

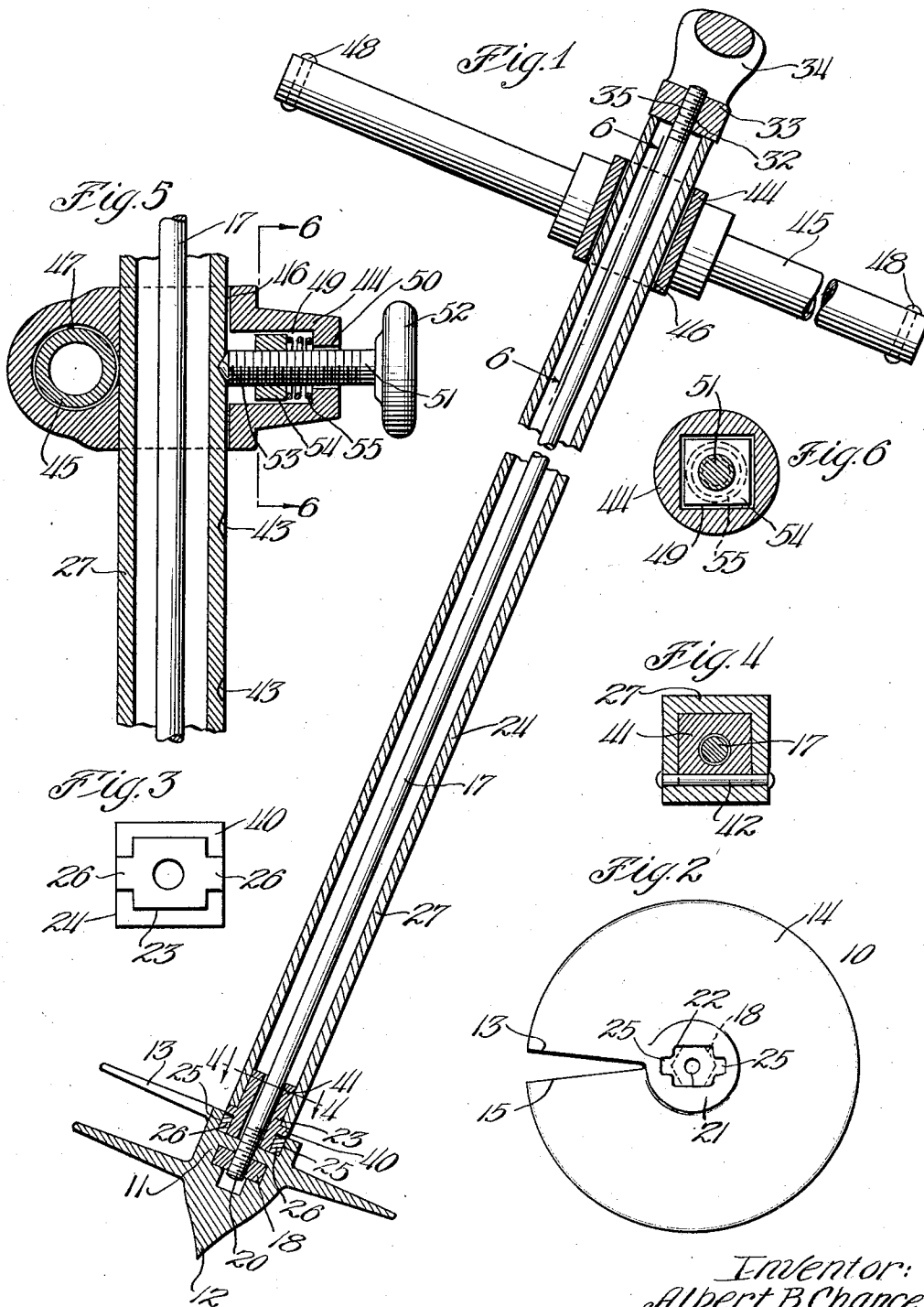
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EARTH ANCHOR TOOL

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UNITED STATES PATENT OFFICE

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EARTH-ANCHOR TOOL

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The present invention relates to earth anchor tools and is particularly concerned with tools or wrenches peculiarly adapted to be used in placing earth anchors.

