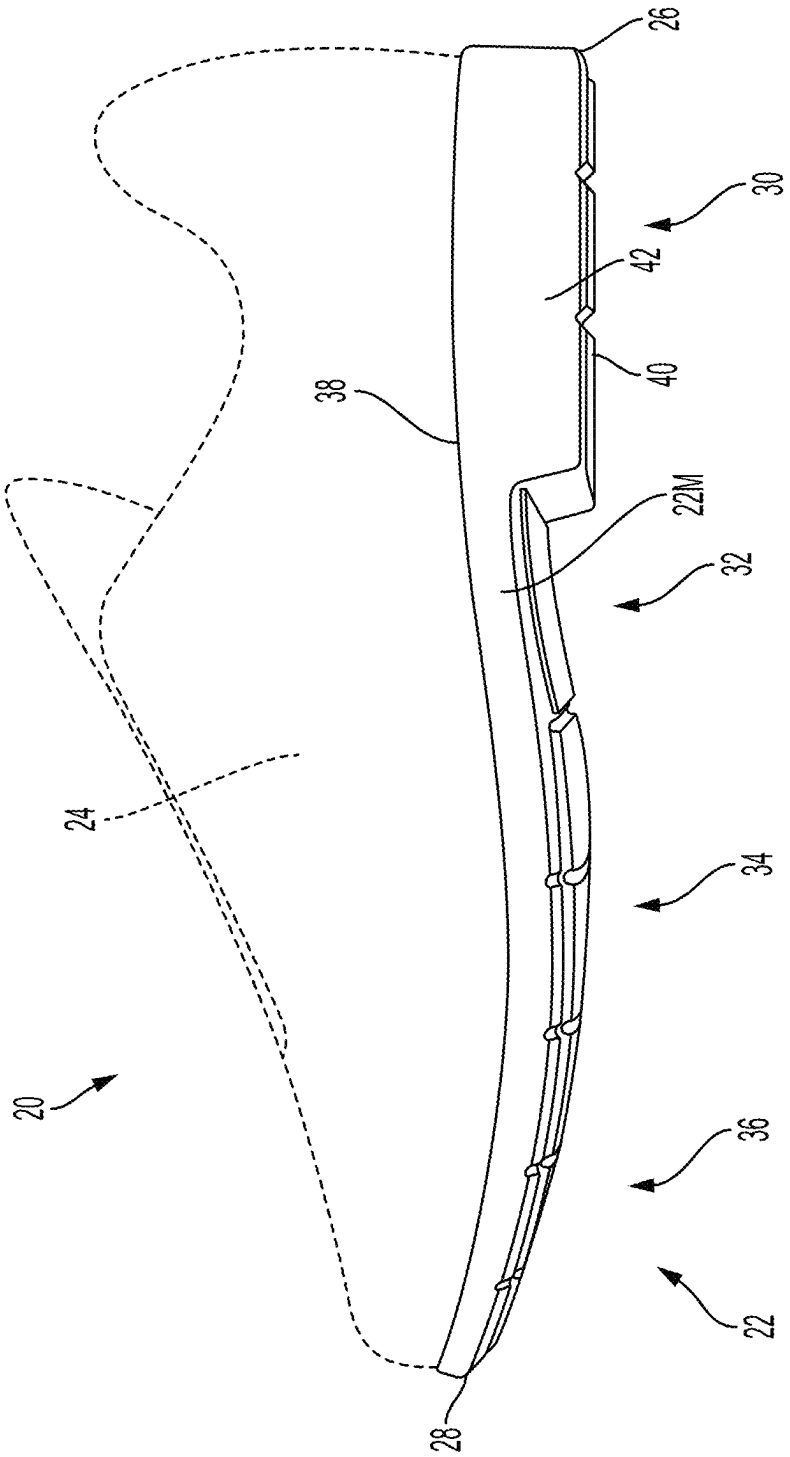


FIG. 1a

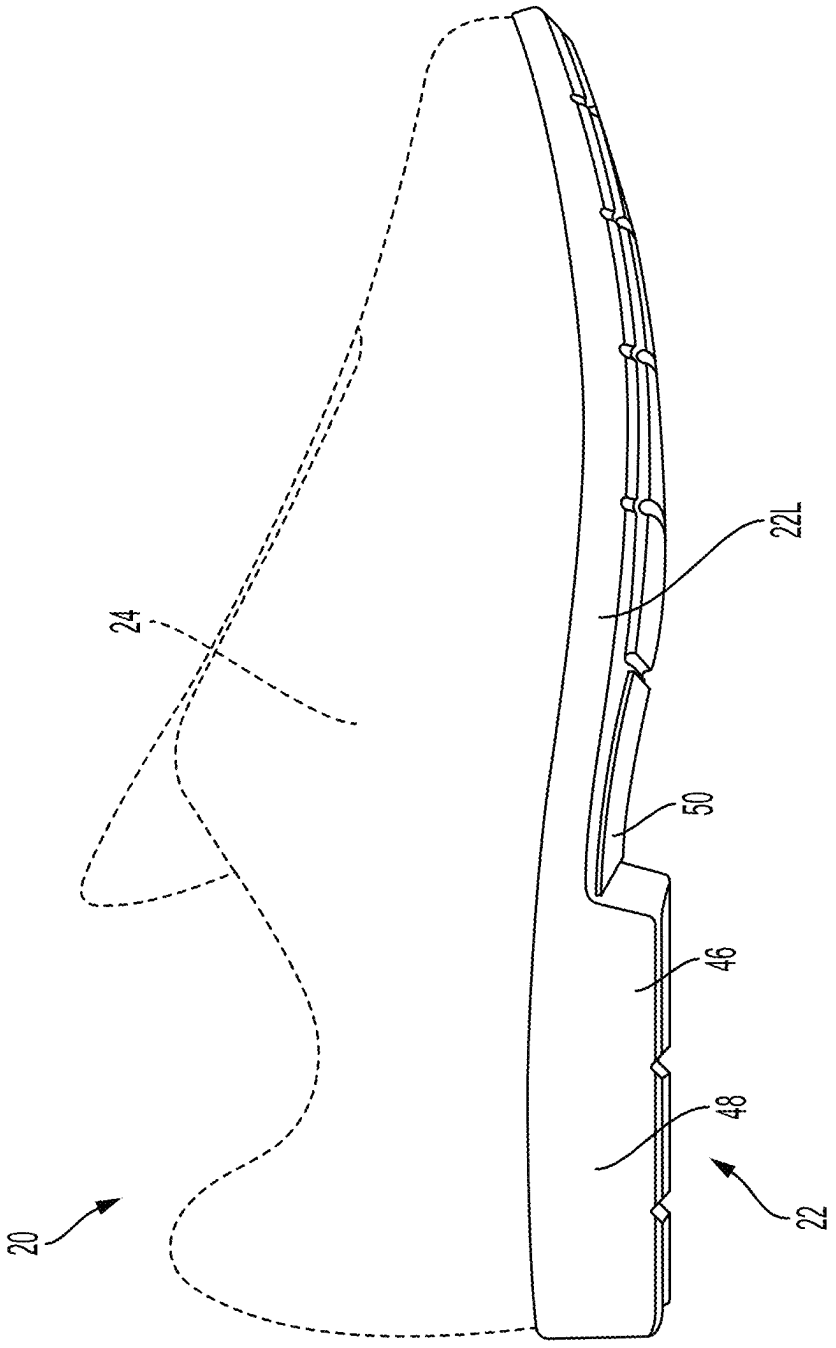


FIG. 1b

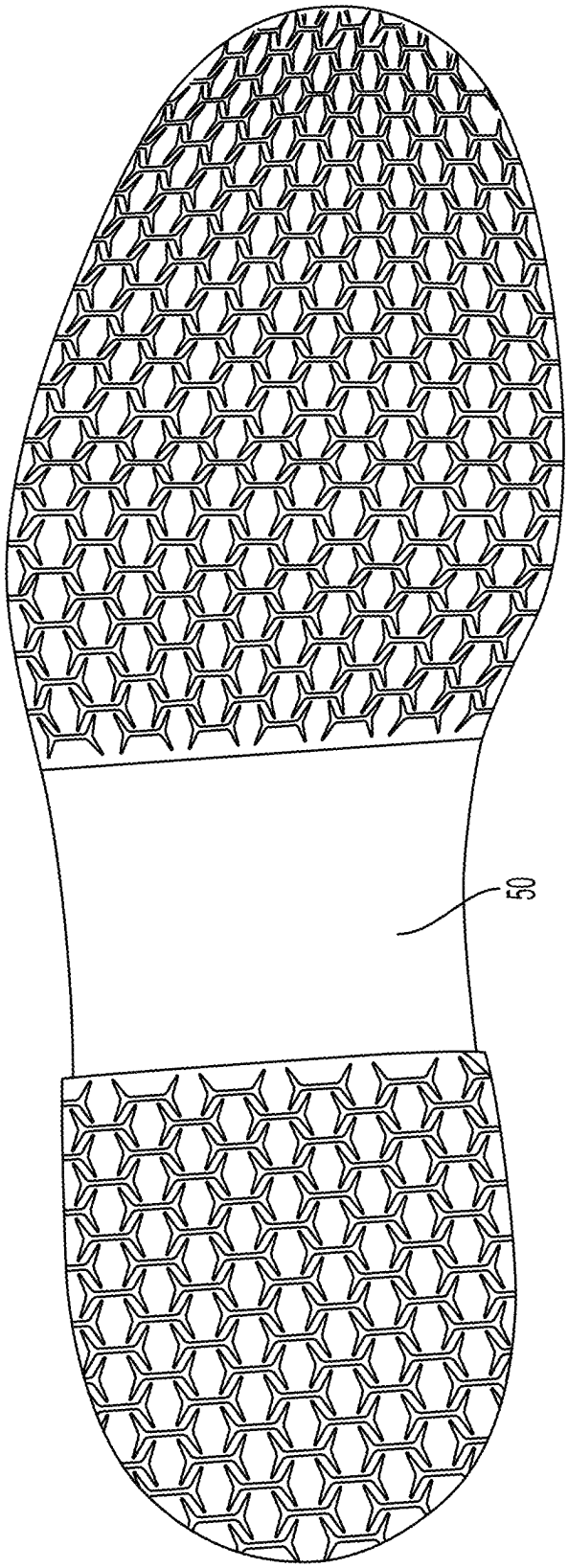


FIG. 1c

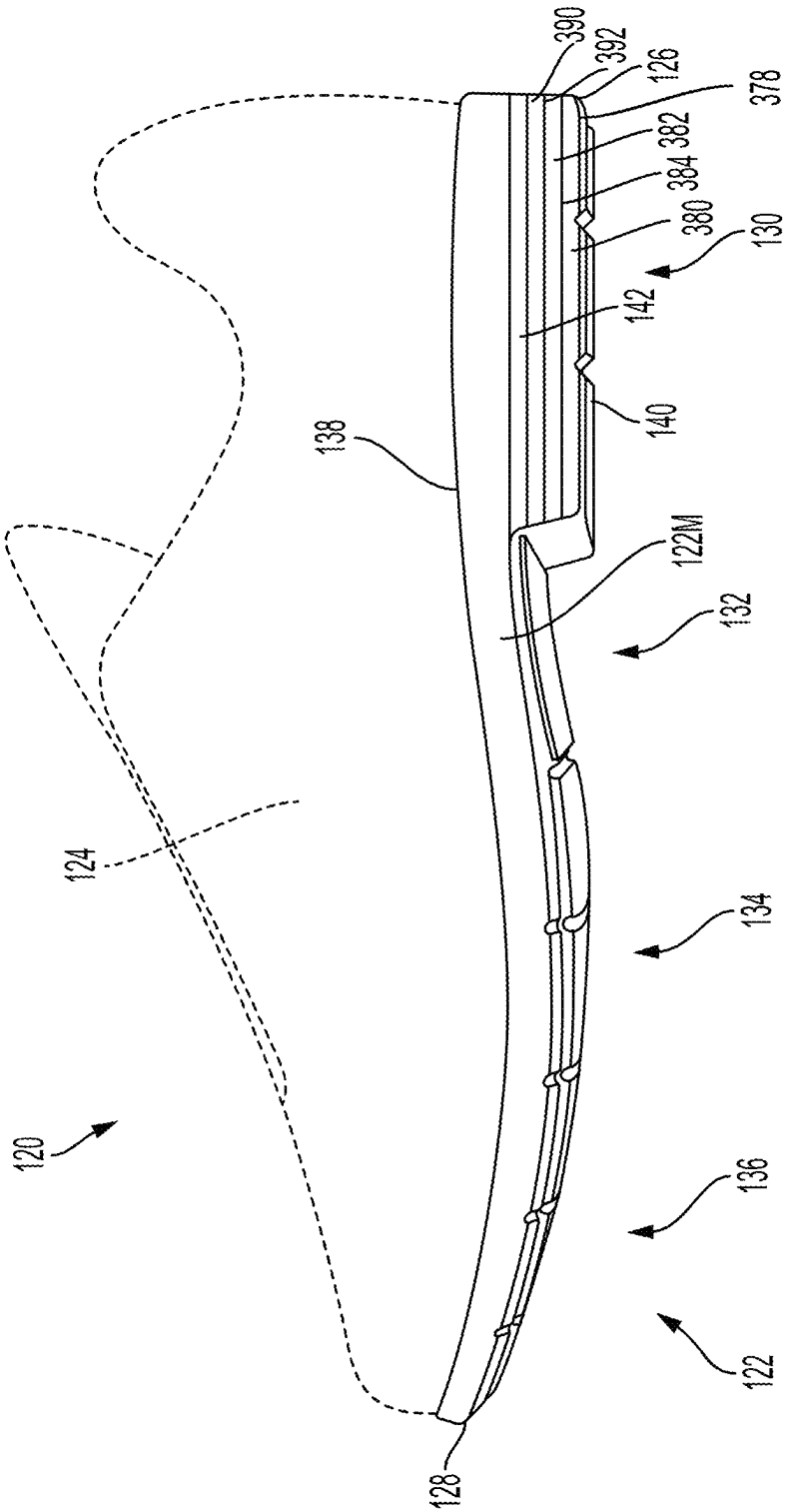

390
392
126
378
382
384
380
130
142
140
138
122M
