E. LITTLE.

DITCHING AND GRADING MACHINE.

APPLICATION FILED SEPT. 26, 1917.

1,255,188.

Patented Feb. 5, 1918

3 SHEETS—SHEET 1.

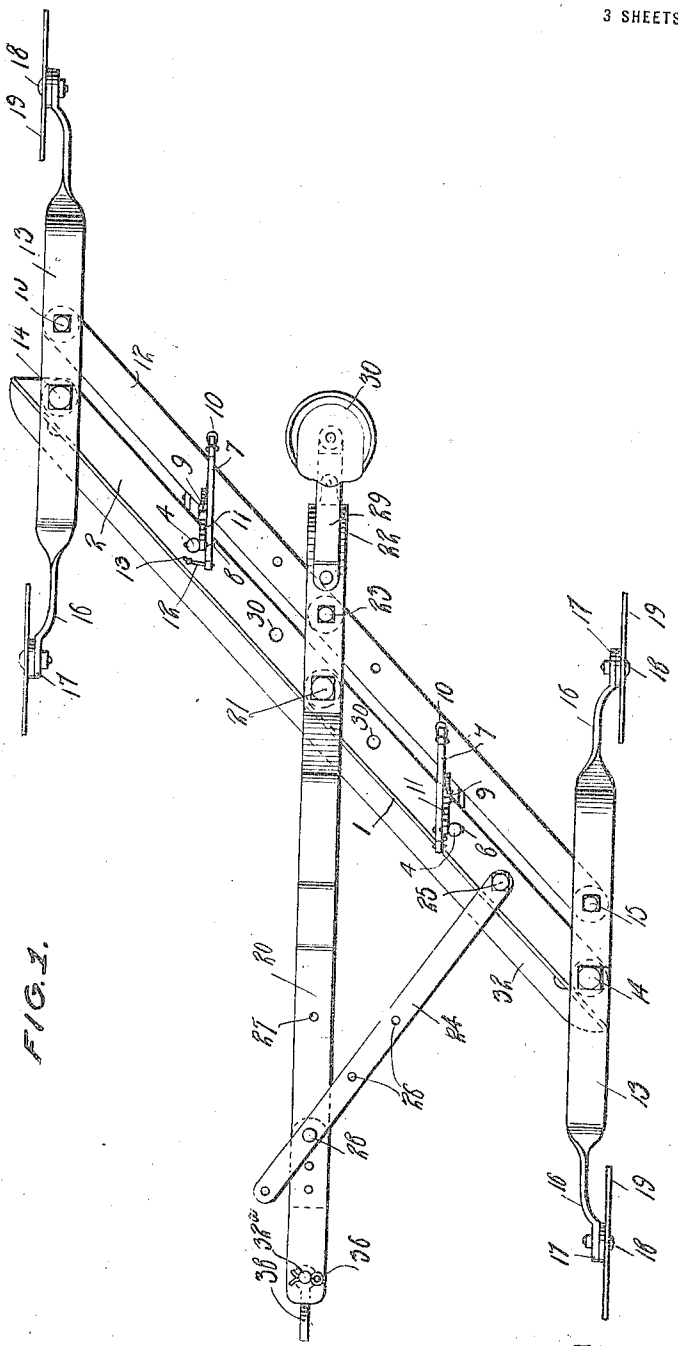


FIG. 1.

WITNESSES

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3 SHEETS—SHEET 2.

FIG. 2.