5 In the installation of earth anchors of the screw type it is necessary to use a wrench having a body or shank of considerable length, as the depth at which the anchor is placed is limited by the length of the wrench
10 used in screwing the anchor into place. I am aware that screw anchor wrenches have been provided with handles which slide up and down on the body of the wrench but the wrenches of the prior art are not provided
15 with any means for retaining them at the desired height and it is necessary with the prior wrenches to given constant attention to the maintenance of the wrench at the proper height.

20 The screw anchors of the prior art have also been provided with ordinary square sockets or sockets of other simple non-circular form for use with a complementary wrench, but as the anchors are usually constructed of cast
25 metal and as the sockets are subjected to heavy strains in driving a screw anchor into the ground, the wrenches of the prior art anchors often turn completely out of the socket and destroy the walls of the socket. It
30 is obvious of course that the thickness of the walls of the socket or the depth of the socket might be increased to increase the strength, but any increase in the size of the anchor renders it more difficult to drive and also any
35 saving of material without sacrifice of strength is of great commercial advantage.

One of the objects of the invention is the provision of a cast metal screw anchor of the class described, having an improved form
40 of connection with an actuating wrench comprising a non-circular socket for the wrench and a plurality of radially projecting lugs adapted to engage the anchor at points more remote from its axis, thereby giving in-
45 creased leverage for the wrench upon the anchor so that it will not turn out of its socket.

Another object of the invention is the provision of an improved form of wrench for in-
50 stallng screw anchors which is peculiarly

adapted to withstand the extreme strains placed upon it in driving screw anchors into the ground and which is also provided with an improved actuating means for enabling
55 the operator to most effectively apply turning force to the wrench and screw anchor.

Another object is the provision of a novel wrench and socket form which is adapted to increase the strength of the anchor to prevent
60 the wrench from turning out of the socket under heavy strains, without increasing the size or cost of the anchor.

Another object is the provision of an improved screw anchor wrench including a transverse handle which is readily adjustable
65 longitudinally of the wrench at any time during the installation of the anchor by the mere application of an axial force so that the handle may always be disposed at the most effective height without loss of time, together with
70 means for resiliently securing the handle in adjusted position so that the handle will be automatically maintained in the desired position without special effort of the operator.

Another object is the provision of a novel
75 form of adapter for enabling the use of the wrench with different forms of anchors and for increasing the effective strength of the connection between the wrench and anchor.

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

Referring to the single sheet of drawings:

Figure 1 is an elevational view in partial section showing the improved wrench in connection with an anchor;
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Figure 2 is a top plan view of the anchor used with this wrench;

Figure 3 is a bottom end view of the wrench;

Figure 4 is a sectional view taken on the
95 line 4—4 of Figure 1;

Figure 5 is an enlarged detail view taken on a plane at right angles to the plane of Figure 1 through the wrench handle; and

Figure 6 is a sectional view taken on the
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line 6—6 of Figure 5, looking in the direction of the arrows.

In the drawings 10 indicates in its entirety my anchor which comprises a cast metal member having a central body of substantially cylindrical shape terminating in a point 12 which may have the shape of a pyramid. Cast integrally with the body 11 is a substantially flat flange 13 projecting at approximately right angles to the axis of the body 11 and progressing along the axis in the form of a screw. The external outline 14 of the flange 13 is preferably circular and the flange may make approximately one revolution about the body 11 terminating below in the relatively sharp forward edge 15. The flange 13 is also preferably tapered from the outer edge 14 to a greater thickness as at 16 adjacent the body 11, thereby increasing the strength of the flange in proportion to the distance from the outer edge.

The body of the body 11 and flange 13 is preferably formed of cast iron and in order to provide a means of connection to a guy rod 17 which is of greater strength than permitted by the cast iron I prefer to locate a steel member, punching or ring 18 within the body 11 of the anchor in such manner that the bore 19 of the steel member is located axially of the anchor and the steel member 18 is embedded in the metal of the body and secured by engagement therewith above and below said member as well as on the sides of said member. In other words the blank may be supported in the mold upon the core used for forming the bore 21, and the anchor body is cast about the blank.

