Aug. 9, 1932. C. DE WITT 1,870,770

STEEL POLE

Filed April 2, 1927

Fig. 1.

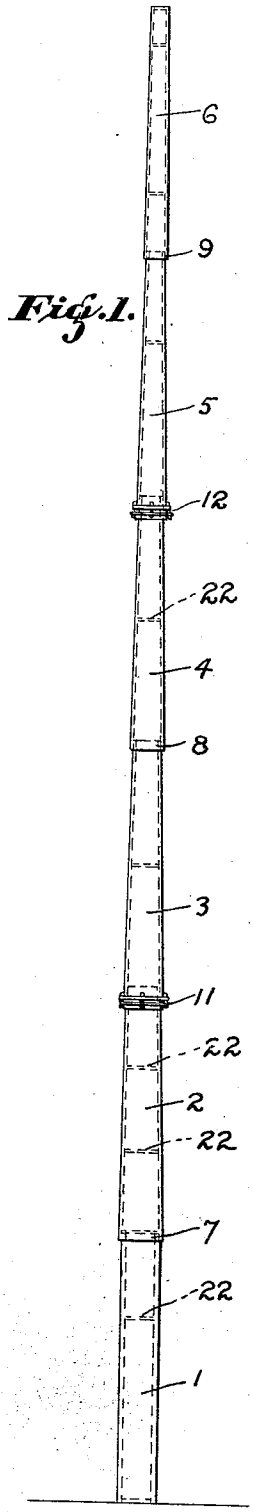


Fig. 2.

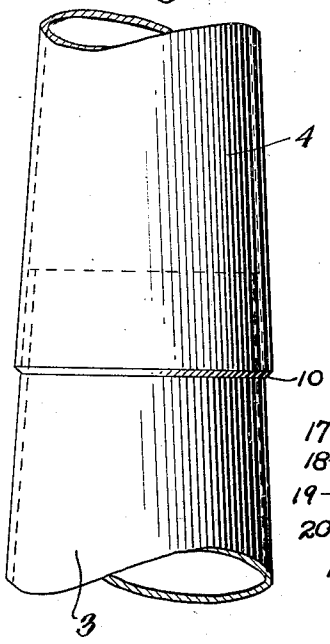


Fig. 3.

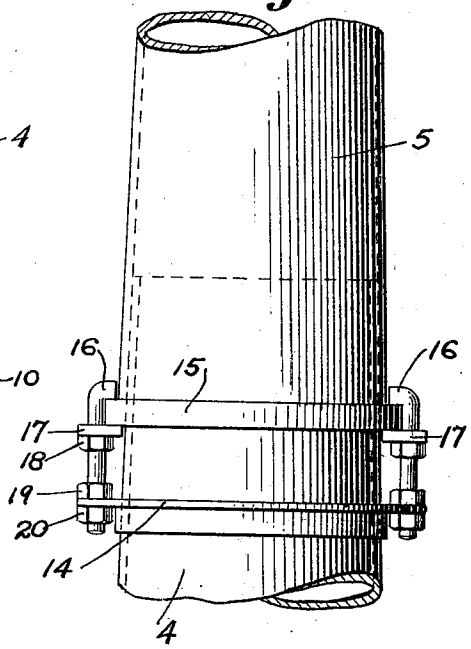


Fig. 5.

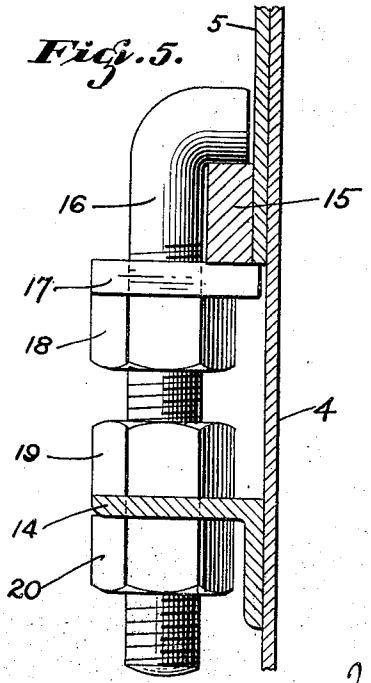
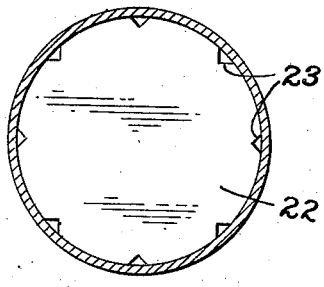


Fig. 4.



