

[54] **DISTRIBUTING CONVEYOR SYSTEM FOR A ROTARY CONCRETE MIXING OR OTHER TRUCK**

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[57] **ABSTRACT**

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A distributing conveyor system for a rotary concrete mixing truck adapted for installation on the truck frame and, when thus installed, embodies a single continuous conveyor unit which is capable of universal compound swinging movement in both vertical and horizontal planes, as well as being longitudinally shiftable to vary its effective length. The conveyor unit is at all times maintained in effective concrete-receiving register with the discharge hopper of the mixing truck and, by reason of its universal swinging and sliding movement, either uphill or downhill concrete distribution is made possible. By reason of its longitudinal shifting movement, either proximate or remote concrete placement may be effected.

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[51] **Int. Cl.** B28c 7/16

[58] **Field of Search**..... 259/169, 170, 172, 259/171, 161, 162, 163, 29, 30

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24 Claims, 16 Drawing Figures

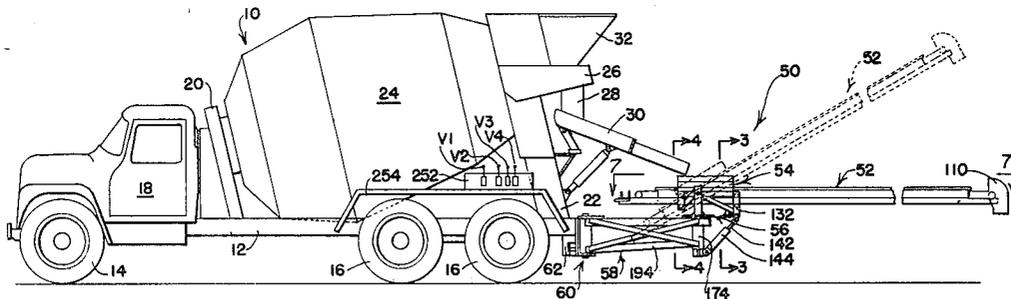


FIG. 3

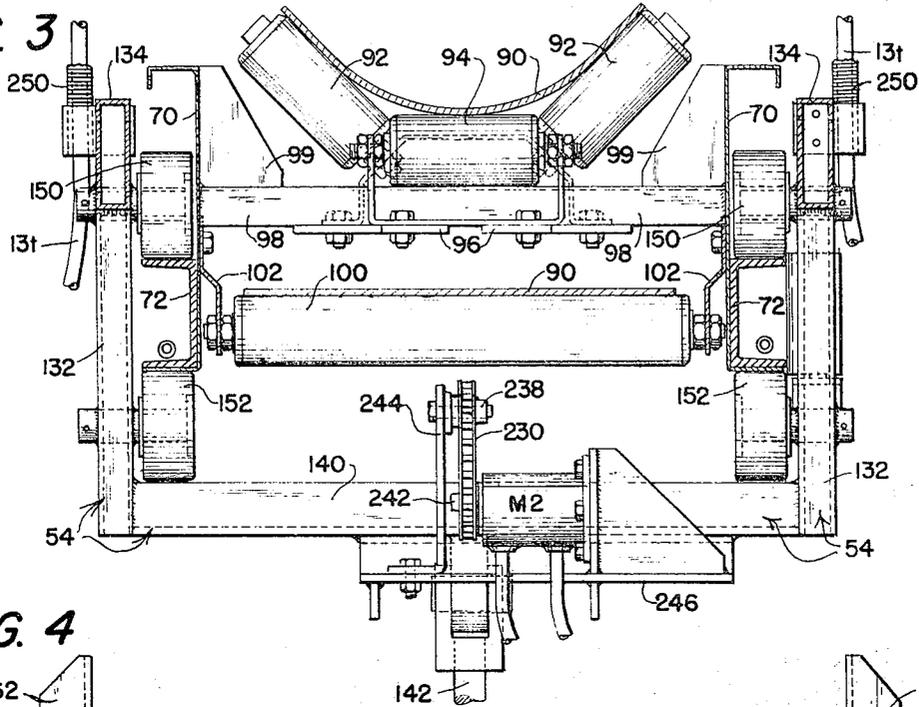
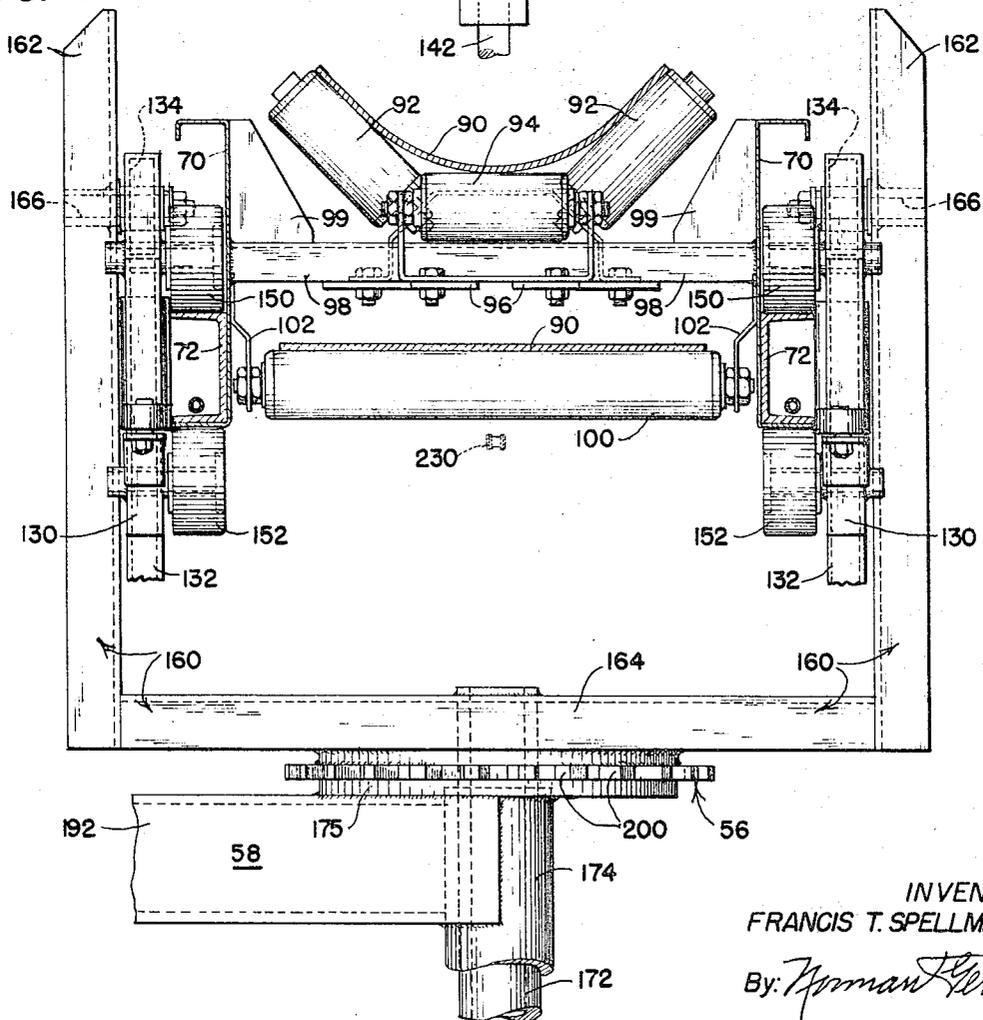


