

Aug. 8, 1961

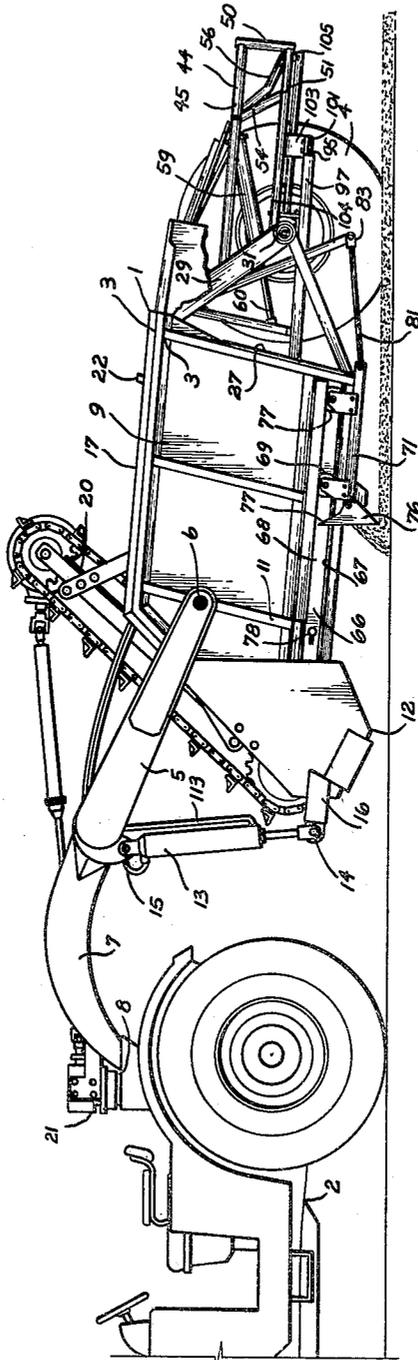
J. E. HANCOCK  
STABILIZER FOR POSITIVE EJECTION MECHANISM  
FOR EARTH MOVING APPARATUS

2,994,976

Filed May 22, 1959

4 Sheets-Sheet 1

**Fig. 1.**



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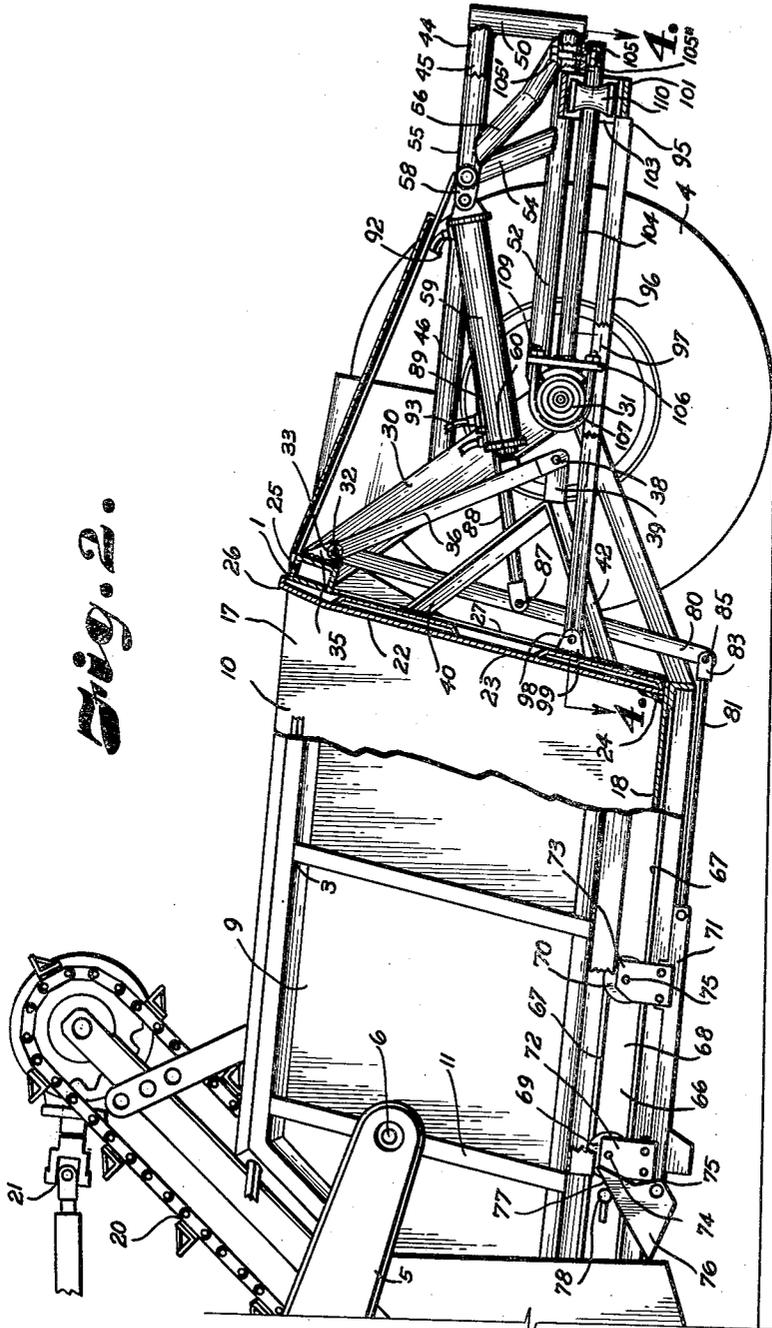


