May 16, 1939. K. A. SPIETH 2,158,340

COMBINED EARTH SCRAPER, SPREADER, AND DUMPER

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Fig. 1.

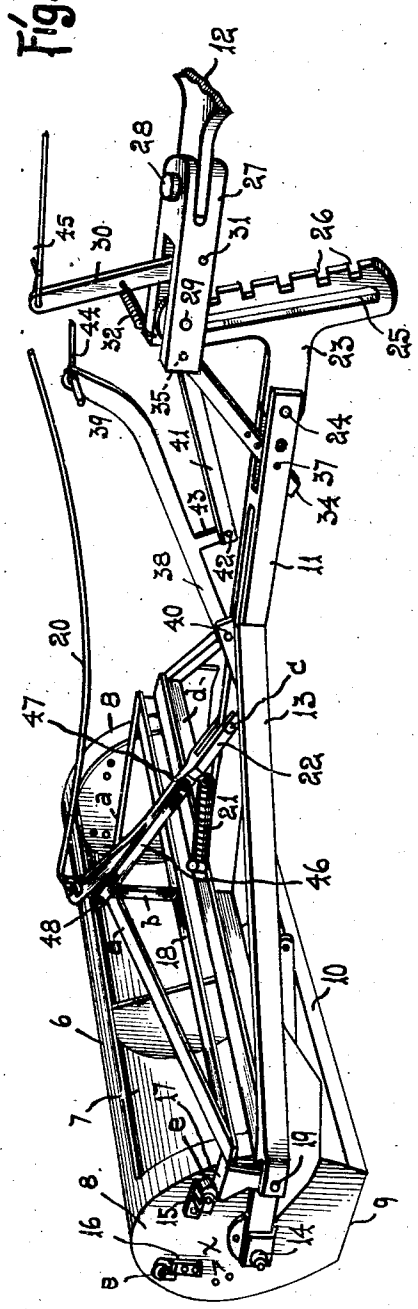


Fig. 3.

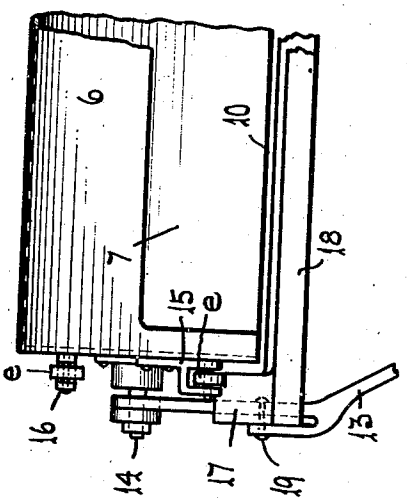
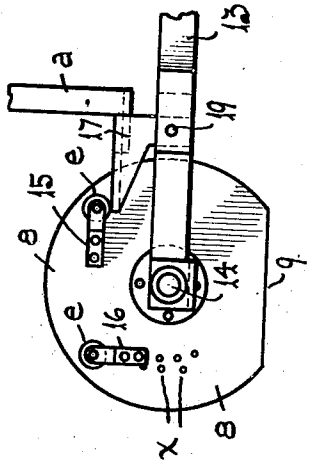


Fig. 2.



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Fig. 4.

