

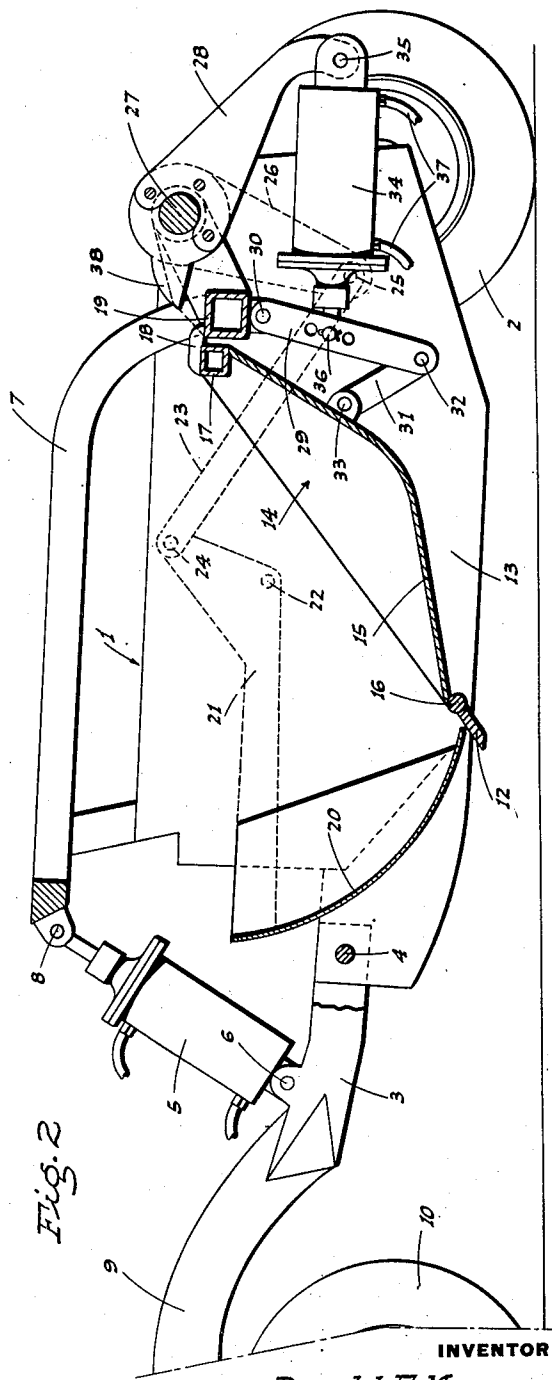
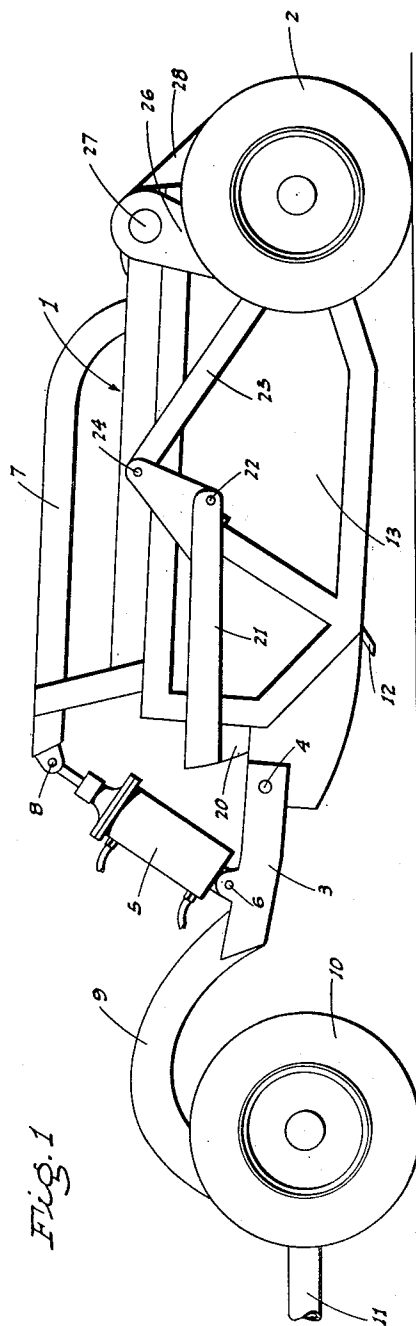
Sept. 9, 1952

