Feb. 13, 1940. L. J. A. LAVALLEE 2,190,211

ANTISKID TREAD FOR STAIRS, FLOORS, AND THE LIKE

Filed March 8, 1939

FIG. 1.

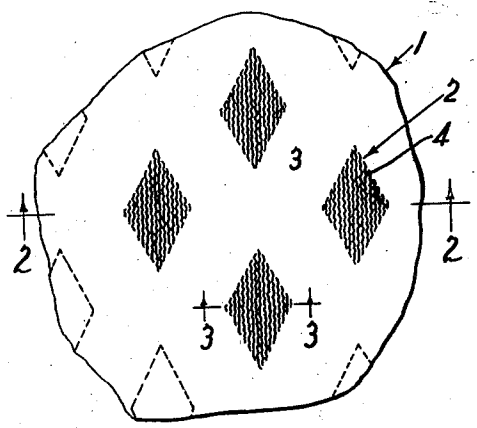


FIG. 2.

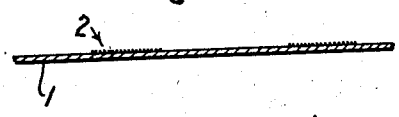


FIG. 3.

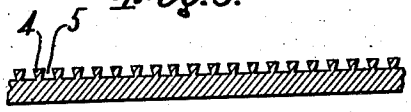


FIG. 4.

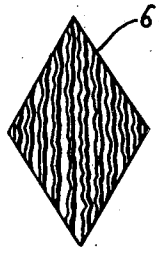


FIG. 5.

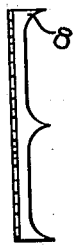


FIG. 6.

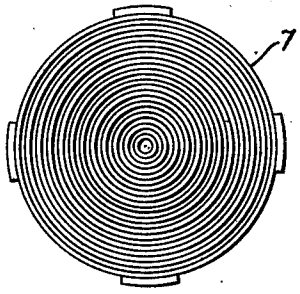
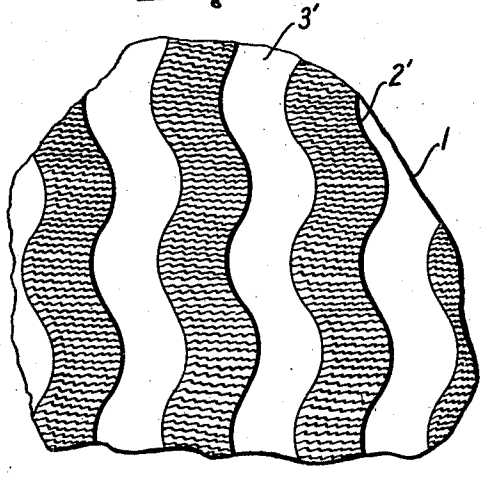


FIG. 7.



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Patented Feb. 13, 1940

2,190,211

UNITED STATES PATENT OFFICE

2,190,211

ANTISKID TREAD FOR STAIRS, FLOORS, AND THE LIKE

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Application March 8, 1939, Serial No. 260,499

3 Claims. (Cl. 94—5)

This invention relates to improvements in antiskid treads for stairs, floors, ship decks, cat walks and other places that are to be walked upon without danger of slipping.

A particular feature of the invention is that it provides a tread which will give sure footing whether dry or wet, and moreover will not be uncomfortable for bare feet as is the case with metal non-skid treads now in general use. This feature of the invention makes my tread highly desirable and useful in ships, engine rooms and other places where water, oil or other liquids are frequently present on the surface to be walked on and where shoes are not always worn.

My tread has further advantages in the economy and simplicity of its construction, as well as in the durability of its antiskidding character, due principally to the special method employed for obtaining the non-skid surface as will appear.

