

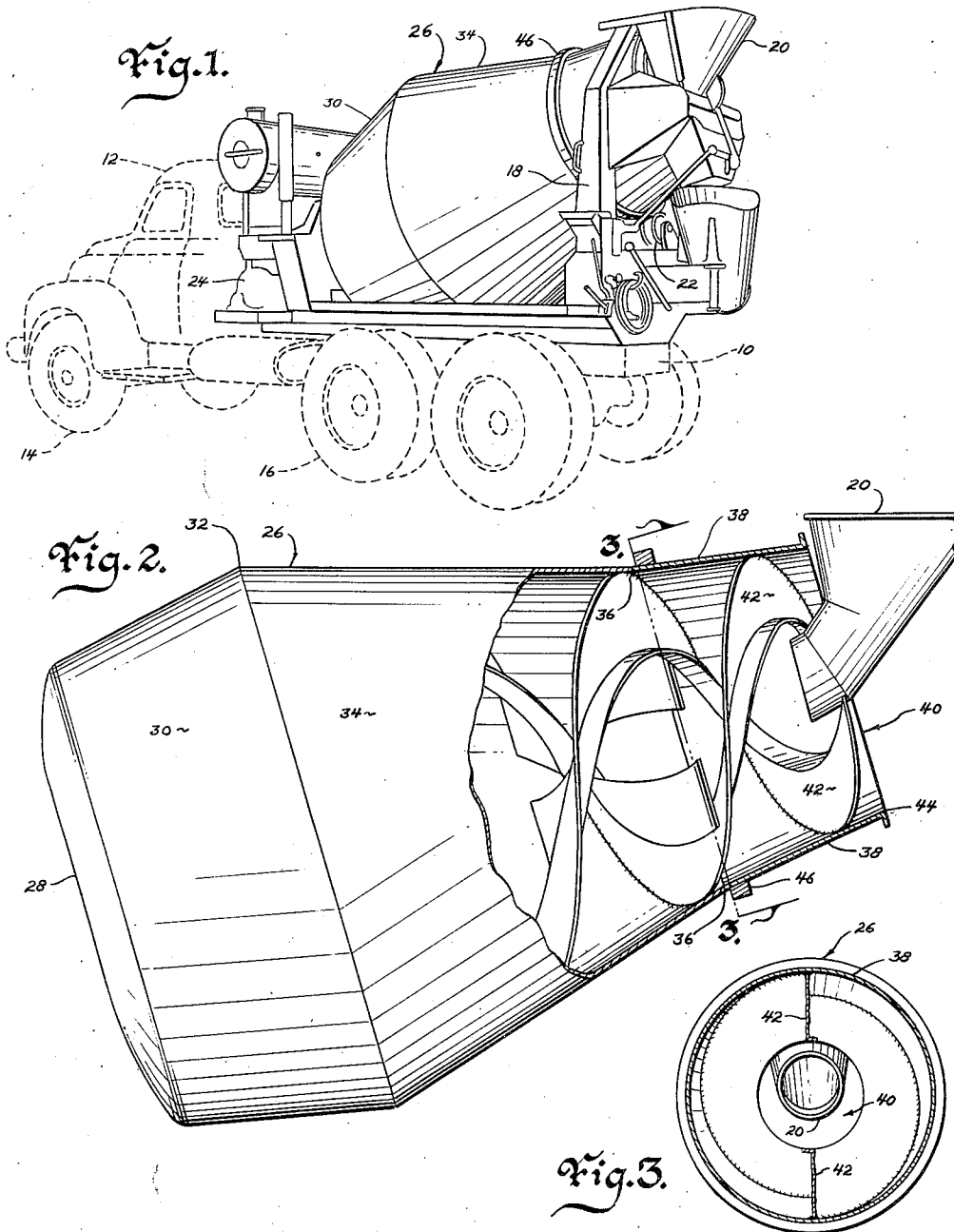
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H. R. McDERMOTT

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DRUM FOR TRUCK MOUNTED CONCRETE MIXERS

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Witness
Edward P. Seeley

Inventor
Harold R. McDermott
by Talbert Dick & Jarley
Attorneys

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DRUM FOR TRUCK MOUNTED CONCRETE MIXERS

Harold R. McDermott, Waterloo, Iowa, assignor to Construction Machinery Company, Waterloo, Iowa, a corporation of Iowa

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My invention relates to concrete mixing equipment and more particularly to the drum in which the actual mixing operation takes place.

