No. 781,726. PATENTED FEB. 7, 1905.

W. J. JUDD.

CONCRETE MIXER.

APPLICATION FILED JULY 25, 1902.

4 SHEETS—SHEET 1.

Fig. 1.

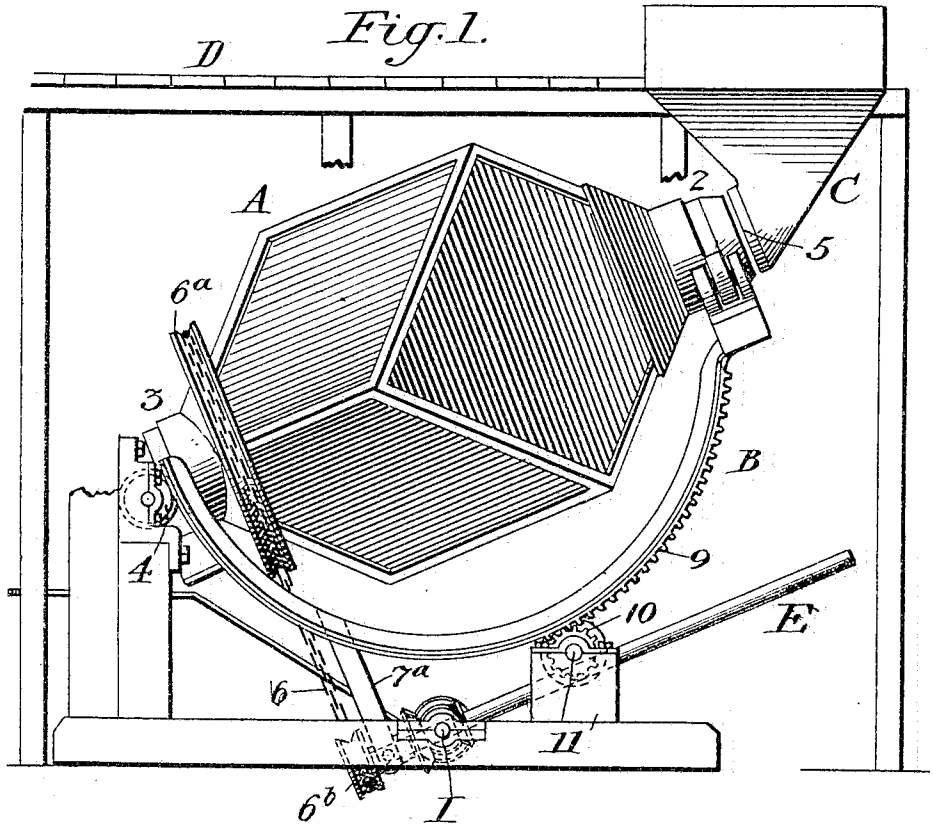
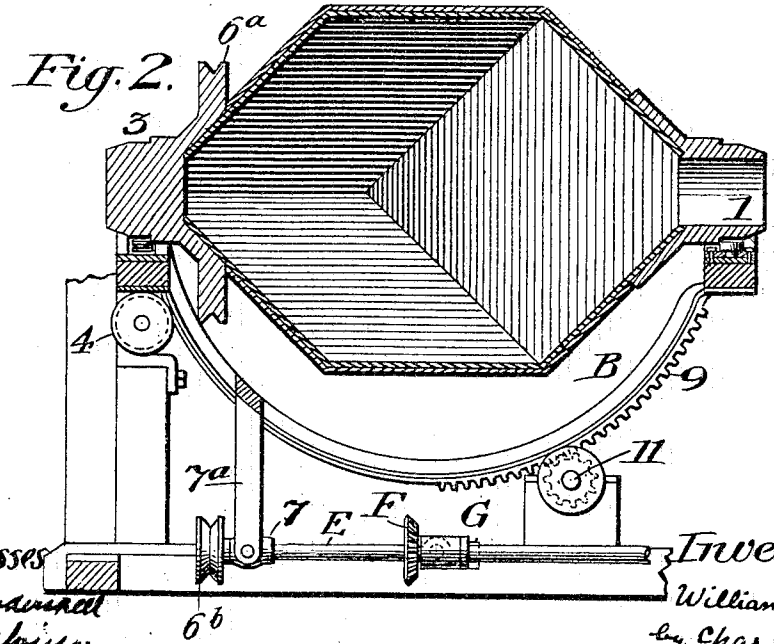


