No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 1.

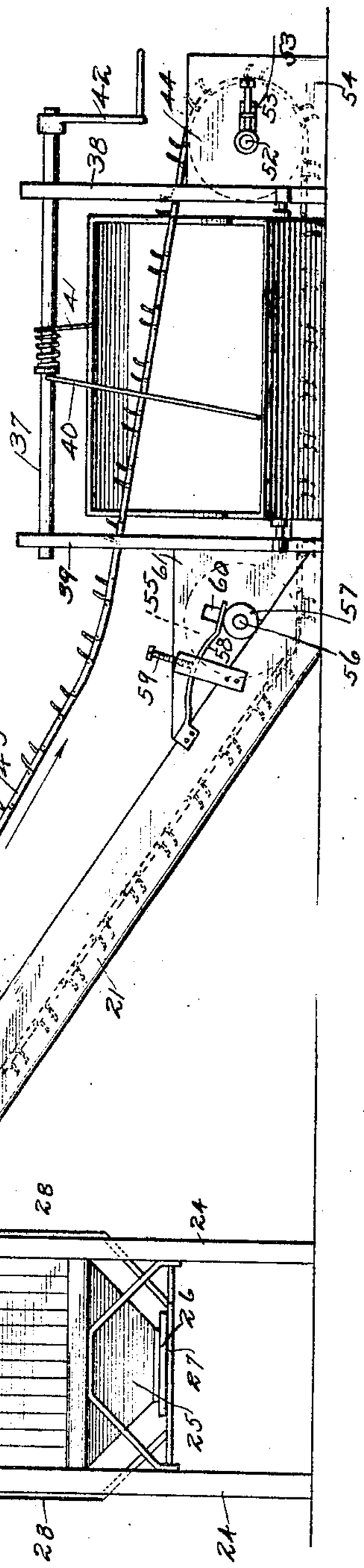


Fig. 1

Witnesses:
C. F. Plumtree
N. J. Mikel

Inventor.
Ralph T. Sollitt
by Bond Adams Pickard & Jackson
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 2.

Fig: 2.

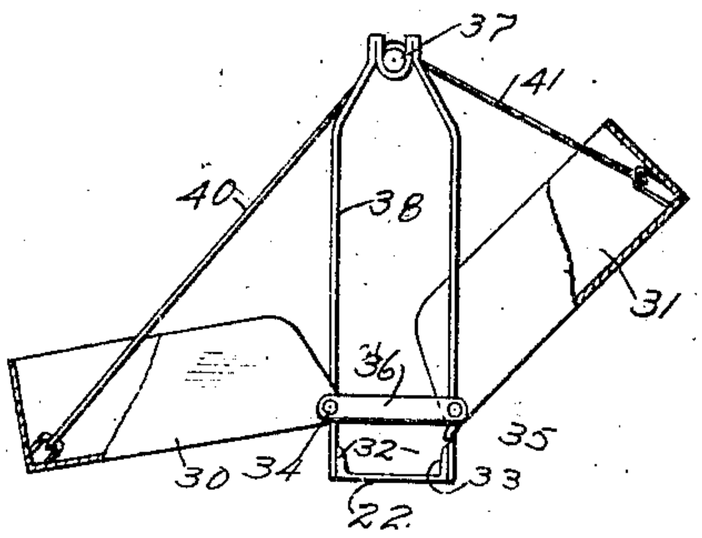


Fig: 3

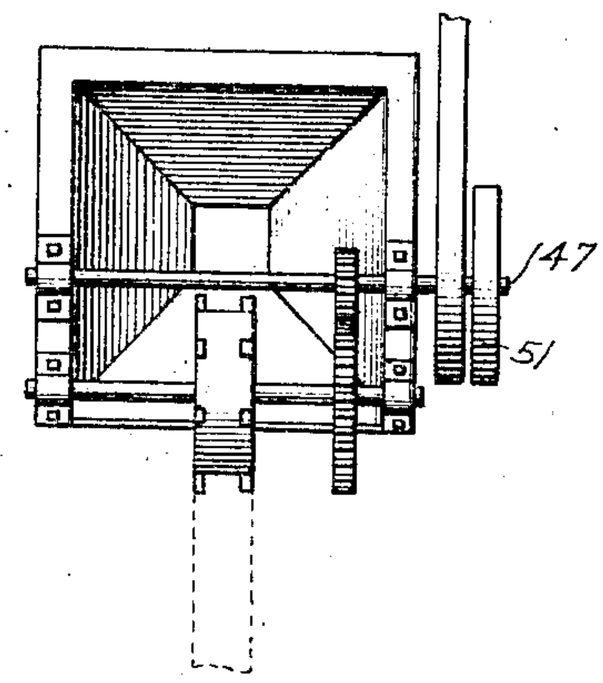


Fig: 4

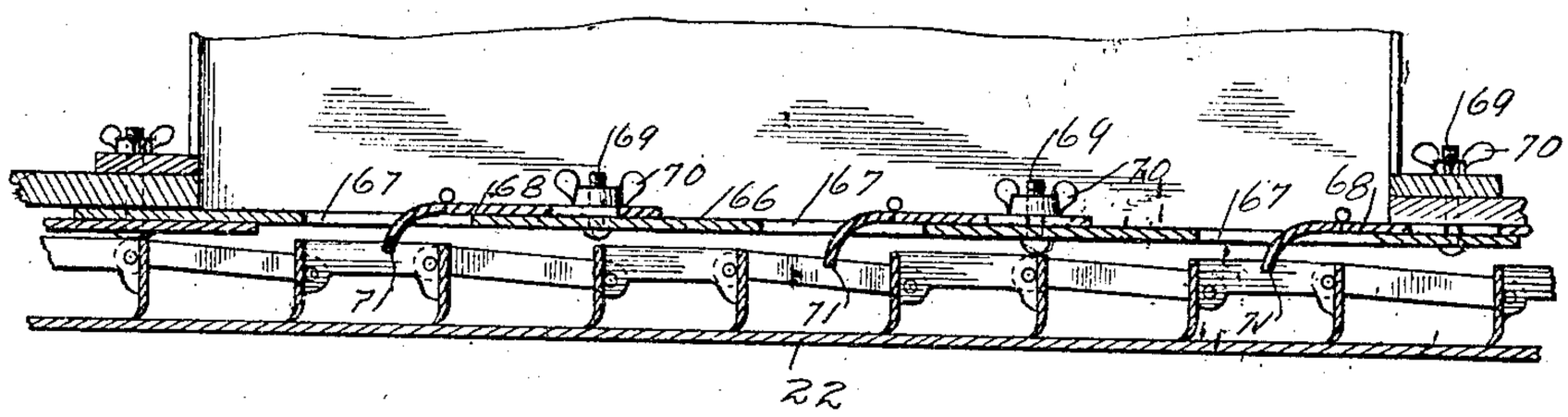


Fig: 5

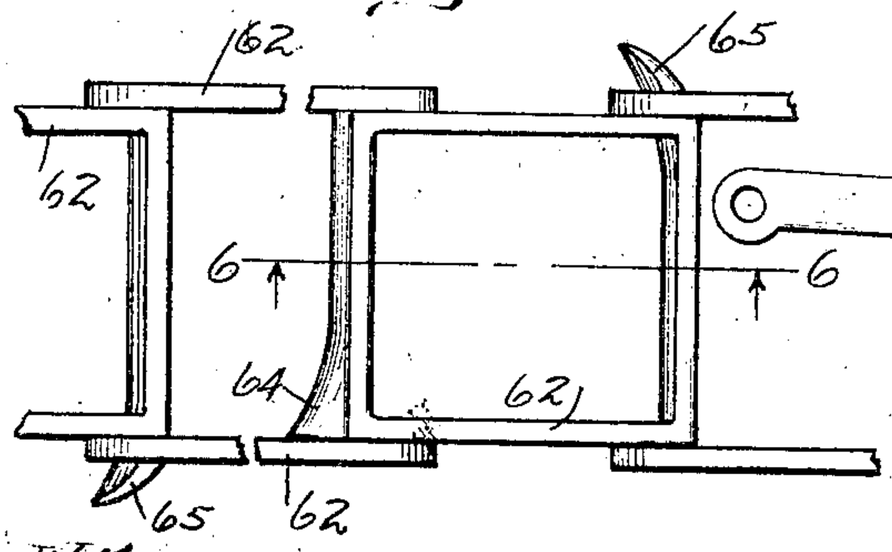
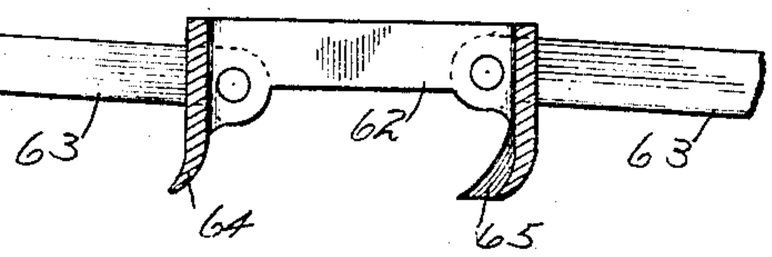


Fig: 6



Witnesses:
C. F. Plumtree.
M. J. McPike

Inventor.
Ralph T. Sollitt,
by Bond Adams Pickard & Jackson.
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 3.

