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SCRAPER

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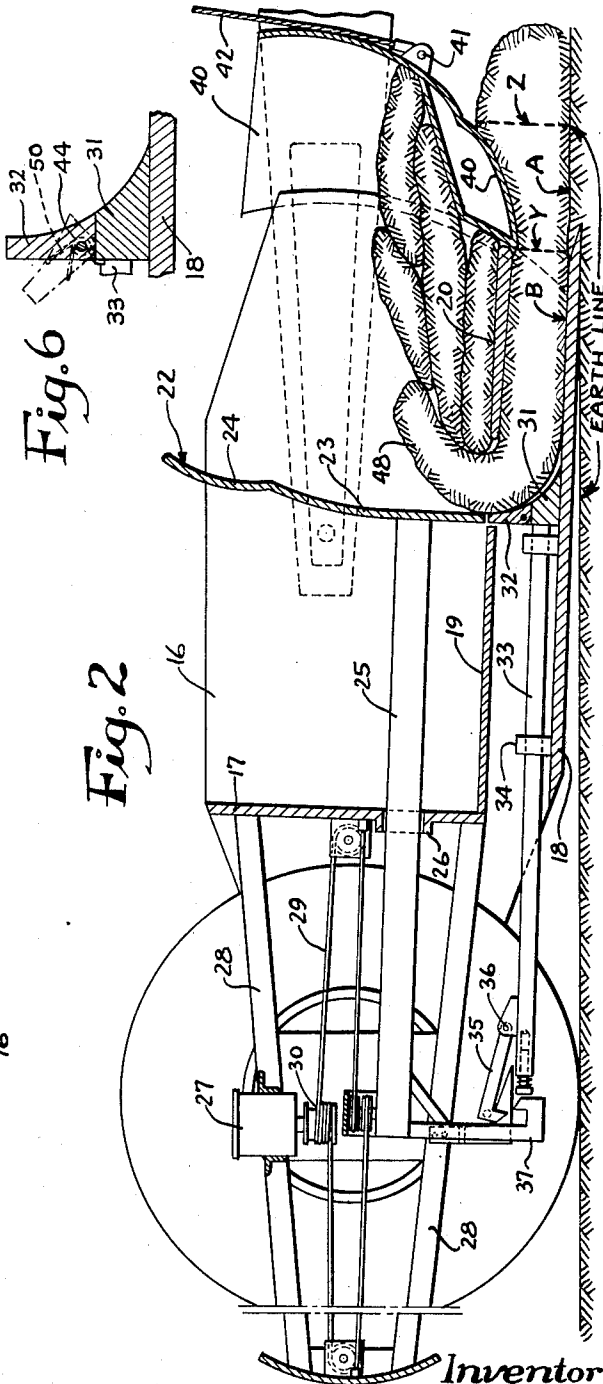
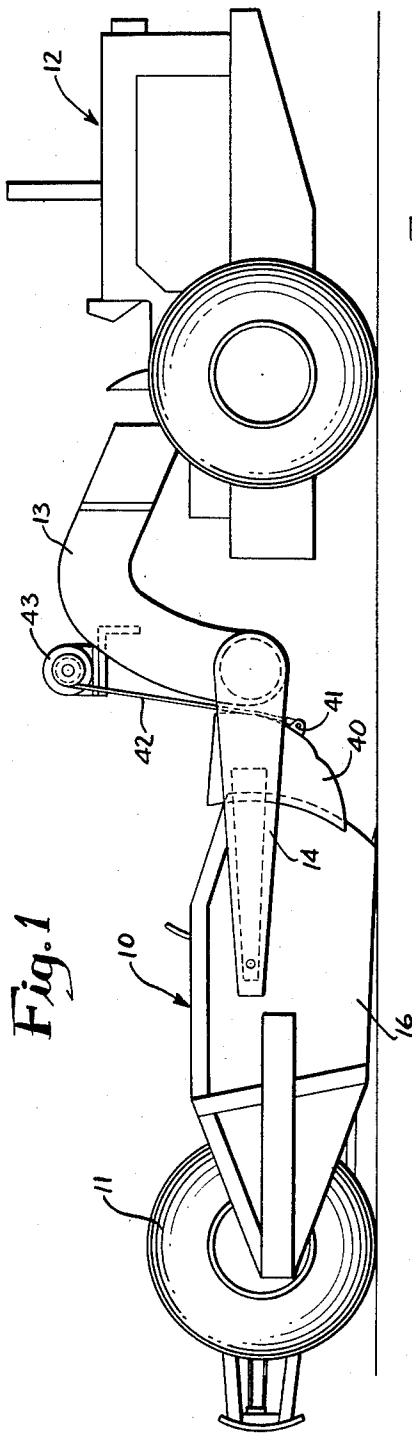


