Jan. 4, 1949. H. D. KADZ 2,458,274

CARRYING SCRAPER

Filed June 18, 1945 4 Sheets-Sheet 1

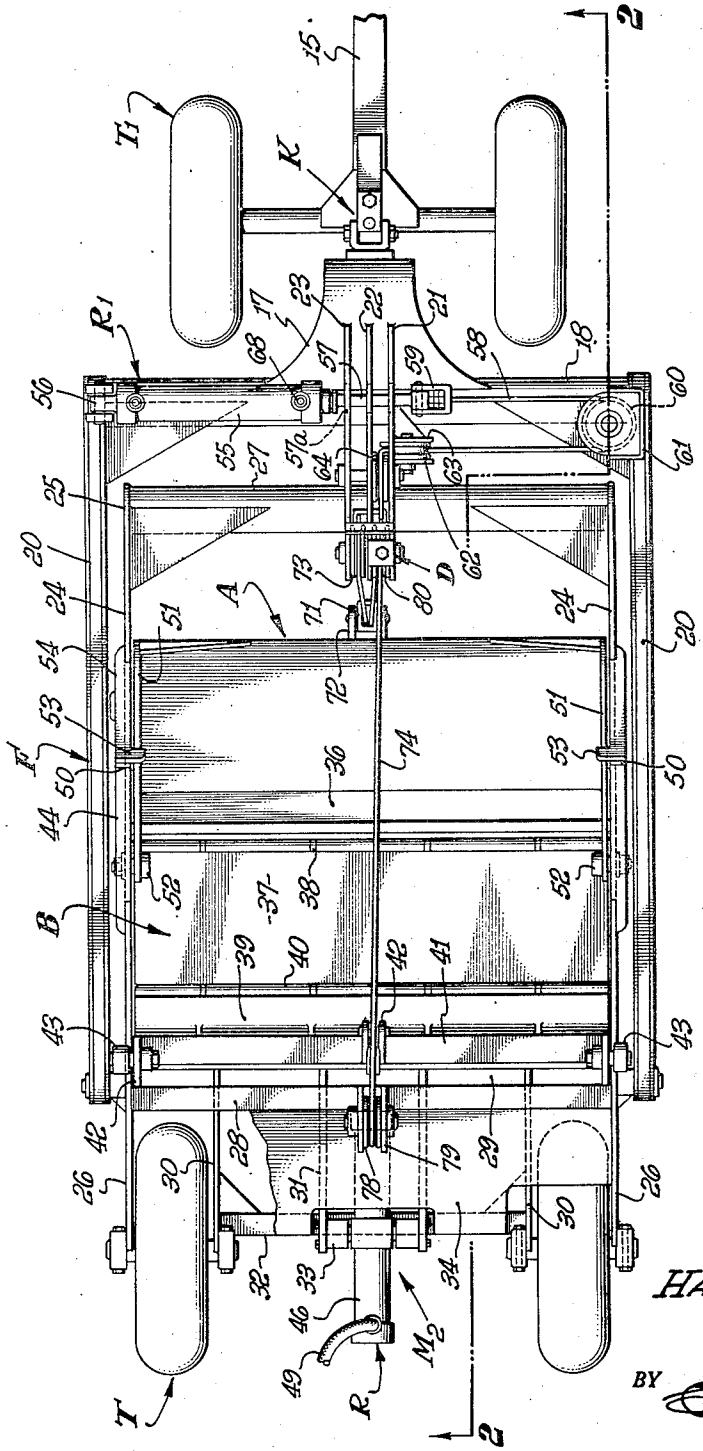


Fig. 1.

