July 19, 1966 L. J. LITHERLAND 3,261,118

LAND LEVELER

Filed April 10, 1964 2 Sheets-Sheet 1

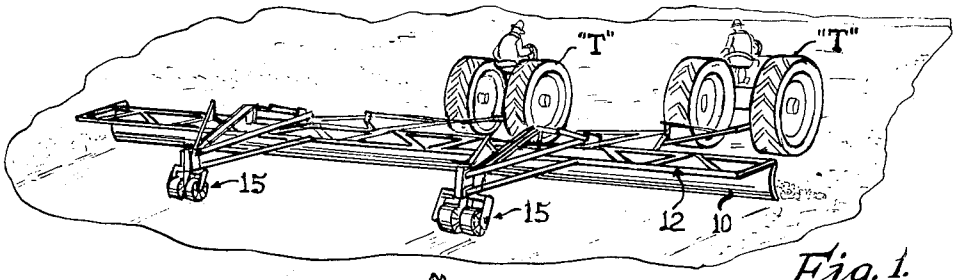


Fig. 1.

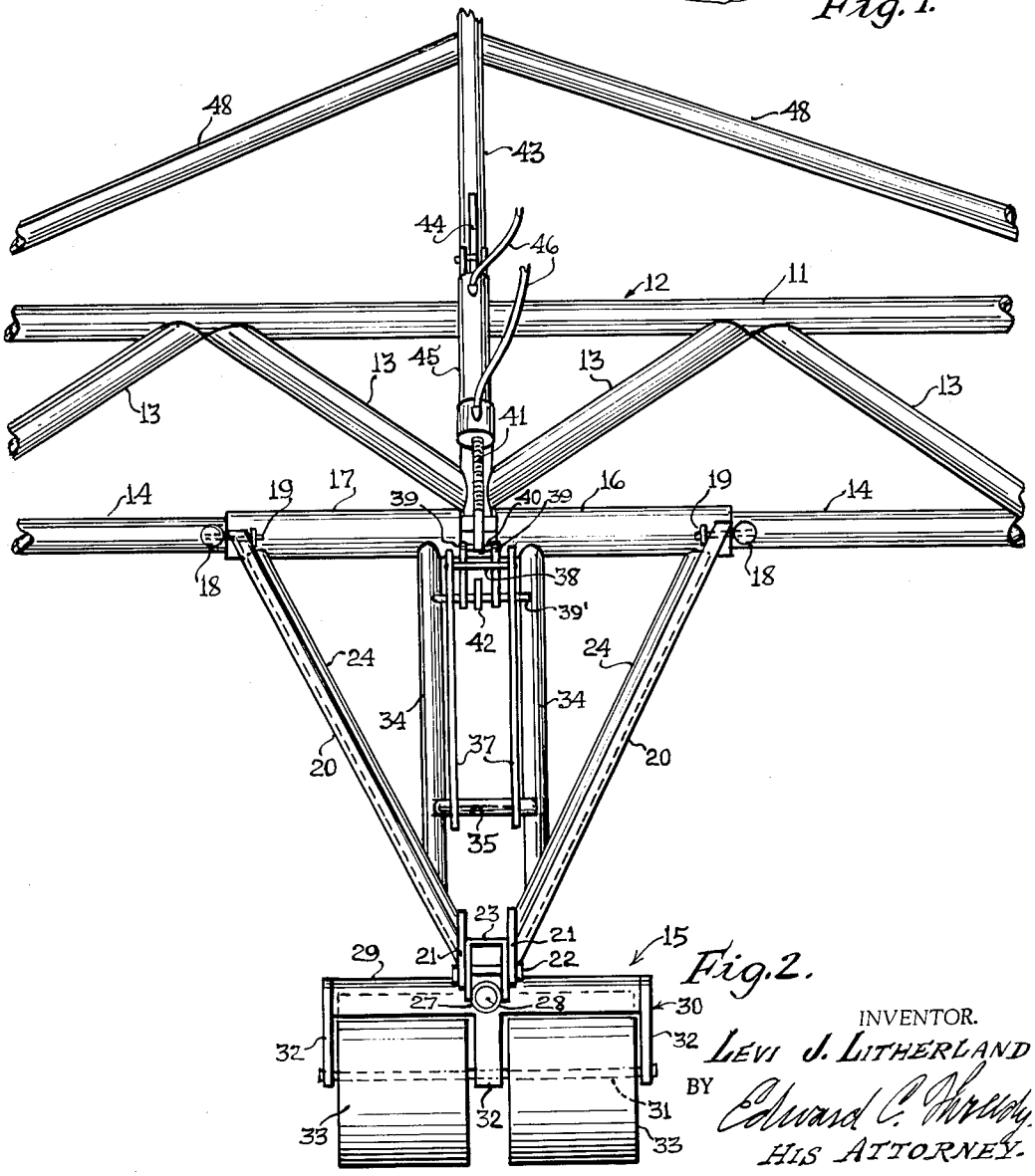


Fig. 2.

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July 