

April 21, 1942.

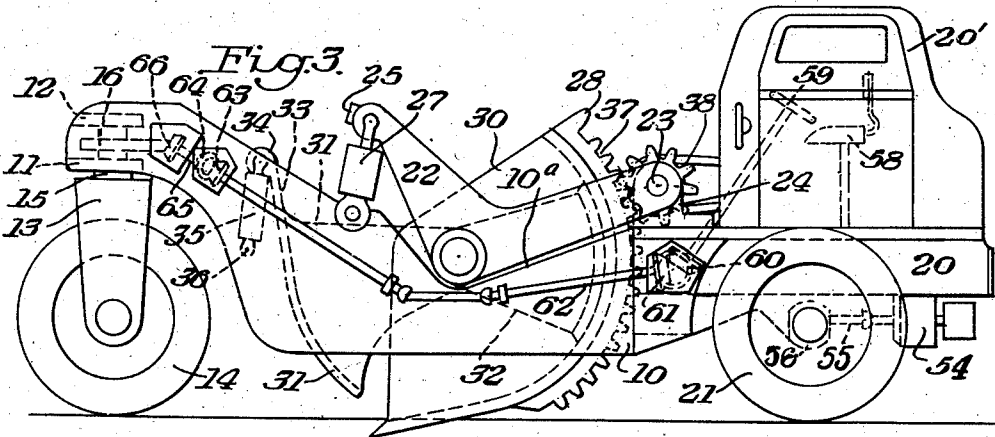
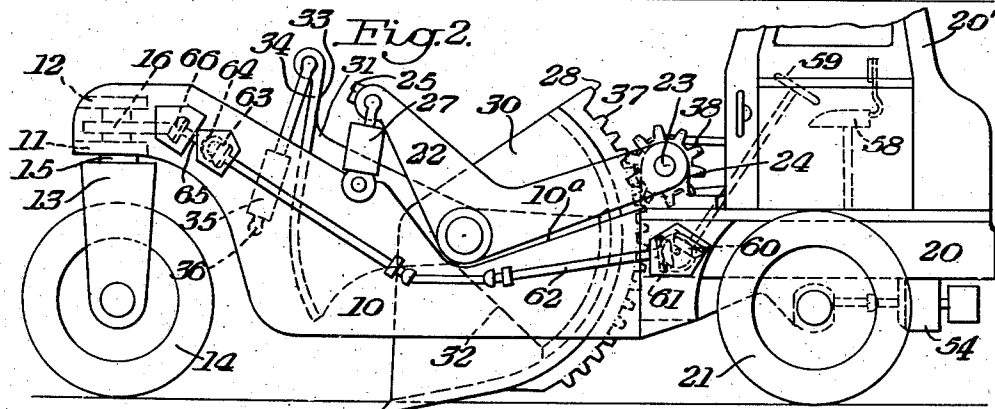
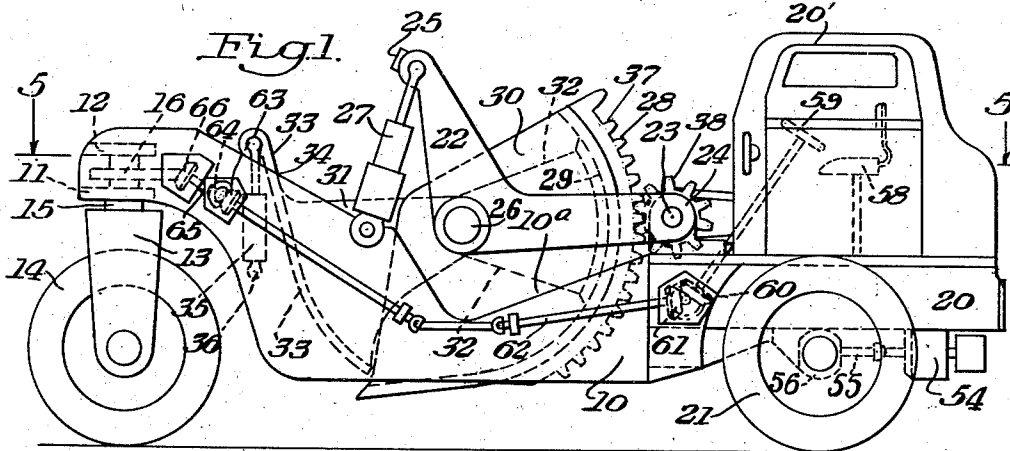
L. O. McLEAN

2,280,439

EARTH MOVING VEHICLE

Filed June 25, 1940

2 Sheets-Sheet 1



INVENTOR  
*Leland O. McLean*  
BY  
*Edward T. Lawrence*  
ATTORNEY

April 21, 1942.

