Aug. 25, 1964 H. E. STROCK 3,146,053

POTENTIAL TAP DEVICE

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FIG. 1

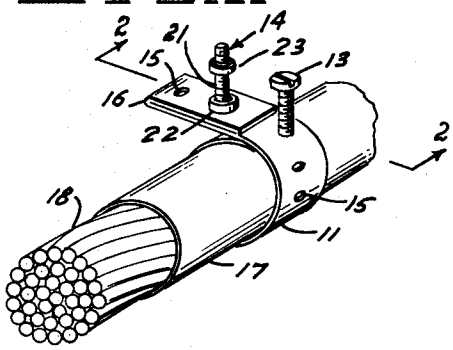


FIG. 2

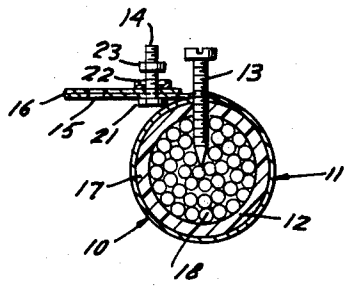


FIG. 8

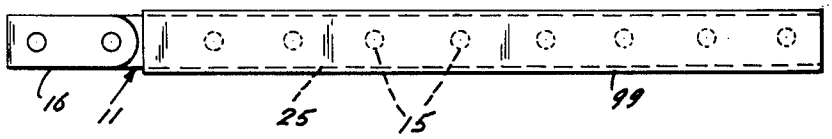
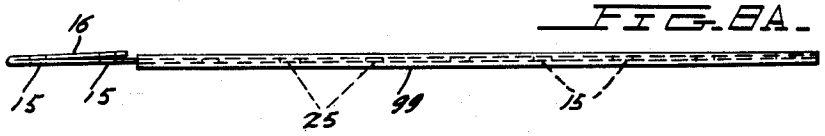


FIG. 8A



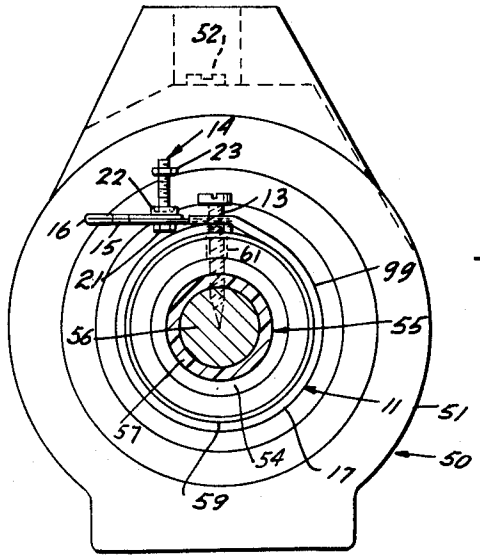


FIG. 9

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FIG. 3.

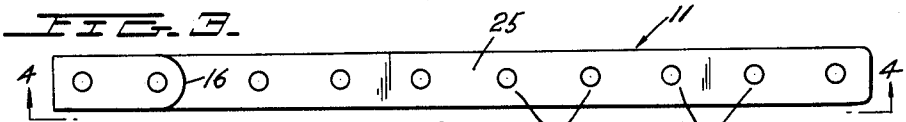


FIG. 4.

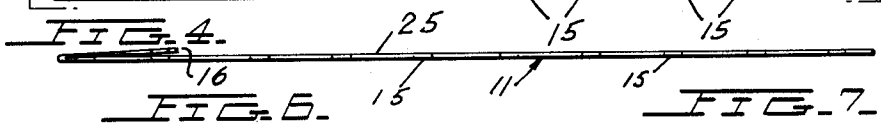


FIG. 6.

