

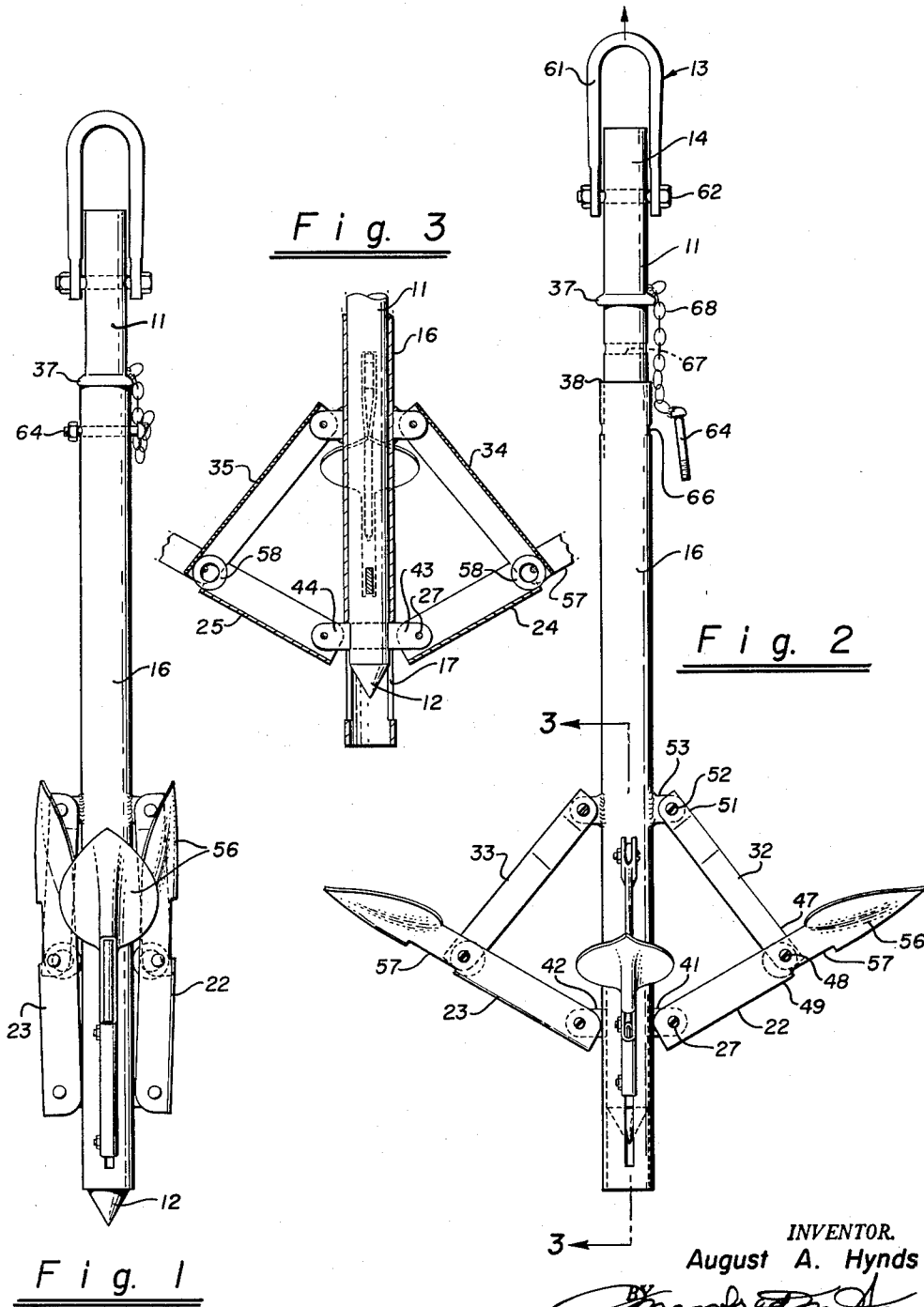
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LAND ANCHOR

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LAND ANCHOR

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The invention relates to ground stakes and more particularly to those designed to improve anchorage in soft ground.

An object of the present invention is to provide a land anchor of the character described which is particularly designed for use in soft, boggy or sandy soil where ordinary ground stakes offer little resistance to pull-out, and which may be driven into the ground in the same manner as an ordinary ground stake without the use of special tools or complicated instructions, and which functions automatically when so positioned in the ground and subjected to a pull-out force to reorient its parts within the ground to greatly increase its pull-out resistance and to automatically increase such resistance as a function of the extent of the pull-out effort up to the full limit of the holding capacity of the device.

Another object of the present invention is to provide a land anchor of the character above which is designed primarily as an emergency or temporary means of mooring and although it may be left in the ground as a permanent anchor, it is nevertheless designed for removal and reuse if and when such removal and reuse is desired.

A further object of the present invention is to provide a land anchor of the character described which is of simple, economical and light weight construction yet with its several parts of sturdy, durable design, capable of giving to the device a long and useful life with minimum repair or replacement of parts.

