

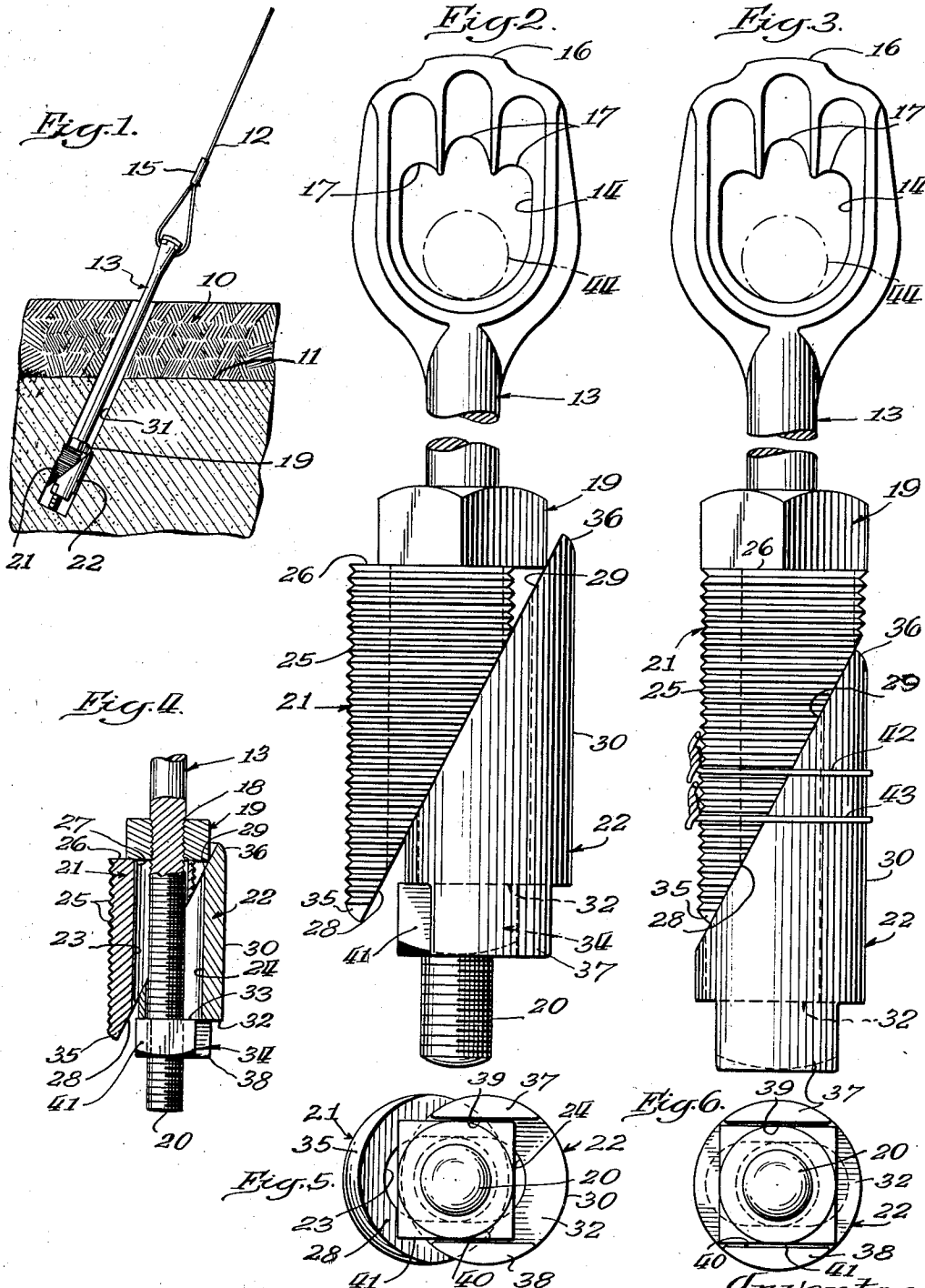
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ROCK ANCHOR

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ROCK ANCHOR

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3 Claims. (Cl. 189—92)

The present invention relates to rock anchors, and is concerned with rock anchors of the type adapted to be used for anchoring guy rods in terrain which comprises at least a strata of solid rock.

One of the objects of the present invention is the provision of an improved rock anchor adapted to be used with guy rods for guying telephone and telegraph poles and the like, which is simple and comprises a minimum number of parts, and which may be caused to be anchored or expanded by rotation of the guy rod.

Another object of the invention is the provision of an improved anchor of the class described, which is caused to become tighter in the hole in the rock by the load which is placed upon the guy rod.

