

Feb. 16, 1954

K. E. REISCHL

2,669,043

DUMPING CONTROL FOR SCRAPERS

Filed March 28, 1947

4 Sheets-Sheet 1

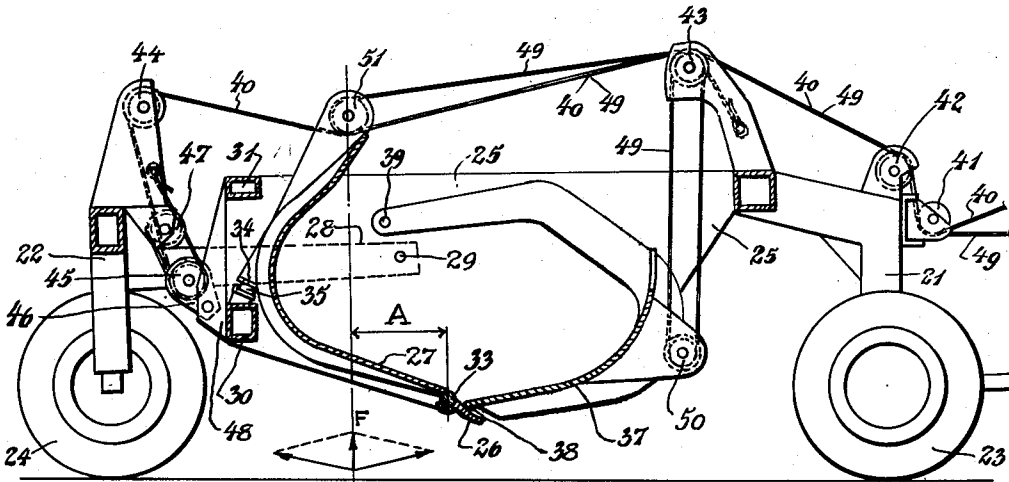


Fig. 1.

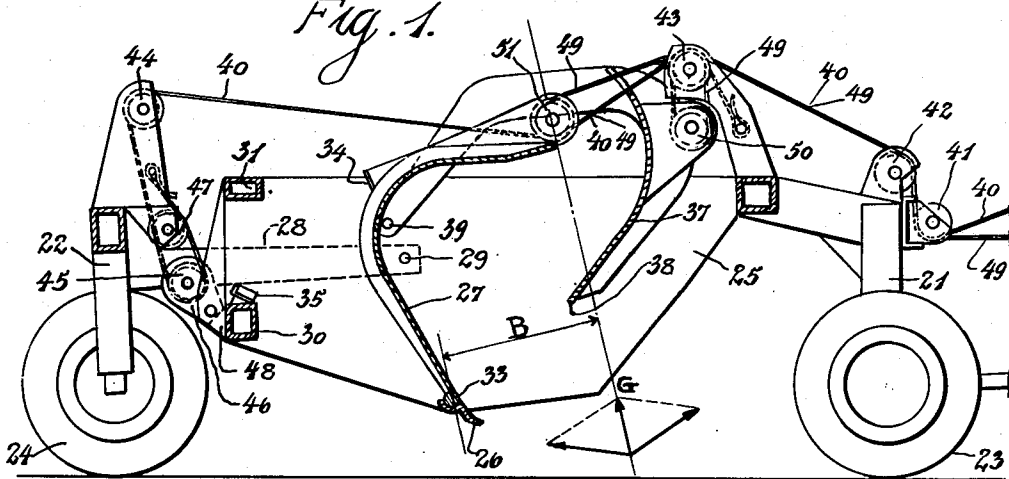


Fig. 2.

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4 Sheets-Sheet 2

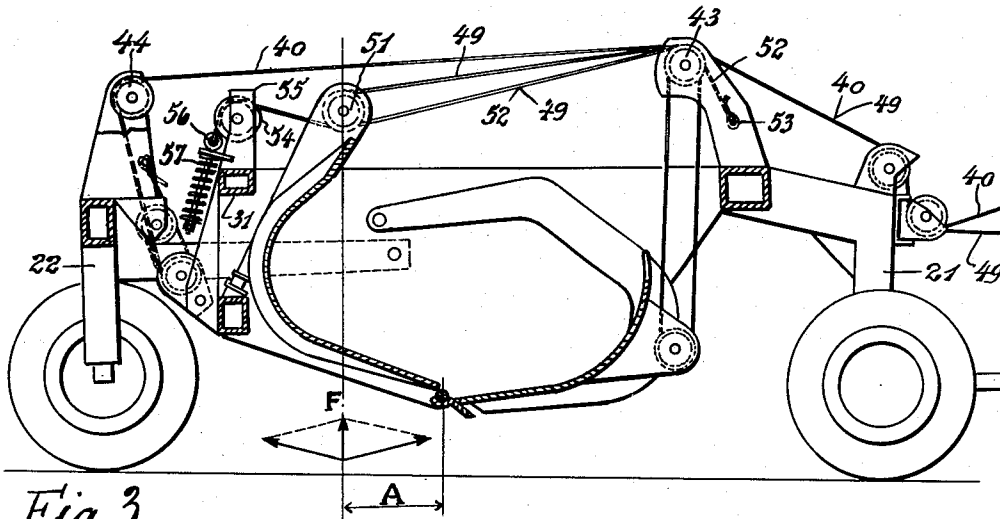


Fig. 3.

