Oct. 26, 1948. H. H. WASHBOND 2,452,408

GRADEBUILDER BLADE MOUNTING

Filed Nov. 29, 1943 5 Sheets-Sheet 1

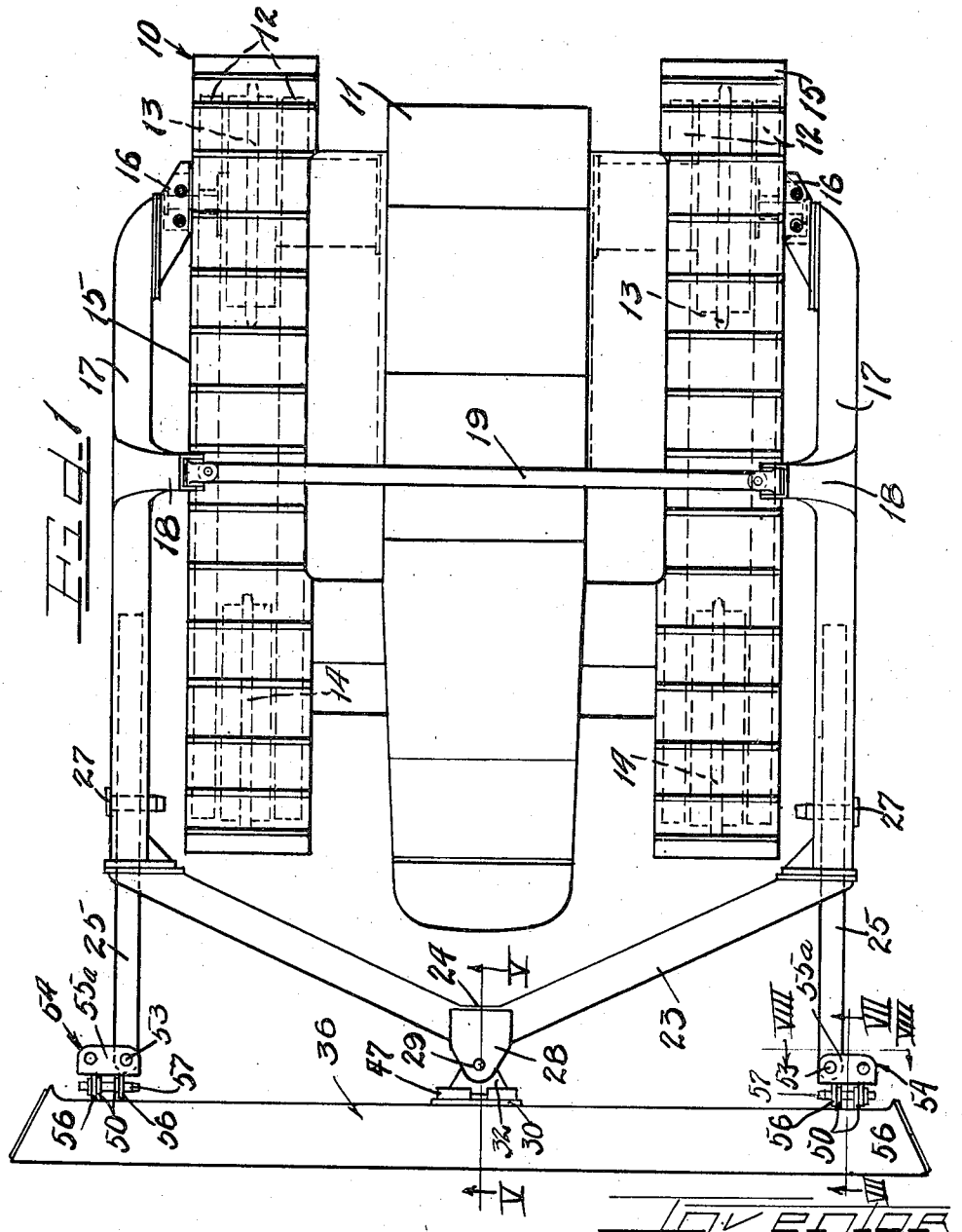


Fig. 1

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GRADEBUILDER BLADE MOUNTING

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Fig. 2

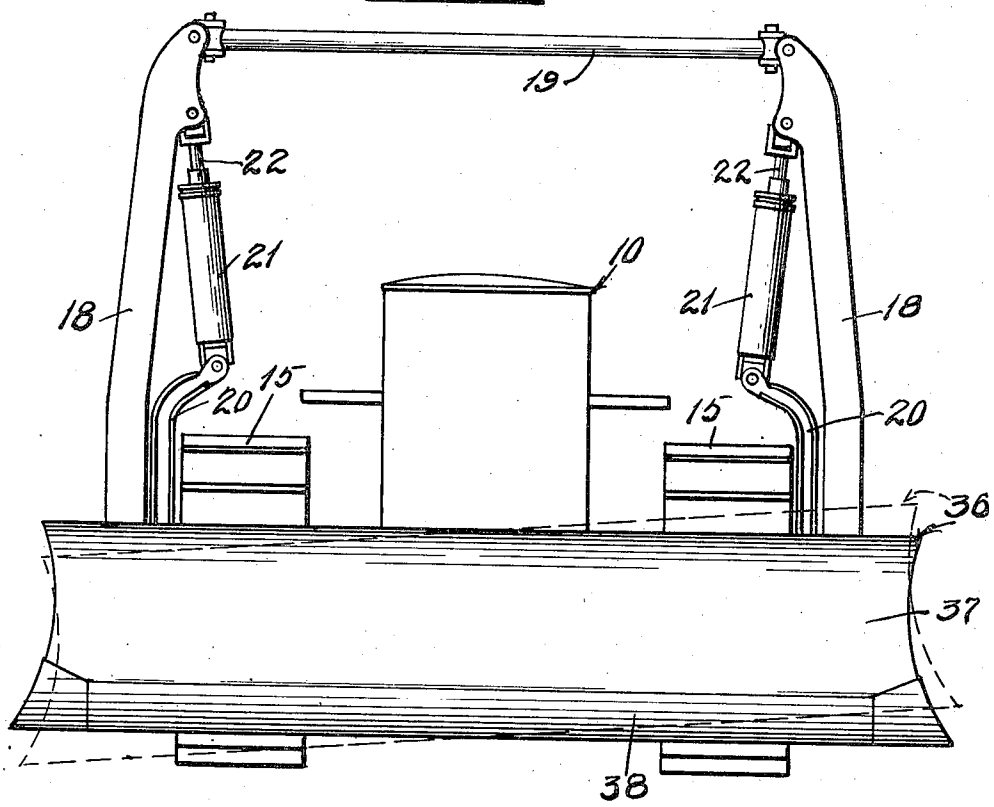
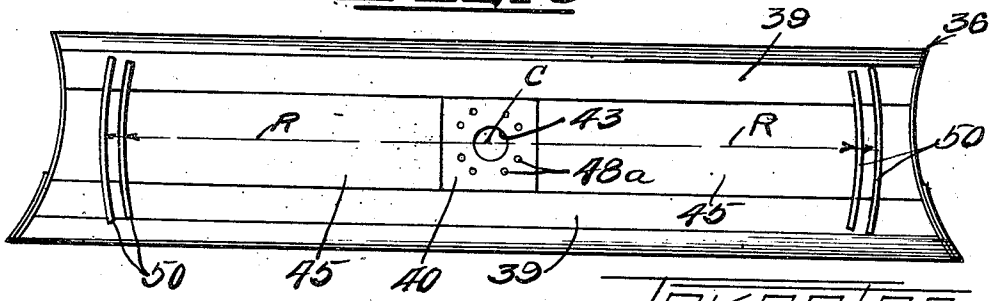


