Dec. 24, 1940. G. K. VIALL 2,226,104

WATER SUPPLY MECHANISM FOR CONCRETE MIXER DRUMS

Filed Nov. 28, 1938 2 Sheets-Sheet 1

Fig. 1.

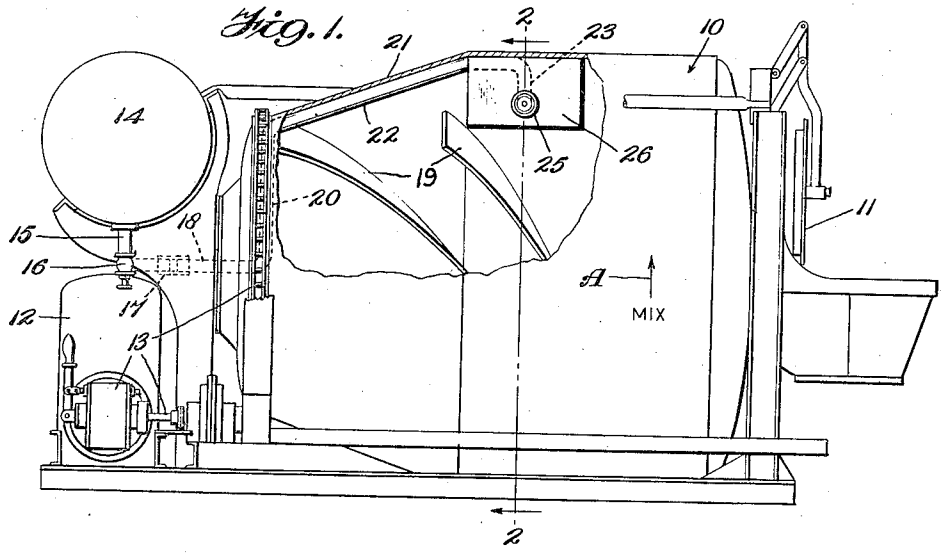
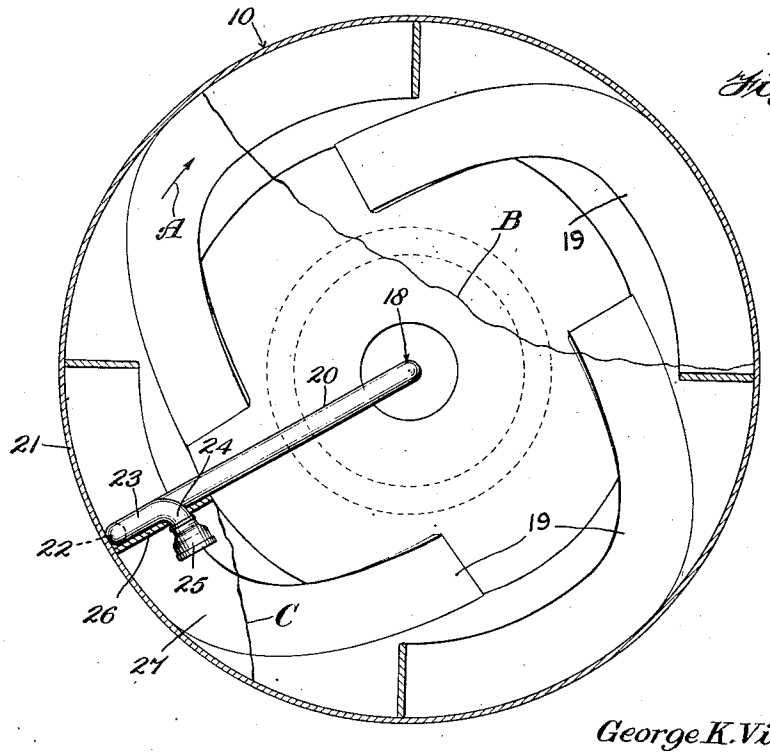


Fig. 2.



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Fig. 3.

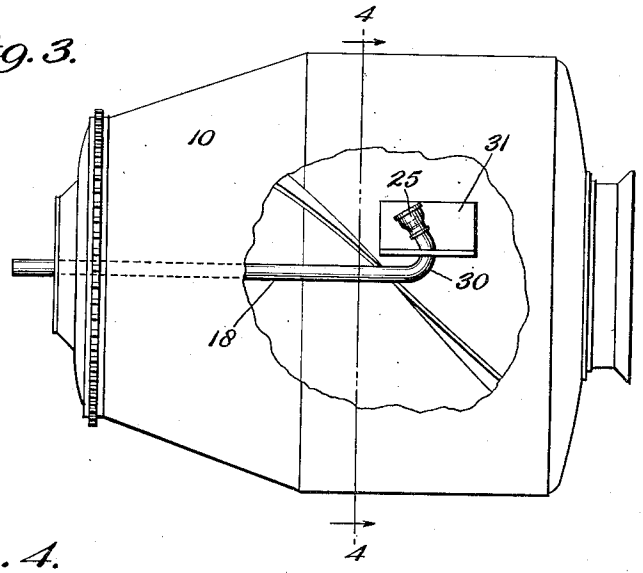


Fig. 4.

