

Oct. 23 1951

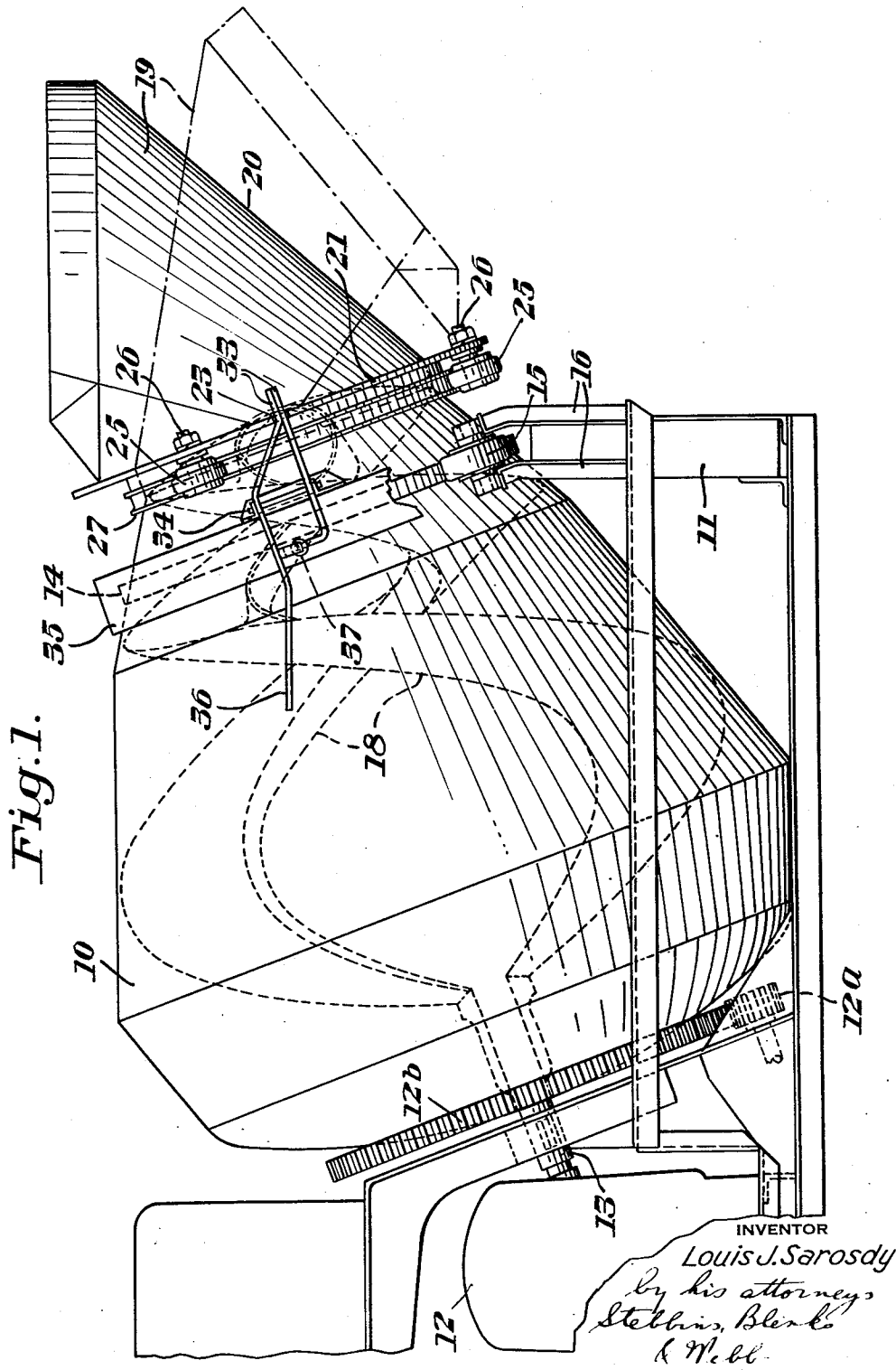
L. J. SAROSDY

2,572,058

CHARGING AND DISCHARGING MECHANISM FOR MIXERS

Filed Sept. 18, 1948

5 Sheets-Sheet 1



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