Fig. 3

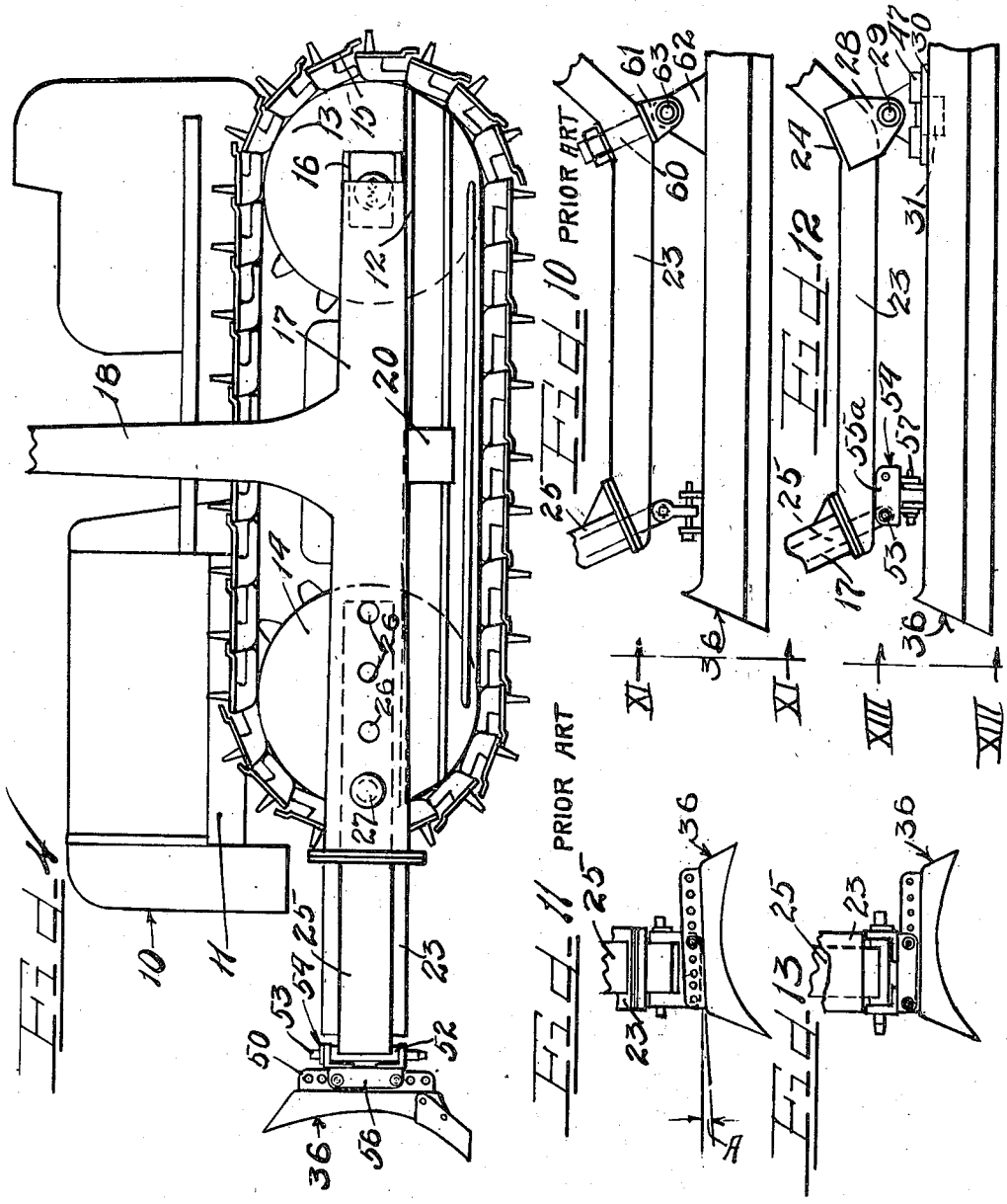


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GRADEBUILDER BLADE MOUNTING

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GRADEBUILDER