United States Patent [19]

Orndorff, Jr.

[11] **3,748,951**

[45] **July 31, 1973**

[54] **MUD RESISTANT ELASTOMERS**

[75] Inventor: **Roy L. Orndorff, Jr.**, Kent, Ohio

[73] Assignee: **The B. F. Goodrich Company**, New York, N.Y.

[22] Filed: **Oct. 6, 1972**

[21] Appl. No.: **295,513**

Related U.S. Application Data

[62] Division of Ser. No. 173,961, Aug. 23, 1971.

[52] **U.S. Cl.** ..... **36/7.3**, 36/4, 36/32 R

[51] **Int. Cl.** **A43b 1/10**

[58] **Field of Search** ..... 36/7.1 R, 7.3, 4, 36/2.5 R, 2.5 AA, 7.4, 32 R

[56] **References Cited**

UNITED STATES PATENTS

2,200,333	5/1940	Herzog et al.	36/4
2,426,211	8/1947	Heckman	36/4
3,308,560	3/1967	Jones	36/4
3,507,059	4/1970	Vietas	36/32 R
3,455,036	7/1969	Lamarche	36/7.3

Primary Examiner—Patrick D. Lawson

Attorney—Joseph Januszkiewicz et al.

[57] **ABSTRACT**

A sole construction such as used on overshoes, boots or shoes having a resilient planar body with a plurality of spaced flexible fins that extend transversely across the body. The fins are evenly spaced and are relatively thin and of the same dimension as the grooves therebetween. All fins are identical and are inclined relative to a horizontal plane. The fin structure is applied to the sides of the boot structure to reduce mud pick-up through the ability of the fins to trap air between adjacent fins.

