

**March 30, 1943.**

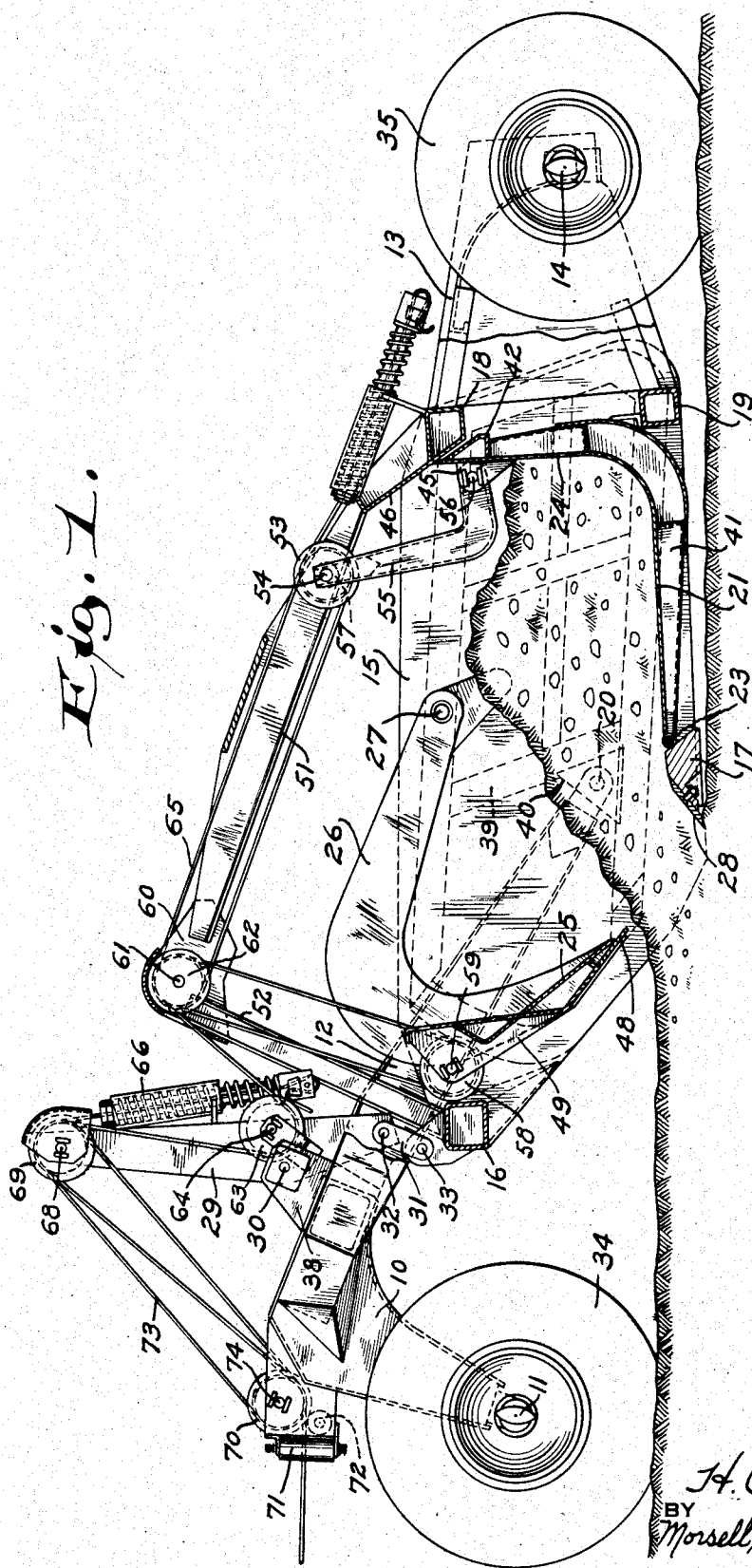
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**2,315,092**

