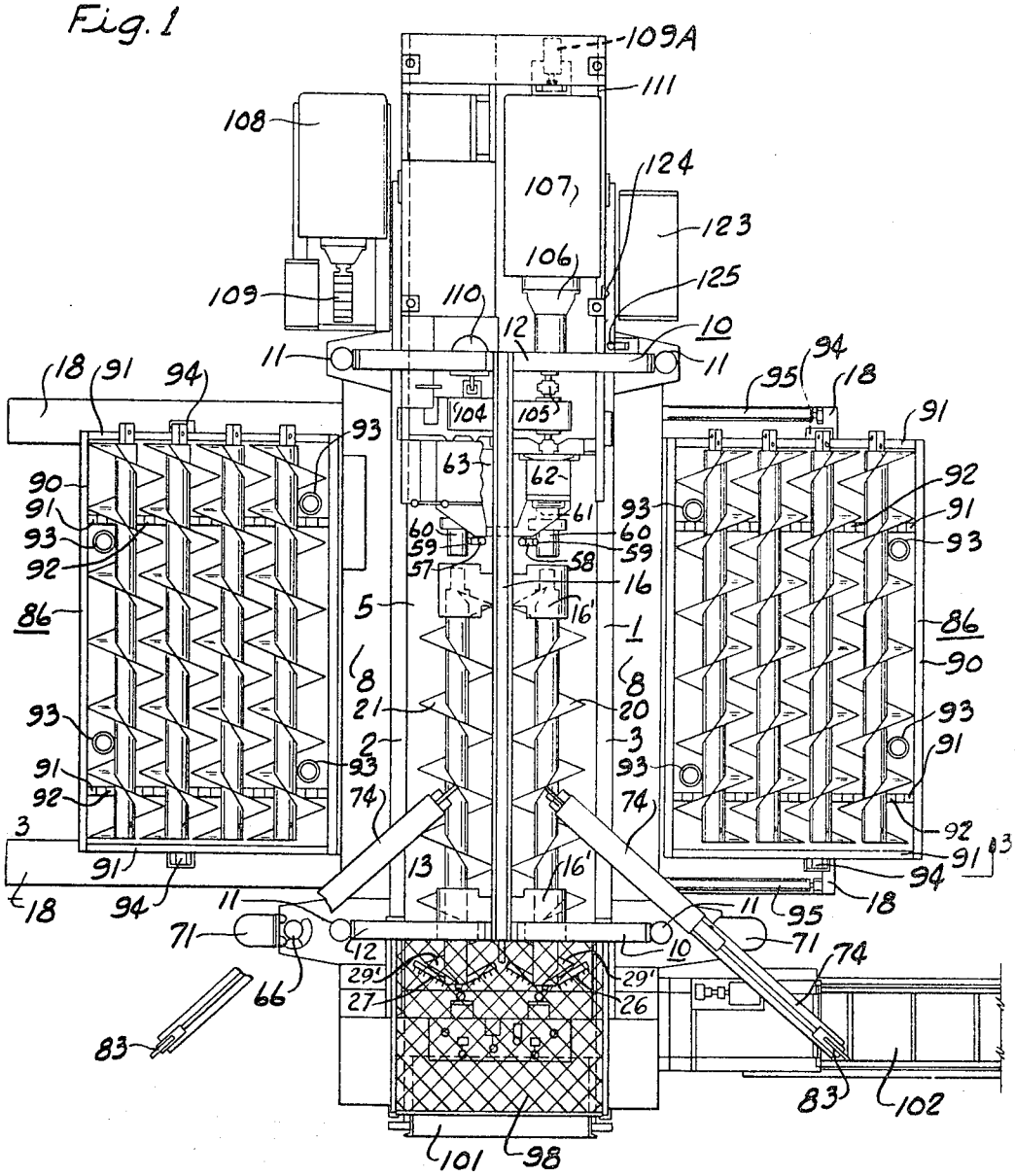
Oct. 25, 1966 G. L. ADAMS ETAL 3,281,187

DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 1

Fig. 1



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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 2