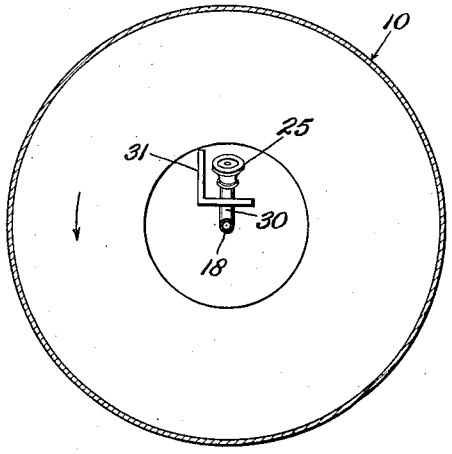


Fig. 5.

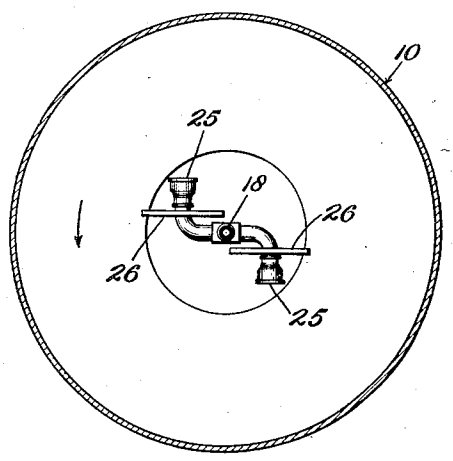
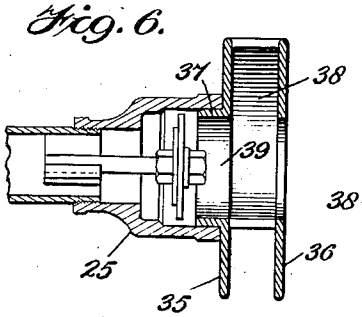


Fig. 6.



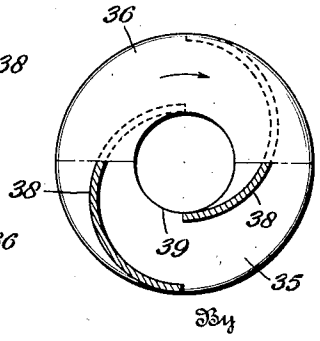


Fig. 7.

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UNITED STATES PATENT OFFICE

2,226,104

WATER SUPPLY MECHANISM FOR CONCRETE MIXER DRUMS

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Application November 23, 1938, Serial No. 242,820

5 Claims. (Cl. 259—168)

The invention relates to water supply mechanism for concrete mixer drums, more especially those of the completely closed type such as are now commonly employed in truck mixer practice, and has for one of its objects to provide a construction which will materially facilitate the discharge of the water from the supply conduit, particularly in cases where the drum is filled with the concrete making materials to a point above its rotative axis.

A study of the several commercial types of rotative drum truck mixers now in general use discloses that the means employed for supplying the water required for the mixing operation to the interior of the drum usually comprise a pipe leading from an elevated water tank to and through the forward end of the drum, and extending axially within the latter to a point intermediate its ends, where it is provided with some sort of discharge head. These heads have discharge openings for the water, which have associated with them devices, such as flexible rubber disks and the like, designed to permit the water to escape more or less freely, but tending to prevent the concrete materials or mixture from working back into the pipe, where they would harden between batches and impede or completely stop the water flow.

While it has been proposed to provide the water supply systems of this type of mixer with centrifugal or other pumps and thus secure a force feed for the water, commercial practice almost universally employs merely a gravity feed from the water tank to the mixing drum. Since the charging and discharging openings of these drums are tightly closed during mixing, so that the drums may be filled to from 60% to 80% of their total capacity, the water must flow into a closed chamber, with the result that the pressure opposing its flow increases as the flow continues and progressively tends to slow it down.

Furthermore, since the discharge head is buried in the aggregates, unless it is very effectively baffled, it is necessary for the water to overcome the pressure of the aggregates upon the protecting disks, and in any event it must escape through aggregates tightly packed about the head.

In order to improve upon this prior practice and thereby materially facilitate the discharge of the water from the supply conduit, and its distribution through the aggregates, according to the present invention the discharge orifice or head of the water supply pipe has associated and moving with it one or more paddles or baffles, which may take various forms, and which, as they rotate, produce voids or open spaces in the aggregates into which the water is discharged. The discharge head is preferably, although not necessarily, located at a point intermediate the drum axis and the peripheral wall, where it describes an annular path about the axis as it rotates with the drum; and the paddles or baffles are so positioned as to be ahead of the discharge head when the drum is rotating in the mixing direction, so that the void or open space in the aggregates will be produced around the discharge orifice.

