May 25, 1954 F. B. ROBB 2,679,119

AUXILIARY SCRAPER AND LOADING APRON
FOR CARRY-TYPE EXCAVATING SCOOPS

Original Filed May 18, 1943 3 Sheets-Sheet 1

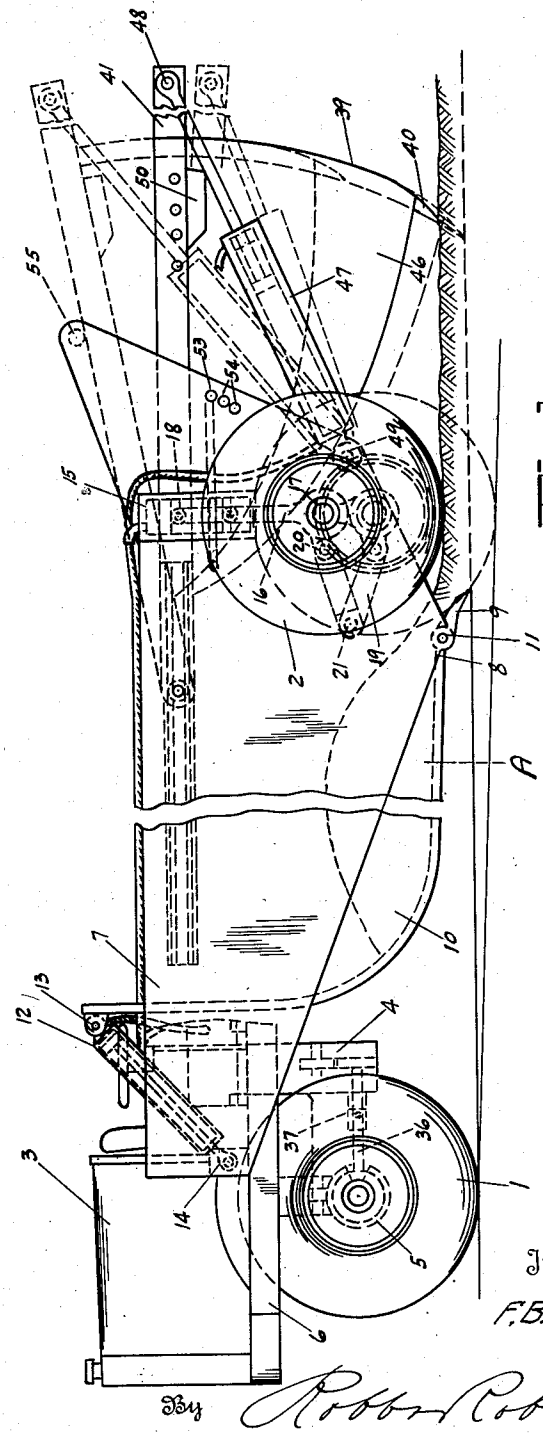

Fig. 1

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Original Filed May 18, 1943 3 Sheets-Sheet 2

