

Dec. 9, 1941.

C. F. BALL

2,265,752

APPARATUS FOR CHARGING CONCRETE MIXERS

Filed Jan. 11, 1940

2 Sheets-Sheet 1

FIG. 1.

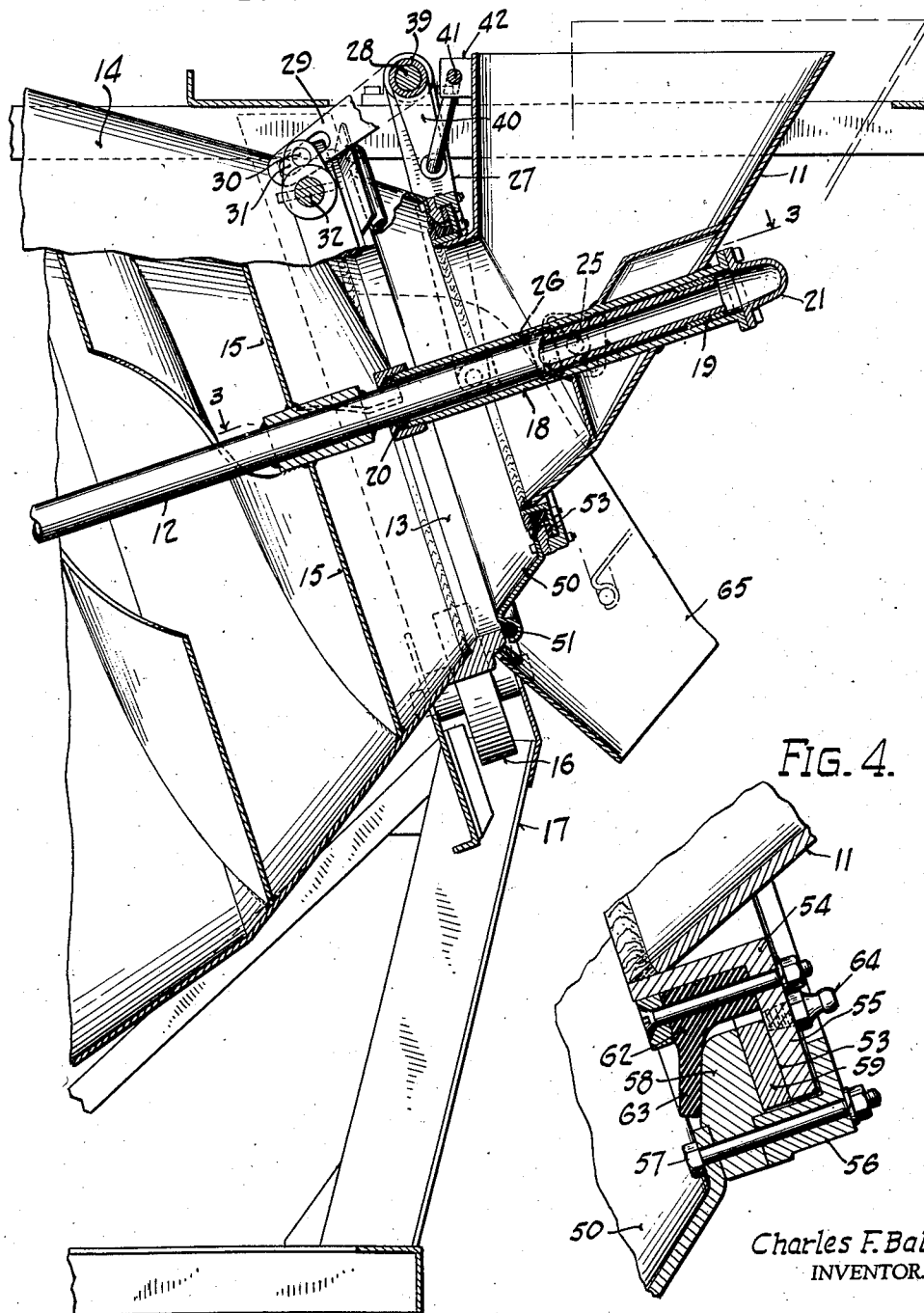
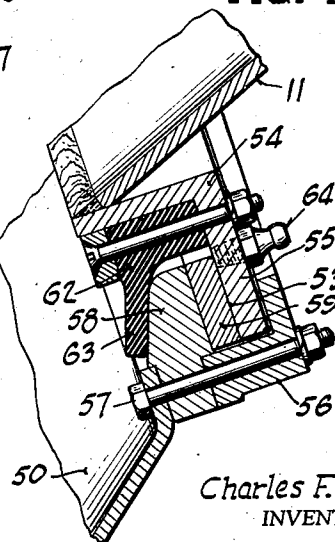


FIG. 4.



