

Jan. 12, 1943.

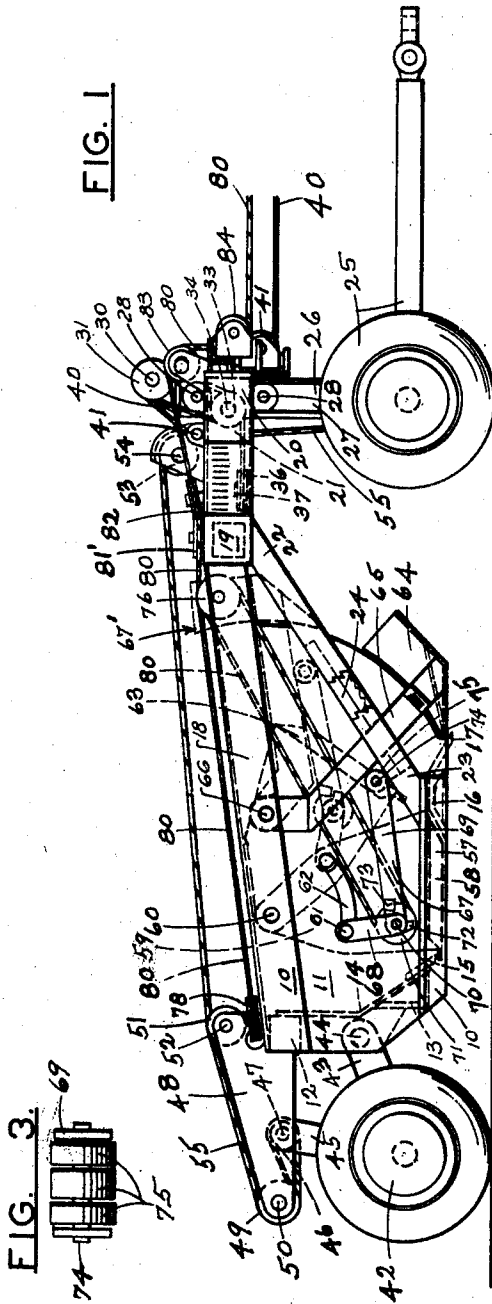
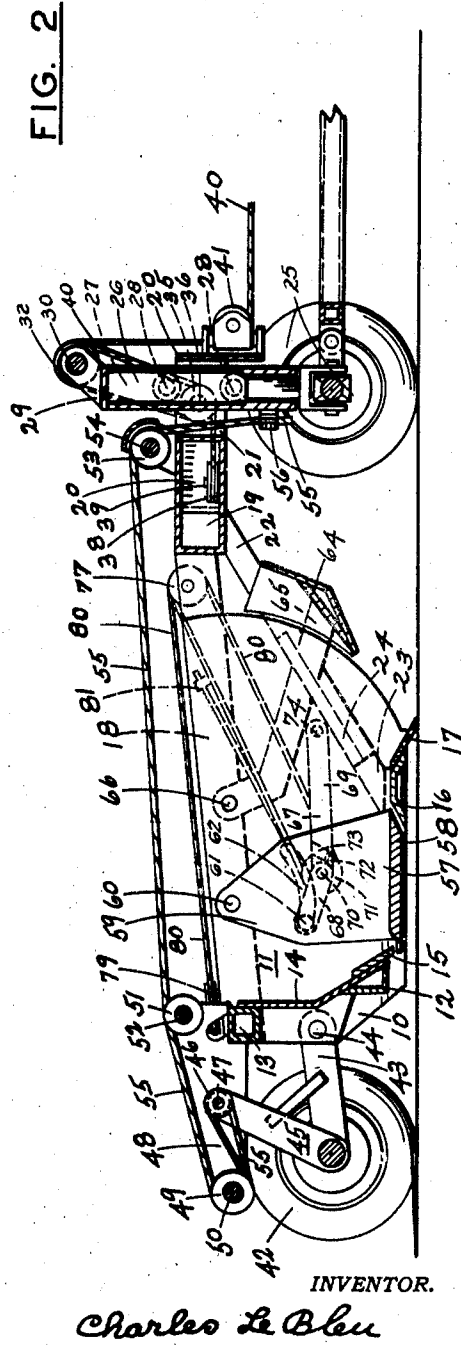
C. LE BLEU

