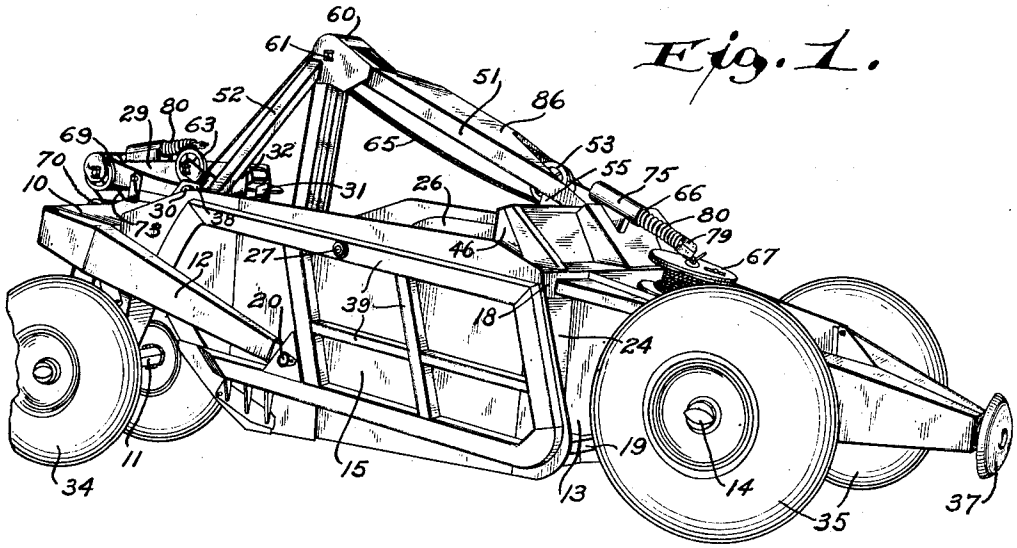
April 21, 1942. H. C. FRENCH 2,280,696

ROAD SCRAPER

Filed Sept. 9, 1939 5 Sheets-Sheet 1

Fig. 1.



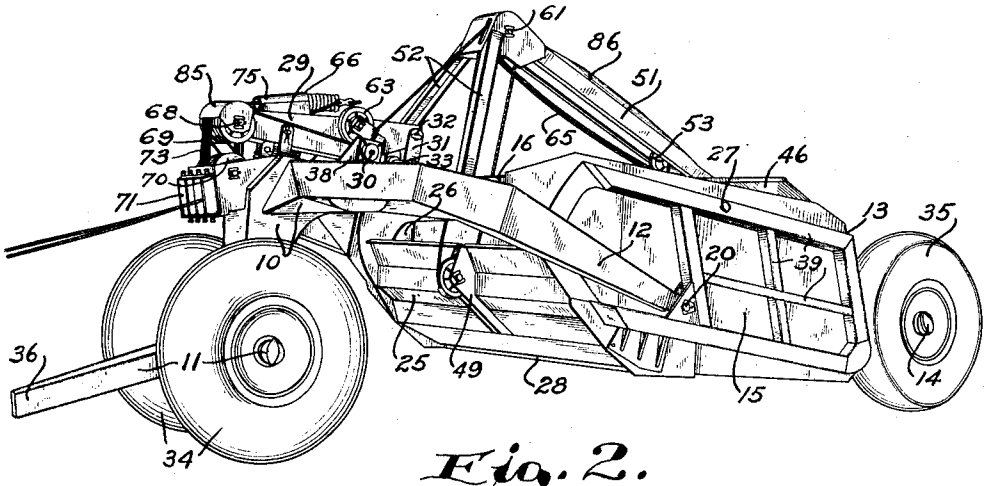


Fig. 2.

INVENTOR
H. C. French
BY
Morsell, Lieber & Morsell
ATTORNEYS.