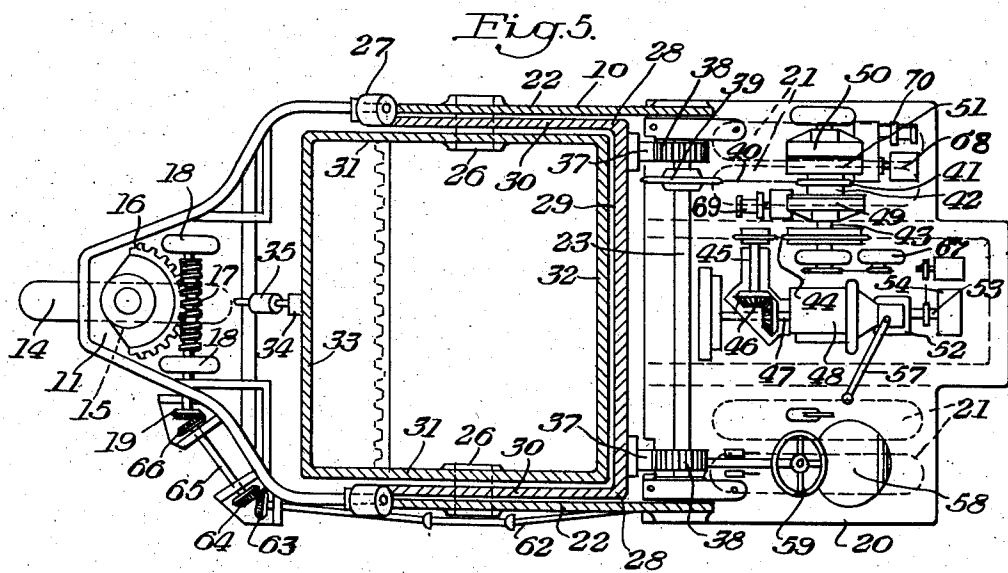
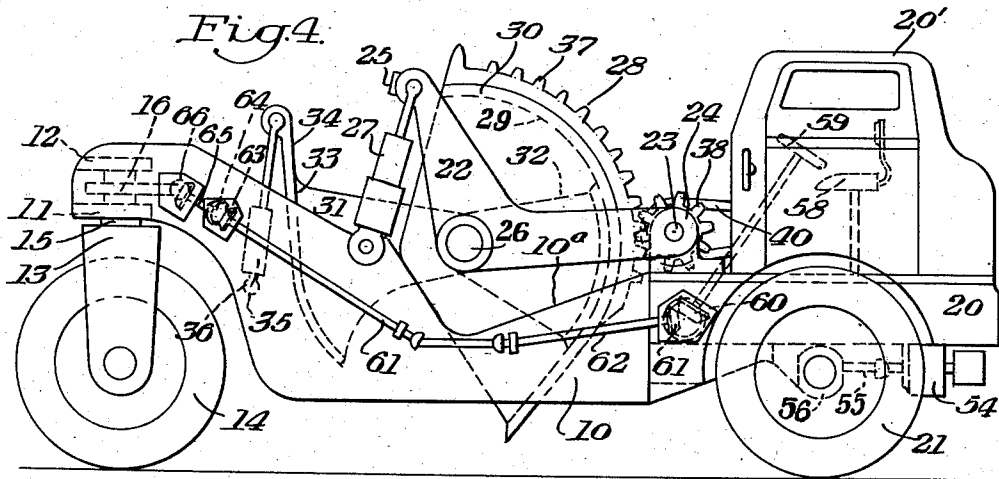
L. O. McLEAN

2,280,439

EARTH MOVING VEHICLE

Filed June 25, 1940

2 Sheets-Sheet 2



INVENTOR  
*Leland O. McLean*  
BY  
*Edmond A. Lawrence*  
his ATTORNEY

# UNITED STATES PATENT OFFICE

2,280,439

## EARTH MOVING VEHICLE

Leland O. McLean, Marion, Ohio

Application June 25, 1940, Serial No. 342,243

8 Claims. (Cl. 37-124)

My invention consists in a new and improved vehicle for use in the excavating, moving and dumping of earth and other materials.

