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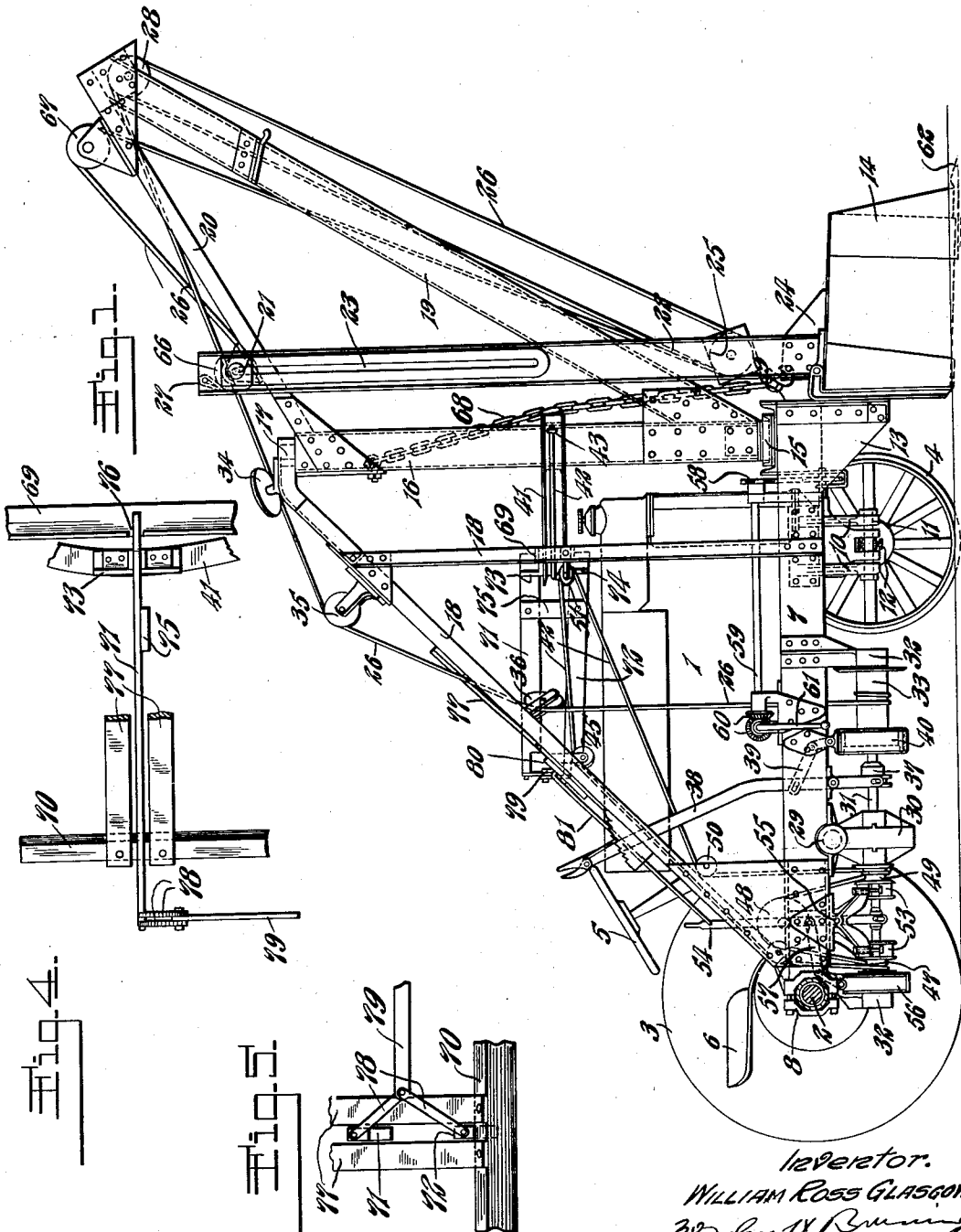
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MACHINE FOR HANDLING MATERIALS