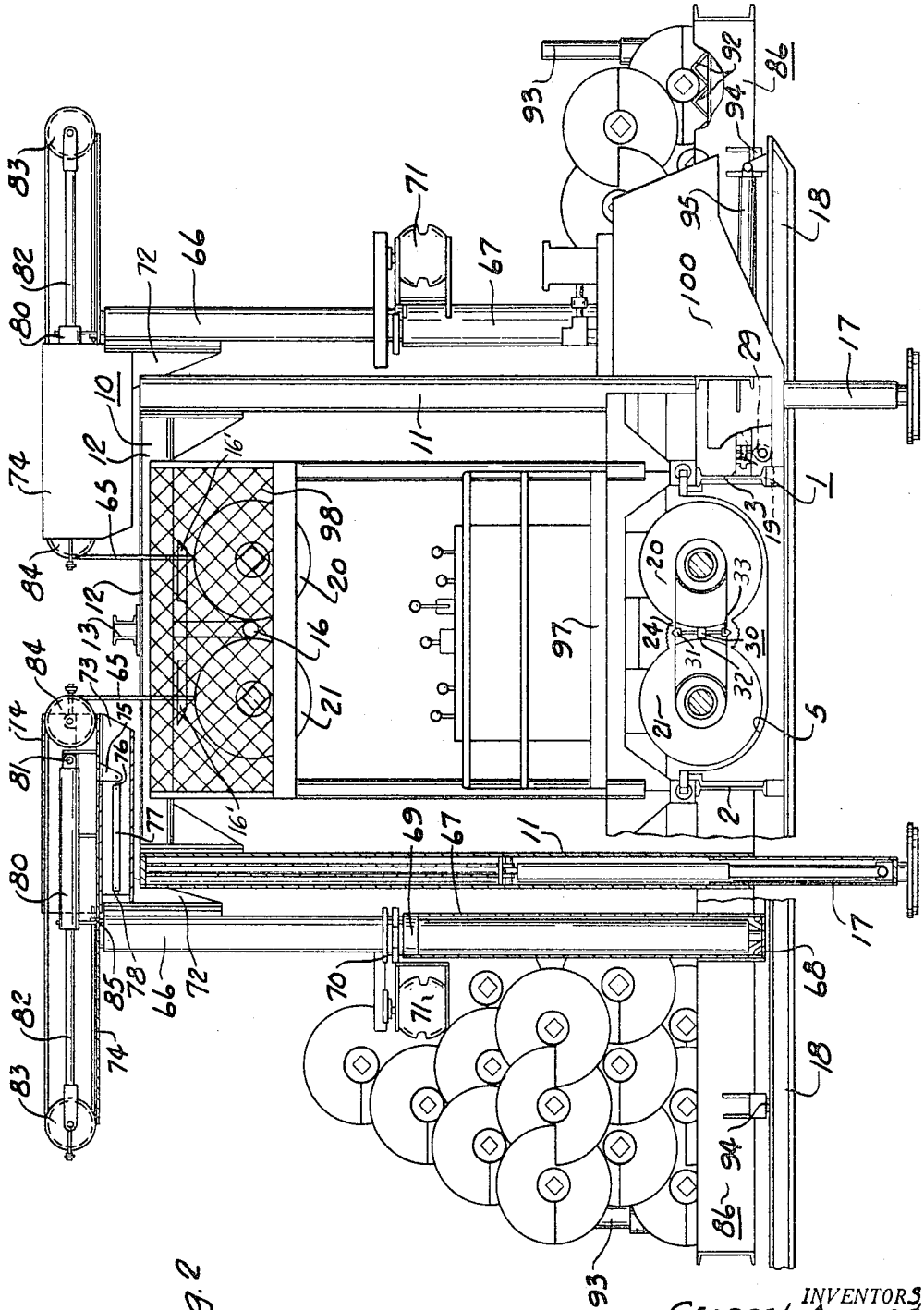


Fig. 2

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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 3

