This invention relates to improvements in supports for insulators. More particularly this invention relates to improvements in supports for insulators that have threaded recesses in the bases thereof.

It is an object of the present invention to provide an improved support for insulators that have threaded recesses in the bases thereof.

In using insulators, and in particular in using insulators for electric fences, it is desirable to provide a quick and easy method of securing them to a post or other stationary object. One very useful method includes passing a nail, or other small-diameter post-penetrating element, through an opening in an insulator-engaging member and then forcing the post-penetrating element into a post to bring the insulator-engaging member into assembled relation with the post. With such a method the nail and the insulator-engaging member are first affixed to the post, and thereafter the insulator is threaded onto the insulator-engaging member. The insulator and the insulator-engaging member are so dimensioned that the recess in the insulator telescopes over and completely encloses the head of the nail and the insulator-engaging member. Consequently the insulator support is protected against attack by the weather and will be long lived.

In driving the nail or other post-penetrating element into the post, it is desirable to space the head of the nail from the post a distance approximately equal to the depth of the recess in the insulator. Where this is done the insulator-engaging member can be rotated into engagement with the innermost threads of the recess of the insulator; thus increasing the amount of pull that the insulator can withstand without being dislodged from the post. The present invention insures this full and exact spacing of the head of the nail from the post by providing a spacer that is carried by the nail. It is, therefore, an object of the present invention to provide a spacer that is carried by the nail and acts to provide a minimum distance between the post and the nail head when the nail is forced into the post.

Other objects and advantages of the invention can be ascertained from an examination of the drawing and the accompanying description.

In the drawing and accompanying description, four preferred embodiments of the invention are shown and described, but it is to be understood that the drawing and accompanying description are merely illustrative of and do not limit the invention and that the invention will be defined by the appended claims.
engaging member 10 is moved along the generally cylindrical body of the nail until it engages the ribs 30 of nail 26. At this time, if the ribs 30 are in register with the notches 16, the insulator-engaging member 10 can be moved adjacent the head 28 of the nail 26. If, however, the ribs 30 are not in register with the notches 16, the nail 26 or the insulator-engaging member 10 might be rotated until the ribs 30 are in register with the notches 16; whereupon the insulator-engaging member 10 can be moved adjacent the head 28 of the nail 26. Thereafter the sharp end of the nail 26 is inserted through the opening 28 in the spacer 18, and the spacer 18 is moved along the generally cylindrical body of the nail 26 until it engages the ribs 30. At that time, if the ribs 30 are in register with the notches 22, the spacer can be moved adjacent the insulator-engaging member. If, however, the ribs 30 are not in register with the notches 22, the spacer 18 or the nail 26 must be rotated until the ribs 30 of nail 26 are in register with the notches 22 in the spacer 18; whereupon the spacer 18 can be moved adjacent the insulator-engaging member 10.

When this has been done, the nail 26, insulator-engaging member 10, and spacer 18 will form an assembled unit because of the snug fit between the notches 22 of the spacer 18 and the ribs 30 of the nail 26. This unit can then be picked up, placed with the sharp end of nail 26 against a post, and hammered or otherwise forced into the post until the head 28 of the nail 26 holds the insulator-engaging member 10 adjacent the top of the spacer 18 and thus holds the flange 24 against the post. At this time, the insulator-engaging member 10 will be spaced from the post by the spacer 18. Thereafter the flange 24 can be placed so its threaded recess 34 is in contact with the insulator-engaging member 10; and the insulator can be rotated until the helical periphery of the insulator-engaging member 10 is snugly seated in the threaded recess 34. At this time the base of the insulator will be immediately adjacent the post and will cooperate with the post to substantially enclose the insulator-engaging member 10, the spacer 18, and the upper section of nail 26.

