Jan. 28, 1936. A. W. RYBECK 2,029,126

MIXING APPARATUS

Filed March 1, 1934 3 Sheets-Sheet 1

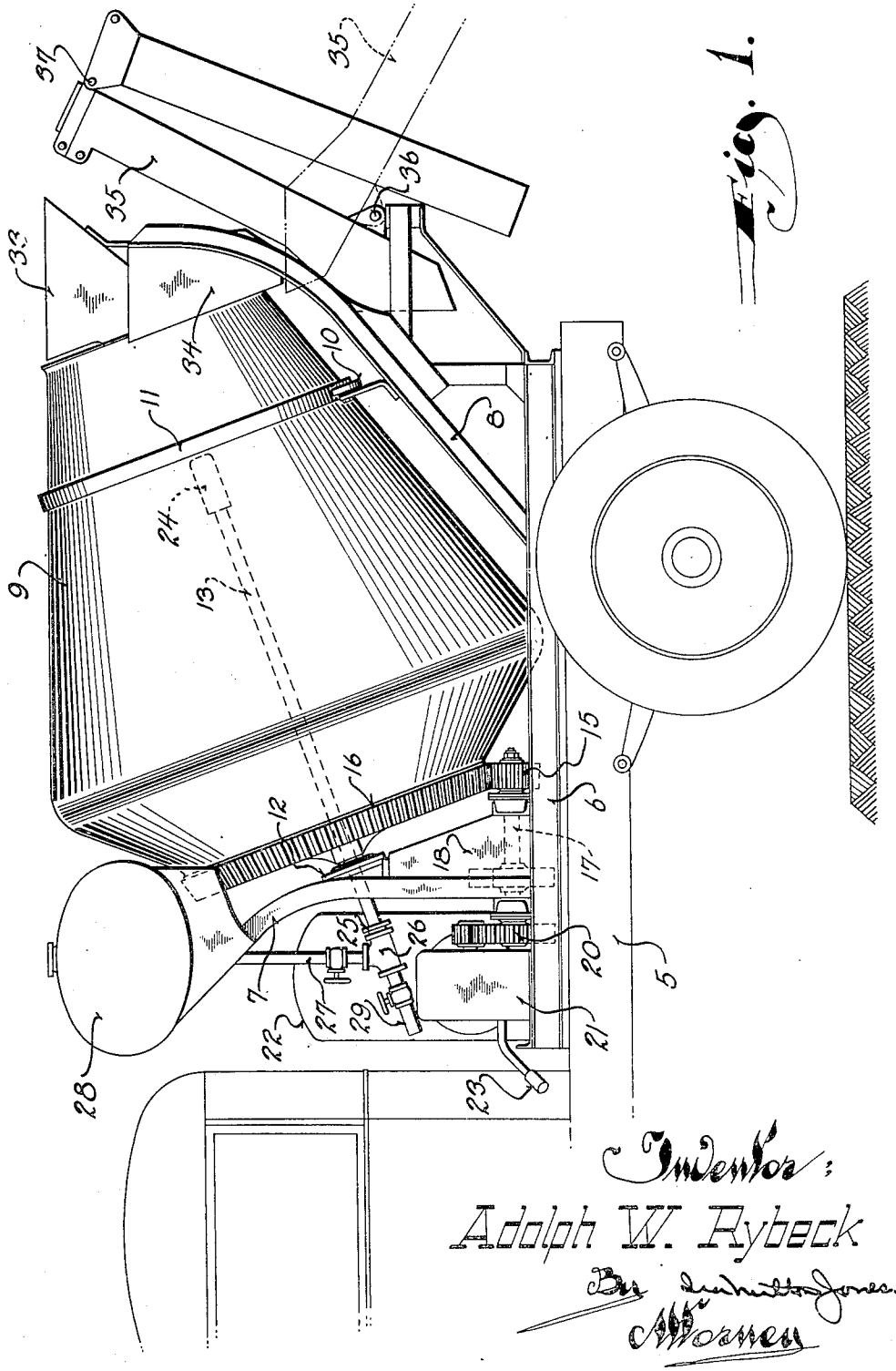


Fig. 1.

