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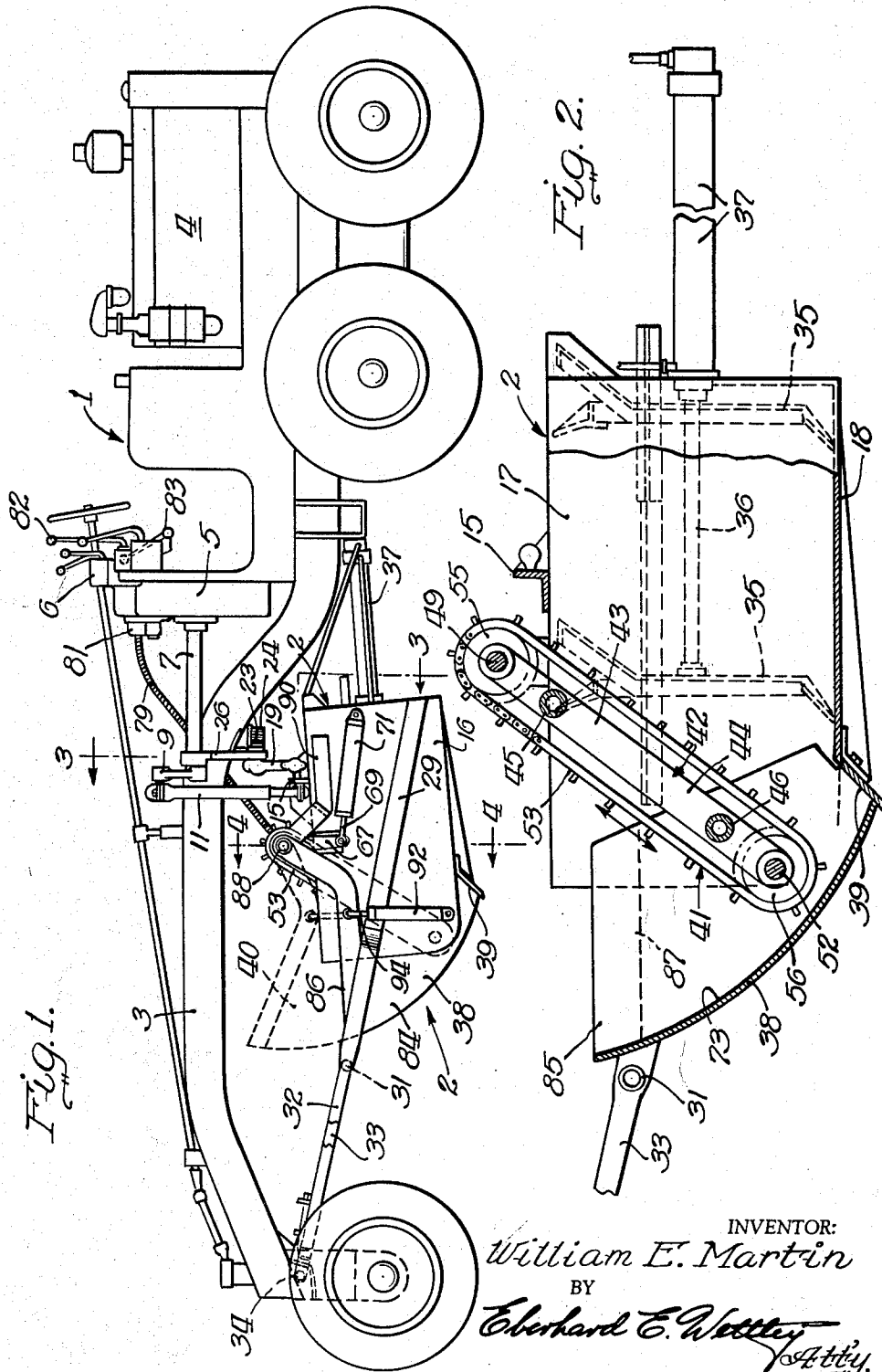
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3,170,254

