Jan. 15, 1963

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3,073,580

TRUCK-MIXER DRIVE MECHANISM

Filed July 27, 1959

2 Sheets-Sheet 1

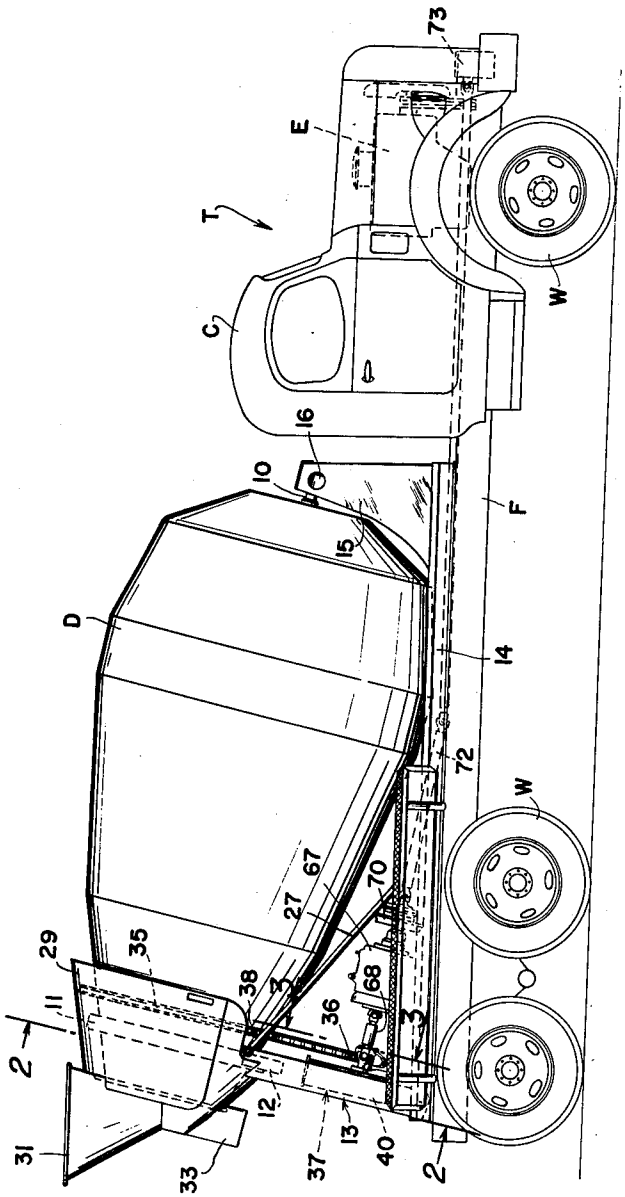


FIG. 1.

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FIG. 2.

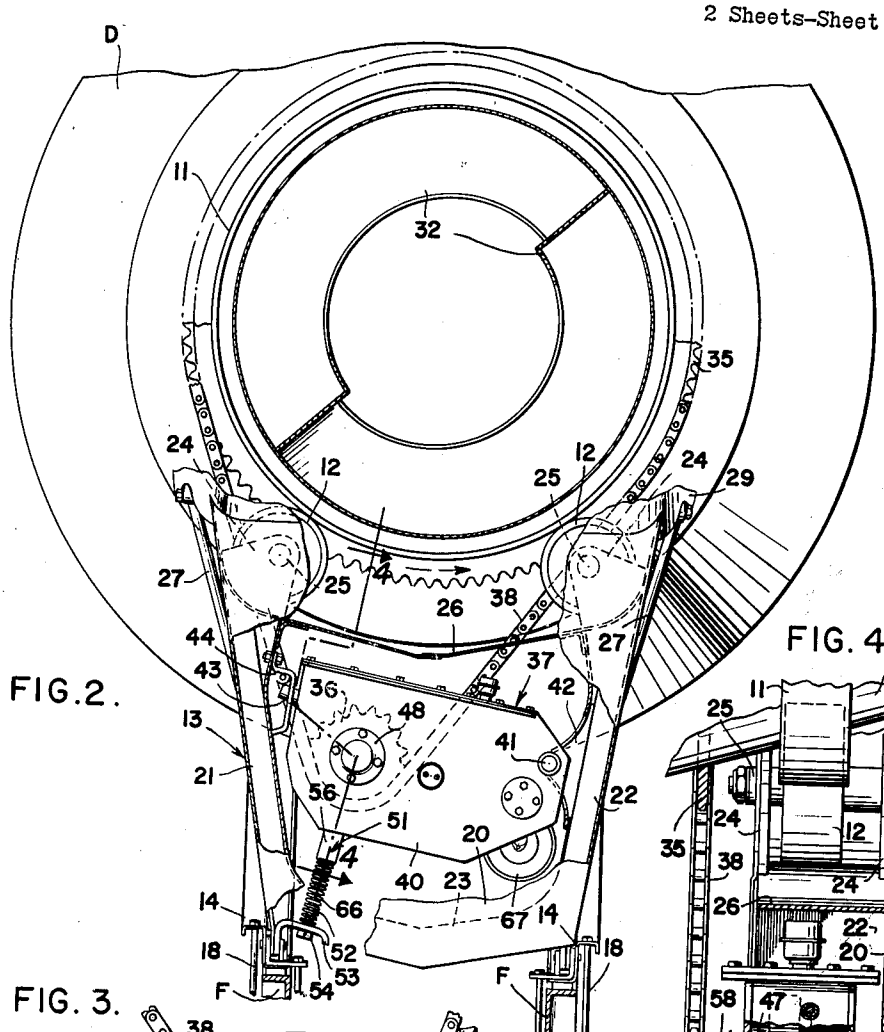


FIG. 3.