FIG. 4



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FIG. 5

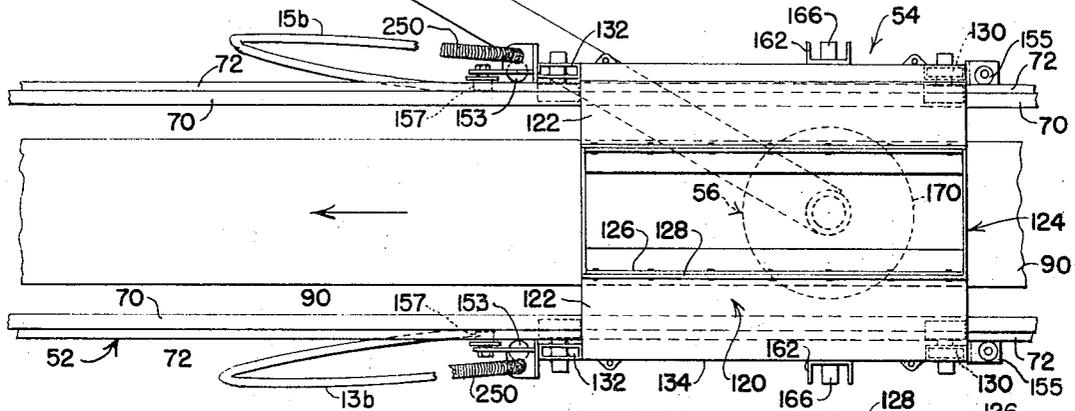
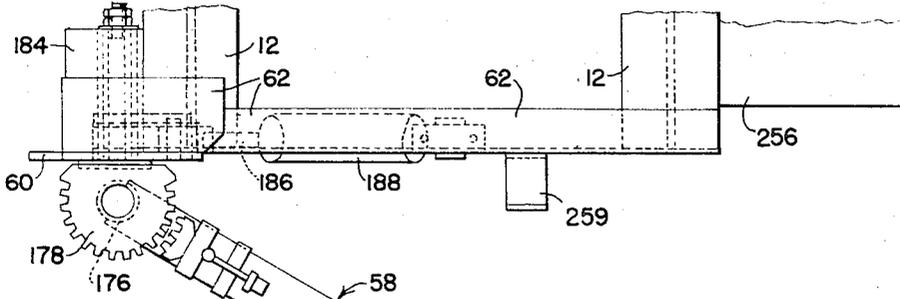
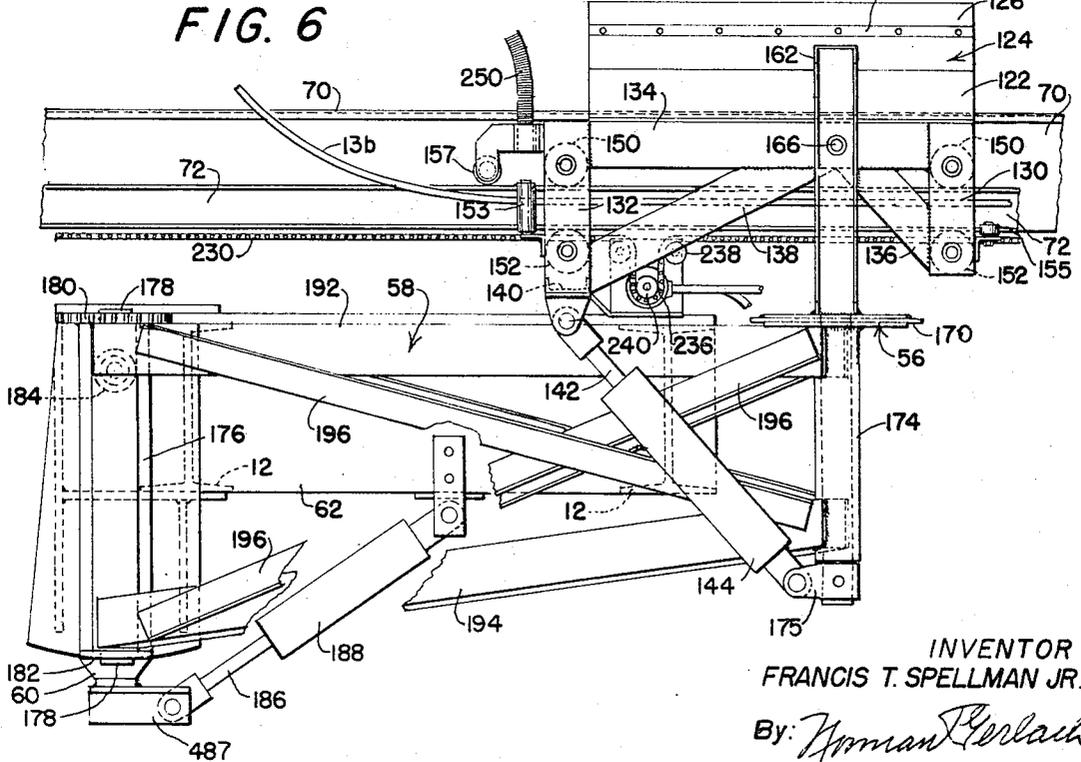
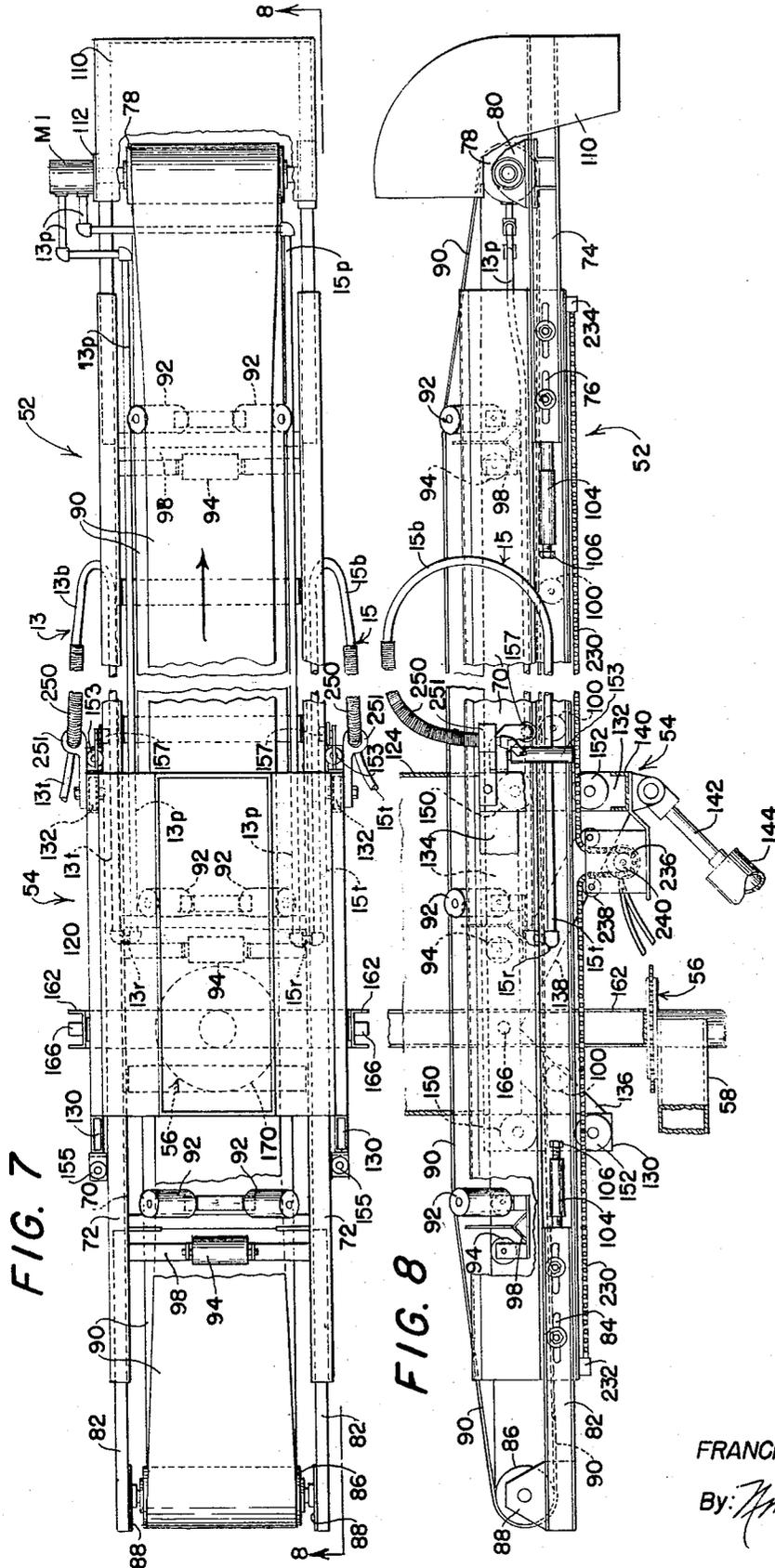


FIG. 6



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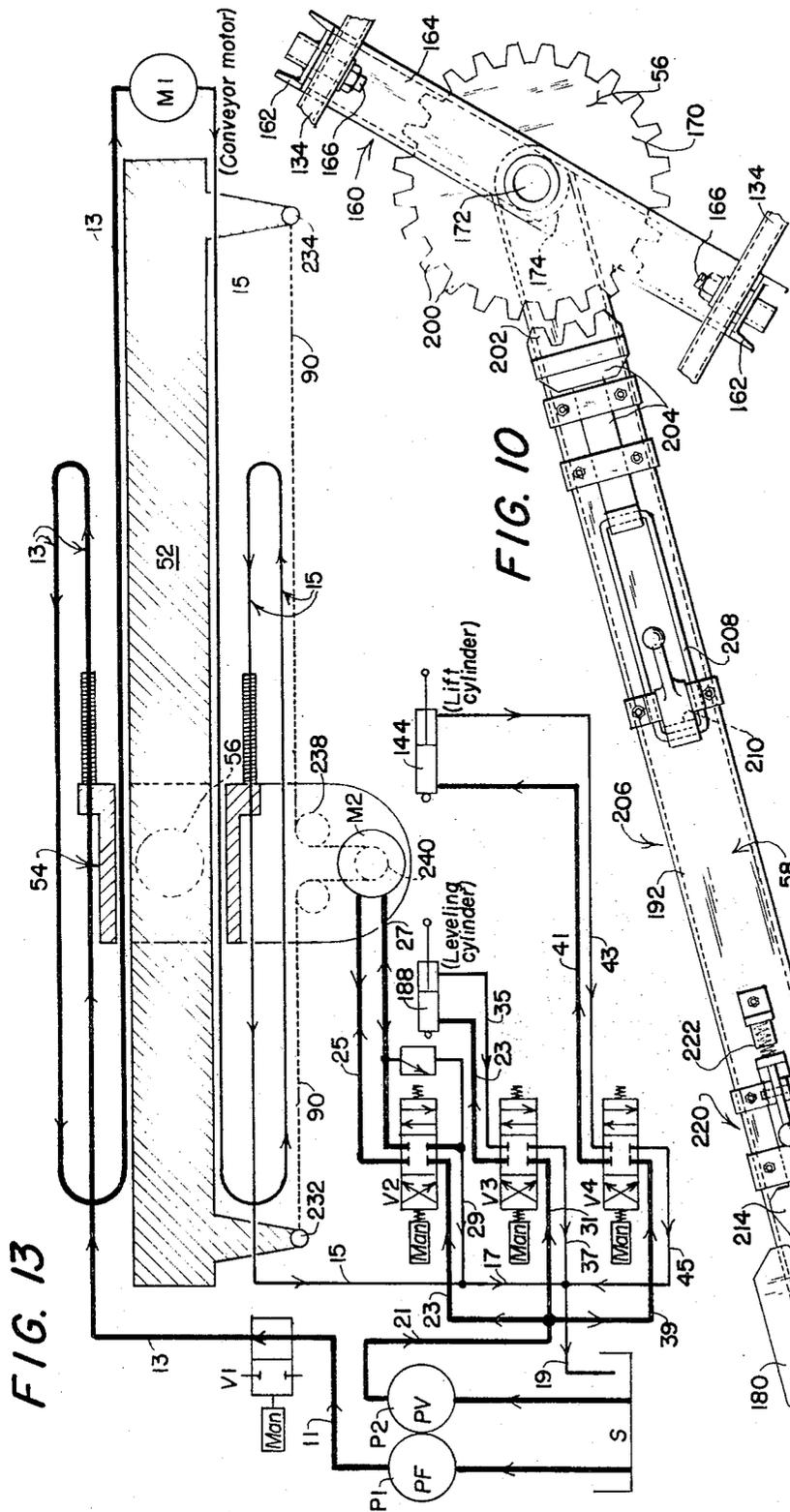
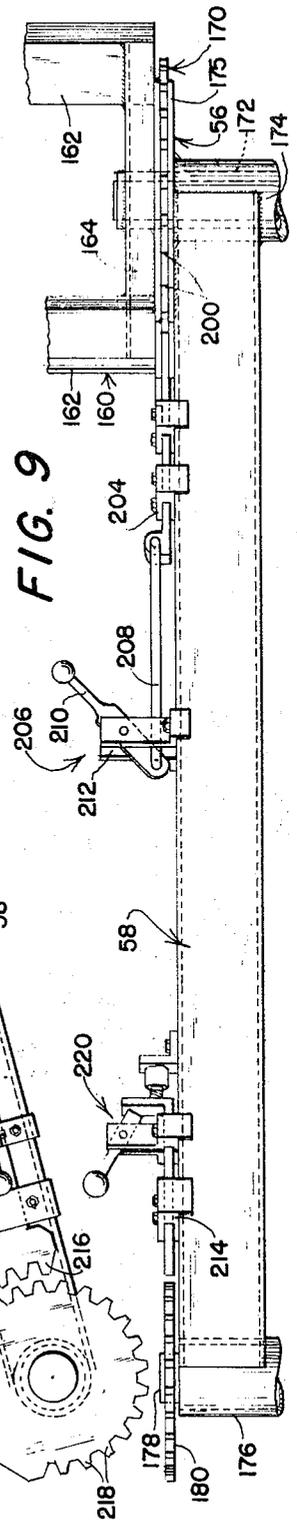


