

R. IRELAND.
LAND CLEARER.

APPLICATION FILED MAR. 30, 1911.

1,011,348.

Patented Dec. 12, 1911.

3 SHEETS—SHEET 1.

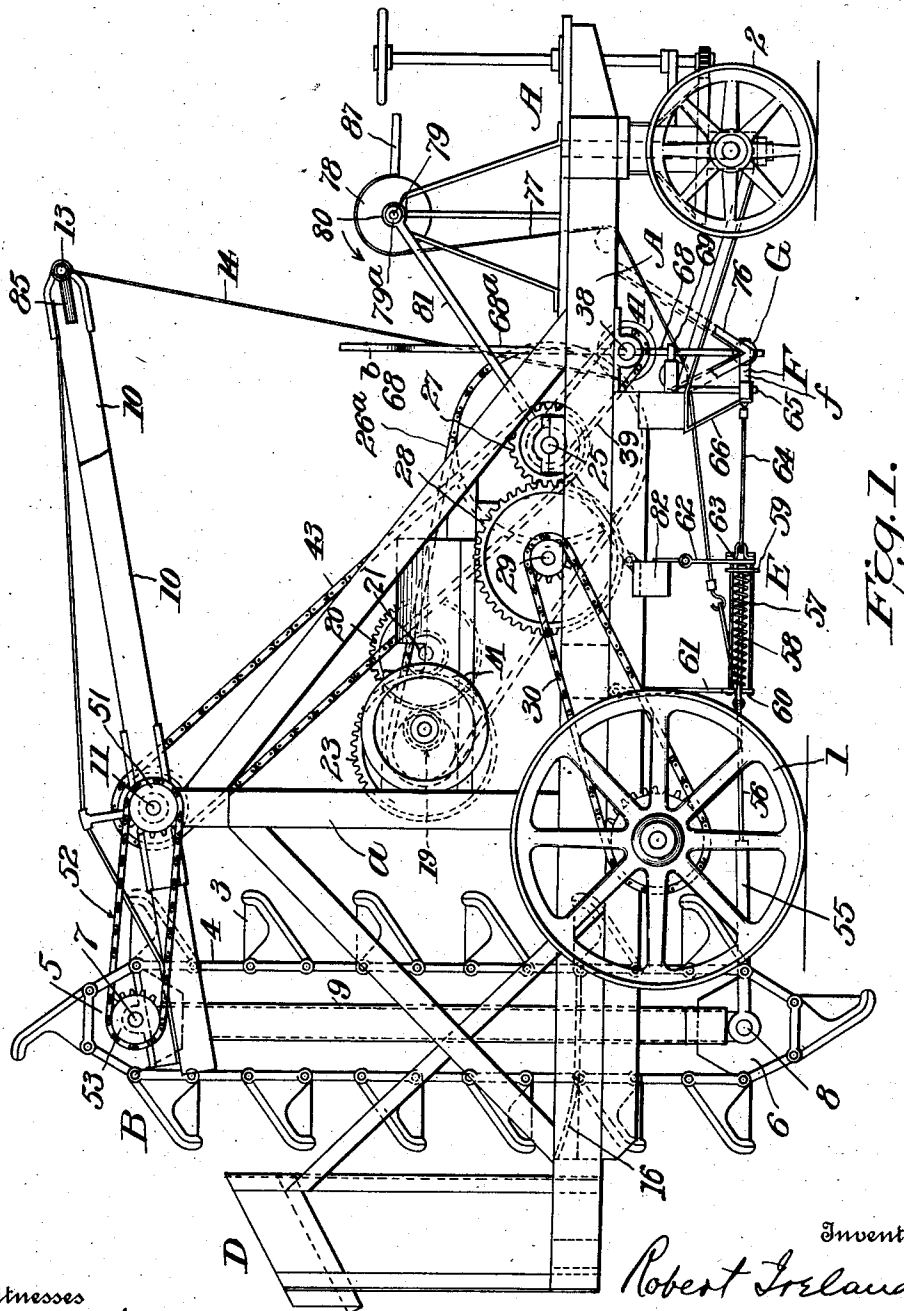


Fig. 1.

Witnesses

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3 SHEETS-SHEET 2.