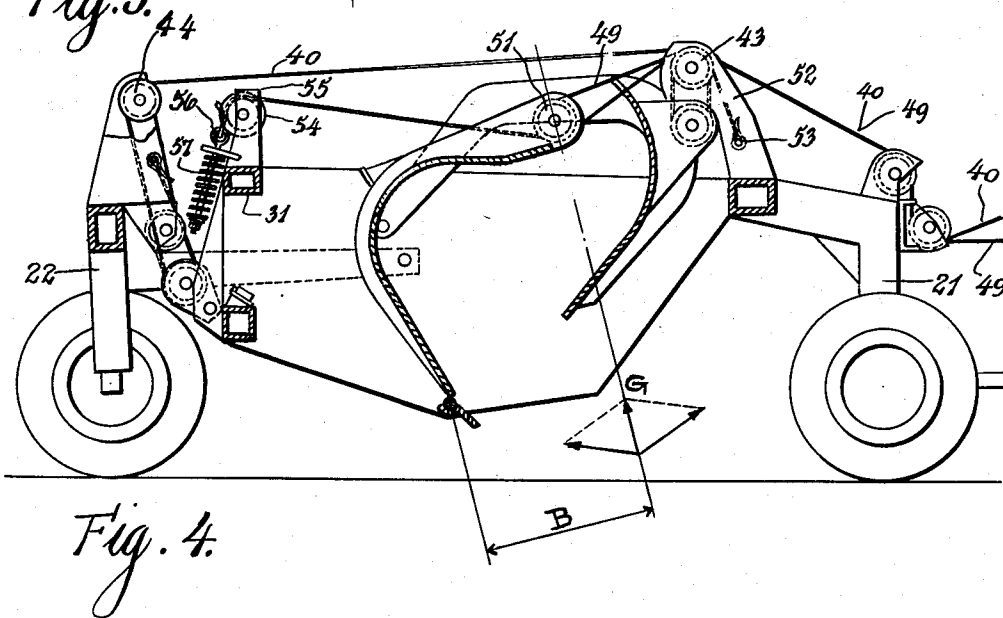


Fig. 4.

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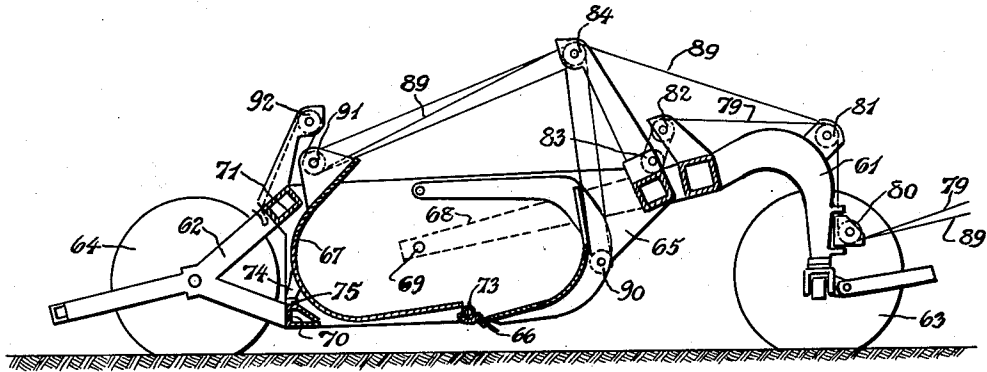


Fig. 5.

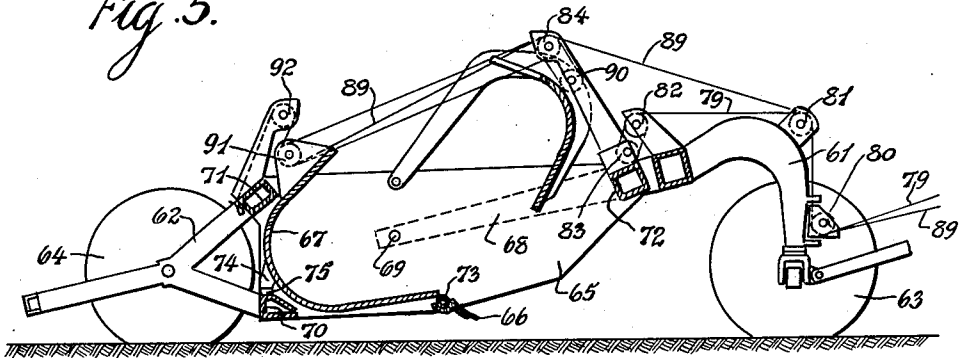


Fig. 6.