Fig. 6

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Fig. 3

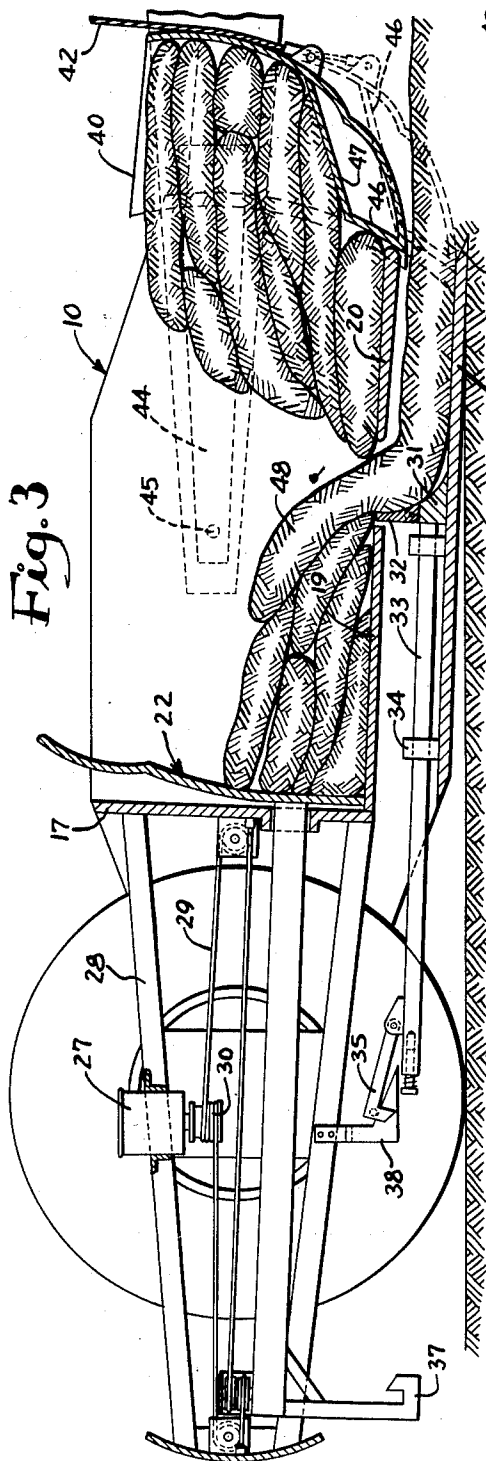
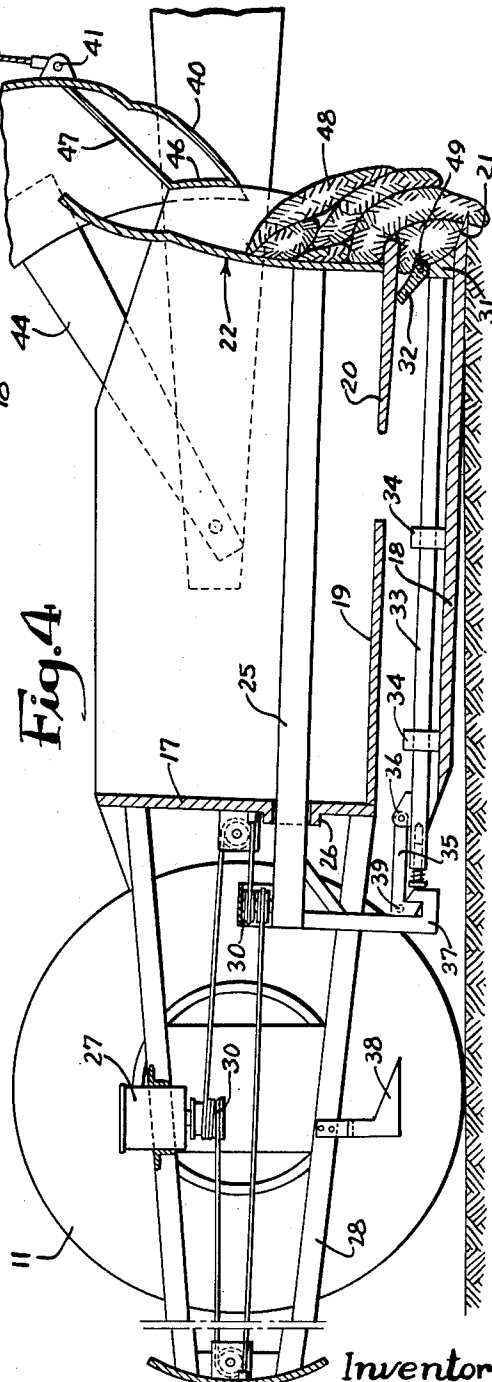