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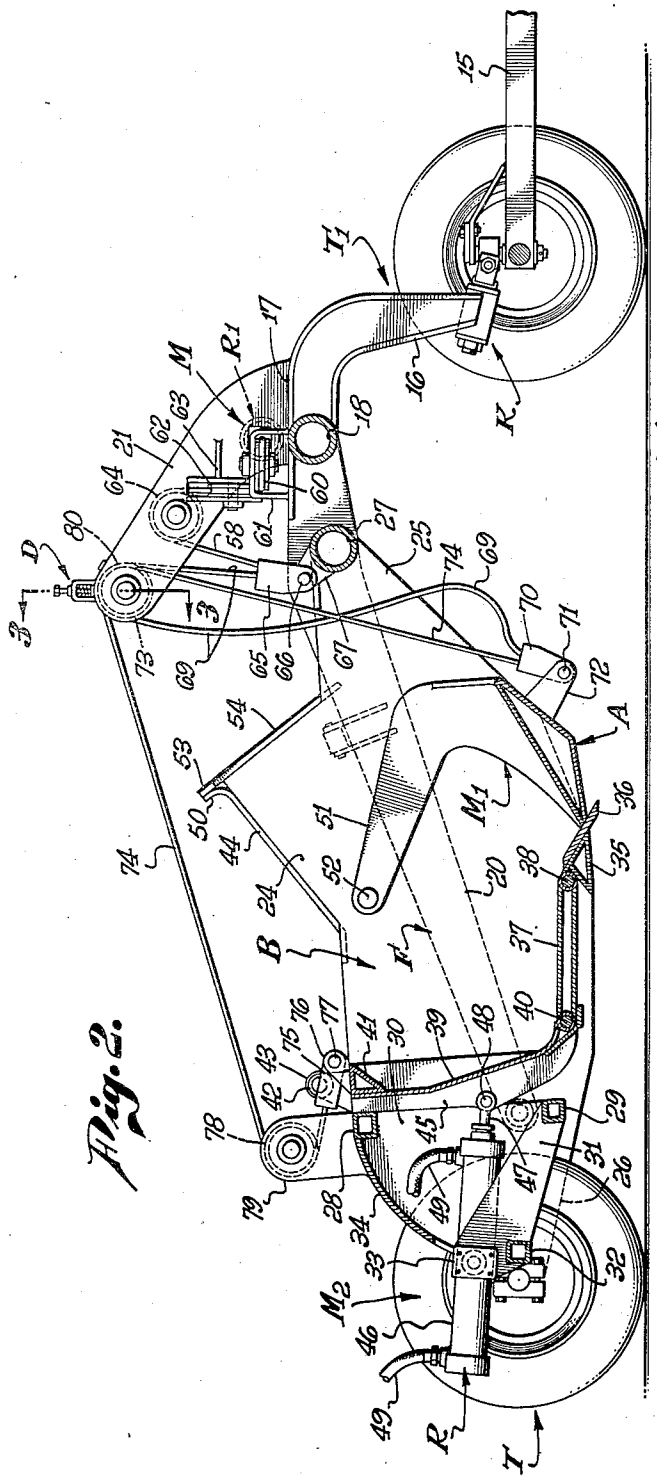


Fig. 2.

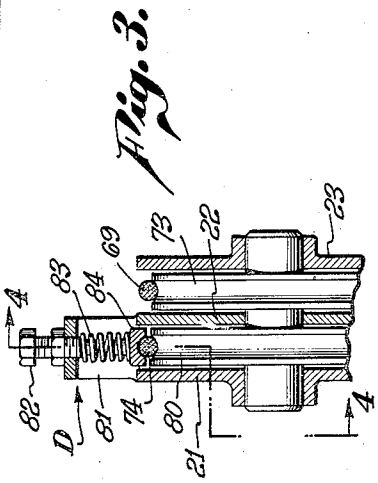


Fig. 3.

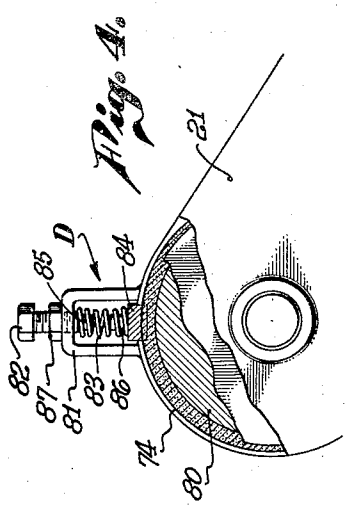


Fig. 4.