SUSPENDED ELEVATOR SCRAPER ATTACHMENT

Filed Aug. 23, 1962

3 Sheets-Sheet 1



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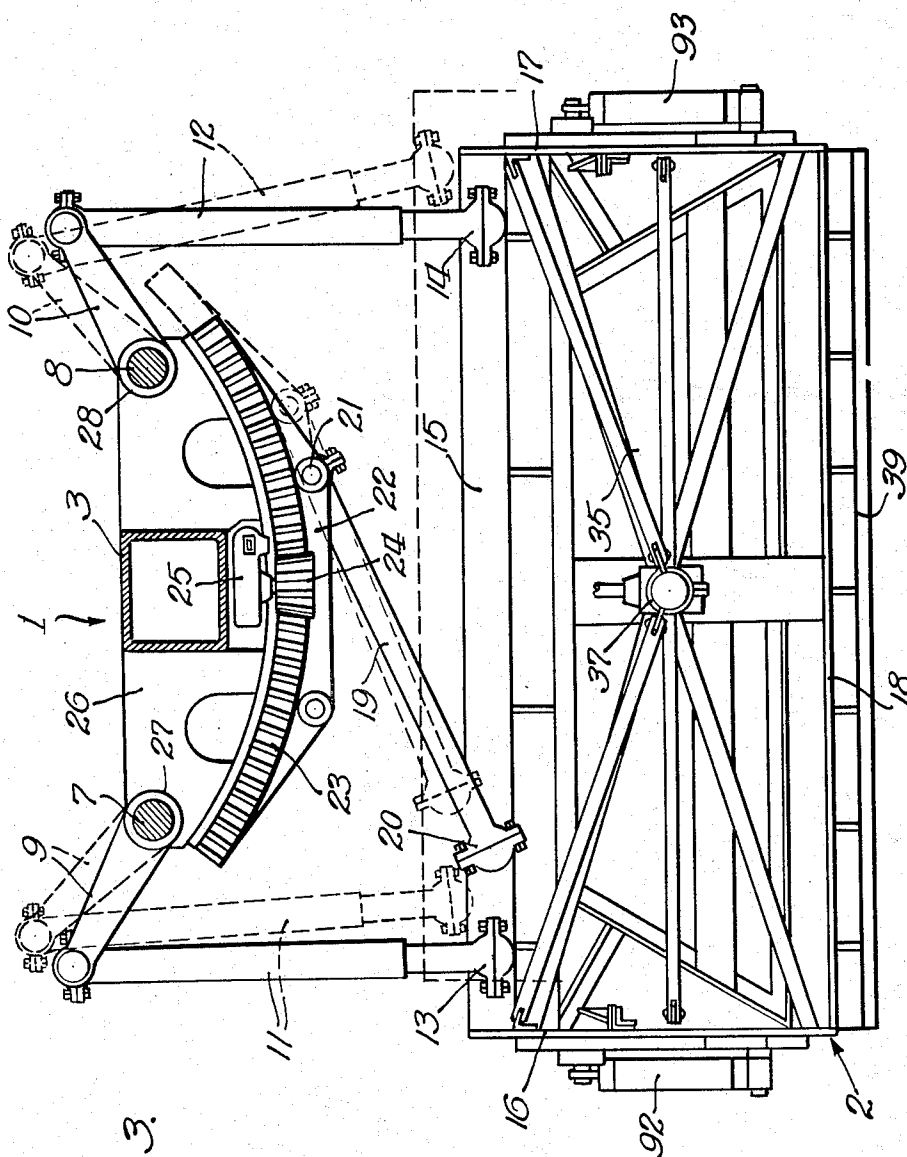


Fig. 3.

