Oct. 31, 1933. F. W. COFFING 1,932,768

METHOD OF AND APPARATUS FOR LINE POLE REPLACEMENT

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FIG. 1

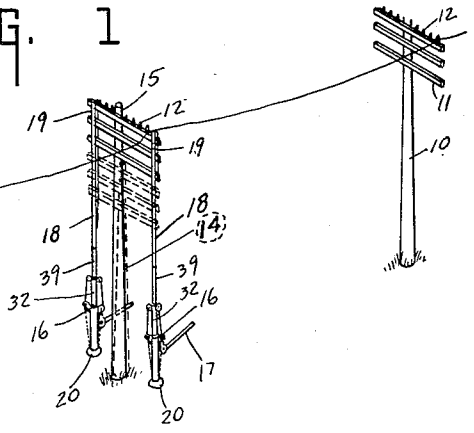


FIG. 2

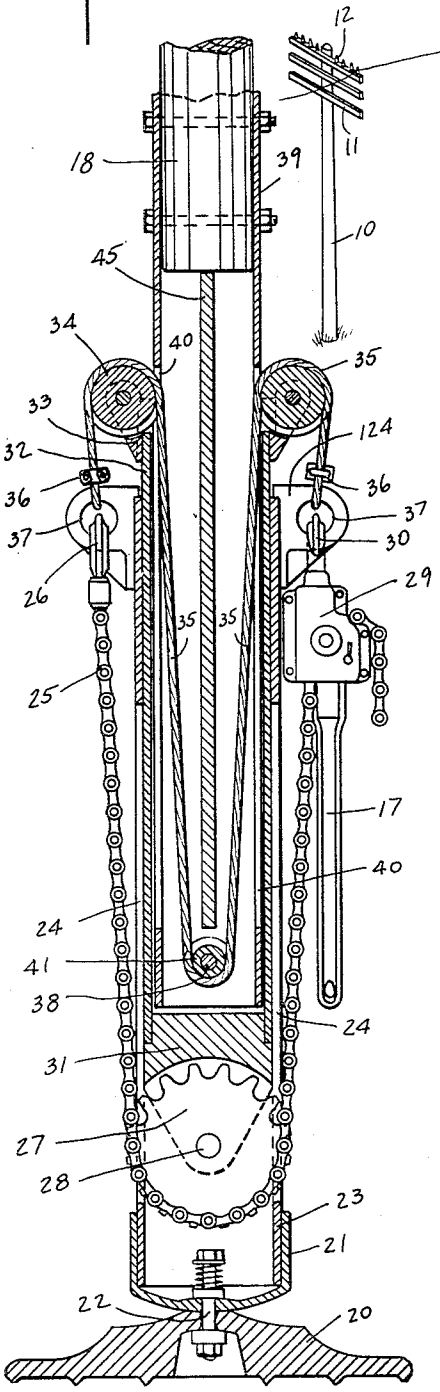
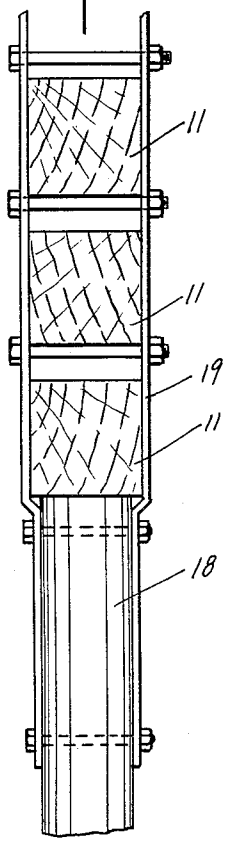


