March 8, 1938. R. S. WEIMER 2,110,186

EXCAVATOR

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Fig. 1

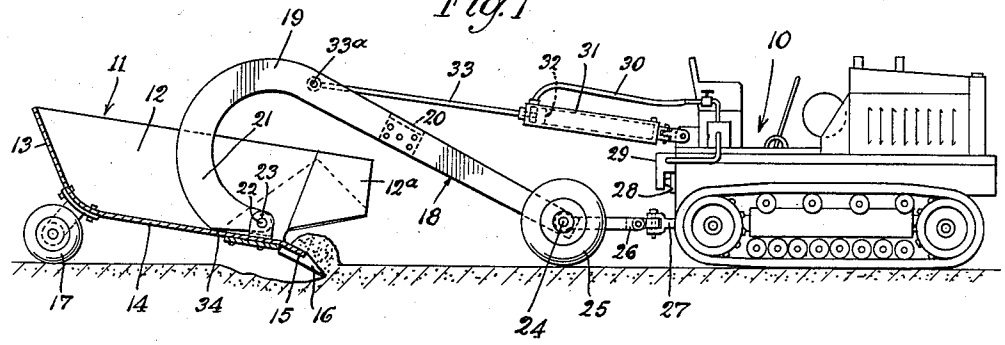


Fig. 2

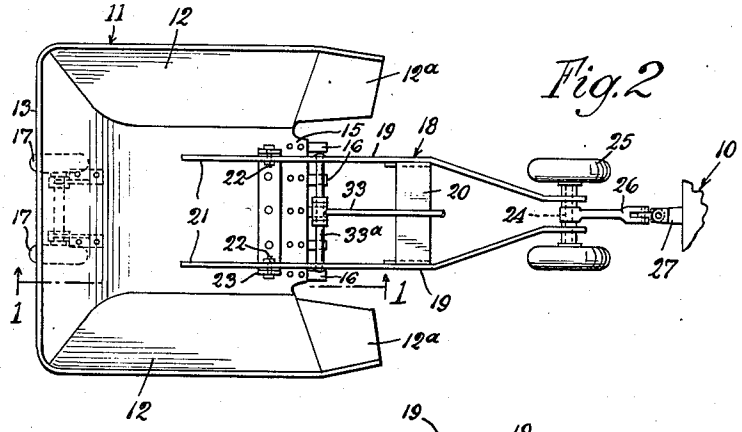
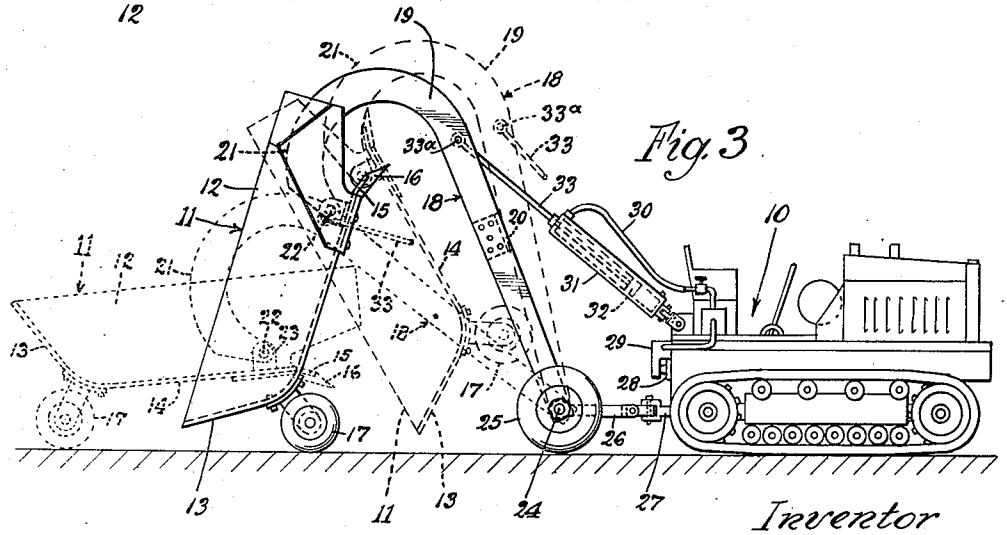


