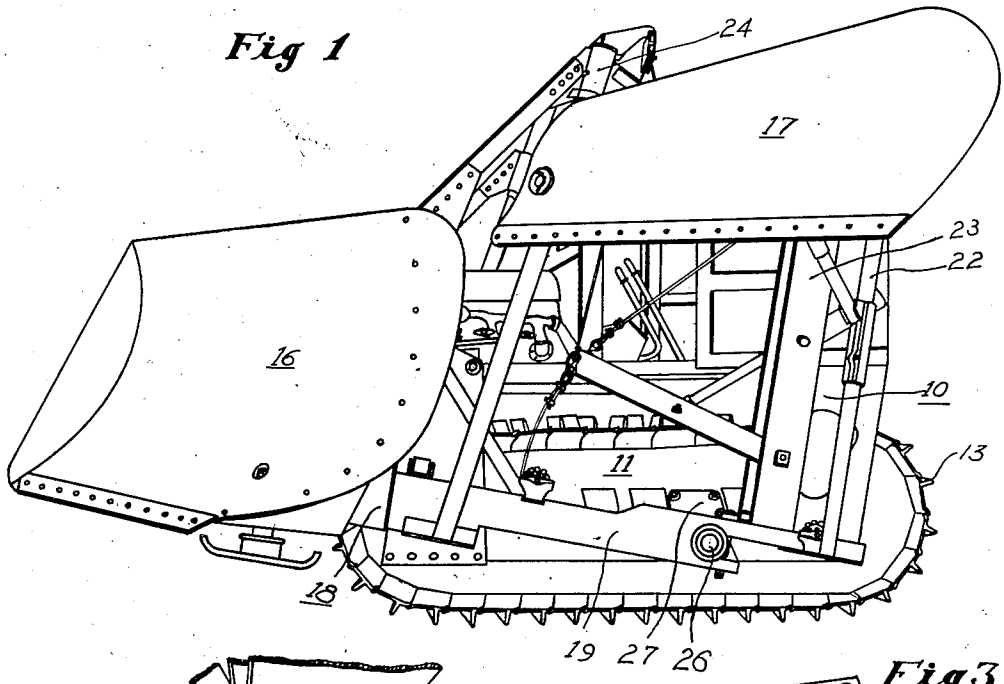
May 23, 1939. E. W. AUSTIN 2,159,348

EARTH MOVING DEVICE

Filed Nov. 23, 1936 2 Sheets-Sheet 1

Fig 1



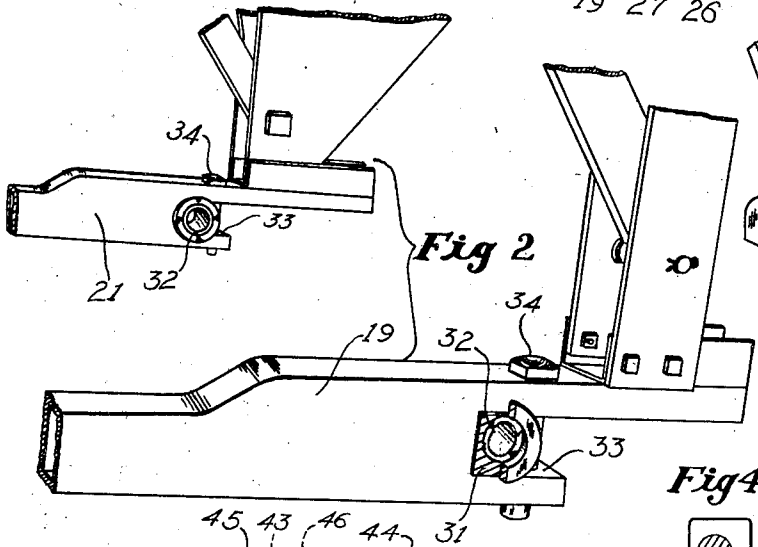


Fig 2

Fig 3

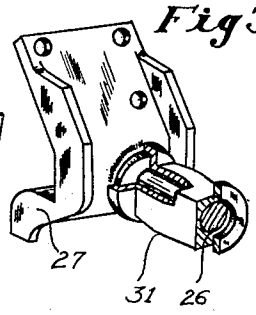


Fig4 Fig5 Fig6

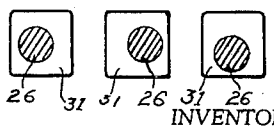


Fig 7

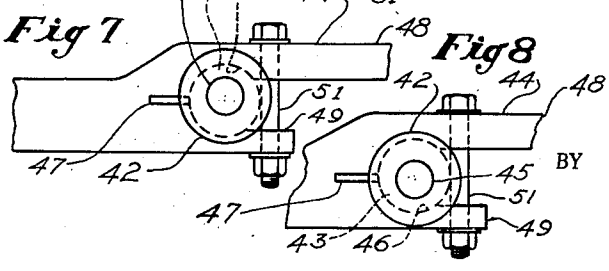


Fig8

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EARTH MOVING DEVICE

Filed Nov. 23, 1936 2 Sheets-Sheet 2

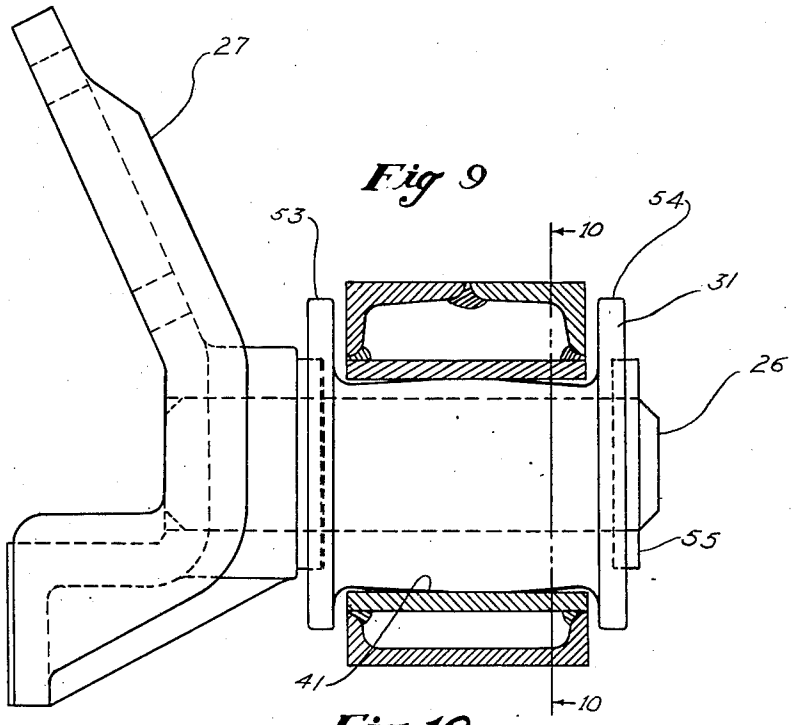


Fig 9

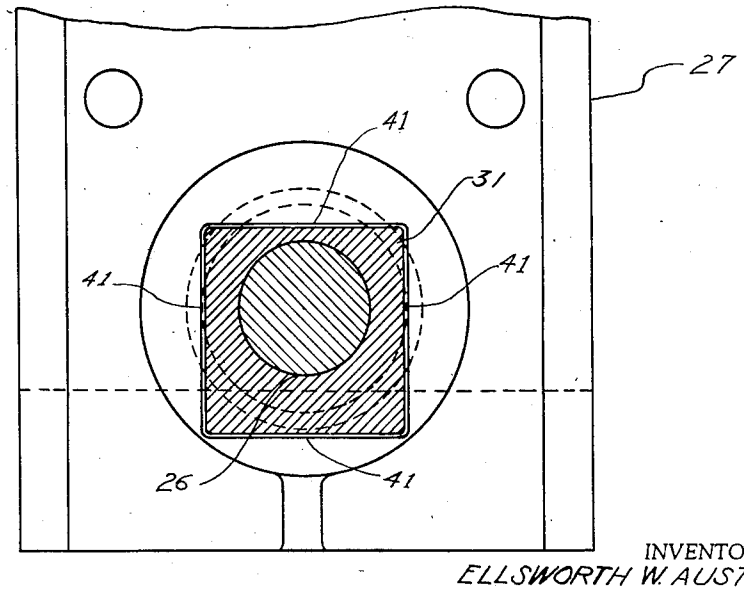


Fig 10

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UNITED STATES PATENT OFFICE

2,159,348

EARTH MOVING DEVICE

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Application November 23, 1936, Serial No. 112,199

7 Claims. (Cl. 37—44)

This invention relates to earth moving devices and has particular relation to means for attaching an earth moving blade to a tractor or other prime mover.

In devices of this general character it is customary to support an earth moving blade of the bulldozer or scraper type in front of a tractor by means of push arms or A frames pivotally engaged to the side frames or running gears of the roller frames of the tractor.

It is desirable under different operating conditions of digging, as for instance digging in different materials such as clay, sand, gravel and the like or in the removal of snow and frozen material for highway use, that the angle of incidence of the blade be varied with respect to the ground plane. It is also desirable that the position of the blade and push arms with reference to the tractor be changed to meet other conditions, as for instance when removable tractor grousers are placed on the track for ice service, which raises the tractor some several inches from the normal position it occupied without these grousers.