FIG. 3



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FIG. 4

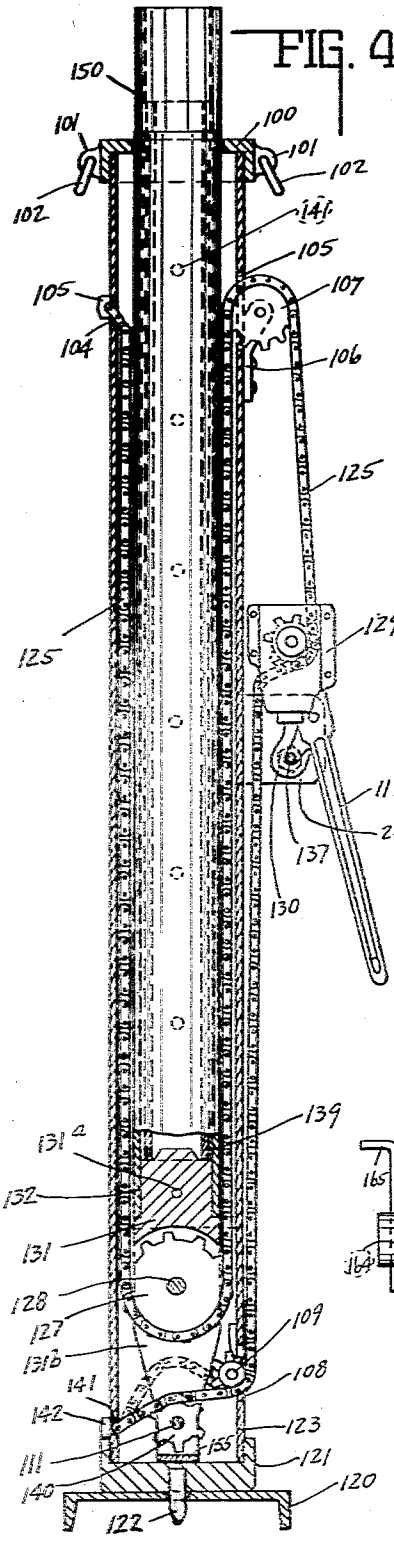


FIG. 5

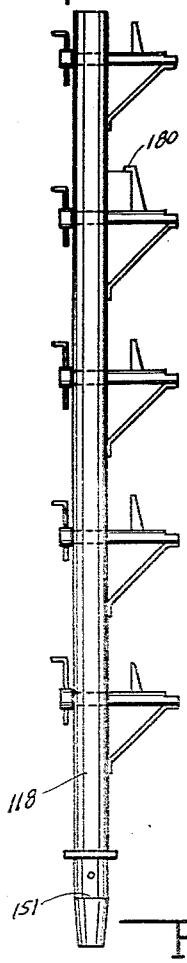


FIG. 8

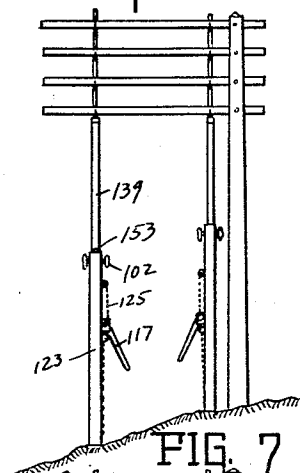


FIG. 7

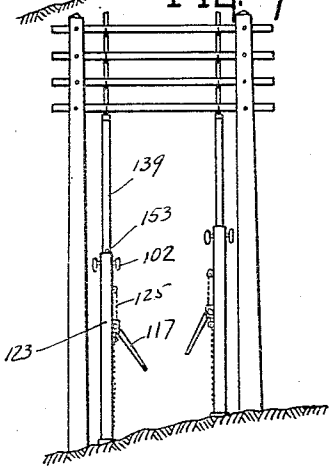
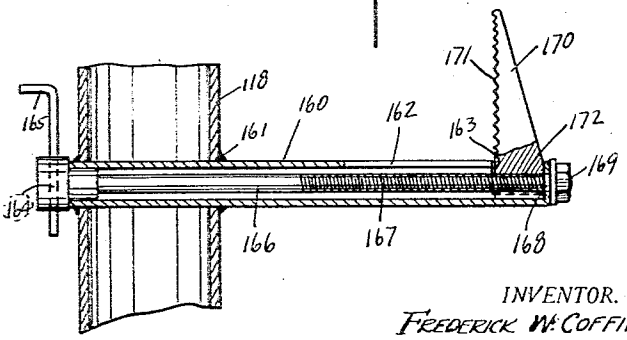


FIG. 6



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Patented Oct. 31, 1933 1,932,768

UNITED STATES PATENT OFFICE

1,932,768

METHOD OF AND APPARATUS FOR LINE POLE REPLACEMENT

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Application September 29, 1930
Serial No. 485,098

4 Claims. (Cl. 254—148)

This invention relates to a process of resetting or replacing line poles and the like and apparatus suitable therefor.

The chief object of the invention is to support the cross arms of a transmission line for power, telephone, telegraph and like purposes during an interval in which the old pole may be removed and a new pole substituted therefor without removing the wires supported by the cross arm or cross arms during the transfer.