SCRAPER

Original Filed Sept. 9, 1939

3 Sheets--Sheet 1



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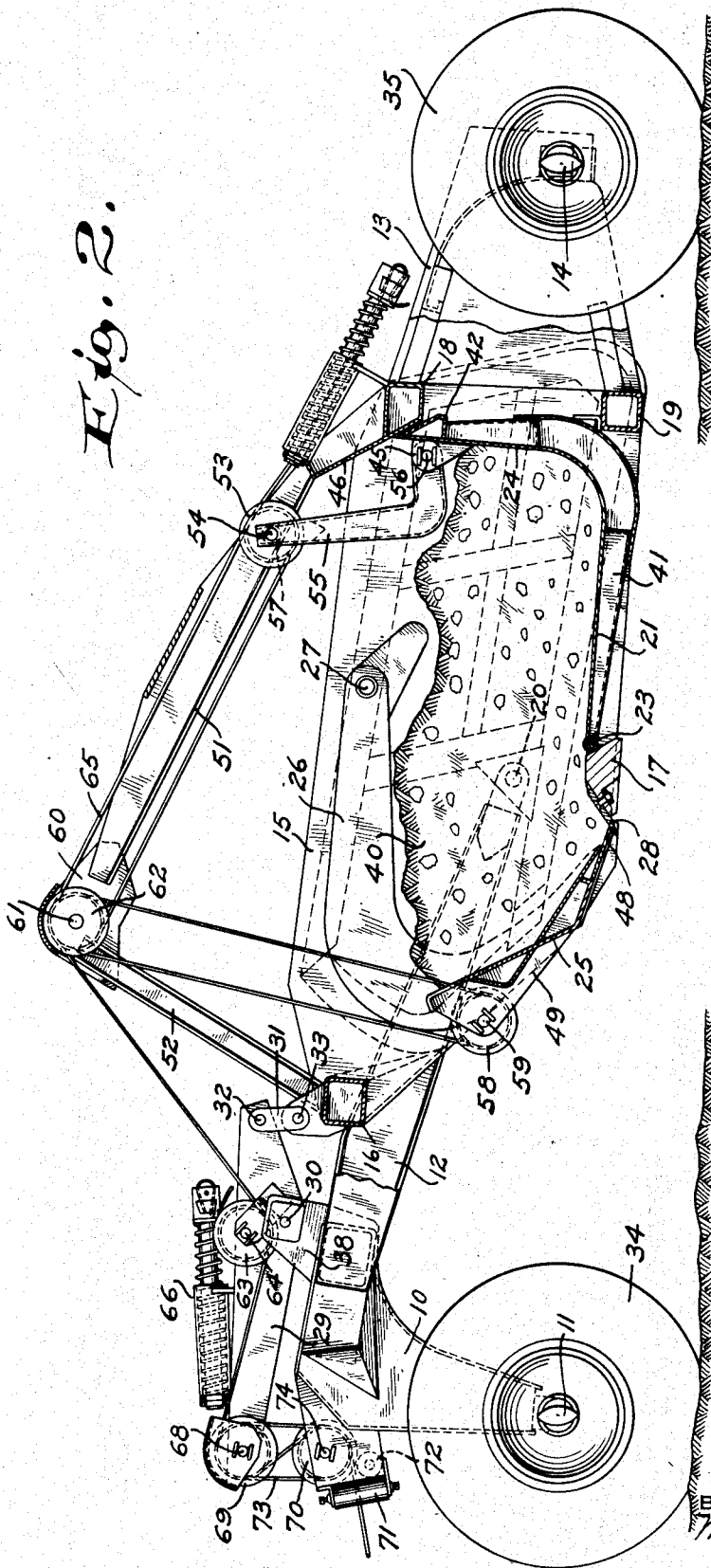
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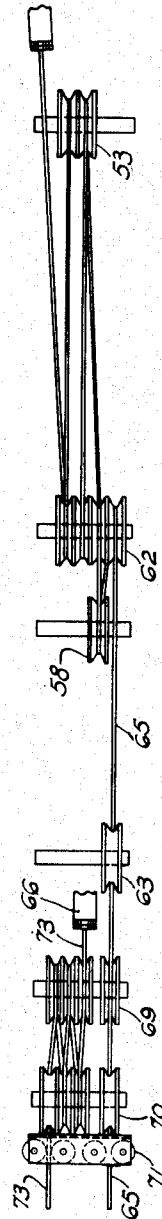
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*Fig. 2.*