Fig. 2.

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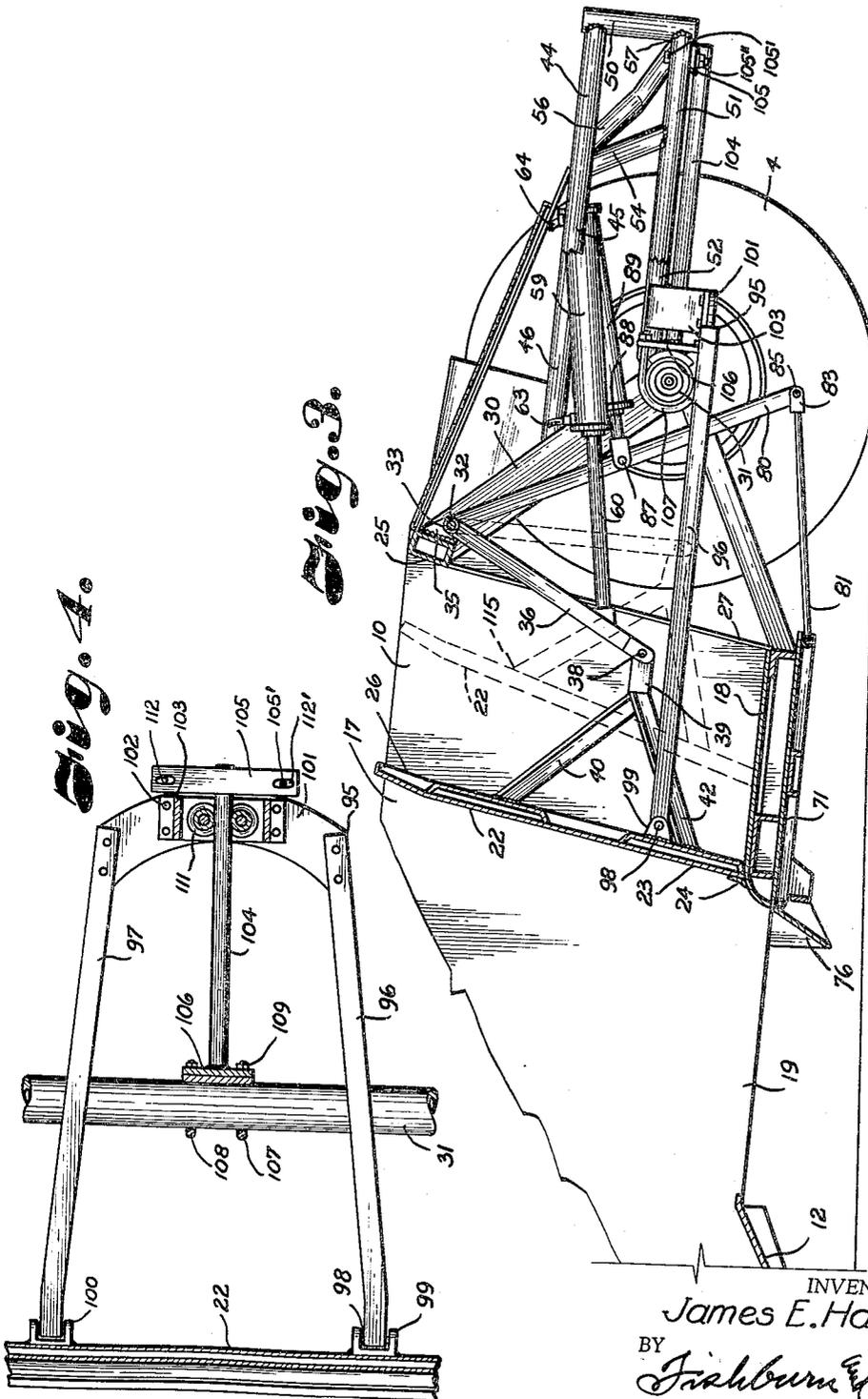
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4 Sheets-Sheet 3



