Jan. 22, 1952 W. H. LEWIS 2,583,108

CONCRETE SPREADER

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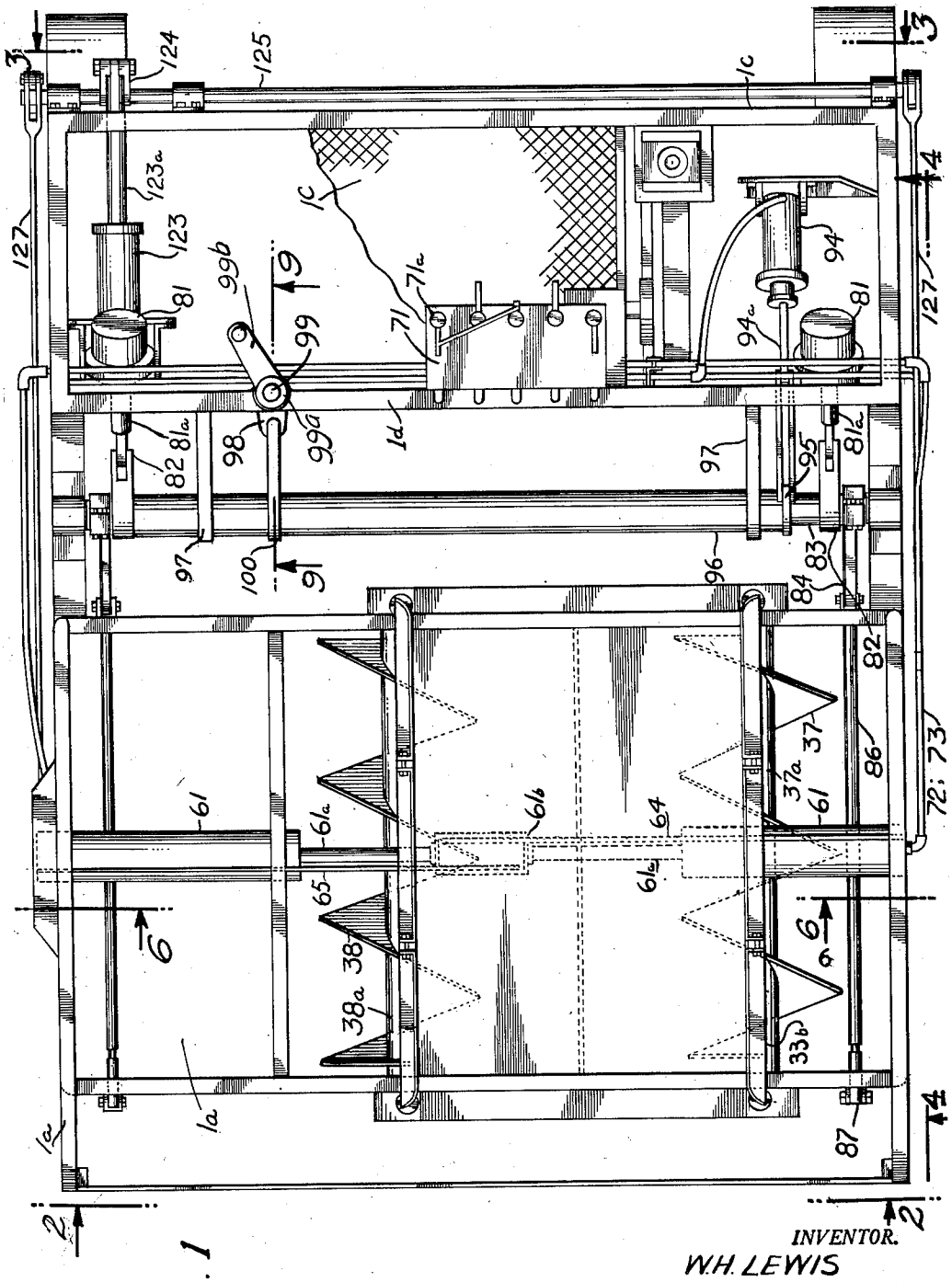