Fig. 7.

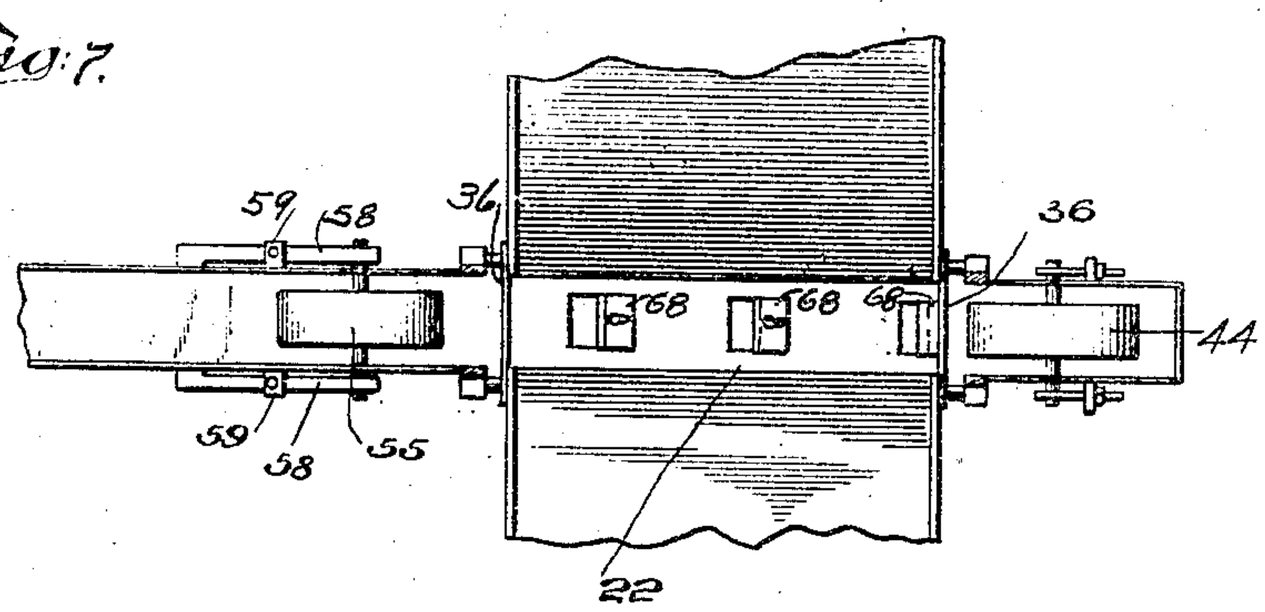


Fig. 9.

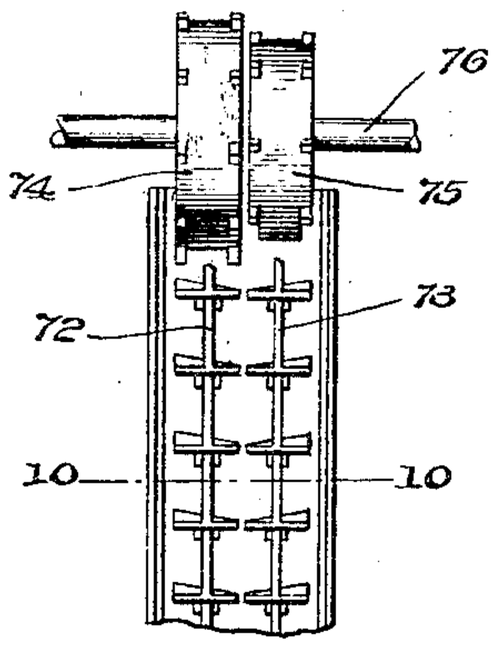


Fig. 10.

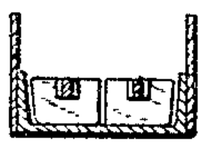


Fig. 11.

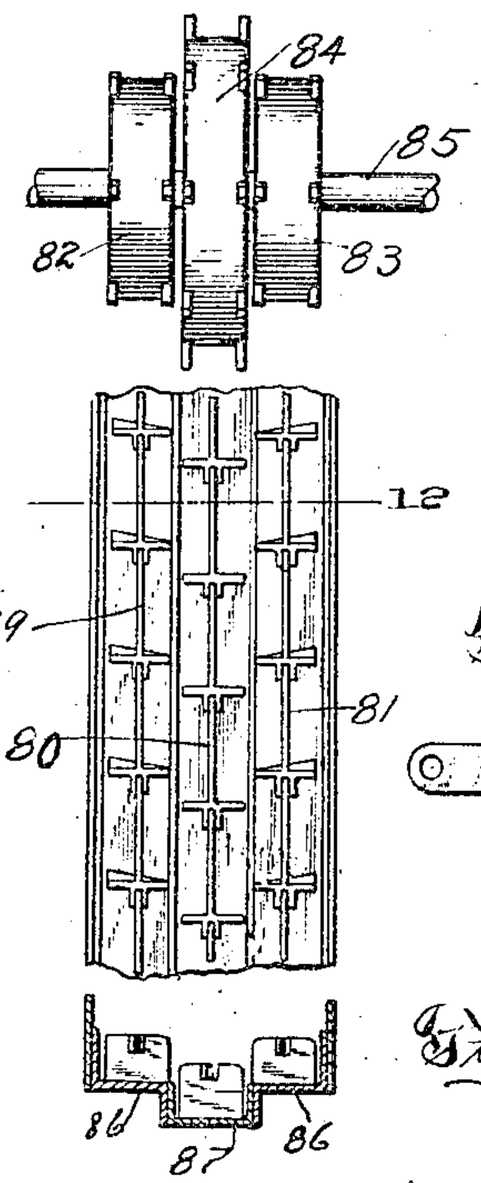


Fig. 8.

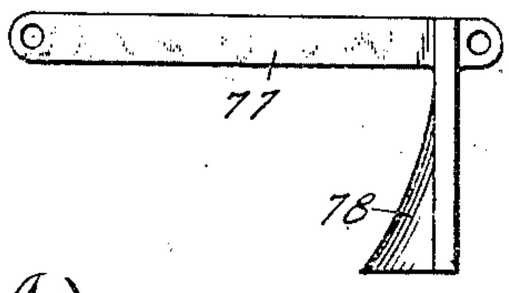


Fig. 12.

Witnesses:
C. F. Plumtree
M. J. McSpike

Inventor:
Ralph T. Sollitt
by Bond Adams Pierce & Johnson
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 4.

Fig. 13.

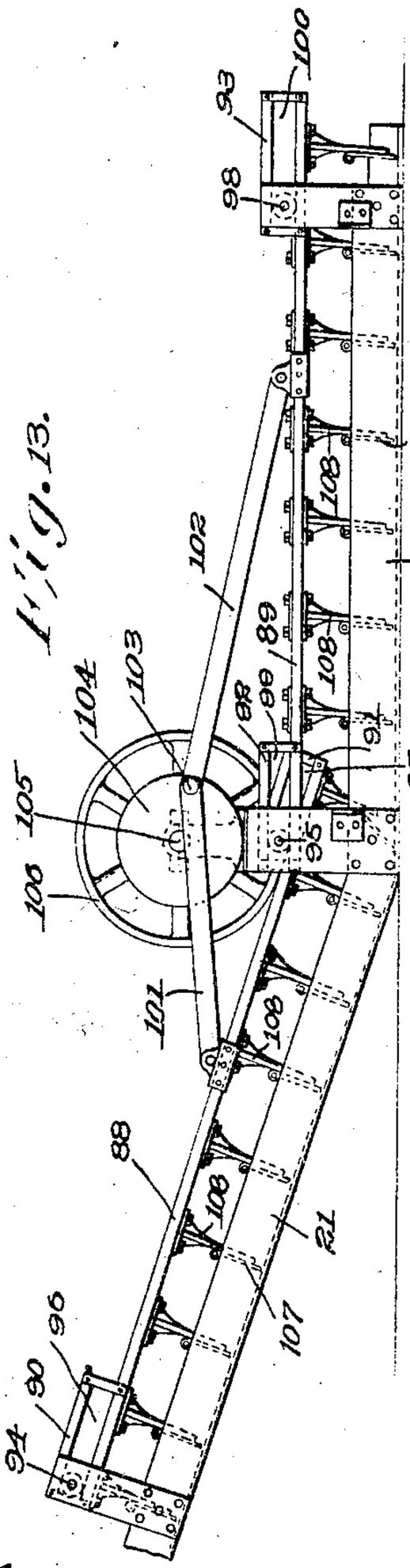


Fig. 14.

