

No. 666,668.

Patented Jan. 29, 1901.

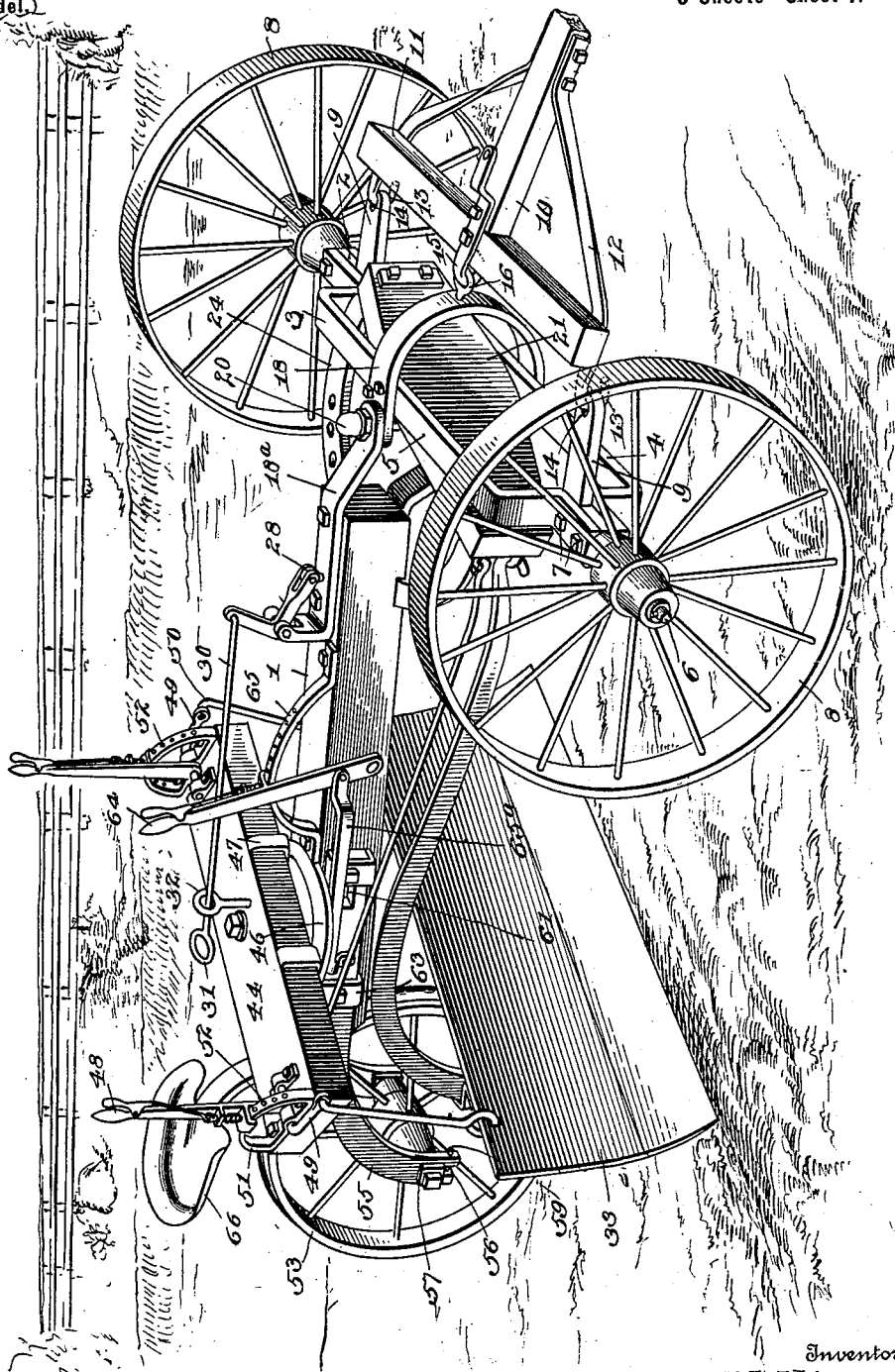
L. J. HELLING & W. & H. KOCH.  
DITCHING AND GRADING MACHINE.

(Application filed May 4, 1900.)

3 Sheets—Sheet 1.

(No Model.)

Fig. 1.



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Fig. 2.