Fig. 1

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CONCRETE SPREADER

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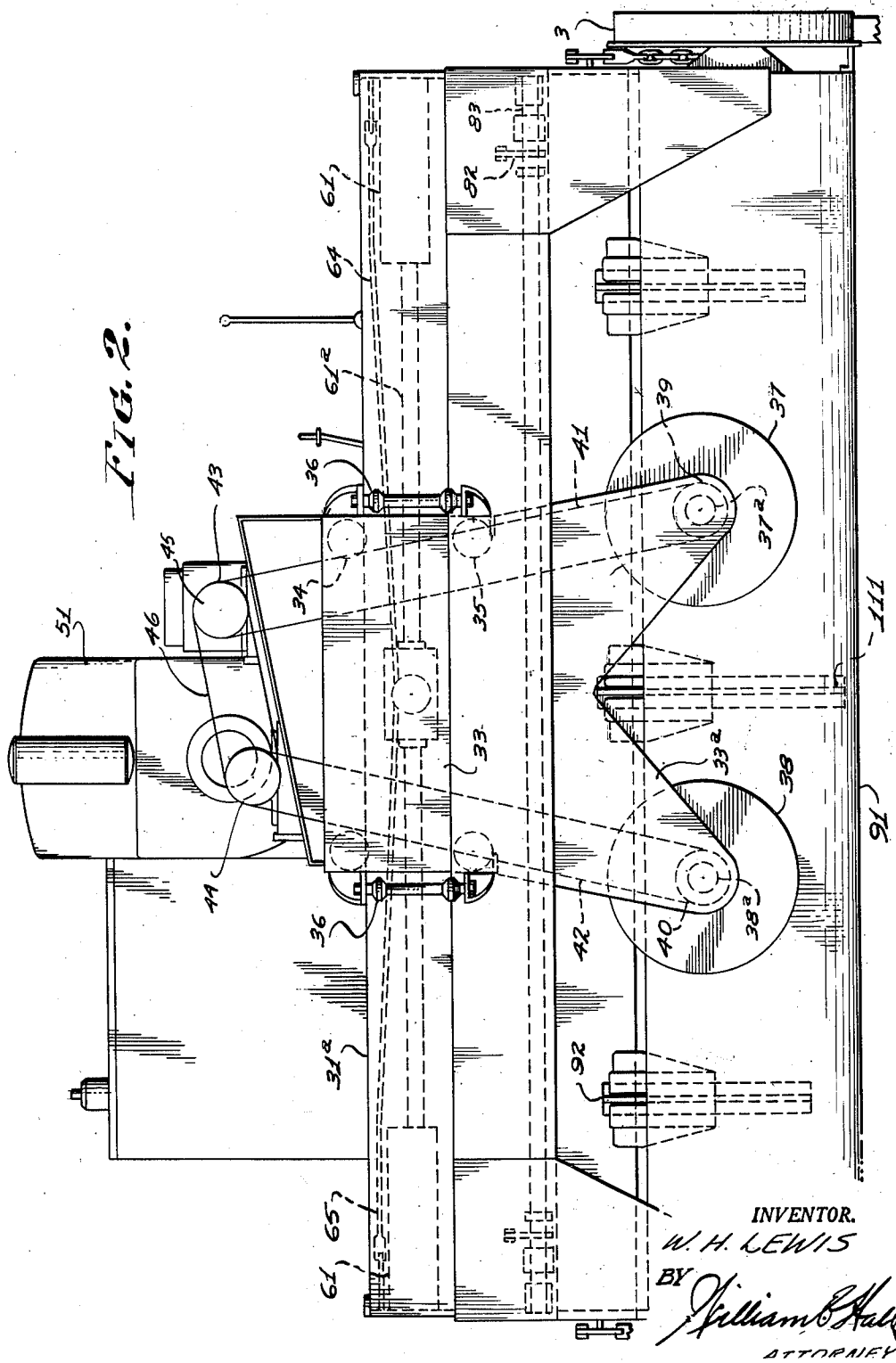
FIG. 2.



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CONCRETE SPREADER

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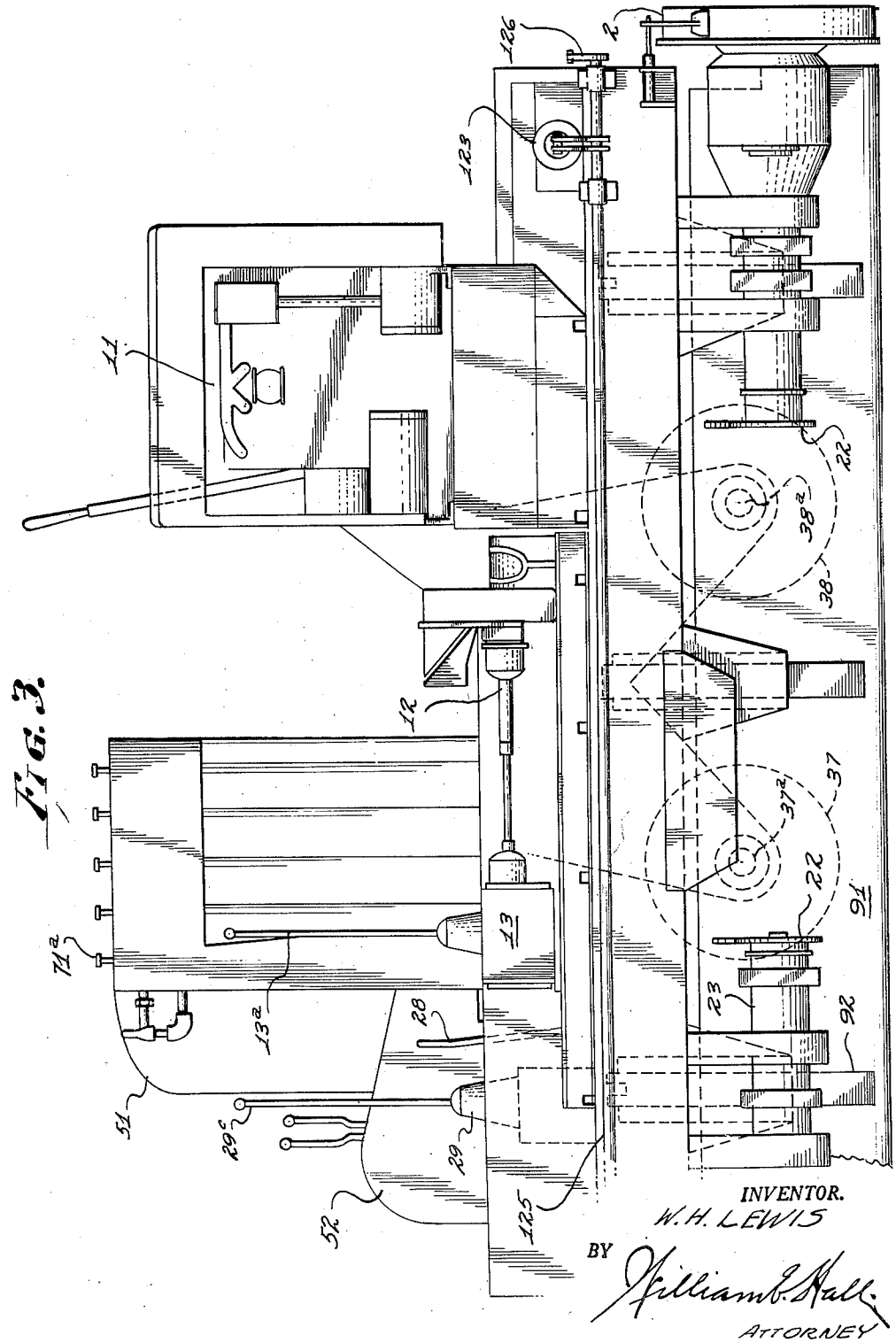

Fig. 3.