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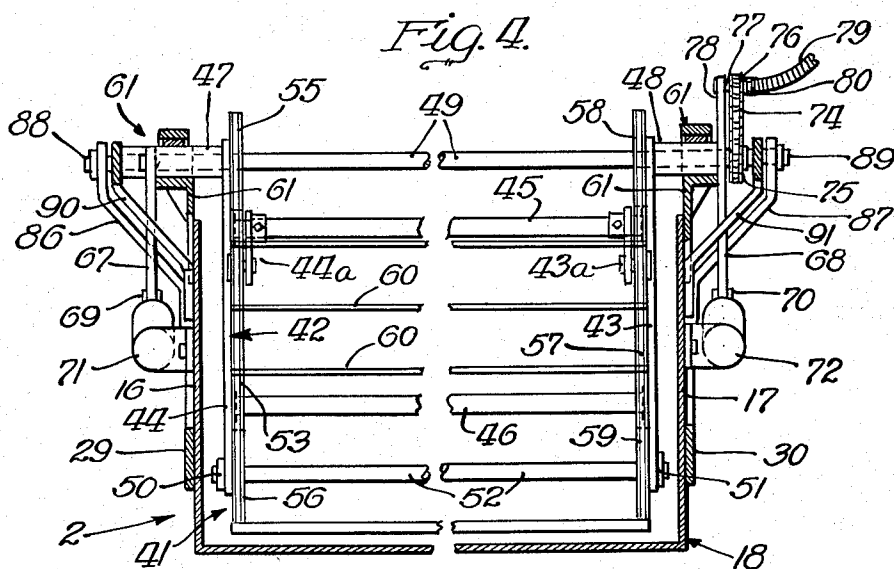
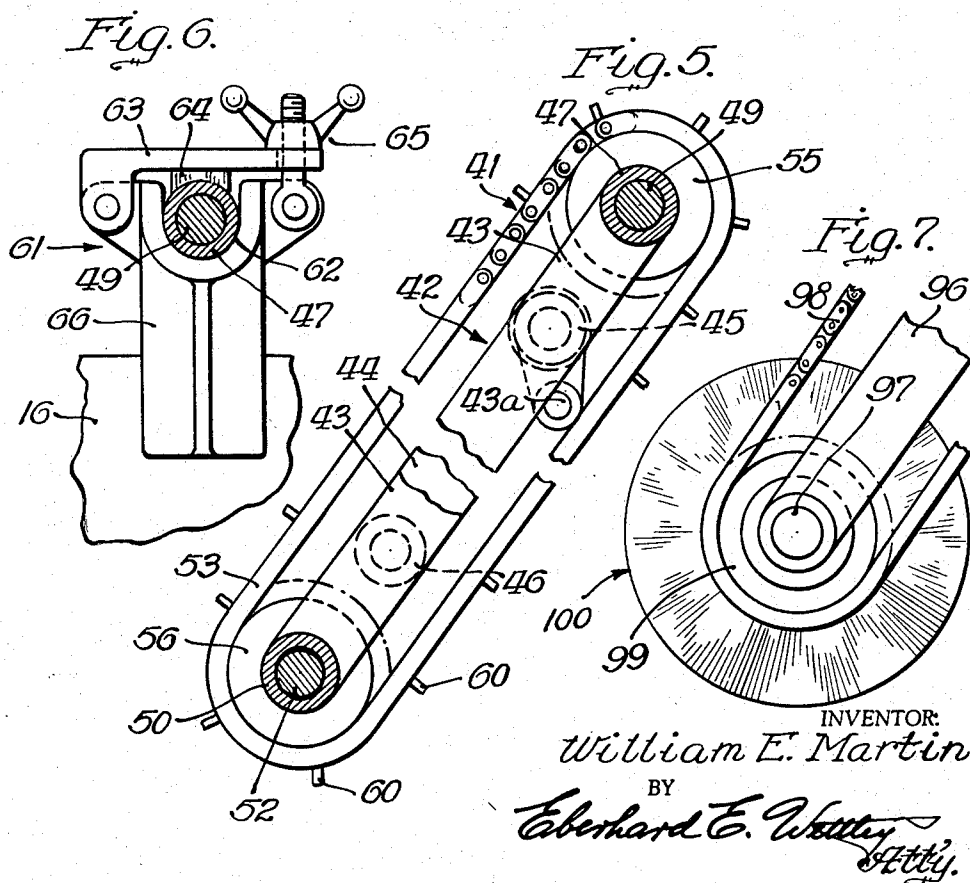
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3,170,254

