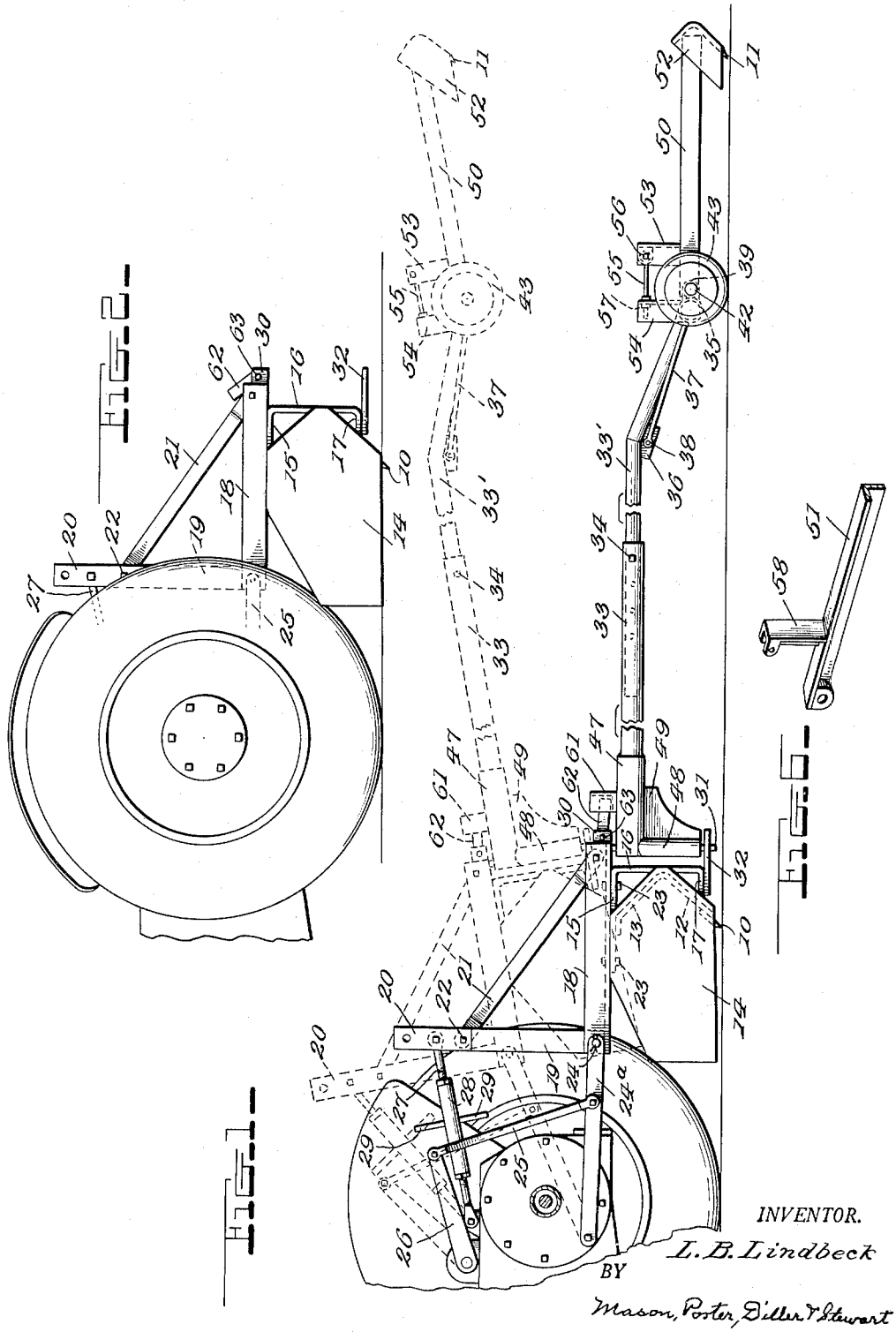
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LAND LEVELING MACHINE