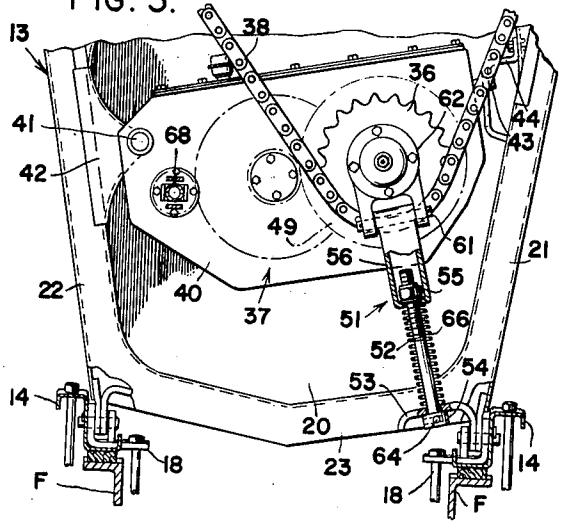
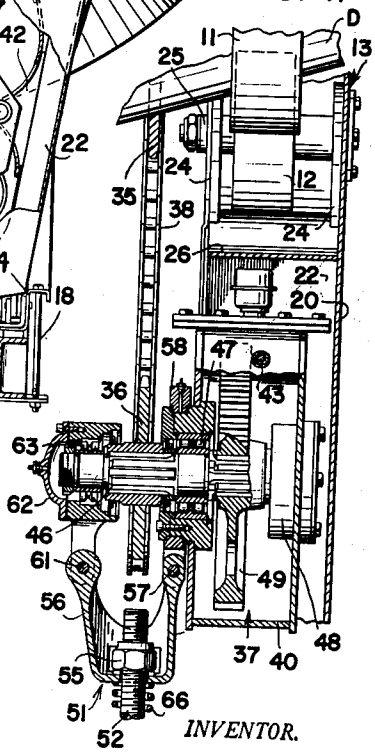


FIG. 4.



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TRUCK-MIXER DRIVE MECHANISM

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11 Claims. (Cl. 259—177)

This invention relates generally to concrete mixers of the truck-mounted or transit mixer type and more particularly to an improved arrangement for rotatably supporting and driving the mixing drum of a mobile concrete mixer.

Concrete mixers of the truck-mounted type are ordinarily so arranged that the mixing drum for the concrete is driven either by means of a power take-off connection from the propulsion engine of the supporting motor truck or by means of a separate engine that is provided especially for rotating the drum. In either event the driving power is necessarily transmitted through various speed changing and reversing mechanisms and is usually conveyed from these mechanisms to the drum by means of a power transmitting chain that passes around the drum. Because of the various transmission mechanisms required between the engine and the chain connection to the mixing drum, it has usually been found necessary in the past to utilize such expedients as bevel gearing in transmitting the power at right angles and to employ other heavy and complicated apparatus and attachments such as idler sprockets for keeping the chain tight, and the like.

It is a general object of this invention to provide an improved mixing drum supporting and driving mechanism for a mobile concrete mixer that is rugged in construction yet light in weight to facilitate hauling heavier loads of concrete.

Another object of this invention is to provide a simplified and lighter power transmitting train for driving the mixing drum of a concrete mixer such as a truck-mounted mixer.

Another object of the present invention is to provide an improved arrangement for supporting and retaining a mixing drum in the frame of a truck-mounted concrete mixer.

Another object of the invention is to provide an improved arrangement for rotatably supporting a mixing drum of a truck-mounted mixer wherein the driving chain that rotates the drum serves also to restrain the drum from movement out of its cradled position upon its supporting rollers.

Another object is to provide an improved power transmission mechanism for a truck-mounted concrete mixer wherein the final speed reducing gearing is mounted within the rear frame element that supports the open end of the mixer drum.

Another object is to provide a drum drive for a truck-mounted mixer in which the final speed reducing mechanism is bodily movable within the rear frame element to provide for tightening the final drive chain.

A further object of the invention is to provide an improved chain take-up mechanism for the final drive chain of a concrete mixer or the like.

According to this invention, a truck mounted concrete mixer is enabled to carry heavier loads of concrete by providing an improved drum supporting and rotating arrangement that is lighter in weight and more convenient and efficient in operation than previously known supporting and power transmission mechanisms for this purpose. To this end, the elevated open end of the mixing drum is supported by an upright rear frame element carrying a pair of spaced rollers that engage a complementary annular trackway on the drum, the forward closed end of