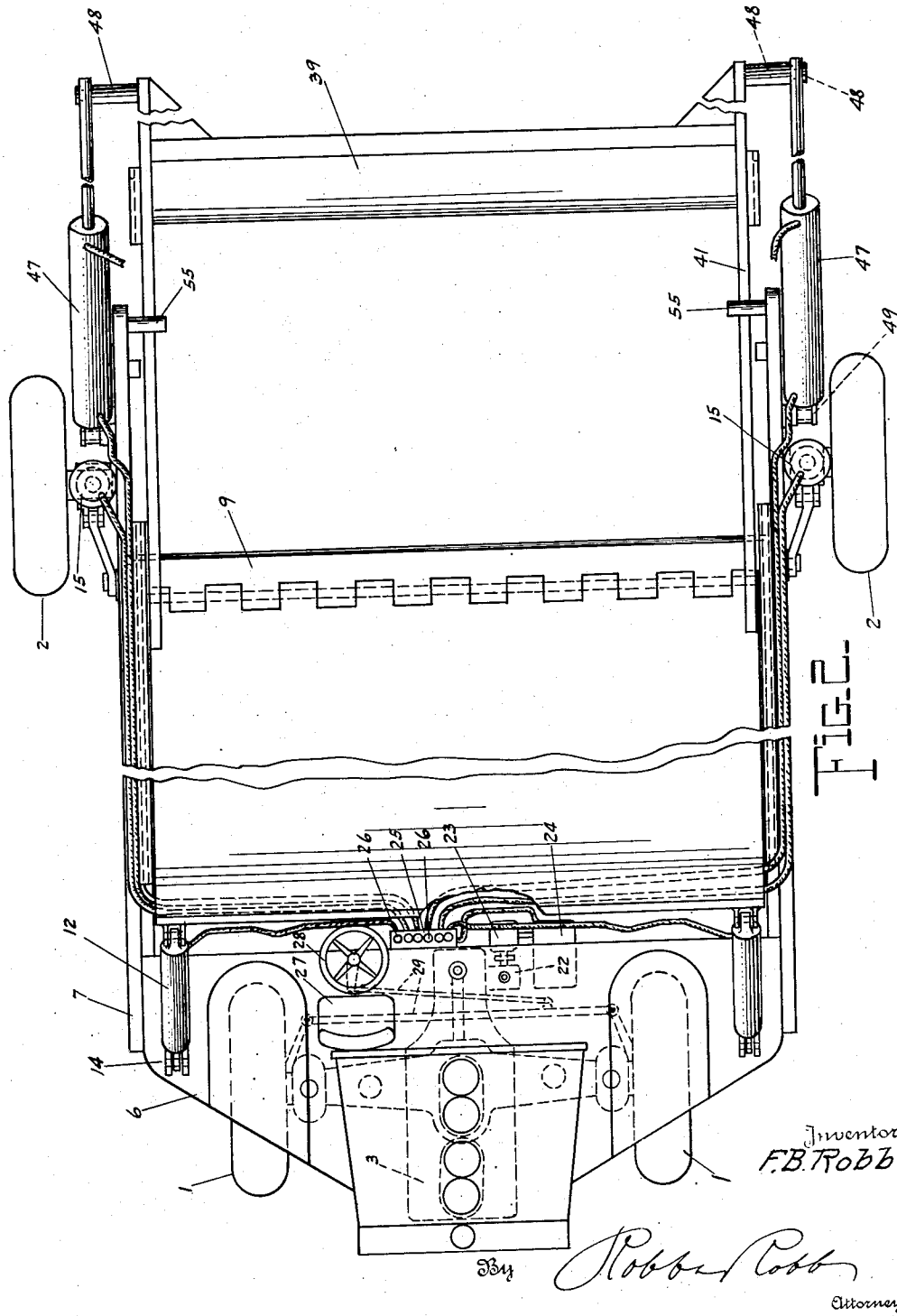

FIG. 2

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FIG. 3.

