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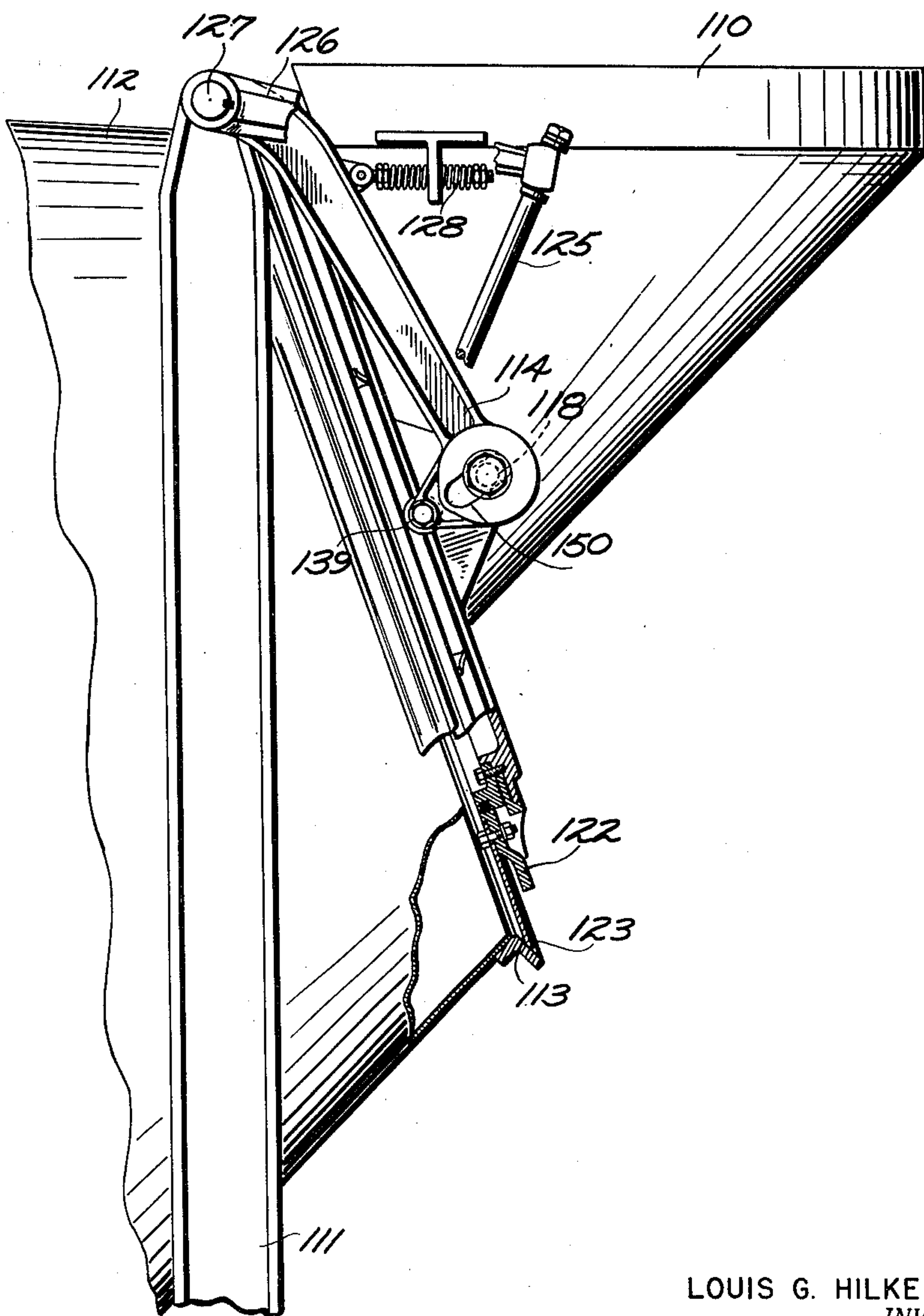
**2,544,085**

