

Nov. 14, 1939.

J. S. WALCH

2,179,532

CARRYING SCRAPER

Filed May 2, 1938

3 Sheets-Sheet 1

Fig. 1

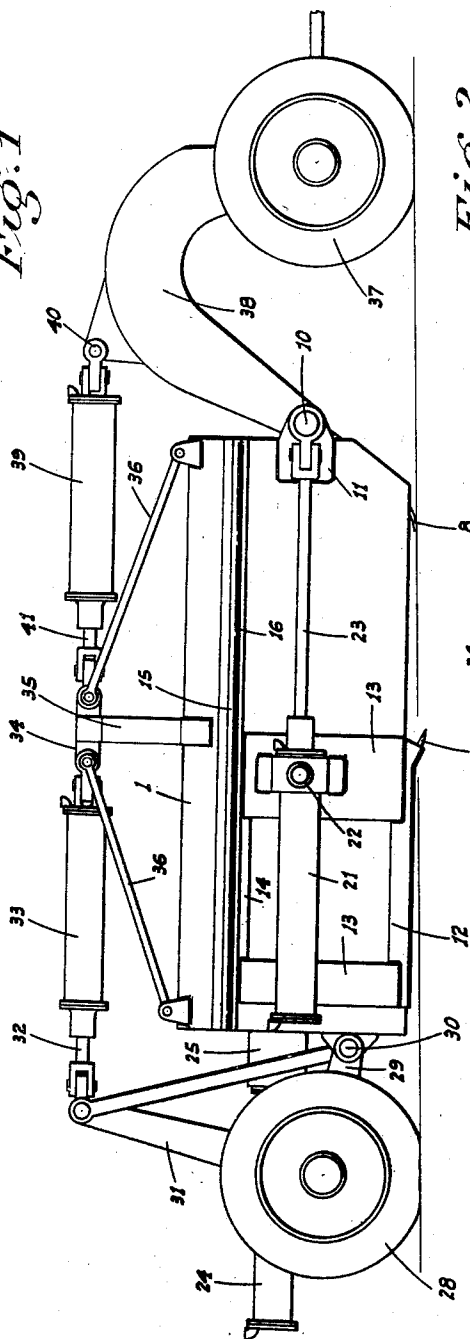
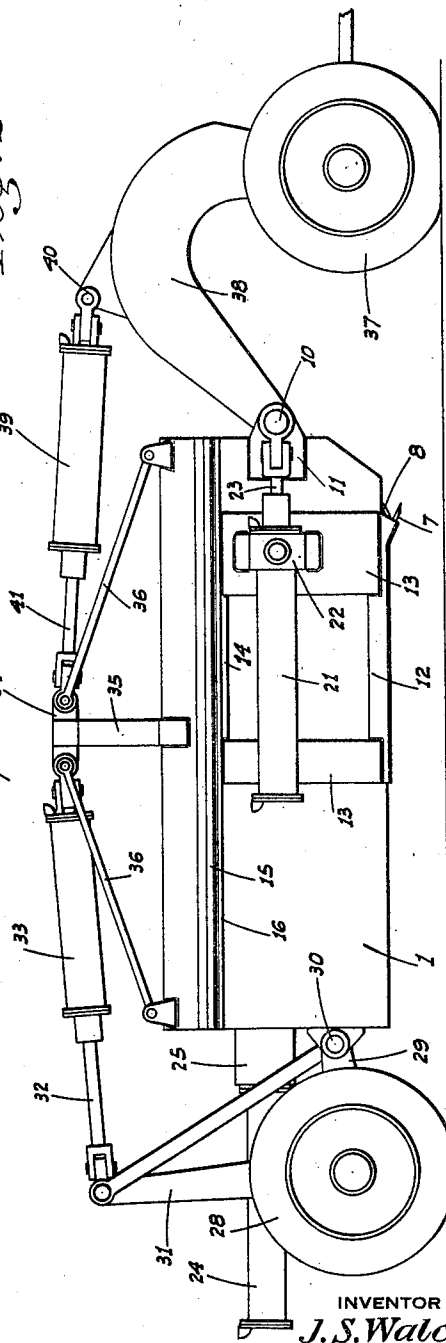


