July 8, 1969 P. E. HANSER 3,454,110

SADDLE STRUCTURE FOR EARTH GRADER

Filed June 21, 1966 Sheet 1 of 2

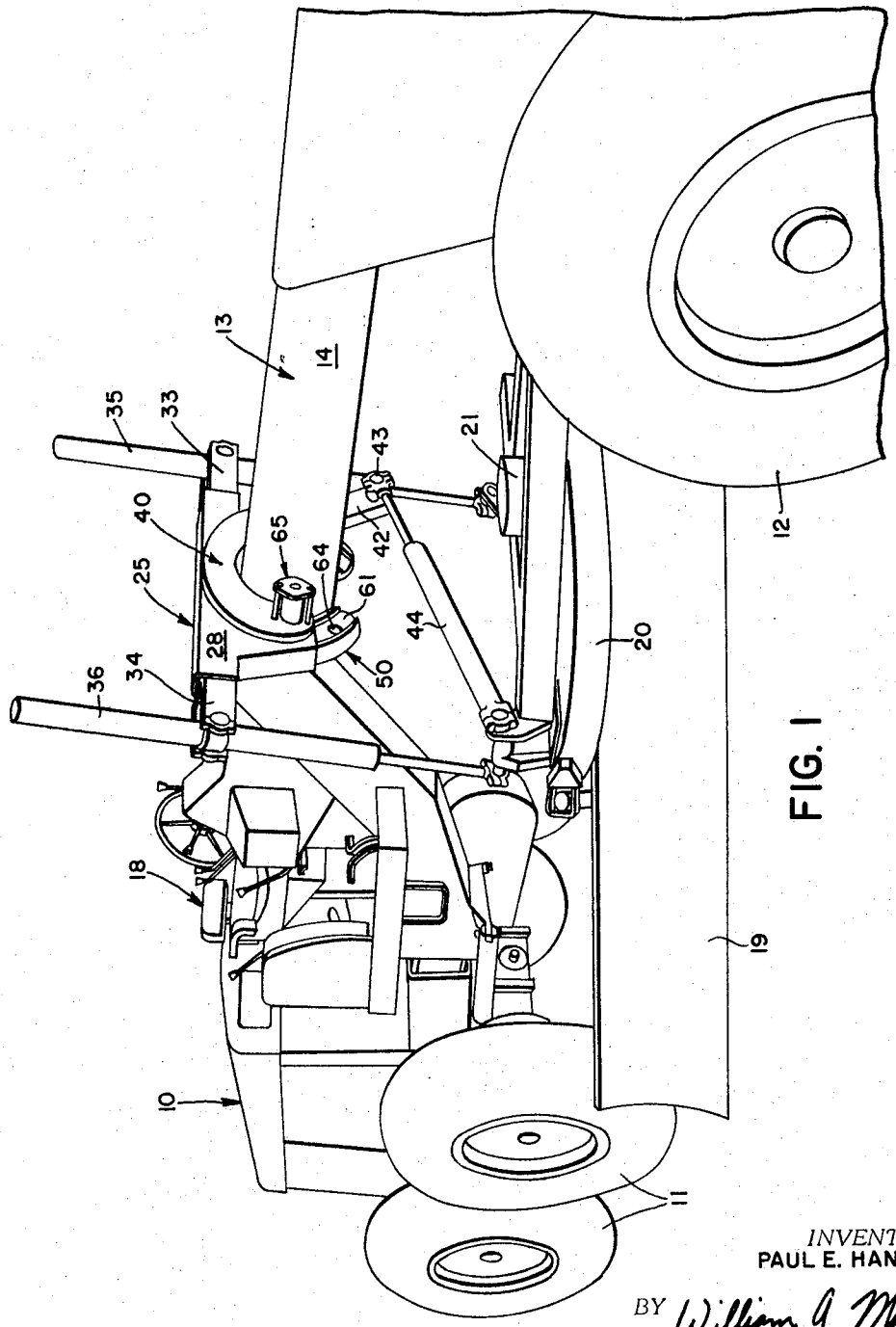


FIG. 1

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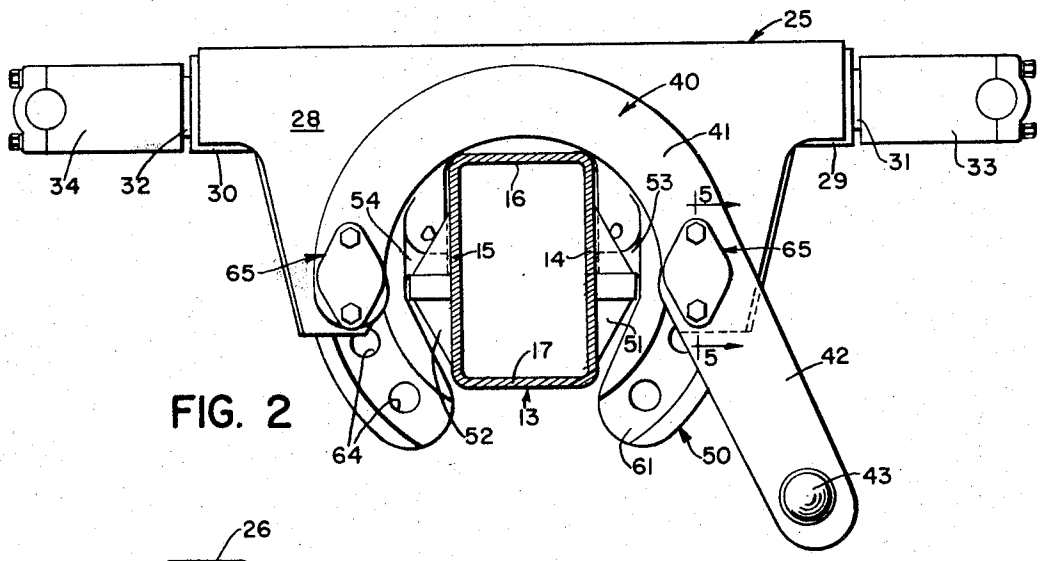