April 21, 1942. H. C. FRENCH 2,280,696

ROAD SCRAPER

Filed Sept. 9, 1939 5 Sheets-Sheet 2

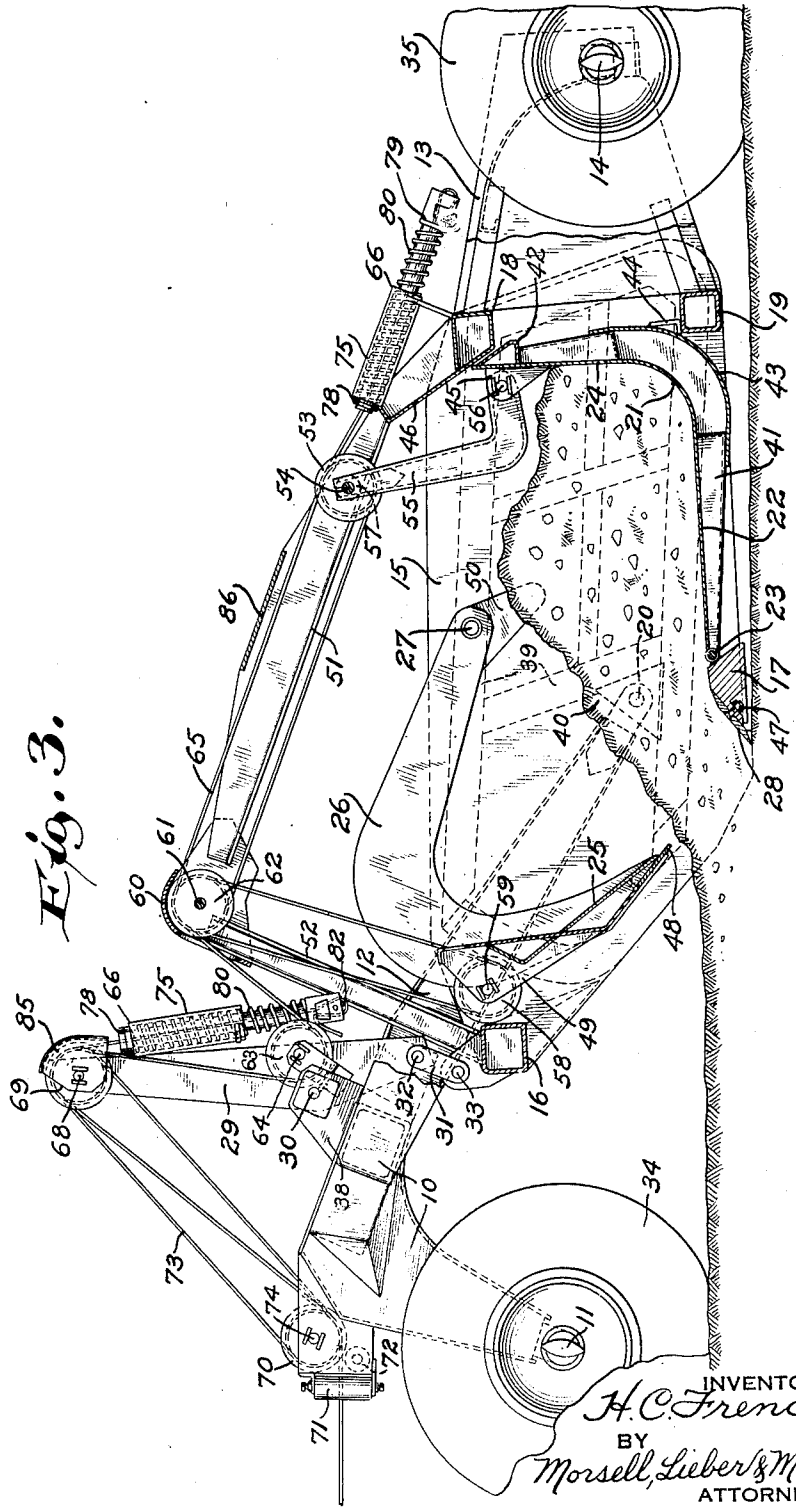


Fig. 3.

INVENTOR
H. C. French
BY
Morsell, Lieber & Morsell
ATTORNEYS.