Fig. 2



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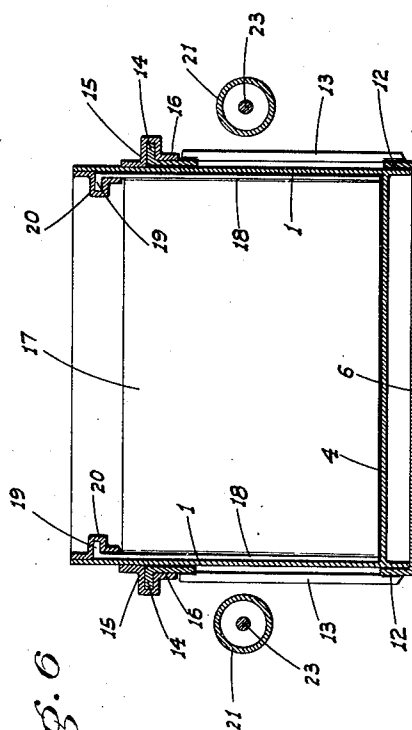
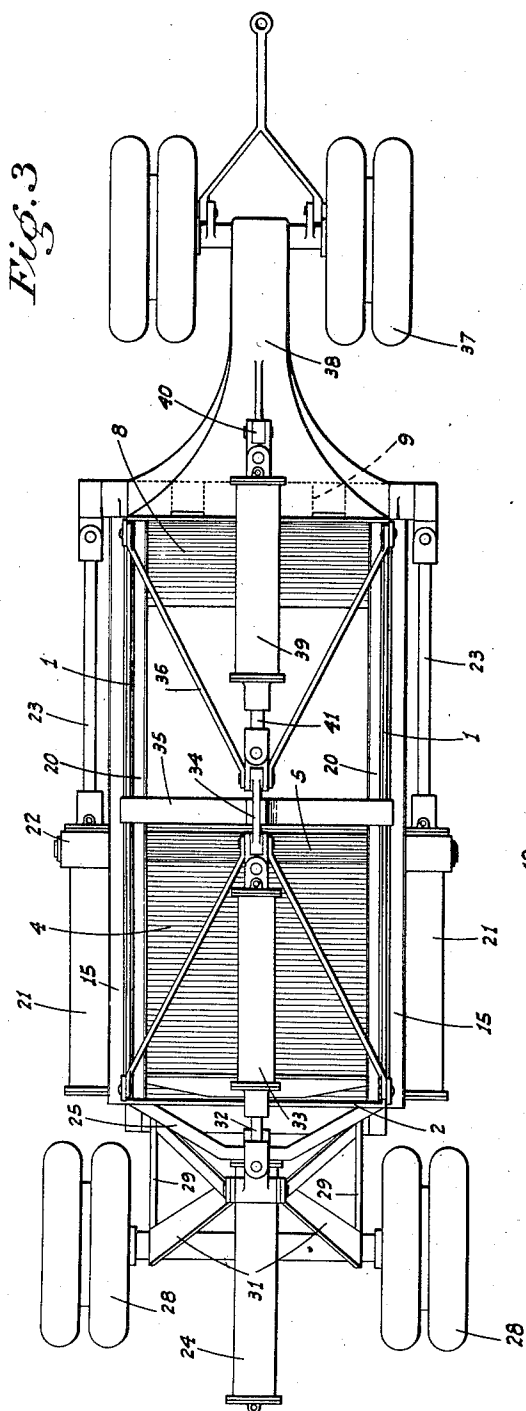
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3 Sheets-Sheet 2