The ribs 30 of nail 26 not only cooperate with the notches 22 in the spacer 18 to provide a snug fit that holds the head 28 of the insulator-engaging member 10 and the spacer 18 in assembled relation with nail 26, but they also cooperate with the notches 16 in the insulator-engaging member 10 to prevent rotation of member 10 relative to nail 26. Moreover, since the nail 26 will be held against rotation by the fibers in the wood of the post, the insulator-engaging member 10, which is locked to the nail 26 by the ribs 30, will also be held against rotation. This makes it possible for the insulator to be threaded onto or off of the insulator-engaging member 10 with ease. The frictional engagement between the flange 24 and the post will assist in preventing rotation of the nail 26 relative to the post, since the spacer 18 is also locked to the nail by the ribs 30. Not only does the flange 24 assist in preventing rotation of the nail, but it provides a broad blunt surface that will prevent the forcing of the end of the spacer into the fibers of the post. This is desirable because it guarantees the maintenance of the desired minimum distance between the post and the insulator-engaging member 10. In addition, the flange may be made so it will serve as a surface against which the edges of the recess in the insulator may bear. With such an arrangement, the flange 24 on the spacer 18 and the engagement between the head 28 of the nail 26 and the insulator-engaging member 10 could provide three points of support for the insulator.

In the event the insulator-engaging member 10 or the spacer 18 or the nail 26 has to be replaced, the nail 26 can be removed from the post, the spacer 18 can be removed from the nail 26, the insulator-engaging member 10 can be removed from the nail 26, and the needed substitution can be made. This obviates the need of disposing of all three members when only one member needs replacement.

By providing the spacer, the invention insures proper spacing of the insulator-engaging member 10 from the post. This not only insures easy assembly of the insulator 32 with the insulator-engaging member 10, but it insures engagement between the insulator-engaging member 10 and the innermost portion of the thread in the recess 34. Moreover, the use of the spacer appreciably increases the resistance of the insulator to forces that tend to dislodge the insulator by urging rotation of the insulator about an axis parallel to the surface of the post. The spacer 18 does this by shifting the instantaneous center of rotation of the insulator from the periphery of the nail to the periphery of the spacer.

The bowl-shape of the spacer 18 is quite valuable. It permits the spacer to be held in snug engagement with the nail and yet permits the spacer to be tilted relative to the nail. This is valuable because it permits firm and correct seating of the spacer against the post even when the nail is not perpendicular to the surface of the post. The bowl-shape is additionally valuable because it provides a surface that receives the insulator-engaging member and will be parallel to the post when the nail is driven into the post. This surface will keep the insulator-engaging member parallel to the surface of the post, and will thus make it quite easy to assemble the insulator with the insulator-engaging member.

The teachings of this invention have been found to be very useful in making supports for insulators that are used on the portable electric fences employed by farmers in confining grazing animals. By using a nail that was approximately two inches long and was less than five thirty-seconds of an inch in diameter, and by using a spacer and an insulator-engaging member that were less than nineteen thirty-seconds of an inch in diameter, it was found possible to secure an insulator to a post so intimately that a force of ninety pounds could not dislodge or appreciably loosen the insulator or any part of its support.

The numeral 38 denotes a modified insulator-engaging member which has a central opening 35 of rectangular form therein. The periphery of the insulator-engaging member 38 has such a notch 46 therein that provides the leading and trailing edges of a helix, which helix is the periphery of the member 36. The numeral 42 denotes a generally cylindrical spacer member that is made of resilient material, such as leather, and that has an axially-extending opening 44 therethrough. The numeral 46 denotes a generally cylindrical body and a notched head 48. Depending downwardly from the head 48 of the nail 46 and secured to the head 48 adjacent the notches are lugs 50. The head 46 of the nail and the lugs 56 of the head 48 are dimensioned so the lugs will fit into the rectangular opening 39 of the insulator-engaging member 36 and can.
prevent relative rotation between the nail 46 and the insulator-engaging member 36.

In using this modified form of the invention, the sharp end of nail 46 is inserted through the opening 30 of the insulator-engaging member 36 and the member 36 is moved along the generally cylindrical body of the nail 46 until it engages the nail head 48. At this time, if the lugs 50 of the nail head 46 are in register with the rectangular opening 38 of the insulator-engaging member 36, the lugs 50 can be moved into engagement with opening 38. If, however, the lugs 50 and the opening 38 are not in register, the nail 46 or the insulator-engaging member 36 must be rotated to bring the lugs 50 of nail head 46 into register with the opening 38 of the insulator-engaging member 36; whereupon the lugs 50 can be moved into engagement with the opening 38. Thereafter the sharp end of the nail 46 can be inserted through the opening 44 of the spacer 42, and the spacer can be urged along the generally cylindrical body of the nail 46 until it is adjacent the insulator-engaging member 36.

