Feb. 27, 1962 E. G. SMITH 3,023,056

CONCRETE MIXING DRUM AND METHOD OF MAKING SAME

Filed May 4, 1959

Fig. 1.

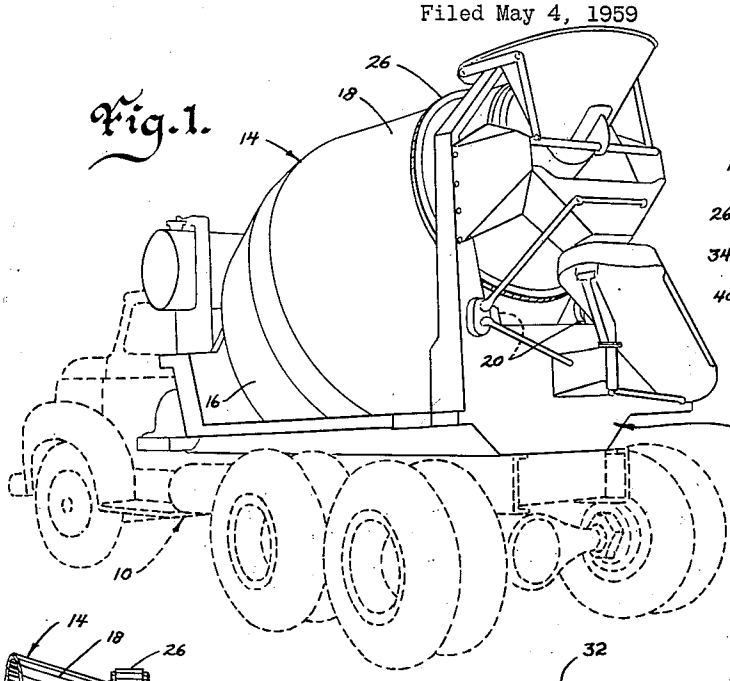
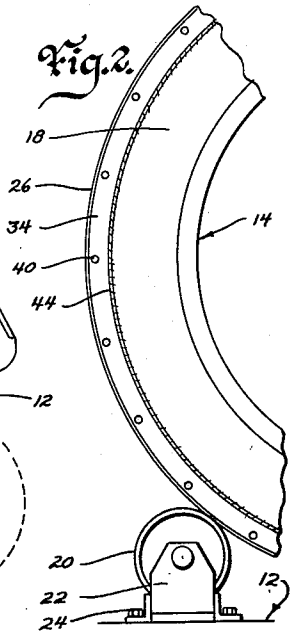


Fig. 2.



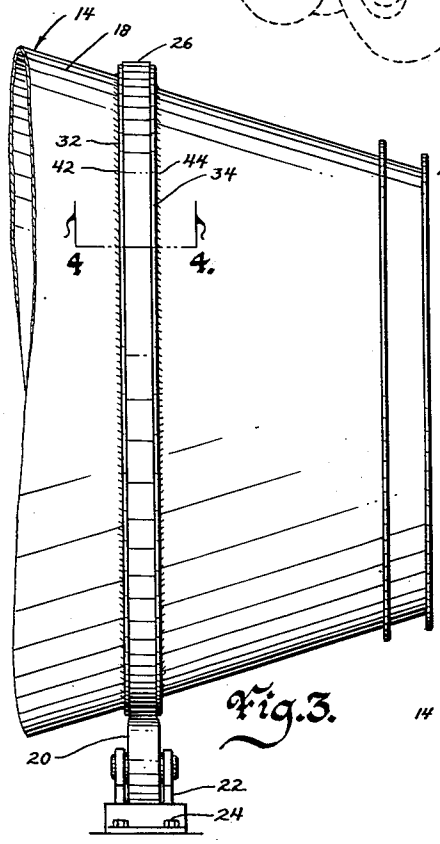


Fig. 3.

Fig. 4.