FIG. 13

FIG. 10

FIG. 9



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FIG. 11

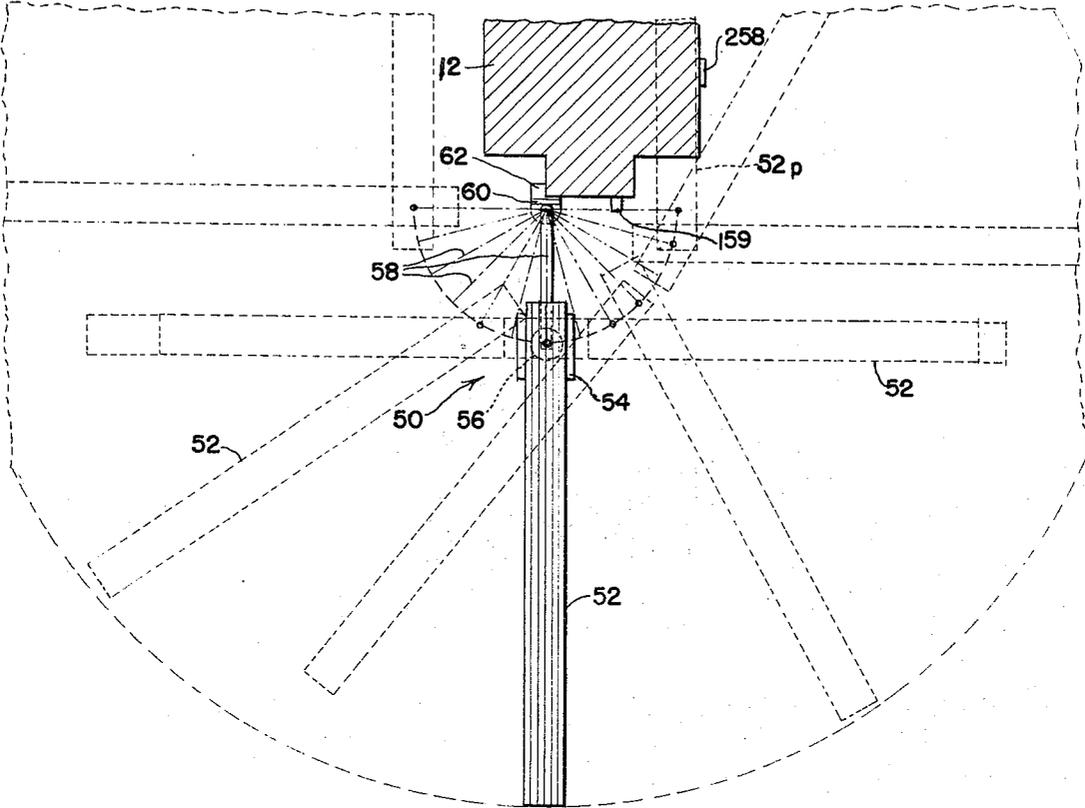
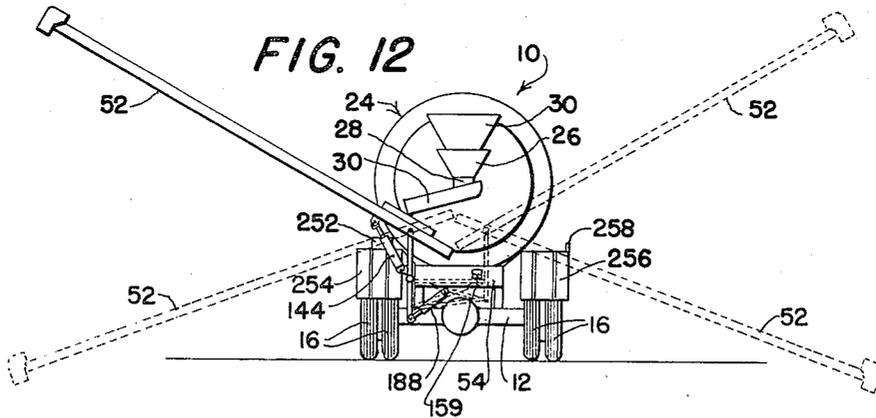


FIG. 12



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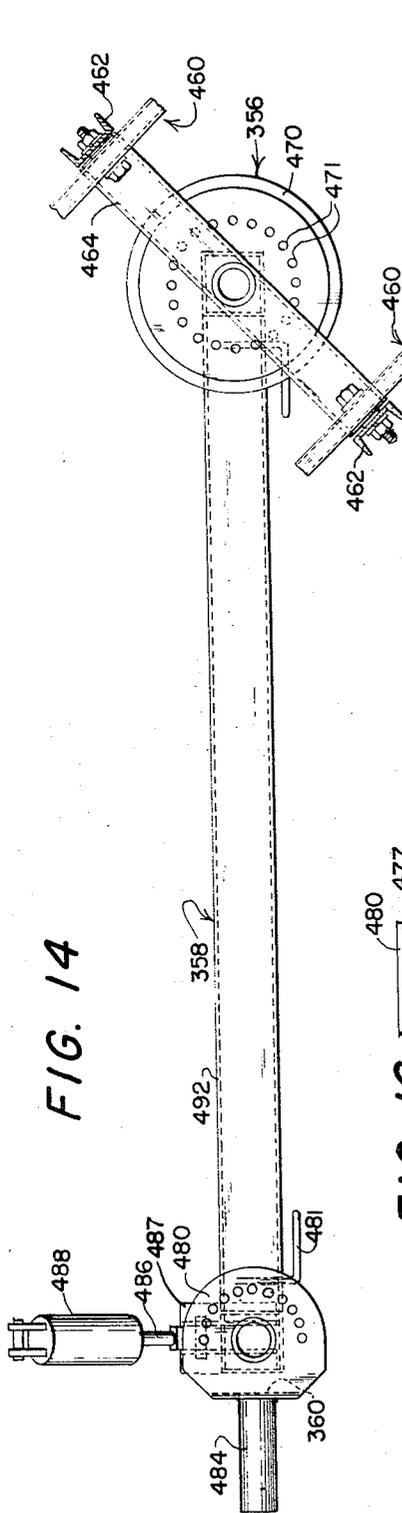


FIG. 14

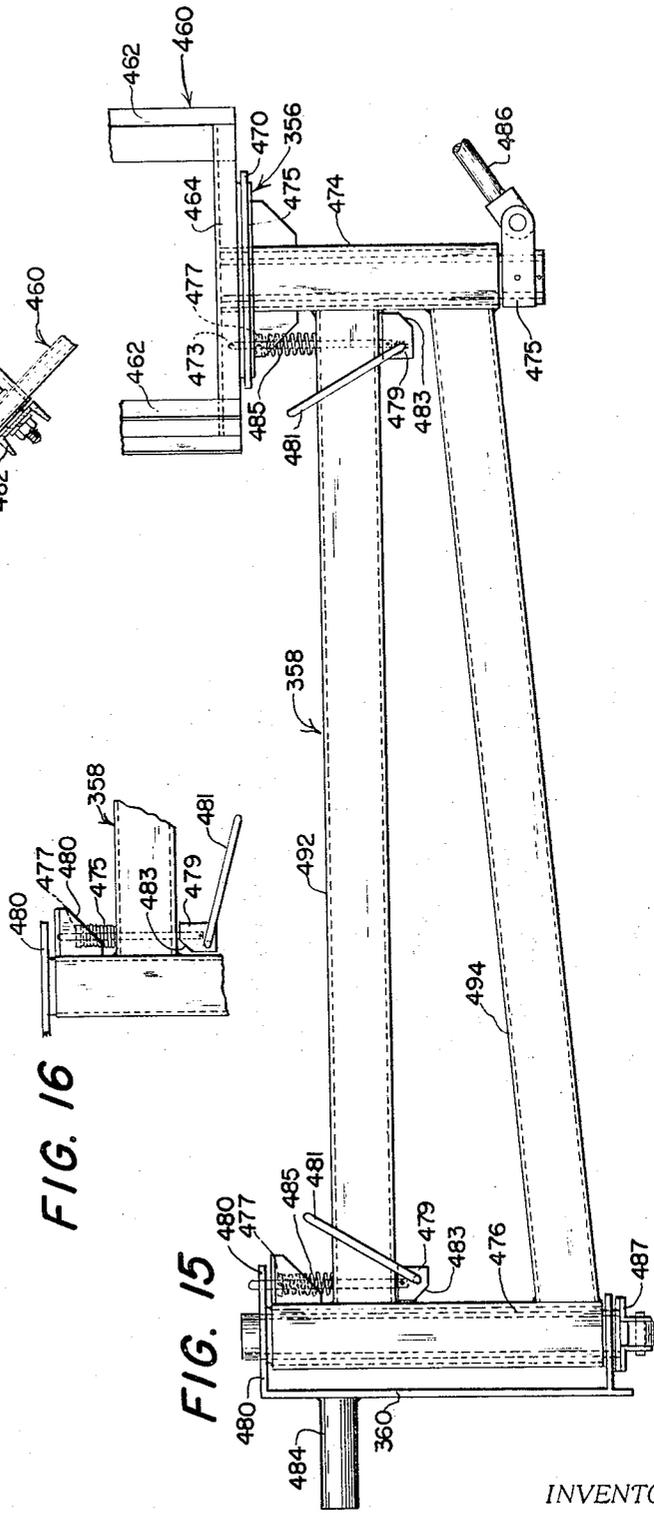


FIG. 16

FIG. 15

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DISTRIBUTING CONVEYOR SYSTEM FOR A ROTARY CONCRETE MIXING OR OTHER TRUCK

The present invention relates generally to a vehicle-mounted concrete distributing conveyor system which is designed for use primarily, but not necessarily, in connection with a wide variety of concrete mixing trucks of the ready-mix type and has particular reference to an articulated conveyor structure or system embodying a single elongated concrete conveyor unit which is of the fixed length endless belt type and, by reason of the numerous placement positions of which it is capable of assuming, is capable of performing both long and short pouring operations at varying pouring levels in a manner which is considerably more simple and efficient than is the case with any present day vehicle-mounted concrete distributing conveyor system which utilizes a single extensible and contractible conveyor unit or two or more serially arranged conveyor units which are disposed in end-to-end elbow joint fashion.