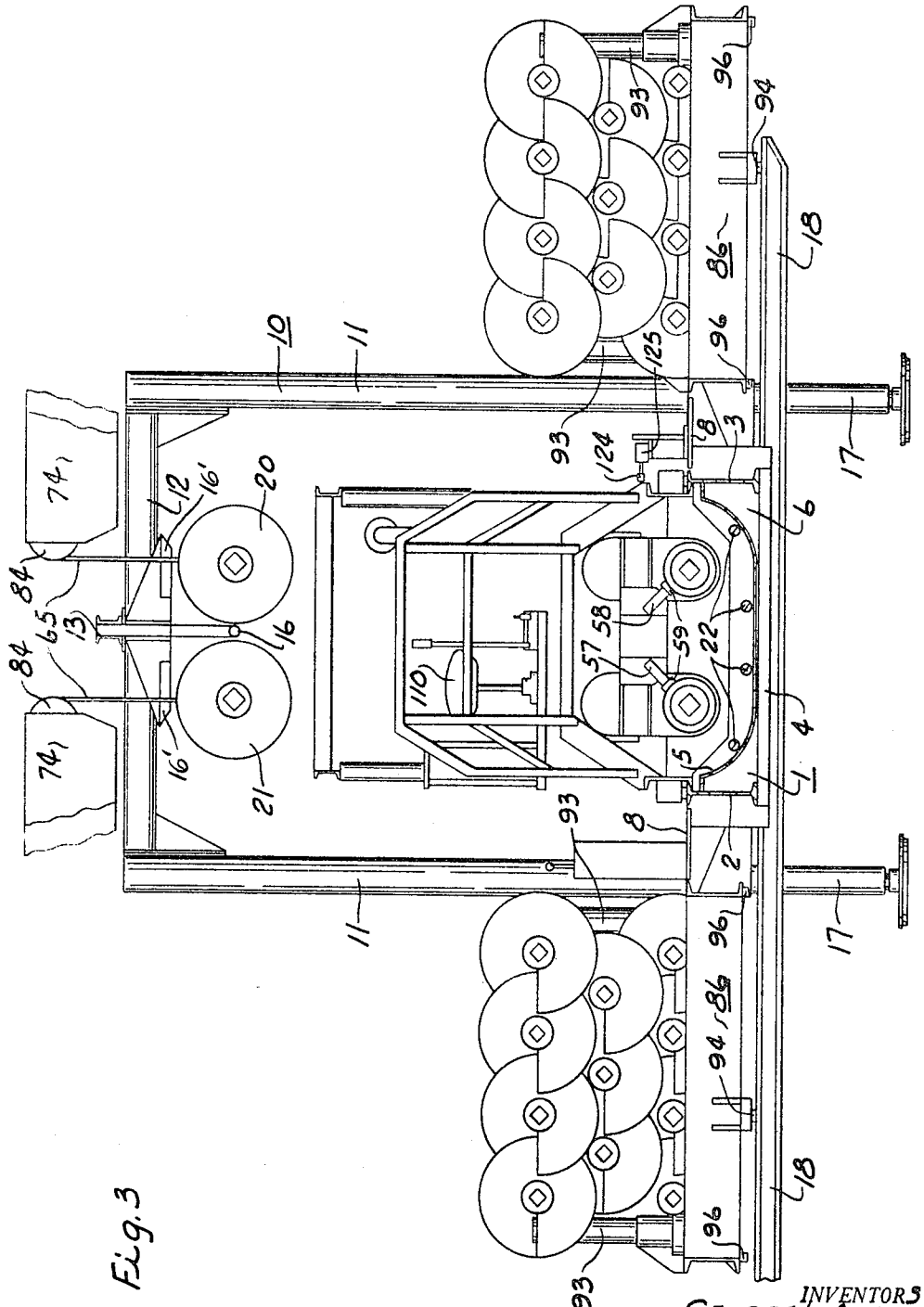


Fig. 3

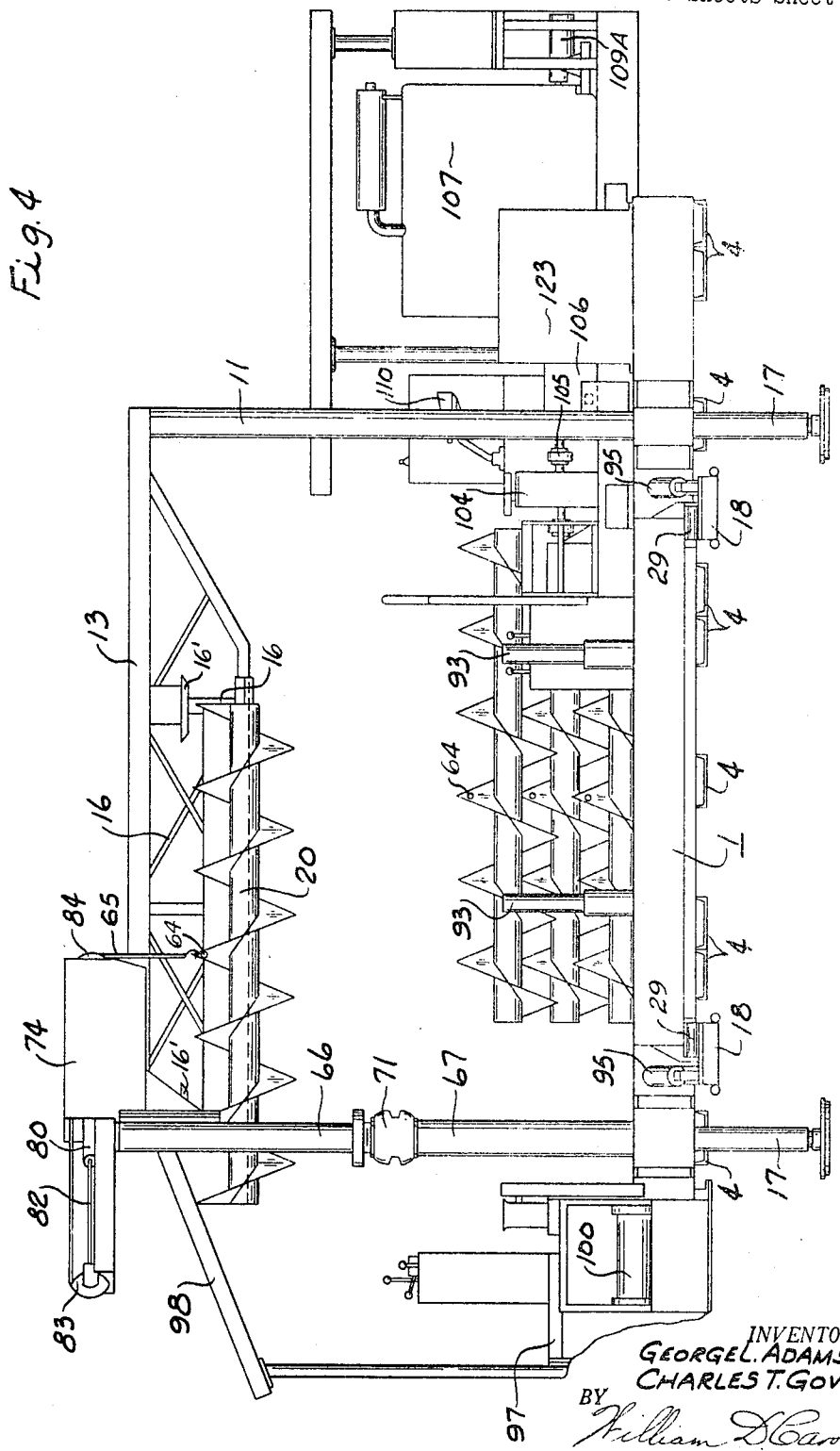
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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 4

Fig. 4



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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 5

