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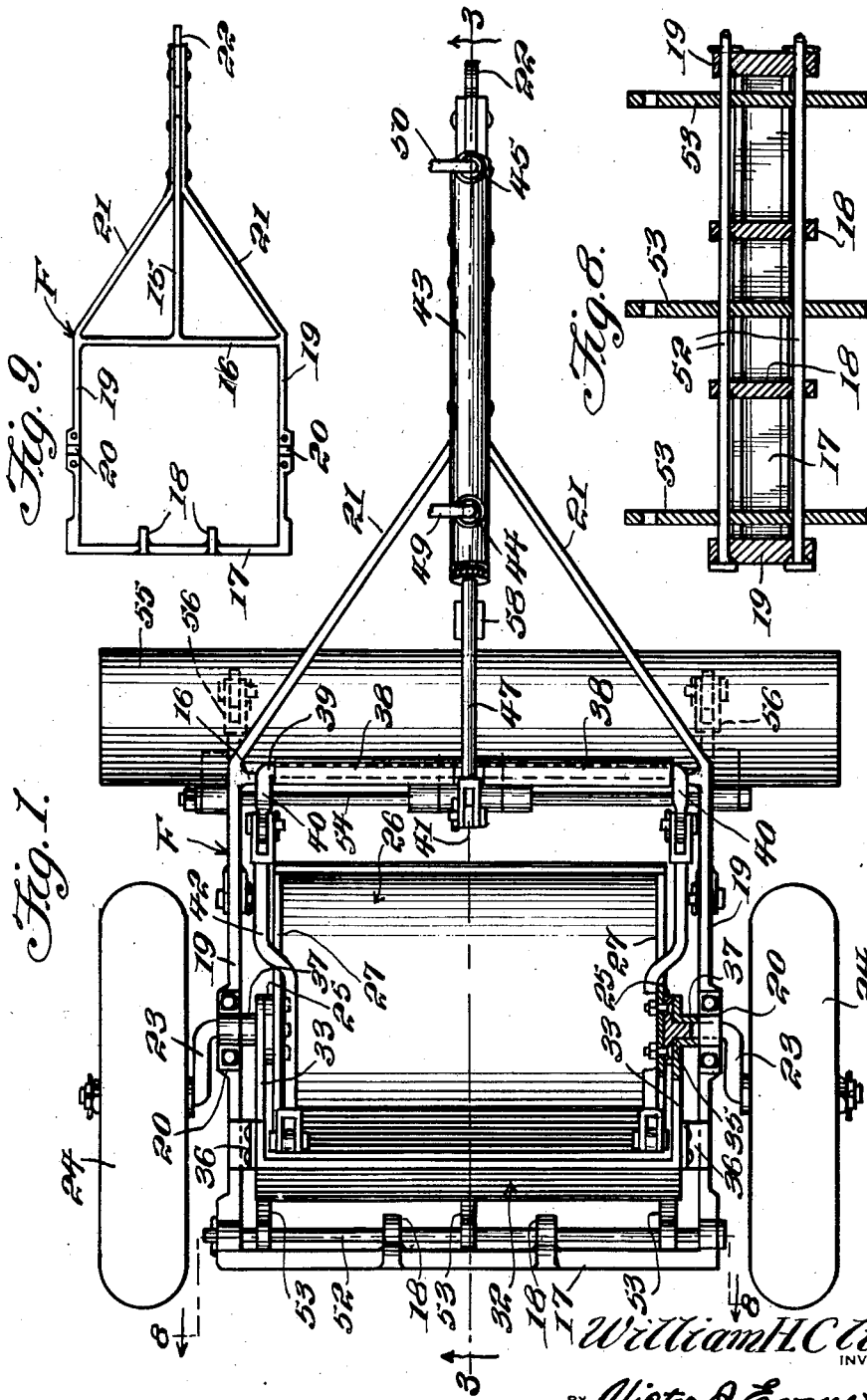
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2,311,639