The chief feature of the invention, in addition to the accomplishment of the foregoing object, consists in the apparatus employed or associated with the cross arms whereby the same may be supported during the resetting or replacing operation.

The full nature of the invention will be more clearly understood from the accompanying drawings and the following description and claims.

Fig. 1 is a perspective view of a portion of a telephone or telegraph transmission line with the invention included, the dotted lines representing the old position of the cross arms and the old supporting pole and the full lines indicating the new and final position of the cross arms, the apparatus for supporting the same therein, and the new pole. Fig. 2 is an enlarged central sectional view through the bottom portion of the extensible support. Fig. 3 is a transverse sectional view through the top portion of the support showing the cross arms associated therewith. Fig. 4 is an enlarged central sectional view of a modified form of extensible support. Fig. 5 is an enlarged side elevational view of a modified cross arm support carried by the extensible support. Fig. 6 is an enlarged sectional view of a portion of the cross arm support and a cross arm clamp. Fig. 7 is a diagrammatic view of an H fixture construction with two of the exensible supports associated therewith preliminary to pole removal for replacement purposes. Fig. 8 is a similar view of the same parts with one of the poles removed preliminary to pole replacement.

In the drawings 10 indicates supporting poles. Upon these poles are mounted in the usual spaced relation cross arms 11 carrying insulators 12 which support the lines or wires 13. The dotted line 14 indicates an old or small pole which is to be replaced. 15 indicates in full lines the new and replacing pole.

The steps of the process of removing and replacing poles without removing the wires from the cross arms consists in providing a pair of extensible support constructions indicated generally by the numeral 16 in Fig. 1, each having a lever handle 17 for extending the same and each supporting a vertical support 18 which telescopes the bottom portion of 19 that receives the ends of the cross arms 11 supported by the pole to be removed. After two of the members 19 are associated with cross arms before mentioned, said cross arms are used to pull the pole out of the ground; then the cross arms are disengaged from the supporting pole by removing the anchoring bolts, lag screws and the like as well as brace rods if employed. The pole may then be let down by the usual block and rope or winch from sling or lower cross arm and a new pole raised in the same manner and set in the opening previously occupied by the old pole.

After the cross arms are elevated to the desired height, they are secured to the new pole whereupon the extensible supports may be removed and the line replacement is completed, all without removing wires or lines from the cross arm or disturbing the arrangement of the cross arms or in any way disturbing the transmission purposes of the wires.

It will, of course, be understood that the process of replacement consists in associating the cross arms with the auxiliary spaced supports, disconnecting the old pole from the cross arms, and, after the new pole has replaced the old pole which has been removed and the cross arms have been elevated into the new position, securing the cross arms to the new pole. The sequence of the intermediate steps is relatively immaterial for the process chiefly consists in supporting the cross arms in their usual relationship during pole replacement.

The lower portion of the extensible apparatus is shown clearly in Fig. 2 and the broad arrangement thereof is substantially illustrated and claimed in the copending application entitled Chain jack filed Oct. 5, 1929, Serial No. 397,645, and the power mechanism disclosed therein and herein is also disclosed and claimed in the copending application entitled Automatic reverse ratcheting hoist filed Sept. 3, 1929, Serial No. 389,956, which is a continuation of an application entitled Reverse ratcheting hoist filed May 23, 1923, Serial No. 231,158, and copending with the previously mentioned application and abandoned in favor thereof.

In the drawings 20 indicates a foot that rockably supports through a universal joint connection a cap or socket 21, the universal joint construction being indicated by the numeral 22. The socket 21 is adapted to support a tubular body

23 having a pair of spaced slots 24 extending longitudinally thereof and herein diametrically of each other. The upper end of the support 23 carries an anchorage 124 to which one end of a chain 25 is secured as at 26. The chain passes over a sprocket 27 rotatably mounted at 28 within the tubular support 23 and the sprocket teeth project through the slots 24. The chain 25 passes through a hoist construction 29 supported as at 30 by the hook, the hoist construction being of the after-mentioned character and including the handle 17 for operating the same.

A slidable member 31 pivotally supports at 28 the sprocket wheel 27 and member 31 supports a tube 32 that is slidably mounted within the tubular support 23 and is elevated relative thereto when the chain is taken up by the hoist. For every two inches of chain travel, there results an inch of travel for the member 32 and, of course, approximately double the power application is obtained.