Filed March 15, 1924

3 Sheets-Sheet 1



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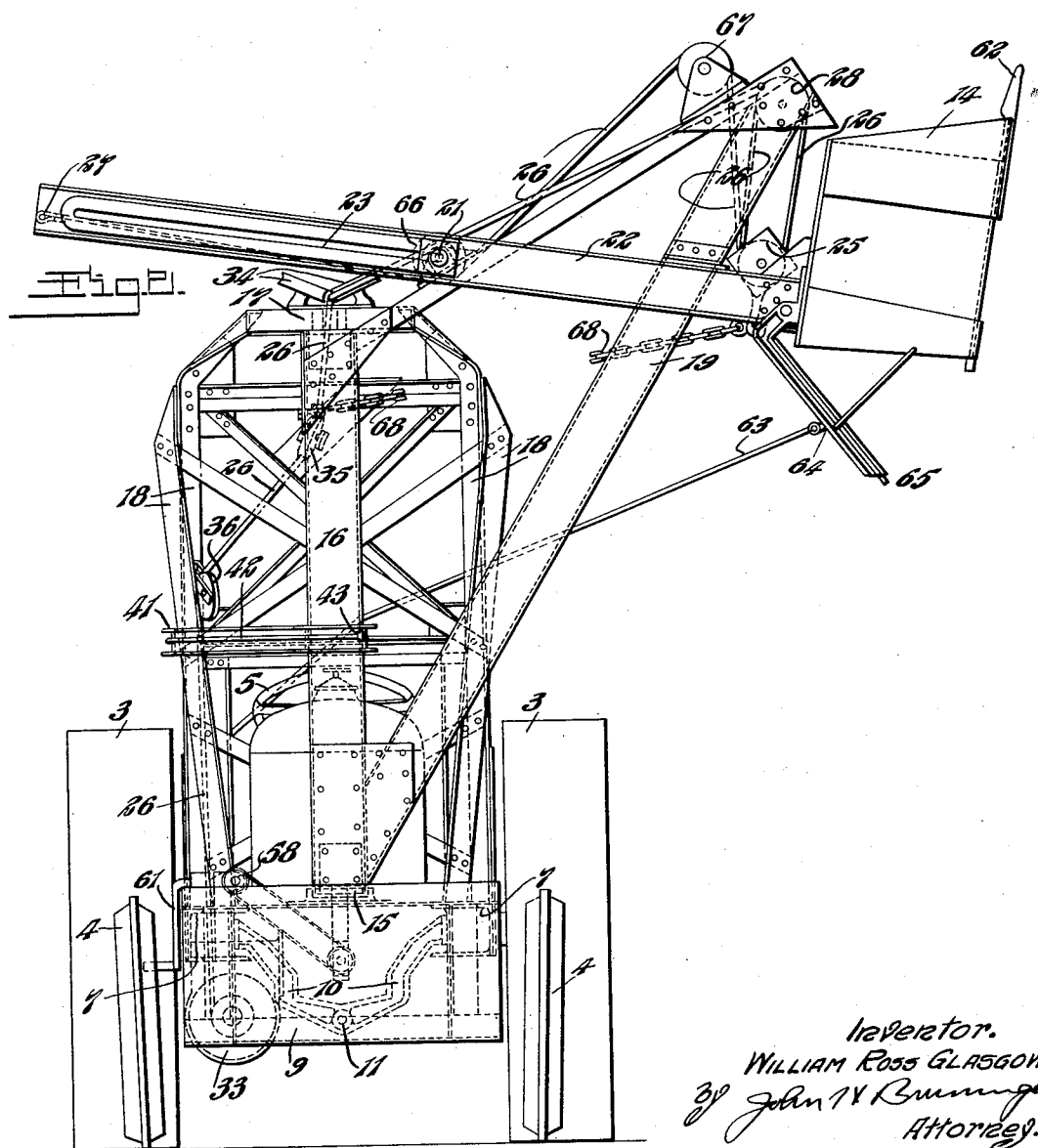
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3 Sheets-Sheet 2