EARTH WORKING APPARATUS

Filed Oct. 13, 1941

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

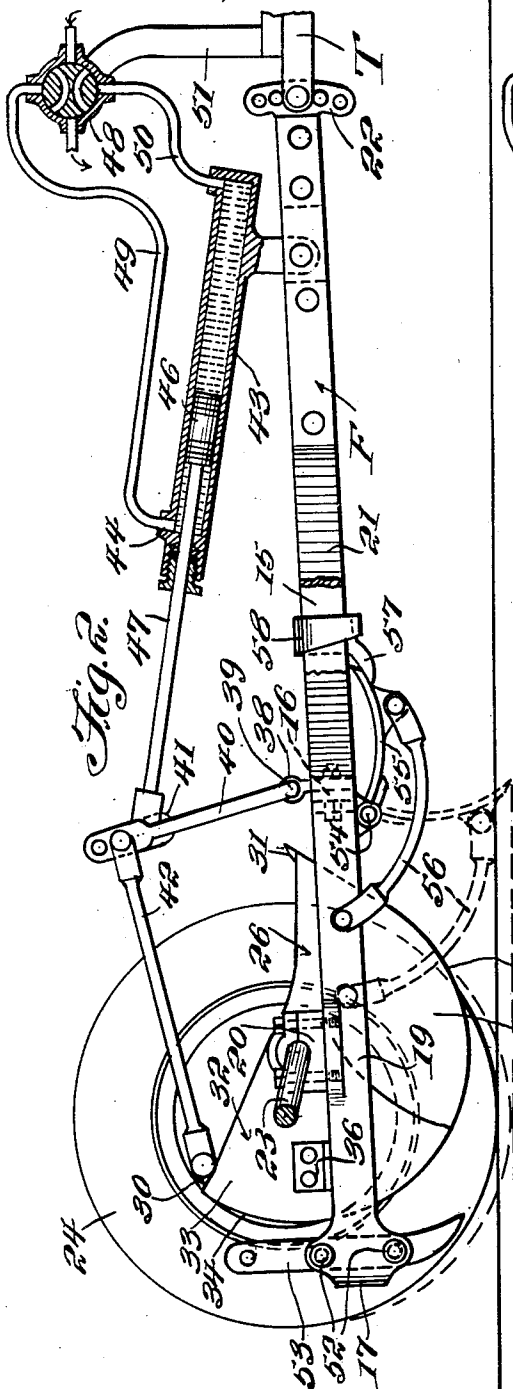


Fig. 2.