Charles F. Ball
INVENTOR.

BY

George A. Evans
ATTORNEY.

Dec. 9, 1941.

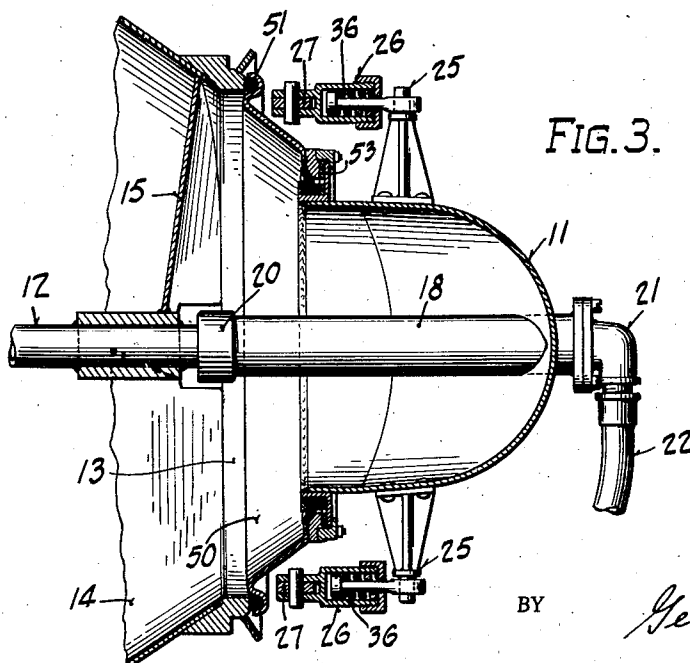
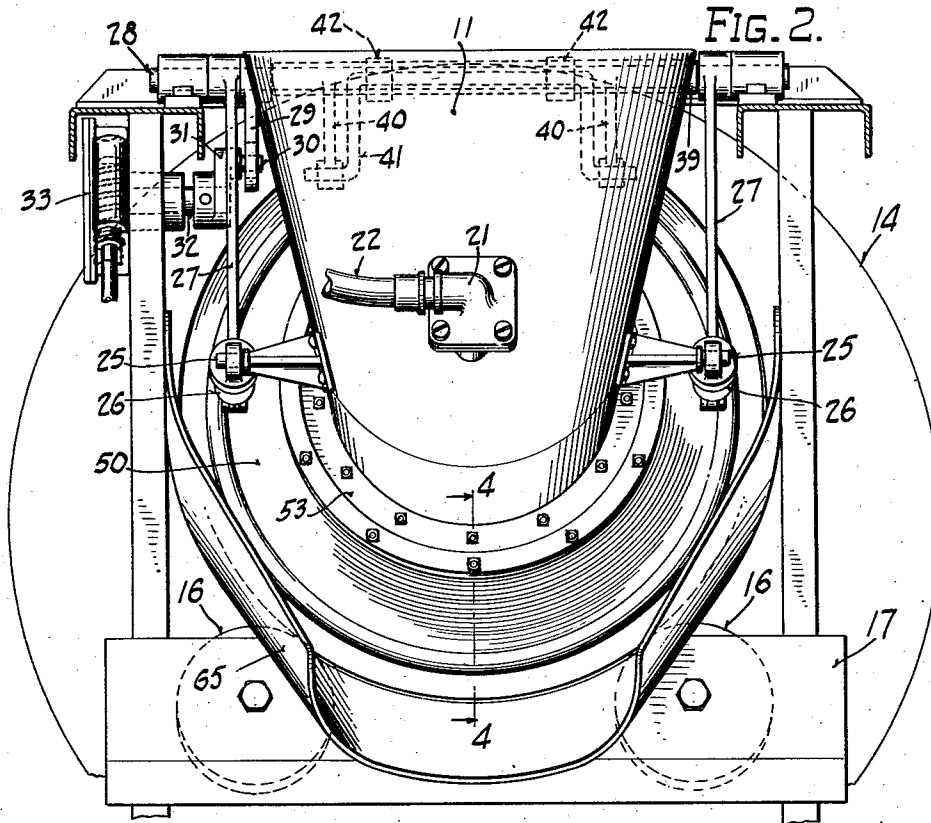
C. F. BALL

