

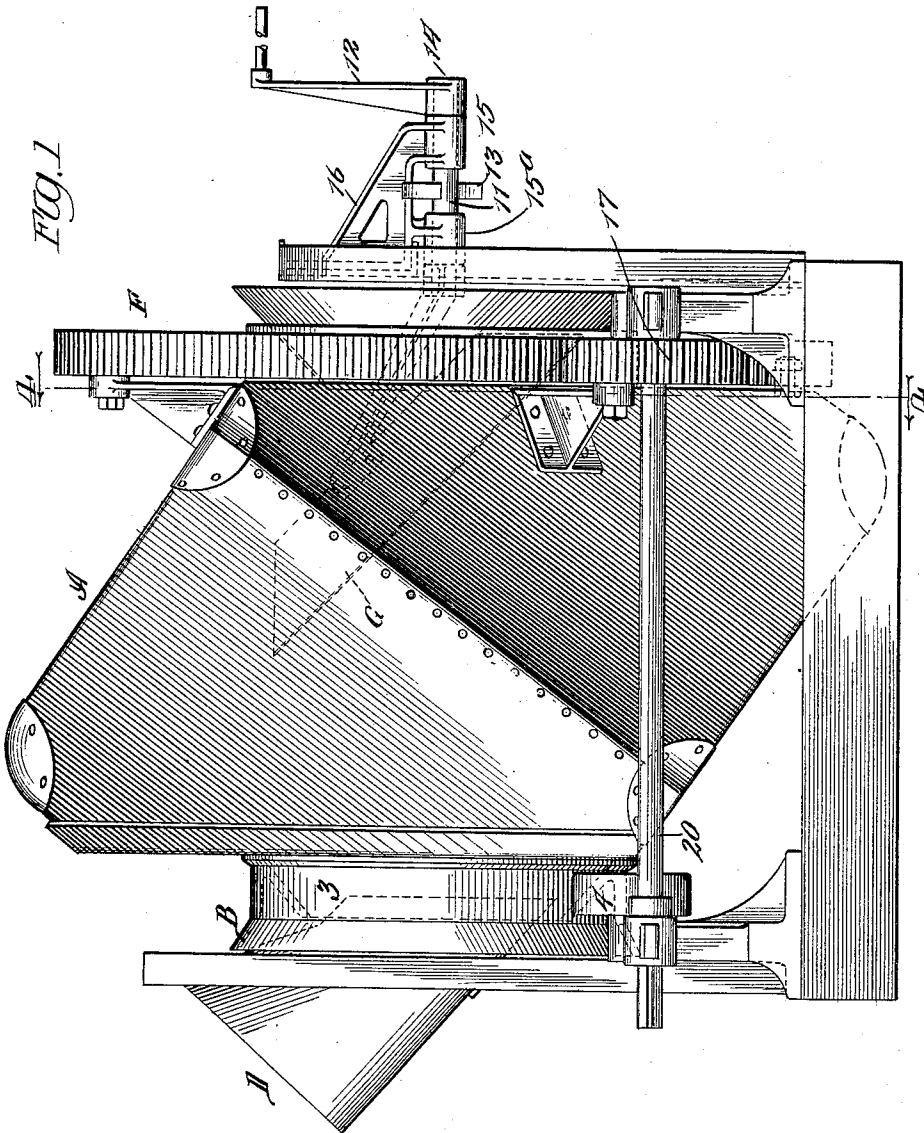
C. E. BATHRICK.
MIXING MACHINE.

APPLICATION FILED SEPT. 24, 1908.

1,064,276.

Patented June 10, 1913.

7 SHEETS—SHEET 1.



Witnesses:
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Harold G. Barrett

Inventor:
Charles E. Bathrick
by Chas. & Page Atty.