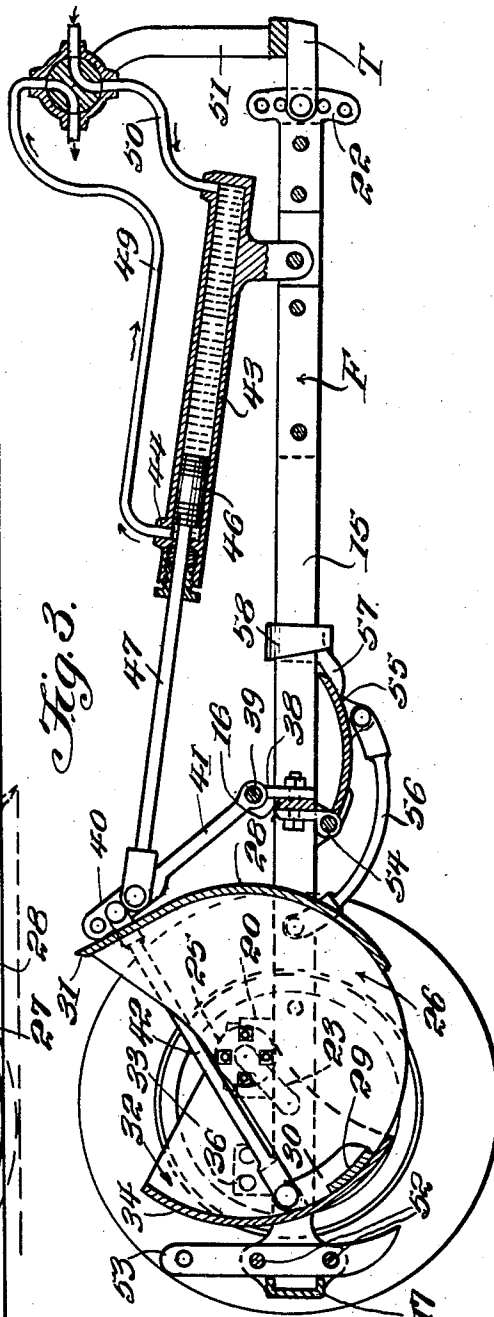


Fig. 3.

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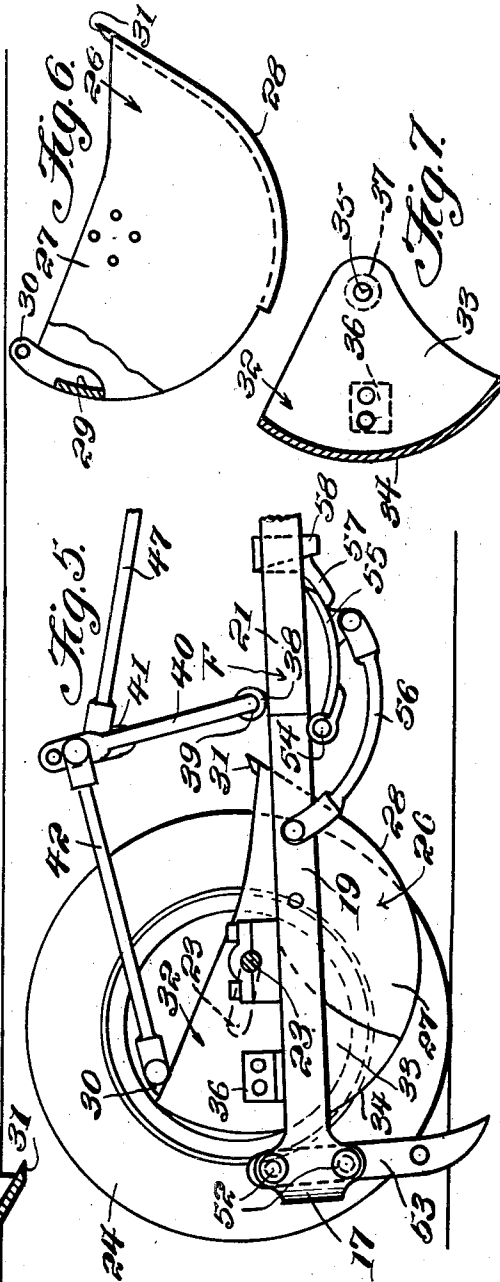
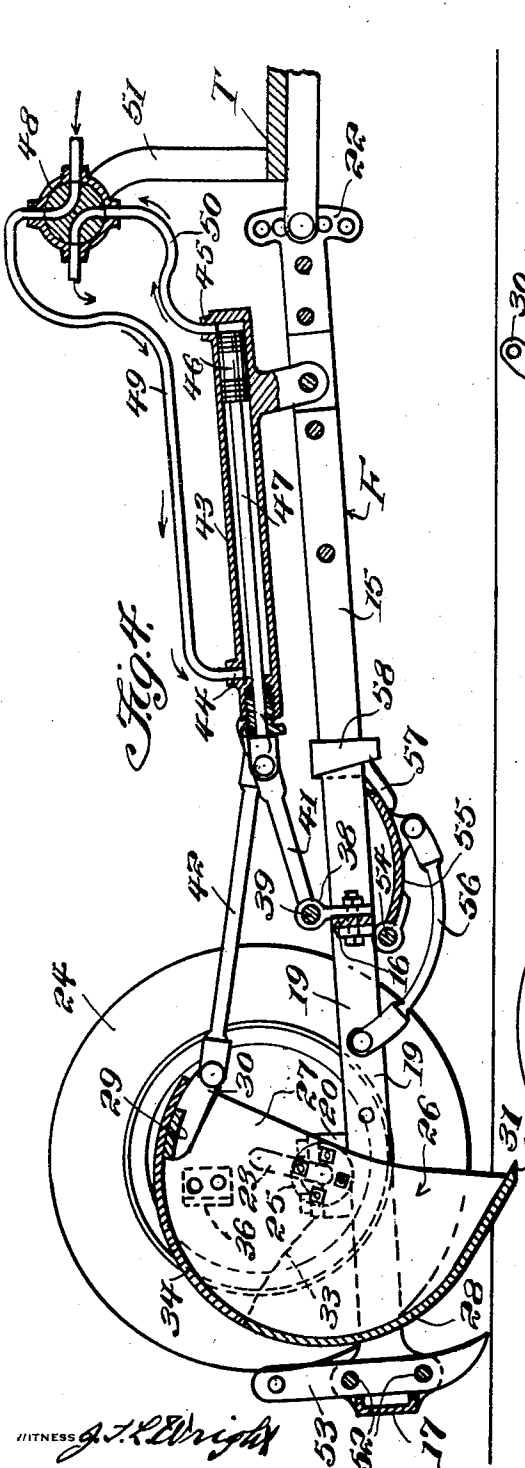
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EARTH WORKING APPARATUS