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CONCRETE SPREADER

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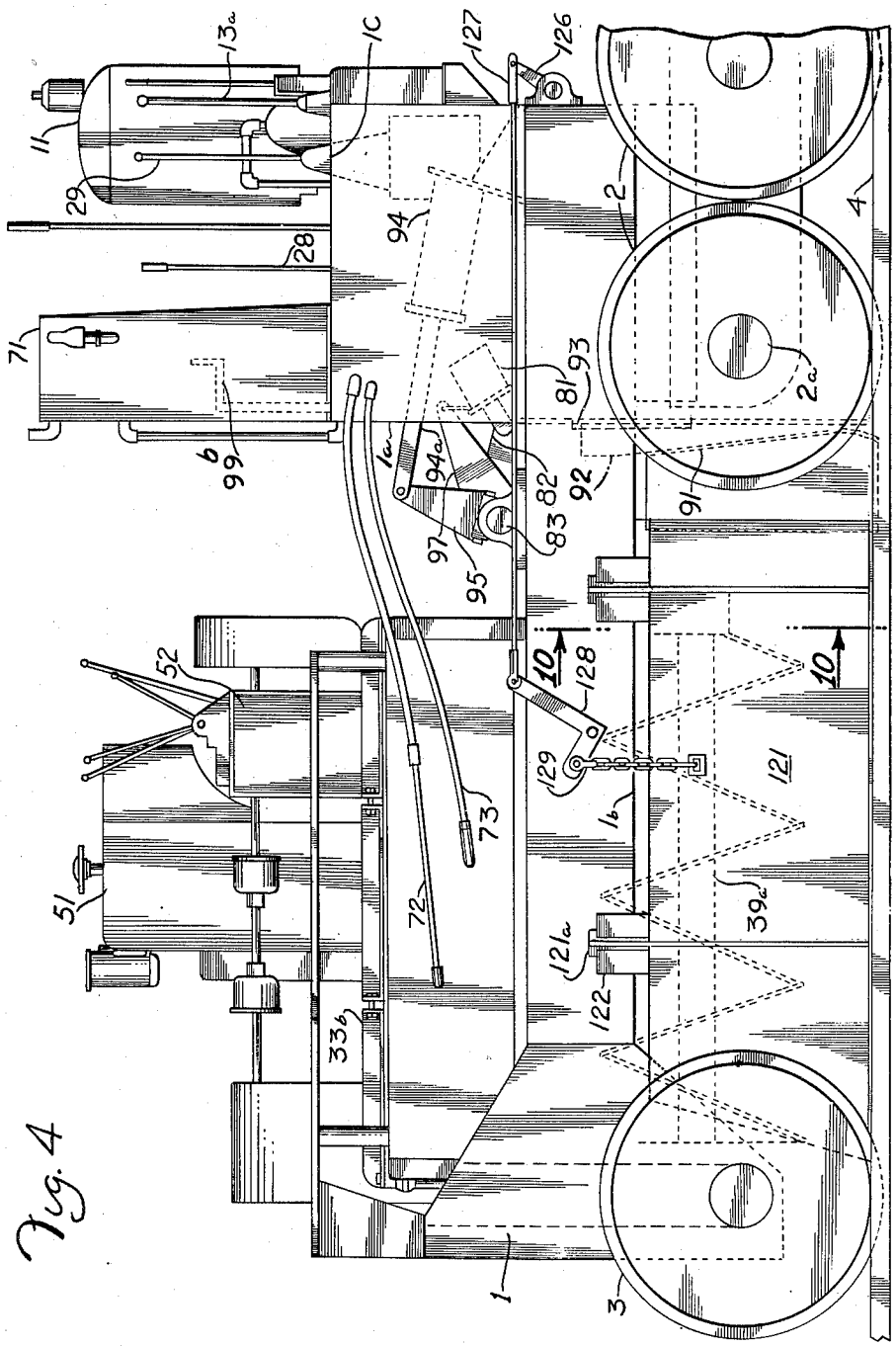