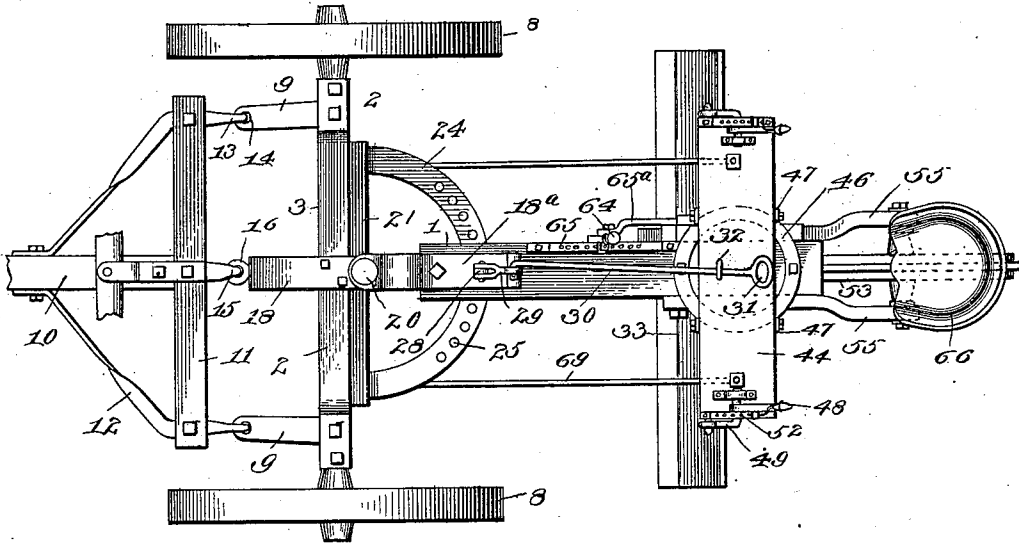


Fig. 3.

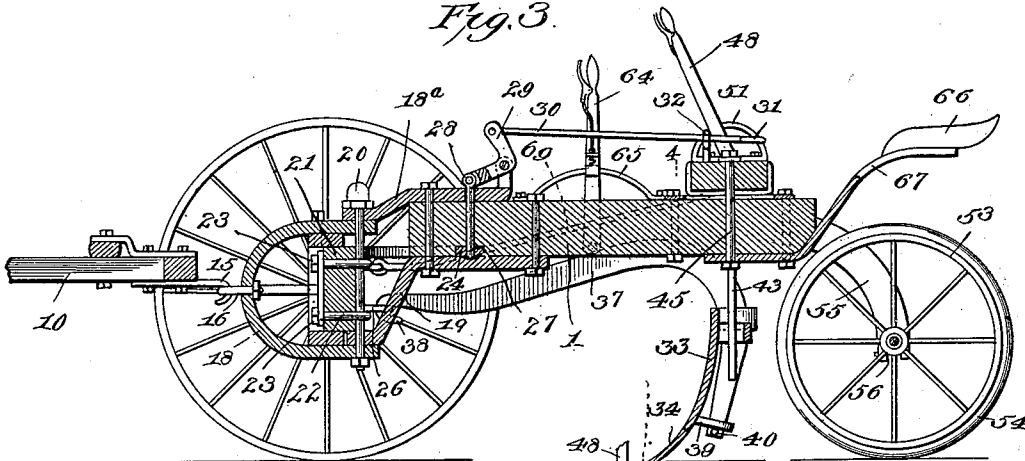
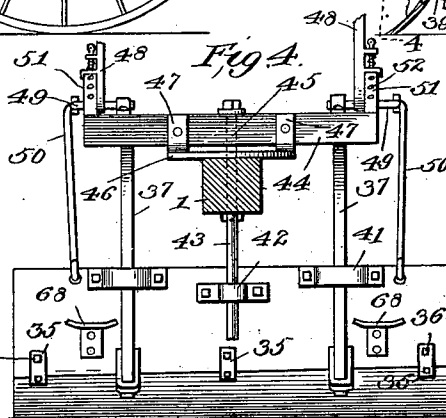


Fig. 4.