Truck mounted concrete mixers have acquired an essential role in the building world today. These devices, simply stated, are comprised of a tapered drum rotatably mounted on a truck chassis in an inclined position; spirally positioned blades within the drum, and a power means to control and rotate the drum. The drum is "charged" with the concrete ingredients through its open, elevated rear end portion, and the mixed concrete is also discharged through this same opening.

Low slump or very stiff concrete is commonly used in highway construction, and even lower slump concrete is used in the construction of prestressed concrete structures. The discharge of mixed concrete through the opening at the elevated rearward portion of the drum acts essentially like an extruding machine. It is therefore obvious that the rate of discharge of stiff concrete will be correspondingly slower than more fluid concrete. This slow rate of discharge of low slump concrete increases the unloading time of a given truck unit, and oftentimes causes a single truck to tie up other truck units waiting to move to the discharge area. One solution to this problem is to enlarge the discharge opening in the mixing drum, but there are several factors which prevent the arbitrary enlargement of this opening.

Truck mixers are generally rated by their capacity in cubic yards of mixed concrete. In an effort to standardize and control the ratings of truck mounted concrete mixers, the Truck Mixer Manufacturers Bureau, to which most manufacturers of truck mixers subscribe, has established certain truck mixer and agitator standards. These standards provide, among other things, that a mixer rated at a given capacity shall have certain limitations on its gross volume. Adherence to the volume requirements of these standards was one of the factors contributing to the conception and necessity of my invention.

Enlarging the discharge opening in a drum that has a uniformly tapered rear portion will necessarily change its volume and immediately violate the aforementioned standards. Shortening the length of the drum to keep the volume constant causes and adverse angular climb for mixed concrete to negotiate. Increasing the length of such a drum lowers the elevation of the discharge opening which makes it difficult for the concrete to slide down the awaiting chutes after being discharged. Furthermore, the height of the mixing drum cannot be varied because standard heights of concrete charging equipment have been established throughout the country.

Therefore, the principal object of my invention is to provide a drum for truck mounted concrete mixers which can have an enlarged discharge opening without substantially altering the length, height or volume of a conventional mixer of similar capacity.

A further object of my invention is to provide a drum for truck mounted concrete mixers which will provide an enlarged discharge opening while at the same time the center of gravity of the loaded drum will be moved in a forward direction.

A still further object of my invention is to provide a

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drum for truck mounted concrete mixers that will provide an enlarged discharge opening while at the same time will tend to more effectively keep the concrete in the mixing area of the drum.

A still further object of my invention is to provide a drum for truck mounted concrete mixers that will require less pouring time for low slump concrete without violating the height and volume requirements for conventional mixers.

A still further object of my invention is to provide a drum for truck mounted concrete mixers which will permit an increase in blade depth at the discharge opening and hence an increase in the carrying capacity of mixed concrete for the drum.

A still further object of my invention is to provide a drum for truck mounted concrete mixers which 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, 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 which is shown in dotted lines;

FIG. 2 is a side elevational view of my device with a portion of the drum cut away to show the blade structures; and

FIG. 3 is a sectional view of my device taken on line 3-3 of FIG. 2.

I have used the numeral 10 to generally designate a truck chassis having a cab 12, front wheels 14 and rear wheels 16. A frame 18 extends upwardly from the rear end of chassis 10 to support charging chute 20, drum rollers 22 and other miscellaneous equipment. The power mechanism 24 for the drum is mounted on the forward end of chassis 10.

The drum 26 is comprised of a forward end wall 28 which terminates in a frusto-conical shaped base portion 30. As shown in FIG. 2, base portion 30 extends rearwardly and outwardly from end wall 28. At point 32, the portion 30 terminates in a first frusto-conical shaped drum portion 34 which extends rearwardly and inwardly from base portion 30.

