April 22, 1969 J. COONTZ 3,439,752

ANGLE DOZER

Filed Feb. 24, 1966 Sheet 1 of 3

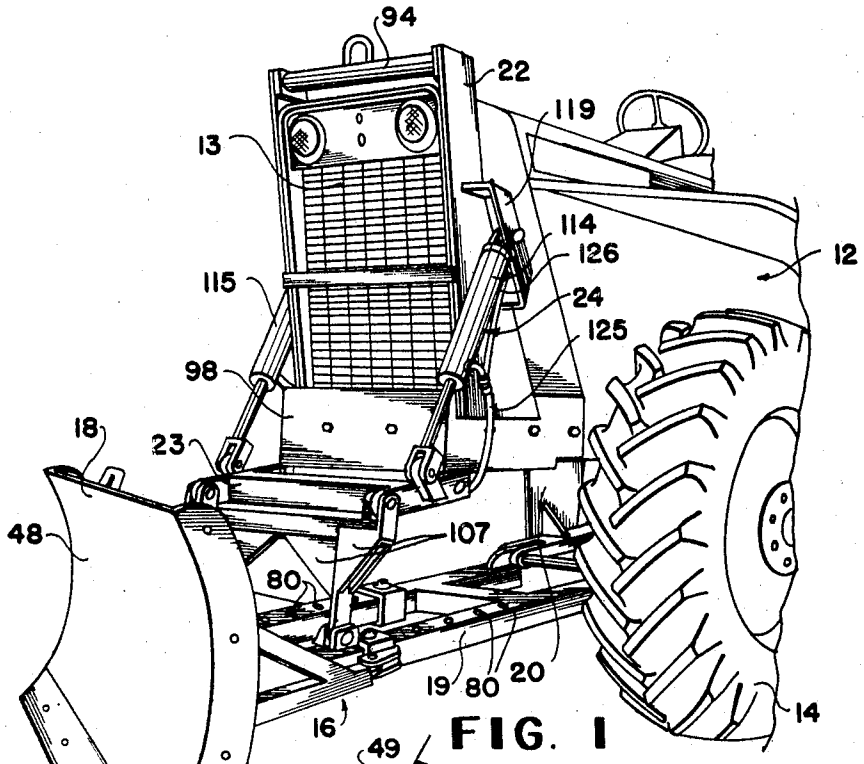

FIG. 1

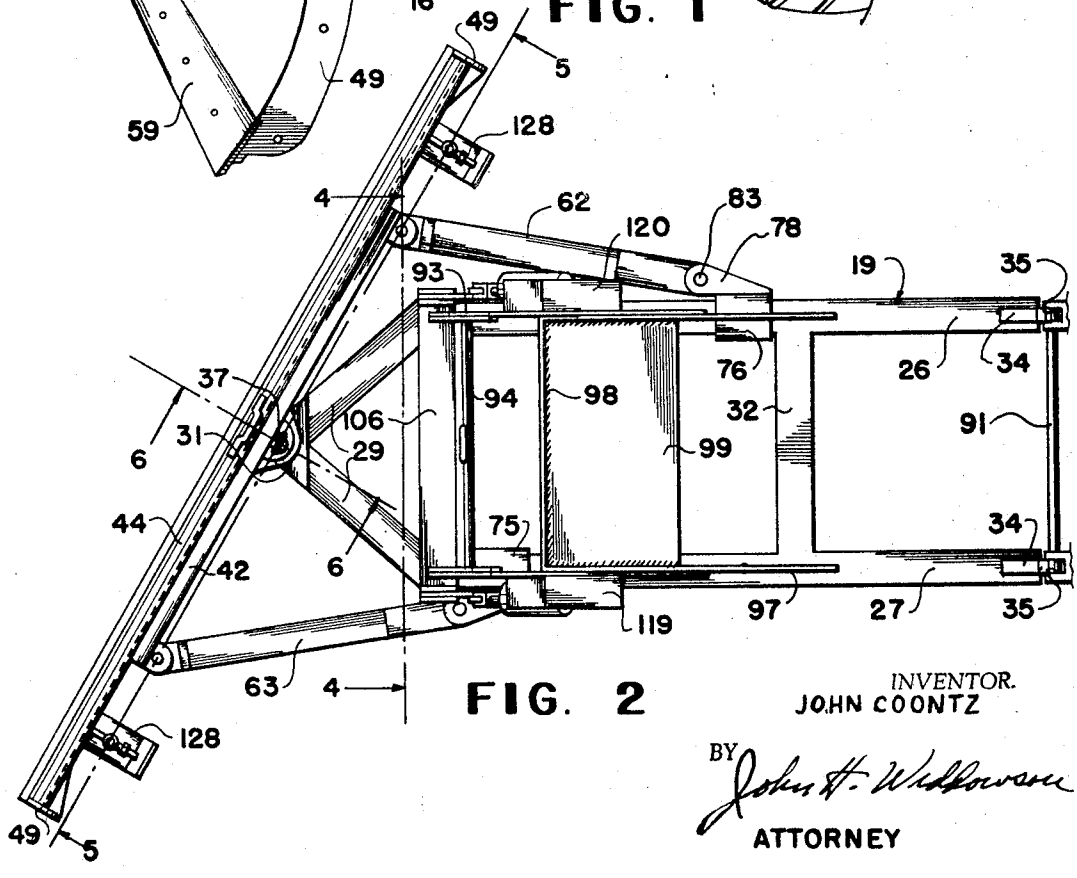

FIG. 2

INVENTOR.
JOHN COONTZ

BY John H. Widdowson
ATTORNEY

April 22, 1969 J. COONTZ 3,439,752

ANGLE DOZER

Filed Feb. 24, 1966 Sheet 2 of 3

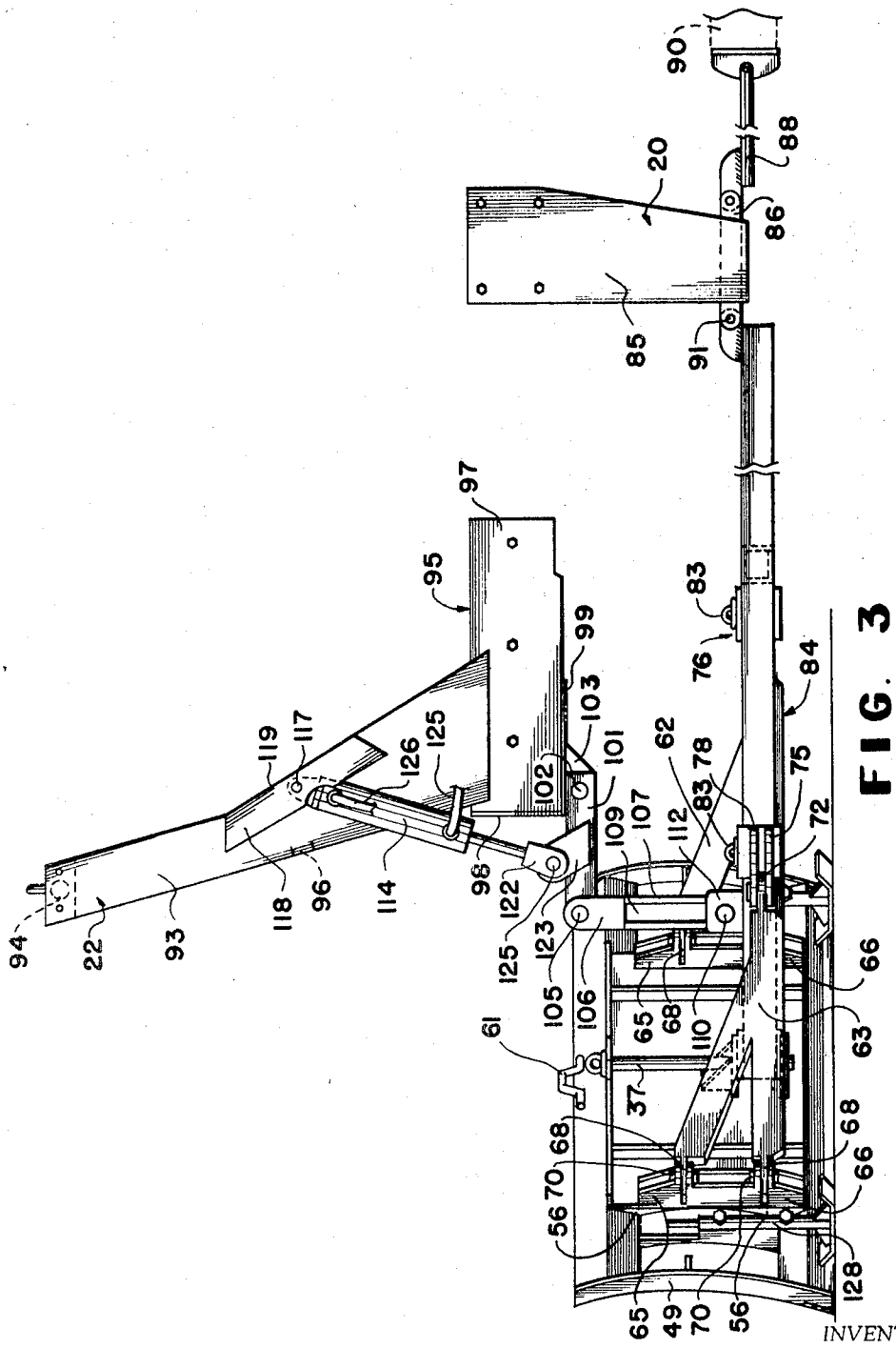

FIG. 3

INVENTOR.
JOHN COONTZ

BY John H. Widdowson
ATTORNEY

April 22, 1969 J. COONTZ 3,439,752

ANGLE DOZER

Filed Feb. 24, 1966 Sheet 3 of 3