Various expedients have been proposed for this purpose, such as using elongated slots in bolt holes on the equipment mountings where these bolt to the tractor, but these expedients are crude, unreliable and relatively complicated in structure. I have observed these difficulties of the prior art and have accordingly devised means for securing the results above noted, which means are quite simple and effective and easily manufactured and maintained to produce changing or angling of the push arms with respect to the tractor or other prime mover.

One of the general objects of my invention is to provide a new and improved means for mounting an earth moving blade on a tractor or prime mover.

An important object of my invention is to provide new and improved means for angling the push arms of an earth moving device with respect to the tractor.

A feature of my invention is its simplicity of operation particularly interchanging from one position of the push arms to another.

Another important object of my invention is to provide in an angling means, means for positioning one of the push arms in advance of the other.

A further object of my invention is that tilting of the blade may be secured with one end higher than the other by positioning one of the push arms in a raised position and the other in a lowered position.

Another feature of my invention is that the change from one position to another may be accomplished readily and quickly by holding the ends of the push arms in a desired position above the ground surface, arranging the connecting means in a desired position, and driving the tractor into the pivotal connections of the push arms.

Other and further features and objects of my invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specification, wherein is disclosed several exemplary embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention. The device may be used or adapted for use for other purposes.

In said drawings:

Figure 1 is a view in perspective of a tractor to which a snow plow has been pivotally engaged in accordance with one embodiment of my invention.

Figure 2 is a fragmentary view in perspective of the push arms and pivot connection bearings of these push arms.

Figure 3 is a view in perspective illustrating the means for mounting the push arms of an earth moving device on a tractor. Portions of the structure have been broken away to show the remaining parts in greater detail.

Figures 4, 5 and 6 are diagrammatic views illustrating the position of the eccentric bearing in various positionings of the side frame or push arms.

Figures 7 and 8 illustrate a modified form of my invention, in which a cylindrical bearing is employed.

Figure 9 is a view partly in elevation and partly in section of a mounting means shown in Figures 1 to 7 inclusive, and

Figure 10 is a view partly in elevation and partly in section taken along the line 10—10 of Figure 9.

Referring now to the drawings, and more particularly to Figure 1 thereof, the earth moving device there shown comprises in general a tractor or other prime mover 10, having roller frames 11 on each side thereof pivotally engaged to the tractor chassis in accordance with the usual practice. Endless tracks 13 are rotatably mounted on these roller frames, also in accordance with the usual practice.