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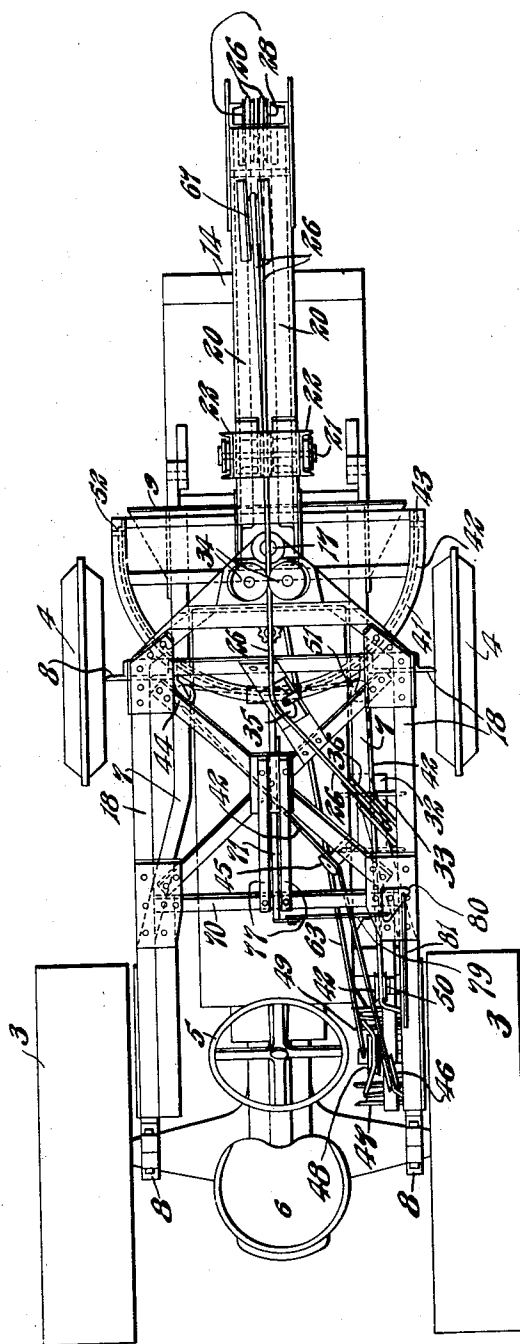
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Fig. 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR HANDLING MATERIALS.

Application filed March 15, 1924. Serial No. 699,523.

This invention relates to machines for handling materials, and more particularly to devices of this kind which can be applied to and used with a tractor of standard design.

One of the objects of this invention is to provide a device for handling materials as, for instance, in the operation of loading trucks and in light digging operations, which will be cheap and convenient to operate, and which may be applied with few alterations to an existing tractor of standard design.

Another object is to provide such a device which may be operated by the power of the tractor to which it is applied and under the complete control of the operator.

Another object is to provide such a device in which the shovel or scoop may not only be elevated but also swung to either side so as to deposit its load in a receiving truck which may be standing either to one side of or directly in front of the device.

Further objects will appear from the detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a view in side elevation, with parts in section, of a device embodying this invention as applied to a tractor of present standard design;

Figure 2 is a front view of the same, but showing the shovel in elevated position and swung to one side;

Figure 3 is a plan view of Figure 1;

Figure 4 is an enlarged detail of the boom-swing brake; and

Figure 5 is a detail of Figure 4.

A tractor is a device of varied utility and is used in many classes of work, such as grading and building operations, as well as some kinds of excavation work. Tractors of certain well known standard designs are frequently at hand or available for use in such operations. An example of such a tractor is the well known Fordson type. It is a great convenience to have available a device which may be applied with little or no alterations to a tractor of such standard design, and which will adapt the machine for light digging operations and material handling operations, such as loading trucks in the transportation of building materials. The present invention, as illustrated in the drawings, is shown as applied to a Fordson tractor. The same is adaptable, of course, for any other type of tractor.

Referring now to the accompanying drawings, 1 designates generally the power plant of the tractor which is suitably connected to an axle 2 connected with traction wheels 3. The forward end of the power plant is supported on steering wheels 4 controlled in the usual manner by the steering hand wheel 5 adjacent the driver's seat 6.

In accordance with this invention a suitable frame or chassis is provided comprising a pair of side members 7 positioned laterally of the power plant 1 and running along the same. These side members are connected by means of any suitable connection such as the clamps 8 to the rear axle 2 and are connected at their forward end by a cross-member 9. The forward end of the frame is supported by a yoke or bracket 10 carried by a pivot pin 11 engaging the front axle 12 and arranged to permit this axle to swing in a vertical plane so as to permit the steering wheels 4 to accommodate themselves to inequalities of the ground. The cross-member 9 at the front of the frame extends downwardly therefrom and being suitably braced by gusset plates 13 or other suitable means, is adapted to provide an abutment for engaging the shovel 14 so as to propel the same for filling with the material to be handled.

