

Feb. 22, 1938.

H. M. LIVINGSTON

2,109,394

ROTARY SCRAPER

Filed April 11, 1936

2 Sheets-Sheet 1

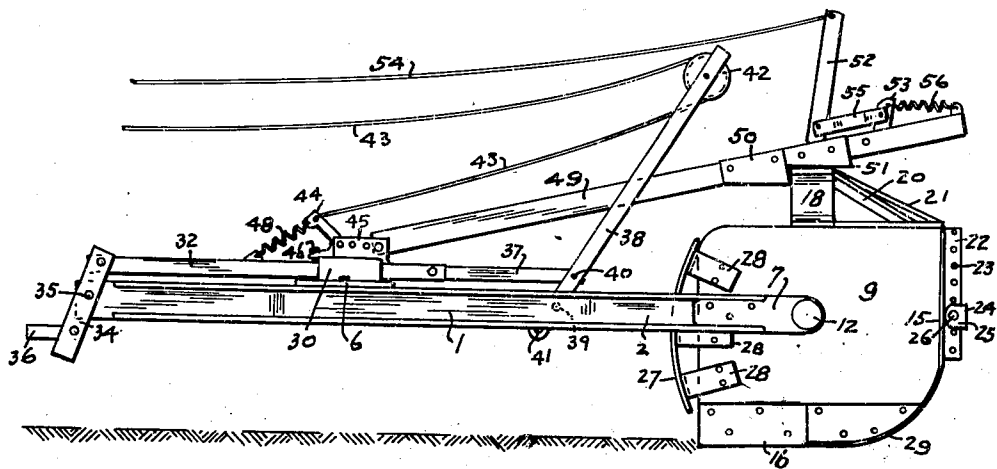


Fig. 1.

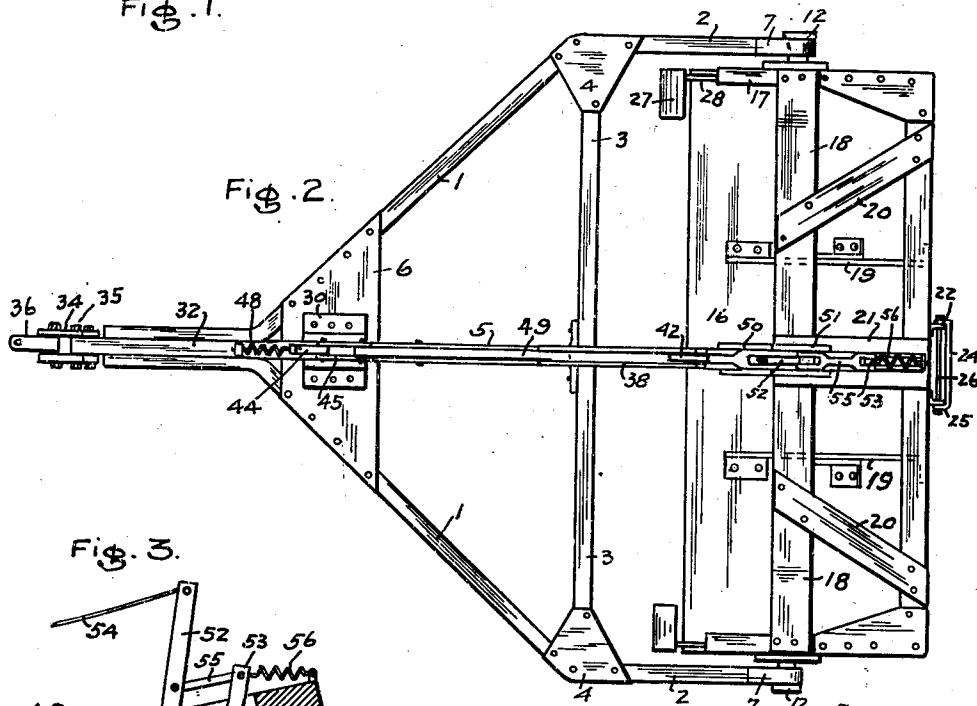


Fig. 2.

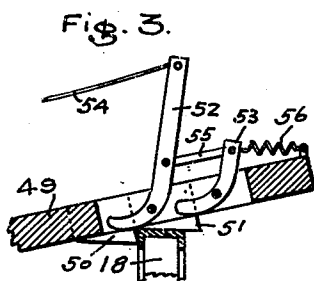


Fig. 3.