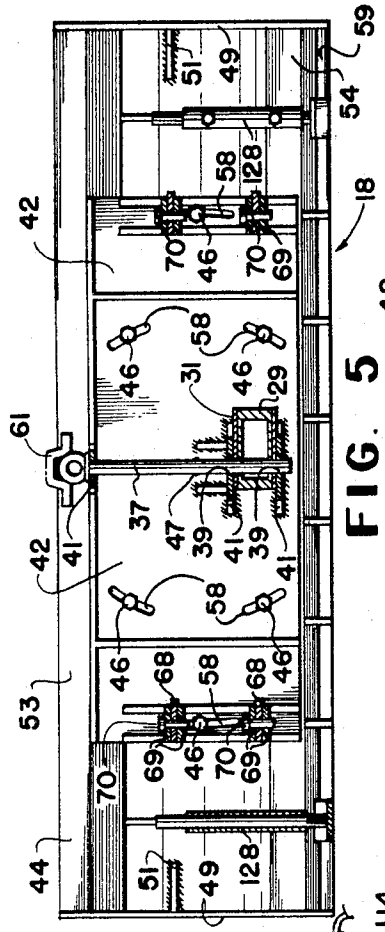

FIG. 5

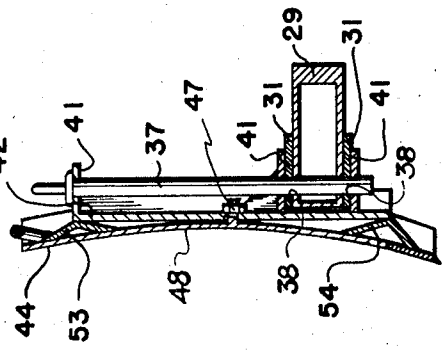

FIG. 6

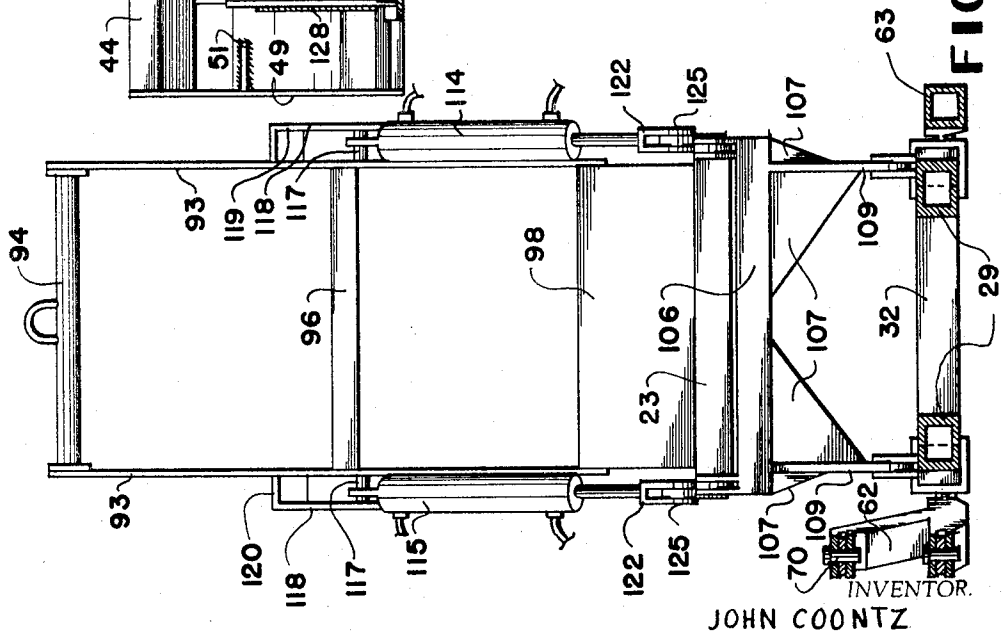

FIG. 4

INVENTOR.
JOHN COONTZ
BY John H. Widdowson
ATTORNEY

United States Patent Office 3,439,752
Patented Apr. 22, 1969

3,439,752

ANGLE DOZER

John Coontz, 131 N. 6th St., Kiowa, Kans. 67070

Filed Feb. 24, 1966, Ser. No. 529,710
Int. Cl. E02f 3/76
U.S. Cl. 172—805 3 Claims

ABSTRACT OF THE DISCLOSURE

This invention is a bulldozer assembly connectible to a tractor having a blade means adjustable in all directions relative to path of tractor movement including a vertical support frame secured to the forward portion of the tractor; a horizontal thrust support assembly mountable on an engine portion of the tractor connectible to a draw bar; an undercarriage means pivotally connected to the thrust support assembly; linkage means having opposite ends connected to the support frame and the undercarriage means; and hydraulic means connected to the support frame and the linkage means to raise and lower the blade means connected thereto as required.

Various bulldozer assemblies are presently available providing for adjustment of the working blade member in a plurality of directions. The prior art devices are limited in the permissible working load capacity as this feature is not compatible with the provision of being readily adjustable. It is desirable to have a bulldozer assembly that is readily attachable to a tractor, adjustable in all directions, and constructed so as to withstand the power capacity of the tractor.