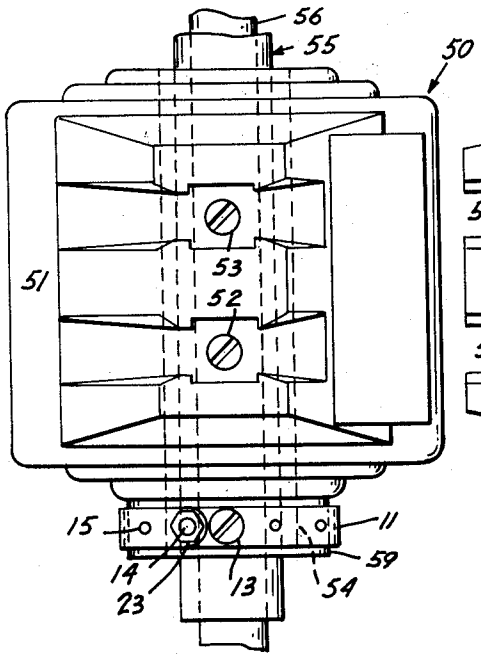
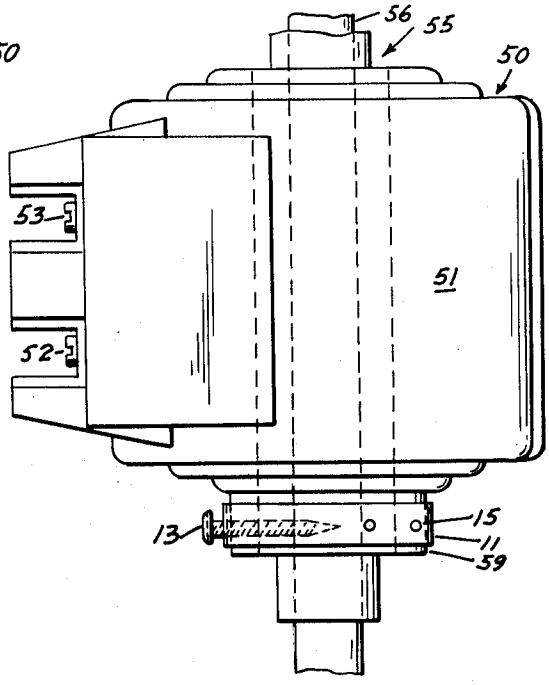


FIG. 7.



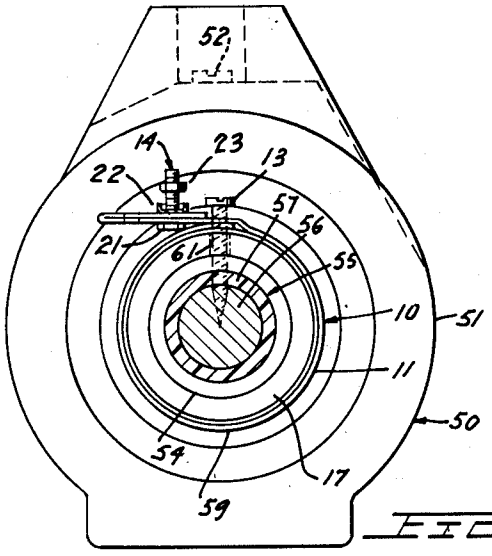


FIG. 5.

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POTENTIAL TAP DEVICE

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Filed Feb. 21, 1961, Ser. No. 90,808
2 Claims. (Cl. 339—97)

This invention relates to potential tap devices and more particularly to means for making an electrical connection to an insulation covered cable in a more efficient and less costly manner than has been possible with prior art devices.

After an electrical installation has been made it is often found necessary to make additional electrical connections at points in the installation not having means provided for this purpose. This invention provides a novel means for making these electrical connections.

Briefly, the device of the instant invention comprises an adjustable band in combination with a self-threading pointed screw. The band is positioned with the insulated cable passing therethrough and the screw threaded to the band which serves as an anchoring device which enables the screw to be threaded through the cable insulation and into the conductor. External electrical connections are made either directly to the tapping screw or to an electrical fitting mounted to the band.

The device of the instant invention as hereinbefore described is more economical than somewhat similar prior art devices and the instant invention does not require the provision of a separate female threaded device so that bolts and nuts are eliminated on the puncturing or contact making part. This is achieved by utilizing a screw which is self-threading at the anchoring band and into the cable insulation and conductor.

The device of the instant invention provides a more reliable electrical connection than somewhat similar devices of the prior art in that the device of this invention includes a self tapping feature by which the connecting screw taps into the conductor itself to provide a holding action. This is especially true in the case of a stranded conductor with the screw penetrating between the strands to be held there by a binding action.

