

C. E. BATHRICK.  
CONCRETE MIXER.

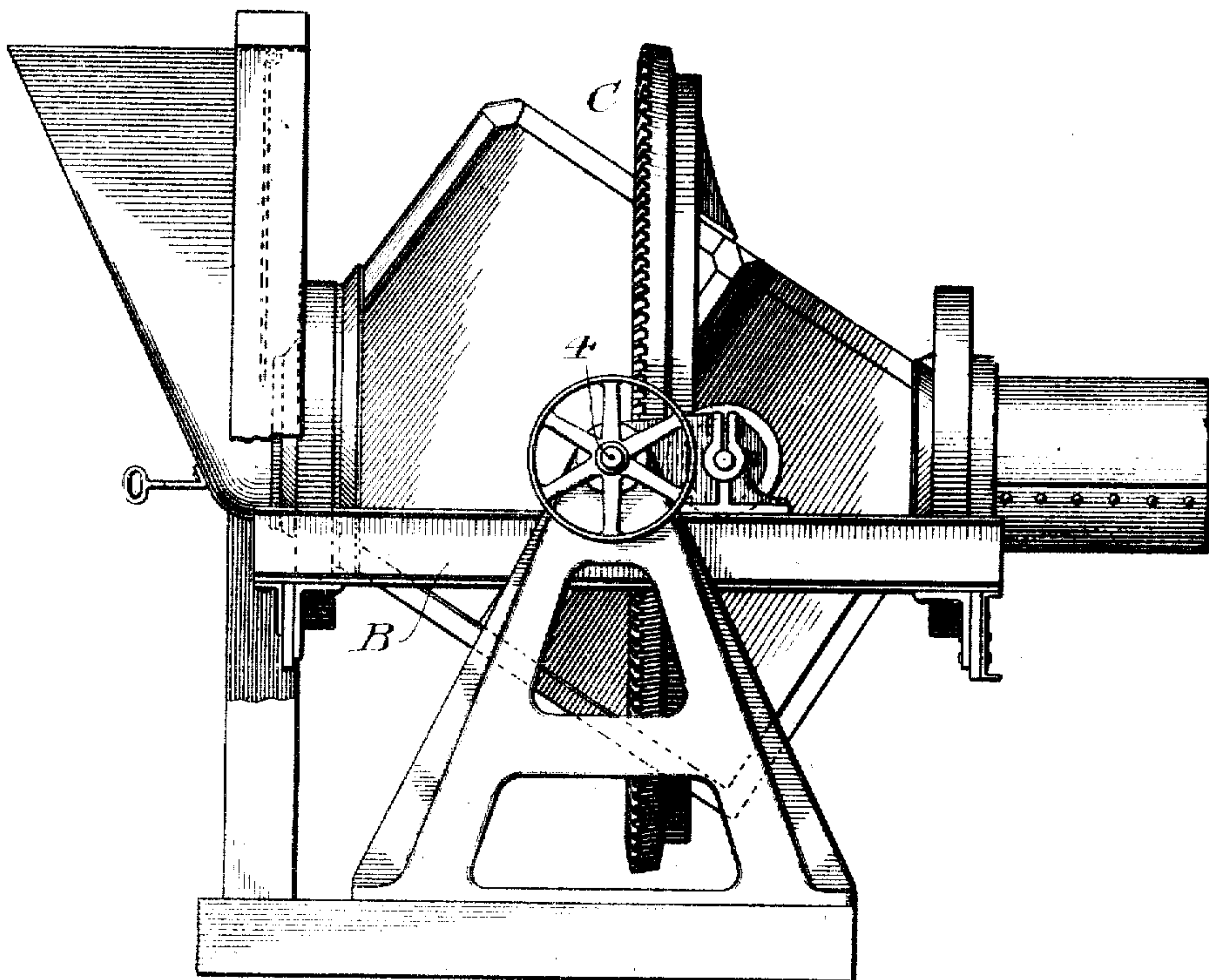
APPLICATION FILED JUNE 29, 1908.

920,416.