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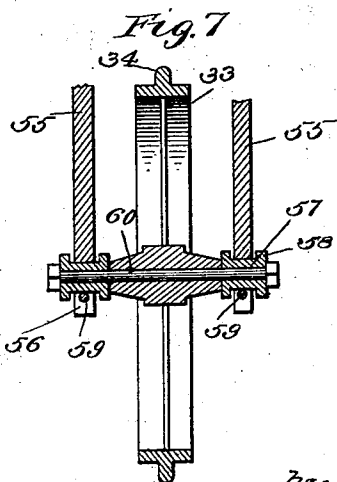
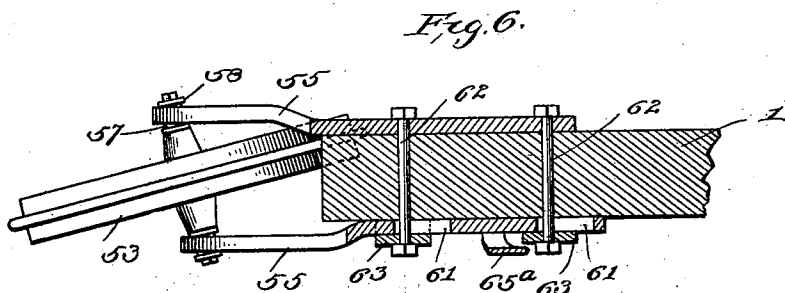
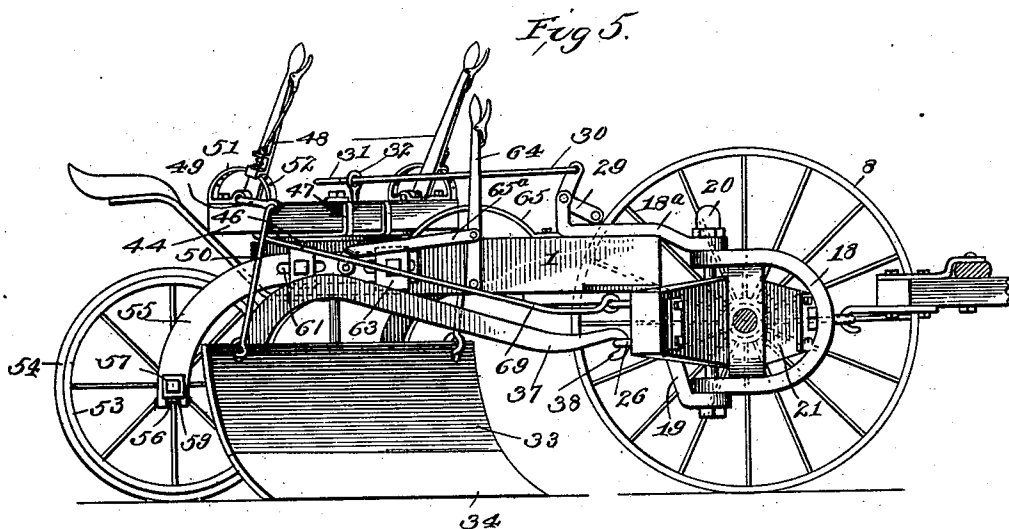
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# UNITED STATES PATENT OFFICE.

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## DITCHING AND GRADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 666,668, dated January 29, 1901.

Application filed May 4, 1900. Serial No. 15,557. (No model.)

*To all whom it may concern:*

Be it known that we, LOUIS JOHN HELLING and WILLIAM KOCH, residing in and whose post-office address is Owensville, county of Gasconade, and State of Missouri, and HERMANN KOCH, residing in and whose post-office address is Ellinwood, county of Barton, and State of Kansas, citizens of the United States, have invented a new and useful Improvement in Ditching and Grading Machines, of which the following is a specification.

This invention relates to improvements in grading-machines, and more particularly relates to machines of this character designed for grading and ditching.

One object of the invention is to provide a grading-machine which is simple in construction, light of draft, strong, compact and durable in the general assembly of its parts, and designed to attain perfectly satisfactory results for the use for which it is intended.

A further object of the invention is to provide a grading-machine which is so constructed as to be entirely under control of the operator thereof, and, furthermore, to so arrange the scraper-blade in relation to the frame of the machine that the same may be easily adjusted without the driver dismounting from the machine.