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

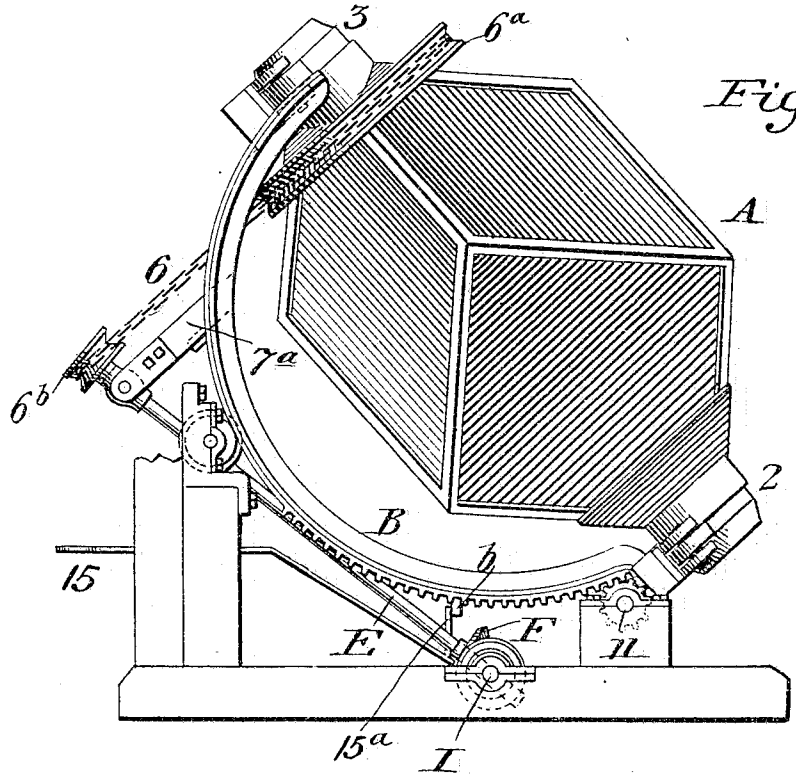


Fig. 4

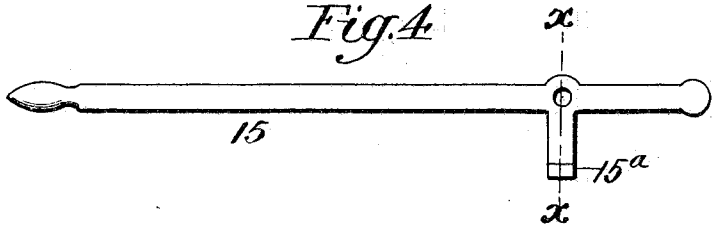
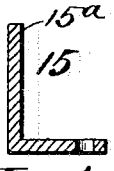


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 6.

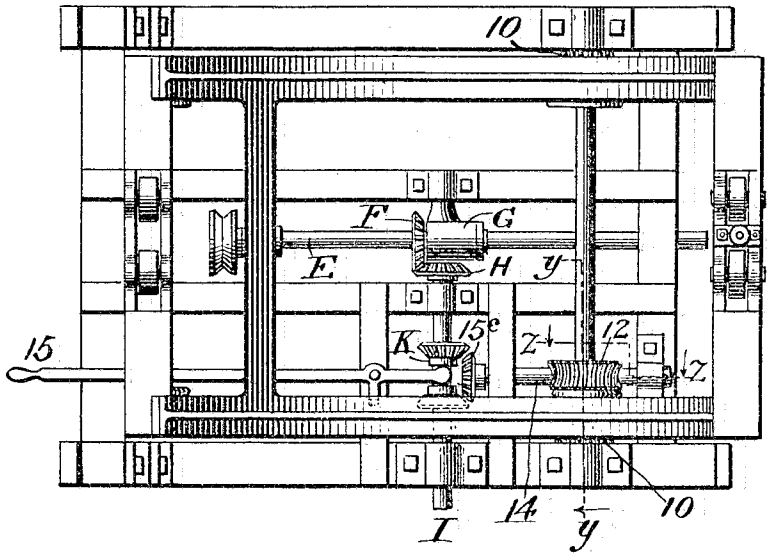


Fig. 7.