The invention possesses other objects and features of advantage, some of which of the foregoing will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of this specification. It is to be understood however, that variations in the showing made by the said drawing description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing (one sheet):

FIGURE 1 is a side elevation of a land anchor constructed in accordance with the present invention.

FIGURE 2 is a view similar to FIGURE 1 but showing certain of the parts opened out in anchoring position.

FIGURE 3 is a fragmentary cross-sectional view taken substantially on the plane of line 3—3 of FIGURE 2.

The land anchor of the present invention consists briefly of a shaft 11 adapted for driving of one end 12 into the ground and providing a holding line connection 13 at its opposite end 14; a sleeve 16 surrounding shaft 11 and supported thereby in a driving position, as illustrated in FIGURE 1, carrying the sleeve into the ground with the shaft, the sleeve being formed with one or more longitudinal slots 17; one or more flukes 22 mounted externally of sleeve 16 and having a pivotal connection 27 to shaft 11 extending through slot 17, and a link 32 connecting fluke 22 and sleeve 16 and rotating the fluke 22 to longitudinal position alongside the sleeve as depicted in FIGURE 1 in its aforementioned driving position, and to an outwardly projecting position relative to the sleeve, as depicted in FIGURE 2, upon relative displacement of shaft 11 in an opposite ground-withdrawal direction from the aforementioned driving position.

In accordance with the present invention shaft 11 is here solid and pointed at its lower end 12 for direct driving into the ground by means of a sledge or the like striking the upper end 14 of the shaft. A stop here

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formed as a shoulder 37 on shaft 11 adjacent its upper end 14 engages the upper end 38 of the sleeve in driving position so as to jointly drive the sleeve with the shaft into the ground. Conveniently sleeve 16 is formed of slightly greater diameter than shaft 11 to provide the sliding mounting of the sleeve on the shaft for relative longitudinal reciprocation.

The aforementioned pivotal connection 27 is here provided by an arm 41 carried by and projecting radially outwardly from the shaft through slots 17 and has its outer end connected to one end 46 of the elongated fluke 22 by means of a pin providing the hinge or pivotal connection 27.

Link 32 is here pivotally connected at one end 47 by a cross pin 48 to a mid point 49 of the fluke, and is pivoted at its opposite end 51 by cross-pin 52 to an ear 53 formed on sleeve 16 at a position spaced upwardly from arm 41 and slot 17 so as to produce the swinging movement of the fluke as above described upon relative reciprocal movement of the shaft 11 and sleeve 16.

Preferably and as here shown, a multiplicity of flukes and operating connections therefor, are provided symmetrically about the land anchor so as to improve its resistance to pull-out. As here shown, sleeve 16 is formed with four circumferentially spaced slots for accommodating four radially projecting arms on shaft 11 and which are in turn pivotally secured to four circumferentially spaced flukes in the manner above described.

Preferably the flukes and their pivotal and actuating structures are arranged in diametrically opposed pairs with one pair positioned circumferentially between and in longitudinally spaced relation to the other pair. As will be seen in the drawing, one pair of flukes 22 and 23 are mounted in diametrically opposed relation upon radial shaft arms 41 and 42 and are connected to sleeve 16 by diametrically opposed links 32 and 33. Spaced circumferentially at 90° and arranged longitudinally closer to the lower end of the device are diametrically opposed flukes 24 and 25 pivotally mounted on radial arms 43 and 44 and connected to sleeve 16 by links 34 and 35, see FIGURE 3.

In the present construction the flukes 22-25 may be conveniently formed from pressed steel molded to provide an elongated channel shaped form providing spaced opposed sides for receiving therebetween the lower end 47 of each of the links 32-35 for pivotal connection by cross-pin 48. The opposite outer free ends 56 of each of the flukes is here of flattened, broadened out spade-like form so as to present a wide area cross-wise to the direction of pull-out of the device. Preferably also the channel shaped form of the flukes is cut out as at 57 adjacent the pivotal connection for the link ends 47, so as to permit the passage of earth through openings formed thereby thus assisting the free articulation of the joint. Also as here shown, washers 58 are mounted around the hinge pins 48, see FIGURE 3, and function as spacers contacting the sleeve 16 and links in their folded position, see FIGURE 1, so as to keep the hinge point 48 from passing beyond dead center in the driving position of the parts, so that the parts will open out readily when subjected to a withdrawal pull.

