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Ryan

[11] **3,815,686**

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[54] **ROAD GRADER BLADE SUPPORT**

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[73] Assignee: **Blair Manufacturing Co., Inc.,** Blair, Nebr.

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[52] **U.S. Cl.** **172/783,** 172/763

[51] **Int. Cl.** **E02f 3/12**

[58] **Field of Search** 172/783, 781, 413, 763, 172/794; 24/125, 135; 287/111, 118

[56] **References Cited**

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2,640,718	6/1953	Brown	172/763
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3,552,498	1/1971	Stauber	172/783
3,642,333	2/1972	Eisenhardt	172/763 X

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Attorney, Agent, or Firm—Hofgren, Wegner, Allen, Stellman & McCord

[57] **ABSTRACT**

A road grader blade support attachment including a frame, means for securing the frame to a vertically adjustable blade carrier on the grader, a tongue having a front end pivotally mounted on the frame to swing about a vertical axis, an axle carrying ground-engaging blade support wheels, and means mounting the axle for vertical adjustment on the trailing end of the tongue including a piston and cylinder device having a lower end connected to the axle and an upper end connected to the tongue.

6 Claims, 6 Drawing Figures

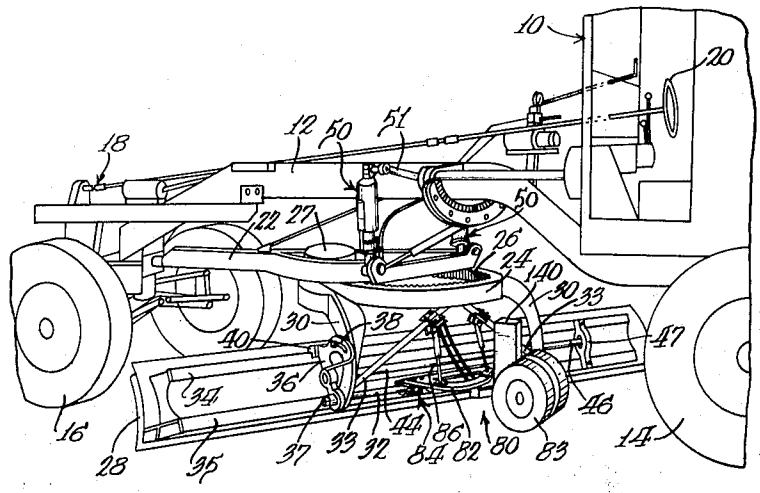

Fig. 1.

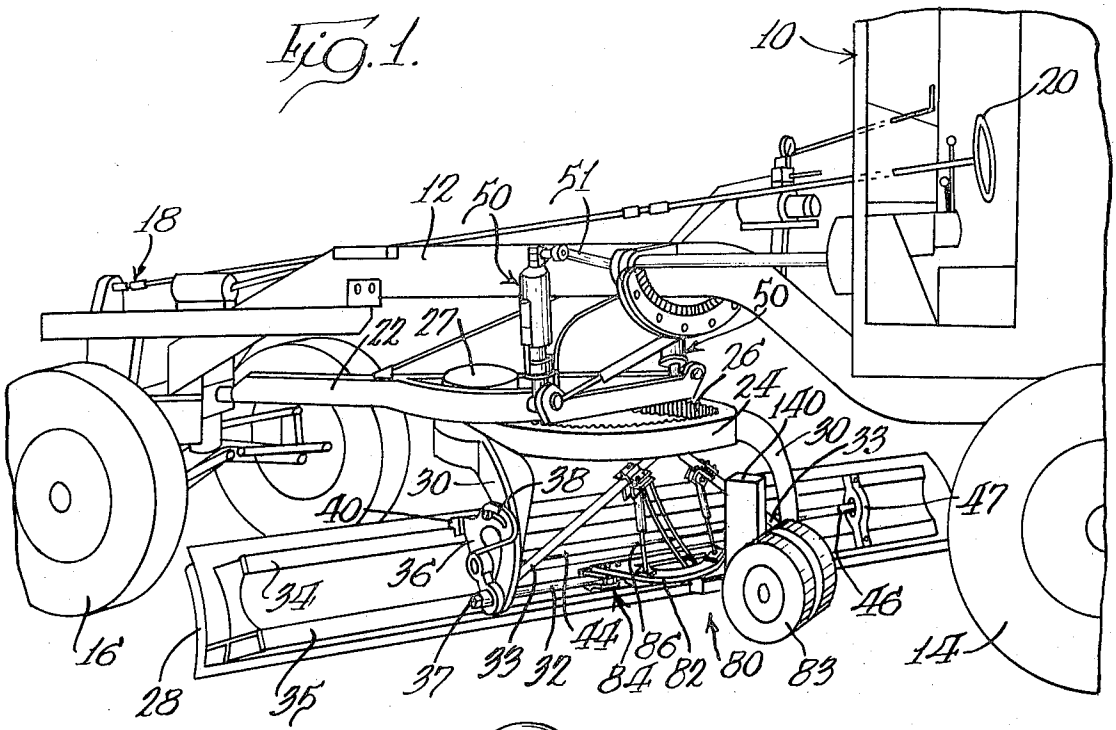
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Fig. 2.