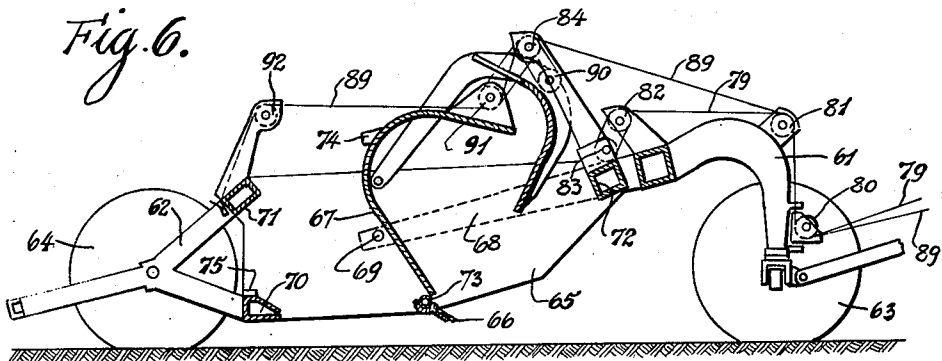


Fig. 7.

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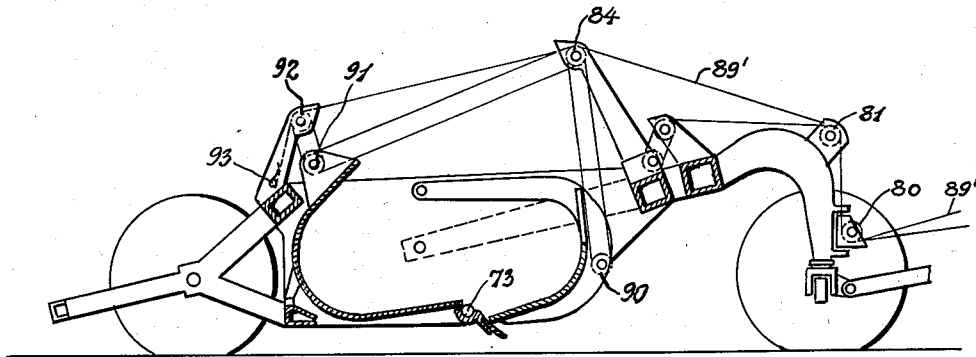


*Fig. 8.*

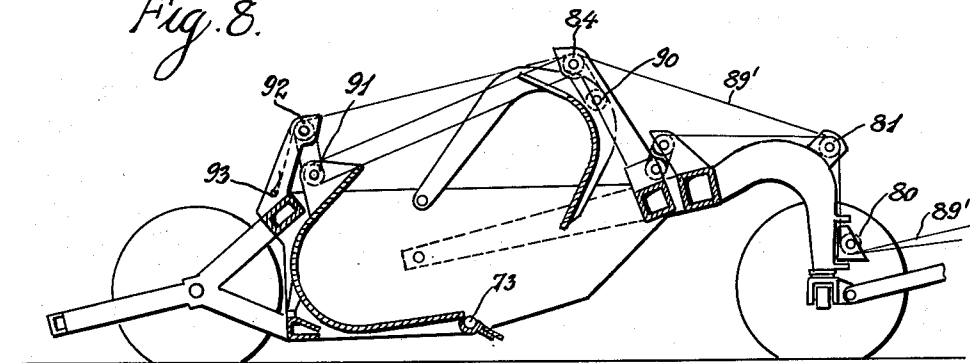


*Fig. 9.*

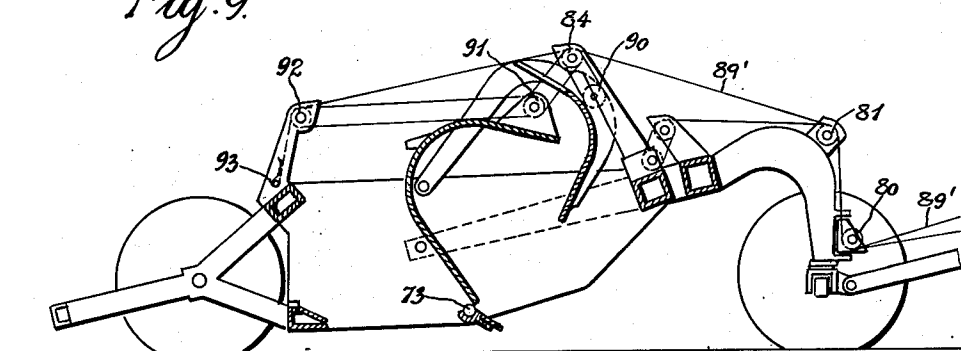


*Fig. 10*

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## UNITED STATES PATENT OFFICE

2,669,043

## DUMPING CONTROL FOR SCRAPERS

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Application March 28, 1947, Serial No. 737,790

15 Claims. (Cl. 37—126)

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My invention relates to new and useful improvements in wheeled scrapers of the general type shown and described in U. S. Patent No. 2,321,410, granted June 8, 1943, to George W. Mork et al., to which patent reference is hereby made, inasmuch as this present invention represents an improvement thereon.