Antiskid treads of metal have heretofore been made wherein the metal is stamped or molded into projections; but the result of forming the projections in this manner is that the corners of the same are more or less rounded or dull which make them less effective for non-skid purposes than if they were sharp. Moreover, the side walls of the recesses thus formed necessarily flare outwardly in consequence of which the corners of the projections gradually become more rounded and dull as the projections wear down. Furthermore, it has not been found feasible by any such prior methods of construction to obtain effective non-skid projections with sharp edges which will retain their non-skid property when smeared with water, oil or other liquids and of such relatively low height that they may be walked on comfortably with the bare feet.

The above objections are overcome by my construction wherein ridged surfaces of metal plates are obtained by an acid etching process. The method employed for this purpose is of the usual commercial character wherein steel plates (preferably stainless steel) are protected by a resist which permits action of an etching acid on unprotected portions of the plate to the depth desired. In this manner extremely narrow grooves and ridges may be formed of low height, the corners of the ridges will be sharp, and the side walls of the ridges will be more or less undercut by the action of the acid so that the corners of the ridges will continue sharp as the ridges wear down. The specific design which is to be etched into the steel plate may be formed in various ways. The anciently used hand method of scraping or cutting away the resist from the plate by hand tools is possible but would be unduly expensive and therefore impractical from this point of view. Modern commercial methods are now commonly employed for modifying the resist (to permit biting of acid into the metal plate) in the most intricate of designs by what is known as an offset printing process, and also by what is known as a photographic process. Etched name plates and number plates are prepared at the present day in this manner on a mass production basis.

However, in these commercial prepared name plates the etching does not exceed .002 of an inch deep whereas for the purpose of the present invention the etched grooves should be of twice that depth or more. On the other hand, any process of etching imposes limits on the depth by which narrow grooves close together may be etched, by reason of the fact that the etching acid, as soon as it eats below the resist controlled surface, begins to spread in all directions, laterally as well as vertically, and eventually would eat through the walls of the intervening ridges. Applicant has succeeded in producing for his tread narrow grooves close together etched to a depth of about .005 of an inch which is deep enough for a good anti-friction surface, yet not deep enough to hurt bare feet in walking thereon.

A characterizing feature of my invention is that my antiskid tread is provided with alternating grooves and ridges having sharp corners, the width of the ridges being such that the pressure exerted by one walking on it when such a tread is wet with water, oil or other liquids, will cause such liquids to be forced into the grooves of the tread and expose to the foot the sharp edges of the tread.

The durability and wearing quality of the steel tread plates thus formed may be further enhanced by heat treating and hardening of the same after being etched without changing the character of the ridges and grooves produced therein.

My improvement may be embodied in various forms. For instance, it is contemplated that a continuous sheet of steel plate may be employed as the tread wherein the surface of the plate is etched away except at distributed areas to form an anti-skid pattern and said distributed areas being etched into a series of alternate narrow grooves and narrow ridges in the manner above described. The antiskid pattern produced by the distributed areas and

the formation of the alternate grooves and ridges therein may be widely varied although for best results the directional extension of said ridges should be such as not to present any appreciably long straight parallel ridges in any one direction. In other words, from whatever direction a foot approaches the plate, it should meet ridges which are at an angle to the direction of foot thrust.

The improvement may also be embodied in a tread made up of various suitable tread materials other than steel, such as wood, cement, rubber, synthetic compounds and the like, and wherein there are distributed stud-like inserts of steel which individually have their surfaces etched with the grooves and ridges as described. Some of the above forms of the invention are illustrated in the accompanying drawing, in which:

Fig. 1 is a plan view of a tread plate made of continuous sheet steel and shown as spotted with antiskid areas;

Fig. 2 is a cross section of said plate along line 3—3 of Fig. 1;

Fig. 3 is a part sectional view enlarged along line 3—3 of Fig. 1 to show the undercut walls of the ridges formed by etching;

Fig. 4 is a plan view of a stud-like insert of steel, a number of which may be distributed about the surface of tread material other than steel;

Fig. 5 is a side view of the insert in Fig. 4;

Fig. 6 is a view of another form of stud-like insert showing a different design of ridges and grooves therein; and

Fig. 7 is a view showing a different style of antiskid pattern that may be etched into the tread plate.