Heretofore, where a single conveyor unit is employed in connection with a vehicle-mounted concrete distribution system, it has invariably been the practice to provide a concrete-receiving hopper at the receiving or proximate end of the conveyor belt and to mount the conveyor unit as a whole for swinging movement about the vertical axis of such hopper, the hopper remaining at all times in concrete-receiving register with the discharge trough or funnel leading from the rotatable drum of the associated ready-mix truck. Long and short pour operations are effected by causing the conveyor unit to be extended or contracted, as the case may be. Lateral pours are effected by swinging the conveyor unit from side to side while various pouring elevations are accomplished by raising or lowering the discharge end of the conveyor unit, usually by means of an hydraulic lift cylinder. It is obvious that with a concrete-distributing system of this character, the shortest pour which can be accomplished is a direct function of the extent to which the conveyor unit can be shortened or contracted. It is also obvious that short down-pours in any direction are limited not only to minimum conveyor length but they frequently are limited by the presence of nearby obstructions such as buildings or partially completed building erections, trees, wall surfaces or the like. In the presence of such obstructions, considerable maneuvering of the associated truck may be necessary in order to attain a given pour since it may be impossible to maneuver the conveyor unit on the truck into pouring position unless the truck is disposed in a conformable position. In some instances, the use of the conveyor unit alone is entirely precluded and it is necessary to employ portable ground conveyors or resort to manual batch pouring.

To a certain extent, these limitations are also present in connection with a vehicle-mounted concrete-distributing system employing plural conveyor units which are arranged in end-to-end fashion and have between the adjacent or contiguous ends an elbow or hinge-type joint for the purpose of permitting articulation of the units. To conduct what ordinarily amounts to a short pour operation, i.e., a concrete placement in the vicinity of the associated truck, there must be resorted to a long pour procedure involving a feed out of the concrete, coupled with a reentrant feed back to the short pour location. In such instances, the presence of

nearby obstructions more frequently precludes such a pouring operation than is the case where a single extensible and contractible conveyor unit is employed.

Another limitation that is attendant upon the construction and operation of a present day concrete-distributing system of either the single or multiple conveyor unit type resides in the obstruction which the truck itself offers to freedom of conveyor unit movement so that close backward pours, i.e., forwardly of the rear wheels of the truck, cannot be accomplished.

A further and serious limitation that is present in connection with any current concrete distributing system of the vehicle-mounted type, whether embodying a single conveyor unit or multiple articulated conveyor units, arises in connection with the problem of conveniently storing the conveyor unit or units during transit or drive of the associated truck to and from a given operating site or location. Disconnecting a given conveyor unit and rearranging its position on the truck involves considerable labor, usually requiring the services of two or more operators, and these difficulties are greatly magnified in sub-zero temperatures where component parts of the conveyor system may be frozen together.

Still another limitation that is present with a conventional vehicle-mounted concrete-distributing system is concerned with the matter of conveyor leveling to prevent spilling of concrete over the sides of the endless conveyor belt during concrete pouring operations. On uneven terrain, if the rotary concrete mixing truck, i.e., ready-mix truck, is not seated or positioned squarely on the ground so that when the single or multiple conveyor unit is extended, it assumes a substantially horizontal position insofar as its transverse direction is concerned, maximum pouring rate cannot be attained and it is necessary to reduce the pouring rate to prevent lateral or sidewise concrete spillage. The usual remedy is to level the truck by the use of jacks and this, of course, is extremely time-consuming.

The present invention is designed to overcome the abovenoted limitations that are attendant upon the construction and use of any present day concrete-distributing system for a ready-mix truck and, toward this end, the invention contemplates the provision of a system wherein a single non-extensible and non-contractible conveyor unit is employed, the unit being permanently mounted on the truck chassis in such a manner that it is capable of a wide variety of movements so as to accommodate both long and extremely short concrete pours and at various elevations. To accomplish this, the conveyor unit is slidably mounted for endwise movement in and through a carrier frame and from a fully retracted position wherein the discharge or head end of the conveyor unit is in close proximity to the frame and a fully extended projected position wherein the tail end of the unit is in close proximity to the frame. The carrier frame is mounted for rotation about a vertical axis at the outer end of a horizontally elongated supporting bracket which is of appreciable length and, in addition, is hinged at its inner or proximal end to swing laterally back and forth about a substantially vertical axis. The length of this bracket is equal at least to one-half the over-all width of the truck so that in either extreme position of the bracket, the carrier frame for the conveyor unit lies outside the lateral confines of the truck. By such an arrangement, when the supporting bracket is in either extreme lateral

position, the carrier frame may be rotated so as to swing the fully or nearly fully projected conveyor unit backwardly to accommodate concrete pours at regions which are disposed forwardly of the rear wheels of the mixing truck. When the hinged supporting bracket is disposed in this overhanging relationship with respect to one side of the truck and the fully projected conveyor is swung backwardly to such an extent that it extends in the longitudinal direction of the truck chassis, it may be brought into contiguity with one side of the truck body and caused to come to rest in a stored or parked position on the adjacent rear wheel fender where it assumes an out-of-the-way position while the ready-mix truck is in transit from a concrete-receiving place to a place of use or vice versa. A further feature of the present invention resides in the provision of a means whereby the hinged supporting bracket may be swung in the manner of a pendulum and throughout a small angle in order to vary the transverse inclination thereof for conveyor unit leveling purposes in the event that the truck becomes supported on uneven terrain and thereby causes sidewise tilting of the conveyor unit.

The provision of a concrete-distributing conveyor system which is, to a large extent, hydraulically powered in that hydraulic power means are provided for driving the endless belt of the conveyor unit, for effecting endwise sliding movement of the conveyor unit with respect to carrier frame in order to vary the length of the concrete pour, for raising and lowering the discharge end of the conveyor unit in order to accommodate different pouring levels, and for leveling the conveyor unit in order to compensate for unevenness of the terrain over which the associated truck is positioned; one in which a separate hydraulic pump is employed to drive the conveyor belt of the conveyor unit so that the hydraulic operation of the other hydraulic components which are associated with the system will not deprive the conveyor belt of its power and constant belt speed throughout a variable range may be obtained; one which is capable of installation as original equipment on a rotary concrete-mixing truck or is capable of readily being installed on an existing ready-mix truck; one which is relatively simple in its construction and, therefore, requires no degree of unusual skill for its operation and, hence, may be operated by the average truck operator; one which is comprised of a minimum number of parts, particularly moving parts, so that it is unlikely to get out of order; one which is rugged and durable and will, therefore, withstand rough usage; one which is capable of ease of assembly and dismantlement for purposes of inspection, replacement or repair of the component parts thereof; one which is easy to clean in between pouring operations; and one which, otherwise, is well-adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects of the invention and the various advantages and characteristics of the present concrete distributing conveying systems will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claims at the conclusion hereof.

In the accompanying seven sheets of drawings forming a part of this specification, two illustrative embodiments of the invention are shown.

In these drawings:

FIG. 1 is a top plan view of a concrete-distributing conveyor system embodying the principles of the present invention and showing the same operatively installed upon a rotary concrete mixing truck;

FIG. 2 is a side elevational view of the particular structure of FIG. 1;

FIG. 3 is an enlarged vertical transverse sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged vertical transverse sectional view taken on the line 4—4 of FIG. 2, the conveyor boom chain drive being omitted in the interests of clarity;

FIG. 5 is a fragmentary enlarged plan view of a portion of the structure shown in FIG. 1, the conveyor boom or unit and its carrier frame being shown in a different position;

FIG. 6 is a side elevational view of the structure shown in FIG. 5;

FIG. 7 is an enlarged top plan view of that portion of the structure of FIG. 2 which is represented by the line 7—7;

FIG. 8 is a vertical longitudinal sectional view taken on the line 8—8 of FIG. 7;

FIG. 9 is an enlarged side sectional view of that portion of the structure of FIG. 1 which is represented by the line 9—9;

FIG. 10 is a plan view of the structure shown in FIG. 9;

FIG. 11 is a plan view of the concrete-distributing conveyor system, largely schematic in its representation, showing the unitary conveyor unit or assembly in various distributing positions;

FIG. 12 is a rear end view of said concrete-distributing conveyor system, showing the same operatively mounted on a rotary concrete-mixing truck, the disclosure being largely schematic and illustrating the conveyor unit or assembly in various distributing positions;

FIG. 13 is an hydraulic circuit diagram of the control mechanism which is associated with the concrete-distributing conveyor system;

FIG. 14 is a plan view similar to FIG. 10 but showing a modified form of conveyor boom;

FIG. 15 is a side elevational view of the structure shown in FIG. 14; and

FIG. 16 is a fragmentary detail view of a portion of the structure shown in FIG. 15 with the boom-locking mechanism in its retracted position.

Referring now to the drawings in detail and in particular to FIGS. 1, 2, 11, and 12, the concrete-distributing conveyor system of the present invention is adapted for use in connection with any one of a number of conventional portable rotary concrete-mixing trucks of the type that embodies an elongated chassis or frame structure to which the conveyor system may be secured. Such trucks are commonly known and referred to in the industry as "ready-mix" trucks and, as a consequence, such designation will be employed throughout this specification and in the appended claims at the conclusion hereof. In FIGS. 1 and 2 of the drawings, there is illustrated a conventional ready-mix truck 10, and it has been selected for environmental purposes in connection with the present invention and comprises a

chassis or frame structure 12. The latter is supported on dirigible or steerable front wheels 14 and power-driven rear wheels 16. An operator's cab 18 is mounted on the front end of the frame structure 12. The truck 10 is provided with front and rear drum supports 20 and 22 which project upwardly and forwardly from the frame structure 12 and serve rotatably to support therebetween a forwardly and downwardly inclined concrete-mixing drum 24. As is conventional and well known in the art, the drum 24 is provided with internal mechanism (not shown) by means of which the concrete which is undergoing mixing within the drum 24 during rotation of the latter is elevated and then discharged from the rear end of the drum and deposited into fixed discharge pan 26 at the rear end of the frame structure 12 of the truck. From the pan 26, the mixed concrete in wet form flows downwards through a down-chute 28 and then into a movably mounted concrete placement chute 30 which, according to the present invention, is employed for feeding the concrete in stream form to the distributing conveyor system constituting the present invention. A drum-loading hopper 32 above the discharge pan 26 is provided for the purpose of introducing raw materials into the drum 24 during charging of the latter. The arrangement of parts thus far described is purely conventional in its design and no claim is made herein to any novelty therein, the novelty of the present invention consisting rather in the association of the chute 30 with the concrete distributing conveyor system which is designated in its entirety by the reference numeral 50 and the nature of which will be more fully described subsequently.