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CARRYING SCRAPER

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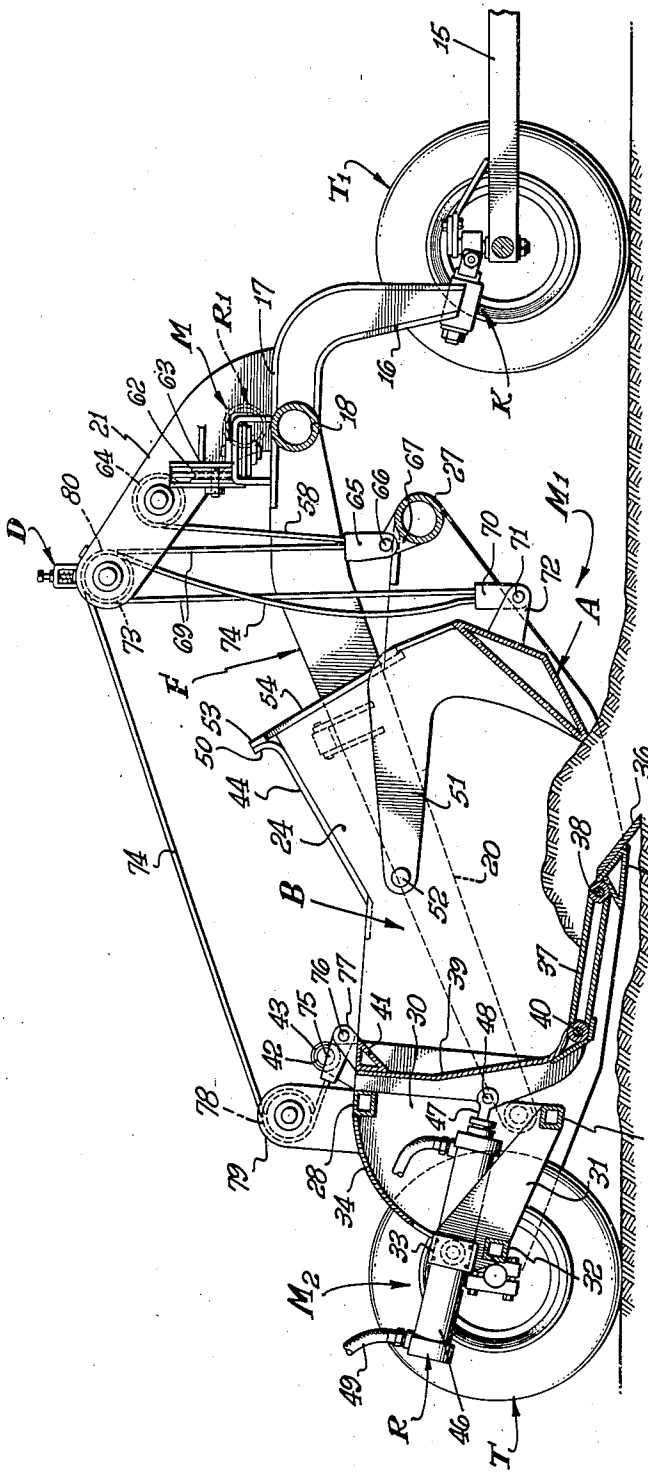


Fig. 5.