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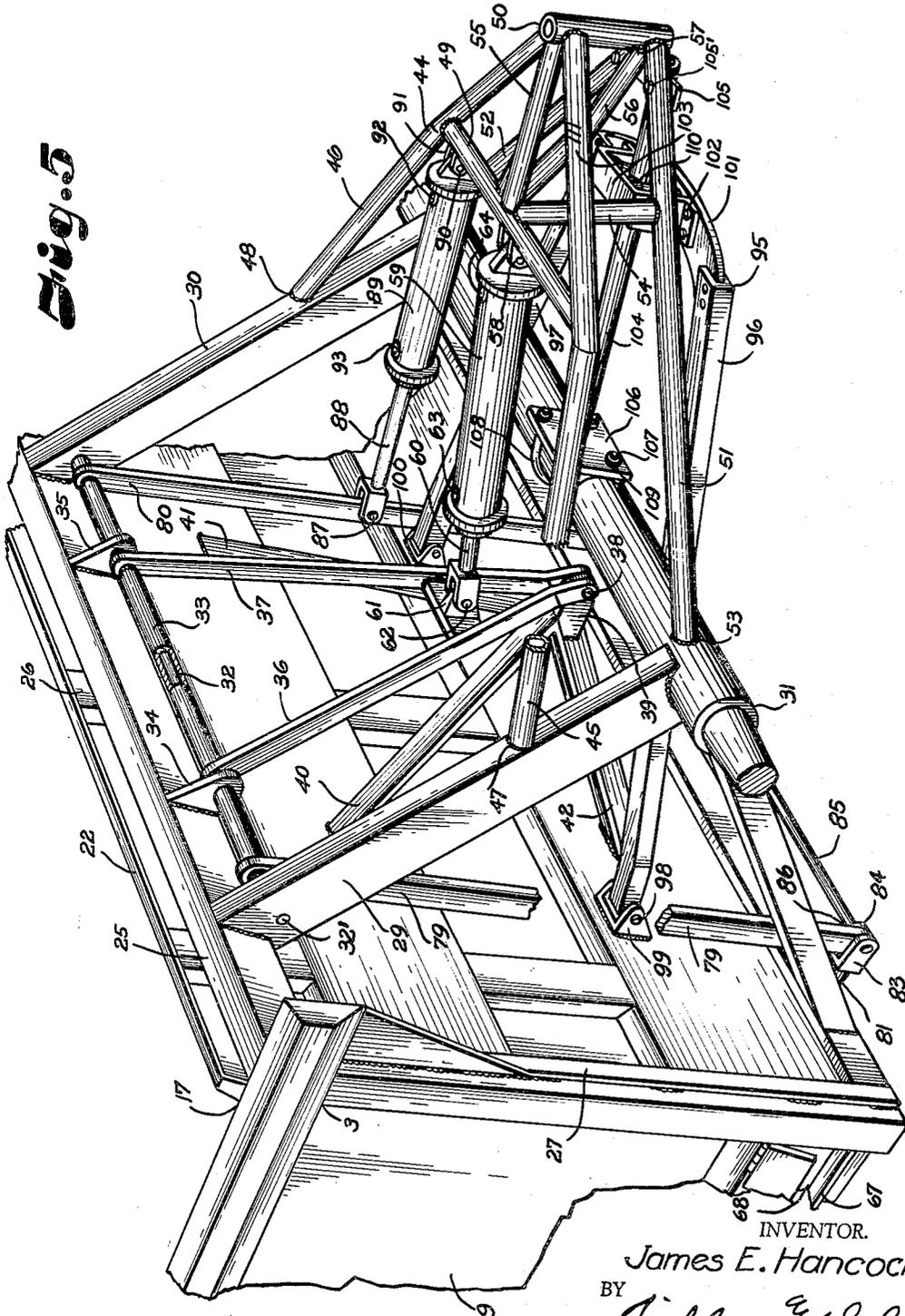
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4 Sheets-Sheet 4