132
124
134
120
136
122
128

FIG. 2a

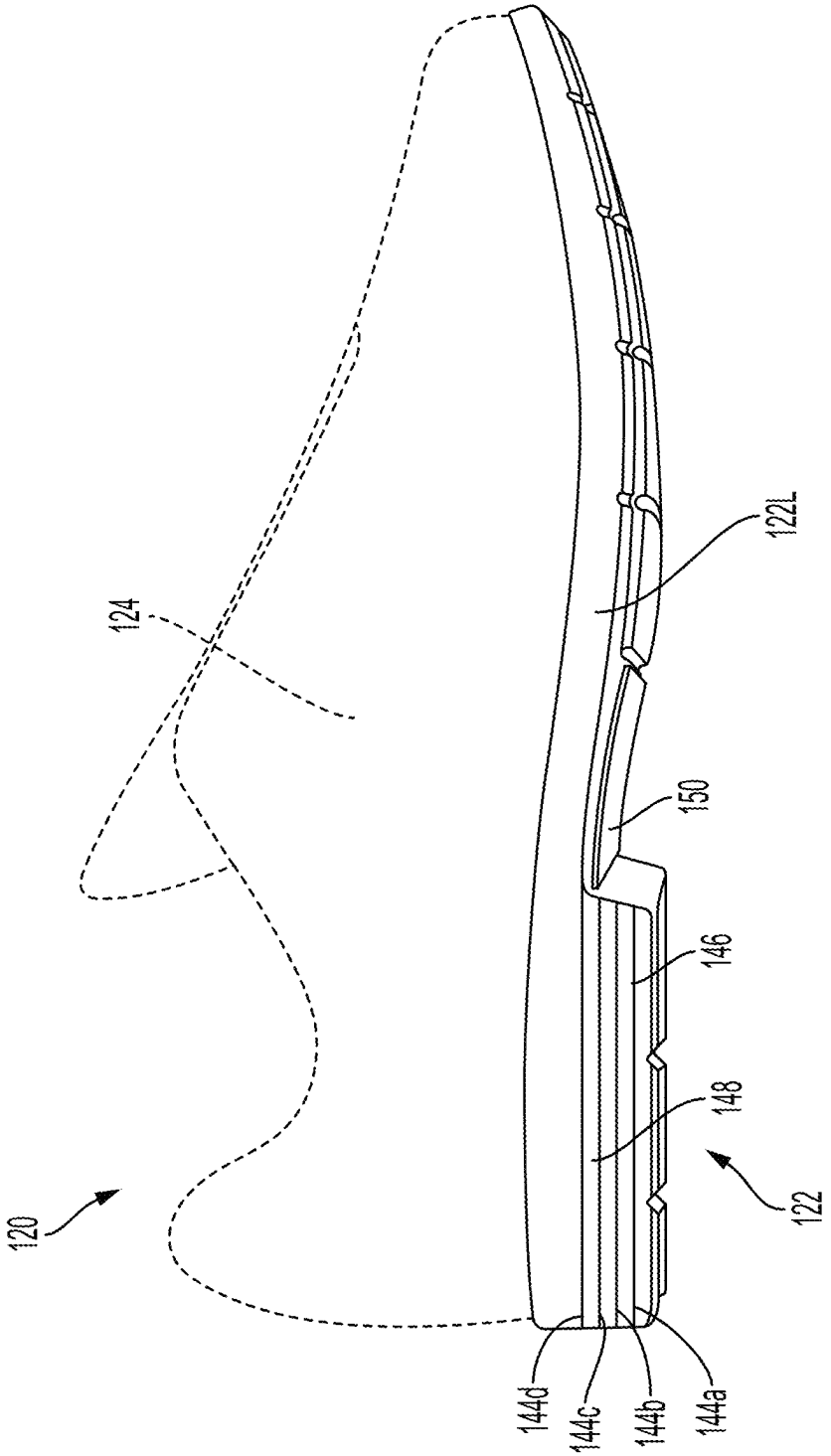


FIG. 2b

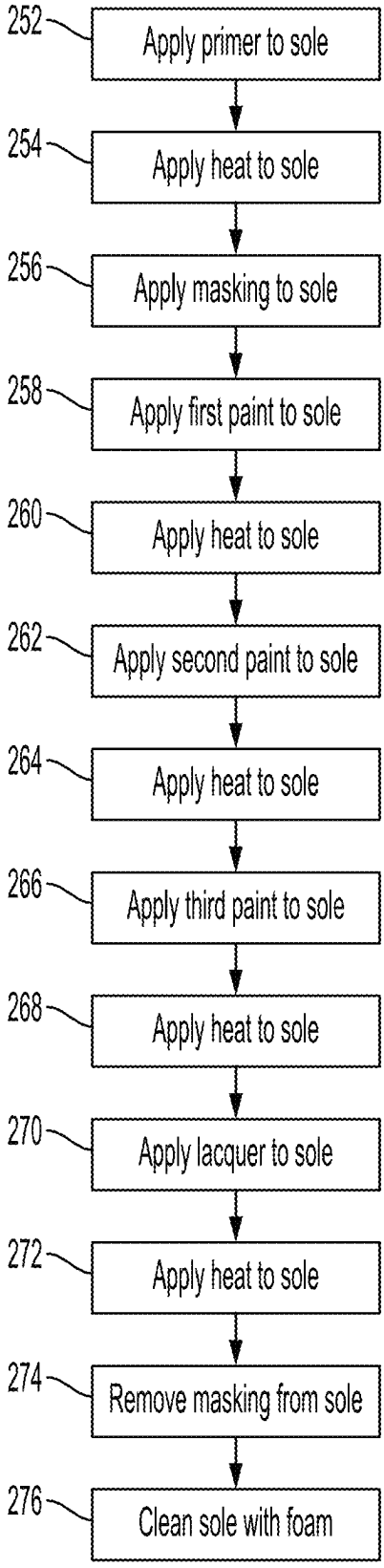

252
Apply primer to sole
254
Apply heat to sole
256
Apply masking to sole
258
Apply first paint to sole
260
Apply heat to sole
262
Apply second paint to sole
264
Apply heat to sole
266
Apply third paint to sole
268
Apply heat to sole
270
Apply lacquer to sole
272
Apply heat to sole
274
Remove masking from sole
276
Clean sole with foam

FIG. 3

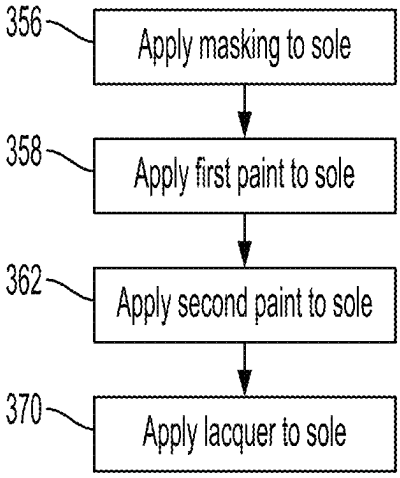

356
Apply masking to sole
358
Apply first paint to sole
362
Apply second paint to sole
370
Apply lacquer to sole

FIG. 4

SHOE SOLE AND METHODS OF MAKING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable.

