May 23, 1939. T. R. PAULSEN ET AL 2,159,045

WHEELED SCRAPER

Filed March 15, 1937 2 Sheets-Sheet 1

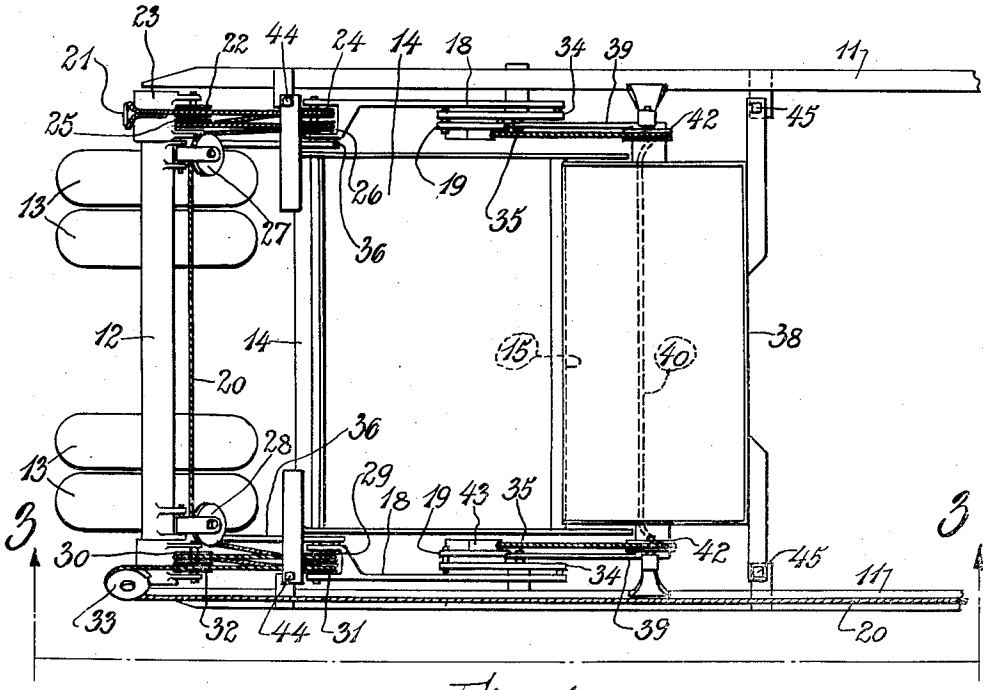


Fig. 1.

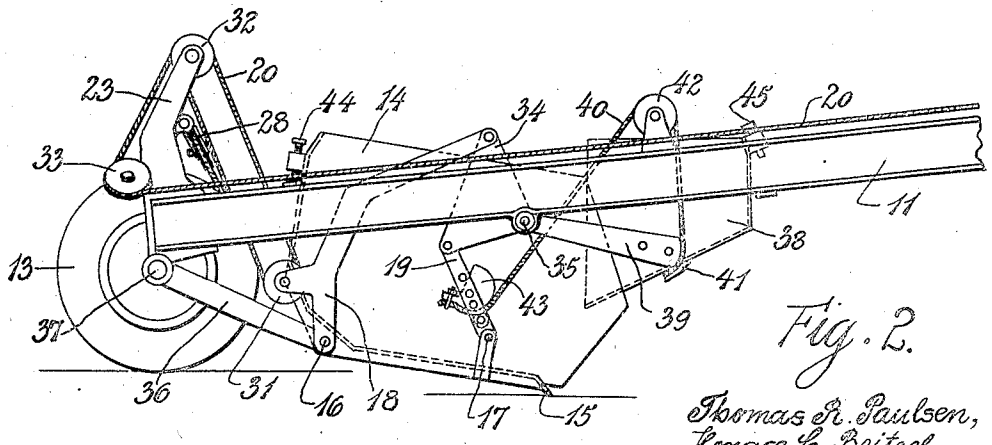


Fig. 2.