Fig. 2.

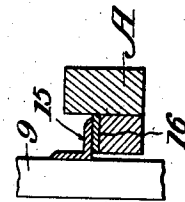
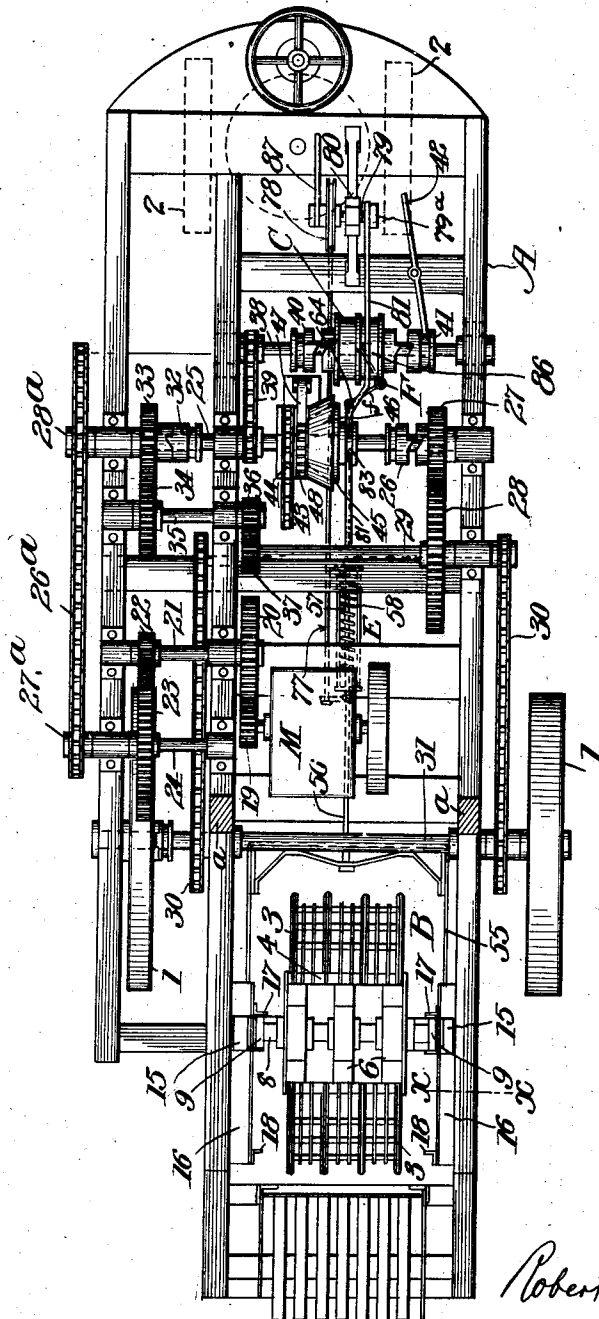


Fig. 2a.