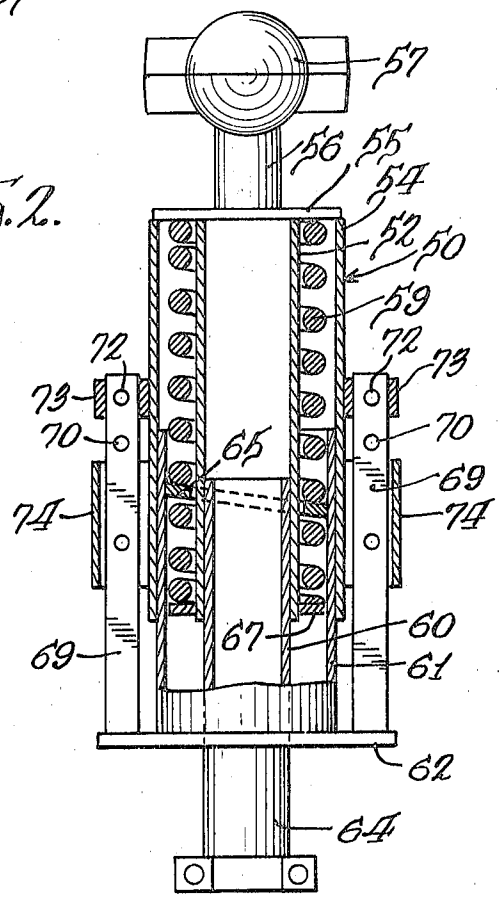
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Fig. 3.

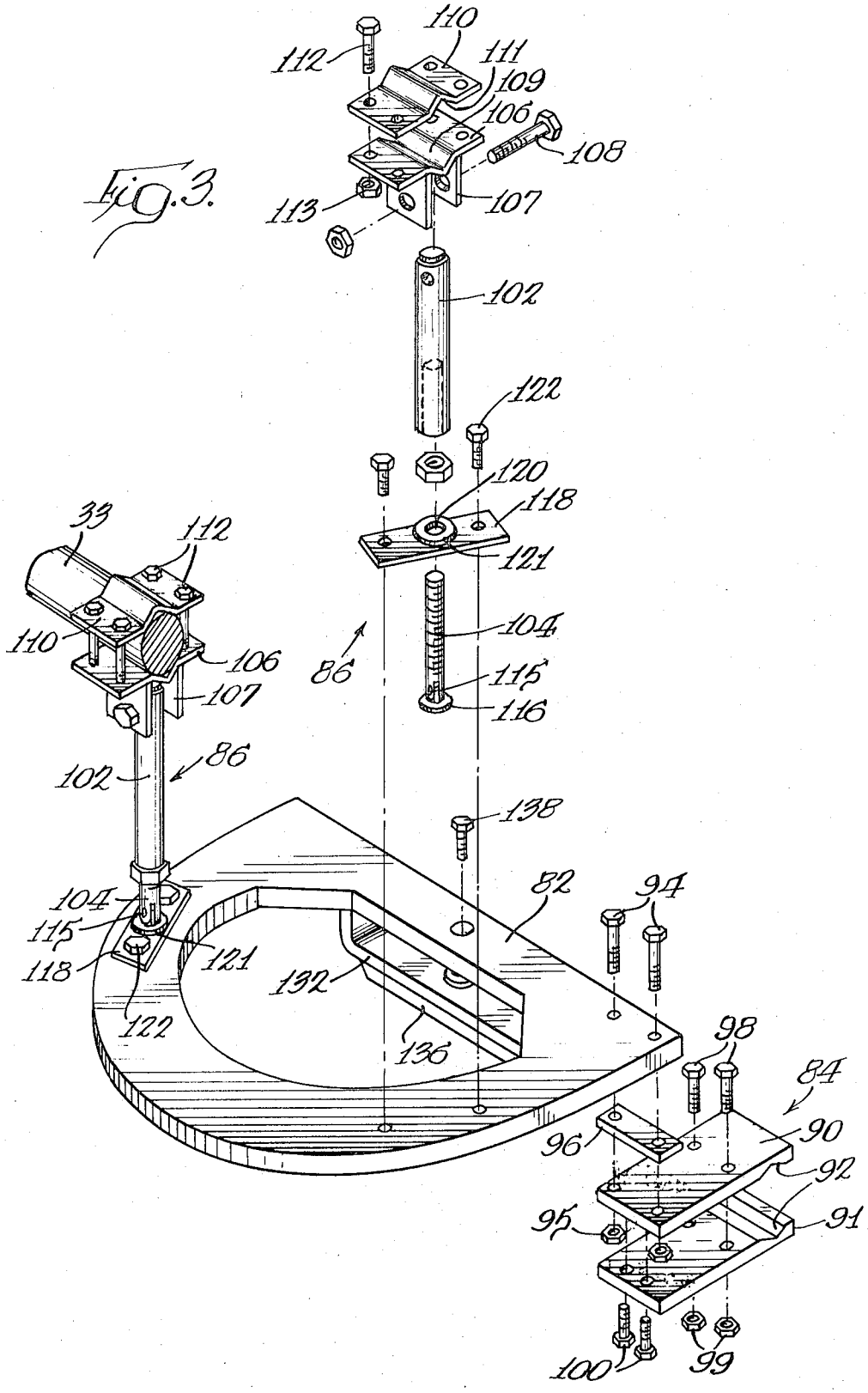
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Fig. 4.