19, 1966 L. J. LITHERLAND 3,261,118

LAND LEVELER

Filed April 10, 1964 2 Sheets-Sheet 2

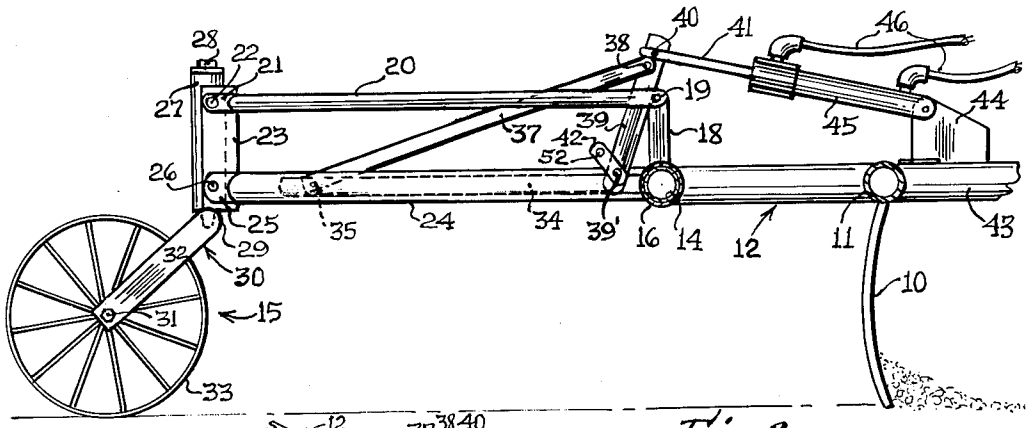


Fig. 3.

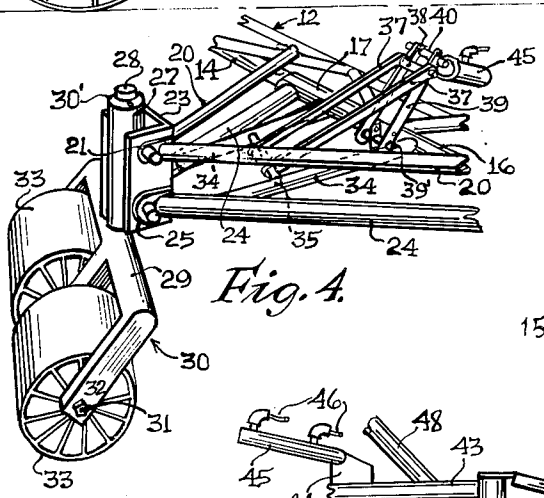


Fig. 4.

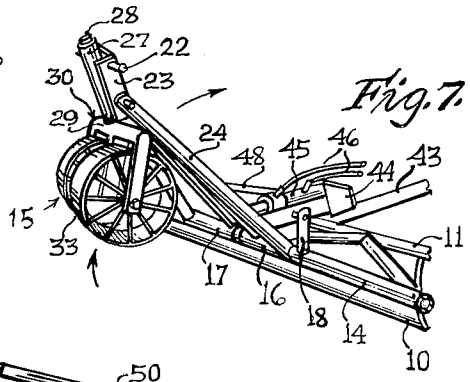


Fig. 7.