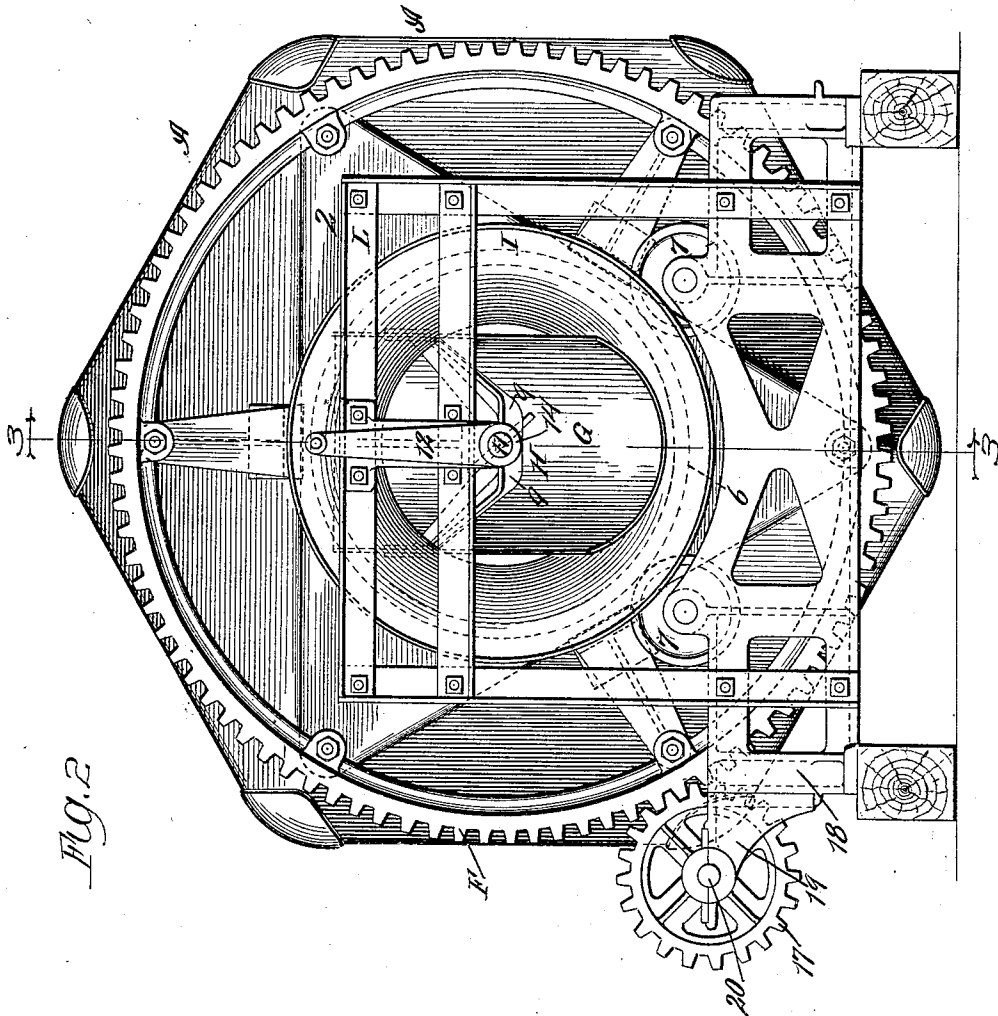
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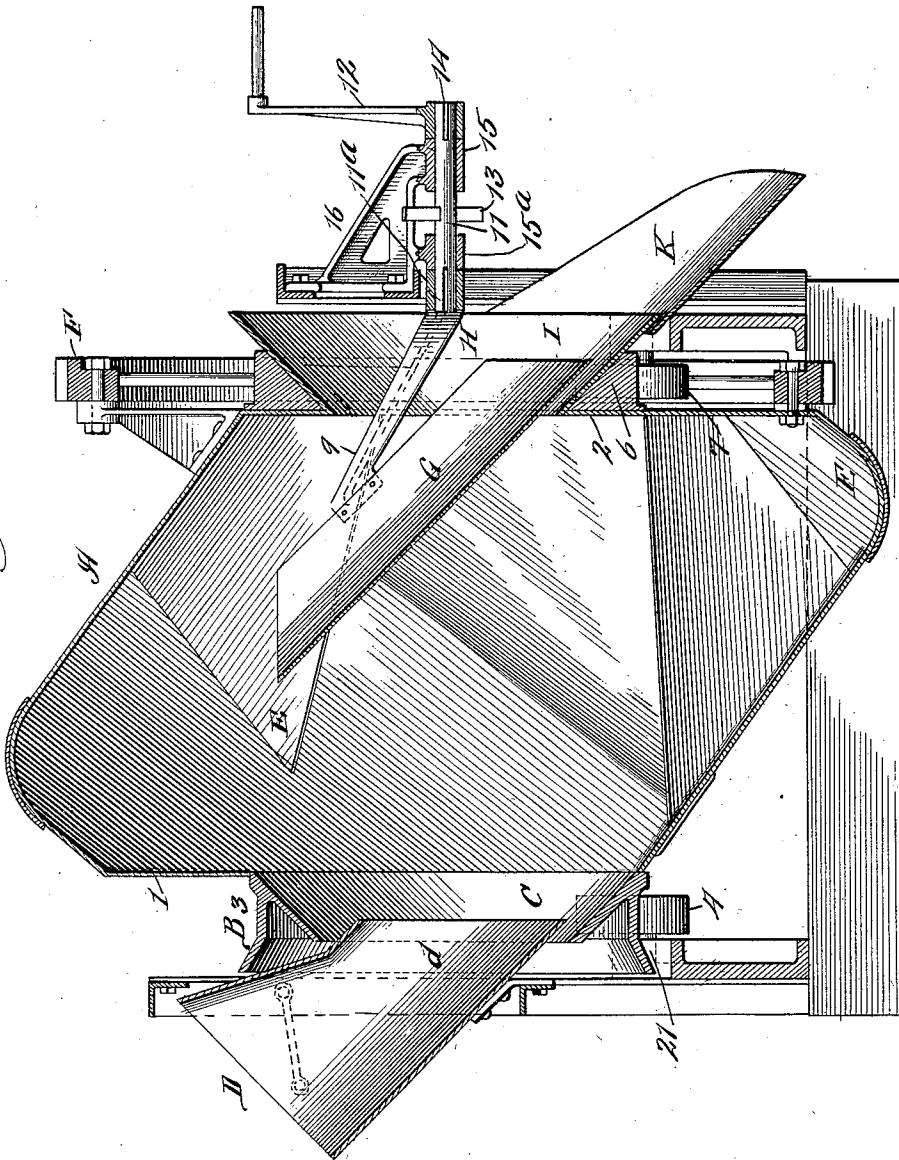
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Fig. 3.



