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MEANS FOR INCREASING THE CAPACITY OF CONCRETE MIXER DRUMS

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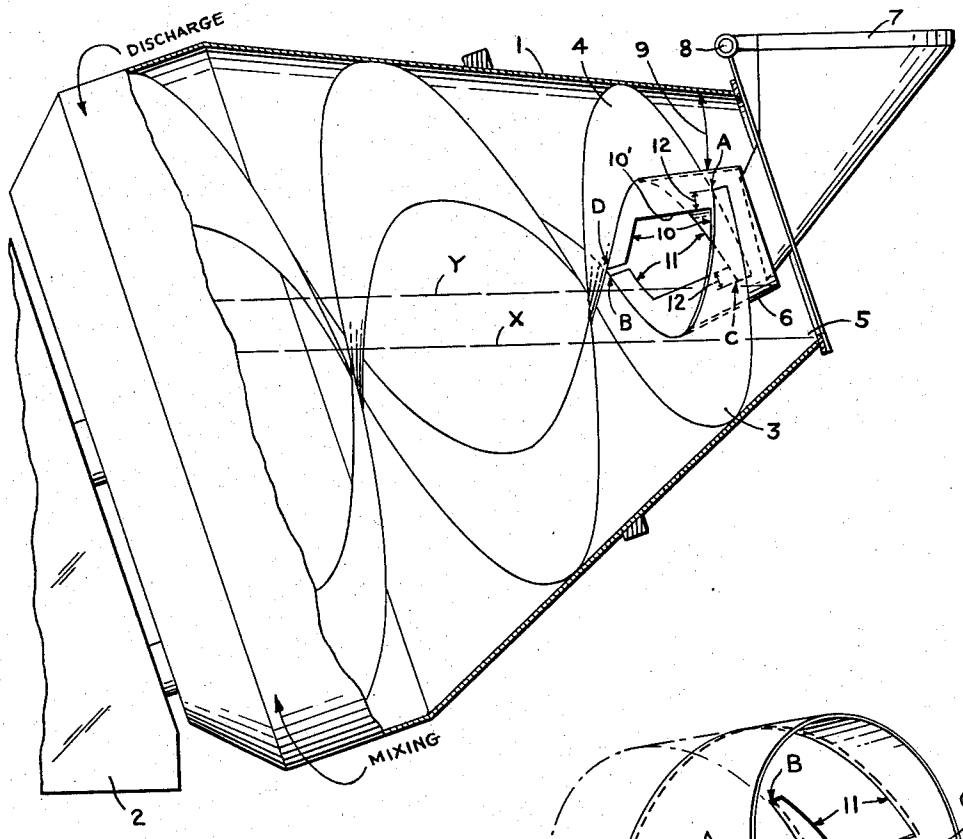


FIG. 1

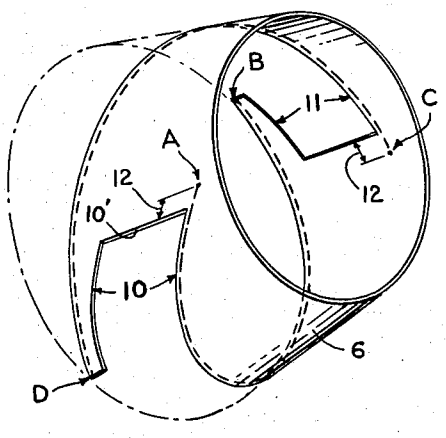


FIG. 2

LOUIS G. HILKEMEIER
VICTOR H. BERG
INVENTORS

BY Daniel H. Bobis
Atty

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MEANS FOR INCREASING THE CAPACITY OF CONCRETE MIXER DRUMS

Louis G. Hilkemeier, Plainfield, and Victor H. Berg, Dunellen, N.J., assignors to Worthington Corporation, Harrison, N.J., a corporation of Delaware

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1 Claim. (Cl. 259—161)

This invention relates to means for increasing the load carrying capacity of a concrete mixer drum and particularly a mixer drum handling stiff slump concrete.