Fig. 3



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Fig. 4

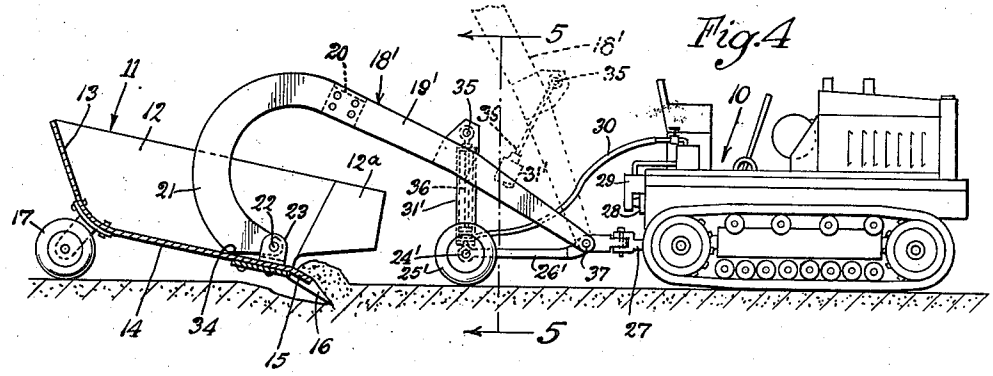


Fig. 5

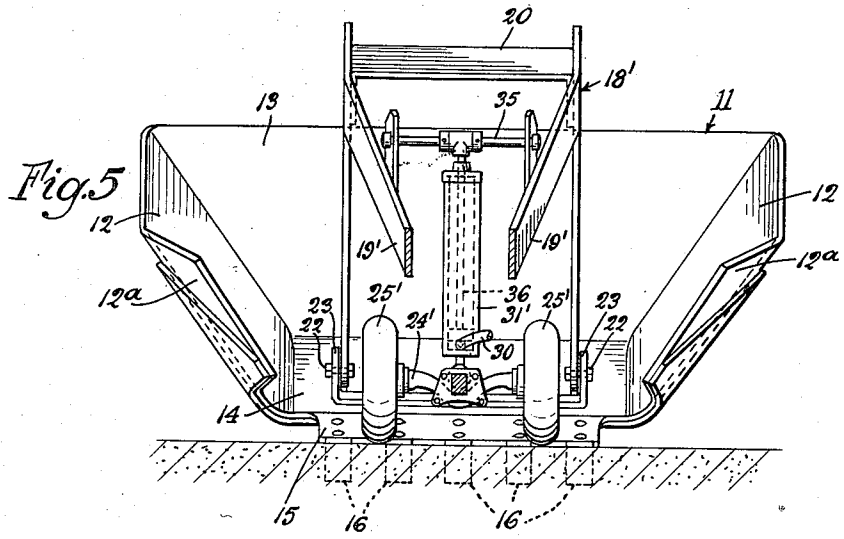
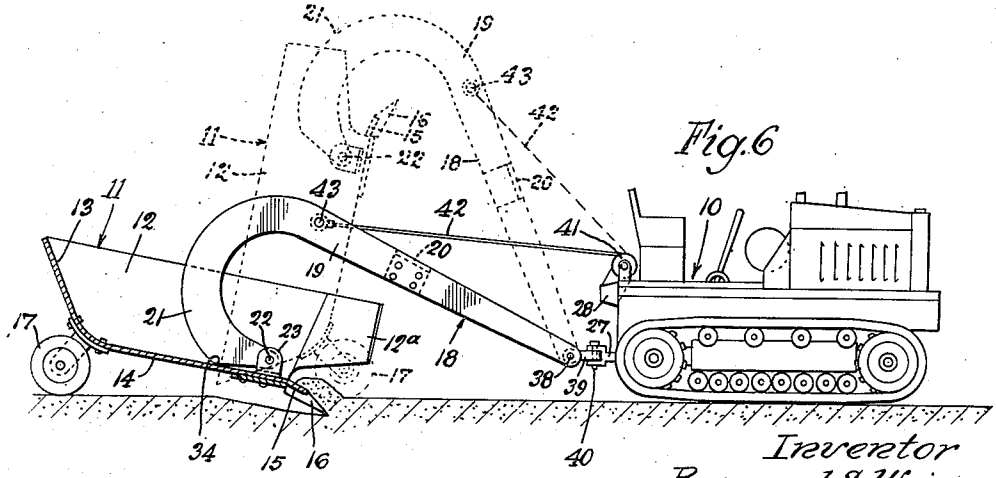


