This invention relates to overhead line equipment and in particular to insulators suitable for use with overhead line systems such as overhead power lines and overhead telecommunication lines.

According to the invention, an overhead line insulator of insulating material includes a central barrel part having a straight-through bore for receiving a support arm, and an outer annular groove around the barrel part; and at least one skirt around the barrel part spaced away from it and extending longitudinally away from the annular groove; whereby the insulator may be slipped onto a support arm receivable into the bore, and whereby a conductor may be secured in the groove.

If desired, the groove may be provided with an insert of wear resistant material embedded within the insulator. The wear resistant material may be metal, nylon, or the like. The insulating material may be resilient and may be a synthetic plastic material. The insulator may be moulded.

If desired, a further skirt may be provided extending away from the groove in a direction opposite to that of the first-mentioned skirt. A plurality of concentric skirts may be provided around the central barrel part, cylindrically spaced parts of annular cross section being defined between adjacent concentric skirts. The skirts may diverge outwardly in an axial direction away from the groove.

The central barrel part may project beyond the end of one or both sets of skirts (if two sets of skirts are provided) and this projecting part may be provided with a transverse bolt for bolting to an overhead line support arm passing through the barrel part.

The invention may include also a weather shield at the end of the barrel, the weather shield having a sleeve portion mating with the end of the barrel, and having a flange spaced axially away from the end of the skirt and extending radially beyond the skirt. The bolt of the weather shield may have a turned lip extending axially over the skirt but spaced radially away from it. The skirt may have a skirt flange inwardly from its end and projecting outwardly and spaced axially away from the flange of the weather shield. The weather shield itself may have at least one weather shield skirt projecting axially and with radial and axial clearance into the space defined between the barrel part and skirt or between adjacent skirts. The skirts thereby intercalate and provide a leak-free path. When the weather shield is of resilient material then the shield and barrel part may have an annular head and groove arrangement whereby the weather shield may be clipped into engagement with the barrel for locating the weather shield axially in position relative to the barrel.

The sleeve portion of the weather shield may project axially beyond the skirt and the projecting part of the sleeve portion may be provided with a transverse hole for receiving a bolt for bolting to an overhead line support-arm passing through the barrel part. There may be provided another weather shield integral with the first and spaced axially from it, the transverse hole being disposed between the weather shields, and the other weather shield having a sleeve portion for engagement with the end of another barrel part.

As a further development, the bore of the central barrel part may be shaped to co-operate bayonet fashion with a co-operating cylindrical male member functioning as a spacer sleeve, and having itself a bore to slide onto and to seat snugly on an overhead line support arm. The male member may be provided with a transverse hole for bolting to the support arm.

Further features of the invention will become apparent from the following description with reference to the accompanying drawings.

In the drawings:

FIGURE 1 shows a part sectional front elevation of an insulator according to the invention;

FIGURE 2 shows a sectional end elevation at II--II in FIGURE 3, of another embodiment of the invention;

FIGURE 3 shows a part sectional front elevation of the embodiment shown in FIGURE 2;

FIGURE 4 shows a part sectional front elevation of yet another embodiment of the invention;

FIGURE 5 shows a part front elevation of an overhead line post, showing insulators in position; and

FIGURE 6 shows a part-sectional front elevation of yet another embodiment of the invention.

Referring to FIGURE 1, reference numeral 10 refers generally to an overhead line insulator having a central barrel part 12 defining a straight-through bore 14, and having an annular groove 16 around the barrel part. The insulator has a skirt 18 around the barrel part, but spaced away from it and defines a cylindrical cavity 20 of annular cross-section. Around the skirt 18 there is provided a further skirt 18a, defining a further cylindrical cavity 20a also of annular cross-section, in conjunction with the skirt 18. The skirt 18a has a radially outwardly projecting flange 22.

The groove 16 is defined by a ring 23 of metal or of some suitable hardwearing material. This ring is moulded integrally with the insulator. It will be noted that the ring is centrally disposed, and that skirts extend axially away from the groove in opposite directions.

At each end of the insulator, there is provided a weather shield generally indicated by reference numeral 24 and having a sleeve portion 26 adapted to mate with the end of the barrel part 12, and having a flange 28 spaced axially away from the ends of skirts 18 and 18a, and extending radially outwardly beyond the end of the skirt 18a. The flange 28 has a turned lip 30 extending axially over the end of the skirt 18a, but spaced radially away from it. The weather shield may be further provided with a skirt 32 adapted to extend axially into the cavity 20a defined between skirts 18 and 18a. The barrel part 12 may be provided with a recessed bore 33 at one or at both ends, to engage with insulator spacer sleeve 34, of which determines the spacing between two adjacent insulators. The webs 35 are provided at the root ends of the skirts 18 and 18a, to provide support to the sides of groove 16.