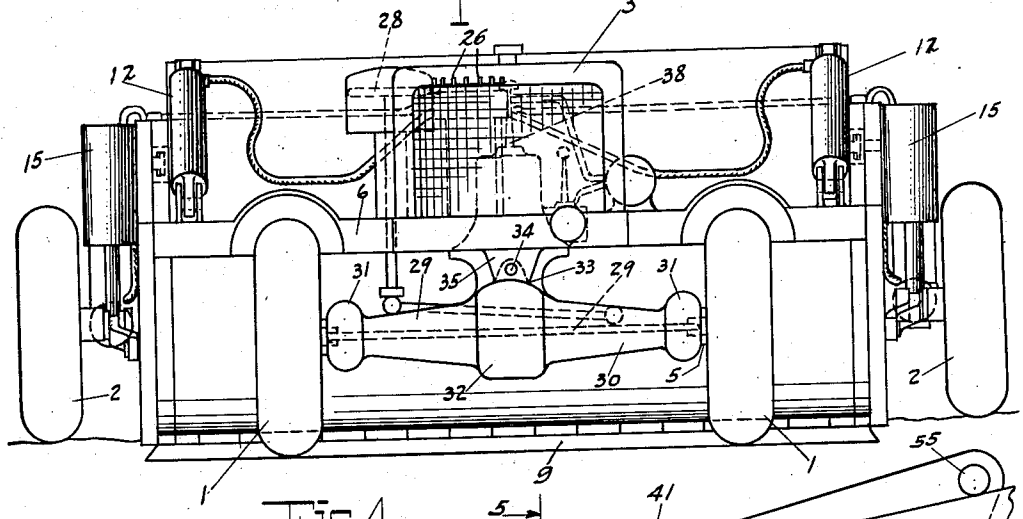
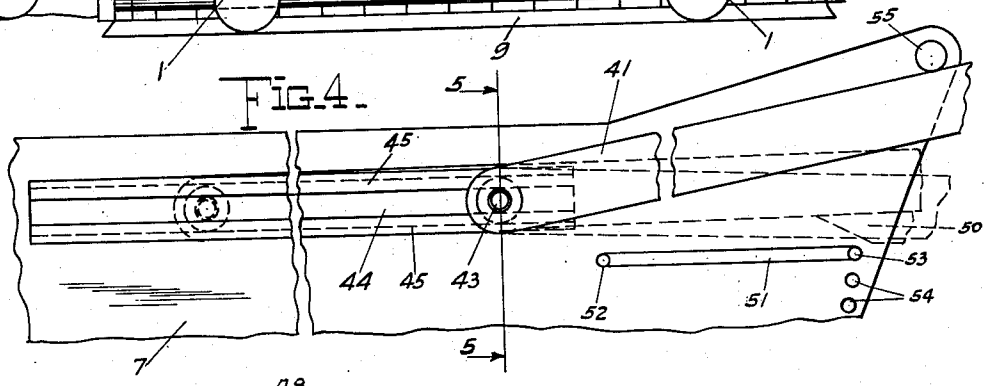


FIG. 4.



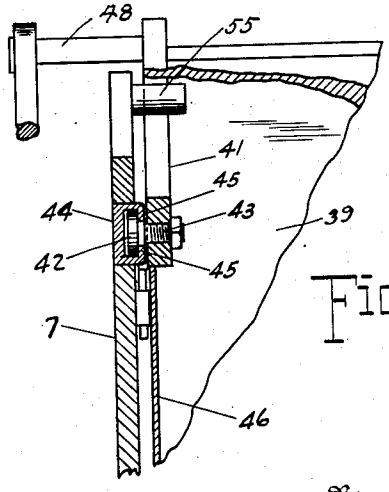


FIG. 5.

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UNITED STATES PATENT OFFICE

2,679,119

AUXILIARY SCRAPER AND LOADING APRON FOR CARRY-TYPE EXCAVATING SCOOPS

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Continuation of application Serial No. 487,512, May 18, 1943. This application June 17, 1948, Serial No. 33,631

1 Claim. (Cl. 37—126)

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This invention relates to the art of dirt moving and hauling machines, and more particularly, to that class of machines adapted to dig up earth and deposit the same in the body of the machine so as to be subsequently carried off at high speed to a place of deposit, and there dumped as desired. This application is a continuation of my original application Serial No. 487,512, now abandoned, filed May 18, 1943, for a Dirt Hauling Vehicle.

As to the present constructed machines of this class, in order to provide the necessary high speed, they are mounted on suitable wheels, preferably pneumatic tired, and either pushed, towed, or by self-contained power, operated in accordance with well known practice. If the machines above referred to are adapted to move at high speed, as either towed or propelled by their own power, these machines do not have sufficient traction to fill the body with a capacity load, which would warrant its transportation to the place of dump or fill without availing of additional power ordinarily provided by a supplementary tractor adapted to either pull or push the vehicle during its loading operation, and subsequently be detached or cease its pushing or pulling function, whereby the machine in which the load has been deposited may move off at high speed.