A further object of the invention is to embody in the machine simple and efficient means for always maintaining the scraper-blade accurately positioned in relation to the work to be performed and which scraper-blade is adapted to instantly respond to the change of parts necessary for adjusting the said blade to the required angle.

With these and other objects in view, which will appear as the nature of the improvements is better understood, the invention consists, substantially, in the novel construction, combination, and arrangement of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a grading-machine constructed in accordance with the present invention. Fig. 2 is a top plan view thereof. Fig. 3 is a lon-

gitudinal sectional view of the machine. Fig. 4 is a transverse sectional view on the line 4 4 of Fig. 3, parts of the machine being removed. Fig. 5 is a side elevation of the machine, the scraper-blade being set at an angle and the parts in the position assumed thereby when the said blade is in the position referred to. Fig. 6 is a top plan view of the rear end of the machine, partly in section. Fig. 7 is a vertical transverse sectional view taken through the axle of the guide-wheel.

Referring to the drawings, the numeral 1 designates the supporting-beam of the herein-described machine, said beam extending in a longitudinal direction and being formed preferably of wood. Arranged at the forward end of the beam 1 is an axle 2, which axle comprises upper and lower members 3 and 4, respectively, each of said members having its central portion bridged or arched, as at 5. The bridged portion 5 of the members 3 and 4 extend in opposite directions, and the extremities thereof lie upon each other, an axle-spindle 6 being interposed between said extremities and secured therein through the medium of bolts 7. Mounted upon each of the spindles 6 is a wheel 8, which wheels may be of any desired construction; but the same are preferably of iron or similar material in order to adapt same for the heavy work to which they are subjected.

Projecting from each of the spindles 6 is a forwardly-extending attaching-lug 9, and suitably connected to the forward ends of said lug is a pole 10. The pole 10 is provided at its rear end with a transversely-extending bar 11, and arranged at the sides of said pole 10 and diverging rearwardly are braces 12, terminating at their rear ends in hooks 13, designed to fit in perforations 14, formed in the lugs 9. A draft-hook 15 is also arranged at the rear end of the pole 9, said hook being connected to an eye 16, fitted in the central portion of a U-shaped clevis. The members 3 and 4 of the axle 2 lie between the upper and lower ends of the clevis 18, and said ends of the clevis extend beyond the rear edges of said members.

Arranged at the upper and lower sides of

the beam 1 and at the forward end thereof are forwardly-extending connectors 18<sup>a</sup>, said connectors being in the form of plates or bars, and the lower of said connectors is provided  
 5 with a downwardly-extending offset 19, which fits upon the upper face of the lower extremity of the clevis 18. The upper connector also fits upon the upper face of the upper extremity of said clevis, and extending through  
 10 said connectors and the clevis is a pivotal pin 20, through the medium of which the supporting-beam 1 is connected to said clevis and in turn couples with the axle 2.

Arranged between the bridged portions of  
 15 the members 3 and 4 of the axle 2 is a draft-head 21, said head being preferably formed of wood, and arranged at the upper and lower edges of said head, at approximately its center, is a pair of connecting-loops 22, the latter passing through the body of the head 21  
 20 and being secured therein by means of nuts 23. A semicircular locking-guide 24 is arranged at the rear face of the draft-head 21, the central portion of said guide being provided with a series of spaced perforations 25,  
 25 and the ends of said guide are bent at right angles to its body portion and connected to said draft-head by means of eyebolts 26. The guide 24 passes through and works within a  
 30 transversely-extending semicircular groove 27, formed in the under face of the beam 1, the lower connector 19 passing beneath said groove, and thereby confining the guide 24 therein, and it will be observed at this point  
 35 that said guide 24 is adapted to swing on the arc of a circle whose center is the pivotal pin 20. For locking the guide 24 against movement within the slot 27 a latch-pin 28 passes through the upper connector 18 and the beam  
 40 1 in order that its lower end may engage with one of the perforations 25 of the guide 24, and thereby prevent movement of said guide within said groove. The latch-pin 28 is hingedly  
 45 connected with a bell-crank lever 29, the latter being fulcrumed within the bifurcated upwardly-bent rear end of the upper connector 18<sup>a</sup>, and said lever is designed to be operated by  
 50 means of a rearwardly-extending rod 30, having at its rear end a handle-loop 31, said rod being supported in an eyebolt 32.