2,307,933

SCRAPER

Filed Feb. 8, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 4

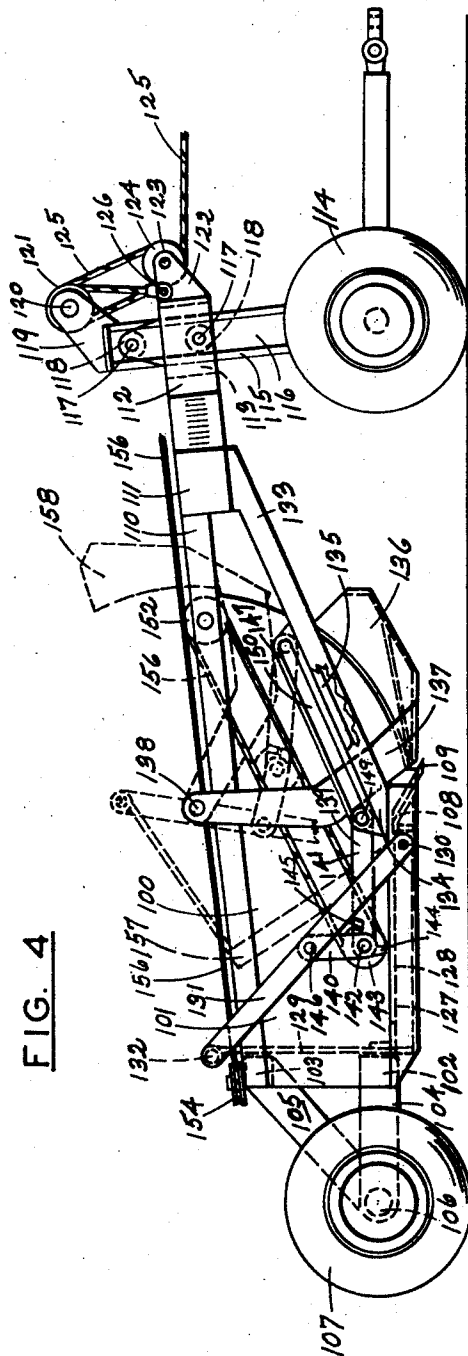
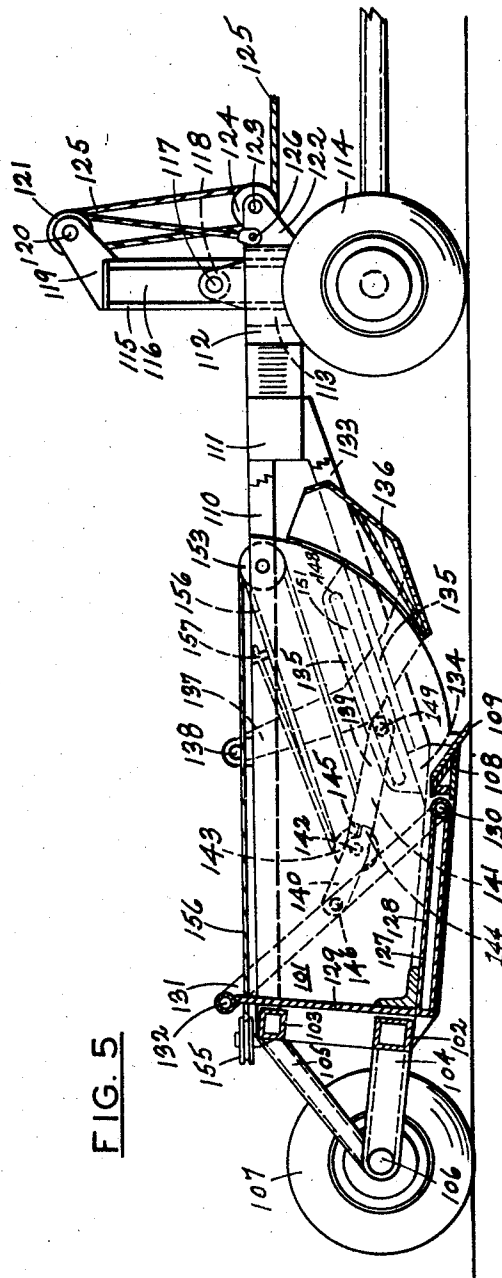


FIG. 5



INVENTOR.