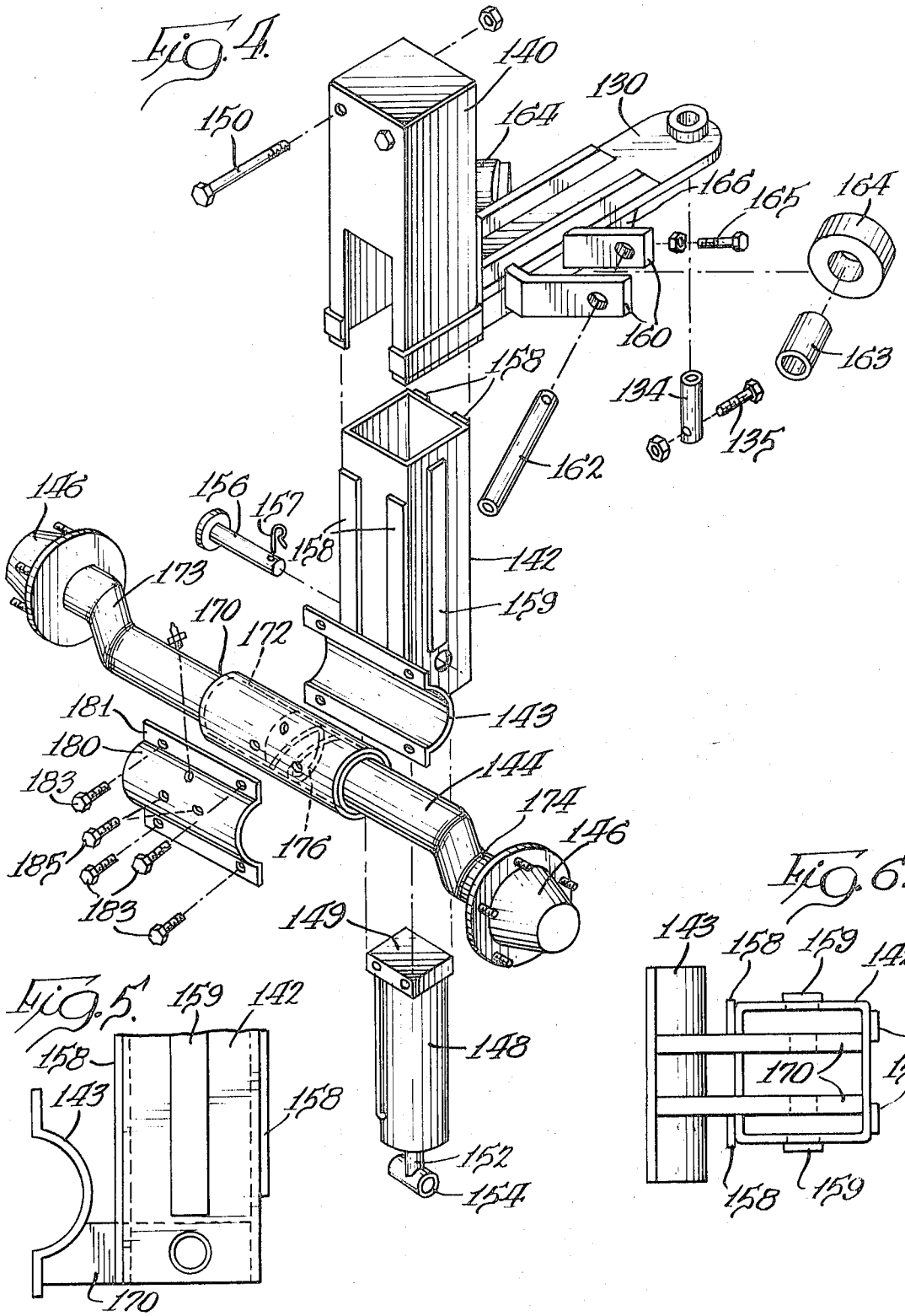

Fig. 5.

Fig. 6.

