United States Patent

[11] **3,576,311**

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[54] **POST EXTRACTOR**
4 Claims, 3 Drawing Figs.

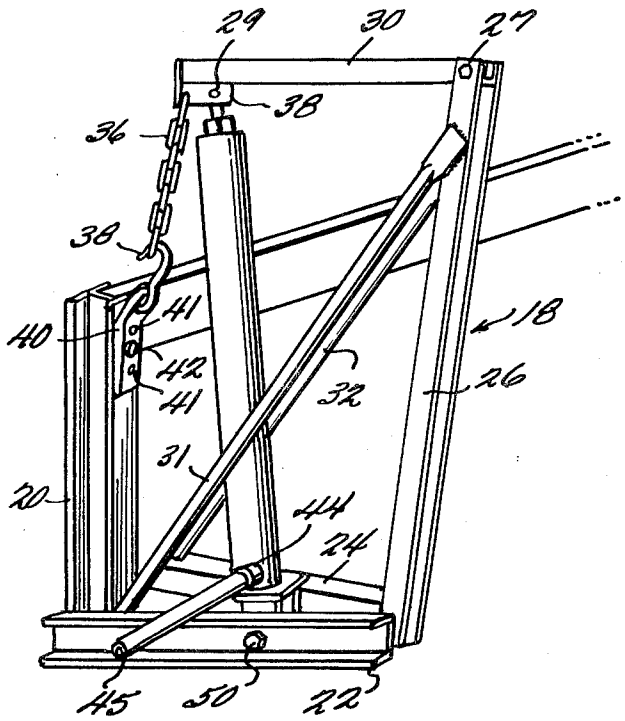
[52] **U.S. Cl.** **254/30,** 254/132
[51] **Int. Cl.** **E21b 19/00,** B66f 3/00
[50] **Field of Search** 254/2, 8, 29, 30, 131, 132; 214/1

[56] **References Cited**
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ABSTRACT: A light weight, simple, effective, hydraulically operated device for dislodging and extracting poles or similar structures from the ground. In one embodiment, a hydraulically operated piston pulls directly upward on a chain or strap directly attached to the post or pole to be dislodged while an arm attached to both the chain and piston and a frame allowing the arm to pivot as the post is pulled upward operate to minimize side forces on the piston arm. An adapter, for pulling long poles that have holes only near the top is also disclosed.



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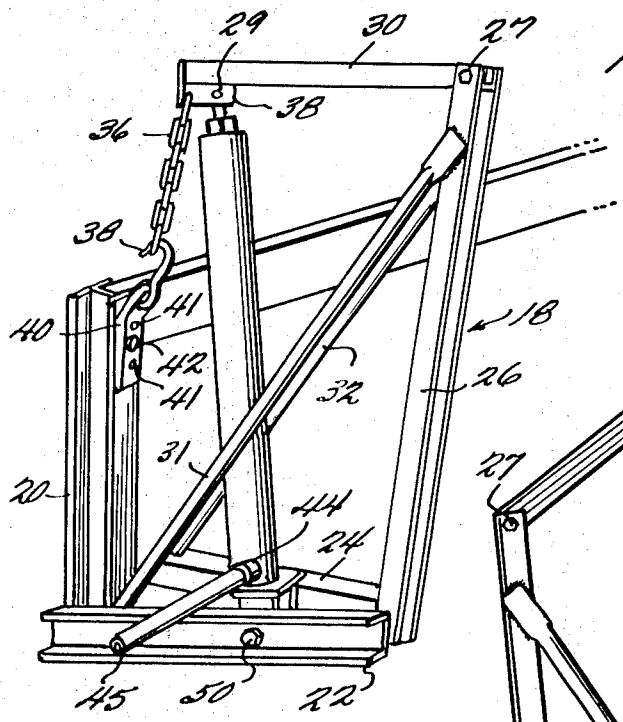