the drum being rotatably mounted by a trunnion that engages a universal bearing carried by a pedestal. An annular sprocket is provided on the drum just in front of the annular trackway for the supporting rollers. A power transmitting chain running over the drum sprocket serves both to rotate the drum and to hold it down with the trackway in cradled relationship between the rollers against any tendency for the drum to be displaced as the result of the supporting truck operating over rough terrain. The chain operates around and is driven by a drive sprocket that extends outward from a speed reducing transmission mechanism that is movably mounted within the drum supporting rear frame. A chain take-up screw and nut mechanism is arranged to exert downward force on the sprocket in order to move it in the direction to tighten the chain. The take-up screw is arranged to exert tightening force directly in the plane of operation of the chain in direction radially downward from the axis of the drum. This is accomplished by providing a bail or clevis with its ends rotatably connected at the respective sides of the drive sprocket whereby the tightening pull is equalized and is applied directly through the sprocket in the plane of the chain. This avoids transmitting the tensioning force through the speed reducing mechanism which is preferably pivotally mounted in the frame for limited swinging movement to accommodate the movement of the drive sprocket in tightening the chain. A flexible drive connects the movable speed reducer to a speed selecting and reversing mechanism that is mounted in a stationary position on the truck and that transmits power at the required speed ratio and in the desired direction from the driving engine. By this arrangement, power is transmitted in the most direct and convenient manner from the engine to the mixing drum, while the improved tensioning mechanism for the final driving chain serves also to hold the drum down in its proper position on its supporting rollers.

The foregoing and other objects of this invention will become more fully apparent as the following detailed description of an improved truck-mounted mixer constituting an exemplary embodiment is read in conjunction with its representation in the accompanying illustrative drawing, wherein:

FIGURE 1 is a view in right side elevation of a truck-mounted concrete mixer provided with an improved drum supporting and driving mechanism embodying the present invention;

FIG. 2 is an enlarged fragmentary axial view, taken from the rear and partly in section on the plane represented by the line 2—2 in FIG. 1, with parts broken away to better disclose the drum supporting and driving mechanism;

FIG. 3 is another enlarged fragmentary view, taken from the opposite direction and partly in section on the plane represented by the line 3—3 in FIG. 1, showing the inner side of the movable speed reducing mechanism and chain take-up arrangement; and,

FIG. 4 is a fragmentary view, largely in vertical section through the chain tightening and speed reducing mechanism, taken generally on the planes represented by the line 4—4 in FIG. 2.

As is well known, truck-mounted concrete mixers or transit mixers for delivering freshly mixed concrete to sites of use, are required to be of robust construction to withstand the stresses imposed in carrying heavy loads yet they should be as light in weight as possible in order that the maximum amount of concrete may be transported by the truck. The particular truck-mounted concrete mixer shown in the drawing is representative of well known truck mixers in general and is similar in basic construction to the truck-mounted concrete mixer shown

in my previous Patent No. 2,696,371, issued December 7, 1954.

Referring now more specifically to the drawing, and especially to FIG. 1 thereof, the truck-mounted concrete mixer there shown includes apparatus constituting an exemplifying embodiment of the improvements over the usual truck mixer construction that are provided by the present invention. As shown, the concrete mixer comprises essentially a large, relatively long, tapered mixing drum D that is disposed longitudinally on the chassis of a conventional commercial motor truck T with its axis of rotation inclined upwardly toward the rear of the truck. The particular motor truck T shown in the drawing is intended to be representative of any of various standard commercial trucks of conventional construction and includes the usual longitudinal frame F supported upon wheels W. The rear wheels of the truck T are arranged to be driven in the usual manner by a propulsion engine E mounted at the front of the truck frame F while the front wheels are connected conventionally to be steered from the driver's cab C.

The mixing drum D is mounted on the frame F with its large end foremost, the large forward end of the drum being closed and provided on the axis of rotation with a forwardly projecting trunnion **10** that serves to rotatably support the closed end of the drum. As shown, the drum D tapers rearwardly and its reduced upwardly inclined end is open to receive and discharge concrete at a position directly above the rear end of the truck frame F. Just forwardly of its rearward end, the drum D is provided with an encirculing annular trackway **11** that serves to rotatably support the open end of the drum by cooperating with a pair of spaced rollers **12** that are rotatably mounted at the opposite sides respectively of an upright rear frame member **13** as more clearly shown in FIG. 2.

The rear frame member **13** is pivotally mounted at its lower end on the rear end of a horizontal lower frame constituted by a pair of longitudinal frame members **14** that lie parallel with and are mounted respectively on the two side member of the truck frame F, and that are interconnected at their forward ends by means of a transverse bearing pedestal **15** to constitute a unitary mixer frame structure. The bearing pedestal **15** is provided at its upper end with a self-aligning or universal type of bearing **16** which receives the projecting drum trunnion **10** and thereby serves as the main bearing to rotatably support the closed forward end of the drum on the truck T. As best shown in FIG. 2, the two parallel longitudinal side members **14** of the mixer frame are of Z-shape in section and each is secured at its respective ends by means of clamps **18** to the corresponding side member of the truck frame F upon which it rests. In this manner the mixer frame is secured at its four corners to the chassis of the truck T in a way to permit limited flexing movement when the truck operates over rough ground.

As best shown in FIG. 1, the rear frame upright member **13** is inclined forwardly in extending upwardly from the lower side frame members **14**, the angle of inclination being such that the plane of the frame member **13** is disposed at substantially right angles to the upwardly inclined axis of rotation of the drum D. By this arrangement, the rollers **12** act only in radial direction in cooperation with the trackway **11** to support or cradle the open rear end of the drum while the forward universal bearing **16** assumes the thrust loads, whether resulting from gravity and the downward inclination of the drum axis or from the inertial loads imposed by accelerating or decelerating the truck T.