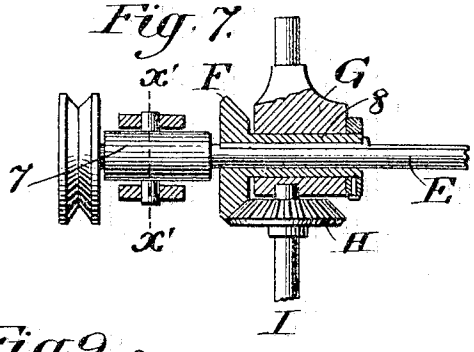


Fig. 8.

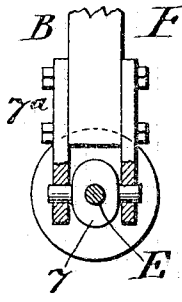


Fig. 9

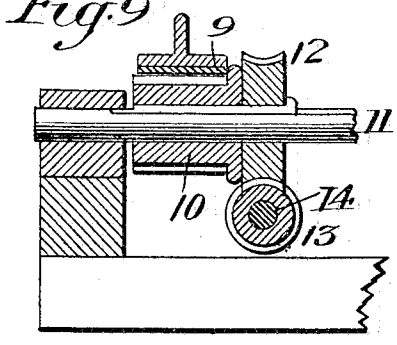
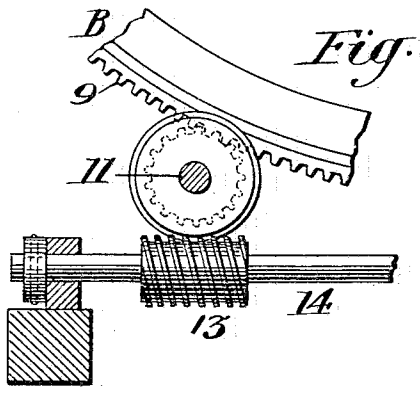


Fig. 10.



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APPLICATION FILED JULY 25, 1902.

4 SHEETS—SHEET 4.

Fig. 11.