If machines are constructed, as heretofore, which have enough traction to fill the body with a capacity load such as would be necessary to make the dirt moving operation pay, they are not adapted at the present time to move at high speed, and, therefore, a desired economy of construction of the machine and operation thereof is not present. My present invention embodies improvements upon a certain type of tire wheel scraper heretofore proposed, which utilizes dual, or main and auxiliary scrapers, preferably operated by the self-contained high speed travel power of the machine to completely load the scraper dirt holding body with a pay load, and carry the same off to the fill at high speed, likewise returning empty at such speed.

The important features of this invention, which enable the foregoing objects to be accomplished, are the novel provisions of an auxiliary or secondary scraper member adapted to be operated by the self-contained power of the machine to supplement the loading operation of a main body scraper member, and to operate the said second scraper member by novel mechanism to fill the machine with a capacity or pay load.

It is a primary object of this invention to provide a scraper of novel construction adapted to be driven by its own power and to avail of that power with novel mechanical instrumentalities to carry out all of the operations of loading, hauling, and dumping the machine with the greatest economy, and in a novel manner.

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It is a still further object of this invention to provide a novel form of front closure and scraper adjustably positioned near the open end of the body of the machine, the said front closure and scraper being provided with a scraper member and control means, whereby this scraper member may be actuated to perform a scraping operation supplementing that of another scraper provided on the body.

Another object of this invention is to provide a novel mounting for the front end of the machine, whereby adjustment of the main scraper, or scraper on the frame of the machine, may be effected relative to the ground or terrain over which the machine travels, and thereby maintain the machine in position so as to perform its proper scraping operations.

A still further object of this invention is to provide a novel form of front body closure and scraper combined, and control means for said scraper involving a minimum amonut of mechanical operating equipment, for applying unyielding digging force downwardly to said scraper to cause it to penetrate the undug earth in advance of the main scraper on the body of the machine, and maintaining said front scraper unyieldingly in its ground penetrating position as it is moved rearwardly to carry earth material freshly dug thereby into the scraper dirt holding body; and additionally to provide such a front scraper that works independently of raising and lowering the main scraper frame in performing the functions above described.

In order to exemplify the invention by way of its incorporation in a machine suitable for the objects above referred to, reference will be had hereinafter to the drawings, in which a preferred embodiment of the invention is disclosed, which, however, is not intended to limit the scope of the invention in any other manner than that set forth in the claim likewise appended hereto.

In the drawings:

Figure 1 is a side elevation of a machine embodying the necessary mechanical means for carrying out the invention, and certain portions of the machine, and the front closure structure, are shown in dotted lines in this view.

Figure 2 is a top view of the machine showing the mounting thereof on the pneumatic tires and

the relation of the various instrumentalities incorporated therein.

Figure 3 is a rear view showing in somewhat more detail the mounting of the machine, and certain hydraulic or other suitable jack means for operating the various parts thereof.

Figure 4 is a fragmentary view of the upper forward end of one of the frame members of the machine, illustrating the portion of a closure supporting arm and stop means provided therefor.

Figure 5 is a fragmentary sectional view taken about on the line 5—5 of Figure 4.

It should be understood that in the description of the machine which here follows, and in the claims appended, the word "scraper" is used to denote a member or members capable of effecting the dual functions of excavating and leveling.

Referring now particularly to Figure 1, it will be noted that the machine is mounted on rear wheels 1, and front wheels 2, the rear wheels being preferably driven from a motor 3 mounted thereabove, by means of suitable transmission gearing 4, not further illustrated, but well known in the art, to rear wheels 1 to be more particularly described hereinafter.

The motor 3 is mounted on a suitable rear plate or deck member 6, extending transversely of the machine and adapted to have suitably fastened at its outer ends the side members 7, the same constituting the frame members of the machine. As will be noted, these frame members are substantially triangular in shape.

At the lowermost portion 8 of the substantially triangular side frame members 7, a scraper member 9 is provided likewise extending transversely of the machine, and connected to the side members in any suitable manner. Scraper member 9 is a main or body scraper operable as the machine advances.