*Fig. 4.*



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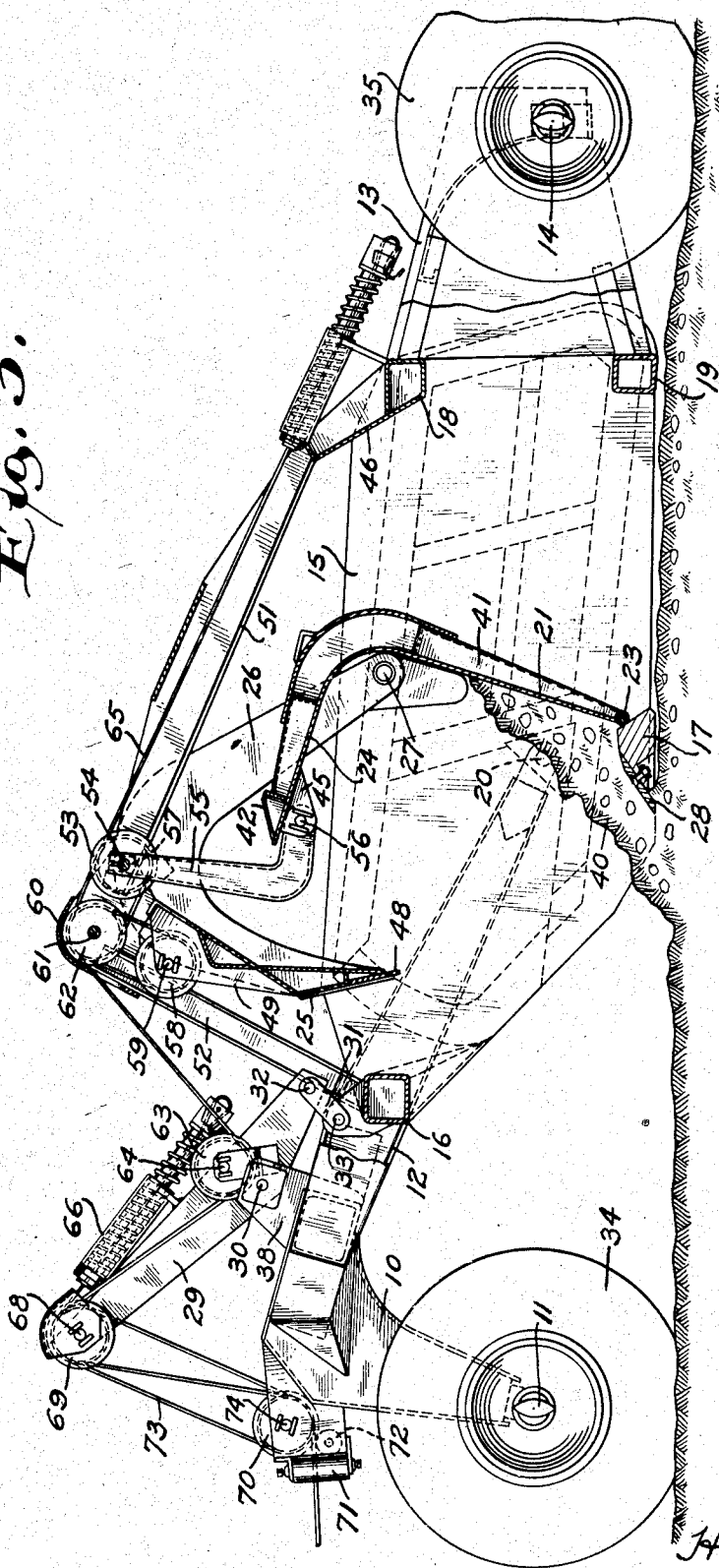
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Fig. 3.



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## UNITED STATES PATENT OFFICE

2,315,092

## SCRAPER

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Original application September 9, 1939, Serial No.  
294,047. Divided and this application Decem-  
ber 9, 1940, Serial No. 369,234

7 Claims. (Cl. 37-126)

The present invention relates in general to improvements in the art of dirt moving, and relates more specifically to improvements in the construction and operation of scrapers for digging, hauling and spreading earth or the like, and this application is a division of my co-pending application Serial Number 294,047, filed September 9, 1939, now Patent No. 2,280,696.