As best shown in FIG. 2, the rear frame upright member **13** is constituted by a single metal plate that forms an enclosing rear panel or web **20** at the back of the mixer frame. The vertical edges of the plate are folded forwardly to constitute, respectively, channel-like side elements **21** and **22** that are inwardly facing and outwardly diverging and that extend upwardly and outwardly generally tangential to the sides of the reduced open end of the drum D. The lower ends of the channel shaped elements **21** and **22** of the frame member **13** are pivotally connected respectively to the rear ends of the two lower frame side members **14** by means of pins or the like. A lower cross member **23** that is also secured to the rear panel **20**, serves to interconnect the side channel members in a manner to reinforce the structure.

Near their upper ends, the flanges of the channel elements **21** and **22** are each reinforced by flange plates **24** that constitute brackets for supporting the spaced drum carrying rollers **12**. Pins or axles **25** pass through the brackets formed by the reinforcing plates **24** and rotatably mount the rollers **12** by means of antifriction bearings (not shown). Just below the drum supporting rollers **12** the two side members or channels **21** and **22** are interconnected by an upper cross member **26** that serves to resist the outward thrust imposed through the rollers upon the side members and that is also secured to the rear panel **20** to further reinforce the entire rear frame member **13**.

As shown in FIGS. 1 and 2, side brace rods or support rods **27** are secured to each of the channel side members **21** and **22**, respectively, in the region of the drum supporting rollers **12** and extend therefrom forwardly and downwardly to the corresponding lower side frame member **14** to constitute diagonal braces that support the rear frame member **13** in its proper upright position at the desired angle of inclination.

As previously mentioned, the preferred degree of inclination of the rear frame member **13** is such that the plane of the frame is normal to the axis of rotation of the drum D whereby the supporting rollers **12** operate in radial alignment with the drum trackway **11**. Because of the pivotal connection between the lower end of the frame member **13** and the rear ends of the side frame members **14**, the upright rear frame member **13** can assume any desired degree of inclination, its position being determined by the length of the brace rods **27** and the position of attachment thereof to the lower frame side members **14**. Such being the case, in the manufacture of a series of truck-mounted mixers of different capacities, it is possible to standardize upon a rear frame member **13** of predetermined size for use with several mixer drums of different sizes. This is accomplished by arranging the frame structure in such a manner that the drums of different sizes are inclined at different angles, the rear frame members **13** being adjusted in each machine to the proper complementary angle by means of the brace rods **27**. By this arrangement it is possible to manufacture the standardized rear frame members in larger quantities and at lower cost than would otherwise be the case if a different rear frame member were needed for each size of mixer drum.

The upper ends of the channel side members **21** and **22** are connected to the respective lower ends of and serve to support a curved shield plate **29** that extends over the top of the rear portion of the drum D as shown in FIG. 1 in position to shield the annular trackway **11**. Secured to and carried by the curved shield **29** at is rear edge is a charging hopper **31** that is arranged to receive the material to be mixed and direct it into the open end of the mixing drum D.

As shown in FIG. 2, the interior of the drum D is provided with spiral blades **32** which are arranged in the usual manner to feed the material into the drum when the drum is rotated in the mixing direction. After the material has been mixed and it is desired to discharge the load, the drum is rotated in the other direction whereupon the spiral blades **32** force the material up and out of the open end of the drum into a collecting hopper **33** that is suspended beneath the charging hopper **31** and from which the material may be chuted as required into forms or the like being filled with concrete.

Just forwardly of the annular trackway **11** and beneath the curved shield **29**, the drum D is fitted with an encircling annular sprocket **35** by means of which the drum

is rotated. A cooperating drive sprocket 36 extending forwardly from a movably mounted speed reducing mechanism 37 within the rear frame upright 13 is positioned beneath and in operating alignment with the drum sprocket 35. Power for rotating the drum D is transmitted from the drive sprocket 36 to the drum sprocket 35 by means of a power transmitting chain 38 that is trained about and runs over the aligned cooperating sprockets to interconnect them.

As shown in the drawings, the speed reducing mechanism 37 is contained within a gear case or housing 40 which is located inside of the rear frame member 13 between the side uprights 21 and 22 and close to the rear panel or web 20 in such a manner that it is neatly housed within the rear frame structure beneath the drum supporting rollers 12. The housing 40 of the speed reducing mechanism 37 is arranged to be movable bodily within the rear upright member 13 in such a manner that the drive sprocket 36 thereon may be moved toward or from the drum sprocket 35 in order to adjust the tightness of the chain 38. This is accomplished by pivotally mounting the housing 40 at the end opposite from the sprocket 36. As shown in FIG. 2, the right end of the housing 40 is pivotally connected to the right side channel 22 of the rear frame upright 13, by means of a pivot pin 41 that passes through a bushing in a bracket 42 secured on the channel 22 and is fastened at its ends in extensions of the walls of the housing 40 near its right end. The left end of the housing 40 is provided with an outwardly projecting guide pin 43 which operates in a slotted guide member 44 secured to the left upright channel 21 and that serves to guide the housing 40 in its pivotal movements about the axis of the pin 41 in moving the sprocket 36 toward or from the drum D in the plane of the rear frame upright 13.

As best shown in FIG. 4, the drive sprocket 36 is mounted outboard of the housing 40 on the forwardly projecting end of a drive or output shaft 46 that is rotatably mounted in the housing or gear case toward the left end thereof as shown in FIG. 2 and distant from the pivot pin 41. The drive shaft 46 is rotatably supported in the housing 40 as shown in FIG. 4, by means of a pair of antifriction bearings 47 and 48 mounted in the respective side walls of the housing at the opposite sides of a gear wheel 49 on the shaft 46 constituting part of the speed reducing gearing 37 within the housing.