D. E. MURRAY
HYDRAULICALLY CONTROLLED APRON AND EJECTOR
ASSEMBLY FOR EARTH WORKING SCRAPERS

2,609,622

Filed Dec. 9, 1950

3 Sheets-Sheet 1



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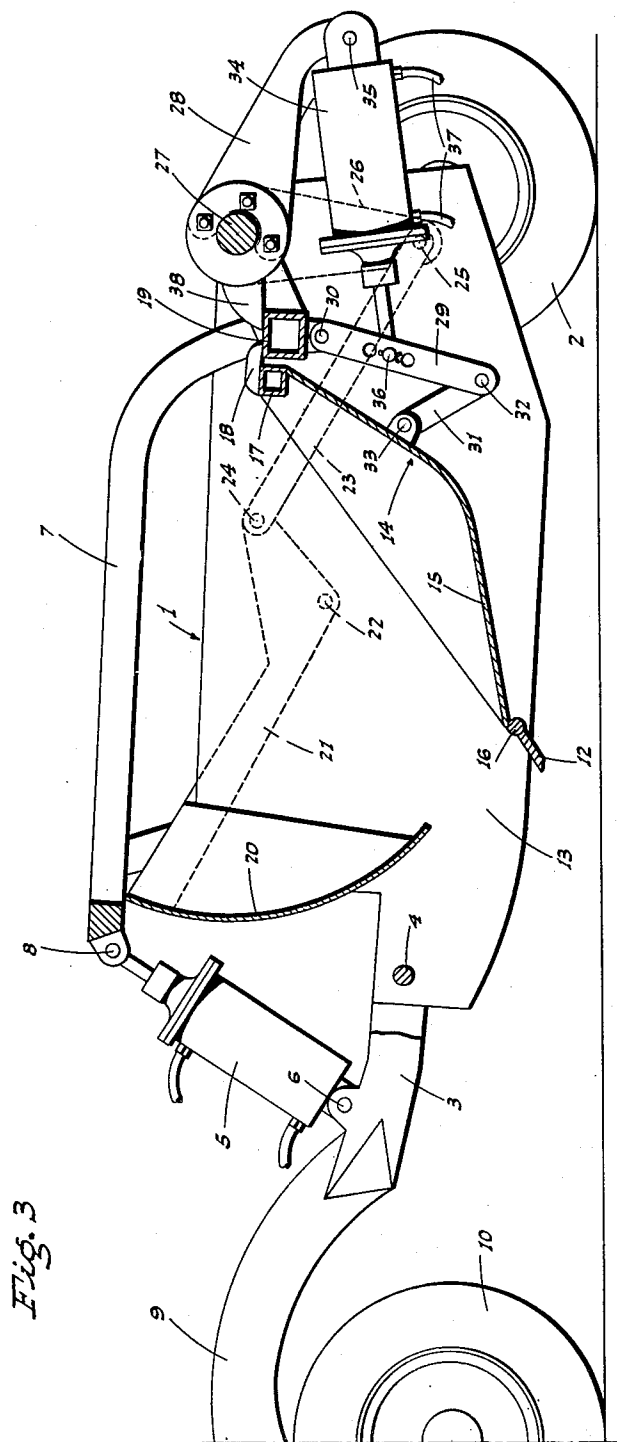