In scrapers of that type, the scraper fills and dumps at its front end.

The main frame of such a scraper is pivoted at either its front end or rear end to a wheeled truck, and the digging and spreading depth is determined by raising or lowering the other end with respect to a second truck. This is the first operation.

In Mork and the first two embodiments of this present invention, the pivoting is at the front end, and the raising and lowering takes place at the rear end; but this is not essential; and in the third embodiment of my invention I show pivoting at the rear end.

The digging blade is carried rigid with the main frame, though this is not essential.

Adjacent the digging blade is pivoted a dirt-extruding curved member, variously termed. For conformity with the nomenclature of the Mork patent, it will here be called a "bucket." Swinging this bucket upward to dump is the second operation. Returning this bucket to load-carrying position is the third operation.

There is also a front closure, known as the "apron." Opening this apron (when digging or dumping), and closing it again for carrying, is the fourth operation.

Mork has two controls (ropes), one of which performs the first operation (namely depth-control), and the other of which successively performs the fourth operation (apron opening) and the second operation (bucket-dumping). For the third operation (bucket-return), Mork depends on a kick-back cam, actuated by the fall of the apron.

It is a principal object of my present invention to provide a new simple and improved means which will serve to initiate the third operation (bucket-return).

A further object is to use this same means to also serve to initiate the second operation (bucket-dumping).

Still further objects are to provide additional torque at the beginning of bucket-dumping, and a cushioning counter-torque at the end of bucket-dumping.

In addition to my principal objects above stated, I have worked out a number of novel and

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useful details, which will be readily evident as the description progresses.

My invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims, and of which three embodiments are exemplified in the accompanying drawings, which are hereinafter particularly described and explained.

Throughout the description, the same reference number is applied to the same member or to similar members.

Figure 1 is a vertical longitudinal section of the first embodiment of my scraper in carrying position.

Figure 2 is a similar section of the same embodiment of my scraper in dumping position.

Figure 3 is a vertical longitudinal section of the second embodiment of my scraper in carrying position.

Figure 4 is a similar section of the second embodiment of my scraper in dumping position.

Figure 5 is a similar section of the first variant of the third embodiment of my scraper in carrying position.

Figure 6 is a similar section of the first variant of the third embodiment of my scraper in partial dumping position (apron alone raised).

Figure 7 is a similar section of the first variant of the third embodiment of my scraper in full dumping position (bucket and apron raised).

Figure 8 is a similar section of the second variant of the third embodiment of my scraper in carrying position.

Figure 9 is a similar section of the second variant of the third embodiment of my scraper in partial dumping position (apron alone raised).

Figure 10 is a similar section of the second variant of the third embodiment of my scraper in full dumping position (bucket and apron raised).

Referring now to Figures 1 and 2 we see that the implement to which I have applied my invention, includes a forward truck 21, and a rear truck 22, supported respectively on forward wheels 23 and rear wheels 24. The forward truck 21 is rigidly secured to two side plates 25, preferably having substantially the outline indicated in the figures. In place of either such truck, we could support one end of the scraper on the propelling vehicle.

These parts constitute parts of the frame of the implement, and are connected together in such a way as to enable the scraper blade 26, which is located forward of the bucket 27, to be raised or lowered at will with respect to the

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ground level. In order to accomplish this, the rear truck 22 is preferably provided with rigid forwardly projecting side arms 28 that extend forwardly to a point about midway between the two trucks, at which point the arms 28 are connected by pivot bolts or pins 29 to the side plates.

Rigidly secured to the side plates 25, I provide a transverse lower beam 30, and an upper beam 31, which latter beam may if desired be made of lighter construction than the lower beam. The inclined scraper blade 26 is preferably rigidly secured to the side plates 25, and cuts into the earth when the bucket 27 is being filled. Adjacent the blade 26 and preferably at its rear edge, the bucket 27 is pivotally mounted on a transverse pivot bar 33.

When the bucket 27 is in the position of rest, as indicated in Figure 1, the stop-bracket 34, carried by the rear face of the bucket, rests against a bumper or bumpers 35 on the top of lower beam 30, and this limits the downward movement of the bucket.

During the scraping operation the blade 26 is held at a low level so as to engage the dirt to be picked up, and the dirt passes over the blade into the bucket. As this takes place, an apron 37 at the forward end of the bucket is held in an elevated position: that is to say, in a partially open position so that as the dirt passes up between the lower edge 38 of the apron 37 and the blade 26, the dirt piling up in the bucket 27 can gravitate into the apron, after which the apron 37 can be moved to a closed position so as to retain the load. The apron is pivotally supported on side plates 25 by pivot pins 39. The load-retaining position is shown in Figure 1. The digging position is not shown.

The reeving of the two control cables, will now be described.