Fig. 1

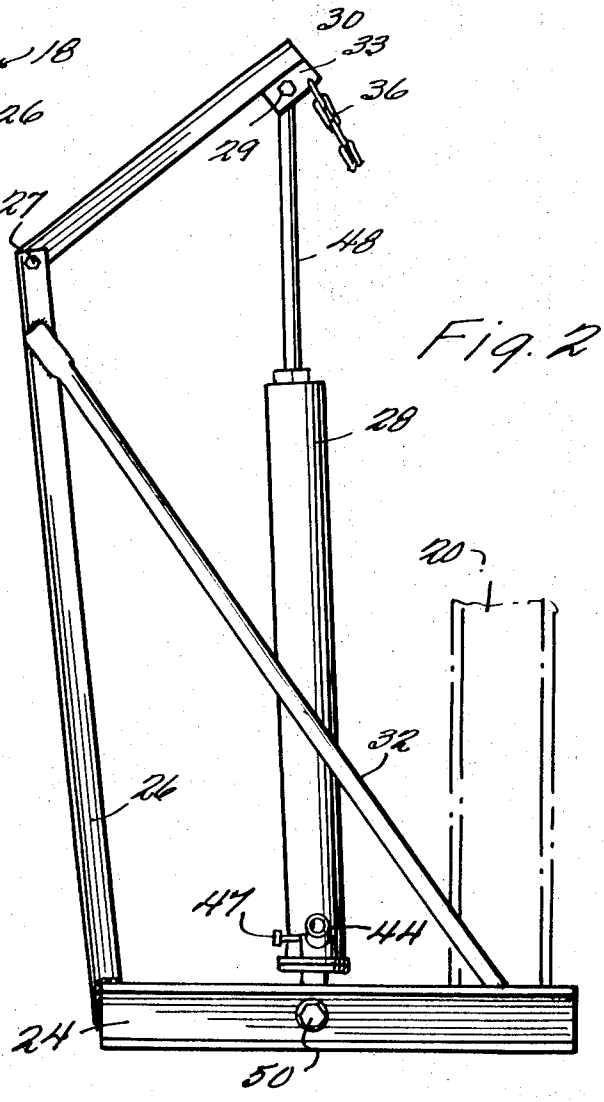


Fig. 2

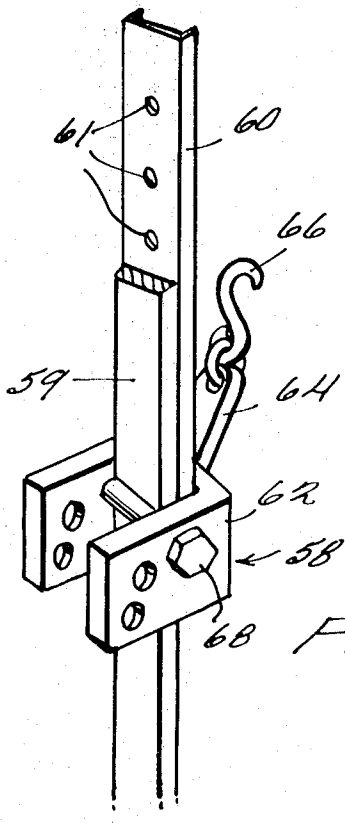


Fig. 3

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POST EXTRACTOR

BRIEF DESCRIPTION OF THE PRIOR ART AND SUMMARY OF THE INVENTION

Posts, poles and other similar structures are often mounted partially within the ground. Such poles and especially poles supporting signs and barriers along the highways necessarily are fixed securely and are often surrounded by concrete or other similar material to insure that the poles will not be removed by climatic occurrences or theft. However, such poles while indeed remaining securely in place often prove very difficult to extract when replacement, maintenance or change is necessary. Particularly, since such signs are often located in remote and relatively inaccessible places where sources of electrical or other power are not readily available, in the past such extraction has been accomplished by means of back-breaking muscle power supplied by workers. Thus, besides being difficult, such removal was usually slow and expensive.

A number of devices in the prior art have been employed to assist workers in dislodging posts. For example, the patent to Benchley, 3,103,343, shows a typical one of these post pulling implements whereby muscle power is applied by a worker through a lever to dislodge a post. Of course, such arrangements, while of great assistance to the workers delegated to extract the post did not wholly solve the problem since muscle power was still necessary and post removal was still slow and difficult.