Fig. 4



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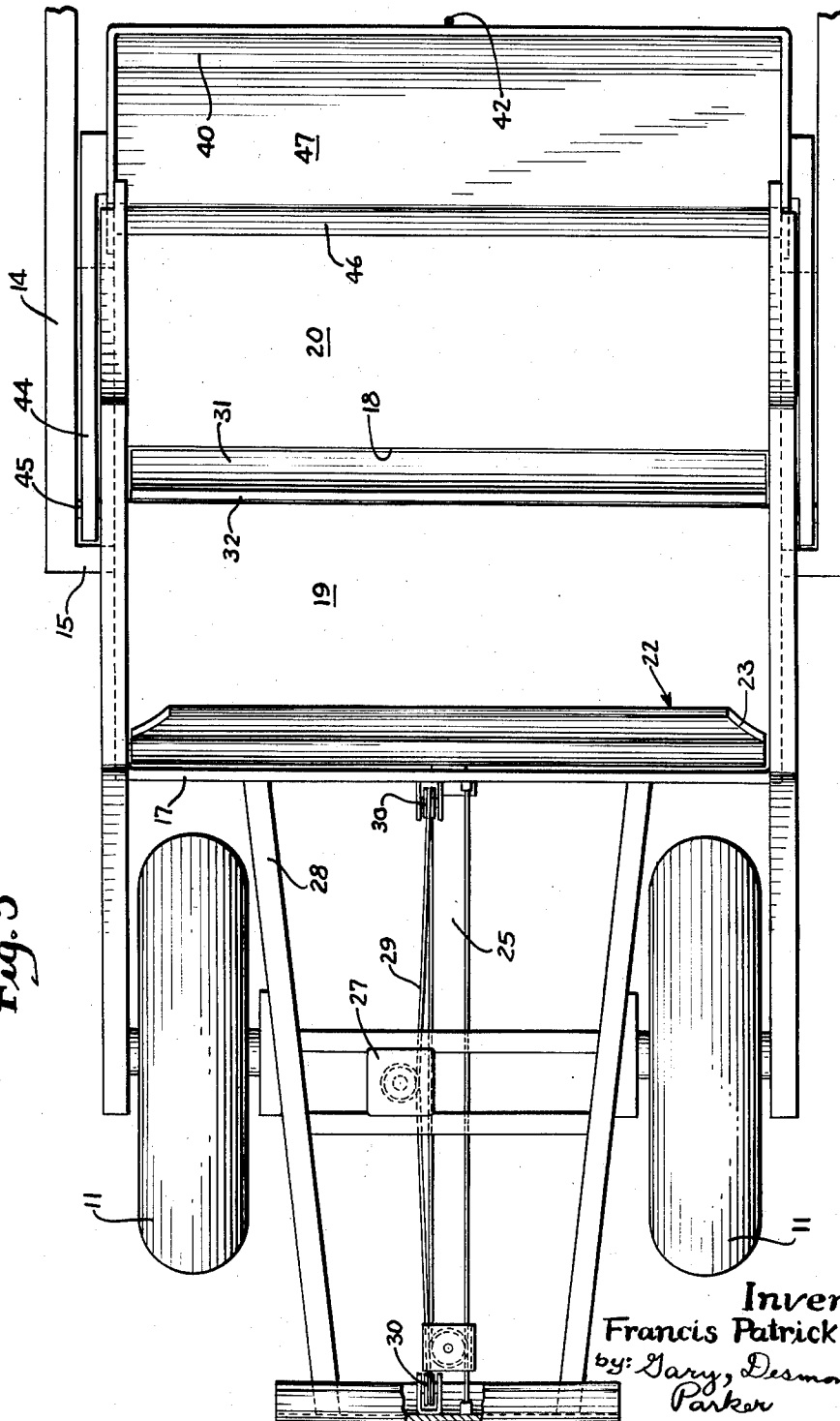
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Fig. 5