The opening 44 in the resilient spacer member 42 is so dimensioned as to provide a snug fit between the spacer and the nail 46. The lugs 50 in the nail head 48 cooperate with the opening 38 in the insulator-engaging member 36 to prevent relative rotation therebetween.

When nail 46, spacer 42, and insulator-engaging member 36 are assembled together, they form a unit that can be handled in the same way as the unit formed by assembling nail 26, spacer 18, and insulator-engaging member 10 can be handled.

Fig. 9 shows a screw 52, an insulator-engaging member 54, a spacer 58, a lock washer 62, and a nut 64. The insulator-engaging disc 54 and the spacer 58 are very similar to the insulator-engaging disc 18 and the spacer 18 of Figs. 1 and 2; and they differ from disc 10 and spacer 18 only in the shape of the openings therethrough. The opening 56 in disc 54 and the opening 60 in spacer 58 are circular while the openings 14 and 29 of the disc 10 and spacer 20 are acircular.

However, the opening 60 in spacer 58 is dimensioned to provide a snug fit with screw 52, whereby the screw 52 and spacer 58 can be picked up and used as an assembled unit; in the manner of nail 26, disc 10 and spacer 18.

In using the assembled insulator support of Fig. 9, the nut 64 and the lock washer 62 are removed, and the threaded end of the screw 52 is inserted through an opening in the post; and thereafter the lock washer 62 and the nut 64 are replaced on the threaded end of screw 52 and are drawn up tightly against the rear surface of the post. This causes the head of the screw 52 to be pressed tightly against the insulator-engaging disc 54, and to force that disc against the spacer 58, and to force spacer 58 against the post. Depending on the tightness with which the nut is drawn up on the threaded end of the screw 52, the pressure between the head of the screw 52, the insulator-engaging disc 54, the spacer 58, the post, and the lock washer 62 can be great enough to prevent rotation of the insulator-engaging disc 54 relative to the post. This permits ready engagement and disengagement of the insulator with the insulator-engaging disc 54.

The structure shown in Fig. 9 is very useful with posts that have openings therethrough; and it is particularly useful with metal posts. Such posts usually have a number of openings therethrough, and the screw 52 can be set at almost any desired level on the post merely by inserting it through an opening at that level.

Fig. 10 shows an assembled unit that is very similar to the unit of Fig. 9, and this includes a screw 66, an insulator-engaging disc 68, a spacer 74, a lock washer 80, and a nut 82. The disc 68 and the spacer 74 are similar to the disc 54 and the spacer 58 of Fig. 9, in that they have the same general configuration and have circular openings 70 and 76 therethrough. However, disc 68 and spacer 74 are unlike disc 54 and spacer 58 in that disc 68 is provided with radially-extending ridges on the under side thereof and spacer 74 is provided with radially-extending grooves 78 in the upper surface thereof. The ridges on the under side of disc 68 are adapted to be placed in register with the grooves 78 in the substantially plane upper surface of spacer 74; and those ridges are indicated in Fig. 10 by the depressions 72 that were formed in disc 68 when the ridges were formed, as by punching in a press.

In using the assembled support of Fig. 10, the nut 82 and the lock washer 80 are removed, the threaded end of screw 66 is inserted through an opening in the post, and the lock washer 80 and the nut 82 are replaced on the threaded end of screw 66 and are drawn up tightly against the post. Again, depending on the tightness with which the nut 82 is drawn up against the post, the insulator-engaging disc 68 can be held in such intimate engagement with the spacer 74 and the spacer 14 can be held in such intimate engagement with the post, that the insulator-engaging disc 68 can be held against rotation relative to the post. The provision of the grooves 78 in the substantially plane upper surface of the spacer 74, and the provision of the cooperating ridges on the under side of the disc 68 additionally assist in preventing any rotation of disc 68 relative to the post.