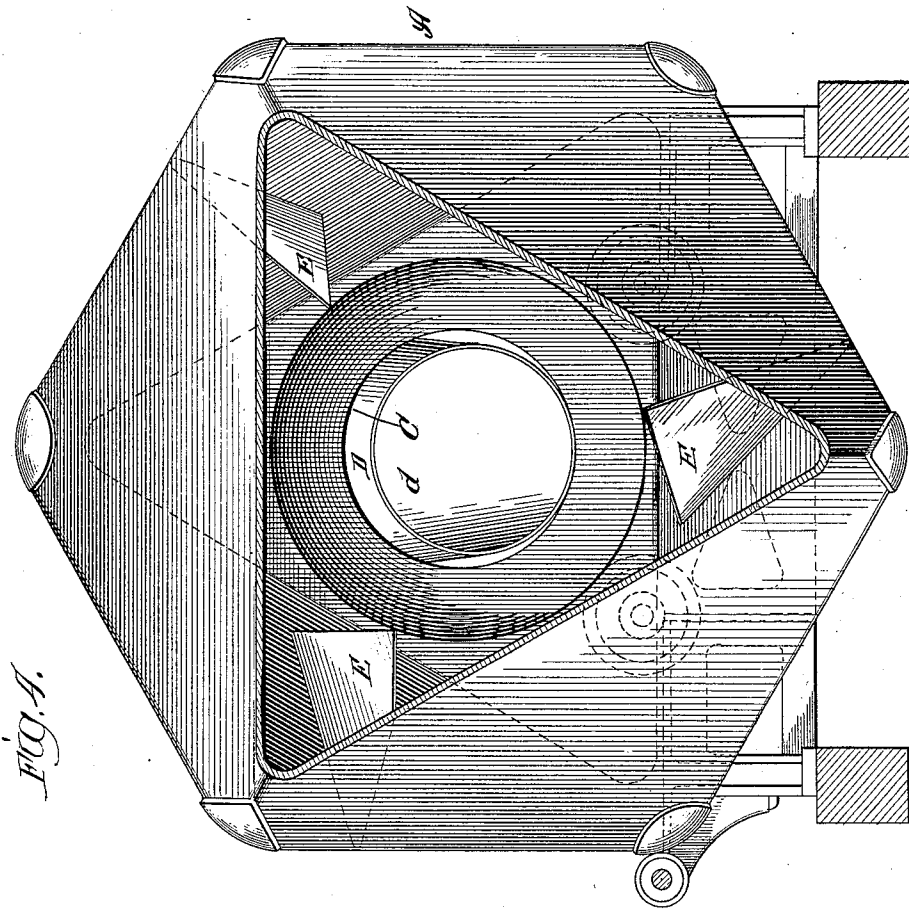
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7 SHEETS—SHEET 4.