Fig. 4

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CONCRETE SPREADER

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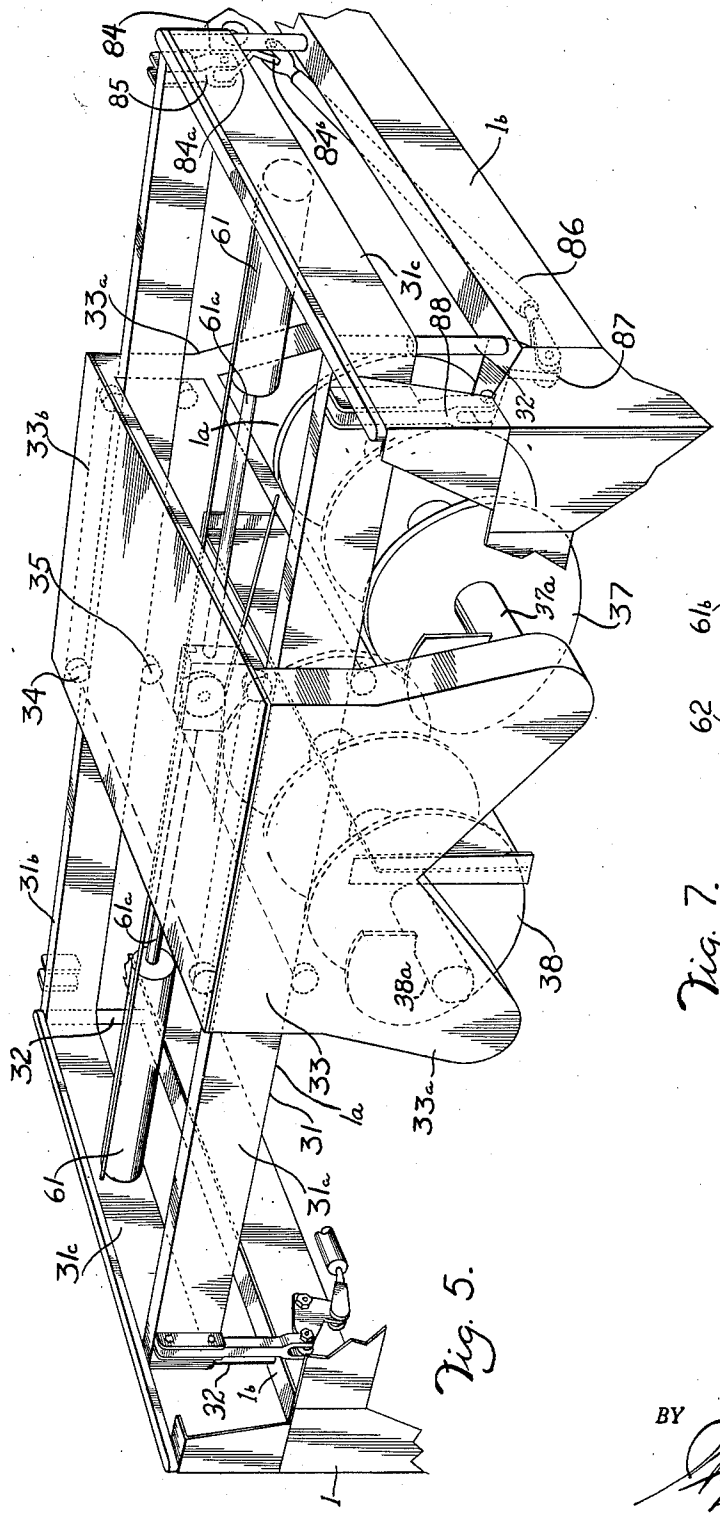

Fig. 5.

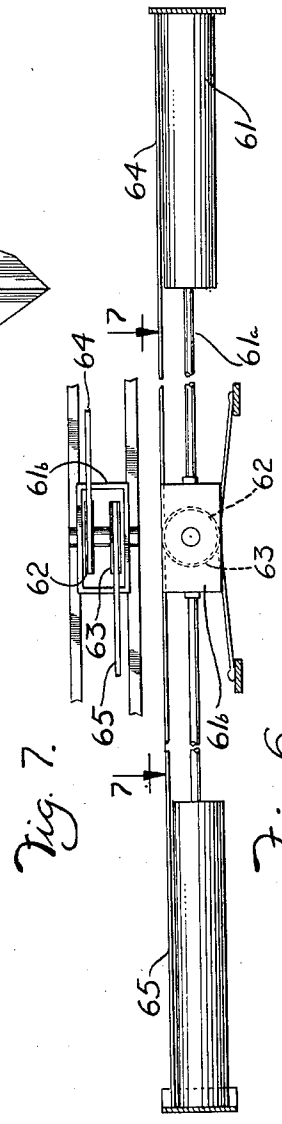

Fig. 7.

Fig. 6.