BLADE MOUNTING

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5 Sheets-Sheet 4

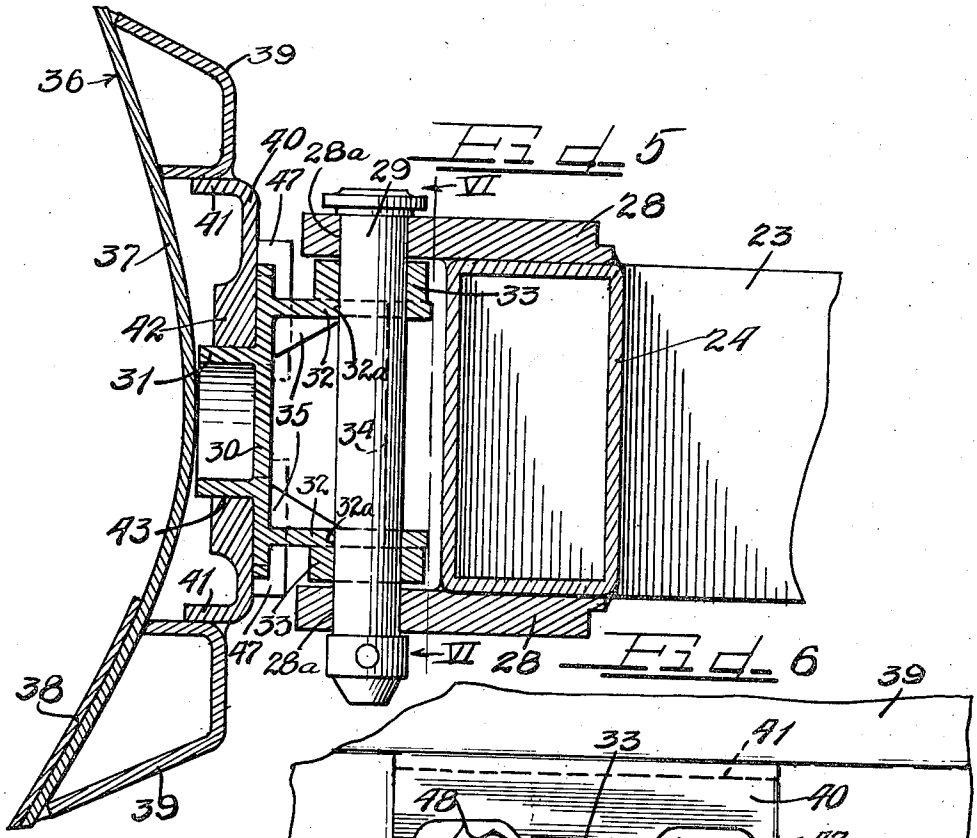
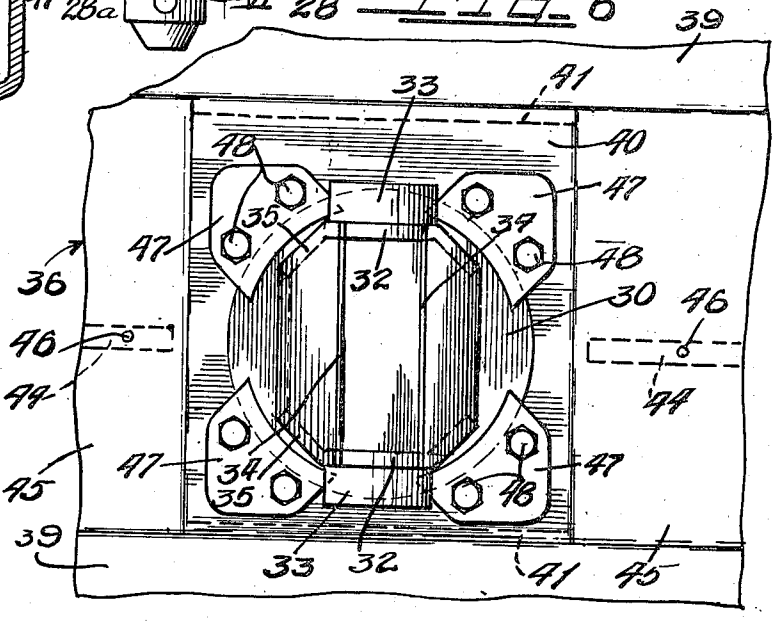