ROAD GRADER BLADE SUPPORT

BACKGROUND OF THE INVENTION

The present invention relates to means for supporting the ground-engaging blade in a motor-powered grader.

Generally speaking, a motor grader contacts the ground at three spaced positions in a front-to-rear direction, namely at the rear propulsion wheels, the front steering wheels, and the blade mounted intermediate the front and rear wheels. While the wheels are laterally spaced and afford some flexibility in adapting to variations in the road surface, the blade has a line contact with the ground and reacts to variations anywhere along the line of contact. As a result, when the speed of the grader increases and it encounters rough places in the road, the blade often develops a rythmic bounce or vibration which gouges a washboard pattern in the ground surface. The bounce and gouging are accentuated when the rear wheels encounter the washboard pattern gouged by the preceding blade. In order to prevent the undesirable washboard pattern, in the absence of other corrective measures, it is necessary for the operator to sharply reduce the speed of the grader, and sometimes the operation is carried on indefinitely in low speed gears.

In order to reduce the undesirable bounce and washboard gouging when the grader is operated at increased speeds, as described above, it has been proposed that the grader blade be separately supported by ground-engaging wheels which enable the blade to work independently of the grader chassis. For example, U.S. Pat. No. 3,552,498 discloses a road grader blade mounting means including a resilient spring device which yieldably urges the blade toward the ground and also resiliently opposes movement toward the ground. The resilient means is used in conjunction with blade-supporting wheels which are vertically adjustable relative to the blade to provide a fine adjustment of the blade elevation. The shock-absorbing action of the resilient means and the fine adjustment afforded by the blade support wheels enables accurate positioning of the blade together with independent support for the blade which reduces objectionable bounce. As a result, better road surfaces are graded at higher speeds with less attention.

The prior U.S. Pat. No. 3,552,498 disclosed a blade support attachment for a road grader including a base or frame attachable to the blade carrier, a tongue pivotally mounted on the frame, an axle carrying blade support wheels, and means for vertically adjusting the axle relative to the tongue. It is desirable to provide a more compact attachment and one with improved adaptability facilitating use with various grader constructions.

SUMMARY OF THE PRESENT INVENTION

It is a general object of the invention to provide an improved blade support attachment for a road grader.

A more specific object is to provide adjustable means adaptable for securing the attachment to blade carriers of various constructions.

Another object is to provide an improved blade support attachment for a road grader including a compact arrangement of an upright piston and cylinder device together with appropriate guide means for vertically adjusting the blade support wheels relative to the frame structure which is attachable to the blade carrier.

In the preferred embodiment of the invention illustrated herein, the blade support attachment comprises a frame, means for securing the frame to a blade carrier in a grader, a tongue having a front end pivotally mounted on the frame to swing about a vertical axis, an axle assembly carrying ground-engaging blade support wheels, and a piston and cylinder device mounting the axle assembly for vertical adjustment on the trailing end of the tongue. The piston and cylinder device includes a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and having a lower end secured to the tongue and an upper end secured to the cylinder, a second tubular guide of rectangular cross section disposed in the first guide and having a lower end secured to the axle assembly and connected to the piston rod, and guide strips secured on the outside of the second tubular guide engageable with the interior of the first tubular guide.

Preferably, the axle assembly is releasably secured to the piston and cylinder device so as to be readily removable when desired. To this end the axle assembly is held by clamping means including one clamp member on the second tubular guide and a separate clamp member releasably secured to the first clamp member.

As illustrated herein, the attachment frame is secured to the blade carrier by means including an upright suspension arm extending between the carrier and the rear of the frame. The front edge of the attachment frame is secured to the blade carrier by clamping means including a pair of clamp members, means for securing one clamp member to the frame, means for securing the clamp plates together in spaced positions gripping a portion of the blade carrier, and means for adjusting the spaced relationship of the blades to each other.

Preferably, the clamping means comprises a pair of similar clamp plates each having a transverse recess for gripping the blade carrier, bolts for securing one clamp plate to the frame, bolts for securing the clamp plates together in spaced positions embracing a portion of the blade carrier, and bolts in the other clamp plate for adjustably spacing the plates.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a substantial portion of a motor-powered road grader embodying the present invention;

FIG. 2 is a vertical longitudinal sectional view through resilient means connecting the blade support to the grader chassis;

FIG. 3 is an exploded perspective view illustrating the frame for the blade support attachment together with the means for attaching the frame to the blade carrier;

FIG. 4 is an exploded perspective view illustrating the tongue of the blade support attachment together with the piston and cylinder connection of the tongue with the axle for the ground-engaging wheels.