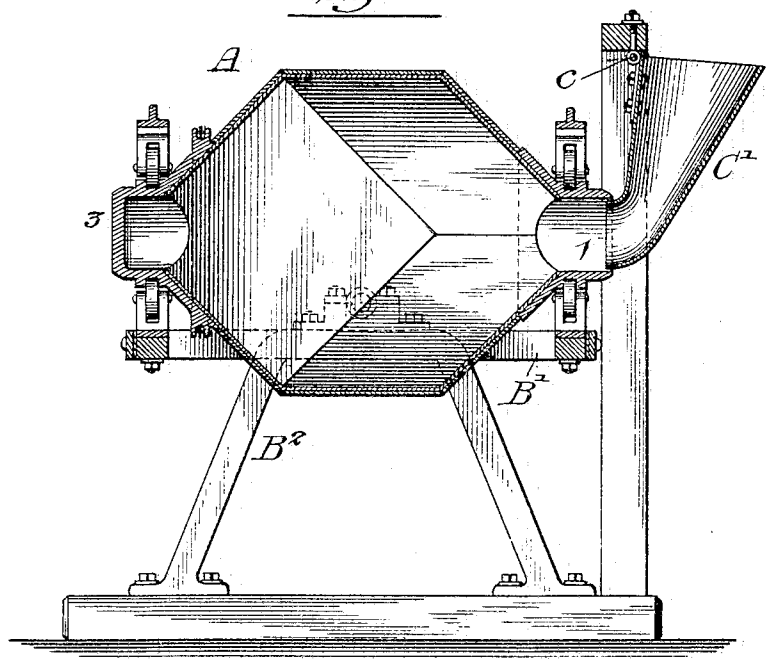
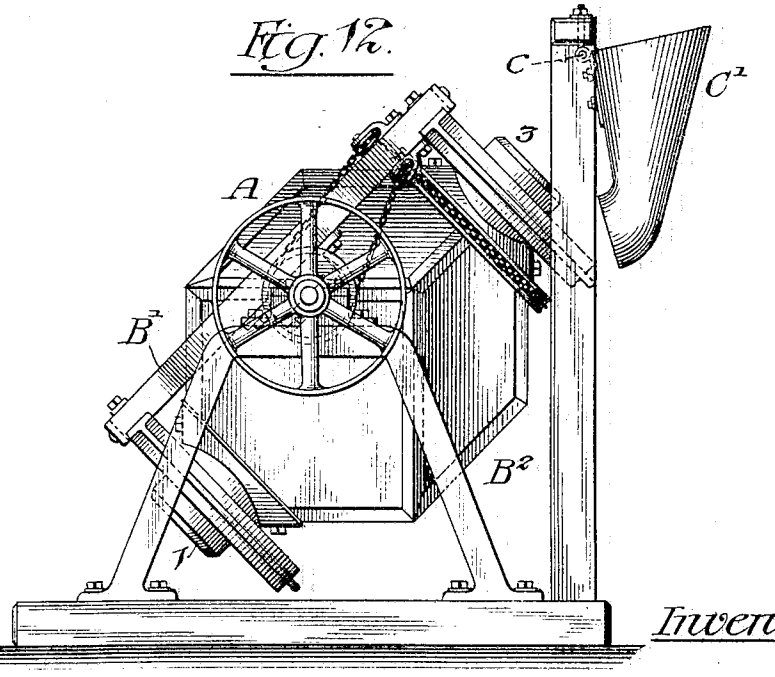


Fig. 12.



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Inventor:

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by Chas. G. Page Atty.

No. 781,726. Patented February 7, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM J. JUDD, OF NEW YORK, N. Y., ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

CONCRETE-MIXER.

SPECIFICATION forming part of Letters Patent No. 781,726, dated February 7, 1905.

Application filed July 25, 1902. Serial No. 117,019.

To all whom it may concern:

Be it known that I, WILLIAM J. JUDD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Machines for Mixing Concrete or the Like, of which the following is a specification.

In my application for Letters Patent of the United States for improvement in concrete-mixers, filed April 15, 1902, and serially numbered 102,960, I have described and claimed a mixer for concrete and the like having a polyhedric or cubiform mixing box or receptacle supported to revolve about a tilting axis and having two openings respectively arranged at opposite corners or vertices, one of such openings being employed to receive the materials to be mixed and the other being employed to discharge the mixed-up batch of concrete, mortar, or the like.

In this application a cubiform mixing-box is shown, which is arranged to revolve about a tilting axis passing through diagonally opposite vertices or corners and which is closed at one of such vertices or corners and open at the diagonally opposite vertex or corner to provide an opening for the passage of material and in alinement with the axis of rotation, which thus passes through two diagonally opposite vertices or corners, the one open and the other closed; but any polyhedric box having an opening in one of its vertices may be employed. With this arrangement the rotary action of the box causes the ejectment of the mixed-up material when the box is tilted to an extent to depress its said corner-opening into position for discharge, and after such discharge the box can be reversely tilted to an extent to bring it into position to receive materials from a hopper located with reference to a point selected for conveniently dumping materials into the hopper employed for directing the materials into the box. The extent of tilt on the part of the box in order to alternately position it for charging and discharge can vary with the selected position of the hopper, and when it is tilted in one direction to an extent to depress its closed corner, which is diagonally opposite its open corner, materials therein contained will not spill out. This construction also permits the box to be continuously revolved and to be charged and discharged through a single opening while revolving and also to secure all of the advantages in mixing attained by rotating the cubiform or polyhedric box about a tilting axis passing through diagonally opposite corners and to attain a quick automatic discharge of the mixed-up batch, which will be ejected by the act of rotating the box about said axis when the latter is inclined in a direction to depress the corner-opening.