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CONCRETE SPREADER

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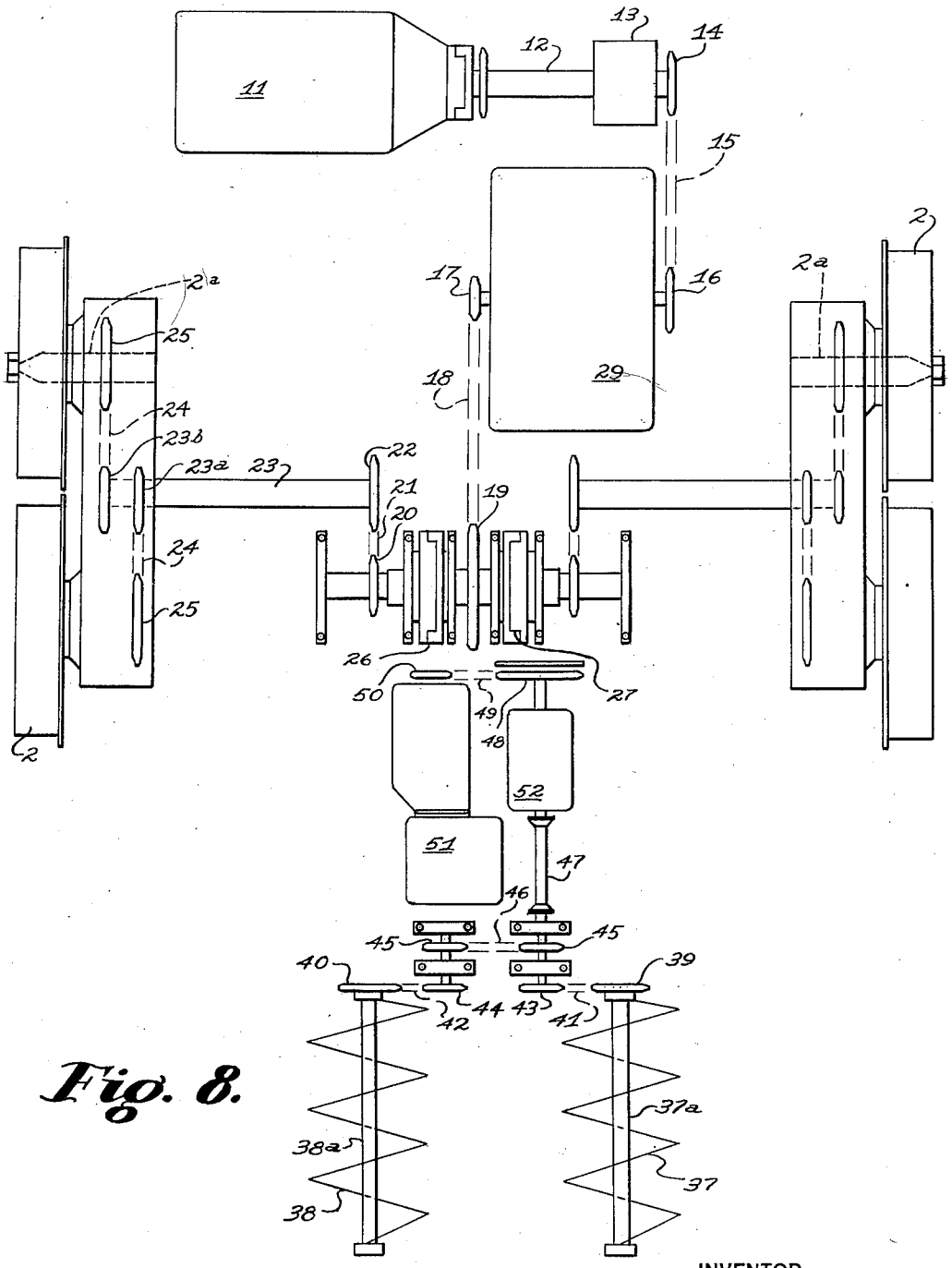

Fig. 8.

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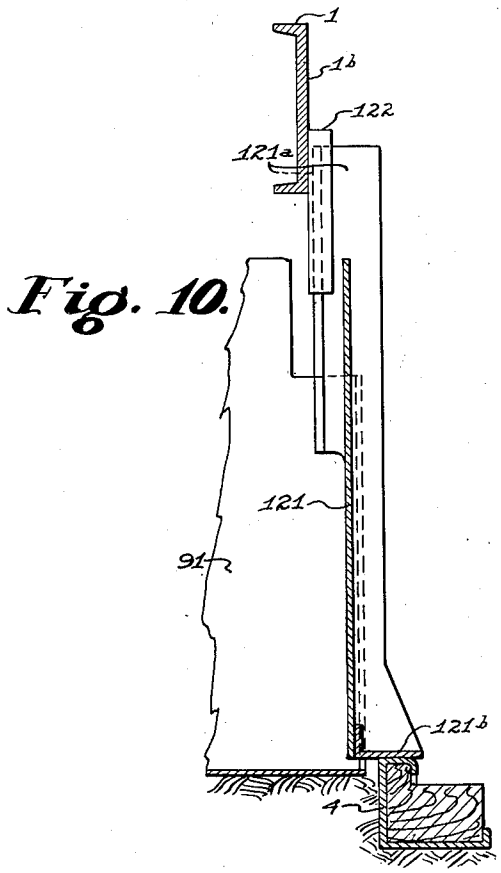

Fig. 10.

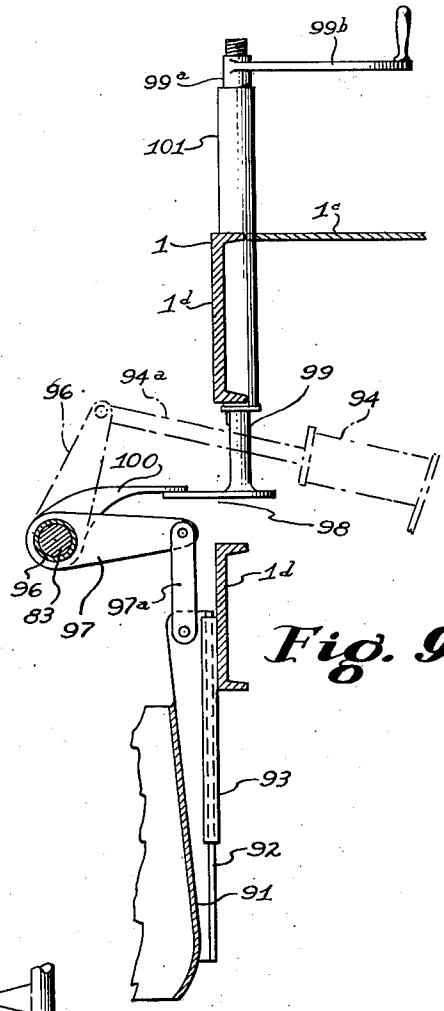

Fig. 9.

