Dec. 23, 1952 G. E. BALDRY 2,622,847

APPARATUS FOR OPERATING EXCAVATING TOOLS

Filed Aug. 31, 1949 2 SHEETS—SHEET 1

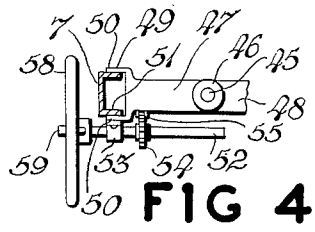


FIG 4

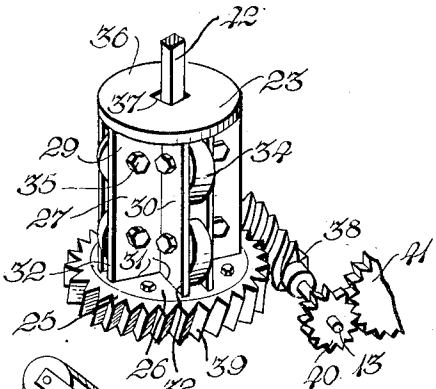


FIG 3

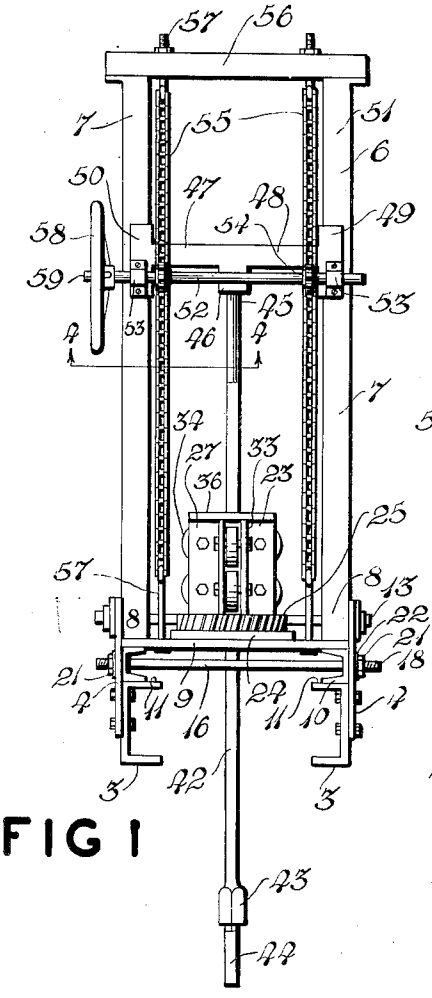


FIG 1

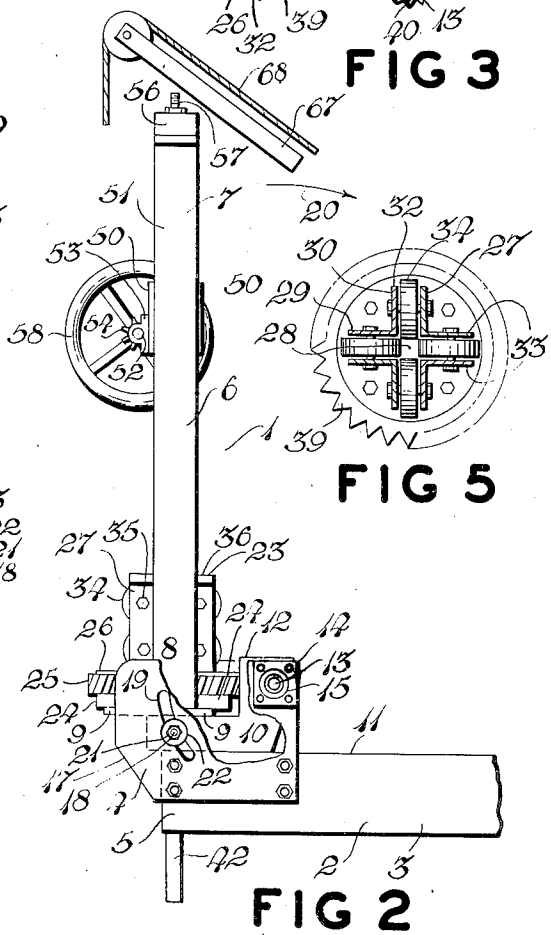


FIG 2

FIG 5

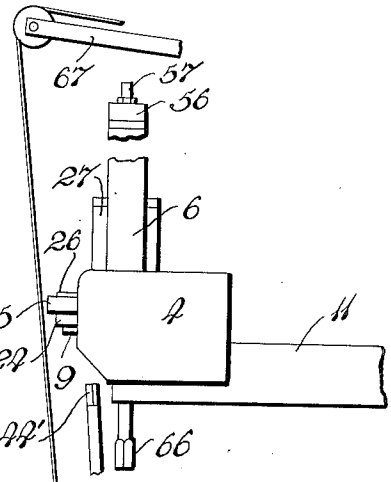
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APPARATUS FOR OPERATING EXCAVATING TOOLS

