

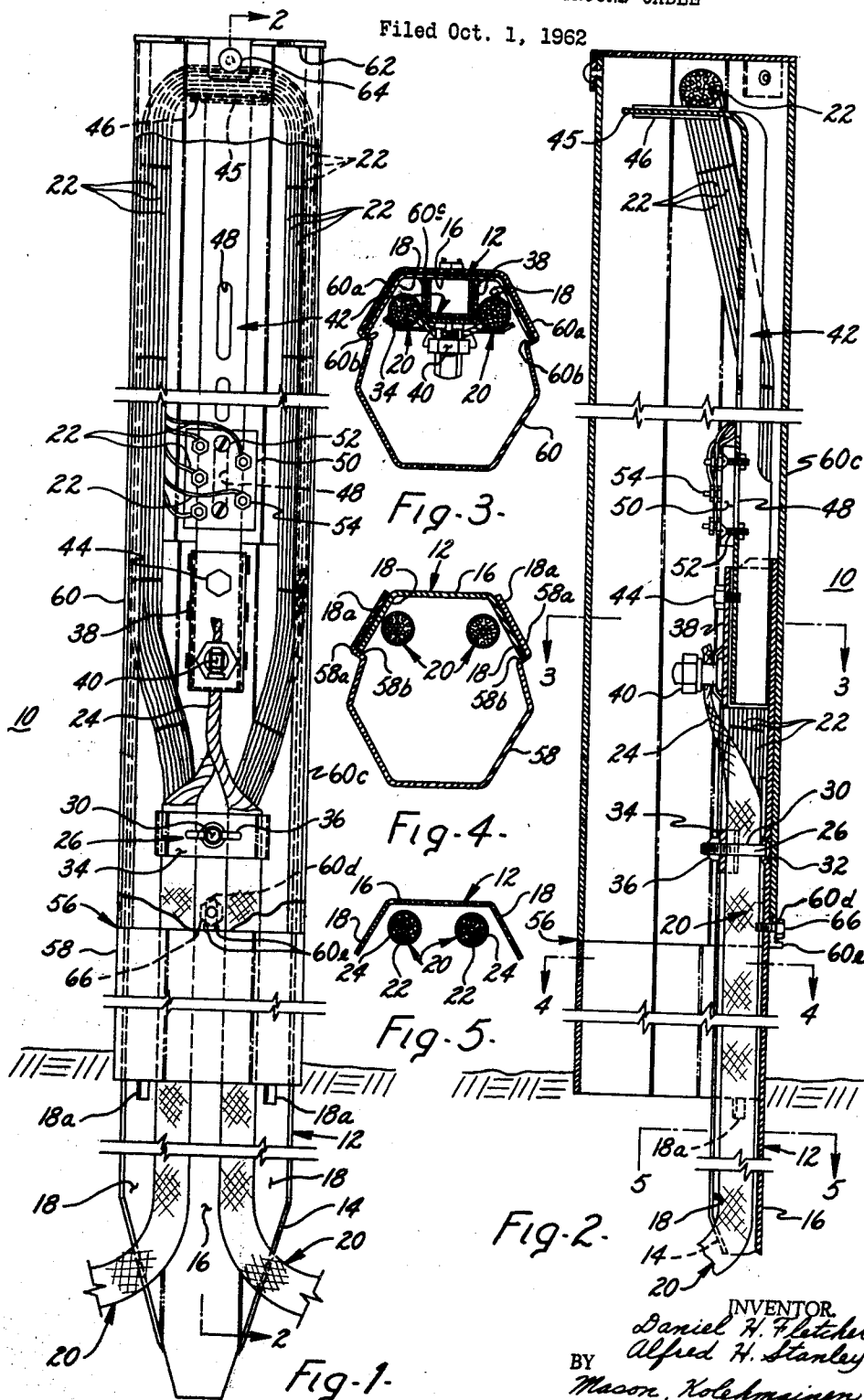
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TERMINAL DEVICE FOR UNDERGROUND CABLE

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## 3,180,920 TERMINAL DEVICE FOR UNDERGROUND CABLE

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This invention relates to a terminal device for underground cable and has for an object the provision of a new and improved terminal housing for underground cable which is simple in construction, economical to produce and which affords means for rapidly and easily making connections or taps to an underground cable.

