F. V. SIMPSON.

GROUND ANCHOR.

APPLICATION FILED FEB. 11, 1909.

998,720.

Patented July 25, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

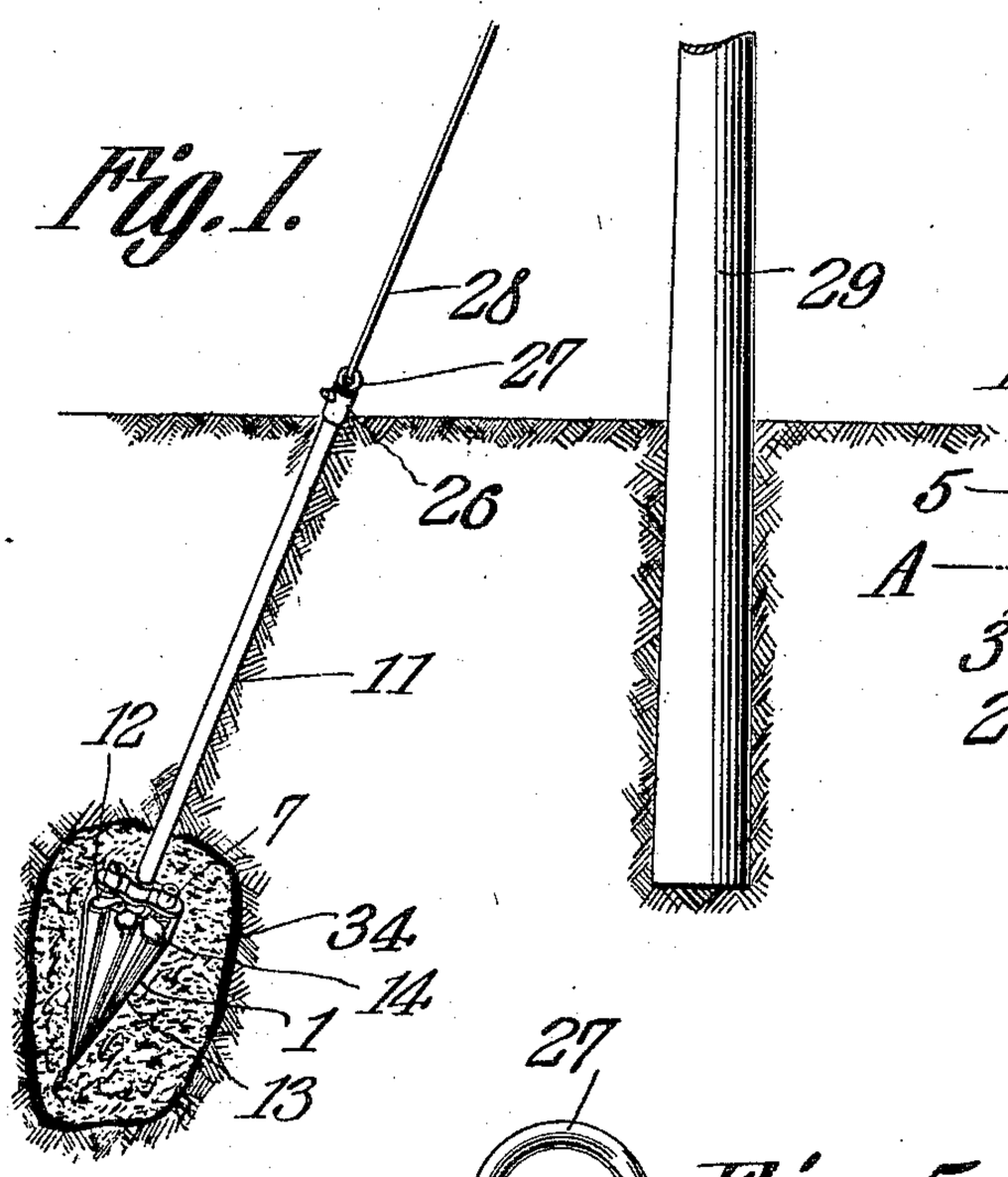


Fig. 2.