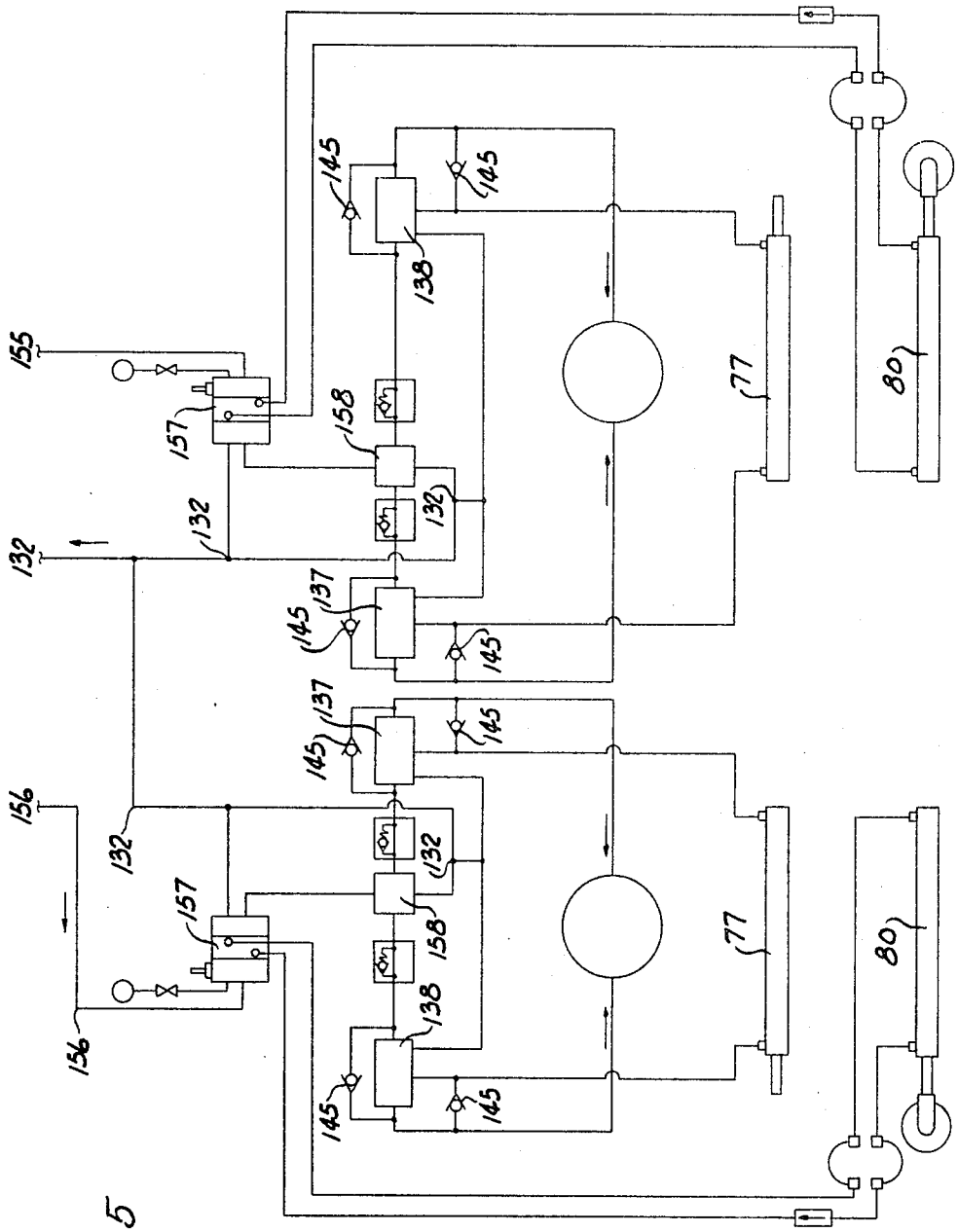


Fig. 5

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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 6