Referring now to FIGURE 3 of the drawings, the construction is similar to that shown in FIGURE 1 except that the flange 22a, corresponding to flange 22 of the embodiment shown in FIGURE 1, is provided at the end of the skirt 18a. Furthermore, the ends of the barrel 12 are provided with ends 36 of reduced diameter, in order to receive the weather shields 24a and 24b. The weather shield 24a comprises a sleeve 40, having recessed bores at its ends, for mating with the ends 36 of smaller diameter of the barrels 12 of a pair of insulators. The sleeve further provides a pair of axially spaced flanges 28a, such that when the sleeve is in engagement with the barrel 12 of an insulator, then the flange 28a is spaced away axially from the ends of the skirts 18 and 18a. The sleeve 40 is provided with a transverse hole 42 for receiving a bolt, for bolting an overhead line sup-
port arm, passing through the barrel part and sleeve 40. The weather shield 24b, also has a flange 28a, and is adapted also, on a reduced diameter of the barrel part 12. A plurality of insulators may be provided, axially spaced in series, adjacent insulators being separated by weather shields 24a, and the outer ends of the outer insulators being then provided with end off weather shields 24b. The end of the barrele part may be provided with an annular head 13, adapted to seat within a mating groove provided in the sleeve portion 26 of the weather shield 24, whereby the weather shield may be clipped into position onto the end of the barrel and located thereby (see FIGURE 1).

Referring to FIGURE 4 of the drawings, each insulator may have its barrel part 12 projecting beyond the ends of the skirts 18 and 18a as at 12a. This projecting barrel part may then be provided with a transverse hole 42a, for receiving a bolt for bolting to an overhead line support arm, passing through the barrel part. In other respects the invention has structural features similar to the other embodiments, similar features being indicated by similar reference numerals.

Referring to FIGURE 5 of the drawings, there is shown a post 50, having a horizontal overhead line support arm 52, onto which the insulators 10 are slipped and maintained in their axial spacing, by means of the spacer sleeve 34 which is bolted to the support arm 52, via transverse hole 54.

Referring to FIGURE 6, reference numeral 60 indicates generally a weather shield in which the insulator spacer sleeve 34 is integral with the flange 62, turned lip 30 and skirt 32 of the weather shield 60. The weather shield 60 has a sleeve portion 64 which has a recessed bore with which the recessed spigot portion 66 of the central barrel part 12 co-operates in spigot and socket fashion, so that a straight-through bore 14 is defined by the barrel part 12 and the sleeve 34. The turned lip 30 which is integral with the flange 62 extends axially over the end of the skirt 18a. The skirt 32 which is provided integral with the flange 62 extends axially into the cavity 20a defined between skirts 18 and 18a.

In use, an insulator having two sets of skirts 18 and 18a, extending oppositely away from the central groove 16, and having two weather shields, one at each end, is slipped over and along a horizontal support arm 52, and is then bolted or otherwise located in position on the support arm. An overhead line conductor, whether for power or telecommunication, can then be easily secured in position in the groove, by binding around the insulator. The skirts 18 and 18a, in conjunction with the weather shield 2, is a long electrical leakage path, between an overhead line conductor secured in the groove 16, and the support arm 52.

Alternatively, a mounting barrel may be provided, a plurality of insulators being mounted on it in axially spaced relationship, the whole assembly being then mounted on the support arm 52. A plurality of insulators as shown in FIGURE 4 and having oppositely projecting barrel ends 12a may be slipped onto the mounting barrel and located in position axially at the ends of the barrel by lock collars. The axial spacing between adjacent insulators will then be determined by the combined lengths of the projecting barrel ends 12a. An advantage of this arrangement is that the assembly of the parts can take place at a convenient work place and the whole assembly thereafter slipped onto a support arm and secured in position, by bolting via one or more transverse holes 42a registering with annular head 13, wherein holes in the mounting barrel and support arm, or by other suitable means.

If desired, the lock collars at the ends may be dispensed with, and axial location of the insulators on the mounting barrel can then take place on the support arm by transverse bolts through holes 42a at opposing ends of the assembly. It may be convenient in such an arrangement to have the insulators a tight push fit on the mounting barrel to keep them in position during transport to site and during mounting.

I claim:

1. An overhead line insulator of insulating material for mounting on a substantially horizontal support arm, and which includes a central barrel part having a straight-through bore for receiving a support arm, and an outer circumferential groove around the barrel part, and skirts around and integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and which includes also a weather shield at each end of the barrel, each weather shield comprising a sleeve engaging with the end of the barrel and an integral weather shield skirt extending axially over the diverging skirt towards the annular groove, but spaced outwardly away from the diverging skirt; whereby the insulator may be slipped onto a support arm receivable into the bore, and whereby a conductor may be secured in the groove.

2. An insulator as claimed in claim 1, and which includes an outwardly extending circumferential flange around and integral with each diverging skirt, and axially spaced away from the end of the weather shield skirt, and disposed between the end of the weather shield skirt and the annular groove.