Still referring to FIGS. 1 and 2, the concrete-distributing conveyor system 50 is in the form of an assembly of components including an elongated conveyor boom 52 of the endless belt type (see particularly FIGS. 7 and 8). Such boom is slidable lengthwise in and through a tiltable traverse carrier frame 54, the latter being mounted for fore and aft tilting movement on a turntable 56 which is capable of rotational movement about a substantially vertical axis on the distal or outer end of a pivoted or hinged support bracket 58 (see FIGS. 5 and 6). The proximate or inner end of said support bracket 58 is pivotally connected to a pendulum bracket 60 which, in turn, is pivotally connected to a mounting fixture 62. The latter is fixedly mounted on the extreme rear end of the truck frame structure 12, preferably at a region adjacent to the rear left-hand corner of the latter as viewed in FIG. 1. The pendulum bracket 60 is capable of limited swinging movements in a vertical transverse plane for conveyor boom leveling purposes in a manner that will be made clear presently.

The aforementioned basic components of the present concrete-distributing conveyor system 50, namely, the conveyor boom 52, the traverse carrier frame 54, the turntable 56, the pivoted or hinged support bracket 58, and the pendulum bracket 60 are schematically portrayed in FIGS. 11 and 12 without detailed disclosure thereof and in such a manner that there are clearly shown the individual movements of which each component is capable. The net result of all of these movements, in various combinations thereof, is to establish an infinite and universal movement of the conveyor boom 52 with respect to the truck frame structure 12 for concrete placement purposes. In regard to these two views, namely, FIGS. 11 and 12, only the outline of the conveyor boom 52 is illustrated in various typical

positions of the latter during concrete-pouring operations, while the directional positions of the turntable bracket 58 are illustrated by broken lines. It will be understood that all of the positions of the conveyor boom 52 which are illustrated in FIGS. 11 and 12, are long-pour positions, which is to say that the conveyor boom assumes a terminal position wherein the conveyor boom tail pulley which is remote from the discharge end of the boom lies close to the traverse carrier frame 54 so that the concrete which is poured in the vicinity of the carrier frame 54 is conducted substantially throughout the entire length of the conveyor boom before it is discharged from the boom over the head pulley. The conveyor boom 52 is, however, capable of short-pour operations wherein the conveyor boom 52 is slid endwise through the carrier frame 54 to various positions in which the traverse frame is disposed medially of the boom or to an extreme terminal position wherein the head pulley lies close to said traverse carrier frame 54. The manner in which these various illustrated or suggested positions of the conveyor boom may be attained will become more readily apparent when the nature of the invention is better understood.

As previously stated, the conveyor boom 52 of the concrete distributing conveyor system 50 is of the endless belt type and, as best shown in FIGS. 7 and 8, it is comprised of an elongated rectangular frame including a pair of sheet metal side plates 70 (see also FIGS. 3 and 4). To the lower portions of the outer sides of these plates are secured respective channel members 72, the latter being substantially coextensive with the side plates 70 in the longitudinal direction thereof. Channel extensions 74 at the discharge end of the conveyor boom 52 and in parallel and associated relation with the channel members 72 are releasably and adjustably secured by pin and slot connections 76 to said channel members and constitute drive pulley mounting arms for a conveyor drive or head pulley 78. The pulley 78 is supported on the mounting arms 74 by means of a pair of upstanding and spaced apart mounting plates 80. Similarly, at the receiving end of the conveyor boom 52, channel extensions 82 are secured by pin and slot connections 84 to the channel members 72 and constitute tail pulley mounting means for a conveyor tail pulley 86, the latter being rotatably supported on the channel extensions 82 by a pair of upstanding and spaced apart mounting plates 88.

An endless flexible conveyor belt 90 passes around the drive or head pulley 78 and the tail pulley 86 and has its upper reach tractionally supported on a longitudinal series of multiple troughing rollers, each group of troughing rollers including a pair of upwardly and outwardly extending inclined rollers 92 (see FIGS. 3 and 4) and a horizontal bottom roller 94 between but laterally offset with respect to the inclined rollers. The various groups of troughing rollers are suitably supported by compound bracket assemblies 96 from respective transverse frame members in the form of horizontal angle pieces 98 (see FIG. 8) which extend between the side plates 70. Gusset plates 99 which are connected to and extend upwards from the ends of the angle pieces 98 serve to strengthen and reinforce the sheet metal side plates 70. The lower reach of the conveyor belt 80 is tractionally supported by a plurality of longitudinally spaced, transversely extending return rollers 100 which are rotatably supported by suspension brackets 102.

The latter are suitably fixedly connected to the inner faces of the side plates 70.

The channel extensions 74 and 82 constitute means whereby conveyor belt tension may be regulated. In order to facilitate such tensioning of the endless belt 90, belt take-up assemblies 104 (see FIG. 8) are fastened to the channel members 72 and include thrust screws 106 which bear at their ends against the inner ends of the channel extensions 74 and 82. By releasing the pin and slot connections 76 and 84 and properly manipulating the take-up assemblies 104, proper belt tension may be attained, after which the pin and slot connections may again be tightened.

A discharge hood 110 (see FIGS. 7 and 8) is operatively mounted on the channel extensions 74 and projects below the level of the conveyor boom as shown in FIG. 8 of the drawings. An hydraulic drive motor M1 (see FIG. 7) for the head pulley 68 is secured by a mounting bracket 112 to one of the channel extensions 74.

The conveyor boom 52 of the concrete-distributing conveyor system embodies numerous incidental arrangements of a minor nature such as gusset plates, reinforcing struts, lateral side flanges, bolting means and the like, such arrangements appearing in the drawings but being not described herein since they do not constitute essential or important features of the invention. Still other illustrated details such as piping and flexible conduit lines which relate to the hydraulic control system for the concrete-distributing conveyor system 50 will be described subsequently when the hydraulic system and its operation are set forth in greater detail hereafter.

Considering now the traverse carrier frame 54 which supports the conveyor boom 52 and through which the boom is longitudinally slidable, the details of such traverse carrier frame are best illustrated in FIGS. 3, 4, 5, and 6. It will be recalled that this carrier frame 54 is carried at the outer or distal end of the pivoted or hinged support bracket 58 which supports the turntable 56. The traverse carrier frame 54 involves in its general organization a composite cradle-like structure of inverted U-shape design and including two vertical sheet metal side plates 120 which straddle and are disposed slightly outwards of the side plates 70 and the channel members 72 of the conveyor boom 52, arch inwardly over the conveyor boom 52 as indicated at 122 in FIGS. 5 and 6, and serve to support therebetween an upwardly opening rectangular concrete-receiving hopper 124. Upstanding elastomeric funnel sheets 126 are secured in position on the upper rim of the hopper 124 by means of fastening strips 128. The sheet metal side plates 120 of the carrier frame 54 are supported by means of a tiltable frame structure of cage-like design and including short vertical corner legs 130 at one end of said frame structure and long vertical corner legs 132 at the other end (see FIGS. 3, 4, 5, and 6). These legs have their upper ends secured to longitudinally extending tubular side members 134. Upwardly and inwardly inclined structural members 136 and 138 are secured to the lower ends of the corner legs 130 and 132, respectively, and also to medial regions of the tubular side members 134 and serve to render the tiltable frame structure rigid. As best illustrated in FIGS. 3, 6, and 8 of the drawings, the lower ends of the long vertical legs 132 are connected together by means of a crossbar 140 which underlies the conveyor boom 52.

The medial region of said crossbar has pivotally attached thereto the outer end of a plunger 142, the latter being associated with an hydraulic lift cylinder 144 which is pivotally attached to the turntable 56 and the nature and function of which will be made clear presently. As set forth hereafter, the cylinder 144 is operable under the control of a lift valve V4 (see FIGS. 1 and 13).

As previously stated, the conveyor boom 52 of the system 50 is slidable bodily and lengthwise through the traverse carrier frame 54 and, accordingly, the boom is guided in its lengthwise sliding movements by means of a longitudinal series of upper rollers 150 and a similar series of lower rollers 152. The upper rollers 150 are rotatably mounted on the upper end portions of the corner legs 130 and 132 and are in the form of hold-down rollers which overlie the upper side flanges of the channel members 72 on opposite sides of the conveyor boom 52. The lower rollers 152 are rotatably mounted on the lower end portions of the corner legs 130 and 132 and underlie the lower side flanges of the channel members 72 as best seen in FIG. 6. The conveyor boom 52 is held in alignment with the traverse carrier frame 54 by means of horizontal rollers 153 which bridge the side flanges of the channel members 72 and also by horizontal rollers 155 which bear against the lower side flanges of the channel members 72. The rollers 153 are mounted on angle brackets which are connected to the lower end portions of the long corner legs 132 and the rollers 155 are mounted on angle brackets which are connected to the lower end portions of the short corner legs 130. From the above description, it will be appreciated that the various rollers 150, 152, 153 and 155 constitute confining guide rollers by means of which the conveyor boom 52 of the system 50 is constrained to move lengthwise through the traverse carrier frame 54 from substantially one end of the boom to the other and in either direction. The carrier frame 54 thus constitutes the sole supporting means for the conveyor boom 52 in all positions of the latter. It is to be understood that in all positions of which the conveyor boom 52 is capable of assuming, the hopper 124 is maintained in vertical register with the upper reach of the conveyor belt 90, and also that, by reason of the various troughing rollers 92 and 94 which are associated with the conveyor belt, the upper reach of the belt will assume the trough-like condition in which it is illustrated in FIGS. 3 and 4 of the drawings. The drive motor M1 is a unidirectional motor and, therefore, the upper reach of the conveyor belt 90 is continuously driven in the direction indicated by the arrows in FIGS. 1, 5, and 7. When the conveyor boom 52 is projected through the traverse carrier frame 54 to a position such as is shown in FIGS. 1 and 2 wherein the discharge end thereof is remote from the carrier frame, a maximum length long pour condition obtains. When the conveyor boom 52 is projected in the opposite direction, i.e., so that the discharge end of the conveyor boom lies close to the traverse carrier frame 54, a minimum length short pour condition obtains.