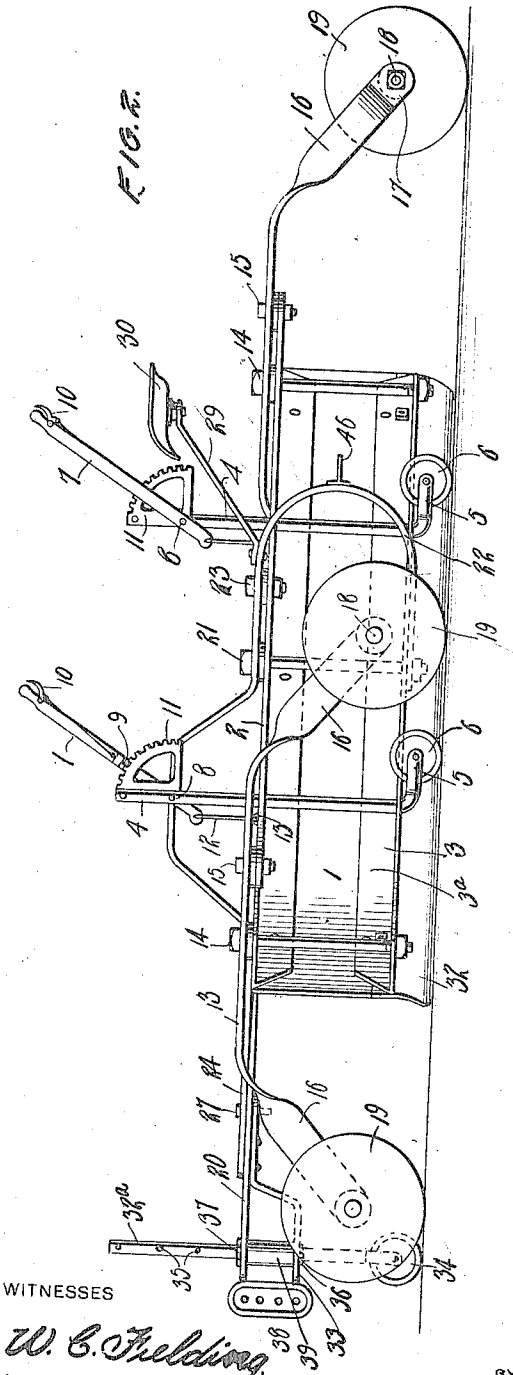


FIG. 4.

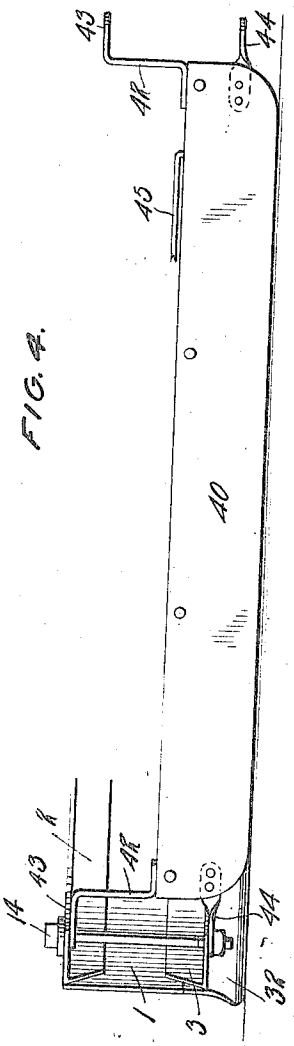
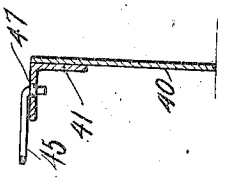


FIG. 5.



WITNESSES

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3 SHEETS—SHEET 3.