3. An overhead line insulator of insulating material for mounting on a substantially horizontal support arm, and which includes a central barrel part having a straight-through bore for receiving a substantially horizontal support arm, and an outer annular groove around the barrel part, and skirts around the integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and which includes also a weather shield at each end of the barrel, each weather shield comprising a sleeve engaging with the end of the barrel, a weather shield skirt extending axially into the cavity of annular section defined between the diverging skirt and barrel, and with the radial clearance between the weather shield and the barrel and diverging skirt, and a circumferential flange integral with and extending outwardly from the weather shield skirt and axially spaced away from the skirt flange of the diverging skirt; whereby the insulator may be slipped onto a support arm receivable into the bore, and whereby a conductor may be secured in the groove.

4. An overhead line insulator of insulating material for mounting on a support arm and which includes:

(a) a central barrel part having a straight-through bore for receiving a substantially horizontal support arm and an outer circumferential groove around the barrel part;

(b) skirts around and integral with and spaced radially away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and

(c) a weather shield at each end of the barrel, each weather shield comprising:

(i) a sleeve engaging with one end of the barrel; (ii) an inner weather shield skirt projecting axially into the cavity of annular section defined between the diverging skirt and barrel holes in the mounting barrel and support arm, or by other suitable means;

(ii) an outer weather shield skirt extending axially over the diverging skirt and towards the annular circumferential groove but spaced outwardly away from the diverging skirt.

5. The combination of two identical overhead line insulators with spacer tube: each insulator being of insulating material and including:

(a) a central barrel part having a straight-through bore
for receiving a substantially horizontal support arm, and having an outer annular groove around the barrel part; and
(b) skirts around and integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and the spacer tube having
(a) a bore the same as the bores of the barrels of the insulators, and engaging at one end with one end of the barrel of the one insulator, and at the other end with one end of the barrel of the other insulator, thereby defining a continuous straight-through bore through the spacer tube and insulator barrels; and
(b) opposed axially spaced spacer tube skirts extending axially over the diverging skirts of the insulators and towards the annular circumferential grooves, but spaced outwardly from the diverging skirts of the insulators.

6. The combination of two identical overhead line insulators with a spacer tube; each insulator being of insulating material and including
(a) a central barrel part having a straight-through bore for receiving a substantially horizontal support arm, and having an outer annular groove around the barrel part; and
(b) skirts around and integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and the spacer tube having
(a) a bore the same as the bores of the barrels of the insulators and engaging at one end with one end of the barrel of the one insulator and at the other end with one end of the barrel of the other insulator, thereby defining a continuous straight-through bore through the spacer tube and insulator barrels; and
(b) oppositely extending integral skirts projecting axially into the cavities of said annular section defined between the diverging skirts and barrels of the insulators.

7. The combination of two identical overhead line insulators with a spacer tube; each insulator being of insulating material and including
(a) a central barrel part having a straight-through bore for receiving a substantially horizontal support arm, and having an outer annular groove around the barrel part; and
(b) skirts around and integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove; and the spacer tube having
(a) a bore the same as the bores of the barrels of the insulators, and engaging at one end with one end of the barrel of the one insulator, and at the other end with one end of the barrel of the other insulator, thereby defining a continuous straight-through bore through the spacer tube and insulator barrels; and
(b) two axially spaced sets of inner and outer skirts, the inner skirts projecting axially into the cavities of said annular section defined between the diverging skirts and barrels of the insulators, and the skirts extending axially over the diverging skirts toward the circumferential annular grooves, but spaced outwardly away from the diverging skirts of the insulators.

8. An overhead line insulator of insulating material, which includes a central barrel part having a straight-through bore for receiving a substantially horizontal support arm, and an outer annular groove around the barrel part; skirts around and integral with and spaced away from the barrel part, and diverging oppositely away from the annular groove, and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove, the skirts having circumferentially extending outwardly projecting skirt flanges at their ends; and a weather shield at each end, each weather shield comprising a sleeve engaging with the barrel part, and a flange fast with the sleeve and extending radially outwardly from the sleeve to substantially the same extent as the skirt flange and being spaced axially away from the skirt flange; whereby the insulator may be slipped onto a support arm receivable into the bore and whereby a conductor may be secured in the groove.

9. The combination of two identical overhead line insulators with a spacer tube; each insulator being of insulating material and including
(a) a central barrel part having a straight-through bore for receiving a substantially horizontal support arm and having an outer annular groove around the barrel part; and
(b) skirts around and integral with and spaced away from the barrel part and diverging oppositely away from the annular groove and defining cavities of annular section with the barrel part, the cavities extending axially inwardly adjacent the annular groove, the skirts having circumferentially extending upwardly projecting skirt flanges at their ends; and the spacer tube having
(a) a bore the same as the bores of the barrels of the insulators, and engaging at one end with one end of the barrel of the one insulator and at the other end with one end of the barrel of the other insulator thereby defining a continuous straight-through bore through the spacer tube and insulator barrels; and
(b) a pair of axially spaced flanges integral with it and projecting outwardly to the same extent as the skirt flanges of the insulators and being closely spaced away from the skirt flanges; whereby the combination may be slipped onto a support arm receivable into the straight-through bore through the insulators and spacer tube and whereby conductors may be secured in laterally spaced relationship in the grooves of the insulators, the lateral spacing between the grooves being determined by the spacer tube.

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