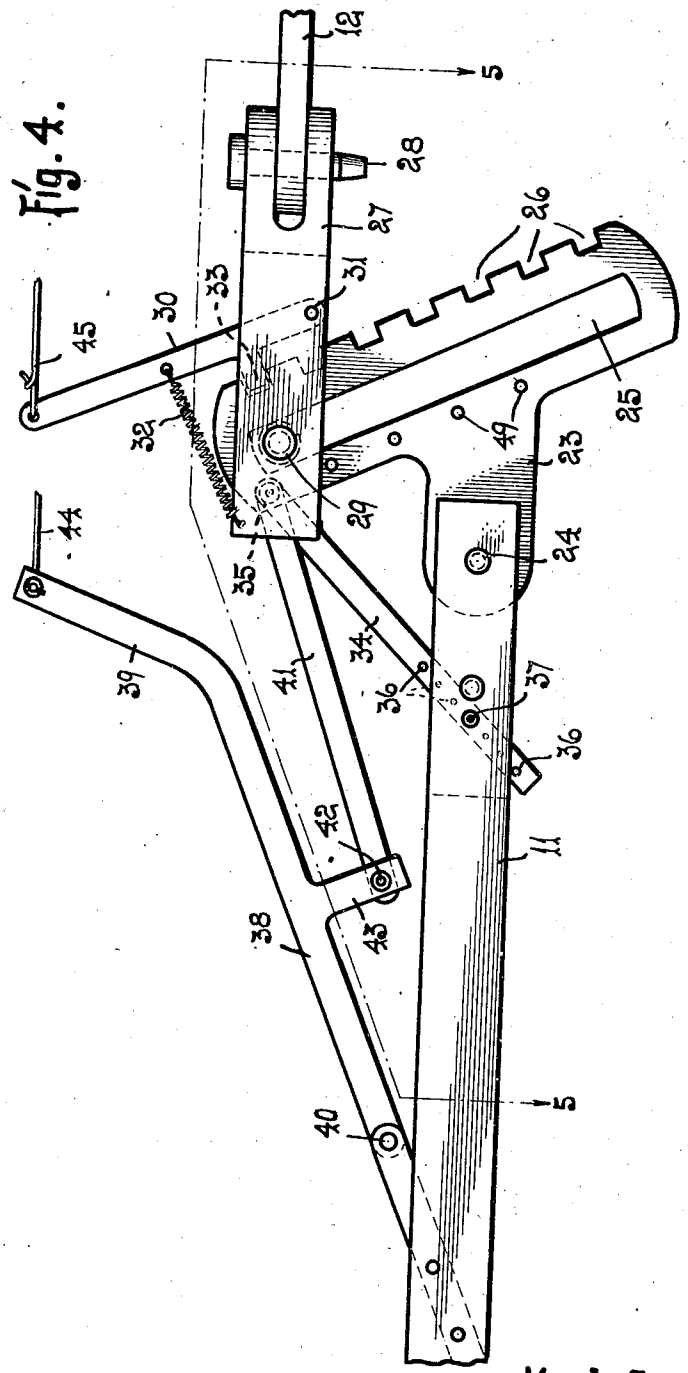
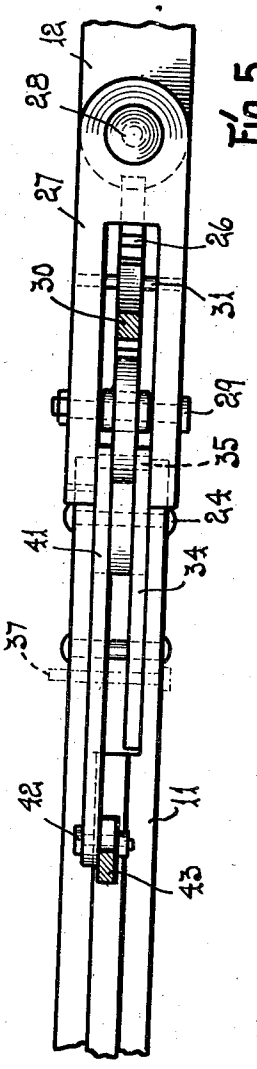


Fig. 5.



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UNITED STATES PATENT OFFICE

2,158,340

COMBINED EARTH SCRAPER, SPREADER, AND DUMPER

Karl A. Spieth, Omaha, Nebr.

Application April 18, 1938, Serial No. 202,700

6 Claims. (Cl. 37—140)

This invention relates to an improved construction for an earth scraping, spreading and dumping machine useful in the construction and repairing of highways, and particularly useful in preparing land for irrigation.

Machines similar to the present invention have heretofore been used to greater or lesser advantage for the purposes mentioned, but the present invention discloses certain features believed to be new and to add materially to the utility of the machine.

One of the specific objects of the invention is to provide means on the front end of the scraper-beam for a control of the inclination of the scraper-blade.

Another object is to provide means on the front of the scraper-beam for the automatic maintenance of the scraper blade at a selected degree of inclination during the operation of "spreading" as well as when "scraping", said means to be of such arrangement that they will be convenient for the use of the driver or operator of the machine.

Machines of this class are generally drawn by a tractor, and since the work includes several successive operations, such as scraping, conducting or carrying the load a suitable distance, spreading and dumping, all of these operations being accomplished while the machine is moving, it is obvious the means for control should be conveniently located for use of the driver, and said means of control should operate automatically as far as possible.

The invention consists of the new and useful features of construction, combination and arrangement of parts as described herein and claimed, and as illustrated in the accompanying drawings, it being understood that changes may be made in form, size, proportions and minor details, said changes being within the scope of the invention as claimed.