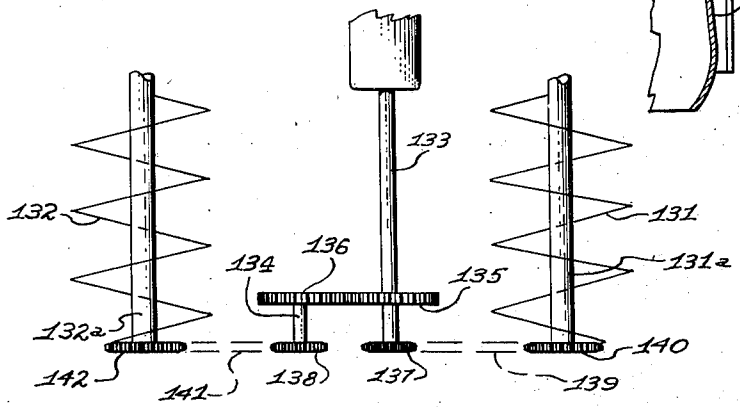

Fig. 11.

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2,583,108

UNITED STATES PATENT OFFICE

2,583,108

CONCRETE SPREADER

William Hurst Lewis, Altadena, Calif., assignor to Standard Steel Corporation, Los Angeles, Calif., a corporation of California

Application June 18, 1945, Serial No. 600,170

5 Claims. (Cl. 94—44)

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My present invention relates to a machine for spreading concrete and the like.

One of the principal objects of this invention is to provide a machine of this class to facilitate the distribution of concrete and the like uniformly over a designated area, and a machine of this class which is particularly adapted to follow dump trucks, or other conveying means, supplying concrete and the like, for uniformly spreading the same over the designated area over which the machine is intended to travel.

An important object also of this invention is to provide a machine of this class having conveying means for distributing concrete or the like forwardly or backwardly and also transversely, for filling in low spots in the concrete, or other surface to be made, and also for removing excessive amounts of material from other portions of the surface.

Another important object of this invention is to provide distributing means for concrete and the like which may be readily raised or lowered, for varying the amount of material to be distributed, and also to facilitate the conveyance of the machine from place to place.

A further important object of this invention is to provide a distributing means of this class in combination with a strike-off plate which determines the height of the surface of the material to be laid.

A still further important object of this invention is to provide a novelly positioned distributing plate in combination with a conveyor screw whereby coarse material may be directed longitudinally with respect to the direction of movement of the machine, or with respect to the direction of the road surface to be laid, and whereby the finer materials may be spread evenly in a lateral direction.

Another important object of this invention is to provide a novel and efficient means for moving the conveying means and distributing plate as a unit laterally with respect to the direction of movement of the machine.

A novel feature of this invention is the provision of vertically adjustable plates at the sides and between the supporting wheels for confining the road or surface making material between the lateral extremities of the machine.

With these and other objects in view, as will appear hereinafter, I have devised a machine, for spreading concrete and the like, having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail and particularly

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set forth in the appended claims, reference being had to the accompanying drawings, and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a plan view of the main frame and main operating elements of my concrete spreader in one form, certain portions being broken away or omitted to facilitate the illustration;

Fig. 2 is a front elevational view thereof, taken at 2—2 of Fig. 1;

Fig. 3 is a rear elevational view thereof, taken at 3—3 of Fig. 1;

Fig. 4 is a side elevational view thereof, taken at 4—4 of Fig. 1;

Fig. 5 is a fragmentary perspective view of the concrete spreading unit of the machine showing the frame in phantom;

Fig. 6 is an enlarged fragmentary sectional view, taken through 6—6 of Fig. 1, showing the mechanism for moving the concrete spreading unit transversely;

Fig. 7 is a fragmentary plan view thereof, taken at 7—7 of Fig. 6;

Fig. 8 is a diagrammatic view of the mechanism for propelling the spreader and for operating the spreading mechanism.

Fig. 9 is an enlarged sectional elevation, taken through 9—9 of Fig. 1, showing the strike-off plate limit means;

Fig. 10 is an enlarged fragmentary sectional elevation, taken through 10—10 of Fig. 4, showing the mounting of the side plates and the relation to the strike-off plate; and

Fig. 11 is a fragmentary diagrammatic view of a slightly modified form of construction of my concrete spreader in which the conveyor screws are reversed in pitch.

My concrete spreader has a main frame 1 which is supported at the opposite sides of its rear end on pairs of wheels 2 and at the opposite sides of its forward end on wheels 3. The rear wheels 2 provide the traction or moving means for the machine while the forward wheels merely support the forward end. All wheels are constructed with flanges at the inner sides for locating the wheels on side or road form boards 4, upon which the wheels are adapted to ride.

On and above the rear portion of the frame is mounted a power plant in the form of an internal combustion engine or motor 11 for propelling the concrete spreader on the form boards 4. The propelling mechanism for operating the tractor wheels 2 by the engine or motor 11 is diagrammatically illustrated in Fig. 8. As shown, the shaft 12 of the motor 11 is connected through

a gear shift transmission 13 to a drive sprocket 14. This sprocket drives a sprocket 16 through a chain 15. On the shaft of the sprocket 16 is a sprocket 17 which drives, through a chain 18, a sprocket 19. On the shaft of the latter sprocket are mounted sprockets 20 which are connected, by chains 21, to sprockets 22. On each of the shafts 23 of the latter sprockets are other sprockets 23a and 23b which are connected by chains 24 to sprockets 25 on the axles 2a of the rear wheels 2. In this manner, the speed of the engine is considerably reduced when applied to the rear wheels.

Coaxial with the sprocket 19 are arranged clutches 26 and 27 for connecting the power from the engine 11 to the sprockets 20 whereby the tractor wheels 2 at the opposite sides of the machine may be connected and controlled. The clutches 26 and 27 are controlled by a unitary clutch lever 28.