The steel member 18 may consist of a blank having a bore and the bore and adjacent portions of the bore 21 in the body 11 may be threaded at the same time. The guy rod 17 is provided with a threaded end 20 which is adapted to be received in the threaded aperture 19 of the steel member 18 and the body 11 is provided with an aligned bore 21 extending above and below the steel member 18 to receive the guy rod 17.

The body 11 is provided at its upper end with a non-circular recess or socket 22 which is adapted to receive a complementary non-circular end 23 of a wrench 24. The socket 22 is preferably rectangular though it may be made hexagonal. In the installation of the anchor 10 a relatively high torque is transmitted to the anchor 10 by the wrench 24 through the non-circular end 23 and socket 22, and considerable difficulty has been experienced in this operation due to the fact that the wrench tends to turn out of the socket 22.

In order to obviate this difficulty I prefer to provide the socket 22 with a plurality of auxiliary recesses 25 communicating with said socket at the sides thereof and extending into the body 11 to a greater distance from the axis of the anchor. The wrench end 23

is then formed with complementary projecting lugs 26 which fit in the recesses 25 and any number of lugs and auxiliary recesses may be employed.

It will thus be observed that not only do the auxiliary recesses and lugs provide an additional bearing surface through which the wrench may react upon the anchor in the screwing operation, but the lugs engage the anchor at a greater distance from the axis of the same so that the lugs have a longer lever arm with which to engage the anchor. The longer lever arm of the lugs enables them to exert a greater torque upon the anchor 10 without destruction of the socket or wrench and this structure has enabled the installation of anchors in places where ordinary anchors could not be embedded due to unusual difficulties in embedding them in the earth.

The wrench end 23 may be provided with a projecting flange 40 adapted to bear against the upper surface of the anchor body 11 and to aid in fixing the wrench end in a supporting member 27. The wrench which is indicated in its entirety at 24 comprises a tubular supporting member 27 preferably of rectangular cross-section and adapted to receive the square portion 41 of the wrench end. The wrench end 23 may be securely fastened in the tubular supporting member 27 by a transverse rivet 42 and the tubular supporting member may be provided with a plurality of recesses 43 for engaging with an adjustable slide 44 carrying a handle 45. The slide 44 comprises a cast metal member having a non-circular aperture 46 adapted to slidably receive the tubular supporting member 27 of the wrench and also having a transverse bore 47 for receiving the tubular handle 45. The tubular handle 45 may be slidably mounted in the bore 47, being retained therein by stops at each end consisting of transverse rivets 48 and the provision of a slidable handle enables the use of my anchor wrench in many places in which another handle could not be turned.

The slider 44 is also provided with a socket 49 formed integrally with the slider and communicating with the non-circular bore 46. The socket 49 has a centrally located bore 50 of sufficient size to receive a threaded bolt 51 without engaging its threads. The threaded bolt 51 is provided with a serrated knob 52 for convenient manipulation and with a substantially conical end 53 adapted to fit in the conical recesses 43. Threaded upon the bolt 51 within the socket 49 is a noncircular nut 54 and the cross-section of the socket 49 is preferably made of the same shape as the nut 54 in order to receive said nut and prevent its rotation but permit reciprocation.

The bolt 51 is also provided with a spring 55 preferably of helical form and confined between the nut 54 and the end of the socket 49. It will thus be observed that by means of the knob 52 the bolt 51 may be screwed in-

ward and the socket 49 will prevent rotation of the nut 54 so that the nut will progress upon the bolt. The bolt 51 can be screwed into such extent that its end 53 will firmly engage in the recesses 43 of the tubular member 27 if desired but the bolt is preferably so disposed that there is sufficient spring tension to hold the bolt in one of the recesses 43 under ordinary conditions but if desired the slider 44 may be moved upward or downward without releasing the bolt 51 since the conical recesses 43 will cam the end 53 of the bolt outward.

It will thus be observed that the wrench is provided with a handle having a slidable connection to the body of the wrench and resilient means for retaining the wrench in any of a plurality of adjustable positions. The sides of the recesses 43 constitute shoulders upon the tubular body 27 for retaining the handle 45 in any vertical position but the handle may be moved upward or downward to a new adjusted position by the mere application of an axial force.