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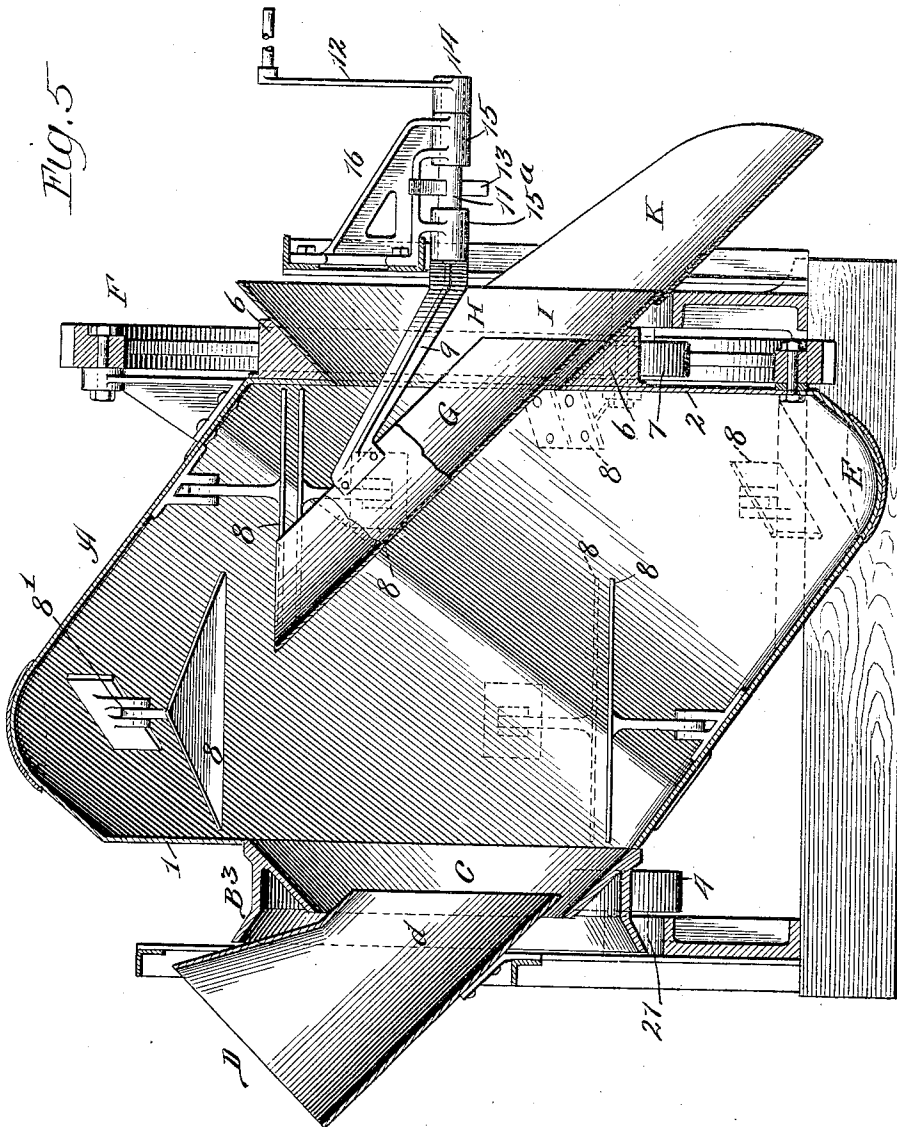
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7 SHEETS—SHEET 5.



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7 SHEETS—SHEET 7.

Fig. 7.