Charles Le Bleu

UNITED STATES PATENT OFFICE

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Charles Le Bleu, Los Angeles, Calif.

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2 Claims. (Cl. 37—126)

This invention relates in general to material digging, scraping, transporting and leveling machines for use in leveling ground, building roads, excavating, grading and transporting materials, and more particularly to that class of material handling machines commonly known as "scrapers," and is an improvement upon my Patent No. 2,212,713 issued August 27, 1940, in which I disclose a bowl, and an auxiliary bowl arranged to cooperate with the bowl at its forward end to retain the load, and control means for said auxiliary bowl which acts in response to movement of the bowl. This invention is also an improvement upon my co-pending application Serial No. 254,851 filed February 6, 1939, and which eventuated in Patent No. 2,260,388, October 28, 1941, in which I disclose a common control for the bowl and auxiliary bowl which is adapted to move the auxiliary bowl exclusively of the main bowl and vice versa.

Now, while gathering a load with a machine of the character above referred to, the auxiliary bowl will ordinarily be adjusted, up and down, in the lower portion of its path of travel a number of times before finally being brought to rest in position closing the front end of the main bowl, and in my Patent No. 2,212,713 these adjustments of the auxiliary bowl are accomplished by adjusting the relatively heavier main bowl together with any load that has, at the time of the adjustment, accumulated therein.

In my Patent No. 2,260,388, a single cable is applied to the bowl and apron so that the apron may be adjusted during the loading operation without the necessity of adjusting the main bowl. However, this single cable control necessitates the use of a large number of sheaves, as will be seen, about which the single cable is reeved. This fact coupled with the further fact that the sheaves used on this class of machines are relatively small in diameter, results in subjecting the cable to excessive wear and abuse.

This invention, therefore, has as one of its manifold objects, improvements upon my Patent No. 2,212,713 so as to provide means for controlling the apron exclusively of the bowl during the loading operation, said improvements also constituting an improvement upon my co-pending application Serial No. 254,851 in that the multiplicity of sheaves and the cable reeved thereabout is reduced and simplified.

Perhaps it is best stated at this time that it is quite common to view the auxiliary bowl as having simply open or closed positions. It will be more accurate to view the auxiliary bowl as hav-

ing carrying, intermediate, or dumping positions. In practice, the auxiliary bowl is disposed at its lower limit of travel for carrying position, at its upper limit of travel for discharge position, and at some intermediate position for loading position thereof. The auxiliary bowl is in the intermediate or loading position when disposed at some point in the lower regions of its path of travel so as to be in position to receive and support thereon materials which move upwardly against the load in the bowl and then tumble forwardly onto the auxiliary bowl. Thus, it is seen that, in practice, the auxiliary bowl is more properly viewed as having carrying, intermediate and discharge positions, instead of simply open and closed positions, and hereafter when the intermediate position of the auxiliary bowl is referred to we shall mean a suitable position thereof relative to the main bowl in which the auxiliary bowl is disposed to allow the passage of a load into the main bowl and also to receive and retain a load which moves upwardly against the load in the main bowl and then falls forwardly onto the auxiliary bowl.

More specifically then, an object of this invention is the provision of a main bowl having loading, carrying and discharge positions; an auxiliary bowl arranged in front of said main bowl so as to be loaded in conjunction therewith and having carrying, intermediate, and discharge positions; and control means applied to said bowls and initially operable when actuated to move said auxiliary bowl from carrying to an intermediate position and thereafter operable upon continued actuation thereof to move both bowls concurrently to discharge positions.

Still other objects and advantages of this invention will be apparent to those skilled in the art upon a detailed perusal of the following specifications and the accompanying drawings, and it is to be understood that my invention is susceptible to numerous modifications in the combination, correlation and construction of parts, members and features, and may have wide application in the design, construction and use of scrapers without departing from the spirit of the invention as defined in the annexed claims.