As a matter of actual practice, the structure shown in Fig. 9 will adequately prevent rotation of the insulator-engaging disc 54 relative to the post under most, if not all, normal operating conditions. However, the provision of the grooves 78 in the upper surface of spacer 74, and the provision of the ridges on the under side of disc 68 additionally increases the resistance of disc 68 to rotation.

The structure shown in Fig. 10, like the structure shown in Fig. 9, is very useful with metal posts; but the structures of Figs. 9 and 10 are both usable with wood posts that have openings therethrough. Whether used with wood or metal posts, the spacers 58 and 74 of Figs. 9 and 10 will maintain the required minimal distance between the post and the insulator-engaging discs 54 and 68, and will seat firmly against the post even though the screws 52 and 66 are inclined at an angle to the surface of the post.

While the drawing and accompanying description show and describe four preferred embodiments of the invention, it is obvious to those skilled in the art that various changes may be made in the form of the invention without affecting its scope. For example, the post-penetrating member and the insulator-engaging member could be made unitary rather than in two separate pieces, or the screws, washers and nuts could be replaced by wood screws for use with wood posts; and these and other things can be done without affecting the use or scope of the invention. Accordingly, it is to be understood that the drawing and description merely illustrate pre-
ferred embodiments of, and do not limit, the invention and that the invention will be defined by the appended claims.

What I claim is:

1. In a support for an insulator, a post-penetrating member, an insulator-engaging member, and a spacer that is adapted to be positioned between a post and the insulator-engaging member, said spacer having means adapted to bear against said post and having a flat surface spaced from said means in a direction parallel to said post-penetrating member, said post-penetrating member projecting through an opening in said flat surface of the spacer and projecting through an opening in the insulator-engaging member, said bearing means of said spacer being disposed radially outward from the point where the post-penetrating member enters the post, said spacer fitting snugly onto the post-penetrating member and being carried by it, said insulator-engaging member being a disc with a helical periphery that extends beyond said flat surface of said spacer to engage a threaded recess in an insulator.

2. In a support for an insulator, a post-penetrating member, an insulator-engaging member, and a spacer that is adapted to be positioned between a post and the insulator-engaging member, said spacer having a surface adapted to bear against said post and having a second surface being spaced from the first said surface in a direction parallel to said post-penetrating member, said post-penetrating member projecting through an opening in said second surface of the spacer and projecting through an opening in the insulator-engaging member, said spacer fitting snugly onto the post-penetrating member and being carried by it, said insulator-engaging member being a disc that is adapted to engage and hold an insulator.

3. In a support for an insulator, a post-penetrating member, an insulator-engaging member, and a spacer that is adapted to be positioned between a post and the insulator-engaging member, said spacer having a surface adapted to bear against said post and having second surface adapted to bear against said insulator-engaging member, said second surface being spaced from the first said surface in a direction parallel to said post-penetrating member projecting through an opening in said second surface of the spacer and projecting through an opening in the insulator-engaging member, said spacer fitting snugly onto the post-penetrating member and said spacer having a surface adapted to bear against said insulator-engaging member, said second surface being spaced from the first said surface in a direction parallel to said post-penetrating member projecting through an opening in said second surface of the spacer and projecting through an opening in the insulator-engaging member, the portions of said insulator-engaging member and said spacer which define said openings being thin so they contact only very limited portions of the length of said post-penetrating member, said portions of said spacer which define said openings being adapted to coact with said post-penetrating member to provide a snug fit, the limited engagement between said post-penetrating member and said portions of said spacer and said insulator-engaging member permitting tilting of said post-penetrating member relative to said insulator-engaging member and said spacer.

4. In a support for an insulator, a post-penetrating member, an insulator-engaging member, and a spacer that is adapted to be positioned between a post and the insulator-engaging member, said spacer having a surface adapted to bear against said post and having a second surface adapted to bear against said insulator-engaging member, said second surface being spaced from the first said surface in a direction parallel to said post-penetrating member, said post-penetrating member projecting through an opening in said second surface of the spacer and projecting through an opening in the insulator-engaging member, said spacer being thin where it engages said post-penetrating member so said spacer and said insulator-engaging member can tilt relative to said post-penetrating member.

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