As previously stated, the traverse carrier frame 54 is tiltable bodily, together with the conveyor boom which is carried thereby, for rocking movements about a horizontal axis in a fore and aft direction. Accordingly, and as previously stated, the traverse carrier frame 54 is mounted for tilting or rocking movement on the turntable 56 by means of an upright U-stand 160 (see FIGS.

4, 5, and 6) which comprises a pair of vertically extending spaced apart side arms 162 and a connecting horizontal base member 164. The U-stand 160 is welded or otherwise fixedly secured to the turntable 56 and, thus, the U-stand may be regarded as constituting an element of the turntable assembly. The vertical side arms 162 of the U-stand straddle the traverse carrier frame 54 and the upper regions of these arms are provided with inwardly extending trunnions 166 which pass through holes in the tubular side members 134 of the carrier frame 54 and constitute pivotal connections for the frame and the conveyor boom 52 which is slidably supported thereby. The central portion of the base member 164 of the U-stand 160 is attached in diametric relationship to the upper surface of a circular horizontally extending cogwheel 170 (see FIGS. 9 and 10) which constitutes an element or part of the turntable 56. The latter further includes a pivot shaft 172 which depends from the central portion of the cogwheel 170 and is rotatably mounted within a vertically extending sleeve 174, the latter being carried at the extreme outer or distal end of the hinged support bracket 58 for the turntable 56. The lower end of the pivot shaft 172 projects below the sleeve 174 as shown in FIG. 6 and carries a split clamping collar 175 to which the closed end of the lift cylinder 144 is pivoted. The lower end region of the sleeve 174 constitutes a reaction point for the aforementioned lift cylinder 144.

The pivoted or hinged support bracket 58 for the turntable 56 is in the form of a generally trapezoidal frame structure of which the turntable sleeve 174 constitutes the outer or distal end piece thereof. The upper end of the sleeve is formed with a circular turntable bearing plate 175 (see FIG. 4) on which the cogwheel 170 rests. The support bracket further includes an inner or proximate end piece 176 which also is in the form of a vertically extending sleeve and is rotatably carried on a generally vertically extending fixed supporting shaft 178. This supporting shaft 178 constitutes the main reaction member for the entire concrete-distributing conveyor system 50, the shaft being capable of limited tilting movement in a plane which extends vertically and transversely with respect to the truck frame structure 12, the aforementioned limited tilting movement being for conveyor-leveling purposes as will be described presently. Accordingly, the supporting shaft 178 is fixedly secured at its upper and lower ends in a pair of laterally extending ears comprising an upper ear 180 in the form of a cog sector and, in addition, a lower ear 182, both ears being secured to and forming a part of the aforementioned pendulum bracket 60. As shown in FIG. 6, the upper portion of the pendulum bracket 60 is pivotally connected as indicated at 184 for limited swinging movement on the aforementioned mounting fixture 62 on the rear end of the truck frame structure 12 throughout a small angle under the control of an hydraulic device in the form of a plunger 186 the outer end of which is pivoted to the lower end of the pendulum bracket 60, and a cylinder 188 the closed end of which is pivoted to an appropriate point on the mounting fixture 62. The cylinder 188 is operable under the control of a leveling valve V3 in a manner that will be made clear when the operation of the concrete-distributing conveyor system 50 is set forth. Upper and lower frame bars 192 and 194 which extend between the end portions of the sleeves 174 and

176, and diagonal struts 196 complete the pivoted or hinged support bracket 58 for the turntable 56.

As clearly shown in FIG. 10 of the drawings, the cogwheel 170 at the outer end of the hinged turntable support bracket 58 is provided with an annular series of peripheral teeth 200 which cooperate with an arcuate series of pinion teeth 202 on a dog 204, the latter being slidable longitudinally on the upper frame bar 192 of the hinged or pivoted turntable support bracket 58. The dog 204 is movable between an advanced locking position wherein its teeth 204 are in mesh with the teeth 200 of the cogwheel 170, and a retracted position wherein the cogwheel 170 is released by the dog 204 so that it may be rotated in either direction about the substantially vertical axis of the pivot shaft 172, thus causing the turntable 56 as a whole to rotate and effect directional adjustment of the traverse carrier frame 54 and its associated conveyor boom 52. Such sliding movement of the dog 194 is effected under the control of an over-center toggle device 206 including a loop-like draw link 208 and a manipulating lever 210 therefore, such lever being pivoted on an upstanding bracket 212 the lower end portion of which is fixedly mounted on the upper frame bar 192 of the support bracket 58.

The pivoted or hinged turntable support bracket 58 is locked in any of the positions into which it is swung by means of the setting of a dog 214 which is similar to the dog 194 and is similarly carried on the upper frame bar 192 of the support bracket 58 near the proximate end of the latter. Said dog 214 is provided with an arcuate series of teeth 216 which are designed for cooperation or meshing relation with an arcuate series of teeth 218 on the cog sector which forms or constitutes the upper ear 180. The dog 214 is operable under the control of an over-center toggle device 220 which is substantially the same as the toggle device 206. The toggle device 220 differs from the toggle device 206 only in that the slidably mounted dog 214 which is associated therewith is biased toward its advanced locking position by way of a helical compression spring 222.

In addition to the parts or elements heretofore described, the concrete-distributing conveyor system 50 comprises an hydraulically powered chain drive mechanism by means of which the conveyor boom 52 may be shifted lengthwise through the traverse carrier frame 54 in order to vary the length of concrete pour. Referring particularly to FIGS. 3, 6, and 8, lengthwise conveyor boom movements are effected under the control of a single length of chain 230. One end of the chain is secured to the medial region of a crossbar 232 which extends transversely across the conveyor boom 52 and is secured to the underneath sides of the channel members 72 in the vicinity of the tail pulley 76, while the other end of the chain is similarly secured to the medial region of a crossbar 234 which is secured to the underneath sides of the channel members 72 in the vicinity of the drive or head pulley 78. The chain 230 projects longitudinally through the traverse carrier frame 54 and within the frame it makes a U-shaped or serpentine dip as indicated at 236 in FIGS. 6 and 8. The upper portions of the dip extend over a pair of spaced apart sprockets 238, and the lower portion of the dip extends under and around a drive sprocket 240 which is fixedly mounted on the drive shaft 242 of a reversible hydraulic boom motor M2. The boom motor M2 is operable under the control of a reversible boom extension valve V2 in a manner that will be made clear when the hy-

draulic operation of the conveyor system 50 is set forth hereafter. As best shown in FIG. 3, the two sprockets 238 are carried at the upper end of an upstanding angle bracket 244 which is supported on and fixedly connected to a suspension beam 246, the latter being attached to the underneath side of the crossbar 140 of the traverse carrier frame 54. The motor M2 is supported from the suspension beam 246 by means of a motor mount 248.

From the above description, and with reference to FIG. 8 of the drawings, it will be apparent that when the drive sprocket 240 is rotated by the boom motor M2 in a clockwise direction, the chain 230 will be shifted lengthwise to the left as seen in this view, thus placing that portion of the chain which extends between the crossbar 234 and the drive sprocket 240 under tension so as to draw the conveyor boom 52 to the left and thereby progressively shorten the effective concrete-conveying surface of the endless conveyor belt 90. Conversely, when the drive sprocket 240 is rotated in a counterclockwise direction, the chain will be similarly shifted lengthwise to the right so as to draw the conveyor boom in a direction which will lengthen the effective concrete-conveying surface of the belt 90.

OPERATION OF THE CONCRETE DISTRIBUTING CONVEYOR SYSTEM

A description of the operation of the herein disclosed concrete distributing conveyor system 50 will be facilitated by reference to FIG. 13 which is an hydraulic circuit diagram illustrating schematically the dual pumping system which is employed for actuating the various hydraulic power components of the conveyor system 50. In this view, the fluid lines leading to such components are fully disclosed, whereas in the preceding views, namely, FIGS. 1 to 12, inclusive, only fragmentary portions of such fluid lines are disclosed.

According to the present invention, it is contemplated that in order to maintain constant conveyor belt speed at all times, there shall be no reduction of the full line pressure which is maintained in the fluid lines leading to the belt drive motor M1. Accordingly, the hydraulic circuit for the motor M1 extends from an oil sump S, through a pump P1, a conduit section 11, a manual shut-off valve V1, a conduit section 13, the hydraulic motor M1, and conduit sections 15, 17, and 19 back to the sump S. By reason of the fact that the hydraulic motor M1 is fixed to and movable bodily with the conveyor boom 52 as previously described, it is necessary that at least certain portions of the conduit sections 13 and 15 be flexible. Thus, in FIGS. 7 and 8, and elsewhere in the drawings, the portions of the conduit sections 13 and 15 which are designated 13_t and 15_t are in the form of lengths of flexible tubing, while the portions which are designated 13_p and 15_p are in the form of lengths of rigid piping. It will be noted that the lengths 13_p and 15_p of rigid piping travel bodily with the conveyor boom 52 and connect through short reverse connections 13_r and 15_r with the lengths 13_t and 15_t of flexible tubing. In order to prevent snarling of the flexible tubing lengths 13_t and 15_t, spring sheathes 250 are fixed to a bracket 251 on the conveyor boom 52, surround portions of the lengths of flexible tubing and initiate or effect formation of flexible reverse bends 13_b and 15_b. The latter vary or change in size as the conveyor boom moves through the carrier frame 54. The sheathes thus prevent the forma-

tion of kinks in the flexible tubing lengths. The aforementioned rollers 153 which guide the channel members 72 of the conveyor boom 52 serve the additional function of guiding the reverse bends 13_b and 15_b of the lengths 13_t and 15_t of the flexible tubing between the flanges of the channel members 72. Additional rollers 157 assist the rollers 153 in thus guiding said flexible tubing lengths.

Referring again to FIG. 13, lengthwise sliding movement of the conveyor boom 52 in opposite directions is effected under the control of a reversing valve V2 which is associated with a second hydraulic pump P2. The latter pump serves to supply fluid (oil) under pressure to all of the hydraulic components of the concrete distributing conveyor system 50 other than the belt drive motor M1, the valve V2 serving the boom motor M2, a valve V3 serving the leveling cylinder 188, and a valve V4 serving the lift cylinder 144. For the convenience of the operator, the valves V1, V2, V3, and V4 are mounted on a valve control panel 252 (see FIG. 2) which is suitably connected to one of the rear wheel fenders of the ready-mix truck 10, preferably the rear left fender 254. By reason of this, said valves are readily accessible to the operator when the conveyor system 50 is to be used.