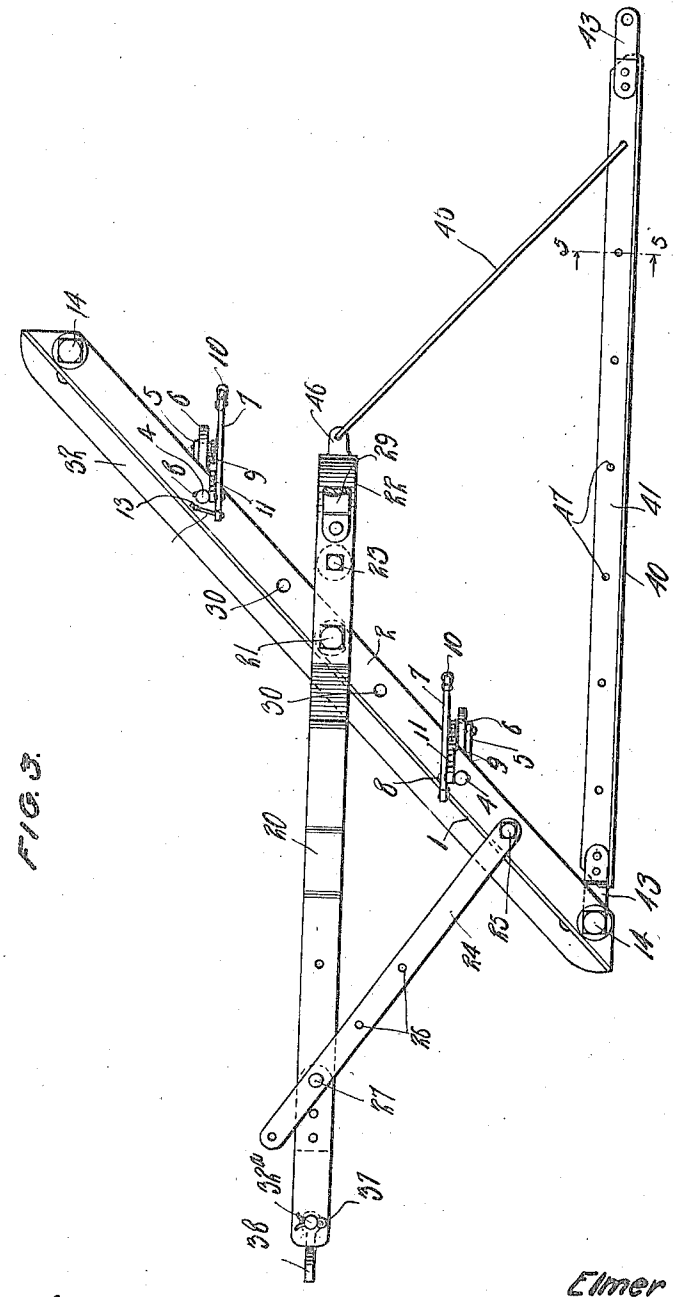


FIG. 3.

WITNESSES

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DITCHING AND GRADING MACHINE.

1,255,188. Specification of Letters Patent. Patented Feb. 5, 1918.

Application filed September 26, 1917. Serial No. 193,364.

To all whom it may concern:

Be it known that I, ELMER LITTLE, a citizen of the United States, residing at Owensboro, in the county of Daviess and State of Kentucky, have invented certain new and useful Improvements in Ditching and Grading Machines, of which the following is a specification.

This invention relates to ditching and grading machines, and more particularly to a machine so constructed as to be readily used for constructing ditches for laying tile or for grading road surfaces, as desired.

One of the main objects of the invention is to provide a machine of the character stated of simple construction and operation which may be produced at relatively small cost. Another object is to provide a machine having ground wheels which are carried by vertically adjustable shafts so as to permit the scraper blade to be adjusted vertically, or set at an angle, to suit circumstances. A further object is to provide a machine the angle of the scraper blade of which to the line of draft may be quickly and easily adjusted to suit circumstances. Another object is to provide a machine having lateral cutting elements so as to insure the production of a clean cut. Further objects will appear from the detailed description.

In the drawings:

Figure 1 is a top plan view of a machine constructed in accordance with my invention as used for digging relatively shallow ditches or for grading.

Fig. 2 is a view in side elevation of the same.

Fig. 3 is a top plan view of the machine as used for digging deep ditches.

Fig. 4 is a fragmentary side view of the same.

Fig. 5 is a section taken substantially on line 5—5 of Fig. 4.

The body or mold-board 1 of the scraper blade is flat and of substantially rectangular shape, being formed from sheet metal of suitable gage. An angle-iron strip 2 is secured to the rear face of plate 1, the upper surface of the horizontal arm of this strip being flush with the upper edge of the plate. An angle-strip 3 similar to strip 2 is secured to plate 1 adjacent the lower edge thereof, with its horizontal arm projecting below the lower edge of the plate. The horizontal arms of strips 2 and 3 are in the same vertical plane and are provided, a short distance from each end, with alined openings which slidably receive the vertical supporting shafts 4, each of these shafts being provided at its lower end with an integral rectangularly disposed fork 5 in which is rotatably mounted a supporting ground wheel 6. A hand lever 7 is pivoted on shaft 4 intermediate its ends, as at 8. This lever is provided with a spring pressed detent 9 controlled by a hand latch 10, this detent coöperating with an arcuate rack 11 fixedly secured to the upper end portion of the shaft so as to lock the hand lever in locked adjustment about its pivot. The lower end of lever 7 is connected by a short cable 12 to an eye 13 secured on the upper face of the horizontal arm of angle-strip 2. The openings of the shaft 4 are of slightly greater diameter than the shafts so as to permit the end portions of the plate 1 to be adjusted independently of each other. By rocking lever 7 about its pivotal axis, the end portion of plate 1 to which this lever is secured will be either raised or lowered depending upon the direction of movement of the lever. If both of the levers are rocked simultaneously and similarly, the plate 1 will be either raised or lowered for its full length. If but one of the levers is rocked, one end portion only of the blade will be adjusted, thus permitting quick and easy angular adjustment of the blade in a vertical plane.