In order that the chain 38 may be tightened in the most direct manner and without imposing unnecessary stresses on other parts of the apparatus, a chain tightening or take-up mechanism 51 is arranged to apply tightening force in the plane of operation of the chain 38 and in direction generally radially of the axis of rotation of the drum D. The chain tightening force is exerted within the mechanism 51 by means of a tightening screw 52 that is positioned to lie in the plane of operation of the chain 38 and that extends outward in radial direction from the drive sprocket 36 as well as generally radially from the drum D. At its outer or lower end, the screw 52 is rotatably mounted in a bracket 53 that is secured to and projects inwardly and forwardly from the lower end of the left upright channel member 21, as best shown in FIG. 2. A head 54 on the screw 52 bears against the lower side of the bracket 53 in a manner to constitute an anchor for the lower end of the chain tightening mechanism 51 and thereby operates to react against and resist the cahin tightening forces.

The upper end of the tightening screw 52 is threaded in a cooperating nut 55 that is secured against turning in the midportion of a bail or clevis 56 just beneath and in the plane of the drive sprocket 36. The clevis or yoke 56 serves to divide the chain tensioning force exerted by the screw 52 in order that it may be applied to the shaft 46 equally at the respective opposite sides of the drive sprocket 36, whereupon the resultant force exerted through the sprocket will be in alignment with the chain

38. As best shown in FIG. 4, the right arm of the bail or clevis 56 is pivotally connected at its upper end by means of a pin 57 to depending shackles of an inner bail anchor 58 that is in the form of a ring rotatably mounted on the housing of the bearing 47 which supports the shaft 46 in the adjacent wall of the gear case 40.

The other or left arm of the clevis or bail 56 is pivotally connected at its upper end by means of a pivot pin 61 to depending shackles of an outer bail anchor 62 containing an antifriction bearing 63 that is mounted on the outer end of the drive shaft 46 in outboard relationship with the drive sprocket 36. By this arrangement, the drive sprocket 36 is in effect rotatably mounted between the spaced arms of the bail or clevis 56 whereby the chain tightening force is transmitted directly from the tensioning screw 52 to both sides of the drive sprocket 36 without exerting bending stresses upon the shaft 46 or upon any other part of the transmission mechanism 37 or its housing 40.

In accommodating the movement of the drive sprocket 36 when the chain tightening force is applied by the screw 52, the gear housing 40 pivots about the pivot pin 41 in such a manner that the shaft 46 and the drive sprocket 36 move in an arcuate path as the housing 40 moves downward away from the drum D. The rotatably mounted inner and outer bail anchors 58 and 62 provide for application of the chain tensioning force in direction radially of the drive sprocket 36 regardless of the pivotal position of the gear housing 40. This pivotal arrangement together with the operation of the clevis pins 57 and 61 transmits the tightening force directly to the sprocket 36 without disturbing its position of alignment with the drum sprocket 35 and the chain 38 and without imposing twisting or bending stresses upon the gear housing 40 within the rear frame member 13.

As shown in FIG. 3, the head 54 of the chain tightening screw 52 is provided with a wrench receiving opening or hole 64 by means of which the screw may be turned in the bracket 53 to effect tightening of the chain. By applying a wrench or bar to the hole 64, and thereby turning the screw 52, the desired degree of tightness or snugness in the chain 38 may be established, the tightening force being transmitted through the bail or clevis 56 as previously explained.

This chain tightening action not only serves the usual purpose of removing excessive slack from the chain 38 but the tightened chain furthermore serves as a restraining hoop for the rear port of the drum D thereby retaining the drum securely in its cradled position upon the spaced supporting rollers 12 in the rear frame 13. When the truck T is driven over roads of various types in delivering freshly mixed concrete to construction sites, there is always the tendency that inertial forces will cause the drum D to move upward out of its position of engagement with the rollers 12, as the result of running over bumps in the road for example. Any such bouncing of the drum D causes the drum trackway 11 to lift from the rollers 12 and then drop back upon them. By maintaining the chain 38 in properly tightened condition, the drum D is held down in a manner to minimize movement of the trackway 11 relative to the rollers 12 thereby limiting any impact or hammering action between the rollers and the trackway.

Since the downwardly exerted chain tightening force operates in the plane of the chain 38 and closely parallel with the plane of the rear frame member 13, the reaction of the downward pull of the chain when driving the drum is taken directly through the rear frame channel members 21 and 22 and the drum supporting rollers 12. Because these forces are exerted in closely spaced parallel planes and are confined within the rear frame structure, they do not cause appreciable bending or twisting of the mixer frame which might otherwise have detrimental effects upon the structure. Furthermore, since the chain tightening forces operate in direction generally radially

of the drum D, the tensioning action on the chain is substantially the same regardless of the direction in which the chain happens to be operated to drive the drum. Because of the drum restraining or hoop action of the properly tightened chain **38**, there is no necessity for heavy structural elements extending from the rear frame upright **13** over the drum to hold it down, the only structure over the drum being the light curved guard member **29** that serves as a shield, both for the drum supporting rollers and their cooperating trackway and for the drum rotating sprockets and chain.