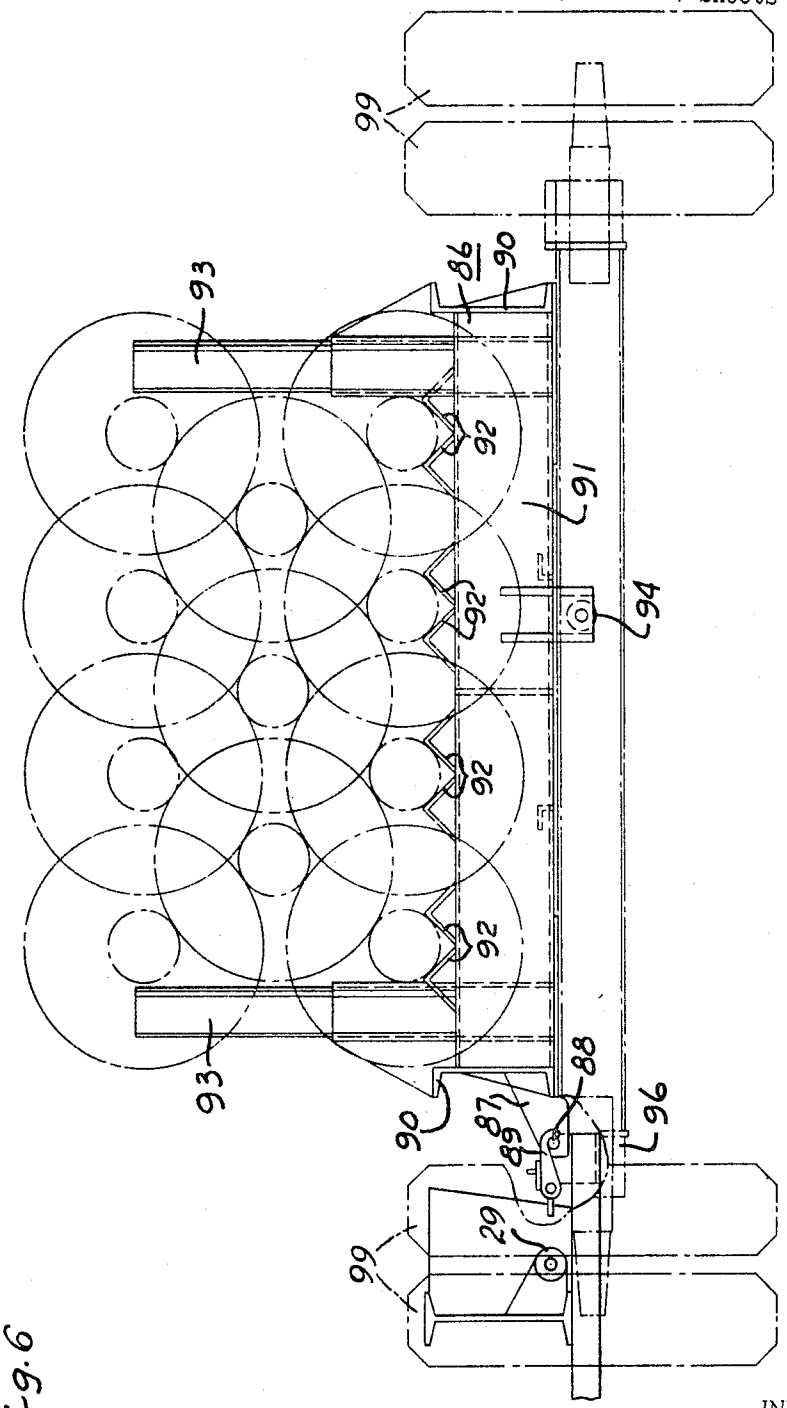


Fig. 6

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DUAL AUGERING MACHINE

Original Filed June 20, 1960 7 Sheets-Sheet 7

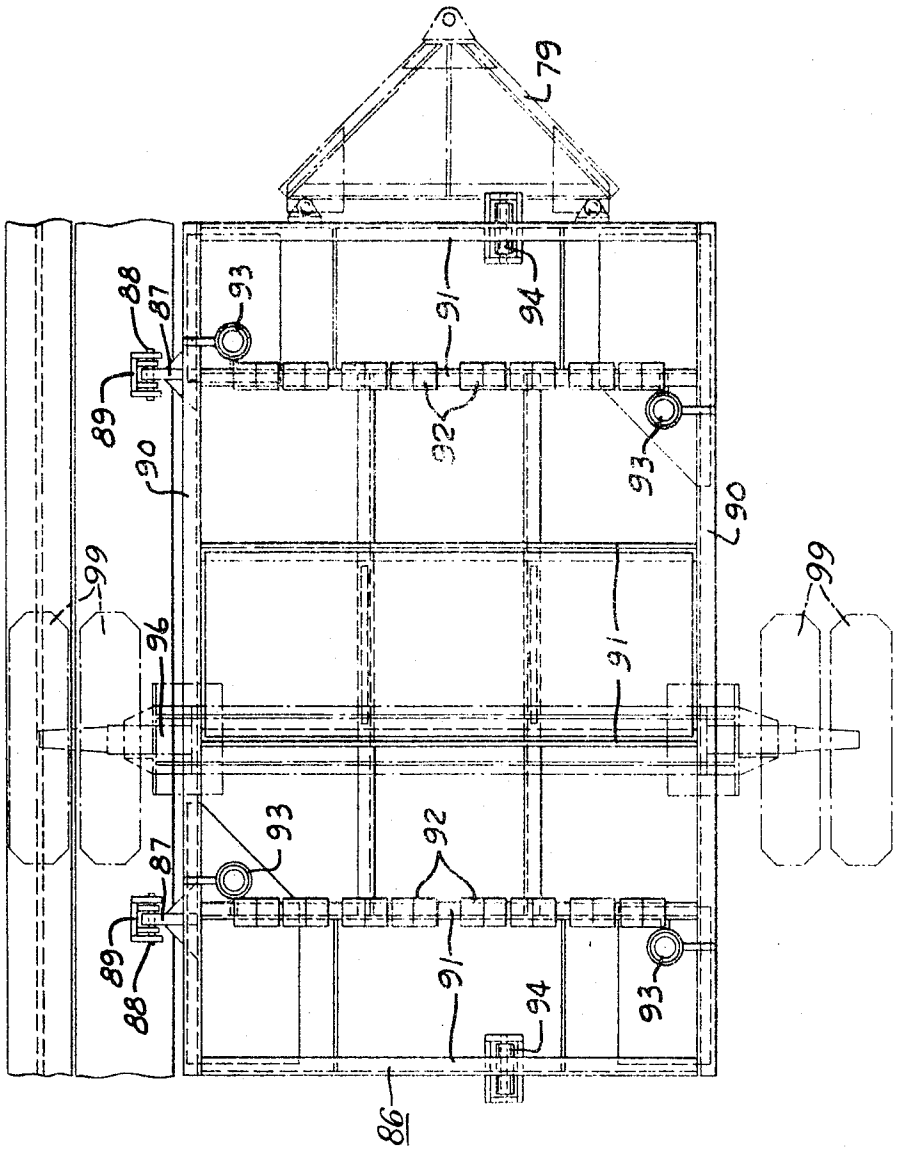


Fig. 7

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United States Patent Office 3,281,187 Patented Oct. 25, 1966

3,281,187

DUAL AUGERING MACHINE

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Original application June 20, 1960, Ser. No. 37,490, now Patent No. 3,091,439, dated May 28, 1963. Divided and this application July 5, 1962, Ser. No. 207,638
26 Claims. (Cl. 299—55)

This invention is a division of United States Letters Patent 3,091,439, issued May 28, 1963.

This invention relates generally to auger mining machines and more particularly to a dual auger mining machine.

The augering machine illustrating this invention employs two augers that rotate in opposite directions to cut two closely adjacent holes that do not overlap each other and a cutting head is mounted between the augers to hold the augers in spaced relation and to break out the thin wall and upper and lower cusps in the coal during the boring operation. The dual auger strings continue from the cutting head to the machine. These augers are of opposite hand and are preferably rotated to move the coal from the center to the outer portions of the bored holes formed by the cutting head. This cutting head may include reciprocating members to aid in chipping the cusps from between the dual augers. This chipping action also aids in directing the dislodgment of the coal away from the midposition between the dual augers.

An object of this invention is the provision of an improved mining machine which receives and feeds the auger sections during the mining operation and is provided with laterally disposed storage racks supported from the skids to steer and guide the machine in its movement laterally from one boring position to another and at the same time support the storage auger racks.

Another object is the provision of independent boom hoists which swing the auger sections from their storage racks at opposite sides of the machine into and out of position within the mining machine and each of which cooperate with baffle means to steady and pre-position the auger flight before depositing it in the machine.

Other objects and advantages appear herinafter in the following description and claims.

The accompanying drawings show for the purpose of exemplification without limiting the claims thereto, certain practical embodiments illustrating the principles of this invention wherein:

FIG. 1 is a plan view of the dual augering machine comprising this invention.

FIG. 2 is a front elevation of the dual augering machine with parts in section.

FIG. 3 is a view taken on the line 3—3 of FIG. 1.

FIG. 4 is a side elevation of the dual augering machine.

FIG. 5 is a schematic view of the fluid control mining machine operating circuit.

FIG. 6 is a view in vertical section of the auger storage rack.

FIG. 7 is a plan view of the auger storage rack.

Referring to FIGS. 1 to 4 of the drawings the augering machine consists of the frame 1 constructed of a pair of longitudinally disposed parallel I-beams 2 and 3 joined by a plurality of channel members 4 on the under side thereof and connected by the continuous belly plate 5 that extends from one I-beam to another and is braced by a series of brace plate 6. The outer face of the I-beams 2 and 3 are provided with the outboard brace plates 7 along the sides of the frame to provide for the walkways 8.

The frame members 10 which consist of the riser posts 11, the cross members 12 and the longitudinal beam 13 function to support the auger baffle frame 16 as well as the four vertical jacks 17 in the riser tubes 11. Horizontal baffle portion 16' extends on each side of said baffle frame 16 as illustrated in FIGS. 1 to 4 inclusive. These horizontal baffle portions 16' extend laterally on each side of the baffle member 16 to provide right angle surfaces against which the single line hoist means raises each of the auger sections to steady and preposition the same as illustrated in FIGS. 2, 3 and 4. As shown in FIGS. 2 and 3 the outer end of these baffles slope upwardly to aid in guiding the auger sections inwardly against the baffle 16. These horizontal baffle portions 16' function as dampeners in cooperating with the vertical baffle member 16 to align and steady the auger sections. The vertical lifting jacks 17 are capable of lifting the whole of the machine and their large disc type feet are enabled to be raised above the skids 18 which support the mining machine for guiding movement and travel along the ground. The underside of the skids 18 represent the lowermost surface of the mining machine when the jacks 17 are retracted. These skids are retained to the under side of the frame 1 by the brackets 19 and the frame 1 in turn is provided with rollers 29 to support the movement of the frame on the skids.