Certain prominent objects of my invention as embodied in this construction and arrangement are: to permit the hopper to be elevated to such extent that when the mixing-receptacle is tilted into position to receive the materials from the hopper the flow of such materials from the hopper into the mixing-receptacle may be in a downward direction into the mixing-chamber, which with the exception of its temporarily-upturned opening is otherwise closed, whereby the admitted materials will not prematurely run out; to position the hopper whereby any drip therefrom may take place over the point whereat the batch is discharged from the mixing-receptacle and remote from the driving-gearing applied to the mixing-receptacle; to avoid the use of stirring or stirring and feeding blades within the mixing-receptacle and to cause the mixing to be quickly and effectively performed by the planes forming the interior sides of the cubiform or polyhedric mixing-receptacle; to quickly and rapidly eject the mixed-up batch by reason of the rotation of the mixing-receptacle when the latter is tilted into position for discharge; to provide a simple and compact construction, and to simplify the construction of hopper employed.

In the accompanying drawings, Figure 1 is a side elevation of a mixing-machine embodying the principles of my invention, the mixing-receptacle being in position to receive from an elevated hopper. Fig. 2 is a central longitudinal section on a vertical plane through the mixing-receptacle and support

thereof, the mixing-receptacle having been tilted to bring its axis of rotation into a horizontal position. Fig. 3 is a side elevation showing the mixing-receptacle tilted into position for discharge. Fig. 4 illustrates a clutch-shifting lever which may be employed. Fig. 5 is a section on $x\ x$ in Fig. 4. Fig. 6 is a top plan view with the mixing-receptacle removed. Fig. 7 is an enlarged detail view, partly in section and partly in plan, of mechanism for operating the mixing-receptacle. Fig. 8 is a section on line $x'\ x'$ in Fig. 7. Fig. 9 is a section on line $y\ y$ in Fig. 6. Fig. 10 is a section on line $z\ z$ in Fig. 6. Fig. 11 is a section similar to Fig. 2, but showing the mixing-box mounted upon a pivotally-supported frame and illustrating a tilting hopper. Fig. 12 is a side elevation of the arrangement shown in Fig. 11 with the rotary cube box tilted in a direction to discharge at the side of the machine opposite the side at which the hopper is supported.

The rotary mixing-receptacle A, as shown, is cubiform and arranged to revolve about an axis passing through diagonally opposite vertices or corners, a portion of one corner being removed to provide the box or receptacle with an opening or passage 1, through which the materials that are to be mixed are introduced and through which the mixed-up batch of concrete, mortar, or the like is ejected. This charging and discharge passage is in alinement with the axis of rotation of the mixing-receptacle and is preferably formed through one of two journals with which the mixing-receptacle is provided. In this way the rotary mixing-chamber has a charging and discharge passage through the hollow journal 2 and is otherwise closed, the opposite journal 3 being shown as an ordinary solid pivot or journal.

