March 29, 1938. J. P. HEIL 2,112,288

SCRAPER

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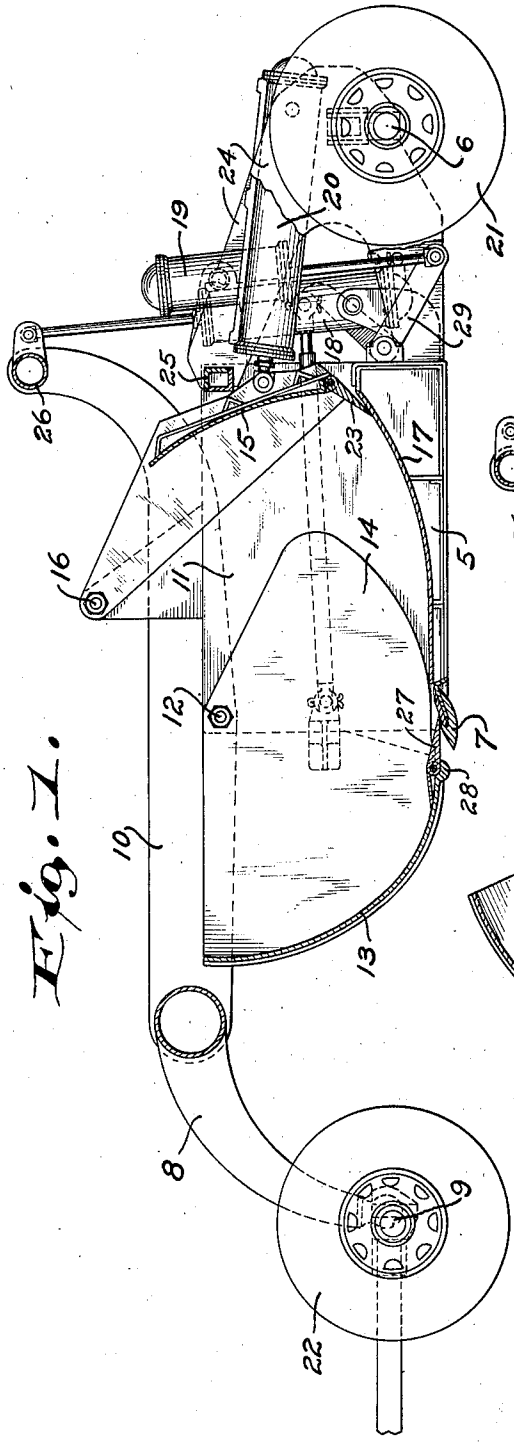


Fig. 1.

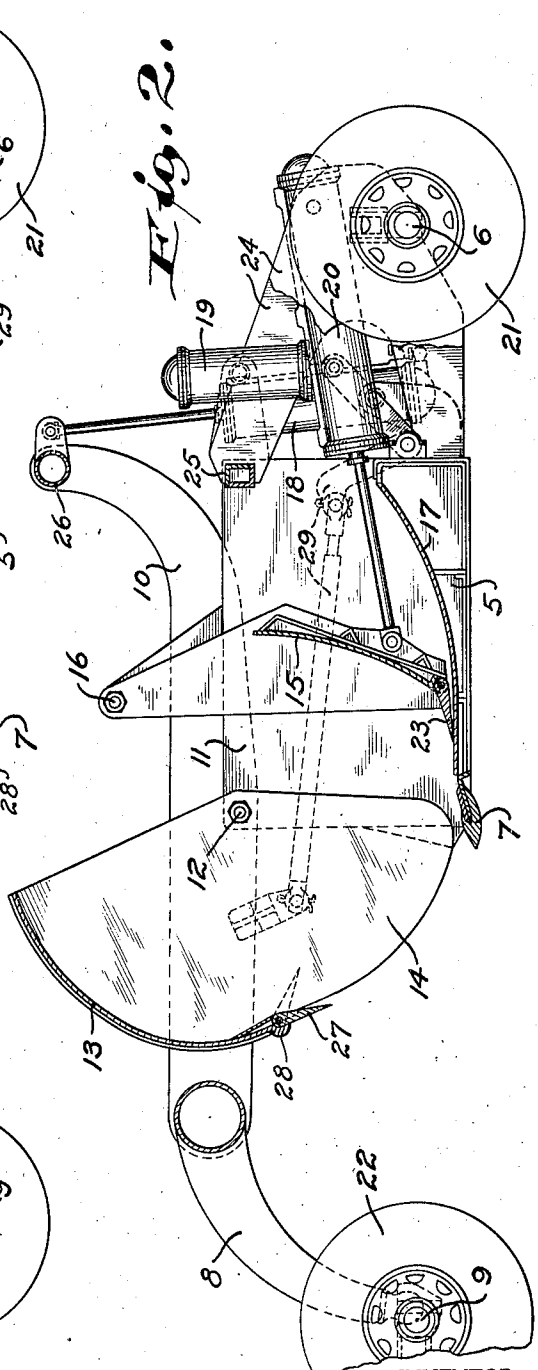


Fig. 2.