2,265,752

APPARATUS FOR CHARGING CONCRETE MIXERS

Filed Jan. 11, 1940

2 Sheets-Sheet 2



Charles F. Ball
INVENTOR.

BY

George A. Evans
ATTORNEY.

UNITED STATES PATENT OFFICE

2,265,752

APPARATUS FOR CHARGING CONCRETE MIXERS

Charles F. Ball, Wauwatosa, Wis., assignor to
Chain Belt Company, Milwaukee, Wis., a corporation of Wisconsin

Application January 11, 1940, Serial No. 313,323

7 Claims. (Cl. 259—164)

This invention relates to apparatus for charging the bodies of mixers, such as are mounted on trucks to mix or agitate concrete in transit. In my co-pending application, Serial Number 307,784, filed December 6, 1939, I have disclosed a charging device for truck mixers arranged to co-operate with an opening in one end of the mixing drum, said device being slidably mounted on a shaft aligned with the drum axis. The present invention involves some modifications of the embodiments disclosed in said co-pending application, although the objects and advantageous features of each are in many respects similar.

In truck mixers, it is desirable to charge a drum of given volume with as much material as can be handled, and it is contemplated that with the machines here described the level of material may be well above the lower edge of the end-opening in the drum, with the result that the charging device must be positively seated with respect to the drum, if leakage around the edge of the opening is to be prevented.

In my previous as well as my present application, I provide a pressure plate, which is substantially frusto-conical in shape, arranged so its larger end may enclose and seal the drum opening and its smaller end may be sealed against the lower end of the hopper. This plate, when seated against the drum, is held under pressure sufficient to cause the plate to rotate with the drum and consequently a running seal is provided between the plate and the hopper, which is held stationary.

For carrying the pressure plate, my other application discloses a sleeve mounted on the hopper-supporting shaft, said sleeve carrying a spider rigidly connected to the aforementioned pressure plate. A bearing between the hopper and spider-supporting sleeve transmits pressure from the hopper to the plate and permits relative rotation between these parts. The inclusion of a spider, however, in this arrangement, causes some obstruction to material passing through the charging device, the elimination of which is one of the objects of this invention.

Another object of the invention is to provide a bearing so arranged with respect to the other elements of the charging hopper that the conical plate which rotates with the drum may be entirely supported through the bearing on the hopper, and pressure which is applied to bring the hopper into charging position transmitted through the bearing to cause the plate to effectively seal the drum opening.

It is a further object to provide a simplified

arrangement for bearing and seal between the stationary hopper and the rotating pressure plate by means of which the objects, among others, expressed in my co-pending application may be attained, namely, rapid charging; improved, bi-directional mixing; sampling through the hopper, and increased drum-carrying capacity.

Referring to the accompanying drawings in which like numerals are used to designate like parts throughout:

Figure 1 is central vertical section through the assembled hopper arrangement;

Figure 2 is a rear view of the hopper;

Figure 3 is a transverse section taken on the line 2—3 of Figure 1; and

Figure 4 is a detail view of the seal between the hopper and pressure plate taken on the line 4—4 of Figure 2.

