

April 30, 1940.

M. M. BRODERSEN ET AL

2,199,023

HEAVY DUTY SCRAPER

Original Filed April 6, 1936

2 Sheets-Sheet 1

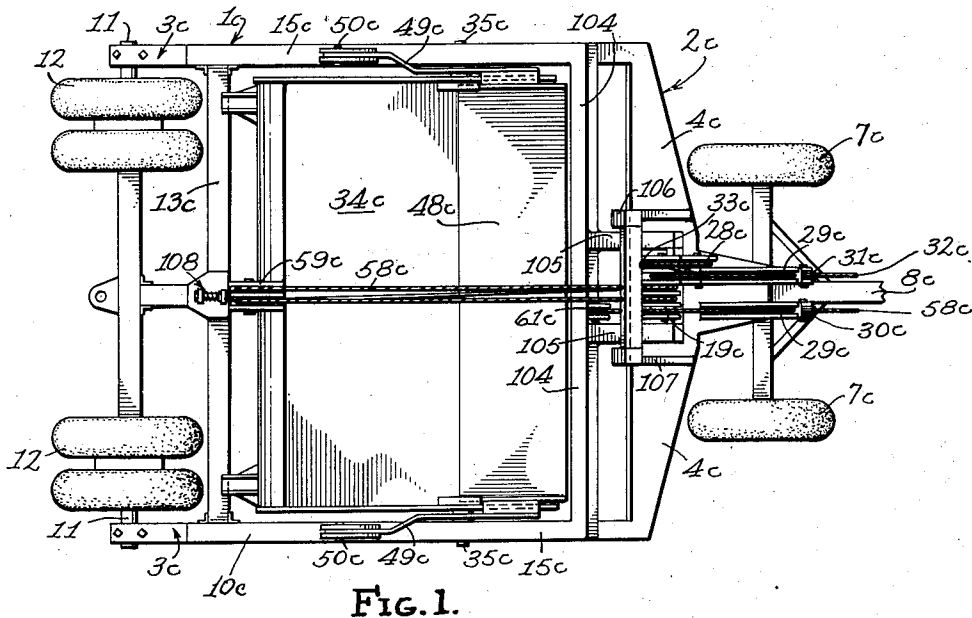


FIG. 1.

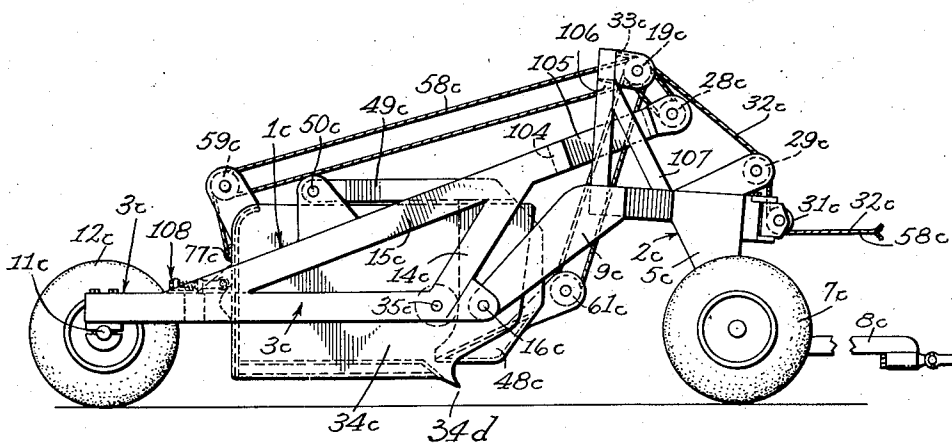


FIG. 2.

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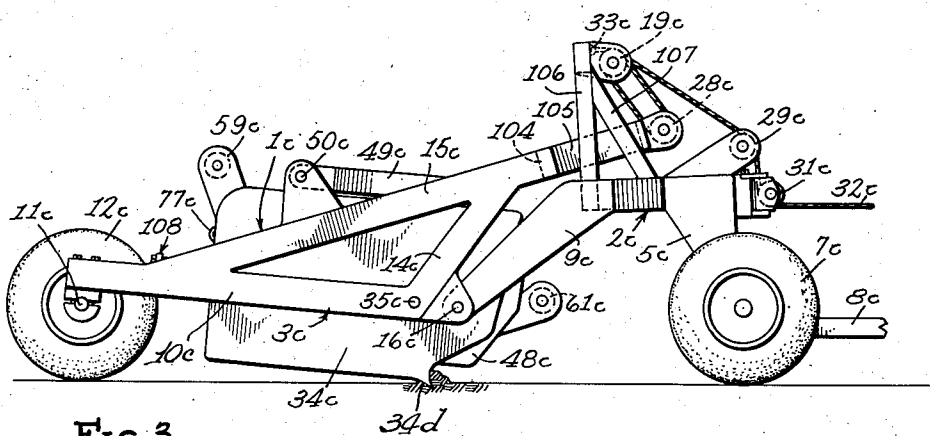


