

Aug. 7, 1945.

E. R. SNYDER

2,381,085

EXCAVATOR

Filed Jan. 8, 1944

3 Sheets-Sheet 1

Fig. 1.

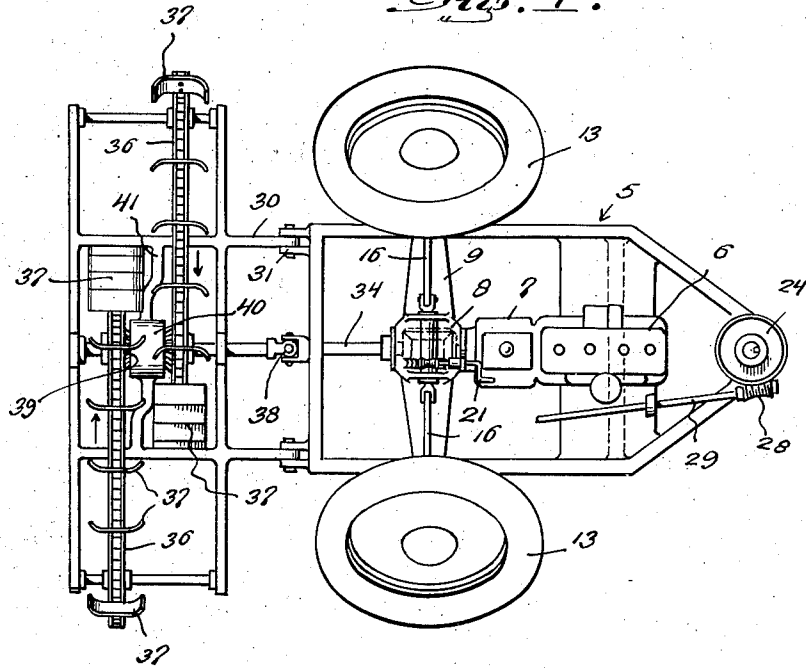
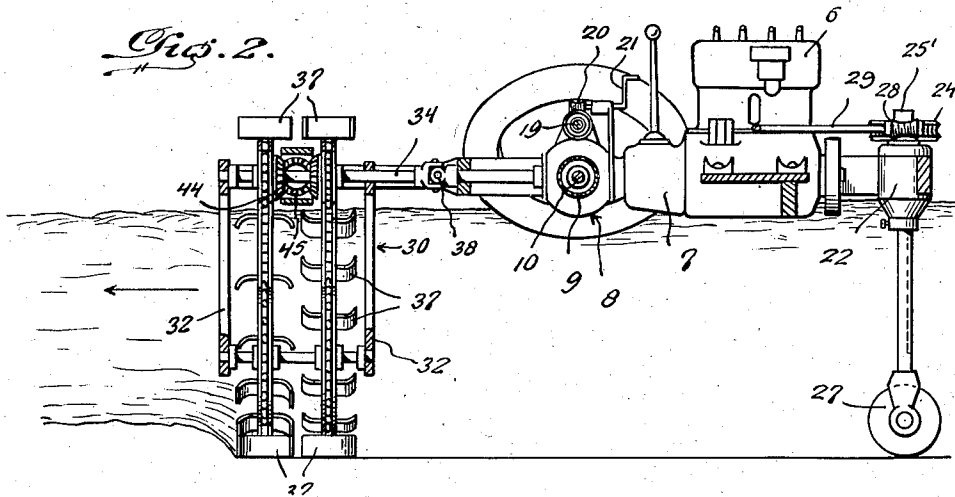


Fig. 2.



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Fig. 3.

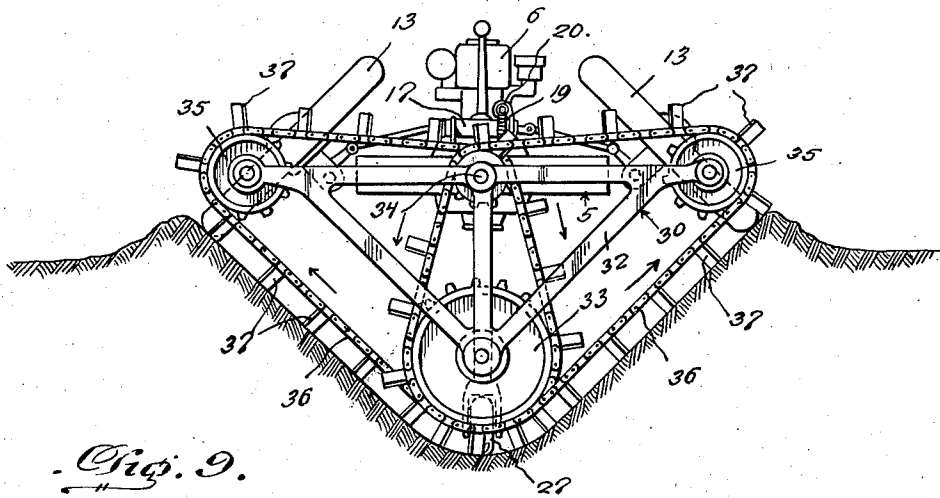


Fig. 9.