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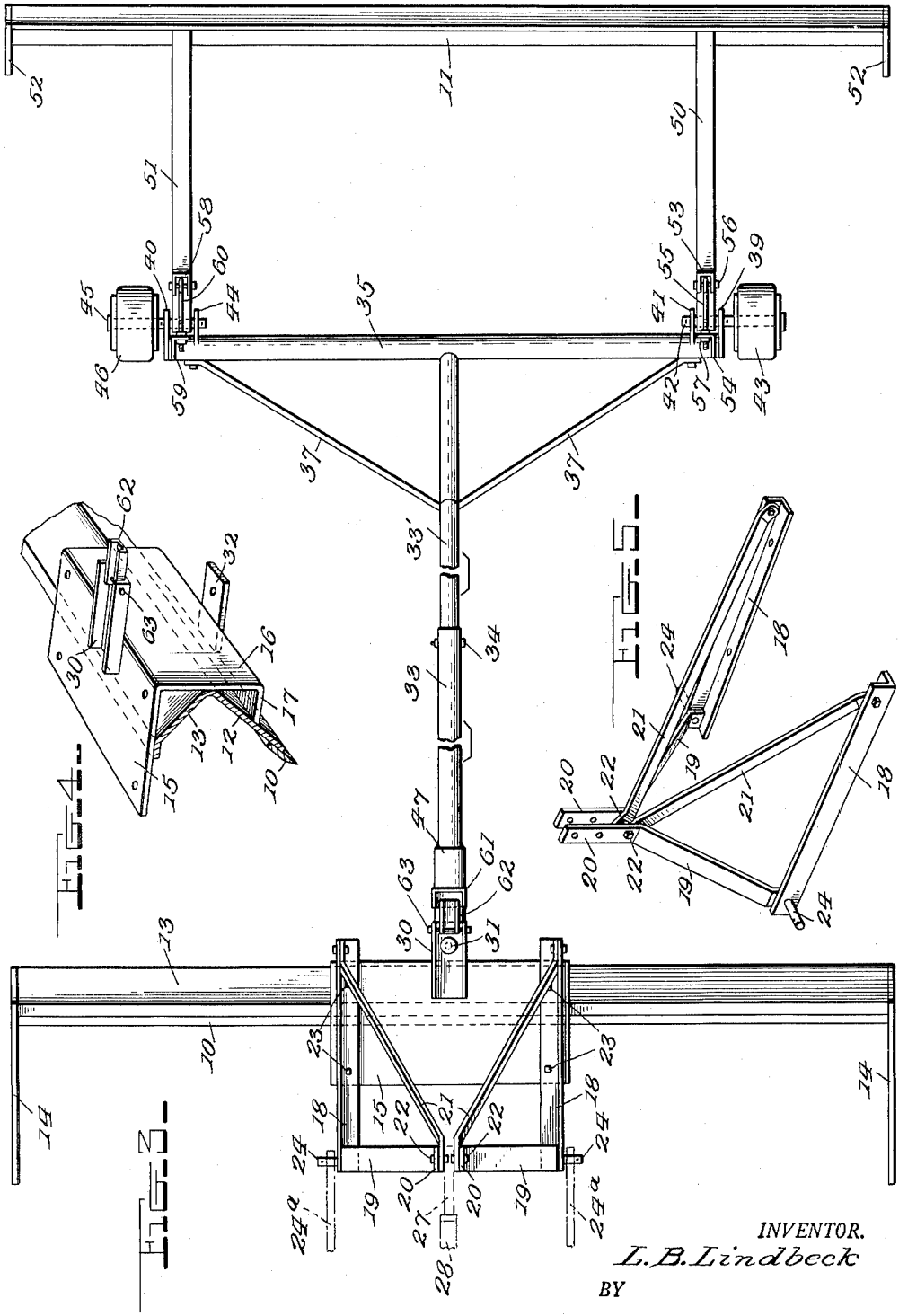


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LAND LEVELING MACHINE

Laurel Byron Lindbeck, Las Cruces, N. Mex.

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6 Claims. (Cl. 37—169)

The invention relates to land levelling machines and more particularly to leveling machines that are drawn by a tractor.

An object of the invention is to provide a leveling machine having a main leveling blade mounted on a rigid frame structure attached to and supported by the tractor and also having an auxiliary leveling blade mounted on a rigid frame structure supported on the ground wheels and attached to the frame carrying the main leveling blade so that said auxiliary blade can swing laterally and follow the path of the main leveling blade.

A further object of the invention is to provide a connection between the two rigid frame structures whereby the auxiliary blade carrying structure can be locked against lateral swinging movements and lifted as a unit with the frame structure carrying the main leveling blade for transporting the machine from one land plot to another.

A still further object of the invention is to provide a connection between the two rigid frame structures which includes a single coupling pin which when removed detaches the rigid frame structure, the ground wheels and the auxiliary leveling blade, so that the main blade may be used as a scraper or for back dozing.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings which show one embodiment of the invention:

Figure 1 is a side view of the land leveling machines showing in full lines the leveling blades in position for a leveling operation and in broken lines the blades and associated parts lifted for transportation.