Another object of the invention is the provision of an improved rock anchor which is adapted to be installed in the rock as a unit, and which may be expanded or released as desired, by the application of a rotative force applied to the guy rod by means of the eye and a rod or bar.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawing, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawing:

Fig. 1 is a reduced elevational view, with the terrain in cross-section, showing an installation of a guy rod and rock anchor according to the present invention;

Fig. 2 is a fragmentary full size elevational view of my rock anchor in expanded position;

Fig. 3 is a view similar to Fig. 1 of the guy rod in collapsed position preliminary to its installation, and provided with means for holding its parts in predetermined position;

Fig. 4 is a vertical sectional view taken through the guy rod and anchor, with the parts in the position of Fig. 2;

Fig. 5 is a bottom end view of the expanded anchor of Fig. 2;

Fig. 6 is a bottom end view of the collapsed anchor of Fig. 3.

Referring to Fig. 1, 10 indicates the earth, which may be solid rock, or provided with a strata of solid rock, indicated at 11. The anchor installation includes the guy cable 12, which is secured to the guy rod 13 by being passed through its eye 14 and secured by a cable clip 15. The guy rod preferably comprises an elongated rod which is provided with an improved eye 14 having

an impact surface 16 at the top and one or more cable receiving grooves 17.

The rod is threaded at its lower end from the point 18, where the upper nut 19 has been driven home, to the extreme lower end 20. Thus the rod may be provided with a thrust bearing in the form of the nut 19, which is merely threaded on the threaded end of the rod until it abuts the unthreaded portion at 18.

The expanding members 21 and 22 are similar in shape in that each member consists of a substantially cylindrical portion which is provided with an oval opening 23, 24 passing through each expanding member axially from one end to the other. The bore is made oval in cross section, as shown in Fig. 5 so as to provide space for lateral movement of the expanding members 21, 22 on the guy rod. The oval openings or bores 23, 24 have their narrow diameter large enough to receive the threaded end of the guy rod. The larger dimension of the oval openings 23, 24 is such as to permit the desired amount of lateral movement. The expanding member 21 is adapted to bite into the rock by virtue of the teeth 25 which extend peripherally and may be formed in the expanding member 21 during the casting operation. The end surface 26 of the expanding member 21 is preferably flat so that it will engage the inner side 27 of the nut 19.

The opposite end of the expanding member 21 and the adjacent end of the expanding member 22 are cut off or shaped with beveled surfaces 28, 29 of the same angularity in extending in a plane which is preferably at a slight angle, such as that shown, to the axis of the guy rod. This gives the two expanding members 21, 22 engaging beveled surfaces by means of which they may be forced upward when axial force is applied to them. The expanding member 22 may have a smooth cylindrical outer surface 30 which is adapted to slide when it engages the surface of the rock in the bore 31.

Its lower end 32 in Fig. 4 is preferably provided with a flat surface so that it will engage the flat upper surface 33 of the nut 34, which is threaded on the end of the guy rod 13. The leading ends of these expanding members 21, 22 are preferably provided with a curved or beveled surface 35 and 36, so as to ride over obstructions when the guy rod is being put into the bore or when it is being expanded and the expanding member 22 is moving upward.

At each side of the flat surface 32 on the lower end of expanding member 22 there is a downwardly extending lug 37, 38, and the lugs 37, 38

have parallel plane inner walls 39, 40 for engaging the sides 41 of the nut 34. Thus the nut 34 is prevented from rotation when the anchoring members 21 and 22 are held against rotation.

5 The guy rod 13 and nuts 19 and 34 are preferably galvanized to prevent corrosion and to permit the loosening of the anchor when desired, while the anchor shoes 21 and 22 are preferably made of malleable cast steel.

10 Referring to Fig. 3, the expanding members 21 and 22 are preferably assembled with the guy rod initially as shown in that figure, the two anchoring members being held together by a pair of relatively light tie wires 42, 43. The rod may then be twisted slightly, relative to the anchor members 21, 22, until the tie wires 42, 43 are tight, and the device is then ready for assembly as a unit.

20 When the parts are in this position, the assembled rock anchor is substantially cylindrical at the anchoring members 21 and 22.

The installation of my rock anchor is as follows: A bore 31 is made in the rock, and the bore is preferably slightly larger than the collapsed anchor, as shown in Fig. 3, so that the anchor may be readily inserted. The guy rod 13 is of sufficient size to reach the top of the ground, and projects far enough to be attached to the cable. The bore 31 is made at an angle which extends in the direction in which the guy cable 12 is to extend. The anchor may then be placed in the bore and the space between the anchor and the bore may be filled with a small amount of material, such as dirt or rock, on top of the anchor, and around the guy rod until the halves 21, 22 of the anchor are prevented from rotating.