FIG. 3.

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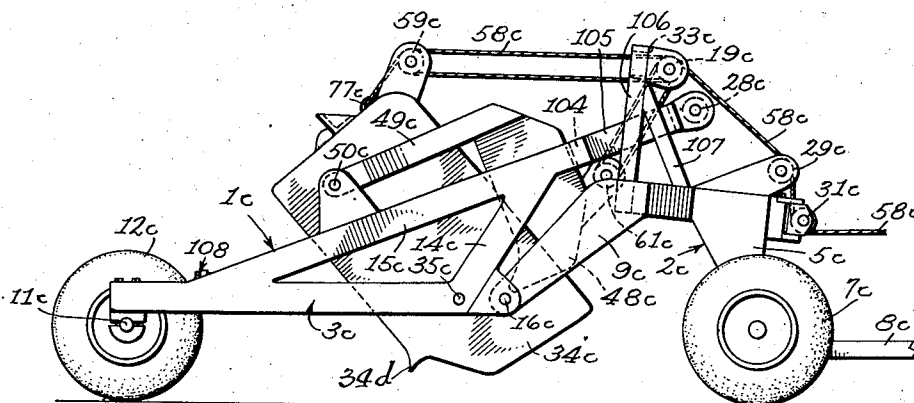


FIG. 4.

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HEAVY DUTY SCRAPER

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Original application April 6, 1936, Serial No.
72,934, now Patent No. 2,168,319, dated August
8, 1939. Divided and this application June 7,
1939, Serial No. 277,951

10 Claims. (Cl. 37—126)

This invention relates to earth handling apparatus of the type shown in our application for Letters Patent filed April 6, 1936, Serial No. 72,934, now Patent No. 2,168,319, and the present application is a division of said earlier application.

One of the purposes of this invention is to provide an improved hauling scraper of the tiltable bowl, tiltable apron type, in which advantages and improvements as to simplicity, ruggedness and durability of the entire scraper, as well as to nicety and positiveness of control and a quicker response and a greater flexibility of the operation of the bowl and apron, are made possible by means of a single cable operated mechanism for effecting and controlling operation of said bowl and said apron, and as a result of the particular relative arrangement and combination of the single cable mechanism, the scraper frame structure, bowl, apron and associated parts.

This combination makes it possible through appropriate manipulation of the single cable to instantly raise and lower the apron at will, without tilting or moving the bowl, and also makes it possible through further manipulation of same cable and while maintaining the apron under control of said cable, to move or tilt the bowl quickly or slowly and under great flexibility for loading, earth carrying, spreading, dumping and other purposes. Moreover this same cable controls the return movements of the bowl and apron and therefore, the manipulation of a single control lever or the like for operating the cable makes possible a greater number of operations and a greater nicety and flexibility of control of the apparatus as a whole than is possible where separate hydraulic and other types of independent devices are employed for independently operating the bowl and apron. Such hydraulic and other operating devices as heretofore used have required the use of two hands to operate the bowl and scraper inasmuch as separate valves and tractor controls must be operated either simultaneously or in succession or the operator must release one control and grasp another and vice versa, in order to operate the implement as desired. With our scraper and its single cable control means, a single control operated with one hand need not be let go of by the operator for moving the bowl and apron relatively and exclusively as desired into and out of the positions into which they may be moved by turning thereof on their axis, to perform the required operations such as loading, dumping, spreading, etc. On hauling scrapers having a tiltable bowl and a

tiltable apron operated by independent hydraulic devices, particularly the heavy duty types, the slowness of operation and lack of flexibility of said hydraulic devices and the necessity of separate operation thereof are disadvantageous in that part of the load may be lost if the bowl is in or is tilted to a position to gravitationally discharge the load or after being loaded lifted to carrying position before the apron is in bowl closing or load retaining position, and this can and does often happen due to poor timing of the necessary operations and the slow response to the apron and bowl following the operator's selective manipulation of the separate controls. Thus, it is seen that a single cable operated means for controlling the bowl and apron in accordance with the provision of our invention, make possible a mode of operation and control and afford advantages not possible with hydraulic and other separate or independent devices for operating the bowl and apron.