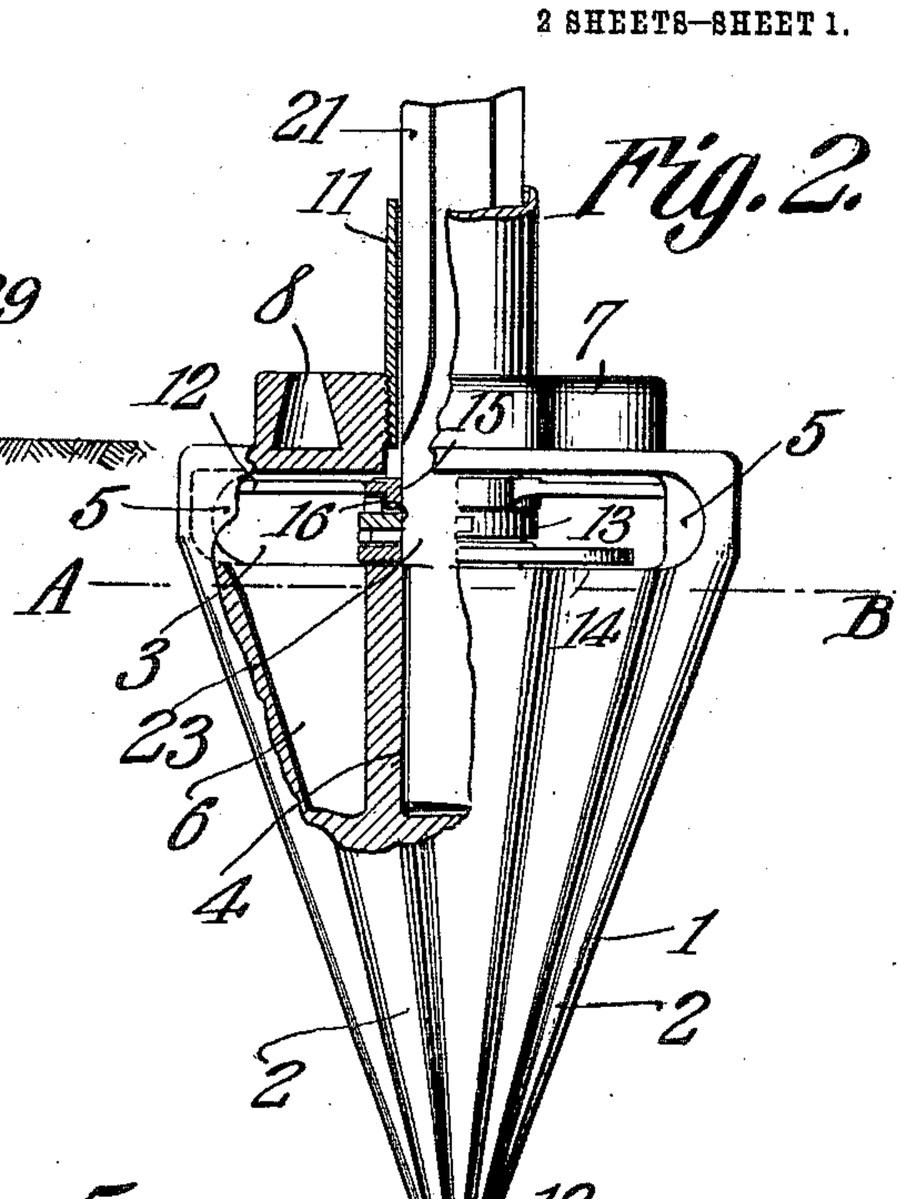


Fig. 6.

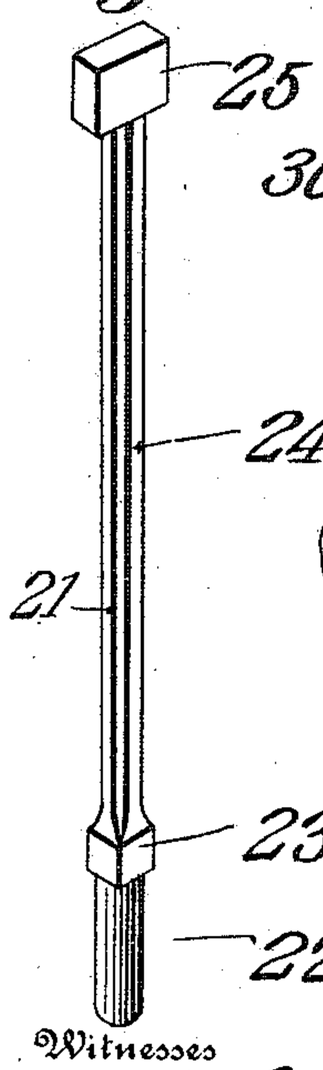


Fig. 5.

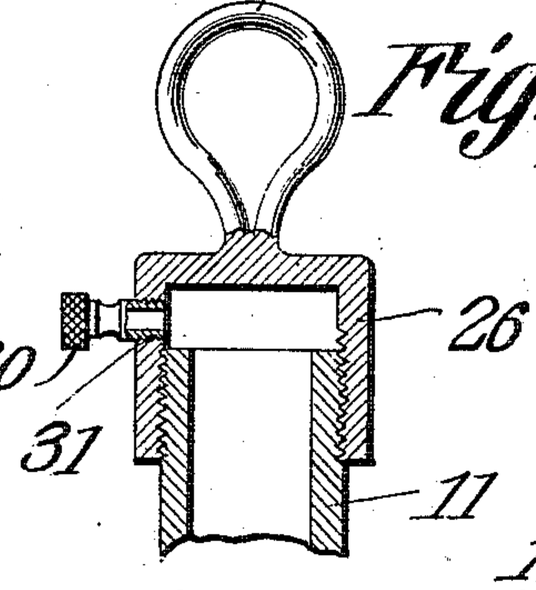


Fig. 7.