40 A rod 44 may then be placed through the eye 14 and used for rotating the guy rod, whereupon the nut 34 will be caused to progress upward on the threaded end of the guy rod, causing the halves 21, 22 of the anchor to slide on the beveled surfaces 28, 29. These halves are thus caused to expand laterally toward the position of Fig. 2, until they engage the sides of the bore 31.

45 The tie wires 42 and 43 are soon torn apart by the expansion of the expanding members 21, 22, and may be disregarded thereafter, as they have performed their function of holding the halves of the anchor in position for shipment and installation. Subsequent expansion may cause some slight crushing of the rock at each side, tending to make the bore 31 slightly oval where the halves of the anchor engage, and thus further preventing rotation of these parts of the anchor.

60 Continued rotation of the guy rod by means of the guy rod 34 will bring the halves of the anchor into the position of Fig. 2, and during this motion the half anchor member 21 stays still in the bore, while the half anchor member 22 rides upward on the nut 34.

65 It will thus be observed that I have invented an improved anchor by means of which a guy rod may be fixedly secured to a solid, rocky terrain or to a terrain having a strata of rock.

70 The guy rod is thus adapted to utilize the entire weight of the rock to which the anchor is attached, and the possibilities for bearing a load on the guy rod are limited only by the character of the rock, its size and weight and strength of the parts used.

75 The anchor is not intended to be used in relatively soft, crumbly rock, but only in a relatively firm rock. It tends to become more tightly

wedged in the bore in the rock by the pull which is exerted on the guy rod, since the upper half 21 of the expanding anchor remains still, and the lower half 22 is pulled upward by the nut 34. The application of a greater force thus only tends to anchor the device more firmly in the rock.

10 The present anchor may be constructed at a very low cost, due to the few small parts which it requires, and due to the fact that practically no machining operations are necessary on the anchor parts.

15 While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

20 Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an anchor for electric line poles and the like, the combination of a guy rod having a cable receiving eye at its upper end, said guy rod being threaded at its lower end, a nut carried by said threaded end and driven tightly against the unthreaded part of said guy rod, a relatively fixed expanding member of substantially cylindrical shape having a flat end engaging said nut and having an axially extending bore of oval cross section for receiving the threaded portion of said guy rod, a movable expanding member of cylindrical shape, having a similar through bore for said guy rod and having at its lower end a flat surface for engaging the inner end of a nut and axially projecting shoulders with flat inner sides for engaging the sides of said nut, said expanding members having acutely bevelled inner engaging end surfaces, and a nut carried by the end of said guy rod and located between said shoulders, whereby rotation of the guy rod causes the latter nut to travel upward on said guy rod to effect a sliding movement between said bevelled surfaces and a lateral expansion of each expanding member relative to the other.

45 2. In an anchor for electric line poles and the like, the combination of a guy rod having a cable receiving eye at its upper end, said guy rod being threaded at its lower end, a nut carried by said threaded end and driven tightly against the unthreaded part of said guy rod, a relatively fixed expanding member of substantially cylindrical shape having a flat end engaging said nut and having an axially extending bore of oval cross section for receiving the threaded portion of said guy rod, a movable expanding member of cylindrical shape, having a similar through bore for said guy rod and having at its lower end a flat surface for engaging the inner end of a nut and axially projecting shoulders with flat inner sides for engaging the sides of said nut, said expanding members having acutely bevelled inner engaging end surfaces, and a nut carried by the end of said guy rod and located between said shoulders, whereby rotation of the guy rod causes the latter nut to travel upward on said guy rod to effect a sliding movement between said bevelled surfaces and a lateral expansion of each expanding member relative to the other, said relatively fixed anchor member being formed with a plurality of peripherally extending ridges for engaging the wall of an aperture for said anchor.

75 3. In an anchor for electric line poles and the like, the combination of a guy rod having a cable receiving eye at its upper end, said guy rod being

threaded at its lower end, a nut carried by said threaded end and driven tightly against the unthreaded part of said guy rod, a relatively fixed expanding member of substantially cylindrical shape having a flat end engaging said nut and having an axially extending bore of oval cross section for receiving the threaded portion of said guy rod, a movable expanding member of cylindrical shape, having a similar through bore for said guy rod and having at its lower end a flat surface for engaging the inner end of a nut and axially projecting shoulders with flat inner sides for engaging the sides of said nut, said expanding members having acutely bevelled inner engaging end surfaces, and a nut carried by the

end of said guy rod and located between said shoulders, whereby rotation of the guy rod causes the latter nut to travel upward on said guy rod to effect a sliding movement between said bevelled surfaces and a lateral expansion of each expanding member relative to the other, said relatively fixed anchor member being formed with a plurality of peripherally extending ridges for engaging the wall of an aperture for said anchor, and a plurality of tension wires extending tightly about both said expanding members and between said ridges and urging the expanding members axially into engagement with said nuts.

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