Self-threading minimizes the possibility of loosening the screw thereby reducing the possibility of high resistance at the point of contact if the potential tap device should be subjected to mechanical vibration. The tapping of the anchoring band and the cable insulation provides additional positive holding means for the screw.

Accordingly, a primary object of this invention is to provide a novel construction for a potential tap device which is more economical and more reliable than prior art devices.

Another object is to provide a potential tap device which utilizes a self tapping screw which taps into an anchoring band as well as into the insulation and conductor of the cable.

Still another object is to provide a potential tap device which may readily be utilized in conjunction with an instrument transformer.

A further object is to provide a potential tap device including an anchoring band which, when used in conjunction with a plastic molded instrument transformer, will put the plastic housing of the transformer in compression and will spread the mechanical stresses of tapping around the periphery of the housing.

A still further object of this invention is to provide a potential tap device which does not require a separate female threaded member for tapping purposes.

Yet another object is to provide a potential tap device in which most of the anchoring band is covered with an insulating coating which is penetrated by the self tapping screw which penetrates the cable conductor.

FIGURE 1 is a perspective illustrating the potential tap device of this invention mounted to a stranded cable.

FIGURE 2 is a cross section taken through line 2—2 of FIGURE 1.

FIGURE 3 is a plan view of the member from which the band is formed.

FIGURE 4 is a side elevation of the band of FIGURE 3 looking in the direction of arrows 4—4 of FIGURE 3.

FIGURE 5 is an end view of an instrument transformer having the potential tap device of this invention mounted thereto.

FIGURE 6 is a plan view of the combination illustrated in FIGURE 5.

FIGURE 7 is a side elevation of the combination illustrated in FIGURE 5.

FIGURE 8 is a plan view of a band forming member having an insulating covering.

FIGURE 8A is a side elevation of the band of FIG. 8.

FIGURE 9 is an end view of the instrument transformer of FIGURES 5–7 with a power tapping device including the anchoring band of FIGURES 8 and 8A.

Now referring to the figures and more particularly to FIGURES 1–4, potential tap device **10** comprises band **11** which surrounds insulated cable **12**, tapping means comprising screw **13** mounted to band **11**, and take-off means comprising terminal connector **14** also mounted to band **11**.

Band **11** is constructed of an elongated strip **25** (FIGS. 3 and 4) preferably comprised of a non-magnetic metal such as stainless steel. Strip **25** is provided with a plurality of apertures **15** spaced along the longitudinal axis. The left end of strip **25** is provided with an overlying portion **16** to which connector **14** is mounted. Apertures **15** are provided so that the size of band **11** can be readily adjusted so as to be compatible with the size of the cable to which potential tap device **10** is mounted.

Tapping means **13** is comprised of a self-tapping pointed screw, preferably a sheet metal screw.

Potential tap device **10** is installed by placing strip **25** over cable **12** and drawing it into the form of band **11** with portions of strip **25** overlapping so that two of the apertures **15** are in alignment. Screw **13** is then entered into the aligned apertures and rotated. Screw **13** is closely fitted to apertures **15** so that the rotation of screw **13** will cause it to be tightly gripped by band **11**. This rotation also causes the tip of screw **13** to first penetrate the insulation covering **17** of cable **12** and thereafter enter between the strands **18** which comprise the cable conductor.

Thus, it is seen that band **11** acts as an anchoring means while screw **13** is rotated to pierce insulation **17** and the conductor comprised of strands **18**. The passage of screw **13** between strands **18** results in a binding action which produces good electrical contact. In addition, the fact that screw **13** is self tapping into band **11** and insulation **17** as well as into the cable comprised of strands **18** results in a mechanical securement which resists loosening which would otherwise result from vibrations.

The output of the potential tap device **10** may readily be taken directly from tapping screw **13**. However, terminal means **14**, in the form of screw **21**, cup washer **22** and nut **23** are provided. The threaded portion of screw **21** is entered into aligned apertures in the overlying portion **16** and the main portion **25** of the strip comprising band **11**. The resilient nature of the material comprising band **11** causes the overlying portion **16** to normally be positioned in somewhat spaced relationship from main portion **25** as best seen in FIG-

URE 4. Because of this, even if nut **23** were to be removed from screw **21**, screw **21** would be retained in a mounted position upon band **11**.