In the drawings,

Fig. 1 is a perspective view of a combined earth-scraper, load-carrier, spreader and dumper embodying my invention.

Fig. 2 is an end view of the cylindrical bowl or ground-engaging body of the scraper, and Fig. 3 is a view taken at right angles to the view shown in Fig. 2, showing the front side of a part of the bowl or scraper body.

Fig. 4 is an enlarged side view of certain operating-parts carried by the front end of the scraper-beam, and Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Referring now to the drawings for a more particular description, the invention is shown and described in connection with the elongated bowl or holder 6 of cylindrical form, in plan, which constitutes the shell of the scraper body having an opening 7 extending lengthwise between its ends 8 as shown in the drawings, said ends being of disc-shape except that each end is provided with a flat surface 9, that part of the shell 6 at the front part thereof adjacent to the flat portions 9 of the ends, being provided with a cutting edge or blade 10.

Other parts in general use on machines of this kind consist of a scraper-beam 11 and a forwardly movable draw-bar 12 which is usually attached to a tractor (not shown), said beam being provided with a pair of rearwardly divergent arms 13 which are mounted swingably at their rear ends on trunnions 14 which are provided for the ends 8 of the bowl 6 centrally of said ends.

Since the "scraping" is effected while the machine is drawn forwardly after the bowl 6 has been adjusted in such a manner that its blade 10 will be inclined downwardly for engaging the ground, means must be provided for maintaining the blade at a selected angle, said angle depending upon the thickness of the slices of material to be removed. For preventing a free rotation of the hollow cylindrical bowl 6 during operation certain means have been employed to be described.

The ends 8 of the bowl 6 are provided with stop-lugs 15 and 16, adapted to be engaged at intervals by a pair of control-lugs 17 which are rigidly mounted on the ends of a horizontal bar 18 mounted for oscillation, the pivotal mountings for this purpose being indicated at 19 upon the arms 13 of the beam 11.

The horizontal bar 18 is a part of a rock-frame adapted to be moved in one direction by a pull-rope 20 under control of an operator and to be swung in a reverse direction by action of a spring 21.

The rock-frame consists of a pair of inclined, connected truss-bars *a*, secured at their outer ends to the horizontal pivotally mounted bar 18, supported by an upright brace-bar *b* carried by said bar 18, a swing-bar 22 being provided, having a pivotal mounting *c* upon one of the base-strips *d*. The base strips *d* shown in Fig. 1 operate to support stresses directed to the arms 13 of the scraper-beam 11, and the spring 21 is secured at its respective ends to one of the base strips *d* and swing-bar 22.

Numeral 46 indicates a link pivotally mounted

at its respective ends on the swing-bar 22 and brace-bar b.

The parts thus described for preventing or permitting rotation of the cylindrical bowl 6 have heretofore been in general use and no part thereof is claimed in the present invention except the fact that the lugs 15 and 16 on the ends 8 of the bowl are provided with rollers e, and these lugs are disposed inwardly of the periphery of each end 8, this being of great advantage to avoid vibration and providing durability in wear. Also it has been found to be of advantage to provide adjustments for the stop-lug 16, so that the distance between them may be increased or decreased, and for this purpose apertures x are formed, at suitable radial distances from the trunnions, in said ends 8 for use when making said adjustments.

As thus described, a forward movement of the pull-rope 20 against the force of the spring 21 may cause release of the lugs 17 from the stop-lugs 15, and a forward movement of the machine will permit a continued rotation of the bowl 6 on the ground so long as the rock-frame and its lugs 17 are under control of the forwardly moved pull-rope 20. However, when the forward pull of the rope 20 ceases, the rock-frame together with the lugs 17, by action of the spring 21, will engage the stop-lugs 16 to permit dumping.

The present invention includes means attached to the front end of the scraper-beam, best shown in Figs. 4 and 5, whereby the blade 10 may be set at any desired angle relative to the surface of the ground, and therefore material, to any practical depth, may be removed, and the depth, according to this improved construction, may vary from the fraction of an inch to several inches, depending upon the density (such as hard clay or loose sand) of the material. Also as will be described, the parts for operation, for the most part, are under automatic control so that the operator may give his attention to driving. Also according to the present invention no stresses will be directed to the cylindrical bowl 6 except to prevent rotation thereof.

To attain these objects I provide a head-piece 23 for the front end of the machine, said head-piece being pivotally mounted on the beam 11 by the pivot-pin 24, and provided with a slot 25, and also is provided, in alinement with numerous notches 26.