SUSPENDED ELEVATOR SCRAPER ATTACHMENT

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11 Claims. (Cl. 37—8)

This invention relates generally to a scraper or bowl assembly devised for attachment with a conventional form of road working vehicle such as a grader from which the scraper blade has been removed.

More specifically, the invention concerns the use of an accessory scraper bowl with an elevator, the scraper being made for ready attachment with a frame portion of a grader and which attachment is provided with various means to bodily control its position relatively to the frame of the grader to perform its functions and to engage the surface of the earth in certain selected angular positions with respect to the common supporting surface disposed under the wheels of the grader.

One of the objects of this invention is to provide a scraper assembly subject to suspension from a vehicle frame including power means connectible with power takeoff devices on said vehicle to regulate the positions of the scraper and to provide the scraper bowl with a conveying elevator in the scraper bowl to enhance the flexibility of operation of an accessory attachment device of this nature.

Another object is to provide a scraper bowl equipped with an earth ejecting blade and a hood, wherein a conveying mechanism is used in combination as an elevator to efficiently complement the handling of materials into and out of the scraper bowl.

A further object is to provide suitable supporting bearing mechanisms on the scraper bowl for the ready assembly of the elevator unit into the bowl and for the removal of the conveying means to interchangeably accept another mechanism adapted to a different use, as a sweeper assembly for the scraper bowl.

And another object is to provide a scraper bowl of the character noted with a power driven sweeper unit that cooperates with the bowl to clean up various areas under regulation by the same or similar arrangements employed to drive and operate the elevator assembly. Obviously, the sweeper is a brush arrangement subject to the controlled regulation and bodily movements of the scraper bowl, and in this respect, the brush receives its operative manipulations as to placement through the same means that operates the scraper bowl.

Other objects and advantages shall hereinafter appear in or become apparent from the following detailed description of the invention having reference to the accompanying drawings forming a part of this specification.

In the drawings:

FIG. 1 is a side elevational view of the present invention of a suspended elevator scraper attachment with the scraper being carried by a frame portion of a conventional road grader;

FIG. 2 is an enlarged side elevational view of the scraper bowl per se, partially broken away and in section, to show certain operational details of the construction of this assembly;

FIG. 3 is a vertical transverse cross sectional view taken through the motor grader frame substantially along the plane of the line 3—3 in FIG. 1 with the rear of the scraper bowl and its associated mechanisms shown in elevation and with certain other operative parts thereof indicated in section for the sake of clarity;

FIG. 4 is another vertical cross sectional view through the scraper proper taken crosswise substantially in the plane of the line 4—4 in FIG. 1 to illustrate certain details of construction thereof that are more or less diagrammatically shown;

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FIG. 5 is a detailed side elevational view of the conveyor mechanism per se;

FIG. 6 is a detailed view of one of the bearing units mounted on a side wall for the scraper bowl to releasably orient and hold one portion of the conveyor assembly in operative relation within the scraper bowl;

FIG. 7 is a fragmentary side elevational view of an assembly for interchangeable use with the conveyor and which provides a cleaning arrangement including a power driven brush to coact with the scraper bowl and its working mechanisms.

In the construction herein illustrated and described, conveying means is cooperatively added to the scraper bowl of a vehicle to greatly enhance the flexibility of action of the scraper to expand its operative features, the conveying means comprising an elevating conveyor carried by the bowl itself, this bowl in this instance being one that is bodily movable independently of the vehicle to which it is attached. The scraper bowl is attached to a vehicle, such as a motor grader, by suitable swinging link structures rendered operative by power takeoff means on the grader, and the elevating conveyor is used in conjunction with the bodily movable bowl and also receives its power through suitable drive connections from power sources supplied by the vehicle carrying the entire newly devised assembly.