A bracing beam 12^a is mounted in parallel spaced relation to the rear edge of the horizontal arm of strip 2. End bars 13^a are provided at each end of strip 2 and beam 12, and are secured thereto by the spaced securing bolts 14 and 15 inserted through the end bar and the horizontal arm of strip 2 and the beam 12^a, respectively. Each of these end bars is arched downwardly at each end and twisted into a plane at right angles to the plane of the body of the bar so as to provide a supporting arm 16. The outer end portion of this arm is offset to provide a plate 17 through which is secured a bearing bolt 18 on which is rotatably mounted a cutter disk 19. These disks at each end of the machine are disposed in alinement and project laterally of the machine. A traction-pole 20 is secured to the center of the horizontal arm of strip 2 by an elongated securing bolt 21 inserted

through the same, this bolt extending through the horizontal arm of the lower strip 3 and the end of the beam 20 which is provided with a bowed portion 22, the end of the beam being bent back under the horizontal arm of strip 3. A securing bolt 23 is inserted through the beam 20 in rear of bolt 21 and through the beam 12^a. A brace bar 24 is pivotally secured at its rearward end to the horizontal arm of strip 2 by a bolt 25 inserted through the same and the strip. This bar is provided, through its forward portion, with a series of spaced apertures 26 which are adapted to be moved into register with the spaced apertures 27 provided through pole 20. A securing pin 28 is inserted through the alined apertures of the bolt and the bar, this pin serving to prevent movement of the pole. When the pole 20 is thus locked in position, the strip 2 and beam 12^a are securely locked in parallel spaced relation. By removing pin 28, the pole 20 may be rocked about the bolt 21 so as to vary the angular adjustment between the pole and the plate 1. The strip 2 and beam 12^a, together with the end bars 13^a, constitute a jointed parallelogram so that, when pole 20 is rocked about bolt 21, beam 12^a will be moved either toward or away from the strip 2, and the end bars 13^a will be maintained in parallelism with the pole 20 thus insuring that the disks 19 will be at all times directed forwardly of the machine. The pole 20 may be readily secured in any desired adjustment by means of the coöperating apertures 26 and 27 of the bar 24 and pole 20, respectively, and the pin 28.

The bow 22 of pole 20 provides a resilient support for the seat standard 29 upon the upper end of which is swiveled a seat 30. This seat is so positioned as to permit the operator to easily reach the levers 7, the beam 12 providing a support or rest for the feet of the operator. By this construction, the vertical adjustment of the plate may be readily effected, and is easily controlled, by the operator when the machine is in use.

As will be noted more particularly from Figs. 1 and 2 of the drawings, the horizontal arm of angular strip 2 is provided with a plurality of spaced openings 30 adapted to receive the securing bolt 21, these openings being in vertical alinement with similar openings through the horizontal arm of strip 3. The beam 12 is also provided with a plurality of spaced apertures 31 adapted to receive the bolt 23. By this means, the pole 20 may be adjusted longitudinally of strip 2 and beam 12^a so as to vary the line of draft transversely of the machine to suit special conditions.

An arcuate scraper blade 32 is detachably secured to the vertical arm 3^a of strip 3 by means of bolts and nuts, or in any other suitable manner. The upper edge of this blade fits snugly against the lower edge of this plate 1 so as to present a smooth surface for directing the material scraped laterally of the machine in the well known manner.

A vertical supporting shaft 32^a is slidably mounted through the forward end of pole 20, and through a hammer strap 33 secured to the underface of the pole. This shaft is provided with a fork at its lower end in which is rotatably mounted a ground wheel 34. Shaft 32^a is provided with a vertically extending series of spaced apertures 35. The spaces between these apertures correspond to the distance between the underface of the lower arm of hammer strap 33 and the upper face of pole 20 so that, by inserting cotter-pins 36 and 37 through these apertures above the pole and beneath the hammer strap the forward end of the pole may be secured in vertical adjustment of the shaft. The portion of shaft 32 intermediate the pole and the hammer strap forms a bearing member for a sleeve 39 which carries the apertured clevis-block 38 which provides traction attaching means.

As the machine is drawn forward, the blade engages into the earth so as to scrape the upper portion thereof off and direct it laterally of the machine. By means of the levers 7, the blade 32 may be tilted so as to cause one end portion thereof to cut into the earth relatively deeply, the earth removed by this portion of the blade being directed toward the other side of the machine. By reversing the adjustment of the blade on the return trip, a comparatively deep cut will be made at the other side of the ditch which is being formed. By repeating this operation, the material which has been scraped or cut off will be directed to one side of the ditch, and a shallow ditch may be readily dug. During this digging operation, the cutting disks 19 act to cut all roots or rubbish such as would tend to interfere with the operation of the machine, thus producing a ditch having clean cut and clearly defined lateral walls or banks. This machine may also be readily used for scraping and road grading, for which purpose it is particularly well adapted due to the readiness with which the angle of the scraping blade may be adjusted. Also, by adjusting the angle to the line of draft, the effective width of the machine may be readily varied.