Figure 2 is a view of the machine in side elevation with the auxiliary leveling blade and its associated parts detached permitting the operation of the main leveling blade alone for grading, back dozing and the like.

Figure 3 is a plan view of the entire leveling machine and showing in broken lines the draw bars and upper link for attaching the machine to a tractor.

Figure 4 is a view partly in section and partly in perspective showing the main leveling blade and the upper and lower horizontal plates welded thereto.

Figure 5 is a perspective view of the supporting frame structure to which the upper horizontal plate carrying the main leveling blade is detachably connected.

Figure 6 is a perspective view of a portion of one of the arms supporting the auxiliary leveling blade.

The leveling machine includes a main leveling blade **10** extending from one side of the machine to the other. It also includes an auxiliary leveling blade **11** likewise extending from one side of the machine to the other.

The main leveling blade inclines rearwardly at **12** and thence forwardly at **13** and thus forms a bucket for retaining the earth taken from a high point and distributes it in the low levels. At each end of the leveling blade are wing plates **14, 14** which prevent the earth from spilling around the ends of the blade.

Attached to the blade is a plate having an upper horizontal portion **15**, a vertical portion **16**, and a lower horizontal portion **17**. These plate portions are welded to the blade intermediate the ends of the blade and serve as a very strong means by which the blade is supported.

Detachably connected to the horizontal upper portion of the plate is a supporting frame which includes parallel angle bars **18, 18**, attached to the ends of the plate **15**, and extending forward therefrom. Connected to the forward ends of these angle bars **18** are upwardly extending inclined bars **19, 19**, terminating in vertical portions **20, 20**, closely spaced from each other. The supporting frame also includes brace bars **21, 21**, attached to the rear ends of the angle bars **18, 18**, and inclining inwardly and forwardly with the upper ends thereof disposed between the vertical members **20, 20** and secured thereto by a bolt **22**. This provides a very rigid frame which is detachably connected to the horizontal plate portion **15** by four bolts **23**.

Extending outwardly from the forward end of the frame structure are pivot pins **24, 24**. Draw bars **24*a*, 24*a***, are connected to the pivot pins at their outer ends and are pivoted at their inner ends to the housing of the tractor. Pivoted to each draw bar is a link **25** and the links are connected in turn to the power actuated lifting arms **26** of the tractor.

There is also an upper center link **27** which is pivoted at its inner end to the tractor housing and at its outer end to the vertical members **20, 20**, of the frame structure supporting the main leveling blade. This link **27** is made in two parts connected by right and left-hand threads to a sleeve **28**. Handles **29, 29** are provided for turning the sleeve to lengthen or shorten the link for shifting the supporting structure to different set positions on the pivotal supports on the draw bars **24*a*, 24*a***. The link **27** may be connected at different set positions to the vertical members **20, 20**, to vary the supporting leverage on the supporting frame structure.

Welded to the plate portion **15** is a coupling pin supporting lug **30** which projects rearwardly from the plate and has an opening for the coupling pin **31**. There is also a lug **32** welded to the lower horizontal plate portion **17** which has an opening for the coupling pin **31**.

Attached to the rigid frame structure carrying the leveling blade **10** is a rigid trailing T-frame structure. This trailing frame includes a central draw bar made in two sections, one of which is indicated at **33** and the other at **33'** in Figure 1. The section **33'** can be telescoped into the section **33** to a greater or lesser extent for shortening or lengthening the draw bar. The sections are held in set position by a bolt **34**. The rear portion of the telescoping section **3'** inclines downwardly and is attached at its end to a tubular cross bar **35**. Welded to the underside of the telescoping section **33'** is a plate **36**. Brace rods **37, 37** are joined near their ends to this cross bar **35** and are connected by a suitable bolt **38** to the opposite sides of the plate **36**. This makes up a very rigid T-shape frame structure.

Welded to one end of the cross bar **35** is a plate **39** which projects rearwardly from a cross bar. There is a similar plate **40** at the other end of the cross bar which likewise projects laterally therefrom. There is a plate **41** welded to the cross bar adjacent but spaced from the plate **39**. A stub axle **42** passes through said plates and is held from movement therein in any suitable way. Mounted on the outer end of the stub axle **42** is a trailing ground wheel **43**. At the other end of the cross bar **35** is a plate **44** which is welded to the cross bar and projects rearwardly therefrom. It is spaced from the plate **40** and a stub axle **45** extends through said plates and is secured thereto in any suitable manner. Mounted on the stub axle is a trailing ground wheel **46**.