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3 Claims. (Cl. 37—133)

The present invention relates to new and useful improvements in earth working apparatus.

An object of the invention is to provide an earth working apparatus of generally improved design.

Another object of the invention is the provision of an earth working apparatus which is highly efficient for scraping, earth carrying and load dumping.

A further object of the invention is to provide an apparatus of the above character having fluid actuated means for operating a scraping, carrying and dumping member thereof.

Still another object of the invention is to provide apparatus of the aforesaid character which is compact, durable and relatively simple in construction.

A still further object of the invention is the provision of an earth working apparatus of the above character which is rapid and efficient in operation and which can be conveniently operated.

Other objects and advantages will be apparent from the following description and appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings illustrating a practical adaptation of the invention, and in which:

Figure 1 is a top plan view of the apparatus in earth carrying arrangement,

Figure 2 is a view partly in side elevation and partly in section of the same,

Figure 3 is a longitudinal section taken on line 3—3 of Figure 1 with one section of the bowl in earth dumping position,

Figure 4 is a similar view showing the bowl of the apparatus in earth scraping position,

Figure 5 is a fragmentary longitudinal sectional view showing the digging elements in extended digging position,

Figure 6 is an end elevational view of one of the bowl sections,

Figure 7 is a transverse sectional view through the complementary bowl section,

Figure 8 is a transverse section taken on line 8—8 of Figure 1, and

Figure 9 is a top plan view of the frame of the apparatus.

With reference to the drawings, wherein like characters of reference denote corresponding parts throughout the several views F generally designates the frame of the apparatus which embodies a rectangular shaped body section having an elongated draft bar 15 extending for-

wardly from the center of the front transverse frame bar 16. The rear transverse frame bar 17 is advantageously of channel shaped cross section formed with a pair of spaced forwardly directed bearing eyes 18. At the medial portion of each side bar 19 of the frame body is provided a bearing 20. A pair of converging bars 21 serve to reinforce the connection of the draft bar 15 with the body section of the frame. To the forward end of the draft bar is connected a hitch head 22 provided with a plurality of apertures for adjustable connection with a tractor T or other suitable draft means.

In each of the side bearings 20 is rotatably mounted the inner transversely directed journal portion of an axle crank 23 having the right angularly directed arm disposed outwardly of the frame and having each of a pair of supporting or carrier wheels 24 rotatably mounted on the outwardly directed spindles thereof. The journals of these cranks are disposed in transversely aligned position and are formed, at their inner ends, with flanges forming transversely disposed disks 25 which serve to support a bowl section 26.