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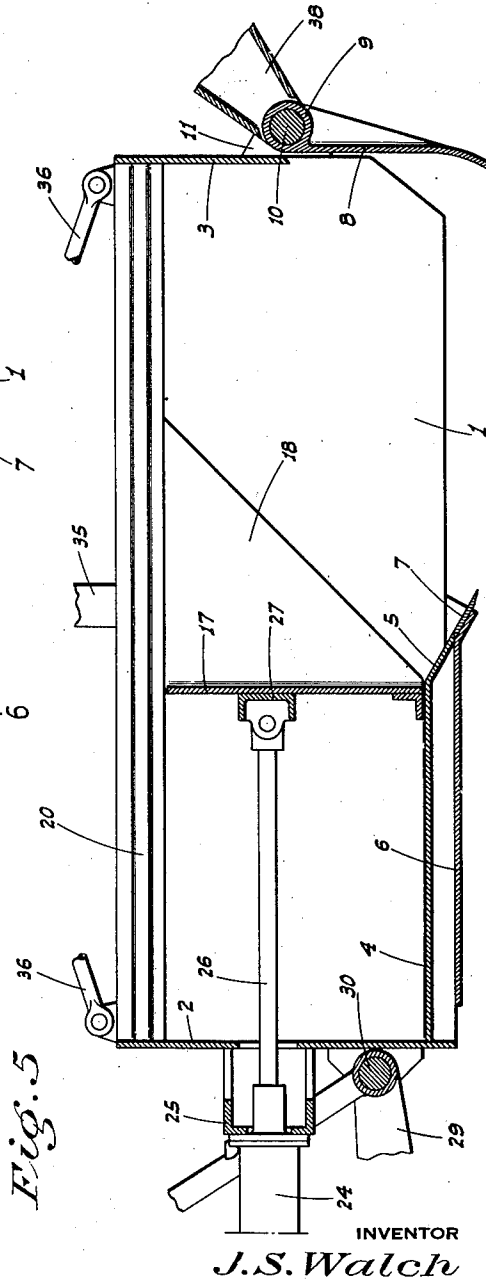
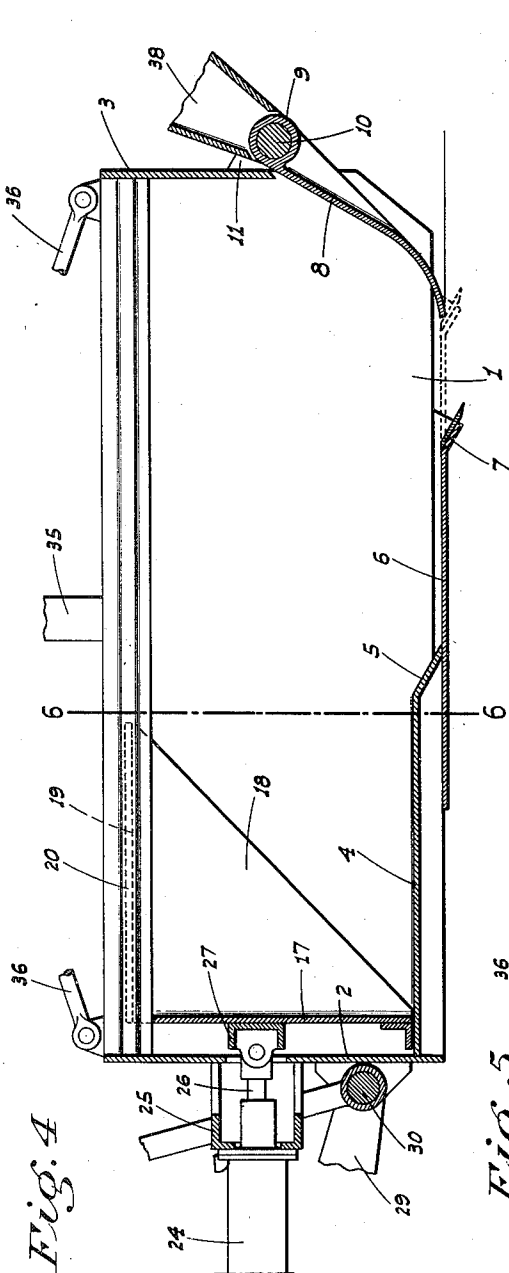
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CARRYING SCRAPER