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UNITED STATES PATENT OFFICE

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STEEL POLE

Application filed April 2, 1927. Serial No. 180,416.

This invention relates to steel poles such as used for electric power transmission lines, trolley poles, telephone and telegraph poles, etc., and especially to a pole of this character which is constructed of separable sectional tapering tubular sections.

The object of the present invention is to generally improve and simplify the construction and operation of poles of the character described; to provide a pole consisting of a plurality of tapering tubular telescoping sections, said sections increasing in diameter from top to bottom and the thickness of the metal employed also increasing from top to bottom; to provide a pole in which the tapering sections may be permanently welded or joined in pairs or units; to provide means whereby a detachable adjustable connection may be formed between each pair of permanently connected tubular sections; and further to provide one or more internal reinforcing members for each tubular section. One form which the invention may assume is shown by way of illustration in the accompanying drawing, in which:

Fig. 1 is a side elevation of the tubular sectional pole showing it assembled,

Fig. 2 is an enlarged view of one of the permanent tubular connections,

Fig. 3 is an enlarged view of one of the detachable tubular connections,

Fig. 4 is a plan view of one of the internal bracing discs,

Fig. 5 is an enlarged section of the detachable connection shown in Fig. 3.

Referring to the drawing in detail and particularly Fig. 1, it will be noted that the tubular tapering sectional steel pole is illustrated. In the present instance, the pole is shown as consisting of six sections such as indicated at 1, 2, 3, 4, 5 and 6. The lowermost section is heaviest in construction, i. e., constructed of the heaviest sheet metal and is uniform in diameter throughout its length. The remaining sections are also tubular but they taper from end to end so as to provide a series of telescoping connections. Each tapering section is constructed of steel or like material and the metal employed in each section decreases in thickness from the bottom to the top, i. e., the metal employed in the base section is the heaviest, the metal employed in the section indicated at 2 is slightly lighter, etc. The particular method of constructing each individual tubular section is of no material importance. Suffice it to say that each section may be made up of two half sections which may be stamped or rolled and which are welded or otherwise joined. In actual practice, it is preferred to permanently join the tubular sections in pairs or units, the sections 1 and 2 being permanently joined as at 7, the sections 3 and 4 being permanently joined as at 8 and the sections 5 and 6 being permanently joined as at 9. These tubular sections are joined in pairs or units as indicated in Fig. 2 by telescoping them with relation to each other and then by welding as indicated at 10. This permanent joining of the tubular sections in pairs is preferably done in the shop or factory where they are manufactured and they are shipped in this condition to the point of assembly. A detachable joint or other suitable detachable connecting means is accordingly required between each pair or unit, these detachable joints being indicated at 11 and 12. The detachable joints are best illustrated in Figs. 3 and 5, for instance, the upper end of the section 2 is provided with an annular flange 14 which is angle-shaped in cross-section and permanently secured to the tubular section 2 by welding or the like. Similarly secured to the lower end of the section 3 is a comparatively heavy metal ring 15. The angle flange 14 is drilled to receive the lower ends of a suitable number of hook-shaped bolts generally indicated at 16. These bolts are threaded substantially from end to end and each bolt carries a washer 17 and three nuts