FIG. 5 is a fragmentary side elevation of a tubular guide shown in FIG. 4; and

FIG. 6 is a bottom view of the guide member shown in FIG. 5.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to the drawings in more detail, a road grader embodying the present invention, as illustrated in FIG. **1**, includes a cab **10** mounted on a chassis including a longitudinal frame member **12**, rear propelling wheels **14**, and front steering wheels **16**. Behind the cab **10**, not visible, there is an appropriate power unit for supplying propulsion drive to the rear wheels **14**, under control of an operator in the cab **10**. The front wheels are adapted to be steered by a steering mechanism indicated in general at **18** and including a steering wheel **20** accessible in the cab **10**. The propulsion means and the steering mechanism form no part of the present invention and need not be described in complete detail herein.

The chassis includes a front portion disposed between the steering wheels **16** for mounting a drawbar **22** extending rearwardly and supporting a circular carrier member **24** disposed beneath a central portion of the longitudinal frame member **12**. The circular carrier **24** is formed with internal teeth as at **26** to facilitate angular adjustment on the drawbar **22** by means of suitable power driven mechanism including a gear box visible in part at **27**.

In order to support a ground-engaging grader blade **28**, the circular carrier **24** is formed at opposite sides with curved depending draft arms as at **30**. Lower ends of the draft arms **30** include apertures which support a transversely extending brace and pivot rod assembly as at **32**. Angularly inclined braces **33** extend from a central portion on the circular carrier **24** outwardly respectively to the lower ends of the draft arms **30**. To facilitate attachment of the blade **28** to the carrier in various adjusted positions, the back of the blade is formed with parallel longitudinally extending clamp ways as at **34** and **35**. Each of the draft arms **30** carries a pivotal blade support **36** having a lower end portion pivotally mounted at **37** on the lower end of the arm **30** and an upper portion in the shape of a quadrant **38** adapted to be secured to the arm **30** in angularly adjusted positions. Each of the blade holders **36** is formed at the top and bottom with a clamp as at **40** engageable with the ways **34** and **35** on the back of the blade **28**. It will be understood that the blade supports **36** are pivotally adjustable on the depending draft arms **30** so that the face of the blade **28** is angularly adjustable relative to the surface of the ground.

The blade **28** is laterally adjustable relative to the carrier **24** by a piston and cylinder device including a cylinder **44** secured to the depending draft arms **30** and a piston having a piston rod **46** secured to the blade as at **47**. When the blade is loose in the clamp members **40**, fluid may be admitted to the cylinder **44** for moving the blade laterally.

The drawbar **22** is pivotally adjustable on the grader chassis so that the carrier **24** is movable vertically relative to the frame member **12** and relative to the ground. The rear end of the drawbar **22** is supported at opposite sides respectively by resilient suspension units **50** each having a lower end secured to the drawbar and an upper end secured to a laterally outwardly extending arm **51** pivotally mounted on the longitudinal frame member **12** to raise and lower the suspension unit **50**.

As seen best in FIG. **2**, each of the resilient suspension units **50** includes a pair of concentric can-shaped members **52** and **54** secured to a plate **55** having an upper extension **56** with a ball joint connection **57** to the arm **51**. The concentric members **52** and **54** are spaced and provide a housing for a coiled spring **59**. The lower ends of the cans **52** and **54** are fitted telescopically on the outside of concentric can-shaped members **60** and **61** secured together at the lower end by a plate **62** having an extension **64** adapted to be secured to the drawbar **22**. The lower outer can **61** is provided with an internal thread-shaped member as at **65** fitted between the coils of the spring **59** in a manner to function as an intermediate spring seat so that the single spring **59** functions both to resiliently urge the carrier **24** downwardly toward the ground and at the same time to resiliently oppose movement toward the ground. The lower end of the spring **59** is seated on an annular member **67** secured to the lower end of the upper inner can **52**. The upper end of the spring is seated against closure member **55** connecting the upper ends of the cans **52** and **54**.

In order to limit the downward movement of the carrier **24** relative to the frame member **12**, if desired, the plate **62** on the lower cans **60** and **61** is provided with a pair of upwardly extending rods as at **69** formed with spaced apertures as at **70** adapted to receive a pin as at **72** for securing a collar **73** on the rod **69** to engage a guide **74** on the outer upper can **54**. In this way, it will be understood that while the carrier **24** is elevated, the collar may be adjusted downwardly on the rods **69** and locked by insertion of the pin **72** in the appropriate aperture **70** so that the downward movement of the blade is limited. Alternatively, the blade may even be held in elevated position.

In order to reduce vibration and bounce of the blade vertically relative to the grader chassis, a blade support attachment generally designated **80** is secured to the blade carrier and includes ground-engaging wheels. The attachment **80** includes a generally horizontally disposed D-shaped frame plate **82** adapted to be secured to the blade carrier by means best illustrated in detail in FIG. **3**. In general, the front edge of the frame plate **82** is secured to the crossbrace **32** by a pair of clamp means as illustrated at **84**. Rear portions of the plate **82** are supported by means of adjustable suspension arms as at **86** each having an upper end pivotally connected to one of the inclined braces **33** and a lower end pivotally connected to the plate **82**. In this manner, the plate is rigidly secured to the blade carrier and forms an extension thereof.