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2 Sheets-Sheet 2

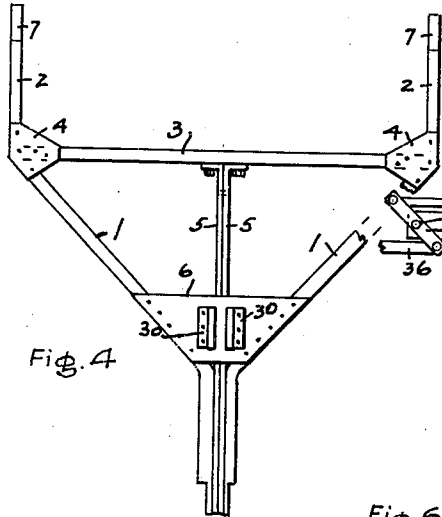


Fig. 4

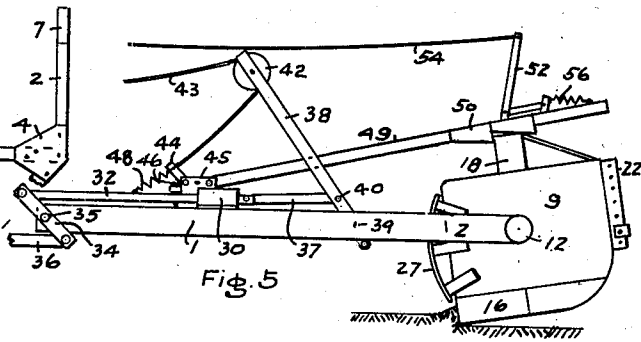


Fig. 5

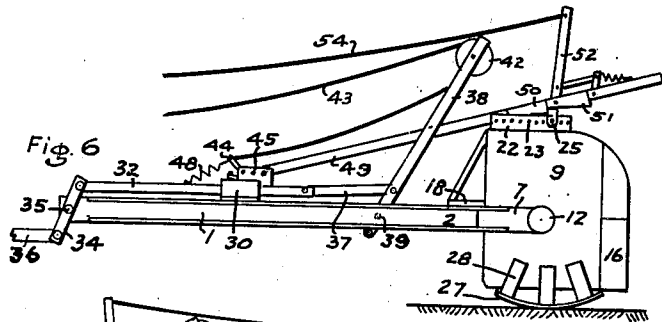


Fig. 6

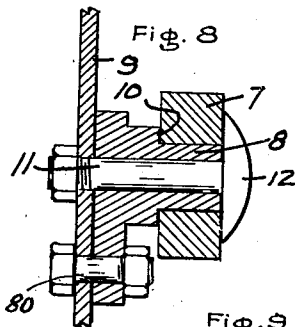


Fig. 8

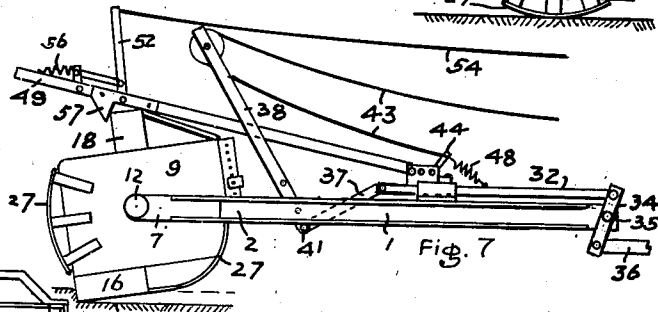


Fig. 7

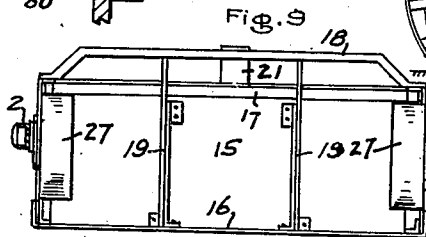


Fig. 9

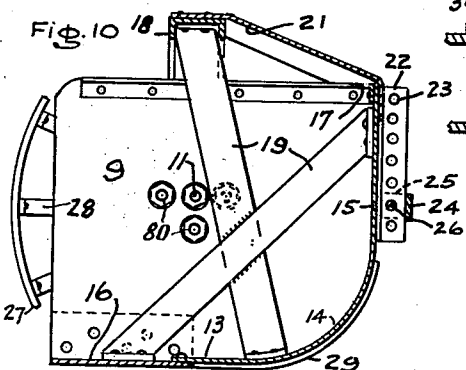


Fig. 10

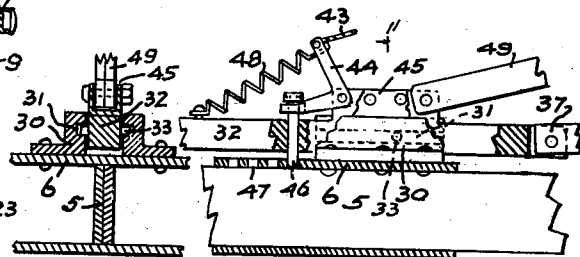


Fig. 11

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UNITED STATES PATENT OFFICE

2,109,394

ROTARY SCRAPER

Harry M. Livingston, Rainier, Wash.