The present invention seeks to solve this problem by employing hydraulic power to quickly and simply remove posts, poles and similar structures. Since hydraulic pressure can be easily taken to the inaccessible locations at which such posts are often found by means of specially constructed vehicles or carts which the workmen ride, or take to the pole sights, such pressure then provides an excellent source of energy for extracting the poles. Moreover, the hydraulically operated piston which applies an upward force on the post to extract the sign pulls substantially directly upward on the post or pole rather than acting through a lever arm as do many other hydraulically operated cranes or jacks such as the jack described in the U.S. Pat. to Buckeye, No. 3,059,785. Since sufficient strength is available in a suitable hydraulic system to pull almost any post, it is not necessary to increase that force by means of a lever. Further, since such a lever is subject to great stress and thus provides a weak point in the assembly it is necessary to provide a lever which will not break, thereby, increasing considerably the cost of the device. Pulling directly on the post both decreases the expense of manufacturing this invention and increases reliability. The arm in this invention, to which is attached the hydraulic piston at approximately the same location as the chain or other device which attaches to the post simply serves as a part of the frame and acts to minimize side forces on the piston arm.

Other objects and purposes of this invention will become clear after reading the following detailed description of the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a post extracting device of the present invention in position ready to pull a post supporting a guard rail;

FIG. 2 shows the extracting device of FIG. 1 in the extreme position after pulling a post or similar structure; and

FIG. 3 shows an adapter which can be employed with this invention to pull long poles which have holes only near the top,

DETAILED DESCRIPTION OF THE DRAWINGS

Reference is now made to FIG. 1 which shows a post extractor 18 attached to a post 20 which supports a guard rail and which is about to be pulled from the ground. The extractor 18 includes two horizontal legs 22 and 24 which are attached permanently at one end to a frame member 26, for example, by welding, and hold the extractor 18 firmly on the ground. These two legs 22 and 24 form a V angling outward from the place of attachment to the member 26. If desired, a single wheel or a number of wheels (not shown) can be mounted on the device 18 to permit easy movement. The post to be pulled, in FIG. 1 the post 20, can then be disposed between the outer ends of the legs 22 and 24 so that a piston and cylinder unit 28, or ram, can exert an approximately straight upward pull on the pole 20. Two inclined strut members 31 and 32 are attached permanently at their ends to the frame member 26 and to the legs 22 and 24, for example, by welding and serve to structurally strengthen the device. The legs 22 and 24 as well as the frame member 26 may be simply pieces of channel iron of conventional construction.

Attached to the upper part of the frame member 26 and adapted to pivot in a vertical plane about the point of attachment 27 is a guide arm 30 which serves to minimize side forces on the piston and cylinder unit 28 during a post pulling operation. The upper end of the unit 28 is pivotally connected to the outer end portion of the arm 30, as by means of a bracket 33 fixed to the arm 30 and a bolt 29. The lower end of the unit 28 is attached to a baseplate which is pivotally connected between the legs 22 and 24 as by a bolt 50 located at about the midpoint of the legs.

Any suitable arrangement of attaching the post or sign to the arm 30 can be employed, and it is envisioned that the arm 30 may have a number of mounting holes or fixtures so that any of a number of different connecting devices, such as chains of various lengths and solid metal connectors, can be employed. In the illustrated embodiment a chain 36 is attached to the outer end of the arm 30, as by attachment to the bracket 33.

In order to releasably attach the chain 36 to the pole 20 there is provided an adapter plate 40 which carries a hook 38. The plate 40 is provided with at least one hole 41 through which a bolt 42 may be inserted so as to pass through one of the usual holes in the pole 20. Three sizes of holes 41 are located on the illustrated adapter 40 so that the adapter will match any of several sizes of holes conventionally found in poles supporting guard rails and signs.