The taper of the sides of drum portion 34 is interrupted at point 36 by a second frusto-conical shaped drum portion 38 which extends rearwardly and inwardly with respect to the rearmost edge of drum portion 34. However, it should be noted that the taper of portion 38 is less than that of portion 34, for, as seen in FIG. 2, the diameter of portion 38 progressively decreases at a lower rate than that of portion 34. This phenomenon is the key step in creating a larger opening at the rear end portion of the drum, and it can be seen from FIG. 2 that the opening 40 at the rearward end of portion 38 is substantially larger than if the taper of portion 34 were extended to that same length. The gross volume of drum 26 can be adjusted to the volume of drums having a uniform taper by adjusting either the diameter of portions 34 and 38 at point 36 or by regulating the length of portion 38. But again, the fact that the outer surfaces of portions 34 and 38 form an angle less than 180 degrees is of the utmost importance in increasing the size of the discharge opening 40. The normal drum discharge opening is from 34 to 36 inches in diameter but my invention enables me to provide a 40 inch opening which results in an increase in the area of the discharge opening of from 23 to 39 percent. As shown in FIGS.

1 and 2, the longitudinal axis of drum 26 is held in an inclined position by the supporting structure with the rearward end of the drum being elevated.

Spirally shaped mixing blades 42 are mounted within drum 26. The capacity of mixed concrete in drum 26 is usually measured on a horizontal "water level" line extending forwardly from the lowest point 44 on the periphery of opening 40. However, the blades 42 adjacent the opening 40 tend to "dam up" the concrete to a certain extent which permits the drum to contain a quantity of mixed concrete greater than that quantity measured below the so-called "water level" line. Since I have provided a drum with a correspondingly larger discharge opening, I also can provide blades 42 with a correspondingly greater depth, which in turn gives my drum a greater carrying capacity of mixed concrete without having changed the gross volume of the drum. Blades 42 act in conventional fashion to carry mixed concrete from drum sections 30 and 34 outwardly through the rearward end of drum section 38 when the drum sections are rotated in one direction.

A continuous circular rail 46 is welded or otherwise secured to portion 38. This rail 46 rides on the two drum rollers 22 and the forward end of the drum is rotatably supported in a bearing means (not shown).

From the foregoing it is seen that I have provided a drum for truck mounted concrete mixers that can discharge low slump concrete at a faster rate than ever before known in the industry. Furthermore, my device presents a larger discharge opening without departing from the height and volume requirements imposed upon the drum by the industry. My large discharge opening permits the use of deeper blades which will permit a greater carrying capacity for a drum of given volume, and these deeper blades also tend to prevent spilling of concrete when the rear wheels of the truck are at a lower level than the front wheels. Although I have increased the discharge opening of my drum, the girth of the drum forwardly of the opening is in effect decreased which requires that more of the concrete be moved forwardly in the drum. This moves the center of gravity of the loaded drum forwardly which relieves part of the weight on the rail 46 and allows the front wheels of the truck to assume an increased proportion of the load. The quality of the mixed concrete is also enhanced by urging the concrete to the forward part of the drum. It is seen, therefore, that my device will accomplish at least all of its stated objectives.

Some changes may be made in the construction and arrangement of my drum for truck mounted concrete mixers without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In combination, a concrete mixing drum, comprising,
 - a base portion including a forward wall,
 - a first frusto-conical shaped drum section connected to and extending rearwardly of said base portion,
 - said first drum section having its diameter progressively decreased away from said forward wall,
 - said base portion being shaped to direct material toward said first drum section,
 - a second frusto-conical shaped drum section secured to the rearward end of said first drum section;
 - said second drum section extending rearwardly away from said first drum section and having its diameter progressively decreased;
 - the exterior surfaces of said first and second drum sections forming an angle of less than 180 degrees,
 - said second drum section having a concrete charging and discharge opening at its rearward end,
 - the diameter of the rearward end of said second drum