One of the objects of the present invention is the provision of a vehicle which will excavate earth and the like to the selected depth, will transfer the same to any desired destination and dump the same, and will also level the deposited material into a layer of the selected depth.

Another object is the provision of such a vehicle of compact form and self-propelled which may be driven along the highways without obstructing traffic or require special permits.

Another object is the provision of a self-propelled vehicle for the above purposes wherein the operator is positioned in the rear of the vehicle where he has full view of the operation of the mechanism of the vehicle in performing its intended operation and has an unobstructed view of the road in transporting material or in driving the vehicle along the highway.

Other objects will appear in the following description.

In the accompanying drawings, wherein is illustrated a practical embodiment of the present invention:

Fig. 1 is a side elevation of the vehicle with the scoop raised and the gate closing the same as when the vehicle is transporting a load of earth from the place of excavation to the place of disposal, or when the vehicle is being driven from one location of work to another.

Fig. 2 is a like view but with the scoop lowered into digging position and the gate raised to permit the scoop to freely pick up clay and the like which it will retain.

Fig. 3 is a like view showing the scoop in digging position and with the gate partially lowered, this relative position of the scoop and gate being preferable when the material being excavated is sand, loam or loose gravel which would tend to slide out of the scoop were the gate fully elevated.

Fig. 4 is a like view of the scoop in dumping and spreading position and the gate raised.

Fig. 5 is a plan view partially in section along the line 5-5 in Fig. 1, the scoop being shown, for the sake of clearness, in a position intermediate of its position in Figs. 1 and 2 and the gate being shown raised.

The frame of the vehicle is rigid and integral, comprising the side beams 10 which for the major portion of their extent are in spaced parallel relation but converge and merge into each

other at their front ends and are connected by the floor 11 and the top closure 12.

The front end of the frame is supported by the fork 13 in which is journaled the axle of the front wheel 14.

The upwardly extending stem 15 of the fork 13 is journaled in a sleeve bearing mounted in the floor 11, and above the bearing the sleeve has fixedly mounted thereon the toothed sector 16 which is in mesh with a horizontal worm shaft 17 journaled in bearing boxes 18 mounted on the floor 11 and having one end protruding through the beam 10 and having mounted thereon the beveled gear 19.

Fixed to and spanning the beams 10 at the rear of the vehicle is the platform 20 which may be provided with the enclosing cab 20' for the protection of the operator and the motor and power-transmitting and control machinery. The rear end of the frame is supported by the traction wheels 21 located beneath the platform 20. The side beams 10 and the platform 20 with the supporting wheels form the chassis of the vehicle.

22 represents twin elevator levers of angular form and having their rear ends pivotally mounted on a shaft 23 journaled transversely of the vehicle in bearing stands 24 mounted on the platform 20 and preferably having their front ends connected by the cross brace 25 to maintain them for movement in unison in their proper parallel relationship with each other and with the side beams of the frame.

At their angles the levers 22 are provided with inwardly extending aligned gudgeons 26.

The levers 22 are raised and lowered by means of the twin fluid operated jacks 27, the cylinders of which are pivotally mounted on the beams 10 so as to swing on horizontal axes. The compound pistons of the jacks are pivotally secured to the front ends of the levers 22.

28 represents the scoop formed by the arcuate floor 29, ending in the usual tangential and preferably serrated digging edge, and the side walls 30 which are provided with aligned bearings by means of which the scoop is pivotally mounted next the levers 22 on the gudgeons 26. The arcuate floor 29 is concentric with the gudgeons and the scoop moves between the beams 10. The scoop is raised or lowered by raising or lowering the levers 22. To provide clearance for the levers 22, the beams are recessed downwardly as at 10a, said levers being in the same vertical planes as the beams 10 to reduce the overall width of the vehicle.

Pivotally mounted at their centers on the

gudgeons 26 inside the side walls of the scoop are the arms 31, whose ends are segmentally enlarged.

The rear ends of the arms 31 have integrally attached thereto the concentrically curved ejector plate 32 which is arranged to move over the inner surface of the bottom 29 of the scoop 28 and aid in discharging the excavated material from the scoop in dumping or unloading the latter.