By stiff slump concrete is meant concrete having a standard slump test rating of 3 inches or less.

To facilitate in the charging and the discharging of a mixer drum of a truck mixer, and to increase the load carrying capacity of the mixer drum, it is a common practice in the prior art to utilize a frusto-conical member. In U.S. Patents No. 2,254,639, No. 2,723,112 and No. 2,746,734, this frusto-conical member is shown disposed adjacent the end opening of the drum and mounted to the inner periphery of the blades of the mixer drum.

With these prior art frusto-conical members however, it has been found that when stiff slump concrete is forced through the confined area between the outer periphery of the frusto-conical member and the inner periphery of the drum wall, that the said concrete will stow up or clog in this area. This results in the concrete discharging from the drum at an undesirable reduced rate of flow.

Accordingly, it is an object of the present invention to provide a frusto-conical member which increases the capacity of a mixer drum, and which also permits stiff slump concrete to be readily discharged from the drum.

To accomplish this, a cutout or opening is provided in opposite sides of the frusto-conical member in the section between the two end coils of the spiral blades in the rear of the drum. During drum charging and mixing, while some materials pass to the outside of the frusto-conical member through the cutouts, by having the cutouts of a preferred shape and starting a predetermined distance in back of the point of origin of a blade, these materials are suitably prevented from leaking past the blades and out of the drum. On the other hand, during drum discharge, when the concrete is being discharged from the drum through the area between the outer periphery of the frusto-conical member and the inner periphery of the drum wall, the cutouts function as an escape passage to the inside of the frusto-conical member for some of the stiff slump concrete. This serves to relieve any pressure on the discharging concrete and thus enables it to discharge from the drum at a relatively rapid rate of flow.

The invention will be better understood when considered in connection with the accompanying specification and drawings forming a part thereof in which:

Figure 1 is a side view of a concrete mixer drum partly broken away to show the frusto-conical member constructed in accordance with the present invention.

Figure 2 is an enlarged view of only the frusto-conical member.

In Figure 1, a conventional concrete mixer drum **1** is shown inclined at the angle it would occupy when mounted on a truck or other mobile unit, which is equipped with suitable means **2** to rotate the drum **1**. Two spiral blades **3** and **4**, originating in the opening **5** in the rear of the drum are mounted about the interior of the drum **1** in the usual manner well known in the art. According to the known principle of operation of the said spiral blades,

when the drum is charged with materials and the drum is rotated in the direction indicated for mixing, the materials are carried by the blades to the interior of the drum where the mixing operation takes place.

Frusto-conical member

To facilitate the charging operation, a charging element or frusto-conical member **6** is disposed centrally of the blades in the opening **5** in the rear of the drum **1**. This frusto-conical member **6** also serves to increase the load carrying capacity of the drum **1** from the level represented by the line *x* to that represented by the line *y*. A hopper **7** is pivotally mounted above the drum rear opening **5** as at **8**, and is adapted to feed materials through the frusto-conical member **6** into the interior of the drum **1**.

The frusto-conical member **6** is welded or otherwise suitably connected along its outer periphery to the inner edges of the spiral blades **3** and **4**. Referring to Figure 2, spiral blade **3** is connected to the frusto-conical member **6**, starting at point A and terminating at point B, along the dotted line A—B. Spiral blade **4** is similarly connected to the frusto-conical member **6** along the dotted line C—D.

While the frusto-conical member **6** effectively increases the load carrying capacity of the drum **1**, it has been found that unless it is constructed in the manner as will be described, that stiff slump concrete cannot be satisfactorily discharged from the drum **1**. The reason for this is that the stiff slump concrete is being forced through the relatively narrow passageway **9** defined by the outer periphery of the frusto-conical member **6** and the inner periphery of the drum wall, will usually stow up or clog while passing through this passageway **9**. This results in an undesirable slow rate of flow of the concrete from the drum **1** during the discharge operation.