Fig. 5



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2,994,976

**STABILIZER FOR POSITIVE EJECTION MECHANISM FOR EARTH MOVING APPARATUS**

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3 Claims. (Cl. 37-126)

This invention relates to earth handling apparatus, and more particularly to a stabilizing mechanism for forced ejection of the earth from the apparatus through a door opening in the bottom thereof.

This invention is related to that shown in the application of myself and Sylvester D. Fetters, filed April 21, 1958, Serial No. 729,607, the present apparatus being an improvement in stabilizing the mechanism for pushing the endgate or plate forwardly in the body of the vehicle to drop the earth through the door opening in the bottom of the box.

The principal object of the present invention is to provide a stabilizer mechanism traveling on a guide bar horizontally to the rear of the axle and at right angles to the axle and adjustably fastened at the front end to the axle and to the push bar for stabilizing the endgate or ejecting plate which forces the earth through the door opening in the bottom of the box.

Other objects of the present invention are to provide arms pivotally mounted in spaced relation laterally on the endgate structure and having their rear ends connected and adjustably secured to the guide bar for taking the stresses that are applied to the endgate as it moves the earth forwardly in the box and hold it in alignment transversely of the box.

Further objects of the present invention are to provide means for securing a guide bar to the rear of the axle; to provide a framework structure rearwardly of the axle and frame of the earth carrying vehicle including a push bar; to provide rollers engaging the guide bar to stabilize the mechanism as it moves forwardly to move the dirt forwardly in the box; and to provide a device of this character simple and economical to manufacture.

In accomplishing these and other objects of the invention I have provided improved details of structure, the preferred forms of which are shown in the accompanying drawings, wherein:

FIG. 1 is a side view illustrating my stabilizer attached to earth handling apparatus which in turn is drawn by a tractor or the like.

FIG. 2 is a fragmentary side view illustrating the stabilizer mechanism as the pusher mechanism starts to push the endgate forwardly to move the earth in the box.

FIG. 3 is a fragmentary side view particularly illustrating the stabilizing mechanism as the endgate is moved forwardly in the box.

FIG. 4 is a sectional view through the stabilizer mechanism taken on a line 4-4, FIG. 2.

FIG. 5 is a fragmentary perspective view particularly illustrating the ejection mechanism and the stabilizer mechanism attached thereto, the gate being in closed position.

Referring more in detail to the drawings:

1 designates a trailer type implement propelled by a tractor 2 with a power or drive connection from the tractor to operating parts on the trailer implement for driving the same. The trailer type implement is an elevating scraper or earth moving apparatus having a frame 3, the rear end of which is supported by ground engaging wheels 4. The forward end of the frame has a pair of arms 5 pivotally connected thereto as at 6, and having arms extending forwardly and terminating in a gooseneck 7 having a draft coupling at its forward end as indicated at 8.

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The frame includes side wall members 9 and 10 having the usual uprights and standards as disclosed in application Serial No. 729,607. Extending from the forward portion of the frame slightly forward of the front standard 11 is a scraper blade 12 extending between the sides and transversely of the trailer unit and a hydraulic extensible member 13 has its ends 14 and 15 connected to the side extension members 16 and arms 5, respectively, in spaced relation to the pivot 6 whereby the extension of the extensible member 13 moves the side members 16 with the blade 12 and thus the forward end of the trailer type implement downwardly relative to the arms 5 to engage the scraper blade 12 with the ground. The sides 9 and 10 of the framework structure comprise a box 17 having a fixed bottom 18 covering substantially one half of the box with an open front portion 19 for a purpose hereinafter described. The mechanism thus far described is substantially the same as that described in application Serial No. 729,607.