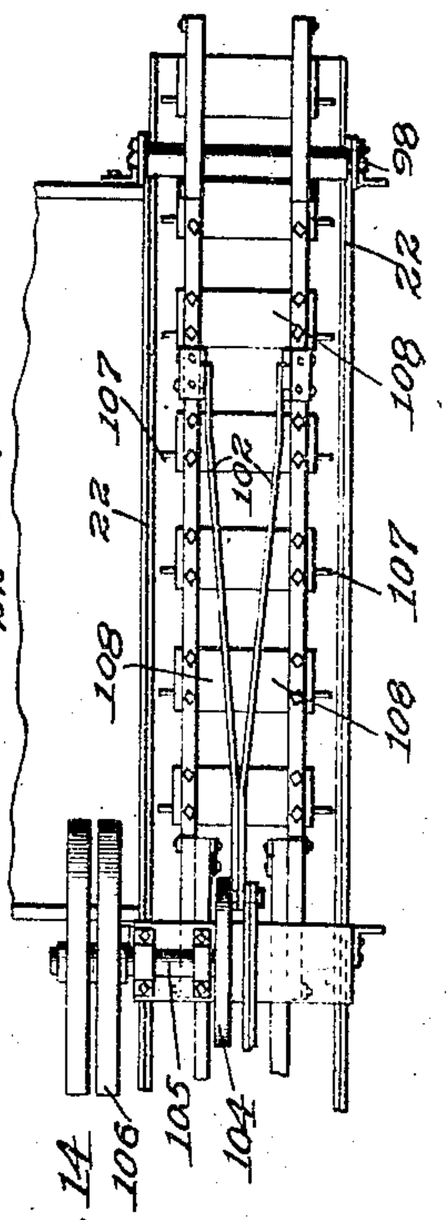


Fig. 15.

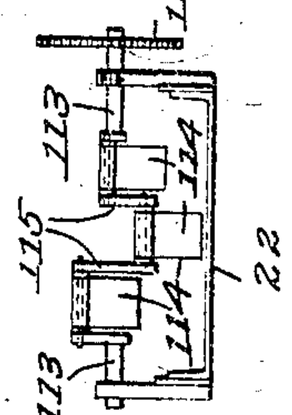
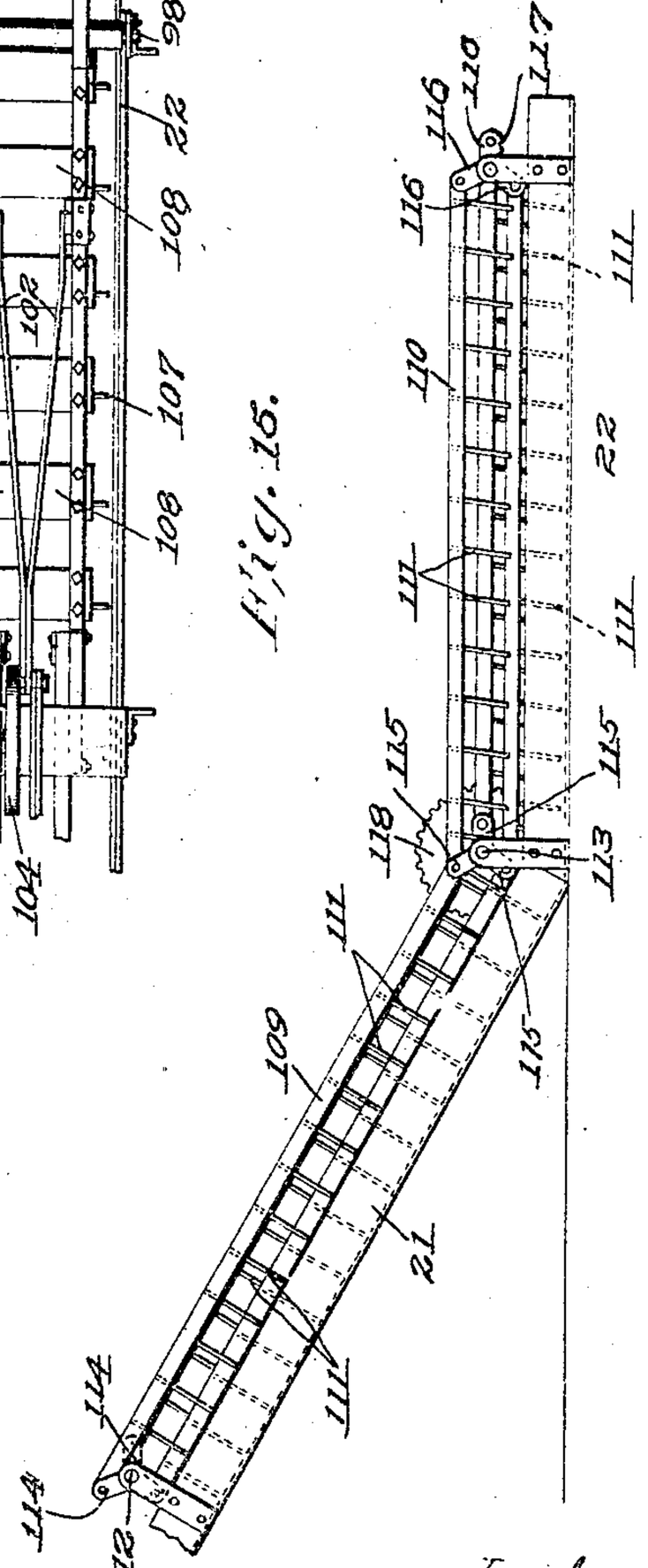


Fig. 16.



Witnesses:
C. F. Plumtree
M. J. McNeil

Inventor:
Ralph T. Sollitt
by Bond Davis Pickard Jackson
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 5.

Fig. 18.

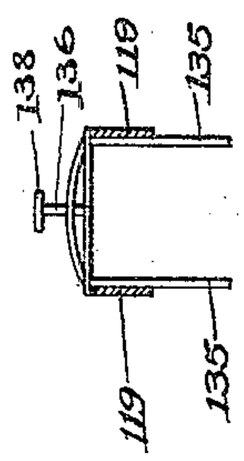


Fig. 17.

Witnesses:
C. F. Plumtree
M. J. McSpike

Inventor:
Ralph T. Sollitt
by Bond Adams Pickard Jackson
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 6.

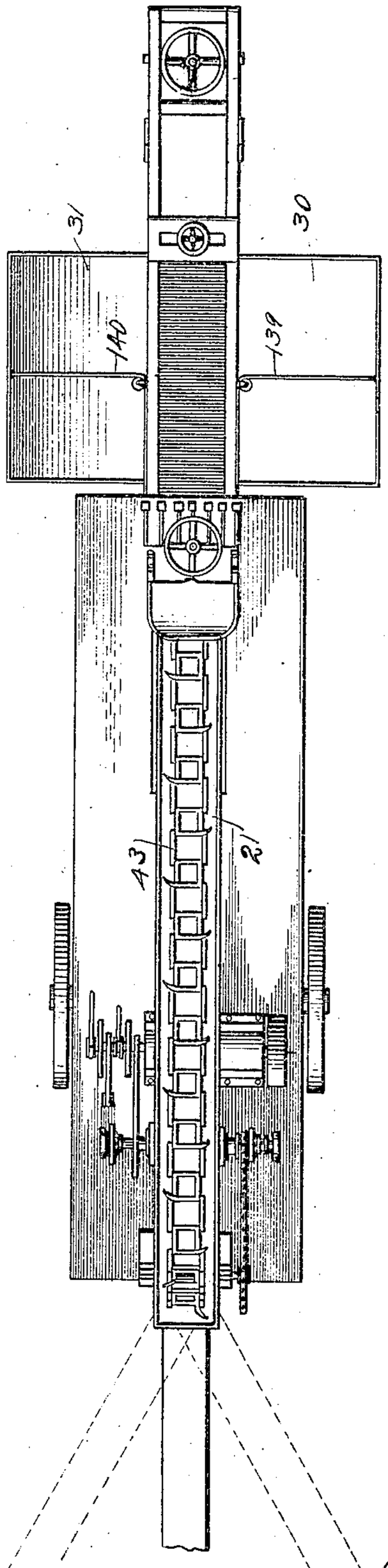


Fig. 19.