Fig. 6



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UNITED STATES PATENT OFFICE

2,110,186

EXCAVATOR

Raymond Samuel Weimer, Wilmington, Ill.

Application December 30, 1935, Serial No. 56,613

14 Claims. (Cl. 37—126)

This invention relates to improvements in excavators.

One object of the invention is to provide an improved excavator which can be hitched to a tractor or like automotive vehicle and which can be operated or controlled by conventional power take-off means carried by the tractor. The invention is characterized by the provision of an excavator scoop which loads from the front and dumps the load over a rear wall thereof upon the elevation of the forward end of the scoop by suitable mechanism which may be operable by the conventional power take-off mechanism of the tractor.

Another object of the invention is to provide an excavator scoop having a boom-like draft member for operatively attaching the excavator to a tractor and by means of which the scoop can be elevated to dumping position or to an intermediate position for transporting a load of the excavated material.

A further object of the invention is to provide an excavating mechanism comprising a scoop pivotally attached to a draft member which comprises stop means which limit forward tilting movement of the scoop beyond a predetermined cutting or excavating angle during operation, and preferably which limit tilting movement of the bucket beyond a predetermined load discharging position whereby the bucket can be employed to spread or level off the discharged load.

Other objects relate to various features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawings, wherein:

Figure 1 is a side elevation of apparatus embodying the present improvements, part of the apparatus being shown in section taken on line 1—1 of Figure 2.

Figure 2 is a broken enlarged top plan view of the apparatus shown in Figure 1.

Figure 3 is a side elevation of the apparatus showing the scoop in dotted lines in transporting position, in dash lines in full discharging position, and in full lines in an intermediate load discharging position.

Figure 4 is a side elevation of a modified form of apparatus the scoop being shown with the near side wall cut away.

Figure 5 is an enlarged sectional view taken on line 5—5 of Figure 4.

Figure 6 is a side elevation of a modification wherein the draft member is supported to the draw bar of a tractor, the scoop being shown in excavating position in full lines with the near side wall broken away and in load discharging position in dotted lines.

In the drawings 10 generally indicates a conventional tractor of the "caterpillar" or track laying type which per se forms no part of the present invention as any other conventional type of automotive vehicle may be employed with the present improvements. The excavating apparatus comprises a scoop indicated generally by the numeral 11 having preferably outwardly flaring side walls 12, a rearwardly inclined rear wall 13, and a bottom 14 which at its forward end terminates in an excavating lip 15, which is shown as being provided with teeth 16. The forward ends 12a of the side walls are shown as being deflected inwardly to enable the scoop better to sustain a load which extends forwardly of the lip 15.

Secured to the rear of the scoop is a pair of wheels 17 which normally support the scoop with the bottom 14 and lip 15 in forwardly inclined excavating position. A draft member indicated generally by the numeral 18, which in the form shown is formed of two arms 19, is pivotally secured to the scoop to provide for relative tilting action of the latter when the former is elevated. In the form shown the arms 19 which are held in spaced relation by struts 20, is provided with downwardly extending rear end portions 21 which are pivotally secured at 22 to lugs 23 secured to the bottom 14 of the scoop. The forward ends of the arms 19 converge and are pivotally secured on horizontal axes at 24 to a supporting truck 25 which is suitably connected by a hitch 26 to the draw bar 27 of the tractor 10.