Fig. 3

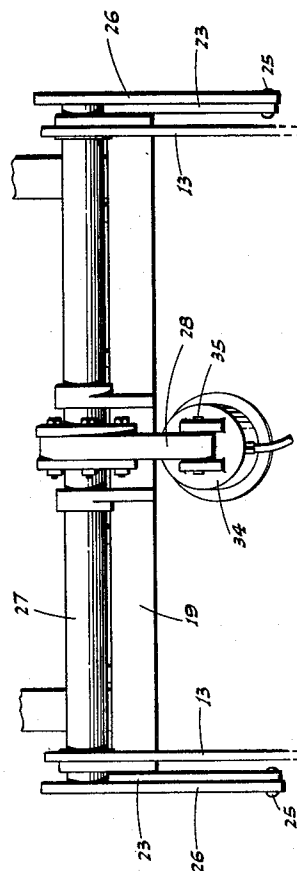


Fig. 5

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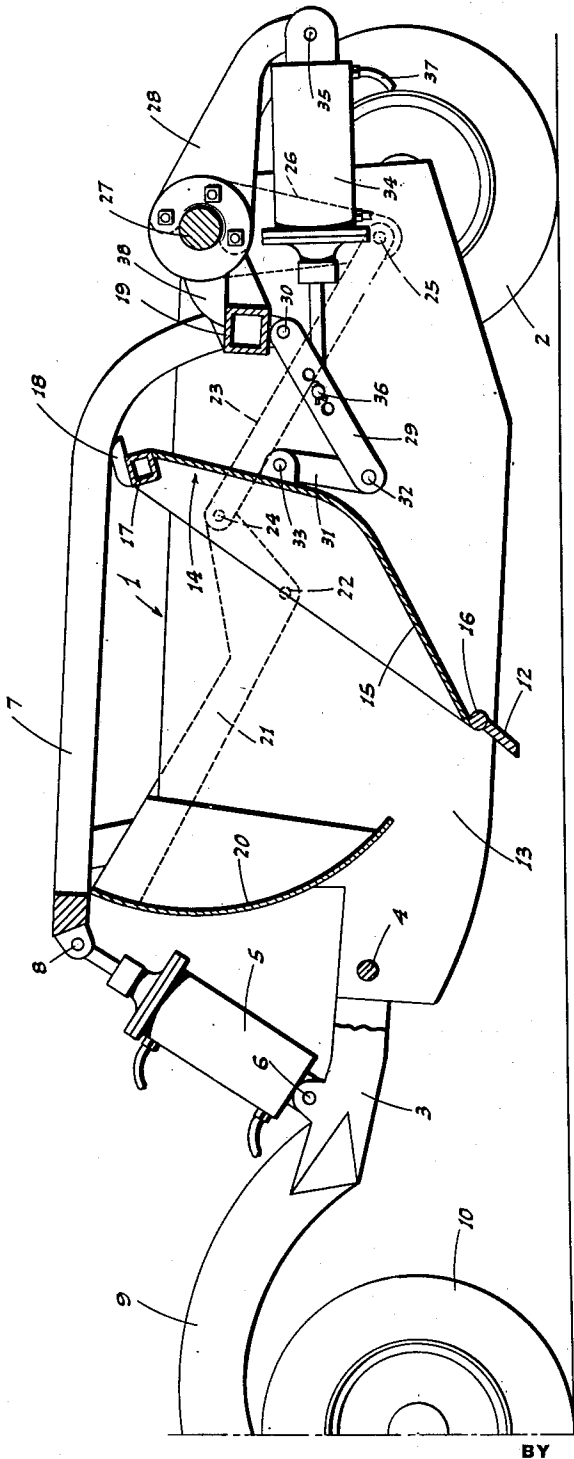
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Fig. 4



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UNITED STATES PATENT OFFICE

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HYDRAULICALLY CONTROLLED APRON AND
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ING SCRAPERS

Donald E. Murray, Modesto, Calif.

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4 Claims. (Cl. 37-126)

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The present invention relates to an improvement in an earth working scraper, of the carry-type, which includes a bowl having a forwardly swingable rear endgate, and a vertically adjustable apron cooperating with said bowl at the front.

The major object of this invention is to provide novel control mechanism for actuating the apron and rear endgate in a predetermined sequence; such mechanism including a single power device under the control of the operator, and connections between said power device, apron, and rear endgate arranged to cause said sequential operation.

Another important object of the invention is to provide control mechanism, as in the preceding paragraph, which may be employed to vertically adjust the apron, either up or down, without moving the endgate, or to vertically adjust the apron to full open position followed by forward swinging of said endgate; the respective purposes of such actions appearing hereinafter.

A further object of the invention is to provide a control mechanism, for the purpose described, which includes a hydraulic power cylinder, the actuating connections for the apron and rear endgate including parts mounted for relative separating motion, and the power cylinder being connected therebetween; the part corresponding to the rear endgate having greater resistance to motion whereby the part corresponding to the apron reacts first to expansion of the cylinder, so that the apron acts ahead of said rear endgate.