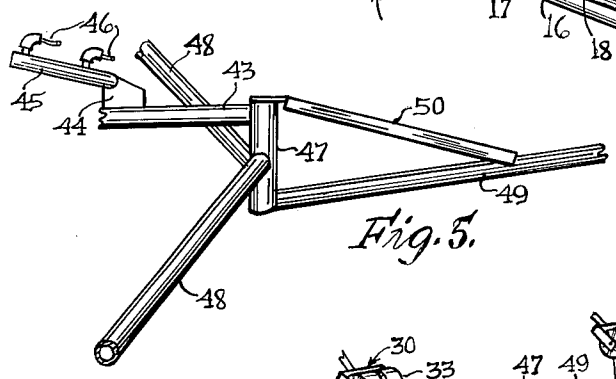


Fig. 5.

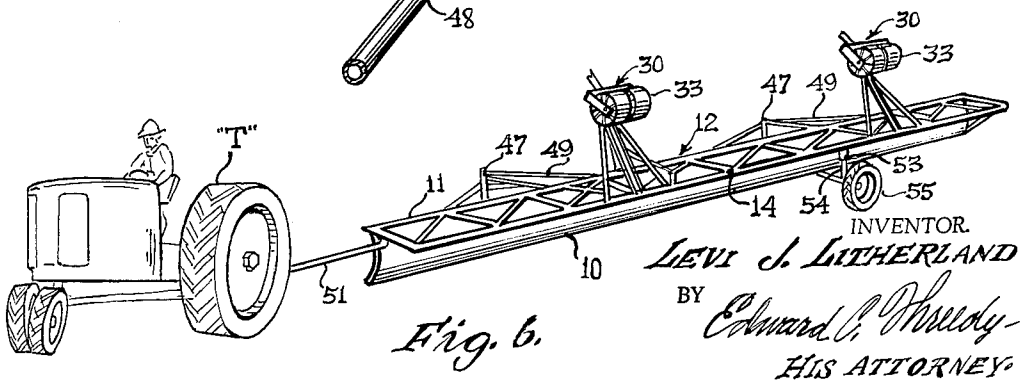


Fig. 6.

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3,261,118

LAND LEVELER

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5 Claims. (Cl. 37—180)

My invention relates to a new and useful improvement in a land leveler and more particularly to an implement adapted for attachment to a pair of farm tractors, or the like, which operate to supply the motivating operating power for such implement.

An object of this invention is to provide in an apparatus of this character an elongated leveling blade which is carried by a tubular supporting body and which is readily attached to a pair of tractors, the connection between the blade and the tractor being such that the blade may be pulled by such tractors while it extends through a diagonal plane with respect to the ground over which it passes.

A further object of this invention is to provide in a land leveler of this character a tubular support body, the construction of which is light in weight while at the same time providing the structural strength needed to prevent the leveling blade from bending or humping during its operation.

Yet another object of my invention is to provide in an apparatus of this character a means for pneumatically positioning a wheel structure relative to the blade and supporting body thereof for adjusting both the level and depth of cut of the leveling blade during its operation.

An equally important object of my invention is to provide in a land leveler of this character a construction arrangement whereby the apparatus may be readily collapsed into a highly portable condition.

A still further important object of my invention is to provide in an apparatus of this character a pneumatic means and arrangement for raising and lowering a pair of caster unit wheel mountings which rotatably support the leveling blade and which determine the level and depth of cut of such blade.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

FIG. 1 is a perspective view of my invention in operation;

FIG. 2 is a fragmentary top plan view showing a portion of my invention;

FIG. 3 is a fragmentary detail side elevational view showing the caster-type wheel mounting as associated with my invention;

FIG. 4 is a fragmentary perspective view of the caster type wheel mounting;

FIG. 5 is a fragmentary perspective view of the tractor hitch arrangement;

FIG. 6 is a perspective view of my apparatus in its portable condition; and

FIG. 7 is a fragmentary perspective view of the caster-type wheel mounting in a semi-raised condition.