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Jan. 28, 1936. A. W. RYBECK 2,029,126

MIXING APPARATUS

Filed March 1, 1934 3 Sheets-Sheet 2

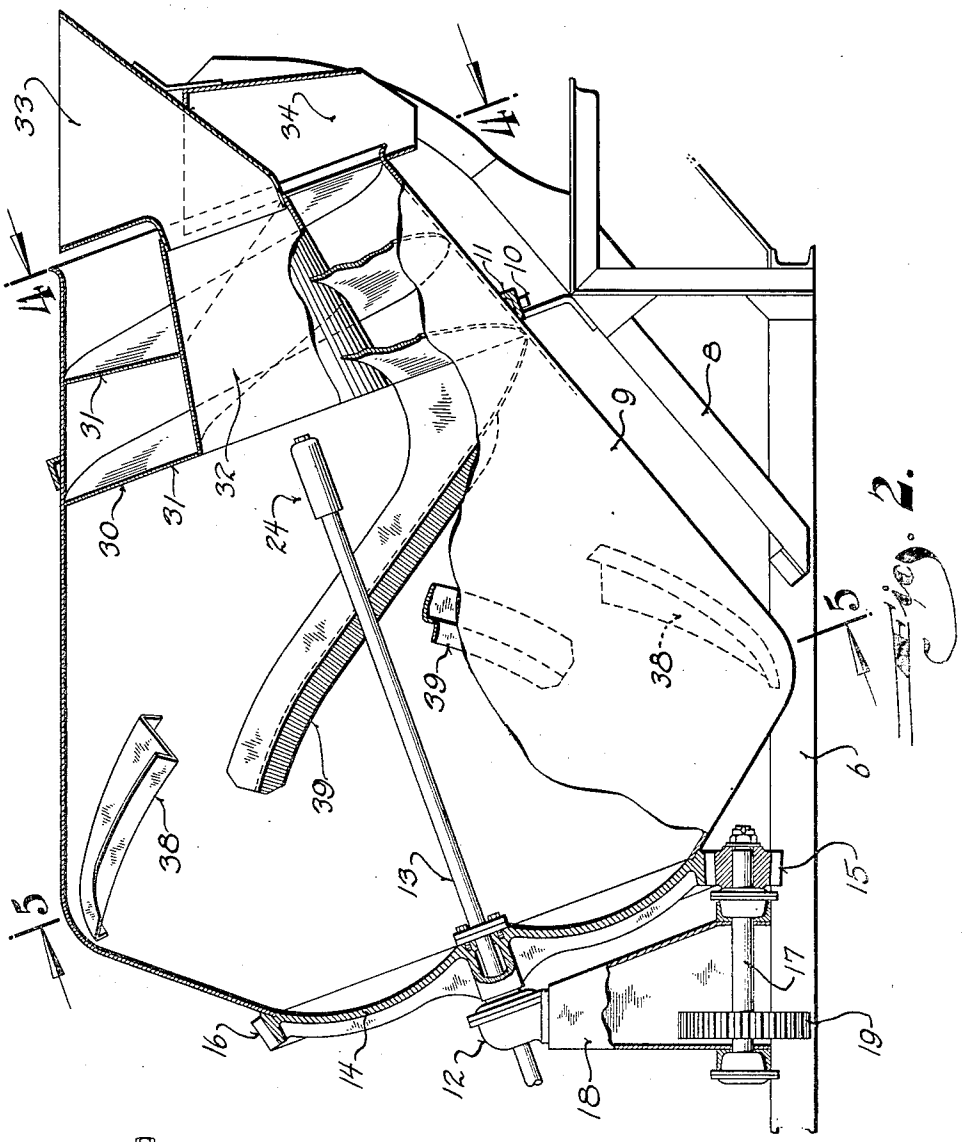


Fig. 2.