In the drawings, the hopper 11 is slidably mounted on a tubular member or shaft 12 arranged axially of an opening 13 in the end of the mixing drum 14. Tube or shaft 12 is rigidly connected to blades 15 welded on the inside of the drum, and the drum itself rotates on rolls 16 carried on frame 17 at the rear end of the truck. The forward end of the drum is supported by a bearing in a conventional manner not considered necessary to illustrate or describe herein. For supporting the hopper on the shaft a sleeve 18 is provided which is attached to the hopper and extends therethrough, telescoping the shaft. Bearing bushing 19 is provided at the rear end of the shaft while the forward end of the sleeve carries a gland 20, which also acts as a bearing, and wipes away any concrete which may be deposited on the shaft when the hopper is in the dotted line position shown in Figure 1. Member 12 is preferably tubular in order that water may be introduced through it to the interior of the drum. For this purpose a fitting 21 is attached to the outer end of sleeve 18, said fitting communicating with a source of water supply through a flexible hose 22. In this case, gland 20 serves as a packing between the sleeve and the tube.

For actuating the hopper, that is, to slide it on the shaft 12 into charging position or to remove it from such position when the drum is to be discharged, trunnions 25 are mounted on the sides of the hopper and each trunnion is connected to one end of a link 26, the opposite end of which is pinned to an arm 27 secured to a transverse shaft 28 pivoted at the top of frame 17. Shaft 28 is actuated by an arm 29 which is

slotted and engages a pin 30 carried by a crank 31 secured to a shaft 32 which may be actuated by suitable mechanism such as a worm and worm wheel assembly 33, more particularly described in my co-pending application.

To equalize pressure on both sides of the hopper and to absorb road shocks, caused by tilting of the frame, each link 26 may be made in two parts with one telescoping the other and a spring 36 interposed between them. To maintain the hopper in upright position, and relieve torque on the actuating mechanism a sleeve 39 is mounted on shaft 28, said sleeve carrying depending arms 40 pinned to extremities of a U-shaped member 41, the sides of which are arranged for parallel movement with the actuating arms 27 and links 26, and the back of which is journaled in bearings 42 carried at the top of the hopper.

Disposed between the hopper and the end of the drum and for certain purposes forming a part of the hopper is a plate 50, preferably of frusto-conical shape, the larger diameter of which corresponds to that of the drum opening, while the smaller diameter corresponds to that of the lower end of the hopper. To provide a seal at the drum opening, the plate 50 is bent back so its radial cross-section is approximately semi-circular forming a socket for a ring 51 of resilient material which is inserted therein and presses against the drum.

Annular member or plate 50, instead of being supported directly from the shaft 12 as in said co-pending application, is supported on the hopper 11, and a bearing 53 is provided between these parts. The bearing assembly includes a ring 54 which is welded to the hopper 11 and has an outwardly-turned, radial flange 55, arranged to support an annular member 56 secured to the plate 50 by means of bolts 57, member 56 having an inwardly turned, radial flange disposed outside of, but adjacent to flange 55. Also mounted on bolts 57, and arranged between plate 50 and member 56, is an inwardly extending bearing plate or flange 58 spaced from the flange 55 to accommodate a mating bearing plate 59 which may be keyed to flange 55 or may float between these members. Plate 59 may be of bronze, or any suitable bearing material, or a plurality of balls or rollers may be used in lieu thereof.

To prevent concrete from entering the bearing, a resilient, annular member 62 is secured to ring 54, said member having an outwardly extending flange 63 arranged to be pressed inwardly of the hopper by contact with that face of bearing plate 58 which is opposite the bearing face. This face of plate 58 is tapered, as illustrated in Figure 4 in order that the surface of the seal may be extended by contact with the flange 63 of the resilient member. Certain space is provided between the end of plate 58 and packing member 62 into which grease may be applied through appropriate fittings 64 extending through the flange 55.

When the hopper is moved into charging position, by proper manipulation of the actuating mechanism previously described, pressure which is applied to the trunnions acts through the bearing 53 to force the closure plate 50 tightly against the end of the drum. Due to this pressure, rotation of the drum for mixing or agitating purposes causes plate 50 to rotate therewith, bearing 53 reducing friction between the plate and the hopper. By providing a dished or cone shaped pressure plate it is possible to maintain a large

charging passageway and yet reduce the diameter of the bearing surfaces and the seal, a very important factor if the bearing and seal are to operate satisfactorily over a reasonable length of time. To illustrate this fact, if the bearing were located at the discharge opening of the drum, which may be assumed to have a diameter of 34 inches, the frictional area would be 2.39 times as great as it would be over a bearing surface of the same width located at the smaller end of a conical section which as herein illustrated may have a diameter of 22 inches. The load placed on the bearing can be appreciated when it is realized at concrete heaped above the bottom edge of the hopper or pressure plate may exert as much as 2,000 pounds total force.