As best seen in FIG. **3**, each of the clamp means **84** comprises a pair of similarly formed rectangularly shaped clamp plates **90** and **91** having inwardly facing recesses as at **92** adapted to receive the curved outer surface of the crossbrace **32** when the plates are clamped in place on the brace. One of the plates **90** and **91** is adapted to be securely fastened to the frame plate **82**. As illustrated herein, the upper plate **90** is secured to the bottom surface of the frame **82** by means of a pair of bolts **94** and lock nuts **95**. Intermediate the clamp plate **90** and the frame **82**, there may be one or more spacers as at **96** provided for the purpose of variably spacing the plate **90** from the frame **82** in a manner to aid in fitting the attachment to existing graders with varying dimensions. The second clamp plate **91** is secured in spaced relation to the first clamp plate **90**,

gripping the brace **32**, by means of clamp bolts **98** adapted to receive lock nuts **99**. In order to properly space the ends of the plates **90** and **91** remote from the crossbrace **32**, adjustable bolts **100** are mounted in the clamp plate **91** so that the ends are engageable with the plate **90**. It should be understood that the clamp means provides a flexible device which may be secured to the bottom of the frame **82**, or inverted and secured to the top of the frame **82**, while the clamp plates may be variably spaced from each other in order to fit crosspieces of various dimensions. It should also be understood that the clamp **84** may be installed with one of the plates **90** and **91** on one side of the frame **82** and the other plate on the other side of the frame **82**.

As best illustrated in detail in FIG. **3**, each of the upright suspension arms **86** includes an internally threaded sleeve **102** adapted to receive a threaded adjustable bolt **104** in a manner such that the sleeve and the bolt form an arm of adjustable length. In order to secure the upper end of the sleeve **102** to the angularly inclined brace **33**, a clamp bracket **106** is formed with depending flanges **107** pivotally mounted on the sleeve member **102** by means of bolt **108**. In this manner, the sleeve **102** may be substantially vertically disposed while the clamp bracket **106** may be angularly inclined. The bracket **106** is formed with a transverse recess as at **109** adapted to receive the periphery of the brace **33** and a clamp plate **110** is formed with a complementary recess **111**. The plate **110** is secured to the bracket **106** by means of bolts as at **112** secured in place by nuts **113**.

In order to attach the lower end of the bolt **104** to the frame **82**, the lower end of the bolt is bifurcated to the frame **82**, the lower end of the bolt is bifurcated at **115** and pivotally mounted on an upright flange of a circular head **116**. The head **116** is adapted to rest on the frame **82** while captured by a clamp plate **118** having a central aperture **120** for the bolt **104** and a deformation **121** around the aperture for receiving the head **116**. The plate **118** is secured to the frame **82** by means of bolts or screws as at **122**. It will be understood that the lower end of the bolt **104** is rotatably and pivotally mounted relative to the frame **82**.

Referring now to FIG. **4**, in order to mount the ground-engaging wheels **83** for supporting the blade **28**, a tongue **130** is pivotally mounted on the front of the frame **82** and extends rearwardly. The front end of the tongue **130** is positioned beneath the frame plate **82** and above a spaced parallel bracket **132** secured beneath the plate **82**. A pivot pin **134** is positioned in aligned apertures in the bracket **132**, the tongue **130** and the plate **82**. The pin is secured in frame **82** by means of a bolt **135** secured to a flange **136** on the bracket **132**. The pin **134** is additionally retained against vertical displacement by means of a bolt **138** threadable into the upper end of the pin **134** and engageable with the top surface of the frame plate **82**.

The rear end of the tongue **130** is formed with an upright tubular guide member **140** of rectangular cross-section having a lower end rigidly secured to the tongue. The upper end of the guide member **140** is closed and the lower end is open to receive telescopically therein the upper portion of a tubular guide **142** of complementary cross-section having a lower end portion rigidly secured to a transversely extending clamp member **143** for an axle assembly including an axle **144**. At opposite ends, the axle **144** carries rotatably mounted drums **146** for receiving the ground-engaging wheels **83**. In order to provide for vertical adjustment of the axle relative to the tongue, a cylinder **148** includes a rectangular head **149** at the upper end, and the cylinder is positionable in the guide member **140** so that the rectangular head **149** may be secured in the guide **140** as by means of bolts as at **150**. The cylinder is thus rigidly secured in the guide member **140** and also closely surrounded by the inner guide member **142**. The cylinder carries a reciprocable piston with a downwardly extending piston rod **152** having a lower end portion at **154** adapted to be pivotally secured in the lower guide member **142** by means of a pin **156** retained in place by a spring clip **157**.