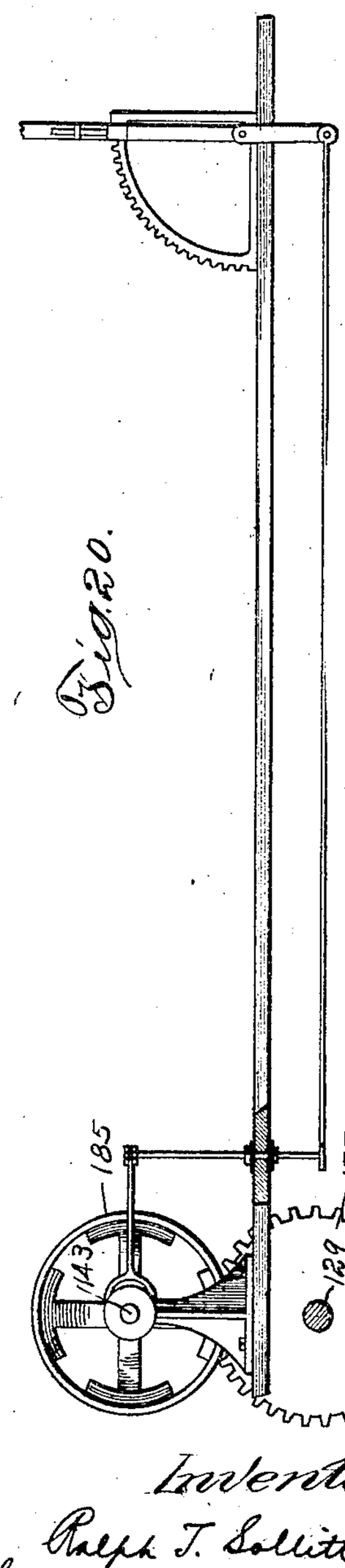


Fig. 20.

Witnesses:
C. F. Burtis
M. J. McSpike

Inventor:
Ralph T. Sollitt.
by Bond Adams Parker & Johnson.
his Attys.

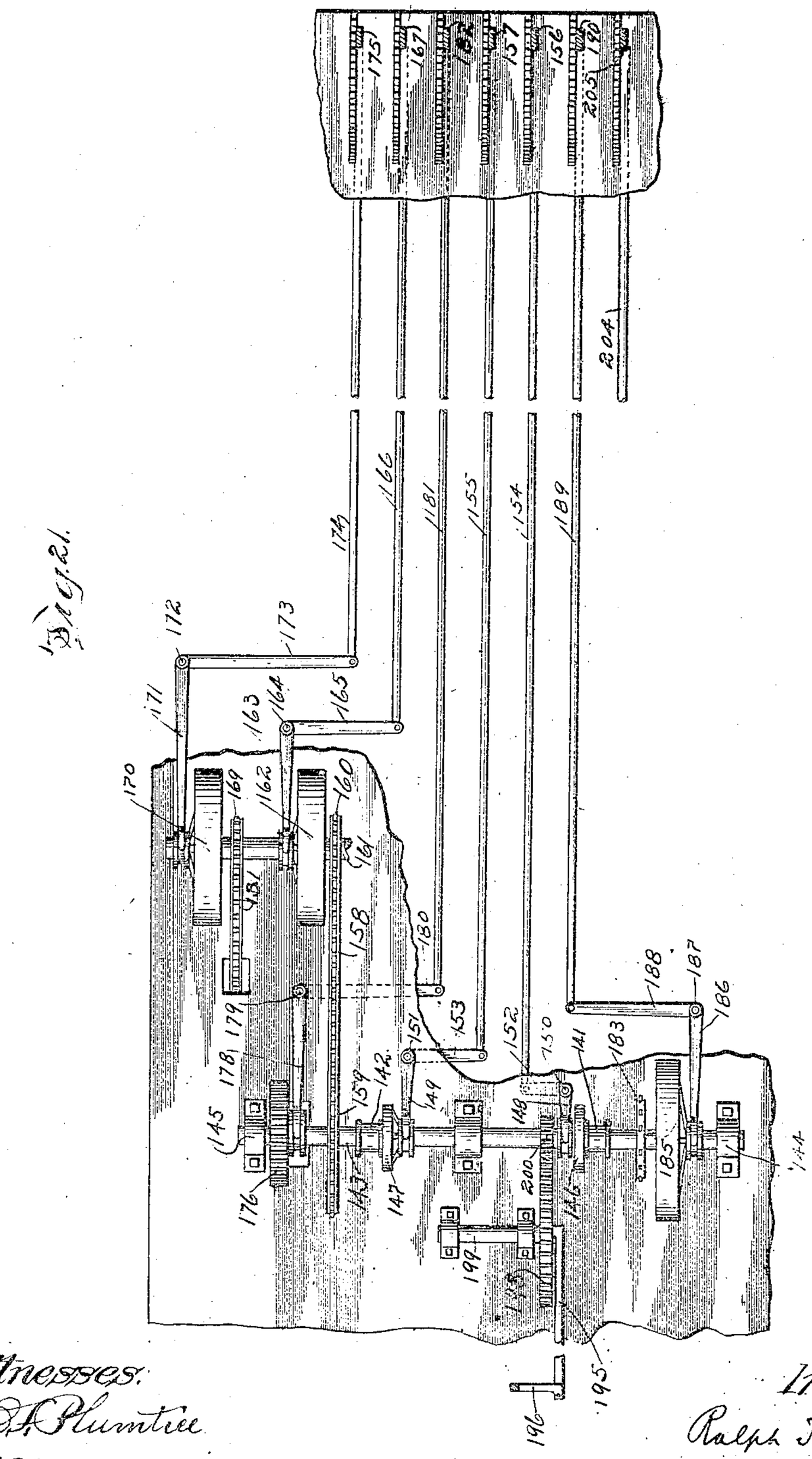
No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 7.



Witnesses:
C. F. Pluntze
M. J. McVicker

Inventor:
Ralph T. Sollitt,
by Bond Adams Pierce & Parker
his Attys.

No. 883,983. PATENTED APR. 7, 1908.

R. T. SOLLITT.

CONCRETE MIXING MACHINE.

APPLICATION FILED NOV. 28, 1903.