The invention therefore has for a further and more specific object the provision of the paddles or baffles arranged to rotate with the drum and to travel in annular paths about the rotative axis of the latter, such paddles or baffles being so located with respect to the discharge orifice as to produce a "slip stream" or void in the aggregates surrounding said orifice into which the water may flow with comparative freedom.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction, and novel combinations and arrangements of parts, more fully hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification, in which like reference characters designate like parts in all the views:

Figure 1 is a side elevational view, partly broken away, of a well known form of truck concrete mixer unit, with one form of the present invention applied thereto;

Fig. 2 is an enlarged transverse sectional view, taken approximately on the plane indicated by the line 2—2 of Fig. 1, looking in the direction of the arrows; the parts being illustrated, however, as having rotated through an angle of about 240° from the positions shown in Fig. 1;

Fig. 3 is a side elevational view, also partly broken away, of a truck mixer drum similar to that shown in Fig. 1, illustrating a modified form of the invention applied thereto;

Fig. 4 is a transverse sectional view, taken approximately on the plane indicated by the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is a view similar to Fig. 4, showing a further modified form of the invention;

Fig. 6 is a vertical sectional view of a still further modified form of the invention, as applied to a discharge head or protector of the type described and claimed in the prior U. S. Patent

of Charles F. Ball, No. 1,956,521, granted April 24, 1934; and

Fig. 7 is an end elevational view, partly broken away and in section, of the device shown in Fig. 6.

Referring more particularly to Figs. 1 and 2, the conventional truck mixer unit shown embodies a mixing drum **10** having a side charging opening (not shown) which is normally closed by a suitable closure, and an end discharging opening in its rear end, which is closed during transportation and mixing by the closure **11**. The drum is mounted for rotation about a horizontal longitudinal axis, power being supplied from a motor mounted within a housing **12**, and transmitted to the drum by any suitable drive **13**. The interior circumferential surface of the drum may be provided with the usual helically disposed mixing blades **19**, arranged when the drum is rotated in a predetermined direction, e. g., a clockwise direction as viewed in Fig. 2, to agitate and mix the raw materials into a plastic mixture, and when the rotation is reversed, to worm the mixture toward the discharge end of the drum, as is well known in the art. A water supply tank **14** is mounted in an elevated position in front of the drum, and a pipe or conduit **15**, controlled by a valve **16**, leads therefrom to a stuffing-box **17**. A pipe **18** extends from the said stuffing-box through the forward end wall of the drum, and in accordance with prior practice has extended along its rotative axis to a point more or less midway between the ends, where it has been provided with a discharge head or protector.

In this particular form of the present invention, the pipe **18**, instead of thus extending axially into the drum, is turned after it passes through the front wall, to extend radially outward along or adjacent said wall, as at **20**, until it reaches the outer peripheral wall **21**, which it then follows toward the rear,—or right as viewed in Fig. 1,—as at **22** to a point midway, or somewhat beyond, between the two drum ends. Here the pipe is again turned radially inward, as at **23**, and its end is finally turned in a plane transverse to the drum axis, as indicated at **24**, to face rearwardly as regards the direction of mixing rotation of the drum, indicated by the arrows A in Figs. 1 and 2 respectively. The end of the pipe may be provided with any suitable discharge head or protector **25**, that here shown being of the type illustrated in the said prior U. S. Patent No. 1,956,521. The pipe may be secured to the drum walls in any desired manner, so as to rotate with the drum.

To produce the void in the concrete aggregates or mixture into which the water may freely discharge from the head or protector **25**, the paddle or baffle **26** is associated with the pipe **18** adjacent the protector **25**, being secured to the pipe and/or to the drum wall **21** in any desired manner. As here shown, the end **24** of the pipe passes through the baffle **26**, with the portions **22** and **23** of the pipe being located on one side thereof and the protector or head **25** on the other, the latter being to the rear of the baffle as regards the direction of mixing rotation.

In use, the drum is supplied with the necessary aggregates and cement for producing the concrete mixture, the upper level of which during mixing rotation of the drum may be substantially as indicated by the irregular line B in Fig. 2, and considerably above the drum's axis. During mixing rotation in the direction indicated by the arrow A, the baffle **26** will produce a void **27** behind it in the concrete constituents, defined by the baffle **26**, drum wall **21**, and the irregular line C in Fig. 2. This void **27** will of course be constantly changing in shape and dimensions as the baffle enters, passes through, and leaves the concrete mixture, but actual practice has found it sufficient to enable the water to be discharged from the head **25** with comparative freedom, and much faster than where the head **25** is located axially, as in prior practice. The void **27** also facilitates the distribution of the water throughout the mass, thereby contributing in a reduction in the time necessary to effect complete mixing.