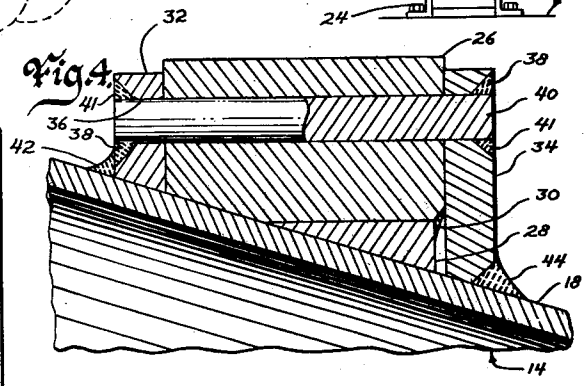
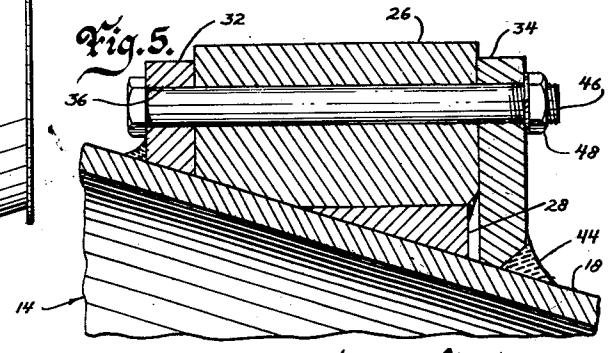


Fig. 5.



Witness
Edward P. Seeley

Inventor
Earl G. Smith
by Donald H. Zarley
Attorney

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CONCRETE MIXING DRUM AND METHOD OF MAKING SAME

Earl G. Smith, Waterloo, Iowa, assignor to Construction Machinery Company, Waterloo, Iowa, a corporation of Iowa

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My invention relates to concrete mixing machinery and more particularly to a drum for use in the concrete mixing operation, and the method of making this unit.

All concrete construction projects which are not large enough for the establishment of a semi-permanent concrete mixing plant, or which cannot be served by such a plant because of distribution considerations, must rely on the well known truck-mounted concrete mixers. These latter mixing units are becoming more and more essential in the concrete mixing and distribution world.

The truck-mounted concrete mixers are comprised generally of a heavy and powerful truck chassis upon which a partially tapered or cone-shaped mixing drum is mounted in an inclined position. The drum is suspended or mounted at three different points on the truck chassis to compensate for the fact that the chassis will twist and deflect when passing over rough ground. These drums normally have one point of support on their longitudinal axis at the forward ends thereof where rotational motion is imparted to the drum. A circular rail extends around the perimeter of the drums at a point rearwardly of this first means of support and two oppositely disposed drum rollers on the truck chassis or frame engage this rail and provide the other two supporting means. Charging, mixing, and discharging mechanisms complete the general structure of these truck-mounted mixers, but my invention is primarily concerned with the problems arising out of the requirements of the circular rail and drum rollers.

The drum on any truck mixer must carry extremely heavy loads. A drum carrying a load of six cubic yards of concrete will bring approximately 12,000 pounds to bear on its forward means of support with over 6,000 pounds being supported by each drum roller. These figures do not take into account the great weight of the drum itself. The drum, the rail, the rollers and all related structure are specifically designed to withstand these excessive loads which are obviously aggravated and increased by the impact resulting from moving a loaded truck over rough terrain.

Nothing can be done about the weight of concrete, but each pound removed from the weight of the mixing apparatus itself means either a reduction in the strength requirements of the mixer or an increase in the carrying capacity of the unit. A decrease in the dead weight of the mixer and an increase in the concrete payload obviously can be done to great advantage without conflict with load limits imposed on a given truck by law.

Therefore, the principal object of my invention is to provide a relatively lightweight concrete mixing drum which can adequately satisfy the heavy load requirements of a conventional heavyweight drum.

More particularly, an important object of my invention is to provide a mixing drum fabricated of a relatively lightweight metal, such as an alloy of aluminum, with a steel rail thereon to partially relieve the drum from the bearing stresses of the supporting drum rollers.