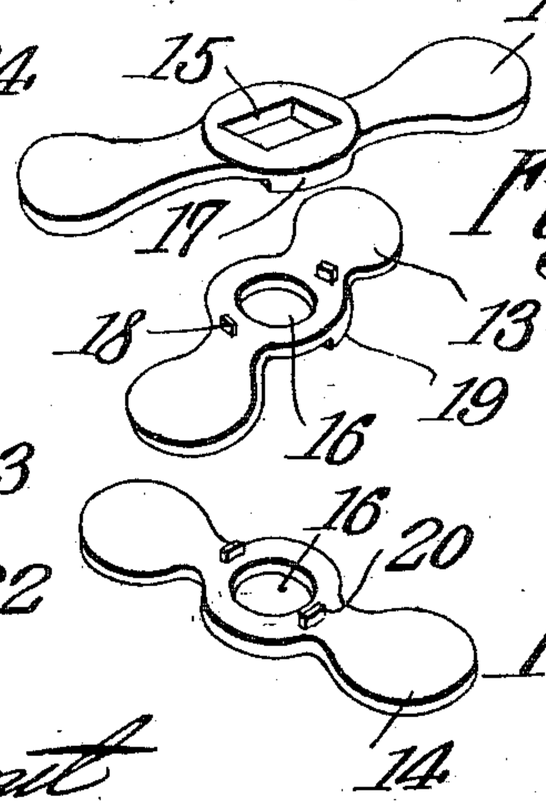


Fig. 3.

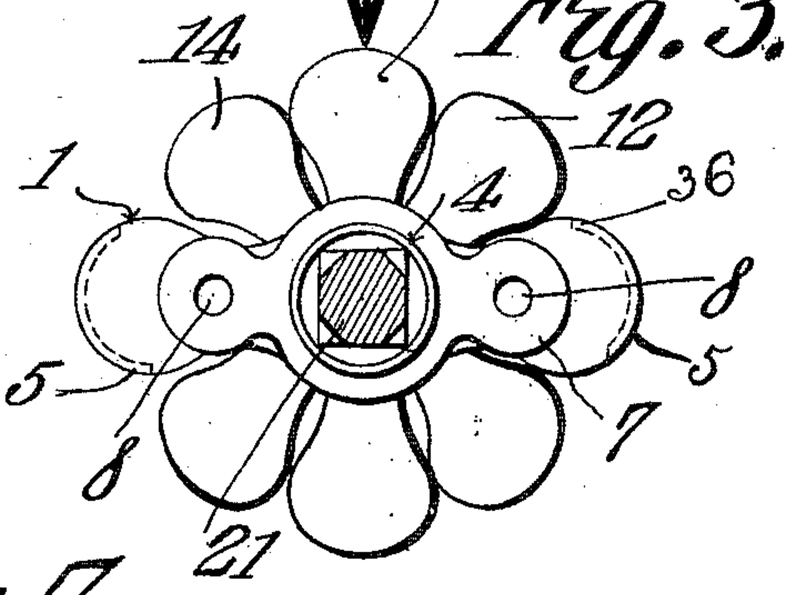
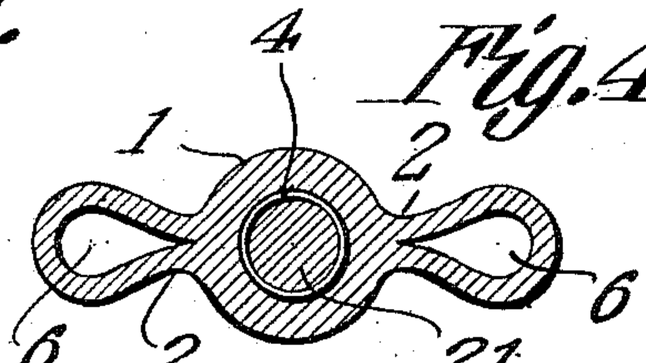


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 8.