Just to the rear of the scarper 9, the body member 10 is hinged at 11 so as to be raised or lowered, as desired, for dumping the contents of the body or returning the body to its dirt receiving position. The raising and lowering of the body 10 is effected by means of suitable jacks 12, pivotally engaged at 13 with the upper rear portion of the body member 10 and similarly pivotally engaged at 14 with the rear deck member 6.

Passing now to the means for supporting the front wheels 2 of the machine, it will be noted that adjacent the outer sides of the machine, and above the wheels, suitable jacks 15 are provided adapted to have the piston rods 16 thereof connected in any suitable manner to the axles 17 of the wheels. The jacks 15 are pivotally engaged at 18 with the upper outer sides of the frame members 7, and in order to maintain the desired position of the wheels upon adjustment of the pistons in the jacks 15, suitable links 19 are provided and pivotally engaged at 20 with the housing of the axle 17, and similarly engaged at 21 with the frame members 7.

It will be seen, therefore, that upon actuation of the pistons in the jacks 15 by hydraulic or other suitable means, a raising and lowering of the frame members 7, and thus the body 10, is accomplished. It is significant, in view of the provision of separate jacks 15 for the front wheels 2, that the front wheels may be individually controlled as to their relationship with the body 10 to properly maintain the scraper 9 in any desired adjusted position.

In order to provide the necessary fluid or air, as the case may be, the engine 3 is equipped with a power take-off 22, as seen in Figure 2, adapted to drive a suitable pump 23 to pressurize a tank 24 adapted to deliver the necessary pressure fluid to the jacks 12 and 15. For the control of this pressure fluid, a suitable control panel 25 is provided, having a series of control levers 26 thereon, adapted to be actuated by the operator of the machine from the seat 27 provided on the rear deck 6.

As will be seen upon further consideration of Figure 2, the operator is provided with the necessary steering wheel 28 whereby the rear wheels 1 of the machine may be actuated through conventional steering controls 29, in accordance with well known automotive practice.

At this point reference is made to Figure 3 to more particularly disclose the manner of mounting the rear axle 5. The said rear axle 5 is carried in a housing 30 provided at its end with additional housings 31 adapted to enclose well known universal joint steering knuckle mechanism, and at its central portion with a known type of differential enclosed in a housing 32. Adjacent the top of the housing 32, an extension 33 is provided, adapted to be pivotally connected at 34 with a member 35 attached to the rear deck 6, whereby transverse pivotal movement of the wheels 1 may take place.

It should be noted, as shown in Figure 1, that the drive from the transmission gearing 4 is accomplished by means of conventional drive shaft 36 in a housing 37, suitably pivotally engaged with the housing 32, whereby the drive may be effected from the engine under the control of the shift lever 38, as shown in Figures 2 and 3.

The drive from the engine 3 to the rear axle 5 is not further here referred to by reason of its being known by those skilled in the art, and since it is of conventional construction.

Referring again to Figure 1, and likewise to Figure 4, the front closure and auxiliary scraper 39 is shown as being substantially arc-shaped in cross section, extending transversely of the machine, and being provided at its lower edge with a suitable scraper 40. The closure 39 is connected at its upper end with the arms 41, the said arms extending rearwardly into the body portion of the machine, and being provided at the rear ends with roller elements 42, pivotally engaged at 43 with the arms 41. These roller elements are adapted to move in rail sections 44 formed in the side frame members 7, the said rail sections being provided with overhanging lips 45, whereby to confine the rollers 42 within the rails 44. In order to strengthen the connection of the front member 39 with the arms 41, suitable side members 46 are provided, the said side members likewise facilitating the operation of loading the machine, as will be hereinafter pointed out.