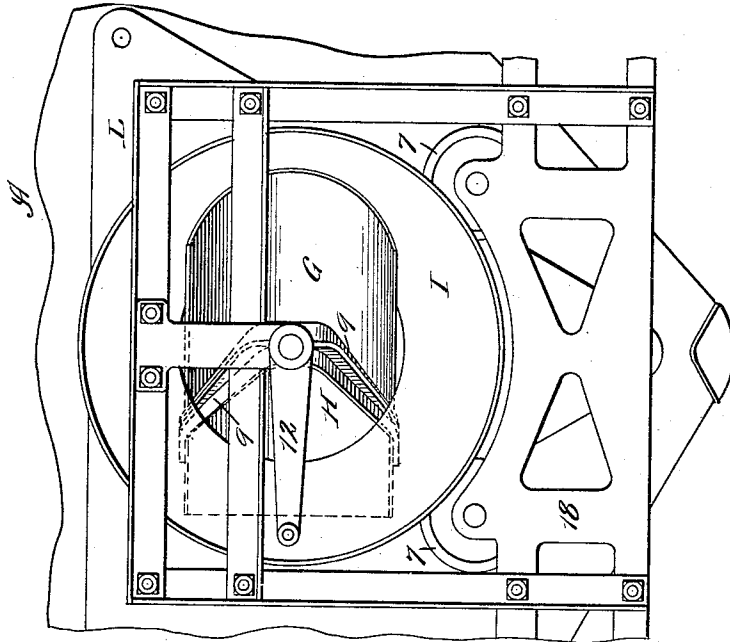
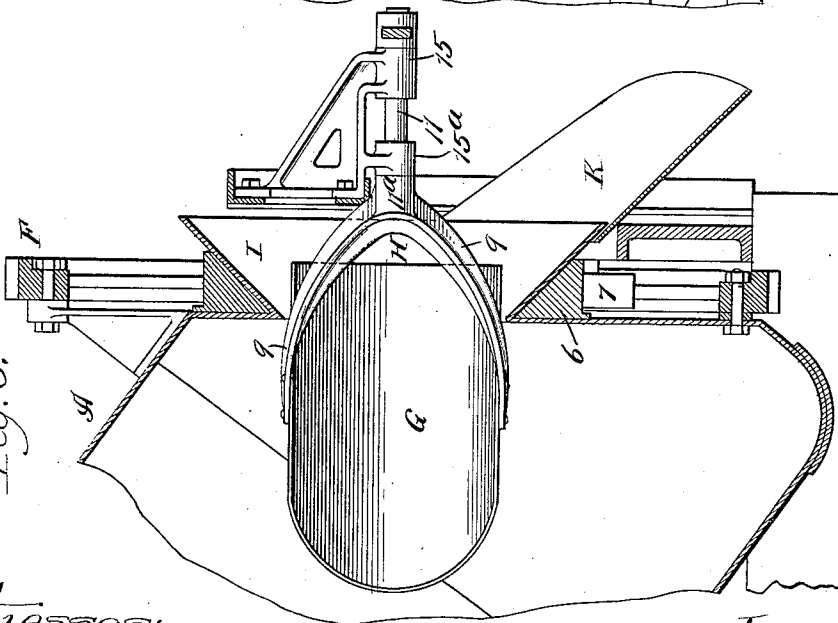


Fig. 8.



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UNITED STATES PATENT OFFICE.

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MIXING-MACHINE.

1,064,276.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed September 24, 1908. Serial No. 454,665.

To all whom it may concern:

Be it known that I, CHARLES E. BATHRICK, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Mixing-Machines, of which the following is a specification.

My invention relates to machines for mixing together ingredients for forming concrete and the like.

The object of my invention is to provide simple, practical and efficient means for discharging from a rotary non-tilting mixing drum or receptacle, all or any desired portion of a mass or batch of mixed up matter, and to provide certain novel and improved matters of detail and arrangement as hereinafter set forth.

In the accompanying drawings: Figure 1 is a side elevation of a mixing machine embodying my invention, the discharge chute being illustrated in dotted lines. Fig. 2 is an end elevation of said machine and shows the discharge end of the rotary mixing drum or receptacle with the chute in position for discharging. Fig. 3 is a section taken longitudinally and centrally through the machine on a vertical plane indicated by line 3—3 in Fig. 2, the rotary spindle 11 of the chute operating means being shown in elevation. Fig. 4 is a cross-section on line 4—4 in Fig. 1. Fig. 5 is a view similar to Fig. 3, showing however, hinged lifting blades in place of the fixed lifting blades shown in Figs. 3 and 4. Fig. 6 is a view similar to Fig. 4 but showing hinged lifting blades. Fig. 7 is an end elevation of a portion of the front or discharge end of the machine with the chute in an inoperative position. In this view the chute is partially illustrated by dotted lines, its remaining portion being shown in full lines. Fig. 8 is a fragmentary section similar to a portion of Fig. 3 but showing the chute in the inoperative position illustrated in Fig. 7.

The rotary mixing drum or receptacle A is of the non-tilting type and can be of any suitable construction adapting it for the purposes for which it is intended. As shown in the drawings, it is of cube or cubiform type and consists of a hollow cube having each of two diagonally opposite corner portions removed and replaced by

end walls 1 and 2, respectively. The end wall 1 has a receiving opening surrounded by a trunco-conical ring C, and the end wall 2 has a discharge opening surrounded by a trunco-conical ring or mouth piece I, these two openings being concentric or substantially concentric with the longitudinal axis about which the drum revolves. The space within the ring C provides an inlet for materials discharged from a hopper D, and the space within the mouth piece I provides an outlet opening or passage through which material can be discharged by way of a chute G extending within the mixing drum and having its outer end portion projecting within said discharge opening or passage. The drum is supported by suitably arranged anti-friction rolls 4 and 7, its receiving end portion being provided with an annulus B which is shown as integral with the inlet piece C and formed with a peripheral circular track portion 3 arranged to bear upon a pair of anti-friction rolls 4. The mouth piece I is rigid with the end plate 2 and can also serve as a spout portion. This mouth piece I is braced by an annular bearing ring 6 secured to the body of the receptacle and arranged to bear on forward supporting rolls 7. If desired the mouth piece I can be practically extended as a spout by means of an inclined trough or spout member K, which latter is particularly useful for charging wheel barrows and the like.