Pivoted at 15 is an upright derrick comprising a vertical column 16 pivoted at its upper end at 17 to a suitable bracing structure 18 connected in any suitable manner with the frame or chassis so as to securely brace the column 16 in upright position and permit the same to turn on its vertical pivots. Connected to the lower end of the column 16 and adapted to turn therewith is a forwardly and upwardly extending arm or boom 19 supported at its upper end by a bracing member 20 also connected to turn with the column 16. The elements 16, 19 and 20 thus provide a derrick which is adapted to swing laterally about the pivots of the column 16 and which is braced by the structure 18. Pivoted at 21 on the upper part of the derrick is a sliding shovel handle or stick 22. This handle is provided with a longitudinally extending slot 23 which is adapted to slide on the pivot 21 so that this handle is at the same time slidably and pivotally mounted on the upper part of the derrick. The handle 22 is fixed at 24 to the shovel 14. At the shovel 14 is attached a double block 25 adapted to run on a cable

26 secured at 27 to the handle 22. The cable 26, being attached at 27 to the handle, passes under a sheave 66 mounted to turn on the pivot 21, thence over a sheave 67 on the upper end of the derrick, then down to one of the sheaves of the block 25, then up over one of a pair of sheaves 28, (only one of which is seen in Figure 1), then down to the other sheave of the block 25, then up to the other sheave of the pair 28, and then back to the power plant as will be presently described. The shovel 14 is thus suspended on the forward part of the derrick so that when the cable 26 is wound up, the shovel will be lifted and at the same time drawn forwardly, the forward movement being restrained, however, by a chain or cable 68 connecting the shovel 14 with the upper part of the column 16. The handle 22 is adapted during such movement to slide on the pivot 21 and guide the movement of the shovel 14.

A tractor of the type here illustrated is ordinarily provided with an auxiliary shaft 29 connected with the motor so as to provide means for driving auxiliary apparatus. In accordance with the present invention, the shaft 29 is connected by means of suitable gearing, such as the worm gearing 30, with a horizontal shaft 31 mounted in suitable bearings 32 on one of the side members 7. Mounted on the shaft 31 is a winding drum 33 adapted to wind the cable 26, which after passing over the second sheave 28, passes back between a pair of sheaves 34 mounted on the upper part of the structure 18 and so positioned that the cable 26 will be guided thereby from the sheave 28 to a sheave 35 mounted on the structure 18 in whatever position the derrick may take in swinging about its vertical pivot. From the sheave 35, the cable 26 passes over a sheave 36 on the structure 18 and then down to the drum 33. A suitable clutch 37 is provided for connecting the drum 33 to the shaft 31 when it is desired to wind up the cable 26. The clutch 37 is controlled by an operating handle 38 positioned adjacent the driver's seat 6 and connected by a suitable connection 39 so as to operate a brake 40 on the drum 33. The handle 38 is so connected to the clutch 37 and the brake 40 that when the clutch is in engagement so as to connect the drum with the shaft 31, the brake 40 will be free. When, however, the clutch is released, the brake 40 is set, but a very slight interval is provided between the position of the arm 28 at which the clutch is released and the position at which the brake 40 is engaged. This arrangement is to provide for lowering the shovel 14. The shovel is permitted to come down by its own weight but under the control of the brake 40, the operator controlling the handle 38 so as to regulate the pressure of the brake 40

in such a way as to control the speed of descent of the shovel and to stop the same at the desired point.