It will be understood that the mounting of the cylinder **148** in the upper guide member **140** and the connection of the piston rod **152** to the lower guide **142**, and the mounting of the guide members **140** and **142** telescopically with respect to each other, provides for vertical reciprocable movement of the lower guide relative to the upper guide to raise and lower the wheels **83** relative to the tongue **130**. As the wheels are lowered, the blade **28** is elevated. As the wheels are raised, the blade **28** is lowered.

In order to facilitate reciprocation of the guide **142** in the guide **140**, guide **142** has guide strips secured on its outer surfaces, including on each of the front and rear surfaces a pair of laterally spaced vertically disposed bearing strips as at **158** welded or otherwise suitably secured on guide **142**. On each of the laterally opposite surfaces, the guide **142** has a vertically disposed spacer strip as at **159**, secured in place by welding for example. With the construction illustrated, the guide members **140** and **142** may be conveniently made from standard commercially available structural steel tubing. For example, both guides may be 1018 carbon steel, the outer member **140** being 6 x 6 x 3/8 inches and the inner member **142** being 4½ x 4½ x 1/4 inches. The bearing strips **158** are preferably an aluminum bronze alloy bearing material. The spacer strips **159** may be steel.

The tubular guide **140** engages the bearing strips on the guide **142** over an extended length in a manner to enable vertical movement of the axle **144** relative to the tongue even though the guide **142** is offset from the axis of the axle **144**. The rectangular cross section of the guides **140** and **142** prevents pivotal movement of the axle **144** relative to the tongue **130** about a vertical axis. The mounting of the guide **142** forwardly of the axle **144** enables a reduction in the over-all height of the blade support in contrast to an arrangement where the piston and cylinder device is aligned vertically over the axle **144**. The arrangement illustrated also provides a compact over-all length in a front-to-rear direction, in contrast to arrangements where the axle **144** might be supported by a pivoted crank arm mounted on the tongue **130**.

As the circular support **24** is angularly adjusted to vary the angle of the blade relative to the path of motion, the tongue **130** is free to swing about the vertical pivot pin **134** so that the wheels **83** trail properly. In order to facilitate angular adjustment of the tongue **130** relative to the frame plate **82**, the tongue is formed at each side with a pair of angularly disposed brackets **160** adapted to receive a roller pin **162** carrying a bushing **163** for a bearing roller **164**, adapted to engage the bottom surface of the D-shaped frame plate **82**. The pivot

pin **162** is secured in place by a bolt **165** engageable with a depending flange **166** on the tongue **130.**

In order to facilitate removal of the axle assembly carrying the ground-engaging blade support wheels **83,** so that the wheels can be readily detached when they are not necessary, the axle assembly is releasably clamped to the clamp member **143** which is carried on the lower end of tubular guide **142.** The clamp member **143** is an elongate recessed, half tubular member, and as best seen in FIGS. **5** and **6,** it is rigidly secured to the guide member **142** by means of a pair of bars **170** which are welded in the lower end of member **142** and project forwardly where they are welded to memer **143.**

The axle assembly mounted in the clamp member **143** includes a tubular housing member **170** which carries an inner bushing **172** supporting the axle **144** for angular motion. At opposite ends, the axle **144** has oppositely offset portions **173** and **174** rotatably supporting wheel hubs **146,** and the axle is normally biased to a position in which the offset portions **173** and **174** lie in a common horizontal plane by means of torsion spring means **176** in the housing **170** acting between the housing and the axle. In this manner the wheels are free to adjust vertically to local variations in the terrain without materially altering the position of the blade.

The housing member **170** is releasably clamped in the member **143** by a separate complementary clamp member **180** having a recessed central portion and flanges **181** along opposite edges adapted to be secured to similar flanges on clamp member **143** by bolts as at **183.** Rotation of housing member **170** in the clamp members **143** and **180** is prevented by screws as at **183** which penetrate clamp member **180** and the housing member **170.** The releasable clamp **180** may be easily removed so that the axle assembly and blade support wheels may be disconnected when the wheels are not necessary. When the wheels are desired, the axle assembly may be readily attached by securing clamp member **180** in place.

I claim:

1. A road grader, comprising,

a. a chassis having propelling wheels and guiding wheels,

b. a drawbar pivotally mounted on the front of the chassis and extending rearwardly to swing vertically,

c. a circular carrier mounted on the drawbar for angular adjustment,

d. a horizontally disposed grader blade secured to the circular carrier to engage the ground,

e. resilient means on the chassis biasing the drawbar downwardly and resiliently supporting the drawbar,

f. a tongue having a front end pivotally mounted on the carrier to swing about a vertical axis,

g. an axle housing supporting an axle carrying ground-engaging blade support wheels,

h. a piston and cylinder device connected between the tongue and the axle housing for vertically adjusting the axle relative to the tongue including

1. a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and secured to the tongue and the cylinder,

2. a second tubular guide of rectangular cross section telescopically mounted relative to the first guide and secured to the axle housing and connected to the piston rod, and

3. wear strips of bearing material secured to the outer front and rear surfaces of the inner tubular guide engageable with the interior surfaces of the outer tubular guide.