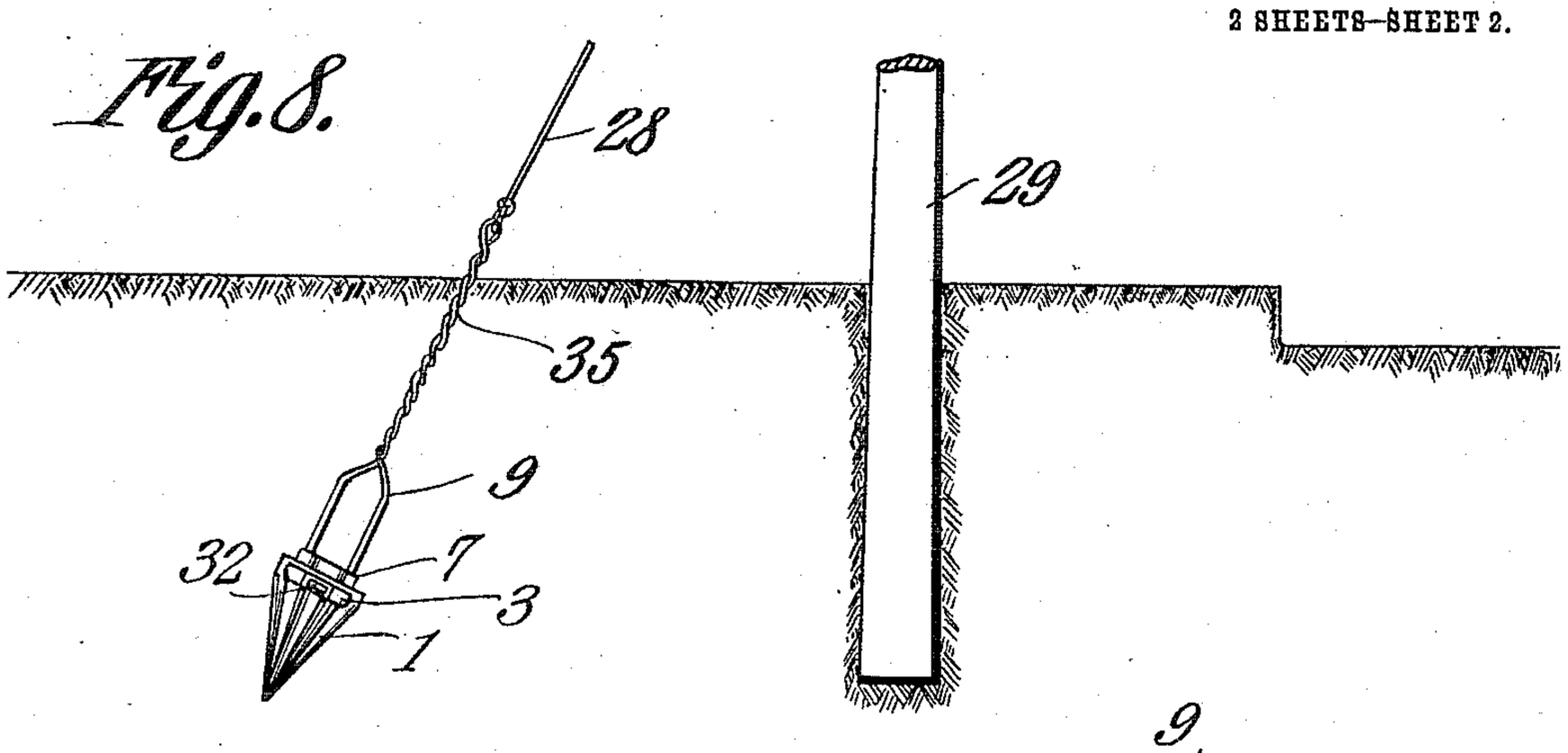
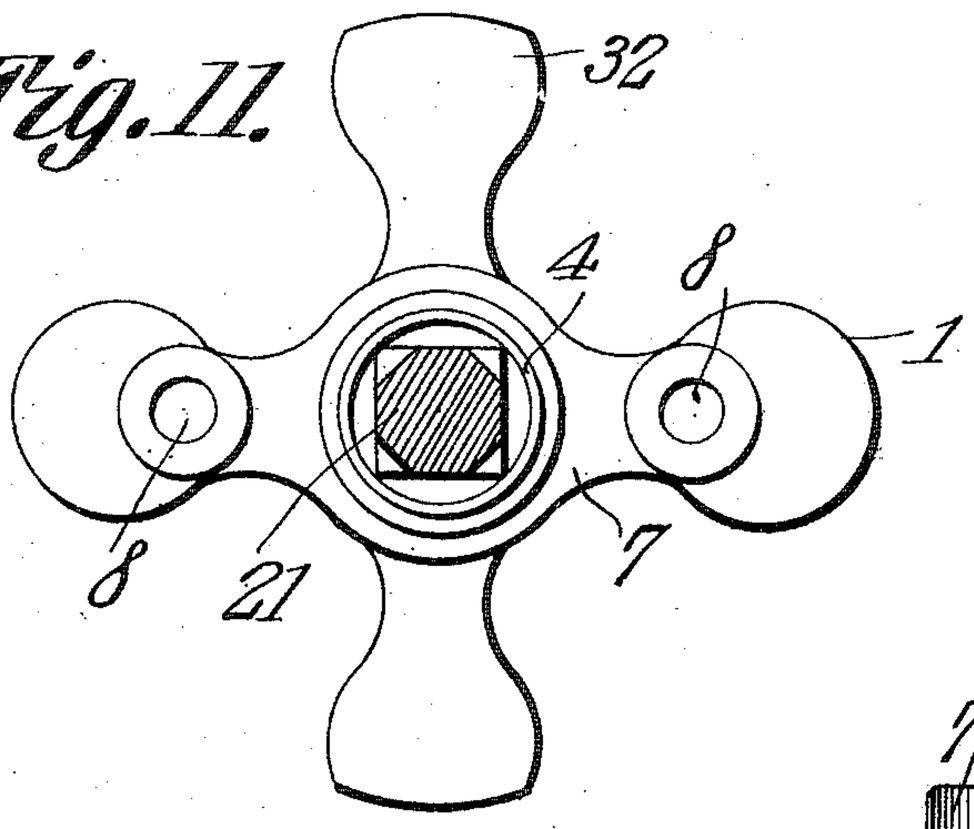


Fig. 11.