As will be pointed out hereinafter, the draft member 18 may, of course, be supported by the draw bar 27 rather than by the auxiliary truck 25, the latter of which for the purpose of this specification and the claims is considered as part of the tractor.

A conventional power take-off mechanism is indicated at 28 but inasmuch as such mechanism is of well-known construction the details of the same are not illustrated. The mechanism may be employed for operating a hydraulic compressor 29 of conventional construction which through conduit 30 supplies fluid under pressure to a cylinder 31 for moving a piston 32 to the right as viewed in Figure 1. The piston operates a rod 33 which is pivotally connected at 33a to the member 18 adjacent the rear portion thereof. By admitting pressure fluid to the cylinder 31 the operator of the tractor 10 can selectively raise

the scoop 11 to the dotted line position shown in Figure 3, in which position the loaded scoop can be transported upon the wheels 17, or he can raise the boom-like draft member 18 to the full line position shown in said figure for discharging the load over the rear wall 13. If desired, the scoop can be elevated off the ground to the dash line position of Figure 3, wherein it more effectively discharges the load, especially if wet, since in this position the bottom 14 is in a plane disposed at approximately 30° to the vertical.

It will be noted that the curved downwardly extending rear portions 21 of the arms 19 provide clearance for the lip 15 and teeth 16 which project forwardly of the pivotal axis 22 when the apparatus is in load discharging position. It will be noted also that the point of attachment of the rod 33 to the member 18 at 33*a* is at an elevation above the forward pivotal axis 24. This arrangement provides an advantageous angle for applying power in lifting the draft member and scoop to the position shown in Figure 3.

As shown in Figure 1, the lower ends 21 of the draft members 19 are flattened at 34 to provide stops which engage the bottom 14 of the scoop to limit forward tilting of the scoop beyond a predetermined excavating position. Upon initial forward movement of the scoop the teeth 16 begin to penetrate the ground and tend to cause the scoop to swing clockwise as viewed in Figure 1 about the axis 22. The stops 34 of the arms 21 limit such tilting action at the desired excavating angle.

The modification of the invention shown in Figure 4 consists in mounting the piston 31', which corresponds to piston 31 of the above described modification, upon the truck 25 and in upright position. The arms 19' of Figure 4 are shown as being provided with a transverse rod 35 to which the upper end of a piston rod 36 is pivotally connected. The cylinder 31' is shown as being pivotally connected at its lower end to the axle 24' of the truck 25'. The forward ends of the boom arms 19' are pivotally connected on a horizontal axis at 37 to the hitch 26'.

It will be seen that the operator of the tractor can by conventional control means admit pressure fluid through the conduit 30 to the cylinder 31' to force the piston upwardly and thus raise the draft member 18 a distance to elevate the forward end of the scoop into transportation position or to the scoop discharging position indicated by the dotted lines in Figure 4.

In Figure 6 the forward end of the draft member 18 is shown as pivotally connected at 38 to a hitch or link 39 which in turn is pivotally secured on a vertical axis at 40 to the draw bar 27. In this modification the power take-off mechanism 28 is arranged to operate a drum or windlass 41 for taking in a flexible cable 42 which is attached at 43 to the arms 19 of member 18. The operator can operate the drum 41 by means of the power take-off device 28 to wind up the cable and elevate the draft member 18 a distance to lift the lip of the scoop out of excavating position for the purpose of transporting the load to the place of discharge or elevate the draft member to the load discharging position shown in dotted lines in Figure 6. The construction of the scoop and draft member of Figure 6 is the same as the form shown in Figure 1 and the parts of the same have been given corresponding reference characters.

In the forms of the invention shown it will be apparent that the operator can elevate the scoop the distance required to effect a quick discharge of the load, or by a gradual elevation of the forward end of the scoop as the tractor moves forwardly he can spread the material along the path of travel. It will also be seen that upon discharging the load and throwing the tractor into reverse the rear end 13 of the scoop will level off or spread the heap.