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FIG 6



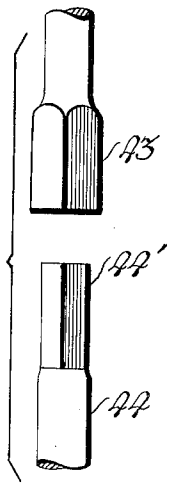
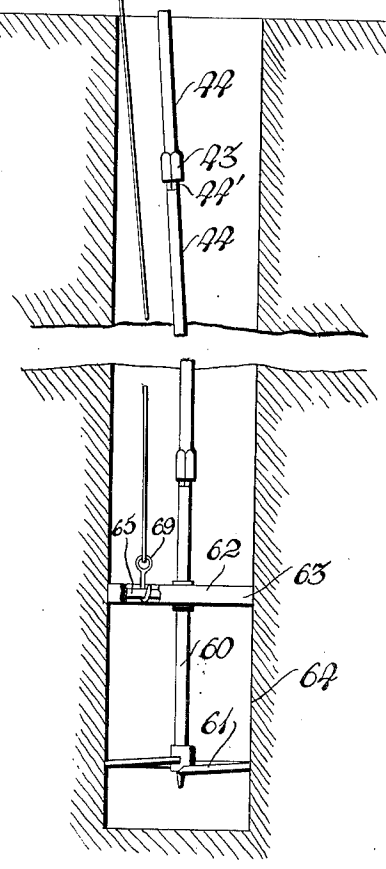


FIG 7



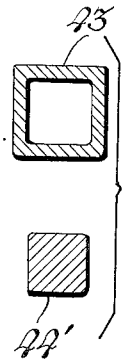


FIG 8

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Patented Dec. 23, 1952

2,622,847

UNITED STATES PATENT OFFICE

2,622,847

APPARATUS FOR OPERATING EXCAVATING TOOLS

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Application August 31, 1949, Serial No. 113,466

2 Claims. (Cl. 255—22)

1

My invention relates to new and useful improvements in excavating tool operating apparatus, an object of my invention being to provide a device of the character herewithin described whereby the excavating auger may be driven, fed downwardly and retracted upwardly expeditiously.

A further object of my invention is to provide a device of the character herewithin described wherein successive lengths of auger shafting may be added and coupled directly to the device.

Another object of my invention is to provide a device of the character herewithin described whereby the rate of speed of the auger is directly controlled by the operator the downward thrust being supplied directly from the crosshead.

A still further object of my invention is to provide a device of the character herewithin described which can be angulated from the vertical, if required, in order to obtain a direct thrust to the auger shafting.

A further object of my invention is to provide a device of the character herewithin described which permits rapid withdrawal of the length of shafting from the excavation in order to facilitate the removal of displaced soil.

A yet further object of my invention is to provide a device of the character herewithin described which is particularly suitable for mounting upon the rear of a truck or trailer which can be positioned adjacent the excavation and which furthermore can be driven from a source of power mounted upon said truck or trailer.

A still further object of my invention is to provide a device of the character herewithin described which is relatively economical in manufacture, of heavy duty construction and otherwise well suited for the purpose for which it is designed.

With the foregoing objects in view and such other objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:

Fig. 1 is a rear end view of the apparatus per se.

Fig. 2 is a side elevation of Fig. 1 sectioned in part to show the construction thereof.

Fig. 3 is an enlarged perspective fragmentary view of the open-centred through chuck.

Fig. 4 is a section viewed along the line 4—4 of Fig. 1.

2

Fig. 5 is a sectional plan view of the open-centred through chuck per se.

Fig. 6 is a fragmentary sectional view showing my device in operation.

Fig. 7 is an enlarged fragmentary view of the adjacent ends of a pair of auger-rod sections.

Fig. 8 is an enlarged fragmentary end view of the adjacent ends of a pair of auger-rod sections.

In the drawings like characters of reference indicate corresponding parts in the different figures.

In the art of building construction considerable difficulty is experienced in the formation of suitable excavations within the ground in order to receive supporting piles or the like due to the need for continuous removal of the excavated soil. While relatively simple at the commencement of the excavations, the length of auger shafting that has to be removed as the exacavation deepens renders the operation extremely laborious and time consuming.

The apparatus hereinafter to be described, permits the rapid insertion and withdrawal of lengths of auger shafting as well as providing a device which is self-contained and which may be driven directly to the site of the excavations.

Proceeding now to describe my invention in detail it will be seen upon reference to the accompanying drawings that I have illustrated the apparatus collectively designated 1 mounted upon a supporting structure 2 comprising, in this embodiment, a pair of relatively heavy duty, longitudinally extending channels 3 situated in parallel spaced relationship and which may be secured upon the platform of a truck or tractor (not illustrated).