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WHEELED SCRAPER

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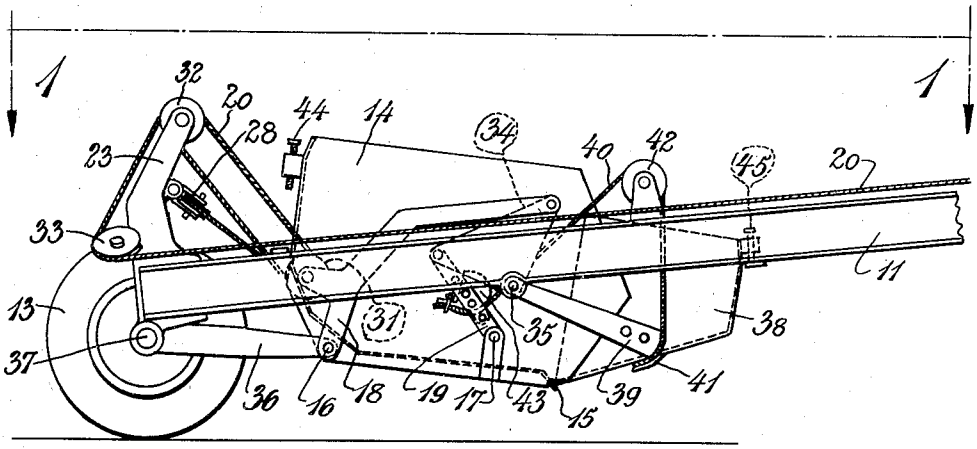


Fig. 3.

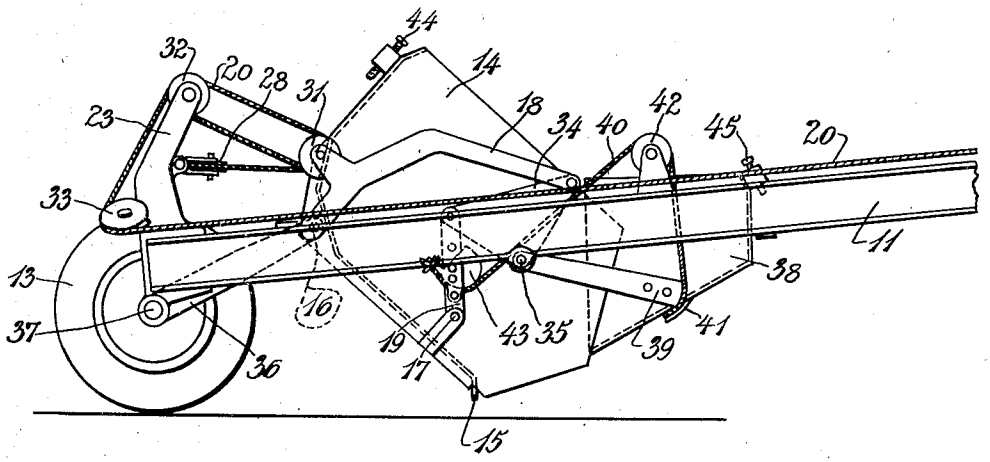


Fig. 4.

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UNITED STATES PATENT OFFICE

2,159,045

WHEELED SCRAPER

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Application March 15, 1937, Serial No. 130,933

6 Claims. (Cl. 37—129)

Our invention relates to new and useful improvements in wheeled scrapers, and more particularly to that type of such scrapers in which the bowl both fills and dumps at its forward end. Such a scraper is shown in United States Patent No. 2,088,091, issued July 27, 1937, to Stanley S. Moore, on application Serial No. 4,064; and our present invention is an improvement over said patent.

In devices of this sort, the bowl is hung both front and rear from the carrying frame, in such a way that a single lifting means, applied to the rear hanger, operates through a complicated linkage or its equivalent, to raise the front hanger in a predetermined relation to the motion of the rear hanger.

An "apron" is provided to close the front end of the bowl when in its carrying (i. e., intermediate) position; and this apron opens automatically in both the digging position and the dumping position.

Although these functions have been attained in the Moore patent with a fair degree of satisfaction, we have found it desirable to effect the following improvements.

We connect the hoisting rope at a different point than Moore does, thereby obtaining a greater leverage with fewer reaches of rope at that part of the digging cycle when leverage is needed, and yet obtaining greater speed when speed is needed: a seeming paradox.

We provide a new and ingenious means for supporting and for automatically opening the apron, this means being adjustable to attain different degrees of opening.

We reeve the bowl-hoisting rope in such locations as to free it from spillage of dirt and stones, which would otherwise cause clogging and/or undue wear.

In addition to our principal objects, above stated, we have worked out a number of novel and useful details, which will be readily evident as the description progresses.

Our invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims, and of which one embodiment is exemplified in the accompanying drawings, which are hereinafter particularly described and explained.

Throughout the description, the same reference number is applied to the same member or to similar members.

Figure 1 is a plan view of one form of scraper, shown in the carrying position, taken along the lines 1—1 of Figure 3.

Figure 2 is a side elevation of the same scraper, in the digging position.

Figure 3 is a side elevation of the same scraper, in the carrying position, taken along the line 3—3 of Figure 1.

Figure 4 is a side elevation of the same scraper, in the dumping position.

In the figures, we see that 11, 11 are side beams of the frame of the scraper. These are shown broken off at the right hand side of the figures, but in practice they extend to a forward wheel or wheels (not shown) of any convenient sort, and/or to a draw-bar (not shown) for attachment to the tractor which is to pull our scraper.

Beams 11 are joined by cross-beam 12. The frame is supported by wheels 13, preferably rubber-tired.

The bowl 14 is a boxlike structure, open at the top and front, and provided with a scraping blade 15 along its front lower edge.

The bowl is supported on each side at two points 16 and 17, by bent link 18 and link 19 respectively. Bent link 18 is in turn supported by hoist rope 20, the reeving of which is as follows.

It passes from an anchorage 21 on the frame, over sheave 22 on one of the two elevated arms 23, thence over sheave 24 on one of the bent links 18, thence over sheave 25 on the elevated arm, thence over sheave 26 on the bent link, thence over swiveled sheave 27 on cross beam 12, thence across to the other side of the scraper to swiveled sheave 28, thence over sheave 29 on the other bent link 18, thence over sheave 30 on the other elevated arm 23, thence over sheave 31 on the bent link, thence over sheave 32 on the elevated arm, thence over deflecting sheave 33, and thence to the forward end of our scraper, where (by means of other sheaves, not shown) it is led to the winch (not shown) on the tractor (not shown) which pulls our scraper.

It should be noted that this reeving keeps the rope 20 and its sheaves free of the spillage of dirt at the rear and sides of our bowl.

The link 19 is pivotally hung from one corner of triangle 34. Bent link 18 is pivotally attached to a second corner of this triangle, and the triangle is pivotally supported by the frame at 35.

Toggle arm 36 is pivoted to the frame at 37 and to the bowl at 16.

Apron 38 is supported as follows. Apron arm 39 is pivoted to the frame at 35. Rope 40, attached to the apron at 41, passes over a sheave 42 carried by the frame, and thence to an anchorage on cam 43, secured in any one of a number of selective positions on link 19.

All the foregoing linkage is duplicated on the further side of the scraper.

Adjustable stops 44 limit the descent of the bowl, and adjustable stops 45 limit the descent of the apron.

The operation of our scraper is as follows.

When the scraper is in the digging position of Figure 1, the reaction of the ground against scraping blade 15, tends to force point 16 downward, due to the fact that the bowl 14 and toggle arms 36 are below toggle. This tendency is resisted by rope 20, and hence the depth of digging can be regulated (subject to the limiting effect of stops 44) by paying out rope 20 or hauling it in.

The location of sheaves 24, 26, 29 and 31 on bent links 18, rather than on the rear of the bowl as in the Moore patent, or on the toggle arms 36, as sometimes practiced, gives greater leverage than Moore during digging and carrying, and greater speed than Moore during dumping.

When rope 20 is hauled in, point 16 on the bowl rises in a circle about point 37 on the frame as a center. At the same time, bent link 18 causes triangle 34 to rotate clockwise, this lifting link 19, and thereby causing the front of the bowl to rise slightly faster than the rear of the bowl. This is the motion between the position of Figure 2 and the position of Figure 3.

But, in moving to the position of Figure 4, the parts of the linkage are so proportioned and disposed that the rear of the bowl rises so much faster than point 17, that the scraping blade 15 actually lowers again, thereby serving as a spreader for the material which is being dumped.

Meanwhile what of the corresponding cycle of the apron?

In Figure 2 the low position of link 19, acting on the rope 40, holds the apron 38 elevated.

As the link 19 rises to its position of Figure 3, the apron correspondingly lowers until it closes the front of the bowl. The extent of its descent is limited by stops 45, which also serve to relieve the scraping blade 15 from having to support the apron and its contents during carrying.

But as the link 19 moves to its position of Figure 4, its rise or descent is negligible, and hence the rocking motion of cam 43 is provided, so as to take in rope 40, thereby raising the apron again.

The automatic operation of the apron can be nicely regulated by changing the length of rope 40, the adjustment of stops 45, the location of cam 43 on link 19, or by any combination of these adjustments.

Having now described and illustrated one form of our invention, we wish it to be understood that our invention is not to be limited to the specific form or arrangement of parts hereinbefore described, except insofar as such limitations are specified in the appended claims.

We claim:

1. A scraper, having a frame, ground-supports for the frame, a digging bowl, lifting means applied only at the back of the bowl, hanging means separate from said lifting means for supporting the front of the bowl from the frame, additional brace means connecting the bowl to the frame, to convey the digging reactions from the bowl to the frame, and to cooperate with the connection about to be described; and an interconnection between the lifting means and the hanging means such that the lifting of the bowl at the back from the digging position will cause the hanging means to rise, but to a lesser extent than the back of the bowl, whereby to finally dispose the bottom of the bowl at a steep angle for dumping, characterized by the fact that the interconnection includes two links, one of which is pivoted to each side of the bowl adjacent the rear thereof, and each of which is operatively associated with the hanging means, and by the further fact that the lifting means is applied to these links at a point above the attachment of each link to the bowl, and from such a point on the frame that the direction of pull in the dumping position will pass above the point of attachment of the link to the bowl.

2. A scraper, according to claim 1, characterized by the still further fact that the lifting means is flexible and passes around sheaves mounted on the links.

3. A scraper, having a frame, ground-supports for the frame, a digging bowl, lifting means applied only at the back of the bowl, hanging means separate from said lifting means for supporting the front of the bowl from the frame, additional brace means connecting the bowl to the frame, to convey the digging reactions from the bowl to the frame, and to cooperate with the connection about to be described; and an interconnection between the lifting means and the hanging means such that the lifting of the bowl at the back from the digging position will cause the hanging means to rise, but to a lesser extent than the back of the bowl, whereby to finally dispose the bottom of the bowl at a steep angle for dumping, characterized by the fact that the hanging means includes two links, one of which is pivoted to each side of the bowl adjacent the front thereof, and by the possession of the following further elements: an apron, capable of closing the front of the bowl when it is in carrying position; means independently pivoting this apron on the frame for opening and closing; and flexible means passing from an anchorage on the apron, over a sheave on the frame, to such means carried by one of the links, that the motion of the link, as the bowl passes from carrying position to each of digging and dumping positions, serves to raise the apron out of the way.

4. A scraper, according to claim 3, characterized by the still further fact that the means on the link is a flexible-means-engaging cam, adjustable in its position on the link.

5. A scraper, according to claim 3, characterized by the still further fact that the means on the link is such that the descent of the link, as the bowl descends from its carrying position to its digging position, pulls on the flexible means, and that the rocking of the link, as the bowl rises from its carrying position to its dumping position, is sufficient to offset the rise of the link and thereby pull on the flexible means.

6. A scraper, having a frame, ground-supports for the frame, a digging bowl, lifting means applied only at the back of the bowl, hanging means separate from said lifting means for supporting the front of the bowl from the frame, additional brace means connecting the bowl to the frame, to convey the digging reactions from the bowl to the frame, and to cooperate with the connection about to be described; and an interconnection between the lifting means and the hanging means such that the lifting of the bowl at the back from the digging position will cause the hanging means to rise, but to a lesser extent than the back of the bowl, whereby to finally dispose the bottom of the bowl at a steep angle for dumping, characterized by the fact that the interconnection includes two links, one of which

is pivoted to each side of the bowl adjacent the rear thereof, and each of which is operatively associated with the hanging means, and by the further fact that the lifting means is applied to these links at a point above the attachment of each link to the bowl, and from such a point on the frame that the direction of pull will pass above the point of attachment of the link to the bowl in the dumping position, and behind this point of attachment in the digging position.

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