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SCRAPER

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9 Claims. (Cl. 37—124)

My present invention relates generally to improvements in the construction and operation of scrapers for grading and for transporting batches of dirt, and relates more particularly to improvements in the details of construction of dirt handling machines of the general type forming the subject of Patent No. 2,095,759.

Generally defined, an object of my invention is to provide an improved scraper assembly which is adapted to efficiently handle dirt of various kinds under the severest conditions, without the use of excessive effort and without danger of damaging the machine.

In the prior Patent No. 2,095,759, above referred to, there is shown a road scraper comprising a main dirt carrying bowl mounted for transportation along the ground and having a front cutter adapted to be lowered into the earth for scraping purposes, and front and rear aprons swingably suspended for cooperation with the cutter and with the bowl bottom, respectively, for loading and unloading purposes. While this prior scraper operates most effectively when handling ordinary dirt, it has been found that wet clay and other sticky soil tends to adhere to the bowl bottom and obstructs rapid unloading of the contents by the rear apron. It has also been discovered that large rocks or other obstructions located in the path of the cutter, prevent the latter from being elevated so as to permit simultaneous tight closure of the front apron in order to confine the load, without subjecting the lower edge of the front apron to severe shock and possible damage. While these unusual conditions of operation are not of frequent occurrence, they may arise at any time and are not only annoying to the operator but may also cause loss of time due to necessary repairs.

It is therefore a more specific object of my present invention to provide improvements in the construction of the dirt confining apron or aprons of scrapers of the above described type, whereby these aprons will function most effectively under all conditions of operation.

Another specific object of my present invention is the provision of an improved unloading apron assemblage which is effectively cooperable with the bottom of the load retaining bowl of a scraper, to remove all deposits therefrom during the unloading operation.

A further specific object of this invention is the provision of an improved loading or load confining apron assemblage which cooperates with the cutter of the scraper to permit effective confinement of the charge without danger of damaging the elements by intervening stones, stumps or other abnormal objects.

Still another specific object of the invention is to provide simple, compact and durable means for effecting rapid and most efficient loading and unloading of a scraper type of dirt carrying unit.

These and other specific objects and advantages will be apparent from the following detailed description; and it is to be noted that some of the improved features of scraper assembly shown and described but not claimed herein, form the subject of the co-pending application herein-above referred to.

A clear conception of the improved details of construction constituting the present invention, and of the mode of constructing and of operating scrapers built in accordance with this improvement, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the several views.

Fig. 1 is a somewhat diagrammatic central longitudinal vertical section through a scraper, showing the assemblage in load confining and transporting condition; and

Fig. 2 is a similar view of the scraper assembly, showing the elements thereof in unloading condition.

While the invention is shown herein as being applied to a specific type of scraper assemblage, it is not the intent to thereby unnecessarily restrict the scope, since the novel details of construction may be more generally applicable.

The scraper assembly shown in the drawing by way of illustration, comprises in general a main load receiving and confining bucket or bowl 5 supported to swing about a rear axle 6 and having a front cutter 7 movable toward and away from the ground; a frame 8 normally supported to swing about a front pivot or fulcrum 9 and having rearwardly extending laterally spaced side arms 10, the medial portions of which are swingably attached to the forward upper portions of the side walls 11 of the bowl 5 by means of alined pivot pins 12; a front load confining and carrying apron 13 swingably suspended from the pins 12 and movable toward and away from the cutter 7 and having opposite side walls 14 slidably cooperable with the adjacent side walls 11 of the bowl 5; a rear load confining pusher or apron 15 swingably suspended from the opposite side walls 11 of the bowl 5 by means of alined pivot pins 16 and having its lower end movable along and in close proximity to the curved bottom 17 of the bowl 5; a plurality of hydraulic jacks 18, 19,

20 for independently actuating the bowl 5, apron 13 and apron 15 respectively; and rear and front wheels 21, 22 for movably supporting the axle 6 and the fulcrum 9 respectively.