With the advent of increased usage of underground cable for power distribution, telephone and other electrical lines, it has become desirable to provide a terminal device for underground cable whereby connections to various individual leads or lines of the underground cable can be made above ground with a minimum of effort and time, and without interrupting service or deenergizing the lines in the cable and the satisfaction of this desire constitutes another important object of the present invention.

The present invention has for a further object the provision of a new and improved terminal device having a stake or bracket driven into the ground and supporting a loop or end of the underground cable having several individual lines or conductors the ends of which can be easily and rapidly connected to a terminal post carried by the stake.

Another object of the present invention is the provision of a new and improved terminal device of the type described having a cover portion which can be easily and rapidly removed to facilitate connections being made.

A further object of the present invention is to provide a new and improved terminal device of the type described which includes means for easily and rapidly grounding and receiving the sheath or ground wire of the underground cable to the terminal device.

Still another object of the present invention is to provide a new and improved terminal device of the type described wherein a portion of the sheath is removed freely exposing the lines in the underground cable in a manner such that splicing, tapping, and connecting of various individual lines to binding posts, terminal strips, carried in the housing can be rapidly and simply accomplished.

A still further object of the present invention is to provide a new and improved terminal device for underground cable wherein a stake is driven into the ground and supports a removable cover which may be easily removed to permit ready access to the cable, terminal strips, grounding clamps, etc., normally housed within the device.

Another object of the present invention is to provide a new and improved terminal device of the type described wherein the stake and cover members are telescopically engaged for sliding contact with one another to form a strong and rigid housing for the cable and the terminal carrying post.

The invention has for another object the provision of a new and improved terminal device wherein a relatively narrow post extends upwardly from a relatively wide stake portion which is driven into the ground with the post supporting a loop of the cable having its individual leads or wires exposed for rapid connection to a terminal board mounted on the post.

The foregoing and other objects and advantages of the present invention are accomplished by the provision

of a new and improved terminal device for an underground cable and having a vertically extending stake or bracket with its lower portion extending into the ground and its upper portion extending upwardly therefrom. There is provided a vertically upwardly extending supporting post which is attached to the upper end of the stake and supports a loop of underground cable extending generally downward along the stake and into the ground. The stake is provided with means for securing the cable thereto and for grounding the outer sheath or ground wire. A removable cover member is telescopically engaged with the upper portion of the stake and slides thereon to enclose the support post and upper portion of the cable. The stake and the cover member cooperate to form a rigid enclosure for the protection of the cable and terminals and the cover may be easily and rapidly removed to permit access to the cable and to the individual lines therein when desired.

The invention, both as to its organization and manner of operation, together with further objects and advantages, will best be understood by reference to the following detailed description and appended claims when taken in conjunction with the drawings herein:

FIG. 1 is a front elevational view of a terminal device embodying the features of the present invention with portions shown broken away to illustrate certain details of construction.

FIG. 2 is a cross-sectional view taken along a line substantially corresponding to line 2—2 of FIG. 1, assuming, of course, that the latter shows the entire construction.

FIG. 3 is a cross-sectional view taken along a line substantially corresponding to line 3—3 of FIG. 2, assuming again that the latter shows the entire construction.

FIG. 4 is a cross-sectional view taken along a line substantially corresponding to line 4—4 of FIG. 2, making the same assumption as before.

FIG. 5 is a cross-sectional view taken along a line substantially corresponding to the line 5—5 of FIG. 2, assuming that the latter shows the entire construction.

Referring now to the drawings, there is illustrated a terminal device for underground cable constructed in accordance with the features of the present invention and indicated generally by the reference numeral 10. The terminal device is comprised of a vertically extending stake or support bracket 12, the lower portion of which is adapted to be inserted into the ground. To this end, the lower end of the stake 12 is pointed or tapered as at 14 to facilitate the driving of the stake into the ground while the upper portion of the stake extends upwardly above the ground to support the other parts of the terminal device.