Rope 43 controls the first listed operation, namely depth control, as in Mork. It passes, from a winch (not shown) under one of fairlead sheaves 41, over one of sheaves 42, over one of sheaves 43, under one of sheaves 51 on bucket 27, over sheave 46 on the rear truck 22, and thence around several sheaves 45 in block 46 and sheaves 47 on the rear truck 22, finally being anchored to either. Block 46 is secured to flanges 48 which are welded to cross-beams 30 and 31 on the main frame.

Rope 49 controls the second listed operation, namely dumping, and the fourth listed operation, namely apron-opening, as in Mork. It passes, from the winch, under one of fairlead sheaves 41, over one of sheaves 42, over one of the sheaves 43, and thence preferably two or more times down and around the sheaves 50 on apron 37 and sheaves 43, thence back from one of sheaves 43 to and around sheave 51 on the bucket 27, and back to an anchorage adjacent sheaves 43.

Drawing-in on this rope 49 first draws sheaves 43 and sheave 50 together, thus raising the apron 37 until these sheaves are chock-a-block, thus dumping the contents of the apron. Further drawing-in of this rope 49 then draws sheave 51 and sheaves 43 together, thus pulling the bucket 27 forward to dump its contents.

Turning now to the subject matter of my invention, we see that when bucket 27 is in lowered or "carry" position (Figure 1), rope 40 is deflected downward by one of sheaves 51 at the top of the bucket so that tension in rope 40, which is proportional to the weight of the scraper frame, results in an upward force  $F$  (less than the weight of the bucket) acting against the top of

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the bucket. The torque produced by this force  $F$  acting at the end of moment arm  $A$  tends to rotate bucket 27 clockwise (i. e. forward) about pivot bar 33, thus providing the additional torque necessary to free the bucket from its "carry" position in which it may be stuck on account of dirt and sticky material accumulated at and between the sides of the bucket 27 and side plates 25. This same torque will also cushion the bucket as it returns from dumping to carry or digging position. The extent of the cycle for which this lifting and cushioning effect is obtained depends upon relative vertical positions of sheaves 43 and 44 on the one hand and sheaves 51 on the other hand. The higher sheaves 43 and 44 are relative to sheaves 51 in carry position the greater the force  $F$  over a greater portion of the cycle. Likewise the relative height of sheaves 43 and 44 will determine the length of moment arm  $A$ . Thus the higher sheaves 44 are relative to sheaves 43, the longer the moment arm  $A$ . It should be noted that when the sheave 51 is in a certain intermediate position between the position of Figure 1 and the position of Figure 2, lever-arm  $A$  is reduced to zero, and hence there is no torque in either direction on the bucket; and furthermore, if sheaves 43 and 44 be placed low enough, force  $F$  will be negligible throughout quite a range of mid-position of the bucket, which fact combined with very short lever-arm, will result in negligible torque.

Turning now to the dumping portion of the cycle, we see that when bucket 27 is in raised or "dump" position (Figure 2), rope 40 is again deflected downward by its sheave 51, so that tension in rope 40 results in an upward force  $G$  being exerted against the top of the bucket. Here, however, the torque produced by this force  $G$  acting at the end of moment arm  $B$  tends to rotate bucket 27 anticlockwise (i. e. backward) about pivot bar 33, thus freeing the bucket from its nearly stalled position above its pivot 33 and forcing the bucket backward until its center of gravity is well back of the pivot 33. Here again the amount of the return force, the length of the moment arm, and the extent of the cycle over which the force acts is governed by the relative heights of sheaves 43, 44 and 51.

Although I have in my first embodiment shown my bucket actuated at each end of its cycle by a force set up when the bucket deflects the blade-lowering-and-raising rope 40, which is kept in tension by the weight of the scraper frame, it is clear that the same action can be obtained by deflecting any other suitably suspended rope that is in tension and is subject to deflection.

Accordingly, for my second embodiment I show, in Figures 3 and 4, the bucket deflecting, in lowered and raised positions respectively, an independent rope 52, which passes from an anchorage as at 53 over one of sheaves 43 on front truck 21, under one of sheaves 51 on the bucket, over a sheave 54 on bracket 55 on cross beam 31 and thence to the rod 56 of compression spring 57 which keeps rope 52 under tension. Although I show compression spring 57 and sheave 54 preferably located on the rear end of the main frame, either one or both of them could be located on some other part of the scraper. The principles of operation of this embodiment are the same as in my second embodiment, except that tension in the deflected rope 52 depends on the force progressively increasing with compression of spring 57 instead of on the constant weight of the scraper frame.

Turning now to the first variant of my third

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embodiment, shown in Figures 5 to 7 inclusive, we see that it is similar in principle to my first embodiment, except that it shows my invention used on a scraper in which the pivoting is at the rear end and the raising and lowering is at the front end of the scraper (this is not, however, an essential difference), and in which additional torque at the beginning of bucket-dumping and a counter-torque at the end of bucket-dumping are obtained by deflection of a reach of the common bucket-dumping and apron-opening rope, instead of by deflection of the depth-control rope, although in this variant, this deflected reach does not serve to initiate bowl return, and thus accomplishes only a part of the objectives of my invention. Thus in this variant the level of the blade can be kept constant during the dumping operation.