Witnesses

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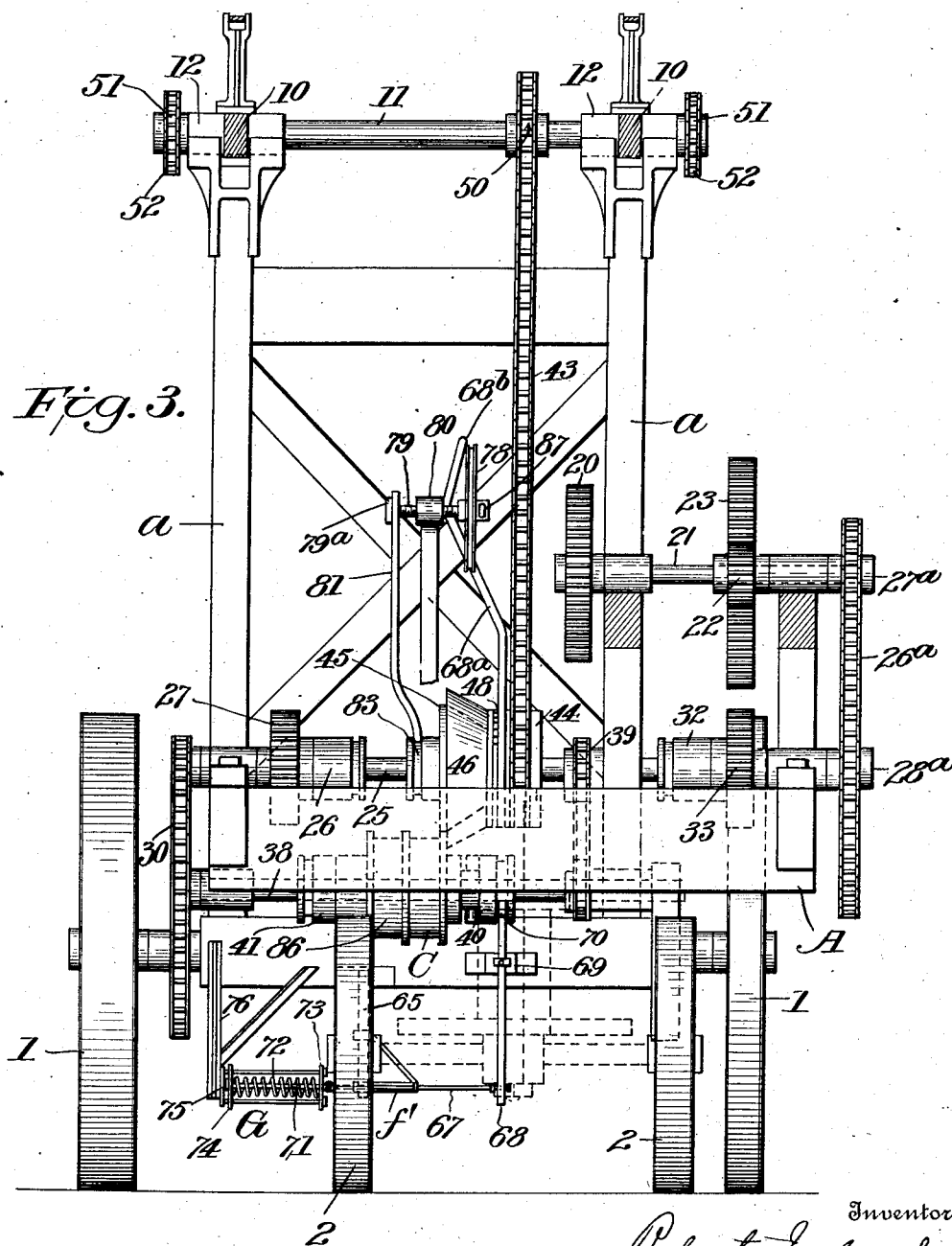
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ROBERT IRELAND, OF WILKES-BARRE, PENNSYLVANIA.

LAND-CLEARER.

1,011,348.

Specification of Letters Patent.

Patented Dec. 12, 1911.

Application filed March 30, 1911. Serial No. 617,873.

To all whom it may concern:

Be it known that I, ROBERT IRELAND, a citizen of the United States, residing at Wilkes-Barre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Land-Clearers, of which the following is a specification.

This invention relates to machines for clearing land of stones and it comprises a truck upon which is mounted an elevator provided with buckets or scoops for lifting the stones from the land and carrying them to a common delivery point, from whence they may pass into a suitable conveyance trailing at the rear of the machine for carrying them from the field. The elevator is operated by a suitable motor and as the truck travels over the ground the loose stones are picked up by buckets and carried thereby to the delivery chute. Stones and other obstacles embedded in the ground and difficult to remove or of such size that they cannot be handled by the elevator are sometimes encountered by the elevator scoops or buckets. Such obstacles might cause breakage or injury to the apparatus if the elevator was secured rigidly in fixed relation to the truck. In order to overcome this difficulty I provide means whereby when an obstacle difficult to remove is encountered, the elevator leg may yield rearwardly with respect to the truck, to a limited extent, cushioned by a spring. If the resistance of the object is such as to cause a certain relative movement between the elevator leg and the truck, the driving apparatus for the elevator is immediately thrown out of gear and, as the machine moves forward, a greater pressure is applied to the obstacle, as the spring becomes compressed, so that unless the obstacle is too firmly fixed to be removed by the machine, it will be dislodged by the increased pressure applied. If dislodged the elevator is manually connected again to the motor and operates to lift the obstacle. If the obstacle is too firmly seated to be dislodged by the elevator, the latter, after being stopped, will be automatically lifted out of engagement with the ground so as to clear the obstacle, after which the elevator automatically returns into engagement with the ground and it is then connected to the driving mechanism so that it may continue to operate as before. The automatic features, it will be evident, insure the safety

of the apparatus and render the machine more effective since these features relieve the operator of the care of avoiding stones or obstacles which may be firmly fixed in the ground.

