J. E. FUNK.

GRADE MAINTAINING DEVICE FOR DITCHING MACHINES.

APPLICATION FILED FEB. 25, 1920.

1,386,103. Patented Aug. 2, 1921.

Fig. 1

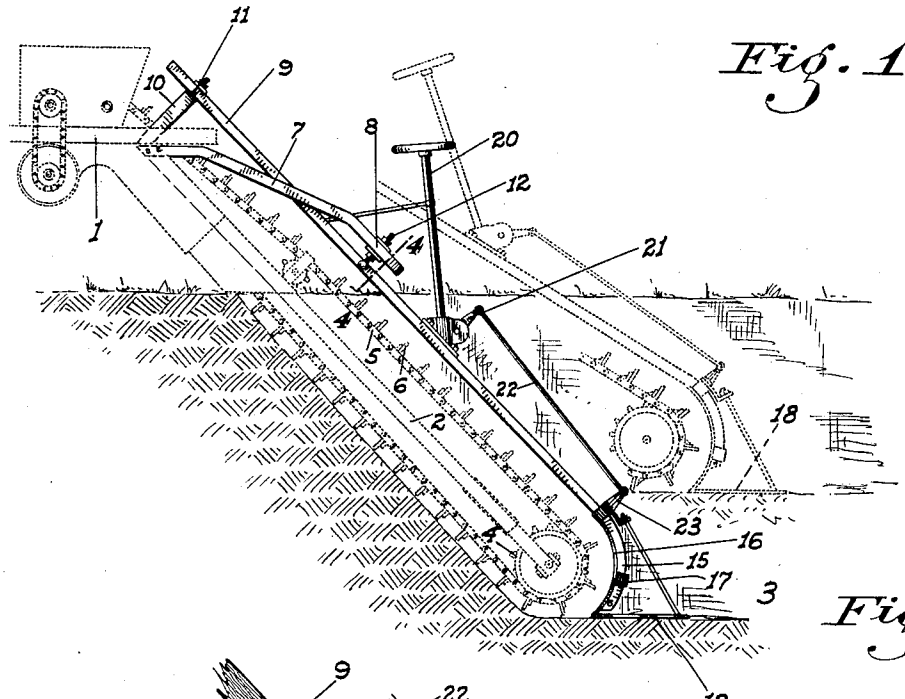


Fig. 3

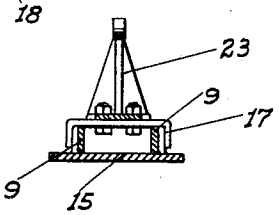


Fig. 4

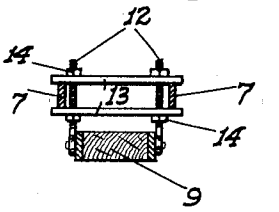


Fig. 2

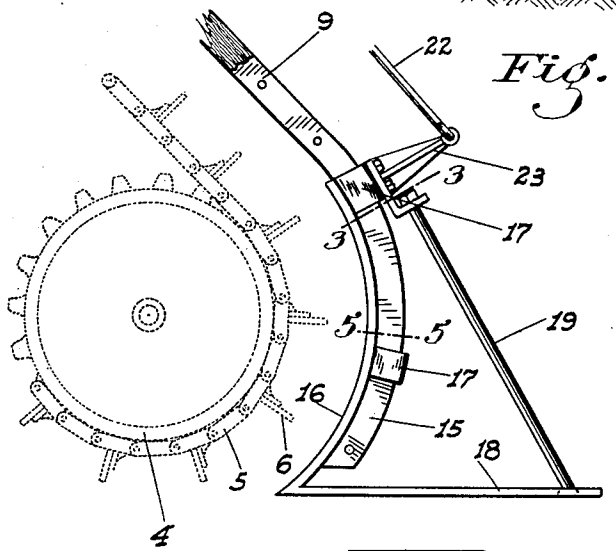
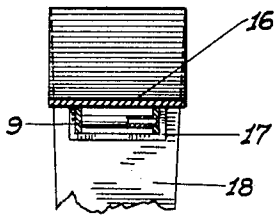


Fig. 5



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JOHN E. FUNK, OF STOCKTON, CALIFORNIA.