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6 Claims. (Cl. 37—126)

This invention relates to improvements in earth moving equipment, and particularly to a novel scraper adapted for use with modern motorized tractor units.

The modern scraper of today is comprised basically of three parts which come in contact with the material to be moved, these being the body of the scraper itself, the tailgate which forces the material out when the scraper is to be unloaded, and the apron which acts as a "front door" while carrying the loaded material and also as a metering valve as the material is being loaded, the tailgate and apron being actuated, by an operator on the tractive unit, by suitable interconnected hydraulic means, motor driven cables, and the like.

The problem of moving material, such as for example a load of earth, into the scraper is simply to be able to continue a speed and forward motion, or force, slightly above that which is required to keep the earth flowing into the scraper bowl or body. This can readily be accomplished by the modern scraper unit having for example a 150-horse power rating, for the first three to five cubic yards of earth. After this amount has been loaded, the earth which is to enter must either push through the already loaded earth, or push the loaded earth upwardly in upward swings while it enters the space being vacated by the earth being forced upward. At this point the power of the tractor is not only moving the assembly forward, cutting the top of the area being scraped and moving a goodly quantity of earth in front of the apron, but it is also working against the forces of gravity and friction in order to load added increments of earth beyond the three to five cubic yards thereof first loaded.

Ordinarily in the situation above described, the tractor begins to "lug" and needs more tractive force, which must be supplied by its own built-in power or by a separate pusher unit, and it is an object of the present invention to facilitate the loading of the scraper by a novel structure which minimizes the requirement for such added tractive force.

The aforesaid prime object of the present invention is accomplished by providing means in combination with the scraper for directionalizing the earth being scraped up in two directions or components.

The object of the present invention, its details of construction and arrangement of parts, and other advantages and economies thereof will be apparent from a consideration of the following specification and accompanying drawings, wherein:

Fig. 1 is a side elevational view of a motorized scraper assembly in accordance with the present invention.

Fig. 2 is an enlarged longitudinal vertical section of the scraper component of Fig. 1, illustrating the first stage in the loading operation.

Fig. 3 is a view similar to that of Fig. 2 but with the tailgate moved to its most rearward position for the second stage of the scraper.

Fig. 4 is a view also similar to that of Fig. 2, but illustrating the most forward movement of the tailgate and load direction gate for unloading.

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Fig. 5 is a plan view of the scraper shown in Fig. 3. Fig. 6 is a detail view of the load direction gate.

