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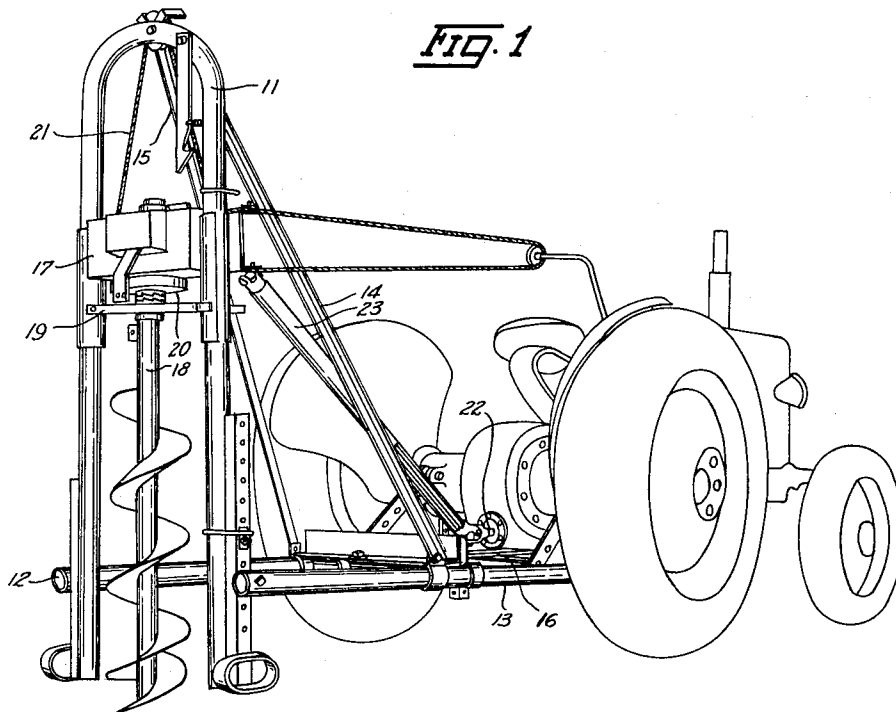
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POST HOLE DIGGER AND DRIVING MEANS THEREOF

Filed June 15, 1953

2 Sheets-Sheet 1



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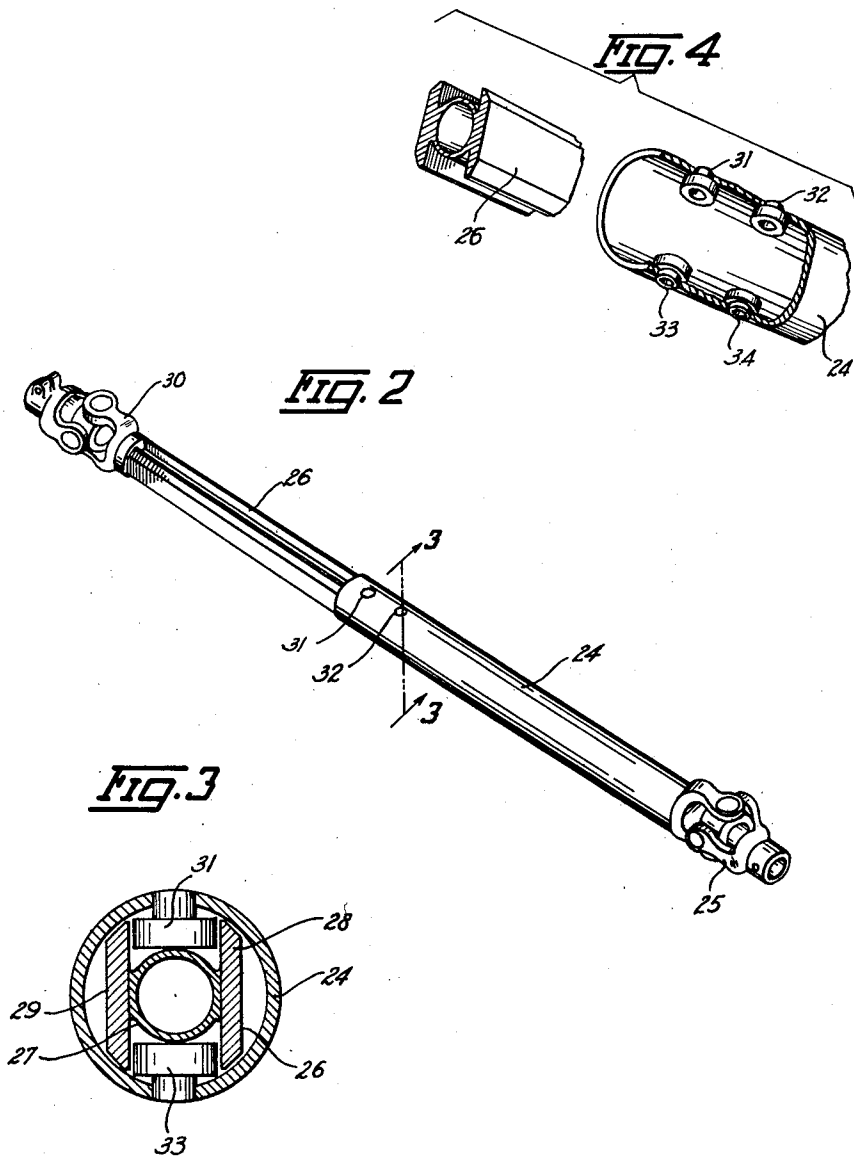
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POST HOLE DIGGER AND DRIVING MEANS THEREOF