GRADE-MAINTAINING DEVICE FOR DITCHING-MACHINES.

1,386,103. Specification of Letters Patent. Patented Aug. 2, 1921.

Application filed February 25, 1920. Serial No. 361,200.

To all whom it may concern:

Be it known that I, JOHN E. FUNK, a citizen of the United States, residing at Stockton, in the county of San Joaquin, State of California, have invented certain new and useful Improvements in Grade-Maintaining Devices for Ditching-Machines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in ditching machines of the type having a digger boom depending from the rear and adapted to depend into the ditch, and having an endless digging member operatively mounted thereon.

The principal object of the invention is to provide a means for insuring that the digging member while resting in the ditch of its own weight, may be kept at any desired depth and thus be prevented from digging too deep.

Another object is to so construct this means that it may be adjusted quickly and easily by a person riding on the machine or walking alongside the same, so that the digger member may be readily adjusted to dig the ditch to a reasonably accurate grade, regardless of the contour and roughness of the ground, over which the machine is moving.

Also, by means of this device alone, the digger boom may be started at the surface and be gradually lowered so that the ditch may be dug at a gradual slope, and vice versa.

I have also provided means for maintaining the device at a given distance from the digging member at all times, regardless of the adjustment of the latter.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a side outline of the digger boom of a ditch digging machine cutting a ditch, and showing my improved grade maintaining device installed thereon.

Fig 2 is an enlarged elevation of the shoe of the device.

Fig. 3 is a cross section taken on a line 3—3 of Fig. 2.

Fig. 4 is a similar view on a line 4—4 of Fig. 1.

Fig. 5 is another section on a line 5—5 of Fig. 2.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes the frame of the machine, to which is pivoted a digger boom 2 adapted to extend into a ditch 3 being dug.

At the lower end of the boom and mounted thereon is a sprocket wheel 4, around which passes an endless chain 5 having a plurality of transverse digger plates 6 thereon, the wheel 4 being adapted for adjustment lengthwise of the boom.

To the boom 2 on each side thereof are fixed extension bars 7, which overhang the boom somewhat, and terminate in portions 8 parallel to the boom above the same, and are there connected together.

Between these extensions and passing thereunder at their outer termination, is a rigid member 9, narrower than the digger plates 6, which rests on a bracket 10 projecting up from the members 7 at the forward end thereof, and being adjustably clamped thereto for allowing relative longitudinal movement by means of bolts 11.

Adjacent the portions 8 of the members 7, the member 9 is provided with bolts 12 on each side projecting up between the members 7 through plates 13 placed thereacross above and below, the bolts having nuts 14 bearing against the outer faces of the plates.

By this means, the alinement of the member 9 relative to the boom 2 may be adjusted, these members being normally substantially parallel, and suitably spaced from the outer ends of the digging or scraping plates 6, while at the same time it may be adjusted longitudinally.

The member 9 extends straight to the lower end of the boom, and then terminates in a curved portion 15 concentric with the sprocket wheel 4, its lower end being spaced but very little from the ground, comparatively, when the boom 2 is lowered to its deepest digging position.

On the inner face of the curved portion 15, is a shoe 16, slidable thereagainst, and

maintained in position by means of guide straps 17 fixed to the shoe and passing over the member 15. This shoe is the same width as the scraper plates 6, and below the end of the member 15 is bent to form a flat portion 18 extending rearwardly and so angled relative to the boom 2 that it may always lie flat on the ground in the bottom of the ditch regardless of the angle of the boom with the ground.

A brace 19 extends from the upper guide strap 17 to the member 18 at a point near the rear thereof to prevent the latter becoming bent out of true.