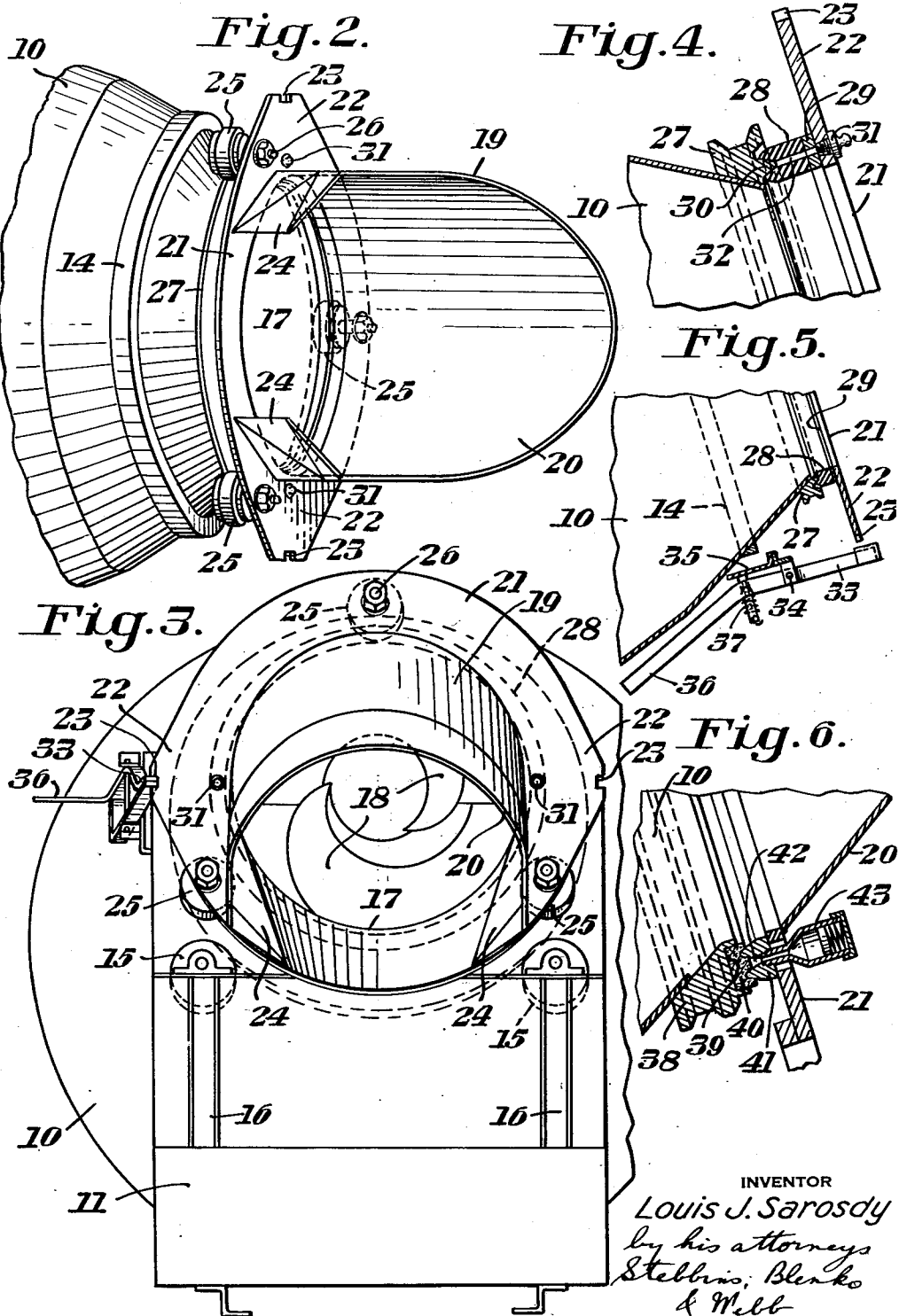
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CHARGING AND DISCHARGING MECHANISM FOR MIXERS

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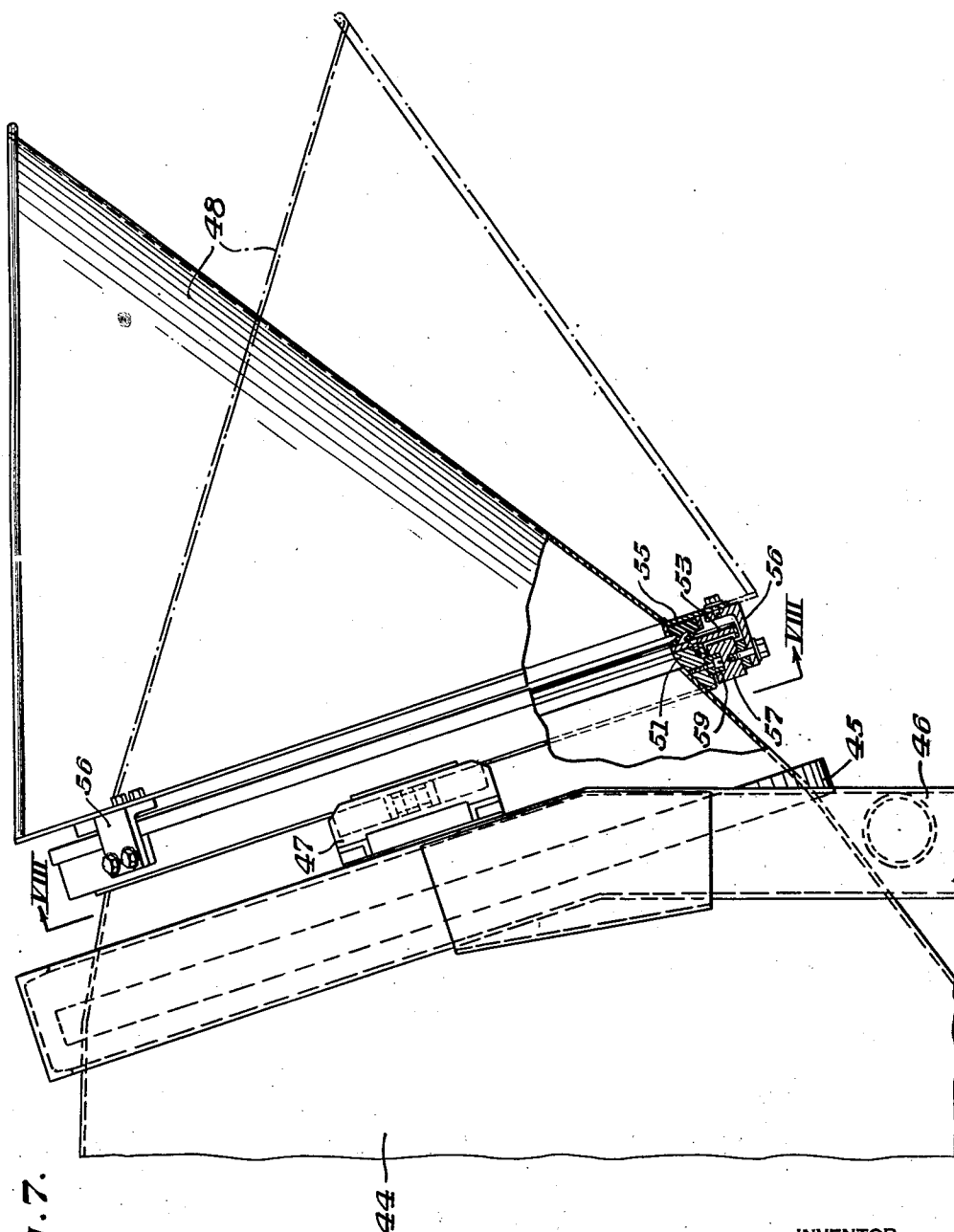