Mounted in the front end of the frame of the box structure is a conveyor element 20, the construction and operation of which is the same as that shown in application Serial No. 729,607, and the tractor may be the wheel or track type suitable for propelling the scraper and having a power take-off and gearing mechanism as indicated at 21 for operating the elevator mechanism. This structure is not shown in detail but is shown in the James E. Hancock application for patent, Serial No. 715,713, filed February 17, 1958, now Patent No. 2,931,451.

A quadrangular endgate or ejector plate 22 is provided for movement fore and aft within the box 17 and comprises the rear of the box when the endgate is in the rearmost position as illustrated in FIG. 2. The lower edge of the endgate is tapered slightly downwardly as indicated at 23 and has a reinforcing plate on the front plate 24 on the front edge for engaging along the floor or bottom 18 of the box. The frame includes a cross member 25 at the uppermost rear end, and when the endgate is in its rearmost position the upper portion 26 of the endgate rests thereagainst as best illustrated in FIG. 2. The side edges of the endgate will engage against the uprights 27 at each rear corner of the frame when the endgate is in its rearmost position.

Braces 29 and 30 are provided for the rear end of the frame structure and the upper ends are welded or otherwise suitably secured to the cross brace 25 and their lower ends welded or otherwise suitably secured to the axle 31 of the vehicle. A shaft or rod 32 is provided having its respective ends 32' mounted in the upper ends of the braces 29 and 30. A sleeve 33 is mounted on the rod 32, and supporting brackets 34 and 35 are provided on the cross member 25 through which the rod is inserted for giving stability to the mechanism. Rigidly mounted to the sleeve 33 on the inside of the brackets 34 and 35 by welding or other suitable means are actuating arms 36 and 37 extending downwardly and inwardly and pivotally connected by a pin 38 to a bar or bracket 39. The bar or bracket 39 has inwardly and upwardly diverging arms 40 and 41 having their ends rigidly secured to the upper portion of the endgate in spaced relation, and outwardly and downwardly extending arms 42 having their outer ends rigidly secured to the lower portion of the endgate in spaced relation, as best illustrated in FIG. 5, so as to distribute the forces on the endgate for moving the same in the box as will later be shown.

A substantially pusher U-shaped frame structure 44 has its free ends or side arms 45 and 46 rigidly secured to the diagonal braces 29 and 30 as indicated at 47 and 48. A cross bar 49 connects the side arms 45 and 46, and the rearward end of the U-shaped frame 44 is rigidly connected to a post 50 extending vertically downwardly and has side braces 51 and 52 extending forwardly, and which

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are rigidly connected as at 53 to the rear of the axle 31. Stabilizing posts as indicated at 54 extend between the side braces 51 and 52 and the cross arm 49, and a rod 55 extends rearwardly from the cross arm 49 to the vertical post 50, as best illustrated in FIG. 5. Also extending from the cross arm 49 underneath the rod 55 is a brace 56 extending to and rigidly secured to the upright post 50 as indicated at 57.

Pivotally mounted to forwardly extending ears 58 on the cross member 49 is one end of a double acting hydraulic cylinder 59 having a piston rod 60 pivotally connected to an ear 61 by a pin or the like 62 mounted between the arms 36 and 37. Fluid lines 63 and 64 are attached to the cylinder on each side of the piston and run to a source of fluid supply of the tractor as is the usual practice. This fluid supply may be from the fluid supply of the tractor or may be independently carried by the trailer mechanism if desired.

The frame of the box structure includes horizontal lower side members 66 which are of angle shape having outwardly extending portion 67 forming trackways 68 for pairs of rollers 69 and 70. The forward portion of the box is provided with a movable bottom 71, and spaced from each end of the closing door 71 on each side thereof, and suitably secured thereto by welding or other suitable means are upstanding brackets 72 and 73 for receiving short shafts 74 and 75 for mounting of the rollers 69 and 70. It will be obvious the brackets 72 and 73 are near the respective front and rear edges of the side edges of the movable bottom 71 to support the movable bottom which is slidable underneath the fixed bottom 13, as illustrated in FIG. 1.