April 21, 1942. H. C. FRENCH 2,280,696

ROAD SCRAPER

Filed Sept. 9, 1939 5 Sheets-Sheet 3

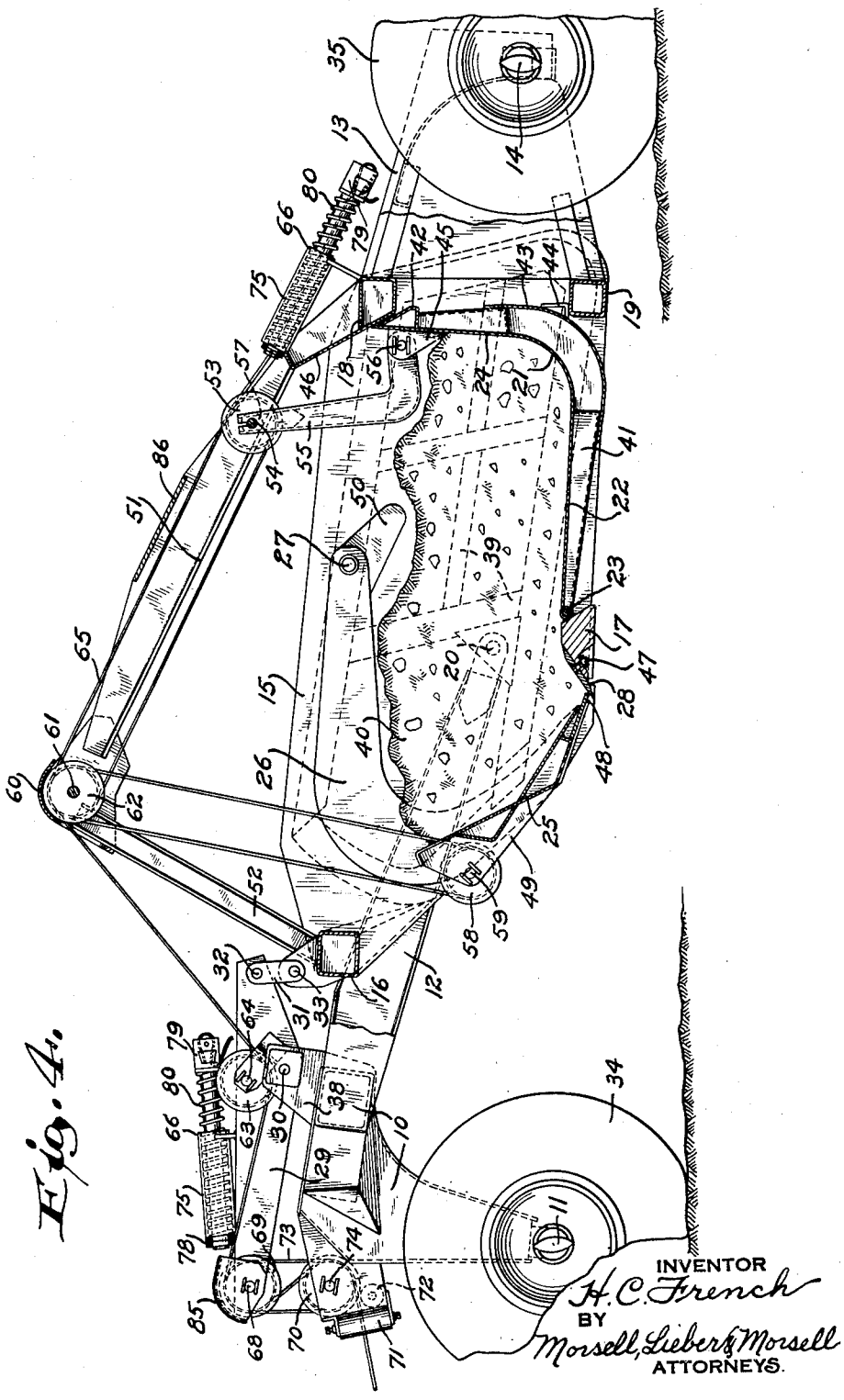


Fig. 4.

INVENTOR
H. C. French
BY
Morsell, Liebert & Morsell
ATTORNEYS.

April 21, 1942. H. C. FRENCH 2,280,696

ROAD SCRAPER

Filed Sept. 9, 1939 5 Sheets-Sheet 4

Fig. 5.

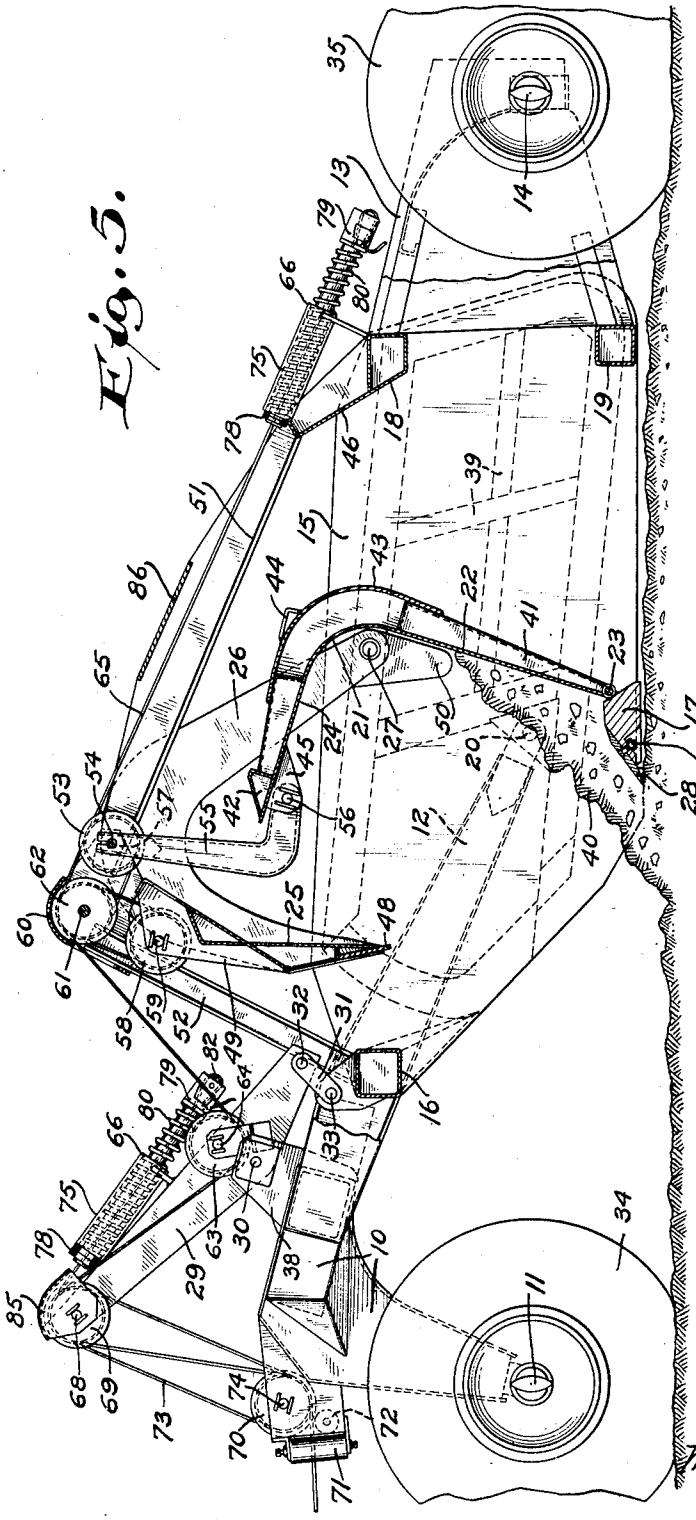


Fig. 7.