Fig. 5

Fig. 6



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GRADEBUILDER BLADE MOUNTING

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Fig. 7

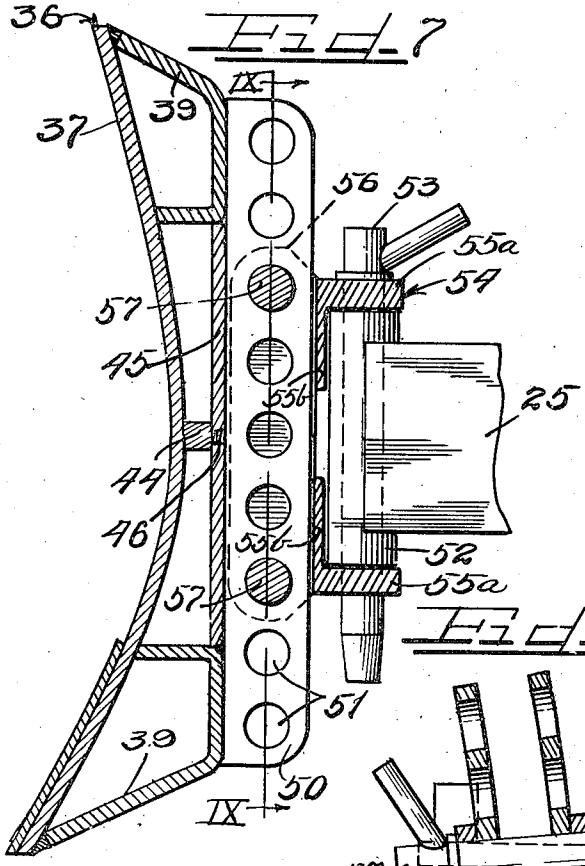


Fig. 8

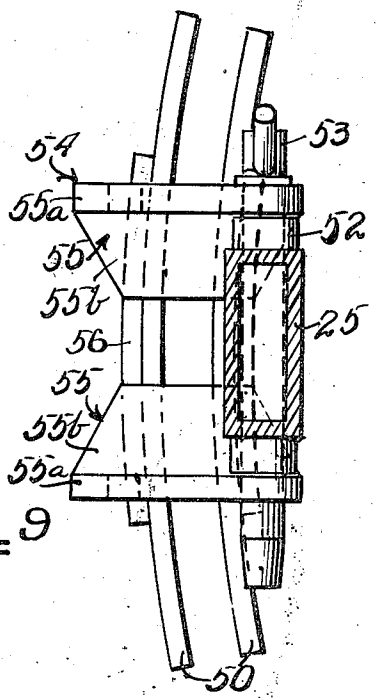
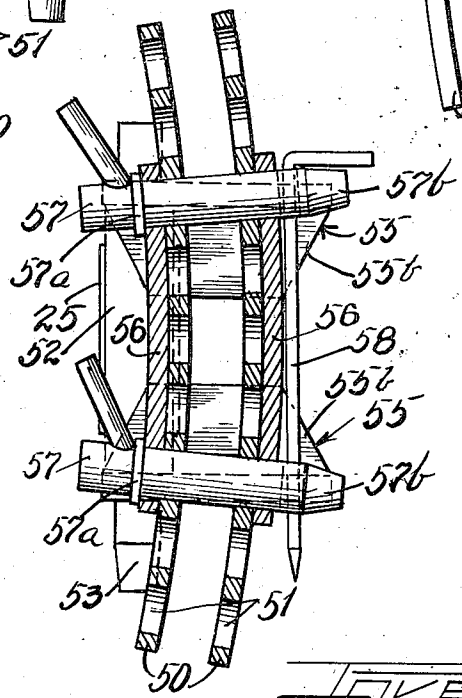


Fig. 9



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Patented Oct. 26, 1948

2,452,408

UNITED STATES PATENT OFFICE

2,452,408

GRADE BUILDER BLADE MOUNTING

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Application November 29, 1943, Serial No. 512,187

17 Claims. (Cl. 37—144)

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This invention relates to gradebuilders having implement blades which are so tiltably mounted that they will always pivot about an axis at right angles to the blade irrespective of whether or not the blade is in bulldoze or angledoze position.

Specifically the invention relates to gradebuilder blade mountings which tiltably support the blade on an axis which is always at right angles to the blade face.

Heretofore, gradebuilder blades have been pivoted on a yoke member which was swivelly mounted on the push frame of a tractor. When these gradebuilder blades are positioned for angledozing the swivel mounting is at an acute angle relative to the blade face and tilting of the blade about a pivot point at an acute angle thereto will cause a tilting of the face of the blade. Thus, if the face of the blade is vertical in bulldoze position and the blade is then swung to angledoze position and next tilted about its swivel axis, the vertical face of the blade will be tilted at an angle to the vertical in an amount dependent upon the extremity of the angledoze position or the acuteness of the angle between the blade and its swivel mounting.

As a result of the necessity for tilting gradebuilder blades when in angledoze position about an axis at an acute angle to the base of the blade, it was necessary to design the blade mounting structure with considerable looseness in the outer end retainers for the blade so as to compensate for the tilting of the blade. If the retainer structure had good fitting relation with the blade-carried structure, adjusting devices had to be provided to accommodate tilting of the blade.

In accordance with the present invention a center blade mounting is now provided which pivotally supports the blade on an axis that is always at right angles to the blade face irrespective of whether or not the blade is in bulldoze or angledoze position. The preferred blade mounting of this invention includes a yoke structure which rotatably carries the blade on a horizontal axis. This yoke structure is pivotally supported by the push beam frame on a vertcial axis. The vertical axis accommodates swinging of the blade between angledoze and bulldoze positions while the horizontal axis permits tilting of the blade. Since the horizontal axis swings with the blade, it is always at right angles to the blade face and therefore the blade always tilts about an axis in the same angular relation to the blade face.

