April 5, 1932. C. B. JOHNSON 1,852,751

ANTISLIP DEVICE

Filed Oct. 27, 1930

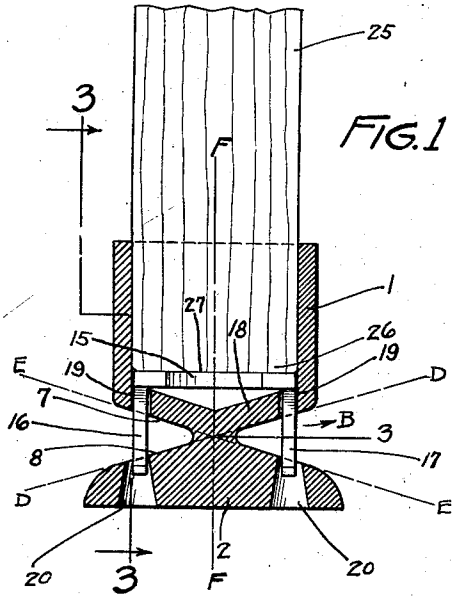

FIG. 1

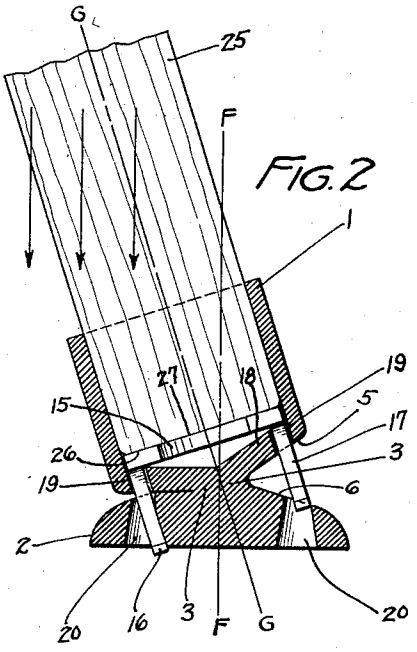

FIG. 2

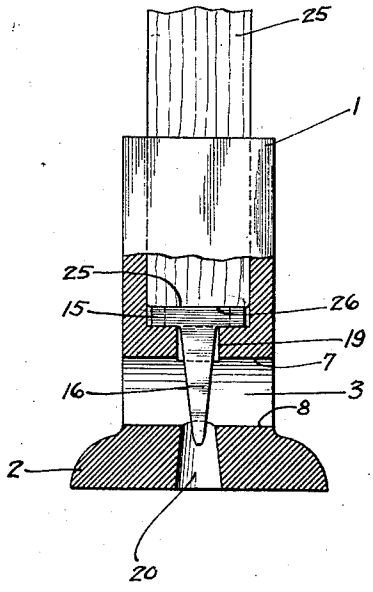

FIG. 3

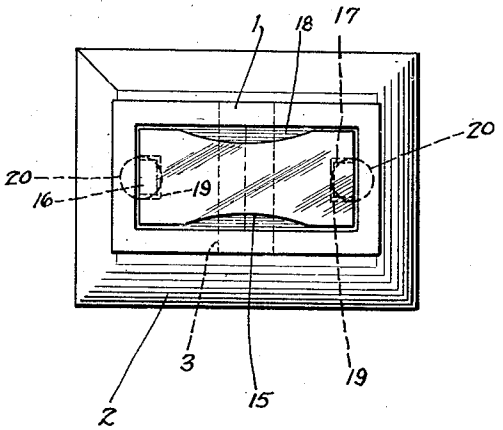

FIG. 4

Inventor
CONRAD B. JOHNSON
By Paul, Paul & Moore
ATTORNEYS

Patented Apr. 5, 1932 1,852,751

UNITED STATES PATENT OFFICE

CONRAD B. JOHNSON, OF EAU CLAIRE, WISCONSIN

ANTISLIP DEVICE

Application filed October 27, 1930. Serial No. 491,490.

This invention relates to anti-slip devices for use on the legs of stepladders, on tripods and the like.

I am aware that many attempts have been made to solve the problems in this art, of which slipping is one of the most difficult. In order to avoid slipping, various devices have been employed such as vacuum cups, roughened surfaces, etc., but in all, tipping and slipping of the foot piece results, or if vacuum cups are used, the material of the foot piece is weakened by formation of the cup, so as to be flimsy.