# APPARATUS FOR CHARGING AND DISCHARGING CONCRETE MATERIALS

Filed Jan. 29, 1948

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

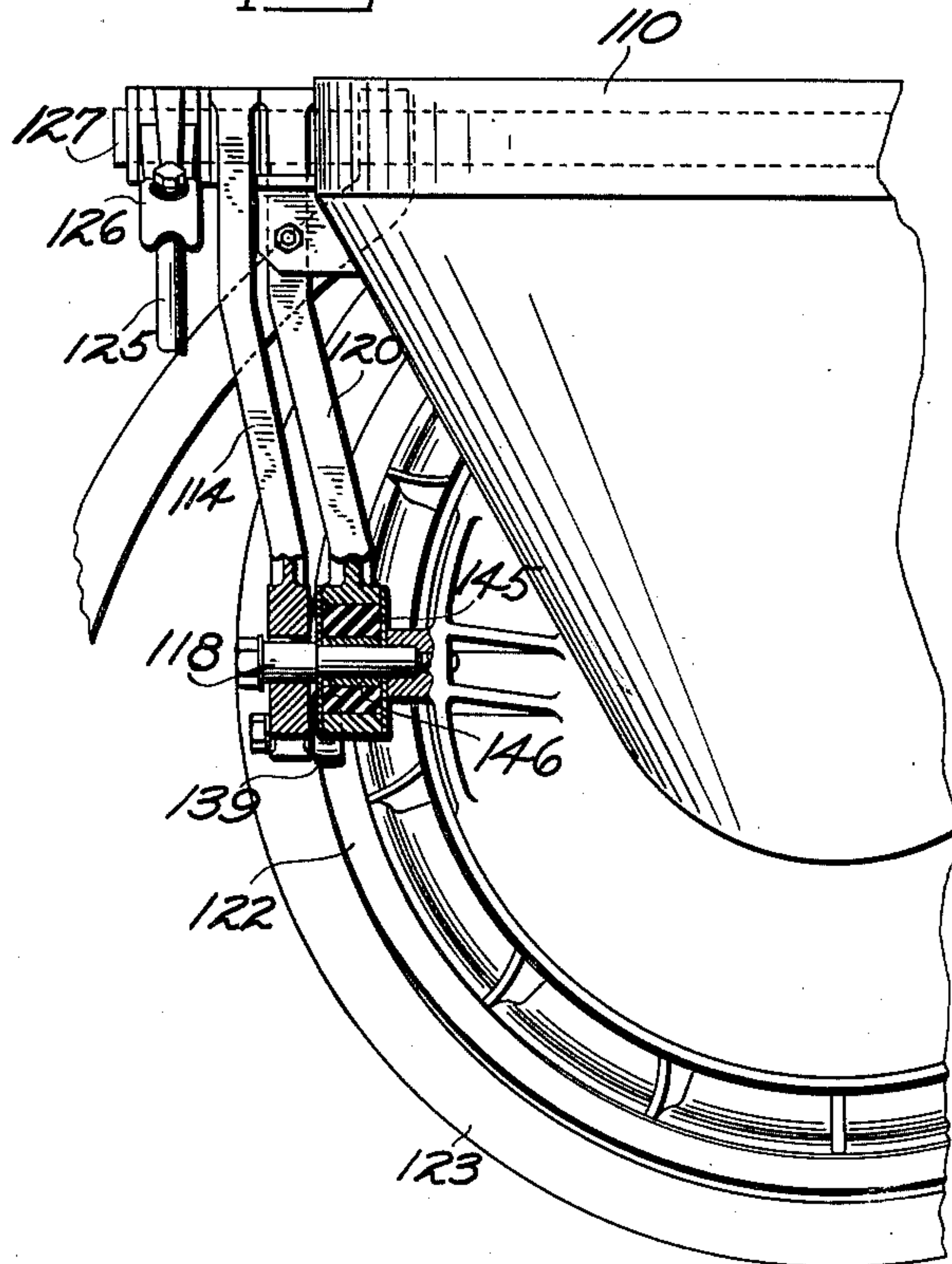
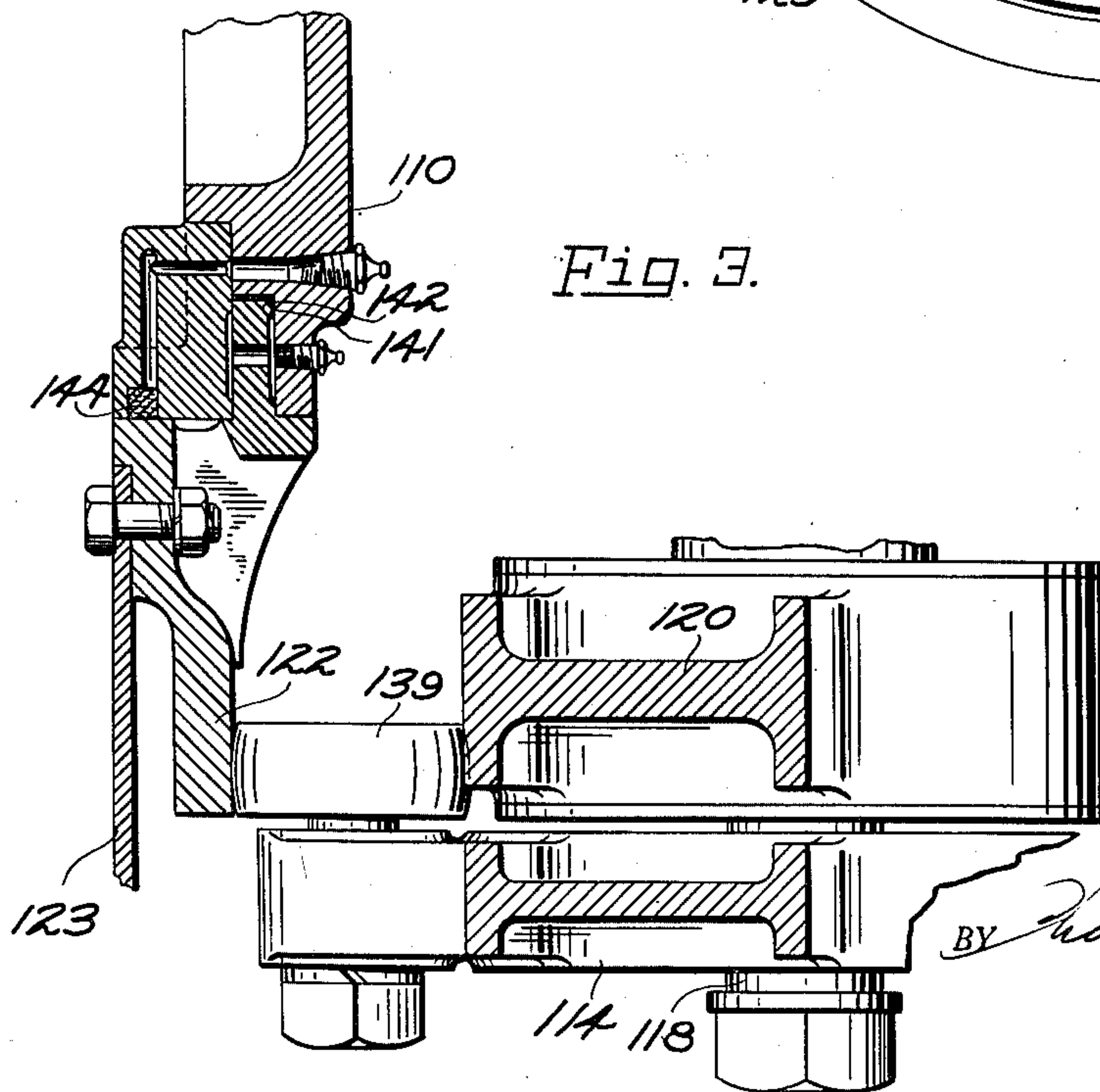