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4 Claims. (Cl. 37-140)

This invention relates to dirt movers, commonly known as rotary scrapers, and has special reference to such scrapers as are adapted to be operated by a tractor or other power-driven means.

The objects of my invention are:—first, to provide improved means whereby the angle of the scoop is controlled; second, to provide an improved form of scoop, which is simpler to make, stronger and more economical to operate; third, to provide a scoop in which the wearing plates may be easily removed and replaced, thereby lengthening the useful life of the scoop; fourth, to provide a scoop which may be easily reversed in its frame and operated by being pushed in front of the tractor, thereby permitting it to function in soft ground; fifth, to provide a scoop which is non-cylindrical in form and yet which provides a means for the control beam to engage it at a substantially equal distance above the trunnions at all attitudes of the scoop; and sixth, to improve the construction of the scoop whereby the trunnions are secured to the scoop in such manner that they will not tear the plates under severe usage and yet hold the frame legs in place by a light bolt.

I attain these and other objects by the devices and arrangements illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation of my improved scraper, showing it in position for taking a shallow cut in the earth; Fig. 2 is a plan thereof; Fig. 3 is a longitudinal section of the outer end of the control beam, showing the cams for releasing the scraper from the control beam; Fig. 4 is a plan view of the frame; Fig. 5 is a view, similar to Fig. 1, showing the scraper adjusted to take a deep cut in the earth; Fig. 6 shows the scraper in dumping position; Fig. 7 is a view of the scraper when placed in reversed position to be pushed by the tractor, and taking a deep cut in the earth; Fig. 8 is a section of the trunnion connection between the scoop and the frame; Fig. 9 is a front elevation of the scoop; Fig. 10 is a vertical section thereof; Fig. 11 is a section of a portion of the control mechanism taken on the line 11-11 in Fig. 12; and Fig. 12 is a side elevation of the control mechanism, showing parts thereof broken away to illustrate the construction thereof.

Similar numerals of reference refer to similar parts throughout the several views.

The frame of my improved scraper is shown along in Fig. 4 and consists of a pair of complementary bent channel irons 1. The rear legs 2 of these channels 1 are parallel and are separated by

sufficient space to permit the proper mounting of the scoop between them. A short distance in front of the scoop space, a cross brace 3 extends from one leg 2 to the other, being suitably secured thereto by means of the riveted plate 4. A double longitudinal bar or plate 5 is secured to the center of the cross brace 3 and extends straight forward therefrom. The channels 1 are bent at the plates 4 and are inclined inward to join the said double central plate 5 and are again bent at this point to lie in contact with the said plate 5. A top plate 6 is secured to both the channels 1 adjacent the point where they meet the said central plates 5. The front portion of the channels 1 are each secured to the said plates 5 to form a rigid connection.

The rear ends of the legs 2 of the channels 1 are each provided with a trunnion bearing block 7 comprising a heavy body securely fastened by bolts to each said leg 2 (Fig. 1) and having a bearing hole therein adapted to receive the shank 8 of the trunnion (Fig. 8). This trunnion comprises a heavy strong body securely bolted to the side plate 9 of the scoop and having the cylindrical shank 8 integral therewith and extending laterally therefrom and provided with an axial hole through said shank and body and through the plate 9 of the scoop. The bearing block 7 fits on the shank 8 against a shoulder 10. The shank 8 extends slightly out beyond the outside surface of the bearing block 7. A comparatively light bolt 11, having a large head 12 is passed through the central hole in the shank 8 and is secured by a nut bearing on the inner side of the plate 9 of the scoop. The head 12 is of greater diameter than the shank 8 and therefore holds the bearing block 7 from pulling off of the said shank 8 and yet permits a perfectly free rotary motion of the trunnion shank 8 in the bearing block 7. The rigid body of the trunnion 8 is provided with a wide base in contact with the plate 9 of the scoop, said base being secured to the plate by means of large bolts 13, thus distributing the stresses from the trunnion to the plate and reducing the tendency to tear the said plate.

