This invention relates to stand-off insulators, especially for transmission line or lead-in cable for television receivers.

Transmission line or cable is commonly used as a lead-in from a television antenna above a building or receiver within the building. It is customary to support the cable at spaced intervals, and at bends, etc., by means of stand-off insulators. In one common form such an insulator comprises a screw or post with a circular eyelet holding an insulation grommet, which in turn holds the cable.

The primary object of the present invention is to generally improve stand-off insulators. A more particular object is to provide a stand-off insulator in which the cable is supported and surrounded solely by insulation, and is located outside the metal support. The metal stand may include a loop or collar portion which receives and holds the insulator, but the cable itself does not pass through the collar portion, and is not encircled by metal as is the case with the devices now in use.

An additional and more specific object of the invention is to provide such a stand-off insulator which may be applied to the cable at any desired point along its length, and without requiring threading of the cable through the insulator. Another object is to provide an insulator which grips the cable fractionally, and so tends to hold it against longitudinal movement through the insulator. Still another object is to provide an insulator, the cable-holding or insulation portion of which may be readily assembled with the stand or metal portion, and which after assembly is gripped so firmly by the stand as not to require crimping or closing of the metal about the insulation. Nevertheless, the metal may be crimped if desired, and this may be done by using an ordinary pair of pliers and without requiring a special crimping tool. Still another object of the invention is to so design the insulator as to receive one or another of several types of conventional cable.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the stand-off insulator elements, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings, in which:

Fig. 1 is a side elevation of one form of insulator embodying features of my invention;
Fig. 2 is a front elevation of the same;
Fig. 3 is a section taken approximately in the plane of the line 3—3 of Fig. 1;
Fig. 4 is explanatory of how the insulator is applied to the cable;
Fig. 5 shows how the insulation holder is applied to the metal stand;
Fig. 6 shows a stand in which the free end of the post is provided with a wood screw thread;
Fig. 7 is a side elevation of a modified form of the invention;
Fig. 8 is a front elevation of the same;
Fig. 9 is a section taken approximately in the plane of the line 9—9 of Fig. 7;
Fig. 10 is a front elevation of a modified insulator holder used in the stand-off insulator of Figs. 7—9;
Fig. 11 shows a modified form of metal stand, and
Fig. 12 is a view similar to Fig. 4, but showing how the holder is applied to ribbon or flat cable. Referring to the drawing, in all forms shown the stand-off insulator comprises a metal stand S and an insulation holder H. Referring more particularly to Figs. 1—4, the stand S comprises a post 12 and a collar 14 which is preferably disposed approximately perpendicular to the post at its outer end. The holder H is somewhat U-shaped, with its closed end 16 notched on the inside, as shown at 18, to receive a cable 20, here shown as a round cable. The legs 22 of the U are dimensioned to fit tightly in the collar 14. It will be seen from Figs. 1 and 2 that the cable 20 is supported and surrounded solely by insulation, and that it is spaced from and located outside of the metal collar 14. It does not pass through and is not encircled by the metal collar.

The collar 14 is preferably rectangular, as is best shown in Fig. 3, and the holder H is similarly rectangular in cross-section. The legs 22 are preferably notched on the outside, as is best shown at 24 in Fig. 4. The insulation is at least somewhat elastic, and it will be seen that the holder may be engaged with the collar with a snap fit, the collar being received in the notches 24 as is best shown in Fig. 2.

The holder H is made of a suitable flexible low-loss dielectric, preferably polyethylene. It may be described as being a block of insulation with a hole 26 (Fig. 4) near one end shaped and dimensioned to frictionally receive the cable. In the present case it will receive either tubular cable or ribbon cable. The block is slotted, as shown at 28 (Fig. 4), from the opposite end to the hole 26, so that the cable may be inserted in the block without threading it longitudinally.
through the block. For this purpose the legs of the holder spread apart, as shown in broken lines in Fig. 4, thus permitting the cable to be pushed sidewardly into the block. At this time the cable is preferably disposed edgewise, as shown in broken lines in Fig. 4, but on reaching the hole 5 it (or the block) is turned 90°. The procedure with fist or ribbon cable is substantially the same, as will be seen from inspection of Fig. 12. The cable 30 is inserted through the slot 28 edgewise, and is then turned 90° on reaching the hole 25, at which time the cable is received in the notches 19. The holder is then applied to the stand, which ordinarily has already been secured in position. If to be mounted in wood, the free end of the post is preferably provided with a wood screw thread, as shown by the thread 32 on post 34 in Fig. 6. The stand is screwed into position; the holder is placed on the cable; and thereafter the holder is applied to the stand.