For further information and for greater detailed description of the bodily movable scraper bowl and its general operation and construction, reference may be had to the Cecil L. Elenburg application, Serial No. 715,918, filed February 18, 1958, now Patent 3,052,049, which is directed to Earth Moving Devices.

Referring to the drawings, FIG. 1 illustrates a representative assembly of an earth working vehicle incorporating the flexibly suspended scraper mechanism embodying the elevating equipment of the present invention. The scraper provides a device which may readily be attached to or detached from conventional grading equipment like the wheeled type graders used in road working or for earth moving operations of various kinds.

The mobile unit in FIG. 1 more specifically comprises a motor grade 1 from which the conventional blade has been removed to permit attachment of the scraper assembly 2 to the frame 3 of this type vehicle. The grader 1 has its usual power plant or engine 4 and by suitable transmission means the engine is connected with a power takeoff or gear mechanism 5 that drives various means under the control of the control lever box assembly 6 placed within the operator's reach.

Mechanism 5 provides rockable shafts 7 and 8 with cranks 9 and 10 that normally are used for suspension of the blade, but in the present structure, links such as 11 and 12 are swingably connected with the crank ends and include universal joints 13 and 14 connected with a frame bar 15 secured to the opposite sides 16 and 17 of the scraper bowl 18 as best shown in FIG. 3. A further link 19 has a universal connection at 20 with bar 15 and angles upwardly transversely for a swingable connection at 21 with a rockable auxiliary frame 22. Frame 22 has an arcuate rack 23 driven by a pinion 24 connected with the shaft of a driving unit 25, rack 23 and frame 22 being guided by a fixed baffle unit 26 that is secured to the vehicle frame 3 and which provides outboard bearings 27 and 28 for crank shafts 7 and 8.

As a further link and suspension means, the bowl 18 has a suitable tow assembly comprising, for example, side bars 29 and 30 fixed to the sides 16 and 17 of the bowl 18, one or more cross braces 31 and one or more hitch bars such as 32 and 33 that connect with a suitable universal joint arrangement at 34 mounted on the forward end of frame 3.

With this link suspension arrangement, the bowl may

be vertically lowered or raised at each side by links 11 and/or 12. The bowl may be laterally displaced by the link 19, while any combination of adjustment may be had with the manipulation of the described links to cant the bowl into various angular relations with respect to the vehicle and in respect to the surface lying under the vehicle. The tow assembly 29 to 34 is rockable with respect to the frame of the vehicle and is readily responsive to the manipulations of the scraper bowl by the links 11, 12 and 19 while providing the pulling force for the bowl.

Bowl 18 is further provided with an ejector blade 35 guided in the bowl and operated by a push rod or piston rod 36 from a double acting hydraulic cylinder 37. The front open end of the bowl 18 is selectively opened and closed by means of a dirt or material retaining hood 38 swingable about a predetermined axis from a fully closed position in contact with a material engaging bowl blade 39 to some open position such as shown in broken lines at 40 in FIG. 1. The hood may be held at various positions with respect to blade 39 to obtain different loading or unloading conditions with respect to the bowl and in cooperation with the ejector blade, etc.

To increase the workable operation of the scraper bowl by further material control, particularly when loading or unloading the bowl material, a conveying mechanism 41 is mounted upon bowl 18 to function in the scoop like hollow of the bowl aiding the passage of material into the bowl or out of such bowl area.

The conveying mechanism 41 comprises a conveyor supporting frame 42 providing spaced side panels 43 and 44 connected by suitable cross braces 45 and 46. The frame 42 has suitable spaced bearing elements or frame hubs 47 and 48 for the upper conveyor shaft 49 and bearing elements or frame hubs 50 and 51 for the lower conveyor shaft 52.