2. A road grader, comprising,

a. a chassis having propelling wheels and guiding wheels,

b. a drawbar pivotally mounted on the front of the chassis and extending rearwardly to swing vertically,

c. a circular carrier mounted on the drawbar for angular adjustment,

d. a horizontally disposed grader blade secured to the circular carrier to engage the ground,

e. resilient means on the chassis biasing the drawbar downwardly and resiliently supporting the drawbar,

f. a tongue having a front end pivotally mounted on the carrier to swing about a vertical axis,

g. an axle housing carrying an axle with ground-engaging blade support wheels,

h. a piston and cylinder device connected between the tongue and the axle for vertically adjusting the axle relative to the tongue including

1. a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and secured to the tongue and the cylinder,

2. a second tubular guide of rectangular cross section telescopically mounted relative to the first guide and connected to the piston rod,

3. a first recessed clamp member on the lower end of the second tubular guide for receiving the axle housing,

4. a second recessed clamp member embracing the axle housing opposite the first clamp member, and

5. bolt means releasably securing the second clamp member to the first clamp member so that the axle is readily removable.

3. A road grader, comprising,

a. a chassis having propelling wheels and guiding wheels,

b. a drawbar pivotally mounted on the front of the chassis and extending rearwardly to swing vertically,

c. a circular carrier mounted on the drawbar for angular adjustment,

d. a horizontally disposed grader blade secured to the circular carrier to engage the ground,

e. resilient means on the chassis biasing the drawbar downwardly and resiliently supporting the drawbar,

f. a tongue having a front end pivotally mounted on the carrier to swing about a vertical axis,

g. an axle housing supporting an axle carrying ground-engaging blade support wheels,

h. a piston and cylinder device connected between the tongue and the axle housing for vertically adjusting the axle relative to the tongue including

1. a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and secured to the tongue and the cylinder,

2. a second tubular guide of rectangular cross section telescopically mounted relative to the first guide and secured to the axle housing and connected to the piston rod,
3. wear strips of bearing material secured to the outer front and rear surfaces of the inner tubular guide engageable with the interior surfaces of the outer tubular guide, and

i. clamp means for releasably securing the second tubular guide to the axle housing including a recessed clamp member fixed on the second tubular guide for receiving the axle housing and a separate recessed clamp member embracing the axle housing and releasably secured to the fixed clamp member.

4. A road grader, comprising,

a. a chassis having propelling wheels and guide wheels,
b. a drawbar pivotally mounted on the front of the chassis and extending rearwardly to swing vertically,
c. a circular carrier mounted on the drawbar for angular adjustment,
d. a pair of spaced draft arms extending downwardly from the carrier,
e. a cross brace connecting the lower ends of the draft arms,
f. inclined braces extending respectively from the carrier to the lower ends of the draft arms,
g. a horizontally disposed grader blade secured to the draft arms to engage the ground,
h. resilient means on the chassis biasing the drawbar downwardly and resiliently supporting the drawbar, and
i. a blade support attachment including
1. a D-shaped frame,
2. means for securing the frame to the rear of the blade and to the carrier in horizontal position with the curved portion of the D positioned rearwardly of the straight portion thereof,
3. a tongue having a front end mounted on the center of the straight portion of the frame to swing about a vertical axis,
4. an axle housing carrying an axle with ground-engaging blade support wheels,
5. means mounting the axle housing for vertical adjustment on the trailing end of the tongue, and
6. a pair of upright suspension arms connected respectively between the inclined braces and rear portions of the frame.

5. A road grader as defined in claim 4, wherein the means mounting the axle housing for vertical adjustment on the trailing end of the tongue comprises

a. a piston and cylinder device connected between the tongue and the axle housing for vertically adjusting the axle relative to the tongue including
1. a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and secured to the tongue and the cylinder,
2. a second tubular guide of rectangular cross section telescopically mounted relative to the first guide and secured to the axle housing and pivotally connected to the piston rod, and
3. guide strips secured on the outside of the second tubular guide engageable with the interior of the first tubular guide.

6. A road grader as defined in claim 4, wherein the means mounting the axle housing for vertical adjustment on the trailing end of the tongue comprises

a. a piston and cylinder device connected between the tongue and the axle housing for vertically adjusting the axle housing relative to the tongue including
1. a first tubular guide of rectangular cross section disposed in an upright position around the cylinder and secured to the tongue and the cylinder,
2. a second tubular guide of rectangular cross section telescopically mounted relative to the first guide and pivotally connected to the piston rod, and
3. clamp means for releasably securing the second tubular guide to the axle housing including a recessed clamp member fixed on the second tubular guide for receiving the axle housing and a separate recessed clamp member embracing the axle housing and releasably secured to the fixed clamp member.

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