A still further object of the invention is to provide a control mechanism, as above, which is relatively simple in structure, being designed for ease and economy of manufacture, but nevertheless sturdy and capable of withstanding the hard usage to which earth working equipment is subjected.

An additional object of the invention is to provide a practical and reliable hydraulically controlled earth working scraper, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the scraper with the bowl raised to carrying position; the front apron being closed and the rear endgate being retracted.

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Fig. 2 is a longitudinal sectional elevation with the parts as in Fig. 1.

Fig. 3 is a similar view, but shows the front apron raised.

Fig. 4 is a similar view, but shows the front apron raised and the rear endgate advanced.

Fig. 5 is a fragmentary rear end elevation showing the cross shaft assembly as employed between the power cylinder and the actuating connections for the front apron.

Referring now more particularly to the characters of reference on the drawings, the earth working scraper which embodies the present invention is of the type which is adapted to dig, carry, and dump earth. Such scraper includes a bowl, indicated generally at 1, supported at its rear end by transversely spaced, pneumatic tire wheels 2, and carried at its forward end by a yoke 3 pivoted, as at 4, to the bowl for up and down adjustment of the latter by means of a double acting, hydraulic power cylinder 5 connected between the yoke at the front, as at 6, and the front of an overhead frame 7, as at 8. The overhead frame 7 is rigid with the bowl 1 whereby the power cylinder 5 is operative to cause raising or lowering of said bowl.

A gooseneck 9 projects in rigid relation forwardly from the yoke 3, being supported by a pony truck 10 adapted to be coupled to a tractor by a draft bar 11.

An earth cutting digging blade 12 extends transversely between the side plates 13 of the bowl 1 at the lower edge of said plates and at a point intermediate the front and rear of said bowl.

A normally retracted but forwardly swingable rear endgate 14, including a bottom portion 15, is disposed between the side plates 13, forming the bottom and back of said bowl; the bottom portion 15 being hinged, as at 16, to the blade 12.

The rear end gate 14 includes, at its rear upper edge, a cross beam 17, and a stop 18 projects rearwardly from said cross beam 17 to normally rest on a main cross beam 19 of the frame structure of the scraper.

A front apron 20 cooperates with the bowl 1 at its front end, such apron being mounted for up and down adjustment by means of side arms 21 in the form of bellcranks; said side arms extending rearwardly along corresponding sides of the bowl exteriorly thereof and pivoted, intermediate their ends, as at 22, to the bowl.

Links 23 are pivoted, at their forward ends, as at 24, to the upper rear ends of the bellcrank-like side arms 21, and thence said links extend at a downward and rearward incline exteriorly of

corresponding sides of the bowl 1 to pivotal lower end connections, as at 25, with the corresponding ends of radial lever arms 26 which are fixed to and depend from a cross shaft 27.

The cross shaft 27 is disposed rearwardly of the main cross beam 19 and is suitably journaled in connection with the frame structure of the scraper.

A third or central, radial lever arm 28 is fixed to the cross shaft 27 and depends therefrom at a generally rearward and downward incline.

Ahead of the central radial lever arm 28, and in substantially the same vertical longitudinal plane, there is a dependent link 29 pivoted at its upper end, as at 30, to the bottom of the main cross beam 19. A connector link 31 extends forwardly and upwardly in pivotal connection between the lower end of the link 29 and a point on the back side of the rear endgate 14; the points of pivoting being indicated at 32 and 33, respectively.

A hydraulic pressure power cylinder, indicated at 34, is pivoted at its rear end, as at 35, to the lower end of the central radial lever arm 28, and is adjustably pivoted at its forward end, as at 36, to the depending link 29. The power cylinder 34 is of double-acting type and is interposed in a valve regulated, fluid pressure conduit system 37. Such conduit system is controlled from the tractor and serves as the medium whereby the power cylinder 34 can be caused to extend or contract selectively and at the will of the tractor operator.

The arrangement of parts is such that the link 29 offers greater resistance to forward swinging motion than the resistance to rearward swinging motion offered by the central radial lever arm 28.

Consequently, upon extension of the power cylinder 34, the central radial lever arm 28 is first to move, and swings rearwardly, swinging the radial lever arms 26 in a corresponding direction, which causes the front apron 20 to be raised.