In the form of the invention shown in Figs. 3 and 4, the pipe **18**, instead of turning radially outward after passing through the front wall of the drum, is continued axially of the drum, as in the prior art, but its inner end is bent, as at **30** to displace the protector or head **25** from the axis, as will be clear from the drawings. The amount of displacement of course may vary. In this particular form the protector is shown as being directed to discharge somewhat toward the forward end of the drum, rather than directly transversely thereof, and it will be understood that in all forms the discharge orifice may be positioned to discharge the water toward the front, toward the rear, or directly transversely, of the drum, as may be desired. The baffle or paddle in this instance takes the form of an angle member **31** mounted on the pipe, and it will be readily understood that when the drum rotates in the counterclockwise mixing direction indicated by the arrow in Fig. 4, it will produce a void behind it in the concrete constituents into which the water may freely discharge.

The form shown in Fig. 5 is similar to that shown in Figs. 3 and 4, except that the pipe **18** is branched at its inner end, and each branch provided with a protector **25** and baffle **26**.

In Figs. 6 and 7 there is shown a form of baffle adapted for attachment to the protector of Patent No. 1,956,521 when the latter is positioned axially of the drum, as in the said patent. This attachment comprises a pair of spaced disk-like members **35** and **36**, the former of which may have a hub **37** by means of which it may be attached to the protector. The members **35** and **36** are connected by two or more curved webs or baffles **38** which are arranged eccentrically with respect to the water discharge opening **39**, and when the device is rotated as indicated by the arrow in Fig. 7 they will create voids behind them around the opening **39** into which the water may freely pass.

It is obvious that those skilled in the art may vary the details of construction, as well as the precise arrangements, of the parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure, except as may be required by the following claims.

What is claimed is:

1. Concrete mixing apparatus comprising a closed drum mounted for rotation about its longitudinal axis, arranged to receive concrete making materials and having means for agitating said materials through rotation of the drum in a predetermined direction to produce a plastic concrete mixture; a water supply conduit extending through a wall of the drum, having means within the latter for discharging water into the mass of materials; and means rotatable with the drum, and having a face substantially parallel to and

radially offset from the rotative axis of the drum, for producing a void in the materials behind it when the drum is rotated in said predetermined mixing direction, into which void water may be freely discharged from said discharge means by gravity flow.

2. Concrete mixing apparatus comprising a closed drum mounted for rotation about its longitudinal axis arranged to receive concrete making materials and having means for agitating said materials through rotation of the drum in a predetermined direction to produce a plastic concrete mixture; a water supply conduit extending through an end wall of the drum, having means within the latter for discharging water into the mass of materials in a direction opposite to said predetermined direction of rotation of the drum when mixing; and a baffle adjacent said discharge means, said baffle being rotatable with the drum about its axis to thereby produce a void within the materials behind it as the drum is rotated in said predetermined mixing direction, into which void water from said conduit may be freely discharged by gravity flow.

3. Concrete mixing apparatus comprising a closed drum mounted for rotation about its longitudinal axis, arranged to receive concrete making materials and having means for agitating said materials through rotation of the drum in a predetermined direction to produce a plastic concrete mixture; a water supply conduit extending through an end wall of the drum and rotatable therewith, having means within the drum for discharging water into the mass of materials at a point radially offset from the drum axis and in a direction opposite to said predetermined direction of rotation of the drum when mixing; and a baffle rotatable with said conduit and drum in advance of said discharge means when the drum is rotated in said predetermined mixing direction, said baffle having a face at substantially right angles to the direction of liquid discharge for producing a void within the longitudinal medial portion of the mass of materials as a result of said rotation, into which void water from said conduit may be freely discharged by gravity flow.

4. In water supply apparatus for the drums of concrete mixers, a conduit arranged to axially enter one end of the drum and then to extend radially to and along the peripheral wall of the drum, said conduit having a discharge orifice disposed intermediate said peripheral wall and the rotative axis of the drum; and a baffle mounted for rotation with the drum adjacent and in advance of said orifice as the drum is rotated in the mixing direction, said baffle being adapted when so rotated to produce a void behind it in the concrete constituents into which the water may be freely discharged from said orifice.

5. A baffle device for the water supply conduits of concrete mixer drums which conduits are rotatable with said drums, said device comprising a support arranged to be mounted adjacent the discharge orifice of the conduit; and a plurality of curved baffles extending longitudinally beyond said orifice and disposed eccentrically relative to the orifice axis, said baffles being rotatable with said conduit and drum to provide voids in the concrete mixture adjacent the orifice into which the water may freely flow.

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