In preferred specific embodiments of the invention, a bulldozer assembly is provided for a heavy duty tractor having a blade means, an elongated undercarriage frame means connected to the blade means, a horizontal thrust support assembly secured to the tractor, a pivot connecting the undercarriage frame means to the horizontal thrust support assembly for upward pivotal movement, a vertical thrust support assembly secured to the tractor, a linkage connecting the undercarriage frame means to the vertical thrust support assembly, and hydraulic cylinders connected and operable to raise and lower the undercarriage frame means and attached blade means. The blade means includes a blade plate bolted to a support plate so as to be adjustable vertically to control the angle of blade tilt. The mid portion of the blade means is pivotally connected to the undercarriage frame means and the outer ends of the blade means is connected by arm members to the undercarriage frame means. The arm means are movable in opposite directions on the undercarriage frame means to adjust the working or blade angle of the blade means relative to the path of tractor travel. It is seen, therefor, that the bulldozer assembly is readily adjustable for upward pivotal movement about the horizontal thrust support assembly, rotational movement of the blade plate about the support plate to adjust the angle of tilt, relative to the support surface, and the blade is movable horizontally to adjust the blade angle.

Accordingly, it is an object of this invention to provide a new and novel bulldozer assembly.

Another object of this invention is to provide a bulldozer assembly having a rigid undercarriage frame means connected to a blade means and hydraulic control means operable to raise and lower the blade means.

Still another object of this invention is to provide a bulldozer assembly having means for the ready attachment and removal from a tractor.

A further object of this invention is to provide a bulldozer assembly having a new and novel undercarriage

frame structure designed to withstand the load capacity of the largest tractors.

One other object of this invention is to provide a bulldozer assembly readily attachable to most any type of tractor vehicle.

A still further object of this invention is to provide a bulldozer assembly of a rigid unit frame construction adapted to withstand the twist and thrust of large working loads while having means permitting rapid adjustment of the blade to a plurality of different positions.

Various other objects, advantages and features of the invention will become apparent to those skilled in the art from the accompanying description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a fragmentary perspective view of a construction tractor embodying the bulldozer assembly of this invention;

FIG. 2 is a top plan view of the bulldozer assembly of this invention;

FIG. 3 is a side elevational view of the bulldozer assembly of this invention;

FIG. 4 is an enlarged fragmentary sectional view taken along line 4—4 in FIG. 2;

FIG. 5 is an enlarged sectional view taken along line 5—5 in FIG. 2; and

FIG. 6 is an enlarged fragmentary sectional view taken along line 6—6 of FIG. 2.

The following is a discussion and description of preferred specific embodiments of the new bulldozer assembly of this invention, such being made with reference to the drawings, whereupon the same reference numerals are used to indicate the same or similar parts and/or structure. It is to be understood that such discussion and description is not to unduly limit the scope of the invention.

Referring to the drawings in detail and particularly to FIG. 1, a large construction tractor such as the Case 1200 manufactured by J. I. Case Company, is indicated generally at **12** having an engine portion **13** between the front wheels **14** to which is mounted a bulldozer assembly **16** of this invention. The bulldozer assembly **16** consists of a blade means **18** connected to an elongated undercarriage frame means **19**, a horizontal thrust support assembly **20** mounted on the tractor **12** supporting the rearward portion of the undercarriage frame means **19**, a vertical thrust support assembly **22** mounted on the forward section of the engine portion **13**, linkage means **23** connecting the undercarriage frame means **19** to the vertical thrust support assembly **22**, and hydraulic ram means **24** operably connected to the linkage means **23** to raise and lower the undercarriage frame means **19** and interconnected blade means **18**.

More particularly, as shown in FIGS. 2 and 3, the undercarriage frame means **19** is of a boxed construction having elongated parallel beams **26** and **27** interconnected as by welding at one adjacent end with converging boxed angles **29**. The adjoining ends of the boxed angles **29** are reenforced by gusset plates **31** welded to the upper and lower surfaces thereof. The beams **26** and **27** are interconnected intermediate their ends by a transversely extended box channel **32** welded therebetween. A connector ear **34** welded to the top rearward end surface of each beam **26** and **27** extends laterally therefrom and has a hole **35** therein for reasons to become obvious. The undercarriage frame means **19** is connected to the blade means **18** by an elongated vertically extended king pin **37** mounted within axially aligned holes **38** in the gusset plates **31** and holes **39** in laterally extended plates **41** welded to a support plate **42** which is part of the blade means **18**.