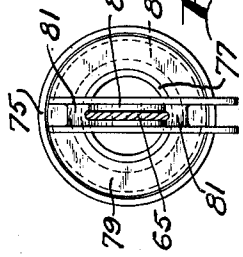
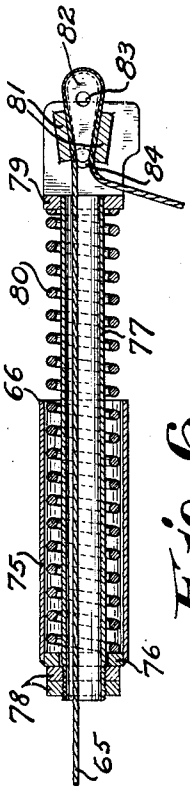


Fig. 6.



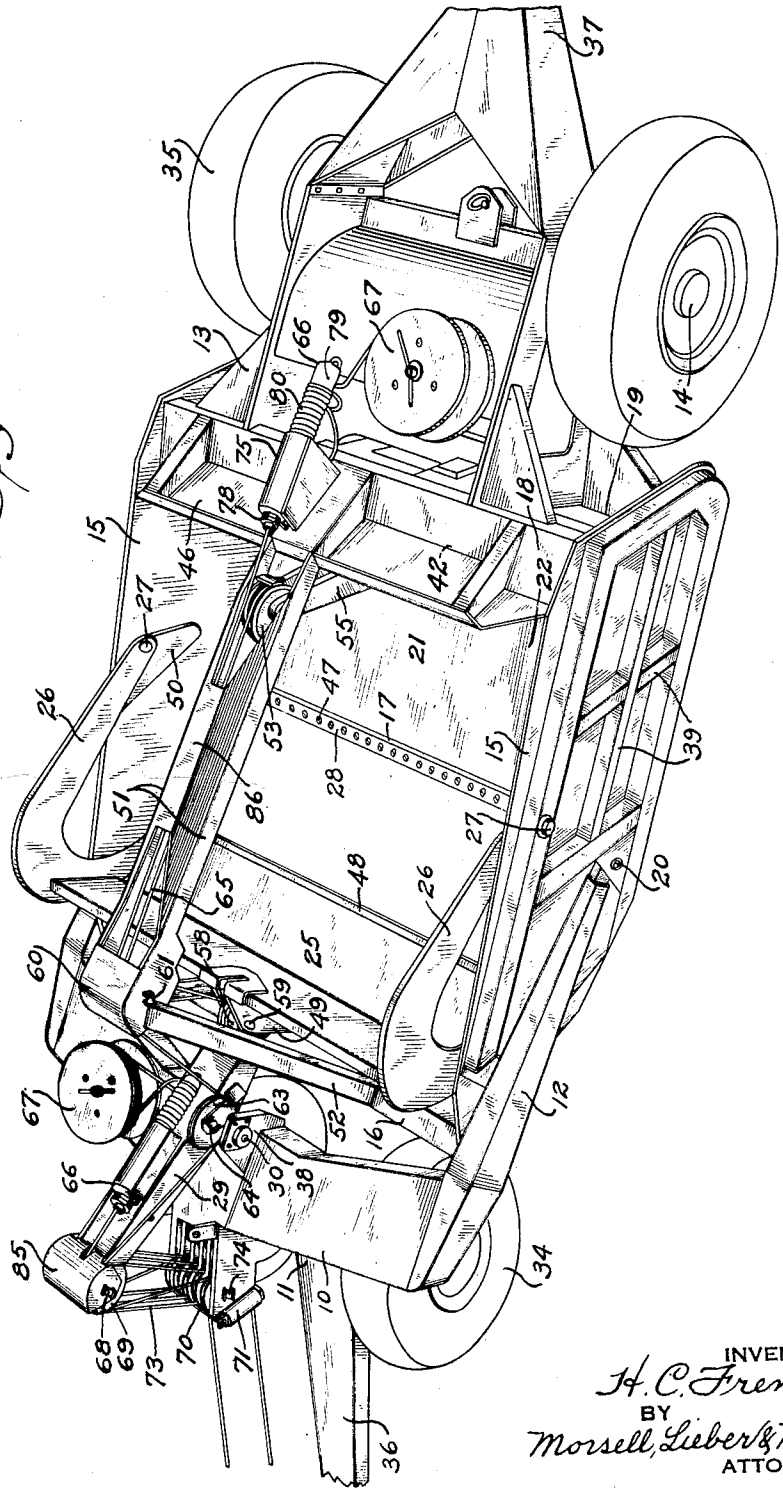
INVENTOR
H. C. French
BY
Morsell, Lieber & Morsell
ATTORNEYS.

