May 21, 1935. W. T. STEPHENS 2,001,803

EARTH HANDLING DEVICE

Filed April 12, 1933

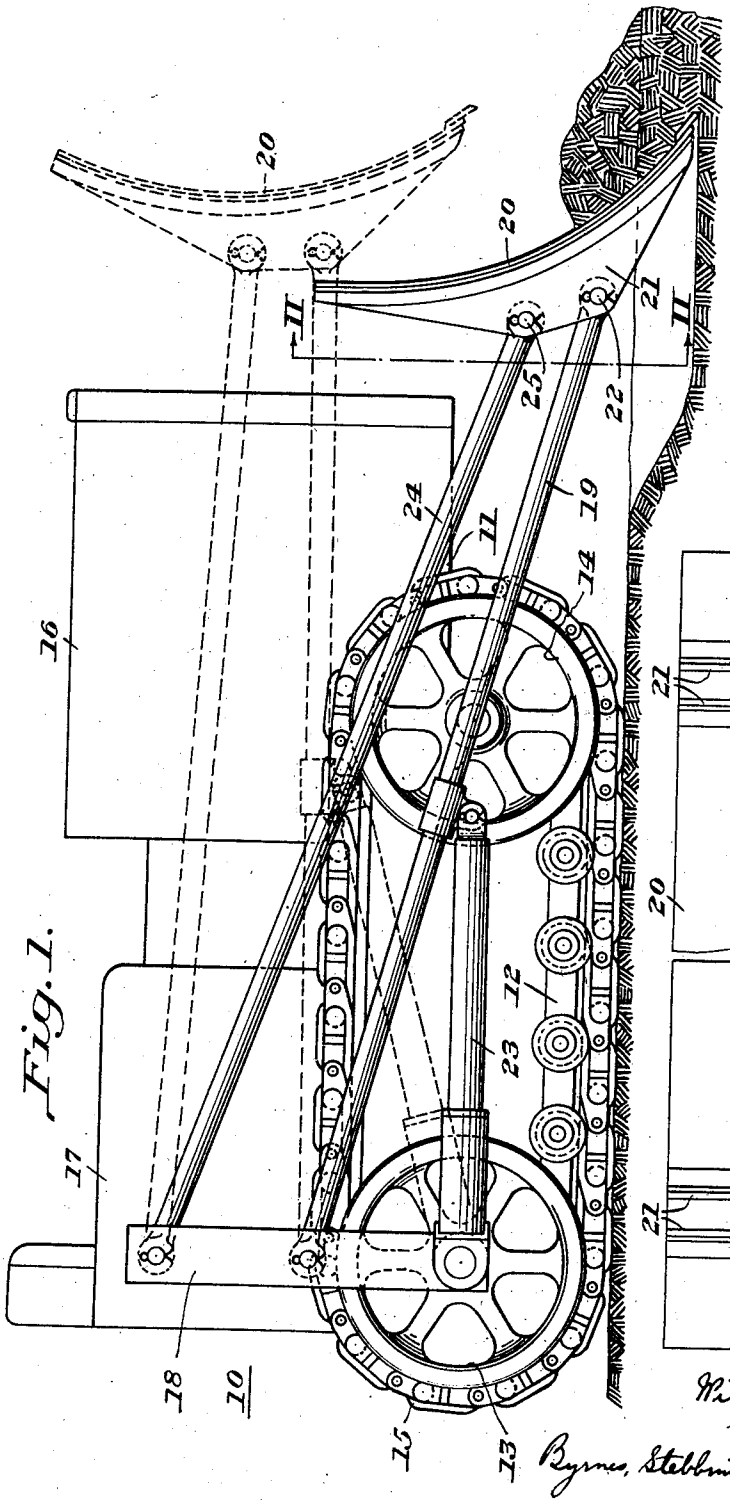


Fig. 1.