The front ends of the arms 31 have integrally attached thereto a plate or gate 33 which is downwardly and forwardly curved and when lowered as shown in Fig. 1 closes the front of the raised scoop to prevent the escape of material therefrom when transporting the material from one location to the other, and when lowered when the scoop is in its digging position, as in Fig. 3, prevents sand or other loose material from prematurely escaping from the scoop.

The top of the gate 33 is provided with an upwardly extending arm 34, the upper end of which is pivotally connected to the fluid operated piston of the jack 35, the cylinder of which is pivotally mounted on the shaft 36 spanning the space between the converging beams 10.

Thus simultaneously the gate may be lowered and the ejector raised, or the gate raised and the ejector lowered, the gate and ejector moving in unison but in opposite directions.

37 represents concentric rack bars secured to the outer surface of the floor 29 of the scoop, which racks are in mesh with pinions 38 fixed on the shaft 23. 39 is a sprocket wheel also fixed to the shaft and operatively connected by a chain 40 with a sprocket 41 on a tubular shaft 42 which is free on an axial shaft 43 journaled on the platform 20 and driven by means of sprocket and chain connection 44 by a jack shaft 45 which is driven through the beveled gear connection 46 by the crank shaft 47 of the internal combustion motor 48 or other source of power. 49 and 50 represent pneumatically operated clutches by means of which the shaft 42 and the shaft 23 may be selectively driven in either direction, thus either raising or lowering the scoop as desired. 51 represents a fluid pressure brake.

Power is applied to the traction wheels 21 from the motor 48 by means of the shaft-gear mechanism indicated at 52, the shaft 53, the chain drive 54 connecting the shaft 55, the differential 56 and the axles upon which the wheels are mounted. 57 indicates the gear-shift lever convenient to the hand of the operator whose seat is indicated at 58.

59 indicates the steering wheel and its shaft whose lower end is provided with a beveled pinion 60 meshing with a pinion 61 on the rear end of a flexible shaft 62 journaled in bearings mounted on the left hand side beam 10 and running forward and provided at its front end with a beveled pinion 63 which meshes with a like pinion 64 on one end of a short shaft 65 journaled in bearings carried by the frame. The other end of the shaft 65 is provided with a pinion 66 meshing with the beveled pinion 19 on the protruding end of the worm shaft 17.

67 represents a fluid compressor and storage mechanism of any suitable type driven from the engine through the shaft 45 and connected by suitable controlled ducts, not shown, to the pneumatic jacks and the spring set air release brake control 68 and the spring release air set controls 69 and 70 which operate the pneumatic clutches 49 and 50 respectively.

It will be understood that suitable brakes will be provided for the traction wheels 21, such as fluid pressure brakes supplied from the air-compressor and storage.

Any convenient control for the jacks and brakes, to the operator, may be used.

When the vehicle is to be used to excavate clay, shale and other material which will tend to retain its position in the scoop until intentionally discharged the scoop is rotated counter-clockwise and the levers 22 lowered as shown in Fig. 2 with the gate raised to provide the scoop with its full receptive capacity. By energizing the brake control 68 to release the brake 51 the scoop may drop by gravity. When sand, gravel, or other loose gravel is to be excavated, the gate is partially lowered into the position shown in Fig. 3, thus preventing the accumulated material from falling forward out of the scoop during the digging operation.

When the scoop is filled, it is rotated clockwise and the levers 22 raised into the position shown in Fig. 1 with the gate in position to close the scoop and prevent the escape of the load from the scoop. When the destination at which the material is to be dumped is reached the gate is raised and the scoop rotated into the positions shown in Fig. 4, thus dumping the load, and as the vehicle moves forwardly, employing the lower edge of the scoop as a scraper to level and grade the deposited material.

It is apparent that my improved vehicle is of simple yet strong and durable construction.

The one-piece rigid chassis frame is cheaper to manufacture than the multipart pivotally jointed frames of the prior art, inasmuch as it comprises no relatively movable parts and presents no lubrication problems.

The portions of the apparatus, such as the drive and clutch mechanisms, are inclosed in a cab and protected from the dirt.

The overall length and width of the vehicle are comparable to those of a relatively small commercial truck and the vehicle may be driven and steered along the highway from one location of work to another without obstructing the ordinary traffic.