This bowl section embodies a pair of approximately semi-circular end walls 27 formed integral with or connected to the end edges of an essentially arcuate bottom wall 28 extending transversely of the frame between the end walls, and from the front of the section to a point slightly exceeding one-half the extent of the outer edge of each of the end walls. Secured to and extending between the rear portions of the end walls 27 is a longitudinal bar 29 formed at each end with a web terminating in an upwardly projecting apertured ear 30. As shown to advantage at Figures 4 and 6, the forward marginal portion of the curved wall 28 may be practically straight to form a scraping portion which terminates in a bevelled scraping edge 31 projecting beyond the ends of the end walls.

Mounted to assume complementary relationship with the main bowl section 26 is an auxiliary bowl section 32 of reduced segmental size having approximately sector shaped end walls 33 whose outer peripheral edges are formed integral with or secured to the end of a bottom wall 34 extending transversely of the frame and of arcuate transverse curvature corresponding to that of the outer edges of the end walls. In the reduced ends the end walls 33 are provided with concentrically arranged apertures 35. To the outer side of each end wall 33 is secured an angle member 36 providing laterally directed stop lips

disposed to contact with the side bars 19 of the frame. When assembled in bowl forming relation the end walls 33 of the auxiliary bowl section assume position outwardly of and in planes parallel with the end wall 27 of the main section while the rear wall 34 is curved on a radius corresponding to the curvature of the wall 28 to assume a continuous relationship therewith when the sections are closed, as shown at Figure 4. In such arrangement the bar 29 assumes a position within the wall 34. The apertures 35 are fitted on sleeves 37 rotatably mounted on the crank journals between the disks 25 and the frame bearings so that the auxiliary bowl section is freely rotatable about the shaft portion of the cranks.

On the forward cross bar 16 are fastened a pair of aligned complementary bearing sleeves 38 having journaled therein a transversely extending rock shaft 39 formed with right angular crank arms 40 at the ends and a crank arm 41 at its center. The outer end of each crank arm 40 is pivotally connected to the inner end of a longitudinally extending connecting rod 42 bent to form an offset at its medial portion and having its rear end pivotally connected to the ear 30 of the bowl section 37.

To the forward portion of the draft bar 15 is pivotally connected an elongated fluid containing cylinder 43 having ports 44 and 45 at its end portion and having a reciprocating cylinder 46 operatively mounted therein. To this piston is connected the inner end of a piston rod 47 slidable through a packed opening in the front of the cylinder and having its outwardly extending end pivotally connected with the outer end of the crank arm 41 of the rock shaft. The ports 44 and 45 of the cylinder are connected with a control valve 48 through the medium of a pair of flexible conduits 49 and 50. The valve 48 may advantageously embody a rotary plug having passages adjustable to connect the connecting lines 49 and 50 with either the feed port or the discharge port of the valve or, to intermediate positions to cut off the fluid supply. As illustrated at Figures 2, 3 and 4 the control valve 48 may be mounted upon a bracket 51 of the tractor in a position conveniently operable from the driver's seat.

At the rear of the frame F, immediately forward of the channel bar 17 are mounted a pair of parallel rods 52 extended through the apertured projections 18 and apertures in the sides of the frame to support thereon a plurality of, in the present example three, digging implements or picks 53. These implements embody flat elongated bars having forwardly curved and pointed bottom ends and provided with apertures for adjustable connection with the support rods 52.

To the frame bar 16 is connected, by a hinge connection 54, an elongated scraper blade 55 extending transversely below the frame and preferably shaped to provide an arcuate transverse curvature. To this blade are connected a pair of arcuate arms 56 adapted for pivoted connection with the side bars 19 of the frame at two longitudinally spaced points for firmly bracing the scraper blade in its depending scraping position and to allow movement thereof to a forwardly directed elevated in-operative position. In the latter arrangement of the blade 55 it is releasably supported by a finger 57 slidably mounted on the draft bar by a slide yoke 58.