FIG. 2

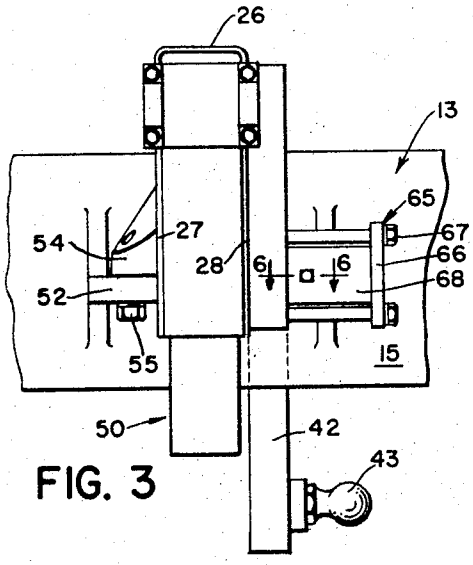


FIG. 3

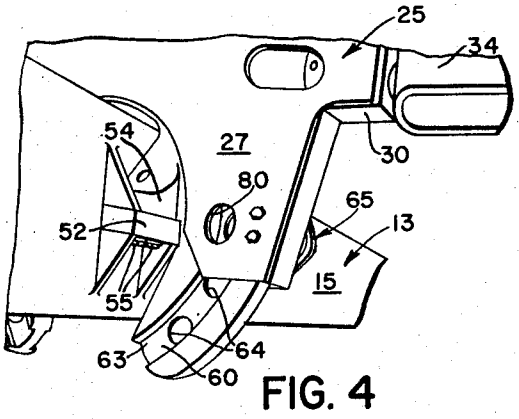


FIG. 4

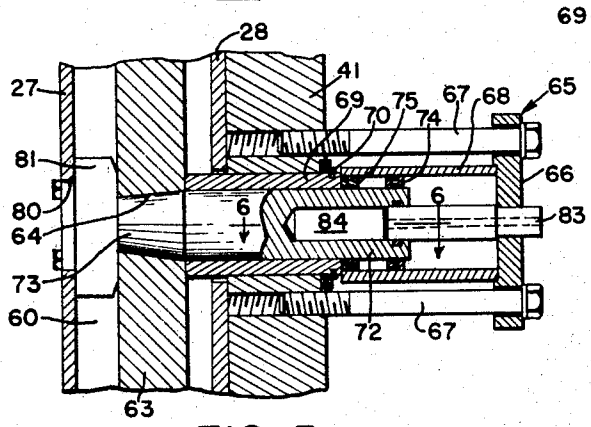


FIG. 5

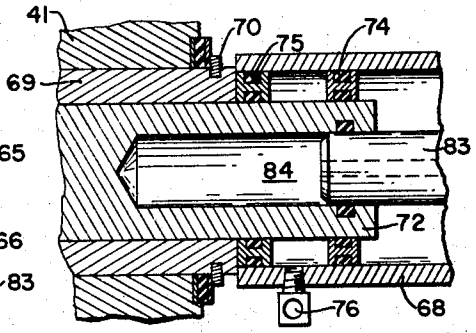


FIG. 6

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United States Patent Office 3,454,110 Patented July 8, 1969

3,454,110

SADDLE STRUCTURE FOR EARTH GRADER

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Filed June 21, 1966, Ser. No. 559,159
Int. Cl. E02f 3/12
U.S. Cl. 172—793 8 Claims

ABSTRACT OF THE DISCLOSURE

A saddle structure for a motor grader that includes a vertically disposed downwardly opening U-shaped track structure extending around the main fore-and-aft beam with an annular recess in a vertical face thereof. A transverse implement supporting beam positioned above the track structure with depending portions residing in the recess for guiding the transverse beam angularly, and a hydraulic locking device for locking the transverse beam structure against movement on the track structure.

This invention relates to an earth grader and more particularly to the saddle structure on the longitudinal main beam of the grader that conventionally angles the blade.

Normally a road grader or scraper is composed of a fore-and-aft extending main beam that is supported at its front and rear ends by wheels, one set of which is traction wheels. The beam overlies and suspends a grader blade that may be shifted transversely as well as angled vertically so that various grades and cuts may be made. The means of suspending the blade generally includes a transverse beam structure that is carried on the main fore-and-aft beam and a pair of vertically disposed hydraulic cylinders that have lower ends connected to the blade structure. Often times the transverse beam structure is adapted to move angularly about the fore-and-aft extending main beam. It is the main object of the present invention to provide an improved saddle structure that permits the transverse beam structure to rotate or angle about the fore-and-aft extending main beam.

Specifically it is an object of the invention to provide an angular-shaped track that is supported transversely on the main fore-and-aft extending beam with annular grooves on opposite radial faces thereof. A transverse beam is positioned above the track and has depending wall structure disposed adjacent opposite sides of the track. The wall structures have internal guide means extending into the annular grooves for guiding the transverse beam structure around the track. The annular track has angularly spaced openings therein that receive pins carried on the depending walls. The pins are actuated by hydraulically operated rams and are inserted or withdrawn from the openings in the track as desired.