Mounted on the front end of the telescoping section **33**

is a sleeve **47**. Welded to the sleeve **47** is a depending sleeve **48**. A web **49** is welded to the sleeve 47 and also to the depending sleeve **48** thus forming a rigid support for the depending or vertically extending sleeve **48**. This T-shaped rigid frame is connected to the rigid frame structure carrying the main leveling blade **10** by the coupling pin **31**.

During the leveling operation of the machine the rigid T-frame can swing laterally on the coupling pin so that the trailing wheels of the T-frame structure will follow the path of the main leveling blade.

Mounted on the stub axle **42** between the plates **39** and **41** is an arm **50**. This arm is pivotally mounted on the stub axle. Also mounted on the stub axle **45** between the plates **40** and **44** is an arm **51**. This arm pivots on the stub axle. At the outer ends of the arms **50** and **51** is an L-shaped leveling blade **11**, Said blade is secured in any suitable way to the arms so as to provide a rigid connection between them. At each end of the leveling blade **11** is an end plate **52**, **52**. These end plates **52**, **52** prevent the dirt from spilling around the end of the leveling blade **11**.

An upstanding U-shaped bracket **53** is welded to the arm **50**. An L-shaped bracket **54** is welded to the cross bar **35**. A rod **55** is secured to the bracket **53** by a bolt **56** which passes through an eye in the rod. The opposite end of the rod is threaded and passes through an opening in one of the flanges of the bracket **54**. There is a nut **57** threaded onto the rod outside of the flange of the bracket and there is a nut threaded on the rod at the inner side of the flange. By adjusting these nuts the rod may be shortened or lengthened and thus the arm **50** raised or lowered. The arm **51** carries a similar U-shaped bracket **58** and the cross bar **35** has a similar L-shaped bracket **59**. There is a similar rod **60** attached to the bracket **58** and adjustably connected to the bracket **59** by nuts so that the rod may be lengthened or shortened for raising or lowering the arm **51**.

There is an upstanding U-shaped bracket **61** secured to the sleeve **47**. An arm **62** is secured to the flanges of the bracket **30** by means of a bolt **63**. During grading this arm is turned to an upright position as shown in Figure 2. When, however, it is desired to raise the T-shaped frame the trailing wheels and the auxiliary leveling blade for transportation purposes then the arm **62** is swung into a horizontal position between the flanges of the U-shaped bracket **61**. This will prevent the draw bar from swinging laterally on the coupling pin.

The machine described above is capable of many uses in grading and leveling a plot of land. Perhaps the most important use is finish leveling, where both the main blade and the auxiliary blade are in action. For this finish leveling the main blade and the auxiliary blade are positioned or set so that the blades are raised a slight distance above the leveled ground surface when the ground wheels are in contact therewith. Thus set, the blades will not cut into a leveled surface. However, when a high portion of earth passes between the tractor wheels the main blade will cut into the high portion, remove it, and carry it along and distribute it in low places over which the tractor passes. Any rough or ribbed portions passing the main blade and between the ground wheels will be engaged by the auxiliary blade and smooth out to a finished level.

The changing of the set position of the main blade can be accomplished by operating the power arms **26**, **26**, of the tractor so as to lift the ground wheels **38**, **38** off the ground, then lengthening the link **27** when you want to raise the main blade, or shortening the link when you want to lower the blade. After these adjustments have been made the power arms are lowered to bring the ground wheels back into contact with a level ground surface. The auxiliary blade **11** can be raised or lowered by adjusting the stop nuts **57**, **57** on the rods.

It is sometimes desirable to use the main blade alone in leveling or grading certain areas. This can quickly

be accomplished by withdrawing the coupling pin which releases all connection with the auxiliary leveling blade, the ground wheel and all associated frame parts. By removing the four bolts connecting the upper horizontal plate to the supporting frame the main blade can be reversed end for end, again attached and used as a pusher or back dozer when the tractor is operated in a reverse direction.

It is obvious that many changes in the details of construction can be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A leveling machine comprising a rigid frame structure attached to and supported by a tractor, a main leveling blade mounted on said frame structure, a second rigid frame structure, ground wheels carried thereby, an auxiliary leveling blade mounted on said last named rigid frame structure and disposed in rear of said wheels and supported by said wheels, means for raising and lowering said auxiliary blade relative to said wheels for setting said auxiliary blade at or above ground level and means for swingingly connecting said first named rigid frame structure to the frame structure carrying the ground wheels and auxiliary leveling blade so that said auxiliary blade may swing laterally and follow the path of the main leveling blade.