As shown in Fig. 2, the two supporting rolls 7 at the discharge end of the machine are mounted upon a frame 18, which is also provided with a bearing portion 19 for the driving shaft 20. The shaft 20 extends alongside the mixing receptacle and carries at one end a gear 17 which engages and turns a large ring gear "F" fixed on one end portion of the mixing receptacle. The gear 17 may be said to be on the forward end of the shaft, the rear end of the latter being suitably supported and connected when desired with any suitable driving means for the purpose of rotating the mixing receptacle. The anti-friction rolls 4 and 7 are also mounted on any suitable supporting means.

The interior of the mixing receptacle is provided with blades arranged in series about the axis of rotation and attached to

the inner wall of said receptacle. Figs. 3 and 5, for example, respectively show somewhat different forms or arrangement of blades or shelves for operating on the material within the mixing receptacle. In Fig. 5 the said blades 8 are triangular or of similar form, and attached to the inner walls of the cubiform receptacle by hinge joints 8'. Like blades 8 are illustrated by dotted lines in Fig. 6. In Figs. 3 and 4 the blades or shelves E are not hinged to the inner walls of the mixing receptacle, but are secured thereto and project inwardly therefrom.

During the rotation of the mixing drum, the blades or shelves serve to carry up material and then drop or discharge the same downwardly from a suitably elevated point within the mixing drum. In order to collect the falling material and discharge it from the mixing drum when so desired, a chute G is mounted upon a rotary support or carrier and held thereon in position oblique to the axis about which said support or carrier is arranged to turn, so that when the chute support or carrier which operates about an axis that is longitudinal relatively to the rotary drum, has been turned to an extent to place the chute right side up, the angle of the chute relatively to the axis of its said support will incline the chute downwardly and forwardly for receiving and discharging material which has been carried up by the blades and then dropped or discharged into the chute. This position of the chute is herein termed its operative position. When the rotary chute support is operated to turn or swing the chute laterally away from its operative position, the chute while remaining oblique to the axis of rotation of its turning support, will turn toward an inverted or upside down position, it being however only necessary to cause a quarter or substantially a quarter of a revolution on the part of the chute in order to bring it into an inoperative or inactive position.

The chute is best shown in its operative position in Figs. 2, 3 and 5, wherein it is in place for receiving material from the lifting devices successively passing points above the chute, its inoperative position being illustrated in Figs. 7 and 8, in which the chute extends horizontally and obliquely within the drum, one longitudinal edge portion of the chute being above its opposite longitudinal edge portion, whereby the chute laterally presents its convex underside to such material as may drop or be discharged from the lifting devices during further mixing action, and cause such material thus impinging against its partially inverted convex underside to shed off laterally within the mixing drum. It will therefore be seen that the angle of the chute relatively to the axis of the drum, is constant, and that

when it is swung or turned from an operative toward an inoperative position, its rear or inner end which is shown for example at the left in Fig. 3, will drop or swing down until the chute as a whole reaches a position where it will stand horizontally oblique within the mixing drum.

As a means for supporting and operating the chute, H indicates a reversely rotative bifurcated support or carrier having arms 9 secured to opposite sides of the chute which is fixed thereon oblique to the axis about which this chute supporting member is arranged to turn. The rotary support H is keyed upon or otherwise rigid with a reversibly rotative spindle 11, having at its outer end a handle 12 by which it can be turned either way about its longitudinal axis. With this arrangement, the chute support 9 turns about the axis of the spindle 11 or more concisely described, it turns about what may be defined an extension of the axis of rotation of the spindle. The handle 12 is shown keyed to the spindle at 14, and the spindle is mounted in bearings 15 and 15^a on a bracket 16 which is in turn secured to any suitable portion of frame L (Fig. 2) outside of the mixing drum. The spindle 11 is shown provided with a stop device 13 comprising arm portions projecting radially from the spindle, so that when the spindle has been turned to an extent to bring the chute into the operative position illustrated, one of these arm portions will engage the bracket 16 and thereby determine such operative position of the chute. It is also understood that the other arm portion can be likewise set for determining the extent to which it is desirable to turn the chute away from its operative position in order to bring it into an inoperative position, or that these stop arms can be omitted so as to permit an attendant operating the handle 12 to determine the desired extent of turn or rotative action.