The belly plate 5 supports the right hand and left hand auger sections 20 and 21 side by side and in spaced relation and are guided in retaining their position when rotated, by the guide bars 22. These auger sections are coupled to the mining head and are joined together at their front and rear ends by bearing spacing bars. The right hand auger flights 20 are provided with the cutting head 26 and the left hand auger flights 21 are provided with the cutting head 27. The forward spacing bar 24 carries a bearing for each auger section. Each cutting head is provided with its own sectional flight 29' to feed the coal from the cutting head rearwardly past the forward bearing space bar 24 to the auger flight sections 20 and 21.

The forward space bar 24 has mounted thereon the vertically disposed cutter 30 having three cutting bits as indicated at 31, 32, and 33. The central bit 32 may overlap the path of the outermost teeth of the cutting heads 26 and 27 but it is positioned to the rear of the same and is the foremost bit of the cutter 30 and will chip out the thin section of coal if it has not already fallen that would lie between the cutting diameters of the cutting heads 26 and 27.

The machine is provided with rear auger latch release cylinders 57 and 58 which carry the cam sections 59 for engaging unlatch pins, not shown, on the driving coupling 60 which is bolted to the coupling bit 61 attached to the drive shafts of their respective gearboxes 62 and 63, the auger driven from the gearbox 62 being counterclockwise and the auger driven from the gearbox 63 being clockwise. In order to actuate the automatic front and rear latch release mechanisms it is necessary to stock the auger sections in a predetermined position which position leaves the hole 64 in the center of the auger flight on the top of the auger which permits the same to be engaged by hook members from the hoist lines 65.

The hoists 66 are positioned outwardly of the front lifting jacks 11 and are stepped in the deep tubular sockets 67 that are provided with step bearings 68 at their lower end and a bronze bearing 69 at the upper end of the sockets above which is positioned a sprocket 70 driven by a chain from a sprocket on a shaft of the motor 71. Each hoist member 66 thus may be made to swivel on its step bearing through 360° if necessary. The upper end of the hoist is provided with a bracket member 72 that supports the outwardly projecting box member 73 that slidably sup-

ports the boom members 74 that is guided by the box member 73 that functions as a track for the boom. The boom 74 is provided with a depending bracket 75 to which is secured a piston 76 of the cylinder 77, the opposite end of which is pivotally secured to the inner end of the box 73 as indicated at 78. Thus by energizing the cylinder 77 the piston 76 moves the boom forwardly for the full length of the piston 76.

The boom in turn is provided with a cylinder 80 which is pivotally secured as indicated at 81 to the boom and extending from its opposite ends is the piston 82 which carries a pulley 83 at its outer end or at the back of the boom 74. A hoist line 65 travels over the pulley 84 pivoted to the forward end of the boom 74 and travels backwardly over the top of the pulley 83 and returns to the anchor 85 on one of the brackets that supports the cylinder 80 within the boom. Thus when the cylinder 80 is energized to retract the piston 82, the hook and the weight on the end of the hoist line 65 will descend and if it is necessary to extend the position of this hook from the center of rotation of the hoist mast 66 the cylinder 77 is energized to run the boom outwardly. Thus the hook is enabled to function within the varying radius of the center of rotation of the hoist mast 66 by the extension of the piston 76 from the cylinder 77 and the hook is enabled to be raised and lowered by the extension and contraction of the piston 82 within the cylinder 80. As shown in FIG. 1 the boom 74 can be swung outwardly at different radii to receive and discharge auger sections from their loading position on the machine bed to the auger storage racks 86 of which there is one on each side of the augering machine. Each auger storage rack has a pair of parallel pivot arms 87 which are secured to the pivot pin 88 detachably fastened to the laterally extending pivoted latch members 89 that are welded to a transverse channel member 4 beyond the outer face of the I-beams 2 and 3 between the positions of the skids 18 as shown in FIGS. 6 and 7.

The auger storage frames 86 are rectangular in shape being constructed of the parallel longitudinal channel members 90 connected by the four transverse channel members 91. The inner of these channel members are provided with a series of inverted angle irons 92 which are secured to the frame in alignment to form a seat for the tubes of the auger flights 20 and 21. As illustrated four sets of the brackets 92 are provided to support four auger flights in the bottom of the pile on which are stacked a row of three auger sections which in turn provide with the extensible 93 seats for four additional auger sections in the next level. If the posts 93 are extended any higher they can be made to stack a considerable number of auger sections. However, as shown in FIG. 2 the augers are stacked in six elevations but they reduce in number as they pyramid.

The outer transverse channel members 91, of the auger storage frame 86, have secured to their under sides the rollers 94 which ride on the inner side of the top flat surface of the skids 18, the outer sides of which are occupied by the skid operating jacks 95.

Wheels 99 may be mounted in the sockets 96 to individually support each of the racks 86 as a trailer with a tongue 79. However, when the racks are mounted on the machine the wheels 99 are removed to provide more clearance between the bottom of the racks 86 and the ground. It will be noted from FIGS. 2 and 3 that the skids have ample length to support both of the racks 86 on either side of the machine when the machine is properly located at a boring position.

Thus each of the hoists 66 with their expansible boom 74 may raise a pair of augers from the storage racks 86 and swing them into position against the auger baffle 16 to steady and straighten the same and then drop them down onto the bed plate 5 within the bar guides 22 in proper position so that they may be readily coupled. Since the hoist openings 64 in each auger section properly orients the same for coupling alignment the auger section when lowered to the bed plate they may be readily coupled with the automatic latching means by merely moving the carriage forward to connect the couplings at the rear and at the front of the newly inserted auger section.