Dependent upon the degree of extension of the power cylinder 34 the front apron 20 can be adjusted vertically to any point, between fully closed and fully open positions, during loading of the scraper, which loading is accomplished in the usual manner, with the bowl lowered and the blade 12 in ground engagement.

It is thus evident that the front apron 20 can be adjusted in its working position by the power cylinder 34 without any motion being imparted to the rear endgate 14.

When it is desired to unload the scraper; i. e. to dump a load from the bowl 1 over the blade 12 by forward swinging of the rear endgate 14 from its normal position, as in Fig. 3, to its advanced or dumping position, as in Fig. 4, the power cylinder 34 is caused to extend first sufficient to raise the front apron 20 to its full open position, as in Fig. 3, at which time a stop 38 which radiates from the cross shaft 27 abuts the main cross beam 19 on top thereof. This prevents further rotation of such cross beam, and then with continued extension of the power cylinder 34 the link 29 is swung forwardly, and through the medium of the connector link 31 swings the rear endgate 14 between its normal load carrying position, as in Fig. 3, to load dumping position, as in Fig. 4.

While the described control mechanism is relatively simple in its structure, it functions most effectively toward the attainment of selective and

sequential control of the front apron 20 and rear endgate 14.

From the foregoing description it will be readily seen that there has been 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 the invention, the following is claimed as new and useful and upon which Letters Patent are desired:

1. In an earth working scraper having a bowl including a longitudinally movable rear endgate and a vertically adjustable front apron cooperating with the bowl; a control mechanism for the rear endgate and front apron comprising separate actuating connections therefor, the connections for the rear endgate including a link pivotally mounted rearwardly of the bowl for swinging in a forward longitudinal direction, the connections for the front apron including a cross shaft mounted adjacent the rear end of the bowl and having a dependent radial lever arm for swinging in a rearward longitudinal direction, the link having greater resistance to forward motion than the lever arm to rearward motion; and a fluid pressure power cylinder connected between said link and lever arm.

2. In an earth working scraper having a bowl including a longitudinally movable rear endgate and a vertically adjustable front apron cooperating with the bowl; a control mechanism for the rear endgate and front apron comprising separate actuating connections therefor, the connections for the rear endgate including a link pivotally mounted rearwardly of the bowl for swinging in a forward longitudinal direction, the connections for the front apron including a cross shaft mounted adjacent the rear end of the bowl and having a dependent radial lever arm for swinging in a rearward longitudinal direction, the link having greater resistance to forward motion than the lever arm to rearward motion, a fluid pressure power cylinder connected between said link and lever arm, a stop radiating from the shaft, and an abutment fixed with the scraper which the stop engages after predetermined rotation of the shaft in a direction swinging the lever arms rearwardly.

3. In an earth working scraper having a bowl including a longitudinally movable rear endgate and a vertically adjustable front apron cooperating with the bowl; a control mechanism for the rear endgate and front apron comprising a cross shaft journaled on the scraper adjacent the rear end of the bowl, radial lever arms depending from opposite ends of the cross shaft, actuating connections between said lever arms and the front apron adapted to raise the latter when said lever arms swing rearward, a third radial lever arm depending from the cross shaft intermediate its ends and rearward of the rear endgate, a pivotally mounted longitudinally swingable link depending from the frame structure back of the rear endgate, a connection between the link and rear endgate, and a fluid pressure power cylinder coupled between said third lever arm and the link, the link having greater resistance to forward motion than said third lever arm to rearward motion.

4. In an earth working scraper having a bowl

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including a longitudinally movable rear endgate and a vertically adjustable front apron cooperating with the bowl; a control mechanism for the rear endgate and front apron comprising a cross shaft journaled on the scraper adjacent the rear end of the bowl, radial lever arms depending from opposite ends of the cross shaft, actuating connections between said lever arms and the front apron adapted to raise the latter when said lever arms swing rearward, a third radial lever arm depending from the cross shaft intermediate its ends and rearward of the rear endgate, a cross beam in the scraper directly ahead of the cross shaft, a stop radiating from the cross shaft in position to engage the cross beam after predetermined rotation of said shaft in a direction to swing the first named lever arms rearward, a link pivoted to and depending from the

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cross beam, a connection between the link and rear endgate, and a fluid pressure power cylinder coupled between said third lever arm and the link; the link having greater resistance to forward motion than said third lever arm to rearward motion.

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