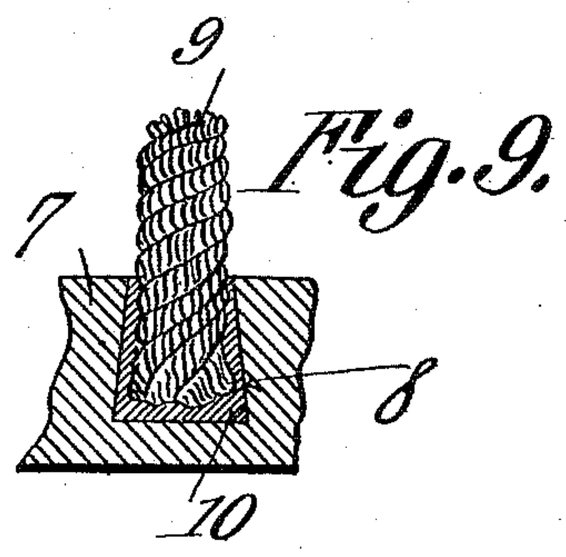
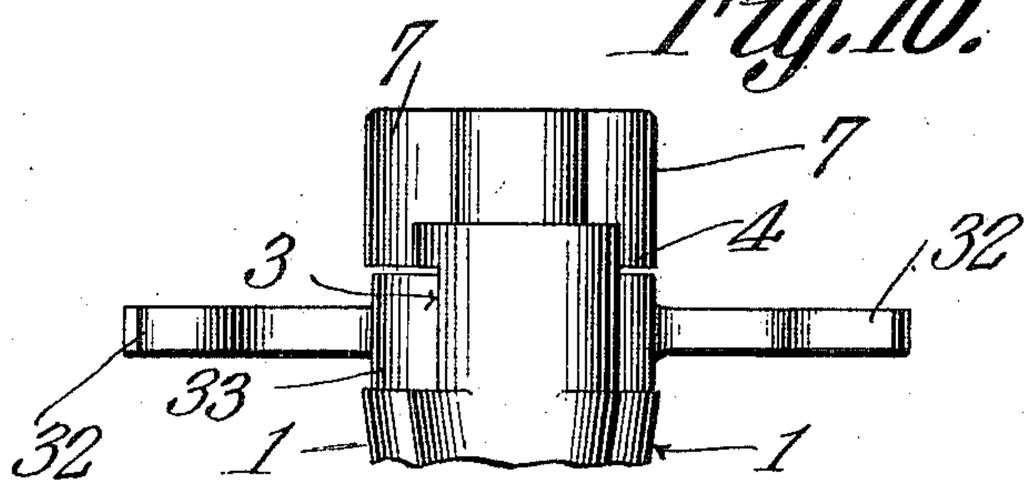


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

FREDRICK V. SIMPSON, OF NIAGARA FALLS, NEW YORK.

GROUND-ANCHOR.

998,720. Specification of Letters Patent. Patented July 25, 1911.

Application filed February 11, 1909. Serial No. 477,342.

To all whom it may concern:

Be it known that I, FREDRICK V. SIMPSON, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented a new and useful Ground-Anchor, of which the following is a specification.

The improved ground anchor herein described and forming the subject matter of this application is of that general type which is adapted to be used in connection with a guy wire for staying telegraph, telephone, and tent poles, stacks, derricks, and the like.

The objects of the invention are, generally, the provision, in a merchantable form, of a device of the above mentioned class which shall be inexpensive to manufacture, facile in operation, and devoid of complicated parts; specifically, the provision of an anchor of improved construction, of earth-engaging means adapted to be used in connection therewith, of novel means for operating the earth-engaging means, and of improved means for connecting the anchor with the tension element; other and further objects being made manifest hereinafter as the description of the invention progresses.

The invention consists in the novel construction and arrangement of parts, hereinafter described, delineated in the accompanying drawings, and particularly pointed out in that portion of this instrument wherein patentable novelty is claimed for certain peculiar features of the device, it being understood that within the scope of what hereinafter is thus claimed, divers changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Similar numerals of reference are employed to denote corresponding parts throughout the several figures of the drawings.

In the accompanying drawings:—Figure 1 shows in perspective the anchor of my invention mounted in the earth; Fig. 2 is a front elevation of the anchor, parts of the same being broken away better to illustrate the structure; Fig. 3 is a top plan of the anchor, the earth-engaging blades being extended beyond the contour thereof; Fig. 4 is a transverse section upon the line A—B of Fig. 2; Fig. 5 is a longitudinal section of the cap, the same being mounted in its place upon the upper terminal of the tubular member, the said tubular member being broken away anteriorly; Fig. 6 is a detail perspective of the driving bar; Fig. 7 is a detail perspective of the earth-engaging blades, the same being separated vertically in order more clearly to reveal their structure and to illustrate the means whereby the upper or master blade actuates the blades disposed beneath it; Fig. 8 shows in front elevation the anchor of my invention mounted in the earth, the parts being assembled in a slightly different manner from that shown in Fig. 1; Fig. 9 is a sectional detail view of a portion of the top of the anchor and is designed to show one means whereby the anchor may be assembled with the tension element; Fig. 10 is an end elevation of an anchor equipped with a single blade after the manner shown in Fig. 8; Fig. 11 is a top plan showing the anchor equipped with a single blade as illustrated in Figs. 8 and 10.

In carrying out my invention I provide, primarily, an anchor denoted generally by the numeral 1. The anchor 1 in its preferred form is conoidal and in cross section of unequal dimensions. The anchor is indented, as shown at 2, whereby the faces of the same are caused to assume a series of longitudinally disposed undulations. The anchor 1 is provided near its upper terminal with a transverse chamber 3 extending entirely through the body portion of the anchor, and with an axial bore 4 extending from the top of the anchor downward, communicating with the transverse chamber 3 and terminating within the body of the anchor below the chamber. Diagonally disposed portions of the side walls of the anchor are extended beyond the ends of the chamber 3 to form stops 5 to receive the earth-engaging means in a manner to be described at length hereinafter. For lightness the anchor may be cored interiorly upon either side of the axial bore 4, as denoted by the numeral 6.

