

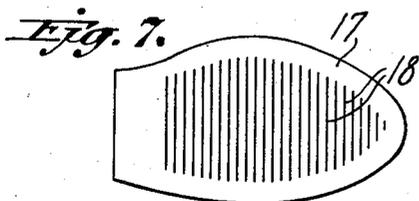
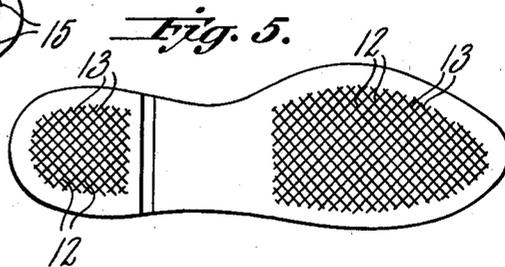
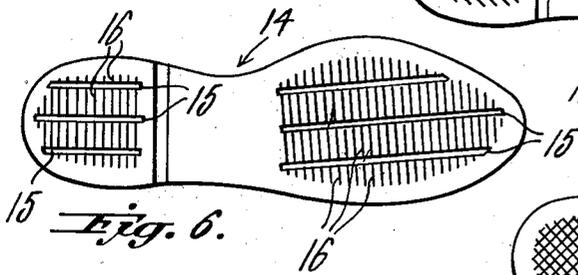
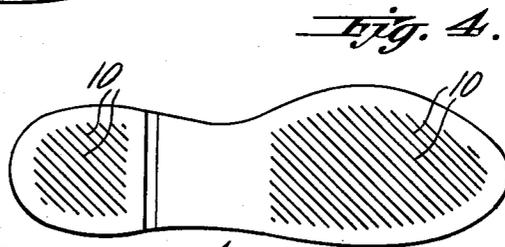
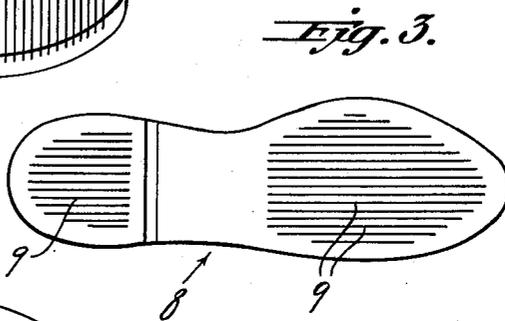
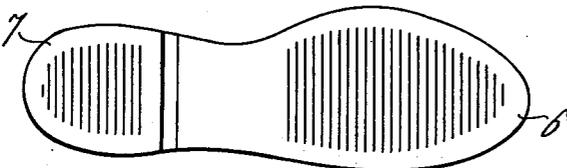
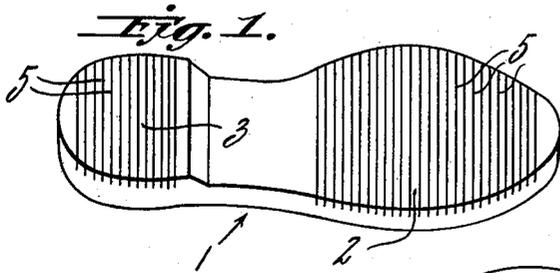
June 20, 1939.

B. B. CRAVER

2,162,912

RUBBER SOLE

Original Filed June 13, 1936



BY

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# UNITED STATES PATENT OFFICE

2,162,912

## RUBBER SOLE

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Original application June 13, 1936, Serial No. 85,072. Divided and this application August 26, 1937, Serial No. 161,007

### 1 Claim. (Cl. 36—59)

This application is a division of application Serial No. 85,072 filed June 13, 1936.

My invention relates to rubber soles and the combination of rubber soles and heels, and more particularly to the improvements of the anti-slipping or anti-skidding characteristics thereof by the provision of small slits in the ground engaging surfaces thereof.

It is well known that footwear having rubber heels and/or soles may become very slippery when used on wet pavements, walks, or boardwalks, particularly if the weight of the wearer is placed on a wet metal part.

I have found that the anti-slipping or anti-skidding characteristics of rubber soles and the combination of rubber soles and heels may be materially improved by providing a number of slits in the exposed rubber surface. Such slits may vary from a thin slit such as is formed by a knife cut without substantial removal of material to a narrow slot such as is formed by a thin saw and in which some material is removed but which is still sufficiently narrow so that the side walls engage to mutually support each other when load is applied. The presence of the thin edges of the slits provides additional traction surface, as compared with a smooth rubber surface, and also the slits provide small passageways through which the liquid or liquid film may be squeezed to permit the rubber surface to have a relatively dry contact with the underlying road or walk surface. The slits may be superimposed on various designs of sole and heel configurations or they may be applied directly to otherwise smooth rubber surfaces.

The accompanying drawing illustrates certain present preferred embodiments of the invention, in which:

Fig. 1 is a perspective view of a combined heel and sole embodying my invention;

Fig. 2 is a plan view of a modified form of the heel and sole;

Figs. 3, 4, 5 and 6 are similar views of further modifications of the invention;

Fig. 7 is a similar view of a sole embodying my invention.