The axis about which the chute support or carrier revolves is coincident or substantially coincident with the axis of rotation of the rotary mixing drum or receptacle, and it is therefore central or substantially central as to the discharge opening which as hereinbefore observed is concentric or substantially concentric with the said drum axis, and where the drum is provided with an outwardly flaring mouth piece I into which the outer end portion of the chute extends, the chute is secured to its rotative support or carrier at an angle in conformity with the longitudinal angle or inclination of the mouth piece, so that when the chute is laterally turned about the axis of rotation of the drum, the bottom portion of the chute which extends within the mouth piece will move in a path concentric with the inner cone-shaped face of said mouth piece.

In Fig. 3, for example, a middle longitudinal line along the chute bottom is parallel with a line extending longitudinally along the next adjacent opposing inner face portion of the mouth piece, and obviously, this condition of relative parallelism between the inclined chute bottom and the next adjacent opposing or opposite inclined annular inner face of the mouth piece will be maintained regardless of the extent to which the chute is laterally swung or turned about the rotary drum axis extending centrally through the inner end of the discharge opening or passage. This arrangement insures relatively true action and permits the transverse curvature of the forward end portion of the chute to conform, as nearly as may be desired, to the curvature of the inner circular end of the mouth piece.

Where it is desired to partially invert the chute to cut off discharge from the mixing drum, substantially as illustrated, the direction of lateral swing or rotative action of the chute from its operative position should be determined by the direction in which the mixing drum revolves so that when the chute has been brought into such inoperative position, its convex bottom face will be properly exposed to material carried up by and then dropped or shed from the blades or other suitable elevating means. Obviously, a one half revolution of the chute support or carrier H from its operative position shown in Fig. 3 for example, would place the chute in precisely the reverse of the position shown in said figure, the chute in such case being completely inverted and inclining downwardly inward in place of inclining downwardly outward.

Broadly considered I may employ any suitable means for elevating and then dropping or downwardly discharging the mixture into the chute, and as to this, the drum itself, when of the cubiform type or construction shown, will when revolved, provide means serving to carry up and then drop or downwardly discharge the mixture into the chute temporarily positioned in an operative position. The action of the cubiform drum or receptacle in this particular is as follows, to wit: When the cubiform box or drum is revolved with its diagonal axis horizontal or substantially so, as illustrated, certain lateral movements of the concrete take place and at the same time that these lateral movements of the mass of concrete are being alternately produced by the angles of the planes or sides of the receptacle to the plane of axial revolution, the whole mass of concrete is being lifted along the plane of axial revolution until the angle of repose for the material is passed, when it gravitates back along lines of direction which intersect the paths of particles projected by the alternating positions of the sides of the

cube in its revolution. When therefore the chute has been moved into an inoperative position, no discharge will take place, but when the chute has been moved into an operative position, the gravitating material mentioned will fall into the chute, which in turn discharges the same.

I do not wish to be understood as claiming in this application the broad feature of combining a discharge chute with a cubiform mixing receptacle of the character described, as such invention is made the subject-matter of another application filed by me in the United States Patent Office on the 23rd day of December, 1909, Serial No. 534,692.

What I claim as my invention is:

1. In a mixing machine, the combination with a rotary mixing receptacle constructed for raising and dropping material therein and having a discharge opening substantially concentric with its axis of rotation, a chute obliquely arranged within said rotary mixing receptacle and having its outer end extending adjacent the wall of said discharge opening, and a rotary means whereon said chute is wholly supported, said chute being turned by said rotary means to place it in an operative position and in alternation therewith to place it in inoperative position.

2. In a mixing machine, the combination with a rotary mixing receptacle constructed for raising and dropping material therein and having a discharge opening substantially concentric with its axis of rotation, of a chute obliquely arranged within said rotary mixing receptacle and extending through said discharge opening, and a rotary means whereon said chute is wholly supported, said chute being rigidly fixed to said rotary means and shifting therewith to operative and inoperative positions.

3. In a mixing machine, the combination with a rotary mixing receptacle constructed for raising and dropping material therein and having a discharge opening substantially concentric with its axis of rotation, of a rotary chute support revoluble independently of said mixing receptacle about an axis substantially coincident with the axis of rotation of the receptacle, and an inclined chute wholly sustained upon said rotary support.