Intermediate the gear speed transmission 13 and the rear wheels may be provided another speed change transmission 29, as shown.

The transmissions 13 and 29, as shown, are provided with gear shift levers 13a and 29a, respectively.

On the forward portion of the frame 1 is mounted the spreading unit, shown best in Fig. 5. The forward portion of the frame 1 is provided with a vertical opening 1a in which the spreading unit is adapted freely to move and operate. The spreading unit is carried on a separate rectangular frame 31 which is slidably mounted at its four corners on vertical guide rods 32 which extend above the side rails 1b of the main frame 1. Such mounting of the frame 31 permits vertical movement thereof on and with respect to the main frame 1.

On the frame 31 is mounted another movable frame 33. This frame 33 is provided at its forward and rear ends with aprons 33a which hang downwardly from the frame 31 beyond and over the forward and rear sides thereof. The frame 31 has transverse rails 31a and 31b at its forward and rear sides forming tracks upon which the frame 33 is adapted to ride transversely of the machine. The frame of carriage 33 has supporting rollers 34, which support the carriage 33 on the rails, and other rollers 35 which engage or ride along the lower edges of the rails, thus retaining the carriage 33 in position. The carriage 33 also has rollers 36 at the forward and rear ends of the lateral sides thereof which ride upon the forward and rear sides of the rails 31a and 31b.

The depending aprons 33a of the carriage 33 are bifurcated, forming diverging arms which rotatably support, at the lower and lateral ends thereof, separate large conveyor screws 37 and 38. The forward ends of the shafts 37a and 38a, which carry the respective screws 37 and 38, are mounted on the laterally positioned arms of the forward depending apron 33a. On the front ends of these shafts are mounted, respectively, sprockets 39 and 40, which are connected by chains 41 and 42, respectively, to sprockets 43 and 44. The shafts of the latter sprockets have sprockets 45 which are connected by a chain 46, thus driving the two screws 37 and 38 in unison and in the same direction.

The drive shaft 47 of one of the sprockets 45 is connected through another sprocket 48, chain 49, and sprocket 50 to another power plant, in the form of an internal combustion engine 51. This engine 51 is carried on the upper connecting portion or bridge 33b of the carriage 33. Thus, the mechanism and various movements of the spreader unit are powered separately from the engine propelling the machine.

The sprockets 45 and 48 may be connected through a speed change transmission 52 through which the speed and direction of the conveyor screws 37 and 38 may be controlled.

The carriage 33, which supports the conveyor screws 37 and 38, is shown as being capable of being moved transversely by a hydraulic mechanism shown best in Figs. 5 and 6 of the drawings. On the side members 31c of the rectangular frame 31 are mounted hydraulic cylinders 61 having inwardly directed reciprocating plungers 61a carrying a unitary cross-head 61b on which is mounted a pair of sheaves 62 and 63. Around the sheaves 62 and 63 extend cables 64 and 65, respectively. One end of each cable is secured to a side rail 31c of the frame 31, and the other end of each cable is secured to the carriage 33, and respectively, to the lateral edge portion of the connecting platform or bridge 33b thereof, and specifically at the side of such platform nearest the side rail 31c of the frame 31 to which the other end of the respective cable is connected. That is, the ends of the cable 64 are secured to the adjacent sides of the frame 31 and the carriage 33 while the ends of the cable 65 are connected to the opposite adjacent sides of the frame 31 and the carriage 33. Such arrangement provides twice the movement of the carriage 33 for the movement of each plunger 61a of an hydraulic cylinder.

On the platform 1c, at the rear portion of the machine on which the engine 11 is mounted, is also mounted a control box 71 having a plurality of levers or buttons 71a for controlling various movements of certain elements of the machine. One of these buttons may be operated to control the hydraulic cylinders 61 through flexible fluid conductors 72 and 73, shown in Figs. 1 and 4.

The raising and lowering of the frame 31 is also controlled by one of the buttons 71a on the control box 71. From the control box the flow of hydraulic fluid is controlled to or from hydraulic cylinders 81, one positioned at the opposite sides of the machine. The plungers 81a of these hydraulic cylinders are connected to the ends of arms 82 mounted at the ends of a rock shaft 83 which is positioned in front of the platform 1c and mounted at its ends on the opposite side rails 1b of the main frame. Near the opposite ends of the rock shaft 83 are provided bellcranks 84. One arm 84a of each of these bellcranks is connected by a link 85 to the rear rail 31b of the frame 31. The other or lower arms 84b of the bellcranks 84 are connected by links 86 to one arm of other bellcranks 87. The other arms of the latter bellcranks are connected by links 88 to the opposite ends of the forward rail 31a of the frame 31. In this manner, operation of the hydraulic cylinders 81 raises or lowers the frame 31 simultaneously at all corners thereof. Thus, the elevation of the conveyor screws 37 and 38 may be readily controlled from the control box 71.

Immediately behind the spreader unit, comprising the conveyor screws 37 and 38, is a strike-off plate 91 which is provided at its rear side with vertical brackets 92 of T-shaped cross-section. These brackets are reciprocally mounted in a vertical direction in guides 93 which are supported at the front side of the transverse connecting portion 1d of the main frame. The raising and lowering of the strike-off plate is also controlled by one of the buttons 71a of the control box 71. From this box the flow of hydraulic fluid is controlled to the hydraulic cylinder 94 having a plunger 94a

pivotally connected to an arm 95 extending from a rocking member 96. This rocking member is in the form of a tube rotatably mounted about the rock shaft 83. The tubular rocking member 96 has laterally extending arms 97 which are connected to the upper portion of the strike-off plate 91 for raising and lowering the same by means of the hydraulic cylinders 94.