Upon manipulation of the valve V2 for boom extension purposes, i.e., to slide the boom lengthwise through the traverse carrier frame 54 to the right as viewed in FIGS. 2, 7, and 13, an hydraulic circuit will be established and will extend from the sump S, through the pump P2, a pair of conduit sections 21 and 23, the reversing valve V2, a conduit section 25, the motor M2, a conduit section 27, the valve V2, a conduit section 29, and the conduit sections 17, 19 back to the sump S. The existence of this hydraulic circuit will cause the drive sprocket 240 to rotate in a counterclockwise direction as viewed in FIG. 13, thus placing the section of the chain 90 which extends between the sprocket 240 and the crossbar 232 under tension so as to pull or shift the conveyor boom 52 to the right and thus extend the boom and increase the length of the concrete pour as previously described. If it is desired to shorten the length of the concrete pour, the valve V2 is reversed so as to establish an hydraulic circuit which extends from the sump S, through the pump P2, the conduit sections 21, 23, the valve V2, the conduit section 27, the motor M2, the conduit section 25, the reversing valve V2, and conduit sections 29, 17, 19 back to the sump S. The existence of this latter hydraulic circuit will cause the drive sprocket 240 of the motor M2 to rotate in a clockwise direction, thus placing the span or portion of chain which extends between the drive sprocket 240 and the crossbar 234 under tension so as to draw the conveyor boom to the left and thus shorten the length of the concrete pour.

If, at any time during concrete-pouring operations, the truck frame structure 12 should happen to rest on uneven terrain so that the conveyor boom 52 is tilted sidewise, and thus, is not level insofar as its transverse direction is concerned, this condition may be remedied by manipulation of the leveling valve V3. Such valve is a reversing valve and manipulation thereof in one direction will establish an hydraulic circuit which extends from the sump S, through the pump P2, the conduit section 21, a conduit section 31, the valve V3, a conduit section 33, the leveling cylinder 188, a conduit section 35, the valve V3, a conduit section 37, and the

conduit section 19 back to the sump S. Introduction of fluid under pressure into the cylinder 188 from the conduit section 33 will serve to project the plunger 186 of said cylinder (see FIG. 6), thus causing the pendulum bracket 60 to swing throughout a limited degree to thus bring the conveyor boom 52 to a level condition insofar as its transverse direction is concerned, all in a manner that has previously been set forth. In order to swing the pendulum bracket 60 in the opposite direction, the valve V3 is manipulated so as to establish an hydraulic circuit which extends from the sump S, through the pump P2, the conduit sections 21, 31, the valve V3, the conduit section 35, the leveling cylinder 188, the conduit section 33, the valve V3, and the conduit sections 37, 19 back to the sump S.

When it is desired to raise or lower the boom, i.e., change its inclination by raising or lowering the discharge end thereof, the lift valve V4 is manipulated. In order to raise the discharge end of the boom, the valve V4 is manipulated so as to establish an hydraulic circuit which extends from the sump S, through the pump P2, the conduit section 21, a conduit section 39, the valve V4, a conduit section 41, the lift cylinder 144, a conduit section 43, the valve V4, a conduit section 45, and the conduit section 19 back to the sump S. Introduction of fluid under pressure into the cylinder 144 from the conduit section 41 will cause the plunger 142 (see FIGS. 2, 6 and 8) to be extended, thus causing the traverse carrier frame 54 to rock about the horizontal axis of the trunnions 166 in a counterclockwise direction as viewed in FIGS. 2 and 8, and in a clockwise direction as viewed in FIG. 6, thereby raising the discharge end of the boom 52. Reverse rocking of the traverse carrier frame 54 in order to lower the discharge end of the boom is accomplished by manipulating the valve V4 so as to establish an hydraulic circuit extending from the sump S, through the pump P2, the conduit sections 21, 31, the valve V4, the conduit sections 45, 19 back to the sump S.

It is believed that the above description, when considered in the light of the disclosure of FIGS. 11 and 12 which have been briefly described heretofore, will suffice for an understanding of the various operative conveyor boom positions which may be attained for concrete pouring purposes. In addition to these infinitely variable operative positions, the conveyor boom 52 is capable of being stored alongside the truck chassis or frame structure 12 in an inoperative or "parked" position as shown in dotted lines in FIG. 1.

To bring the conveyor boom 52 to this parked position from any one of the operative positions of which it is capable of assuming, the boom will first be brought to its fully extended position by manipulating the valve V2 as previously described. Thereafter, with the boom fully extended, the over-center toggle device 220 (see FIG. 10) is manipulated to release the dog 214 from the cogwheel sector 180, after which the hinged turntable support bracket 58 is swung in a counterclockwise direction as viewed in FIG. 1 until it assumes a transverse position with respect to the truck chassis or frame structure 12, such position being illustrated in dotted lines in FIG. 1. With the bracket 58 in its dotted line position as shown in FIG. 1, the over-center toggle device 206 (see FIG. 10) will be manipulated to release the dog 204 from the cogwheel 170, after which the conveyor boom (which at this time is fully extended as previously mentioned) will be swung in a counterclock-

wise direction as viewed in FIG. 1 in order to bring the same to a longitudinal position alongside the truck frame structure 12 and above the rear right fender 256 of the truck and in wrap-around relationship with respect to the rear right-hand corner of the vehicle chassis.

In order that the conveyor boom 52 may clear the fender 256 when it is being moved toward its parked position as previously described, the leveling valve V3 is manipulated to shift the position of the pendulum bracket 60 to a slightly inclined position wherein the distal end of the hinged turntable support bracket 58 (and consequently, the conveyor boom 52 as a whole) is elevated above the level of the fender 256. After the boom 52 has been swung towards the truck frame structure 12 and is disposed above the fender 256, the valve V3 will again be manipulated in order to level the turntable support bracket 58, and thus, lower the conveyor boom 52 onto the fender 256. In order to prevent dislodgment of the conveyor boom 52 from its parked position on the right rear fender 256, one or more marginal retaining flanges 258 are provided on the outer side edge of the fender. Additionally, if desired, the conveyor boom 52 may be strapped in its parked position by the use of a suitable strapping arrangement (not shown).

At such time as the conveyor boom 52 is thus parked or shifted into its stored and inoperative position, the hinged support bracket 58 of the conveyor system 50 extends transversely across the rear end of the vehicle frame structure 12 and extends alongside the mounting fixture 62. At such time as the boom is lowered onto the fender 256 under the control of the valve V3 and the leveling cylinder 188 as previously described, the support bracket becomes lowered to its substantially horizontal position so that the upper frame bar 192 of the support bracket enters the confines of a hook-like bracket 259 (see FIGS. 1 and 5) on the mounting fixture 62 and, thus, said support bracket 58 is held against dislodgment while the conveyor beam is in its so-called "parked" position.

In FIGS. 14, 15 and 16 of the drawings, a slightly modified form of the invention is disclosed. In this latter form of the invention, the dog and cogwheel arrangements 180, 214 and 170, 204 (see FIG. 10) which are associated with the hinged turntable support bracket 58 are replaced by the substitution of a modified form of hinged support bracket 358 which employs locating pins and index wheels in place of the dogs and cogwheels. In view of the similarity between the turntable supporting bracket 358 and the supporting bracket 58, and in order to avoid needless repetition of description, similar reference numerals but of a higher order have been applied to the corresponding parts as between the disclosures of FIGS. 14, 15 and 16 on the one hand and FIGS. 9 and 10 on the other hand.

The support bracket 358 includes upper and lower frame members 492 and 494 and is devoid of diagonal struts. The tubular sleeves 474 and 476 remain substantially the same as the sleeves 174 and 176 of the support bracket 58, but the cogwheel 170 of the last-mentioned bracket is replaced by an index plate in the form of a circular index wheel 470 while the cog segment 180 of the support bracket 58 is replaced by an arcuate index segment 480. The index wheel 470 is provided with a circular series of locating holes 471 which establish the various angular positions of which

the conveyor boom is capable of assuming and these holes cooperate with a locating pin 473 which projects vertically through the upper frame member 492 of the hinged turntable support bracket 358 and is biased upwardly by means of a helical compression spring 485. The latter surrounds the pin, bears at its lower end against the upper frame member 492, and abuts at its upper end against a collar 477 which is carried by the pin 473 in the upper region thereof. The lower end of the pin 473 is pivotally connected to a cam block 479 of generally rectangular configuration. A manipulating lever 481 which is welded at its proximate end to the block 479 enables said block to be turned back and forth between the position in which it is shown in FIG. 15 and wherein the pin 473 is retracted from cooperation with the index wheel 470, and the position wherein it is shown in FIG. 16 in which the pin projects through a selected hole 471 and, thus, locks the turntable 456 and the U-stand 460 in a desired angular position. A truncated corner 483 of the block 479 facilitates turning of the block through the 90° angle which is traversed by the block when moving between its two extreme positions.

The arcuate index segment 480 cooperates with an articulated locating pin assembly which is identical to the assembly previously described in connection with the index wheel 470, the two assemblies being designated in the drawings by identical reference numerals.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit or scope of the invention. For example, while the mounting fixture 62 for the pendulum bracket 60 is disclosed herein as being positioned on the truck chassis or frame structure 12 in the vicinity of the rear left-hand fender 254 of the truck, such fixture would serve its intended purpose if it were mounted near the right-hand fender 256. In such an instance, the conveyor boom 52 would, in the parked position thereof, overlie the left rear fender 254 while the panel 252 for the valves V1, V2, V3, and V4 would be positioned on the rear portion of the right rear fender 256. The invention is, however, not necessarily designed for use as a mounted adjunct on a concrete ready-mix truck. It is within the purview of the invention fixedly to mount the present distributing conveyor system 50 on a vehicle other than a ready-mix truck, or on a stationary support in the vicinity of concrete-pouring operations, in which case the same may be operated in the same manner as has been described herein. It is also within the purview of the invention for the system to distribute flowable material other than wet concrete. Therefore, only insofar as the invention is particularly pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what I claim as new and desire to secure by letters patent is:

1. In an hydraulically-operable concrete-distributing system for a ready-mix concrete truck, in combination, a vehicle frame structure, a rotary mixer mounted on said frame structure and having a discharge chute, an elongated support bracket having its proximate end hingedly secured to the rear end of said frame structure for rotation about a substantially vertical axis, a turntable mounted on the distal end of said support bracket, a traverse carrier frame pivotally mounted on said turn-

table for fore and aft rocking movements about a horizontal axis, a conveyor unit including an elongated rigid boom slidable endwise in opposite directions through said carrier frame between projected terminal positions on opposite sides thereof, an endless conveyor belt, a tail pulley and a drive pulley at opposite ends of the boom respectively for guiding said belt, and an hydraulic belt motor connected to said drive pulley in driving relationship, drive means including a reversible boom motor for projecting the boom in opposite directions, a concrete-receiving hopper on said carrier frame for receiving concrete from said discharge chute and depositing the same on the endless belt in any position of the boom, an hydraulic lift cylinder operatively connected to the carrier frame and turntable for effecting rocking movements of the former, means for locking said support bracket on the vehicle frame structure in selected positions of angularity with respect thereto, means for locking said turntable on the support bracket in selected rotational positions of the former, and means for selectively supplying hydraulic fluid to said lift cylinder and hydraulic motors.

2. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said hydraulic belt motor is unidirectional, and the boom is provided with a concrete discharge hood on the end thereof adjacent to said drive pulley.

3. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said means for supplying hydraulic fluid to the lift cylinder and hydraulic motors comprises a first fluid pump operatively connected to said belt motor, and a second and separate fluid pump operatively connected to said lift cylinder and boom motor.

4. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said means for locking the support bracket on the vehicle frame structure comprises a toothed arcuate cog sector fixedly secured with respect to said vehicle frame structure, and a toothed dog on the bracket movable into and out of engagement with the cog sector.

5. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said means for locking the support bracket on the vehicle frame structure comprises a toothed arcuate cog sector fixedly secured with respect to said vehicle frame structure, and a first toothed dog on the bracket movable into and out of engagement with said cog sector, and said means for locking the turntable on the support bracket in selected rotational positions comprises a toothed cogwheel fixedly secured to the turntable, and a second toothed dog slidably mounted on the bracket and movable into and out of effective engagement with said cogwheel.

6. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said means for locking the support bracket on the vehicle frame structure comprises a toothed arcuate cog sector fixedly secured with respect to said vehicle frame structure, and a first toothed dog on the bracket movable into and out of effective engagement with said cog sector, and said means for locking the turntable on the bracket comprises a toothed cogwheel fixedly secured to the turntable, and a second toothed dog mounted on the bracket and movable into and out of effective engagement with the cogwheel, said lock-

ing means further including over-center toggle means for maintaining each toothed dog in its position of effective engagement.

7. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said means for locking the support bracket on the vehicle frame structure comprises an index plate fixedly secured with respect to said vehicle frame structure and provided therein with a circular row of locating holes, and a locating pin movably mounted on the support bracket and designed for selective reception in said holes.

8. In an hydraulically operable concrete-distributing system, the combination set forth in claim 7 and wherein said means for locking the turntable on the support bracket comprises a second index plate fixedly mounted on the turntable and provided with a circular row of locating holes therein, and a second locating pin movably mounted on the support bracket and designed for selective reception in the holes in said second indexing plate.

9. In an hydraulically operable concrete-distributing system, the combination set forth in claim 8 and including, additionally, spring means yieldingly biasing each of said locating pins to positions wherein they are withdrawn from their respective holes.

10. In an hydraulically operable concrete-distributing system, the combination set forth in claim 1 and wherein said conveyor boom is in the form of an elongated generally rectangular boom frame including a pair of longitudinally extending side plates and transverse frame members extending between said side plates, a series of troughing rollers carried by each of said transverse frame members and including horizontal bottom and inclined side rollers and serving effectively to support the upper reach of the endless conveyor belt, and a series of horizontal return rollers rotatably supported between said side plates below the level of said transverse frame members and serving effectively to support the lower reach of the conveyor belt.

11. In a ready-mix concrete-transporting vehicle, in combination, a vehicle frame structure, a rotary mixing drum mounted on said frame structure and provided with a positionable discharge chute adjacent to the rear end of said frame structure, a normally vertical conveyor-leveling bracket pivotally mounted on the rear end of said frame structure for limited angular displacement about a horizontal longitudinal axis, a support bracket having its proximate end hingedly secured to said conveyor-leveling bracket for swinging movement about a vertical axis, a turntable mounted on the distal end of said support bracket for rotation about a vertical axis, a carrier frame pivotally mounted on said turntable for rotation bodily therewith and for fore and aft rocking movement about a horizontal axis, a conveyor unit including an elongated rigid boom having a discharge end and a tail end and slidable endwise in opposite directions through said carrier frame between a projected terminal position on one side of the carrier frame wherein said discharge end of the boom is remote from the carrier frame for long pour operations, and a reverse projected terminal position on the other side of the carrier frame wherein said discharge end of the boom is in close proximity to the carrier frame for short pour operations, an endless conveyor belt, a drive pulley and a tail pulley at the discharge and tail ends of

the boom respectively for guiding the belt, a unidirectional hydraulic belt motor connected to said drive pulley in driving relationship, reversible drive means including an hydraulic boom motor for projecting said boom in opposite directions, a concrete-receiving hopper on said carrier frame for receiving concrete from said positionable discharge chute and depositing the same on said belt in any position of the boom, an hydraulic lift cylinder operatively connected to the carrier frame and turntable for effecting rocking movements of the former, means for locking said support bracket on the conveyor-leveling bracket in selected rotational positions of the former, a leveling cylinder operatively connected to the vehicle frame structure and conveyor-leveling bracket for effecting limited angular displacement of the latter, and means for supplying hydraulic fluid to said hydraulic motors, lift cylinder and leveling cylinder.

12. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 11 and wherein said means for supplying hydraulic fluid to the hydraulic motors, lift cylinder and leveling cylinder comprises a first fluid pump operatively connected to said belt motor, and a second and separate fluid pump operatively connected to the boom motor, lift cylinder and leveling cylinder.

13. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 12 and wherein said means for supplying hydraulic fluid to the hydraulic motors, lift cylinder and leveling cylinder further includes a manually operable shut-off valve interposed between the first fluid pump and the hydraulic belt motor, a manually operable reversible valve interposed between the second fluid pump and the boom motor, and a manually operable reversible valve interposed between the second fluid pump and each of said cylinders.

14. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 13 and wherein the reversible boom motor is mounted on said carrier frame and said reversible drive means for projecting the boom further includes a drive chain having its opposite ends connected to the boom adjacent to the tail and discharge ends of the latter, and a drive sprocket operatively connected to said boom motor and in meshing engagement with said drive chain.

15. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 11 and wherein said conveyor boom is in the form of an elongated boom frame including frame sides embodying horizontally extending channels which face laterally so as to present upper and lower channel flanges, and the carrier frame is provided with longitudinally spaced pairs of rollers which straddle said channels so as to ride tractionally on said flanges.

16. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 11 and wherein said means for supplying hydraulic fluid to the hydraulic motors, lift cylinder and leveling cylinder comprises a first fluid pump operatively connected to the belt motor, and a second and separate fluid pump operatively connected to the boom motor, lift cylinder and leveling cylinder, said first and second fluid pumps are mounted on the vehicle chassis, the connection between the first fluid pump and belt motor embodies a lead-out fluid conduit and a return fluid conduit, each of said conduits including an elongated section of flexible tubing,

one end of which is fixedly mounted on the carrier frame and the other end of which is fixedly mounted on the conveyor boom and moves bodily with the latter, said conveyor boom is in the form of an elongated boom frame embodying horizontally extending channels, each section of flexible tubing defining a variable size reentrant bend, one end of which is fed into the confines of one of said channels as said conveyor boom is slid endwise toward said reverse projected terminal position.

17. In a ready-mix concrete-transporting truck, the combination set forth in claim 16 and wherein guide means in the form of rollers mounted on the carrier frame and tractionally engageable with said reentrant bends are positioned so as to guide said reentrant bends into the confines of said channels during sliding movement of the boom.

18. In a ready-mix concrete-transporting truck, the combination set forth in claim 17 and wherein the carrier frame includes structural side members which straddle the boom channels in close proximity thereto, and guide means in the form of rollers are provided on the carrier frame and positioned so as to direct said reentrant bends between adjacent side members and channels and into the confines of the latter.

19. In a ready-mix concrete-transporting truck, the combination set forth in claim 17 and wherein said variable size reentrant bends in the flexible tubing are sustained by means of helical spring sheathes which encompass portions of the reentrant bends and have their proximate ends fixedly secured to the carrier frame.

20. In a ready-mix concrete-transporting truck, the combination set forth in claim 17 and wherein each side member of the carrier frame has mounted thereon an upper series of at least two longitudinally spaced traction rollers and a similar lower series of traction rollers, and said horizontally extending channels of the conveyor boom frame slide endwise between said upper and lower series of traction rollers and are guided in their endwise movement thereby.

21. In a ready-mix concrete-transporting truck, the combination set forth in claim 20 and wherein the conveyor boom further includes a series of transverse frame members which extend between said channels, a

series of troughing rollers carried by each of said transverse frame members and including horizontal bottom and inclined side rollers and serving effectively to support the upper reach of the conveyor belt, and a series of horizontal return rollers rotatably supported between said side plates below the level of said transverse frame members and serving effectively to support the lower reach of the conveyor belt.

22. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 11 and wherein the reversible boom motor is mounted on the carrier frame and said reversible drive means for projecting the boom comprises, additionally, a drive chain having its opposite ends connected to the boom adjacent the tail and discharge ends thereof, a pair of spaced apart idler rollers mounted on said carrier frame in close proximity to each other and over which said drive chain passes, and a drive sprocket carried by the boom motor below the level of the idler rollers and in meshing engagement with said drive chain, and wherein said drive chain makes a serpentine dip between said idler rollers and passes beneath said drive sprocket.

23. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 11 and wherein said conveyor boom is in the form of an elongated extensible and contractible boom frame including composite frame sides embodying horizontally extending channel sections which face laterally, channel extensions at the opposite ends of said channel sections and disposed in telescopic sliding relationship with respect thereto, said drive pulley and tail pulley being mounted on said channel extensions, means are provided for securing said channel sections in selected positions of adjustment for belt-tightening purposes, and the carrier frame is provided with spaced pairs of rollers which straddle said channel sections so as to ride tractionally on said channel sections and the channel extensions.

24. In a ready-mix concrete-transporting vehicle, the combination set forth in claim 23 and wherein the means for securing said channel sections in selected positions of adjustment comprises clamping pin and slot connections between each channel section and its adjacent channel extensions.

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