In the accompanying drawing, Figure 1 is a side elevation of a land clearer; Fig. 2 is a plan view of the truck and mechanism thereon, the beam for raising and supporting the elevator and the upper shaft and portions of the chain of scoops being omitted; Fig. 2^a is a section on the line *x-x* of Fig. 2; and, Fig. 3 is a front elevation of the machine, the elevator being omitted.

Referring to the drawing, A indicates a truck provided with traction wheels 1 and steering wheels 2 and B indicates an elevator comprising scoops or buckets 3 arranged upon an endless chain 4 which passes around sprockets 5 and 6 mounted on shafts 7 and 8, respectively, which are arranged at the ends of a pair of bars 9 which constitute the elevator leg. The shaft 7 is suitably mounted upon the shorter ends of a pair of levers 10 which are journaled upon a shaft 11 mounted in suitable bearings 12 upon standards *a* projecting upward from the frame of the truck. The longer arms of the levers 10 are connected together by a rod 13 to which is attached a cable 14 leading down to a hoisting drum C hereinafter referred to. When the cable 14 is pulled downward it will be evident that the elevator will be lifted away from the ground by the levers 10 and when said rope is relaxed the elevator will return into engagement with the ground. The bars 9 of the elevator leg are provided with laterally projecting flanges or stops 15 which rest upon arcuate bearing surfaces 16, and normally support the elevator in proper relation to the ground. These arcuate surfaces are concentric with the axis of the shaft 7, when the elevator is in its normal position, shown in Fig. 1, so that the elevator leg may swing rearwardly with respect to the truck, to a limited extent, about the axis of the shaft 7 as a center. Stops 17 and 18, Fig. 2, are arranged at the ends of the bearings 16 in order to limit the forward and backward movements of the elevator with respect to the truck. Normally the elevator leg rests against the forward stops 17, being yieldingly held in this position by means hereinafter referred to. The stones picked up by the elevator are carried to the top of the machine and there dumped into a chute D from

whence they may pass into a wagon, trailing at the rear of the machine.

The truck and the elevator are both propelled by a suitable engine or motor M through suitable speed reducing gears and counter shafts. As shown in the drawing a pinion 19 on the engine shaft engages a gear 20 on a counter shaft 21 and a pinion 22 on the latter shaft engages a gear 23 upon another counter shaft 24, the latter shaft, in turn, being connected to a main driving shaft 25 by a sprocket chain 26^a passing over sprocket wheels 27^a and 28^a, on the counter shaft 24 and main shaft 25, respectively. For driving the truck forward a clutch member 26, splined to the main shaft 25, may be thrown into engagement with a clutch member on a gear 27, loose on said shaft which gear meshes with a gear 28 on a shaft 29, the latter being connected by sprocket chains 30 and suitable sprocket wheels to the driving axle 31 upon which the traction wheels are mounted. For driving the truck rearwardly a clutch 32 is provided upon the driving shaft 25 and this clutch is adapted to engage a clutch member on the hub of a gear 33, loose on said shaft, which gear meshes with a gear 34 on a counter shaft 35, said latter shaft having a pinion 36, which engages a pinion 37, on the shaft 29, which, as before stated, is connected to the axle 31 by sprocket chains 30. Suitable mechanism, not necessary to illustrate, is provided, whereby either the clutch member 26, or the clutch member 32 may be thrown into engagement with its coöperating clutch member, as desired, to direct the truck forward or rearward. A shaft 38, upon which is loosely mounted a hoisting drum C, is also driven from the shaft 25, through a sprocket chain 39 and suitable sprocket wheels. Upon the shaft 38 is splined a clutch member 40 which is automatically moved into and out of engagement with the hoisting drum, as hereinafter explained, and a clutch member 41 which may be moved into and out of engagement with said drum by a hand lever 42.