A further object of my invention is to provide a method of securing a steel rail to a drum comprised of an aluminum alloy.

A still further object of my invention is to provide a concrete mixing drum that is economical of manufacture, durable in use and refined in appearance.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangements, and combination, of the various parts of the device, and the method for making same, whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of my device mounted on a truck chassis;

FIG. 2 is a partial elevational view of my drum and rail mounted on one of the two conventional supporting drum rollers;

FIG. 3 is a partial elevational view taken at right angles to the view shown in FIG. 2. The longitudinal axis of the drum shown in FIG. 3 has been shown in a horizontal position for convenience;

FIG. 4 is a partial sectional view of the preferred specie of my device taken on line 4—4 of FIG. 3; and

FIG. 5 is a partial sectional view of my device similar to that of FIG. 4 but shows another specie of my invention.

I have used the numeral **10** to generally designate a wheel-mounted truck chassis with a concrete mixer frame mounted thereon and generally designated by the numeral **12**. A concrete mixing drum **14** is mounted on frame **12** in an inclined position and is comprised generally of a drum head **16** and a cone-shaped or tapered rearward portion **18**. The drum **14** can be mounted on frame **12** in conventional fashion by means of a forward bearing (not shown) on the drum head **16**, and two drum rollers **20** rotatably engage the rail on the drum. Details of the rail will be discussed hereafter. Rollers **20** can be mounted on brackets **22** which can be adjustably secured to frame **12** by means of bolts **24**. The details of the rollers per se do not constitute a part of my invention.

The drum **14** should be comprised of a relatively lightweight metal other than steel or the like. I prefer to use a heavy-gauge, abrasion-resisting alloy aluminum which can satisfy all the strength requirements for a concrete mixing drum with one exception. Such a lightweight metal simply cannot successfully withstand the bearing stresses created by a loaded drum being supported on drum rollers **20**. A steel rail on a mixing drum is required to bear on rollers **20**. Accordingly, I have provided a circular, endless steel rail **26** on drum **14**. A triangular steel ring **28** can be secured to rail **26** by weld **30** to provide extra depth, and hence, extra strength, to the rail. The securing of this steel rail **26** to the aluminum drum **14** called for a very important method of fabrication since the shear values of aluminum would not permit the two elements to be bolted together, and the welding of steel to aluminum is a physical impossibility.

Accordingly, I took two aluminum rings **32** and **34** which substantially corresponded in diameter to that of the tapered portion **18** of drum **14**. The inner diameter of ring **32** can be slightly greater than that of ring **34** and the outer diameter of the two rings can be equal and slightly less than that of rail **26**. A plurality of registering holes **36** were placed around the circumferences of ring **32**, rail **26** and ring **34**. These holes **36** are countersunk at **38** on the outer surfaces of rings **32** and **34** as shown in FIG. 4. An aluminum pin **40** is then placed in each of the registering holes **36** to extend through rings **32**, **34** and rail **26**. The length of pin **40** should substantially correspond to the overall thickness of the two rings and the rail. The ends of pins **40** are then welded to rings **32** and **34** by welding material **41** and the countersunk portions **38** in the rings facilitate this aluminum welding operation. The welding of opposite ends of the aluminum pin **40** within the aluminum rings **32** and **34** tends to ultimately shrink the pin and pull

the rings into tight binding engagement with rail **26**. The inner diameters of steel ring **28**, rail **26**, and aluminum rings **32** and **34** are then planed off so as to coincide to the diameter and taper of the portion **18** of drum **14** which dwells in the same plane as drum rollers **20**. The combined "rail" is then inserted over the tapered portion **18** of drum **14** and is secured to the drum by welds **42** and **44**. The welds **42** and **44** present no unusual difficulties because the aluminum welding operation connects rings **32** and **34** with drum **14**, all of which are comprised of aluminum or similar-type metals.

The structure shown in FIG. 5 is the same as that described heretofore except a steel bolt **46** with nut and washer assembly **48** can be substituted for the aluminum pin **40** and welding material **41**.