The stake 12 is generally channel-shaped in cross-section (FIG. 5) and has a web or back 16 of substantial width extending between a pair of integrally formed legs 18 diverging outwardly from the web. The stake is preferably constructed from a single piece of flat metal with the legs being formed by bending. The channel-shaped cross-section of the stake 12 provides a stiff or rigid structure which is resistant to bending and the concave area formed by the channel-shaped cross-section is of sufficient size to accommodate two parallel legs of an underground cable 20 extending upwardly from the ground to form a loop. The cable 20 is of the common type used for the underground transmission of power, telephone or other electrical service and embodies a plurality of insulated individual leads or wires 22 surrounded by an outer sheath 24 of conducting material which serves as a common ground.

In order to secure the vertically extending legs of the cable 20 to the stake 12 there is provided a cable clamp-

ing assembly generally indicated by the numeral 26. The clamping assembly 26 includes a bolt 30 secured to the web 16 of the stake and extending between the legs of the cable 20 with the head of the bolt seated within an apertured indentation 32 in the back of the web. The bolt head is secured to the web 16 in appropriate manner such as by welding or staking, and a clamping bar 34 with an apertured body portion and intumed ends is placed on the bolt to press the legs of the cable tightly against the stake 12 when a wing nut 36 is threaded onto the bolt 30 and tightened. Thus, when the clamping assembly 26 is tightened the legs of the cable 20 are tightly secured to the stake 12 and cannot move vertically if a pull is exerted on the cable.

At the upper end of the stake 12 there is provided a post supporting bracket 38 preferably formed from a channel bar having a web of considerably narrower width than the web 16 of the stake 12. The channel of the bracket 38 opens in the opposite direction from the channel of the stake 12 and the extreme outer ends of both legs of the channel bracket 38 are welded to the web 16 to provide a good electrical and mechanical connection therebetween. The lower portion of the web of the channel bracket 38 is provided with a cable clamp 40 to which braided ends of the sheath 24 of the legs of the cable 20 are attached in order to provide a primary ground connection to the stake 12. As will be apparent from FIG. 1, the sheath 24 of the cable 20 is stripped off around the upper loop of the cable from a point just above the clamping assembly 26 so that the individual wires 22 are exposed to facilitate the making of connections or splicing. When the sheath 24 is stripped from the legs of the cable, portions of the sheath ends are braided and inserted into the cable clamp 40 to provide the ground connection.

Extending upwardly from the channel bracket 38 is a support post 42 which is preferably constructed from a piece of channel. The lower end of the post 42 is telescoped into a guide channel (FIG. 3) formed between the channel bracket 38 and the web 16 of the stake and is secured therein by a cap screw 44. The upper end of the post is bent at right angles to provide a support leg 45 for the top portion of the loop of the cable 20 which may be trained over the support 45 as illustrated or may pass beneath the support and be suspended therefrom by a suspension string (not shown). The support leg 45 is provided with an insulating cover 46 to prevent fraying of the insulation from the leads 22 of the cable and consequent grounding out against the bracket 38.

The web of the post 42 is provided with longitudinal slots 48 accommodating a number of devices 50 such as terminal blocks, splices or load coils which may be attached to the post by screws 52 or by other suitable means. The terminal blocks are provided with a plurality of terminals 54 to which desired individual leads 22 of the cable can be connected. It should be noted that the web width of the post 42 is considerably smaller than the width of the web 16 of the stake, thus providing a relatively large open work area permitting access to the individual leads 22 of the cable and, hence, facilitating selection of the various leads and the connection, splicing or tapping to the various terminals on the blocks 50.