The rotary mixing-receptacle is supported to revolve about a tilting axis passing through its journals at opposite corners or vertices, and to such end it is mounted upon an oscillatory or tilting support. This oscillatory or tilting support may be a tilting frame supported by trunnions upon a stationary frame, as in Figs. 11 and 12, or it may consist of an oscillatory base-support B, having a curved bearing-face arranged upon one or more supporting-rolls 4, both of such constructions being shown in my said application Serial No. 102,960. When the rotary mixing-receptacle is in mixing position, the axis about which it revolves is preferably horizontal, or nearly so. Broadly considered, the hopper may be arranged to charge the rotary mixing-receptacle while the axis of rotation of the latter is horizontal, as in Fig. 11, and in such case the hopper can be arranged to tilt as in my said application; but as a matter of further improvement the hopper C can be stationary and arranged above the plane occupied by the axis of rotation of the mixing-receptacle when the latter is in mixing position, so that in order to charge the mixing-receptacle the latter can be tilted from its mixing position in a direction to elevate its charging and discharge opening, and thereby bring such opening in register with the discharge-opening of the hopper. With this arrangement the mouth of the discharge-opening of the hopper can be transversely on an inclined plane, as at 5, and arranged relatively to the arc described by the outer end of the hollow journal 2 when the mixing-receptacle is tilted, as illustrated, whereby when the outer end of such journal is in register with the discharge-orifice of the hopper the two will be in proximate juxtaposition. It will be seen that with this organization materials in the hopper will take a downward course in flowing from the hopper into and through the hollow journal 2, whereby there will be no spilling or retardation of the passing materials. The hopper may, for example, be rigid with an elevated platform D, along which materials can be carried and dumped into the hopper. The rotary mixing-receptacle can be driven by any suitable driving-gear adapted to cause it to rotate continuously regardless of the position of its axis of rotation, and the oscillatory or tilting support for the rotary mixing-receptacle can be operated by hand or any suitable hand or power actuated mechanism, the devices herein illustrated for operating the rotary mixing-receptacle and its oscillatory or tilting support being the same as those shown and described in my application for Letters Patent of the United States filed May 26, 1902, and serially numbered 109,024, with the exception that the rocking bearing for the tilting and longitudinally-movable counter-shaft is adjusted with reference to the greater range of movement the oscillatory or tilting support B is permitted to have. It is therefore only necessary to give a brief general description of the devices shown for rotating the mixing-receptacle and actuating the tilting support, as follows:

The rotary mixing-receptacle is driven from a rotary counter-shaft E by an endless belt 6, which passes around a grooved pulley 6^a on the mixing-receptacle, and a grooved pulley 6^b, mounted upon one end of the shaft E. The counter-shaft E revolves in a bearing 7, which is trunnioned in a bracket 7^a on the tilting support B and has a sliding key or feathered connection with a bevel-gear F. The hub portion 8 of gear F revolves in a rocking bearing G, mounted upon the supporting-frame, said gear being operated by a bevel-gear H, secured upon the rotary driving-shaft I. By such arrangement shaft E will tilt and slide in accordance with the movement of the tilting support B and will in its different positions remain approximately parallel to the axis of the rotary mixing-receptacle, it being understood, however, that any slack in the endless belt occasioned by such tilting may

be taken up by a suitable and well-known belt-tightener. (Not shown.) As a means for actuating the tilting support B it has a rack 9, which is engaged by a pinion 10 on a rotary shaft 11, the said rack and pinion being preferably duplicated, as shown. The shaft 11 also has a gear 12, which is fixed thereon and engaged by a worm-gear 13, fixed on a rotary shaft 14. The shaft 14 has at one end a bevel-gear 15, which can be engaged by either one of the gear members of a double clutch K, keyed to slide upon but revolve with the driving-shaft I. The clutch K can be operated by a lever 15. In this way the shaft 11 can be caused to turn in opposite directions in alternation and the support B tilted as desired. Suitable stop devices can be employed for automatically disconnecting shaft 14 from the driving power when the tilting support has reached the limit of its required tilt in one or each of the directions in which it can be tilted—as, for example, when the box or receptacle is brought into the position shown in Fig. 3 a stop *b* on the tilting support B can engage an arm 15ª on the clutch-lever 15, and thereby move said lever in a direction to shift clutch K, Fig. 6, out of mesh with the gear 15ᶜ, as in my said application Serial No. 109,024, and obviously when the box is brought into position for charging a similar stop on support B could be employed to engage and shift the clutch-lever, it being understood that in the arrangement shown the starting up of the tilting mechanism is in each instance effected by manually shifting the lever 15, as fully described in my said application Serial No. 109,024.