8 Claims, 5 Drawing Figures

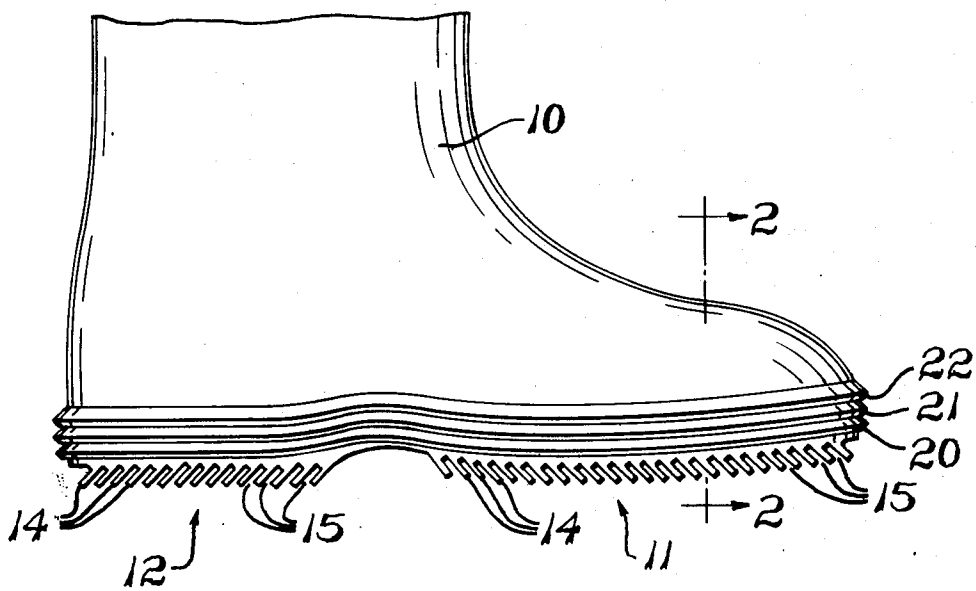


FIG. 1

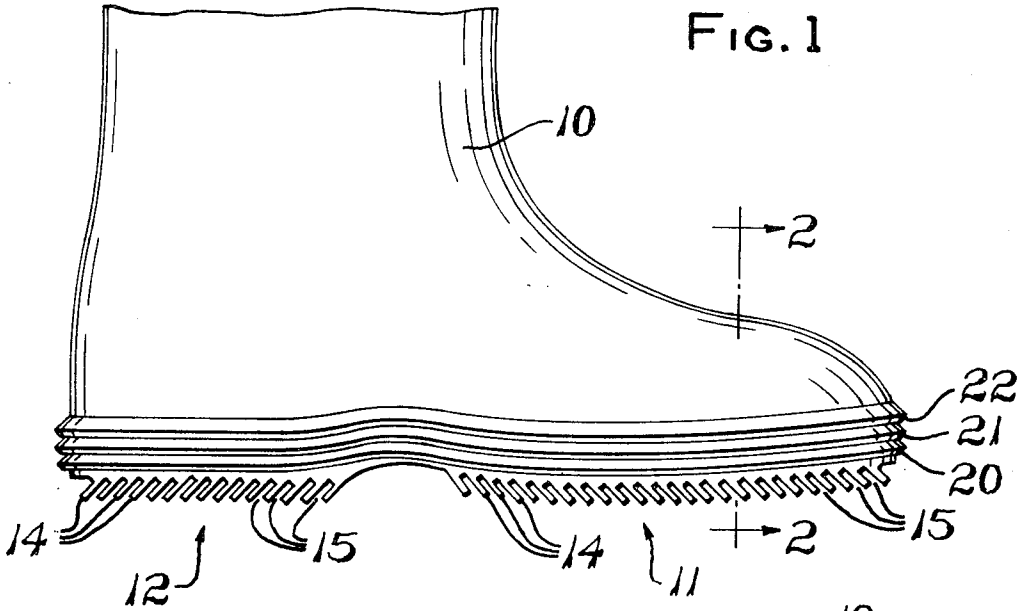


FIG. 2

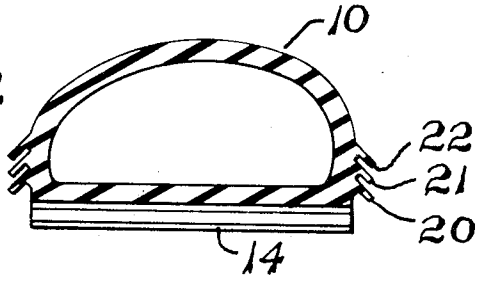
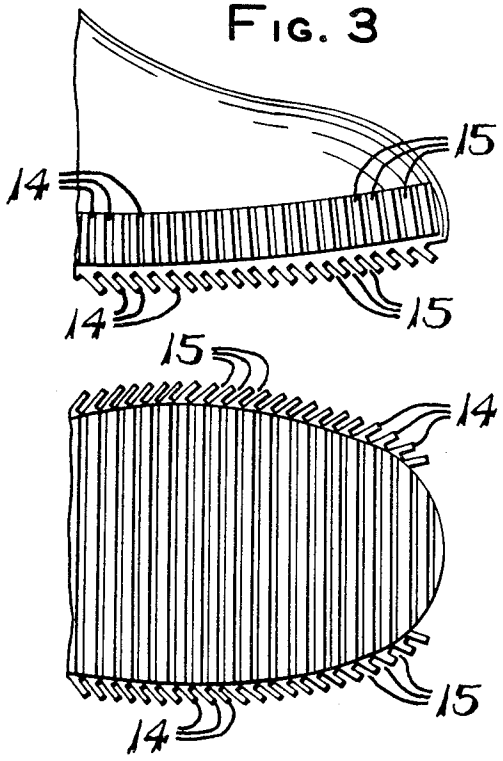


FIG. 3



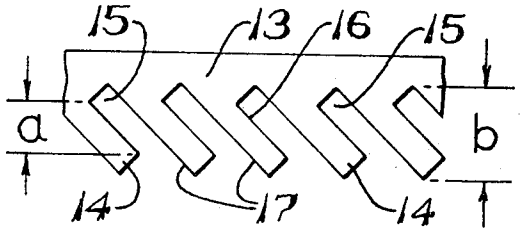


FIG. 5

FIG. 4

MUD RESISTANT ELASTOMERS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a division of U.S. Pat. application Ser. No. 173,961 filed Aug. 23, 1971.

BACKGROUND OF THE INVENTION

This invention relates to a molded, resilient self-cleaning piece of rubber and more particularly to a new and improved boot or shoe which has a mud build-up resistant side construction and a sole which has a novel action of trapping air to clean itself when used in the environment of mud or like sticky materials.