On the forward wall 1d of the main frame is provided a stop 98 which may be vertically adjusted by means of a screw 99 which is mounted on the cross-portion 1d of the main frame and is readily accessible from the operating platform 1c thereon. The tubular rocking member 96 has a laterally extending arm 100 which is adapted to rest upon the stop 98 for positively limiting the low position of the strike-off plate. In this manner the low position of the strike-off plate may be changed by the operation of the adjusting screw 99. The screw is raised or lowered by a nut 99a positioned at the upper end of a vertical tubular screw guide 101 supported on the upper cross-beam 1d of the frame 1. The nut 99a has a lever or arm 99b for operating the same. This structure is shown best in Fig. 9.

In operation, the machine is moved forwardly at a slow rate of speed, and the conveyor screws are rotated in either direction and at the desired speed and also moved transversely with respect to the machine, as described above. This permits transfer of concrete, or other similar surfacing material, forwardly or backwardly, or laterally. The conveyor screws tend to convey all coarser aggregates of the surfacing material forwardly, but may not provide effective means for laterally distributing the concrete, or other surfacing material. I have therefore provided a vertical distributing plate 111 which, in this instance, is positioned intermediate the conveyor screws 37 and 38 and parallel to the longitudinal axis of the machine, and to the rotating axes of the conveyor screws. This distributing plate 111 is supported by and depends from the carriage 33. The lower edge of the distributing plate is preferably positioned a slight distance below the lowermost positions of the conveyor screws. This distance in most instances is approximately one-half inch. Since this plate is mounted on the carriage 33, it is movable laterally with the conveyor screws.

In order to confine the concrete, or other surfacing material, between the lateral portions of the machine, and inwardly from the forward wheels 3, I have provided side guards 121 which have, on their inner sides, supporting brackets 121a of T-shaped cross-section, the upper portions of which are reciprocally mounted in guides 122 supported on and depending from the side walls 1b of the main frame 1. The lower edges of the side guards 121 are provided with runners 121b which are adapted to ride upon the side or road form boards 4 when such side guards are in normal or operative positions. These side guards may be raised by hydraulic means which also may be controlled by a button on the control box.

As shown in Fig. 1 of the drawings, a hydraulic cylinder 123 is mounted at the rear portion of the frame 1 and the plunger 123a thereof is connected to an arm 124 mounted on a rock shaft 125 at the rear end of the main frame. At the ends of the rock shaft are provided other arms 126 which are connected by rods 127 to one arm of bellcranks 128 mounted on the sides 1b of the main frame 1. The other arms of these bellcranks may be connected with the side guard plates 121 by suitable links 129.

In the structure described above, the conveyor screws 37 and 38 are the same, that is, of the same hand. The conveyor screws 131 and 132 in modified structure shown in Fig. 11, are of opposite hand, that is, one is right hand, and the other is left hand. In this instance, the drive shaft 133 of the conveyor operating motor is connected to a countershaft 134 by gears 135 and 136. The shafts are provided with sprockets 137 and 138, respectively. The sprocket 137 is connected by a chain 139 to a sprocket 140 mounted on a shaft 131a of the screw 131. The drive sprocket 138 is connected by a chain 141 to the sprocket 142 mounted on the shaft 132a of the screw 132. Thus the two screws 131 and 132 are rotated in opposite directions for simultaneously feeding the concrete forwardly or backwardly. I have found that this method of conveyance is more satisfactory with certain materials.

Though I have shown and described a particular construction, combination, and arrangement of parts and portions, of my spreader for concrete, or the like, I do not wish to be limited to the same, but desire to include in the scope of my invention the construction, combination, and arrangement substantially as set forth in the appended claims.

I claim:

1. In a road machine supported on wheels, a transverse trackway supported by said machine, a carriage supported on said trackway for transverse movement, a screw carried by said carriage and disposed with its axis transverse to the trackway and parallel to the longitudinal axis of the machine, means for rotating said screw, and means for moving said carriage transversely along said trackway.

2. In a road machine supported on wheels, a transverse trackway supported by said machine, a carriage movable along said trackway, a screw carried by and rotatable on said carriage, said screw being disposed with its axis transverse to the trackway and parallel to the longitudinal axis of the machine, means for rotating said screw, and means for moving said carriage transversely along said trackway.

3. In a road machine supported on wheels, a transverse trackway supported by said machine, a carriage movable along said trackway, a plurality of screws rotatably mounted on said carriage with their axes extending transverse to the trackway and parallel to the longitudinal axis of the machine, means for rotating said screws, and means for moving said carriage transversely along said trackway.

4. In a machine of the class described, a main frame having a longitudinal axis extending in the direction of travel of the machine, a carriage carried by and movable transversely of the main frame, a pair of screws carried by and rotatably mounted on said carriage in laterally-spaced relationship and with their axes extending parallel to said longitudinal axis, rotating means for selectively rotating the screws in either direction, and moving means for moving said carriage and the screws carried thereby transversely of said longitudinal axis.

5. In a machine of the class described, a main frame having a longitudinal axis extending in the direction of travel of the machine, a carriage carried by and movable transversely of the main frame, a pair of screws carried by and rotatably mounted on said carriage in laterally-spaced rela-

tionship and with their axes extending parallel to said longitudinal axis, rotating means for selectively rotating the screws in either direction, moving means for moving said carriage and the screws carried thereby transversely of said longitudinal axis, and a substantially vertical distributing plate positioned between and substantially parallel to said screws with its lower edge extending below the lower portions of said screws.

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