As shown in FIG. 2 a platform 97 is provided in front of the forward lifting jacks and the hoist controls show three control levers for each hoist for the purpose of swinging the hoist in either direction, extending or retracting the boom or raising and lowering the hoist line 65. Above the platform 97 is a screen canopy 98 which protects the hoist operator from falls from the face of the high wall or hill. This also protects the forward end of the machine as well as the conveyor section indicated at 100 which withdraws the coal as it is carried over the extensible auger guide section 101 and drops onto the conveyor 100 from whence it is conducted to the elevating conveyor 102 to a truck or other transportation means.

As shown in FIG. 1 the gearboxes 62 and 63 are adjustably mounted on a plate means. In back of the gearboxes is the chain drive 104 that extends from the shaft driving the gearbox 63 to the shaft driving the gearbox 62 and thence through the coupling 105 and the transmission 106 to the diesel engine 107. An auxiliary powered diesel engine 108 is placed on the side of the machine for operating a hydraulic pump 109 that serves all of the hydraulically actuated controls. The controls for operating the auger sections and feeding them forward is shown at the operator station 110 in FIG. 3.

As shown in FIG. 5 in which diagrammatic view the oil reservoir of 123, as shown in FIGS. 1 and 4, to the pump 109, 109A and the opposite side of the pump is connected to suitable control valves which feed the lines 155 and 156 serving the right and left hoist lines respectively which are controlled by the independent four way control valves 157 to supply the left cylinders 80 together with the mast extending cylinders 77 through their respective flow dividers 137 and 138 and actuated by their respective four way control valves 158, each of the circuits being provided with a check valve return as indicated at 145. The lines 132 serve as return lines to the reservoir 123.

It was also noted on the hydraulic diagram a line 160 is provided from the third section of the pump to supply the control valve 161 which actuates the hydraulic motor 162 that operates the conveyor that would be placed in front of the machine and intended to be operated by the power supply, the energy for operating this invention.

We claim:

1. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame and providing a uniform location to rotate and move the augers along said frame in mining, an independently operated spaced pair of parallel track members located beneath said frame for moving and steering the frame upon the ground, an independent auger storage rack outside of said frame, latch means to hold said auger storage rack to said frame, hoist means on said frame to transfer augers to and from said rack and mining assembly, and support means on said auger storage rack engaging said track members to carry the same along with said frame to maintain the augers at a uniform location.

2. The auger mining machine of claim 1 characterized in that said latch means includes a horizontal pivot to permit said auger storage rack to ride at different angles relative to said frame and retain the auger sections in position for said hoist.

3. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame and providing a uniform location to rotate and move the augers along said frame in mining, an independently operated

spaced pair of parallel track members located beneath said frame for moving and steering the frame upon the ground, an auger storage rack along one side of said frame, latch means to hold said auger storage rack to said frame, hoist means on said frame to transfer augers to and from said rack and mining assembly, and support means on said auger storage rack engaging said track members to carry the same along with said frame to maintain the augers at a uniform location, said hoist means includes a boom mounted to swivel on a vertical member stepped in a bearing to swing the augers from said rack to the mining assembly, and means to extend and retract said boom to suspend the augers in their proper position over said rack and said mining assembly.

4. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame and providing a uniform location to rotate and move the augers along said frame in mining, an independently operated spaced pair of parallel track members located beneath said frame for moving and steering the frame upon the ground, an auger storage rack along one side of said frame, latch means to hold said auger storage rack to said frame, hoist means on said frame to transfer augers to and from said rack and mining assembly, and support means on said auger storage rack engaging said track members to carry the same along with said frame to maintain the augers at a uniform location, a baffle above and aligned with said mining assembly, a horizontal extendible and retractible means on said hoist to extend and retract suspended augers to and from said rack and against said baffle means to properly align them for insertion in said mining assembly.

5. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame and providing a uniform location to rotate and move the augers along said frame in mining, an independently operated spaced pair of parallel track members located beneath said frame for moving and steering the frame upon the ground, an auger storage rack along one side of said frame, latch means to hold said auger storage rack to said frame, hoist means on said frame to transfer augers to and from said rack and mining assembly, and support means on said auger storage rack engaging said track members to carry the same along with said frame to maintain the augers at a uniform location, a baffle means having vertical and horizontal surfaces adjacent each other above and aligned with said mining assembly, an extendible and retractible means on said hoist to extend the augers into engagement with said baffle means before lowering the same into said mining assembly.

6. An auger mining machine consisting of a frame, a rotary auger mining assembly carried by said frame in mining, an auger rack supported on one side of said frame to carry auger sections for said auger mining assembly, upwardly extending supports on the front and rear of said frame, a baffle extending longitudinally parallel with said auger mining assembly and carried between said upwardly extending supports in alignment with said mining assembly, an auger rack on one side of said mining assembly, and a single line hoist means positioned to engage an auger section at substantially the center thereof to raise an auger section from said rack and swing it into said baffle to align the same for insertion into said mining assembly, said single line hoist means presenting the auger sections intermediate the ends of said baffle.

7. The auger mining machine of claim 6 characterized in that said baffle includes vertical and horizontal aligning surfaces to cooperate with an auger suspended by said hoist.

8. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame and providing a uniform location to rotate and move the augers along said frame in mining, a spaced pair of parallel track members located beneath said frame for movement upon the ground, independently operated and controlled power means connecting each track member to the frame for moving each track member in either direction to steer and move the frame along the ground, an auger storage rack along one side of said frame, latch means to hold said auger storage rack to said frame, and support means on said auger storage rack engaging said track members to carry the same along with said frame to maintain the augers at a uniform location, a hoist on said frame to insert and withdraw said augers from said frame to and from the uniform locations of said frame and said rack, and a baffle above said frame and parallel therewith, said augers when suspended by said hoist engaging said baffle to orient them before said hoist inserts them in the frame.

9. The auger mining machine of claim 8 characterized by horizontal baffle portions attached to said baffle to steady the augers suspended from said hoist to steady and align the same before inserting them into said frame.

10. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame to rotate and move the augers along said frame in mining, a single line hoist on said frame positioned to pick up an auger section at substantially the center thereof for insertion into and withdrawal from said frame, a baffle supported above said frame and extending substantially the length of said frame in alignment therewith to be engaged by the augers suspended from said single line hoist to properly align them with said frame, said single line hoist presenting each auger intermediate the ends of said baffle.

11. The auger mining machine of claim 10 characterized by horizontal baffle portions supported by said baffle to engage and stop the auger sections suspended from said hoist.

12. The auger mining machine of claim 11 characterized in that said horizontal baffle portions has an upwardly sloping outer edge to receive the auger thereunder.

13. The auger mining machine of claim 10 characterized in that said hoist has an extensible boom, a jack to extend said boom, a jack in said boom, a sheave on one end of said boom, a sheave on the movable end of said jack, a hoist line received over said sheaves, and power means to swing said boom, said hoist elements cooperating to place said augers against said baffle to align the same.

14. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame to rotate and move the augers along said frame in mining, an auger baffle means, a boom hoist on said frame to pick up and deposit an auger section for insertion into and withdrawal from said frame, a lift motor on said boom hoist to raise and lower a suspended auger section, a boom extension motor on said boom hoist to extend or retract the boom and a suspended auger section, and a boom turning motor on said boom hoist to swing a suspended auger section while said other two motors are operating, and a single control means to simultaneously operate said boom extension and said boom turning motors in aligning said augers on said baffle means.

15. The auger mining machine of claim 14 characterized by a second single control means to actuate said lift motor and simultaneously interrupt the operation of said first single control means.

16. An auger mining machine comprising a mining machine frame, a rotary auger mining assembly carried by said frame to rotate and move the augers along said frame in mining, an auger rack supported from one side of and outboard of said frame, hoist means for transferring the augers between said auger rack and said mining assembly, and baffle means above said mining assembly and parallel therewith to orient said augers suspended by said hoist means before insertion into said mining assembly.

17. The auger mining machine of claim 16 characterized in that said frame extends above said mining assembly to support said baffle.

18. The auger mining machine of claim 16 characterized in that said auger rack is pivotally and detachably secured to said frame and is supported therefrom to be maintained at a uniform height relative to said mining assembly.

19. The auger mining machine of claim 16 characterized by jack means to support said frame and auger rack.

20. An auger mining machine comprising a mining frame, a rotary dual auger mining assembly carried by said frame to rotate and move the augers along said frame in mining, an auger rack supported from outboard of and on each side of said frame, hoist means for transferring the augers between each auger rack and said mining assembly, and baffle means above said mining assembly and parallel therewith to orient augers suspended by said hoist means before insertion into said mining assembly.

21. The auger mining machine of claim 20 characterized in that said auger racks are pivotally and detachably secured to said frame and are supported therefrom to be maintained at a uniform height relative to said mining assembly.

22. The auger mining machine of claim 20 characterized by jack means to support said frame and said auger racks.

23. An auger mining machine comprising a frame, a rotatable mining assembly carried by said frame to rotate and move the augers along said frame in mining, a hoist means supported to swivel on a vertical axis and having a pickup hoist line, power means to swing said hoist means back and forth on said vertical axis, an extensible and retractible sheave mounted on said hoist means over which said pickup hoist line travels, and single control means to simultaneously retract said sheave and energize said power means to swing said hoist line in one direction, and said single control means to simultaneously extend said sheave and energize said power means to swing said hoist line in the opposite direction, a baffle supported above said frame and extending substantially the length of said frame and in alignment therewith to be engaged longitudinally by the augers suspended from said hoist means to properly align them with said frame.

24. An auger mining machine comprising a frame, a rotary auger mining assembly carried by said frame for mining, an auger rack supported on one side of said frame to carry auger sections for said assembly, a hoist means supported to swivel on a vertical axis and having a pickup hoist line, power means to swing said hoist means back and forth on said vertical axis, an extendible and retractible sheave mounted on said hoist means over which said pickup hoist line travels, and single control means to simultaneously retract said sheave and energize said power means to swing said hoist line in one direction, and said single control means to simultaneously extend said sheave and energize said power means to swing said hoist line in the opposite direction, upwardly extending supports on the front and rear of said frame, a baffle extending longitudinally parallel with said mining assembly and carried between said upwardly extending supports to align the auger sections suspended by said hoist means longitudinally with said mining assembly.

25. An auger mining machine comprising a mining machine frame, a rotary auger mining assembly carried by said frame to rotate and move the augers along said frame in mining, augers stored on one side of said frame for use with said mining assembly, baffle means extending substantially the length of said frame above said mining assembly and parallel therewith to orient the stored augers before inserting them into said auger mining assembly, hoist means supported to swing on a vertical axis and having a power-operated pickup single line hoist positioned to engage substantially the center of said augers, power means to swing said hoist means on its vertical axis, motor extension means to extend and retract said hoist line relative to said baffle, and single control means to simultaneously operate said power-operated pickup hoist line and swing said hoist means in one direction toward said baffle for orienting the auger suspended by said hoist line before placing it into the mining assembly and to simultaneously operate said power-operated pickup single hoist line and swing said hoist means in the opposite direction away from said baffle in placing the auger suspended from the hoist line to storage.

26. An auger mining machine comprising a mining machine frame, a rotary auger mining assembly carried by said frame to rotate and move the augers along said frame in mining, augers stored on one side of said frame for use with said mining assembly, baffle means extending substantially the length of said frame above said mining assembly and parallel therewith to orient the stored augers before inserting them into said auger mining assembly, a single line hoist means positioned to engage substantially the center of said augers to move the stored augers to the mining assembly and from the mining assembly to storage, and power means on said hoist means to extend an auger into engagement with said baffle intermediate the ends of the latter for aligning the same to position in said auger mining assembly and to retract the auger for withdrawing it from the mining assembly.

References Cited by the Examiner

UNITED STATES PATENTS

2,616,677	11/1952	Compton	299—56
2,911,111	11/1959	Grove	212—35
2,935,309	5/1960	McCarthy	299—31
2,974,809	3/1961	Sellars et al.	212—34

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