The numeral 33 designates a scraper-blade, which blade is curved in cross-section, as is usual, and said blade is provided at its lower  
 55 end with a share 34, designed to engage the earth, said share being connected to the blade 33 by means of binding-clips 35 and bolts 36.

Arranged at each side of the supporting-beam 1 and in a plane therebeneath is a longitudinally-extending draft-beam 37, the forward end of which terminates in an attaching-hook 38, which hooks are connected to the lowermost of the eyebolts 26. The draft-beams 37 are preferably of metal, and the  
 60 rear ends thereof extend downwardly and lie  
 65 in rear of the scraper-blade 33, the extremity

of said ends passing through and fitting within angular attaching-lugs 39, carried by the rear face of said scraper-blade, said ends being held within said lugs by transversely-extending locking-pins 40. Movement of the  
 70 scraper-blade 33 transversely with relation to the rear ends of the beams 37 is prevented by means of loops 41, arranged at the upper edges of the blades 33, and said loops encircle said  
 75 ends of the beams 37, and thus always maintain said blade in proper relation to said beams. A similar loop 42 is arranged at the central portion of the blade 33, which loop encircles a depending guide-rod 43, carried  
 80 by the rear end of the supporting-beam 1, and said rod is designed to limit the transverse movement of the blade 33 relative to the frame of the machine.

To enable the scraper-blade 33 to be adjusted at various angles relative to the supporting-beam 1, thus providing for presentation of the blade at various angles to the earth,  
 85 a swivel-beam 44 is arranged upon the upper side of the supporting-beam 1, adjacent to the rear end thereof, said beam 44 being connected to the supporting-beam 1 by means of  
 90 a pivotal pin 45, and said beam 44 is designed to swivel upon the pin 45 when adjusting the blade 33 to the desired angle. An annular guide-ring 46 is interposed between the beams  
 95 44 and 1, which ring is designed to prevent wear upon the latter, and in order that the beam 44 may also be free from the wear incident to its swiveling movement the same is provided at its under side with U-shaped  
 100 shoes 47, which embrace the side edges thereof and are suitably secured thereto. The shoes 47 work upon the guide-ring 46, and thus the beam 44 is maintained at all times in the same relation to the beam 1, as is clearly  
 105 obvious.

For raising and lowering the scraper-blade 33 a pair of ratchet-levers 48 is employed, one of said levers being arranged at each end of the beam 44, and each of said levers is provided with a crank 49, to which is connected  
 110 a link 50. The links 50 extend from the cranks 49 to the upper edges of the scraper-blade 33, at which point said links are connected to said blade; but it is thus evident  
 115 that when the cranks 49 are raised and lowered by swinging the levers 48 upon their fulcrums said blade 33 will be raised and lowered also for moving the same away from and toward the earth. In order that the blade 33  
 120 may be maintained at various heights above the earth, each of the levers 48 is provided with a semicircular guide-rack 51, having in its body portion a series of perforations 52, with which the ratchets of the levers are  
 125 adapted to coact in the usual manner, and thereby lock the levers at various points on said racks.

For upholding the supporting-beam 1 at its rear end a guide-wheel 53 is provided, which  
 130