The scoop comprises an open, substantially rectangular, body having the two end walls or plates 14, a bottom 15, a curved lower rear corner plate 16 and a rear plate 17. The front portion of the bottom is formed of a heavy wearing plate 18 which comprises the cutting blade of the scoop and which is bent up on each side to fit outside of the side walls 14 to which it is removably attached by suitable bolts or rivets. A suitable angle-iron brace 19 extends around the upper

edges of the sides 9 and rear plate 15. An inverted channel-iron bridge 18 extends across the top of the scoop substantially vertically above the trunnion, from one side wall 9 to the other, and is bent upward therefrom, as shown in Fig. 9, a sufficient distance so that its center is substantially as far from the trunnion as is the back plate 15. This bridge 18 forms a very rigid means connecting the side plates 9 and is a great improvement over the common practice of bringing the back plate over the top of the scoop in a cylindrical form, and it also permits a substantial saving in material in the sides and back of the scoop without losing any rigidity or strength. Two pairs of crossed braces 19 extend from the bottom 13 to the rear plate 15 and the bridge 18 (Fig. 10), said braces being preferably welded together where they cross. The bridge 18 is also braced to the top of the rear plate 15 by the side braces 20 and the central brace 21.

A pair of vertical angle-irons 22, having spaced holes 23 therein are secured in spaced relation to each other to the outside of the rear plate 15 of the scoop, forming a central rack. A bar 24 is provided with down-turned ears 25, adapted to lie outside of the legs of the two said angle-irons 22. A long bolt 26 passes through the ears 25 and the corresponding holes 23 of the angle-iron rack 22. The position of the said bar 24 along the angle-iron rack determines the relative position or attitude of the scoop when dumping (Fig. 6).

The front edges of the two side walls 9 of the scoop are provided with wide skid plates 27 suitable curved, if desired, and secured to the said side walls by means of extension arms 28.

Suitable wearing plates or shoes 29 may be secured to the bottom, the curved corner 14 and the rear plate 15, to take up the wear when the scoop is turned upward to slide thereon in transporting the dirt from one place to another.

A slide guide is mounted on the cross plate 6 of the frame and comprises two complementary parallel spaced castings 30, each provided with a horizontal groove 31 (Fig. 11) and suitably secured to the plate 6. A sliding beam 32 is mounted between the said castings 30 and is provided with suitable lugs 33 adapted to ride freely in the said grooves 31 of the guide castings 30. This beam 32 lies over the front end of the frame and its front end is pivotally connected to a pair of links or levers 34, which are themselves pivoted at 35 to the front end of the frame and which extend down below the frame to a pivotal connection with the coupling link 36 which is adapted to be secured to the tractor or other propelling machine. The rear end of the beam 32 is pivotally secured to a link 37 connecting it to the operating lever 38. This lever 38 is pivoted at 39 to the central plates 5. The lever 38 extends down below the pivot 39. The above-described connecting link 37 is adapted to be connected at its rear end to the said operating lever 38 either at 40, above the pivot 39, or at 41 at the lower end of the lever 38. When the scoop is attached to the tractor to be dragged thereby, as shown in Figs. 1, 5 and 6, the link 37 is connected at 40 to the lever 38, but when the scoop is connected to be pushed by the tractor, as in Fig. 7, the connection is made at the point 41.

A suitable pulley wheel 42 is mounted on the upper end of the operating lever 38. A rope or light cable 43 extends from the driver's seat on the tractor, around the said pulley wheel 42 and is secured to the bell-crank latch lever 44, hereinafter described.

The sliding beam 32 is provided, at a point therein adjacent the said guide castings 30, with a channel or U-shaped extension 45 (Figs. 11 and 12) rigidly secured thereto by welding, or otherwise, the latch lever 44 is mounted between the legs of the said channel 45, at the forward end thereof. One leg of the said bell-crank latch lever 44 extends upward from the said channel 45 to receive the end of the rope 43, attached thereto, and the other leg thereof extending forward and bifurcated at its end to receive the control pin 46, which is mounted in a vertical hole in the said sliding beam 32 and extends there-through, and which is adapted to enter one of a series of spaced holes 47 made in the plate 6 of the frame (Fig. 12). A spring 48 engages the upper end of the bell-crank lever 44 to oppose the pull of the rope 43 and to normally hold the front leg of the lever 44 down, thereby permitting the pin 46 to remain in the hole 47 in which it may be located, until removed therefrom by a pull on the rope 43.

The rear end of the channel 45 is pivotally connected to the control beam 49. This beam 49 is preferably formed of two plates riveted together from the said connection with the channel 45 rearward, but separated at the rear portion to receive the hereinafter described releasing levers. Two pairs of teeth or engaging lugs or plates 50 and 51 are secured to the sides of the control beam 49, at such points therein that the front lug 50 engages the front side of the bridge 18 of the scoop when the scoop is in digging position and such that the rear lug 51 engages the said bridge 18 when the scoop is turned into carrying or transporting position (not shown) and is sliding on the above described shoes 29. It is evident that the position of the scoop, therefore, depends on the longitudinal position of the sliding beam 32, and therefore on the particular hole 47 into which the pin 46 is engaged. The further forward that the pin 46 is placed, the deeper the cut which the scoop will take, while, if the lug 51 is in engagement with the bridge 18, the front edge of the scoop is tipped up and it slides on the shoes 29.