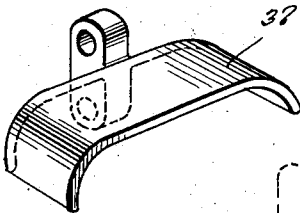
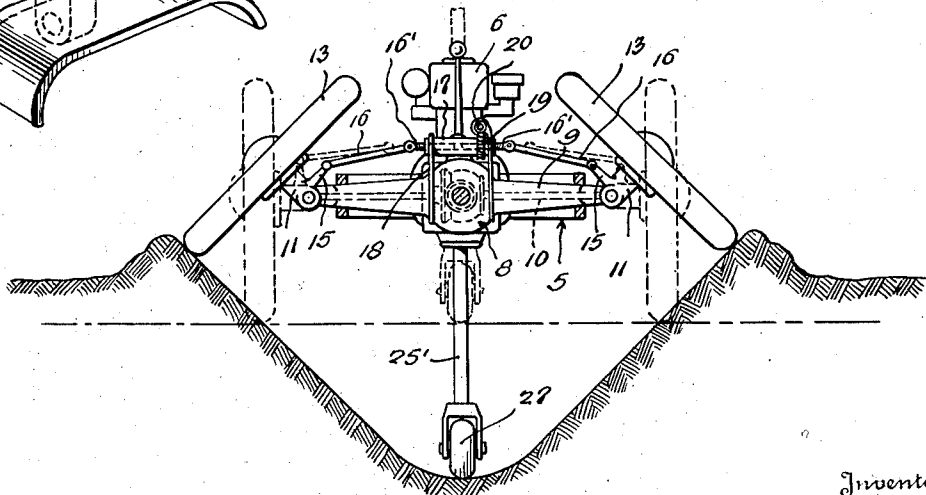


Fig. 4.



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Fig. 5.

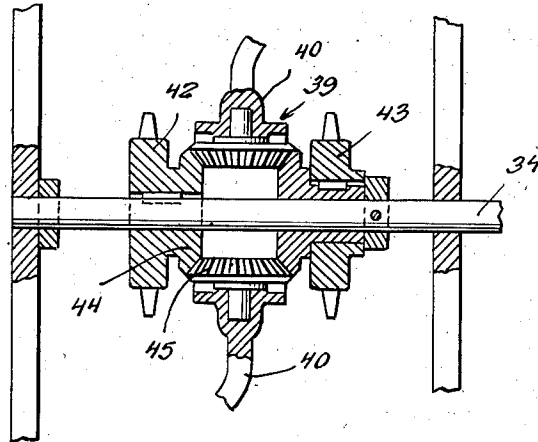


Fig. 6.

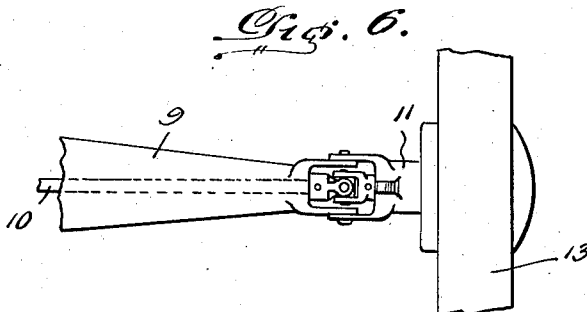
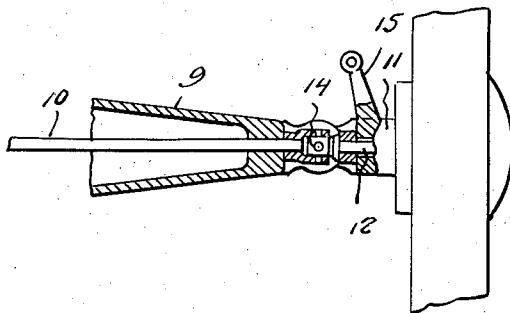
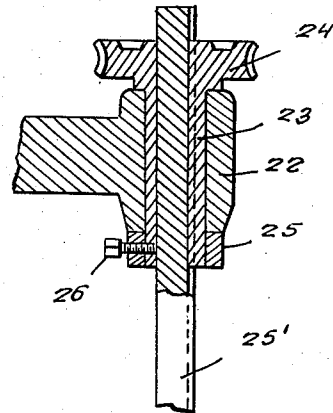


Fig. 8.