Referring to the drawings, the reference numeral 10 generally designates a scraper unit supported at one end on wheels 11 and engaged at its other end to tractive means, such as for example the wheeled tractor 12 matching in horse power the capacity of the scraper 10. The two are suitably connected, in conventional manner, through the frame 13 extending from the tractor to the arms 14 of a yoke pivotally engaged at 15 to the side walls 16 of the scraper body.

The scraper body 10 further comprises a fixed rear wall 17 which need not be full as shown but may merely comprise a cross-member in the form of a bar or beam extending between side walls 16, a bottom 18, and a pair of false or spaced bottoms, namely, a false rear deck 19 parallel to the bottom 18, and a false front deck 20, the under face of the latter being inclined to the bottom 18, so that their vertical spacing at the forward end at the scraper edge 21 is less than the spacing at the inner end of deck 20. Thus, when for example the spacing at said forwardly open end is of a height of about seven inches, the spacing and said inner deck end is about eight inches from bottom 18. The purpose of this inclination is to provide a safety factor against jamming something into the loading space between false deck 20 and fixed bottom 18, during scraping, and to insure freedom to move rearwardly through the rearwardly enlarged opening. For similar reasons the edges of false decks 19 and 20 are spaced from each other to a further extent, for example, nine inches in the given instance.

Disposed within the scraper body 10, and above its false decks 19 and 20, is the tailgate 22 extending between the side walls 16 generally vertically, but with slight forward curved portions 23 and 24 at its upper end portions for the purpose of providing a forward component and flow to earth loaded in the front section of the scraper when in the position shown in Fig. 2.

The tailgate 22 is adapted for regulated movement and positioning longitudinally of scraper body 10 by means of the tailgate push beam 25 extending through bearing 26, which in the absence of a full rear wall 17 may be a block of rollers, by means of motor winch 27 on the frame 28, and through cable 29 and the several sheaves 30, conventionally controlled by means, not shown, leading to the tractor 12.

Disposed for longitudinal reciprocation within the space between the false deck 20 and fixed bottom 18, and extending fully between side walls 16, is a load direction gate comprising an arcuate bottom 31 and an upper portion 32 hinged thereto at 49. The upper component 32 is adapted to pivot only rearwardly as shown in Fig. 4, and is urged to vertical position by suitable compression or torque spring means 50, so that when moved between the adjacent ends of decks 19 and 20 the upper end of upper component 32, freed of deck 20, will spring erect to a height such that it will abut against the forward edge of deck 19.

The load direction gate is adapted for reciprocation by means of a pusher beam 33 slidably engaged in the guides 34 and connected at one end to the direction gate lower component 31. The opposed end of beam 33 carries a latch 35 pivotally retained at 36 and adapted to engage in ratchet tooth 37 secured to and depending from beam 25, whereby the two beams and respectively engaged tail and load direction gates may move together. However, since the direction gate is limited from movement beneath rear false deck 19, when the beam 25 is moved rearwardly beyond a point where the tail and load direction gates are in vertical alignment, a cam 38 on frame 28 will enter beneath pin 39 on

latch 35 to disengage it from tooth 37 and thus permit beam 25 to continue movement free of beam 33.

The forward end of scraper 10 is provided with an apron 40 pivotally engaged at 41 to the actuating cable 42 extending from the cable drum 43 carried by and actuated from tractor 12. The apron is further pivotally engaged by its arms 44 at 45 to the sides 16 of the scraper 10. At its lower end apron 40 is inwardly provided with a false bottom formed by the components 46 and 47, so that when it is fully closed, as shown dotted in Fig. 3, the component 47 will be substantially in line with false deck portion 20, and the portion 46 will provide a closure for the area between deck 20 and bottom 18. Further, as will appear, when the apron 40 is opened to meter the flow of earth, the vertical portion 46 will arrest any "turbulence" just above the loading opening.