Chain 53 passes over sprockets 55 and 56 on shafts 49 and 52 at one side of the bowl, while a companion chain 57 passes over sprockets 58 and 59 at the other side of the bowl. Suitable cleats 60 or cross angles or the like are connected between the chains 53 and 57 to provide conveying elements to pass through the bowl 18 in a direction depending on the direction of drive of the conveyor mechanism. Frame 42 also carries suitable chain tightening or adjusting means 43a and 44a for each chain 53 and 57.

The whole conveyor is swingably supported upon spaced bowl mounted bearing means 61 of the kind shown in FIG. 6. Each such bearing means provides an upwardly open seat 62 to releasably receive the upper frame hubs 47 and 48 respectively, and in FIG. 6 hub 47, these bearing means forming the swingable supporting arrangement for the entire conveyor mechanism. A pivoted closure arm 63 carries an overhead bearing block 64 and a swivel screw unit 65 holds the arm and block down upon the upper portion of the conveyor frame hub to orient such hub portion in the bearing. A suitable bracket 66 secures the bearing unit to one of the bowl sides.

With this bearing arrangement the elevator conveyor may be readily installed in the bowl or removed therefrom as conditions warrant such procedures. Other interchangeable material handling assemblies may be associated with the bowl through this provision of the bearing units described.

The angularity of the elevator conveyor relatively to the bowl is controlled by means of crank arms such as 67 and 68 fixedly connected with or forming portions of the hubs 47 and 48. These crank arms are acted upon by piston rods 69 and 70 of the hydraulic cylinders 71 and 72 mounted to pivot on the bowl sides. Thus, movement of the crank arms by the cylinders swings the conveying mechanism on the bearing units 61 causing the free end of the conveyor to describe a certain arc through the front end of the bowl mouth and along the interior of

the hood. The forward hood wall 73 is formed concentric with respect to the axis of shaft 49 of the conveyor to permit the free conveyor end to operate within the hood and out of the open mouth of the scraper bowl as best seen in FIG. 2.

The drive to the conveyor 41 may be made by means of a hydraulic motor or by means of a suitable flexible drive arrangement using articulated shafts universally connected or by means of a suitable flexible cable drive such as shown in FIG. 4. On the right end of shaft 49 in FIG. 4, a chain 74 connects a sprocket 75 on shaft 49 with another sprocket 76 on a shaft 77 supported on an upright projection 78 on bearing means 48. A flexible drive cable means 79 is joined through a coupling 80 to drive sprocket 76 and through chain 74 and sprocket 75 to drive the upper shaft 49. The cable means 79 is connected through a junction box 81 to receive driving power from the power gear mechanism 5. A lever such as 82 provides a speed control and another lever such as 83 is to run the conveyor forward or in reverse as desired by the operator.

Hood 38 forms a three sided enclosure comprising the front curved hood wall 73 with two space side wings 84 and 85 that closely flank the side walls 16 and 17 of the bowl 18. The hood 38 is carried and controlled in its movements by arms 86 and 87 that are pivotally supported on stub shafts 88 and 89 on brackets 90 and 91 secured at opposite sides of the bowl 18 on the walls 16 and 17 thereof. Shafts 88 and 89 are coaxial with respect to each other and also coaxial with respect to the axis of the upper conveyor shaft 49.

Power cylinders 92 and 93 have their respective piston or ram rods 94 and 95 connected with intermediate portions of arms 86 and 87 to open or close the hood or to place it into positions selected by an operator to carry material distribution according to the particular action demanded.

With the coaxial supporting arrangement described for the conveyor and hood, relative movements between these units may be easily and readily accomplished as gathered from the disclosure in FIG. 2. The free end of the conveyor 41 can sweep toward and away from blade 39 of the bowl and in relation to the open scoop end of the bowl, while the hood 38 may be actuated and held in various positions from fully closed to fully open independently of the conveyor action or the position assumed by the latter.