In order to protect the post, the terminal blocks and the cable which extends above the ground from the elements and from inadvertent contact with other objects there is provided a housing or cover 56. The cover 56 is comprised of a lower section 58 and an upper or top cover 60. The lower section 58 telescopically engages the legs 18 of the stake 12 and is supported along its bottom edge by a pair of outwardly extending lugs 18a which are punched outwardly from the legs of the stake. The cross-section of the lower section 58 is shown in FIG. 4 and is generally hexagonal in configuration with one open side. The lower section is provided with a pair of legs 58a substantially conforming to the outer surface of the legs 18 of

the stake 12. There are also provided a pair of inwardly extending ridges or guide shoulders 58b positioned to face the ends of the legs 18 of the stake and guide the section 58 as it is slid down the stake 12 until the lower edge of the section rests against the lugs 18a. It should be noted that the outer edges of the legs 58a of section 58 are not joined and that the web 16 of the stake 12 completes the back side of the enclosure.

As is shown in FIG. 3, the upper cover portion 60 is similar in cross-sectional configuration to the section 58 with the exception that legs 60a which face the legs 18 of the stake 12 are integrally joined by a back 60c which faces the web 16 of the stake so that a complete enclosure is formed by the cover portion 60 alone. A pair of inwardly directed ridges or guide shoulders 60b in the cover portion 60 face the edges of the legs 18 and serve to guide the section as it is slid onto the stake 12. The portion 60 is provided with a top cover 62 which may be attached by suitable means such as by rivets 64 or by welding.

To assemble the cover 56 after the cable connections have been completed, the section 58 is slid onto the stake 12 and moved downwardly until its lower edge rests on the legs 18a, whereupon the cover portion 60 is slid onto the stake until its lower edge seats against the upper end of the lower section 58. The top cover or upper portion 60 is detachably secured in this assembled position by means of a cap screw 66 extending through an open ended slot 60d at the extreme lower end of the back 60c of the cover portion 60 and threaded into the web 16 of the stake. A portion of the metal which is deformed during formation of the slot 60d is bent outwardly adjacent the lower ends of the slot to form a pair of locking lugs 60e which prevent the upward movement of the cover portion 60 by engaging the head of the cap screw 66. Thus, in order to slide the cover portion 60 downwardly to close the housing or to slide this portion upwardly during removal the cap screw 66 must be screwed outwardly until the head thereof is positioned beyond the ends of the lugs 60e.

Installation of the terminal device 10 is rapid and simple. The stake 12 is driven into the ground at the desired location and the underground cable 20 is then looped over the support 45 at the upper end of the support post 42. The legs of the cable 20 are then stripped of their outer sheath 24 to a point just above the clamping assembly 26. The lower portions of the legs of the cable are then positioned within the concave area of the stake and the clamping assembly 26 is tightened to secure the cable in position before backfilling the ground over the cable around the bottom of the stake. The stripped off portions of the cable sheath 24 are cut to the desired length, braided, and secured in the cable clamp 40, thus completing the ground connection from the sheath to the terminal device.

As can be seen from FIG. 1 the large working area around the post 42 makes the individual leads or wires 22 in the stripped loop portion of the cable 20 readily accessible to facilitate the desired splices and connections to the terminals 54. Because of the relatively narrow width of the post 42 in comparison with that of the stake 12 easy access is available to any of the exposed individual wires 22 so that their connection can be made very rapidly. Since the narrow post 42 extends upwardly from the top end of the stake 12 the portions of the cable in the loop adjacent the post can be freely moved or twisted as desired to facilitate making connections to the individual wires 22.

After the desired connections have been made the lower section 58 of the cover 56 is slipped over the cable loop and post 42 into sliding engagement with the stake 12 and is dropped downwardly until its lower edge rests on the lugs 18a. The upper portion or top cover 60 is then slipped over the cable loop and post 42 into sliding engagement with the stake 12 and is also dropped downwardly until its lower edge rests on the upper end of the

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lower section 58. The cap screw 66 is then inserted and tightened to lock the upper and the lower sections 60 and 58 in place on the stake 12 thus forming a complete enclosure for protecting the terminals and the exposed cable conductors.