In operation, in the first phase of loading, the apron 40 is lifted to expose the full or a metered lesser portion of the distance between bottom 18 and deck 20, and the load direction gate is moved to abutment with deck 19, with tailgate 22 aligned thereabove. The scraper 10 is then drawn forwardly by its tractor 12, and earth cut by blade 21 simply allowed to flow into scraper 10 in a thin layer between deck 20 and bottom 18 and through the spacing between decks 19 and 20, the earth moving upward, as at 48 shown in Fig. 2, in a slow turn throughout this first loading cycle. This is aided by the arcuate outer contour of the lower portion of the apron 40 which aids in effecting a "rolling of the dirt before the scraper unit in order to load more easily." Toward the end, there will be a tendency for the increments of earth already loaded to move down on that being loaded, thus causing greater work to be performed by the tractive force of the unit.

In the second stage of loading, the tailgate 22 is moved rearwardly, either at once or in stages to allow the rear section to load at reduced tractive force requirement until filled, as in the case of the forward section. Moving the tailgate 22 in stages, say about two feet at first, will allow earth collected in front of it to fall by gravitational force toward the rear on further movement rearwardly of the tailgate without help of tractive force of the assembly.

As each increment of material 48 scraped into component 10 falls on either the front or rear false decks, it is carried by the forward motion of the machine and does not have to be moved again by the material in front of the apron, nor encounter the stationary inertia or gravitational force of the added increments of material being scooped up. Consequently the added incoming increments of material 48 do not force the previously loaded increments to move upward or turn to the front or rear of the scraper 10, eliminating such "boiling" action of prior devices.

The prime advantage of my improved scraper is that it keeps the scooped material 48 moving into the body 10 at just forward of center, causing the least amount of friction between the material and the steel bottom portions. This allows the material 48 to build up into scraper body 10 without having to move upward the already loaded increments.

After completion of loading and for moving to the dumping area, the apron is lowered, as shown dotted in Fig. 3.

For unloading the apron 40 is lifted by its cable 42, as shown in Fig. 4, and the tailgate 22 caused to move forwardly. As it comes into alignment with direction gate component 32 the pusher beams 25 and 33 become interengaged and material between false deck front 20 and bottom 18 is also expelled jointly with material thereabove.

Referring to Fig. 2, the area of a plane on the dotted line Y is smaller than the area of a plane on the dotted line Z. All earth between Z and Y tends to hold earth between false deck 19 and bottom 18 stationary, thus

allowing the body of the unit to "move underneath" and "pick it up." Add to this the high friction coefficient of the surface indicated at A between the planes Y and Z, as compared to the relatively low friction adjacent surface B and one has the variables of any given material which affect loading efficiency. The effect between Z and Y is somewhat like a hydraulic piston, limited, of course, by the amount of "pushed earth."

Although not shown the false deck components 19 and 20 may be mounted for vertical movement between side walls 16 to suit requirements of different materials to be loaded. Other modifications may also be made in other details of my novel scraper without departing from the spirit of my invention.

I claim:

1. A scraping unit comprising a body defined by a pair of side walls, a bottom disposed between said walls, a cutting edge secured to said bottom adjacent the forward ends of said side walls, a pair of false decks disposed between said walls above said bottom and substantially parallel thereto, said false decks being edgewise spaced from each other substantially medially by the side walls a distance at least equal to the spacing of said decks from said bottom, a pivotally mounted apron providing a regulatable closure for the front end of said body, a tailgate mounted for longitudinal reciprocation in said body above the said false decks, and a load direction gate mounted for longitudinal reciprocation between said bottom and the forward one of said false decks and for abutment against the forward edge of said rearward false deck providing an entrance path from the outer forward end of said bowl to an area substantially medially thereof for material scraped into said bowl when drawn over said material by associated tractive means.