It is a further object of the invention to provide in the depending wall facing the operator's station on the grader openings through which the hydraulically operated locking pins may be viewed from the operator's station.

It is a further object of the invention to provide the annular track to have an open underside so that it may be removed from the main fore-and-aft extending beam. The fore-and-aft extending beam has upwardly facing ledges and the annular track has cooperating downwardly facing ledges that rest upon the ledges on the main fore-and-aft beam. The two ledges are detachably interlocked.

Other objects and advantages of the invention will become apparent to those skilled in the art as the nature of the invention is better understood from the following description and as shown in the accompanying drawings.

FIG. 1 is a front and side perspective view of the main portions of the road grader.

FIG. 2 is a sectional view of the road grader taken substantially along a vertical transverse plane just forwardly of the saddle structure and looking rearwardly.

FIG. 3 is a side view of the structure shown in FIG. 2.

FIG. 4 is a side and rear perspective view of a portion of the saddle and main beam structure.

FIG. 5 is an enlarged sectional view taken substantially along the line 5—5 of FIG. 2.

FIG. 6 is an enlarged sectional view taken substantially along the line 6—6 of FIG. 5.

The grader is composed of a rearwardly positioned tractor **10** having two sets of transversely spaced traction wheels **11** and a pair of front steerable wheels, one of which is shown at **12**. Interconnecting the tractor and the front steerable wheels **12** is a fore-and-aft extending main beam **13** that is rectangular in cross section; having vertical side walls **14, 15** and horizontal upper and lower walls **16, 17** respectively. An operator's station **18** is supported on the rear end of the main beam **13**. Suitable controls and steering mechanism are provided adjacent the operator's station **18** so that an operator may operate the various hydraulic units of the grader as well as steer the grader.