The elevator used in cooperation with the scraper bowl is readily removable through the releasable bearing arrangements 61 of the character shown in FIG. 6. As an alternative or substitute means or conversion assembly for the bowl to adapt the latter to a different operative use, the device shown in FIG. 7 can change the bowl to a cleaning facility. This unit is a rotary brush sweeper wherein a frame 96 carries spaced shafts, one being shown at 97, and a chain and sprocket drive such as 98 and 99 is used to rotate the brush 100. The frame 96 is made similar to frame 42 subject to swinging motion and hydraulic cylinder control to carry out the cleaning functions.

The foregoing description relates to one preferred construction adapted to carry out the inventive concept disclosed. It is contemplated that certain changes may be made in the associated elements or in the combinations thereof without departing from the fundamental scope of the invention. The extent of such modifications and changes shall, however, be governed by the breadth and scope of the appended claimed subject matter directed to the suspended elevator scraper attachment of the present invention.

What I claim is:

1. In an earth working vehicle having a frame and power means, in combination, a scraper bowl, spaced individual swingable link elements on said bowl having rockable connections with said frame to suspend opposite

sides of the bowl for individual vertical bodily movement relatively to said frame, certain of said link elements having connection with said power means to provide regulatory mechanism for selectively and angularly adjusting the scraper bowl transversely relatively to the frame and with respect to the surface of the ground, said scraper bowl comprising a forwardly open material scoop having a material ejecting blade mounted within the body of the scoop for fore and aft movement therein, and a material conveyor carried by said bowl at the open end thereof and ahead of the maximum forward position of said ejecting blade, said ejecting blade and said conveyor providing cooperative means to load and unload the scraper bowl material during the operation of the vehicle.

2. The apparatus of claim 1 with the addition of a movable closure hood located at the open end of the scoop beyond the ejector blade and ahead of the conveyor location, said hood coacting with the scoop to fully close the open end thereof and to provide various degrees of opening at this scoop end, and power means connected with said hood to actuate the same relatively to the scoop.

3. A scraper assembly for attachment with an overhead frame of a road working vehicle comprising an earth handling bowl, and supporting links having universal elements connected with said bowl including further universal means to suspend said bowl from said vehicle frame for free bodily movement of the bowl in pendulum fashion independently of said vehicle frame, said bowl having an earth elevator mounted thereon for bodily movement directly with said bowl independently of said frame of the vehicle, said elevator comprising means to augment the loading and unloading of said bowl during operative vehicle earth working conditions, said earth elevator comprising a framework structure carrying conveying mechanisms and including supporting elements on said framework structure at one end thereof, said bowl having bearing units thereon to accept said supporting elements for the swingable mounting of the framework structure with respect to the bowl, said bearing units having releasable latch means to retain said framework structure elements in said bearing units, release of said latch means permitting removal of said framework structure and conveying mechanisms from operative association with said suspended bowl.

4. The apparatus of claim 3 with the addition of at least one arm connected with said framework structure and disposed outside said bowl and extending generally radially with respect to the axes of said bearing units, and power means connected with said bowl and having connection with said arm to regulate the angularity of said elevator framework structure with respect to said axes of said bearing units and in relation to said bowl.

5. In a road working and material handling vehicle, in combination, a frame on said vehicle, a scraper bowl, link means to releasably suspend said bowl from said frame and vehicle including control means to raise and lower or to move said bowl into various angular positions in fore and aft and in transverse relations or in combinations thereof, and an auxiliary material handling mechanism mounted on said bowl for cooperation therewith to further facilitate the action and function of said bowl, said auxiliary mechanism bowl mounting providing means to cause the universally suspended bowl and said auxiliary mechanism to move bodily together under the action of said link means.

6. The apparatus of claim 5, with the addition of a hood for the bowl to open and close the open end of said bowl, said hood being mounted on said bowl for movement about a given axis, and said auxiliary mechanism having pivotal connection from said bowl mounting upon an axis coincident with said pivotal axis of said hood whereby said auxiliary mechanism is swingably

operative at the open end of said bowl and within the confines of said swingable hood.