Generally defined, an object of the invention is to provide an improved scraper assemblage which is simple but durable in construction, and which is moreover highly efficient in use.

Some of the more important specific objects of my present invention are as follows:

To provide a new and useful load carrying scraper of the tractor propelled and cable operated type, which is extremely flexible in operation and may be used interchangeably for digging, hauling and spreading purposes.

To provide an exceedingly strong load carrying scraper assemblage of large capacity, and which is rapidly manipulable to elevate and to unload the dirt confining bowl, with relatively simple mechanism.

To provide a sturdy and durable scraper assemblage which may be readily constructed of sheet metal and standard bar stock or the like, at relatively low cost.

To provide an improved scraper of the jack-knife frame type, and improved mechanism for relatively moving the front and rear articulable frame sections.

To provide various other improvements in the construction and operation of dig and carry scrapers whereby the cost of construction and operation is reduced to a minimum, and which scrapers are operable with maximum efficiency and capacity under most adverse conditions.

A clear conception of the features constituting my present invention, and of the mode of constructing and of assembling a scraper built in accordance with the improvement, may be had by referring to the drawings accompanying and forming a part of this specification, wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a central longitudinal section through one of the improved scrapers, showing the parts in normal cutting and loading position;

Fig. 2 is a similar longitudinal sectional view showing the parts in load carrying or transporting position;

Fig. 3 is another similar longitudinal sectional view, showing the parts in load discharging and spreading position; and

Fig. 4 is a partially schematic top view illustrating the reeving system.

While the improvements have been specifically embodied in a two cable actuated dig and carry road scraper of large capacity having a tiltable load supporting bottom plate cooperable with a pivotally suspended front apron, it is not the intent to thereby unnecessarily restrict the scope or utility of the invention.

Referring to the drawings, the improved dig and carry road scraper shown therein, comprises in general, a rugged front frame 10 transportable by and swingably suspended from a front wheel supported carriage 11 and having laterally separated rearwardly extending integral side arms 12; a rugged rear frame 13 transportable by and swingably suspended from a rear wheel supported carriage 14, and having laterally separated forwardly extending integral opposite side walls 15, disposed between the rear ends of the front frame arms 12 and rigidly interconnected by means of cross-beams 16, 17, 18, 19; aligned pivots 20 articulably interconnecting the rear ends of the front frame arms 12 with the medial lower outer portions of the rear frame side walls 15 slightly above the cross-beam 17; an L-shaped load supporting plate 21 pivotally suspended at its front portion from the rear frame 13 near the cross-beam 17 by means of a pivot shaft 23, and having an upwardly projecting rear portion 24 cooperable with the rear beams 18, 19 to support the load; a front load confining apron 25 having integral side arms 26 located between and swingably suspended from the upper inner portions of the side walls 15 by means of aligned pivot pins 27, and being cooperable with a cutting blade 28 mounted on the cross-beam 17, and with the side walls 15 to normally confine the loads upon the bottom plate 21; a rigid frame articulating lever 29 swingably suspended at its medial portion from the front frame 10 by means of a pivot shaft 30 and having its rear end connected to the medial portion of the front cross-beam 16 of the rear frame 13 by means of links 31 and pivot pins 32, 33; mechanism for effecting actuation of the plate 21 and of the apron 25 to swing these elements about their suspension pivots; and other mechanism cooperating with the lever 29 for bodily raising and lowering the plate 21, apron 25 and blade 28.