Another disadvantage of the hydraulic operating devices is the lack of flexibility thereof as compared to cable operated devices. A single cable operated mechanism is particularly advantageous in the tilting bowl, tilting apron combination of this invention, in that a quick "banging" movement of the bowl and apron and a vibratory action may be effected to dislodge wet dirt, mud, etc., clinging thereto due to the resiliency and flexibility of the cable and such resiliency and flexibility is impossible of achievement with the hydraulic devices.

With the foregoing and other objects in view, the invention hereof consists in the combination, correlation and construction of parts, elements and features which will be described in the following specification and finally pointed out in the claims hereto appended, it being understood that the apparatus of our invention is subject to modification within the scope of said claims.

Figure 1 is a top plan view of a hauling scraper embodying our invention.

Figure 2 is a side elevation of the scraper.

Figure 3 is a side elevation showing the scraper in loading position.

Figure 4 is a side elevation showing the scraper in dumping position.

In the embodiment of our invention shown in the accompanying drawings, a jointed vehicular frame structure 1c is composed of a front section 2c and a rear section 3c. The front section includes a transverse member 4c provided with a leg 5c swiveled on a wheeled support 1c, from which latter a draft tongue 8c affords connection

with a tractor not shown. Extending rearwardly and downwardly from the member 4c are arms 9c which are pivoted as at 16c to the front ends of the rear frame-section 3c.

As here provided, the rear section 3c includes side arms 10c pivoted at their rear ends on an axle 11c of a wheeled support or carriage 12c. A transverse tie or brace member 13c extends between the arms 10c just forward of the carriage 12c, and it is seen that the pivotal connections 16c, are made at the front ends of said arms. Extending upwardly and forwardly from arms 10c at points adjacent the pivots 16c are members 14c which are joined to brace members 15c extending from points on said arms adjacent the cross member 13c, upwardly and forwardly so as to terminate beyond the upper ends of members 14c. Joined to and extending between the forward ends of the members 10c, is a brace member 104 which carries a pair of forwardly extending arms 105 for supporting a pulley block 28c at a point over the approximate center of the front section 2c.

Mounted on the leg 5c are pulleys 29c and 31c of which the latter are swivelled. A cable 32c is dead ended as at 33c on a post 106 carried by the member 4c and braced by members 107. This cable is reaved between a pulley block 19c on the post 106, and the pulley block 28c, then passed over one idler 29c, through the swiveled pulley 31c and extended therefrom for connection with a hoist on the tractor in the usual manner.

Upon pulling on the cable 32c, a block and tackle action takes place between pulleys 19c and 28c so that the rear section 3c is swung upwardly by turning on the axle 11c. This effects a knee action of the jointed sections of the frame whereby to raise the bowl 34c carried by the rear frame section. This bowl as here shown is pivoted as at 35c to points on the arms 10c adjacent but rearwardly of frame pivots 16c. The sectional or jointed frame and bowl will gravitate to loading or carrying position as the case may be, upon releasing the cable 32c.

The bowl is maintained in carrying and loading positions by means of a spring detent device 108, which releases incident to an intentional upward pull on the rear end of the bowl as will be hereinafter described.

An apron 48c is mounted adjacent the forward end of the bowl 34c so as to extend between the sides of the bowl for the usual cooperations with the bowl and the scraping edge or blade 34d which is located adjacent the front of the bowl. The apron functions to retain the load in and release the load from the bowl and is scoop or bowl shaped. When lowered to position shown in Figure 3 the apron has its lower side spaced above the scraper edge on blade 34d so that the dirt may readily enter the bowl, yet in this position will prevent the dirt from rolling forward out of the bowl. When in position shown in Figure 2 the apron closes the front end of the bowl. When in position shown in Figure 3 the apron is fully raised and the bowl upon being likewise raised will dump its load.

As here provided arms 49c are fixed to the upper portion of the apron and extend rearwardly and are pivoted as at 50c to the rear section 3c adjacent the rear side of the bowl or otherwise, provided the apron may be raised and lowered at will exclusively of the bowl.