My improved land leveler comprises an elongated arcuate scraper blade **10** which is fixedly attached to the underside of a forward longitudinally extending structural member **11** which comprises a portion of the blade carriage **12**.

The blade carriage **12** is in the form of an elongated, rectangularly-shaped tubular structure comprising in part the forward longitudinal member **11** which in turn is connected by a series of diagonal cross supports **13** to a parallelly extending rear longitudinal member **14**.

As shown in FIG. 1, the blade carriage **12** is adapted to be supported at its rear side by a pair of caster-type wheel units **15**. Each of these wheel units **15** is pivotally connected to the rear longitudinal member **14** in the following manner. For each wheel unit **15** I provide a pair of tubular bearing elements **16** and **17** which are freely journaled upon the rear longitudinal member **14**. The rear longitudinal member **14** provides a plurality of vertical posts **18** which are positioned adjacent the opposite ends of the bearing elements **16** and **17** as shown in FIG. 2. These vertical posts **18** carry attaching bolts **19** for removably connecting the inner ends of a pair of upper support arms **20**. These upper support arms **20** have their opposite converging ends welded to a face plate **21**, which in turn is removably connected by a bolt **22** to a U-shaped socket support **23**.

In vertical alignment beneath the upper support arms **20** are enlarged lower support arms **24**. The inner ends of these lower support arms **24** are welded to the bearing element **16** while their opposite converging ends are welded to a face plate **25** which in turn is connected to the U-shaped socket support **23** by a bolt **26** (see FIG. 3).

Within the spaced apart arms of the U-shaped socket support **23**, and welded therebetween is a cylindrical socket or bearing **27**. This socket **27** rotatably houses a circular stem **28** which is a part of the horizontal base **29** of an inverted E shaped caster type wheel mounting **30**. The circular stem **28** is rotatably retained in the socket **27** by a lock collar **30'** attached to the upper exposed end thereof as seen in FIGS. 3 and 4.

Rotatably supported on a shaft **31** between the arms **32** of the inverted E shaped caster-type wheel mounting **30** are a pair of roller-type wheels **33**. As shown in FIG. 1, due to the elongated length of the land leveler there are two such caster-type wheel mountings which support the same and which are identical in structure and operation.

Extending horizontally between the varying elements **16** and lower support arms **24** are a pair of braces **34**. Welded between these parallelly extending braces **34** is a connecting rod **35**. Hingedly connected to this rod **35** is the free end of each of a pair of spaced apart parallelly extending levers **37**. The opposite upper ends of these pivot levers **37** (FIGS. 2 and 3) are connected by a bolt **38** to a corresponding parallelly extending pair of link arms **39**. These link arms **39** are in turn removably connected at one end thereof, by a cylinder pin **40** to the free end of a cylinder plunger **41**, while their opposite lower ends are hingedly connected to a rod **39'** which extends between and is welded to the braces **34** as seen in FIGS. 2 and 3. A pivot link **42** is freely journaled upon the rod **39'** between the link arms **39**. The purpose and function of this pivot link **42** will be hereinafter made apparent.

Carried by a horizontal structural member **43** which is connected to the confronting ends of the diagonal cross support **13** immediately to the rear of the bearing elements **16** and **17** and welded to the member **14** is a vertically disposed plate **44** (FIGS. 2 and 3) which pivotally supports a pneumatic cylinder **45**. This cylinder **45** by suitable conduits **46** is operatively connected to the power source furnished by the tractors "T" which are adapted to be connected to and pull the land leveler. The reciprocal plunger **41** of the pneumatic cylinder **45** is removably connected to the link arms **39**, as hereinbefore described, so that upon actuation of the cylinder **45**, the bearing element **16** together with the caster-type wheel mountings **30** may be pivoted through an arcuate path relative to the elongated axis of the blade **10** in a manner and for a purpose hereinafter described.