such as indicated at 18, 19 and 20. In actual practice when the permanently joined tubular sections are received in the field, they are joined by telescoping the section 3 over the upper end of the section 2 and similarly by telescoping the lower end of the section 5 over the upper end of the section 4. The sections are driven or otherwise forced together and the bolts 16 are applied by removing the lower nuts 20 and passing the lower ends of the bolts through the drilled holes or perforations in the flange 14. The upper ends of the bolts are then hooked over the ring or flange 15 and the lower nuts 20 are applied and tightened. When the tubes are properly aligned and properly telescoped with relation to each other, nut 18 is tightened against the washer 17 and the ring or flange 15 while the nut 19 is screwed downwardly on the bolt into engagement with the flange 14. This is important as any bending stresses transmitted to the joints is taken up by the bolts and it may also be stated that any tendency of the tubular sections to further telescope with relation to each other is also taken care of due to the support afforded by the nuts 19 engaging the upper face of the flange 14. The tubular sections may be internally reinforced by metal discs such as shown at 22 (see Figs. 1 and 4.) These discs are preferably notched as indicated at 23 to permit drainage as will later be described. As previously stated the pole is made in sections to permit the use of standard plate lengths and to reduce weight by using varying plate thicknesses. The sections are joined in pairs in the shop as shown in Fig. 2 and the detachable joints are not connected until the poles arrive at the point of erection. The joints made in the shop, are as previously stated, closed by a circular weld while the detachable joints are held together by the hook bolts and any stresses encountered are thus taken care of by placing the bolts either under tension or compression as the case may be. A joint of this character will accordingly not rely on the friction of the telescoping action only as the greater part of the load or stresses imposed is transmitted to the bolts. The bolt connection is also of further importance as it permits a variation in the amount of lap when the sections are joined by employing longer bolts, etc. It must be assumed that bolts of this character will be provided with a protective covering such as galvanizing, asphaltic paint, etc. Field welding destroys protective coverings of this character and is not desirable for that reason. Furthermore, welding requires compressed air and additional equipment and is a comparatively expensive operation. The type of detachable field joint here described is for these reasons considered a vital factor in the successful use of the pole. In actual practice, the permanently joined pole sections may be galvanized or covered with asphaltic material by dipping or the like and as the protective covering is applied both to the exterior and interior surfaces, it is obvious that the notches 23 must be formed in the reinforcing discs to permit perfect drainage or escape of excess covering material. A disc may also be placed in the bottom of the lowermost section 1, this being also more or less of importance as it will provide a proportionately greater bearing area. Any suitable type of cross arm structure may be employed, no particular cross arm or method of attaching the cross arms being illustrated as this may be varied to suit different conditions. The base section is indicated at 1 which enters the ground as previously stated, is constructed of heavier metal as it carries the stresses in load and also due to the fact that it must resist corrosion to a greater degree. This section is cylindrical in shape to save metal and to reduce the size of hole required for receiving the pole. On the other hand, if a concrete protective shell is desired for the base section to further reduce corrosion, the tapered sectional construction will be continued throughout to permit of easy extraction of the interior concrete form.

While certain features of the present invention are more or less specifically described and indicated, I wish it understood that various changes may be resorted to within the scope of the appended claims; similarly, that the materials and finish of the several parts employed may be such as the manufacturer may dictate or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a pole of the character described, a pair of telescoping sections, each section being provided with annular exterior flanges which are superposed with relation to each other, a plurality of bolts extending through the lowermost flange, a hook-shaped end on each bolt engaging the uppermost flange and nuts carried by the bolts and engageable with the underside of the uppermost flange and with upper side of the lowermost flange.

2. A pole for vertical erection and to resist a horizontal load at its uppermost end, said pole comprising a lowermost unit formed of a plurality of hollow sections the lowermost thereof being cylindrical and the remainder frusto-conical, said sections having telescoping ends and being permanently secured together by welding, upper units each comprising a plurality of hollow frusto-conical sections arranged with their ends telescoping and permanently secured together by welding, all of said units being assembled by telescoping the contiguous ends thereof, detachable connecting means at the contiguous ends of said units for clamping said units together

in axial alignment, said sections other than the lowermost cylindrical section tapering uniformly from the lowermost to the uppermost when said units are assembled, the wall thickness of each section being uniform throughout its length, commencing with the lowermost section the wall thickness of each succeeding section being less than the preceding one whereby the wall thickness of the pole will uniformly decrease from bottom to top.

CLINTON DE WITT.