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UNITED STATES PATENT OFFICE

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EXCAVATOR

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Application January 8, 1944, Serial No. 517,561

2 Claims. (Cl. 37—80)

This invention relates to an excavator especially adapted for cleaning or deepening irrigation ditches, and has for the primary object the provision of a device of this character which will be capable of rapidly and efficiently cleaning or removing materials from ditches covering a large area within a minimum length of time, so that the ditches may be kept in proper condition at a nominal cost.

Another object of this invention is the provision of a device of the above stated character which is motor propelled and includes power driven cleaners acting to loosen the material within the ditch and conveying such material from the ditch at each side thereof, utilizing the same power source for the cleaners as used for the propulsion of the device.

A further object of this invention is the provision of a device easily adjusted for operating on ditches which vary as to depth as well as to width and the traction wheels of said device may be made to travel either on the surface of the ground at each side of the ditch or on the walls of the ditch, which permits the device to clean ditches of considerable depth.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts, as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a top plan view illustrating an excavator constructed in accordance with my invention.

Figure 2 is a longitudinal sectional view illustrating the device.

Figure 3 is an end elevation illustrating the arrangement of the cleaners so as to remove materials from the bottom and sides of the ditch and deliver such materials onto the ground at opposite sides of the ditch.

Figure 4 is a transverse sectional view showing the means of adjusting the angle of inclination of the traction wheels so that said traction wheels may be made to travel on the surface of the ground or on the walls of the ditch.

Figure 5 is a fragmentary horizontal sectional view showing a gearing arrangement for the driving of the cleaning elements in opposite directions.

Figure 6 is a fragmentary top plan view illus-

trating the journaling of one of the ground wheels and the drive connection therefor.

Figure 7 is a fragmentary horizontal sectional view showing the drive for the traction wheels.

Figure 8 is a fragmentary vertical sectional view showing means for raising and lowering the steering or pilot wheel as well as the steering therefor.

Figure 9 is a perspective view illustrating one of the blades of the cleaners.

Referring in detail to the drawings, the numeral 5 indicates a main frame supporting an internal combustion engine 6. The engine includes the usual variable speed transmission 7 operatively connected to a differential 8 of a conventional construction including a differential housing 9 and drive axles 10. A conventional clutch may be interposed between the transmission 7 and the differential 8. The ends of the differential housing have pivotally connected thereon stub axle housings 11 in which stub axles 12 are journaled and have secured thereto traction wheels 13 arranged at opposite sides of the main frame 5. The stub axles 12 are connected to the drive axles 10 of the differential by universal joints 14.

Arms 15 are formed on the stub axle housings 11 to which connecting links 16 are pivoted and which are in turn pivotally connected to feed stems 16' threaded in a sleeve 17 journaled on a mounting 18 carried by the differential housing 9. The sleeve 17 has a worm gear 19 secured thereto which meshes with a worm 20 secured on an operating shaft 21 including a crank handle. This construction will permit the operator of the device to change the position of the traction wheels from the full line position shown in Figure 4 to the dotted line position shown in Figure 4.

The traction wheels when adjusted vertically, as shown in dotted lines in Figure 4, are for the purpose of supporting the device on the ground surface at the opposite sides of the ditch and when adjusted into the inclined positions as shown in Figure 4 are adapted to support the device on the walls of the ditch and by varying the inclination of the traction wheels between the two positions as shown in Figure 4, the device may be made to operate at varying depths in the ditch. The traction wheels as shown in Figure 1 are located closer to one end of the main frame than the other end and said latter named end of the frame includes a vertically arranged bearing 22 in which is journaled a sleeve 23 having a worm gear 24 formed on its upper end and riding against the upper end of the bearing 22. A vertical spindle extends through the sleeve 23 and is splined or keyed thereto whereby the spindle may

move vertically. Mounted on the sleeve and engaging the lower end of the bearing 22 is a collar 25 equipped with a set screw 26 which locks the sleeve to the collar and also engages with the spindle to secure the latter against vertical sliding movement in the sleeve. However, the set screw 26 may be removed from engagement with the spindle and the latter adjusted vertically in the bearing. The lower end of the spindle has journaled thereon a steering or pilot wheel 27. The worm gear 24 meshes with a worm 28 of a steering rod 29. The steering rod 29 may form a part of a conventional type of steering mechanism (not shown) so that the operator of the device may steer the latter by turning the pilot wheel to the right or to the left. The spindle being adjustable in the sleeve 23 as specified will permit raising and lowering of the frame in accordance with the adjustment of the traction wheels to operate either upon the surface of the ground or on the walls of the ditch, so that the frame in either case will be maintained substantially horizontally.