Accordingly to correct this situation, openings or cutouts **10** and **11** are provided in opposite sides of the frusto-conical member **6** between the respective first coil or turn of each of the blades **3** and **4**. Taking cutout **10**, it is shown to be substantially rectangular in shape, having a width just slightly less than the distance between the line A—B and the line C—D which represent the path the first coil or turn of each of the blades **3** and **4** follow respectively. The preferred length for cutout **10** is any dimension equal to or greater than the width just described and is easily provided inasmuch as there is no restriction placed on this dimension by the spacing of the blades **3** and **4**. In other words, and as clearly shown in Figure 2, the length of cutout **10** being parallel to the path A—B followed by blade **3** can be made any dimension desired, and as long as it is at least equal to or greater than the width, an overall dimension for cutout **10** is assured which readily permits discharging concrete to pass to the inside of the frusto-conical member **6** to relieve clogging during drum discharge. Further, the upper edge **10'** of cutout **10** is purposely started a slight distance **12** in back of the point of origin A of spiral blade **3**. Cutout **11** is substantially identical to cutout **10**, having the same width, and also starting a slight distance **12** in back of the point of origin C of spiral blade **4**. The reason for starting both the cutouts **10, 11** in back of the points of origin of the blades is to insure that there will be no leakage from the drum during the charging and mixing operations.

More specifically, it has been found that with concrete having a standard slump test rating not exceeding 3 inches, and a frusto-conical member **6** with substantially full width cutouts **10, 11** as described above, that there will not be any leakage from the drum during the charging and mixing operations if the cutouts start at least 2 inches in back of the points of origin A, C of the blades,

In other words, since concrete in general, and particularly that having a standard slump test rating as low as 3 inches, does not flow readily, a 2 inch lead of the blades **3, 4** relative to the cutouts **10, 11** is sufficient to prevent leakage past the blades when the drum is rotated in the direction for mixing. Moreover, if the concrete is stiffer than 3 inch slump, or if the cutouts are narrower than as shown, or if the cutouts start further in back of the points of origin of the blades than 2 inches, there will be even greater assurance against leakage during the charging and mixing operations. However, the cutouts **10, 11** as described and as shown in Figures 1 and 2 are of the preferred dimensions since they produce the optimum results in facilitating the discharge of 3 inch slump or less concrete during drum discharge.

Drum discharge

When the drum **1** is rotated in the direction for discharge, the stiff slump concrete is carried by the spiral blades **3, 4** towards the opening **5** in the rear of the drum **1**. The concrete enters the passageway **9** about the outer periphery of the frusto-conical member **6** for passage therethrough, and eventual discharge from the drum **1**. In flowing through the passageway **9**, if the concrete starts to clog, some of it can expand or pass to the inside of the frusto-conical member through the cutouts **10** and **11**. The escape of this concrete through the cutouts **10, 11** thus relieves any pressure on the concrete discharging through the passageway **9**. This results in the stiff slump concrete flowing more readily and rapidly through the passageway **9** during drum discharge.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claim.

What is claimed is:

In a rotatable concrete mixing drum handling stiff slump concrete and having an end opening therein, a plurality of spiraled blades extending inwardly from said end opening about the inner periphery of the drum and operable to convey the stiff slump concrete toward and away from said end opening depending on the direction of rotation of the drum, and a hollow generally frusto-conical member disposed in said end opening and connected to the inner periphery of the blades to increase the drum capacity, the said frusto-conical member having two cutouts, one in each opposite side thereof, each said cutout being of a substantially rectangular shape with a width slightly less than the axial distance between axially adjacent portions of the spiralled blades and a length at least equal to this said width, and each said cutout starting a predetermined distance in back of the point of origin of the blade, whereby discharging stiff slump concrete can pass through the said cutouts to the inside of the frusto-conical member to relieve clogging during drum discharge.

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