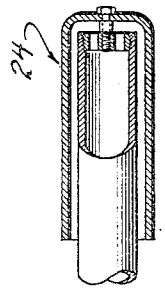


Fig. 3.

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Jan. 28, 1936. A. W. RYBECK 2,029,126

MIXING APPARATUS

Filed March 1, 1934 3 Sheets-Sheet 3

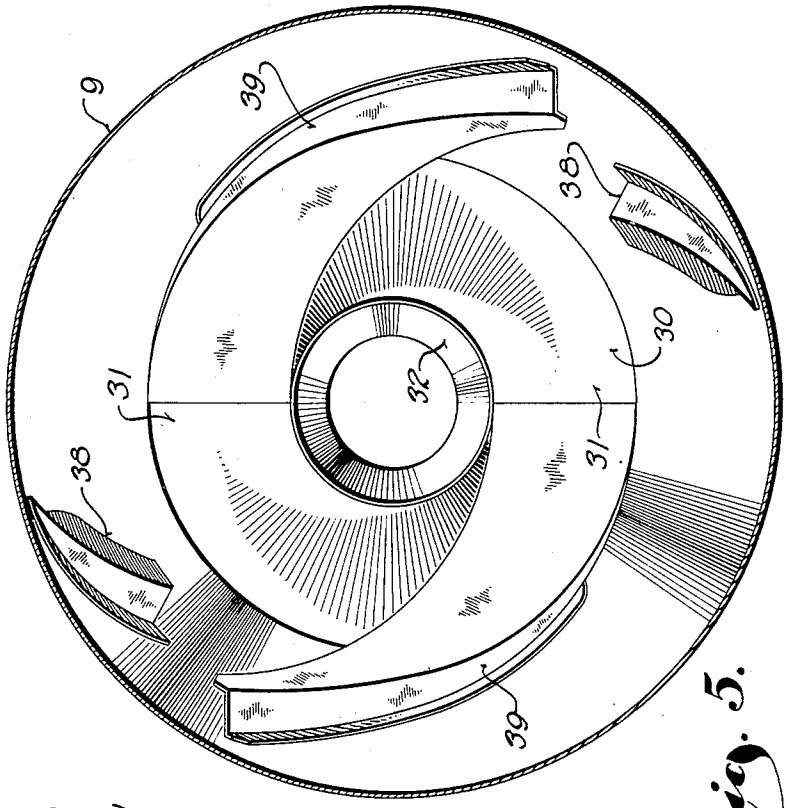


Fig. 5.

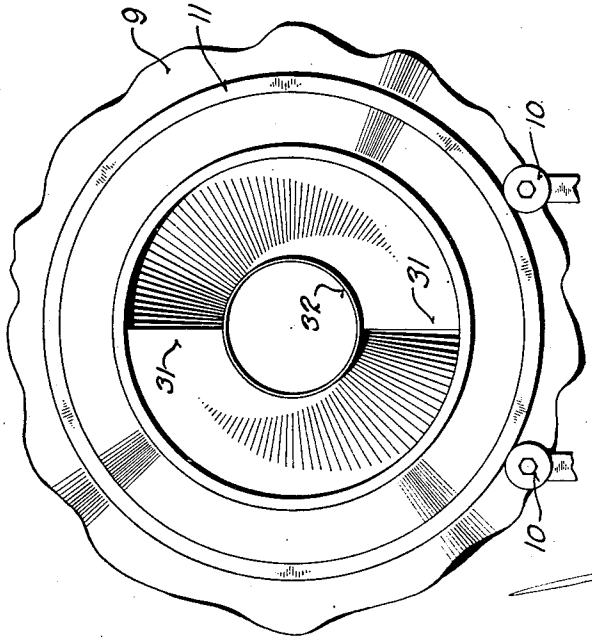


Fig. 4.