Another feature of the invention resides in the

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provision of arcuate anchoring means on the end portions of the blade which are struck from radii centered on the horizontal axis of the center blade mounting. These anchoring means are elongated and project rearwardly from the rear face of the blade to provide a plurality of pin-receiving holes. Push beam frame-carried struts are equipped with retainers which cooperate with the arcuate anchoring means and have pin-receiving apertures therethrough capable of being aligned with the apertures in the anchoring means. Fastening pins are inserted through the aligned apertures of the anchoring means and the retainers to hold the blade at the desired tilted angle. Since the arcuate anchoring means are struck from radii centered on the horizontal tilting axis for the blade, no looseness between the cooperating anchoring means and retaining means is required and accurate fit can be maintained. The blade is thus held firm and steady.

It is, then, an object of this invention to provide a gradebuilder blade mounting which will not tilt the face of the blade when the blade is tilted in an angledoze position.

A further object of the invention is to provide a blade mounting for gradebuilders which is pivoted about a vertical axis on the push beam frame of a tractor and is rotatable about a horizontal axis on the gradebuilder blade.

A still further object of the invention is to provide a center blade mounting for tractor implement blades wherein the back face of the blade provides a bearing for a yoke piece which is pivotally mounted on the push beam frame of a tractor.

A further object of the invention is to provide improved gradebuilder mounting structure having cooperating push beam frame-carried and blade-carried retaining structure in snug fitting relationship.

A still further object of the invention is to provide a firm and steady mounting for gradebuilder blades.

Another object of the invention is to provide a shiftable strut-carried retainer for gradebuiler blades having snug fitting relationship with arcuate anchoring means on the gradebuilder blades.

A still further object of the invention is to provide a tilt support for implement blades which swings with the blade.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed descriptions of the annexed sheets of drawings which, by way of preferred

example only, illustrate one embodiment of the invention.

On the drawings:

Figure 1 is a top plan view of a tractor-mounted gradebuilder according to this invention.

Figure 2 is a front elevational view of the tractor-mounted gradebuilder shown in Figure 1.

Figure 3 is a rear elevational view of the gradebuilder blade shown in Figures 1 and 2.

Figure 4 is a fragmentary side elevational view of the machine of Figures 1 and 2.

Figure 5 is an enlarged vertical cross-sectional view of the center blade mounting of this invention, with parts in elevation, taken along the line V—V of Figure 1.

Figure 6 is a fragmentary rear elevational view of the center blade mounting taken along the line VI—VI of Figure 5 with parts being omitted.

Figure 7 is an enlarged vertical cross-sectional view, with parts in elevation, of the blade retainer structure of this invention, taken along the line VII—VII of Figure 1.

Figure 8 is a rear elevational view of the retainer structure, with parts in vertical cross section, taken along the line VIII—VIII of Figure 1.

Figure 9 is a vertical cross-sectional view of the retainer structure of this invention taken along the line IX—IX of Figure 7.

Figure 10 is a fragmentary top plan view of a conventional prior art gradebuilder mounting illustrating the blade in angledoze position.

Figure 11 is an end elevational view of the prior art structure of Figure 10 taken along the line XI—XI of Figure 10 and illustrating the tilted position of the blade face.

Figure 12 is a view similar to Figure 10 but illustrating the blade mounting structure of this invention.

Figure 13 is a view similar to Figure 11 taken along the line XIII—XIII of Figure 12 and illustrating the straight vertical position of the blade face even when tilted in angle doze position.

As shown on the drawings:

In Figures 1, 2 and 4, the reference numeral **10** designates generally a tractor having a main body portion **11**, tractor track frames **12**, rear and front toothed wheels **13** and **14**, and endless tractor tracks **15** trained between the wheels **13** and **14** in toothed engagement therewith. The tractor track frames **12**, near their rear ends, carry brackets **16** pivotally supporting the rear ends of push beams **17**. These push beams have upstanding arm portions **18** intermediate their ends projecting for a considerable distance above the tractor and connected at their upper ends by means of a tie rod **19**.

Arms **20** are mounted on the track frames **12** in spaced relation from the brackets **16** and extend upwardly above the tracks **15** in spaced alignment with the arms **18** as best shown in Figure 2. Hydraulic or pneumatic jack cylinders **21** are pivoted on the upper ends of the arms **20** and have piston-operated rods **22** pivoted to the arms **18**. The jacks **21** serve to raise and lower the push beams relative to the tractor by swinging the beams about their pivot points on the brackets **16**.

The front ends of the push beams **17** are connected by a V-frame or cross beam **23** having a central apex point **24** at the axial center of the tractor.

Struts **25** telescope into the front end of the push beams **17** and have apertures therethrough adapted to be aligned with any one of a plurality of apertures **26** in the push beam for receiving locking pins **27** to anchor the struts to project for a selected distance beyond the ends of the push beams.

As best shown in Figures 1 and 5, the apex **24** of the cross beam **23** has top and bottom plates **28** welded thereon and projecting forwardly therefrom. These plates **28** have aligned vertical apertures **28***a* therethrough receiving a vertical pivot pin **29**.

As shown in Figures 5 and 6, a circular metal mounting piece **30** has a cylindrical collar **31** projecting from one face thereof and spaced opposed flat horizontal flanges **32** projecting from the other face thereof. These flanges have vertical apertures **32***a* therethrough and carry apertured bosses **33** on the outer faces thereof. The pivot pin **29** extends though the bosses **33** and apertures **32***a*.

In order to rigidify the flanges **32**, side plates **34** are disposed between the flanges and are welded thereto. These side plates **34** extend from the plate **30** and converge into spaced opposed relation on each side of the pin **29**. To further stiffen the flanges **32**, the same are provided with downturned ears **35** welded to the circular plate **30**.