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CARRYING SCRAPER

Filed June 18, 1945 4 Sheets-Sheet 4

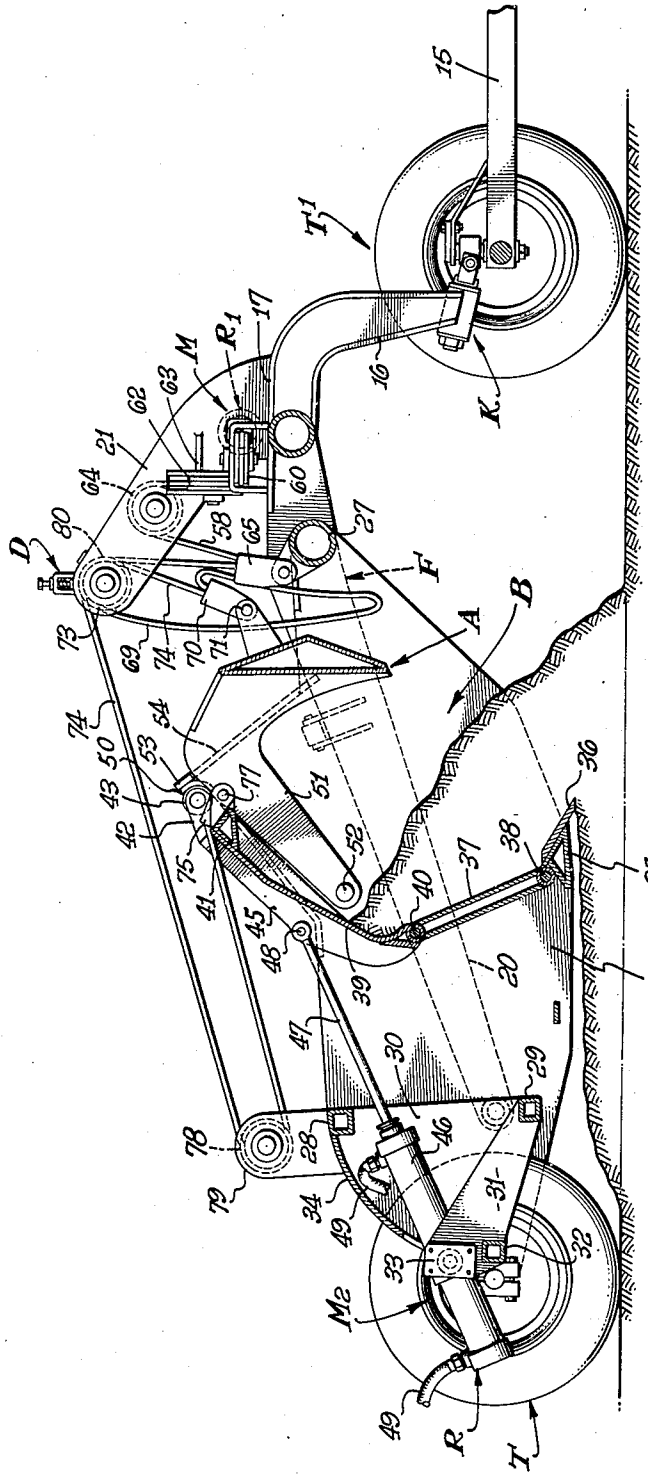


Fig. 6.

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Patented Jan. 4, 1949 2,458,274

UNITED STATES PATENT OFFICE

2,458,274

CARRYING SCRAPER

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Application June 18, 1945, Serial No. 600,087

4 Claims. (Cl. 37—126)

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My invention relates to carrying scrapers of the type embodied in my pending application, Serial No. 522,235, filed February 14, 1944, and which has since issued as Pat. No. 2,418,554, and which scraper is characterized by an apron and an articulated bowl, the two being operable to effect earth loading, carrying, and dumping by cables actuatable from a winch carried by a tractor for towing the scraper.

It is a purpose of my invention to provide a carrying scraper of the above described character in which the employment of a winch is eliminated together with the attendant expense and disadvantages thereof, and the cables for actuating the bowl and apron are operable by simple and effective mechanisms carried by the scraper and controllable from the tractor.

It is also a purpose of my invention to provide a carrying scraper in which the actuating mechanisms for the cables are in the form of hydraulic rams, and the cables are so correlated to the rams, the bowl and the apron, that their operation of the rams, the bowl and the apron can be effected in the required sequence to produce loading, carrying and the complete dumping of earth from the bowl irrespective of the character thereof being handled, by virtue of the articulated construction of the bowl.

A further purpose of my invention is the provision of a carrying scraper in which the actuating mechanism for establishing loading and carrying positions of the bowl, may comprise a single ram and a single cable, the bowl being connected to the apron through a single cable so that when the bowl is elevated the apron is closed to confine the earth within the bowl, and when the bowl is lowered for loading the apron is partly elevated to permit such loading.

Another purpose of my invention is the provision of a carrying scraper having the advantages set forth in the preceding paragraph, and, in addition, a hydraulic ram for actuating the articulated sections of the bowl to effect dumping thereof, and a cable connection between the apron and the articulated sections whereby, as the sections are advanced to effect dumping the apron is elevated to a fully open position to permit of such dumping.

I will describe only one form of carrying scraper embodying my invention and will then point out the novel features thereof in claims.

In the accompanying drawings.

Fig. 1 is a view showing in top plan one form of carrying scraper embodying my invention.

Fig. 2 is a vertical longitudinal sectional view taken on the line 2—2 of Fig. 1 and showing the scraper in earth carrying position.

Fig. 3 is an enlarged fragmentary vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a view taken on the line 4—4 of Fig. 3.

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Fig. 5 is a view similar to Fig. 2 showing the scraper in loading or digging position.

Fig. 6 is a view similar to Fig. 5 showing the scraper in earth dumping position.

Similar reference characters refer to similar parts in each of the several views.