8 SHEETS—SHEET 8.

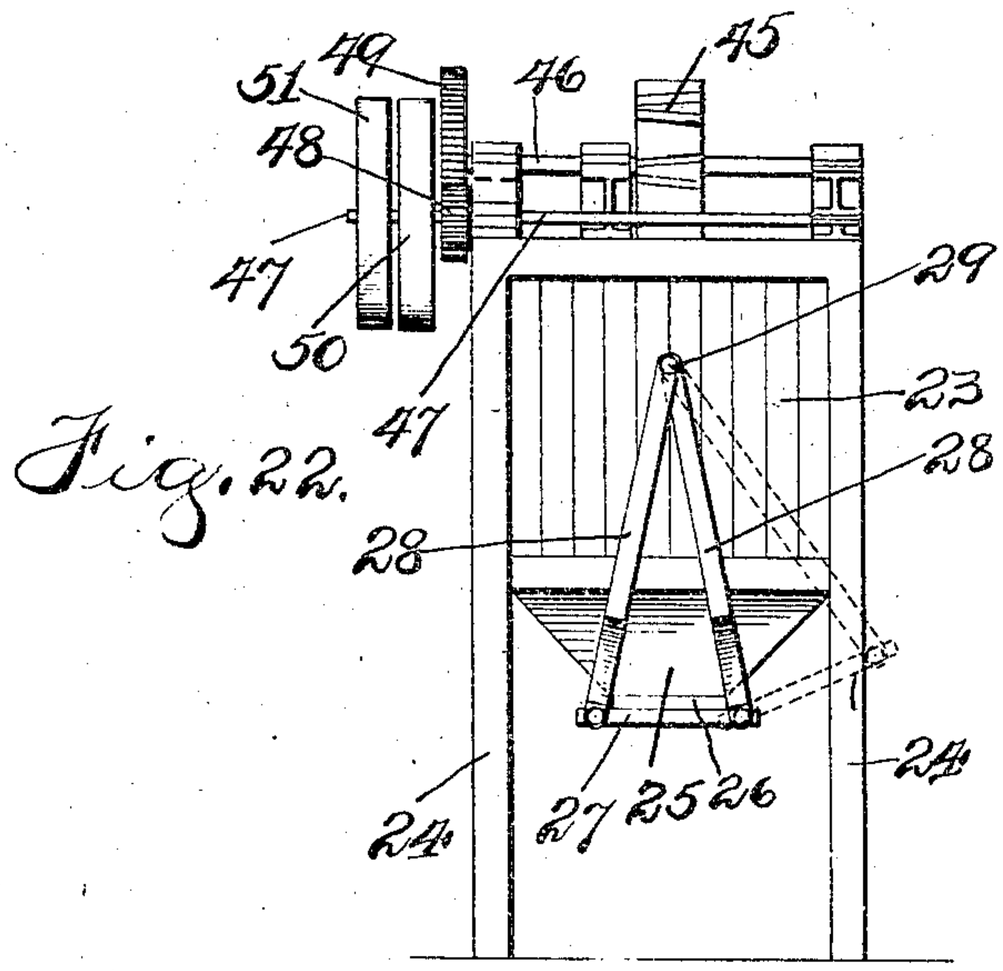


Fig. 22.

Fig. 24.

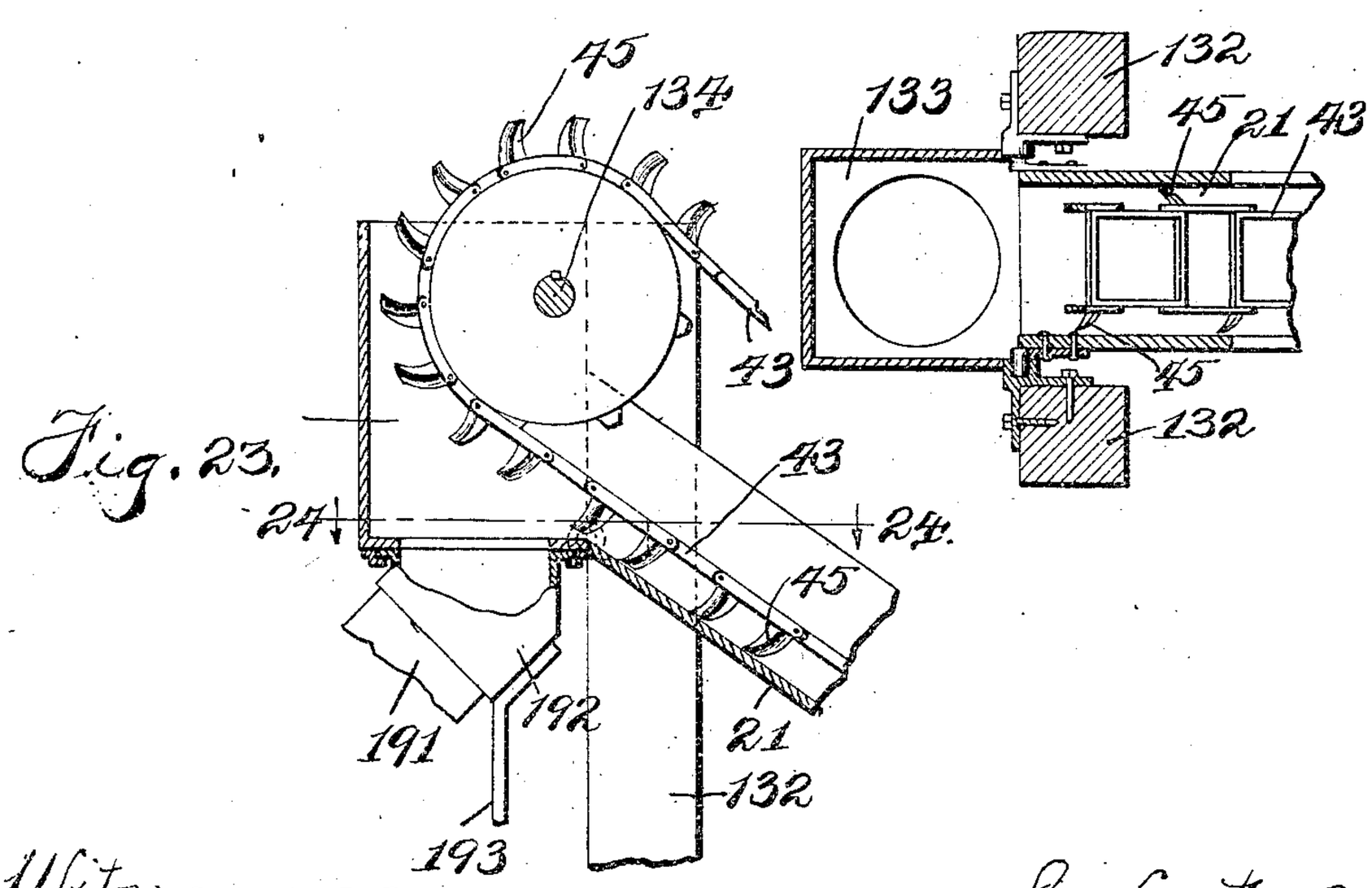


Fig. 23.

Witnesses:
J. B. Weir
Emil E. Wettmann

Inventor:
Ralph T. Sollitt,
by Bond Adams Pierce & Jackson
his Attys.

UNITED STATES PATENT OFFICE.

RALPH T. SOLLITT, OF CHICAGO, ILLINOIS.

CONCRETE-MIXING MACHINE.

No. 883,963. Specification of Letters Patent. Patented April 7, 1908.

Application filed November 28, 1903. Serial No. 183,079.

To all whom it may concern:

Be it known that I, RALPH T. SOLLITT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete-Mixing Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to machines for mixing the ingredients used in making concrete, which are usually crushed stone, sand, and cement.

It has for its object to provide a new and improved machine, by which the mixing of the ingredients may be thoroughly effected and by which the materials, both before and after mixing, may be more economically and easily handled. I accomplish this object as illustrated in the drawings and as hereinafter described.

What I regard as new is set forth in the claims.

In the accompanying drawings,—Figure 1 is a side elevation, illustrating one form of machine embodying my invention; Fig. 2 is an end view, partly in section, illustrating the charging-pans; Fig. 3 is a plan view of the hopper and adjacent parts shown in Fig. 1; Fig. 4 is a longitudinal section of that part of the mixing-apparatus which lies between the charging-pans; Fig. 5 is an enlarged plan view of a part of the conveyer-mechanism shown in Figs. 1 and 4; Fig. 6 is a longitudinal section on line 6—6 of Fig. 5; Fig. 7 is a plan view, illustrating the inner portion of the charging-pans and adjacent parts of the machine; Fig. 8 is a side elevation of one of the links of the conveyer shown in Figs. 5 and 9; Fig. 9 is a partial plan view, illustrating a modified form of conveyer; Fig. 10 is a cross-section on line 10—10 of Fig. 9; Fig. 11 is a partial plan view, illustrating a further modification; Fig. 12 is a cross-section on line 12—12 of Fig. 11; Fig. 13 is a side elevation, illustrating a further modification; Fig. 14 is a plan view of a part of the mechanism shown in Fig. 13; Fig. 15 is a side view, illustrating a further modification; Fig. 16 is an end view of the parts shown in Fig. 15; Fig. 17 is a side elevation of a further modification, illustrating the application of my improvements to a self-moving or automobile machine; Fig. 18 is a vertical section on line 18—18 of Fig. 17; Fig. 19 is a plan view of the machine shown in Fig. 17; Fig. 20 is a longitudinal vertical section, illustrating a typical operating-lever and the mechanism through which it acts; Fig. 21 is a partial plan view, partly broken away,—showing the arrangement of the different operating-levers and clutches by which the machine is controlled; Fig. 22 is an end-elevation of the form of apparatus shown in Fig. 1; Fig. 23 is a partial longitudinal sectional view of the upper portion of the trough and carrier,—showing also a part of the delivery-spout; and Fig. 24 is a horizontal section on line 24—24 of Fig. 23.