Fig. 7.

INVENTOR

Louis J. Sarosdy

by Hoopes, Leonard & Glenn
his attorneys

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L. J. SAROSDY

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CHARGING AND DISCHARGING MECHANISM FOR MIXERS

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Fig. 8.

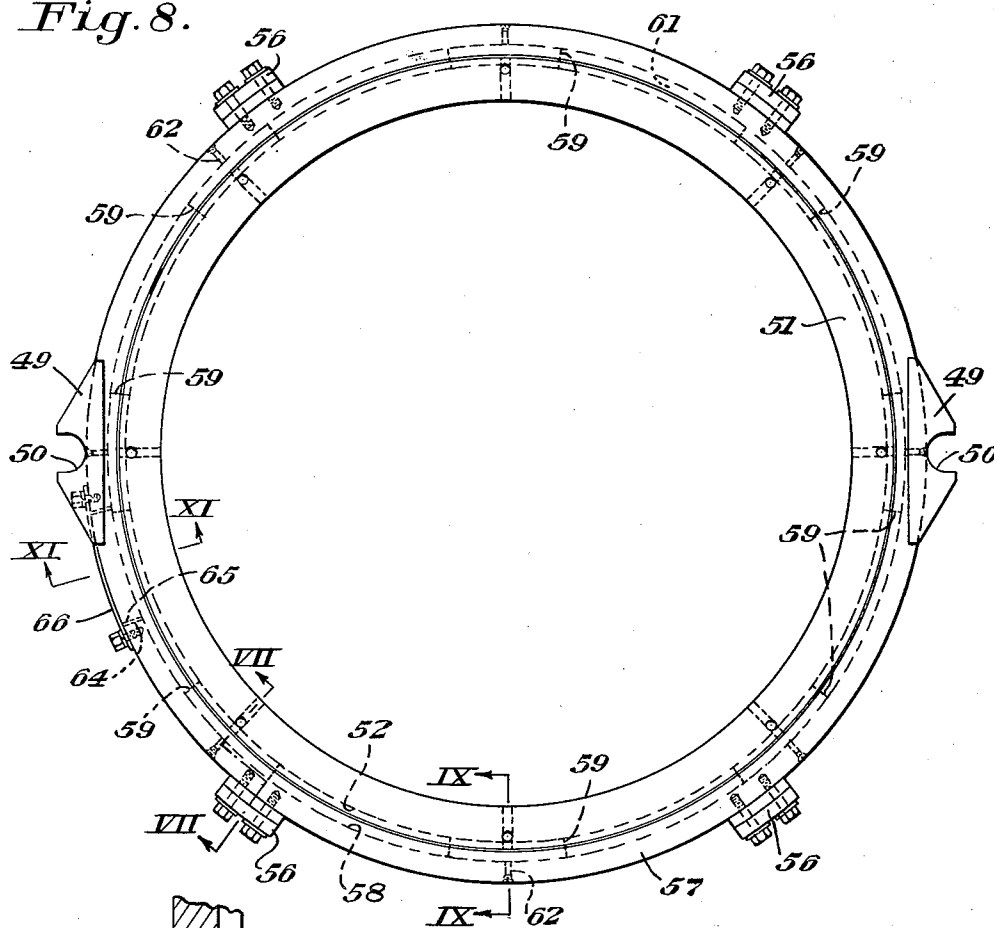
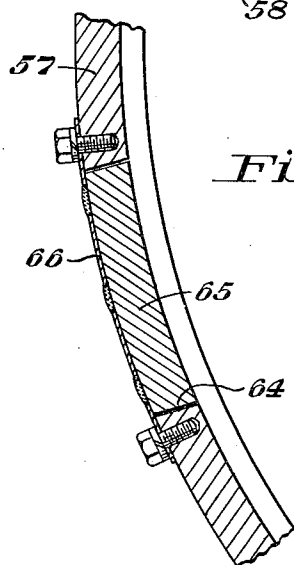


Fig. 10.



INVENTOR

Louis J. Sarosdy

by Hoopes, Leonard & Glenn
his attorneys

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L. J. SAROSDY

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CHARGING AND DISCHARGING MECHANISM FOR MIXERS

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Fig. 9.