Numeral 27 indicates a clevis pivotally mounted by a vertical pin 28 on the draw-bar 12, said clevis also being provided with a horizontal pivot-pin 29 which engages in the slot 25 of the head-piece.

Numeral 30 indicates a locking-bar which is disposed in the channel of the clevis and is pivotally mounted therein as indicated at 31, and by means of a spring 32 the locking-bar will normally be pressed toward the head-piece so that its lug 33 may enter any selected notch 26 thereof.

Means are provided for elevating or lowering the front end of the beam 11 together with the head-piece 23, and since the rock-frame, together with the control-lugs 17 and scraper-beam 11 will move as a unit, the depth to which the blade 10 may enter the ground may be controlled by the vertical movements of said beam 11.

For instance, if it is desired that the blade 10 shall enter the ground at a lesser depth than before, the beam 11 and its head 23 may be swung upwardly, and since the parts move as a unit as mentioned, the upward movement of the control-lugs 17 will roll the bowl 6 rearwardly a limited distance for elevating the blade. Also if it is desired that the blade 10 shall enter the ground at an increased depth, the beam 11 and head-piece may be swung downwardly to cause the control-lugs 17 to move downwardly, the result being that the control-lugs 17 will move downwardly a limited distance from the stop-lugs 15 to permit the blade 10 to enter the ground to said increased distance.

During the operations last described, the pull-rope 20 is not used, and the spring 21 will normally cause the control-lugs to remain in engagement with the lugs 15. If the head-piece 23 swings downwardly the cylindrical bowl 6 will have a limited rolling movement forwardly occasioned by traction of the moving machine, the angle of the blade 10 therefore being changed and caused to enter the ground deeper than before.

The notches 26 of the head-piece are suitably spaced apart so that the swinging movements mentioned for said beam and head-piece will cause limited movements of the control-lugs 17, sufficient to permit the blade 10 to enter the ground a suitable distance.

Numeral 34 indicates an adjusting-link pivotally mounted at 35 on the upper end of the head-piece 23, the lower end of said link being adjustably mounted on the beam 11, said link being provided longitudinally with apertures 36 and a holder element or pin 37 being used and removably mounted in a suitable aperture formed in the beam for engagement in a selected aperture 36 of said link, and therefore the head-piece 23 may be disposed at a suitable angle relative to the beam 11, and may be maintained stationary relative to said beam, the locking-bar 30 being used for maintaining the head-piece and beam at a suitable altitude after said beam has been elevated or lowered.

On account of the degree of inclination which may be selected for the head-piece 23, a forward movement of the draw-bar 12 and clevis 27 will cause the beam 11 to swing upwardly after the locking-bar has been released, and a downward swinging movement of these parts will be effected by gravity after the locking-bar is released from the notches 26 of the head-piece.

A modified means for elevating and lowering the beam 11 is shown in Fig. 4 of the drawings, said means consisting of an arrangement of compound levers, and this may be used to advantage in instances when the metallic parts of the rock-frame and scraper-beam are of unusual proportions or weight.

This modified means consists of a lever 38 provided with an extension 39 and pivoted at 40 upon the beam 11, a second lever 41 being used and pivoted at one of its ends as indicated at 42 upon the arm 43 of lever 38. A third lever (not shown) similar in all respects to the lever 34 is also employed and is pivotally mounted at one of its ends on the end of lever 41 and its opposite end is mounted pivotally on the beam 11 the same or similar to the mounting thereon of said lever 34.

According to this arrangement of compound levers, an upward swinging movement of the lever 38 will cause a downward swinging movement of the beam 11. A pull-and-push rod 44 is provided for the extension 39 so that the movements mentioned may be under control of the operator. Numeral 45 indicates a pull-rope for use in releasing the locking-bar 30.

In operation, the pin or bolt 29 will be pressed

forwardly in the slot 25 by the forward movement of the draw-bar 12 and clevis 27 and on account of the inclination of the slot 25 the beam 11 will normally swing upwardly under control of the locking-bar 30, and on account of the adjustable features of the locking-bar with the notches 26 of the head-piece, the bowl 6 may be maintained at a suitable inclination for earth-scraping and earth-spreading or for conducting the load of material to be dumped, the dumping, as explained, being effected by use of the pull-rope which releases the control-lugs 17 from the lugs 15.