Filed May 2, 1938

3 Sheets-Sheet 3



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2,179,532

CARRYING SCRAPER

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Application May 2, 1938, Serial No. 205,401

14 Claims. (Cl. 37-126)

This invention relates to carrying scrapers, my principal object being to provide a scraper of this character in which the dirt retaining bowl is so arranged that the scraper may be loaded to full capacity with a minimum of power, and from which the load may likewise be discharged with a minimum of power.

Another object is to provide a scraper so constructed that it may be successfully made either in relatively small or large sizes, and which in any case will have a bowl capable of being made considerably longer than its width. In this manner, while having a relatively great capacity, the scraper may be efficiently used where operating widths are limited by natural or man-made conditions, and which would bar large capacity scrapers of ordinary form.

A further object is to provide what I believe to be a novel arrangement for suspending the bowl and for controlling the movements of the same between scraping and dumping positions, and vice versa.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangements of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of my improved scraper, showing the same in a scraping position.

Figure 2 is a similar view, showing the scraper in a carrying position.

Figure 3 is a top plan view of the scraper.

Figure 4 is a sectional elevation of the bowl of the scraper, showing the position of the movable shovel plate of the same when adjacent its foremost scraping position.

Figure 5 is a similar view, showing the position of the parts at the finish of a dumping or load discharging operation.

Figure 6 is a cross-section of the bowl taken on line 6-6 of Fig. 4.

Referring now more particularly to the characters of reference on the drawings, the bowl of the scraper comprises substantially rectangular side plates 1 connected at the back by a cross plate 2 extending from top to bottom, and at the front by a cross plate 3 extending about half way down from the top. The length of these plates is consequently greater than their height

or the spacing therebetween. A bottom plate 4, a short distance above the bottom edge of the plate 1, extends forwardly from the back plate 2 to a termination in a short downwardly sloping apron 5, which is disposed at a point approximately midway of the length of the side plates. This plate 4, and the adjacent portion of the side plates form a fixed dirt retaining portion of the bowl.

Disposed at a level immediately below the apron 5 is a longitudinally movable bottom plate 6 which terminates in a downwardly sloping scraping blade 7. This unit I term the movable shovel or shovel plate. The length of the plates 4 and 6 is substantially the same, and the apron 5 and plate 7 are adapted to aline to form a continuous sloping surface as shown in Fig. 5, when the shovel is in its rearmost position.

The blade 7 when fully advanced is adapted to engage under and support the lower edge of a flap or front closing apron 8. This apron extends the full width between the side plates 1 and is provided at the top with spaced hinge sleeves 9 hung for free swinging movement on a cross shaft 10. This shaft is mounted on brackets 11 at the sides of the plates 1, and is disposed immediately in front of the same and on a level adjacent the lower edge of the plate 3. This shaft is relatively heavy, so that besides forming a hinge pin it also serves to brace the bowl plates. It will therefore be seen that when the shovel 6 is fully advanced and engaged with the apron 8, a dirt retaining enclosure extending for the full length of the side plates and from top to bottom thereof, is provided.

The shovel plate 6 extends under the bottom edge of the plates 1, and is turned up on the outside of the same to form stiffening flanges 12. Relatively heavy plates 13 are secured on and project upwardly from the flanges 12 at their ends and are connected at the top with longitudinal outwardly facing inverted angle rails 14. These are parallel to plate 6 and substantially the same length as said plate. The horizontal flanges of these rails ride with a running fit in the grooves formed by channel tracks 15, which face inwardly or toward the side plates. These tracks are secured above the rails on the plates 1, parallel to the plate 4, and extend the full length of the side plates, being formed along the lower edges and outwardly of the rails with depending skirts 16, which extend to adjacent the lower edges of the vertical flanges of the rails 14. By means of this construction, not only is the shovel slidably supported for movement lengthwise of

the side plates, but the latter are adequately braced against lateral deflection. Also, substantially dirt-proof enclosed run-ways or tracks for the rails are formed—a feature aided by the fact

5 that the channels are closed at their ends.