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UNITED STATES PATENT OFFICE

2,029,126

MIXING APPARATUS

Adolph W. Rybeck, Milwaukee, Wis., assignor to T. L. Smith Company, Milwaukee, Wis., a corporation of Wisconsin

Application March 1, 1934, Serial No. 713,494

3 Claims. (Cl. 83—73)

This invention relates to improvements in concrete mixing apparatus and refers more particularly to transit mixers in which a mixing drum is mounted upon a road vehicle to receive a load of aggregates, cement and water, at a supply source and mix the batch while en route so that upon arrival at the job, the concrete is ready for use.

In transit mixers heretofore in use, an opening in the side wall of the drum has provided the feed opening through which the drum was charged. The opening was, of course, closed by a removable cover, but owing to the difficulty of keeping the parts clean, it was practically impossible to close the cover tightly and as the drum is rotated during transit, much of the fine mixture leaked out through the feed opening, thus materially affecting the quality of the concrete.

With this and other objections to existing transit mixers in mind, this invention has as its object to provide a concrete mixer of the character described in which both the feeding and the discharging of the contents of the mixing drum may be effected at one end of the drum.

More specifically, it is an object of this invention to provide a mixing drum particularly adapted for use in transit mixers in which the feed and discharge openings are both at one end of the drum and are defined by walls so arranged that one opening is within the other.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side view of a concrete mixing apparatus embodying this invention, showing the same mounted upon a truck chassis;

Figure 2 is an enlarged view partially in side elevation and partly in section of the mixing drum per se;

Figure 3 is an enlarged detail view of the water discharge nozzle;

Figure 4 is an end view of the mixing drum taken on the plane of the line 4—4 of Figure 2; and

Figure 5 is a cross sectional view taken through Figure 2 on the plane of the line 5—5.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 designates the chassis of the automobile truck upon which the frame 6 of the mixing apparatus is mounted. The frame 6 includes forward and rear supports 18 and 8, respectively, between which the mixing drum 9 is rotatably mounted.

As shown, the drum is of roughly truncated cone shape and is mounted sidewise with its axis inclined upwardly and rearwardly to dispose its open vertex which is the rear end of the drum, high enough to preclude accidental discharge of the drum contents. The means to rotatably mount the drum from the forward and rear standards comprises a plurality of rollers 10 mounted on the rear upright 8 and arranged to track on an annular rim 11 encircling the drum.

Cooperating with the rollers 10 is a bearing 12 carried by the forward support 18. Journalled in this bearing is a tubular shaft 13, which extends through the center of the front wall 14 of the drum. The drum is thus freely rotatably mounted through the coaction of the bearing 12 and the rollers 10 and is driven from a pinion 15, which meshes with a large ring gear 16 preferably formed directly on the front wall 14.

The driving pinion 15 is fixed to a shaft 17 journalled in bearings carried by the support 18. A gear 19 is fixed to the shaft 17, which in turn meshes with and is driven through gearing indicated generally by the numeral 20, from a transmission unit 21. The transmission unit 21 may be driven from an engine (not shown) enclosed within a housing 22.

The particular type of drive mechanism is, of course, optional and is, therefore, not shown in detail. It is noted, however, that the transmission unit 21 is provided with a gear shift lever 23, through which the direction of the driving force may be reversed so that the drum may be driven in either direction.

The hollow shaft 13, as noted, extends through the center of the front wall 14 and its inner end, which terminates at the approximate center of the drum is provided with a discharge nozzle 24, illustrated in detail in Figure 3. This nozzle comprises merely a hood secured over the open end of the hollow shaft so that fluid issuing therefrom will be directed back into the drum rather

than expelled through the rear open end thereof, and the materials being mixed will be precluded from entering the hollow shaft.