In the event that the drive chain **38** should become excessively slack through failure to properly tighten the adjusting screw **52**, the weight of the transmission mechanism **37** and its housing **40** would tend to push the tightening screw **52** downward through its bearing in the bracket **53** in such a manner that the head **54** of the screw would drop below and be spaced from the bracket **53** when power is not being transmitted. If this condition were permitted to develop, the driving pull on the chain **38** when the power is suddenly applied, would move the housing **40** upward suddenly and the inertial forces thereby developed would result in severe hammering of the screw head **54** against the bracket **53**. This difficulty is obviated in the construction shown in the drawing by providing a large compression coil spring **66** that encircles the adjusting screw **52** and supports the housing **40**. As shown in FIG. 3, the spring **66** extends between the top of the bracket **53** and the bottom of the clevis **56**, and is maintained under compression therebetween in a manner to exert sufficient force upward against the clevis **56** to sustain the weight of the speed reducing transmission mechanism and its housing **40**. By this arrangement, should the chain **38** become too slack, the transmission housing **40** will not sag from its adjusted position and when power is applied the slack will be taken up in the chain without moving the housing **40**, thereby avoiding the hammering action of inertial forces.

Power for rotating the drum D is transmitted to the speed reducing mechanism **37** in the upright frame member **13** from a speed changing and reversing gear box mechanism **67** that is mounted on the right lower frame member **14** as shown in FIG. 1. The speed changing and reversing mechanism **67** is mounted at an angle of inclination substantially equal to that of the drum axis and is connected by a flexible drive connection or Cardan drive **68** including two universal joints, to the speed reducing transmission mechanism **37** at a position on the housing **40** in the region of and closely adjacent to the pivot pin **41**. As best shown in FIG. 3, the flexible drive element **68** is connected to the transmission mechanism **37** at a position sufficiently close to the pivot axis of the supporting pin **41** that the universal joints of the Cardan drive will accommodate tilting movement of the housing **40** throughout the full range of adjustment of the sprocket **36** in taking up the slack in the chain **38**. Although the range of movement of the sprocket **36** is not great, it is sufficient to accommodate the gradual increase in the length of the chain **38** that normally occurs as the result of wear in the chain joints, the extent of the movement being a little more than the length of one link of the chain. Accordingly, when the full range of adjustment is exhausted, the chain can be shortened by removing a link and the tightening action then resumed and continued throughout the useful life of the chain.

The speed selecting and reversing mechanism **67** may be of conventional type which provides for transmitting power in either direction at any of several speed ratios to the flexible drive element **68**, the speed of rotation then being further reduced in the speed reducing mechanism **37** to turn the drive sprocket **36** and the drum D at the desired speed ratio in the required direction.

The speed changing and reversing mechanism **67** is preferably driven by a disconnecting clutch **70** that may be of the usual friction type and that is connected directly to the input shaft of the mechanism **67**. As previously mentioned, the power for rotating the drum may be derived from a separate engine or from the propulsion engine E of the supporting truck T, the latter arrangement being the one shown in FIG. 1. For this purpose a power transmitting shaft **72** extends forward from the clutch **70** along the right side frame member **14** to the front of the truck where it is connected to the engine E by means of a front end power take-off mechanism **73** that is attached to the forward end of the engine crank shaft, although as an alternative the connection may be made to the fly wheel end of the engine E in trucks having power take-off connections at this position.

From the foregoing description and explanation of the construction and operation of the improved supporting and driving mechanism for the mixing drum of a truck-mounted concrete mixer that has been set forth herein by way of example, it will be apparent that the apparatus embodying the present invention is light in weight and provides a new, more efficient and economical arrangement for supporting and driving the mixing drum of a truck mixer in a manner to accommodate larger loads of concrete.

Although a truck mounted mixer arrangement constituting a specific example of the improved drum supporting and driving apparatus embodying the present invention has been set forth in some detail for the purpose of completely disclosing a practical and useful embodiment of the invention, it is to be understood that various other arrangements and different proportional relationships of the elements of the apparatus may be utilized by persons familiar with this art without departing from the spirit and scope of the invention as defined in the subjoined claims.

An exemplary embodiment of the invention having now been fully described, I claim as my invention:

1. In a truck mounted concrete mixer, a frame comprising a pair of generally parallel longitudinal members adapted to be mounted on a motor truck, a bearing pedestal carried by and interconnecting said longitudinal members at the forward end of said frame, upright members connected respectively with and upstanding from said longitudinal members at the rearward end of said frame, a mixing drum closed at its forward end and open at its rearward end to receive and discharge concrete, a bearing arranged to rotatably support the closed forward end of said mixing drum on said bearing pedestal at the forward end of said frame, an annular trackway disposed to encircle and secured to said mixing drum adjacent to its open end, a pair of supporting rollers mounted respectively on said upright frame members in alignment with and beneath said annular trackway on said mixing drum to rotatably support the open rearward end of said mixing drum between said upright members, an annular sprocket disposed to encircle and secured to said mixing drum adjacent to and forwardly of said annular trackway, a gear case constituting a speed reducing power transmission mechanism movably mounted between said upright frame members below said supporting rollers, a pivotal connection pivotally supporting one end of said movable transmission mechanism gear case upon one of said upright members, guiding means on another of said upright members arranged to guide the other end of said transmission mechanism gear case for pivotal movement generally toward or from said mixing drum sprocket, a drive sprocket mounted on said gear case at a position remote from said pivotal connection and connected to be driven by said speed reducing transmission mechanism said drive sprocket being disposed in operating alignment with said annular sprocket on said drum, a power transmitting chain arranged to operate over said aligned sprockets, a speed changing and reversing power transmission mechanism mounted on one of said longitudinal frame members, a flexible power transmitting connection arranged to transmit power from said speed changing

and reversing mechanism to said movably mounted speed reducing mechanism at a position on said gear case close to said pivotal connection to effect driving of said mixing drum selectively in either direction at selected speed, and chain tightening mechanism anchored to said frame and operatively connected to said movably mounted speed reducing gear case mechanism in manner to pivot said mechanism in downward direction to tighten said chain and thereby also to hold said drum down and maintain said annular trackway in engagement with said supporting rollers.