A gradebuilder blade **36** composed of a concave front plate **37**, an overlying scraping edge plate **38** welded to the front face of the plate **37** at the bottom thereof, and spaced opposed top and bottom hollow box channels **39** welded to the rear face of the plate **37** at the top and bottom ends thereof, has a square back plate **40** inserted between the channels **39** at the midpoint of the blade. This square plate **40** has top and bottom flanges **41** seated on the top and bottom channels **39** and a thickened central portion **42** with a horizontal aperture **43** therethrough receiving the collar **31** of the plate **30** in rotatable relation.

As shown in Figures 6 and 7, ribs **44** are welded on the back face of the plate **37** on each side of the square plate **40** and extend from the square plate to the outer end of the blade. Covering plates **45** bridge the space between the box channels **39** on each side of the square plate **40** and are welded to these box channels. Plug wells **46** also anchor the plates **45** to the ribs **44**.

The circular plate **30** is rotatably held on the square plate **40** by means of four finger plates **47** best shown in Figure 6, which are bolted to the plate **40** by means of bolts **48** and overlie the peripheral portion of the end face of the plate **30**. As shown in Figure 3 the square plate **40** has pairs of bolt holes **48***a* for receiving the bolts **48**.

The blade **36** is thus rotatably mounted on the collar **31** of the circular plate **30** and this circular plate in turn is pivotally mounted on the push beam frame. The rotatable mounting for the blade **36** thus swings with the blade about the pivot pin **29** and its axis is always at right angles to the rear face of the blade.

As best shown in Figure 3, the blade **36** carries pairs of arcuate anchor flanges **50** on the rear face thereof near its outer ends. These flanges **50** project rearwardly from the rear face of the blade and are arcs of circles struck from radii R centered on the center point C of the bearing **43** provided by the square plate **40**. As shown in Figures 7 and 9, the flanges **50** have a series of apertures **51** therethrough. These apertures are drilled on the same radii R from which the flanges **50** are struck.

As shown in Figures 4, 7 and 8, the front ends of the struts **25** have vertical hollow bosses **52**

secured thereon receiving pins 53 for swivelly mounting retainer links 54 for the blade 36. Each link 54, as best shown in Figures 7 to 9, is built up from opposed angle pieces 55 having horizontal flanges 55a respectively overlying and underlying the boss 52 together with vertical flanges 55b on which are welded spaced opposed arcuate ribs 56 straddling the arcuate flanges 50. The horizontal flanges 55a of the angle pieces are apertured for receiving the pin 53. Likewise the arcuate ribs 56 have top and bottom apertures adapted to be aligned with the apertures 51 of the flanges 50 for receiving pins 57. The pins 57 have heads 57a as shown in Figure 9 for abutting one rib 56 and have apertured end portions 57b for projecting beyond the other rib 56 to receive a locking rod 58 therethrough.

As shown in Figures 1, 8 and 12, the flanges 55a of the links 54 have a pair of holes therethrough for the pins 53. Thus, when the blade 36 is in bulldoze position, as shown in Figure 1, the pins 53 extend through the innermost holes of the flanges 55a but, when the blade 36 is in angledoze position as shown in Figure 12, viz., one of the struts 25 being fully telescoped into the push beam 17 while the opposite strut 25 is being extended to its full outermost position from the other push beam 17, the pin 53 is shifted to the outer hole on the pair of flanges 55a connected to the telescoped strut 25. The pins 53 are shifted from the innermost holes of the link 54 to the outermost holes to compensate for the changes in positions of the flanges 50 relative to the struts 25 as the blade is swung about a vertical axis. The links 54 could be provided with more than a pair of holes for the pins 53 if intermediate angledoze positions for the blade 36 are desired.

Since the tilting bearing or horizontal pivot for the blade 36 always swings with the blade about the vertical pivot 29, the blade will always tilt about an axis at right angles to its vertical rear face irrespective of the angled position of the blade. Thus, as shown in Figures 12 and 13, the blade 36 may be mounted in full angledoze relation and then tilted as indicated in dotted lines in Figure 2 without causing any tilting or throwing forward of the face of the blade. This tilting of the face of the blade necessarily results in prior structure as shown in Figures 10 and 11 when the blade 36 is tilted in angledoze position, since it is swivelled about a pin 60 at an acute angle to the blade. In this prior art structure, the horizontal pivot 60 is swivelly mounted in the cross beam 23 and carries a yoke 61 on which the center blade support 62 is pivotally mounted by means of a pin 63. Now as indicated in Figure 11, when the blade 36 is in angledoze position and is then tilted, its face will be tilted through an angle A depending upon the acuteness of the angle between the swivel 60 and the rear face of the blade. Since the blade face 36 will be tilted, all retainer connections for the blade in the prior art structures must be quite loose to accommodate the tilting of the blade. In the structure of the present invention, on the other hand, the retainers can have snug fit and the blade will always be firmly held. Wear of the parts is reduced to a minimum because impact loads attendant with loose fitting parts are avoided.

The construction of the present invention is well adapted for accurate mass production since the square plate 40 need not be welded into final position until the outer end blade retainers are actually mated with the strut-carried links. The plate 40 can then be properly aligned with the pivot 29 and welded into position. The use of a circular plate 30 with a collar riding in a bearing on the plate 40, coupled with the use of the retaining fingers 47, provides an inexpensive yet efficiently operating and strong bearing structure. The bearing surfaces are substantially sealed from ingress of dirt and will operate freely over prolonged periods.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a gradebuilder adapted for attachment to a track-type tractor having side push beams connected at their front ends by a cross beam, an implement blade, and struts adjustably carried by the push beams, the improvements of a center blade mounting pivoted about a vertical axis on the cross beam and rotatable about a horizontal axis on the blade, arcuate anchoring means on the end portions of the blade struck from radii centered on said horizontal axis, shiftable fastening means pivoted on said struts cooperating with said anchoring means to secure the blade in selected position on the push beams, and said shiftable fastening means having a plurality of vertical pivot axes for selective cooperation with the struts in accordance with the angle position of the blade.