guide-wheel may be of any suitable construction, and said wheel has upon its periphery a circumferential flange or rib 54 to prevent the wheel sliding over the earth, and in order  
 5 that the wheel 53 may be connected to the beam 1 a pair of attaching-arms 55 is connected to the rear end of the beam and arranged one at each side thereof. The lower end of each of the arms 55 is bifurcated, as  
 10 at 56, and fitting in the bifurcations of each of said arms is a bearing-sleeve 57, provided at each of its ends with flanges 58. The flanges 58 embrace the arms 55, and thus prevent lateral movement of the sleeves 57 relative to said arms, said sleeves being held in  
 15 the bifurcations of the arms 55 by means of retaining-pins 59. A transversely-extending axle-shaft 60 passes through the sleeves 57, upon which axle or shaft the wheel 53 is mounted, the hub of the latter snugly fitting between the inner ends of said sleeves. It is desirable when ditching that the portion of the blade 33 employed for this purpose be  
 20 firmly held to its work, and to provide for this one of the attaching-arms 55 is so constructed as to be capable of longitudinal movement upon the supporting-beam 1. This is accomplished by providing said arm with a pair of elongated slots 61, through which  
 25 slots bolts 62 are adapted to pass, the said bolts being also adapted to secure the attaching-arms 55 to the beam 1. A pair of guide-loops 63 embrace the slotted arm, through which loops the ends of the bolts 62 pass, and  
 30 by reason of the loops 63 the slotted arm is designed to easily move upon the supporting-beam 1 and always maintained in proper relation thereto. An operating-lever 64 is pivoted to one side of the supporting-beam 1,  
 35 said lever being provided with a ratchet adapted to coact with a guide-rack 65, and extending from the lever 64 to the slotted arm 55 is a connecting-link 65, the point of connection of said link being intermediate the  
 40 slots 61. It will thus be seen that when the lever 64 is moved upon its pivot the slotted attaching-arm is adapted to follow the same, and in so moving it will be seen that one end of the shaft 60 of the wheel 53 moves with  
 45 said slotted arm. By reason of this the wheel 53 is positioned at an angle to the line of draft of the machine, and thus holds the portion of the blade 33 which is employed for ditching purposes well up to its work, as  
 50 will more fully appear hereinafter.

A seat 66 projects from the rear of the beam 1, said seat being mounted upon a supporting-arm 67, and said arm is suitably connected to the under side of the beam 1, the seat 66  
 60 being disposed directly above the wheel 53. A pair of foot-rests 68 is also carried by the scraper-blade 33 at its rear face, and upon said rests the driver places his feet for manipulating the scraper-blade 33.

65 A pair of connecting-rods 69 is suitably at-

tached to the swivel-beam 44, the forward ends of said rods being connected to the uppermost of the eyebolts 26, and inasmuch as these bolts are carried by the draft-head 21  
 70 it follows that the swivel-beam 44 is adapted to follow the movements of said head, the rods 69 being disposed one at each side of the beam 1.

The operation of the herein-described grader is as follows: When it is desired to transport the grader from place to place, the levers  
 75 48 are manipulated so as to move toward the seat 66, occupied by the driver of the machine, it being understood that the feet of the driver are positioned upon the rests 68, and  
 80 by so moving said levers it will be seen that the scraper-blade 33 will be moved upwardly, the share 34 thereof being drawn away from the earth. The machine is thus free to pass over the ground without the blade en-  
 85 gaging therewith. An unimpeded movement of the grader may be thus effected. When, however, it is desired to grade, and in a direct manner, the levers 48 are moved forwardly,  
 90 thus permitting the scraper 33 to move downwardly, and if an equal pressure of the feet of the driver is exerted upon the ends of the scraper the latter will be positioned in direct  
 95 transverse relation to the supporting-beam 1. The share 34 of the scraper 33 will therefore engage the earth in a straight manner and at no angle thereto, and in order to deposit the  
 100 earth accumulated upon the scraper-blade it is simply necessary to elevate the blade 33, whereupon the earth which has been gathered thereby will be deposited in the rear  
 105 thereof. When necessity arises for the earth being engaged by the blade 33 at an angle, the rod 30 is grasped by the driver and rearward pressure exerted thereon, which pressure causes the latch-pin 28 to move upwardly,  
 110 and said pin is thus disengaged from the guide 24. Pressure is then exerted upon one of the foot-rests 68 to advance the end of the scraper 33 to which said rest is attached and according to which end it is desired to advance,  
 115 whereupon said end moves forward while the other end moves in a corresponding rearward direction. The blade 33 is thus placed at an angle to the line of draft, and hence is adapted to engage the earth at such angle.

When used for ditching purposes, it is of course apparent that only the portion of the blade 33 adjacent to one end thereof is employed, and if therefore the ditching is to be  
 120 done at the right side of the machine the lever 48 at the left side thereof is moved rearwardly in order to elevate the end of the blade to which the same is connected, the lever 48 at the right side of the machine being  
 125 moved forwardly, so that the end of the blade to which said lever is connected may descend, and in order that the end of the blade so lowered may be properly held to the earth for the ditching operation the lever 65 is moved  
 130

rearwardly, and thereby causes the attaching-arm to which said lever is connected to also move rearwardly, whereupon the adjacent end of the shaft 60 follows the movement of the attaching-arm 55, so that the wheel 53 is thrown at an angle to the line of draft, and which angle is such that the wheel is positioned toward the depressed end of the blade 33. By reason of the position of the parts just described the end of the blade 33 which engages the earth is held well up to it, so that the ditching is effectually accomplished. For ditching at the left side of the machine it is obvious that a mere reversal of the position of the parts for ditching at the right side is necessary.