In Fig. 1 the mixing-receptacle is tilted so as to place its axis of rotation in an inclined position and bring its hollow journal 2 in register with the discharge-orifice of the elevated hopper, it being observed that in practice the two openings can be brought more closely together than represented in Fig. 1, it being understood that as made for use the end of the journal 2 will move in a much greater arc, owing to the enlargement of the machine and consequent increased distance between the outer end of journal 2 and the transverse axis about which the mixing-receptacle is supported to tilt. The mixing-receptacle, broadly considered, is polyhedric, having its interior surface formed by planes and having its charging and discharge opening formed at one corner or vertex produced by angularly-arranged plane surfaces. By reason of such construction and arrangement the cubiform or polyhedric mixing-receptacle will when revolved effectively mix together the contained materials regardless of the angle of its axis of rotation. Thus while the mixing-receptacle may be tilted from the position shown in either Fig. 1 or Fig. 3 into the mixing position shown in Fig. 2 it will be evident that the position shown in Fig. 1 could also be adopted as a mixing position. For certain work, however, it will be convenient to adopt the position shown in Fig. 2 as both a charging and a mixing position, and in such case the hopper can be positioned lower down and arranged to tilt as in my said application, Serial No. 102,960. When the mixing-receptacle is tilted as in Fig. 3, the mixed-up batch will be ejected through its charging and discharge opening.

Owing to the formation of the mixing-receptacle, all need of internal feed or mixing blades is avoided, the materials being agitated and mixed from the instant they enter the receptacle up to the point where the batch is ejected through the charging and discharge opening. The transverse area of the discharge opening or passage is quite small as compared with the transverse area of the receptacle, and hence a large quantity of materials can be mixed at one time and retained until the receptacle is in position for discharge.

The cubiform or polyhedric mixing-receptacle can be revolved continuously whether its axis of rotation be horizontal or inclined and while such axis is being tilted as the result of oscillating or tilting of oscillatory support B. I may also form such tilting or oscillatory support B with bearing-faces on downwardly-converging planes, as will be described and claimed by me in another application. The tilting mixing-receptacle may also have a greater extent of tilting or oscillatory movement than illustrated, whereby the hopper can be positioned at points other than that shown. For example, the hopper in place of being arranged to the right of the machine, as in the drawings, may occupy a corresponding position to the left of the machine, in which case the mixing-receptacle will in tilting to an extent to shift its charging and discharge opening from a charging to a discharging position have more than one-half of a revolution about an axis transverse to its axis of rotation which passes through the charging and discharge opening. When the mixing-receptacle is thus operated, it will be tilted in a way to keep its opening uppermost until it approaches the point for discharge, and in this way the materials will not accidentally spill out, while at the same time, owing to the formation of the mixing-receptacle, the process of mixing will not be interrupted from the time the materials are introduced into the mixing-receptacle to the time when the batch is discharged. Where the mixing-receptacle is thus caused to have such further extent of tilting movement, the driving and tilting devices employed must of course be modified or adapted with reference to the desired extent of tilt on the part of the mixing-receptacle.

In Fig. 11 the rotary mixing-box is supported by a tilting frame B′, which is pivotally supported upon suitable side standards B², and the hopper C′ is pivotally supported, as at *c*, whereby it can be swung or tilted to-

ward and away from the open corner of the box. Obviously this swinging hopper could be arranged at the left of the machine thus shown and be swung away from the box and so held until the latter has been tilted into position to bring its opening 1 to the left, or, what is the same thing, the cube box shown in Fig. 11 can be tilted about a transverse horizontal axis in a direction to depress its closed end and raise its open end, and this movement can be continued until the box has made more than a half-turn and has reached the position shown in Fig. 12, wherein its axis of rotation is inclined and its open corner 1 is depressed and in position for discharge. A peculiar feature of the discharge is that the material is thrown out and that the box need not be tilted to an extent to position its open corner underneath, so as to allow a sliding action of the material.

What I claim as my invention is—

1. In a machine for mixing concrete and the like, a rotary, polyhedric mixing-box arranged to revolve about a tilting axis passing through diagonally opposite vertices, the box being closed at one of such vertices and having its diagonally opposite vertex portion removed to an extent to provide a charging and discharge opening in alinement with said axis of rotation; and a hopper for feeding materials that are to be mixed into the box by way of its charging and discharge opening; the box being supported to tilt its axis of rotation in a direction to bring its charging and discharge opening into position to receive from the hopper, and in alternation therewith to depress such charging and discharge opening into position to permit the rotary action of the box to eject therefrom the mixed-up batch.