In order to provide for swinging the derrick laterally so as to swing the shovel to either side for loading trucks, an arcuate rim or guide 41 is suitably mounted on the column 16. A cable 42 is suitably fixed to this guide 41 to turn the same for turning the derrick. This cable is fixed at 43 to one side of the guide 41, passes part way around said guide to the opposite side to a sheave 44 mounted on the structure 18, thence to a sheave 45 and a sheave 46 also mounted on the structure 18 to a small traction drum 47 on the shaft 31. The cable passes several times around the drum 47 and then off of said drum over a sheave 48 and down to a second drum 49 similar to the drum 47. The cable passes several times around the drum 49 and then off of said drum to a sheave 50, thence to a sheave 51 mounted on the structure 18 on the opposite side to the sheave 44, and then back around the guide 41 being fixed thereto at 52 at the opposite side thereof to the point of attachment 43. The drums 47 and 49 are individually controlled by clutches 53 controlled by an operating handle 54 pivoted at 55 on the frame and arranged so that when one clutch is engaged, the other is released. The drum 47 is further provided with a brake 56 connected by a suitable connection 57 with the operating handle 54. The arrangement is such that when the handle 54 is in mid-position, both of the clutches 53 are released and the brake 56 is set. When the handle 54 is moved either forward or back, one or the other clutch 53 is engaged and the brake 56 is released. By means of the handle 54, therefore, the operator has control of the swinging of the derrick from side to side. By moving the handle forwardly, the brake 56 is released and one of the drums 47 or 49 is operated by the shaft 31. At the same time, the other drum is free to rotate idly on said shaft. By this arrangement the cable 42 may be pulled in one direction by the active drum so as to swing the derrick to the side desired. As soon as the handle 53 is returned to mid-position, both drums are released from the shaft 51 and the brake 56 is set. This renders it impossible to rotate the drum 47 which consequently holds the cable 42 against movement and thus holds the guide 41 and consequently the derrick in the position to which it has been swung.

Additional means for locking the derrick against swinging movement are shown in Figures 1, 4 and 5. Mounted on the cross members 69 and 70 is a pair of levers 71 and 72 provided with brake shoes 73 and 74 adapted to engage the guide 41. The levers are connected near their forward ends by a

link 75 and are secured against lateral movement by being let into a notch 76 in the member 69 and being confined between guide strips 77 on the structure 18. The rear ends of the levers 71 and 72 are connected by a toggle 78 to the middle point of which a link 79 is connected. The link 79 is connected to a plate 80 pivoted on the structure 18 and connected by a link 81 to the boom-swing handle 54. The connections are such that when the handle 54 is in neutral position the toggle 78 is spread so as to clamp the shoes 73 and 74 against the guide 41 to hold the same against movement.

15 In order to start the engine, the shaft thereof is connected by means of a suitable sprocket and chain connection 58 to an auxiliary shaft 59 suitably mounted on one of the side members 7 and connected by means of a pair of bevel gears 60 to a crank 61. This connection enables the operator to start the engine from the side since the mounting of the derrick in front makes a connection in front impossible.

25 In operating this device the tractor may first be operated as a vehicle to carry the device to any desired point at which it is to be used. In order to pick up its load, the operator will release the drum 33 and allow the shovel to descend under the control of the drum 40. During this operation the handle 22 is extended and at the same time depressed so as to position the shovel 14 in front of the abutment 9 and in such a position that its digging edge or prongs 62 will engage the ground or the material to be handled. The operator will then drive the tractor forward by means of its traction wheels 3, so as to propel the shovel forwardly to fill the same with material. When thus filled the tractor may be stopped and held stationary while the handle 38 is operated to lift the shovel. By the lifting operation, the cable 26 being suspended from the forward part of the derrick draws the shovel forwardly and upwardly. The downward pull of the cable 26 on the handle 22, to which it is connected at 27, assisted by the weight of the parts, resists retraction of the handle during the early part of the shovel movement and produces an outward thrust along the handle to keep the shovel in extended position during its upward movement. The outward movement of the handle is restrained by the chain 68 which is kept taut during said movement.

At the same time the handle 22 operates to guide the shovel in a forward and upward scooping movement adapted to gather up the material and at the completion of this movement, the shovel 14 is righted so as to retain the material therein. During the elevation of the shovel, the handle 22 is retracted by the chain 68 by a sliding movement during which the slot 23 moves over the pivot 21.

This retractive movement of the handle 22 is also effected by the lifting cables 26 which change their angle with respect to the handle as the shovel rises until, at the end of the movement, they are in a position to actually retract the shovel. When elevated, the shovel takes the position illustrated in Figure 2. The operator may now operate the handle 54 so as to swing the derrick and with it the shovel laterally so as to be able to deposit its load on either side of the tractor. When the shovel has been suitably positioned over the receiving vehicle, the pull rope 63 may be operated to release the latch 64 so as to open the bottom 65 of the shovel and deposit the load. Having deposited the load, the operator again moves the handle 38 so as to release the brake 40 and allow the shovel to descend under the control of the brake. During the descent the bottom again closes and when the same is brought against the abutment 9, the latch 64 will catch to hold the same closed.