While the form of the invention herein shown and described is what is believed to be a preferable embodiment thereof, it is to be understood that the invention is susceptible to various changes, and a right is therefore reserved to modify or vary the invention as falls within the spirit and scope thereof.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the class described, the combination with a supporting-beam, of a fixed axle-support carried thereby, an axle pivoted at one end in said support and carrying a wheel, a sliding support for the opposite end of the axle, also carried by said beam, and means for operating said sliding support, substantially as described.

2. In a machine of the class described, the combination of a supporting-beam, arms carried thereby and extending beyond the end thereof, a clevis having its ends overlapping the ends of the arms, a pivotal bolt passing through the overlapping ends of said arms and clevis, and an axle secured to said clevis, substantially as described.

3. In a machine of the class described, the combination with an axle, comprising a pair of complementary members provided with bridged portions, and wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade carried by said beam and vertically adjustable thereon, said blade being adapted to be positioned at various angles to the line of draft, a draft-head carried by the axle and disposed between the bridged portions of the members thereof, said head adapted to swing on said axle, and draft-beams arranged between and connecting the draft-head with the scraper-blade, whereby said head is adapted to follow the movements of the scraper, and means for locking the draft-head in its adjusted positions.

4. In a machine of the class described, the combination with an axle, comprising a pair of complementary members provided with bridged portions and wheels carried thereby, of a supporting-beam suitably connected to the axle, a scraper-blade suspended from the

supporting-beam and vertically adjustable, said blade being positioned at various angles to the line of draft, a draft-head arranged between the bridged portions of the members of the axle and adapted to swing therein, draft-beams arranged between and connecting the draft-head with the scraper-blade, a locking-guide carried by said draft-head, and a latch-pin for engaging said guide to lock the draft-head in its adjusted positions.

5. In a machine of the class described, the combination with an axle, and wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade suspended from said beam and adapted to be positioned at various angles to the line of draft, attaching-arms carried by the supporting-beam, and a wheel journaled in said arms, one of the latter being capable of longitudinal movement relative to the supporting-beam, whereby the guide-wheel is positioned at various angles to the line of draft.

6. In a machine of the class described, the combination with an axle, and wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade suspended from the supporting-beam and adapted to be positioned at various angles to the line of draft, attaching-arms carried by the supporting-beam, a guide-wheel journaled in said arms, one of the latter being capable of longitudinal movement relative to the supporting-beam, whereby the guide-wheel is adapted to be positioned at various angles to the line of draft, and means for shifting said arm.

7. In a machine of the class described, the combination with an axle, and wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade suspended from the supporting-beam and adapted to be positioned at various angles to the line of draft, attaching-arms carried by the supporting-beam, a guide-wheel journaled in said arms, one of the latter being capable of longitudinal movement relative to the supporting-beam, whereby the guide-wheel is adapted to be positioned at various angles to the line of draft, means for shifting said arm, and means for locking the arm in its adjusted positions.

8. In a machine of the class described, the combination with an axle, and wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade suspended from the supporting-beam and adapted to be positioned at various angles to the line of draft, attaching-arms carried by the supporting-beam, a guide-wheel journaled in said arms, one of the latter being capable of longitudinal movement relative to the supporting-beam, whereby the guide-wheel is adapted to be positioned at various angles to the line of draft, and a ratchet-lever for shifting said arm and locking the latter in its adjusted positions.

9. In a machine of the class described, the combination with an axle, wheels carried thereby, of a supporting-beam suitably connected to said axle, a scraper-blade suspended  
5 from said beam and adapted to be positioned at various angles to the line of draft, attaching-arms carried by the supporting-beam, one of said arms being provided with elongated slots, bolts for connecting the attaching-arms  
10 to the supporting-beam, said bolts fitting in said slots a guide-wheel journaled in the attaching-arms, and means for shifting the movable arm, whereby the guide-wheel is

positioned at various angles to the line of draft.

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