Disposed inside the bowl and extending the full width between the side plates substantially from top to bottom thereof is the rear end or pusher plate 17, having side wings 18 extending forwardly and sloping forwardly from the bottom, so that they are of considerable length at the top. Along the top the wings are provided with horizontal flanges 19 parallel to the bottom plate 4 and facing the opposite side plates. These

15 flanges ride in track grooves formed in longitudinally extending channels 20, which are of the same form as the channels 15, and which are secured on the inside of the plates 1 along the top. These tracks slidably support the pusher plate, and also provide additional bracing for the side plates.

Longitudinal movement of the shovel is accomplished by suitable means, such as hydraulic cylinders 21 supported from brackets 22 on the forward plates 13 of the shovel, and whose piston rods 23 engage the shaft 10 at its ends outwardly of the brackets 11. When the shovel is in its rearmost position, the piston rods are fully extended, and fluid to move the shovel forward is, of course, admitted to the cylinders at their

30 forward end.

Longitudinal movement is imparted to the pusher plate by suitable means, such as a single centrally disposed hydraulic cylinder 24. This is secured on and projects rearwardly from a

35 bracket 25 extending across the bowl at the back, and having a piston rod 26 connected to a reinforcing member 27 which extends across the back of the pusher plate. When the pusher plate is fully retracted, the piston rod is also fully retracted, and to advance the plate, the fluid is admitted to the rear end of the cylinder. The bowl is supported at the back by wheels 28 disposed behind the bowl and connected by radial arms 29 with a transverse supporting shaft 30

40 mounted on the side plates 1 at their rear end and below the cylinder 24. This shaft besides serving as a fulcrum for the arms also braces the bowl. Other arms 31, rigid with the arms 29, extend upwardly in laterally converging relation to a connection in common with the piston rod 32 of a hydraulic cylinder 33. This cylinder extends lengthwise of the bowl above the same and is swivelly supported at its front end on a bracket 34. This is held in place by laterally extending straps 35 connected to the side plates 1

45 at the top and by longitudinal diverging brace rods 36 extending to the corners of the plates. Advance of the piston rod from the cylinder therefore turns the arms 29 about the wheels as an axis, and raises the bowl at the back. With the retraction of the piston rod, the reverse movement of the parts of course takes place. The bowl at its front end is supported by a swivel wheel truck 37 adapted for connection to the

50 draw bar of a tractor. This truck supports a gooseneck member 38, which at its lower rear end is hinged on the shaft 10 between the hinge sleeves of the apron 8. This gooseneck is swung about the front wheel truck as an axis, to raise and lower the shaft 10 and the front end of the bowl; by suitable means such as a rearwardly extending hydraulic cylinder 39. This cylinder is swivelly connected at its forward end to the

55 gooseneck at the top as at 40 and has a piston rod 41 which is connected to the front end of

the bracket 34, the cylinders 33 and 39 being substantially aligned.

Though these hydraulic devices above described are separate units, it is intended to admit fluid to the cylinders simultaneously, so that the bowl lifts and drops while remaining on a substantially constant level; although when lifting, the front end of the bowl is preferably raised somewhat ahead of the rear end. It will be seen, however, that due to the proposed relationship

10 and common mounting of these hydraulic units, but little strain is placed on the supporting bracket, since the pressures being in the cylinders at the same time counteract each other as far as a straining action on the bracket is concerned.