2. The combination with a track-type tractor having a main body portion, track frames on the sides of said main body portion pivoted thereon, and endless tracks enveloping said track frames, of a gradebuilder attachment comprising a push frame having side arms pivotally mounted on said track frames and a V-shaped cross arm secured to the front ends of said side arms having an apex point at the axial center of the tractor, fluid-pressure operated jacks interposed between said track frames and said side arms for raising and lowering the push frame relative to the tractor, a blade mounting device swingably mounted at the apex point of said cross arm about a vertical axis, a gradebuilder blade rotatably mounted on said swingable mounting device midway between the ends thereof, a pair of spaced opposed arcuate ribs projecting rearwardly from said blade adjacent each end of the blade and having a plurality of pin-receiving apertures therethrough, struts telescopically mounted in said side arms of the push frame having vertical pivots at their front ends, links having a plurality of pivot-receiving apertures to selectively receive said pivots on the struts, arcuate flanges on said links adapted to straddle the pairs of ribs on said blade and having pin-receiving apertures therethrough, and retainer pins adapted to be passed through the apertures of said flanges on the links and the apertures of said arcuate ribs to lock the blade in selected tilted relation relative to the push frame.

3. A gradebuilder attachment for tractors and the like which comprises a push frame having side arms and a V-shaped connecting arm with the apex thereof midway between said side arms and projecting forwardly therefrom, a vertical pivot pin carried by said cross arm at the apex thereof, a blade-mounting device having rearwardly projecting apertured bosses receiving said vertical pivot pin, a circular plate member on said mounting device, and a horizontal pivot projecting forwardly from said plate member, a gradebuilder

blade, an apertured plate on the rear face of said blade having an aperture therethrough receiving said horizontal pivot of the mounting device, fingers secured on said plate overlying the circular plate portion of the mounting device to rotatably secure the mounting device to said blade, a pair of arcuate ribs projecting rearwardly from said blade at each end portion thereof, said ribs being arcs of circles struck from radii centered on the center point of the aperture in said apertured plate on the blade, retaining means for each pair of arcuate ribs having flanges for snugly straddling said ribs, each of said retaining means having a plurality of aligned vertical apertures therethrough, struts adjustably carried by the side arms of said push frame and adapted to project forwardly from said side arms at selected distances, each of said struts having vertical bosses at the front ends thereof, pins pivotally connecting said bosses and said retaining means adapted to be selectively seated in pairs of aligned vertical apertures on the retaining means, said flanges on the retaining means and said ribs having apertures therethrough, and pins passed through said apertures to lock the blade in selected tilted positions relative to the push frame.

4. In a grade builder adapted for attachment to a tractor or the like, a push frame having side arms and a V-shaped cross-connecting arm with an apex point midway between said side arms, plates welded to the top and bottom of said cross arm at the apex point thereof and projecting forwardly therefrom, a blade-mounting device having a circular plate with means projecting rearwardly therefrom between said plates on the cross arm, a vertical pivot pin passed through said plates on the cross arm and said rearwardly projecting means to swingably mount said blade-mounting device on the cross arm, a horizontal collar projecting forwardly from said circular plate of said mounting device, a gradebuilder blade having an apertured rear wall member rotatably mounted on said collar, and fingers secured on said rear wall member of the blade overlying said circular plate of the mounting device for holding said mounting device in rotatable relation relative to said blade whereby said blade can be swung to angled position relative to said push frame on said vertical pivot pin and can be rotated to tilted positions relative to said push frame without tilting the face thereof.

5. In a gradebuilder, an implement blade having a curved front wall, channel strips welded to the rear face of said front wall at the top and bottom thereof providing spaced opposed rigid walls projecting rearwardly from said front wall, a plate having top and bottom flanges supported on said opposed horizontal walls of the channel strips and welded to said strips, said plate having a central aperture providing a bearing, and a blade-mounting device rotatably mounted on said bearing and having means projecting therefrom adapted to receive a pivot whereby said blade-mounting device will swing with said blade and will tiltably support the blade.

6. An implement blade construction comprising a blade wall, box channel strips welded to the rear face of said wall and extending in spaced opposed relation along the length of the wall, said strips providing spaced opposed shelves on the wall, a plate having top and bottom flanges secured on said shelves, a circular blade-mounting device overlying said plate and having a pivot projecting into said plate in rotatable relation therewith, retainer members secured on said plate overlying said circular mounting device to rotatably secure the mounting device on the plate, and pivot support means projecting rearwardly from the circular portion of said mounting device adapted to be swingably mounted on another support.

7. An implement blade construction comprising a curved scraper plate, elongated hollow box channels welded to the rear face of said plate along the top and bottom ends thereof and defining spaced opposed shelves, a mounting plate secured to said box channels to the rear of said curved scraper plate, a blade-mounting device rotatably mounted on said mounting plate, ribs secured to the rear face of said curved scraper plate between said box channels and extending along the length of the plate, and covering plates between said box channels anchored to said ribs.