In digging deep ditches, the end bars 13 and the connecting beam 12^a are removed, after which a side plate 40 is secured at an angle to the front plate 1. This side plate is of substantially rectangular shape, having its lower corner rounded. This plate is provided at its upper edge with an integral inwardly directed horizontal flange 41. At each end of the plate, a bracket 42 is secured to the flange 41. This bracket is pro-

vided at its upper end with a horizontal arm 43 disposed at a right angle to the body of the bracket. To the vertical arm of plate 40, at the transverse center and at each end thereof, is secured a bracket 44 which is disposed in parallelism with the upper arm 43 of bracket 42. The brackets 42 and 44 are provided with vertically alined apertures which are adapted to be moved into alinement with the apertures through the angle strips 2 and 3 which receive the securing bolts 14, the brackets being so spaced as to fit snugly beneath the horizontal arm of these strips. When secured in position in this manner, the forward end of plate 40 is pivotally secured to the end of the body of the machine so as to form an acute angle therewith. A spacing-rod 45 has its inner end secured through an apertured lug 46 secured on the bow 22 of pole 20 for this purpose. The outer end of this rod is turned downward at a right angle to provide a finger which may be secured through any one of the spaced apertures 47 through the horizontal arm of plate 40, selectively. By this means, the lateral plate 40 may be rigidly secured in parallelism with the draft pole 20. As the machine is drawn forward, plate 40 is pressed against the side wall or bank of the ditch being formed to prevent lateral movement of the machine thus insuring accuracy of operation. The earth which is dug or scraped is directed to the center of the ditch from each side, from which it may be removed in any suitable manner. In this construction, the blade 32 may be adjusted vertically bodily, or may be set at an angle to the vertical, to suit conditions.

When it is desired to transfer the machine, the plate 1 may be raised on the shafts 4 by means of the end levers 7 in the manner previously described, and the forward end of pole 20 may be raised on the shaft 32ª. By this means, the cutting or scraping blade and the disk 19 may be secured in raised position well above the ground surface thus permitting the machine to be easily moved from one scene of operation to another. When it is desired to use the machine, it is only necessary to reverse the operation described so as to bring the blade and disks into operative engagement with the ground. The form shown in Figs. 3 and 4 for digging deep ditches may be readily adjusted vertically in the same manner for transportation purposes.

It will be evident that there may be slight changes made in the construction and arrangement of the different parts of my invention without departing from the field and scope of the same, and I intend to include all such variations as fall within the scope of the appended claims, in this application in which a preferred form only of my invention is disclosed.

What I claim is:

1. In a scraping and ditching machine, a front plate, a beam mounted in parallel spaced relation therewith, end bars pivotally secured directly to the ends of said plate and beam, cutter disks rotatably mounted on the ends of each of said end bars and directed forwardly of the machine, a traction pole pivotally secured to the front plate and to the beam, a scraping blade carried by said front plate, said pole being in parallelism with the end bars, and means for normally preventing relative movement between said front plate and said beam.

2. In a scraping and ditching machine, a scraping blade, a beam mounted in parallelism therewith, end bars pivotally connected directly to the ends of the blade and beam, cutter disks carried by said end bars at each end thereof and directed forwardly of the machine, a traction pole pivotally connected to said blade and beam, means for normally preventing movement of said pole relative to the blade and beam, and vertically adjustable ground wheels carried by said blade for adjusting the same toward and away from the surface being operated upon.

3. In a scraping and ditching machine, a scraping blade, a beam mounted in parallelism therewith, end bars pivotally secured to the ends of said blade and beam intermediate their ends, the end portions of each of said end bars being arched downwardly and bent to provide downwardly directed supporting arms, cutting disks rotatably supported by each of said arms and directed forwardly of the machine, a draft pole pivotally secured to said blade and beam, and means for preventing relative movement between the draft pole and the blade and beam.

In testimony whereof I affix my signature in presence of two witnesses.

ELMER LITTLE.

Witnesses:
WILBUR K. MILLER,
GUNTHER H. PETRIE.