The main bowl 5 is preferably formed of heavy metal plates welded or otherwise rigidly united, and the bottom 17 is curved to substantially conform with an arc generated about the axis of the pins 16 which swingably support the rear apron 15. The apron 15 which is adapted to be swung back and forth between the parallel side walls 11 of the bowl 5 by the hydraulic jack 20, has a scraper flap 23 pivotally suspended from its lower end; and this flap 23 which may be composed of one or more adjoining sections, spans the bowl 5 and is adapted to ride along the upper surface of the bowl bottom 17 whenever the apron 15 is moved. The bowl 5 is adapted to be raised or lowered by means of two similar and simultaneously operable hydraulic jacks 18, the cylinders of which are carried by rigid rearwardly extending frame members 24 formed integral with the bowl 5, and the members 24 are swingably associated with the rear axle 6 and also support the rear apron actuating jack 20. As shown, the rear frame members 24 are rigidly attached to a stiff transverse beam 25 which interconnects the upper rear portions of the side walls 11, and are also likewise attached to the lower rear portion of the bowl 5 near the rear end of the bottom 17. The piston rods of the jacks 18 are attached to another cross-beam 26 which rigidly interconnects the rear upper ends of the main frame arms 10, and the beams 25, 26 are preferably disposed rearwardly of the top of the bowl 5 so as to avoid obstruction to loading of the bowl with a steam shovel or the like.

The front apron 13 and its side walls 14 are also formed of heavy metal plate, and a lower edge of this apron which coacts with the cutter 7, may be provided with a pivotally suspended closure flap 27 which is normally adapted to contact with the cutter 7 as shown in Fig. 1. The flap 27 is prevented from swinging outwardly to a position beyond tangency with the apron 13, by a stop 28, and this flap may likewise be formed of one or more adjoining sections and spans the apron 13. As shown in dash lines in Fig. 2, the front apron flap 27 may swing inwardly of the apron 13 and away from the stop 28 when the apron 13 is lowered and the flap engages an obstruction which cannot be severed by this flap. The front apron 13 may be swung about its suspension pins 12 by the hydraulic jack 19 which is supported upon the cross-beam 25 and coacts with the apron side walls 14 through linkage 29.

During normal operation of the improved scraper, the unit is being drawn along the ground by a tractor attached to the drawbar associated with the front fulcrum 9, and the hydraulic jacks 18, 19, 20 are controllable by means of valve and pump mechanisms of well known construction mounted upon the tractor near the driver's seat. The jacks 18, 19, 20 may be independently and selectively actuated at the will of the operator, and when the set of jacks 18 is operated, the bowl 5 will be swung about the rear axle 6 and the main frame 8 will be simultaneously swung about the front fulcrum 9 thus raising or lowering the pivot pins 12 and causing the cutter 7 to move up or down relative to the ground. When the cutter 7 is lowered into the ground, the hydraulic jack 19 should be manipulated to move the front apron 13 upwardly away from the bowl 5 as shown in Fig. 2, and the hydraulic jack 20 should also be manipulated to move the rear apron 15 toward the rear end of the bowl bottom 17 as shown in Fig. 1. With the scraper elements thus disposed, advancement of the mechanism along the ground will cause the cutter 7 to shear the dirt which will then advance rearwardly over the bowl bottom 17 and toward the rear apron 15, thus filling the bowl 5 with earth. When a suitable charge of dirt has been admitted to the bowl, the set of jacks 18 may be operated to elevate the cutter 7 away from the ground, and the jack 19 may be simultaneously operated to lower the front apron 13 to the position shown in Fig. 1, thereby causing the flap 27 to engage the upper portion of the cutter 7 and thus confining the load within the bowl 5 and within the apron 13. The confined load may then be transported over the ground and may be subsequently dumped or unloaded by manipulating the jacks 19 and 20 to raise the front apron 13 and to move the rear apron 15 along the interior of the bowl 5. As the rear apron 15 moves along the interior of the bowl 5, the flap 23 at the lower end of this apron will advance along the bowl bottom 17 and will thus effectively remove all of the dirt from within the bowl. In this manner, the scraper may be quickly loaded and unloaded, and removal of all of the charge is assured by the flap 23.