In the drawings:

Figure 1 is a side elevation of my invention with all parts disposed in raised carrying position, the discharge position of the bowls being indicated thereon in broken lines.

Figure 2 is a side elevation, in section, and showing the parts thereof disposed in load gathering and supporting position.

Figure 3 is a front view of the forward end of the toggle link showing the three rollers carried thereby for engaging the frame and the auxiliary bowl.

Figure 4 is a side elevation of a modified form of my invention showing all parts in raised carrying position, the discharge position of the bowls being indicated thereon in broken lines.

Figure 5 is a side elevation, partly in section, of the modified form of my invention showing all parts in the load gathering and supporting positions.

Referring now to the various parts of the preferred embodiment of my invention, reference is made to Figures 1, 2 and 3.

A bowl support 10 comprises spaced apart side walls 11 rigidly connected adjacent their rear ends by beams 12 and 13 and a back wall 14 which is provided at its lower edge with a spreader blade 15. Sidewalls 11 are rigidly connected at their lower forward ends by a blade support beam 16 having a blade 17 detachably secured thereto. Said sidewalls are each provided along their upper edges with a longitudinally extending beam 18 rigid therewith and at their forward ends with a transverse frame 19 having a forwardly projecting portion 20 which is provided at its front end with a well or opening 21 therethrough. Bowl support 10 is provided at each side thereof with an inclined rail 22, rigid at their forward ends with transverse frame 19 and at their lower ends at 23 respectively with an adjacent sidewall 11, the intermediate portion of each of said rails 22 being laterally removed from its adjacent sidewall 11 so as to provide unoccupied space therebetween, each of said sidewalls 11 being provided with a short rail 24 extending parallel to and in spaced relation to the adjacent side of rail 22, thus leaving unoccupied space between rails 22 and the adjacent rails 24, the use of which will become apparent later on.

Means carrying said bowl support 10 so that it may be raised and lowered and transported are provided as follows:

A front wheeled truck 25 is adapted, as shown, for connection to a draft device. A post 26 is articulately supported at its lower end on truck 25, as shown, and extends upwardly through opening 21 in the forward end of frame 20 and is formed to provide opposite channels 27 into each of which a pair of vertically spaced horizontal trunnions 28 extends, said trunnions being rigidly secured to adjacent frame structure 20, and upon the inwardly projecting portion of each of said trunnions a wheel is journaled, as shown, so as to be operably disposed within channels 27. Thus the forward portion of bowl support 10 is mounted for vertical movement on post 26.

Means for imparting vertical movement to the forward end of bowl support 10 is provided as follows:

A bracket 29 is supported on the upper end of post 26 and carries a horizontal pin 30 upon one end of which is journaled a plurality of sheaves 31, see Fig. 1, and upon the opposite end of which is journaled a plurality of sheaves 32, see Fig. 2. A plurality of sheaves 33 are operably arranged relative to sheaves 31 and journaled on pin 34 carried by frame 20, see Fig. 1. A plurality of sheaves 35 are arranged relative to sheaves 32 and journaled upon pin 36 carried by frame 20, see Fig. 2. A direction change sheave 36 is arranged relative to sheaves 33 and journaled on a vertical pin 37 carried by frame 20,

see Fig. 1, and a direction change sheave 38 is arranged relative to sheaves 35 and journaled on a vertical pin 39 carried by frame 20, see Fig. 2. A pull cable 40 is attached to frame 20 at 41 and then reeved about sheaves 31 and 33 after which it passes about direction change sheaves 36 and 38 respectively and is then reeved about sheaves 35 and 32. Cable 40 then extends downwardly from sheaves 32 to and about a direction change sheave 41 swivelly mounted on the forward end of frame 20, and from which it may extend to a winding drum, not shown because of conventional design. Thus it is readily seen that cable 43 may be pulled or slackened to move the forward end of bowl support 10 up or down respectively depending upon whether said cable 40 is pulled or slackened.