In the present form of the invention this is done as shown in Fig. 5, in which it will be seen that one notch 24 of holder H is applied to one end of the rectangular collar 14, following which the holder is pivoted about the notch 24 until the opposite side has been forced within the collar 14. For this purpose the corners of the holder are preferably cut away or rounded, as shown at 38. The sides of the block are then squeezed tightly together, as shown in Fig. 2, and it will be understood that this increases the frictional grip of the holder on the cable.

If desired the holder may be provided with additional apertures, as shown at 38 and 40 in Fig. 4. These increase the yieldability of the insulation material about the cable and within the collar.

I have found that the resulting snap fit between the holder and the collar is so firm and tight that crimping of the metal is unnecessary. However, if the installer wishes to crimp the stand this is readily done with the aid of an ordinary pair of pliers and without requiring a special tool. For this purpose clearance is provided in the collar 14, as shown at 42, thus making it possible to tighten the collar about the holder after the holder has been inserted in position.

In Figs. 1 and 2 the post 12 is shown with a machine screw thread 44. It will be understood that this receives nuts which may be tightened on opposite sides of a metal bracket or the like, as when mounting one or more stand-off insulators along a mast supporting the antenna, or in any other situation in which a machine screw thread is more useful than a wood screw thread. The post may also be formed out of steel and shaped like a "cut nail" suitable for driving into cement or mortar. In Figs. 7, 8 and 9 show a modified form of the stand-off insulator. The metal stand S is modified in that the collar 50 is formed separately from the post 52, following which the two are secured together by a welding operation performed at the point 54. In such case the gap or opening in the collar 50 may be formed at the opposite side, as shown at 56 in Fig. 9. The post 52 has been shown with a machine screw thread, but it will be understood that it may equally well be provided with a wood screw thread, or formed like a nail.

The holder H in Figs. 7 through 10 differs from that previously described in being designed to be simply pushed lengthwise into the collar, instead of being rotated into the collar. The configuration is best shown in Fig. 10, in which it will be seen that the legs 60 have been cut away or narrowed somewhat on their outer sides, and have been tapered at their free ends, as shown at 62. The notches 64 are provided as before. It will be evident that with this construction it is merely necessary to squeeze the legs 60 together while pushing the same forcibly through the collar 50, until the notches reach the collar, at which time the holder is solidly anchored in position. Here again the collar may be crimped or closed slightly further by using a pair of pliers.

It will be understood that the holder of Figs. 7–10 may be used with the one-piece bent wire stand of Figs. 1–6, and similarly that the holder of Figs. 1–5 may be used with a two-piece welded stand shown in Figs. 7–10.

It will be understood that additional apertures such as those shown at 38 and 40 in Figs. 2, 4 and 5 may be formed in the insulation holder of Figs. 7–10, thereby saving some insulation and increasing the yieldability of the material.

The coupling of the post in the holder is modified differently than shown in Figs. 1–6, and a modification is shown in Fig. 11, in which it will be seen that the post 70 is turned away from the rectangular collar 72 at one corner of the collar, instead of at the center of one side as in Fig. 2.

It is believed that the construction and method of use of my improved stand-off insulator, as well as the advantages thereof, will be apparent from the foregoing detailed description. The transmission line or cable is not encircled by metal. This reduces coupling absorption and minimizes disturbance of the wave carried on the transmission line. Poor supporting insulators will tend to upset the electrical characteristics of the line. Insulators which encircle the cable with metal tend to produce standing waves, and any increase in the standing wave ratio causes a loss in efficiency.

The wire and the holder may be brought together without requiring threading of the cable through the holder. The holder grips the cable frictionally, and the stand grips the holder tightly. The holder will take care of a number of different forms of cable. The post of the stand may be made with different kinds of thread or with a nail point for various applications. Crimping of the metal about the holder is unnecessary, but may be done if desired, and if done does not require a special tool for the purpose.