From the foregoing, it is seen that the device described will greatly reduce the overall weight of the mixing unit and will permit a much larger concrete payload to be carried. The method of securing a steel ring to an aluminum-type mixing drum will result in a structurally sound mixing unit, and represents the key aspect in using lightweight metal drums for concrete mixing purposes. Thus, my invention is seen to accomplish at least all of its stated objectives.

Some changes may be made in my concrete mixing drum and method of making same without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms or equivalents of my methods or structures which may be reasonably included within their scope.

I claim:

1. In combination, a drum, two parallel spaced apart endless rings secured to and extending around said drum, said rings each having lateral sides, an endless continuous rail element engaging said drum in between and adjacent to said rings, the lateral width of said rail element being confined to the distance between said rings, said rail element having a supporting surface at its outer diameter adapted to movably engage a supporting means, and means for securing said rail element to said rings; the geometric plane of the supporting surface of said rail element intersecting the plane of said drum; one of said rings having a greater inside diameter than said other ring; the supporting surface of said rail element extending beyond the outer peripheries of said rings; said rail element being of steel material and said rings and said drum being of aluminum alloy.

2. In combination, a drum having a longitudinal axis normally disposed at an angle with respect to a horizontal plane, two parallel spaced apart endless rings secured to and extending around said drum, an endless continuous rail element engaging said drum between and adjacent to said rings, the lateral width of said rail element being confined to the distance between said rings, means connecting said rail element to said rings, said rail element having a supporting surface at its outer diameter adapted to movably engage a supporting means, said supporting surface forming an angle with the axis of said drum, one of said rings having a greater inside diameter than said other ring, the supporting surface of said rail element extending beyond the outer peripheries of said rings; said rail element being of steel material and said rings and said drum being of aluminum alloy.

3. In combination, a drum, two parallel spaced apart endless rings secured to and extending around said drum, an endless steel rail continuously engaging said drum in between and adjacent to said rings, said rail extending beyond the outer peripheries of said rings, the lateral width of said rail being confined to the distance between said rings, and means rigidly connecting said rail to said rings; said drum and said rings consisting of an aluminum alloy.

4. The structure of claim 3 wherein the means connecting said rail element to said rings is comprised of a plurality of pins extending through registering holes in said rings and said rail, and means connecting the ends of said pins to said rings.

5. The structure of claim 3 wherein the means connecting said rail element to said rings is comprised of a plurality of aluminum alloy pins extending through registering holes in said rings and said rail, the ends of said pins being welded to said rings.

6. The structure of claim 3 wherein the means connecting said rail element to said rings is comprised of a plurality of bolts extending through registering holes in said rings and said rail, and nut elements on the ends of said bolts to hold them in place.

7. In combination, a drum, two parallel spaced apart endless rings secured to and extending around said drum, an endless rail continuously engaging said drum in between and adjacent to said rings, said rail extending beyond the outer peripheries of said rings, the lateral width of said rail being confined to the distance between said rings, and means rigidly connecting said rail to said rings; said drum and said rings being of a material which has the same welding affinity for the material of said rail as an aluminum alloy has for steel.

8. In combination, a drum, ring means secured to and extending around said drum in continuous engagement with said drum, an endless rail continuously engaging and extending around said drum adjacent to said ring means, means rigidly connecting said rail to said rings, said drum and said ring means being of a material which has the same welding affinity for the material of said rail as an aluminum alloy has for steel.

References Cited in the file of this patent

UNITED STATES PATENTS

813,490	Edison	Feb. 27, 1906
1,479,173	Cole et al.	Jan. 1, 1924
2,198,820	How	Apr. 30, 1940
2,543,594	Patten	Feb. 27, 1951
2,543,595	Patten	Feb. 27, 1951
2,610,043	Lendved et al.	Sept. 9, 1952
2,678,198	Hilkemeier	May 11, 1954
2,702,217	Treshow	Feb. 15, 1955
2,702,218	Schoonover	Feb. 15, 1955
2,753,163	Hilkemeier	July 3, 1956