April 28, 1953 B. L. PRYOR 2,636,289

BLADE ANGLING AND TILTING MECHANISM FOR BULLDOZERS

Filed Oct. 20, 1949 3 Sheets-Sheet 1

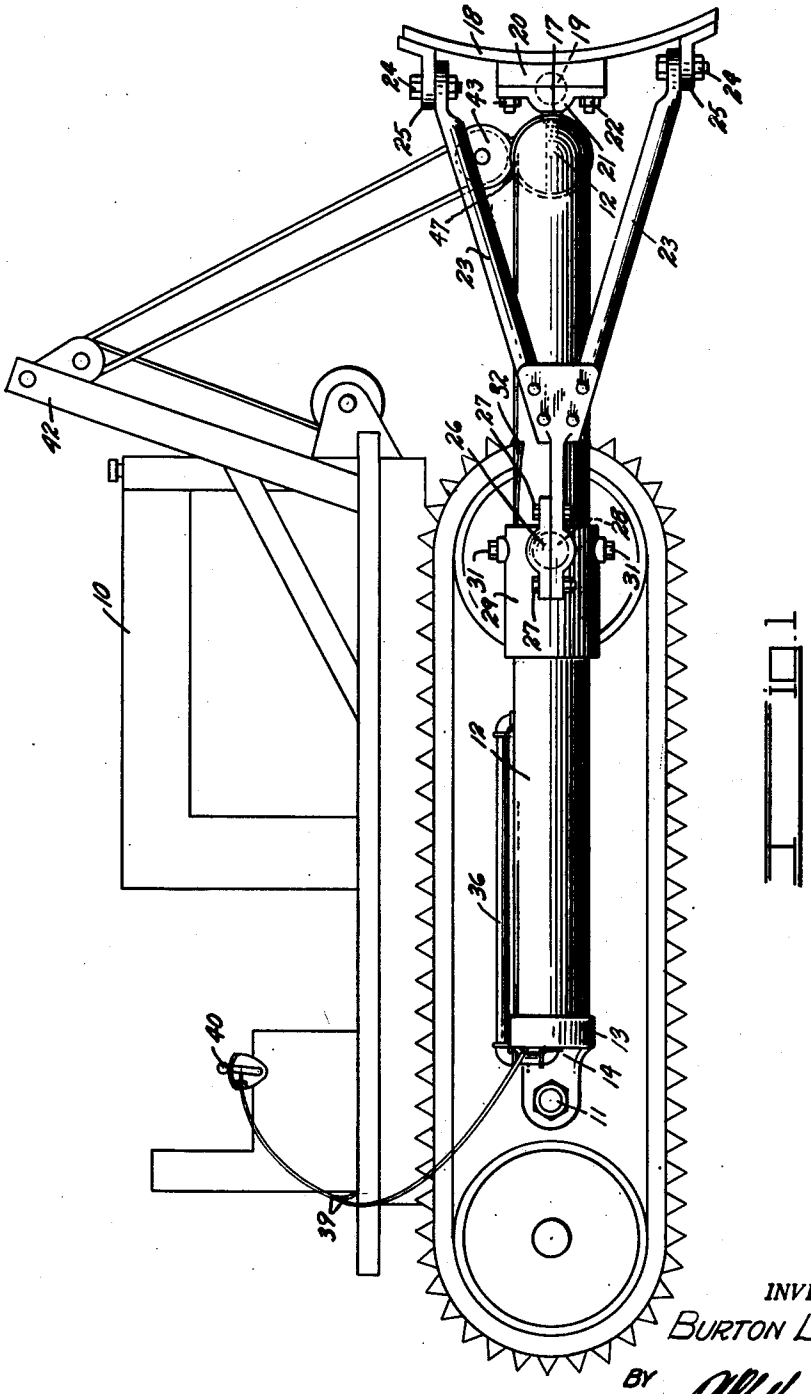


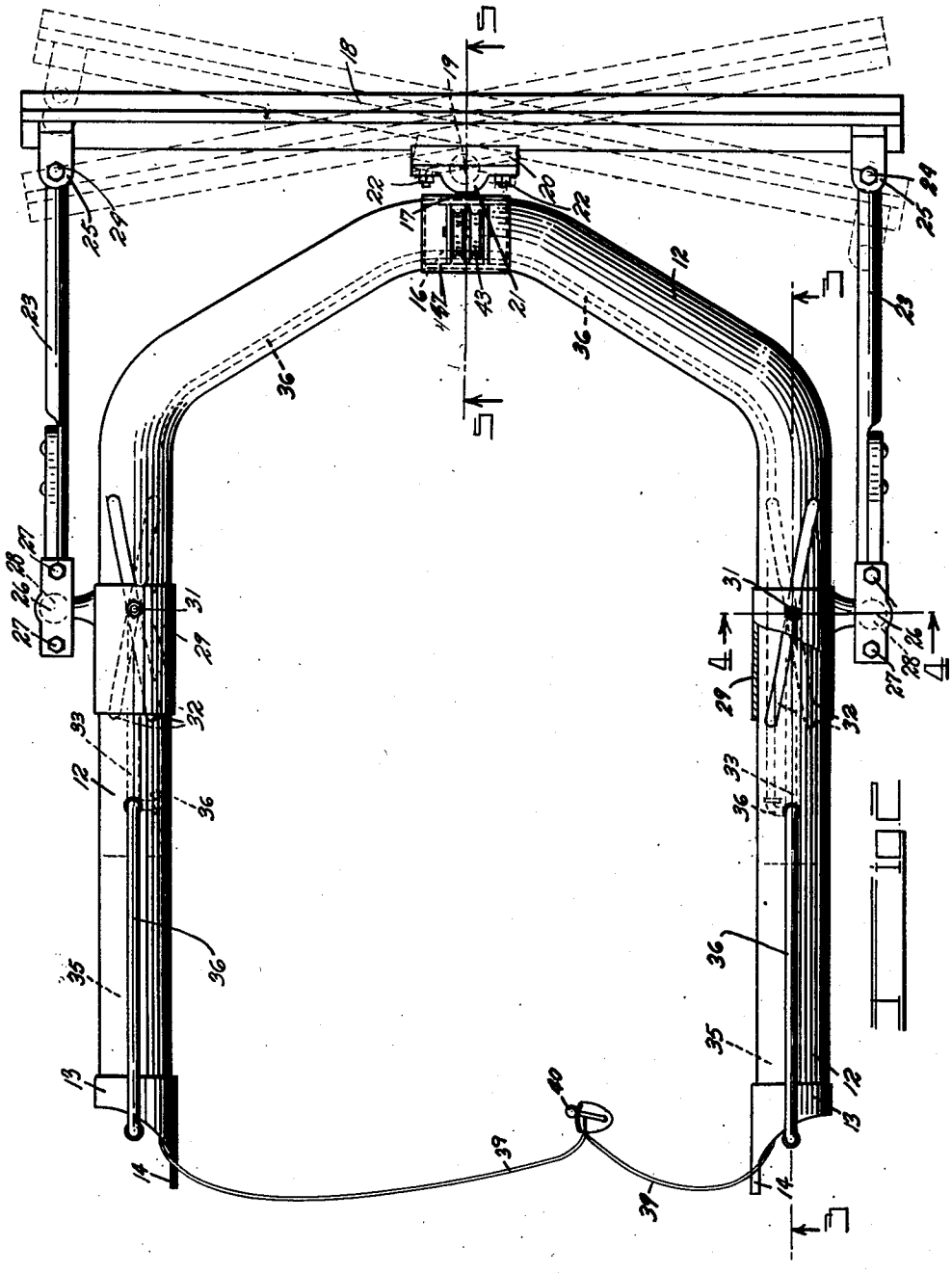

Fig. 1

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BLADE ANGLING AND TILTING MECHANISM FOR BULLDOZERS

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BLADE ANGLING AND TILTING MECHANISM FOR BULLDOZERS

Filed Oct. 20, 1949 3 Sheets-Sheet 3

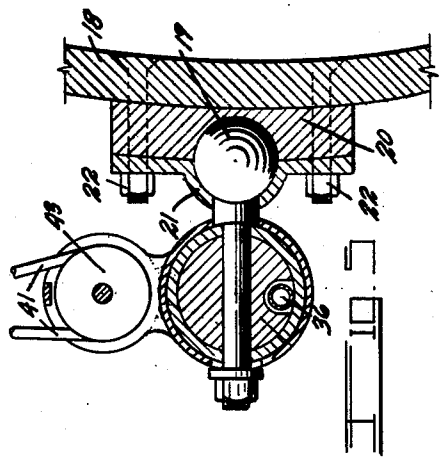


FIG. 5

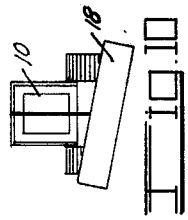


FIG. 10

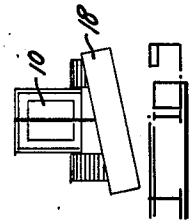


FIG. 9