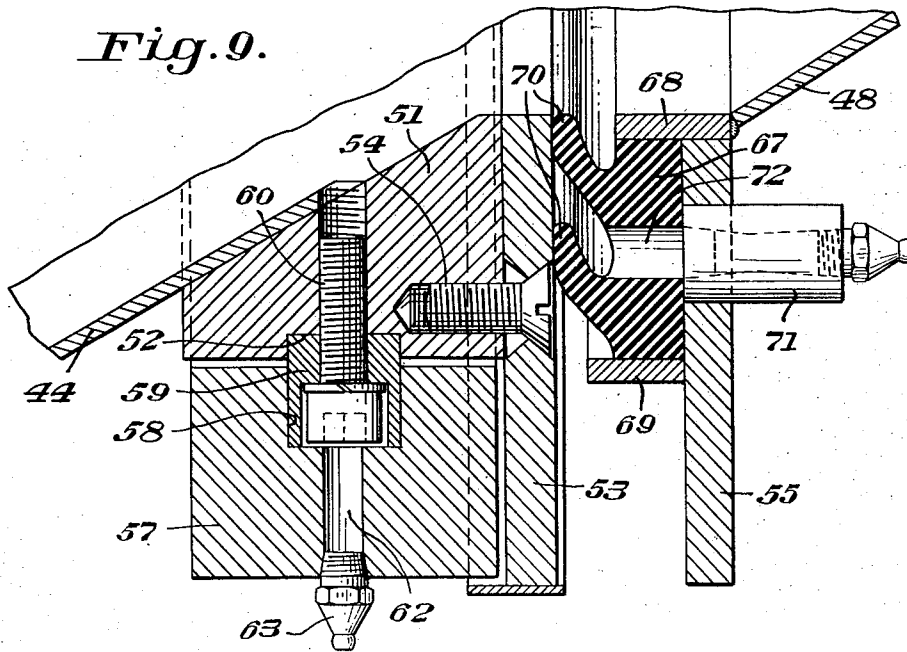
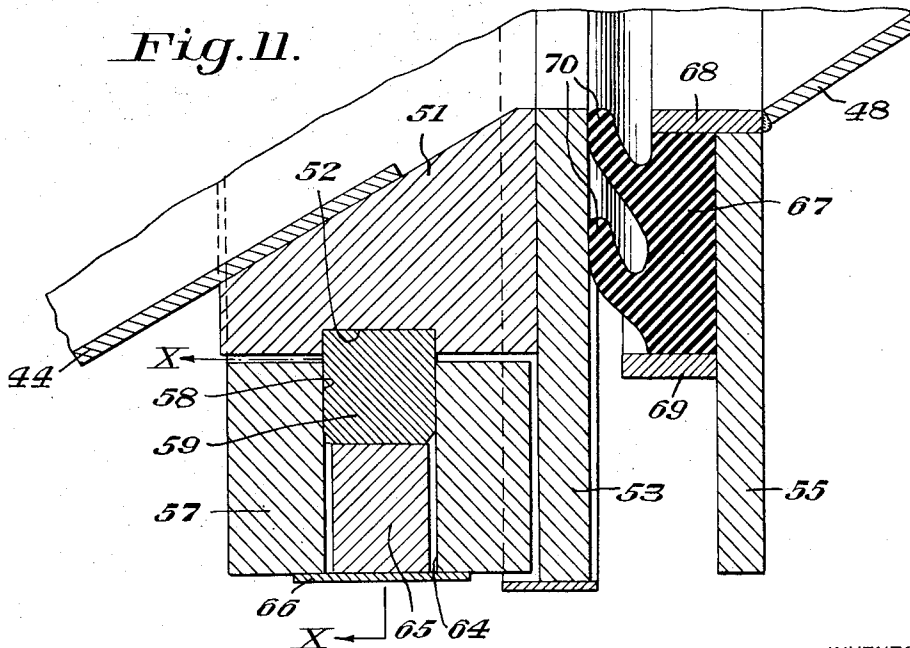


Fig. 11.



INVENTOR

Louis J. Sarosdy

by Hoopes, Leonard & Glenn
his attorneys

UNITED STATES PATENT OFFICE

2,572,058

CHARGING AND DISCHARGING MECHANISM
FOR MIXERSLouis J. Sarosdy, Pittsburgh, Pa., assignor to
Blaw-Knox Company, Pittsburgh, Pa., a cor-
poration of New Jersey

Application September 18, 1948, Serial No. 49,948

10 Claims. (Cl. 259—161)

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This invention relates to mechanism for charging material into a mixer drum and discharging it therefrom. In particular, the invention concerns a device for use on rotary-drum concrete mixers known as "high-discharge" mixers but it is also applicable to mixers for other materials and of other types. This application is a continuation-in-part of my application Serial No. 581,761 filed March 9, 1945 and bearing the same title, which application Serial 581,761 is now abandoned.

High-discharge mixers, usually mounted on a motor truck, comprise a drum supported for rotation with its axis inclined to the horizontal and having an axial opening at the rear end through which material may be charged into the drum and discharged therefrom. Mixers to which my invention is applicable comprise a reversible spout adapted in upturned position to serve as a chute for directing a charge of material into the mixer drum and, when in downturned position, to deliver material discharged from the drum to a suitable receiver. The spout is journaled on the drum adjacent the open end thereof, whereby it may be held stationary while the drum is rotating or permitted to rotate therewith to turn from upturned or charging position to downturned or discharging position. Means are provided for arresting the spout in either of its operative positions. My invention relates to means for supporting the spout on the drum.

I believe that a brief review of the development history of truck mixers will demonstrate the value of my invention in overcoming two main problems with which past inventors of truck mixers have been confronted but which they did not solve. The problems are: First, the truck mixers must be such that they can be quickly and completely charged and discharged. The length of time required for these operations materially affects the overall efficiency of a central concrete plant from which the truck mixers deliver concrete. Second, sand, cement and water form a perfect grinding compound and if this material gets into moving parts of the mixers, these parts are rapidly destroyed thereby creating considerable maintenance expense.