Due to the location of the pivotal axis of the scoop forwardly of the center of gravity, thereof, the scoop will, even under its own weight, swing to the dash-line position shown in Figure 3 when sufficiently elevated, but further counter-clockwise movement is restricted by the lower ends of the arms 19 abutting the forward edge of the bottom 15 and hence the scoop functions positively when used to spread a heap of discharged material as the tractor moves rearwardly.

While I have shown and described certain embodiments of my improvements for the purpose of illustration, I do not wish to be restricted specifically thereto except as so limited by the appended claims.

I claim:

1. An excavator adapted to be drawn by an automotive vehicle having a power take-off mechanism, comprising a scoop having fixed side and rear load retaining walls, intermediate draft means pivotally connected at the ends thereof to both said scoop and vehicle on horizontal axes, and means operable by said mechanism and acting directly on said draft means for elevating the rear end of said draft means for effecting the simultaneous elevation of the forward end of said scoop for tilting the latter rearwardly upon the pivotal connection of the same with said draft means to discharge the load over said rear wall.

2. An excavator adapted to be drawn by an automotive vehicle having power take-off mechanism comprising a scoop having fixed side and rear load retaining walls, draft means pivotally secured to a forward portion of the scoop and to the vehicle on horizontal axes, and means connected to said draft means and operable by said mechanism for elevating the rear of said draft means and the forward end of the scoop to effect the simultaneous rearward tilting of the latter about the pivotal connection of the same with said draft means for effecting the discharge of the load over said rear wall.

3. An excavator adapted to be drawn by an automotive vehicle provided with power take-off mechanism comprising a scoop provided with side and rear load-retaining walls, draft means pivotally secured to said tractor and to a forward portion of said scoop, and means connected to and operable on said draft means and operable by said mechanism for elevating the rear end of said draft member and the forward end of said scoop a distance sufficient to effect rearward tilting movement of the scoop about the pivotal connection of the same with said draft means to effect the discharge of the load by gravity over said rear wall.

4. An excavator adapted to be drawn by an automotive vehicle provided with power take-off mechanism comprising a scoop provided with side and rear load-retaining walls, vertically movable draft means pivotally attached on horizontal axes to a rear portion of said vehicle and to a forward portion of said scoop, and hoist means attached to a rear portion of said draft means and operable by said mechanism for elevating

simultaneously the rear end of said draft means and the forward end of said scoop a distance sufficient for effecting the discharge of the load by gravity over said rear wall.

5. An excavator adapted to be drawn by an automotive vehicle provided with power take-off mechanism comprising a scoop having side and rear load-retaining walls and a bottom provided with a cutting lip at the forward end thereof, a draft member pivotally attached at the forward end thereof to said vehicle and at the rear end to said scoop on a horizontal axis above said cutting lip, stop means carried by said draft member and arranged to engage a portion of said scoop to limit forward tilting action of the same beyond predetermined excavating position, and hoist means operable by said mechanism for elevating the rear of said draft means and the forward end of said scoop for effecting the discharge of the load over said rear wall.

6. An excavator adapted to be drawn by an automotive vehicle having power take-off mechanism and comprising a scoop having side and rear load-confining walls, and a bottom wall terminating at the forward end in an excavating lip, a draft member pivotally secured to the rear of said vehicle and to the interior of the scoop rearwardly of said excavating lip, the rear end of said draft member being shaped to accommodate said lip when the scoop is in dumping position, and means operable by said mechanism for elevating the rear end of said draft member and the forward end of said scoop to effect the discharge of material over said rear wall.

7. An excavator comprising a scoop having side and rear load-confining walls, a boom-like draft member pivotally attached at the rear thereof to a forward portion of said scoop and arranged for attachment at the forward end to the rear of a tractor having a power take-off mechanism, and means operable by said mechanism and engaging said draft member adjacent the rear thereof for elevating the same and said scoop simultaneously to effect rearward tilting of the latter a distance sufficient to discharge the load by gravity over said rear wall.