APPENDIX

Not Applicable.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention pertains to a shoe sole and methods of making the same.

SUMMARY

One aspect of the disclosure is a method of forming a shoe sole having the appearance of leather. A masking is applied to a peripheral margin of a shoe sole. The shoe sole is of a polymer material. The shoe sole has a sole top surface, a sole bottom surface, and a sole edge extending between the sole top surface and the sole bottom surface around a periphery of the sole. The peripheral margin extends at least partially around the periphery of the sole bottom surface. After applying the masking to the peripheral margin, a first paint is applied to the sole edge. The first paint is of a first color. After applying the first paint, a second paint is applied to the sole edge. The second paint is of a second color. After applying the second paint, a third paint is applied to the sole edge to form a sole edge pattern. The third paint is of a third color different from the first and second colors. After applying the third paint, a lacquer finish is applied to the sole edge. The sole edge pattern has the appearance of leather.

Another aspect of the disclosure is a method of forming a shoe sole having the appearance of leather. A first paint to a sole edge of a shoe sole. The first paint is of a first color. The shoe sole is of a polymer material. The shoe sole has a sole top surface, a sole bottom surface, the sole edge extending between the sole top surface and the sole bottom surface around a periphery of the sole. After applying the first paint, a second paint is applied to the sole edge via a roller printing process to form a sole edge pattern. The second paint is of a second color different from the first color. The roller printing process applies the second paint in a non-uniform coat such that the sole edge pattern has the appearance of leather. After the roller printing process, a lacquer finish is applied to the sole edge.

Yet another aspect of the disclosure is a shoe having a polymer sole member and an upper secured to the polymer sole member. The polymer sole member has a medial side and a lateral side. The polymer sole member extends between the medial side and the lateral side. The polymer sole member also has a heel end, a toe end, a heel region, a midfoot region, a forefoot region, and a toe region. The heel region extends from the heel end to the midfoot region. The midfoot region extends from the heel region to the forefoot region. The forefoot region extends from the midfoot region to the toe region. The toe region extends from the forefoot region to the toe end. The polymer sole member has a top surface, a bottom surface, and a sole edge that extends between the sole top surface and the sole bottom surface around a periphery of the polymer sole member. The polymer sole member has at least two grooves extending around the entire heel region periphery. The shoe further comprises a first paint having a first color and a second paint having a second color different from the first color. The periphery of the polymer sole member is covered by the first paint. The second paint is on the first paint in a stippled manner such that at least portions of the first paint is visible between the stippling of the second paint.

Further features and advantages, as well as the operation, are described in detail below with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1***a* is a medial side view of a shoe.

FIG. **1***b* is a lateral side view of the shoe of FIG. **1***a*.

FIG. **1***c* is a bottom view of the shoe of FIG. **1***a*.

FIG. **2***a* is a medial side view of another embodiment of a shoe.

FIG. **2***b* is a lateral side view of the shoe of FIG. **2***a*.

FIG. **3** is a flow diagram for a method of manufacturing the sole of the shoe of FIGS. **1***a* and/or **2***a*.

FIG. **4** is a flow diagram for a method of manufacturing the sole of the shoe of FIGS. **1***a* and/or **2***a*.

Reference numerals in the written specification and in the figures indicate corresponding items.

DETAILED DESCRIPTION

An embodiment of shoe in accordance with the present invention is indicated generally by reference number **20** in FIGS. **1***a*-**1***c*. The shoe **20** has a polymer sole member **22** and an upper **24** secured to the polymer sole member. The polymer sole member **22** has a medial side **22**M and a lateral side **22**L. The polymer sole member **22** extends between the medial side **22**M and the lateral side **22**L. The polymer sole member also has a heel end **26**, a toe end **28**, a heel region **30**, a midfoot region **32**, a forefoot region **34**, and a toe region **36**. The heel region **30** extends from the heel end **26** to the midfoot region **32**. The midfoot region **32** extends from the heel region **30** to the forefoot region **34**. The forefoot region **34** extends from the midfoot region **32** to the toe region **36**. The toe region **36** extends from the forefoot region **34** to the toe end **28**.

The polymer sole member has a top surface **38**, a bottom surface **40**, and a sole edge **42** extending between the sole top surface and the sole bottom surface around a periphery of the polymer sole member **22**.

The shoe further comprises a first paint **46** having a first color and a second paint **48** having a second color different from the first color. The periphery **42** of the polymer sole member is covered by the first paint **46**. The second paint **48** is on the first paint **46** in a stippled manner such that at least portions of the first paint is visible between the stippling of the second paint.

The shoe **20** may further comprise a leather sole member **50**. The leather sole member **50** is operatively connected to the sole bottom surface **40** in the midfoot region **32**. The leather sole member may be embossed, branded, or gilded with a design (now shown).