As shown in FIGS. 3 and 5, the blade means **18** includes a heavy blade plate **44** connected as by bolt members **46** and **47** to the support plate **42**. The blade plate **44** is of a rectangular shape having a concave forward working surface **48** with the outer ends supported by vertical struts **49**. Gusset plates **51** are welded to the struts **49** and adjacent surfaces of the blade plate **44** for added rigidity (FIG. 5). The upper and lower elongated horizontal edges of the blade plate **44** are reenforced by parallel angle iron braces **53** and **54**, respectively, welded thereto with their open sides facing the blade plate **44**. Block members **56** are welded to the inner rearwardly facing surfaces of the iron braces **53** and **54** and the blade plate **44** to provide flat contacting surfaces between the blade plate **44** and the support plate **42**. These contacting surfaces in conjunction with arcuate slots **58** through which the bolts **46** are mounted permits rotational movement of the blade plate **44** about the central bolt **47** for angular adjustment. It is seen, therefore, that the blade means **18** provides for adjustment of the blade plate **44** for variance of the tilt relationship with the working soil for best results. The lower forward edge of the blade plate **44** supports a cutting plate **59** bolted thereto adapted to take substantially all of the cutting wear of the bulldozer assembly **16** and is therefore made so as to be replaceable. It is obvious that the cutting plate **59** can be rotated 180 degrees and bolted to the blade plate **44** so as to provide for a second cutting edge for double wear. A handle member **61** is welded to the top edge of the blade plate **44** for the purpose of lifting for attachment and/or removal of the blade means **18** from the tractor **12**.

In order to anchor the blade means **18** in a given rotational position about the king pin **37** relative to the parallel beams **26** and **27** of the undercarriage frame means **19**, a pair of lifting arms **62** and **63** are connected to the beams **26** and **27**, respectively (FIGS. 2 and 3). The lifting arms **62** and **63** are of substantially Y shaped having upper and lower spaced ends connected to brackets **65** and **66**, respectively, which are welded to the support plate **42** of the blade means **18**. As shown in FIG. 5, these spaced ends are formed with eye pieces **68** mounted between ears **69** on the brackets **65** and **66** and pivotally connected thereto by pins **70** inserted within axially aligned holes therein. The opposite or rearward ends of the lifting arms **62** and **63** have eye members **72** pivotally connected by pins **73** to sleeve members **75** and **76**, respectively.

As shown in FIGS. 2 and 3, the sleeve members **75** and **76** are of a box construction mounted on the beams **26** and **27**, respectively, in a telescoping relationship for axial movement relative thereto. A pair of spaced parallel ears **78** welded to each of the sleeve members **75** and **76** extend laterally outward therefrom and are positioned about the eye members **72** for pivotal connection with the lifting arms **62** and **63** by the pins **73**. As shown in FIG. 2, the blade means **18** is pivotal about the king pin **37** for angular adjustment with resultant axial movement in opposite directions of the sleeve members **75** and **76** on the beams **26** and **27**, respectively. Each of the beams **26** and **27** have spaced adjustable holes **80**, which are movable into vertical axial alignment with holes **82** in the upper and lower surfaces of the sleeve members **75** and **76**. These axially aligned holes are adapted to receive pull pins **83** to lock the blade means **18** to the undercarriage frame means **19** in a given angular position.

The undercarriage frame means **19** and the blade means **18** cooperate to form a pusher assembly **84** which is connected to the tractor **12** for pivotal vertical movement about the horizontal thrust support assembly **20**. As shown in FIGS. 2 and 3, the horizontal thrust support assembly **20** includes a pair of parallel bracket plates **85** bolted to opposite sides of the engine portion **13** of the tractor **12** and having a load transfer plate **86** welded and extended between the lower edges thereof. A pair of parallel thrust rods **88** have adjacent ends thereof pivotally connected to the transfer plate **86** and the opposite rearwardly extended ends pivotally connected to bar clamps which are bolted to the draw bar **90** of the tractor **12**. The connector ears **34** on the beams **26** and **27** are connected by pins **91** to the forward portion of the transfer plate **86**. It is seen therefore, that the horizontal thrust support assembly **20** is rigidly connected to the engine portion **13** and the drawbar **90** of the tractor **12** while permitting the pusher assembly **84** to pivot relative to the transfer plate **86** and still rigidly absorb any horizontal load carried by the blade means **18**.