8. Excavating apparatus adapted to be drawn by an automotive vehicle having power take-off mechanism comprising a scoop having side and rear load-confining walls and a bottom provided with an excavating lip, ground wheels attached to the rear of said scoop normally tending to hold said bottom and lip in excavating position, a boom-like draft member the rear of which is pivotally secured on a horizontal axis to said scoop and the forward end of which is pivotally attached on a horizontal axis to said vehicle, and means attached to said draft member and operable by said mechanism for selectively elevating the rear of said draft member a distance to raise said bottom and lip from excavating position for transportation of the scoop on said wheels or a distance sufficient to effect the tilting of said scoop rearwardly to discharge the load over said rear wall.

9. Excavating apparatus adapted to be drawn by an automotive vehicle having power take-off mechanism comprising a scoop having side and rear load-confining walls and a bottom provided with an excavating lip, ground wheels attached to the rear of said scoop normally tending to hold said bottom and lip in excavating position, a boom-like draft member the rear of which is pivotally secured on a horizontal axis to said scoop and the forward end of which is pivotally attached on a horizontal axis to said vehicle, and hydraulic means attached to said draft member and operable by said mechanism for selectively elevating the rear of said draft member a distance to raise said bottom and lip from excavating position for transportation of the scoop on said wheels or a distance sufficient to effect the tilting of said scoop rearwardly to discharge the load over said rear wall.

10. Excavating apparatus adapted to be drawn by an automotive vehicle having power take-off mechanism comprising a scoop having side and rear load-confining walls and a bottom provided with an excavating lip, ground wheels at the rear of said scoop normally tending to hold said bottom and lip in excavating position, a boom-like draft member the rear of which is pivotally secured on a horizontal axis to said scoop and the forward end of which is pivotally attached on a horizontal axis to said vehicle, and a hoist cable attached to said draft member and operable by said mechanism for selectively elevating the rear of said draft member a distance to raise said bottom and lip from excavating position for transportation of the scoop on said wheels or a distance sufficient to effect the tilting of said scoop rearwardly to discharge the load over said rear wall.

11. Excavating apparatus arranged to be drawn by an automotive vehicle comprising a boom-like draft member, a scoop pivotally secured adjacent the forward end thereof to said member and provided with a rear end wall, and means for elevating said draft member for effecting rearward tilting of the scoop to discharge the load over said rear wall, said draft member being arranged to limit the rearward tilting of the scoop beyond a predetermined position whereby upon rearward movement of the vehicle said rear wall constitutes leveling means.

12. An excavator comprising a scoop having side and rear load retaining walls, a boom-like draft member adapted to be pivotally attached at its forward end on a horizontal axis to a vehicle and pivotally attached on a horizontal axis adjacent the rear end thereof to said scoop, said draft member and scoop having cooperating portions arranged to limit the pivotal movement of the scoop beyond predetermined excavating position but which render the scoop free to swing on its pivotal axis in the opposite direction approximately to vertical position to discharge the load upon predetermined elevation of the draft member, and means for elevating the draft member for effecting such swinging movement of the scoop to load discharging position.

13. An excavator comprising a scoop having fixed rear and side load retaining walls, a draft member adapted to be pivotally attached at its forward end to a vehicle and pivotally attached at its rear end to said scoop adjacent the forward end of the latter, said scoop and draft member having cooperating portions arranged to limit relative pivotal movement of the scoop in one direction during loading operations but which enable said scoop to swing freely on its pivotal axis in the opposite direction for discharging the load over said rear wall when the rear end of said draft member is sufficiently elevated, and means for elevating said draft member.

14. Excavating apparatus adapted to be drawn by an automotive vehicle having a power mechanism comprising a scoop provided with load confining side and rear walls and a forwardly excavating lip, a combination draft and scoop elevat-

ing member pivotally attached on horizontal axes at the rear of said vehicle and to a forward portion of said scoop whereby said lip normally seeks an excavating position as the scoop is drawn forwardly, and means operatively secured to said draft member and selectively actuatable by said power mechanism for elevating the rear of said draft member for elevating the forward end of said scoop from excavating position to a load transporting position or to a more elevated position for tilting the scoop sufficiently rearwardly on its pivotal axis for discharging the load over said rear wall.

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