7. The apparatus of claim 5, wherein said auxiliary mechanism comprises an elevator conveyor in said bowl to augment the entry and discharge of material into and out of said bowl.

8. The apparatus of claim 5, wherein said auxiliary mechanism comprises a sweeper arrangement to augment and to cooperate with the action of said scraper bowl to clean and to remove debris from various areas by said vehicle.

9. In an earth working vehicle providing a frame and power means, in combination, an independent scraper bowl separate from the frame, movable link means connected with said frame with certain of said means having connection with said power means, said link means including connections with said separate independent bowl to suspend the same freely from said frame for bodily adjustable movements independently with respect to said frame and to the underlying ground, a material elevator supported upon said bowl for bodily motion therewith and having a material conveyor operatively disposed within a predetermined portion of said bowl to aid in loading and unloading material into and out of said bowl, a movably supported hood on the open end of said scraper bowl to control material flow into and out of said bowl, one end of said elevator terminating within a portion of said hood to augment material flow toward and away from said hood, pivotal means on said bowl to support said conveyor and said hood for swinging motion with respect to said bowl, and individual power means supported on the bowl for movement therewith and connected with said conveyor and said hood respectively to regulate the angular positions of said conveyor and said hood with respect to each other and with respect to the bowl carrying said units.

10. In an earth working vehicle providing a frame and power means, in combination, an independent scraper bowl separate from the frame, movable link means connected with said frame with certain of said means having connection with said power means, said link means including connections with said separate independent bowl to suspend the same freely from said frame for bodily adjustable movements independently with respect to said frame and to the underlying ground, a material elevator supported upon said bowl for bodily motion therewith and having a material conveyor operatively disposed within a predetermined portion of said bowl to aid in loading and unloading material into and out of said bowl, a movably supported hood on the open end of said scraper bowl to control material flow into and out of said bowl, one end of said elevator terminating within a portion of said hood to augment material flow toward and away from said hood, pivotal means on said bowl to support said conveyor and said hood for swinging motion with respect to said bowl, and individual power means supported on the bowl for movement therewith and connected with said conveyor and said hood respectively to regulate the angular positions of said conveyor and said hood with respect to each other and with respect to the bowl carrying said units, said pivotal means on said bowl being disposed in coaxial relation for said conveyor and hood to swing about a common axis whereby said conveyor and hood coact with each other when disposed in selected positions to each other and to the bowl by said power means to regulate the material flow into and out of said bowl.

11. A scraper assembly provided for attachment with a vehicle comprising an earth handling bowl and supporting links including universal connections for attachment with the vehicle and being universally connected with said bowl to provide means to suspend said bowl from the vehicle for free bodily movement in pendulum fashion independently of said vehicle, said bowl having an earth elevator mounted thereon for bodily move-

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ment directly with said bowl independently of said vehicle, said elevator providing means to augment the loading and unloading of said bowl during operative vehicle working conditions, and bearing means mounted on said scraper bowl to swingably support said elevator, said 5 elevator comprising a swingable frame having hub member with sprocket shafts in said hub members to carry sprockets and chain conveyors, certain of said hub members being supported in said bearing means to position said elevator in a predetermined operative relation with 10 respect to the bowl, said swingable elevator frame hub members that are rockably carried in said bearing means being provided with actuation arms arranged radially to the axes of said bearing means, and power mechanisms attached to said bowl and joined with said actuation arms to swing said elevator frame into different selected angular positions with respect to the bowl.

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References Cited by the Examiner

UNITED STATES PATENTS

629,051	7/99	Swan	308—75
1,088,651	2/14	Cunningham	15—83
2,106,759	2/38	Paulsen.	
2,258,038	10/41	Titus	37—126
2,637,055	5/53	Mott	15—83
2,725,584	12/55	Dempster	15—84
2,931,451	4/60	Hancock.	
2,956,353	10/60	Hanner	37—8
2,961,783	11/60	Bowen	37—156

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