If, during final loading of the scraper, the front apron 13 meets an obstruction such as a stone, stump or the like, the flap 27 may swing about its pivot and away from the stop 28, and will ride over the top of the obstruction. The apron 13 may thus be lowered to its extreme position, and as the cutter 7 is raised to a position above the obstruction, the flap 27 will be brought to sealing position by the charge confined within the scraper bowl 5 and within the front apron 13. It will therefore be apparent that the flap 27 associated with the front apron 13 permits tight closing of the load carrying elements, without subjecting the apron 13 to undesirable stresses and possible breakage.

From the foregoing description it will be apparent that the present improvement comprising the flaps 23, 27, will permit effective use of the scraper assemblage even when the soil is sticky and contains abnormal obstructions such as rocks and stumps. The flap 23 associated with the rear apron 15 has been found extremely effective in removing wet clay and other sticky substances from within the bowl 5 during unloading of the scraper, and also prevents the charge from backing up into the space at the rear of the apron 15. The flap 27 associated with the front apron 13 will obviously function to protect this apron against damage, and will also maintain a thorough seal between the apron 13 and the front of the bowl 5 when these elements have been raised away from the ground. The flaps 23, 27 perform their function automatically, and besides being extremely simple in construction, these flaps may be readily replaced in case they become twisted or broken.

It should be understood that it is not desired to limit the present invention to the exact details of construction and 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 a scraper, a bowl having a front cutter and a laterally straight but longitudinally curved bottom, an apron swingable within said bowl toward and away from said cutter, and a rigid

rectilineal flap pivotally suspended from the lower end of said apron and having a straight knife edge engageable only with said bottom during swinging of said apron.

2. In a scraper, a bowl having a laterally straight but longitudinally curved bottom and a cutter secured to the front of said bottom beneath the load supporting surface thereof, an apron swingable within said bowl toward and away from said cutter, and a rigid rectilineal flap pivotally suspended from said apron and having a straight knife edge constantly engaging said bottom in advance of said apron during movement of the latter toward said cutter.

3. In a scraper, a bowl having a front cutter, an apron movable relative to said cutter to confine a load within said bowl, a flap pivotally suspended from said apron and being freely swingable toward and away from said cutter, and a stop for said flap disposed externally of said apron and bowl.

4. In a scraper, a bowl having a front cutter, an apron pivotally suspended to swing toward and away from said cutter, a rigid flap pivotally suspended from the lower end of said apron to swing freely toward and away from the bottom of said bowl, and a stop for said flap disposed externally of said apron.

5. In a scraper, a bowl having a front scraper, a front dirt confining apron pivotally suspended from said bowl to swing toward said cutter, and a rigid flap pivotally suspended from the lower end of said apron and swingable toward and away from said cutter, said flap being swingable only within the confines of said apron and having a limit stop disposed externally of the apron.

6. In a scraper, a bowl having a cutter, a pair of aprons movable relative to said bowl and cooperable with the latter to confine material therein, and a flap pivotally suspended from the lower portion of each of said aprons, both of said flaps being swingable toward and away from said cutter and each other.

7. In a scraper, a bowl having a bottom and a cutter at the forward end thereof, a rear apron pivotally suspended from said bowl and movable therein toward and away from said cutter, said rear apron having a pivoted flap at its lower end provided with a rectilineal knife edge engageable with said bottom, a front apron pivotally suspended from said bowl and movable toward and away from said cutter, and a pivoted flap associated with the lower end of said front apron and movable upwardly and downwardly with respect to said cutter, said front apron flap having a limit stop disposed externally of said aprons and bowl.

8. In a scraper, a bowl having a laterally straight bottom and a cutter at the forward end thereof, a rear apron movably suspended from said bowl to advance therein over said bottom toward and away from said cutter, a rigid flap pivotally suspended from the lower end of said rear apron and having a rectilineal knife edge engageable with said bottom during forward movement of said apron toward said cutter, a front load confining apron pivotally suspended from said bowl and swingable toward and away from said cutter, and a rigid flap pivotally suspended from the lower end of said front apron and being freely swingable upwardly and downwardly with respect to said cutter when said front apron is in lowermost position, said front apron flap having a limit stop disposed externally of said aprons and bowl.

9. In a scraper, a bowl having spaced parallel flat side walls and a laterally rectilineal relatively wide bottom rigidly attached at its opposite sides to said walls, said bowl being constantly open at its rear end near said bottom, a cutter secured to the front of said bowl, a rear apron supported from said bowl and being movable toward said cutter between said side walls, means operable through the lower portion of said open bowl end and coacting with the lower rear portion of said apron for moving the same, and a rigid flap pivotally suspended from the lowermost portion of said apron and having a rectilineal scraping edge engageable only with said bottom during said movement of the apron.

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