April 21, 1942. H. C. FRENCH 2,280,696

ROAD SCRAPER

Filed Sept. 9, 1939 5 Sheets-Sheet 5

Fig. 8.



INVENTOR
H. C. French
BY
Morsell, Lieber & Morsell
ATTORNEYS.

Patented Apr. 21, 1942 2,280,696

UNITED STATES PATENT OFFICE

2,280,696

ROAD SCRAPER

Henry C. French, Milwaukee, Wis., assignor to The Heil Co., Milwaukee, Wis., a corporation of Wisconsin

Application September 9, 1939, Serial No. 294,047

12 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.

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 improved road scraper of the tiltable bowl and front apron type, which is conveniently manipulable to confine and discharge the loads in an expeditious manner.

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 an improved tiltable bowl scraper unit having simple and efficient mechanism for dumping the load from the bowl and for restoring the latter to load receiving position.

To provide an improved cable actuated scraper having improved instrumentalities for clamping and for renewing the operating cables when broken or damaged.

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 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.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of the several features constituting my present invention, and of the mode of constructing and of assembling a dig and carry 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 rear and side perspective view of the improved dig and carry scraper in load transporting condition with the bowl in loading carrying position but elevated from the ground, and with the front apron lowered;

Fig. 2 is a front and side perspective view of the same scraper with the parts in the same position as in Fig. 1;

Fig. 3 is an enlarged central longitudinal vertical section through the improved scraper of Figs. 1 and 2, showing the parts in normal cutting and loading, or scraping position;

Fig. 4 is a similar longitudinal sectional view, showing the parts in load carrying or transporting position;

Fig. 5 is another similar longitudinal sectional view, showing the parts in load discharging and spreading position;

Fig. 6 is an enlarged central longitudinal section through one of the improved resilient cable connectors and clamps;

Fig. 7 is a further enlarged end view of the improved cable attachment of Fig. 6; and

Fig. 8 is a top perspective view of the improved dig and carry scraper assemblage.

While I have shown the improvements as being specifically embodied in a two cable actuated dig and carry road scraper of large capacity and having a bodily tiltable load confining bowl 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 specifically illustrated 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 or plates 15 disposed between the rear ends of the front frame arms 12 and rigidly interconnected by means of a front cross-beam 16, a lower cross-beam 17, and upper and lower rear cross-beams 18, 19 respectively; alined pivots 20 articulably interconnecting the rear ends of the front frame arms 12 with the medial lower outer portions of the rear frame side plates 15 slightly above the cross-beam 17; an L-shaped load supporting bowl 21 pivotally suspended at the front portion of its bottom 22 from the rear frame 13 near the cross-beam 17 by means of a pivot shaft 23, and having its rear wall 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 medial inner portions of the side plates 15 by means of pivot pins 27, and being cooperable with the lower cross-beam 17 or with a cutting blade 28 mounted on this cross-beam, and with the side plates 15 to normally confine the loads within the tiltable bowl 21; a 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 a set of links 31 and pivot pins 32, 33; improved mechanism for effecting actuation of the bowl 21 and of the apron 25 to swing these elements about their suspension pivots; and other improved mechanism for bodily raising and lowering the bowl 21, apron 25 and blade 28.

The frames 10, 13, bowl 21 and apron 25 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 wth a suitable draw bar 36 adapted for convenient attachment to a tractor, and the rear carriage 14 may be provided with a pusher extension and paid 37 for facilitating advancement of the scraper by means of a power unit applied to the rear of the assemblage, see Figs. 1 and 2. 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 or plates 15 of the frame 13 may be abundantly reinforced by means of external ribs 39 in order to avoid distortion or deflection thereof. These parallel vertical plates 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 as shown in Fig. 5 in order to permit material which may escape from the bowl 21, to drop freely to the ground, thus making the bowl the primary load holder.

The L-shaped bowl 21 or movable load carrying element which constitutes the sole means for directly supporting the weight of a load 40 as will be clearly apparent from Figs. 3 and 4, preferably has its bottom 22 and rear wall 24 formed of a continuous durable sheet of metal, and is also abundantly reinforced by ribs 41, a top transverse beam 42, and a curved corner plate 43, the latter being provided with supporting cleats 44. The bowl 21 is swingable between the side plates 15 of the frame 13 about the pivot shaft 23, and when the bowl is in load receiving and supporting position as shown in Figs. 3 and 4, the upper beam 42 coacts with the rear frame beam 18 while the curved plate 43 coacts with the cross-beam 19 through the lugs or cleats 44 which are rigidly attached to the plate 43. The upper portion of the rear wall 24 is provided with integral ears 45, and the cross-beam 18 of the rear frame 13 is preferably provided with an upwardly and forwardly inclined stiff plate 46 extending entirely across the top of the bowl 21 and cooperating with the rear wall 24 thereof, to prevent material from spilling over the beam 18, and to also direct the material rising along this wall forwardly into the bowl. The lower cross-beam 17 of the rear frame 13 must be of exceptionally rigid construction, and the cutting blade 28 which is reversible, is detachably secured to this beam 17 by means of bolts 47 or the like.