Fig. 3.



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## UNITED STATES PATENT OFFICE

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APPARATUS FOR CHARGING AND DIS-  
CHARGING CONCRETE MATERIALS

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5 Claims. (Cl. 259—161)

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This invention relates to concrete mixers and in particular to the mounting for the charging hoppers used therewith and has matter described herein which is disclosed and claimed in the co-  
pending application of Roy M. Hawkins, entitled "Apparatus for Charging and Discharging Concrete Mixers, filed December 27, 1947, Serial No. 794,150, and the application of Louis G. Hilkemeier and Roy M. Hawkins, entitled Apparatus for Charging and Discharging Concrete Mixers, filed January 12, 1948, Serial No. 1,743.

In truck mounted concrete mixers it is now widespread practice to mount the mixing drum on an axis which is inclined as regards to the horizontal. Associated with such mounted mixers is a charging hopper, an example of such a hopper is shown in the Letters Patent issued to R. J. Barnes on May 1, 1945, 2,374,912. The use of such apparatus has a great advantage in that it enables the charging and discharging of the mixing drum contents through a single opening. However, since the mass of concrete is an abrasive substance any apparatus used therewith must necessarily be subject to abrasive wear. In the aforesaid Letters Patent to R. J. Barnes a charging hopper mounting for truck type concrete mixers is disclosed which has some advantages over the prior art. Nevertheless such structure has been found to have inherent failings which necessitated costly repair and replacement after comparatively short periods of use. This is by reason of the fact that a rotatable closure ring is journaled on a nonrotatable hopper; a seal is provided and also thrust accommodating means. The structure of the said thrust accommodating means when viewed with the mounting apparatus as a whole was such as to wear very rapidly especially when abrasive substances became lodged therewith. For, all of the force necessary to bring the rotatable closure ring into sealing engagement with the drum is exerted through the thrust assembly, hence the thrust accommodating means quickly wore out. Such a condition usually requires expensive repair or replacement of the hopper apparatus and results in much lost time.

Accordingly, it is an object of this invention to provide pivotally mounted charging hoppers for concrete mixers with means necessary to seal the mouth of the drum opening, which exert the necessary force through the rotatable closure ring instead of through the entire hopper assembly.

The foregoing is necessarily the broad object of this invention, however other objects will appear to those skilled in the art in the reading of the following description and claims.

In the figures, Fig. 1 represents a front elevation partly broken away, of a charging hopper mounted on an inclined axis truck mixer.

Fig. 2 is a side elevation partly broken away, of the hopper mounting.

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Fig. 3 is an enlarged view, partly in section, of the apparatus shown in Fig. 2.

Referring to the figures, Fig. 1 shows a mixing drum 112 of the inclined axis type mounted to the frame 111 of the conventional type truck mixer. Pivotally mounted to said frame is the hopper 110 which directs materials into the drum during the charging operation. The hopper and closure ring function accordingly, when the hopper is pivoted about the shaft 127 the rotatable closure ring 123 is free of the mouth 113 of the mixing drum and the contents can be discharged therefrom, when the hopper is again brought into engagement with the mouth of the mixing drum the rotatable closure ring 123 seats itself on the mouth of the mixing drum, sealing the same. The hopper is in this position during most of the time that the truck mixer is in operation, as charging and discharging operations are relatively infrequent during normal operations.

The hopper is supported by means of the arms 120 which are pivotally connected to the rock shaft 127. These arms are not keyed to said shaft but are free to rock thereabout. They are flexibly mounted to the nonrotatable hopper by means of deformable or rubber-like bushings 145 which engage a bushing 146, said bushing registering with the pin 118 which is attached to the hopper 110. Although not shown in the drawings, it will be appreciated that the aforesaid arm and bushing structure is duplicated on the opposite side of the hopper, a pin similar to pin 118 being in alignment with pin 118 with their axes approximately intersecting an extension of the drum axes. A resilient connection 128 is provided between the hopper 110 and the arm 120 and is so arranged so that the hopper will not tip when it is in a raised position. In this manner a resilient support for the hopper mechanism is afforded which may accommodate the erratic movements of the drum opening as respects to the frame of the mixer when the truck mixer travels over rough terrain, such travel occasioning weaving and twisting of the frame.

The hopper is moved from a discharge position to a charging position by pivoting the same about the shaft 127. This is accomplished by having arms 114 keyed to said shaft: a lever 126 is likewise keyed to said shaft and a rod member 125 is attached to said lever; the rod 125 may be moved by means of any conventional bell and crank mechanism by the manipulation of an operator. The levers 114 have a lost motion connection 150 which cooperates with an enlarged portion of the pin 118, this arrangement moves the hopper toward and away from the mouth of the drum opening when the shaft 127 is rocked in the corresponding direction.

Fig. 3 shows the rotatable closure ring 123, the hopper 110 and the connecting means between them which includes a seal 144 and a thrust plate



142 which is an annular member integral with the closure member and is set in the groove 141 of the hopper 110. In the prior art all of the force required to bring the rotatable closure ring 123 into sealing engagement with the mouth of the mixing drum 113 was exerted through and upon the thrust ring 142 as shown in the afore-said Barnes patent. This force is necessarily great and brought about the condition in a short time wherein the thrust ring was so badly worn that it had to be replaced. Also the rotatable closure member 123 was displaced axially toward the mouth of the mixing drum so that the seal 144 had no effectiveness, consequently great expense was entailed to repair this deficiency. Fig. 3 shows a track member 122 integral with the rotatable closure ring 123. A rolling member 139 rides on the track member 122, this rolling member is integral with the lever 114 and is so arranged to exert all the force necessary to bring the rotatable closure ring 123 into sealing engagement with the mouth of the mixing drum 113 through or directly upon the rotatable closure ring itself. This obviates any excessive thrust on the thrust ring 142 as only the weight of the hopper is absorbed by said ring and it is free to float in the hopper groove 141.