Exteriorly of the drum and forwardly of the bearing 12, the tubular shaft has a rotatable but fluid-tight connection 25 with one of the three branches of a T fitting 26. One of the remaining branches of the fitting is connected through a valved connection 27 with a water supply tank 28 mounted at the top of a water tank support 7, and the third branch of the fitting has a valved discharge pipe 29 connected thereto through which the contents of the tank and the hollow shaft may be completely drained.

Mounted in the rear open end of the drum is a screw conveyer indicated generally by the numeral 30 and comprising two spiral rings or baffles 31, whose outer peripheries are secured to the inner walls of the drum and whose inner peripheries are fixed to a central duct 32, which affords an inlet or feed passage to the interior of the drum.

In loading the drum, the materials are inserted through the duct 32 and to facilitate such loading, a charging hopper 33 is mounted on the rear upright 8 with its discharge end extending into the duct 32, as clearly shown in Figure 2.

Beneath the charging hopper 33 and embracing the lower portion of the open rear end of the drum is a discharge hopper 34, also supported on the rear upright 8. This discharge hopper is at all times in communication with the space between the duct 32 and the wall of the drum to receive material worked upwardly and rearwardly by the spiral rings 31 upon reverse rotation of the drum.

During mixing of the batch, the rotation of the drum is such that any material which contacts the spiral rings 31 is continuously thrown back down into the drum, but when the direction of rotation is reversed, the material will be worked rearwardly into the discharge hopper 34, from which it may be discharged through a collapsible chute structure 35. The chute structure 35 is preferably hingedly and pivotally mounted from the rear upright 8 as at 36 and may comprise two sections hingedly connected as at 37.

Forwardly of the spiral rings 31, the inner wall of the mixing drum carries a plurality of inwardly directed blades 38 and 39, so shaped and disposed with respect to the spiral rings that during the normal rotation of the drum to effect the mixing of its contents, the tendency is to keep throwing the material toward the front end of the drum, but upon a reversal of the direction of rotation, the material is constantly fed rearwardly to the spiral rings 31, which as stated, carry it back into the discharge hopper 34.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention affords a concrete mixing apparatus particularly suitable to the transit type of mixer, and that it does away with the loss of the finer portions of the batch through leakage, and also materially simplifies the mounting for the mixing drum.

What I claim as my invention is:

1. In a material mixing apparatus, a rotatable mixing drum having an opening at one end, a tubular duct in said end of the drum to afford a charging passage, said duct being spaced from the adjacent wall of the drum to provide a discharge passage around the outside of the duct and extending a substantial distance into the drum, and a spiral wall encircling the tubular duct with one edge fixed to the duct and its opposite edge fixed to the drum to mount the duct from the drum without closing said discharge passage, and said spiral wall being operable upon rotation of the drum in one direction to eject material from the interior of the drum out through said discharge passage between the duct and the adjacent wall of the drum.

2. In a material mixing apparatus of the character described, a rotatable mixing drum, means to rotatably mount the drum with its axis inclined from the horizontal so as to dispose one end higher than the other, a duct mounted in the high end portion of the drum in spaced relation to the wall thereof and extending a substantial distance into the drum to define a central inlet passage and an annular discharge passage circumscribing the duct, and spiral vanes fixed to the outer wall of the duct and the inner wall of the drum to extend across said discharge passage for carrying material from the interior of the drum outwardly through said discharge passage upon rotation of the drum in one direction.

3. A transit mixer comprising in combination with a road vehicle, a frame, a mixing drum, means to rotatably mount the mixing drum in the frame including a bearing and a tubular shaft journalled in the bearing and extending into the mixing drum, drive means carried by the frame to selectively rotate the drum in either direction, means for supplying water to the drum through said tubular shaft, a duct mounted in one end portion of the drum in spaced relation to the wall thereof and extending a substantial distance into the drum to define a central inlet passage and an annular discharge passage circumscribing the duct, and spiral vanes fixed to the outer wall of the duct and the inner wall of the drum to extend across said discharge passage for carrying material from the interior of the drum outwardly through said discharge passage upon rotation of the drum in one direction.

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