The front apron 25 which spans the gap between the side walls 15 of the frame 13, may be built up of sheets of metal welded together as illustrated in Figs. 3, 4 and 5, and has a lower reinforced edge portion 48 which is cooperable with the blade 28 to effectively confine the load 40 within the bowl 21, see Fig. 4. The front of the 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. One or both of the apron suspension arms 26 which swing between and in close proximity to the side walls 15, may be provided with a bowl kick-back projection 50 near its pivot pin 27; and these projections 50 are so formed and positioned that when the apron 25 is dropped from uppermost position as shown in Fig. 5, and the bowl 21 is uppermost, the projections will strike the bowl bottom 22 and will thereby start the bowl 21 on its descending movement toward lowered position.

The mechanism for effecting actuation of the bowl 21 and front apron 25 so as to swing these parts about their respective suspension pivots 23, 27, may comprise either a single cable for elevating both the bowl and apron in proper sequence. The rear frame 13 is preferably provided with a pair of upwardly and forwardly inclined tracks or rails 51 the rear lower ends of which are rigidly attached to and supported by the transverse plate 46, and the front upper ends of which are fixedly supported from the cross-beam 16 by means of outwardly inclined struts 52, see Fig. 8. A pair of cable sheaves 53 are mounted on a shaft 54 carried by the upper end of an L-shaped bowl actuating arm 55 the lower end of which is attached to the ears 45 by a pivot pin 56, and the shaft 54 is provided with end rollers 57 which are adapted to travel along the inclined parallel rails 51. The sheaves 53 are therefore simultaneously rollable along the tracks 51, and when these sheaves are advanced upwardly along the track rails, the bowl 21 is tilted about its pivot shaft 23, as clearly indicated in Fig. 5, and dumps the material therein forwardly over the blade 28. The front apron 25 has a single cable sheave 58 journalled in its front flanges 49 by means of a shaft 59, and is adapted to be fully elevated as in Fig. 5, or partially raised as in Fig. 3, or completely lowered as in Fig. 4. The upper forward end of the rails 51 are connected with the struts 52 by means of a rigid bracket 60 in which a shaft 61 is journalled, and four alined 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 flexible member or cable 65 coacts with all of the sheaves 63, 62, 58, 53, in such manner that a pull on the cable 65 will first elevate the apron 25 and will thereafter tilt the bowl 21.

The cable 65 passes from the equalizing sheave 63 upwardly over one of the sheaves 62; from thence downwardly around the sheave 58; from the sheave 58 upwardly and around another sheave 62; from this second sheave 62 rearwardly and around one of the sheaves 53; from this sheave 53 forwardly and around the third sheave 62; from this sheave 62 rearwardly around the second sheave 53; from this last sheave 53 forwardly and around the fourth sheave 62; and from this last sheave 62 rearwardly and through one of the improved cable clamps 66 to a cable supply reel 67 mounted upon the rear end of the frame 13, see Fig. 8. The front end of the blade elevating lever 29 has a shaft 68 mounted thereon, and this shaft 68 provides a rotary support for five alined sheaves 69. Mounted upon a shaft 74 journalled at the forward upper end of the front frame 10, is another group of five sheaves 70, and in front of these sheaves 70 a group of four parallel vertical guide rollers 71 is located. The elevating cable 65 for the apron 25 and bowl 21, after coacting with the sheave 63, extends forwardly and upwardly over one of the sheaves 69 and downwardly therefrom beneath one of the complementary sheaves 70. From this lower sheave 70, the cable 65 extends forwardly over a guide roller 72 and between two of the rollers 71 to the hoisting drum or winch, which is not shown, but is ordinarily located near the driver's seat on the propelling tractor. The arrangement of cable 65 and of the sheaves with which this cable coacts, is obviously such that when a pull is exerted on the cable 65 the front apron 25 and bowl 21 will be elevated as shown in Fig. 5, whereas release of the pull on the cable 65 will cause these elements to drop by gravity to the position shown in Fig. 4. The front apron 25 may however be elevated and retained in any intermediate position, such as shown in Fig. 3, without affecting the position of the bowl 21.

The front and rear frames 10, 13 which are articulably connected by the pivot shafts 20, may be swung relatively to each other about these shafts, by means of another flexible member or cable 73. This cable 73 extends from the hoist or winch on the tractor, rearwardly between the other set of vertical guide rollers 71 over the horizontal guide roller 72, and after winding successively about the remaining complementary sets of front sheaves 69, 70, the cable 73 passes through another cable clamp 66 and connects with a second cable supply reel 67 carried by the front frame 10, see Fig. 8. The cooperation between the cable 73 and the sheaves 69, 70 is such that when a pull is exerted on the cable 73 the lever 29 will be swung about its pivots 30 from the position shown in Fig. 3 to that shown in Fig. 4, 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 bowl 21 will cause the blade 28 to move downwardly either to the position shown in Fig. 3, or to some intermediate position such as illustrated in Fig. 5 dependent upon the complete or only partial release of the pull. The two cables 65, 73 are manipulable independently of each other, and are also independently renewable.