Devices constructed according to my invention may be employed in connection with any of the usual types of earth moving blades, such as snow plow blades, scraper blades, bulldozers, trail-builders or in fact any machinery which is mounted for hinged pivotal movement on a tractor. In the present instance, however, I have illustrated means by which a snow plow 16 may be pivotally mounted on the tractor.

The plow 16 here shown is of the V-type and wing plows 17 are employed one on each side of the tractor. The V-plow is mounted at the front end of a supporting frame or A-frame 18 which includes side arms 19 and 21. These side arms or push arms 19 and 21 are provided with various uprights 22, 23 and 24 which furnish means for mounting the wing blades 17 and wing blade actuating mechanism and act as a frame for supporting the V-plow. The wing plow and wing plow actuating mechanism constitutes no part of my invention and need not be further described.

The side arms 19 and 21 are pivotally engaged upon stub shafts 26 which are a part of stub shaft brackets 27. One of these brackets is mounted on each of the running gears or roller frames 11 and of course in opposed relation.

I have found it extremely desirable, under different operating conditions of earth moving devices of this character, that the point of engagement of the arms 19 and 21 be movable or adjustable to afford limited angling and tilting of these arms. I have found it desirable not only that the rear end of the side arms be adjustable up and down to vary the angle of reaction between the blade and the pivot points afforded by the stub shafts but also that it is desirable to advance one of the push arms ahead of the other to accommodate inaccuracies of alignment of the parts or to compensate for side thrust or the like.

In order to secure angling and tilting or positioning of the push arms in different positions I have devised an offset or eccentric connection between the tractor and the push arms. In practicing my invention I have found that the simplest and most efficient way to secure angling or tilting of the blade is to employ an eccentric or off-center bearing between the stub shafts and the push arms.

In the embodiment of the invention shown in Figures 1 to 6, 9 and 10, I preferably employ a square bushing 31 having the shaft opening 32 for receiving the stub shafts 26 drilled off-center or eccentrically with reference to the center of the bushing. The bushing 31 is received in rectangular recesses 33 at the rear of the push arms 19 and 21 and when the bushing is in place it may be held in its proper position by means of pins 34. Now it is apparent that the off-center bushing 31 may be received in the recess 33 in four different positions. In the "low" position illustrated in Figure 2 the push arms 19 and 21 will be at their lowest point, while in the position of the bushing illustrated diagrammatically in Figure 6 they will be in the same relative positions front and rear but will be raised by twice the eccentricity of the opening 32 in bushing 31 to a "high" position to thus vary the angle of the push arms with reference to the ground plane.

In two other positions of the bushing 31, as illustrated in Figures 4 and 5, the push arms will be in the same horizontal plane, which is halfway between the "high" and "low" positions but when the bushing is in the position indicated in Figure 4, the push arm will be located at a position to the rear of its normal position while with the bushing in the position shown in Figure 5, the push arm that rests on this bearing will be positioned ahead of its normal position. It is apparent then that with this square eccentric bushing, the push arm which receives this bushing may be located in any one of four positions: that is high, or low, front or rear positions.

The bushing on the opposite side of the machine may be changed in the same way and need not necessarily be positioned in the same position as the opposite bushing. For instance, one of the bushings might be high and the other low to cause tilting of the blade 16 to one side of the other, or one might be in a front position and the other in the back position to cause the blade 16 to assume an angling position with one side further advanced than the other, or one bushing might be in the front position and the one on the opposite side in the high position to cause a combination of angling and tilting.

It is apparent that many different positionings of the earth moving blade 16 with regard to the tractor 10 may be secured, limited only by the eccentricity of the bushing or bearing 31, although each bushing may occupy only one of four positions. It is apparent that many combinations may be secured.