In accordance with this invention, therefore, a machine is provided by means of which the handling of materials is readily facilitated. It is not only capable of transporting itself to the place at which it is to be used, but provides power driving means for picking up and depositing materials as desired. The shovel may be positioned so as to be propelled by the tractor itself for gathering up its load and may then be lifted and swung laterally so as to deposit the load as desired. This makes it possible to use this device not only in handling materials but in certain digging or excavating operations. The structure is arranged so that it may be easily and quickly applied to a tractor of present standard design with a minimum of alteration in the tractor. There is thus provided a simple and effective device which may be applied to a tractor of proven reliability to adapt the same for a wider field of use.

It is obvious that various changes may be made in details of construction without departing from the spirit of this invention; it is, therefore, to be understood that this invention is not to be limited to the specific details shown and described.

Having thus described the invention, what is claimed is:

1. A machine of the character described comprising, a traction propelled frame, a shovel mounted for movement to and from said frame and adapted to be positioned in engagement therewith to be propelled thereby to fill said shovel, means for elevating said shovel and means for swinging said shovel laterally adapted to permit dumping the contents beside said frame.

2. A machine of the character described comprising, a traction propelled frame, a shovel engaging with said frame and pro-

10 pelled thereby to fill the same, a handle for
said shovel adapted to be extended for posi-
tioning said shovel for filling, means for ele-
vating said shovel, and means cooperating
5 with said elevating means adapted to retract
said handle.

3. A machine of the character described
comprising, a traction propelled frame, a
shovel engaging with said frame and pro-
10 pelled thereby to fill the same, a handle for
said shovel adapted to be extended for posi-
tioning said shovel for filling, means for ele-
vating said shovel, and means cooperating
with said elevating means adapted to retract
15 said handle, and means for swinging said
shovel laterally adapted to permit dumping
the contents beside said frame.

4. A machine of the character described
comprising, a power propelled frame, a
20 shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel mounted to slide on
said derrick, and means for elevating said
shovel on said derrick.

25 5. A machine of the character described
comprising, a power propelled frame, a
shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel mounted to slide on
30 said derrick, means for elevating said shovel
and means cooperating with said elevating
means adapted to slide said handle.

6. A machine of the character described
comprising, a power propelled frame, a
35 shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel mounted to slide on
said derrick to extended position for filling
said shovel, means for elevating said shovel
40 on said derrick, and means cooperating with
said elevating means adapted to slide said
handle to retract said shovel.

7. A machine of the character described
comprising, a power propelled frame, a
45 shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel mounted to slide on
said derrick, means for elevating said shovel
on said derrick, and means for swinging said
50 shovel laterally when elevated adapted to
permit dumping said shovel beside said
frame.

8. A machine of the character described
comprising, a power propelled frame, a
55 shovel engaging with said frame and pro-
pelled thereby to fill the same, a pivoted der-
rnick on said frame, a handle for said shovel
mounted to slide on said derrick, means for
elevating said shovel, and means for swing-
60 ing said derrick to swing said shovel later-
ally adapted to permit dumping said shovel
beside said frame.

9. A machine of the character described
comprising, a power propelled frame, a
65 shovel engaging with said frame and pro-

10 pelled thereby to fill the same, a derrick, a
handle for said shovel slidably mounted on
the upper part of said derrick and adapted
to be extended to position said shovel for
filling, means for elevating said shovel, and
70 means cooperating with said elevating
means adapted to slide said handle.

10. A machine of the character described
comprising, a power propelled frame, a
75 shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel slidably and pivot-
ally mounted on the upper part of said der-
rnick and adapted to be extended and de-
pressed to position said shovel for filling, 80
means for elevating said shovel, and means
cooperating with said elevating means
adapted to slidably retract said handle.

11. A machine of the character described
comprising, a power propelled frame, a 85
shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel slidably and pivot-
ally mounted on the upper and rearward part
of said derrick and adapted to position said 90
shovel for filling, and elevating means for
said shovel connected to the upper and for-
ward part of said derrick.

12. A machine of the character described,
comprising, a power propelled frame, a shovel 95
engaging with said frame and propelled
thereby to fill the same, a derrick, a handle
for said shovel slidably and pivotally mount-
ed on the upper and rearward part of said
derrick and adapted to position said shovel 100
for filling, elevating means for said shovel
connected to the upper and forward part of
said derrick, and means for swinging said
shovel laterally.