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3 Claims. (Cl. 255—19)

This invention relates to post hole diggers and more particularly to the driving means for such structures.

In many post hole diggers it is customary to provide a stationary driving structure at the top of the digger, a driven gear and a square drive shaft slidably mounted in the gear. The auger is then attached to the slidable square shaft in order that it may be moved up and down as it digs. Such an arrangement is far from satisfactory in that excessive distortion is present and often causes the shaft to twist as the auger reaches its greatest depth.

It is one of the main objects of my invention to provide a device in which the auger and the power train can be in close coupled relation regardless of the depth of the hole dug. My invention is therefore directed to a post hole digger in which the power head is adapted to move up and down in relation with the auger.

It is a further object of my invention to provide a drive mechanism for the power head which extends and retracts as the head moves up and down. In drive mechanisms of this character it must be realized that high torque is present and that such a drive must not bind as it extends and contracts.

I avoid many of the difficulties of the prior art such as this binding action by providing a telescoping drive shaft in which the inner and outer tubular members are not permitted to contact one another. All such surfaces are separated from one another by rollers yet it is another object of my invention to so position these rollers that they will not weaken the drive shaft.

One of the features of my invention is the provision of a U-frame in which a vertically slidable power head may be mounted. A U-frame which is so adapted makes it possible for an auger to be closely coupled to the power head and a telescoping shaft to be positioned between the power head and the power take-off of the tractor or other vehicle.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specifications, wherein is disclosed a single exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a view in perspective of a post hole digger and drive mounted on a tractor to show the structure of the device and its position in relation to the tractor.

Figure 2 is a view in perspective showing the drive shaft in a partially extended position.

Figure 3 is a view in cross section, taken at 3—3 of Figure 2, showing the drive shaft as it appears in the center portion, and

Figure 4 is a cut-away view in perspective to show the sliding joint in the drive shaft and more particularly the rollers therein.

Referring now to the drawings and more particularly to Figure 1 thereof; in practicing my invention I provide

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a U-frame 11 which is supported by pipes 12 and 13 and braces 14 and 15 connecting to the pipes which in turn are mounted on the draw bar 16 of a conventional tractor. The aforesaid pipes and braces are all adjustable, however, the pipes will usually be positioned in approximately the same plane as the power take off of the tractor. Since the pipes are fastened to the lower portion of the U-frame the bulk of the frame will extend for some distance above the power take off.

Mounted in this U-frame is a vertically slidable power head 17. This head encloses a right angle gear drive the main shaft of which extends through the bottom of the power head to form a spindle for the auger 18.

The main shaft of the power head also carries a freely rotatable cable drum 20 which serves to wrap the cable 21 which is strung through a pulley adjacent the drum thence to a pulley at the top of the U-frame and returned to the power head where it is anchored. Immediately below the cable drum and between it and the freely rotatable auger is a reciprocating lever 19 which alternately connects the cable drum or the auger to the main power shaft through a conventional splined double-jawed clutch. It will be apparent from the foregoing description of the cable drum and cable that engaging the clutch with the cable drum will cause the power head to be elevated on the U-frame while releasing it will cause the head to drop.

Again referring to Figure 1 and the positioning of the slidable power head in the vertical U-frame it will be noted that the considerable travel of the head will cause the distance and the angle between the head and the customary power take off of the tractor shown at 22 to vary to a large degree. To achieve the flexible drive required by these conditions I have provided a telescoping shaft 23.