Referring to Figures 5 to 7, we see that the scraper of the first variant of my third embodiment includes a forward truck 61, and a rear truck 62, supported respectively on forward wheels 63 and rear wheels 64. The rear truck 62 is rigidly secured to two side plates 65, preferably having substantially the outline indicated in the figures. In place of either such truck, we could support one end of the scraper on the propelling vehicle.

These parts constitute parts of the frame of the implement, and are connected together in such a way as to enable the scraper blade 66, which is located forward of the bucket 67, to be raised or lowered at will with respect to the ground level. In order to accomplish this, the front truck 61 is preferably provided with rigid rearwardly projecting side arms 68 that extend rearwardly to a point about midway between the two trucks, at which point the arms 68 are connected by pivot bolts or pins 69 to the side plates.

Rigidly secured to the rear end of the side plates 65, I provide a transverse lower beam 70, and an upper beam 71; and to the forward end of side plates 65 I similarly secure transverse beam 72. The inclined scraper blade 66 is preferably rigidly secured to the side plates 65, and cuts into the earth when the bucket 67 is being filled. Adjacent the blade 66 and preferably at its rear edge, the bucket 67 is pivotally mounted on a transverse pivot bar 73.

When the bucket 67 is in the position of rest, as indicated in Figure 5, the stop-bracket 74, carried by the rear face of the bucket, rests against a bumper or bumpers 75 on the top of lower beam 70, and this limits the downward movement of the bucket.

The scraping operation is as described above in the case of my first embodiment.

The reeving of the two control cables, will now be described.

Rope 79 controls the first listed operation, namely depth control, as in Mork. It passes, from a winch (not shown) under one of fairlead sheaves 80, over one of sheaves 81, and thence around several sheaves 82 on forward truck 61 and sheaves 83 on beam 72, finally being anchored to either.

Rope 89 controls the second listed operation, namely dumping, and the fourth listed operation, namely apron-opening, as in Mork. It passes, from the winch (not shown), under one of fairlead sheaves 80, over one of sheaves 81, over one of the sheaves 84, and hence one or more times around sheaves 90 on the apron and sheaves 84, thence over and around one of sheaves 91 on the bucket and back over and around another of

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sheaves 84, thence back under another of sheaves 91, thence up and over sheave 92 on rear truck 62, and finally to an anchorage adjacent sheave 92.

Drawing-in on this rope 89 first draws sheaves 84 and 90 together, thus raising the apron until these sheaves are chock-a-block, thus dumping the contents of the apron. Further drawing-in of this rope 89 then draws sheaves 91 and sheaves 84 together, thus pulling the bucket forward to dump its contents.

From Figure 5, it is seen that when the bucket is in lowered or "carry" position, the single reach of rope 89 which extends between sheaves 84 and 92 is deflected downward by one of sheaves 91 at the top of the bucket so that tension in rope 89, which is proportional to the weight of the loaded bucket and the apron results in an upward force acting against the top of the bucket. The torque produced by this force is additional to that resulting from the pull between sheaves 84 and 91 and assists to rotate the bucket clockwise (i. e. forward) about pivot bar 73, thus freeing the bucket from its "carry" position in which it may be stuck on account of dirt and sticky material accumulated at and between the sides of the bucket and side plates 65. This same torque will also cushion the bucket as it returns from dumping to carry or digging position. Just as in my other embodiments, the amount of this lifting and cushioning effect and the extent of the cycle for which it is obtained depends upon relative positions of sheaves 84, 91, and 92.

Turning now to the dumping portion of the cycle, we see that when the bucket is in raised or "dump" position (Figure 7), rope 89 is again deflected downward by sheave 91, so that tension in rope 89, which is proportional to the weight of the apron, results in an upward force being exerted against the top of the bucket. Here, however, the torque produced by this force opposes that produced by the pull between sheaves 84 and 92 and tends to rotate bucket 67 anticlockwise (i. e. backward) about pivot bar 73, thus setting up a counter-torque which serves to cushion the end of the dumping cycle. Here again the amount of the torque, and the extent of the cycle over which it acts is governed by the relative positions of sheaves 84, 91 and 92.

Turning now to the second variant of my third embodiment, as shown in Figures 8 to 10 inclusive, we see that, just as in the first variant, initiation of bucket dumping and bucket return is obtained by means of the common bucket-dumping and apron-opening rope. However, the reeving of this rope for this purpose differs from that of the first variant in that instead of merely deflecting this rope under a sheave on the bucket, a two-part (or more) reeving between this bucket sheave and a sheave on the rear of the scraper is employed, as hereinafter more particularly described.

Referring to Figures 8 to 10, we see a scraper pivoted at the rear end and raised and lowered at the front end, just as in the first variant, although this is not essential. Likewise the mounting of the bucket and the apron and the reeving of the depth control rope are the same as in the first variant.