A pair of rectangular plates 4 are bolted to the extremities 5 of the channels 3 extending upwardly therefrom and between which the apparatus 1 is situated. This apparatus comprises an upstanding headframe 6 taking the form of a pair of spaced and parallel, inwardly facing channels 7 secured at the lower ends 8 thereof as by welding or the like to a rectangular platform or plate 9 which in turn is mounted upon and secured to a pair of relatively short channel bearers 10.

The bearers 10 rest upon the upper flanges 11 of the aforementioned supporting channels 3 (when the apparatus is in the vertical position as illustrated) and are each provided with lug plates 12 which extend upwardly from the rear end thereof to be journalled upon a shaft 13 spanning

the aforementioned plates 4 adjacent the upper rear corners 14 thereof within suitable bearings 15.

A further shaft 16 spans the channel bearers 10 adjacent the forward ends 17 thereof with the extremities 18 engaging and extending through an arcuate slot 19 provided within each plate 4 as illustrated in Figure 2.

From the foregoing it will be appreciated that the headframe 6, mounted upon channel bearers 10, is capable of partial rotation in the direction of the arrow 20 pivoting around shaft 13. In order to maintain the headframe at the desired inclination from the vertical, friction nuts 21 together with washers 22 are screw-threadably engageable with the extremities 18 of shaft 16 which may be tightened thereby locking the channel bearers 10 to the plates 4 adjacent the arcuate slot 19 therein.

Mounted between the channels 7 of the headframe 6 and upon the platform or plate 9 is an open centered through-chuck collectively designated 23. A bearing shoulder 24 upon platform 9 provides support for a rotary drive member 25 in the form of a crown wheel, upon the upper surface of which is bolted a circular plate 26. The chuck 23 also includes a set of four angle bearings 27 situated in concentric and annular relationship around a square aperture 28 provided within the drive member 25. Each angle bearing 27 consists of a pair of right angularly related, vertically disposed flanges 29 and 30 welded to plates 26 at the lower ends 31 thereof, said flanges converging towards aperture 28 and having the edges 32 lying parallel with the rotary axis of the drive member 25. The adjacent flanges 33 of adjacent angle bearings are interfacially spaced and parallel and provide support for pairs of shaft-centering rollers 34 journalled therebetween upon pins 35.

A cap-plate 36 spans the upper ends of the angle-bearings 23 and is apertured as at 37 in alignment with aperture 28 within the drive member 25.

Drive means to rotate the open centered through-chuck 23 is provided in the form of a worm gear 38 secured to the aforementioned shaft 13 and co-acting with the rotary drive member 25 which is provided with helical teeth 39. A spur gear 40 is secured to the extremity of shaft 13, external of plate 4, and is connected via a further spur gear 41 to a source of power (not illustrated) which may be mounted upon the truck or trailer body.

A tool driving head shaft 42 of square cross-section extends vertically through the aperture 28 within the rotary drive member 25 and through the aperture 37 within the cap 36, bearing support being provided by means of the aforementioned rollers 34 held within the angle bearings 23. The lower end of shaft 42 is provided with a squared socket 43 to which may be attached lengths of conventional auger-rod section 44 by means of the square heads 44' thereof which complement socket 43. The upper end 45 of the squared shaft 42 is cylindrical and is journalled for rotation within a thrust bearing 46 carried upon the underside of a crosshead collectively designated 47. The crosshead 47 consists of a beam 48 spanning the aforementioned vertical channels 7 of the upstanding headframe 6, being provided with channel-engaging end pieces 49 in the form of a pair of plates 50 which engage around the flanges 51 of the channels 7. In at least one of the claims appended hereto, I have

defined the aforementioned vertical channels 7 as being spaced and parallel guides for the crosshead 47 which is capable of vertical sliding movement upon the guides and thereby being capable of applying endwise effort to the aforementioned tool-driving head shaft 42 which, as hereinbefore described, is slidably positioned in the open centred through chuck 23 and capable of rotation thereby due to the apertures 37 and 28 which complement the cross-section of shaft 42.

I have provided means for slidably moving the aforementioned crosshead 47 upon the guides or channels 7 in order to apply endwise effort to shaft 42, which takes the form of a counter-shaft 52 journalled to the crosshead 47 by means of pillow bearings 53 secured to plates 50 and having a pair of spaced sprocket wheels 54 secured thereto for rotation by shaft 52 and each being engageable with a vertically situated rack 55 which, in this embodiment, takes the form of a sprocket chain.