I claim:

1. In an excavator vehicle, the combination of a chassis, a scoop mounted on the chassis to swing on a horizontal axis, means for raising and lowering said axis relative to the chassis, a pair of arms pivotally mounted intermediate of their ends coaxially with the scoop, an ejector plate mounted on one end of the arms and arranged to travel over the floor of the scoop to assist in discharging the contents of the latter, a gate mounted on the other end of said arms and arranged to open and close the front of the scoop, means for swinging the scoop on its axis, and means for swinging the arms independently of the movement of the scoop.

2. In an excavator vehicle, the combination of a chassis, a scoop mounted on the chassis to swing on a horizontal axis, means for raising and lowering said axis relative to the chassis, a pair of arms pivotally mounted intermediate of their ends coaxially with the scoop, an ejector plate mounted on one end of the arms and arranged to travel over the floor of the scoop to assist in discharging the contents of the latter, a gate mounted on the other end of the arms and arranged to open and close the front of the scoop, means to swing the arms, concentric rack means on the scoop, and power-pinion means carried by the

chassis and meshing with the rack means to swing the scoop.

3. In an excavator vehicle, the combination of a chassis comprising a pair of parallel side members, a pair of levers pivotally mounted on the chassis to swing on a horizontal axis, a scoop pivotally mounted on the levers to swing on a horizontal axis, a pair of arms pivotally mounted coaxially of the scoop, an ejector plate carried by the arms and arranged to travel over the floor of the scoop to assist in discharging the contents of the latter, means to raise and lower the levers, means to swing the scoop on its axis, and means to swing the arms independently of the movement of the scoop.

4. In an excavator vehicle, the combination of a chassis comprising a pair of parallel side members, a pair of levers pivotally mounted on the chassis to swing on a horizontal axis, a scoop pivotally mounted on the levers to swing on a horizontal axis, a pair of arms pivotally mounted intermediate of their ends coaxially with the scoop, an ejector plate mounted on one end of the arms and arranged to travel over the floor of the scoop to assist in discharging the contents of the latter, means for raising and lowering the levers, means for swinging the scoop on its axis, and means for swinging the arms on their axis independently of the movement of the scoop.

5. In an excavating machine, the combination of a vehicle, a scoop, for gathering and discharging material, pivotally mounted on the vehicle and having a concentrically curved bottom, an arcuate plate curved concentrically to and supported from the axis of the scoop and arranged to move over and in close proximity to the bottom of the scoop, a gate pivotally supported relative to the scoop and arranged to open and close the front of the scoop, and means to move the plate and the gate independently of the movement of the scoop.

6. In an excavating machine, the combination of a vehicle, a scoop, for gathering and discharging material, pivotally mounted on the vehicle

and having a concentrically curved bottom, an arcuate plate curved concentrically to the axis of the scoop and arranged to move over and in close proximity to the bottom of the scoop, a gate arranged to open and close the front of the scoop, supporting arms connecting the ends of the plate and gate, said arms arranged to swing on the same axis as that of the scoop, and means to move the plate and gate in unison and independently of the movement of the scoop.

7. In an excavator vehicle, the combination of a mobile chassis comprising spaced parallel side members connected at their ends forming an intermediate opening therebetween, a transverse shaft supported on the chassis immediately to the rear of the opening, a downwardly inclined recess on each side member extending forwardly from the shaft, a pair of rigidly connected elevator levers disposed in the same vertical plane as the side members and pivotally mounted on said shaft and arranged to be received in the recesses when in their lowered position, a scoop pivotally supported in aligned bearings on said elevator levers, and means connected to the outer end of said levers and mounted on the chassis for raising and lowering the levers.

8. In an excavator vehicle, the combination of a mobile chassis comprising spaced parallel side members connected at their ends forming an intermediate opening therebetween, a transverse shaft supported on the chassis immediately to the rear of the opening, a downwardly inclined recess on each side member extending forwardly from a shaft, a pair of rigidly connected elevator levers disposed in the same vertical plane as the side members and pivotally mounted on said shaft and arranged to be received in the recesses when in their lowered position, a scoop pivotally supported in aligned bearings on said elevator levers, means connected to the outer end of said levers and mounted on the chassis for raising and lowering the levers, and cooperating means on said shaft and scoop for rotating the scoop.

LELAND O. McLEAN.