In order to provide for vertical support of the pusher assembly **84**, the linkage means **23** is connected to the vertical thrust support assembly **22** which is anchored to the forward end of the engine portion **13**. As shown in FIGS. 1 and 3, the vertical thrust support assembly **22** is of an irregular shape having vertical parallel side panels **93** interconnected by a transverse pipe **94** at the upper ends and by a U-shaped tray section **95** welded to the lower ends. A transverse plate **96** is welded between the side panels **93** for added rigidity. The tray section **95** has parallel sidewalls **97** bolted to the engine portion **13**, a front wall **98** bolted to the front of the engine portion **13**, and a bottom wall **99** welded to the sidewalls **97** and front walls **98** adapted to absorb the vertical thrust portion of a load against the blade means **18**.

As shown in FIGS. 3 and 4 the linkage means **23** includes a pair of parallel first link sections **101** having ends thereof pivotally connected by pins **102** to downwardly extended ear pieces **103** welded to the bottom wall **99** of the vertical thrust support assembly **22**. The opposite ends of the first link sections **101** are pivotally connected by releaseable pins **105** to an upper base portion of a U-shaped second link section **106**. A plurality of gusset plates **107** are welded to opposite sides of parallel legs **109** of the second link section **106** for added rigidity. The attachment of the linkage means **23** to the pusher assembly **84** is accomplished by the pivotal connection by pins **110** of the lower ends of the legs **109** to upwardly extended ears **112** welded to the beams **26** and **27**. It is seen, therefore, that the pusher assembly **84** is connected to the vertical thrust support assembly **22** by the linkage means **23** for pivotal movement about the transfer plate **86** of the horizontal thrust support assembly **20** by actuation by the hydraulic ram means **24**.

The hydraulic ram means **24** includes first and second ram cylinders **114** and **115** having upper ends thereof rotatably connected to pins **117** carried between the sidewalls **118** of protector brackets **119** and **120**, respectively, mounted on the side panels **93**. The first and second ram cylinders **114** and **115** each contain an axially movable double acting piston integral with a piston rod (not shown). The lower ends of the piston rods have integral U-shaped ear members **122** mounted about upwardly extended eye pieces **123** welded to the mid portion of the first link sections **101** and pivotally connected thereto by pins **124**. The hydraulic ram means **24** further includes first and second hydraulic lines **125** and **126** operably connected to each of the first and second ram cylinders **114** and **115** to raise and lower, respectively, the pusher assembly **84**. A hydraulic pressure source is connected to the first and second hydraulic lines **125** and **126** to selectively move the pistons under fluid pressure by a control lever available to the operator of the tractor (not shown).

In the use and operation of the bulldozer assembly **16**, the vertical and horizontal thrust assemblies **22** and **20** are bolted to the tractor **12** as previously described. The pusher assembly **84** is thereupon easily attachable to the tractor **12** on first attaching the connector ears **34** of the beams **26** and **27** by the pins **91** to the transfer plate **86**. The hydraulic ram means **24** is then actuated to place the first link sections **101** in nesting engagement with the base portion of the second link section **106** and pivotally connected thereto by the releaseable pins **105**. It is seen,

therefore, that the pusher assembly **84** is now connected to the tractor **12** for pivotal movement about the pins **91** on actuation of the hydraulic ram means **24** by the tractor operator.