Rising from the top of the anchor 1 and integral therewith is a neck 7 through the central portion of which passes the axial bore 4. and in that portion of the axial bore 4 which pierces the neck 7 is mounted the lower terminal of a tubular member 11.

I further provide earth-engaging means adapted to be used in connection with the anchor hereinbefore described, and as shown in Fig. 7 these earth-engaging means may comprise a master blade 12, a middle blade 13 and a bottom blade 14, it being understood that the middle blade 13 is typical merely and that it may be replaced by two or more middle blades of similar construction. The master blade 12 is provided midway between its ends with a polygonal opening 15 and upon its under surface at its periphery with lugs 17. The middle blade 13 is provided upon its upper face with upstanding lugs 18 designed to be engaged by the lugs 17 of the master blade when the latter is rotated, and the said middle blade 13 carries upon its lower face lugs 19 similar in construction to the lugs 17 of the master blade 12. The bottom blade 14 presents a substantially flush lower surface and from its upper face rise lugs 20 adapted to be engaged by the lugs 19 of the middle blade 13 as the same is rotated by the master blade 12. It is to be understood that the several lugs hereinbefore mentioned are so disposed that each blade will travel through an arc of considerable size before engaging the blade beneath it. Each of the blades 13 and 14 is provided with a circular aperture 16 disposed midway between its ends, these circular apertures 16 together with the aperture 15 of the master blade having functions which will be disclosed presently in connection with the description of the drive bar 21.

The device should be provided with a drive bar 21 which may take a variety of forms; the particular shape of drive bar shown in Fig. 6 having been found to possess advantages. As thus shown, the drive bar comprises a lower terminal 22 circular in cross section and of a diameter conforming approximately to the diameter of that portion of the axial bore 4 which is disposed beneath the chamber 3 in the body of the anchor. Upon this circular portion 22 the blades 13 and 14 are journaled for rotation by means of the apertures 16 therein. Above the circular portion 22 the drive bar is provided with a polygonal shoulder 23 adapted to engage the opening 15 in the master blade 12, and this shoulder 23 and the opening 15 in the master blade may be made square in cross section, as shown. It is to be understood that the circular portion 22 of the drive bar is of such length that when the lower terminal thereof is in abutment with the anchor at the bottom of the axial bore 4, the shoulder 23 will engage the opening 15 in the master blade 12. The openings 16 in the members 13 and 14 are of such diameter that the shoulder portion 23 of the drive bar may rotate freely in them. Above the shoulder 23 the drive bar may be given octagonal cross section, as shown at 24, terminating at its top in a squared or quadrilateral portion 25. The drive bar 21 is thus constructed that it may be seized for rotation at or near its upper end by wrenches having a variety of jaw apertures. This drive bar 21 is to be mounted within the tubular member 11 and it is to be understood that the diagonal dimension of the shoulder 23 is to be such that it may readily be introduced into the member 11.

The upper terminal of the tubular member 11 may be threaded, as shown in Fig. 5, to receive removably a cap 26 having an upstanding eye 27. This eye 27 serves as a means whereby the cap 26 may be rotated to its seat, and further provides an attachment for the guy wire 28 which rises into upper terminal connection with the post 29 or other element which it is the function of my anchor to support. The cap 26 is provided with an aperture 31 preferably located in the side walls thereof above the upper terminal of the tubular member 11 and threaded to receive a closure which may take the form of a screw plug 30.

Passing now to Figs. 8, 9, 10 and 11 wherein I have shown my invention assembled in a slightly different manner from that disclosed in the preceding figures, it will be seen that the device may be equipped in lieu of the plurality of blades already described with a single blade 32 having a broadened neck 33 to substantially fill the chamber 3 of the anchor.

Referring to Figs. 2 and 9, it will be seen that the neck 7 is provided near its ends with downwardly flaring apertures 8 and into these apertures may be introduced the lower terminals of a cable 9 or other tension element, the terminals of the element 9 being retained in the apertures 8 by means of lead or babbitt 10 which may be poured into the apertures 8 in a molten condition. The upper portion of the cable 9 may be twisted, as denoted by the numeral 35 and arranged to receive the lower terminal of the guy wire 28.

It is obvious that the cable 9 in Fig. 8 and the tubular member 11 in Fig. 1 may each be extended upward into contact with the post 29, the guy wire 28 in such case being dispensed with.

The peculiar shape of the anchor 1 hereinbefore described causes it to drive readily into the earth, the undulating form of its faces causing it to maintain a straight and direct course while it is being driven. The form of the anchor furthermore causes it to pass through the soil without unduly disturbing the same which is an important feature since the earth which lies about the anchor when it arrives in its ultimate position should be as solid and undisturbed as

possible, in order that the blades when swung outward, as hereinafter described, may find firm holding ground.