The improved cable clamps 66 which cooperate with the cables 65, 73 are of similar construction as shown in detail in Figs. 6 and 7, and each of these clamps 66 comprises a tubular casing 75 rigidly attached to the adjacent frame 10, 13 and having a flange 76 secured to one end thereof; an elongated tube 77 extending through and beyond the casing 75 and having nuts 78 secured to one end and coacting with the casing flange 76, the opposite end of the tube 77 having a head 79 rigidly attached thereto; a helical compression spring 80 embracing the tube 77 and coacting with the flange 75 and head 79; a pair of wedge lugs 81 formed integral with the head 79 and coacting with a cable 65, 73 extending through the tube 77; and a wedge element 82 also coacting with the cable and with the lugs 81 to firmly clamp the cable in any desired position. The nuts 78 may obviously be adjusted to vary the compression of the spring 80, and the wedge element 82 is provided with a hole 83 for facilitating removal thereof. The head 79 may also be provided with a transverse hole 84 for facilitating removal of the wedge element 82, and when a cable 65, 73 becomes disabled, it may be readily replaced from one of the cable reels 67 by merely removing the clamping wedge element 82 coacting therewith and by subsequently drawing the new cable stock through the tube 77 and replacing the wedge 82 in proper position against the new section. The casing 75 acts as a guard for the spring 80, and the bracket 60 guards the sheaves 62; and a similar guard plate 85 may be provided for the sheaves 69. The rails 51 may also be rigidly interconnected by a guard plate 86, and other guards may be provided wherever needed or desired.

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 into the cut as shown in Fig. 3 for loading purposes, or the blade may be elevated to the position shown in Fig. 4 for load carrying purposes; or the frames may be relatively positioned as in Fig. 5 for discharging and spreading purposes. When the assemblage is in the position shown in Fig. 3 and the scraper is advanced along the ground, the load 40 will enter the bowl 21 and will pile up within this bowl. If the load 40 reaches a height above the rear wall 24 of the bowl 21, then the inclined plate 46 will become effective to prevent spilling of dirt and to direct the excess dirt forwardly into the bowl 21. Any dirt which escapes along the opposite sides of the bowl 21 or over the rear wall thereof, will obviously fall freely to the ground since the bowl 21 is in fact the only load sustaining element in the assemblage. During scraping, the front apron 25 may be elevated to the position shown in Fig. 3, or to any greater height, and as the load 40 accumulates within the bowl 21, it is preferable to gradually lower the apron 25 so as to most effectively confine the load 40.

When the bowl 21 has been properly filled with dirt, the front apron 25 may be lowered into engagement with the blade 28, and the entire load 40 may be elevated from the ground as shown in Fig. 4. In order to do this it is only necessary to release the cable 65 whereupon the apron 25 will drop by gravity. The scraper with its confined load 40 may then be transported over the ground until it becomes desirable to discharge the load from within the bowl 21.

In order to discharge and simultaneously spread the load 40, it is preferable to somewhat lower the cutting blade 28 to the position shown

in Fig. 5, and this may be done by releasing the tension on the cable 73. When the blade 28 has been properly positioned, the cable 73 may be held, and the cable 65 may then be actuated to first elevate the front apron 25 to its extreme uppermost position, and to thereafter tilt the bowl 21 to the position illustrated in Fig. 5. During such tilting of the bowl 21, the rollers 57 will ride upwardly along the rails 51 and will cause the link 55 to positively tilt the bowl. The load 40 will then be gradually delivered over the blade 28 and onto the ground, and the dirt will be simultaneously spread as the scraper unit is advanced along the ground.

When the load has been fully discharged from the bowl 21, the tension on the cable 65 may be released. The apron 25 will then tend to drop by gravity, and while the bowl 21 should return to its normal lowered position by gravity, it may tend to remain in tilted position. The lugs 50 on the front apron 25 will then become effective and will directly engage the bottom 22 of the bowl 21, thus starting the bowl on its initial movement toward lowered position. Since the bowl 21 has no opposite side walls, the lug 50 will directly engage the bowl bottom 22 and will thus insure return movement of the bowl 21 without danger of damaging the same.

From the foregoing detailed description it will be apparent that the improved mechanism may be readily utilized to effectively load the dirt carrying bowl, to transport the load from one place to another, and to finally discharge and spread the dirt during discharge thereof. All of these operations may be quickly and effectively accomplished with the aid of relatively few cables, and the improved cable clamping mechanism obviously provides means for rapidly renewing the cables when they become disabled or broken. 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 position of the blade 28, and this blade 28 may obviously be supported either on the cross-beam 17, or directly on the tiltable bowl 21. When the bowl 21 is in lowermost position, it is rigidly supported by the rear beams 18, 19, and the front beam 16 provides a rigid support for the rails 51 and the supporting struts 52. The various cable sheaves are effectively protected against possible damage due to exposure to the weather and dirt, and the entire assemblage is of extreme rigidity and strength and will thus effectively withstand the abuse to which such machines are normally subjected. The improved machine has proven highly satisfactory in principle, and may be readily controlled and manipulated by a single operator located on the propelling vehicle.

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, a transportable frame, a load carrying bowl having a bottom formed with a rear wall and movable relative to said frame, a track carried centrally above said frame, sheaves movable along said track and being connected to said bowl, and a cable for advancing said sheaves along said track to move said bowl relative to said frame.