Means are provided for supporting, raising and lowering the rear end of bowl support 10 as follows:

A rear wheeled truck 42 includes arms 43 pivotally connected at their forward ends to bowl support 10 as indicated at 44. Wheeled truck 42 is also provided with spaced apart parallel arms 45 between the upper ends of which a sheave 46 is disposed and journaled on pin 47 carried by arms 45. Bowl support 10 is provided with spaced apart parallel arms 48 rigid therewith and overhanging truck 42. A sheave 49 is disposed between the rear ends of arms 48 and journaled on a horizontal pin 50 supported by said arms. A sheave 51 is disposed between the upper forward ends of arms 48 and journaled on a horizontal pin 52 carried by said arms. Forwardly of bowl support 10, a sheave 53 is arranged relative to post 26 and sheave 51 and is journaled on a horizontal pin 54 carried by frame 20. The intermediate portion of a cable 55 passes about sheave 46, carried on the upper ends of arms 45, and passes thence about sheaves 49, 51 and 53 respectively, both ends of which extend downwardly from sheave 53 to a connection with post 26 as shown at 56, see Fig. 2. Thus it will be readily understood that when a pulling force is applied to cable 40 raising the forward end of bowl support 10, sheave 53 carried by frame 20, which in turn is an integral part of bowl support 10, will also move upwardly with respect to post 26, to which cable 55 is anchored at 56, resulting in a pulling force in cable 55 so as to swing the forward ends of arms 43 upwardly, thus raising the rear end of bowl support 10, and when cable 40 is slackened to allow the forward end of bowl support 10 to move downwardly, cable 55 will slacken in response to the downward movement of sheave 53, thus lowering the rear end of bowl support 10.

A main bowl 57 comprises a bottom 58 disposed between sidewalls 11 rearwardly of blade 17, and hanger plates 59 disposed one at each side of said bottom 58 and to the lower edges of which said bottom is secured, said hanger plates 59 being pivotally supported on sidewalls 11 as shown at 60. Main bowl 57 is thus pivotally supported in a position behind said scraper blade 17 to receive and support materials scraped up thereby. Each of the hanger plates 59 are provided with a laterally projecting trunnion 61 rigid therewith and extending laterally through openings 62 provided as shown in each of the sidewalls 11. It will be readily understood that means may be applied to trunnions 61 to swing bottom 58 forwardly and upwardly to a discharge position, indicated in broken lines at 63, see Fig. 1, so as to discharge materials therefrom directly onto

the ground behind said scraper blade 17, that is to say, main bowl 57 may be swung about pivots 60 to dispose the same in a carrying or a discharge position.

An auxiliary bowl 64 is disposed forwardly of blade 17 and includes at each end thereof an arm 65 which is attached at its forward end to the auxiliary bowl and extends rearwardly therefrom between rails 22 and 24 to a pivotal connection with bowl support 10 as shown at 66. Auxiliary bowl 64 is thus mounted to swing about pivots 66 to dispose the same in a carrying, intermediate or a discharge position. The carrying and discharge positions are shown in Fig. 1, the discharge position being indicated thereon in broken lines at 67', an intermediate position being shown in Fig. 2, in which position it is adapted to receive and support material which moves upwardly against a load in the main bowl and then falls forwardly onto the auxiliary bowl.

Control means for the bowls are provided as follows:

A toggle link 67 is disposed one along the side of each of sidewalls 11 and each comprises a short link 68 and a long link 69 pivotally connected at their adjacent ends by a pin 70 upon which sheaves 71 are journaled, each of said links being provided respectively with stops 72 and 73, as shown, and arranged to cooperate in limiting the straightening out or extending action of said links about their pivotal connection 70. Each of said toggle links 67 is journaled at its rear end on an adjacent trunnion 61 carried by the main bowl, and each is provided at its front end with a pin 74 upon which are journaled three rollers 75, see Fig. 3, the end rollers being arranged to engage rails 22 and 24 while the center roller engages the under edge of an adjacent auxiliary bowl arm 65. Fixed sheave blocks 76, see Fig. 1, and 77, see Fig. 2, are disposed one adjacent the forward end of each of side walls 11, as shown, and arranged relative to sheaves 71. A direction change sheave 78, see Fig. 1, is mounted adjacent the rear end of bowl support 10 and arranged relative to sheave block 76. A direction change sheave 79, see Fig. 2, is mounted adjacent the rear end of bowl support 10 and arranged relative to sheave block 77. It will be understood that sheaves 78 and 79 are also arranged relative to each other.

