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BORE HOLE FORMING APPARATUS

Filed June 1, 1965

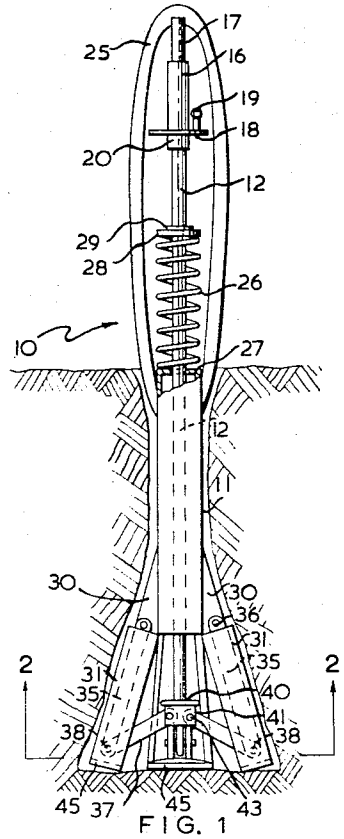



FIG. 1

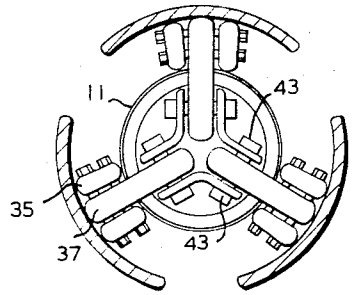



FIG. 2

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# BORE HOLE FORMING APPARATUS

Rudolph E. Parisien, Box 807, Montreal Road, RR. 1, Ottawa, Ontario, Canada

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## ABSTRACT OF THE DISCLOSURE

A tool for compressibly expanding the lower portion of a post hole which when filled with concrete provides a substantially conical footing for a post. The tool includes semicylindrical plates adapted to be forced outwardly by links in response to downward movement of a rod connected thereto which is in turn connected to a jack.

This invention relates to an apparatus for enlarging the lower portion of a post hole or bore hole which, when filled with concrete, provides a generally conical footing to support a post or the like.

Where soil conditions permit, post holes may be readily bored by power or hand operated augers. It is desirable, however, to provide an enlarged base or footing to prevent heaving of posts or piles particularly in areas where frost penetrates the ground to a considerable depth. It is also desirable to bore a hole only slightly larger than the post thus reducing the amount of concrete required to fill around the post.

In the case of a pile the bore hole may serve as a form for the concrete if an enlarged base can be provided. It is possible of course, to enlarge the lower portion of the post hole by digging. However, this is a slow hand operation and it is difficult to remove all the earth loosened in this manner.

Known devices include pile forming members adapted to expand when driven into the ground. It will be appreciated that such devices due to their size and power requirements are not suited for use in preparing holes for fence posts. Furthermore, such pile forming devices are usually adapted to remain in the earth and thus cannot be withdrawn for subsequent use.

### *Summary of the invention*

A bore hole framing apparatus including a guide member, a push rod slidable on said guide, a guide member and a push rod slidable on the guide with extensible means removing the push rod relative to the guide. A pair of plates with one end of each plate pivotally secured to one end of the guide and at least a pair of links pivotally interconnecting one of the plates with one end of the push rod whereby the operation of the extensible means causes the push rod to move outwardly relative to the guide and move the links and the plates radially outwardly.

It is a feature of the present invention to provide an apparatus for enlarging bottoms of a post hole by compressing the soil and thus it is unnecessary to remove the soil.

It is a further feature of this invention, to provide an apparatus which does not require powerful driving means such as a pile driver and which can be removed from a bore hole for subsequent use.

Accordingly, the present invention provides an apparatus for expanding the lower portion of a post hole, said apparatus comprising a guide member, a push rod slidable on said guide, extensible means for moving said push rod relative to said guide, at least a pair of plates an end of each plate being pivotally secured to one end of said guide, at least a pair of links each said link pivotally interconnecting one of said plates with one end of said push rod whereby operation of said extensible means causes



said push rod to move outwardly relative to said guide to move said links and said plates radially outwardly.

In the drawings which illustrate an embodiment of this invention,

FIG. 1 is a side elevational view of the post hole enlarging apparatus of this invention in use, and

FIG. 2 is a sectional view taken substantially along the line 2—2 of FIG. 1.

Referring now in detail to the drawings, in FIG. 1 an apparatus indicated generally by the numeral **10** includes a tubular steel guide member **11**, a steel push rod **12** extending therethrough and extensible means in the form of an hydraulic jack **14** engaging one end of the push rod **12**. Although an hydraulic jack is illustrated, it will be appreciated that a suitable screw type jack or the like could be used.