The polymer sole member **22** may comprise a first sole component **22***a* and a second sole component **22***b*. The first

sole component **22***a* may circumscribe the second sole component **22***b*. The first sole component **22***a* may have a hardness of 60-65 Asker C and the second sole component **22***b* may have a hardness of 50-55 Asker C. One or both of the first and second sole components **22***a*, **22***b* may comprise ethylene vinyl acetate (EVA), thermoplastic polyurethane (TPU), or the like.

FIGS. **2***a* and **2***b* show another embodiment of shoe **120**. The shoe **120** may be similar in all respects to the shoe **20**, except as noted herein. It is also to be understood that components, elements, features, or regions of the embodiment of FIGS. **2***a* and **2***b* have reference numbers corresponding to the reference numbers of the embodiment of FIGS. **1***a*-**1***c*, except the reference numbers of the embodiment of FIGS. **2***a* and **2***b* includes a prefix "1."

The polymer sole member **122** may have at least two grooves **144** extending around the entire heel region periphery. The at least two grooves **144** may comprise a first groove **144***a* and a second groove **144***b*. The first and second grooves **144***a*, **144***b* may extend around a majority of the periphery **142** of the sole **122**. The at least two grooves **144** may further comprise a third groove **144***c* and a fourth groove **144***d*. The third and fourth grooves may extend around a majority of the periphery **142** of the sole **122**.

FIG. **3** is a flow diagram of an embodiment of a method of manufacturing the shoe sole **22** and/or the shoe sole **122**.

Referring to reference number **256**, the method comprises applying a masking to a peripheral margin of a shoe sole. The peripheral margin extends at least partially around the periphery of the sole bottom surface.

Referring to reference number **258**, the method further comprises, after applying the masking to the peripheral margin, applying a first paint to the sole edge. The first paint is of a first color. The first paint may be a solvent-based adhesive (e.g., TPU base ink/Solvent-Based TPU-500).

Referring to reference number **262**, the method further comprises, after applying the first paint, applying a second paint to the sole edge. The second paint is of a second color. The second paint may be a solvent-based adhesive (e.g., TPU base ink/Solvent-Based TPU-500). The second paint may be different from the first paint and, likewise, may have a different color from the first paint. Alternatively, the second paint may be the same as the first paint and have the same color as the first paint. In the latter scenario, the first paint constitutes a first coat of the first paint and the second paint constitutes a second coat of the first paint.

Referring to reference number **266**, the method further comprises, after applying the second paint, applying a third paint to the sole edge to form a sole edge pattern. The third paint is of a third color different from the first and second colors. The third paint may be applied via a roller printing process.

Referring to reference number **270**, the method further comprises, after applying the third paint, applying a lacquer finish to the sole edge.

The method may further comprise applying a primer to the sole edge. This is shown via reference number **252**. The primer cleans the sole edge, creating a surface that is more suitable for the application of paint.

Referring to reference number **274**, the method may further comprise removing the masking after the lacquer finish is applied.

Referring to reference number **276**, the method may further comprise cleaning the shoe sole with foam after the masking is removed.

The method may further comprise applying heat to the shoe sole. This may occur at any of the following: (1) after applying the primer but before the applying the masking to the peripheral margin (reference number **254**); (2) after applying the first paint but before applying the second paint (reference number **260**); (3) after applying the second paint but before applying the third paint (reference number **264**); after applying the third paint but before applying the lacquer finish (reference number (**268**); and/or after the lacquer finish is applied but before the masking is removed (reference number **272**). Preferably, each instance in which heat is applied to the shoe sole may occur in a heating chamber having a heating chamber temperature between 40 and 50 degrees Celsius, inclusive. More preferably, the heating chamber temperature is 44 degrees Celsius. Preferably, each instance in which heat is applied to the shoe sole comprises applying heat in the heating chamber for 10±5 minutes. More preferably, each instance in which heat is applied to the shoe sole comprises applying heat in the heating chamber for 5 minutes. Each instance in which heating applies facilitates the rapid drying of the material applied in the immediately prior step (e.g., primer, first paint, second paint, third paint, or lacquer). Similar results may be achieved by allowing the primer, first paint, second paint, third paint, or lacquer to dry naturally, but the process may take substantially longer depending on drying conditions (e.g., humidity, airflow, temperature, etc.).

The sole edge pattern resulting from the method of the present embodiment has the appearance of leather. In other words, it resembles a stacked leather sole. As used herein, a stacked leather sole refers to a sole comprising multiple pieces of leather stacked one upon another (joined by adhesive and/or fastening components such as nails) to form a unitary sole. Often, the stacked leather sole is also abraded (e.g., sanded or burnished) to make the individual leathers of layer be of a uniform dimension such that they appear to be striations in a single component.

FIG. **4** is a flow diagram of another embodiment of a method of manufacturing the shoe sole **22** and/or **122**.

Referring to reference number **358**, the method comprises applying a first paint to a sole edge of a shoe sole. The first paint is of a first color. The sole edge **42**/**142** may comprise a first sole edge region **380**, a second sole edge region **382**, and a narrow first intermediate sole edge region **384**. The first intermediate sole edge region **384** is between and adjacent the first and second sole edge regions **380**, **382**. The applying the first paint to the sole edge may comprise applying the first paint to each of the first sole edge region **380**, the second sole edge region **382**, and the first intermediate sole edge region **384**. The first paint may be uniformly applied to the first, second, and intermediate regions **380**, **382**, **384** such that at least a portion of the first paint is visible in the first and second sole edge regions after the second paint is applied.