The elevator is driven from the main shaft 25 by means of a chain 43 which passes around a sprocket wheel 44 loosely mounted on the shaft 25 but normally connected thereto by a friction cone 45 which is splined to the shaft 25 and engages a conical flange 46 on the sprocket wheel. A pawl 47 engages an annular series of teeth 48 connected with the sprocket wheel 44, and prevents the backward rotation of said sprocket wheel and a reverse movement of the elevator which might otherwise occur when the clutch is thrown out. The chain 43 passes around a sprocket wheel 50 on the shaft 11 and the latter shaft is provided with sprocket wheels 51, at its ends, upon which are arranged chains 52 which pass around

sprocket wheels 53 on the elevator shaft 7. It will be seen that when the engine is in motion and the cone clutch 45 engages the bell or flange on the gear 44 the elevator chains and buckets will be driven in the direction to carry materials from the ground and deliver them into the chute D. A yoke or bail 55 has its arms pivoted upon the shaft 8 at the lower end of the elevator leg, and this bail is connected to devices which operate to first disconnect the elevator from the driving means when a firmly fixed stone or obstacle is encountered, then to lift the elevator from the ground if the obstacle cannot be moved and then to automatically release the elevator and permit it to return into engagement with the ground after it has passed over the obstacle. The bail 55 is connected by a rod 56 to a rod 57 arranged to move longitudinally in a spring-frame E and a coiled spring 58 is interposed between a head 59 on said rod and the rear end 60 of said spring-frame. The spring-frame E is supported in horizontal position beneath the body of the truck by arms 61 and 62 which are pivoted to the main frame and connected to the ends 60 and 63 of the spring-frame. The forward end of the spring-frame is connected by a rod 64 to one arm *f* of a bell-crank lever F which is pivoted upon a stud 65 depending from the main frame and suitably braced by a bracket 66. The arm *f*' of the bell crank lever engages a rod 67, one end of which is connected to a lever 68, pivoted between its ends, at 69, to the main frame and having a yoke 70 which engages the clutch member 40 on the shaft 38. Through the connections just described, the force exerted by the drag of the elevator tends to move the clutch member 40 into engagement with the hoisting drum C, the spring 58 and its frame E forming a yielding connection between the elevator leg and the bell-crank lever which operates the clutch lever. The clutch is normally held open, however, by a strong spring 72 contained in a spring-frame G, and operating through rod 67 upon the clutch lever and arm *f*' of the bell-crank lever, this latter spring having sufficient strength to resist the drag of the elevator and hold the clutch open under normal conditions, but adapted to yield and allow the clutch to close when the pull on the elevator exceeds a certain amount. As shown in the drawing, the rod 67 is connected to a rod 71, extending longitudinally in the spring-frame G and the spring 72 is interposed between the head 73 of said frame and a head 74 on said rod so that the spring constantly tends to move the rod in the direction to disengage the clutch. The end 75 of the spring-frame G is secured to a bracket 76 depending from the main frame of the machine.

A cable 77 is connected to the rod 56, at the rear of the spring-frame E and this cable is secured to a pulley 78 fixed to a threaded rod 79 which extends through a threaded opening in a standard or bracket 80, mounted upon the forward part of the truck. One end of a lever 81 rests against a stop 79^a on the threaded shaft 79 and the opposite end of said lever is suitably pivoted to a cross piece 82 on the main frame. An intermediate portion of this lever engages a groove 83 in the friction cone 45.