In the simplest form of my improved machine, illustrated in Fig. 1, I provide an inclined trough 21, which leads from a substantially horizontal trough 22 best shown in Fig. 2 to a hopper 23,—the upper end of said trough being at a sufficiently high elevation so that a hopper of the required capacity may be used. The hopper 23 is mounted on legs 24, and is provided at its lower end with a funnel 25, the opening of which is closed by a swinging gate 26. The gate 26 is supported by crossbars 27, carried at the lower ends of swinging-links 28 pivotally connected at their upper ends by pivots 29 with the frame of the hopper, as shown in Figs. 1 and 22. The arrangement is such that the gate 26 may be swung away from the funnel opening as shown in dotted lines in Fig. 22,—thereby permitting the contents of the hopper to be discharged into a wheelbarrow set below it. As shown in Figs. 1 and 22, the lower end of the funnel 25 is set at a distance from the ground,—the arrangement being such that sufficient space is provided for a wheelbarrow to be set below the hopper to receive the contents thereof.

The usual ingredients for making concrete are supplied to the horizontal trough 22 by charging-pans 30—31, arranged at opposite sides thereof and pivoted thereto, preferably at points slightly above the sides 32—33 of the trough 22, by pivots 34—35, respectively, as shown in Fig. 2.

36 indicates braces, connecting the pivots 34—35.

37 indicates a shaft, by which the charging-pans 30—31 are rocked to discharge their contents alternately into the trough 22. Said shaft is mounted horizontally in standards 38—39 near the ends of the trough 22, as best shown in Figs. 1 and 2.

40—41 indicate cables, connected at their outer ends to the outer portions of the charging-pans 30—31, respectively, and at

their inner ends to the shaft 37, as shown in Figs. 1 and 2. Said cables are so arranged that when one of them is wound upon the shaft 37 the other is unwound, as shown in Fig. 1, so that by rotating said shaft in one direction or the other, either of the pans 30—31 may be tilted to discharge its contents into the trough, while the other is rocked in the opposite direction, into position to receive a fresh charge. A crank 42, or other suitable device, is provided for rotating the shaft 37.

In practice, sand, cement and stone in proper proportions are dumped into the pan which is in position to receive the charge,—as, for example, the pan 30 in Fig. 2. The shaft 37 is then rotated, raising the pan with its contents and discharging the mass of materials into the trough 22,—the other pan at the same time moving down into position to receive another charge. The materials so dumped into the trough 22 are mixed, and simultaneously elevated, by a traveling conveyer 43, consisting, in the form shown in Fig. 1, of an endless chain which passes around a lower pulley 44 and an upper sprocket-wheel 45,—said sprocket-wheel being mounted upon a shaft 46 mounted on the hopper 23 and driven from a drive-shaft 47 by intermeshing pinions 48—49, as shown in Fig. 1. The shaft 47 is provided with fast and loose pulleys 50—51, shown in Figs. 1 and 3, so that its operation may be readily controlled. It may be driven from any suitable source of power. The pulley 44 is carried by a shaft 52, suitably mounted in sliding-boxes 53 mounted in supports 54 near the standard 38. By this construction the pulley 44 may be adjusted to regulate the tension on the conveyer-chain 43.

As best shown in Figs. 1 and 4, the lower portion of the chain 43 passes through the trough 22 and up through the trough 21 carrying the materials up on the trough, on which they rest during the mixing and elevating operation,—the upper portion of the chain forming the return. In order to hold the lower portion of the chain 43 down in proper operative position, I provide a tension-pulley 55, best shown in Figs. 1 and 7, which is loosely mounted on a shaft 56 fitted with suitable collars 57 which are cylindrical in form and are adapted to engage the side edges of the trough 21 when said pulley is in its lowermost position, as shown in Fig. 1. Springs 58 are provided, which, at one end, are secured to the sides of the trough 21,—their free ends resting upon the collars 57, exerting downward pressure thereupon. Adjusting screws 59 are provided over the springs 58 for regulating the tension upon the collars 57. To prevent the shaft 56 from becoming displaced, said shaft extends through slots 60 in side plates 61 provided adjacent to the standard 39, as shown in Fig. 1. The slots 60 are arranged at an angle to the upper edges of the trough 21, so that the shaft 56, with its collars 57, is free to move toward and from the upper edges of the trough, except in so far as its position is controlled by the springs 58. By this construction the pulley 55 has sufficient freedom of action to permit of the passage of large masses of material without danger of breaking, and the tension-pulley 55 cannot move downward far enough to cause the conveyer to bear too hard upon the trough.

If desired, the collars 57 may be arranged to bear in the slots 60 instead of on the upper edges of the sides of the trough 21, in which case said slots are suitably enlarged, as shown in Fig. 17.

The construction of the conveyer-chain 43 is best shown in Figs. 4, 5, and 6,—from an inspection of which it will be seen that said chain is composed of conveyer-links 62 and connecting-links 63. The conveyer-links 62 consist of open rectangular frames, shown in Fig. 5, having downwardly-extending blades 64—65 which also extend forward at one side, after the manner of a plow. As shown in Fig. 5, the blades 64 extend downward, and are coincident with the side edges of the links 62, while the blades 65 project both downward and laterally beyond the side edges of said links. On alternate links 62 the blades 65 project in opposite directions, as shown in Fig. 5. The links 63 are small bars which pivotally connect the links 62. The conveyer-links 62 do not act solely to elevate the mass of materials in the trough, but, by moving upward through the inclined trough 21, they serve to effect a complete intermixture of the ingredients, which are delivered to the hopper in a thoroughly mixed condition. The conveyer is so constructed that the materials are not carried up continuously, but are given an intermittently progressive movement,—falling back from time to time over the upper edges of the blades 64—65, and being also thrown from side to side, by the blades 64—65, owing to the form and arrangement of said blades, the forward edges of which are inclined, in whole or in part, to the line of movement of the conveyer; so that any given quantity of material is turned over many times before reaching the hopper. The effect is analogous to that secured when such materials are hoed by hand, as is the custom where machinery is not employed for mixing purposes.

In order to control the feeding of the unmixed materials to the trough 22, I provide a plate 66, which extends over the trough 22, as shown in Fig. 4, and is provided with a number of openings 67 through which the material dumped upon said plate from the pans 30—31 may pass to the trough 22. The size of the openings 67, and the feeding of the material through said openings, is controlled

by sliding-plates 68 secured to the upper side of the plate 66 by bolts 69 provided with thumb-screws 70, as shown in Fig. 4. Said plates are provided with hinged ends 71, which are turned down, as shown in Fig. 4, so as to lie in the path of the conveyer. By this construction the plates 68 may be adjusted to project a greater or less distance into the openings 67, thereby regulating the size of said openings; and the hinged ends of said plates operate to agitate the material lying on the plate 66, since, as the conveyer moves along, its links successively engage the downturned ends of said plates, causing them to vibrate and agitate the material,—thus preventing packing thereof and insuring the proper feeding of the material through the openings 67.

In Fig. 9, I have shown a modified form of conveyer-mechanism, in which I employ two conveyer-chains 72—73 arranged to move through the troughs 21—22 side by side,—being operated by sprocket-wheels 74—75, respectively, mounted on a shaft 76 which corresponds with the shaft 46. Said sprocket-wheels 74—75 are of different diameters, so that the chains 72—73 move at different speeds. In other respects they are operated similarly to the chain 43. Each of said chains 72—73 is composed of a series of links 77 having blades 78, shown in Fig. 8,—the blades of the two chains 72—73 being oppositely disposed, as shown in Fig. 9. By this construction the materials are thrown back and forth across the trough from one conveyer to the other as it moves upward therein,—thus effecting a thorough intermixture thereof. In this arrang ent also the materials are carried up irregularly,—the transverse movement of the materials, effected by the operation of the belts at different rates of speed, being supplementary to such movement.

In Fig. 11 I have shown an amplification of the construction shown in Fig. 9, in which I employ three conveyer-chains 79—80—81, respectively,—the outside chains 79—81 being driven by pulleys 82—83 of the same diameter, while the intermediate chain 80 is driven by a pulley 84 of different diameter from said pulleys 82—83. All of said pulleys are mounted on the same shaft 85, which corresponds with the shaft 46. Thus the outside chains move at the same rate of speed, while the intermediate chain moves at a different rate of speed. By this construction, also, I secure the lateral movement of the materials, together with their irregularly progressive movement.