It has been known to construct shoe soles and heels of resilient deformable materials such as rubber, flexible plastics and other suitable compositions which have a plurality of transversely arranged corrugated ribs or cleats, undulations which project downwardly from and formed integrally with an upper section that is secured to the base portion of a shoe. The ribs generally project rearwardly from the front or toe section of the shoe towards the heel and are inclined generally downwardly. Such ribs in shoe construction have been confined to the general use of facilitating the walking action or to ease the wearer's comfort in standing.

The sole construction of the present invention which is particularly adaptable to overshoes is an improved concept over such corrugated ribs by providing a plurality of transversely extending flexible fins that are thinner in construction and even in spacing and of such length that they trap air between adjacent fins upon deflection such that they spring back into original shape and will clean themselves if such fins come in contact with mud. One form of the invention is to have a plurality of fins disposed approximately at an angle of 45° with respect to the horizontal plane and with fin structure around the side surfaces of the boot to inhibit mud build-up in that area adjacent to the sole of a boot. The fins are flexible such that the normal walking action of the overshoe or boots will compress the fins easily to effect a trapping action of the air to clean the mud that is encountered on the lower most surface as well as the side surfaces.

Such invention is applicable to other rubber products wherein they inhibit the build-up of mud and their use in such an environment. The present invention is especially applicable to boots and shoes.

SUMMARY OF THE INVENTION

This invention relates to sole construction and side boot construction such as used on overshoes, boots, or shoes wherein the sole has a resilient body that is adapted to be fixedly secured to the base of the shoe or an integral part of it as constructed. The sole has a plurality of tranversely extending fins, which fins slant downwardly from the resilient body. All the fins' cross-sectional dimensions are equal and with grooves between adjacent fins being equal and similar in dimension. The fins cooperate with each other such that on deflection the fins trap air to facilitate the self-cleaning feature whereby the sole of overshoes clean the mud. The action of the fins on the side surfaces of the boot, which may be flat thin fins or of the described lobe structure, perform a similar self-cleaning action. This invention is applicable to other uses that remove mud from their operating surfaces as in mud from tire surfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a boot provided with a sole and side construction embodying the principle of the present invention;

FIG. 2 is a cross-sectional view of the boot shown in FIG. 1 taken along line 2—2 thereof;

FIG. 3 is a fragmentary view of the forward portion of a boot showing a modified form of side construction;

FIG. 4 is a bottom view of the sole and side construction illustrated in FIG. 3;

FIG. 5 is an enlarged fragmentary side elevational view of a portion of a sole construction.

DETAILED DESCRIPTION

Referring to the drawings wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a boot or overshoe **10** having a sole **11** and heel **12** construction made in accordance with the present invention. The sole **11** and heel **12** are shown attached and part of the overshoe **10.** It is to be understood that this sole and heel construction is particularly adaptable to an overshoe or boot construction which encounters mud and that this structure may be applied to shoes, tire or other surfaces to reduce or eliminate their mud pick-up. The sole **11** includes a solid planar portion **13** (FIG. **5**) that is generally horizontally disposed having a plurality of downwardly and forwardly extending fins **14.** The fins **14** extend transversely across the sole defining grooves **15** between adjacent pairs of fins **14.** Each fin **14** is of uniform thickness throughout its height. The fins extend downwardly and rearwardly with respect to the heel portion and downwardly and forwardly on the toe portion of the boot, with each fin having a front surface portion **16** and a rear surface portion **17.** All of the front and rear surfaces **16** and **17** respectively of the fins **14** of the sole portion are parallel to each other and disposed at approximately 45° with respect to the horizontal. However, such angle may vary from 25° to over 55° with respect to the horizontal and still function to provide a novel result as set forth above. Further, such fins may all be slanted in the same direction. The height of the fin designated as *a* in FIG. **5** is 0.115 of an inch whereas the height as measured along line *b* is 0.160 of an inch. The height of the fins and that of the grooves are identical in height and width wherein width is taken as the cross-sectional dimension running perpendicular to the surfaces of **16** and **17.** The length of the fin **14** and the groove **15** is determined by the width of the sole as viewed in plan view of FIG. **4.** The grooves **15** cooperate with their respective adjacent fins **14** to trap air which facilitates the self-cleaning action of the sole and the heel. The entire circumferential side portions of the boot as depicted in FIG. **1** has a plurality of rows of fins which are identical in construction to that depicted by FIG. **5** and disclosed by the respective heels and soles to perform a cleaning action of mud along the side surfaces ofthe boot. Although three rows of fins are disclosed as **20, 21,** and **22,** any number may be employed and as an example six rows of such fins were employed which were found to be very effective in the elimination of mud build-up along the side surfaces of the boot. Such fins along the side surfaces operate in the same manner as described

above on the sole and heel wherein the respective grooves of the fins trap air to facilitate the self-cleaning action thereof. The size of the fins shown in FIG. 2 are larger than actually designated by the dimensions *a* and *b;* however, such enlargement is for clarity purposes.