The stake 12 and the cover 56 form a strong, rigid enclosure which will withstand considerable side or bending force in any direction because of the inter-locking sliding engagement between these members and the relatively high moment of inertia of the structure. These members and additional post and channel brackets are simple in construction requiring no special equipment to make them since they can be formed of flat plate or sheet metal and bent to the desired configuration on a standard brake. Preferably, these members are constructed of galvanized steel or other corrosion resistant material which is readily available and is inexpensive.

When it is desired to remove the top cover or section 60 to make a connection or to inspect the wiring, the cap screw 66 is simply screwed outwardly until the head clears the lugs 60e, whereupon the cover portion 60 is lifted upwardly and removed. Thus, the terminal device can be rapidly disassembled by simply removing a single bolt.

While a particular embodiment of the invention has been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made and it is therefore contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. A terminal device for underground cables comprising a support stake having a lower portion for insertion into the ground and an upper portion extending upwardly above the ground, said stake having a channel-shaped cross section formed with a central web and a pair of opposed outwardly diverging side flanges, and a separate removable cover member forming an enclosure for a cable loop extending upwardly from the ground along said web between said side flanges, said cover member slidable in telescopic engagement along a substantial length of the upper portion of said stake and including a pair of opposed, inwardly diverging wall sections arranged to overlie respective side flanges of said stake when said cover is in telescoping relation thereon, said cover member including a pair of opposed, longitudinally extending ridge means extending inwardly from outermost portions of said wall sections, respectively, to face outer divergent edges of the side flanges of said stake for guiding and holding said cover member in sliding telescopic engagement with said stake.

2. Apparatus as defined in claim 1 including a separate removable post for supporting the upper end of said cable loop above said stake, said post disposed to extend upwardly from the upper end of said stake and having its lower end detachably secured to the web thereof.

3. A terminal device for underground cables having an outer grounding sheath comprising a stake adapted to have a lower portion thereof inserted into the ground and an upper portion thereof extending upwardly from the ground, said stake having a generally channel-shaped cross-section including a relatively wide web and a pair of integrally formed diverging legs, a relatively narrow, generally channel-shaped in cross-section support post having a lower portion disposed between said legs and secured to said web and an upper portion extending upwardly from said web, securing means on said web for

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removably securing said post to said web, cable securing means carried by said upper portion of said stake for securing parallel legs of said cable to said stake substantially within the confines of said channel-shaped cross-section thereof, sheath grounding means attached to said upper portion of said stake for grounding a stripped-off portion of said cable sheath to said stake, removable cover means having a cross-section with a portion thereof conforming to the outer surface of said stake and having inwardly directed ridge means formed at the edges of said conforming portion for guiding said cover means in telescopic sliding engagement along a substantial length of said upper portion of said stake, and means for securing said cover means on said stake.

4. A terminal device for securing an above ground loop of an underground cable comprising a stake adapted to have a lower portion thereof inserted into and supported by the ground and an upper portion thereof extending upwardly from the ground, said stake having a generally channel-shaped cross-section including a web and a pair of integrally formed legs, a support post of substantially smaller transverse dimensions than said stake removably secured to the upper end of said upper portion thereof and extending upwardly therefrom, support means at the upper end of said post for supporting the upper end of said cable loop and thereby providing two generally parallel legs of said cable extending downwardly adjacent said post and said stake, cable securing means carried by said upper portion of said stake for securing said parallel legs of said cable substantially within the cross-section of said stake, removable cover means having a cross-section thereof conforming to the outer surface of said stake and having inwardly extending ridges formed to abut the edges of said stake for guiding said cover means in sliding telescopic engagement along a substantial portion of said upper portion of said stake.

5. A terminal device as described in claim 4 wherein said cover means is substantially hexagonal in cross-section and wherein said stake is provided with a web and a pair of divergent legs, said web and legs normally facing the inner surfaces of said cover means when said cover means is telescopically engaged on said stake.

6. A terminal device as described in claim 4 wherein said cover means includes an upper member and a lower member, stop means for limiting the downward sliding engagement of said lower member on said stake and means for removably securing said upper member to said stake adjacent said lower member.

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