Sprocket chains 55, which are adjacent each guide or channel 7, extend between the aforementioned supporting platform or plate 9 and an overspanning member 56 situated across the upper ends of channels 7, the chains being secured by means of eye-bolts 57 so that they can be adjusted to the correct tension in order to provide an efficient engaging surface to the aforementioned sprocket wheels 54, one of which is engageable with each chain. I have provided a hand wheel 58 keyed to the extremity 59 of the countershaft 52 in order that the operator can rotate the shaft thereby moving the crosshead 47 vertically up or down the guides 7.

The means and method of effecting the attachment and detachment of a set of interchangeable auger-rod sections 44 is best illustrated in Figs. 6, 7 and 8 of the accompanying drawings. In this context it is to be appreciated that the leading auger-rod section specifically designated 60 is attachable to a conventional excavating auger 61 and is provided with a centering attachment 62 situated medially along the length thereof and comprising a circular excavation-engaging ring 63 which maintains the excavation indicated by reference character 64 in alignment. Ring 63 is maintained around shaft 60 by means of a set of spokes one of which is shown at 65.

The interchangeable auger-rod sections 44 are each provided with a square of polygonal socket 43 upon one end thereof and a complementary polygonal head 44' upon the other. The aforementioned head 44' of adjacent sections is receivable within the corresponding socket 43 and the drive transferred thereby. In at least one of the claims appended hereto, I have defined a set of separable auger-rod sections as a jointed auger shaft and it is to be understood that this shaft may be lengthened or shortened as desired depending upon the depth of excavation.

In operation the aforementioned crosshead 47 is raised to the upper extremity of the chains or racks 55 whereupon the first or leading section 60 is attached to the lower end thereof which in turn is fitted with a polygonal or square socket portion 66. The chuck 23 is now rotated as hereinbefore described thereby rotating the auger 61 downwardly, the downward thrust being provided thereto by means of the crosshead 47 as hereinbefore described.

When the crosshead 47 reaches the lower end of its travel, the crosshead together with the head shaft 42 is retracted whereupon the next

rod-section 44 is attached to the auger section 60 via the aforementioned socket and head connections 43 and 44' respectively whereupon the head shaft 42 is lowered into rotary engagement with the upper end of the rod-section by means of the crosshead 47.

When it is desired to withdraw the assembly from the excavation, I utilise a derrick 67 which may be driven by the source of power (not illustrated) and is adapted to overspan the device as clearly shown in Figs. 3 and 6. The cable 68 of the derrick 67 is attached by means of hook 69 to the aforementioned spokes 65 on the leading rod-section 60. The uppermost rod 44 is detached from the head shaft 42 whereupon the entire assembly is elevated by the derrick 67 until the next successive length is positioned at ground level.

At this point the rod-section at ground level is separated by endwise manual effort whereupon the auger shaft is raised until the next length is conveniently positioned for removal.

From the foregoing it will be observed that rapid withdrawal and replacement of the auger shafting lengths may be made and, in conclusion, I desire to point out that the head frame 6 may be inclined from the vertical as hereinbefore described, in order that a direct thrust upon the auger shaft may be made if the excavation is inclined.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:

1. Apparatus for operating an excavating tool, comprising in combination an upstanding head frame, supporting structure for said head frame, said head frame including a pair of spaced parallel, inwardly facing channels forming guides, a base plate, and an upper cross member spanning said guides, a pair of channel bearers upon which said base plate is mounted, a pair of upstanding plates secured to said supporting structure, said plates being pivotally secured at their rear ends to said channel bearers, a crosshead slidable in said guides, an open centered through chuck rotatably mounted upon said base plate between said guides, drive means connected

to said chuck for rotating the same, a source of power for operating said drive means, a tool driving head shaft of polygonal cross section slidably positioned in said chuck for rotation thereby, a thrust bearing on said crosshead to receive the upper end of said shaft, means for slidably moving said crosshead in said guides and thereby applying an endwise effort upon said shaft, said means consisting of a horizontal shaft journalled on said crosshead, sprocket wheels secured to said shaft adjacent to each guide for rotation by said shaft, means for rotating said shaft, and an elongated sprocket chain secured vertically adjacent to each of the said guides, said chains being secured at the upper ends thereof to said cross member and at the lower ends thereof to said base plate, one of said sprocket wheels being engageable with one of said sprocket chains, and the other of said sprocket wheels being engageable with the other of said chains.

2. The device, according to claim 1, which includes means whereby the angle of inclination of said head frame may be selectively moved from the vertical, said means including a pair of arcuate slots formed within said plates, toward the front ends thereof, a horizontal shaft spanning said plates at the rear ends thereof, said channel bearers being journalled upon said shaft, a further horizontal shaft secured to said channel bearers transversely, said second mentioned shaft extending through said arcuate slot, nuts screw-threadably engageable upon the ends of said second mentioned shaft and bearing against said plate, whereby said shaft may selectively be locked in the desired position within said slots.

GEORGE E. BALDRY.

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