A further improvement, especially applicable where a plurality of chains moving at different rates of speed are employed, consists in using a trough 86 having a depressed portion 87 in which one of the chains moves. As shown in Fig. 11, the depressed portion 87 is arranged intermediately and receives the chain 80,—the blades of which are flat, whereas the blades of the chains 79—80 are inclined, as shown.

Instead of using an endless conveyer as described, I may also employ conveyers arranged to reciprocate, as best shown in Fig. 13,—in which two reciprocating conveyers 88—89 are provided, the conveyer 88 operating in the inclined trough 21, while the conveyer 89 operates in the horizontal trough 22. Said conveyers consist of frames provided at their ends with brackets 90—91 and 92—93, respectively, by which said frames are guided as they reciprocate. For guiding the conveyer 88 rollers 94—95 are provided near the ends of the trough 21,— said rollers running in the slots 96—97 formed by the brackets 90—91, as shown in Fig. 13. The conveyer 89 is guided by the roller 95 and a roller 98 at the opposite end of the trough 22,—said rollers running in slots 99—100 formed by the brackets 92—93. Said conveyers are reciprocated by pitmen 101—102, respectively, connected to a crank-pin 103 carried by a disk 104 mounted on a shaft 105 which carries a pulley 106 driven by any suitable source of power. Each of the conveyers 88—89 carries a series of blades 107, which are hinged to depending arms 108 in such manner as to swing forward, but not backward: consequently when said conveyers 88—89 move to the left, as shown in Fig. 13, they travel longitudinally of the trough, and the materials in advance of the blades 107 are carried forward and upward. At the same time part of the material overflows the upper edges of the blades and falls back upon the material behind it. On the return movement of said conveyers the blades 107 swing up to a substantially horizontal position,—riding over the materials in the troughs. This construction also provides for the intermittently progressive movement of the materials.

In Figs. 15 and 16, I have shown conveyer-mechanism consisting of revolving frames 109—110 carrying depending rigid arms 111, which also travel longitudinally in the trough. In the construction shown there is a conveyer for each of the troughs 21—22,—the conveyer in the trough 21 consisting of three of the frames 109, while that in the trough 22 consists of three of the frames 110. The frames 109 are supported by upper and lower shafts 112—113 at the ends of the trough 21,—which shafts carry crank-arms 114—115, respectively, to which the ends of the frames 109 are pivoted, so that as said shafts rotate, the frames 109 revolve through the trough 21, carrying up therein any materials encountered by the arms 111. The different frames 109, of course, operate successively upon the materials in the trough. In like manner the frames 110 in the trough 22 are

supported by arms 115 and by similar arms 116 carried by a shaft 117 at the opposite end of the trough 22, so that the arms 111 of said frames 110 operate to move any materials in the trough 22 along until they are taken up by the blades of the frames 109. All the frames 109—110 are operated from the shaft 113, which is provided with a gear 118, or other means for driving it from any suitable source of power. By this construction I provide for the lateral or transverse movement from side to side of the materials in the trough, as well as the intermittently progressive movement, since the materials are thrown from side to side by the blades of the different frames.

In Figs. 17 to 20, I have illustrated the embodiment of my invention in an automobile-machine, so that all the parts of the apparatus may be readily and quickly transported from place to place, and by which also the mixed concrete may be discharged from the machine directly to the place where it is to be used, without the intervention of manual labor. In the machine shown in said figures, I employ a supporting frame 119 mounted on front and rear wheels 120—121,—the front axle 122 being connected to a vertically-disposed spindle 123 having a wheel 124 by which it may be rotated to guide the machine. The rear wheels 121 are provided with sprocket-wheels 126, connected by a chain 127 to a pinion 128 mounted on a drive-shaft 129 carried in suitable bearings below the frame 119 and driven from an engine 130 by a chain 131. The engine 130 may be of any suitable type for the purpose. 132 indicates a standard at the rear end of the frame 119, which supports a hopper 133 corresponding to the hopper 23, as shown in Fig. 17. The standard 132 also carries a shaft 134, which corresponds to the shaft 46 and carries a sprocket-wheel 45 by which the conveyer-chain 43 is operated. The upper end of the trough 21 is also pivotally secured to the standard 132 as shown in Figs. 23 and 24. The forward end of the trough 22 is supported from the carriage-frame 119 by a hanger 135; and as the adjacent ends of the troughs 21—22 are secured together, as best shown in Fig. 4, the parts of the apparatus may be wholly suspended from the frame 119. In practice, the hanger 135 is made vertically adjustable by means of a screw-threaded bolt 136 which is fitted in a suitable bearing 137 carried by the frame 119, and screws into the hanger 135; so that by rotating said bolt the hanger 135 may be raised or lowered at pleasure, to raise or lower the trough 22. For rotating the bolt 136 it is provided with a hand-wheel 138, as shown in Fig. 17.

When in use the trough 22 rests on the ground, but for transportation purposes it is raised out of contact with the ground by means of the bolt 136. When the trough 22 is thus lifted the lower end of the inclined trough 21 is also lifted by reason of its connection with the trough 22, the two troughs together being supported clear of the ground by the carriage,—the forward end of the trough 22 being suspended by means of the hanger 135 and the rear or upper end of the inclined trough 21 by pivots 220—221, shown in Fig. 24, which permit the lower end of the inclined trough to be raised and lowered.

The charging-pans 30—31 are tilted in the portable machine shown in Figs. 17 to 21 by means of cables 139—140, which connect, respectively, with drums 141—142 mounted on a main drive-shaft 143 carried near the rear end of the frame 119 in suitable bearings 144—145, as shown in Fig. 21. The drums 141—142 are loosely mounted on said shaft, and are adapted to be operatively connected therewith by suitable clutch-mechanisms 146—147 mounted on feathers on said shaft and operated by levers 148—149, respectively. Said levers 148—149 are mounted, respectively, on the upper ends of vertically-arranged shafts 150—151, which carry at their lower ends levers 152—153, respectively, connected by connecting-rods 154—155, respectively, with hand-levers 156—157 placed near the operator's seat. (See Figs. 17 and 21.) Thus, by means of the levers 156—157, either of the drums 141—142 may be operatively connected with the shaft 143. Said shaft is driven in a constant direction by means of a chain 158, which connects sprocket-wheels 159—160, mounted, respectively, on the shaft 143 and on the engine-shaft 161, as shown in Fig. 21. The sprocket-wheel 160 is loosely mounted on the shaft 161, and is adapted to be connected therewith by clutch-mechanism 162 operated by a lever 163 carried by a vertical shaft 164 and adapted to be rocked by a lever 165, connecting-rod 166 and hand-lever 167, so that by operating said hand-lever the rotation of the main drive-shaft 143 may be controlled at pleasure.

As hereinbefore described, the machine is propelled from the engine through chain 131. As shown in Fig. 17, the chain 131 passes over a sprocket-wheel 168 mounted on the shaft 129; and as shown in Fig. 21, said chain passes also over a sprocket-wheel 169 mounted on the engine-shaft 161. The latter sprocket-wheel is loosely mounted on said engine-shaft, and is adapted to be operatively connected therewith by clutch-mechanism 170 operated by a lever 171 which is carried on a vertical shaft 172. Said shaft also carries a lever 173, which is connected by a connecting-rod 174 with a hand-lever 175, so that the operator may connect or disconnect the wheels with the engine. For reversing the wheels to back the machine, I provide a

gear 176 mounted on a feather on the main drive-shaft 143 and adapted to be moved into engagement with a gear 177 mounted on the shaft 129, as shown in Fig. 20. The gear 176 is moved laterally to mesh with the gear 177 by a lever 178, mounted on a vertical shaft 179 and connected through a lever 180 and connecting-rod 181 with a hand-lever 182. The machine may be stopped by disconnecting the sprocket-wheel 169 with the engine-shaft 161. It may be driven forward by connecting said sprocket-wheel with said engine-shaft, and it may be backed by disconnecting said sprocket-wheel with the engine-shaft and causing the gear 176 to intermesh with the gear 177,—these different operations being accomplished by operating the appropriate hand-levers, all of which, as shown in Figs. 17 and 21, are arranged adjacent to each other in front of the operator's seat.

183 indicates a sprocket-wheel, which is connected by a chain 184 with the sprocket-wheel 45 which drives the conveyer 43. The sprocket-wheel 183 is loosely mounted on the main drive-shaft 143, and is adapted to be connected thereto by clutch-mechanism 185 which is operated by a lever 186 mounted on a vertical shaft 187 and connected by a lever 188 and connecting-rod 189 with a hand-lever 190, as shown in Fig. 21. Thus, the operator may readily control the operation of the conveyer, without regard to the operation of the other parts of the mechanism.