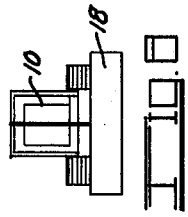


FIG. 8

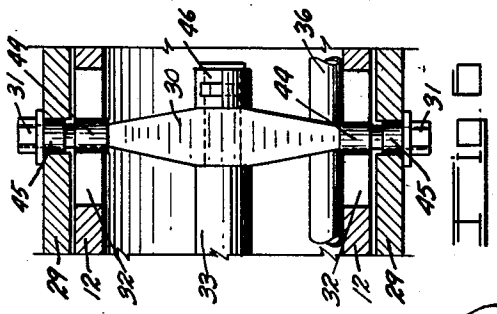


FIG. 6

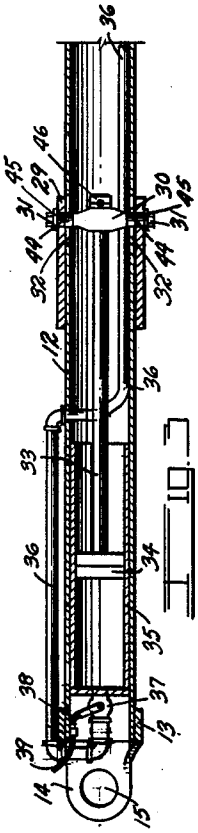


FIG. 4

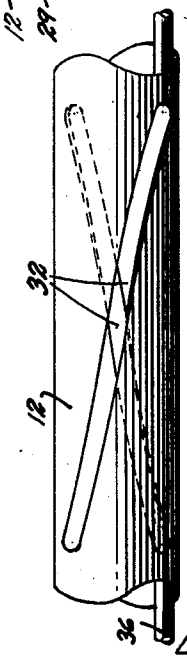


FIG. 7

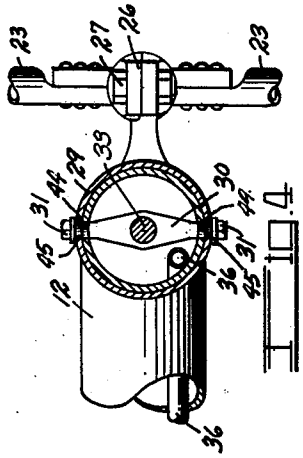


FIG. 11

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# UNITED STATES PATENT OFFICE

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## BLADE ANGLING AND TILTING MECHANISM FOR BULLDOZERS

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Application October 20, 1949, Serial No. 122,452

3 Claims. (Cl. 37—144)

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This invention relates to a bulldozer blade attachment for tractors and has for its principal object the provision of a complete unitary structure which can be quickly and easily applied to a tractor of the "Caterpillar" type to support a bulldozer blade ahead of the tractor and to provide means whereby the horizontal angle and vertical incline of the blade can be adjusted by the driver for the work to be done without it being necessary to leave the driver's seat.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side view of a typical tractor of the Caterpillar type illustrating the invention in place thereon;