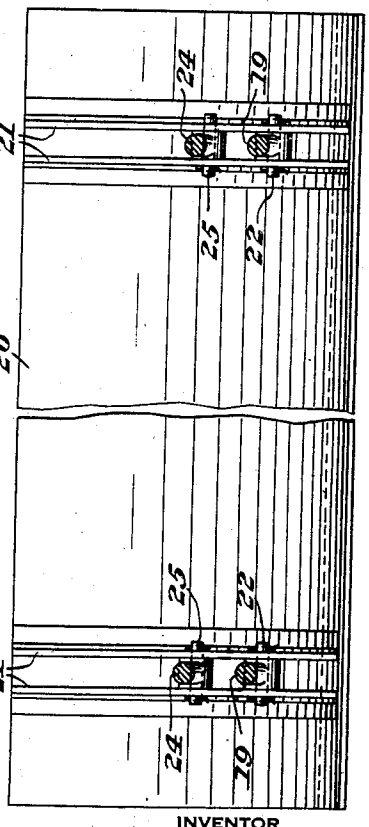


Fig. 2.

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Patented May 21, 1935

2,001,803

UNITED STATES PATENT OFFICE

2,001,803

EARTH HANDLING DEVICE

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Application April 12, 1933, Serial No. 665,721

6 Claims. (Cl. 37—144)

My invention relates to a device for moving earth and, in particular, to the mounting of the earth-engaging blade of a device generally known as a "bulldozer."

The present type of bulldozer comprises a tractor having an earth-engaging blade supported at the front thereof on push beams carried on the frames which guide and drive the endless tread belts on which the tractor rests. The push beams are generally pivoted to the track frame so that the level of the blade may be shifted for different classes of work.

In operating bulldozers of the present type, it has been found that when the blade is lowered to a level adjacent the ground line, it is disposed at an angle such that it does not dig in to the ground but tends to chatter along the surface thereof. This condition has been found to be serious enough to warrant some manufacturers providing a double acting hoist for the blade to insure that it digs into the ground to the proper extent.

Bulldozers are generally called upon to meet two extreme conditions. In some cases, they are employed to dispose piles of relatively soft earth in the desired location. For this use, the blade is generally lifted. They are also employed for effecting an actual digging operation and it is for this purpose that the blade must be lowered. Heretofore, the blade has been fixed to the pusher beams and the swinging of the latter to lower the blade has imparted a slightly forward tilt to the blade so that the latter is not efficient as a digging tool.

It is the purpose of my invention to provide means for automatically varying the angle of engagement of a bulldozer blade with the earth to be moved so that when the apparatus is employed for digging at or below the ground level, the blade will assume an efficient digging angle. In accordance with my invention, I mount the blade pivotally upon the pusher beams and provide a link connecting the blade to a fixed pivot so that on swinging of the pusher beams, the desired angular movement of the blade will result. The blade is thus properly positioned at a fairly large angle to the horizontal for moving piles of loose earth, for which purpose the blade is raised substantially above the ground level. At the same time, the blade is automatically positioned at a smaller angle to the horizontal when lowered to ground level or below for actual digging.

For a complete understanding of the invention, reference is made to the accompanying drawing illustrating a preferred embodiment. In the drawing:

Figure 1 is a side elevation of a tractor shown diagrammatically having a bulldozer blade incorporating my invention attached thereto; and

Figure 2 is a sectional view along the line II—II of Figure 1.

Referring in detail to the drawing, a tractor 10 comprises a chassis 11 mounted on a track frame 12. Driving and guiding sprockets 13 and 14 are journaled on the track frame and tread belts 15 are turned around the sprockets and the frame. In accordance with the usual practice, a driving motor 16 for the tractor is located adjacent the forward end thereof while the operator's seat and control mechanism are located adjacent the rear in the general location indicated by the numeral 17. The details of the motor, drive, and control mechanism have not been illustrated since they are not material to the present invention.