The first truck mixers were simply tubs mounted on trucks and equipped with stirring paddles. These have long been discontinued. They were followed by closed type mixers such as is shown in Paris No. 1,657,762. The commercial forms of the Paris mixers generally had a tapered end as indicated in Reed No. 1,848,223 and were charged and discharged through the tapered end as shown

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in the Reed patent. These Paris mixers required a considerable period of time both for charging and discharging. Truck mixers were also developed having a side opening for charging and an end opening for discharging. Such mixers are shown in Shaw Reissue No. 18,511 and Jaeger Reissue No. 19,085. These side opening mixers can be charged considerably faster than the Paris mixers but the discharge opening is at a low level which decreases the rate of discharge and frequently requires hand shoveling concrete down the discharge chute from the drum.

The first high discharge truck mixer is shown in Rybeck No. 2,029,126 in which the drum is tilted so as to raise the discharge opening of the drum. A charging chute is arranged concentrically within the discharge opening. The open annular discharge outlet in this mixer, however, limits the volumetric capacity of the drum. Accordingly high discharge truck mixers with hinged closures for the opening have been developed as shown in Peters No. 2,338,820 and Smith No. 2,314,169. The latter two designs, however, provide a charging opening substantially less in diameter than the diameter of the opening of the vessel. This materially increases the time required for charging. Visser No. 2,316,137 shows an attempt to decrease the charging time by securing a charging chute in a fixed position relative to the drum and providing an opening in the chute to permit discharge of the concrete, this opening being closed by a door during charging and transporting. Flow through the chute however is obstructed by an axial pilot shaft and other mechanism for closing the seal between the chute and the drum. The discharge opening is also limited in area.

Another attempt at solving the problems of high-speed charging and discharging and low maintenance is shown in Ball No. 2,265,751. Here again the charging opening is limited in area as in Rybeck and flow is further obstructed by an axial pilot shaft similar to Visser. Still another attempt at solving the truck mixer problems is shown in Shafer No. 2,285,685 in which a spout is rotatably mounted on the end of the mixing drum, the spout being rotated 180° to either a charging or discharging position. Shafer, however, felt it necessary to provide for movement of the spout along the axis of the drum and provided a pilot shaft assembly to hold the spout axially to the drum, thus creating an obstruction to the flow of material through the drum. A more serious defect in the Shafer construction

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lies in the fact that the bearings by which the spout is secured to the drum and the seal which closes the space between the spout and the drum lie in the same radial plane. The unavoidable wear on the seal permits sand, water and cement to flow into the bearings and thereby destroy them.

As will hereinafter be shown my invention provides a drum and a charging and discharging spout secured to the drum whereby there is substantially no obstruction to the flow of material through the spout and in which maintenance costs are minimized because any leakage of sand, cement and water cannot reach the bearings by which the spout is held to the drum.

A complete understanding of the invention may be obtained from the following detailed description which refers to the accompanying drawings illustrating a preferred embodiment. In the drawings,

Figure 1 is a side elevation of a high discharge truck-mounted rotary mixer having the invention applied thereto;

Figure 2 is a partial plan view;

Figure 3 is an end elevation showing the spout in downturned position;

Figure 4 is a partial section on a horizontal plane through one side of the drum;

Figure 5 is a similar section through the other side of the drum showing parts in plan;

Figure 6 is a view similar to Figure 4 showing a modification;

Figure 7 is a side elevation partially in section and with certain parts removed of a rotary mixer similar to that shown in Figure 1 but embodying a modification of my invention;

Figure 8 is a section along the lines VIII—VIII of Figure 7;

Figure 9 is a section along the lines IX—IX of Figure 8;

Figure 10 is a partial section taken in the direction of the arrow marked X in Figure 11; and

Figure 11 is a section along the lines XI—XI of Figure 8.

Referring now in detail to the drawings, a mixer drum 10 composed of several frusto-conical sections is mounted in a frame 11 for rotation with its axis inclined to the horizontal. The frame 11 is adapted to be disposed on a truck body and includes driving mechanism 12 for the drum, operatively connected to a drive pinion 12a. A ring gear 12b secured to the drum 10 meshes with pinion 12a, whereby the drum may be rotated by the driving mechanism. The forward end of the drum has a hollow stub shaft 13 projecting therefrom rotatably supported in the frame on a suitable bearing. This hollow shaft forms a conduit for introducing water into the drum. A bearing ring 14 adjacent the rear end of the drum rests on supporting rollers 15 journaled in bearings carried on posts 16 extending upwardly from the frame 11.

The open rear end of the drum 10 is indicated at 17. Helical flights 18 extending around the interior of the drum are effective on rotation of the drum to tumble and agitate the material therein to insure a thorough mixing thereof. The drum may be rotated in either direction. The usual practice is to drive it while mixing in the direction in which the flights 18 tend to move material toward the closed or forward end and in the reverse direction when the material has been thoroughly mixed and is ready to be discharged. On reversal of the direction of rotation, of course, the flights 18 tend to move the

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material in the drum upwardly toward the open rear end thereof. The construction so far described is already well known and forms no part of the present invention.