The tube 32 at its upper end supports a collar 33 upon which is pivotally supported the sheaves 34. A cable 35 passes over each pulley or sheave and one end is clampingly secured as at 36 in loop formation relative to the eye 37 of the anchorage 124 of the initial tubular support 23. The other end of the cable may be associated, as at 38, with a member 39 which herein is shown tubular and which is provided with diametrical slots 40 through which the cables pass. Whenever a single cable is employed instead of two cables, the portions that normally would be secured to member 39 and 38 are mounted on a pulley 41 rotatably supported on shaft 38, as shown in Fig. 2.

Torsional twisting of the tube 23 relative to the slidable tube 32 is prevented by the interlocking construction of the cables 35 and slots 40. The tube 39 is provided with a transverse member 45 that extends longitudinally thereof and serves as an interior support for the cross arm supporting standard indicated at 18 in Fig. 1 that is receivable by the tubular member 39.

Figure 2 shows the parts substantially in their collapsed position. Figure 1 shows the parts in substantially their extended position. For every two inches of chain travel secured by manipulating the hoist handle 17, there will result an inch of elevation of tube 32 and two inches of travel of cable 35 and one inch of tube travel 39 and substantially full power will be transmitted therethrough.

It will be readily apparent from the foregoing description that a substantially standard hoist construction 29 may be embodied in the present invention, which hoist construction has all the advantages and utility found in the before-mentioned applications. Likewise the chain jack construction embodied herein which includes the aforesaid hoist is a standard construction that is suitable for bracing poles in the setting and removing of poles and the only additional elements required from this as a departure from these standard parts is the additional slotted tube 39, the pulleys and cables 35 and their anchorage to the base construction and the telescopic addition of the cross arm support which is receivable by the tubular portion 39.

The operation of the several parts in the raising and lowering movement of the portion 18 is substantially that set forth in the before-mentioned applications.

In Fig. 4 there is illustrated a modified form of extensible support. In this form 120 indicates the foot, 121 the cap or socket that receives the tubular member 123, and 122 indicates the universal joint connection between the cap and foot. The tube 123 at top carries supports 101 that support handles 102 whereby the entire extensible apparatus may be readily transported from place to place. The bottom member 121 may, if desired, be similarly provided.

The tube 123 near its upper end is slotted as at 104 and an anchorage 105 secures one end of the chain 125 which passes downwardly within the tube 123 and between it and the sliding tube 132. Sliding tube 132 terminates at its lower end in a closure member 131 anchored as at 131*a* thereto. Closure member 131 has a pair of spaced legs 131*b* which pivotally supports at 128 a sprocket wheel 127 associated with chain 125.

Tube 123 opposite the slotting 104 is slotted at 105 and adjacent thereto in bracket 106 is mounted an idler sprocket 107. The bracket 224 carried by tubular member 123 includes a support 137 by which hook 130 is connected to the construction. Hook 130 is a part of the chain-hoist 129 having the lever handle 117. The chain 125 after passing over socket 107 enters the hoist as shown and then leaves the hoist.

The lower end of the chain extends downwardly and enters a slot 108 in the tubular member 123. Adjacent thereto and within the tubular member is a sprocket 109 which serves as a guide member. The legs 131*b* are extended below the pivotal support 128 and pivotally support as at 111 a sprocket 140 which engages and supports the chain 125. The free end of the chain 125 is passed through an opening 141 in the tubular member 123 and opposite opening 108 and is anchored as at 142.

As the hoist lever handle 117 is actuated to elevate member 132, the chain is passed through the hoist. In this elevational movement the member 131*a* moves upwardly in the tube 123 and the sprocket 140 engages the chain 125 so that it will double upon itself as shown dotted in Fig. 4. Binding of the chain at 108 is prevented by the sprocket 109. Thus magazine type action for chain retention and storage is secured.

Slidably supported within the tube 132 is a tube 139. Tube 139 is free relative to tube 132 and normally bears upon the member 131 as illustrated. As tube 132 is projected out through the opening in the cap 100, the tube 139 is carried therewith. The upper end of tube 139 terminates in a socket or laterally enlarged portion 150, integral therewith or rigidly secured thereto, which socket receives the end 151, see Fig. 5, of the member 118 that provides the support for the cross arms and cross arm clamps.