Suspended beneath the main beam **13** is a grader blade **19** suitably carried, in conventional manner, by a circle **20** having an internal gear, not shown, but suitably controlled for rotation by a hydraulic rotary motor, indicated by its housing **21**. A beam structure **25** is positioned above the longitudinal beam **13** and has opposite ends thereof projecting transversely outwardly of the beam **13**. The beam structure **25** is composed basically of a downwardly opening U-shaped structural plate **26** with fore-and-aft spaced apart walls **27, 28**. Trunnion blocks **29, 30** are welded to the internal surfaces of the transverse beam portion **26** adjacent opposite ends thereof. The trunnions receive horizontal and transversely outwardly projecting swivel pins, shown partially at **31, 32**, carrying yokes **33, 34**. Swiveled on the yokes **33, 34** are vertically disposed extensible and retractable links or hydraulic cylinders **35, 36** that have their rod ends connected to structure on the circle **20**. Welded to and projecting forwardly from the wall **28** is a reinforcing structural member **40** that includes in part a semicircular or semiannular portion **41** and an outwardly and downwardly extending arm portion **42**. The arm portion **42** has a ball section **43** of a ball-and-socket joint at its lower end. A third hydraulic cylinder **44** extends from the ball **43** transversely beneath the main beam **13** to a lower end connected to the circle structure **20**. As is clearly apparent, the hydraulic cylinders **35, 36** and **44** operate to raise and lower and tilt the blade **19**.

The transverse beam structure **25** is supported on the main fore-and-aft extending beam **13** by means of an annular track member **50** that extends around the beam **13** and opens downwardly so as to permit the track member **50** to be removed. The side walls **14, 15** have outwardly projecting ledge members **51, 52**. Cast integral with the track **50** are a pair of ledge members **53, 54** that face downwardly and are supported on the lower ledge members **51, 52**. Suitable bolts **55** detachably but rigidly connect the ledge members **53, 54** to the ledge members **51, 52**.

As may best be seen from viewing FIG. 6, the track is I-shaped in cross section having annular grooves **60, 61** in its front and rear radial faces respectively. The flange **63** between the respective grooves **60, 61** has a plurality of angularly spaced pin receiving openings **64**.

Fixed to the semicircular structural member **41** on opposite sides thereof is a pair of hydraulically operated

locking pin structures **65**. Each structure **65** includes a head plate **66** that has its outer edges bolted, as at **67**, to the structural member **41**. The plate **66** bears against a fluid cylinder **68**. The forward end of the cylinder **68** bears against the end of a sleeve **69** extending fore-and-aft through the semicircular structural portion **41** and the wall portion **28**. The forward end of the sleeve **69** operates as a boss portion that is inserted in the groove **61** and operates as a guide within the groove **61**. A snap ring **70** is fitted on the outer surface of the sleeve **69** and limits its inward travel in respect to the groove **61**. The sleeve **69** carries a locking pin **72** having a forward tapered end **73** that is received in the openings **64** of the track, the openings **64** being also tapered in accordance with the taper of the pin end **73**. The forward end of the pin **72** extends through the guide **69** and into the cylinder **68**. A sealing ring **74** is positioned on the extreme forward end of the pin **72**. A similar sealing ring **75** is slidably positioned, in respect to the pin **72**, adjacent the end of the sleeve **69**. A fluid passage **76** is provided in the cylinder **68** between the rings **74**, **75** so that fluid may be moved into the cylinder to thereby move the pin **72** axially to unlock the entire saddle structure **25** to permit angular movement in respect to the track structure **50**.

The wall **27** that faces the operator's station **18** has a pair of openings **80** in alignment with the locking structure **65** and particularly in alignment with the pin **72**. The purpose of the openings **80** is to permit the operator to view the positions of the pins **72** in respect to the respective openings **64**. Thus, the operator may determine whether the pins **72** are properly aligned with the openings **64** and also whether the pins **72** are in their locked or unlocked position in respect to the openings **64**. Suitable guide blocks **81** are fixed to the front wall **27** and are positioned just outwardly of the openings **80**. The blocks engage the outer edge of the track **50** and generally hold the track in proper fore-and-aft alignment in respect to the transverse beam structure **25**. The forward end of each of the pins **72** is provided with an axial opening **84** that receives a pilot rod **83** fixed to the central portion of the end plate **66**. The pilot **83** operates to stabilize the pin **72** in its axial movement and has an axial fluid passage through which hydraulic fluid may move to and from the opening **84**. Thus movement of fluid into opening **84** will force the pin **72** into a locked position in respect to the track **50**.