My improved charging and discharging mechanism comprises a spout 19 mounted on the drum adjacent the rear open end thereof so that it may remain stationary while the drum is rotating or turn with it to shift from the upturned charging position in which it is shown in Figures 1 and 2, to the downturned discharging position in which it is shown in Figure 3. The downturned position is also shown in chain lines in Figure 1. The spout 19 comprises a chute 20 secured to a supporting plate 21. The plate 21 is generally circular but has diametrically opposite projections 22 with notches 23 therein for a purpose which will appear shortly. Wings 24 constitute short extensions of the sides of the chute 19 to confine the outflowing material when the spout is in discharging position.

The spout is mounted on the drum 10 adjacent the rear end thereof in such manner as to permit relative rotation therebetween. Rollers 25 are journaled on pins 26 spaced circumferentially of the plate 21 and traveling in a grooved race or track formed in a ring 27 extending around the drum adjacent the rear end thereof. The pins 26 are threaded at one end and have shoulders there adjacent whereby they may be secured to the plate 21 by suitable nuts.

A flexible or compressible sealing member 28, such as a ring of rubber-like material, is secured to the plate 21 and has wiping engagement with a surface of the drum, to close the space therebetween. In the embodiment illustrated, the ring 28 has a groove in its edge adapted to accommodate an annular rib 30 on the rear face of the track ring 27, and is carried by a metal backing ring 29 which may be secured to the plate 21 by any suitable means. In order to lubricate the contacting surfaces of the ring 28 and the rib 30, I provide lubricating fittings 31 on the plate 21 and holes 32 in alignment therewith through the ring 28. The rib 30 is carefully machined so as to be coaxial with the track ring 27. This insures proper relation of the wiping surfaces of the ring 28 and rib at all times, regardless of any slight misalignment of the track ring relative to the drum axis. The contacting surfaces of the seal are constantly in engagement and are thus prevented from collecting foreign matter which would interfere with the sealing action. While the sealing ring 28 has been described as of rubber-like material, it may also be composed of a suitable metal, because of the alignment of the wiping surfaces and the provision for lubrication.

Although the lubrication of the surfaces of the ring 28 and rib 30 reduces the wear, there is still sufficient friction therebetween which tends to rotate the plate 21 and with it the spout 19 as a whole, when the drum 10 is rotated in either direction. I utilize this frictional force to turn the spout from charging position to discharging position and vice versa. I also provide means for arresting the spout at the proper point in its rotary movement and holding it there for any desired length of time. A latching lever 33 is pivoted at 34 on a post 35 or other suitable support extending upwardly from the frame 11. The end of lever 33 is adapted to enter one of the notches 23 in the edge of the plate 21, as shown in Figure 3. A handle 36 on the lever permits manual operation thereof and a compression spring 37

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engaging the handle normally urges the lever into engagement with the edge of the plate 21.

It will be apparent from the foregoing that so long as the lever 33 remains in one of the notches 23, the spout 19 is held stationary and prevented from rotating with the drum 10. Should it be desired to turn the spout from one position to the other, it is only necessary to operate the lever 33 by handle 36, to the position shown in Figure 5, whereupon the friction between the track ring 27 and the sealing ring 28 will cause the spout as a whole to turn with the drum. If the handle 36 of the lever 33 is released after the spout has started to turn, the rotation thereof will automatically be arrested when the other notch comes in line with the lever 33, whereupon latching engagement results from the force exerted by the spring 37. Shifting of the spout from either position to the other may thus be easily and quickly accomplished, regardless of the direction of the rotation of the drum at the moment. If desired, provision may be made for operating the lever 33 from the cab of the truck on which the drum is mounted.

It will be evident that when the spout 19 is in charging position, the chute 20 thereof serves effectively to direct material dumped therein into the interior of the mixer. When the spout is reversed, as shown in Figure 3, the wings 24 confine and direct the material flowing upwardly along the drum and out the rear end thereof as a result of the rotation of the drum in the proper direction to cause such discharge. The material from the mixer, such as concrete, may be discharged into a buggy, trough or other suitable receiver.

Figure 6 illustrates a modified form of sealing means for closing the space between the drum and the plate 21. According to this form, the track ring 38 extending around the open rear end of the drum has a groove 39 adapted to accommodate a ring 40 of compressible material, such as felt or other suitable packing. A metal sealing rib 41 is secured to the rear face of the plate 21 and has an annular groove 42 therein adapted to accommodate lubricant. A cup 43 containing a supply of lubricant is in communication with the groove 42 and is provided with a spring-urged piston which continuously maintains a supply of lubricant under pressure for filling the space within the groove 42. The pressure thus continuously maintained on the lubricant prevents the ingress of the material being charged into or discharged from the mixer, between the contacting surfaces of the sealing means.

Figure 7 shows a rotary mixer embodying a modification of my invention. The mixer comprises a drum 44 having a bearing ring 45 adjacent its rear end. The ring rests on supporting rollers journaled in posts 46 in a manner similar to the drum 10 shown in Figure 1. One of the posts 46 also carries a bracket 47 in which a latching lever such as the latching lever 33 (Figure 1) may be pivotally mounted.

The rear end of the drum 44 is open and carries a spout 48 which can rotate about the axis of the drum and which can be held in both a charging and discharging position. (The discharging position is indicated in chain lines in Figure 7.) Ears 49 secured to the periphery of the spout have radially extending slots 50 which may be engaged by the latching lever to hold the spout in these positions.