Hinged to the forward edge 75 of the movable bottom 71 is a strike-off blade 76 for leveling of the earth material as it drops from the door in the bottom of the box as hereinafter shown. Integrally formed or otherwise suitably secured to the outer ends of the strike-off blade 76 are horns or cam arms 77 for engaging a stop or cam lug 78 (FIG. 2) secured to the sides of the box so that when the door is moved forwardly the horn or cam will strike the stop or lug and the strike-off blade will be moved to a horizontal position as the bottom door moves forwardly to closed position (FIG. 2). The structure of the movable door is substantially the same as that shown and described in application Serial No. 729,607.

Welded or otherwise rigidly secured near the outer ends of the sleeve 33 and inside the braces 29 and 30 are downwardly extending arms 79 and 80. Extending rearwardly near each side of the closing door 71 are rods or bars 81 having ears 83 and 84 on the rear ends to which are pivotally secured by a rod 85 the lower ends of the arms 79 and 80, as illustrated at 86 (FIG. 5). Pivotally attached to the arm 80 by a pin 87 is the end of a piston rod 88 of a double-acting hydraulic cylinder 89 having its other end pivotally secured by a pin or the like 90 to ears 91 secured to the cross arm 49 of the framework structure. The cylinder has line connections 92 and 93 for supply of fluid to the cylinder on each side of the pistons from the source of supply, the same as described in connection with the cylinder 59, for the purpose of operating the cylinder or extension member 89 to move the sliding door to open and closed positions.

The stabilizing apparatus now to be described includes a substantially U-shaped member 95 having side arms 96 and 97 extending underneath the axle 31 and having their forward ends pivotally attached by pins or the like 98 to rearwardly extending ears 99 and 100 rigidly secured to the rear side of the endgate 22, also as best illustrated in FIG. 5, the connection of the arms to the endgate being spaced apart to stabilize the pressure exerted on the door, as will later be seen. The arms 96 and 97 are connected at the rear end by a flat bar 101 to which is attached by bolts or the like 102 a U-shaped bracket 103.

A guide bar 104 having a cross member 105 suitably

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secured to its rear end is adjustably secured to the side braces 51 and 52 by bolts 105' and nuts 105'' and its forward end is rigidly secured to a plate 106 provided with spaced U-bolts 107 and 108 having nuts 109 for engaging around the axle 31 to adjustably attach the guide bar to the axle. Mounted on the plate 101 in the bracket 103 by pins or other suitable means are spaced cone rollers 110 and 111 for engaging on either side of the guide bar 104. The cross bar 105 mounted on the rear end of the guide bar 104 is provided with elongated openings or slots 112 and 112' adapted to receive the lower ends of the bolts 105' extending from the side braces 51 and 52 as shown in FIGS. 2 and 4. The cone rollers carry the stabilizer back and forth along the guide bar to take the stresses that are applied to the endgate that moves the dirt forwardly in the box.

In operation of a device constructed and assembled as described, movement of the tractor will propel the scraper to a location where the scraper is to be lowered. Fluid from its source of fluid pressure and through controls on the tractor is transmitted through fluid lines 113 to the extension member 13 for extending the same to move the forward portion of the frame of the scraper downwardly to cause the scraper blade 12 to contact the earth to be moved. Movement of the tractor will cause the scraper to pass the earth over the scraper blades and by the conveyor 20 the earth is further moved into the box of the scraper. Prior to this operation the movable bottom 71 will be moved forwardly and close the opening at the forward portion of the box so that the blade will cause the dirt to move to the elevator and then to the box. Operation of the conveyor is through mechanism substantially the same as that shown in application for patent Serial No. 715,713.

When the scraper is loaded the front end of the box and frame is again raised. When the scraper arrives at the point of unloading of the earth material operation of the controls on the tractor will retract the piston 88 in the cylinder 89 to move the movable bottom member or door 71 rearwardly by movement of the rollers 69 and 70 on the trackways 68 on the outside of the frame structure as heretofore illustrated. On movement of the movable bottom member door 71 rearwardly, the strike-off blade 76 will drop downwardly by gravity and also aided by the weight of the material thereon to a vertical position as shown in FIG. 1 where it will remain in a vertical position to spread the dirt or earth material delivered from the box as the trailer moves forwardly.