To obtain considerable variation in extensibility without actually operating the chain fully therefor, the tube 139 includes a plurality of openings 241 which, when the tube is manually extended relative to the supporting tube 132, may be supported in said extended position by the employment of a pin or transverse member 153, see Fig. 7.

The resultant construction is such that the mechanism constitutes a magazine type chain extensible support operable through a lever arm or power mechanism of the character before mentioned. To prevent injury to the lowermost sprocket 140, the legs 131*b* are united as at 155 and said lateral portion 155 constitutes a stop to protect the sprocket 140 from injury in the telescoping movement of tube 132 within tube 123.

In Figs. 5 and 6, there is illustrated a modified form of cross arm anchorage. The member 118 is herein shown tubular and supports a plurality

of transverse tubes 160. Each transverse tube is welded or otherwise anchored as at 161 and includes a longitudinal slot 162 in its upper portion, said slot merging with a lateral notch 163.

Rotatably supported in the end of the tube 160 adjacent its mounting or connection to tube 118, is an extended collar 164 which supports a handle 165. Collar 164 is suitably secured to the shaft 166 which is threaded as at 167. Shaft 166 is rotatably mounted at its opposite end in the bearing 168 and the shaft is prevented from axial movement through the nut 169. A clamping jaw 170 having the serrated face 171 and the threaded socket portion 172 is mounted on the threaded portion 167 on the shaft.

In normal position, all of the clamps 170 are tilted into a position substantially transverse to that shown in Fig. 6. In other words, the jaw seats in the notch or cut-out 163. This permits the tubes 161 or cross arm supports to be readily positioned beneath the cross arms and by a lateral positioning movement. When the cross arm is seated adjacent the vertical portion 118, the clamp 170 is elevated into a vertical position and the handle 165 rotated until said clamp is caused to pass between the side walls of slot 162 and move inwardly toward the vertical portion 118 and engage and clamp each of the adjacent cross arms to the vertical member 118. To prevent displacement, one or more of the clamping members 170, see Fig. 5, may be provided with an offset portion 180 for overlying the cross arms.

In Figs. 7 and 8, there is illustrated the replacement of one of the poles of an H fixture construction. In these figures both poles forming the frame construction, may be simultaneously removed and replaced or singly and successively removed and replaced. In either event the two extensible supports are initially associated with the cross arms for supporting and pulling the same and are clamped thereto and then the old pole or poles removed, the new pole or poles replaced, the cross arms secured to the new poles, after which the cross arms are released from the supporting extensions and then the extension supports are removed therefrom.

The invention claimed is:

1. Longitudinally extensible mechanism including three telescopic tubular members, one arranged at one end for footing purposes and another at the opposite end arranged for work support, a chain hoist supported by the footing member intermediate the ends thereof, a chain secured at the opposite ends of and to the footing member and having its intermediate portion associated with the hoist, and means associating the chain and intermediate member whereby said chain advances the third member at a rate less than the chain advance.

2. Longitudinally extensible mechanism including three nested tubes, the outer tube being longitudinally slotted at opposite sides, a sprocket carried by the intermediate tube, a chain anchored at one end to the outer tube and passing through the slots and engaging said sprocket, a hoist carried by the outer tube for chain engagement, the innermost tube including a similar slot arrangement, cable means extending from the base of the innermost tube through said last-mentioned slots and secured to the outer tube, and cable supporting pulley means carried by the outer end of the intermediate tube and over which said cable means extends, whereby travel of the innermost tube is at least equal to the chain travel.

3. Longitudinal extensible mechanism including three nested tubes, a sprocket carried by the lower end of the intermediate tube, a chain secured near the upper end of the outer tube and to the same and passing over said sprocket and upwardly therefrom for hoist engagement, a hoist carried by said outer tube, and means associated with the inner and intermediate tubes for securing relative movement therebetween.

4. Longitudinal extensible mechanism including a pair of nested tubes, a sprocket carried by the lower end of the inner tube, a chain secured to the outer tube near the upper end thereof and passing over said sprocket and upwardly therefrom, a hoist supported by said outer tube and engaging said chain for moving the same, the rate of movement of the inner member being one-half that of the chain movement, and means carried by the lower end of the inner member and arranged for chain engagement in addition to the sprocket engagement before mentioned, whereby the surplus chain in the extending movement of the inner member is returned to the outer member and magazine action is secured.

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