In operation, the bowl is lowered to a scraping position by suitable manipulation of the supporting units, and the shovel 6 is initially disposed in a retracting position or under the plate 4, while the pusher plate is also at its rearmost position. The scraper blade 7 is then aligned with the sloping apron 6, and as the scraper advances, dirt will be scraped up onto the bottom plate 4. Since the latter is of relatively short length, the dirt does not have to push back very far, and it does not require excessive tractor power to load this portion of the bowl. When said portion is full, the shovel is advanced, little by little if desired, so as to load the shovel plate now being exposed, and to fill the corresponding portion of the bowl as a whole. Here again minimum power is used, since the load already taken into the back of the bowl is not disturbed when it has once been received. While the scraping action is proceeding, the apron 6 merely drags on the ground in front of and of course on a higher level than the scraping blade.

The dirt as scraped up and churning in front of the blade is therefore all confined and some of it falls over onto the apron as the blade approaches its foremost scraping position as shown in Fig. 4. When a full load has been received, the shovel is advanced still further until the blade passes under the supports the apron, thus holding the apron against dropping and closing any gap through which dirt might escape. The bowl is then lifted for transport and all the dirt scraped up is retained, since as above stated the apron is held from dropping by the plate and forms a closure with the blade and side plates.

When it is desired to discharge the load, the bowl may be further raised if necessary and the shovel is retracted. Here again a minimum of power to effect the discharge is needed, since none of the load has to be lifted, as the shovel is merely pulled from under the load and the dirt drops of its own weight. At the same time, the apron being released from the shovel also drops to a depending position, instantly increasing the width of the discharge gap, and providing for a rapid discharge of dirt from the adjacent portion of the bowl.

When the shovel has been retracted to its normal rearward position under the plate 4, only the back portion of the bowl remains to be unloaded, and this portion will partly empty of itself, due to the natural tendency of dirt to assume an incline, if unrestrained. A comparatively small amount of dirt therefore remains to be discharged and this is accomplished by the forward movement of the pusher plate 17.

In controlling the operation of the pusher and shovel plates, I preferably feed the fluid to cylinders 21 and 24 simultaneously so as to exert

the bracket 34, the cylinders 33 and 39 being substantially aligned.

Though these hydraulic devices above described are separate units, it is intended to admit fluid to the cylinders simultaneously, so that the bowl lifts and drops while remaining on a substantially constant level; although when lifting, the front end of the bowl is preferably raised somewhat ahead of the rear end. It will be seen, however, that due to the proposed relationship and common mounting of these hydraulic units, but little strain is placed on the supporting bracket, since the pressures being in the cylinders at the same time counteract each other as far as a straining action on the bracket is concerned.

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In controlling the operation of the pusher and shovel plates, I preferably feed the fluid to cylinders 21 and 24 simultaneously so as to exert

a rearward pull on the pusher plate coincident with a forward push on the shovel plate, and vice versa. The pusher plate is thus positively held retracted throughout the advance of the shovel, and while the pusher plate tends to advance when the shovel is being subsequently retracted, it will not do so until the resistance to the pusher plate is less than that acting on the shovel—a condition which will not be obtained until the shovel is fully retracted. Subsequent retraction of the pusher plate again places the scraper in readiness to receive another load.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof a distance less than the length of the side plates, and arranged to initially receive dirt with the advancing movement of the scraper, and a shovel plate movable forwardly from under the bottom plate to receive and retain dirt after the bottom plate portion of the bowl has been filled.

2. A scraper as in claim 1, with means between the shovel plate and side plates slidably supporting the shovel plate for movement lengthwise of the side plates and parallel to the bottom plate.

3. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof a distance less than the length of the side plates, a forwardly sloping relatively short apron depending from the forward end of the bottom plate, a shovel plate supported from the side plates for movement lengthwise thereof and disposed when retracted under the bottom plate on a level immediately below the apron, and a forwardly sloping scraper blade on the forward end of the shovel plate adapted to substantially aline with the apron when said shovel plate is fully retracted under the bottom plate.

4. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof to a termination substantially midway of the length of the side plates, means forming a closure between the plates at their front end and including a depending apron, and a shovel plate on a level below that of the bottom plate supported from the side plates for movement lengthwise thereof from a retracted position under the bottom plate to a fully advanced position in contact with the apron.

5. A scraper as in claim 1, with an upstanding pusher plate mounted between the side plates for movement lengthwise of the bottom plate to discharge the load therefrom when the shovel plate is retracted, and means applied to the pusher plate for moving the same.

6. A scraper comprising a bowl which includes

spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof a distance less than the length of the side plates, a shovel plate disposed on a level below the bottom plate and of a length such that it may be fully retracted thereunder, means supporting the shovel plate from the side plates on the outside lengthwise thereof and in a plane parallel to the bottom plate, and means to move the shovel plate in opposite directions selectively.

7. A scraper as in claim 6, in which said shovel plate extends under the lower edges of the side plates to the outside thereof, and the shovel plate supporting means comprises upstanding members rigid with the shovel plate at its side edges, rails parallel to the shovel plate carried by the members at the top and including horizontal flanges facing away from the adjacent side plates, and channel members secured in fixed connection with the side plates above the rails and providing grooves facing the adjacent side plates and in which the corresponding rail flanges slidably ride.

8. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground for vertical movement, an apron hung for free swinging movement between the side plates adjacent the front end thereof, the depth of said apron being such that when the bowl is lowered to a scraping position the apron will drag on the ground with a rearward slant, and a forwardly movable shovel mounted with the side plates and including a scraping blade depending to a level below that of the apron when the latter is engaged with the ground and adapted to pass under and support said apron when the shovel is advanced to its forward limit of movement.

9. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof a distance less than the length of the side plates, a shovel plate disposed on a level below that of the bottom plate and of a length such that it may be retracted thereunder, upstanding members rigid with the shovel plate at its side edges, rails parallel to the shovel plate carried by said members and including laterally extending flanges facing away from the adjacent side plates, channels mounted in fixed connection with the side plates above the rails and providing grooves facing said adjacent side plates in which the corresponding rail flanges slidably ride and skirts depending from the channels along the lower edges of the grooves.

10. A scraper comprising a bowl which includes spaced side plates, means supporting the bowl from the ground, a fixed bottom plate between the side plates extending forwardly from the back thereof a distance less than the length of the side plates, a shovel plate disposed on a level below that of the bottom plate and of a length such that it may be retracted thereunder, upstanding members rigid with the shovel plate at its side edges, rails parallel to the shovel plate carried by said members and including laterally extending flanges facing away from the adjacent side plates, and channels mounted in fixed connection with the side plates above the rails and providing grooves facing said adjacent side plates in which the corresponding rail flanges slidably ride.

11. A scraper as in claim 8 in which the apron

hanging means comprises a transverse shaft supported from the bowl, the apron along the top having shaft engaging sleeves along the top and spaced apart to expose portions of the shaft; there being a wheeled unit supporting the front of the scraper and including a member having elements engaging said exposed portions of the shaft.

12. A scraper comprising a bowl which includes a bottom plate having a scraping edge, a transverse shaft mounted in connection with the bowl ahead of said scraping edge, a front wheel unit to support the front end of the bowl and including a member having spaced elements turnably engaging the shaft and leaving portions thereof exposed, and an apron dragging on the ground when the bowl is in digging position and provided with sleeves surrounding the exposed portions of the shaft.

13. A structure as in claim 1, with means to move the shovel plate lengthwise of the scraper and comprising side members rigid with the shovel plate and upstanding therefrom on the outside of the side plates, and pull means applied to said members.

14. A structure as in claim 1, with means to move the shovel plate lengthwise of the scraper and comprising side members rigid with the shovel plate and upstanding therefrom on the outside of the side plates, and a pair of hydraulic units, each comprising relatively telescoping parts, one of which is mounted on one side member and the other on the scraper beyond the limit of movement of said member; the parts telescoping in a plane substantially parallel to the shovel plate.

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