The movable bottom member or door 71 is moved rearwardly a sufficient distance to allow the dirt to drop through the opening 19 in the bottom of the box. Through manipulation of the controls on the tractor, the piston 60 in the cylinder 59 is extended therefrom to move the endgate 22 forwardly in the box to eject the earth material left remaining in the rear of the box through the door opening 19. At this point the endgate will be in the position shown in FIG. 3. The movable bottom or door 71 may be retracted entirely before movement of the endgate or pusher plate forwardly or timing mechanism (not shown) may be utilized for starting movement of the endgate forwardly in timed relation to rearward movement of the trap door if desired. The reverse movement of the pistons in the cylinders will retract the endgate to its loading position and move the trap door and strike-off blade 76 forwardly for reloading.

During the forward movement of the endgate in the box, the U-shaped member 95 will move forwardly with the endgate and the cone rollers 110 and 111 will engage the guide bar 104 and through the arms 96 and 97 will cause the endgate to move forwardly in the box evenly and prevent one side of the endgate from moving faster than the other or to get slantwise in the box due to more dirt being on one side of the box than on the other, if this should occur.

The guide bar 104 may be adjusted horizontally to

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 suit the pushing mechanism of the endgate by loosening of the nuts 109 on the U-shaped bolts 107 and 108 to adjust the plate 106 laterally with respect to the axle. The rear end of the guide bar 104 may be adjusted laterally by loosening of the nuts 105" and horizontal movement of the cross bar 105 for a distance provided by the slots with respect to the bolts 105' on the side braces 51 and 52.

When the endgate is in its forwardmost and rearmost position it will be in substantially the same vertical position as shown in FIGS. 2 and 3, but during the travel forwardly when the arms 36 and 37 are in a position as shown in dotted lines in FIG. 3 at 115, the endgate 22 will be slanted slightly backwardly at the top, but this does not interfere in any way with the operation of the structure to move the earth forwardly in the box.

It will be obvious from the foregoing that I have provided an improved stabilizer mechanism for a positive ejection mechanism for earth moving apparatus which may be utilized to prevent disalignment of the positive ejection mechanism or endgate illustrated and shown.

What I claim and desire to secure by Letters Patent is:

1. A stabilizing and actuating mechanism for a movable quadrangular endgate of a scraper box carried by a main frame of a mobile structure having an axle, comprising a pusher frame structure extending rearwardly of the axle, a U-shaped member having side arms traversing said axle and with their forward free ends laterally spaced and pivotally connected to said endgate and their other ends extending rearwardly of said axle and converging towards each other, means connecting said converging ends of said side arms in lateral spaced relation to each other, a guide bar having one end connected to said axle and its other end connected to said pusher frame structure rearwardly of said axle, means on the rear end of said U-shaped member engaging said guide bar and mov-

able therealong for guiding said endgate, upper and lower pairs of transversely spaced arms fixed to the endgate at points spaced from the four corners thereof and projecting rearwardly in converging relation both in a horizontal and vertical plane, a bracket rigidly secured to the converging ends of said arms, a shaft rotatably mounted on the upper portion of said main frame adjacent the rear end of the scraper box, actuating arms having one end rigidly secured to said shaft in spaced relation and having their other ends converging and pivotally connected to said bracket whereby said endgate is bodily swingable about said pivotal connection, extensible actuating means disposed in vertical alignment with said guide bar and having one end pivotally connected to said actuating arms adjacent said bracket and the other end pivotally mounted on said pusher frame structure whereby extension of said actuating means will cause the actuating arms to move in an arc about an axis transversely of the forward and rearward path of travel of the endgate in said box and whereby the endgate will change its inclination relative to a vertical plane extending transversely of the scraper box.

2. The stabilizing and actuating mechanism as defined in claim 1 wherein said guide bar has one end adjustably connected to said axle and its other end adjustably connected to said pusher frame structure rearwardly of said axle.

3. The stabilizing and actuating mechanism as defined in claim 1 wherein said extensible actuating means is hydraulically operated.

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