The practical operation of my invention is as follows:—The tubular member 11 being introduced into the axial bore 4 of the anchor 1, the drive bar 21 is introduced into the said tubular member 11. The blades 12, 13 and 14 are mounted in the transverse chamber 3, their apertures 15 and 16 being in vertical alinement with the axial bore 4 of the anchor. The drive bar 21 is then shoved downward in the tube 11, the lower terminal of the said drive bar abutting against the anchor proper at the bottom of the axial bore 4, the portion 22 of the drive bar registering in the apertures 16 of the blades 13 and 14 and the shoulder 23 engaging the aperture 15 of the master blade 12. The drive bar is then rotated in an anti-clockwise direction which will cause the several blades to retire into the chamber 3 of the anchor, their terminals engaging the stops 5, whereby they will be retained within the contour of the anchor. When thus assembled, percussive force or pressure is applied to the upper terminal of the drive bar 21 and the anchor forced downward into the ground to the desired depth. A key or wrench is then applied to the upper end 25 of the drive bar or to the portion 24 thereof and the same rotated, the shoulder 23 rotating the master blade 13, and the master blade through the lugs 17 which it carries in its turn rotating the blades beneath it, the several blades moving outward from the body on the anchor into the radial position shown in Fig. 3. By referring to Fig. 3, it will be seen that as the master blade 12 moves outward in a clockwise direction from the chamber 3 it will ultimately engage the stop 5 at the point 36, by which construction it will be impossible to give the several blades a complete rotation whereby some or all of them might again become housed terminally in the chamber 3, thus decreasing their effective projecting earth-engaging surface. When the above described operation has been completed, the drive bar 21 is removed from the tube 11 and the cap 26 is rotated into position upon the top of the member 11, whereupon the anchor is assembled to receive the lower terminal of the guy wire 28.

If desired, before the cap 26 is mounted in its place the tubular member 11 may be filled with cement, grout, or other congealable liquid. The cap 26 is then mounted upon the tubular member 11 and the screw plug 30 having been removed, the terminal of an air-compressor is introduced into the opening 31 of the cap. Air under pressure may then be introduced into the tube 11, causing the grout contained in the tube 11 to flow outward at the lower terminal of the said tube, inclosing the member 1 in an anchoring body of cement 34, as shown in Fig. 1. In a solid soil this process need not ordinarily be resorted to but when the device is used in a yielding or soft earth, it may be employed with advantage.

The operation of the device as shown in Fig. 8 and following is substantially the same as that hereinbefore described. In such case, however, the terminals of the cable 9 are assembled with the anchor before the device is driven into the earth, the tubular member 11 being dispensed with. When the anchor has been seated to the required depth, the blade 32 is rotated into its protruding position and the drive bar removed. It is to be understood that when a single blade is used it is provided with a polygonal central aperture to receive the shoulder 23 of the drive bar, after the manner of the master blade 12 shown in Fig. 7.

It is possible to employ a single blade of the character shown in Fig. 10 in connection with the tubular member 11 shown in Fig. 1, and likewise the several blades shown in Fig. 7 may be employed when the anchor is used after the manner shown in Fig. 8; the illustration of so obvious a combination of elements being unnecessary.

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

1. In a device of the class described, an anchor and earth-engaging means housed within the contour of the anchor and being rotatable into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade and another blade actuatable thereby.

2. In a device of the class described, an anchor and earth-engaging means normally housed within the contour of the anchor, and being movable into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade and another blade actuatable thereby.

3. In a device of the class described, an anchor; a series of earth-engaging blades housed within the contour of the anchor and being rotatable in planes normal to the axis of the anchor into projection beyond its contour, the said series comprising a master blade and other blades actuatable thereby.

4. In a device of the class described, an anchor having a transverse chamber; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor, diagonal portions of the side walls of the anchor being extended beyond the end of the chamber to form stops to receive the earth-engaging means.

5. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; a drive bar removably mounted in the bore and being journaled for

rotation therein; and earth-engaging means housed in the chamber and being actuatable by the drive bar into rotation beyond the contour of the anchor.

6. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; a drive bar removably mounted in the bore and being journaled for rotation therein; and a series of earth-engaging blades housed in the chamber and being actuatable by the drive bar into rotation beyond the contour of the anchor.

7. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; a drive bar removably mounted in the bore and being journaled for rotation therein; and a series of earth-engaging blades housed in the chamber and comprising a master blade actuatable by the drive bar into rotation beyond the contour of the anchor; and other blades actuatable by the master blade.

8. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor.

9. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means rotatably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor; and other blades operatively connected with the master blade, whereby they may be moved into projection beyond the contour of the anchor upon the rotation of the master blade.

10. In a device of the class described, an anchor having a transverse chamber, and being provided with an axial bore communicating therewith; earth-engaging means mounted in the chamber, the said means being rotatable into projection beyond the contour of the anchor and being apertured in alinement with the bore of the anchor; a tubular member mounted in the upper terminal of the bore of the anchor and arranged to receive means for rotating the earth-engaging means.

11. In a device of the class described, an anchor having a transverse chamber; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor, a portion of the side wall of the anchor being extended to form a stop to receive the earth-engaging means in projecting position.

12. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor; a tubular member mounted in the upper terminal of the bore of the anchor; a cap carried by the terminal of the tubular member and arranged to receive the terminal of a tension element, the said cap being provided with an aperture and a removable closure therefor.