Fig. 2 is a plan view of the improved bulldozer attachment;

Fig. 3 is a longitudinal vertical section, taken on the line 3—3, Fig. 2;

Fig. 4 is a detail cross-section, taken on the line 4—4, Fig. 2;

Fig. 5 is a similar, enlarged section, taken on the line 5—5, Fig. 2;

Fig. 6 is a detail view illustrating a type of cross head employed in the improved attachment;

Fig. 7 is a fragmentary, detail, top view of a portion of the frame member employed in the attachment; and

Figs. 8, 9 and 10 are diagrammatic from views of the improved attachment.

In the drawing, a typical tractor of the "Caterpillar" type is indicated at 10, with its rear implement mounting studs at 11.

The improved bulldozer attachment mounts upon the studs 11 and comprises a tubular, horizontally positioned, U-shaped frame 12 of a size to extend along both sides of the tractor and across the front thereof. The rear extremities of the legs of the frame 12 terminate in socket castings 13 provided with mounting ears 14 having bearing openings 15 for receiving the studs 11.

A filler block 16 is placed in the tubular frame 12 at its forward apex, and a mounting stud 17 extends through the frame 12 and through the block 16 for mounting a dozer blade 18. The forward extremity of the stud 17 terminates in a

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bearing ball 19 which is engaged by a ball socket member 20 and a ball cap 21 secured to the blade 18 by means of suitable attachment bolts 22.

It will be noted that this method of attachment allows the blade 18 to tilt in every direction. The blade 18 is braced at its extremities by means of U-shaped brace frames 23. The spread portions of the brace frames are mounted at their forward extremities upon vertically aligned hinge bolts 24 extending between ears 25 formed on the blade 18. The axes of the bolts 24 are at right angles to the longitudinal axis of the blade.

The rear extremities of the brace frames 23 terminated in ball sockets closed by means of ball socket caps 26 held in place by suitable cap screws 27. The ball sockets of the brace frames 23 engage joint balls 28 formed on and projecting from sliding sleeves 29, there being one of the sleeves 29 slidably mounted on each side leg of the U-shaped frame 12.

A cross-head member 30 extends diametrically across each sleeve 29 and is secured in the latter by means of terminal attachment screws 31. The cross-heads 30 extend through inclined guide slots 32 in the tubular frame member 12 and are provided with rollers 44 which contact the sides of the slots 32 to reduce the friction thereagainst. Spacing sleeves 45 are positioned between the rollers 44 and the heads of the screws 31. It will be noted that, due to the incline of the slots 32, the sleeves 29 will be rotated when they are reciprocated along the frame members 12.

A piston rod 33 is mounted in each cross-head 30 and extends rearwardly to a piston 34 by means of a piston rod clamp 46. The pistons 34 are slidably mounted in hydraulic cylinders 35 which are fitted and secured in the rear extremities of the legs of the frame 12 in any desired manner.

A hydraulic conduit 36 communicates between the rearward extremities of the two cylinders 35. The conduit 36 preferably extends into the hollow frame 12 forwardly of each cylinder 35, and thence around the frame through the filler block 16 to the opposite side thereof. The flow through the conduit 36 is controlled by means of control valves 37 from which flexible control wires 38 extend through flexible tubes 39 to a control handle 40, which may be mounted at any position convenient to the operator of the tractor 10.

The forward extremity of the frame 12 is conventionally supported, such as upon a block and tackle arrangement 41 extending from a suitable support 42 on the tractor 10 to sheave wheels 43

mounted on a mounting sleeve 47 surrounding the apex of the frame 36.