The control beam 49 is released from engagement with the bridge 18 by means of two cam levers 52 and 53 pivotally mounted on the said beam. The front lever 52 (Fig. 3) extends up from the beam 49 and is provided with a rope or cable 54 leading to the driver's seat on the tractor. The said cam lever 52 is connected to the rear cam lever 53 by means of a connecting rod 55. A spring 56 engages the rear lever 53 to draw it rearward in opposition to the pull on the rope 54. The cam levers 52 and 53 are shown particularly in Fig. 3 and are provided with lower portions normally lying in the space between the two parts of the control beam 49 and out of engagement with the bridge 18, but when the rope 54 is pulled they turn in unison on their pivots and emerge from the beam 49 so that one or the other engages the said bridge 18 and lifts the beam 49 sufficiently so that the teeth or lugs 50 and 51 are entirely clear of the said bridge 18, thereby releasing the scoop from the control of said beam.

It is evident that when the tractor is pulling or pushing on the link 36 it tends to force the sliding bar 32 along the frame and this motion is prevented by the pin 46 in its chosen hole and therefore the pin 46 is locked or clamped in its hole by the side pressure exerted thereon. In order, then, to alter the adjustment of the scoop,

it is necessary to first relieve the link 36 from stress from the tractor; second, to pull on the rope 43 to draw the pin 46 out of its hole and to hold it out by keeping the rope 43 taut; and third, if it is desired to adjust the bar 32 forward, the tractor may be backed slightly, thus drawing the bar 32 forward, or vice versa, until the desired adjustment has been secured, when the rope 43 is released, thus dropping the pin 46 in the appropriate hole.

Referring, now, particularly to Fig. 7, in which the relative positions of the tractor and scraper are reversed, it is necessary to make the following changes. First the scoop is removed from the frame and reversed therein; then the connecting link 37 is disconnected from the point 40 in the operating lever 38 and is connected to the said lever at the point 41 below the pivot 39 thereof; then the teeth or lugs 50 and 51 are removed from the control beam 49 and a reversed tooth or lug 57 is substituted therefor. The apparatus is then ready for use, the tractor pushing on the coupling link 36.

Thus it will be seen that I have devised an improved scraper which is readily and quickly adjusted to properly perform its desired functions and which is simply yet ruggedly constructed and in which the wearing parts may be easily removed and renewed.

It is evident that many minor changes may be made in the details of construction without departing from the spirit of my invention as outlined in the appended claims.

Having therefore described my invention what I claim and desire to secure by Letters Patent, is:—

1. In a rotary scraper, the combination with a frame; a substantially rectangular scoop closed on its end, bottom, and rear sides but open on its top and front sides; trunnion connection between the frame and the scoop; a transverse bridge se-

cured to the center of the upper edges of the end sides of the scoop and braced to the bottom and rear sides of the scoop; and a control beam mounted on the frame and releasably engaging the bridge, whereby the rotation of the scoop is prevented.

2. In a rotary scraper, the combination with a frame; a scoop; trunnion connection between the frame and the scoop; a transverse bridge secured to the center of the upper sides of the scoop; a sliding beam mounted on said frame; locking means mounted on said sliding beam and engaging said frame and adapted to hold said sliding beam in adjusted position on said frame; and a control beam secured at one end to said sliding beam and at the other end releasably engaging the bridge, whereby the rotation of the scoop is prevented and the scoop is held in adjusted position.

3. In a power actuated rotary scraper having a frame, a scoop pivotally secured to said frame, and a control beam adapted to engage the scoop to prevent it from rotation, the combination with guiding means mounted on the frame; of a sliding beam mounted in said guiding means; a pivotal connection between said sliding beam and said control beam; a lever pivoted on said frame; a link connecting said lever to said sliding beam, whereby said lever is adapted to adjust said sliding beam on said frame; and means adapted to selectively lock said sliding beam in any of a series of positions, whereby the said scoop is held in a corresponding adjusted position.

4. In a power actuated rotary scraper as set forth in claim 3, wherein said lever is provided with alternate connections to said link, whereby said scoop may be similarly operated and controlled whether being pulled or pushed by the power applied thereto.

HARRY M. LIVINGSTON.