Uprights 18 are secured to the track frame on opposite sides of the tractor and adjacent the rear end thereof. These uprights may be secured to the track frame in any suitable manner, depending upon the details of construction of the particular tractor. Push beams 19 are pivoted to the uprights 18. A bulldozer blade 20 has angle brackets 21 secured to the rear face thereof adjacent the ends thereof. The pusher beams 19 are secured to the brackets 21 by pivot pins 22. Hydraulic jacks 23 are pivotally connected to the lower end of the uprights 18 and to a point intermediate the length of the pusher beams 19. By controlling the flow of fluid to or from the jacks, it is easily possible to tilt the beams 19 to an angle such that the blade 20 has the desired elevation.

Links 24 are pivoted to the brackets 21 by pins 25 spaced slightly from the pins 22. The other ends of the links 24 are also pivoted to the upper ends of the uprights 18. The length of the links 24 is chosen so that the blade 20 will assume the proper digging angle when lowered by the jacks 23 to the position shown in Figure 1 in solid lines. It will be obvious that as the blade is raised by extending the jacks 23, the links 24 will be effective to swing the blade to a position in which it makes a larger angle with the horizontal. In other words, as the blade is raised to the elevation necessary for working on fairly loose piled earth, as shown in dotted lines in Figure 1, the blade is automatically adjusted to the proper angle for that class of work. At the same time, when the blade is lowered to a digging ele-

vation, it will be tilted backwards so that the leading edge engages the earth at a suitable digging angle.

My invention thus provides a bulldozer blade which is disposed at an angle such that it tends to sink into the ground, when lowered to the proper level, and does not chatter along the ground without digging in as do blades having a fixed mounting upon the forward end of pusher beams pivoted to the track frame. The invention has a further advantage due to the rear mounting of the push beams, in that the force exerted by the tractor does not tend to tilt the latter on its tread belts. The reaction of the blade is transmitted to the rear of the track frame and there is no tendency toward tipping of the tractor.

Although I have illustrated and described but a single preferred embodiment of the invention, it will be apparent that numerous changes in the construction described may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. The combination with a tractor having a chassis with a track frame and tread belts thereon, of pusher beams pivoted to said frame, a bulldozer blade pivotally supported in front of said tractor on said beams, a link pivoted to the blade and to a fixed pivot effective to vary the angular position of the blade relative to the horizontal on angular movement of said beams, and a hydraulic jack pivoted to the chassis and to one of said beams.

2. In a bulldozer, the combination with a tractor having a chassis with a track frame and tread belts thereon, of push beams pivoted to said frame, a blade pivotally supported on said beams, means effective to vary the angular position of the blade on the beams relative to the horizontal on angular movement of the latter, and hydraulic jacks pivoted to the beams and to the chassis.

3. In a bulldozer, a tractor frame, uprights fixed thereon, push beams pivoted to the uprights, an earth-engaging blade pivoted on the beams, and links pivoted to the uprights and the blade at points spaced from the connections between the beams and uprights and the beams and blade, said links being effective to change the angle of the blade relative to the horizontal on angular movement of the beams.

4. In a bulldozer, fixed, spaced uprights, push beams pivoted thereon, guide links pivoted to the uprights in spaced relation to the beams, and an earth-engaging blade, said blade having spaced pivotal connections with said beams and links, said connections and links being so constructed and arranged as to cause the angle of the blade relative to the horizontal to change as said beams move angularly.

5. In a bulldozer, a pair of fixed uprights, a pair of thrust members pivoted to each upright at spaced points and extending forwardly, a material-engaging blade having spaced pivotal connections with each member of said pairs, and a hydraulic jack pivoted to one of said uprights and to one of the members pivoted to said one of said uprights.

6. A bulldozer comprising an earth-engaging blade, push beams pivotally supporting said blade, said beams being pivotally mounted on a traction vehicle, means for tilting the beams to various angles relative to the horizontal, and a link pivotally connected to said blade and to a relatively fixed point on said vehicle, whereby tilting movement of said beams causes a change in the angular position of said blade relative to the horizontal.

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