Features of the invention include the detailed construction of the device as shown, along with the broader ideas of means represented in the preferred embodiment.

Features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings:

Figure 1 is a vertical longitudinal section in a direction transverse to the long dimension of the web with the device in its normal unflexed or upright position;

Figure 2 is a view similar to Figure 1 showing the device in its flexed condition;

Figure 3 is a vertical transverse section on line 3—3 of Figure 1; and

Figure 4 is a top plan view showing the position of the prong-traversed openings of the foot section in dotted lines.

The device provides an upper socket-providing section 1, a lower foot section 2, and web 3 hingedly connecting the sections. The sections have thrust surfaces arranged laterally of the web and normally angularly related as shown in Figure 1 to permit hinging motion of the socket member to bring the surfaces in contact. These surfaces may be considered notches which are convergent from opposite sides toward one another and toward the web, the notch at one side providing upper and lower surfaces respectively indicated 5—6. The notch at the other side provides upper and lower surfaces respectively indicated 7—8. According to the direction of rocking of the socket section 1, the surfaces 5 and 6, or the surfaces 7 and 8 will come in contact with one another.

Although it is preferable to form the device of a single piece of resilient compressible material, yet it is conceivable that a socket member and a base member could be separately formed, and suitably hinged together by other means, and that the surfaces 6 and 7 could be formed of suitable compressible material so that the device would be compressible under the gravity action of the ladder. The device, however, can be most cheaply manufactured from a single piece of material of the kind mentioned. It will be noted that the thrust surfaces 5, 6, 7 and 8 are of substantial area so that when the surfaces are compressively brought together under the action of gravity of the ladder when it is in a tilted position, they substantially unite the upper and lower sections, to transfer gravity thrusts to and distribute them throughout the greater part of the area of the bottom of the foot, thus preventing tilting of the foot.

Although the socket member has been shown as generally of rectangular configuration, it may as well be circular or cylindrical, and the same may be said of the base piece, although it is preferable that the bottom of the base piece be of substantial area.

When the device is used on a tripod, it has been found that there is no blurring of the photographic image, due to vibration as in most other forms of tripod tips. It may be said that the surfaces of the socket and foot sections become solid or one-piece under the compressive and thrust actions of the load. Another point: The thrust surfaces extend at each side of the web a substantial distance therebeyond. It will be further noticed that the area of these surfaces is substantially greater than the horizontal cross-sectional area of the web and that when the device is attached to the leg of a ladder the long dimension of the web is parallel with the rung of the ladder or perpendicular to the direction of angular adjustment. Although the respective surfaces will contact whatever the angle of the ladder with respect to the support, the angle can be increased or decreased after these surfaces are in contact without substantially decreasing or making less effective

the traction or anti-slipping effects of the bottom surface of the foot, with the support.

As herein shown, and as indicated by lines D, E, the top surface of the notch on one side and the bottom surface of the notch on the other are substantially coplanar, and cross on a center line F. The preferable notch angle is 30°. The width of the fillet or web is substantially one-fourth of the all-over length of the socket element. It will be understood, of course, that these statements are not intended as limitations of the invention, inasmuch as they only represent the practice at present found most advisable. The object attained by such a design is a maximum of web or fillet strength, combined with a maximum of bendability and compressibility in the hinging area.

The weight of the stepladder and the weight of the load thereon are compressively transferred to the flat floor-engaging portion of the foot, and inasmuch as the foot is formed of a substantially solid piece of material, as distinguished from material which has a bottom cupped surface, there is always a substantial surface contact which positively prevents slipping. This compressive contact of the surfaces 5—6, 7—8, (particularly when the ladder is loaded, as when a person mounts it) is a very important feature of the invention because there is formed a substantially solid base on that side, with the load distributed substantially over the entire bottom surface of the foot, due to thrusts in a vertical direction, and parallel with the line F—F, and also along line G—G axially of the ladder, which line crosses the line F—F, distributing the load as aforesaid.