With specific reference to the drawings, my carrying scraper, in its present embodiment, comprises a bowl B pivoted at its rear end on the rear wheel truck T, to occupy earth loading, carrying and dumping positions. A frame F is pivoted to the bowl and supported at its front by a front wheel truck T1, there being a swivel connection K between the two by which the scraper as a whole is rendered dirigible. An apron A is pivoted on the bowl to completely close the front of the latter when carrying earth, to partially open the latter when loading or digging, and to completely open the bowl when dumping the latter and also to effect complete dumping of the apron. Three mechanisms M, M1, and M2 are included in the scraper, one for elevating the bowl from loading to carrying position, the second for elevating the apron, and the third for actuating the movable parts of the bowl necessary to effect dumping thereof.

The front truck T1 includes a tongue 15 by which the scraper as a whole is adapted to be connected to the tractor for towing thereof. The frame F includes a leg 16 depending from a platform 17 to the underside of which is secured a transverse beam 18. At the ends of the beam 18 a pair of rearwardly extending and downwardly inclined side beams 20 are secured. Fitted to and rising from the platform 17 are three supporting brackets 21, 22, and 23, upon which are supported certain of the sheaves of the mechanisms M, M1, and M2, as will be later described herein.

The bowl B is arranged between the side beams 18, and it includes a pair of side plates 24 having tapered front ends 25 and tapered rear ends 26. The front ends 25 are rigidly connected to each other by a transverse tubular beam 27, while adjacent their rear ends the side plates are rigidly connected by an upper beam 28 and a lower beam 29. Secured to the beams 28 and 29 and extending rearwardly therefrom are a pair of outer plates 30 and a pair of inner plates 31, the former being spaced inwardly from the rear ends 26 of the bowl sides, and cooperating therewith in supporting the rear wheels T therebetween. The inner plates 31 are secured to a cross beam 32 with the ends of the latter secured to the plates 30, and the plates 31 and the beam 32 providing a mounting for trunnions 33 to support a hydraulical ram as will be more fully described hereinafter. A guard plate 34 may be secured to the beams 28 and 32 for protecting parts of the aforesaid ram against earth falling thereon.

From the preceding description it will be clear that the rear end of the bowl B is pivotally mounted so as to swing vertically about the axles for the wheels of the rear unit T, and to thereby permit the bowl to occupy loading and carrying positions.

Fixed to the inner sides of the bowl plates 24 and spanning the latter is a triangular support 35 to which is secured a cutting or scraping blade 36, which, as shown in Fig. 5, is adapted to cut earth from the ground in the loading of the bowl.

To support earth within the bowl and yet effect complete dumping thereof from the bowl irrespective of the character of the earth being handled, that is whether granular or sticky, the bottom and back of the bowl are of articulated construction. Such construction may be substantially identical to the bowl of my previous application for patent hereinbefore referred to and, hence, may be briefly described herein. The bowl bottom 37 is in the form of a planar plate pivotally mounted at its forward edge by a hinge 38 which extends transversely between the bowl sides. The bowl back 39 is pivotally connected to the rear transverse edge of the bottom 37 by a hinge 40 which likewise extends transversely between the bowl sides and is unsecured thereto.

To the upper edge of the back 39 is secured a beam 41 which not only reinforces the back but provides a support for ears 42 carrying rollers 43, the latter being positioned to engage inclined tracks 44 on the upper edges of the bowl sides 24 and by which the bowl back is caused to rise as it advances from the position shown in Fig. 5 to that shown in Fig. 6. To the rear side of the bowl back 39 is secured a web 45 which reinforces the back and provides a mounting for the piston rod of the mechanism for actuating the bowl back.

This mechanism which has been generally indicated at M2, comprises, in the present instance, a hydraulic ram R, the cylinder 46, of which is pivotally mounted between the plates 31 by means of the trunnions 33. The piston rod 47 of the ram is pivotally connected as at 48 to the web 45, and the web and ram are preferably positioned medially of the ends of the bowl back so that the moving force of the arm will be applied centrally to the back. The cylinder 46 at its ends is provided with the conventional hoses 49 by which fluid under pressure may be supplied to one end or the other of the cylinder and simultaneously discharged from the opposite end. It will be understood that suitable valves (not shown) may be provided and carried by the tractor employed to tow the scraper, by which the control of pressure fluid to and from the cylinder can be effected at will to operate the piston rod in effecting the desired movements of the bowl back.