In road grading operations, it is desirable to have the dozer blade incline downwardly toward the leading extremity of the blade so as to convey the dirt outwardly and downwardly to one side of the tractor. This improved dozer blade attachment automatically accomplishes this result, for when the left-hand extremity of the blade is moved rearwardly, both sleeves 29 will be rotated toward the right. This causes the left-hand ball 28 to move upwardly, and the right-hand ball to move downwardly, carrying the frames 23 with them. Since these frames cannot vertically pivot on the blade 18, they will carry the right-hand extremity of the blade downwardly and lift the left-hand extremity thereof, as shown in Fig. 9. When the right-hand extremity of the blade is forced rearwardly, the reverse will be true, that is, the sleeves will rotate to the left so as to tilt the blade downwardly to the left, as shown in Fig. 10. When the blade is at right angles to the axis of the tracts the cross heads will be at an intermediate position in the slots so that the blade will be horizontal, as shown in Fig. 8.

When the valves 27 are closed, the hydraulic fluid in the cylinders 35 and the conduit 36 rigidly holds the blade at any preset angle. The angle is varied by opening the valves 27 and forcing either extremity of the blade against a bank or abutment by driving the tractor forwardly. This transfers fluid between the cylinders 35 until the desired angle is attained. The valves 37 are then closed and this angle will be rigidly maintained.

The angle of the blade could be changed hydraulically by placing a pressure pump in circuit with the conduit 36 is desired.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A dozer blade attachment for a tractor comprising: a horizontal, U-shaped, tubular frame forming two legs adapted to extend on opposite sides of said tractor and a forward portion adapted to extend across the front of a tractor; means on the rearward extremities of the legs of said frame for hingedly mounting the latter to a tractor; means for supporting the forward portion of said frame from said tractor; a dozer blade extending transversally of and forwardly of said frame; a universal joint substantially at the middle of said dozer blade mounting the latter to the middle of the forward portion of said frame; sliding sleeves surrounding the legs of said frame; a brace member extending from each sleeve to the adjacent extremity of said blade; a hydraulic cylinder mounted in each leg of said frame adjacent its rearward extremity; a piston in each cylinder; means connecting each piston with one of said sliding sleeves; means for supplying hydraulic fluid to said cylinders; and



means for simultaneously rotating said sleeves as they reciprocate so as to automatically tilt said blade at a vertical angle when its horizontal angle is varied.

2. A dozer blade attachment for a tractor comprising: a horizontal, U-shaped, tubular frame forming two legs adapted to extend on opposite sides of said tractor and a forward portion adapted to extend across the front of a tractor; means on the rearward extremities of the legs of said frame for hingedly mounting the latter to a tractor; means for supporting the forward portion of said frame from said tractor; a dozer blade extending transversally of and forwardly of said frame; a universal joint substantially at the middle of said dozer blade mounting the latter to the middle of the forward portion of said frame; sliding sleeves surrounding the legs of said frame; a brace member extending from each sleeve to the adjacent extremity of said blade; a hydraulic cylinder mounted in each leg of said frame adjacent its rearward extremity; a piston in each cylinder; means connecting each piston with one of said sliding sleeves; means for supplying hydraulic fluid to said cylinders; hinge means mounting said brace members to said blade, the axes of said hinge means being such that said blade may swing in the planes of said brace members but is prevented from swinging transversally thereof; and means for rotating said sleeves simultaneously with the reciprocation thereof.

3. A dozer blade attachment for a tractor comprising: a horizontal, U-shaped, tubular frame forming two legs adapted to extend on opposite sides of said tractor and a forward portion adapted to extend across the front of a tractor; means on the rearward extremities of the legs of said frame for hingedly mounting the latter to a tractor; means for supporting the forward portion of said frame from said tractor; a dozer blade extending transversally of and forwardly of said frame; a universal joint substantially at the middle of said dozer blade mounting the latter to the middle of the forward portion of said frame; sliding sleeves surrounding the legs of said frame; a brace member extending from each sleeve to the adjacent extremity of said blade; cross-heads extending diametrically across said sleeves and through spirally inclined slots in the legs of said frame so that as said sleeves move longitudinally, they will be simultaneously rotated; a piston rod extending from each cross-head; a piston on each piston rod; hydraulic cylinders in the rearward extremities of the legs of said frame slidably receiving said pistons; a hydraulic conduit extending from one cylinder to the other to transfer hydraulic fluid therebetween; and a valve controlling the flow of fluid through said conduit.

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