Referring to reference number **362**, the method further comprises, after applying the first paint, applying a second paint to the sole edge via a roller printing process to form a sole edge pattern. The second paint is of a second color different from the first color. The roller printing process applies the second paint in a non-uniform coat such that the sole edge pattern has the appearance of leather. The applying the second paint to the sole edge via the roller printing process to form the sole edge pattern may first comprise applying the second paint to a rotatable roller (not shown). The roller may have a printing surface that has a first roller region having a first texture and a second roller region having a second texture. The first roller region may be spaced from the second roller region. Second, the sole edge **42**/**142** and the roller may be brought into contact with one

another to transfer some of the second paint on the first roller region to the first sole edge region **380** in a stippled manner and to transfer some of the second paint on the second roller region to the second sole edge region **382** in a stippled manner. When so applied, the first intermediate sole edge region **384** is largely devoid of the second paint such that a narrow band of the first paint in the first intermediate sole edge region visibly demarcates the first sole edge region **380** from the second sole edge region **382**.

The sole edge **42/142** may further comprise a third sole edge region **390** and a narrow second intermediate sole edge region **392**. The second intermediate sole edge region **392** is between and adjacent the second and third sole edge regions **382**, **390**. The applying the first paint to the sole edge **42/142** may further comprise applying the first paint to each of the third sole edge region **390** and the second intermediate sole edge region **392**.

The applying the second paint to the sole edge **42/142** via the roller printing process to form the sole edge pattern may further comprise applying the second paint to a third roller region of the third roller. The third roller region may have a third texture. The third roller region may be spaced from the first and second roller regions. Likewise, bringing the sole edge **42/142** and the roller into contact with one another may transfer some of the second paint on the third roller region to the third sole edge region **390** in a stippled manner. The second intermediate sole edge region **392** is largely devoid of the second paint such that a narrow band of the first paint in the second intermediate sole edge region visibly demarcates the second sole edge region **382** from the third sole edge region **390**.

As noted above, the sole may have first and second grooves **144***a*, **144***b*. In such a case, bringing the sole edge **42/142** and the roller into contact with one another may comprise aligning the first groove such that it is between the first and second roller regions and aligning the second groove such that it is between the second and third roller regions such that, after the second paint is applied, the first intermediate sole edge region **384** includes the first groove and the second intermediate sole edge region **392** includes the second groove.

Referring to reference number **370**, the method further comprises, after the roller printing process, applying a lacquer finish to the sole edge.

The method may further comprise applying a masking (reference number **356**). The applying the masking occurs before the first paint is applied. The applying the masking may comprise applying the masking to a peripheral margin of the sole bottom surface. The peripheral margin extending at least partially around the periphery of the sole bottom surface. The heel region **30/130** may have a heel region margin **378**. The heel region margin **378** is the portion of the sole edge **42/142** in the heel region **30/130** adjacent the sole bottom surface **40/140**. The applying the masking may comprises applying the masking to the heel region margin.

In view of the foregoing, it should be appreciated that the invention has several advantages over the prior art.

It should also be understood that when introducing elements of the present invention in the claims or in the above description of exemplary embodiments of the invention, the terms "comprising," "including," and "having" are intended to be open-ended and mean that there may be additional elements other than the listed elements. Additionally, the term "portion" should be construed as meaning some or all of the item or element that it qualifies. Moreover, use of identifiers such as first, second, and third should not be construed in a manner imposing any relative position or time sequence between limitations.

As various modifications could be made in the constructions and methods herein described and illustrated without departing from the scope of the invention, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative rather than limiting. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims appended hereto and their equivalents.

What is claimed is:

1. A method of forming a shoe sole having the appearance of leather, the method comprising:

applying a primer to the sole edge;

after applying the primer, applying heat to the shoe sole;

after applying heat to the shoe sole, applying a masking to a peripheral margin of a shoe sole, the shoe sole being of a polymer material, the shoe sole having a sole top surface, a sole bottom surface, and a sole edge extending between the sole top surface and the sole bottom surface around a periphery of the sole, the peripheral margin extending at least partially around the periphery of the sole bottom surface;

after applying the masking to the peripheral margin, applying a first paint to the sole edge, the first paint being of a first color;

after applying the first paint, applying a second paint to the sole edge, the second paint being of a second color;

after applying the second paint, applying a third paint to the sole edge to form a sole edge pattern, the third paint being of a third color different from the first and second colors;

after applying the third paint, applying a lacquer finish to the sole edge; and

wherein the sole edge pattern has the appearance of leather.

2. The method of claim **1** further comprising applying heat to the shoe sole after applying the first paint but before applying the second paint.

3. The method of claim **2** further comprising applying heat to the shoe sole after applying the second paint but before applying the third paint.

4. The method of claim **3** further comprising applying heat to the shoe sole after applying the third paint but before applying the lacquer finish.

5. The method of claim **4** further comprising removing the masking after the lacquer finish is applied.

6. The method of claim **5** further comprising applying heat to the shoe sole after the lacquer finish is applied but before the masking is removed.