13. A machine of the character described 105
comprising, a power propelled frame, a
shovel engaging with said frame and pro-
pelled thereby to fill the same, a derrick, a
handle for said shovel slidably and pivot-
ally mounted on the upper and rearward 110
part of said derrick and adapted to position
said shovel for filling, means connected to
the upper and forward part of said derrick
for lifting said shovel, and means for swing-
ing said derrick laterally. 115

14. In a machine of the character de-
scribed having a power plant and a traction
wheel connected to be driven by the power
plant, a chassis comprising a pair of side
members connected to the traction wheel 120
and connected together forwardly of said
power plant, an abutment on the forward
end of said chassis, a derrick on said chas-
sis, a shovel mounted to engage said abut-
ment for filling the same, means for lifting 125
said shovel on said derrick, and means for
swinging said shovel laterally.

15. In a machine of the character de-
scribed having a power plant and a traction
wheel connected to be driven by the power 130

plant, a chassis comprising a pair of side members connected to the traction wheel and connected together forwardly of the power plant, an abutment on the forward end of said chassis, a derrick on said chassis, a shovel mounted to engage said abutment for filling the same, means for lifting said shovel on said derrick, and means for swinging said derrick laterally.

16. In a machine of the character described having a power plant and a traction wheel connected to be driven by the power plant, a frame propelled by the traction wheel, a shovel engaging with said frame and propelled thereby to fill the same, a derrick on said frame, means suspended forwardly on said derrick for lifting said shovel, and a handle adapted to guide said shovel.

17. In a machine of the character described having a power plant and a traction wheel connected to be driven by the power plant, a frame propelled by the traction wheel, a shovel engaging with said frame and propelled thereby to fill the same, a derrick on said frame, means suspended forwardly on said derrick for lifting said shovel, and a handle fixed to and adapted to guide said shovel.

18. In a machine of the character described having a power plant and a traction wheel connected to be driven by the power plant, a frame propelled by the traction wheel, a shovel engaging with said frame and propelled thereby to fill the same, a derrick on said frame, means suspended forwardly on said derrick and connected with the power plant for lifting said shovel, and a handle adapted to guide said shovel.

19. A machine of the character described comprising, a tractor having a power plant, a frame therefor, an upright derrick on said frame and having a forwardly extending arm, a shovel engaging with said frame and propelled by said tractor to fill the same, a cable suspended forwardly on said arm and connected with the power plant of said tractor adapted to lift said shovel, and a handle adapted to guide said shovel.

20. A machine of the character described comprising, a tractor having a power plant, a frame therefor, an upright derrick on said frame and having a forwardly extending arm, a shovel engaging with said frame and

propelled by said tractor to fill the same, a cable suspended forwardly on said arm and connected with the power plant of said tractor adapted to lift said shovel, a handle adapted to guide said shovel, and means for swinging said shovel laterally.

21. A machine of the character described comprising, a tractor having a power plant, a frame therefor, an upright derrick on said frame and having a forwardly extending arm, a shovel engaging with said frame and propelled by said tractor to fill the same, a cable suspended forwardly on said arm and connected with the power plant of said tractor adapted to lift said shovel, a handle adapted to guide said shovel, and means for swinging said arm laterally.

22. A machine of the character described comprising, a power propelled frame, a shovel engaging with said frame and propelled thereby to fill the same, a handle for said shovel adapted to be extended for positioning said shovel for filling, and means for elevating said shovel adapted to resist retraction of said handle.

23. A machine of the character described comprising, a power propelled frame, a shovel engaging with said frame and propelled thereby to fill the same, a handle for said shovel adapted to be extended for positioning said shovel for filling, means for elevating said shovel adapted to resist retraction of said handle, and means for retracting said carrier.

24. A machine of the character described comprising, a power propelled frame, a shovel engaging with said frame and propelled thereby to fill the same, a handle for said shovel adapted to be extended for positioning said shovel for filling, and means for elevating said shovel adapted to produce an outward thrust along said handle.

25. A machine of the character described comprising, a power propelled frame, a shovel engaging with said frame and propelled thereby to fill the same, a handle for said shovel adapted to be extended for positioning said shovel for filling, means for elevating said shovel adapted to produce an outward thrust along said handle, and means for restraining said handle.

In testimony whereof I affix my signature this 10 day of March, 1924.

WILLIAM ROSS GLASGOW.