2. In a truck mounted concrete mixer, a mixing drum arranged to be mounted longitudinally on a truck, a mixer frame for supporting said mixing drum on the truck, a bearing pedestal at the front of said frame disposed to rotatably support the forward end of said mixing drum, an upright member at the rear of said frame arranged to rotatably support the rearward end of said drum, a pair of rollers carried by said upright member in position to rotatably support said drum, an annular trackway mounted on said drum in position to engage and roll upon said supporting rollers, an annular sprocket mounted on said drum in juxtaposition to said annular trackway, a driving sprocket movably mounted in said frame upright member beneath said drum supporting rollers and in cooperating alignment with said drum sprocket, a power transmitting chain disposed to engage and run over said cooperating sprockets to rotate said drum, and a take-up mechanism operatively connected to said frame and to said movably mounted driving sprocket in manner to move said sprocket bodily in the plane of operation of said chain to take up slack in said chain, whereby said chain serves to hold said drum track down upon said supporting rollers in addition to driving said drum.

3. In a truck-mounted concrete mixer, a frame adapted for mounting on a motor truck or similar vehicle, an elongated mixing drum rotatably supported at its respective ends on said frame, an annular sprocket encircling and secured to said mixing drum for rotating it, a speed changing power transmission mechanism movably mounted in said frame for adjustment toward or from said mixing drum, a drive shaft extending from said movable transmission mechanism and driven thereby, a drive sprocket secured on said extending drive shaft in operating alignment with said annular sprocket on said drum, a power transmitting chain running over said aligned sprockets to drive said drum, a clevis presenting spaced arms disposed with their ends rotatably mounted on said drive shaft at the respective sides of said drive sprocket, and a take-up mechanism connected to said frame and operatively connected to said clevis in manner to exert force upon said clevis in direction away from said drum and in the plane of operation of said chain to tighten said chain, the arrangement being such that said transmission mechanism may move relative to said frame during tightening of said chain without being subjected to the chain tightening forces.

4. In a truck-mounted concrete mixer, a mixing drum adapted to be mounted on a motor truck, said drum being closed at its forward end and open to receive and discharge concrete at its rearward end, an annular trackway encirculing and secured to said drum in the region of its open end, an annular sprocket encircling and secured to said drum forwardly of and in juxtaposed relationship with said annular trackway, a bearing arranged to support the closed forward end of said drum for rotation upon its longitudinal axis, a narrow upstanding frame disposed beneath the open end of said drum to support it, a pair of supporting rollers rotatably mounted on said frame in spaced relationship and in cooperating alignment with said annular trackway to cradle and rotatably support the open end of said drum, a speed reducing power transmission mechanism pivotally supported within said upstanding frame below said drum supporting rollers, a driving sprocket operatively connected with and extending forwardly from said pivotally supported transmission mechanism in position to align with said annular sprocket on said drum, a power transmitting chain disposed to run over said aligned sprockets to drive said drum, and chain tensioning apparatus operatively connected to exert tensioning force on said driving sprocket in direction generally radially outward from said drum and in the plane of operation of said chain to tighten it, the arrangement being such that action of said tensioning mechanism upon said chain operates also to hold said annular trackway in cooperating relationship with said supporting rollers.

5. A concrete mixer comprising a mixing drum, a frame disposed to rotatably support said drum, a power transmission mechanism pivotally mounted in said frame beneath said drum for adjusting movement toward or from said drum, a drive sprocket rotatably mounted on and driven by said pivotally mounted power transmission mechanism in manner to be movable with said mechanism, a cooperating sprocket encircling and fixed on said drum in alignment with said movable drive sprocket, a power transmitting chain running over said aligned sprockets and operating to suspend said pivotally mounted transmission mechanism, chain tightening apparatus operatively connected to said frame and to said drive sprocket and said transmission mechanism in manner to exert force on them moving them downward to a predetermined position to tighten said chain, power transmitting means operatively connected to drive said transmission mechanism regardless of its pivoted position thereby to rotate said mixing drum, and resilient supporting means mounted on said frame and disposed to engage and support said transmission mechanism against sagging below the position predetermined by said chain tightening apparatus thereby to obviate sudden upward movement of said transmission mechanism when power is applied to drive it.

6. In a power transmitting mechanism, a frame, a sprocket rotatably mounted in said frame, a gear case pivotally mounted in said frame beneath said sprocket for movement generally toward or from said sprocket, a drive shaft rotatably mounted in said gear case and projecting therefrom, a drive sprocket secured on the projecting part of said drive shaft in operating alignment with said frame mounted sprocket, a power transmitting chain running over said aligned sprockets, a chain tightening apparatus operatively connected to said gear case and to said frame in manner to exert downward force only upon said gear case to tighten said chain, and resilient means mounted on said frame and engaging said gear case in manner to exert upward force only upon said gear case in opposition to said chain tightening force, the arrangement being such that should said chain become slack said resilient means will support said gear case and prevent it from moving downward which might otherwise result in inertial shock being imposed upon said apparatus if said gear case were to move upward quickly when said chain is tightened suddenly under load.