8. The combination with a gradebuilder blade and a strut having a vertical pin boss on the end thereof, of a pair of spaced opposed ribs secured on said blade and projecting rearwardly therefrom, said ribs having a plurality of apertures along the lengths thereof, a retainer link having top and bottom flanges for straddling said strut pin boss and having forwardly projecting flanges for straddling said ribs, said top and bottom flanges having a plurality of sets of aligned apertures therethrough, a pin extending through a pair of said aligned apertures and through said pin boss pivotally mounting the link on the strut, and a pin passed through the apertures of the flanges and ribs to connect the blade to the link.

9. In a road machine, a yoke-like frame whose side arm portions are pivotally mounted on the machine on horizontal axes and having a front portion extending across the front of the machine, clevis means on said frame front portion intermediate the sides thereof, a pivot bracket including a bored block and a plate, a vertically disposed pivot bolt removably extended through said clevis means and the bore of said block, a mold board having spaced upper and lower recessed shelves on its inner face intermediate the ends thereof and a socket therebetween, and a pivot stud on said bracket plate removably engaging said mold board socket, opposite edges of said bracket plate being movably engaged in said recessed shelves.

10. In a road machine, a yoke-like frame whose side arm portions are pivotally mounted on the machine on horizontal axes and having a front portion extending across the front of the machine, clevis means on said frame front portion intermediate the sides thereof, a pivot bracket including an apertured protuberance and a plate, a vertically disposed pivot bolt removably extended through said clevis means and the apertured protuberance, a mold board having spaced recessed shelves on its inner face intermediate the ends thereof and a socket therebetween, and a pivot stud on said bracket plate engaging said mold board socket, opposite edges of said bracket plate being movably engaged in said recessed shelves.

11. In a road machine, a yoke-like frame whose side arm portions are pivotally mounted on the machine on horizontal axes and having a front portion extending across the front of the machine with an apex point at the axial center of the machine, a pivot bracket including a vertically apertured protuberance with a rigidly attached plate, said plate having opposed curved edges, a vertically disposed pivot bolt extending through

the aperture of said protuberance, there also being means adjacent the apex of said yoke-like frame through which said pivot bolt extends, a mold board having spaced opposed shelves provided with recesses conforming to the curved edges of said plate and rotatably receiving the latter, there being a socket in said mold board intermediate said shelves, and a pivot stud on said bracket plate engaging said mold board socket and forming an axis for rotatable movement of the plate.

12. In a bulldozer, the combination of: a U-shaped supporting frame, having a vertical hole in the center of the U; a blade, having two undercut arcuate recesses facing each other on the rear face thereof; an attaching member having a flat vertical plate portion, opposite edges of which are designed to register loosely with said two recesses respectively, and having at least one rearwardly projecting lug with a vertical hole therein to register with the vertical hole in the U; and a pin for insertion in these holes.

13. An attachment for vehicles such as track-type tractors and the like which comprises a push frame having side arms and a connecting cross arm, a blade mounting device swingably mounted about a vertical axis on said cross arm for accommodating angling of a blade, a blade rotatably mounted on said mounting device, blade-anchoring struts adjustably mounted on the side arms of the push frame to project forward from the cross arm at selected distances, links pivotally mounted on said struts, means selectively connecting said links with said blade for holding the blade in adjusted tilted position, and said links having adjustable mountings relative to said struts to laterally shift the links for maintaining proper alignment with the blade-mounting means irrespective of the angled condition of the blade.

14. In a gradebuilder construction having an implement blade and an anchoring strut to angle the blade, the improvement of a multi-apertured elongated upstanding rib secured on the rear face of the blade and projecting rearwardly therefrom, a shiftable retainer device having an apertured elongated rib for fitting alongside of the blade-carried rib, pin means adapted to extend between aligned apertures of the ribs to lock the blade and retainer together, spaced opposing mounting flanges on said retainer adapted to straddle said strut, said mounting flanges having a plurality of sets of laterally spaced aligned apertures therethrough, and a pin pivotally connecting said retainer with said strut at a selected position on the strut to maintain close-fitting relation between said ribs irrespective of the angled position of the blade.

15. An implement blade assembly comprising a frame having side arms and a cross beam, a blade mounted on said cross arm for tilting and angling movement, struts telescoped in said side arms, means selectively locking said struts for projecting forwardly from the side arms in variable length increments to accommodate angling of the blade, retainers on said struts, said retainers having spaced opposed angle members with vertical flanges and horizontal flanges, said horizontal flanges straddling said struts and having a plurality of sets of holes therein, pins extending through said holes and struts for pivotally anchoring the retainers on the struts in adjusted lateral positions, ribs secured to said vertical flanges of the retainer, anchoring ribs on said blade adapted to be positioned adjacent the ribs on said retainers, said ribs on the retainers and on the blade having a plurality of holes therethrough, and pins passed through aligned holes of the retainer ribs and the blade-carried ribs to lock the blade in adjusted tilted position.

16. A blade assembly comprising a supporting frame including side beams and a cross beam, a blade-mounting device pivoted on said cross beam for swinging movement about an axis accommodating angling of the blade relative to the frame, said blade-mounting device having a plate portion, a blade having undercut recesses receiving the edges of said plate portion therein for rotatably mounting the blade on the blade-mounting device to accommodate tilting of the blade relative to the frame, and means anchoring the blade on said frame for holding the blade in adjusted position relative to the frame.

17. In a bulldozer or the like machine the combination of a supporting frame of substantially U shape, a blade-mounting device pivotally mounted on the bight portion of said frame for swinging movement about a vertical axis, said blade-mounting device having a plate portion swingable about said vertical axis, an implement blade having opposed undercut recesses on the rear face thereof receiving said plate portion therein in relatively rotatable relation, and means anchoring said blade portion in adjustable tilted position relative to said frame.

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