7. The method of claim **6** further comprising cleaning the shoe sole with foam, the cleaning the shoe sole occurring after removing the masking.

8. The method of claim **6** wherein each instance of applying heat to the shoe sole comprises occurs in a heating chamber having a heating chamber temperature, the heating chamber temperature being between 40 and 50 degrees Celsius, inclusive.

9. The method of claim **8** wherein the heating chamber temperature is 44 degrees Celsius.

10. The method of claim **8** wherein each instance of applying heat to the shoe sole comprises applying heat in the heating chamber for 10±5 minutes.

11. The method of claim **1** wherein the sole edge pattern has the appearance of stacked leather.

12. The method of claim 1 wherein the third paint is applied via a roller printing process.

13. The method of claim 12 wherein the first color is different from the second color.

14. The method of claim 12 wherein the first color is the same as the second color.

15. The method of claim 1 wherein the shoe sole comprises a first sole component and a second sole component, the first sole component circumscribing the second sole component.

16. The method of claim 15 wherein the first sole component has a hardness of 60-65 Asker C.

17. The method of claim 16 wherein the second sole component has a hardness of 50-55 Asker C.

18. The method of claim 17 wherein at least one of the first and second sole components comprises ethylene vinyl acetate (EVA).

19. A method of forming a shoe sole having the appearance of leather, the method comprising:

applying a first paint to a sole edge of a shoe sole, the first paint being of a first color, the shoe sole being of a polymer material, the shoe sole having a sole top surface, a sole bottom surface, the sole edge extending between the sole top surface and the sole bottom surface around a periphery of the sole;

after applying the first paint, applying a second paint to the sole edge via a roller printing process to form a sole edge pattern, the second paint being of a second color different from the first color, the roller printing process applying the second paint in a non-uniform coat such that the sole edge pattern has the appearance of leather;

after the roller printing process, applying a lacquer finish to the sole edge;

wherein the sole edge comprises a first sole edge region, a second sole edge region, and a narrow first intermediate sole edge region, the first intermediate sole edge region being between and adjacent the first and second sole edge regions, the applying the first paint to the sole edge comprising applying the first paint to each of the first sole edge region, the second sole edge region, and the first intermediate sole edge region, and wherein the applying the second paint to the sole edge via the roller printing process to form the sole edge pattern comprises:

applying the second paint to a rotatable roller, the roller having a printing surface, the printing surface having a first roller region having a first texture and a second roller region having a second texture, the first roller region being spaced from the second roller region;

bringing the sole edge and the roller into contact with one another to transfer some of the second paint on the first roller region to the first sole edge region in a stippled manner and to transfer some of the second paint on the second roller region to the second sole edge region in a stippled manner, the first intermediate sole edge region being largely devoid of the second paint such that a narrow band of the first paint in the first intermediate sole edge region visibly demarcates the first sole edge region from the second sole edge region.

20. The method of claim 19 further comprising applying a masking, the applying the masking occurring before the first paint is applied, and wherein the applying the masking comprises applying the masking to a peripheral margin of the sole bottom surface, the peripheral margin extending at least partially around the periphery of the sole bottom surface.

21. The method of claim 20 wherein the shoe sole has a heel end, a toe end, a heel region, a midfoot region, a forefoot region, and a toe region, the heel region extending from the heel end to the midfoot region, the midfoot region extending from the heel region to the forefoot region, the forefoot region extending from the midfoot region to the toe region, the toe region extending from the forefoot region to the toe end, the heel region having a heel region margin, the heel region margin being the portion of the sole edge in the heel region adjacent the sole bottom surface, and wherein the applying the masking further comprises applying the masking to the heel region margin.

22. The method of claim 19 further comprising applying a masking before the first paint is applied, wherein the shoe sole has a heel end, a toe end, a heel region, a midfoot region, a forefoot region, and a toe region, the heel region extending from the heel end to the midfoot region, the midfoot region extending from the heel region to the forefoot region, the forefoot region extending from the midfoot region to the toe region, the toe region extending from the forefoot region to the toe end, the heel region having a heel region margin, the heel region margin being the portion of the sole edge in the heel region adjacent the sole bottom surface, and wherein the applying the masking comprises applying the masking to the heel region margin.

23. The method of claim 19 wherein the applying the first paint to the sole edge comprises uniformly applying the first paint to the first, second, and third sole edge regions such that at least a portion of the first paint is visible in the first and second sole edge regions after the applying the second paint.

24. The method of claim 19 wherein the sole edge further comprises a third sole edge region and a narrow second intermediate sole edge region, the second intermediate sole edge region being between and adjacent the second and third sole edge regions, the applying the first paint to the sole edge further comprising applying the first paint to each of the third sole edge region and the second intermediate sole edge region, and wherein the applying the second paint to the sole edge via the roller printing process to form the sole edge pattern further comprises:

applying the second paint to a rotatable roller, the roller having a printing surface having a third roller region having a third texture, the third roller region being spaced from the first and second roller regions;

bringing the sole edge and the roller into contact with one another to transfer some of the second paint on the third roller region to the third sole edge region in a stippled manner, the second intermediate sole edge region being largely devoid of the second paint such that a narrow band of the first paint in the second intermediate sole edge region visibly demarcates the second sole edge region from the third sole edge region.

* * * * *