Referring to Fig. 1 of the drawing, 1 indicates the body of a tread formed of sheet steel, preferably stainless steel. 2 is one of a series of distributed areas formed on said plate by etching away the surface of the plate at 3 surrounding said areas. 4 indicates the ridges formed in the stud-like areas 2. 5 indicates the grooves which alternate with said ridges in said stud-like surfaces. As above described, these ridges and grooves are formed in the areas 2 by the ordinary process of acid etching. The ridges 4 and their alternating grooves 5 are preferably of about the same width and very narrow, approximately $\frac{1}{32}$ to $\frac{1}{8}$ of an inch wide for good results. As heretofore mentioned, the ridges are narrow so that liquids will be easily squeezed therefrom under pressure of the foot whereby their antiskid character will be retained when wet. The height or projection of the ridges 4 above the body 3 of the plate is also very slight and may be in the order of .005 of an inch. This low height of the ridges 4 is dictated by considerations of economy in forming the same and of having the same low enough so that the tread may be walked upon comfortably with the bare feet. Consequently the height of the ridges should be sufficient to give the nonskid effect and yet not too high to be uncomfortable for bare feet.

I have shown the directional extent of said ridges and grooves as being wavy. I find that this is one of the best designs for such ridges in order to always present an angular surface in all of the various directions from which a foot thrust on said tread may be made. Other directional designs of said ridges may be employed having in mind this purpose of making the same non-skid in all directions. Likewise the shape of the distributed areas 2 may be changed from the diamond shape shown, as indicated in Fig. 6. Various other antiskid patterns may be employed for the tread plate.

Referring to Fig. 3, it will be observed that the walls of the ridges 4 are slightly undercut, which is due to the manner in which the etching acid acts on the steel, said acid generally widening out its area of activity as it eats into the steel. While the action of etching acid in this respect may be controlled by the ordinary processes of etching, I take advantage of this natural tendency of etching acid to produce slightly undercut walls for the ridges as shown because of the great advantage this has of producing a continuously sharp corner for the ridges as the same wear down.

If desired, stud-like inserts 6 and 7 (as shown in Figs. 4, 5 and 6) may be employed in connection with a tread surface (not shown) other than steel, such as wood, cement or rubber, etc. Each insert is of steel, preferably formed with prongs such as 8 to facilitate its being fastened and anchored in place upon its tread surface of other material. Ridges and grooves will be formed in the surface of said inserts 6 and 7 in the manner previously described; and as above suggested, a wide variety of shapes for said inserts or stud-like areas and in the directional extension of the ridges thereof may be employed.

In Fig. 7 I have shown a tread plate 1 etched away at areas 3' to form striped areas 2', which striped areas are etched into grooves and ridges as above described.

It will be understood that my antiskid tread plate, as above described, may be used advantageously in all places where antiskid tread surfaces for walking are desired, such as decks of ships, cat walks, bridge trails, and the like.

I claim:

1. An antiskid tread for stairs, floors, and the like, comprising a metal plate with its surface etched into a series of alternate narrow grooves and narrow ridges, the width of said grooves and of said ridges being in the range of from $\frac{1}{32}$ to $\frac{1}{8}$ of an inch, and the depth of said etched grooves being in the order of .005 of an inch.

2. An antiskid tread for stairs, floors, and the like, comprising a metal plate with its surface etched away in a spotted pattern of stud-like areas projecting above the surface of the plate, said stud-like areas being etched into a series of alternate grooves and narrow ridges.

3. An antiskid tread for stairs, floors, and the like, comprising a metal plate with its surface etched away in a spotted pattern of stud-like areas projecting above the surface of the plate, said stud-like areas being etched into a series of alternate grooves and narrow ridges, the projecting height of said stud-like areas and the depth of said etched grooves being in the order of .005 of an inch.

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