Now referring more particularly to FIGURES 5–7 which illustrate the potential tapping device utilized in conjunction with a current transformer **50**, current transformer **50** is of conventional design and includes molded insulating housing **51** wherein a multi-turn coil (not shown) is disposed. The coil terminals (not shown) are engageable by terminal screws **52**, **53** whose heads are disposed externally of housing **51** and are positioned at the top thereof. Housing **51** is formed with passage **54** extending longitudinally therethrough with current carrying cable **55** disposed within passage **54**.

Cable **55** comprises conductor **56** surrounded by insulating cover **57**. As is well known to the art, conductor **56** forms a single turn primary while the coil within instrument housing **51** comprises a multiturn secondary whereby the current flowing in conductor **56** induces current in the coil of instrument **50**.

Passage **54** is partially defined by axially extending circular lip **59** at one end of housing **51**. The band of the potential tap device surrounds lip **59** with screw **13** passing through closely fitted aligned apertures in band **11**, through clearance aperture **61** of lip **59**, through the space between cable **55** and the wall defining passage **54**, through cable insulation **57**, and into cable conductor **56**.

It is to be noted that during the installation of the potential tap device housing **51** is placed in compression rather than in tension. This is most advantageous in that molded rigid plastic materials are usually much better able to resist compression forces rather than tension forces. In addition, anchoring band **11** serves to spread the stresses over the entire periphery of lip **59**.

FIGURES 8 through 9 illustrate an embodiment of my invention in which a sleeve **99** of flexible electrical insulation covers most of the anchoring band **11**. That is, sleeve **99** covers band **11** except for portion **16** and the part of main portion **25** which portion **16** overlies. When the potential tap is being installed as in FIGURE 9, self-tapping screw **13** penetrates sleeve **99** with the tight fit between screw **13** and aligned aperture **15** insuring a low resistance electrical path through band **11** to terminal means **14**. This construction eliminates an extensive exposed energized area around the periphery of transformer lip **59**.

Thus, it is seen that this invention provides a novel construction for a potential tap device whereby no separate threaded female component is required in connection with the tapping screw so that all bolts and lock washers required of prior art devices are eliminated in connection with the power tapping screw. In addition, the utilization of a self-tapping screw results in a superior electrical connection to the current carrying cable and also results in superior mechanical securement of the tapping device.

Although I have here described preferred embodiments of my novel invention, many variations and modifications will now be apparent to those skilled in the art,

and I therefore prefer to be limited, not by the specific disclosure herein, but only by the appending claims.

I claim:

1. In combination, a current carrying cable including an insulated covered conductor and a potential tap device operatively mounted thereto; said device comprising a single anchor band surrounding said cable to define an enclosed volume for the reception of said cable; a self-threading screw means extending through and threadedly engaging tightly fitting aligned aperture means in overlapping portion of said band with the tip of the screw means entered into the conductor for electrical and mechanical connection thereto; said band being constructed of an elongated strip whose length exceeds the circumference of the band, with said band tightly engaging substantially the entire periphery of said cable, whereby the drive force of said screw means is transferred about the periphery of said cable; said overlapping portions closely abutting said conductor at the point of entry of said screw.

2. In combination, an insulation covered conductor, a measuring means instrument operatively associated with said conductor, and a potential tap device mounted to said instrument and including a part in operative engagement with said conductor; said instrument including an insulating housing having a passage through which said conductor extends; said passage being partially defined by a circular lip of said housing formed of a material more resistive to compressive forces than tension forces; said device comprising an anchor band surrounding said lip and a self-threading screw extending through and threadedly receiving tightly fitting aligned aperture means in overlapping portions of said band, through a hole in said lip, and through a tight fiting threaded aperture of said insulation with the tip of the screw entered into the conductor for electrical and mechanical connection thereto; said band tightly engaging substantially the entire periphery of said lip, whereby the drive force of said screw means is transferred as compressive forces about the periphery of said lip, said overlapping portions closely abutting said lip at the point of entry of said screw.

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