2. A scraping unit comprising a body defined by a pair of side walls, a bottom terminating in a cutting edge adjacent the forward ends of said side walls, a pair of longitudinally spaced false decks secured between said walls substantially parallel to and spaced from said bottom generally defining forward and rearward areas in said bowl, a pivotally mounted apron for alternately providing a closure and vertically regulated opening for the front of said bowl, a load direction gate mounted for longitudinal reciprocation between said bottom and the forward one of said false decks for ejecting scooped material lodged therein as a result of having drawn said unit over said material, said load direction gate including an articulated upper edge portion adapted to abut against the front free edge of the rearward false deck to define an entrance opening substantially medially of said scraper body and for directing material scraped thereinto when the scraping unit is drawn forwardly with the apron defining a metered opening between the bottom and forward false deck, and a longitudinally reciprocal tailgate disposed in said body adapted to be aligned with said load direction gate for initially deflecting introduced scrapings forwardly in said body, then disposed rearwardly for permitting introduced scrapings to be disposed rearwardly in said body, and then moved forwardly to discharge the body contents upon elevation of the apron above the front false deck.

3. A scraping unit comprising a load collecting, moving and dumping bowl adapted to be tractively drawn over the ground defined by a pair of side walls, a bottom terminating in a cutting edge adjacent the front edges of said side walls, a transversely slotted false deck disposed between said walls substantially parallel to and spaced above said bottom generally defining forward and rearward zones therein, a load direction gate disposable between said bottom and the rearward defining edge of the slot in said false deck defining a path into said bowl for ground scrapings introduced into the space between the false deck and the bottom, an apron including a pair of arms pivotally engaged to said side walls, means for adjustably pivoting said apron to regulate the extent

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of forward opening of said bowl, a tailgate disposed in said bowl, means for reciprocating it longitudinally of the bowl for successively aligning it substantially vertically with said load direction gate to initially deflect introduced scrapings into said forward zone, then moving it rearwardly to cause successive scrapings to fall into said rearward zone, and then, upon full lifting of the apron, to move forwardly to discharge said scrapings, and means connected to said load direction gate sequentially engageable by means connected to said tailgate for moving the load direction gate forwardly to jointly discharge scrapings from between said bottom and said false deck.

4. The combination with a scraper body defined by side walls, a bottom terminating forwardly in a cutting edge, a pivotally-mounted vertically-adjustable front closure apron, and a tailgate longitudinally reciprocably disposed in said body for discharging collected scrapings, of a pair of false decks generally parallel to and spaced above said bottom and from each other, and a longitudinally reciprocable load direction gate disposable between said bottom and the free forward edge of the rearward one of said false decks to define a path from the forward end of said body beneath the false deck thereat to an intermediate area within said body.

5. The combination with a scraper body defined by side walls, a bottom terminating forwardly in a cutting edge, a pivotally-mounted vertically-adjustable front closure apron, and a tailgate longitudinally reciprocably disposed in said body for discharging collected scrapings, of a pair of false decks generally parallel to and spaced above said bottom and from each other, and a longitudinally reciprocable load direction gate disposable be-

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tween said bottom and the free forward edge of the rearward one of said false decks to define a path from the forward end of said body beneath the false deck thereat to an intermediate area within said body, the spacing at the bottom face of the forward one of said false decks from the body bottom being greater at the inward end than at the outer end, and the spacing between said false decks being greater than that at said inner end spacing.

6. The combination with a scraper body defined by side walls, a bottom terminating forwardly in a cutting edge, a pivotally-mounted vertically-adjustable front closure apron, and a tailgate longitudinally reciprocably disposed in said body for discharging collected scrapings, of a pair of false decks generally parallel to and spaced above said bottom and from each other, a longitudinally reciprocable load direction gate disposable between said bottom and the free forward edge of the rearward one of said false decks to define a path from the forward end of said body beneath the false deck thereat to an intermediate area within said body, said load direction gate comprising an arcuate bottom section and a hinged spring-actuated vertically-erectable upper edge portion adapted to abut against the forward edge of said rear false deck and to tilt rearward on being urged to discharge collected scrapings on the scraper bottom, means connected to said load direction gate engageable by means connected to said tailgate for moving the load direction gate forwardly jointly upon vertical alignment of said gates in forward movement, and separate means for disengaging them upon rearward movement of the tailgate beyond the point of said alignment.

No references cited.