It will be understood that while I have shown and described my improved stand-off insulator in several preferred forms, changes may be made in the structures shown without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A stand-off insulator for a parallel wire high frequency transmission line, said insulator comprising a split holder made of a somewhat yieldable insulation, and a metal stand on which said holder is mounted, said stand including a post and a collar carried by said post, and said holder having an outer end which is remote from the collar and an inner end which is to be held by the collar, the walls defining the slit being notched at a point spaced from the inner end of the holder to receive the line without threading the line endwise through the holder, and said holder at its inner end having legs shaped and

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268885 S. dimensioned to mate with the collar, at least one of said legs being notched on the outside near the inner end of the holder to engage the collar with a snap fit, with the line receiving portion located outside the collar, whereby the line is surrounded solely by insulation and is located outside of and spaced from the metal stand.

2. A stand-off insulator for lead-in cable for television receivers, said insulator comprising a metal stand having a post and a collar carried by said post and disposed in a plane approximately perpendicular to the post at one end of the post, and a holder which is mounted on said post and which has an outer end which is remote from the collar and an inner end which is held by the collar, said holder being a piece of a somewhat yieldable low loss dielectric, the walls defining the slit being notched at a point spaced from the inner end to frictionally receive the cable, the split of said holder making it possible to receive the cable without threading the cable endwise through the holder, said holder having legs shaped and dimensioned to mate with the collar, at least one of said legs being notched on the outside near the inner end of the holder to engage the collar with a snap fit with the cable receiving portion located outside the collar, whereby the cable is surrounded solely by insulation and is located outside of and spaced from the metal stand.

3. A stand-off insulator for a parallel wire high frequency transmission line, said insulator comprising a metal stand including a post and a collar carried by said post and disposed in a plane approximately perpendicular to the post at one end of the post, and a holder which is mounted on said post and which has an outer end which is held by the collar, the holder being a piece of a somewhat yieldable low loss dielectric, and holder having legs shaped and dimensioned to frictionally receive the line, said holder being slotted from the inner end to said hole so that the line may be inserted in the holder without threading the line endwise through the holder, and the slotted end of the holder being shaped and dimensioned to mate with the collar, at least one of the outer edges of said holder near its inner end being notched to engage the collar with a snap fit, with the line receiving portion located outside of the collar, whereby the line is surrounded solely by insulation and is located outside of and spaced from the metal stand.

4. A stand-off insulator for a parallel wire high frequency transmission line, said insulator comprising a metal stand and a holder made of a somewhat yieldable insulation, said stand including a post and a collar carried by said post, and said holder being made of a somewhat yieldable insulation and holder being somewhat U-shaped with the legs at a point well spaced from their free ends notched on the inside to receive the cable, and with the free ends shaped and dimensioned to mate with and be held by the collar, the legs being compressed toward one another while the cable receiving portion is located outside the collar, at least one of said legs being notched on the outside to engage the collar tightly with a snap fit when the holder is around a cable.

5. A stand-off insulator for lead-in cable for television receivers, said insulator comprising a metal stand and an insulation holder made of a somewhat yieldable insulation, said stand including a post and a collar carried by said post and disposed in a plane approximately perpendicular to the post at one end of the post, and said holder being somewhat U-shaped with the legs at a point well spaced from their free ends notched on the inside to receive the cable, and with the legs of the holder near their free ends shaped and dimensioned to mate with and be held by the collar, the legs being compressed toward one another while the cable receiving portion is located outside the collar, at least one of said legs being notched on the outside to engage the collar tightly with a snap fit when the holder is around a cable.
mated with one part of the collar, the other of said legs being notched on the outside to engage the inside of the diametrically opposite part of the collar with a snap fit, said latter leg being rounded on its approach to the notch so that it may be turned into the collar while turning on the mating parts at the first named part of the collar, so that said first named part of the collar acts as a pivot for the turning movement.

9. A stand-off insulator as defined in claim 4 in which the metal stand consists of a single piece of heavy wire one end of which is bent to form a generally rectangular collar, and the other end of which is bent away from the collar approximately perpendicular to the plane of the collar to form the post.

10. A stand-off insulator as defined in claim 5 in which the metal stand consists of a single piece of heavy wire one end of which is bent to form a generally rectangular collar, and the other end of which is bent away from the collar approximately perpendicular to the plane of the collar to form the post.

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