In order to move the shoe member relative to the member 9, I fix a hand-actuated wheel 20 to the latter, and which projects above the ground, to which wheel is operatively connected an arm 21, adapted for arcuate movement in the longitudinal plane of the member 9. For this purpose an ordinary automobile steering wheel and arm may be used.

A connecting rod 22 extends from this arm to an arm 23 projecting upwardly from the upper guide on the shoe, so that by a movement of the arm in either direction, the shoe is accordingly moved in arcual relation with the sprocket wheel.

In the event that the chain 5 is adjusted which is done by moving the sprocket wheel 4 lengthwise of the boom, the concentric alinement of the portion 15 of the member 9 may be maintained by longitudinal adjustment of the latter.

In operation, presuming the digger boom to be already positioned in and digging a ditch of a predetermined depth, a person walks alongside the machine, keeping a watch on whatever sighting device may be used in connection with the digger boom, and noting the tilting of the machine, as it encounters elevations or depressions in the ground.

In such cases, all he has to do is to turn the wheel 20 one way or the other to raise or lower the shoe 16, and so allowing the boom to be lowered or raised, depending on whether the ditch digger is temporarily elevated or depressed.

A very slight movement of the wheel is sufficient to counteract any ordinary unevenness of movement of the machine itself.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfils the object of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:—

1. In combination with the digger boom of a ditch digging machine having a sprocket wheel on its lower end adjustable lengthwise of the boom and an endless digging device passing thereover, a curved shoe mounted to the boom concentric with the sprocket wheel behind the same and having a rearward extension adapted to bear on the bottom of the ditch at all times, means for altering the vertical level of the shoe while maintaining the concentric alinement thereof with the sprocket wheel, and independent means for maintaining such concentric alinement irrespective of the adjusted position of the sprocket wheel relative to the boom.

2. In combination with the digger boom of a ditch digging machine having a sprocket wheel on its lower end adjustable lengthwise of the boom and an endless digging device passing thereover, a rigid member mounted to the boom and extending lengthwise thereof, means for adjusting the rigid member lengthwise thereof and in a fixed plane parallel thereto, and a shoe member concentric with the sprocket wheel on the lower end of said rigid member having an extension adapted to bear on the bottom of the ditch behind the sprocket wheel and arranged for arcuate movement relative to the sprocket wheel.

3. In combination with the digger boom of a ditch digging machine having a sprocket wheel on its lower end adjustable lengthwise of the boom and an endless digging device passing thereover, a rigid member mounted to the boom and extending lengthwise thereof, means for adjusting the rigid member lengthwise thereof and in a fixed plane parallel thereto, a shoe member concentric with the sprocket wheel slidably mounted on the rigid member for arcuate movement relative to the sprocket wheel, and independent means on the rigid member for so moving the shoe during the operation of the machine.

4. In a ditching machine having a digger boom, a sprocket wheel on the lower end thereof and an endless digging device passing thereover, a rigid beam mounted to the boom and extending lengthwise thereof, said beam terminating in an extension curved concentric with the sprocket, a shoe member having a curved face bearing on the face of the extension nearest the sprocket, guide straps on said shoe engaging said extension, and hand actuated means on the beam and operatively connected to the shoe to move the same peripherally of the extension.

5. In a ditching machine having a digger boom, a sprocket wheel on the lower end thereof and an endless digging device passing thereover, a rigid beam mounted to the

boom and extending lengthwise thereof, said beam terminating in an extension curved concentric with the sprocket, a shoe member having a curved face bearing on the face of the extension nearest the sprocket, guide straps on said shoe engaging said extension, a hand wheel mounted on the beam and positioned to be reached from the ground alongside the machine, and means operatively connecting the wheel with the shoe whereby with the rotation of the former the shoe is moved peripherally of the extension.

In testimony whereof I affix my signature.

JOHN E. FUNK.