191 indicates a discharge-spout, which communicates with the hopper 133 and projects at an angle therefrom,—being pivotally supported at its upper end in a sleeve 192, so that it is free to swing from side to side as shown in Fig. 23. The sleeve 192 is supported by a rotatable post or column 193, which rests at its lower end upon the frame 116. 194 indicates a brace for the lower portion of the spout 191. The post 193 is rotated in one direction or the other, to swing the spout 191 from side to side, by means of a pitman 195, connected at its free end to an arm 196 which is secured to and projects from the post 193, as shown in Figs. 17 and 21. The opposite end of said pitman is connected through a slide 195ª and connecting-rod 196ª to a wrist-pin 197 by a gear 198 mounted on a shaft 199 arranged parallel with the main drive-shaft 143. The gear 198 is driven from the shaft 143 by means of a pinion 200 with which it meshes,—said pinion being mounted upon and keyed to said main drive-shaft. The spout 191 may be disconnected from the mechanism for rocking it by disconnecting the pitman 195 from the arm 196.

201 indicates a brake-lever, mounted on a brake-shaft 202 which carries brakes 203 adapted to engage the rear wheels. The brake-lever 201 is connected by a connecting-rod 204 with a brake-lever 205 arranged near the driver's seat.

From the foregoing description it will be seen that the operator at all times has control of the various operations of the machine and may drive it in either direction, may regulate the operation of the conveyers, the charging of the materials, and the distribution of the mixed concrete, according to his pleasure. In order that he may steer the machine as well, I provide a supplementary steering-wheel 207, mounted on a shaft 208 near the operator's seat and connected with the steering-wheel 124 by a cable 209 which passes around a wheel 210 mounted on the lower portion of the shaft 208, as shown in Fig. 17.

So far as I am aware, no one has heretofore produced a concrete-mixing machine in which the materials to be mixed have been simultaneously elevated and moved laterally or transversely from side to side, and thereby mixed; and, so far as the generic invention is concerned, it is immaterial whether this result be accomplished by means of either of the forms of apparatus described or by other equivalent means, as my invention includes, broadly, the use of other mechanisms equivalent for those described. Furthermore, I wish it to be understood that, except in so far as the particular constructions illustrated are specifically claimed, my invention is not restricted to details of construction, but includes, generically, the subject-matter of the broader claims.

That which I claim as my invention and desire to secure by Letters Patent is,—

1. A concrete-mixing machine, comprising an inclined trough on which the materials to be mixed are supported during the elevating and mixing operation, means for elevating and mixing the materials in said trough, means at opposite sides of said elevating-means for supplying thereto materials to be mixed, and means for actuating said supplying means alternately.

2. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to a horizontal plane, on which the materials to be mixed are supported during the elevating and mixing operation, a substantially horizontal trough adjacent to said inclined trough and connecting therewith, an endless conveyer adapted to move through said troughs and having means for elevating and mixing the materials, and swinging pans at opposite sides of said conveyer adapted to supply materials to be mixed to said horizontal trough.

3. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to a horizontal plane, on which the materials to be mixed are supported during the elevating and mixing operation, a sub-

stantially horizontal trough adjacent to said inclined trough and connecting therewith, an endless conveyer adapted to move through said troughs and having means for elevating and mixing the materials, swinging pans at opposite sides of said conveyer adapted to supply materials to be mixed to said horizontal trough, and means for actuating said pans alternately to discharge the contents thereof into said horizontal trough.

4. A concrete-mixing machine, comprising a carriage, a vertically-adjustable trough supported thereby, said trough being longitudinally inclined with reference to the horizontal, means for vertically adjusting said trough, and means operating in connection therewith for elevating and simultaneously mixing the materials to be mixed.

5. A concrete-mixing machine, comprising a carriage, a trough longitudinally inclined with reference to the horizontal, a horizontal trough communicating with the lower portion of said inclined trough, an endless traveling conveyer adapted to move through said troughs and having means for elevating and mixing materials supported in said troughs, and means carried by said carriage for operating said conveyer.

6. A concrete-mixing machine, comprising a carriage, a trough longitudinally inclined with reference to the horizontal, a horizontal trough communicating with the lower portion of said inclined trough, an endless traveling conveyer adapted to move through said troughs and having means for elevating and mixing materials supported in said troughs, means carried by said carriage for operating said conveyer, and means for raising and lowering said horizontal trough.

7. The combination of a carriage, a trough supported thereby and longitudinally inclined with reference to the horizontal, a horizontal trough communicating with said inclined trough and supported by said carriage, means for moving materials through said troughs and mixing the same as they are carried up through said inclined trough, means for vertically adjusting said horizontal trough, and means carried by said carriage for operating said moving and mixing means.

8. The combination of a carriage, a trough supported thereby and longitudinally inclined with reference to the horizontal, a horizontal trough communicating with said inclined trough and supported by said carriage, means for supplying materials to be mixed to said horizontal trough, means for moving the materials through said troughs, and mixing the same in said inclined trough, means for vertically adjusting said horizontal trough, and means carried by said carriage for operating said supplying means and for driving said moving and mixing means.

9. A concrete-mixing machine, comprising a carriage, means carried by said carriage for elevating and simultaneously mixing the materials to be mixed, driving-mechanism mounted on said carriage, means for driving said elevating and mixing means from said driving-mechanism, and a discharging device mounted on the carriage and arranged to receive mixed materials from said elevating and mixing means, said discharging device being adjustable to distribute the materials.

10. A concrete-mixing machine, comprising a carriage, means carried by said carriage for elevating and mixing the materials to be mixed, driving-mechanism mounted on said carriage, means for driving said elevating and mixing means from said driving-mechanism, a discharging device mounted on the carriage and arranged to receive mixed materials from said elevating and mixing means, said discharging device being adjustable to distribute the materials, and means for adjusting said discharging device by means of said driving-mechanism.

11. A concrete-mixing machine, comprising a trough, a conveyer operating in said trough to mix the materials placed therein, a plate extending over said trough and having openings for the passage of the materials, plates adjacent to said openings for regulating the size thereof, said plates having downturned ends, and means for charging materials upon said plate.

12. A concrete-mixing machine, comprising a trough, a conveyer movable through said trough, a plate extending over said trough and having openings for the passage of the materials to be mixed, and plates adjustably carried by said first-mentioned plate, the latter plates having hinged ends adapted to engage the conveyer.

13. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, on which the materials to be elevated are supported during the elevating and mixing operation, and a plurality of traveling conveyers arranged to move upward in said trough said conveyers having means which operate to elevate and mix the materials supported thereby.

14. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, on which the materials to be elevated are supported during the elevating and mixing operation, a plurality of traveling conveyers arranged to move upward in said trough said conveyers having means which operate to elevate and mix the materials supported thereby, and means for driving said conveyers at different rates of speed.

15. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, on which the materials to be mixed are supported during the

elevating and mixing operation, and a plurality of traveling conveyers arranged to move upward in said trough said conveyers having means which operate to elevate and mix the materials supported thereby, said trough having a depressed portion extending longitudinally thereof.

16. A concrete-mixing machine, comprising a trough, a plurality of conveyers movable longitudinally of said trough, said conveyers being arranged on different levels and having means which operate to elevate and mix the materials supported by said trough, and means for driving said conveyers.

17. A concrete-mixing machine, comprising a trough, a plurality of conveyers movable longitudinally of said trough, said conveyers being arranged on different levels and having means which operate to elevate and mix the materials supported by said trough, and means for driving said conveyers at different rates of speed.

18. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, a plurality of conveyers adapted to move upward in said trough, said conveyers being arranged to carry upward therein the materials to be mixed and to move said materials transversely from side to side, and means for driving said conveyers at different rates of speed.

19. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, said trough having a depressed portion, a plurality of conveyers moving in different planes in said trough and having means for mixing the materials therein, and means for driving said conveyers.

20. A concrete-mixing machine, comprising a trough longitudinally inclined with reference to the horizontal, on which the materials to be mixed are adapted to be supported during the elevating and mixing operation, said trough having a depressed portion, a plurality of traveling conveyers on different levels in said trough and having means which operate to carry the materials therein upward and mix the same, and means for driving said conveyers.

RALPH T. SOLLITT.

Witnesses:
JOHN L. JACKSON,
HELEN M. COLLIN.