The frames 10, 13, plate 21, apron 25, and lever 29 may be formed of rigid sheet metal plate welded or otherwise firmly united; and the front frame 10 and carriage 11 are transportable on rubber tired wheels 34 which normally travel in

front of and centrally of the path of scraping and dumping; while the rear frame 13 and carriage 14 are transportable on similar wheels 35 which travel rearwardly of and near the extreme opposite sides of the path of cutting and dumping, thereby providing a stable transportable support for the scraper unit. The front carriage 11 is preferably provided with a suitable draw bar adapted for convenient attachment to a tractor, and the rear carriage 14 may be provided with a pusher pad for facilitating advancement of the scraper by means of a power unit applied to the rear of the assemblage. The front frame 10 is of box-beam construction and must be of sufficient height to clear the carriage 11 and wheels 34 when these elements are swung about their vertical axis for steering and lateral guiding, and the lever supporting pivot shaft 30 is mounted upon a bracket 38 secured to the upper cross-beam of the frame 10. The rear frame 13 is swingably suspended from the axle of the rear carriage 14 so as to swing only in a vertical plane and not laterally of the wheels 35, and the opposite side walls 15 of the frame 13 may be reinforced by external ribs 39 in order to avoid deflection thereof. These parallel vertical walls 15 are moreover rigidly united by the cross-beams 16, 17, 18, 19 which are welded or otherwise firmly attached thereto, and the space between the lower beams 17, 19 is open in order to permit material which may escape past the bottom plate 21, to drop freely to the ground.

The bottom plate 21 which constitutes the sole means for directly supporting the weight of a load 40, is preferably formed of durable sheet metal, and is abundantly reinforced by ribs 41 and a transverse top beam 42. The plate 21 is swingable between the side walls 15 of the frame 13 about the pivot shaft 23, and when the bottom plate is in load receiving and supporting position, the upper beam 42 coacts with the rear frame beam 18. The upper portion of the rear wall 24 is provided with integral ears 45, and the cross-beam 18 of the rear frame 13 may be provided with an upwardly and forwardly inclined stiff plate 46 extending entirely across the top of the bottom plate 21 and cooperating with the rear wall thereof, to prevent material from spilling over the beam 18 and to also direct the rising material forwardly into the loading space. The lower cross-beam 17 of the rear frame 13 should be of extremely rigid construction, and the cutting blade 28 may be detachably secured to this beam in any suitable manner.

The front apron 25 which spans the gap between the side walls 15 of the frame 13, may be constructed of sheet metal and has a lower reinforced edge portion 48 which is cooperable with the blade 28 to confine the load 40 within the scraper. This front apron 25 is provided with rigid ears 49, and the side arms 26 which swingably support the apron 25 are abruptly curved in order to clear other movable parts and to avoid interference by the load 40 to lowering movement of the apron.

The mechanism for effecting actuation of the load supporting plate 21 and of the front apron 25 so as to swing these parts about their respective suspension pivots 23, 27, may comprise a single cable for elevating both the plate and apron in proper sequence. The rear frame 13 is preferably provided with a pair of upwardly and forwardly inclined tracks 51 the lower ends of which are rigidly attached to and supported by the transverse plate 46, and the upper ends of which

are fixedly supported from the cross-beam 16 by means of outwardly inclined struts 52. A pair of cable sheaves 53 are mounted on a shaft 54 carried by the upper end of an L-shaped arm 55 the lower end of which is attached to the ears 48 by a pivot pin 56, and the shaft 54 is provided with rollers 57 which are adapted to travel along the tracks 51. The sheaves 53 are therefor rollable along the tracks 51, and when these sheaves are advanced upwardly along the tracks, the plate 21 is tilted about its pivot shaft 23 and dumps the material resting thereon, forwardly over the blade 28. The front apron 25 has a single cable sheave 58 journaled between its front flanges 49 by means of a shaft 59, and is adapted to be fully elevated, or partially raised, or completely lowered, as shown in the drawings. The upper forward ends of the rails 51 are connected with the struts 52 by means of a rigid bracket 60 in which the shaft 61 is journaled, and four aligned sheaves 62 are rotatably supported by the shaft 61. An equalizer sheave 63 is mounted upon the medial portion of the blade elevating and lowering lever 29, by means of a journal shaft 64; and a single continuous cable 65 coacts with all of the sheaves 62, 63, 58, 53, in such manner that a pull on the cable 65 will first elevate the apron 25 and will thereafter tilt the plate 21. The cable 65 after coacting with the equalizing sheave 63, extends over one of the sheaves 62, beneath one of the sheaves 70 and forwardly to an actuating winch, ordinarily located on the propelling tractor.