13. In a device of the class described, an anchor; a tube mounted in the anchor; a drive bar journaled for rotation in the tube and being removably mounted therein; and earth-engaging means housed in the anchor and being rotatable by the drive bar into projection beyond the contour of the anchor.

14. In a device of the class described, an anchor; a tube mounted in the anchor; a drive bar journaled for rotation in the tube and being removably mounted therein; and a plurality of earth-engaging blades housed in the anchor and being rotatable by the drive bar into projection beyond the contour of the anchor.

15. In a device of the class described, an anchor; a tube mounted in the anchor; a drive bar journaled for rotation in the tube and being removably mounted therein; and earth-engaging means housed in the anchor and being rotatable by the drive bar into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade actuatable by the drive bar and other blades actuatable by the master blade.

16. In a device of the class described, an anchor; earth-engaging means housed within the anchor and being actuatable into projection beyond the contour of the anchor; and a drive-bar arranged to be removably assembled with the anchor, the drive-bar constituting a means for actuating the earth-engaging means.

17. In a device of the class described, an anchor; earth-engaging blades housed within the anchor and being rotatable into projection beyond the contour of the anchor; and a drive-bar arranged to be removably journaled for rotation in the anchor, the drive-bar constituting a means for rotating the blades.

18. In a device of the class described, an anchor; a series of earth-engaging blades housed within the anchor and comprising a master blade and another blade actuatable thereby; and a drive-bar arranged to be removably assembled with the anchor, the drive-bar constituting a means for actuating the master blade.

19. In a device of the class described, an anchor; a series of earth-engaging blades housed within the anchor and being rotatable

beyond the contour of the anchor, the series comprising a master blade and another blade actuatable thereby; and a drive-bar arranged to be removably journaled for rotation in the anchor and constituting a means for actuating the master blade.

20. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor; and a drive-bar arranged to be removably journaled for rotation in the axial bore of the anchor, the drive-bar constituting a means for rotating the earth-engaging means.

21. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being rotatable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor; a tubular member mounted in the axial bore of the anchor; and a drive-bar removably journaled for rotation in the tubular member, and constituting a means for rotating the earth-engaging means.

22. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being movable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor.

23. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being movable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor; and a drive-bar arranged to be removably mounted in the axial bore of the anchor, the said drive-bar constituting a means for actuating the earth-engaging means.

24. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being movable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor; and a tubular member mounted in the axial bore of the anchor.

25. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means housed in the chamber and being movable into projection beyond the contour of the anchor, the said earth-engaging means being apertured in alinement with the axial bore of the anchor; a tubular member mounted in the axial bore of the anchor; and a drive-bar removably mounted in the tubular member and constituting a means for actuating the earth-engaging means.

26. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means rotatably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor, another blade operatively connected with the master blade, and arranged to be moved into projection beyond the contour of the anchor upon the rotation of the master blade; and a drive-bar removably mounted in the axial bore of the anchor and constituting a means for actuating the master blade.

27. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means rotatably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor, another blade operatively connected with the master blade, and arranged to be moved into projection beyond the contour of the anchor upon the rotation of the master blade; and a tubular member mounted in the axial bore of the anchor.

28. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means movably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor; and other blades operatively connected with the master blade, whereby they may be moved into projection beyond the contour of the anchor upon the movement of the master blade.

29. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means movably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor, and other blades operatively connected with the master blade, whereby they may be moved into projection beyond the contour of the anchor upon the movement of the master blade; and a drive-bar removably mounted in the axial bore of the anchor, and constituting a means for actuating the master blade.

30. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means movably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor, and other blades operatively connected with the master blade, whereby they may be moved into projection beyond the contour of the anchor upon the movement of the master blade; and a tube mounted in the axial bore of the anchor.

31. In a device of the class described, an anchor having a transverse chamber and being provided with an axial bore communicating therewith; earth-engaging means movably mounted in the chamber and comprising a master blade having an aperture alined with the axial bore of the anchor, and other blades operatively connected with the master blade, whereby they may be moved into projection beyond the contour of the anchor upon the movement of the master blade; a tube mounted in the axial bore of the anchor; and a drive-bar removably mounted in the tubular member, the drive-bar constituting a means for actuating the master blade.

32. In a device of the class described, an anchor; a tube mounted in the anchor; a plurality of earth-engaging blades housed within the anchor and being movable into projection beyond the contour of the anchor; and a drive-bar removably mounted in the tube and extended through the blades into terminal contact with the anchor, the said drive bar constituting a means for actuating the earth-engaging blades.

33. In a device of the class described, an anchor; a tube mounted in the anchor; a drive-bar removably mounted in the tube; and earth-engaging means housed within the anchor and being actuable by the drive-bar into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade actuatable by the drive-bar and other blades actuatable by the master blade.

34. In a device of the class described, an anchor; a tube mounted in the anchor; and earth-engaging means housed within the anchor and being movable into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade and another blade actuatable by the master blade.

35. In a device of the class described, an anchor; a tube mounted in the anchor; and earth-engaging means housed in the anchor and being rotatable into projection beyond the contour of the anchor, the said earth-engaging means comprising a master blade, and another blade actuatable by the master blade.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

FREDRICK V. SIMPSON.

Witnesses:

ALBERT W. GRAY,

C. C. JOHNSON.