4. In a mixing machine, the combination with a rotary mixing receptacle constructed for raising and dropping material therein and having a discharge opening substantially concentric with its axis of rotation, of a rotary chute support revoluble independently of said mixing receptacle about an axis substantially coincident with the axis of rotation of the receptacle, and an inclined chute rigidly fixed to said rotary support and shifting therewith to operative and inoperative positions.

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5. The combination with a revoluble mixing drum constructed for raising and dropping material therein and having an open discharge end, of a supporting frame at the discharge end of said drum, arms extending from said supporting frame into said drum through its open discharge end, and a normally inclined, revoluble discharge chute mounted on said arms within said drum.
6. The combination with a revoluble mixing drum constructed for raising and dropping material therein and having an open discharge end, of a supporting frame at its discharge end and an inclined chute rotatably mounted on said frame and having a free inner end within said drum to receive and discharge the mixing material, said chute being capable of complete reversal to present its bottom upward and at a reverse angle to direct the contents of the drum backwardly thereinto.
7. In a mixing machine, a rotary mixing receptacle having a discharge opening concentric or substantially concentric with its axis of rotation, and provided with means for successively elevating and dropping material therein during rotation; a chute supported for reversibly rotative movement independently of the mixing receptacle and about an axis of rotation of the mixing receptacle, the chute being maintained oblique to said axis, and reversibly rotative means for thus supporting the chute oblique to and turning it about said axis between a position to receive and discharge the dropping material and an inoperative position.
8. In a mixing machine, a rotary mixing receptacle having a discharge opening coincident with its axis of rotation and provided with means for successively elevating and dropping material therein during rotation; a rotative chute obliquely disposed to and secured coincident or substantially coincident with the axis of rotation of the mixing receptacle, the inner end of the chute being rotative about said axis; and rotatable means for turning the chute about such axis between an operative and an inoperative position.
9. In a mixing machine, a mixing receptacle having a discharge opening concentric or substantially concentric with its axis of rotation; a rotary chute support revoluble about an axis coincident or substantially coincident with the axis of rotation of the mixing receptacle; a chute rotatable independently of the mixing receptacle and attached to said rotary chute support and oblique to the axis thereof, the chute being extended through the discharge opening of the mixing receptacle and the forward end portion of the chute being outside the mixing receptacle chamber and its remaining portion being within such chamber, and the chute being also oblique to its axis of rotation and having its opposite end portions respectively at opposite sides of the axis of rotation to which it is tied.
10. In a mixing machine, a rotary mixing receptacle having a discharge opening concentric or substantially concentric with its axis of rotation, and provided with an outwardly flaring annular discharge mouth piece; a revoluble chute extending within the mixing receptacle and also extending within the flaring discharge mouth piece; a rotary support carrying the chute and revoluble about an axis coincident with the axis of rotation of the mixing receptacle, the chute being oblique to said axis; and means for successively raising and dropping material within the mixing receptacle.
11. In a mixing machine, a rotary mixing receptacle having a discharge opening concentric or substantially concentric with its axis of rotation and provided with means for successively elevating and dropping material therein; a chute extending through the discharge opening; and a rotary support for the chute having arms extending through the discharge opening and secured to the chute, the latter being oblique to the axis about which its support revolves and said axis being coincident or substantially coincident with the axis of rotation of the mixing receptacle.
12. In a mixing machine, a rotary mixing receptacle having a discharge opening provided at one end thereof; a rotary chute support; a chute attached to the chute support in oblique position, the inner end of the chute being arranged to swing within the mixing receptacle in the arc of a circle about the axis of rotation of such mixing receptacle.
13. In a mixing machine, a rotary mixing receptacle having a discharge opening at one end; a rotary member provided with a fork extending within the mixing receptacle by way of said discharge opening; a chute rotatable independently of the mixing receptacle and attached to said fork and extending within the mixing receptacle, the chute being oblique to the axis about which the fork is arranged to turn, for the purpose set forth.
14. The combination with a revoluble mixing drum having an open discharge end and means to mix and lift the material and carry it toward the discharge end, of a supporting frame beyond the discharge end, and a normally inclined discharge chute revolubly mounted in said supporting frame and having an unattached inner terminal extending through the discharge end into the drum.
15. The combination with a revoluble mixing drum having an open discharge end and means to mix and lift the material and carry it toward the discharge end, of a sup-

porting frame beyond the discharge end, and an inclined chute rotatably mounted therein having a free inner end extending inwardly of the drum through the discharge end to receive the mixed material and capable of complete reversal whereby to present its bottom upwardly and at a reverse angle to direct the contents of the drum backwardly thereinto.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