2. A leveling machine comprising a rigid frame structure attached to and supported by a tractor, a main leveling blade mounted on said frame structure, a second rigid frame structure, ground wheels carried thereby, an auxiliary leveling blade mounted on said last named rigid frame structure and disposed in rear of said wheels and supported by said wheels, means for raising and lowering said auxiliary blade relative to said wheels for setting said auxiliary blade at or above ground level and means for swingingly connecting said first named rigid frame structure to the frame structure carrying the ground wheels and auxiliary leveling blade so that said auxiliary blade may swing laterally and follow the path of the main leveling blade, said connecting means including a coupling pin which when removed detaches the ground wheels, auxiliary leveling blade and the associated frame structure from the machine.

3. A leveling machine comprising a rigid frame structure attached to and supported by a tractor, a main leveling blade mounted on said frame structure, a second rigid frame structure, ground wheels carried thereby, an auxiliary leveling blade mounted on said last named rigid frame structure and disposed in rear of said wheels and supported by said wheels, means for raising and lowering said auxiliary blade relative to said wheels for setting said auxiliary blade at or above ground level and means for swingingly connecting said first named rigid frame structure to the frame structure carrying the ground wheels and auxiliary leveling blade so that said auxiliary blade may swing laterally and follow the path of the main leveling blade, and means for locking said frame structure carrying the ground wheels and auxiliary leveling blade from lateral swinging movement so that said frame, ground wheels and leveling blade can be lifted as a unit with the frame supporting the main leveling blade for transporting the machine.

4. A ground leveling machine comprising a main leveling blade adapted to extend transversely of the machine from one side thereof to the other, a rigid frame structure adapted to support said blade, devices adapted to connect said frame structure to a tractor so that it is supported and raised and lowered by said devices, vertically spaced lugs carried by said frame structure, a vertically disposed coupling pin removably mounted in said lugs, a rigid T-shaped frame consisting of a central tubular draw bar and a tubular cross bar welded to the rear end thereof, said tubular draw bar at the front end thereof having a vertically disposed sleeve adapted to be mounted on the coupling pin for lateral swinging movements only, ground wheels supported at the ends of said tubular

cross bar, arms mounted on said tubular cross bar and projecting rearwardly therefrom and an auxiliary leveling blade carried by said arms and extending transversely from one side of the machine to the other, and means for shifting and rigidly supporting said arms in a selected set position.

5. A ground leveling machine comprising a main leveling blade adapted to extend transversely of the machine from one side thereof to the other, a rigid frame structure adapted to support said blade, devices adapted to connect said frame structure to a tractor so that it is supported and raised and lowered by said devices, vertically spaced lugs carried by said frame structure, a vertically disposed coupling pin removably mounted in said lugs, a rigid T-shaped frame consisting of a central tubular draw bar and a tubular cross bar welded to the rear end thereof, said tubular draw bar at the front end thereof having a vertically disposed sleeve adapted to be mounted on the coupling pin for lateral swinging movements only, said tubular draw bar being formed of two telescoping sections, locking means for holding said sections in a set position, ground wheels supported at the ends of the tubular cross bar, arms mounted on the tubular cross bar and projecting rearwardly therefrom and an auxiliary leveling blade carried by said arms and extending transversely from one side of the machine to the other, and means for shifting said arms vertically and rigidly supporting the same in a selected set position.

6. A ground leveling machine comprising a main leveling blade adapted to extend transversely of the machine from one side thereof to the other, a rigid frame structure

adapted to support said blade, devices adapted to connect said frame structure to a tractor so that it is supported and raised and lowered by said devices, vertically spaced lugs carried by said frame structure, a vertically disposed coupling pin removably mounted in said lugs, a rigid T-shaped frame consisting of a central tubular draw bar and a tubular cross bar welded to the rear end thereof, said tubular draw bar at the front end thereof having a vertically disposed sleeve adapted to be mounted on the coupling pin for lateral swinging movements only, a pair of spaced plates welded to the tubular cross bar at each end thereof projecting rearwardly therefrom, a stub axle in each pair of plates and a ground wheel mounted on each axle, arms pivotally mounted on said stub axles between said plates and projecting rearwardly therefrom, an auxiliary leveling blade carried by said arms and extending transversely from one side of the machine to the other, and means for shifting said arms and rigidly supporting the same in a selected set position.

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