The jack **14** has a cylinder **16**, a piston **17**, a base **18**, an actuator **19** and a pressure release valve (not shown). A socket **20** on the base **18** receives the push rod **12**. The piston **17** is provided with a slot in its outer end to engage a substantially U-shaped frame **25**, which constitutes an extension of the guide **11**.

The frame **25** is preferably formed of angle iron or the like and has two arms and an interconnecting portion, the free ends of the arms being secured as by welding to the upper end of the guide **11**.

A helical spring **26**, carried by the push rod **12** is retained between a first collar **27** on the push rod **12**, which bears on the upper end of the guide **11**, and a second collar **28** also carried by the push rod and retained at a selected position thereon by a pin **29**.

As shown more clearly in FIG. 2, three apertured flanges **30**, secured as by welding to the lower portion of the guide **11** each have a curved plate **31** pivotally secured thereto. As each of the plates **31** and its associated linkage is substantially identical, only one need be described in detail.

A pair of members **35** each of which has apertures adjacent its ends receive the flange **30** therebetween and are secured thereto as by a bolt **36** passing through aligned apertures therein. The members **35** are, in turn, secured as by welding to the plate **31**.

The ends of the members **35** receive an apertured end of a link **37** therebetween and are pivotally secured thereto by a bolt **38** passing through aligned apertures. Inner ends of the members **37** are also apertured for pivotal connection to the lower end of the push rod **12**. A disk **40** secured as by welding to the lower end of the push rod **12**, has three downwardly depending brackets **41**. The brackets **41** being each provided with two apertures and a bend therebetween so that one of the links **37** is received between adjacent brackets **41** and pivotally secured thereto as by pins **43** extending through the aligned apertures in the links and the brackets.

While three plates **31** have been provided on the embodiment described and illustrated herein, it would be possible to construct an apparatus having as few as two plates and more than three plates without departing from the spirit of the invention.

It will also be noted that the plates **31** are segments of a cylinder and that members **45** are provided at the lower ends of the plates **31** to prevent the plates **31** from digging into the ground as they pivot radially outwardly during operation of the apparatus.

In operation, the apparatus **10** in its retracted state, is lowered into a bore hole and the hydraulic jack **14** is extended by moving the actuator **19** in a conventional manner. As the jack **14** extends the push rod **12** is moved downwardly thereby moving the links **37** and the plates **31** radially outwardly.

The plates **31** are thus driven into the earth to enlarge the lowermost portion of the bore. It will be noted that the

spring 26 is compressed by the downward movement of the push rod 12 and when the release valve of the jack 14 is operated, the push rod is withdrawn by the spring 26. The plates 31 are thus caused to be moved radially inwardly to a retracted position which permits apparatus to be withdrawn or partially rotated for further operation. If desired, one or more partial rotations and further operations of the jack 14 to extend the plates outwardly, will provide a more or less conical configuration in the bottom of the post hole.

I claim:

1. An apparatus for expanding the lower portion of a post hole, said apparatus comprising a frame including a guide member, a push rod slidable on said guide, extensible means acting between said frame and said push rod for moving said push rod axially outwardly relative to said frame, at least a pair of concavo-convex plates, an inner end of each plate being pivotally secured to one end of said guide, at least a pair of links, each said link pivotally interconnecting an outer end of one of said plates with an end of said push rod remote from said extensible means whereby operation of said extensible means causes said push rod to move said links and the outer ends of said plates connected thereto radially outwardly to compress soil at the bottom of said post hole and means for moving said push rod axially inwardly thereby moving said plates radially inwardly to permit said apparatus to be withdrawn from said post hole.

2. An apparatus for expanding the lower portion of a post hole, said apparatus comprising a tubular guide member, a push rod slidable in said guide, a jack acting between said push rod and said frame for moving said push rod relative to said guide, at least a pair of plates forming



segments of a cylinder, an end of each plate being pivotally secured to one end of said guide, at least a pair of links each said link pivotally interconnecting one of said plates with one end of said push rod whereby operation of said extensible means causes said push rod to move outwardly relative to said guide to move said links and said plates radially outwardly to compress soil at the bottom of said post hole, and means for moving said push rod axially inwardly thereby moving said plates radially inwardly to permit said apparatus to be withdrawn from said post hole.

3. An apparatus as claimed in claim 1 wherein said means for moving the push rod to a retracted position includes a spring acting between said frame and a collar on said push rod.

4. An apparatus as claimed in claim 1 wherein said outer ends of said plates have inwardly directed members disposed substantially normal thereto to resist the tendency of the plates to dig into the bottom of the hole.


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CHARLES E. O'CONNELL, *Primary Examiner.*