What is claimed is:

1. A saddle construction for use in a road grader having a fore-and-aft extending main frame, comprising: an annular-shaped upright track supported transversely on the frame and formed about a fore-and-aft axis and having an annular groove recessed in a radial face thereof; a transverse beam positioned above the track having depending structure including fore-and-aft spaced vertical walls adjacent the track; guide means on the walls with at least part thereof extending into the recessed groove for guiding the transverse beam for angular movement around the track; a plurality of angularly spaced openings in the track; pin means carried on the walls for movement into and out of engagement with the openings; hydraulic means on the depending structure for forcibly adjusting the pin means into and out of the openings for locking the structure against movement and for releasing the structure for movement respectively; and transversely spaced connections for depending extensible and retractable links on the transverse beam.

2. A saddle construction for use in a road grader having a fore-and-aft extending main frame, comprising: an annular-shaped track supported transversely on the frame and formed about a fore-and-aft axis and having an annular groove in a radial face; transverse beam structure having fore-and-aft spaced guide means adjacent to and engageable with opposite sides of the track with one of said guide means extending into the annular groove for guiding the transverse beam structure for angular movement around the track; a plurality of angularly spaced openings in the track; pin means carried on the beam structure for movement into and out of engagement with the openings; hydraulic means on the beam structure for forcibly adjusting the pin means into and out of the openings for locking the beam against movement and for releasing the beam structure for movement respectively; and transversely spaced connections for depending extensible and retractable links on the transverse beam structure.

an annular groove in a radial face; trnsverse bem structure having fore-and-aft spaced guide means adjacent to and engageable with opposite sides of the track with one of said guide means extending into the annular groove for guiding the transverse beam structure for angular movement around the track; a plurality of angularly spaced openings in the track; pin means carried on the beam structure for movement into and out of engagement with the openings; hydraulic means on the beam structure for forcibly adjusting the pin means into and out of the openings for locking the beam against movement and for releasing the beam structure for movement respectively; and transversely spaced connections for depending extensible and retractable links on the transverse beam structure.

3. The structure as set forth in claim **2** in which the road grader has an operator's station rearwardly of the saddle structure and the beam structure has a vertical wall on the side of the track facing the operator's station with openings therein aligned with the pin means whereby an operator may view the position of the pin means in relation to seating in the respective openings of the track.

4. The structure as set forth in claim **2** in which the pin means are horizontal pins supported to slide axially into and out of engagement with openings in the track, and further characterized by the pins and openings being tapered.

5. The structure as set forth in claim **4** in which the hydraulic means is a hydraulic cylinder supported on one of the walls in axial alignment with the respective pin, and a hydraulically operated ram rigid with the pin retained in the cylinder.

6. The structure as set forth in claim **2** in which the guide element is a rigid boss projecting from the inner face of one of the vertical walls and which surrounds the pin means.

7. The structure as set forth in claim **2** in which the main frame is a fore-and-aft extending beam, the annular track structure fits on the beam and has an open underside to permit the track to be removed from the beam, the beam has upwardly facing ledges on opposite sides, the track structure has downwardly facing ledges adapted to engage and reside on the ledges of the beam, and means detachably and rigidly interconnecting the ledges to one another.

8. In a motor grader, the combination of a fore-and-aft extending main beam with opposite sides; a pair of horizontal ledges rigid with and projecting from the sides; a transverse downwardly opening member disposed about the beam with downwardly facing ledges engaging and fixedly attached to the aforesaid horizontal ledges, said member having an outer circular-shaped groove recessed in a vertical surface thereof and encompassing the main beam; a transverse beam disposed above the main beam and having fore-and-aft projecting guide means projecting into the recessed groove for guiding the transverse beam for angular movement; and means for locking the transverse beam against movement in respect to the member.

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PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,454,110 Dated 8 July 1969

Inventor(s) Paul Edmund Hanser

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, last line, before "transverse" insert -- a --.
Column 4, line 1, cancel "an annular groove in a radial face; trnsverse bem struc-".

SIGNED AND
SEALED
OCT 28 1969

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents