Aug. 12, 1952 G. W. MORK 2,606,376

FRONT-DIGGING REAR-DUMPING EARTH-MOVING SCRAPER

Filed June 19, 1947 4 Sheets-Sheet 1

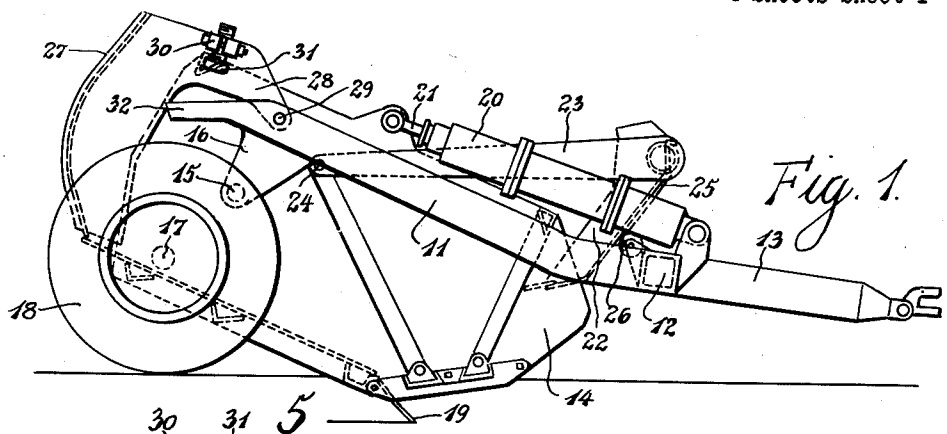


Fig. 1.

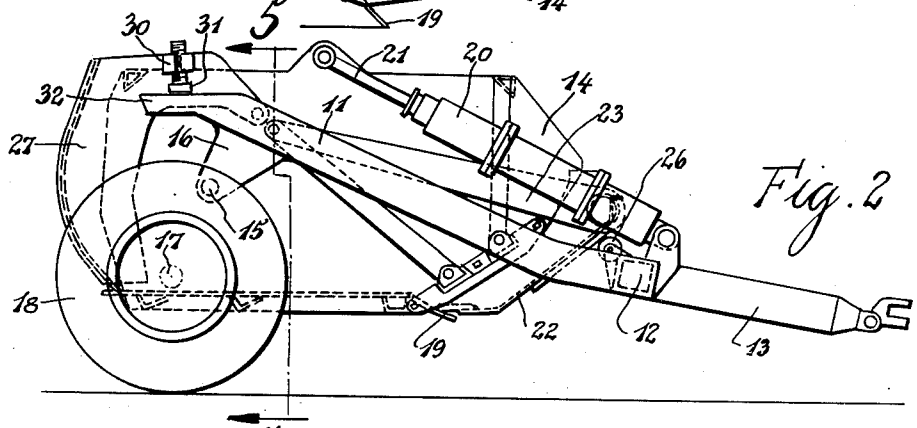


Fig. 2

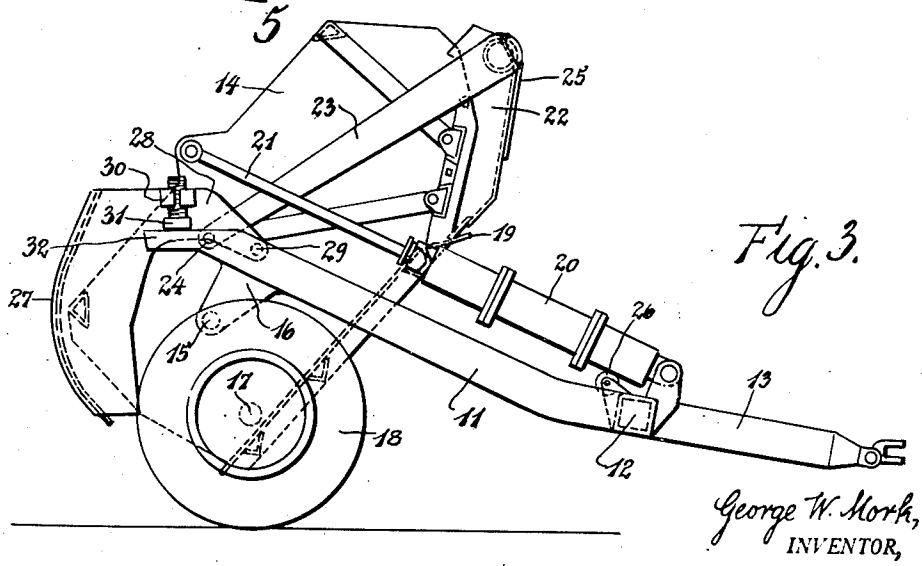


Fig. 3.

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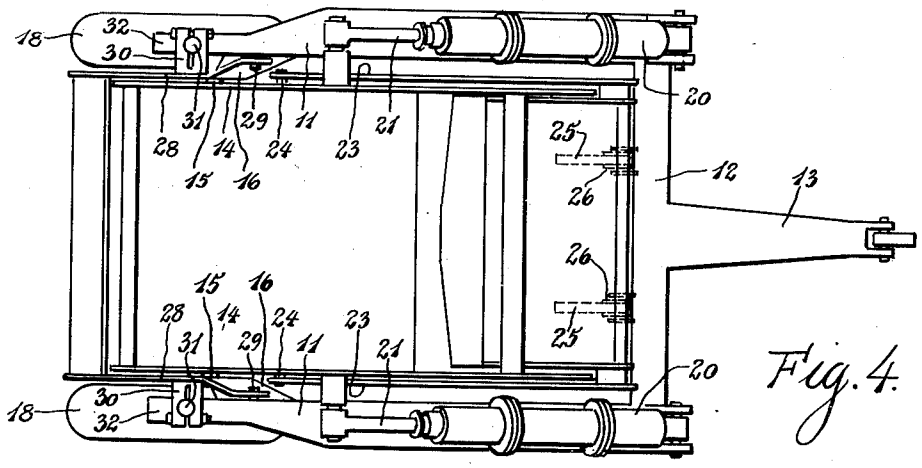


Fig. 4.

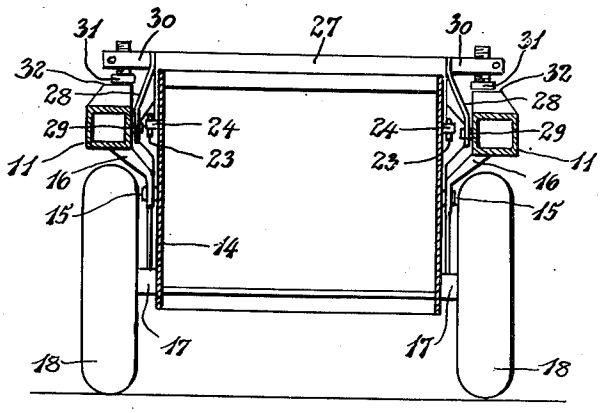


Fig 5.

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FRONT-DIGGING REAR-DUMPING EARTH-MOVING SCRAPER

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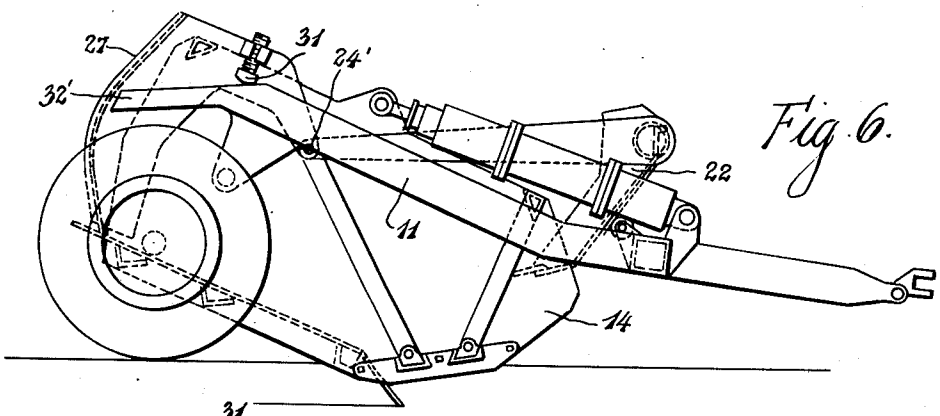


Fig. 6.

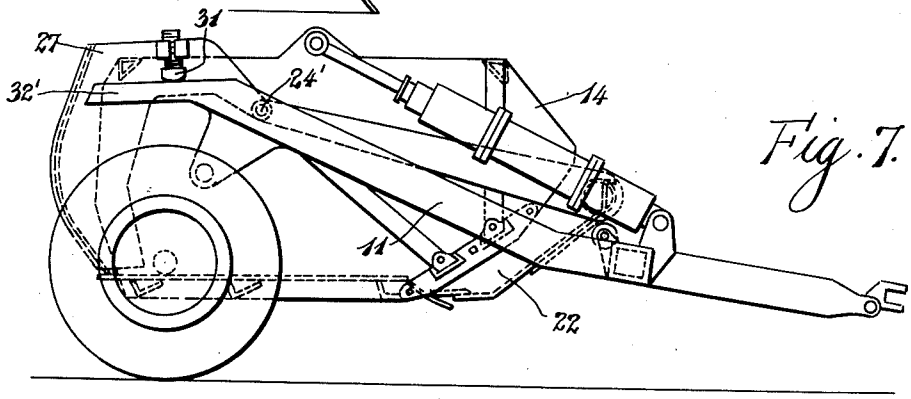


Fig. 7.

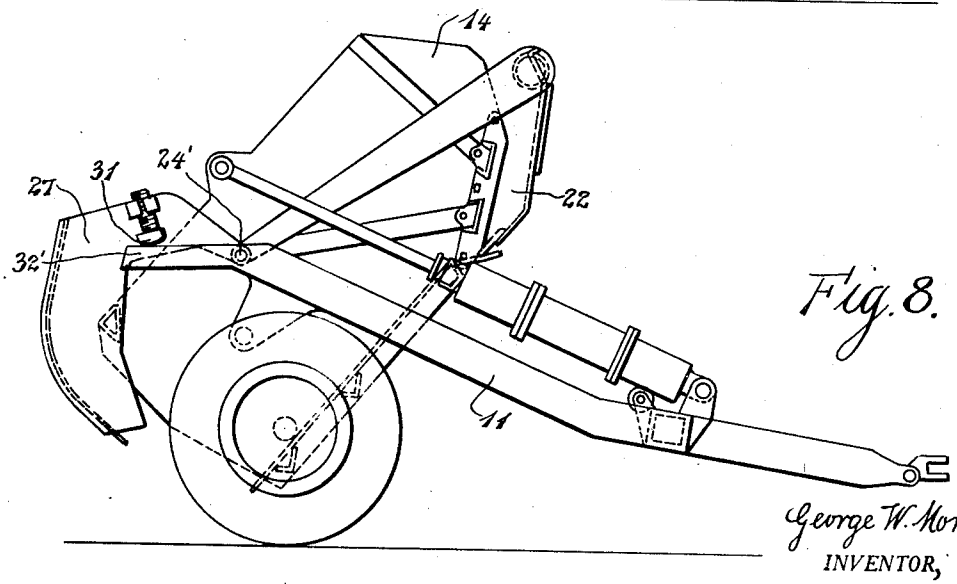


Fig. 8.

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FRONT-DIGGING REAR-DUMPING EARTH-MOVING SCRAPER

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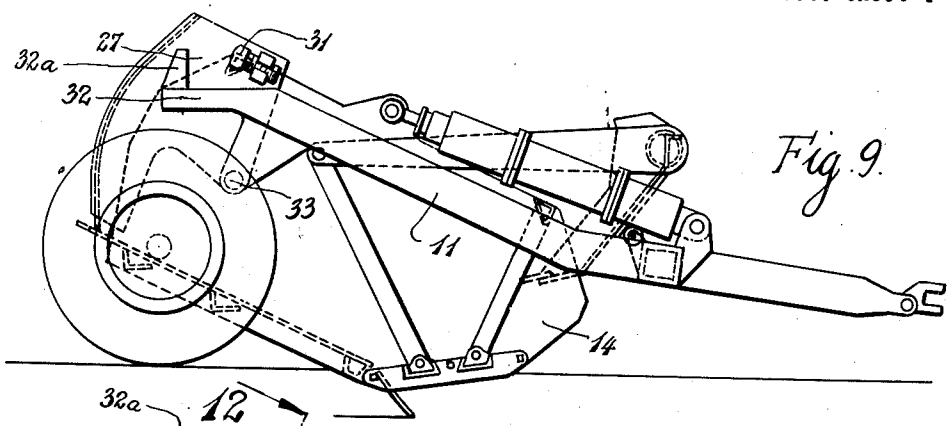


Fig. 9.

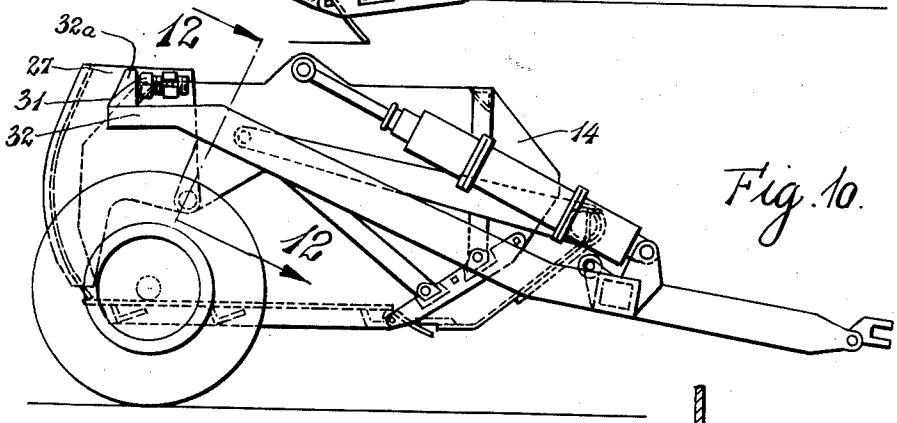


Fig. 10.

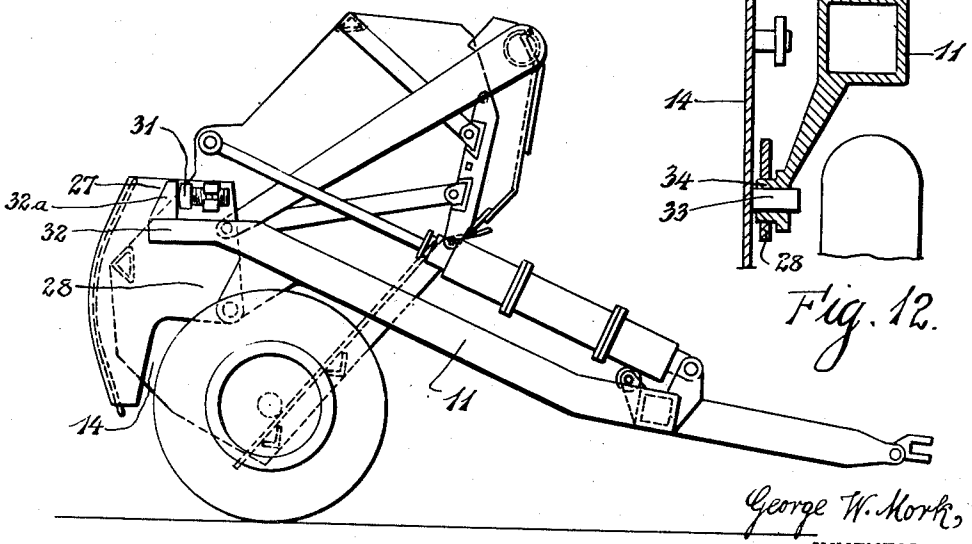


Fig. 11.

Fig. 12.

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Patented Aug. 12, 1952

2,606,376

UNITED STATES PATENT OFFICE

2,606,376

FRONT-DIGGING REAR-DUMPING EARTH-MOVING SCRAPER

George W. Mork, South Milwaukee, Wis., assignor to Bucyrus-Erie Company, South Milwaukee, Wis., a corporation of Delaware

Application June 19, 1947, Serial No. 755,604

3 Claims. (Cl. 37—133)

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My invention relates to new and useful improvements in wheeled scrapers, and more particularly to that type of such scrapers in which the bowl fills at its front end and dumps at its rear end.

In devices of this sort, the bowl is pivoted adjacent its rear end to the carrying frame. A single hydraulic cylinder, or a pair of cylinders, mounted on the frame, serves to rotate the bowl about its pivot, in either direction from its neutral (i. e. carrying) position.

Each end of the bowl is provided with a closure, the front closure being known as the "apron," and the rear closure being known as the "end gate."

When the bowl tips downward into its digging position, the apron opens. When the bowl tips upward into its dumping position, the end gate opens.

The principal objects of my invention are to provide an improved scraper of the above general type in which:

(1) Minimum overall lateral clearance is obtained by the relative disposition of bowl, carrying frame, and wheels.

(2) Actuating and/or supporting linkages between the end gate and the carrying frame, and between the bowl and its actuating hydraulic cylinders, are eliminated.

(3) Wear on pivot bearings is reduced by mounting certain parts (such as the end gate) on other parts (such as the carrying frame) with respect to which there is least relative motion during the digging cycle.

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

My invention consists in the novel parts and in the combination and arrangement thereof, which are defined in the appended claims, and of which three embodiments are 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.

Figures 1, 2, and 3 are side elevations of the first embodiment of my scraper, in digging, carrying and dumping positions respectively.

Figure 4 is a plan view of the same embodiment in carrying position.

Figure 5 is a transverse section, taken along the line 5—5 of Figure 2, showing the same embodiment in carrying position.

Figures 6, 7, and 8 are side elevations of the second embodiment of my scraper, in digging, carrying and dumping positions respectively.

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Figures 9, 10, and 11 are side elevations of the third embodiment of my scraper, in digging, carrying and dumping positions respectively.

Figure 12 is an enlarged partial transverse section, taken along the line 12—12 of Figure 10, showing in detail the pivot bearing of the end gate and apron on the carrying frame.

Referring now to my first embodiment, shown in Figures 1 to 5 inclusive, we see that 11, 11 are the side beams, 12 is the cross beam, and 13 is the tongue of the main frame of my scraper. The tongue 13 extends to the tractor (not shown) which pulls my scraper.

The bowl 14 is pivoted at 15, adjacent its rear end, to side beams 11, preferably to downward extension 16 thereon, and is supported at 17, adjacent its rear lower corners, by wheels 18, 18. The bowl has a digging edge 19. Since side beams 11 are not directly connected to wheels 18, the overall lateral clearance of the scraper is reduced by bending side beams 11 upwardly and locating wheels 18 under instead of outside the side beams.

Hydraulic cylinders 20 are mounted in an elevated position on the main frame, well forward and out of the way of the digging elements. The cylinders rotate the bowl 14 about its pivots 15, by means of piston rods 21 pivotally connected directly to the sides of the bowl 14, preferably adjacent the top thereof. This relative rotation between the bowl and the frame, performs the important incidental function of rotating the bowl about the wheel axles 17. The cylinders are fed from a source (not shown) on the tractor, by means of piping (not shown), and may be controlled, preferably from the driver's seat (not shown), in any convenient conventional manner (not shown).

Considering the carrying position of Figure 2 as neutral, it will be seen that a retraction of piston-rod 21 will lower the bowl 14 to the digging position shown in Figure 1, and that a thrusting out of this piston rod will raise the bowl to the dumping position shown in Figure 3.

The apron 22 is rigidly secured to two apron arms 23, which in turn are pivoted to the bowl 14 at 24. The apron 22 is opened in the following manner. When the bowl 14 is tilted from the carrying position of Figure 2 to the digging position of Figure 1, rails 25 on the bottom of the apron engage and roll upon rollers 26. These rollers are adjustable in any convenient manner; the higher the rollers, the wider will the apron open during digging. Thus the extent of opening

of the apron can be related to the stickiness of the material being excavated.

The end gate 27 is rigidly secured to two end-gate arms 28, which in turn are pivoted to the side beams 11, as at 29. A bracket 30 on each end-gate arm 28 carries an adjustable stop 31, capable of engaging the rear extension 32 of side beam 11. Side beam 11, in some of the claims, will be referred to as "an end-gate supporting member." Thus, by the engagement between this stop and the rear extension 32 of side beam 11, the end gate 27 will open, by the bowl tilting away from it, when the bowl is tilted from the carrying position of Figure 2 to the dumping position of Figure 3; but, in the carrying position of Figure 2, the stop 31 will come away from the rear extension 32 of side beam 11 so that the end gate will rest, in its closed position, on the bowl; and, if rocks or other obstructions prevent the end gate from closing, the bowl can nevertheless return to carrying position, without strain, in spite of the gate being jammed open.

Let us consider the second and third embodiments of my invention. Insofar as the parts thereof are the same as those of the first embodiment, they will not be numbered nor discussed, except so far as necessary to illuminate the description of the changed parts.

Referring to Figures 6 to 8 inclusive, we see that, in the second embodiment, instead of the end gate 27 being pivoted on the side beams 11 as in the first embodiment, it is now pivoted on the bowl 14. The opening of the end gate 27 by engagement of adjustable stops 31 on the rear extensions 32' of side beams 11 is the same as in the first embodiment, except that, due to the motion of pivot 24' relative to the side beams 11, the adjustable stops 31 have a rearwardly sliding instead of a nearly stationary engagement on rear extension 32' as the bowl is tilted upward to dump.

Referring to Figures 9 to 12 inclusive, we see that in the third embodiment of my invention, instead of the end gate 27 being pivoted above the bowl pivot 15 as in the first and second embodiments, it is now pivoted with the bowl at pivot 15, and instead of stop 31 engaging horizontal rear extension 32 of side beam 11, it engages vertical bumper 32a at the end of rear extension 32. This eliminates the relative sliding of stops 31 on rear extensions 32 as the bowl is tilted upwardly to dump. Furthermore, it should be noted (see Figure 12) that each end-gate arm 28 is not pivoted on bowl 14 or on stub pivot shaft 33 which is integral with the bowl, but rather on bearing sleeve 34 which is integral with side beam 11. This reduces wear at pivot 15, since relative motion between the end gate and the side beam occurs only with the limited shifting between carrying and digging positions.

Having now described and illustrated three forms of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts hereinbefore described and shown.

Whenever in the claims I use the phrase "pivotally supported by," it is intended to be generic to a direct pivotal support or an indirect pivotal support, at the location specified.

I claim:

1. A front-digging rear-dumping earth-moving scraper, comprising: a digging bowl, open at both ends; two axially - aligned supporting wheels; a traction frame, including two side beams; means for applying force between a point on the frame and a point on the bowl, whereby to tilt the bowl into digging, carrying, and dumping positions; and a gate pivotally supported by the frame-and-bowl assembly, to close the rear end of the bowl; said scraper being characterized by the fact that the two wheels are directly pivoted on the bowl adjacent the bottom of its open rear end; and by the fact that the side beam on each side of the bowl is directly pivoted on the bowl, and lies close to the bowl and above the wheel on that side and substantially within the outer face extended of that wheel.

2. A scraper according to claim 1, further characterized by the fact that the pivotal supports of the rear gate are adjacent the pivotal connections between the bowl and the side beams; and by having stop means between the rear gate and the side beams to limit only the downward swinging of the rear gate with respect to the side beams.

3. A scraper according to claim 2, further characterized by the fact that the pivotal supports of the rear gate are on the side beams.

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