2. In a machine for mixing concrete and the like, a rotary, cubiform mixing-box arranged to revolve about a tilting axis passing through diagonally opposite corners, the box being closed at one of such corners and having its diagonally opposite corner portion removed to an extent to provide a charging and discharge opening in alinement with said axis of rotation; and a hopper for feeding materials that are to be mixed into the box by way of its charging and discharge opening; the box being supported to tilt its axis of rotation in a direction to bring its charging and discharge opening into position to receive from the hopper, and in alternation therewith to depress such charging and discharge opening into position to permit the rotary action of the box to eject therefrom the mixed-up batch.

3. In a machine for mixing concrete and the like, a rotary, polyhedric mixing-box supported to revolve about a tilting axis passing through diagonally opposite vertices, and means for rotating and tilting said box, the box being closed at one of such vertices and having its diagonally opposite vertex portion removed to an extent to provide an opening through which a mixed-up batch is ejected by the rotary action of the box when the axis of rotation is tilted to an extent to depress such opening into position for discharge.

4. In a machine for mixing concrete and the like, a rotary, cubiform mixing-box supported to revolve about a tilting axis passing through diagonally opposite corners, and means for rotating and tilting said box, the box being closed at one of such corners and having its diagonally opposite corner portion removed to an extent to provide an opening through which a mixed-up batch is ejected by the rotary action of the box when the axis of rotation is tilted to an extent to depress such opening into position for discharge.

5. In a mixing-machine, the combination with a revoluble mixing-receptacle having a plurality of plane surfaces inclined to the axis of rotation thereof, and provided with an opening concentric, or substantially so, with the axis of rotation thereof, and constituting the charging and discharging opening of the receptacle, the receptacle being otherwise closed against the feeding of material therein, or the discharge of material therefrom, of means for tilting said receptacle so as to bring the opening thereof into charging or discharging positions, or into positions intermediate of the charging and discharging positions.

6. In a mixing-machine, the combination with a revoluble mixing-receptacle of cubiform shape, and having an opening concentric, or substantially so, with the axis of rotation thereof, and constituting the charging and discharging opening of the receptacle, the receptacle being otherwise closed against the feed of material therein or the discharge of material therefrom, of means for tilting the receptacle so as to bring the opening thereof into charging or discharging positions, or into positions intermediate of the charging and discharging positions.

7. In a mixing-machine, the combination with a revoluble mixing-receptacle have a plurality of plane surfaces inclined to the axis of rotation thereof and provided with an opening concentric, or substantially so, with the axis of rotation thereof, and constituting the charging and discharging opening of the receptacle, the receptacle being otherwise closed against the feed of material therein, or the discharge of material therefrom, means for tilting said receptacle so as to bring the opening thereof into charging and discharging positions, or into positions intermediate of the charging and discharging positions, and means for holding the receptacle at any position.

8. In a mixing-machine, the combination of a revoluble mixing-receptacle having a plurality of plane surfaces inclined to the axis of rotation thereof and provided with an opening concentric, or substantially so, with the axis

of rotation thereof, and constituting the charging and discharging opening of the receptacle, the receptacle being otherwise closed against the feed of material therein or the discharge of material therefrom, a frame in which the receptacle is revolubly supported, and means for tilting said frame and the receptacle carried thereby so as to bring the opening of the receptacle into charging and discharging positions, or into positions intermediate of the charging and discharging positions.

9. In a mixing-machine, the combination of a cubical mixing-receptacle having its axis of revolution passing through, or substantially through, opposite diagonal corners of the cube, and having one opening for feed and discharge, and a tiltable frame in which the receptacle is revolubly supported.

10. In a mixing-machine, the combination of a mixing-receptacle of polyhedric form, having one opening for feeding and discharging, concentric, or substantially so, with the axis of revolution, and a tiltable frame in which the drum is revolubly supported.

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