The front and rear frames 10, 13 which are articulably connected by the pivot shafts 26, may be swung relatively to each other about these pivots, by means of another flexible cable 73. This cable 73 extends from the winch on the tractor, rearwardly between the vertical guide rollers 71, over a horizontal guide roller 72, and after winding about the remaining complementary sets of front sheaves 69, 70, the cable 73 passes through a cable clamp 66 and connects with a cable supply roll. The sheave 69 is mounted on a shaft 68 carried by the front swinging end of the lever 29, and the sheave 70 is mounted upon a shaft 74 carried by the front frame 10; and the cooperation between the cable 73 and the sheaves 69, 70 is such that when a pull is exerted on this cable, the lever 29 will be swung about its pivot 30 from the position shown in Fig. 1 to that shown in Fig. 2, thereby elevating the cutting blade 28 away from the ground. When the pull on the cable 73 is released, the weight of the rear frame 13 and plate 21 will cause the blade 28 to move downwardly either to the position shown in Fig. 1, or to some intermediate position such as shown in Fig. 3, dependent upon the complete or partial release of the pull. The two cables 65, 73 are manipulable independently of each other, and may also be independently renewed.

During normal operation of the improved scraper, the front and rear frames 10, 13 may be relatively adjusted so as to either lower the blade 28 in the ground as shown in Fig. 1 for loading purposes; or the blade may be elevated to the position shown in Fig. 2 for load carrying purposes; or the frames may be relatively positioned as in Fig. 3 for discharging and spreading purposes. When the assemblage is in the position shown in Fig. 1 and the scraper is advanced along the ground, the load 40 will enter the space above the plate 21 and will pile up within the load carrying zone. If the load reaches a height above

the rear wall 25 of the bottom plate 21, then the inclined stationary plate 46 will become effective to prevent spilling of earth and to direct the excess material forwardly over the plate 21. Any dirt which escapes along the opposite sides of the bottom plate 21 or over the rear extension 24 thereof, will obviously fall freely to the ground since the bottom plate 21 is in fact the only load sustaining element in the assemblage. During scraping operation, the front apron 25 may be elevated to the position shown in Fig. 1, or to any greater height, and as the load 40 accumulates upon the plate 21 and within the loading zone it is preferable to gradually lower the apron 25 so as to most effectively confine the material.

When the plate 21 has been properly loaded with earth, the front apron 25 may be lowered into engagement with the blade 28, and the entire load may be elevated from the ground as shown in Fig. 2. In order to accomplish this it is only necessary to release the cable 55 so as to permit the apron 25 to drop by gravity. A pull may then be exerted upon the cable 13 so as to cause the lever 29 to swing from the position shown in Fig. 1 to the position shown in Fig. 2, and the scraper and its confined load 40 may then be transported along the ground until it becomes desirable to discharge the load from above the plate 21.

In order to discharge and to simultaneously spread the load 40, it is preferable to somewhat lower the cutting blade 28 to the position shown in Fig. 3, and this may be done by releasing the tension on the cable 13. When the blade 28 has been properly positioned, the cable 13 may be held, and the cable 55 may then be actuated to first elevate the front apron 25 to a desired position, and to thereafter tilt the bottom plate 21 to the position shown in Fig. 3. During such tilting of the bottom plate, the rollers 51 will ride along the track 51 and will cause the link 55 to positively tilt the bottom plate 21. As this plate is tilted, the load 40 will be gradually delivered over the blade 28 onto the ground, and the dirt will be simultaneously spread as the scraper unit is advanced along the ground.

From the foregoing detailed description it will be apparent that the improved scraper mechanism may be readily utilized to effectively load the dirt carrying plate, to transport the load from place to place, and to finally discharge and spread the dirt during delivery thereof from the loading zone. All of these operations may be quickly and effectively accomplished with the aid of several cables, and the use of the lever 29 mounted on the front frame 10 and coacting with the foremost portion of the rear frame 13, provides simple and effective means for changing the elevation of the blade 28. This blade 28 may obviously be supported either on the cross-beam 17, or directly on the tiltable bottom 21. When the plate 21 is in lowermost position, it is rigidly supported by the rear beams 18, 19, and the front beam 16 besides providing a rigid support for the rails or tracks 51 also provides means for cooperation with the elevating lever 29. The entire assemblage is extremely strong and rigid and will effectively withstand considerable abuse, and the improved machine has proven highly satisfactory in actual commercial use.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications

within the scope of the claims may occur to persons skilled in the art.