With the apparatus described it is not only possible to rotate the drum charging to increase the normal load carrying capacity, without leakage, but it is also possible to reverse the direction of rotation, in which case the spiral blades 15 will work material back into the hopper where it may be sampled prior to its return to the drum. During certain stages of mixing, it may even be advantageous to rotate in this direction to improve the mixing action within the drum, for the mechanism provided enables material to be worked into and out of the hopper without causing the hopper to be displaced with respect to the drum. When it is desired to discharge the drum, the hopper 11 and its associated plate 50 is slid back from the opening 13 and material is moved through said opening under usual blading action until it falls into a chute 65 disposed beneath the opening.

While the invention is illustrated with a drum having a high end discharge, it is not to be limited to such applications, but may be utilized with drums rotated on a horizontal axis as well.

While plate 50 is preferably frusto-conical in shape, as illustrated herein, it is not limited to this precise contour, but may be dished, or any concave form, such that the larger end encloses the drum opening while the smaller end is spaced axially from the drum and rotates in a seal between it and the charging duct. As used in the claims, the term frusto-conical is intended to include such variations in form as may properly be considered equivalents to the form here disclosed.

The invention having been described, what I claim as new and seek to protect by Letters Patent is:

1. In combination with a rotatable-mixing drum having an opening in one end thereof and a shaft integral with said drum extending axially and outwardly from said opening, a charging device slidably mounted on said shaft, a frusto-conical, pressure plate disposed between said drum and said charging device with its larger end arranged to enclose said opening, said pressure plate being supported directly on said charging device, but being free to rotate with respect thereto and means for applying pressure to said charging device to seat said pressure plate against said drum in order that it may rotate therewith.

2. In a machine for mixing concrete which has a rotatable-mixing drum terminating in an open end portion and an axially aligned shaft extending outwardly from the drum opening, a charging hopper slidably mounted on said shaft, with its lower end portion arranged annularly of said shaft, and an annular plate disposed between said hopper and said drum with one end enclos-

ing said drum and the other end spacing said hopper axially from said drum, said annular member being supported by said hopper but being free to rotate with respect thereto.

3. In combination with a rotatable-mixing drum having an end-charging opening and a charging duct, the lower end of which is annular and spaced axially from said drum opening, a frusto-conical member disposed between said duct and said drum with its larger end arranged to enclose the drum opening and its smaller end enclosing the lower opening in said duct, and mating bearing plates carried on said duct and said member respectively, providing a bearing for supporting said member and for transmitting pressure to seat said member against said drum and to cause it to rotate therewith while said charging duct remains stationary.

4. In combination with a rotatable-mixing drum having an opening at one end thereof and a charging duct, the lower end of which is annular and spaced axially from said drum opening, a frusto-conical member disposed between said duct and said drum supported by said duct and rotatable with said drum, its larger end arranged to enclose said drum opening and its smaller end flanged inwardly toward the center of the charging passageway, and a resilient member extending outwardly from said charging duct and arranged to be pressed against by the flanged portion of the frusto-conical member to form a running seal therebetween.

5. The combination of elements specified in claim 6 in which the flanged portion of the frusto-conical member has one side which presses against and deflects the resilient member while the other side serves as a bearing surface which bears against a corresponding surface on the charging duct.

6. In combination with a rotatable mixing drum having an opening at one end thereof, a charging device for cooperation with said opening during charging and mixing of materials, said device including a charging duct and a disc-shaped plate mounted for rotation with respect to said duct, the larger end of said plate corresponding in size with the opening in said drum and being provided with resilient material along its perimeter to provide a seal with the end of said drum.

7. A charging device for rotatable mixing drums provided with an end charging opening, said device comprising a substantially frusto-conical or dished annulus mounted adjacent said opening for rotation with the drum, a non-rotatable charging duct having its discharge end disposed to pass material through the opening in said annulus, said annulus being supported for rotation on said duct, and sealing means between said duct and said annulus.

CHARLES F. BALL.