In order to operate the front scraper unit, suitable jack members 47 are provided, the pistons of the said jack members being pivotally engaged at 48 with the outer ends of the arms 41. At the inner ends of the said jack members 47 suitable pivotal engagement at 49 is provided on the frame members 7. The arms 41 of the front unit are provided with cam members 50, adapted to coact with stop or abutment members 51. The said stop members 51 are in the form of links pivoted at 52 and are provided at 53 with removable bolts, or the like, adapted to be adjusted in one or other of the holes 54 in the frame members 7, for coaction with the cams 50 upon inward movement of the scraper unit

39, under the action of the jacks 47, during the operation of the scraper 40.

Abutment members 55 are provided at the upper corners or apices of the substantially triangular members 7, whereby to coact with the arms 41 upon upward movement of the member 39 under the action of the jacks 47.

It will be noted that suitable lines for carrying the pressure fluid are provided for all the jacks heretofore referred to, same being under the control of the control levers 26 on the control panel 25, previously mentioned.

It may, under certain conditions, be desirable that the front closure and scraper unit 39, in addition to being provided with the scraper 40, be further provided with digging teeth, not illustrated, to facilitate the digging action of the scraper 40.

In order to further explain the invention, the operation of the various instrumentalities heretofore referred to will be described in their normal sequence of operation, it being borne in mind that the scrapers 9 and 40, provided on the frame members 7, and the closure 39, respectively, are adapted to perform the same functions in accordance with the definition of the word "scraper," previously set forth.

In operation, the operator, at the rear of the machine, having lowered the front end of the frame 7 into the position shown in full lines in Figure 1 and caused the machine to move to the right in said figure, has accumulated by the action of the scraper 9 a certain amount of dirt illustrated in dotted lines, and denoted A in said figure. Having moved the machine forward to the full extent of the traction available at the rear wheels 1, and the said machine no longer being capable of being moved by said traction, fluid pressure having been previously introduced at the lower ends of the jacks 47 so that the member 39 has assumed the upper position shown in dotted lines in said figure, he thereupon actuates one of the control levers 26 whereby to introduce fluid pressure into the upper ends of the jacks 47 and cause a downward picking action of the member 39. This compels the scraper 40 to engage or enter the ground, and, upon continued introduction of fluid pressure into the upper ends of the jacks 47, an inward movement of the said scraper 40 will be effected, the limit of downward movement of the said scraper being determined in accordance with the position of the bolts 53, and the links 51 of the stops shown in Figure 4.

Having engaged the scraper 40 with the ground, continued inward movement of the pistons of the jacks 47 will cause the members 39 and 40 to move towards the open end of the body, and the scraper 40 to perform its scraping function, thereby scraping dirt or material and forcing it rearwardly into the body 10. If, at this point, enough material has been introduced into the body 10 to warrant the carrying off of that dirt or material to the fill or place of deposit, this may be done, but if such is not the case, the fluid pressure may be again introduced into the lower ends of the jacks 47, and the unit 39—40 caused to move outwardly into the upper position shown in dotted lines in Figure 1, and again operated to effect a picking action, if desired, and the inward scraping movement of the scraper 40 again effected.

However, it will be apparent that the material which heretofore resisted the forward movement of the scraper 9, has been removed into the body 10, and, therefore, the machine might again be operated under its tractive power through the wheels 1 to move forwardly and cause the scraper 9 to carry out a further scraping operation. In other words, the front and rear scrapers may be worked alternately, if desired.

It will be apparent that in carrying out the foregoing operations of the machine, the body 10 of the machine will be loaded with a pay load, and, thereupon, the operator introduces fluid pressure into the upper ends of the jacks 15 thereby causing the pistons therein to move downwardly, and thus raise the scraper 9 out of engagement with the earth or ground, the front unit 39—40 having previously been brought into position to retain the dirt or the materials dug up by the scrapers 9 and 40, by assuming a position adjacent to the scraper 9 and closing the body 10.

Thereupon, the operator moves the machine off at high speed to the place of deposit, or fill, and by proper manipulation of the jacks 47, causes the front member 39 to move out of its closing position in front of the body 10, and by actuation of the jacks 12, the body 10 may be caused to pivot around the pivot 11 to dump the dirt or other materials out of the body.