It is to be understood that the steering wheel 27 travels on the bottom wall of the ditch.

An auxiliary or cleaner frame 30 is hinged on the rear end of the main frame, as shown at 31, and includes a portion 32 of substantially triangular shape with the apex thereof disposed lowermost for operation within the ditch. The apex of the portion 32 of the frame 30 has journaled thereon sprocket gears 33 and the frame directly above the sprocket gear rotatably supports a shaft 34. The frame also rotatably supports sprocket gears 35 arranged at opposite ends of the horizontal portion of the frame 30 or at opposite sides of the shaft 34 and in a plane above and laterally of the sprocket gears 33. Trained over the sprocket gears 33 and 35 are endless sprocket chains 36 forming parts of endless cleaners. The sprocket chains have secured thereto and arranged in spaced relation to one another, digging or cleaning elements or blades 37 which are adapted to act on the bottom and side walls of the ditch carrying the material loosened thereby outwardly of the ditch at opposite sides thereof. The sprocket chains travel in the directions indicated by the arrows in Figure 3.

The shaft 34 includes sections one of which is journaled in the frame 30 and the other on the main frame 5 and the sections are connected by a universal joint 38. The section carried by the main frame 5 is geared to the differential 8 to receive power therefrom. The other section of the shaft 34 operates with a gearing mechanism 39 supported by a suitable housing 40 secured to the frame 30 by hangers 41. Sprocket gears 42 and 43 are supported by the shaft 34 outside of the housing 40 and have the sprocket chains 36 trained thereover. The sprocket gear 42 is keyed to the shaft 34 while the sprocket gear 43 is journaled thereon. Beveled gears 44 are formed integrally with the sprocket gears 42 and 43 and operate within the housing and are connected by spider gears 45 journaled in the housing 40. The gears 44 and spider gears 45 cause the sprocket gear 43 to rotate in an opposite direction to the

direction of rotation of the sprocket gear 42 driven by the shaft 34. This arrangement brings about movement of the sprocket chains in opposite directions to each other so that the lowermost runs of the sprocket chains travel in the direction indicated by the arrows in Figure 3 to cause the cleaning blades 37 to drag material from the ditch outwardly thereof at each side of said ditch from the bottom thereof.

From the foregoing description taken in connection with the accompanying drawings it will be seen that a very practical and compact device has been provided and which is especially adapted for removing material from irrigation ditches and that the same power source used for the propulsion of the device may also be employed for driving the cleaners. Further, it will be seen that the cleaners operate from the bottom of the ditch and upwardly against the walls of the ditch so as to efficiently remove material from the ditch in a direction from the bottom of the ditch outwardly therefrom at opposite sides of the ditch resulting in efficiently cleaning material from all walls of the ditch.

Further, it will be seen that the cleaners are so mounted and connected with the power source of the device that the cleaners may rise and fall as they operate on the ditch walls.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention claimed.

Having thus described the invention, what I claim is:

1. In an excavator, a main frame, a pair of traction wheels for the support of said frame, a pilot wheel for the support of said frame and capable of being steered, said traction wheels including pivotally mounted stub axles, a power source on the frame, a drive means connecting the wheels to the stub axles and to said power source, and including universal joints, means connected to the stub axles for varying the inclination of the traction wheels from a vertical position, and an excavating mechanism carried by the frame operated by said drive means.

2. In an excavator, a main frame, traction and steering wheels supporting said frame, means for varying the inclination of said wheels from a vertical position whereby the main frame may be raised and lowered with respect to the ground, a power source on the main frame, a drive means connecting the traction wheels to the power source, a subframe hinged to the main frame and including a substantially triangular shaped portion having its apex disposed lowermost, sprocket wheels journaled on the subframe, sprocket chains trained over said sprocket wheels and arranged thereby each in substantially triangular shaped formation and mounted for movement in opposite directions to each other, gearing for driving said sprocket chains in a reverse direction from said drive means, excavating blades secured to said chains.

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