The horizontal structural member **43** terminates at its free end into a socket housing **47**, as seen in FIG. 5.

The socket housing **47** is also supported by a pair of converging diagonal truss members **48** which extend in a forward direction from the forward longitudinal member **11**. The socket housing **47** rotatably contains a socket arm which extends between a tractor hitching tongue **49** and a supporting brace **50** associated therewith, as seen in FIG. 5. By this arangement the tongue **49** is rotatably connected to the supporting structure furnished by the carriage **12**. By this arrangement the tractors "T" when pulling the blade may be staggered, that is, one may be in advance of the other and the hitching tongue **49** rotate itself in the socket housing **47**, so as to extend in a direct line from the tractor "T," thus disposing the scraper blade **10** through an angled plane with respect to the ground to be leveled.

As viewed in FIG. 6, a fixed hitching tongue **51** is adapted to extend from one end of the carriage **12** so that the land leveler may be readily transported by a single tractor when it is not in use. As viewed in FIG. 6, the caster-type wheel mountings **30** are shown in their elevated portable position.

To elevate the wheel mountings **30** into the position shown in FIG. 6, the operator will release the upper support arms **20** by removing the bolt **19** so as to disconnect these arms **20** from the vertical supports **18** carried adjacent the confronting ends of the rear horizontal member **14**. The pivot levers **37** are disconnected from their associated link arms **39** by removal of the bolt **38**. The cylinder plunger **41** is disconnected from the ends of the link arms **39** by removing the pin **40** thereof and is reconnected to the pivot link **42** through the bolt **52**. Thus, when the pneumatic cylinder **45** is caused to operate so as to retract the plunger **41**, the bearing element **16** is caused to rotate relative to its connection to the rear horizontal member **14** so as to rise the wheel mountings **30** in the direction of the arrows shown in FIG. 7 and into the positions shown in FIG. 6.

When the land leveler is in the condition shown in FIGS. 1, 2 and 3, the depth of cut of the scraper blade **10** can be regulated by the degree of rotation of the bearing elements **16** and through its connection to the wheel mounting **30**, that is to say, the wheels may be pneumatically raised or lowered so as to determine the position of the blade **10** with respect to the ground thereunder.

To readily transport the land leveler, I provide on the forward and rear longitudinal members **11** and **14** a pair of downwardly disposed sockets **53** which receive connecting studs **54** provided by a wheel unit **55** as seen in FIG. 6.

From the foregoing description of the construction of my land leveler it is apparent that either tractor may pull ahead of the other tractor so as to determine the angular disposition of the blade **10** with respect thereto as it is pulled over the ground to be leveled so as to direct the removed ground in a manner to be displaced to either side of the path of the blade.

Each of the pneumatic cylinders **45** may be independently operated to determine the pivotal position of its corresponding caster-type wheel units **30** to cause the longitudinal angle of the blade **10** (from end to end) to vary according to the type of cut desired. The depth of the cut of the blade **10** can likewise be determined by the degree of pivotal displacements of the wheel units **30** relative to the horizontal plane of the frame **11** and blade **10**.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A tractor drawn land leveler comprising an elongated rectangularly shaped tubular frame having forward and rear elongated longitudinal structural members,

(a) a scraper blade mounted beneath said forward longitudinal structural member,

(b) a pair of ground engaging caster-type wheel units carried by said rear longitudinal structural member of said frame behind and intermediate the ends of said blade,

(c) means for pivotally connecting each of said wheel units to said rear longitudinal structural member,

(d) means for pivoting each of said wheel units in an arcuated path about a horizontal axis defined by said rear longitudinal structural member which is normally disposed between said blade and said caster-type wheel units relative to said frame into and out of ground engaging position,

(e) a pair of tractor hitch means pivotally connected to the said forward longitudinal structural member intermediate the ends thereof for connecting and positioning said blade behind a pair of tractors whereby the positioning of said blade may be varied angularly about a vertical axial middle point thereof relative to the respective position of the tractors, and

(f) downwardly directed socket means provided by each of said longitudinal structural members for removably receiving vertical stud members of a wheeled frame for transportation of said leveler in the direction of its length with said blade and said wheel units out of ground engaging positions.