The operation is as follows: The truck is propelled and the elevator operated by the motor through the gearing and connections described and loose stones are picked up by the scoops of the elevator, which penetrate the ground, and these stones are dumped onto the chute D from whence they pass into a wagon trailing behind the machine. If a deeply embedded stone or other firmly fixed obstacle is encountered, the elevator leg swings backward, compressing the spring in the spring-frame E to some extent and simultaneously causing the cable 77 to turn the pulley 78 and threaded shaft 79 and the hand-lever 87 which is fixed to said shaft, in the direction of the arrow, Fig. 1, which permits the clutch lever 81 to move laterally and allows the cone clutch member 45 to spring away from the clutch member 46. This causes the elevator chains and buckets to stop, the pawl 47 preventing reverse movement of the elevator which might occur by reason of the weight of the load of stones in the scoops on its forward side. As the truck moves forward while the elevator scoop is pressing against the obstacle, the spring in the spring-frame E compresses and greater pressure is applied to the obstacle. If the obstacle should yield to this greater pressure before the spring, in the frame E, is compressed beyond a certain amount, say half its length, the elevator will at once swing forward to its normal position, without being lifted from the ground, as the spring in the spring-frame G will resist this pressure and will not be compressed sufficiently to allow the clutch member 40 to engage the hoisting drum C. If, however, the obstacle is not moved by the time the spring in the frame E is compressed about half its length, the elevator is automatically lifted so that it may pass over the obstacle. As the spring-frame E is suspended from the pivoted arms 61 and 62 and the bell-crank lever F is connected to one end of said frame by the rod 64, it will be seen that this spring-frame may move bodily with the bell-crank lever and elevator leg when the resistance of the obstacle is sufficient to move the bell-crank lever against the action of the spring in the frame G. When this occurs the bell-crank lever moves the clutch lever 68 far enough to throw the

clutch member 40 into engagement with the hoisting drum C and thereby this drum, pulling upon the cable 14, rocks the forward ends of the levers 10 downward and causes the rear ends of said levers to lift the elevator out of engagement with the obstruction on the ground. As soon as the elevator is lifted out of engagement with the obstacle the elevator is then moved forward to its normal position by the springs, the spring in frame G returning the bell-crank lever F to normal position and thereby disconnecting the clutch from the hoisting drum so that the elevator will return to the ground by gravity. The operator then connects the elevator to the motor by turning the hand lever 87 so as to connect the clutch members 45 and 46.

As an additional means for releasing the hoisting drum from the driving power, after the elevator has been lifted I have shown the lever 68 with an upper extension 68^a arranged in the path of movement of a projection 85 on the levers 10 so that when the levers 10 are moved downward, to lift the elevator, near the limit of such downward movement, the projection 85 engages the inclined end 68^b of the extension 68^a and moves the lever 68 to throw out the clutch 40. This extension of the lever 68, for the purpose described, is not essential to the operation of the machine but may be desirable, in order to provide a positive means for throwing out the clutch 70 in case it should stick or in case of clogging of the springs in the frames G and E. The hoisting drum C may also be provided with a foot controlled brake, for holding the elevator in its highest position. Any suitable form of brake, not necessary to illustrate, may be used. As shown in the drawing a brake drum 86 is secured to the hoisting drum C and the brake, when used, will be applied to this drum 86. Also, in order to lift the elevator out of engagement with the ground at any time, when it may be desired, the clutch 41 may be thrown into engagement with the hoisting drum C by means of the hand lever 42 and the elevator may then be held in its upper position by the application of the brake.

What I claim is:—

1. In a land clearing machine, a truck, an elevator thereon, means for driving the elevator, and means for automatically lifting the elevator when the latter encounters an obstacle.

2. In a land clearing machine, a truck, an elevator thereon, means for driving the elevator, means for automatically stopping the elevator when the latter encounters an obstacle, and means for then automatically lifting the elevator out of engagement with the obstacle.

3. In a land clearing machine, a truck, an

elevator thereon, means for driving the elevator, means for automatically stopping the elevator when the latter encounters an obstacle, and means for then automatically causing the elevator to be lifted out of engagement with the obstacle and then returned to normal position.

4. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means for the elevator and truck, and means controlled by the relative movement of the elevator and truck for stopping the elevator.

5. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means for the elevator, and means controlled by the relative movement of the elevator and truck for disconnecting the elevator from the driving means.

6. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means for the elevator, and means controlled by the relative movement of the elevator and truck for lifting the elevator out of engagement with the obstacle.

7. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means for the elevator, and means controlled by the relative movement of the elevator and truck for disconnecting the elevator from the driving means, and means for then lifting the elevator out of engagement with the obstacle.

8. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means for the elevator, means controlled by the relative movement of the elevator and truck for disconnecting the elevator from the driving means, and means for then automatically causing the elevator to be lifted out of engagement with the obstacle and then returned to normal position.

9. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, a spring for holding the elevator normally in its forward position, driving means for the elevator, means for disconnecting the driving means from the elevator when the latter moves a certain distance rearward from its normal position and means for lifting the elevator above the obstacle when the elevator moves a certain farther distance from its normal position.

10. In a land clearing machine, a truck,

an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, a spring for holding the elevator normally in its forward position, driving means for the elevator, a hoist operated by said driving means for lifting the elevator, means for disconnecting the driving means from the elevator when the latter moves a certain distance rearward from its normal position, and means for connecting the hoist to the driving means when the elevator moves a certain farther distance from its normal position.

11. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, a spring for holding the elevator normally in its forward position, driving means for the elevator, a hoist operated by said driving means for lifting the elevator, means for disconnecting the driving means from the elevator when the latter moves a certain distance rearward from its normal position, means for connecting the hoist with the driving means when the elevator moves a certain farther distance from its normal position, to lift the elevator, and means for releasing the hoist from the driving means after the elevator has been lifted.

12. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means, a clutch for connecting the elevator mechanism with the driving means, and connections between the elevator and said clutch for disengaging the latter when the elevator moves rearwardly relatively to the truck.

13. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means, a clutch for connecting the elevator mechanism with the driving means, and means for automatically disengaging said clutch comprising a lever engaging the clutch, a worm shaft for moving the lever and connections between the elevator and the worm shaft for turning the latter.

14. In a land clearing machine, a truck, an elevator carried by the truck and adapted to move rearwardly relatively thereto when the elevator encounters an obstacle, driving means, a clutch for connecting the elevator mechanism with the driving means, means for automatically disengaging said clutch comprising a lever engaging the clutch, a worm shaft for moving the lever and connections between the elevator and the worm shaft for turning the latter and manually controlled means for operating said worm shaft to reengage the clutch.

15. In a land clearing machine, a truck, an elevator carried by the truck and movable vertically and also backwardly from normal position with respect to the truck, a motor, hoisting means adapted to be operated by the motor for lifting the elevator, a clutch for connecting the hoisting means with the motor, and connections between the elevator and the clutch adapted to close the clutch when the elevator moves a certain distance rearwardly relatively to the truck.

16. In a land clearing machine, a truck, an elevator carried by the truck and movable vertically and also backwardly from normal position with respect to the truck, a motor, hoisting means adapted to be operated by the motor for lifting the elevator, a clutch for connecting the hoisting means with the motor, and a spring tending to hold the clutch open and to hold the elevator in normal position.

17. In a land clearing machine, a truck, an elevator carried by the truck and movable vertically and also backwardly from normal position with respect to the truck, a motor, hoisting means adapted to be operated by the motor for lifting the elevator, a clutch for connecting the hoisting means with the motor, a spring tending to hold the clutch open and connections between the elevator and the clutch, acting in opposition to said spring, adapted to close the clutch when the elevator moves rearwardly from normal position, said connections including a spring.

18. In a land clearing machine, a truck, an elevator carried by the truck, and movable

vertically and also backwardly from normal position with respect to the truck, a motor, hoisting means adapted to be operated by the motor for lifting the elevator, a clutch for connecting the hoisting means with the motor, a bell-crank lever for moving the clutch, a spring connected to one arm of said lever and tending to hold the clutch open, and yielding connections between the other arm of said lever and the elevator, whereby the elevator may move rearwardly a certain distance with respect to the truck without operating said clutch and a farther movement of the elevator will cause the clutch to close.

19. In a land clearing machine, a truck, a support projecting above the truck, a lever pivoted upon said support, an elevator comprising a leg vertically arranged and having its upper end pivoted to one arm of the lever and provided with stops resting upon the truck and an endless series of scoops on said leg, a hoisting drum, a cable connecting the opposite arm of said lever with the hoisting drum, a motor, a normally open clutch for connecting the hoisting drum with the motor, and connections between said clutch and the elevator leg whereby, when the latter swings rearwardly a certain distance relatively to the truck, the clutch will be moved to closed position.

In testimony whereof I affix my signature, in presence of two witnesses.

ROBERT IRELAND.

Witnesses:

ANNA TAYLOR,
JOSEPH EAGEN.