I will now describe the reeving of the bucket-dumping and apron-opening control rope.

This rope 89' passes, as in the first variant, from a winch (not shown) under one of fairlead sheaves 80, over one of sheaves 81, thence preferably four times over and around sheaves

84 on the front truck and sheaves 90 on the apron, thence preferably twice over and around other of sheaves 84 on the front truck and other of sheaves 91 on the bucket, thence around another of sheaves 84 on the front truck and over one of sheaves 92 on the rear truck, thence preferably once over and around another of sheaves 91 on the bucket and another of sheaves 92 on the rear truck, and finally to an anchorage as at 93. Although I have described rope 89' as reeved in sequence first to the apron from sheaves 84, then to the bucket from sheaves 84, and then again to the bucket from sheaves 92, it is evident that this particular sequence of reeving is not essential and could be varied to suit without affecting the operation.

Drawing-in on rope 89' first draws sheaves 84 and 90 together, thus raising the apron until these sheaves are chock-a-block, thus dumping the contents of the apron. Further drawing-in of this rope 89' then draws sheaves 91 and sheaves 84 together, thus pulling the bucket forward to dump its contents.

By comparing Figures 8 to 10 with Figures 5 to 7, it is seen that functionally the only difference between the two variants is that, in the variant of Figures 8 to 10 a multiple reach of rope 89' around certain of sheaves 84, 91 and 92, takes the place of and performs the function of the single reach of rope 89 which passes over one sheave 84 under sheave 91 and over sheave 92 in the variant of Figures 5 to 7.

The number of reaches in this multiple reach of rope 89' in Figures 8 to 10 is the number of reaches from sheaves 91 to sheaves 92. It is to be noted that the same rule applies equally to the variant of Figures 5 to 7.

Having now described and illustrated one form of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts herein described and shown.

I claim:

1. In a carry-type earth-moving scraper, having: a main frame, comprising side-plates and cross-bracing; a first ground-support, supporting one end of the main frame; a second ground-support, supporting the other end of the main frame for vertical movement relative thereto; a transverse forwardly-pointing digging-blade, carried by the main frame adjacent the bottom thereof; means, operatively connecting the second ground-support to the main frame, to raise and lower the free end of the main frame about the first ground-support, and thereby raise and lower the digging-blade; a dirt-retaining element, pivoted on the main frame adjacent the digging-blade, so that this element may be tilted forwardly from dirt-retaining position to dumping position; and means, operatively connecting the main frame to said element remote from the pivot thereof, for thus tilting said element; the combination therewith of: a reach of rope, extending from front to rear of the scraper, and supported thereby; means operatively connected with this reach of rope for maintaining tension therein; and means, carried by the dirt-retaining element remote from the pivot thereof, and engaging and movable along the reach of rope; this reach of rope, the pivot of the dirt-retaining element, and the movably engaging means being so disposed relative to each other that the force applied by the reach of rope against the movably engaging means, when the reach of rope is under tension, tends to tilt the element forwardly

when in its dirt-retaining position, and tends to tilt the element rearwardly when in its extreme dumping position.

2. A scraper according to claim 1, characterized by the fact that the reach of rope constitutes a part of the means for tilting the dirt-retaining element from dirt-retaining position to dumping position.

3. A scraper according to claim 1, characterized by the fact that the means which maintains tension in the reach of rope is a spring.

4. A scraper according to claim 1, characterized by the fact that the reach of rope constitutes a part of the means for performing one of the operations of the scraper.

5. A scraper according to claim 4, further characterized by the fact that the reach of rope constitutes a part of the means for raising and lowering the digging blade.

6. A scraper according to claim 5, further characterized by the fact that the movably engaging means carried by the dirt-retaining element is a sheave mounted adjacent the top thereof, and that the reach of rope passes under the sheave thereby engaging the sheave.

7. In a carry-type earth-moving scraper, having: a main frame, comprising side-plates and cross-bracing; a first ground-support, supporting one end of the main frame; a second ground-support, supporting the other end of the main frame for vertical movement relative thereto; a transverse forwardly-pointing digging-blade, carried by the main frame adjacent the bottom thereof; means, operatively connecting the second ground-support to the main frame, to raise and lower the free end of the main frame about the first ground-support, and thereby raise and lower the digging-blade; a dirt-retaining element, pivoted on the main frame adjacent the digging-blade, so that this element may be tilted forwardly from dirt-retaining position to dumping position; and means, operatively connecting the main frame to said element remote from the pivot thereof, for thus tilting said element; the combination therewith of: a reach of rope, extending from front to rear of the scraper, and supported thereby; means operatively connected with this reach of rope for maintaining tension therein; and means, carried by the dirt-retaining element remote from the pivot thereof, and engaging from above and movable along the reach of rope; this reach of rope, the pivot of the dirt-retaining element, and the movably engaging means being so disposed relative to each other that, at some position of the dirt-retaining element intermediate its dirt-retaining position and its extreme dumping position, there is a reversal of a component of the force applied by the reach of rope against the movably engaging means, namely the component perpendicular to the line from the pivot to the movably engaging means.