7. In an impoved chain take-up mechanism, a pair of aligned complementary sprockets rotatably mounted in spaced relationship, a chain running over said sprockets, means rotatably mounting one of said sprockets in bodily fixed position, a pair of bearings respectively arranged at opposite sides of the other of said sprockets to rotatably mount said sprocket for bodily movement, a take-up screw disposed radially outward of said movably mounted sprocket at the side thereof opposite from said fixed position sprocket and in the plane of operation of said chain, means to rotatably support said screw in axially fixed position radially of said movably mounted sprocket, a take-up nut disposed in threaded engagement with said screw, a yoke conected at its ends respectively to said bearings at the opposite sides of said movable sprocket and connected at its midportion to said take-up nut, and means to turn said screw in said nut, whereby take-up force may be ex-

erted through said yoke upon said movable sprocket in radial direction and in the plane of said chain to tighten said chain.

8. In a concrete mixer, a mixing drum having an encircling sprocket secured theeron, a power transmitting chain running over said sprocket, a power transmission mechanism movably mounted relative to said mixing drum, a drive shaft extending from and operatively connected to be driven by said transmission mechanism, a drive sprocket mounted outboard on said extending drive shaft in position to engage and drive said chain, a bearing rotatably mounted outboard on said drive shaft outwardly of said drive sprocket, and a chain take-up mechanism operatively connected to said outboard bearing and operative thereon to move said drive sprocket and said transmission mechanism in direction to tighten said power transmitting chain.

9. In a truck-mounted concrete mixer, a frame comprising a pair of generally parallel longitudinal members adapted to be mounted on a motor truck, a bearing pedestal carried by and interconnecting said longitudinal members at the forward end of said frame, a pair of upright members connected respectively with and upstanding in spaced relationship from said longitudinal members at the rearward end of said frame, a mixing drum closed at its forward end and open at its rearward end to receive and discharge concrete, a bearing arranged to rotatably support the closed forward end of said mixing drum on said bearing pedestal, an annular trackway disposed to encircle and secured to said mixing drum adjacent to its open end, a pair of supporting rollers mounted respectively on said spaced upright frame members in alignment with and beneath said annular trackway on said mixing drum to cradle and rotatably support the open rearward end of said mixing drum between said spaced upright members, an annular sprocket disposed to encircle and secured to said mixing drum adjacent to and forwardly of said annular trackway, a drive sprocket rotatably mounted between said upright frame members below said supporting rollers said drive sprocket being disposed in operating alignment with said annular sprocket on said drum, a power transmitting chain arranged to operate over said aligned sprockets to drive said drum and to hold it down upon said supporting rollers, a curved shield extending over the rearward end of said mixing drum in position to cover and protect said annular trackway and said annular drum sprocket and secured at its ends to the respective upper ends of said spaced upright frame members, and a charging hopper secured to and carried by said curved shield in position to receive and guide concrete material into said open rearward end of said mixing drum.

10. In a truck-mounted concrete mixer, a mixing drum arranged to be mounted longitudinally on a truck, a mixer frame adapted to support said mixing drum on the truck, a bearing pedestal at the front of said frame disposed to rotatably support the forward end of said mixing drum, an upright member at the rear of said frame arranged to rotatably support the rearward end of said mixing drum, a spaced pair of rollers carried by said upright member in position to rotatably support said drum, an annular trackway mounted on said drum in position to engage and roll upon said spaced supporting rollers, an annular sprocket mounted on said drum in juxtaposition to said annular trackway, a driving sprocket rotatably mounted in said frame upright member beneath said drum supporting rollers and in cooperating alignment with said drum sprocket, and a power transmitting chain disposed to engage and run over said cooperating aligned sprockets, whereby said chain serves to hold said drum track down upon said supporting rollers in addition to driving said drum.

11. In a truck-mounted concrete mixer, a frame comprising a pair of generally parallel longitudinal members adapted to be mounted on a motor truck, a bearing pedestal carried by and interconnecting said longitudinal members at the forward end of said frame, a pair of upright members connected respectively with and upstanding from said longitudinal members at the rearward end of said frame, a mixing drum closed at its forward end and open at its rearward end to receive and discharge concrete, a bearing arranged to rotatably support the closed forward end of said mixing drum on said bearing pedestal, an annular trackway disposed to encircle and secured to said mixing drum adjacent to its open end, a pair of supporting rollers mounted respectively on said upright frame members in alignment with and beneath said annular trackway on said mixing drum to rotatably support the open rearward end of said mixing drum between said upright members, an annular sprocket disposed to encircle and secured to said mixing drum adjacent to and forwardly of said annular trackway, a speed reducing power transmission mechanism mounted between said upright frame members below said supporting rollers, a drive sprocket connected to be driven by said speed reducing transmission mechanism said drive sprocket being disposed in operating alignment with said annular sprocket on said drum, a power transmitting chain arranged to operate over said aligned sprockets to drive said drum and to hold it down upon said supporting rollers, a speed changing and reversing power transmission mechanism mounted on one of said longitudinal frame members, and a power transmitting train operatively connected to each of said transmission mechanisms in manner to transmit power from said speed changing and reversing mechanism to said speed reducing mechanism to effect driving of said mixing drum selectively in either direction at selected speed.

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