2. A tractor drawn land leveler comprising an elongated rectangularly shaped tubular frame having forward and rear elongated longitudinal structural members,

(a) a scraper blade mounted beneath said forward longitudinal structural member,

(b) a pair of ground engaging caster-type wheel units carried by said rear longitudinal structural member of said frame behind and intermediate the ends of said blade,

(c) bearing elements carried by and rotatable with respect to said rear elongated longitudinal structural member for pivotally connecting each of said wheel units to said frame,

(d) means for pivoting each of said wheel units in an arcuated path about a horizontal axis defined by said rear longitudinal structural member which is normally disposed between said blade and said caster-type wheel units relative to said frame into and out of ground engaging position,

(e) a pair of tractor hitch means pivotally connected to the said forward longitudinal structural member intermediate the ends thereof for connecting and positioning said blade behind a pair of tractors whereby the positioning of said blade may be varied angularly about a vertical axial middle point thereof relative to the respective position of the tractors,

(f) and downwardly directed socket means provided by each of said longitudinal structural members for removably receiving vertical stud members of a wheeled frame for transportation of said leveler in the direction of its length with said blade and said wheel units out of ground engaging positions.

3. A tractor drawn land leveler comprising an elongated rectangularly shaped tubular frame having forward and rear elongated longitudinal structural members,

(a) a scraper blade mounted beneath said forward longitudinal structural member,

(b) a pair of ground engaging caster-type wheel units carried by said rear longitudinal structural member of said frame behind and intermediate the ends of said blade,

(c) means for pivotally connecting each of said wheel units to said rear longitudinal structural member,

(d) hydraulic pressure controlled means for pivoting each of said wheel units in an arcuated path and its connecting means about a horizontal axis defined by said rear longitudinal structural member which is normally disposed between said blade and said caster-type wheel units relative to said frame for positioning each of said wheel units into and out of ground engaging position,

(e) a pair of tractor hitch means pivotally connected to the said forward longitudinal structural member intermediate the ends thereof for connecting and positioning said blade behind a pair of tractors whereby the positioning of said blade may be varied angularly about a vertical axial middle point thereof relative to the respective position of the tractors,

(f) and downwardly directed socket means provided by each of said longitudinal structural members for removably receiving vertical stud members of a wheeled frame for transportation of said leveler in the direction of its length with said blade and said wheel units out of ground engaging positions.

4. A tractor drawn land leveler comprising an elongated rectangularly shaped tubular frame having forward and rear elongated longitudinal structural members,

(a) a scraper blade mounted beneath said forward longitudinal structural member,

(b) a pair of ground engaging caster-type wheel units carried by said rear longitudinal structural member of said frame behind and intermediate the ends of said blade,

(c) bearing elements carried by and rotatable with respect to said rear elongated longitudinal structural member for pivotally connecting each of said wheel units to said frame,

(d) hydraulic pressure controlled means associated with each bearing element for rotating the same so

as to pivot each of said wheel units in an arcuated path about a horizontal axis defined by said rear longitudinal structural member which is normally disposed between said blade and said caster-type wheel units formed by said bearing elements for positioning each of said wheel units relative to said frame into and out of ground engaging position,

(e) a pair of tractor hitch means pivotally connected to the said forward longitudinal structural member intermediate the ends thereof for connecting and positioning said blade behind a pair of tractors whereby the positioning of said blade may be varied angularly about a vertical axial middle point thereof relative to the respective position of the tractors,

(f) and downwardly directed socket means provided by each of said longitudinal structural members for removably receiving vertical stud members of a wheeled frame for transportation of said leveler in the direction of its length with said blade and said wheel units out of ground engaging positions.

5. A tractor drawn land leveler as defined by claim 4 wherein the hydraulic pressure controlled means comprise hydraulic cylinders and cooperating hydraulic pistons, said pistons being connectable to portions of said bearing elements for rotating the same relative to said frame.

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