The piston and cylinder unit 28 which is illustrated in the drawings is of the type which includes a hand-operated pump assembly and valve means for controlling the operation of the unit. As shown, the pump assembly is provided with a socket 44 into which the end of a handle 45 may be inserted, the pump being operated by manual up and down jacking movement of the handle 45. The valve means includes a rotatable knob 47 which may be manually rotated in one direction to apply pump pressure to the unit 28 and in the other direction to release the pressure. When the pump is operated, a piston arm 48 moves upwards to the position shown in FIG. 2 thereby applying tension to the chain 36. The arm 30 pivots upwardly about the bolt 27 during this operation, but no bending forces are applied to the arm 30 as a result of the connection of both the piston arm 48 and the chain 36 to generally the same location on the arm 30. At the same time the piston and cylinder unit 28 pivots in a vertical plane about the pivot point 50. As shown in FIG. 1 the unit 28 when in its retracted position is inclined slightly from the vertical toward the post 20, and as shown in FIG. 2 is inclined slightly away from the post 20 when in its extended position.

In the embodiment of the invention as set forth in FIG. 1 the extractor 18 is capable of developing a lifting capacity of about 6,000 lbs. while weighing about 70 lbs. in contrast to the 100 or more pounds of upward force which a human of ordinary strength can apply. When the device has pushed the piston arm 48 to its furtherest extent as shown in FIG. 2, the post or guard rail 20 has also been elevated to a considerable height above its original position. If the lower end of the post 20 is still embedded in the ground, the pulling operation may be repeated by reconnecting the adapter to a lower point on the post 20.

FIG. 3 shows an adapter **58** which finds special utility for extracting long poles **59** which have holes only near the top. This adapter **58** is made up of a channel iron member **60** which has a large number of holes **61** at spaced intervals together with a holding member **62** which may be simply a conventional piece of channel iron. The member **62** is permanently attached to the member **60** by a weld, a bolt, or any other suitable means. Jutting from member **62** is an extension **64** to which is attached a hook **66** which in turn can be attached to a chain, such as chain **36** in FIG. **1**, to extract a post in the same manner as described above.

To attach the adapter **58** to the long pole **59** having holes only near the top, the pole **59** is slipped into the U-shaped interior of the member **62**, so that the member **60** runs roughly parallel to the pole **59** and in contact with it. One of the holes **61** in the member **60** is then appropriately bolted to one of the holes in the upper part of the pole **59** and a bolt **68** is placed in the one of the several holes in the member **62** which brings the bolt **68** closest to the pole **59**. The arm **30** is then connected to the hook **66**, for example, by means of a chain and the hydraulic piston and cylinder unit **28** then is operated to pull the pole **59** in the same manner as described above in connection with FIGS. **1** and **2**.

The embodiments described above are merely intended to be examples of the invention and many modifications and changes are possible without departing from the spirit of the invention.

I claim:

1. A device for extracting posts comprising:

linear hydraulic drive means having a generally vertical arm which is driven upward by the application of hydraulic pressure;

ground-engaging frame means supporting said drive means and including a guide arm pivotally mounted near one end for swinging movement in a vertical plane, said guide arm being pivotally connected near its other end to the upper end of said generally vertical arm; and

adapter means attachable to said post being extracted and to said guide arm in approximately the same location as said generally vertical arm.

2. Apparatus as in claim **1** wherein said adapter includes a chain connected to said guide arm, a hook connected to said chain, and an adapter member connected to said hook and adapted to be fastened to said post.

3. A device as in claim **1** wherein said adapter comprises:

a elongate channellike member having holes therein for securing said channel to a post;

a lower member attached to said channel member and having a hook means connected thereto for attachment to said guide arm; and

means for connecting said post to said elongate member.

4. A device for extracting posts comprising:

linear hydraulic drive means having a generally vertical arm which is driven upward by the application of hydraulic pressure,

frame means including a generally vertical support member, two horizontal legs attached at one end to said support member, each extending from the point of attachment generally horizontally to form a V and each engageable with the ground so that the post to be extracted is disposed between said legs, a guide arm pivotably mounted on the end of said support member opposite the end to which the legs are attached for swinging movement in a vertical plane, said guide arm being pivotably connected near its other end to the upper end of the said general vertical arm,

means for attaching said post to said guide arm in approximately the same location as said generally vertical arm, and

means for receiving hydraulic pressure and communicating said pressure to said drive means.