Beginning now with Fig. 2, a cable 80 is anchored at 81 and then reeved about sheaves 71 and 77 and passes thence about direction change sheave 79, thence about direction change sheave 78, see Fig. 1, and is then reeved about sheaves 76 and 71, after which cable 80 extends forwardly from sheaves 76 about suitable direction change sheaves 81', 82 and 83 and swivelly mounted sheave 84, from which it may extend to a suitable winding drum not shown.

Manipulation of cable 80 is resorted to for disposing the bowls in a desired position.

In Fig. 1, both bowls are disposed in a position to support earth, that is, in carrying position. When a pulling force is applied to cable 80, short links 68 are caused to swing forwardly and upwardly about trunnions 61 so that the toggle links 67 are caused to straighten out or extend, the forward ends thereof moving upwardly along rails 22 and 24 while engaged with the auxiliary bowl arms 65 so that when short links 68 and long links 69 have reached their limits of relative movement, as defined by stops 72 and 73 carried thereby, the toggle links 67 and the auxiliary bowl 64 will have been moved to the posi-

tions shown in Fig. 2, and thus the auxiliary bowl has been moved from carrying to intermediate position exclusively of the main bowl in which position the auxiliary bowl is adapted to receive and support material which moves upwardly against the load in the main bowl and then falls forwardly into the auxiliary bowl. Now, the toggle links 67 and the auxiliary bowl 64 having reached the positions shown in Fig. 2, if the pull applied to cable 80 is continued both bowls will be caused to move concurrently to the broken line positions 63 and 67' in response to the collective bodily movement of toggle links 67. Thus, the toggle links are initially operable to move the auxiliary bowl from carrying to intermediate position, exclusively of the main bowl and thereafter operable upon continuing the pull on cable 80 to move both bowls concurrently to discharge positions. Both bowls being in discharge positions cable 80 may be slackened thus allowing both bowls to move concurrently in a downward direction, the main bowl arriving at the carrying position simultaneously with the arrival of the auxiliary bowl at intermediate position at which time cable 80 may be arrested, or further slackened to dispose the auxiliary bowl, exclusively of the main bowl, in any desired intermediate position or in carrying position.

It is to be noted that my toggle link control for the bowls is particularly well adapted for use with the type of main bowl shown in Figures 1 and 2, in as much as this type of bowl, under certain conditions, may have a tendency to swing in response to pressure from below during the loading operation. However, the toggle links constitute thrust devices between the bowls, when the auxiliary bowl is in an intermediate position, acting in a forwardly direction to maintain the auxiliary bowl in an intermediate position while at the same time acting in a rearwardly direction to maintain the main bowl in its true loading or carrying position.

In operation the machine is caused to move across to surface from which a load is to be gathered. All parts being in the position of Fig. 1, a pulling force is applied to cable 80 to raise the auxiliary bowl to intermediate position and cable 40 is slackened until the blade 17 engages the surface to be scraped, after which all parts may appear as in Fig. 2. When the bowls have become loaded cable 80 is slackened to allow auxiliary bowl 64 to come to rest in carrying position to retain the load, and a pulling force is applied to cable 40 for raising bowl support 10 to the position of Fig. 1, in which position the machine is caused to move to a place where the load is to be discharged. To discharge the load, a pulling force is applied to cable 80 resulting in first moving the auxiliary bowl from carrying to intermediate position exclusively of the main bowl and thereafter operable upon continuing the pull on cable 80 to move both bowls concurrently into their respective discharge positions indicated in broken lines at 63 and 67', Fig. 1. When the load has been discharged cable 80 may again be slackened to allow the bowls to move concurrently in a downward direction until the main bowl is in carrying position and the auxiliary bowl is in a selected intermediate position or in carrying position.

Thus we conclude a description of the preferred embodiment of my invention in which the same was combined in a scraper having a main bowl that discharges at the rear end thereof. How-

ever, my invention may be combined in a scraper having a main bowl that discharges at its forward end with equal advantage, and reference is now had to a modified form of my invention shown in Figures 4 and 5, in which a bowl support 100 comprises spaced apart sidewalls 101 rigidly connected at their rear ends by transverse beams 102 and 103, and to which beams rearwardly extending arms 104 and 105 are rigidly secured at their forward ends, said arms being provided at their rear ends with a horizontal axle 106 upon which is journaled a plurality of spaced apart wheels 107.