When pressure fluid is supplied to the cylinder 46 so as to move the piston rod 47 outwardly of the cylinder and forwardly of the scraper, the bowl back 39 is advanced between the bowl sides from the position shown in Fig. 2 to that shown in Fig. 6, the rollers 43 moving upwardly of the tracks 44 and into engagement with stops 50. This causes the back 39 to be lifted as it advances, and being connected to the bottom 37 the latter is swung upwardly on its pivot 38 so that the two bowl sections now occupy positions in which all earth is dumped from the bowl.

The apron A is positioned between the bowl sides 24 to open and close the front of the bowl, and by means of rearwardly extending arms 51 pivoted on the bowl sides 24, as at 52, the apron is mounted to occupy a completely closed position as when transporting earth within the bowl, a partly opened position as when loading the bowl, and a completely opened position as when dumping the bowl. The dumping position of the apron is defined by a pair of abutments or stops 53 on the upper ends of flat rods 54 secured to the upper edges of the bowl sides 24.

The mechanism M1 for operating the apron A is interconnected with the mechanism M2 for operating the bowl sections 37 and 39, so that as such sections are advanced for dumping of the bowl the apron is elevated from closed position to completely open position. This mechanism M1 is also interconnected with the mechanism M for elevating the bowl B, and in such manner that when the bowl is in loading position the apron is in partly open position, as illustrated in Fig. 5. Also, when the bowl is elevated to carrying position (Fig. 2) the apron is lowered to closed position to confine the earth within the bowl. Therefore, before describing the apron lifting mechanism, I will describe the bowl lifting mechanism.

The bowl lifting mechanism M, in the present instance, comprises a hydraulic ram R1, the cylinder 55 of which is positioned transversely on the forward end of the frame F and pivoted thereon at one end as at 56. The piston rod 57 of the ram, which is movable through suitable openings 57a in the brackets 21, 22, and 23, is pivotally connected to one end of a cable 58 by a clevis 59, such cable being trained about a sheave 60 mounted for rotation about a vertical axis in a bracket 61 secured to the platform 17. From the sheave 60 the cable extends around and upwardly from a sheave 62 mounted for rotation about a horizontal axis in a frame 63 secured to the supporting bracket 21. From the sheave 62 the cable 58 passes upwardly and over a sheave 64 mounted for rotation about a horizontal axis between the supporting brackets 21 and 22. The cable 58 passes downwardly from the sheave 64 and is secured in a connector 65 pivoted as at 66 on ears 67 fixed to the beam 27.

As in the case of the ram R, the cylinder 55 of the ram R1 is provided at its ends with suitable lengths of hose 68 to extend to the towing tractor, where they are provided with valves for controlling the supply of pressure fluids to opposite ends of the cylinder for actuating the piston rod to in turn actuate the cable 58. It will be understood that in the lowered position of the bowl B the piston rod is fully extended from the cylinder, and that to elevate the bowl the piston rod is moved inwardly of the cylinder thereby actuating the cable 58 to lift the forward end of the bowl.

The mechanism M1 for operating the apron comprises a cable 69 secured at one end to the connector 65, and at its other end to a connector 70 pivoted as at 71 on ears 72 fixed centrally to the forward side of the apron A. The intermedial portion of the cable 69 is trained over a sheave 73 mounted for rotation about a horizontal axis between the upper ends of the supporting brackets 22 and 23. The apron operating mechanism also includes a cable 74 fixed at its forward end to the connector 70, and at its rear end to a connector 75 pivoted as at 76 on ears 77 fixed centrally to the cross beam 41.

From the connector 75 the cable 74 extends around a sheave 78 mounted for rotation about a horizontal axis in a bracket 79 fixed to a beam 28 and to the guard plate 34. From the sheave 78 the cable 74 passes upwardly and then downwardly around a sheave 80 mounted for rotation

about the same axis as the sheave **73**, and positioned between the supporting brackets **21** and **22**.

By virtue of the aforedescribed mechanism for actuating the apron, it will be clear that operation of the apron is controlled by operation of the bowl through the cable **69**, as well as by operation of the bowl back **39** through the cable **74**. In the latter case it is necessary to provide some means for preventing the cable **74** from slackening to such an extent that it falls into the earth collected in the bowl during the loading operation in which the apron A is in the elevated position shown in Fig. 5. If this were permitted the cable would collect earth, particularly if wet, which would ultimately reach and foul the sheaves over which the cable is trained, or it may cause the cable to be thrown off of the sheaves.