Another valuable feature of the invention relates to the anti-slip means for the foot adapted for use in conjunction with ice or oiled floors. This device is adapted to operate whenever the article supported assumes an angular position with respect to the vertical. The action is such that a spike is caused to project beyond the bottom of the foot and into the slippery surface. This means may be operable by the upper section 1 when rocked, and is herein so constructed as to be automatically projected through the bottom of the lower section 2. This device has herein the form of a U-shaped element providing a cross piece 15, prong 16, and a prong 17. The prongs traverse the bottom 18 of the upper section, openings 19 being provided for this purpose. The bottom section 2 is also provided with openings 20 which are substantially larger than the prongs so that when the element 1 is rocked, the element 17 may ride outwardly in direction of the arrow B. The numeral 25 indicates the bottom of a stepladder or a tripod, and when the prong device is used, the bottom 26 engages the top surface 27 of the cross piece 15 so that thrust is applied through the element 15 to the bottom 18 of the socket. The end portions of the bottom of the cross-piece 15 are, in this instance, engaged against the corresponding surfaces of the inner surface of the bottom 18. The contact actions of the surfaces 7 and 8 and of the prong 16 are shown in Figure 2, and it will be understood that the same action takes place with the surfaces 5 and 6 and prong 17 when the socket 1 is tilted in the opposite direction. The spikes merely provide means which are automaticaly projected when the top surface is rocked for the purpose set forth.

Normally, as shown in Figure 1, the ends of the spikes do not project beyond the bottom of the base, but just as soon as the socket moves to some angle laterally of the vertical, one of the prongs is caused to move to be contacted with the slippery surface.

The device is cast from rubber, and it has substantially plane-faced notches extending inwardly from opposite sides an equal distance, leaving or defining a centrally disposed flexible and compressible web or fillet which permits free hinging action, to bring the faces of corresponding notches against one another when the socket portion is rocked, the arrangement being such that when the ladder is loaded, these surfaces are put under compression. Thus at whatever angle the ladder assumes, a compression thrust takes place, which is distributed substantially throughout the entire area of the foot portion.

I claim as my invention:

1. A device of the class described having an upper socket-providing section, a lower foot section, and an elongated web of resilient compressible material hingedly connecting the sections, said sections at each opposite side of the web providing upper and lower flat surfaces, the former adapted to meet the latter as a stop when said upper section is rocked.

2. A device of the class described formed from elastic and compressible material, and having an upper socket-providing section, a lower foot section, and a web hingedly connecting said sections, said upper and lower sections having thrust surfaces arranged laterally of the web and normally angularly related to permit hinging motion of the socket member to bring the surfaces in contact.

3. A device of the class described composed of a single piece of resilient compressible material having notches extending inwardly from opposite sides to define and provide upper and lower sections connected by a web, said notches being convergent toward one another and toward the web and providing upper and lower surfaces which are adapted to meet when the upper section is rocked, and which are adapted to be compressively engaged, when load is applied by an object supported by the upper section.

4. A device of the class described composed of a single piece of resilient compressible material having notches extending inwardly from opposite sides to define and provide upper and lower sections connected by a web, said notches being convergent toward one another toward the web and providing upper and lower surfaces which are adapted to meet when the upper section is rocked, and adapted to be compressively engaged when load is applied by an object supported by the upper section, and means operable by the upper section and adapted when said section is rocked to be automatically projected through the bottom of the lower section to engage a support and prevent slipping of the device.

5. A device of the class described composed of a single piece of resilient compressible material having notches extending inwardly from opposite sides to define and provide upper and lower sections connected by a web, said notches being convergent toward one another and toward the web and providing upper and lower surfaces which are adapted to meet when the upper section is rocked, and adapted to be compressively engaged when load is applied by an object supported by the upper section, and means operable by the upper section as it rocks and providing prongs adapted to be alternately projected to engage a support and secure the device against slipping.

6. A device of the class described formed from elastic compressible material and having an upper socket-providing section, a lower flat-bottomed foot section, and a web portion hingedly connecting said sections centrally, said upper and lower sections having flat thrust surfaces of substantial area arranged at each side of the web and said surfaces being angularly related to permit hinging motion of the socket section to bring the surfaces into contact, to be compressively engaged when load is applied by an object supported in the socket section, said web being elongated in a direction perpendicular to the direction of bend, and means carried by the socket section and extending through the foot section and including spikes adapted to be automatically projected when the top section is rocked to prevent slipping of the base on a slippery support.

In witness whereof, I have hereunto set my hand this 23 day of Oct. 1930.

CONRAD B. JOHNSON.