The structure of this telescoping shaft 23 is of considerable importance because of the difficulties encountered. A great deal of torque is present in such a drive, particularly when the auger is forced into hard dry ground where substantial power is required in order to dig. If the telescoping shaft is not freely moveable this excessive torque may cause it to bind and freeze with consequent damage to the machine and danger to the operator.

To overcome the effects of this binding action I have provided a drive shaft consisting of a tubular portion 24 having a universal joint 25 welded to the outer end. A second and smaller shaft 26 is adapted to telescope within the larger tubular member and also has a universal joint 30 welded to its outer end. The universal joint 30 is adapted to be mounted on the power takeoff of the tractor and the joint 25 is adapted to be operatively connected to the power head.

Referring to Figure 3 I will now describe in detail the structure of the second or smaller shaft 26. It will be seen that the main body or core of this shaft comprises a tubular member 27 which is approximately one-half the diameter of the outer tubular member or housing. Welded to this tubular member 27 are two flat bar like flanges 28 and 29 so positioned as to form an H-shaped cross section. The outer edges of these flanges are beveled so that the surfaces adjacent the tubular member 24 will be in substantially the same plane as the circular walls of the tubular member.

Positioned on the end of the tubular shaft 24 opposite the universal joint 25 are a plurality of rollers 31, 32, 33 and 34. It will be noted that these rollers are disposed in opposite pairs the shafts or axles thereof projecting through the outer walls of the larger tubular member. The rollers themselves are all of slightly less diameter than the distance between the inner faces of the opposed flanges of the smaller tubular member. Since the flanges themselves are beveled it is possible for most if not all of the roller surface to be in contact with one of the flanges. It will also be noted that in

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mounting the rollers in the wall of the outer tubular member I have accomplished the desired results with the least possible weakening of any of the members structurally.

From the foregoing description it will be apparent that I have provided a post hole digger and drive mechanism which accomplishes the desired objectives. I have provided a device in which the power head and auger will always be in a closely coupled relation thus avoiding the customary damaging strains present in other devices of this type.

It is also apparent that the possibility of the drive mechanism binding or freezing under pressure has been avoided since all forces are transmitted through rollers this being true even if considerable dirt or other foreign matter should be introduced into the mechanism.

While I have described a specific embodiment of my invention it will be understood that modifications of the herein described device may be made without departing from the spirit and scope of the present invention as set forth in the appended claims.

I claim as my invention:

1. In combination with a post hole digger having a vertically disposed U-frame and a power head slidably mounted in said U-frame having an auger mounted thereon, a telescoping drive, said drive comprising a tubular member having an H-shaped shaft slidably mounted therein, said tubular member further having a plurality of opposed rollers axially mounted on the inner surface thereof and received between the flanges of the said H-shaped shaft, a universal joint mounted on the outer ends of said H-shaft, a second universal joint mounted on the outer end of the tubular member and positioned to engage the aforementioned power head.

2. In a device of the type described having a power head slidably mounted in a vertically positioned U-frame, a telescoping drive mechanism associated with said power head and comprising a tubular shaft having a plurality of opposed rollers axially mounted on the inner walls

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thereof, the axis of said rollers being radially disposed in relation to the tubular shaft, a smaller tubular shaft having welded thereon a pair of opposed bars of substantially greater width than the diameter of the shaft to form an H-section, said H-section being slidable within said first named tubular shaft, said rollers being positioned between said opposed bars within said H-section whereby the outer periphery of said rollers will engage said bars, and a pair of universal joints, one of said joints being mounted on the larger tubular shaft, and the other of said joints being mounted on the smaller tubular shaft.

3. In a device of the type described having a U-frame and a power driven head slidably mounted therein, means for driving said head comprising a pair of tubular shafts, one of said shafts being approximately one-half the diameter of the other, a pair of opposed flat members welded to the smaller of said tubular shafts beveled on their outer edges to conform to the circular arc of the outer tubular shaft, a plurality of rollers axially mounted on the inner face of said larger tubular member, said rollers being of less diameter than the distance between said opposed flat members and positioned between the opposed faces thereof whereby said smaller tubular member may be telescoped within said larger tubular member, the forces therein being transmitted from said smaller tubular shaft through said flat members to the periphery of said rollers and to the larger shaft to prevent binding, and universal joints mounted on the outer end of each of said tubular members.

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