8. In a carry-type earth-moving scraper, having: a main frame, comprising side-plates and cross-bracing; a first ground-support, supporting one end of the main frame; a second ground-support, supporting the other end of the main frame for vertical movement relative thereto; a transverse forwardly-pointing digging-blade, carried by the main frame adjacent the bottom thereof; means, operatively connecting the second ground-support to the main frame, to raise and lower the free end of the main frame about the first ground-support, and thereby raise and lower the digging-blade; a dirt-retaining element, pivoted on the main frame adjacent the dig-

ging-blade, so that this element may be tilted forwardly from dirt-retaining position to dumping position; and means, operatively connecting the main frame to said element remote from the pivot thereof, for thus tilting said element; the combination therewith of: a reach of rope, extending from front to rear of the scraper, and supported thereby; means operatively connected with this reach of rope for maintaining tension therein; and means, carried by the dirt-retaining element remote from the pivot thereof, and engaging and movable along the reach of rope; this reach of rope, the pivot of the dirt-retaining element, and the movably engaging means being so disposed relative to each other that the reach of rope throughout the cycle of the dirt-retaining element extends between two locations, at least one of which is remote from the path of travel of the movably engaging means.

9. In a carry-type earth-moving scraper, having: a main frame, comprising side-plates and cross-bracing; a first ground-support, supporting one end of the main frame; a second ground-support, supporting the other end of the main frame for vertical movement relative thereto; a transverse forwardly-pointing digging-blade, carried by the main frame adjacent the bottom thereof; means, operatively connecting the second ground-support to the main frame, to raise and lower the free end of the main frame about the first ground-support, and thereby raise and lower the digging blade; a dirt-retaining element, pivoted on the main frame adjacent the digging-blade, so that this element may be tilted forwardly from dirt-retaining position to dumping position; and means, operatively connecting the main frame to said element remote from the pivot thereof, for thus tilting said element; the combination therewith of: a reach of rope, extending from front to rear of the scraper, and supported thereby; means operatively connected with this reach of rope for maintaining tension therein; and means, carried by the dirt-retaining element remote from the pivot thereof, and engaging and movable along the reach of rope; this reach of rope, the pivot of the dirt-retaining element, and the movably engaging means being so disposed relative to each other that said movably engaging means bends said reach into an obtuse angle at the point of contact between said movably engaging means and said reach, when the dirt-retaining element is in a position intermediate its dirt-retaining position and its extreme dumping position, and that the force applied by the reach of rope against the movably engaging means, when said reach is under tension, tends to tilt the dirt-retaining element forward, with diminishing effect, from its dirt-retaining position.

10. A carry-type earth-moving scraper according to claim 9, characterized by the fact that the reach of rope serves also as a part of the means to tilt the dirt-retaining element forwardly from dirt-retaining position to dumping position.

11. A carry-type earth-moving scraper according to claim 9, characterized by the fact that the reach of rope serves also as a part of the means to raise and lower the digging blade.

12. A carry-type earth-moving scraper, including: a main frame, comprising side-plates and cross-bracing; a first ground-support, supporting one end of the main frame; a second ground-support, supporting the other end of the main frame for vertical movement relative thereto; a transverse forwardly pointing digging-blade, carried by the main frame adjacent the bottom thereof; means, operatively connecting the second ground-support to the main frame, to raise and lower the free end of the main frame about the first ground support, and thereby raise and lower the digging-blade; a dirt-retaining element, pivoted on the main frame adjacent the digging-blade, so that this element may be tilted forwardly from dirt-retaining position to dumping position; means, operatively connecting the main frame to said element remote from the pivot thereof, for thus tilting said element; one of the two above-mentioned means comprising a rope, which has a reach extending from front to rear of the scraper and supported thereby, and means operatively connected with this reach of rope for maintaining tension therein; and means, carried by the dirt-retaining element and engaging and movable along said reach; said reach, the pivot of the dirt-retaining element, and the movably engaging means being so disposed relative to each other that the force applied by said reach against the movably engaging means, when said reach is under tension, tends to tilt the dirt-retaining element rearwardly when in its extreme dumping position.

13. A carry-type earth-moving scraper according to claim 12, characterized by the fact that the one of the two means which is stated as comprising a rope and means for maintaining tension in said rope is the means for raising and lowering the digging blade.

14. A carry-type earth-moving scraper according to claim 12, characterized by the fact that the one of the two means which is stated as comprising a rope and means for maintaining tension in said rope, is the means for tilting the dirt-retaining element from dirt-retaining position to dumping position.

15. A carry-type earth-moving scraper according to claim 14, characterized by the fact that the means for maintaining tension in the rope is a second dirt-retaining element, pivotally supported by the main frame at a point above and ahead of the first dirt-retaining element, and depending from said pivot, and that a second reach of said rope, extending from the main frame to the second element at a point remote from its pivot, serves to shift said second element to dump.

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