The use and operation of the device is summarized in the following. The device may be driven into the ground by use of a sledge or mallet applied to the upper end 14 of shaft 11, thus driving the lower pointed end 12 into the ground. While reference is made to the upper and lower ends implying a vertical driving of the device, it will be clear that the device has equally good application when driven horizontally into a bank or the like. Stop shoulder 37 on shaft 11 automatically picks up the outer end 38 of sleeve 16 to carry the sleeve with the shaft into the ground and in this relative position of the shaft and

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sleeve, the flukes 22-25 are folded compactly against the sleeve as illustrated in FIGURE 1. When the device has been driven to desired depth or penetration into the ground, a holding line may be secured to the outer end 14 of the shaft. A bale 61 secured by cross-bolt 62 to the outer end 14 of shaft 11 provides the holding line connection 13 hereinabove referred to. As pull-out force is applied to shaft 11, the latter slides longitudinally within sleeve 16 thereby swinging outwardly flukes 22-25 which increase the resistance to pull-out of sleeve 16, and the greater the pull on shaft 11, the greater the spreading out of flukes 22-25 and the greater the holding strength. Maximum resistance to pull-out thus increases as shaft 11 moves longitudinally within sleeve 16 until arms 41-44 engage the upper ends of slots 17 thereby locking up the parts in position with the flukes in their fully extended position. When it is desired to remove the ground anchor the shaft 11 is again driven downwardly which causes a reverse movement of the flukes to their folded position against the sleeve as illustrated in FIGURE 1. A cross pin 64 may now be inserted through aligned openings 66 and 67 in the sleeve and shaft for locking these two parts against relative movement when a withdrawal force is applied to shaft 11. Thus the ground anchor may be withdrawn from the ground with the flukes in their folded position illustrated in FIGURE 1. Conveniently pin 64 may be permanently carried by chain 68 fastened to shaft 11.

I claim:

1. A land anchor comprising, a shaft adapted for driving of a normally lower end into the ground and providing a holding line connection at its normally upper end, a sleeve surrounding and slidably mounted upon said shaft for relative longitudinal reciprocation, a stop on said shaft engageable with said sleeve in a driving position carrying said sleeve into the ground with said shaft, said sleeve being open at both ends and said shaft extending longitudinally completely through said sleeve when in said driving position, said sleeve being formed with a longitudinally extending slot adjacent the normally lower end thereof, an arm carried by and projecting radially outwardly from said shaft through said slot, an elongated fluke hinged at one end of the outer end of said arm, and a link connecting a mid-point of said fluke to said sleeve at a position upwardly from said arm and swinging said fluke to an upwardly folded position upon said sleeve in said driving position and swinging said fluke to an outwardly projecting position relative to said sleeve upon relative displacement of said shaft from said driving position in a ground withdrawal direction.

2. A land anchor comprising, a shaft adapted for driving of one end into the ground and providing a holding line connection at its opposite end, a sleeve surrounding said shaft and supported thereby in a driving position carrying said sleeve into the ground with said shaft, said sleeve being open at both ends and said shaft extending longitudinally completely through said sleeve when in said driving position, said sleeve being formed with a plurality of circumferentially spaced longitudinally extending slots, a plurality of flukes mounted externally of said sleeve and having pivotal connections to said shaft extending through

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said slots, and a plurality of links connecting said flukes and said sleeve and rotating said flukes to longitudinal positions alongside of said sleeve in said driving position and to outwardly projecting positions relative to said sleeve upon relative displacement of said shaft in a ground withdrawal direction from said driving position.

3. A land anchor comprising, a shaft adapted for driving of one end into the ground and providing a holding line connection at its opposite end, a sleeve surrounding said shaft and supported thereby in a driving position carrying said sleeve into the ground with said shaft, said sleeve being open at both ends and said shaft extending longitudinally completely through said sleeve when in said driving position, said sleeve being formed with a plurality of circumferentially spaced longitudinally extending slots, a first pair of diametrically opposed arms carried by and projecting radially outwardly from said shaft through a pair of said slots, a second pair of diametrically opposed arms carried by and projecting radially outwardly from said shaft through another pair of said slots and being positioned circumferentially between and in longitudinal spaced relation to said first pair of arms, a plurality of flukes hinged to the outer ends of said arms, and a plurality of links connecting said flukes and sleeve and rotating said flukes to longitudinal positions alongside of said sleeve in said driving position and to outwardly projecting positions relative to said sleeve upon relative displacement of said shaft in a ground withdrawal direction from said driving position.

4. A land anchor comprising, a shaft adapted for driving of one end into the ground and providing a holding line connection at its opposite end, a sleeve surrounding said shaft and supported thereby in a driving position carrying said sleeve into the ground with said shaft, said sleeve being open at both ends and said shaft extending longitudinally completely through said sleeve when in said driving position, said sleeve being formed with a plurality of circumferentially spaced longitudinally extending slots, a plurality of arms carried by and projecting radially outwardly from said shaft through said slots, a plurality of flukes of elongated channel shaped form each having spaced opposed sides pivotally secured at one end to an outer end of one of said arms, the opposite outer free ends of said flukes being of flattened broadened out spade-like form, and a plurality of links connecting mid-points of said flukes to said sleeve with one end of each of said links pivotally secured to said flukes between said opposed sides, said links being connected for rotating said flukes to longitudinal positions alongside of said sleeve in said driving position and to outwardly projecting positions relative to said sleeve upon relative displacement of said shaft in a ground withdrawal direction from said driving position, said channel shape form of said flukes being cut out adjacent said link ends to permit passage of earth therethrough.

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