In changing from one position to the other it is only necessary to place jacks under the side frames 19 and 21, drive the tractor back so as to remove the bushing 31 from the receptacle 33, raise or lower the side arms 19 and 21, to the desired new position, rotate the bushings 31 to a position corresponding to the new position of the side arms and drive the tractor back into the A-frame until the bushings are engaged in the receptacles 33 and then pin the bushings in place by means of pins 34.

To facilitate angling and tilting of the earth moving blade 16 I preferably form the bushing 31 with convex faces as indicated at 41 in Figures 9 and 10 to thereby permit the receptacles 33 of arms 19 and 21 to rock to a limited degree on the convex faces 41. The bushing has disclike ends 53 and 54 in order to retain the side arms on the bushing. The bushings are preferably held on the stub shafts by means of washers 55 welded to the shaft. The side frame members may be of any suitable box sections built up from angles and plates as indicated in the drawings.

In another modification of my invention illustrated in Figures 7 and 8 I preferably employ cylindrical bushings 42 having barrel portions 43 on which the side frame members 44 are engaged positioned off-center or eccentrically with respect to the openings 45 which are adapted to receive the stub shafts. These bushings 42 may be rotated through 360° to provide an infinite number of positions of the push arms with respect to the roller frames. It is apparent that this cylindrical bushing has the advantage over the device shown in Figures 1 to 6 of greatly increasing the number of available positions of the push arms with respect to the stub shafts.

In the modification of the invention here shown I prefer to utilize a semi-cylindrical recess 46 in the push arms and to split the push arms as illustrated at 47. The split portions 48 and 49 of the push arms may then be drawn together with the bolts 51 to lock the barrel-like bushings in any desired position.

It is apparent that modifications of my invention may be made by those skilled in the art and that such modification may be made without de-

parting from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In an earth moving device, a tractor, an earth moving blade, a side arm for the blade having a receptacle therein, and means for pivotally connecting the blade to the tractor including an eccentric bushing adapted to be received in the receptacle in the side arm, in a plurality of positions, but employing the same receptacle in all positions whereby the side arm may be located in any of several positions.

2. In an earth moving device, a tractor, an earth moving blade, and means for pivotally connecting the earth moving blade to the tractor including stub shafts on the running gear of the tractor, side arms pivotally connected on the stub shafts and adapted to support the earth moving blade, and means for angling and tilting the side arms including eccentric bushings furnishing eccentric mounting of the side arms on the stub shafts.

3. In an earth moving device, a tractor, an earth moving blade, members for connecting the earth moving blade with the tractor including an arm having a receptacle therein and an eccentric bushing adapted to be received in a plurality of positions in the receptacle and rotatably mounted on the tractor to provide means for angling and tilting the blade.

4. In an earth moving device, a tractor, an earth moving blade, a side arm connected to the earth moving blade, and an eccentric bushing in the side arm adapted to be received therein in a plurality of positions, and means for rotatably mounting the eccentric bushing on the tractor.

5. In an earth moving device including a tractor, a scraper blade, side arms on which the scraper blade is mounted for pivotal connection with the tractor, the pivotal connections including eccentric bushings and means for receiving the eccentric bushings in a plurality of positions in the side arm, the pivotal connections being so constructed that the bushings may be placed in the same relation to one another to advance and retract the blade and raise and lower the line of thrust of the side arms as desired.

6. In an earth moving device, a tractor, an earth moving blade, members for connecting the earth moving blade with the tractor including an arm having a receptacle therein and an eccentric bushing and the bushing having a convex face adapted to be received in a plurality of positions in the receptacle and rotatably mounted on the tractor to provide means for angling and tilting the blade.

7. In an earth moving device, a tractor, an earth moving blade, a side arm connected to the earth moving blade and having a receptacle therein, and an eccentric bushing adapted to be received in the receptacle and rotatably mounted on the tractor, the eccentric bushing and the receptacle forming a connection between the arm and the tractor with one of the said last named members being curved at the contacting face to more readily permit tilting of the arm.

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