I provide such a means, which in the present instance, comprises a gripping device D (see Figs. 3 and 4) that functions to hold that portion of the cable **74** extending rearwardly from the sheave **80** (see Fig. 2), against slackening, and yet yielding under the rearward pull exerted on the cable when the bowl back is advanced through operation of the ram R, to permit lifting of the apron by the cable **74**.

The device D may comprise a frame **81** secured to the brackets **22** and **23**, and in which a screw **82** is threaded for adjustment to vary the tension exerted by a coiled spring **83** on a pressure foot **84** grooved to receive the cable **74** at that point where it passes over the sheave **80**. Centering projections **85** and **86** for the spring are formed on the screw and foot, respectively, and a lock-nut **87** is adjustable on the screw for locking the latter in adjusted position.

Manifestly, the spring **83** presses the foot **84** against the cable **74**, and the latter against the sheave **80** to cause the device to function as described.

In operation, the scraper, is loaded by lowering the bowl B to the position shown in Fig. 5, so that the blade **36** is at the desired digging level, while the apron A is elevated to a partly open position. Such positioning of the bowl is effected by operation of the ram R1 to slacken the cable **58**, and under such slackening the bowl in its downward movement exerts a pull on the cable **69** to elevate the apron to partly open position. Although the vertical stretch of the cable **74** is slackened as a result of the aforedescribed operation, that portion of the cable extending from the sheave **80** to the bowl back **39** is retained taut by the device D.

Following loading of the bowl, it is elevated to the carrying position shown in Fig. 2, by operation of the ram R1 to exert a pull on the cable **58**. This results in slackening the cable **69** to allow the apron A to fall to closed position.

Dumping of the bowl is effected while it is in elevated position through operation of the ram R to advance the back **39** and then the bottom **37** to the positions shown in Fig. 6. Advancement of the back operates the cable **74** to elevate the apron A to fully open position, thus clearing the front of the bowl to allow discharge of earth by the back and bottom, and also dumping earth from the apron itself. It will be understood that during this operation of the cable **74** the device D yields to allow the requisite movement of the cable.

Once the bowl has been dumped the back **39** and the bottom **37** are restored to their original positions by operation of the ram R to retract the back, and during this operation the cable **74** is

actuated by the back to lower the apron to closed postion.

Although I have herein shown and described only one form of carrying scraper embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of my invention and the spirit and scope of the appended claims.

I claim:

1. In a carrying scraper: a frame; a bowl mounted thereon for movement to loading and carrying positions, said bowl having relatively fixed sides, and hinged bottom and back sections mounted between said sides for advance movement from a retracted position, an apron mounted on said bowl for closing, partly opening and completely opening the front of said bowl; a first means for operating said bowl; a second means for moving said apron to partly open position; a third means for advancing and retracting said sections between said sides; and a fourth means including sheaves and a cable operatively connecting said sections to said apron so that with advancement of said sections said apron is moved to completely open position; and a device acting when said apron is held by said second means in partly open position, to hold against slackening that portion of said cable above said bowl.

2. A carrying scraper as embodied in claim 1, wherein said device comprises a spring-pressed foot for pressing said cable against one of said sheaves.

3. In a carrying scraper: a front ground support; a rear ground suport; a bowl pivoted at its rear end to said rear ground support, and having a back mounted for movement forwardly between the sides of the bowl; a frame connected to said front ground support, and pivoted to said bowl; an apron pivoted on said bowl for closing the front of the latter; a first cable mounted on said frame and connected to the front end of said bowl; a hydraulic ram mounted on said frame and connected to said cable for actuating the latter to elevate said bowl; a second cable movably mounted on said frame and anchored at one end to said bowl, and at the other end to said apron, for elevating or lowering said apron through lowering or elevating said bowl; a second hydraulic ram mounted on said bowl and operatively connected to said bowl back for moving the latter forwardly; and a third cable connected at one end to said bowl back, movably mounted on said bowl and said frame, and connected at its other end to said apron so that as said bowl is advanced by said second ram, said apron will be elevated to open the front of said bowl.

4. A scraper as embodied in claim 3, wherein said first and second cables are pivotally anchored to said bowl at one and the same point medially of its width, and said second and third cables are pivotally anchored to said apron at one and the same point and medially of its width.

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