The lower forward end of sidewalls 101 are rigidly connected by a transverse blade support 109 to which a blade 109 is detachably secured.

Sidewalls 101 are each provided along their upper edges with a beam 110 rigid therewith and at their forward end with a transverse frame structure 111 having a forwardly projecting portion 112. Forwardly projecting portion 112 is formed to provide a vertically extending opening 113 therethrough.

A wheeled truck 114 is disposed beneath opening 113 and is adapted as shown for connection to a draft device.

A post 115 is supported at its lower end on truck 114 and extends upwardly through opening 113, said post being formed to provide channel 116 at each side thereof.

Forward portion 12 of bowl support 100 is provided, at each side of post 115, with a pair of vertically spaced trunnions 117 rigid therewith and extending into channels 116, each of said trunnions having a wheel 118 journaled thereon so as to be operably disposed within said channels. Thus, the forward end of bowl support 100 is mounted for up and down movement on post 115, and means for causing said bowl support to so move is provided as follows.

The upper end of post 115 is provided with brackets 119 rigid therewith and supporting a horizontal pin 120 upon which is journaled a plurality of sheaves 121. The forward end of bowl support 100 is provided with brackets 122 rigid therewith and supporting a horizontal pin 123 upon which is journaled a plurality of sheaves 124. A cable 125 is anchored at 125 and reeved about sheaves 121 and 124, and may extend thence to a winding drum, not shown because of conventional design. Viewing Fig. 4, cable 125 may be slackened to allow the forward end of bowl support 100 to move downwardly about the rear wheels as an axis until blade 109 is in scraping engagement with the surface thereunder so that the various parts may appear as in Fig. 5. Now viewing Fig. 5, a pulling force may be applied to cable 125 to raise the forward end of bowl support 100 so that the various parts may appear as in Fig. 4.

A main bowl 127 is disposed between sidewalls 101 rearwardly of blade 109 and comprises an integral bottom and back wall 128 and 129 respectively, the forward end of bottom 128 being pivotally supported at 130 on bowl support 100 and relative to blade 109. A pair of brace bars 131 are disposed one along the outside of each of sidewalls 101 and are rigidly connected at their upper ends by a transverse beam 132, said beam 132 being attached to the upper edge of backwall 129, the lower ends of brace bars 121 being pivoted at 130 in common with main bowl 127.

Bowl support 100 is provided at each side thereof with an inclined rail 133, rigid at their forward ends with transverse frame 111 and at their

lower rear ends at 134 respectively with an adjacent sidewall 101, the intermediate portion of each of said rails 133 being laterally removed from its adjacent sidewall 101, and each of said sidewalls 101 being provided with a short rail 135 extending parallel to and in spaced relation to the adjacent side of rail 133, thus leaving unoccupied space between rails 135 and adjacent rails 133, the use of which will become apparent later on.

An auxiliary bowl 136 is disposed forwardly of blade 109 and main bowl 127 and is provided at each end with an arm 137 which is attached at its forward end to the auxiliary bowl and extends rearwardly therefrom between rails 133 and 135 to a pivotal connection with bowl support 100 as shown at 138.

A toggle link 139 is disposed one along the side of each of side walls 101 and each comprises a short link 140 and a long link 141 pivotally connected at their adjacent ends by a pin 142 upon which is journaled a plurality of sheaves 143, each of said links being provided respectively with stops 144 and 145, as shown, which are arranged to cooperate in limiting the straightening out or extending action of said links about their pivotal connection 142. Each of toggle links 139 are pivotally connected at their rear ends with an adjacent brace bar 131 intermediate the ends thereof as shown at 146, the forward end thereof being disposed to engage auxiliary bowl arms 137 and arrange between the upwardly projecting portion 147 of rail 133, see Fig. 4, and the corresponding upwardly projecting portion 148 of rail 135, see Fig. 5, and each is provided with a pin 149 that extends laterally therethrough and projects to each side thereof into adjacent slots 150 and 151 formed respectively in the upwardly projecting portions 147 and 148 of rails 133 and 135. Thus the forward ends of toggle links 139 are arranged for movement along slots 150 and 151 while engaging the auxiliary bowl arms 137.