The handle 45 is also slidably supported in the slider 44 so that if desired the handle may be moved to project almost entirely from one side of the wrench so that the operator can bring a greater torque to bear upon the wrench. When the handle is in this position or while the handle is being adjusted the automatic retaining device is of great advantage. The rivets 48 constitute stops for preventing the entire removal of the handle from its support 44.

The operation of the wrench in the installation of an anchor is as follows:

The anchor and wrench may be held in assembled position during the operation of installing the anchor by means of a guy rod 17 which may be threaded at its upper end 32 for the reception of a thimble eye 33. The thimble eye 33 has the usual grooved aperture 34 to receive the guy wire and a threaded bore 35 adapted to be threaded on the end 32 of the guy rod. It will thus be observed that the wrench 24 may be placed about the guy rod 17 after which the guy rod may have its lower end 20 threaded in the bore 19 of the anchor. The thimble eye 33 may then be threaded upon the upper end of the guy rod, clamping the tubular member 27 between the anchor and the thimble eye and firmly assembling these parts.

The anchor may then be installed in the usual manner by holding the axis of the wrench in substantial alignment with the top of the post forcing the point 12 into the earth and turning the anchor by means of the handle 45. The point 12 of the anchor penetrates the earth, wedging the earth apart while the forward edge 15 of the helix cuts into the earth defining the course of the flange 30 and directing the anchor through a helical path into the earth. The anchor may thus

be screwed into the earth after which the thimble eye may be removed and the wrench removed over the upper end 32 of the guy rod 17 and the thimble eye may be replaced. The guy wire may then be attached to the thimble eye 33 in the usual manner.

During the installation of the anchor the handle 45 may be slid to a new position on the wrench 24 whenever desired, being automatically retained by the resilient bolt 51, thereby providing a handle which is always at a convenient height for manipulation. If desired the handle may be firmly fixed in any position by threading the bolt 51 into the nut 54 until the nut 54 compresses coils of spring 55 against each other so that the handle is firmly fixed in place.

It will thus be observed that a wrench of the present construction is peculiarly adapted to withstand greater strains in the installation of anchors so that the wrench is not liable to turn out of its socket and the wrench is also provided with a novel handle supporting mechanism adapted to resiliently retain the handle in any adjusted position without special effort on the part of the operator. The wrench end 23 may also perform the function of an adapter for facilitating the use of the wrench with the different types of anchors, since the wrench may be provided with any adapter necessary to fit the socket of any other anchor.

While I have illustrated and described a specific 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.

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

1. In a screw anchor the combination of a cast metal member having a helical flange thereon, with a wrench for screwing said anchor into the earth, said wrench comprising a member axially secured to said anchor and a transverse handle slidably mounted on said axial member, and resilient means adapted to be cammed out of holding engagement with said axial member by application of an axial force for holding said transverse handle in any of a plurality of adjusted positions on said axial member.

2. A wrench for driving earth anchors and the like, comprising a shaft for supporting an anchor, a transverse handle member, a metal member slidably mounted on said shaft for supporting said handle member, said metal member having a socket therein, and an aperture leading to said socket, a threaded member in said socket, a bolt in said threaded member and projecting from said aperture, and a conical point on said bolt for

engaging complementary sockets in said shaft for engagement with said bolt.

3. A wrench for driving earth anchors and the like, comprising a shaft for supporting an anchor, a transverse handle member, a metal member slidably mounted on said shaft for supporting said handle member, said metal member having a socket therein, and an aperture leading to said socket, a threaded member in said socket, a bolt in said threaded member and projecting from said aperture, shoulders formed on said shaft for engagement with said bolt, and a spring tensioned between said threaded member and the base of said socket whereby the tension of said spring may be adjusted by rotating said bolt.

4. A handle support for earth anchor wrenches comprising a cast metal member having an aperture for a shaft and an aperture for a handle transverse to said shaft, said member having a socket communicating with said shaft aperture and another aperture communicating with said socket, a spring in said socket, a latching member slidably mounted in said socket and biased into said shaft aperture by said spring, said latching member comprising a threaded member protruding from said socket and a nut in said socket engaging said spring.

In witness whereof, I hereunto subscribe my name this 30th day of January, 1929.

ALBERT B. CHANCE.

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