I claim:

1. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted intermediate its length to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave means carried by said lever adjacent the pivotal connection thereof, sheaves carried by the outer end of said lever, sheaves carried by said lever-carrying frame below the sheaves carried by the outer end of said lever, a bowl actuating cable extending beneath said equalizer sheave means, over one of the sheaves on the outer end of said lever and beneath one of the sheaves on the lever-carrying frame, and a second cable coacting with another one of the last mentioned sheaves and with one of the sheaves on the forward portion of the lever to raise and lower said lever and thereby raise and lower the scraper blade.

2. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted intermediate its length to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave rotatably mounted adjacent to the pivotal connection of said lever, sheaves carried by the outer end of said lever, sheaves carried by said lever-carrying frame below the sheaves carried by the outer end of said lever, a bowl actuating cable extending beneath said equalizer sheave, over one of the sheaves on the outer end of said lever and beneath one of the sheaves on the lever-carrying frame, and a second cable coacting with another one of the last mentioned sheaves and with one of the sheaves on the forward portion of the lever to raise and lower said lever and thereby raise and lower the scraper blade.

3. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave adjacent the pivotal connection of said lever, sheaves carried by the outer end of said lever, sheaves carried by said lever-carrying frame below the sheaves carried by the outer end of said lever, a bowl actuating cable extending beneath said equalizer sheave, over one of the sheaves on the outer end of said lever and beneath one of the sheaves on the lever-carrying frame, and a second cable coacting with another one of the last mentioned sheaves and with one of the sheaves on the forward portion of the lever to raise and lower said lever and thereby raise and lower the scraper blade.

4. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave carried by said lever adjacent the pivotal connection thereof, sheaves carried by the outer end of said lever, sheaves carried by said lever-carrying frame be-

low the sheaves carried by the outer end of said lever, a bowl actuating cable extending beneath said equalizer sheave, over one of the sheaves on the outer end of said lever and beneath one of the sheaves on the lever carrying frame, and a second cable coacting with another one of the last mentioned sheaves and with one of the sheaves on the forward portion of the lever to raise and lower said lever and thereby raise and lower the scraper blade.

5. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of the said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave rotatably carried adjacent the pivotal connection of said lever, a sheave carried by the outer end of said lever, a sheave carried by the lever-carrying frame, a bowl-actuating cable extending beneath said equalizer sheave and coacting with the sheave on the outer end of the lever and with the sheave on the lever-carrying frame, and separate means for controlling the raising and lowering of said lever to raise and lower the scraper blade.

6. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted to the other frame, the inner end

of said lever being articulably connected to said bowl frame, an equalizer sheave rotatably carried by said lever adjacent the pivotal connection of said lever, a sheave carried by the outer end of said lever, a sheave carried by the lever-carrying frame, a bowl actuating cable extending beneath said equalizer sheave and coacting with the sheave on the outer end of the lever and with the sheave on the lever-carrying frame, and separate means for controlling the raising and lowering of said lever to raise and lower the scraper blade.

7. In combination, articulably interconnected frames, a bowl and scraper blade carried by one of said frames, cable actuated means for controlling the discharge of dirt from said bowl, a lever pivoted to the other frame, the inner end of said lever being articulably connected to said bowl frame, an equalizer sheave rotatably carried adjacent the pivotal connection of said lever, a sheave carried by the outer end of said lever, a sheave carried by the lever-carrying frame, a bowl actuating cable extending beneath said equalizer sheave and coacting with the sheave on the outer end of the lever and with the sheave on the lever-carrying frame, and additional cable controlled means coacting with the outer end of the lever and with the lever carrying frame for raising and lowering the lever to raise and lower the scraper blade.

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