As the hopper 110 is brought adjacent the mouth of the mixing drum 113 it mates with the flared opening divided at said mouth and before the rotatable closure ring effectively seals the mouth of the drum there must be some adjustment of the rotatable closure ring to the axis of rotation of said mouth. In the past this sometimes accounted for eccentric movement of the rotatable closure ring as respects to the mouth of the drum because the adjustment was not possible, with consequent strain upon the hopper mounting apparatus. In this embodiment of the invention clearance exists between the lost motion aperture 150 and the pin 118 as shown in Figs. 1 and 2. It will also be noted that there is lateral clearance between the head of said pin and the lever arm 114, also on the opposite side there is clearance between the lateral faces of levers 114 and 120. This enables the rotatable closure ring and the entire hopper assembly to float before finding its concentricity with the mouth of the mixing drum. The roller 139 is shown as the chosen embodiment to urge the closure ring forward, however it can be appreciated that sliding contact means might otherwise be used. Also, equivalents other than those of the chosen embodiment are not shown but may be selected by one skilled in the art. Hence, the invention is to be limited only by the clear import of the following claims.

I claim:

1. In a transit concrete mixer, a drum rotatably mounted on an inclined axis and having its rear elevated end open; a charging hopper; a stationary frame pivotally mounting the charging hopper to swing toward and from the elevated open end of the drum; a sealing member carried by the charging hopper and engageable in sealing relationship with the mouth of said drum when the charging hopper is in its lowered position; means for swinging the charging hopper upwardly away from the open end of the drum to enable discharge of the drum contents, said means further comprising actuatable lost motion linkage connected to the hopper; means for urging said sealing member into sealing relationship with the mouth of said drum, said means being attached

to said swinging means and arranged to exert the force necessary to seal the drum through the sealing member.

2. In a concrete mixer, a rotatable mixing drum having an open end through which the drum is charged and discharged; a charging hopper; a pivotal support for said hopper, a rotatable closure member on said hopper arranged to seal said open end of the drum when the former is brought into engagement therewith, means for urging said rotatable closure member into engagement with the mouth of said drum, said means including movable arms on each side of said drum having lost motion connections with said hopper and engaging said rotatable closure member, whereby said means perform the dual function of opening and closing the mouth of said drum while exerting the force necessary to seal said drum when the hopper is in a closed position through the rotatable closure member.

3. Hopper mounting apparatus for transit concrete mixers wherein the hopper has a rotatable closure ring journaled thereon, comprising freely pivoted arms for supporting said hopper assembly for movement about a pivot point, lost motion linkage means for moving said hopper assembly about its pivot point, said lost motion linkage further comprising movable means abutting a trackway on the rotatable closure ring for urging the same into sealing engagement with the mouth of an associated mixing drum, and means for actuating said lost motion linkage to move the hopper from a discharge position to a charging position and vice versa.

4. In a concrete mixer, a rotatable mixing drum having an open end through which the drum is charged and discharged; a charging hopper; a pivotal support for said hopper, a rotatable closure member on said hopper arranged to seal said open end of the drum when the former is brought into engagement therewith, a trackway on said rotatable closure member, means for urging said rotatable closure member into engagement with the mouth of said drum, said means comprising movable arms on each side of said drum having lost motion connections to said hopper whereby said means perform the dual function of opening and closing the mouth of said drum while exerting the force necessary to seal said drum when the hopper is in closed position through the rotatable closure member, said movable arms having moving contact members for engagement with said trackway on the rotatable closure member during the sealing step.

5. Apparatus according to claim 4 in which the lost motion connection to said hopper engages pin-like members disposed substantially on the diameter of said hopper, said lost motion connection to the pin-like member having lateral and transverse clearance with said pin-like members whereby the hopper assembly may float while searching for its concentricity with the axis of the mouth of said mixing drum.

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