- being less than the diameter of the rearward end of said first drum,
- said second drum having its rearward end terminating at a point forwardly of the point where an extension of the exterior surface of said first drum section would converge on the longitudinal axis of said concrete mixing drum,
- said second drum having its rearward end terminating at a point forwardly of the point where an extension of its exterior surface would converge on the longitudinal axis of said concrete mixing drum,
- a supporting means,
- said mixing drum rotatably mounted about its longitudinal axis on said supporting means,
- said mixing drum permanently secured to said supporting means in an inclined position at all times with the rearward end thereof being at a higher elevation than the lowest point of said first drum section,
- and spiral blade elements mounted within at least said first and second drum sections and extending to the charging and discharge opening at the rearward end of said second drum,
- said blades extending to a position adjacent the inner surfaces of said first and second drum sections whereby relative rotational movement in one direction between said mixing drum and said blades will cause said blades to urge any concrete in said first drum section upwardly and outwardly through the charging and discharge opening in said second drum section.
2. In combination, a concrete mixing drum, comprising,
 - a base portion including a forward wall,
 - a first frusto-conical shaped drum section connected to and extending rearwardly of said base portion,
 - said first drum section having its diameter progressively decreased away from said forward wall,
 - said base portion being shaped to direct material toward said first drum section,
 - a second drum section having a frusto-conical shape and being secured to the rearward end of said first drum section;
 - said second drum section extending rearwardly away from said first drum section and having its diameter progressively decreased,
 - the exterior surfaces of said first and second drum section forming an angle of less than 180 degrees,
 - said second drum section having a concrete charging and discharge opening at its rearward end,
 - the diameter of the rearward end of said second drum being less than the diameter of the rearward end of said first drum,
 - said second drum having its rearward end terminating at a point forwardly of the point where an extension of the exterior surface of said first drum section would converge on the longitudinal axis of said concrete mixing drum,
 - said second drum having its rearward end terminating at a point forwardly of the point where an extension of its exterior surface would converge on the longitudinal axis of said concrete mixing drum,
 - a supporting means,
 - said mixing drum rotatably mounted about its longitudinal axis on said supporting means,
 - said mixing drum permanently secured to said supporting means in an inclined position at all times with the rearward end thereof being at a higher elevation than the lowest point of said first drum section,
 - and spiral blade elements mounted within at least said first and second drum sections and extending to the charging and discharge opening at the rearward end of said second drum,
 - said blades extending to a position adjacent the inner surfaces of said first and second drum sections whereby relative rotational movement in one direc-

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tion between said mixing drum and said blades will cause said blades to urge any concrete in said first drum section upwardly and outwardly through the charging and discharge opening in said second drum section.

3. In combination, a concrete mixing drum, comprising,
- a base portion including a forward wall,
 - a first frusto-conical shaped drum section connected to and extending rearwardly of said base portion,
 - said first drum section having its diameter progressively decreased away from said forward wall,
 - said base portion being shaped to direct material toward said first drum section,
 - a second frusto-conical shaped drum section secured to the rearward end of said first drum section;
 - said second drum section extending rearwardly away from said first drum section and having its diameter progressively decreased;
 - the diameter of said first drum section decreasing more per unit of length than the diameter of said second drum section,
 - said second drum section having a concrete charging and discharge opening at its rearward end,
 - the diameter of the rearward end of said second drum being less than the diameter of the rearward end of said first drum,
 - said second drum having its rearward end terminating at a point forwardly of the point where an extension of the exterior surface of said first drum section would converge on the longitudinal axis of said concrete mixing drum,
 - said second drum having its rearward end terminating at a point forwardly of the point where an extension

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of its exterior surface would converge on the longitudinal axis of said concrete mixing drum,

a supporting means,

said mixing drum rotatably mounted about its longitudinal axis on said supporting means,

said mixing drum permanently secured to said supporting means in an inclined position at all times with the rearward end thereof being at a higher elevation than the lowest point of said first drum section,

and spiral blade elements mounted within at least said first and second drum sections and extending to the charging and discharge opening at the rearward end of said second drum,

said blades extending to a position adjacent the inner surfaces of said first and second drum sections whereby relative rotational movement in one direction between said mixing drum and said blades will cause said blades to urge any concrete in said first drum section upwardly and outwardly through the charging and discharge opening in said second drum section.

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