The adjustments provided by the keeper 37 and line of apertures 36 in the link 34 is an advantage since the slot 25 may be disposed in fixed inclination for speedy adjustments for changing the degree of inclination of the blade 10, depending upon the solidity of the earth material to be treated.

The advantage in the use of the link 46 is the fact that it causes a more rapid movement of the control lugs 17, and requires less power than otherwise would be required for actuating the rock-bar 18. When the swing-bar is moved forwardly by use of the pull-rope 20 a limited movement of said link will cause immediate release of the control-lugs from the stop-lugs 15 for the reason that the link is pivoted at 47 between the ends of the swing-bar.

As shown in Fig. 4, the headpiece 23 is provided with a line of apertures 49, and in operation said headpiece, for adjustments, may be swung upwardly, and a pin (not shown, and which may be supported upon the top of the clevis) may be used for maintaining the headpiece at a selected angle relative to the beam.

I claim as my invention,—

1. An earth-scraping, spreading and dumping machine, comprising a forwardly drawn clevis provided with a keeper, a cylindrical bowl provided with stop-lugs on its ends, a forwardly extending beam having a pair of arms pivotally mounted on the ends of the cylindrical bowl, a movable rock-frame on the beam provided with control-lugs for engaging the stop-lugs, a head-piece mounted upon and having a slot receiving the keeper of the clevis and inclined forwardly and downwardly relative to said beam, and movable means on the clevis for engaging the head-piece for preventing a movement of the head-piece relative to the clevis.

2. An earth-scraping, spreading and dumping machine, comprising a cylindrical bowl having stop-lugs on its ends, a beam extending forwardly and having arms pivotally mounted on the ends of the bowl, a movable rock-frame on the beam provided with control-lugs for engaging the stop-lugs of said bowl, a head-piece pivotally mounted upon and provided with a slot formed inclinedly relative to said beam, a forwardly drawn clevis having a pivot pin engaging in the slot of the head-piece, a link on the beam pivoted to the clevis, and a locking-bar movable on the clevis for engaging and controlling the movements of the head-piece.

3. An earth-scraping, spreading and dumping machine comprising a horizontal, cylindrical bowl-member provided with stop-lugs, a beam projecting forwardly and having divergent arms pivotally mounted on the ends of the cylindrical bowl-member, a movable rock-frame on the beam having control-lugs for engaging the stop-lugs of said bowl-member, a forwardly drawn clevis provided with a horizontal pivot-pin, a slotted head-piece provided with notches and pivotally mounted on said beam and slidably mounted on the pivot-pin of the clevis, a link pivotally connecting the clevis with the beam, and a locking-bar movable on the clevis for engaging a selected notch of said head-piece.

4. An earth-scraping, spreading and dumping machine comprising a horizontal, cylindrical bowl-member provided inwardly of its periphery with roller stop-lugs, a beam extending forwardly and having a pair of arms pivotally mounted on the ends of the bowl-member, a swingable frame on the beam having control-lugs for engaging the stop-lugs of the bowl-member, a forwardly drawn clevis having a horizontal keeper, a slotted head-piece mounted on the end of the beam and slidably mounted on the keeper of said clevis, and a locking-bar movable on the clevis and having a lug for engaging in a notch of said head-piece.

5. An earth-scraping, spreading and dumping machine, comprising, in combination with a forwardly drawn clevis-member provided with a keeper, a horizontal, cylindrical bowl-member provided with stop-lugs on its ends inwardly of its periphery, a beam extending forwardly and having arms pivotally mounted on the ends of the cylindrical bowl, a rock-frame on the beam arranged for swinging movements having control-lugs for engaging the stop-lugs of the bowl-member, a head-piece pivotally mounted on the beam having a slot for receiving the keeper of the clevis and provided with notches, a link mounted on the clevis and adjustably mounted on the beam for disposing the head-piece with its slot at an acute angle relative to said beam, and a locking-bar movable on the clevis for engaging in a selected notch of the head-piece.

6. In an earth-scraping, spreading and dumping machine, a forwardly drawn clevis provided with a keeper, a cylindrical bowl having stop-lugs mounted on its ends, a beam having arms pivotally mounted on the ends and extending forwardly of the bowl, a head-piece pivotally mounted upon and having a slot receiving the keeper of the clevis and inclined downwardly and forwardly relative to said beam, co-operating means on the head-piece and clevis for controlling a movement of the head-piece relative to said clevis, and a rock-frame on said beam provided with control-lugs for engaging the stop-lugs of said bowl.

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