In accordance with well known practice, the dumping operation may be accomplished at one spot, or spreading of the materials may be facilitated by suitable adjustment of the scraper 9 with respect to the depth of materials desired to be spread or leveled.

It will likewise be apparent that the scraper 40 may be availed of to effect this leveling operation by rearward movement of the machine under the action of reversing the transmission drive by lever 38, or, in other words, movement of the machine to the left, as shown in Figure 1, the front scraper being susceptible of adjustable positioning with respect to the ground.

An alternative method of operation of the machine may be that of operating the machine into a position adjacent the materials to be dug, and without effecting the scraping operation by the scraper 9 rely upon the independent scraping operation which may be effected by the scraper 40, under the controls of the jacks 47, and thus a digging or excavating action may be accomplished regardless of forward movement of the machine to impart a scraping action to the scraper 9.

Another advantageous action obtainable by my construction of scraper lies in the capability of engaging the scraper by downward picking penetration, with the earth, so that when the hydraulic units 47 exert rearward pull on the members 39—40, earth may be scraped into the body 10. If the scraping is hard, the member 40 can act as an anchor to assist the power unit 3 to drive the scraper 9 forward, supplementing the tractive effort of wheels 1. Otherwise, the scraper 40 may be pulled rearwards and adequately perform its independent scraping function. No supplemental traction machines to push or pull my scraper are required, and the self-contained power of the scraper is sufficient to load it completely, and move it at high travel speed to and from the fill.

From the foregoing it will be seen that the jacks 47 form unyielding power devices by which to force the member 40 into, and hold the same, in the undug earth in advance of the scraper 9 and body 10, to effectuate the rearward digging and

scraping action of the member **40** in the manner previously described. The digging action of the member **40** and its scraping operation may be effected without any adjustment of the frame **7** upwardly or downwardly in controlling such action.

If the machine is operating on an earth surface inclining downwardly transversely, the independent adjustments vertically of the wheels **2** may tilt the machine at an angle transversely about the axis **34** connecting frame **7** with the rear axle housing **32**, enabling the scraper unit **39—40** to remain parallel to the surface and dig and scrape a layer of undug earth of predetermined depth for the entire transverse cutting area of the member **39—40**.

The jacks **47** form unyielding power devices for causing the unit **39—40** to dig into the undug earth and maintain its earth penetrating position as it is pulled rearwardly to scrape earth into the bowl **10**. The rollers **42** constitute rolling, movable or sliding connector devices movable longitudinally of the frame parts **7** in the guides **44**, and pivotally connect the arms **41** to the frame.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

In a vehicle of the class described, in combination, a vehicle frame including spaced side members, travel supporting means mounted on the frame, means for propelling the vehicle, a body carried by said frame, a first scraper on said frame, means for raising and lowering at least one end of said frame whereby to raise and lower said scraper, an auxiliary scraper, spaced arms supporting said auxiliary scraper and pivotally and slidably connected with the sides of said frame, means for moving said auxiliary scraper into a position adjacent to the first scraper, an abutment provided on the frame to limit the upward pivotal movement of the auxiliary scraper, adjustable stop means provided on the frame to limit the downward movement of the auxiliary scraper, and cam means carried by the arms of the auxiliary scraper adapted to engage the stop means when the auxiliary scraper is moved into a position adjacent the first scraper.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
276,303	Sweatt	Apr. 24, 1883
1,300,111	Billings	Apr. 8, 1919
1,471,302	Wright et al.	Oct. 16, 1923
1,891,266	Le Tourneau	Dec. 20, 1932
2,189,222	Rapp	Feb. 6, 1940
2,198,087	Moore	Apr. 23, 1940
2,249,356	Goodman	July 15, 1941
2,252,763	French	Aug. 19, 1941
2,306,066	Le Bleu	Dec. 22, 1942
2,328,715	Drott	Sept. 7, 1943
2,396,287	Robb	Mar. 12, 1946
2,418,813	Anderson	Apr. 15, 1947