Referring particularly to Fig. 1, a wear resisting surface for a footwear article is illustrated in the form of a combined heel and sole 1 in which the ball portion 2 of the sole and the tread surface 3 of the heel are interrupted by a considerable number of small slits or incisions 5 for improving the traction qualities of the shoe to which it is attached. These incisions extend

transversely entirely across the ground engaging surfaces of the sole and heel. The transversely arranged incisions are particularly adapted to prevent back slipping of the shoe. Incisions 5 are preferably made after the footwear is vulcanized by a cutting operation, such as by a sharp knife or very thin saw which removes substantially no material. The term "incision" as used herein means a cut formed in the surface of the vulcanized rubber composition without the removal of substantially any material, with the result that the opposite walls of the incision normally engage one another. Incisions which are wider than  $\frac{1}{8}$  inch remove so much of the wearing surface of the rubber that the loss of the wearing surface is not compensated for by the increased traction effect. The spacing of the incisions depends somewhat upon the thickness of the rubber to which it is applied, although a spacing range of from  $\frac{1}{8}$  inch to 1 inch is contemplated. In general, the thinner the stock, the shallower and closer the incisions. A convenient depth for the initial incisions is one-third of the thickness of the stock, although the use of incisions on stock which is less than .2 inch is not recommended. For heavy service boots, such as hunting boots, miners' boots, and the like, having thick soles and heels, incisions of the order of  $\frac{1}{8}$  inch in depth are quite satisfactory. It is to be understood that after the incisions originally formed are eliminated due to the wearing of the rubber, new incisions may be made in the remaining rubber. These should preferably be of a depth of approximately one-half of the remaining rubber.

As shown in Fig. 2, in the event it is desired to have a smooth appearing outer edge of the soles and/or heels, uncut margins 6 and 7 of the order of  $\frac{1}{2}$  inch in width may be provided around the edges of the sole and heel portions, respectively.

Referring to Fig. 3, a combined sole and heel 8 is shown provided with longitudinal incisions 9 which are particularly useful in preventing side slipping. In Fig. 4, incisions 10 are shown set at an angle at approximately 45 degrees to the longitudinal center of the sole and heel 11. Such incisions combine certain of the advantages of the transverse incisions in preventing back slipping and certain of the advantages of the longitudinal incisions in preventing side slipping of the shoe. In Fig 5 a double diagonal arrangement of incisions 12 and 13 is illustrated. The intersections of the incisions 12 and 13 break the wearing surface up into a plurality of square blocks which are flexible relative to each other

so that they move slightly while maintaining their grip on the ground surface thereby reducing scuffing to a greater degree than do the arrangements shown in the previously described figures.

5 Referring to Fig. 6, there is shown a combined sole and heel 14 in which longitudinally extending grooves 15 are originally molded. If desired the grooves 15 may extend through the margin of the surface of the tread of the sole and heel

10 portions. Transverse incisions 16 intersect the grooves 15 so that relatively short pads are provided for the squeezing out the liquid film from between the rubber surface and the pavement. Such a design of the combined sole and heel is

15 particularly useful for very heavy service boots such as hunting and miners' boots.

Fig. 7 illustrates a sole 17 having transverse incisions 18.

By applying the incisions to heels the jar experienced with walking is materially reduced as

20 the subsections of the wearing surface are free to adjust themselves to the inequalities of the worn heel or ground surface and/or load so that a more uniform overall pressure is obtained than

25 is usually obtained where a less flexible body of rubber is employed for the heel.

While I have illustrated and described several designs or patterns of incisions, it will be understood that other patterns may be used within

30 the spirit of the invention and with equally good results. The several modifications of the invention are all characterized by the application of incisions, either so narrow as to be substantially invisible, or so that the opposite walls normally

35 engage, which result in squeezing of a liquid film from between the rubber surface and the ground thereby insuring a better contact between the rubber surface and the ground surface. Such constructions are particularly useful where the

40 footwear is used in wet and slimy places. The ap-

plication of the invention to heels also reduces the jarring. By reason of the subdivision of the wearing surface into small units, these units are free to flex slightly and accommodate themselves to unevennesses in the ground surface or inequalities of the imposed load without slipping or scuffing thereby giving the footwear better wearing characteristics. The various patterns of incisions may be made in a sole and/or heel having a smooth or uneven surface, examples of the latter

5 are the grooves 15 in Fig. 6, or they may be made in surfaces having various designs.

While I have shown and described present preferred embodiments of my invention, it is to be understood that the invention may otherwise be

15 embodied within the spirit thereof and the scope of the appended claim.

Having thus described my invention what I claim and desire to protect by Letters Patent is:

In a shoe, an outsole of elastic cushion rubber

20 having a tread surface provided with a multiplicity of grooves extending in one direction and a multiplicity of slits extending generally transversely of said grooves and thereby forming a plurality of tread sections between said grooves

25 and slits, the walls of said slits being normally in contact when the outsole is at rest, said slits extending inwardly but partially to leave an uncut base integral with the sections, and said slits

30 being of such a spacing and depth as to enable the tread sections to flex on the uncut base of the outsole to an extent to tilt up and expose the corners of the sections between the tread surfaces of the sections and the walls of the slits

35 when the foot wearing the shoe and applying weight on the tread surface tends to slip upon some desired supporting surface with which the tread surface is in contact.

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