The blade means **18** is adjustable to a desired angular position relative to the longitudinal axis of the undercarriage frame means **19** on sliding movement of the sleeves **75** and **76** on the beams **26** and **27**. The blade means **18** is adjustable approximately 35 degrees in either direction relative to the undercarriage frame means **19** and is locked in the adjusted desired position by insertion of the pull pins **83** through the aligned holes **80, 82** in the sleeve members **75** and **76** and the beams **26** and **27**, respectively. Additionally, the blade plate **44** is rotatable in a vertical plane for tilt adjustment relative to the support plate **42** thereby providing for the most desirable cutting angle of the blade means **18** relative to the working surface. A pair of skid shoe assemblies **128** are secured to the blade plate **44** and are vertically adjustable for use in light grading or snow removal. It is seen that the bulldozer assembly **16** provides a new and novel rigid structure which is readily attachable and adjustable in all directions for achieving the most efficient bulldozing position.

As will be apparent from the foregoing description of the preferred embodiments of applicant's bulldozer assembly, relatively simple and rigid connecting means has been provided for the attachment of the bulldozer assembly to a conventional type tractor while still providing a rigid structure adaptable to move huge loads as commonly encountered in normal bulldozer operations. Applicant's construction eliminates a great deal of time consuming and tedious work involved in removing and replacing a bulldozer assembly with a similar or different structure for other earth moving operations.

While the invention has been described in connection with preferred specific embodiments thereof, it will be understood that this description is intended to illustrate and not to limit the scope of the invention, which is defined by the following claims.

I claim:

1. A bulldozer blade assembly adapted for attachment to the framework and draw bar of the tractor, comprising:

(a) a vertical support frame mountable about the forward engine portion of the tractor,

(b) a horizontal thrust support assembly mountable on the engine portion rearwardly of said support frame and having a section thereof connectible to the draw bar for rigidity,

(c) an elongated undercarriage means including a pair of parallel beams having one adjacent end thereof pivotally connected to said thrust support assembly,

(d) means pivotally connecting the forward ends of said undercarriage means to a blade means,

(e) linkage means having opposite ends pivotally connected to said support frame and said beams, respectively,

(f) hydraulic ram means having opposite relatively movable ends pivotally connected to said support frame and said linkage means, respectively,

(g) control means operably connected to said ram means to selectively raise and lower said undercarriage means and interconnected blade means,

(h) arm means having one end thereof slidably mounted on said beams and the opposite end pivotally connected to said blade means whereby said arm means is selectively movable on said beams to pivot said blade means about said connecting means, and

(i) said support frame including a horizontal bottom wall, an upright front wall secured to said bottom wall mountable against the forward engine portion, and upright sidewalls secured to said bottom wall and said front wall forming a tray section whereby vertical thrust against said blade means is absorbed by said bottom wall and said front wall against the engine portion of the tractor.

2. A bulldozer assembly as described in claim **1** wherein:

(a) said thrust support assembly having a pair of support plates mountable on opposite sides of the engine portion, a load transfer frame secured to the lower ends of said plates, and a pair of elongated load struts having one adjacent end thereof secured to the draw bar to apply a horizontal force thereagainst, and the opposite ends pivotally connected to said transfer frame whereby a horizontal load on said undercarriage means is carried through said transfer frame to the draw bar.

3. A bulldozer assembly as described in claim **1**, wherein:

(a) said arm means of Y shape having a first leg extended horizontally with one end pivotally connected to sleeve members mounted on said beams for axial movement relative thereto, and a second leg extended upwardly from said first leg having an outer end and the opposite end of said first leg pivotally connected to said blade means thereby providing horizontal and vertical stability to said balde means, and

(b) said sleeve members of a box-construction mounted about respective ones of said beams providing substantial rigidity relative to thrust against said blade means.

References Cited

UNITED STATES PATENTS

2,626,470	1/1953	Cook et al.	
2,749,630	6/1956	Nave.	
2,943,407	7/1960	Long.	
3,199,236	8/1965	Bartel et al.	37—144

ABRAHAM G. STONE, *Primary Examiner.*

S. C. PELLEGRINO, *Assistant Examiner.*