A modification of the invention is shown in FIG. 3 which depicts only the forward portion of the boot disclosing the fins as running vertically along the side edges of the boot wherein suach fins may be inclined forwardly as disclosed by FIG. 4, i.e., the grooves 15 are open toward the forward portion of the toe of the boot. A variation on this is to have the respective fins slanted rearwardly towards the heel portion in an opposite direction to that shown in FIG. 4. The height of the fins as disclosed in FIG. 3 is determined by the extent to which the side surfaces of the boot are covered.

The operation of the sole and heel construction in the environment of mud, as where an individual uses shoes or an overshoe, is such that in walking the fins yield as they are pressed into the mud, trapping air at the base of the fins. As the shoe is raised out of the mud surface, the fin construction on the sole, heel and side portions of the shoe acts to break up the suction that would ordinarily exist through the yielding action of fins in cooperation with the trapping of the air which facilitates the peeling off and breaking off of the mud. The precise action of the fins and phenomenon occurring is not fully understood, however, tests made of such surfaces in use have shown that because of the above-described sole, heel and side construction, boots and overshoes reduce significantly the amount of mud picked up, compared with boots having conventional soles.

Various modifications are contemplated and may obviously be resorted to by those skilled in the art without departing from the described invention, as hereinafter defined by the appended claims.

I claim

1. In a shoe construction having a shoe upper, said upper having side portions, said shoe having a bottom surface, said upper portion being integrally formed with said bottom surface, said bottom surface having a sole portion and a heel portion, each of said sole and heel portions having a plurality of transversely extending flexible fins, all of said fins on said heel and sole portions extending downwardly and at an acute angle therefrom, said side portions having a plurality of fins extending along the peripheral portions adjacent to said sole and heel portions, all of said fins on said side portions making an acute angle with respect to its juncture with said side portion, and all of said fins on said respective heel, sole and side portions cooperative with adjacent fins to define a groove therebetween.

2. An overhoe construction having an upper portion and a sole attached thereto, said upper including a toe portion and a heel portion, said upper including a pair of side portions merging into said heel and said toe portions, said sole having a plurality of linear transversely extending flexible fins, said fins inclined downwardly at an acute angle along the entire length thereof, said side portions having a plurality of horizontally extending flexible fins that lie in parallel rows with grooves between rows thereof, and said fins on said side portions slanting downwardly and away from said overshoe.

3. An overshoe as set forth in claim 2 wherein each of said fins of said side portions have a pair of parallel surfaces.

4. An overshoe as set forth in claim 3 wherein said fins of said side portions define grooves between adjacent rows, and said grooves have a width and depth that is equal to the thickness and height of said adjacent fins, respectively.

5. An overshoe construction as set forth in claim 2 wherein each of said fins of said side portions have a lobe at the forwardmost portion thereof and a thin narrow portion at the juncture of said fin to said side portion.

6. An overshoe construction having an upper portion and a sole attached thereto, said upper including a toe portion and a heel portion, said upper including a pair of side portions merging into said heel portion and said toe portion, said sole having a plurality of linear transversely extending thin flexible fins, said fins on said sole portion inclined downwardly at an acute angle along the entire length thereof, each of said fins having a front and a rear surface, said surfaces being parallel to each other and parallel to adjacent surfaces of adjacent fins, each of said fins being of uniform width for the entire height thereof, and each fin cooperating with adjacent fins defining a groove therebetween, and said side portions having a plurality of rows of flexible fins, said rows of said fins of said side portions lying in a generally vertical plane.

7. An overshoe construction as set forth in claim 6 wherein said fins of said vertical rows slant from the heel portion toward said toe portion.

8. An overshoe construction as set forth in claim 6 wherein said fins of said vertical rows slant from said toe portion towards said heel portion.

* * * * *