In accordance with this invention a single cable mechanism is provided for operating the bowl and includes a single cable 58c which is dead

ended as at 77c (see Fig. 2) on the bowl 34c. This cable is reaved between a pulley block 59c fixed on the bowl as shown in Fig. 2, and the pulley block 19c, then reaved between block 19 and pulley block 61c on the apron 48c, and finally extended over and under pulleys of the blocks 29c and 31c respectively and thence to the tractor operated hoist not shown.

When a pulling force is exerted on cable 58c a block and tackle effect takes place between pulley blocks 19c and 61c thereby first lifting the apron 48c which is lighter in weight than the bowl. Thus the initial pulling of cable 58c raises the apron exclusive of movement of the bowl. However, when the apron reaches the limit of its upward movement as it turns on the pivot 50c, it is stopped by encountering the cross member 104 of the rear frame 3c and thereafter the pull on the cable 58c causes a block and tackle effect between pulleys of blocks 19c and 59c whereupon the bowl is forced past the detent 108 and is tilted on its pivots 35c. By this tilting movement the bowl may be positioned to load without adjusting the frame, or to vary the depth of the blade 34d during loading, or to dump the load from the bowl; or so that the bowl will operate with a "banging" and vibrating action to dislodge mud and wet earth, etc., clinging thereto, all under control of the single cable 58c which also affords full control and make possible movement of the apron as desired to cooperate with the bowl in its various operations.

When the cable 58c is released the bowl 34 is first gravitationally lowered exclusively of the apron to either a carrying or a loading position, or to other positions as desired, due to its having a greater weight than the apron. When the bowl is lowered to loading or carrying position, further releasing of the cable 58c will allow the apron to gravitate into the desired or its lowermost position dependent on the extent of slackening of said cable, it being noted that the apron comes under control of said cable immediately the bowl has been lowered.

It will now be seen that as a result of providing in a hauling scraper a bowl mounted on the scraper frame for movement relative thereto, an apron mounted for movement exclusively of the bowl into and out of position for retaining the load in the bowl, and a means connected with the bowl and apron, including a single cable and operating when the cable is manipulated for moving the apron relative to the bowl and vice versa, we secure a flexibility of operation and a nicety of control not heretofore possible in hauling scrapers and also eliminate many of the objections which result in scrapers having fixed bowls or tilting bowls operated by hydraulic and devices other than a single cable means.

Another important provision of this invention is that of mounting the fixed pulleys or pulley blocks for operating the bowl and apron forwardly of both of said implements and on the front section while the bowl and apron are both mounted on the rear section of the jointed vehicular frame of the scraper. This simplifies and makes for an efficient straight line pulley and cable system wherein a great deal of friction is eliminated and the life of cable is appreciably increased.

We claim:

1. In a hauling scraper, a frame, a bowl mounted thereon for movement relative thereto, an apron mounted for movement exclusively of the bowl into and out of position for retaining the load in the bowl, and means connected with the

bowl and apron including a single cable and operating when said cable is manipulated for moving the apron exclusively of the bowl and vice versa.

2. In a hauling scraper, a frame, a bowl mounted for movement relative to the frame, an apron mounted for movement exclusively of the bowl into and out of position for retaining the load in the bowl, and means connected with the bowl and apron including a single cable and operating when said cable is manipulated for moving the apron exclusively of the bowl and vice versa, said frame including pivotally connected front and rear sections on the rear section of which the bowl and apron are supported, and means for effecting relative movement of said sections for bodily raising and lowering said bowl.

3. In a hauling scraper, a frame, a bowl mounted thereon for movement relative thereto, an apron mounted for movement exclusively of the bowl into and out of position for retaining the load in the bowl, and means connected with the bowl and apron including a single cable and operating when said cable is manipulated for moving the apron exclusively of the bowl and vice versa, said frame including pivotally connected front and rear sections on the rear section of which said bowl and apron are mounted, and means for effecting relative movement of said sections for bodily raising and lowering said sections including a pulley block on the front section, a pulley block on the rear section and a cable operatively associated with said pulley blocks, said single cable operated means including a pulley on said front section and a pulley on said apron around which said single cable is reaved.

4. In a hauling scraper, a frame, a bowl mounted thereon for movement relative thereto, an apron mounted for movement exclusively of the bowl into and out of position for retaining the load in the bowl, and means connected with the bowl and apron including a single cable and operating when said cable is manipulated for moving the apron exclusively of the bowl and vice versa, said frame including pivotally connected front and rear sections on the rear section of which the bowl and apron are supported, and means for effecting relative movement of said sections for bodily raising and lowering said bowl, said single cable means including a pulley on the apron and a pulley on the front section of said frame, said two pulleys being moveable towards and away from one another in a path extending upwardly and forwardly of the path of movement of said apron.

5. In a hauling scraper, a frame, a bowl mounted thereon for tilting movement relative thereto, an apron mounted for movement exclusively of said bowl into and out of position for retaining the load in the bowl, and means connected with said bowl and apron including a single cable and operating when said cable is pulled for first moving the apron exclusively of the bowl and then tilting said bowl.

6. In a hauling scraper, a frame, a bowl mounted thereon for tilting movement relative thereto, an apron mounted for movement exclusively of said bowl into and out of position for retaining the load in the bowl, and means connected with said bowl and apron including a single cable and operating when said cable is pulled for first moving the apron exclusively of the bowl and then tilting said bowl, said frame including relatively movable front and rear sections, wheels supporting said sections, said bowl and apron

being mounted on one of said sections and means for effecting relative movement of said sections for bodily raising and lowering said bowl.

7. In a hauling scraper a wheel supported frame, a bowl mounted on the frame for movement relative thereto into loading, carrying and dumping positions, a scraper blade associated with and for directing earth into said bowl, an apron mounted on said frame for movement into and out of position for retaining the load in said bowl, and operating means including a single cable and members associated with the cable, frame, bowl and apron and initially operable when said cable is pulled, for moving the apron out of load retaining position exclusively of movement of said bowl and finally operable upon continuing the pull on said cable for moving the bowl into dumping position exclusively of movement of said apron, said operating means being initially operable upon releasing the cable to selectively position the bowl exclusively of said apron and finally operable upon further releasing the cable for disposing and maintaining the apron in load retaining or any position between the limits of movement thereof.

8. In a hauling scraper a wheel supported frame, a bowl mounted on the frame for movement relative thereto into loading, carrying and dumping positions, a scraper blade associated with and for directing earth into said bowl, an apron mounted on said frame for movement into and out of position for retaining the load in said bowl, and operating means including a single cable and members associated with the cable, frame, bowl and apron and initially operable when said cable is pulled, for moving the apron out of load retaining position exclusively of movement of said bowl and finally operable upon continuing the pull on said cable for moving the bowl into dumping position exclusively of movement of said apron, said operating means being initially operable upon releasing the cable to selectively position the bowl exclusively of said apron and finally operable upon further releasing the cable for disposing and maintaining the apron in load retaining or any position between the limits of movement thereof, said frame comprising front and rear sections pivotally connected with one another, said bowl being mounted on said rear section, and means for effecting relative movement, of said sections for bodily raising and lowering the bowl.

9. In a hauling scraper a wheel supported frame, a bowl mounted on the frame for movement relative thereto into loading, carrying and dumping positions, a scraper blade associated with and for directing earth into said bowl, an apron mounted on said frame for movement into and out of position for retaining the load in said bowl, and operating means including a single cable and members associated with the cable, frame and apron, and initially operable when said cable is pulled for moving the apron out of load retaining position exclusively of movement of said bowl and finally operable upon continuing the pull on said cable for moving the bowl into dumping position exclusively of movement of said apron, said operating means being initially operable upon releasing the cable to selectively position the bowl exclusively of said apron and finally operable upon further releasing the cable for disposing and maintaining the apron in load retaining or any position between the limits of movement thereof, said frame including pivotally controlled front and rear sections of which

the rear section supports the bowl and apron, means for effecting relative movement of said sections for simultaneously and bodily raising and lowering the bowl and apron.

- 5 10. In a hauling scraper a wheel supported frame, a bowl mounted on the frame for movement relative thereto into loading, carrying and dumping positions, a scraper blade associated with and for directing earth into said bowl, an
10 apron mounted on said frame for movement into and out of position for retaining the load in said

bowl, an operating means including a single cable and members associated with the cable, frame, bowl and apron and initially operable when said cable is pulled for moving the apron out of load retaining position exclusively of movement of said bowl and finally operable upon continuing the pull on said cable for moving the bowl into dumping position exclusively of movement of said apron.

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