Fixed sheave blocks 152, see Fig. 4, and 153, see Fig. 5, are disposed one adjacent the forward end of each of sidewalls 101, as shown, and arranged relative to sheaves 143 carried by toggle links 139. A direction change sheave 154, see Fig. 4, is mounted adjacent the rear end of bowl support 100 and arranged relative to sheave block 152. A direction change sheave 155, see Fig. 5, is mounted adjacent the rear end of bowl support 100 and arranged relative to sheave block 153. It will be understood that sheaves 154 and 155 are also arranged relative to each other.

Beginning now with Fig. 5, a cable 156 is anchored to bowl support 100 at 157 and then reeved about sheaves 143 and 153 and passes thence about direction change sheave 155, thence about direction change sheave 154, see Fig. 4, and is then reeved about sheaves 152 and 143 and may extend thence, from sheaves 153, about suitable direction change sheaves to a winding drum not shown because of conventional design.

Viewing Fig. 4, the bowls are disposed in carrying position, and a pulling force may be applied to cable 156 in response to which short links 140 are caused to swing forwardly and upwardly about pivots 146 so that toggle links 139 are caused to straighten out or extend, the forward ends thereof moving upwardly along slots 150 and 151, formed in rails 133 and 135, while engaged with the auxiliary bowl arms 137 so that when short links 140 and long links 141 have reached their limits of relative movement about pivots 146, as defined by stops 144 and

145 carried thereby, the toggle links 139 and the auxiliary bowl 136 will have been moved to the positions shown in Fig. 5, and thus the auxiliary bowl has been moved from carrying to intermediate position exclusively of the main bowl, in which position the auxiliary bowl is disposed to receive and support material which moves upwardly against the load in the main bowl and then falls forwardly into the auxiliary bowl. Now, the auxiliary bowl having reached the intermediate position, if the pull on cable 156 is continued then both bowls will be caused to move concurrently to discharge position, see broken line positions in Fig. 4 at 157 and 158. Both bowls being in discharge position cable 156 may be slackened thus allowing both bowls to move concurrently in a downward direction, the main bowl arriving at the carrying position simultaneously with the arrival of the auxiliary bowl at intermediate position at which time cable 156 may be arrested, or further slackened to dispose the auxiliary bowl, exclusively of the main bowl, in any selected intermediate position or in carrying position.

Having thus described my invention, I claim:

1. In a scraper; a frame; a main bowl pivotally supported on said frame and adapted to be disposed in loading, carrying and discharge positions; an auxiliary bowl pivotally supported on said frame and arranged forwardly of said main bowl to be loaded in conjunction therewith and adapted to be disposed in carrying, intermediate and discharge positions; and control means for said bowls including toggle links applied at one

end thereof to said main bowl and at the other end thereof to said auxiliary bowl, said toggle links being initially operable when actuated to first move said auxiliary bowl from carrying to intermediate position exclusive of said main bowl, and thereafter operable upon continued actuation of said toggle links to move both bowls concurrently to their discharge positions; stop means cooperating between the toggles to control their sequence of action, and means for causing said toggle links to operate.

2. In a scraper; a frame; a main bowl pivotally supported on said frame and adapted to be disposed in loading, carrying and discharge positions; an auxiliary bowl pivotally supported on said frame and arranged forwardly of said main bowl to be loaded in conjunction therewith and adapted to be disposed in carrying, intermediate and discharge positions; and control means for said bowls including a toggle link comprising a short link and a long link pivotally connected at adjacent ends, the free end of said short link being applied to said main bowl and the free end of said long link being applied to said auxiliary bowl, said toggle links being initially operable when actuated to first move said auxiliary bowl from carrying to intermediate position exclusive of said main bowl and thereafter operable upon continued actuation of said toggle links to move both bowls concurrently to their discharge positions, stop means cooperating between the toggles to control their sequence of action, and means for causing said toggle links to operate.

CHARLES LE BLEU.