To swing the bowl of the apparatus from its load carrying position, as shown at Figure 2, to

an earth scraping position as illustrated at Figure 4, the valve 48 is actuated to connect the fluid conduit 49 with the feed line from a source of fluid pressure on the tractor so as to slide the piston 46 toward the front end of its cylinder. This movement of the piston retracts the piston rod 47 and, through the medium of the rock shaft and the connecting rods 42, effects clockwise rotation or swinging movement of the closed bowl sections to dispose the scraping edge 31 thereof in a downward position. As the bowl is thus turned the cranks 23 are also rotated to elevate the carrier wheels 24 with relation to the frame and the bowl so that the forward edge portion of the latter is disposed below the lowest point of the wheels to obtain an efficient scraping position. When a predetermined load of earth is gathered in the bowl it is again swung to its previous load carrying position open side upward with its lowest point above that of the wheels, as clearly shown at Figures 2 and 5. When the apparatus has been drawn to a discharge location the fluid mechanism is operated to effect further extension of the piston and the piston rod with the result that the main segmental bowl section 26 is swung upward in a counter clockwise movement while such further rotation of the auxiliary segmental bowl section 32 is restrained by the projecting lips 36 which contact with the side bars of the frame. This action separates or opens the bowl sections to provide a substantial gap or opening between the adjacent edges thereof for discharging or dumping the load of material from the bowl.

For leveling and like operations the blade 55 is dropped to depending position where it is firmly braced by the arms 56 attached to the frame and the wheel carrying cranks rotatably adjusted to obtain the desired frame elevation. The digging elements 53 may likewise be adjusted to operative positions for scoring or breaking up hard soil or the like.

This construction provides a highly efficient earth working apparatus useful for scooping, level scraping and digging and featuring a novel and improved scoop bowl for scraping, load carrying and dumping and having operative mechanism which can be easily and conveniently controlled from a tractor.

It is to be understood that the invention is not confined to the specific construction, arrangement or use illustrated and described and that considerable modification may be made therein within the spirit of the invention as defined by the appended claims.

Having thus described the invention, I claim:

1. In apparatus of the character described, a frame, a pair of complementary cranks journaled on opposed sides of the frame, a pair of carrier wheels rotatably mounted on the spindles of the cranks, a main segmental bowl section mounted transversely of the frame and secured to the inner journals of the cranks, an auxiliary segmental bowl section pivotally connected with the crank journals in complementary relation with the main bowl section, stop elements attached to the auxiliary bowl section engageable with the frame to limit the pivotal movement of the auxiliary section, and means carried by the frame and connected with the bowl whereby to swing the same to load gathering and carrying positions and to separate the sections for dumping the load therefrom.

2. In apparatus of the character described, a frame, a pair of complementary cranks journaled

on opposed sides of the frame, a pair of carrier wheels rotatably mounted on the spindles of the cranks, a main segmental bowl section mounted transversely of the frame and secured to the inner journals of the cranks, an auxiliary segmental bowl section pivotally connected with the crank journals in complementary relation with the main bowl section, stop elements attached to the auxiliary bowl section engageable with the frame to limit the pivotal movement of the auxiliary section, fluid operated mechanism mounted on the frame and connected with the bowl for moving the same to load gathering, carrying and dumping positions, and valve means for selectively controlling the operation of the said fluid operated means.

3. In apparatus of the character described, a frame, a pair of cranks, each of the said cranks

5 having a journal rotatably mounted transversely in a bearing on the frame and an off set transversely directed spindle, a pair of carrier wheels rotatably mounted on the respective spindles of the said cranks, a segmental bowl section mounted transversely of the frame and rigidly fastened to the journals of the cranks, a second segmental bowl section mounted to turn about the axis of the crank journals in complementary relation 10 with the first mentioned bowl section, stop elements projecting from the second bowl section and engageable with the frame to limit the pivotal movement of the said section, and means connected to one of the bowl sections for turning the same to dispose the sections in load gathering and carrying position and to arrange the sections in open dumping position.

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