2. In combination, a transportable frame, a load confining bowl having a bottom formed with a rear wall and tiltable upon said frame, a track supported by said frame centrally above said bowl, sheaves movable along said track and being connected to said bowl remote from its axis of swing, rollers supporting said movable sheaves upon said track, and a cable for advancing said sheaves along said track to tilt said bowl relative to said frame.

3. In combination, a transportable frame having opposite side portions rigidly interconnected by an upwardly and forwardly inclined transverse plate member, a scraper blade interposed between said side portions forwardly of said plate member, and a load carrying element forming a movable bottom swingably supported near said blade and having an upwardly projecting rear portion the upper edge of which is swingable along and in close proximity to said plate member.

4. In combination, a transportable frame having opposite side portions rigidly interconnected by an upwardly and forwardly inclined transverse plate member, a scraper blade interposed between said side portions forwardly of said plate member, a load carrying element forming a movable bottom swingably supported near said blade and having an upwardly projecting rear portion the upper edge of which is swingable along and in close proximity to said plate member, and means operable from the front of said frame for swinging said element to dump material over said blade.

5. In combination, a wheel supported transportable frame having laterally spaced opposite side walls rigidly interconnected at the rear by a transverse forwardly and upwardly inclined plate member and at their medial lower portions by a transverse beam, a scraper blade carried by said beam, and a load carrying element forming a movable bottom pivotally suspended from said beam and having its rear end provided with an upwardly projecting scraping edge swingable along and in close proximity to said plate member.

6. In combination, a wheel supported transportable frame having laterally spaced opposite side walls rigidly interconnected at the rear by a transverse forwardly and upwardly inclined plate member and at their medial lower portions by a transverse beam, a scraper blade carried by said beam, a load carrying element forming a movable bottom pivotally suspended from said beam and having its rear end provided with an upwardly projecting scraping edge swingable along and in close proximity to said plate member, and cable means operable from the front of said frame for swinging said element to dump material over said blade.

7. In combination, a transportable frame having a cutting blade rigidly attached thereto, a load carrying bowl having a bottom and a rear wall pivotally attached to said frame near said blade, a track carried by said frame intermediate the width of said bowl, a sheave movable along said track, a link connecting said sheave with said bowl remote from the pivotal axis of the latter, and means for advancing said sheave along said track to tilt said bowl about said axis.

8. In combination, a transportable frame having a cutting blade rigidly attached thereto, a load carrying bowl having a bottom and a rear wall pivotally attached to said frame near said blade, a track carried by said frame directly over said bowl and intermediate the width of the

latter, a sheave movable upon rollers along said track, a link connecting said sheave with the rear wall of said bowl remote from the pivotal axis of the bowl, a second sheave fixedly journaled to said track, and a cable coacting with said sheaves to advance said movable sheave along said track and thereby tilt said bowl about said axis.

9. In combination, a transportable frame having opposite side walls interconnected by a transverse front beam member and by a transverse rear forwardly and upwardly inclined plate member, a scraper blade interposed between said side walls rearwardly of said beam and forwardly of said plate member, a load carrying element having a movable bottom and having a rear wall, said element being pivotally supported near said blade and having the upper edge of its rear wall swingable along and in close proximity to said plate member, a track carried by said frame beam and plate member above said element and intermediate the width of the latter, a sheave movable along said track and being connected to said rear wall portion of said element, and cable means for advancing said means along said track.

10. In combination, a transportable frame having opposite side walls interconnected by a transverse front beam member and by a transverse rear forwardly and upwardly inclined plate member, a scraper blade interposed between said side walls rearwardly of said beam and forwardly of said plate member, a load carrying element having a movable bottom and having a rear wall, said element being pivotally supported near said blade and having the upper edge of its rear wall swingable along and in close proximity to said plate member, a track carried by said frame beam and plate member above said element and intermediate the width of the latter, a sheave movable along said track, a link pivotally connected to said sheave and to said swinging rear wall of said element, and cable means for advancing said sheave along said track.

11. In combination, a transportable frame having opposite side portions, a scraper blade interposed between said side portions, a load carrying element forming a movable bottom swingably supported near said blade and having an upwardly projecting rear portion, a transverse plate member connecting opposite side portions of the frame and projecting upwardly and forwardly at an incline above the upwardly projecting rear portion of the load carrying element and normally cooperating therewith to form a rear wall, the upper edge of said upwardly projecting rear portion of the load carrying element being swingable along and in close proximity to said plate member to remove material from contact with the latter.

12. In combination, a transportable frame having opposite side portions, a scraper blade interposed between said side portions, a load carrying element forming a movable bottom swingably supported near said blade and having an upwardly projecting rear portion of less height than said side portions, a transverse plate member connecting opposite side portions of the frame and projecting upwardly and forwardly at an incline above the upwardly projecting rear portion of the load carrying element and normally cooperating therewith to form a rear wall, the upper edge of said upwardly projecting rear portion of the load carrying element being swingable along and in close proximity to said plate member to remove material from contact with the latter.

HENRY C. FRENCH.