The structure for mounting the spout 48 on 75

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the drum 44 comprises a supporting ring 51 welded to the drum about the drum opening. The inside of this ring is tapered to fit the cone of the drum shell but the outer surface is finished so as to be square and concentric with the drum axis. The outer surface of the ring has a groove 52 (Figures 9 and 11) the purpose of which will be hereinafter described. The ring 51 carries a flat annular ring or face plate 53 which extends radially from the drum opening past the ring 51 for a substantial distance, the face plate being secured to the ring by bolts 54.

The spout 48 has a peripheral and radially extending flange 55 having a width approximately equal to the face plate 53. The flange 55 carries brackets 56 which in turn support a ring 57 which surrounds and is concentric with the ring 51. The inner surface of the ring 57 has a groove 58 opposite to the groove 52 in the outer surface of the ring 51 and which also forms a bearing race. Bronze bearing shoes 59 are placed in the grooves or races 52 and 58 and are secured to the ring 51 by bolts 60. As shown in Figure 8 several of the bronze shoes 59 are spaced equidistantly around the ring 51, the spaces between the shoes and rings being filled with felt strips 61 to retain and apply lubricant to the groove. In order to lubricate the bearing shoes I provide a number of holes 62 in the ring 57 and lubricating fittings 63.

Figures 8, 9 and 11 illustrate a construction whereby the shoes 59 can be inserted into the grooves or races 52 and 58. An opening 64 slightly longer and wider than one of the bearing shoes 59, is cut in the ring 57. The shoes are passed through this opening 64 and bolted to the inner ring 51, the ring 57 being rotated around the ring 51 so that the opening 64 is opposite successively the correct position for each shoe on the ring 51. To close the opening 64 I provide a block 65 which is held in the opening 64 by a plate 66 welded to the block and bolted to the ring 57 as shown in Figure 10.

It will be noted that the brackets 56 hold the flange 55 and therefore the spout 48 at a fixed distance from the opening of the drum along the axis of the drum. To seal the space between the face plate 53 and the flange 55, I provide a resilient sealing ring of rubber-like material 67 which is held to the flange 55 by the inner edge 68 of the spout and a ring 69 welded to the flange 55, the edge 68 and the ring 69 forming a channel around the opening of the spout opposite the drum. The ring 67 has spaced concentric lips 70 which press against the face plate 53 in a direction parallel to the axis of the drum and thereby seal the space between the spout and the drum. A lubricant fitting 71 may be placed in the flange 55 to supply lubricant to the annular space between the lips 70 of the sealing ring through an opening 72 in the ring.

From the foregoing, it is apparent that I have provided a simple but effective construction for rotatably mounting a charging and discharging spout on the drum of a rotary mixer. The spout may have the same diameter as the diameter of the drum opening and there is no obstruction to the flow of material through the spout. The spout is held in a fixed position relative to the drum and is restrained from axial movement by the same bearing construction which enables it to rotate about the drum. The seal between the spout and the drum and the bearings which connect the spout to the drum are spaced axially from each other so that any material which leaks through the seal cannot enter the bearings and

destroy them. The result is that I obtain a rotary mixer which may be rapidly charged and discharged and which requires relatively little maintenance.

Although I have illustrated and described but one embodiment and a modification of my invention, it will be recognized that changes in the details of construction may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a rotary mixing drum having an opening along the axis of rotation thereof and a charging and discharging spout supportably mounted on said drum around said opening, in combination, a ring member adjacent said opening, said ring member having a circumferential shoulder portion therein in the cylindrical surface portion thereof, a substantially annular supporting member adjacent said opening and generally parallel to said ring member, one of said members being affixed to said drum and the other of said members being affixed to said spout, and a plurality of axially extending members connected to said annular supporting member around the entire boundary thereof, said axially extending members having radially extending portions engaging said shoulder portion, whereby said spout is substantially wholly supported by said drum and may be rotated relative thereto without axial movement therebetween being possible.

2. In a rotary mixing drum having an opening along the axis of rotation thereof and a charging and discharging spout supportably mounted on said drum around said opening, in combination, a ring member adjacent said opening, said ring member having a circumferential shoulder portion therein in the cylindrical surface portion thereof, a substantially annular supporting member adjacent said opening and generally parallel to said ring member, one of said members being affixed to said drum and the other of said members being affixed to said spout, a plurality of axially extending members connected to said annular supporting member around the entire boundary thereof, said axially extending members having radially extending portions engaging said shoulder portion, and a cylindrical sealing member of resilient material connected to one of said members and extending across the distance toward the other of said members to close the space between said drum and said spout.

3. In a rotary mixing drum having an opening along the axis of rotation thereof and a charging and discharging spout supportably mounted on said drum around said opening, in combination, a ring member adjacent said opening, said ring member having a circumferential shoulder portion therein in the cylindrical surface portion thereof, a substantially annular supporting member adjacent said opening and generally parallel to said ring member, one of said members being affixed to said drum and the other of said members being affixed to said spout, a plurality of axially extending members connected to said annular supporting member around the entire boundary thereof, said axially extending members having radially extending portions engaging said shoulder portion, a discoidal sealing surface connected to one of said members, said discoidal sealing surface being positioned between said members, and a cylindrical sealing member of resilient material connected to the other of said members and extending across the space be-

tween said drum and said spout to effect sealing engagement against said sealing surface.

4. In a rotary mixing drum having an opening along the axis of rotation thereof and a charging and discharging spouts supportably mounted on said drum around said opening, in combination, a ring around the outside of said drum adjacent said opening, a circumferential groove in said ring around the cylindrical surface portion thereof, annularly disposed members connected to said spout and surrounding said groove in generally telescoping relation, and radially extending members engaging said groove and said annularly extending members, whereby there is unrestricted communication between said drum and said spout, and said spout is substantially wholly supported radially and axially by said drum.

5. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably and rotatably mounted on said drum around said opening, in combination, a ring around the outside of said drum adjacent said opening, a circumferential surface in said ring extending in a radial direction only, an annular supporting member connected to said spout around the outside thereof, said supporting member being adjacent said opening and positioned generally parallel to said ring, means connected to said supporting member around the entire periphery thereof and extending toward said drum for interlocking engagement with said circumferential surface, and an annular resilient sealing ring adapted to close and seal the space between said ring and said supporting member, whereby said spout is wholly supported by said drum with unimpeded communication through said opening and with rotary movement only possible therebetween.

6. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably mounted on said drum around said opening, in combination, a ring around the outside of said drum adjacent said opening, a circumferential groove in said ring in the cylindrical portion thereof, a sealing surface on said drum positioned between said groove and said spout and lying generally in a plane normal to the axis of said drum, a supporting plate connected to said spout around the outside thereof, said supporting plate being adjacent said opening and positioned generally parallel to said ring and said sealing surface, a plurality of members connected to said supporting plate around the entire periphery thereof and extending toward said drum for interlocking rolling engagement with said groove, and an axially extending resilient sealing member connected to said supporting plate, said sealing member being adapted to engage said sealing surface and close the space between said drum and spout, whereby said spout is wholly supported by said drum with unimpeded communication through said opening and with rotary movement only possible therebetween.

7. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably and rotatably mounted on said drum around said opening, in combination, a ring around the outside of said drum adjacent said opening, a circumferential groove in said ring in the cylindrical portion thereof, a supporting plate connected to said spout around the outside thereof, said supporting plate being adjacent said opening and positioned generally parallel to said ring and said sealing

surface, a plurality of rollers connected to said supporting plate around the entire periphery thereof and extending toward said drum for interlocking rolling engagement with said groove, a sealing surface on said drum positioned between said groove and said spout and lying generally in a plane normal to the axis of said drum, a circular rib on said sealing surface, an axially extending resilient sealing ring connected to said supporting plate, said resilient sealing member having spaced concentric lips for engagement with opposite sides of said rib, means for forcing lubricant between said lips and latching means for holding said spout in charging or discharging position, whereby said spout is wholly supported by said drum with unimpeded communication through said opening and with rotary movement only possible therebetween.

8. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably and rotatably mounted on said drum around said opening, in combination, an inner ring-arranged member attached to the outside of said drum adjacent said opening and generally parallel thereto, an outer ring-arranged member attached to the outside of said spout adjacent said opening and generally parallel thereto, said outer member overlying said inner member in generally telescoping relation, a circumferential recess in the cylindrical portion of one of said members, projecting bearings connected to the other of said members extending into said recess at spaced intervals around the entire circumference of said other members, and an annular resilient seal positioned concentrically about said opening between said drum and said spout to close the space therebetween, whereby said spout is in unrestricted communication with said drum and is wholly supported radially and axially by the outside of said drum.

9. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably and rotatably mounted on said drum around said opening, in combination, a grooved ring attached to the outside of said drum adjacent said opening and generally parallel thereto, a circumferential groove in said ring in the cylindrical surface thereof, a plurality of arcuate bearing shoes positioned in said groove around the circumference of said ring, an annular flange connected to said spout, said flange being adjacent said opening and lying generally parallel thereto, an outer ring attached to said flange and overlying said grooved ring in generally telescoping relation, a groove in said outer ring adapted to fit over the

circumferentially projecting portions of said shoes, a sealing surface connected to said drum between said grooved ring and said flange and overlying said rings, and a resilient sealing ring having spaced concentric lips for engagement with said face plate, whereby said spout is wholly supported by said drum exteriorly of said opening while being rotatable only relative thereto.

10. In a rotary mixing drum having an opening at one end thereof and a charging and discharging spout supportably and rotatably mounted on said drum around said opening, in combination, a grooved ring attached to the outside of said drum adjacent said opening and generally parallel thereto, a circumferential groove in said ring in the cylindrical surface thereof, a plurality of arcuate bearing shoes positioned in said groove around the circumference of said ring, a plurality of fibrous lubricating fillers positioned in said groove around the circumference of said ring and between said shoes, an annular flange connected to said spout, said flange being adjacent said opening and lying generally parallel thereto, an outer ring attached to said flange and overlying said grooved ring in generally telescoping relation, a groove in said outer ring adapted to fit over the circumferentially projecting portions of said shoes, a face plate adapted to act as a sealing surface, said face plate being connected to said drum between said grooved ring and said flange, said face plate further overlying said rings, an axially extending resilient sealing ring having spaced concentric lips for engagement with said face plate, means for forcing lubricant between said lips, and latching means for holding said spout in charging or discharging position, whereby said spout is wholly supported by said drum exteriorly of said opening while being rotatable only relative thereto.

LOUIS J. SAROSDY.

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The following references are of record in the file of this patent:

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2,285,685	Schafer	June 9, 1942
2,316,137	Visser	Apr. 6, 1943
2,360,345	Hilkemeier	Oct. 17, 1944
2,501,944	Jaeger et al.	Mar. 28, 1950

Certificate of Correction

Patent No. 2,572,058

October 23, 1951

LOUIS J. SAROSDY

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 63, for "in which" read *on which*; column 8, line 5, for "spouts" read *spout*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of February, A. D. 1952.

[SEAL]

THOMAS F. MURPHY,

Assistant Commissioner of Patents.