Patented May 4, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

*Wm. H. Whitehead*

*D. P. Freeling*

Inventor:

*Charles E. Bathrick*

*Chas. G. Page*  
*(Att'y)*

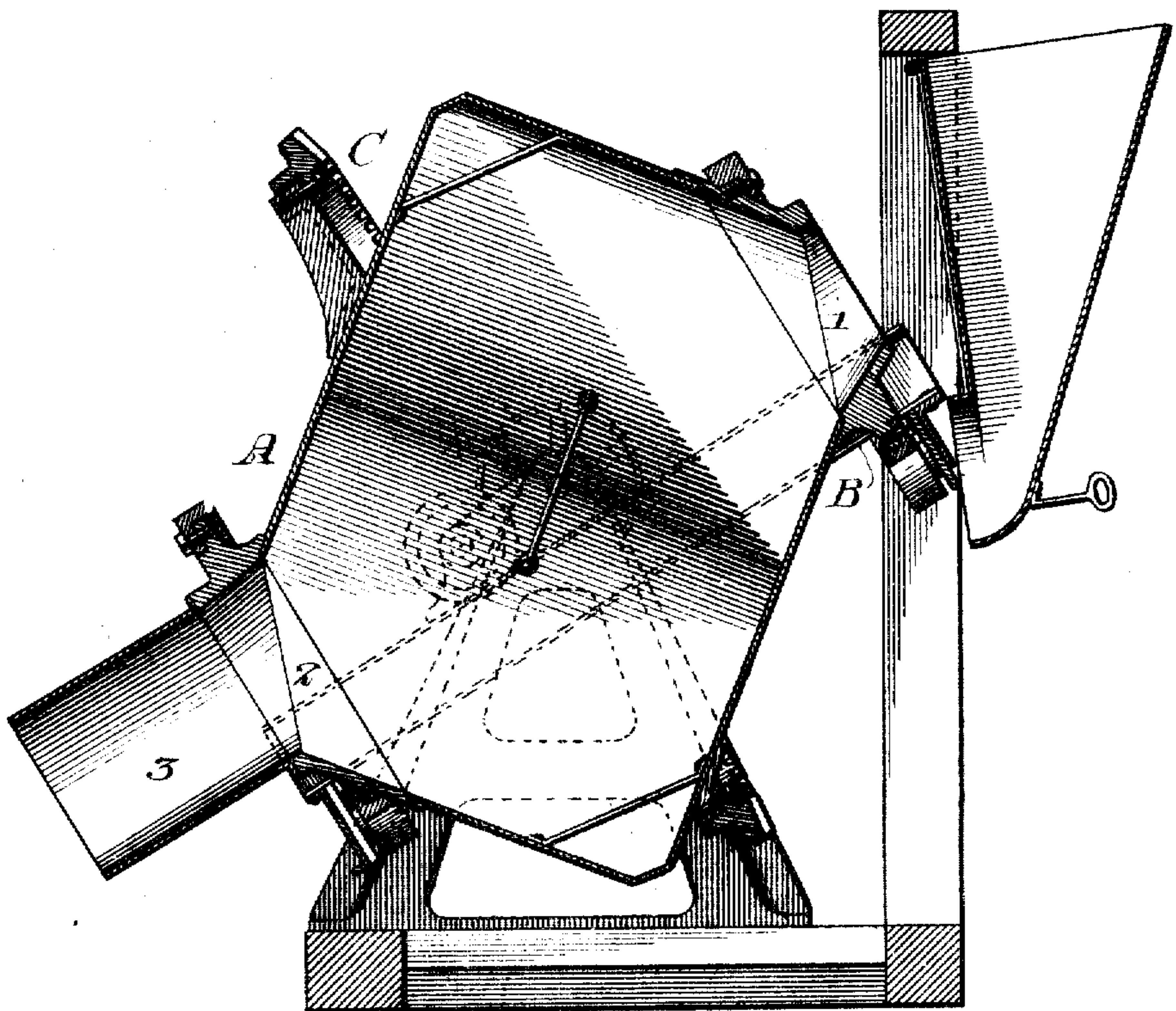
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

*Wm. H. Lohr*

*J. P. Freeling*

Inventor:

*Charles E. Bathrick*

*Chas. E. Page*

*By*

Att'y.

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3 SHEETS—SHEET 3.

Fig. 3.

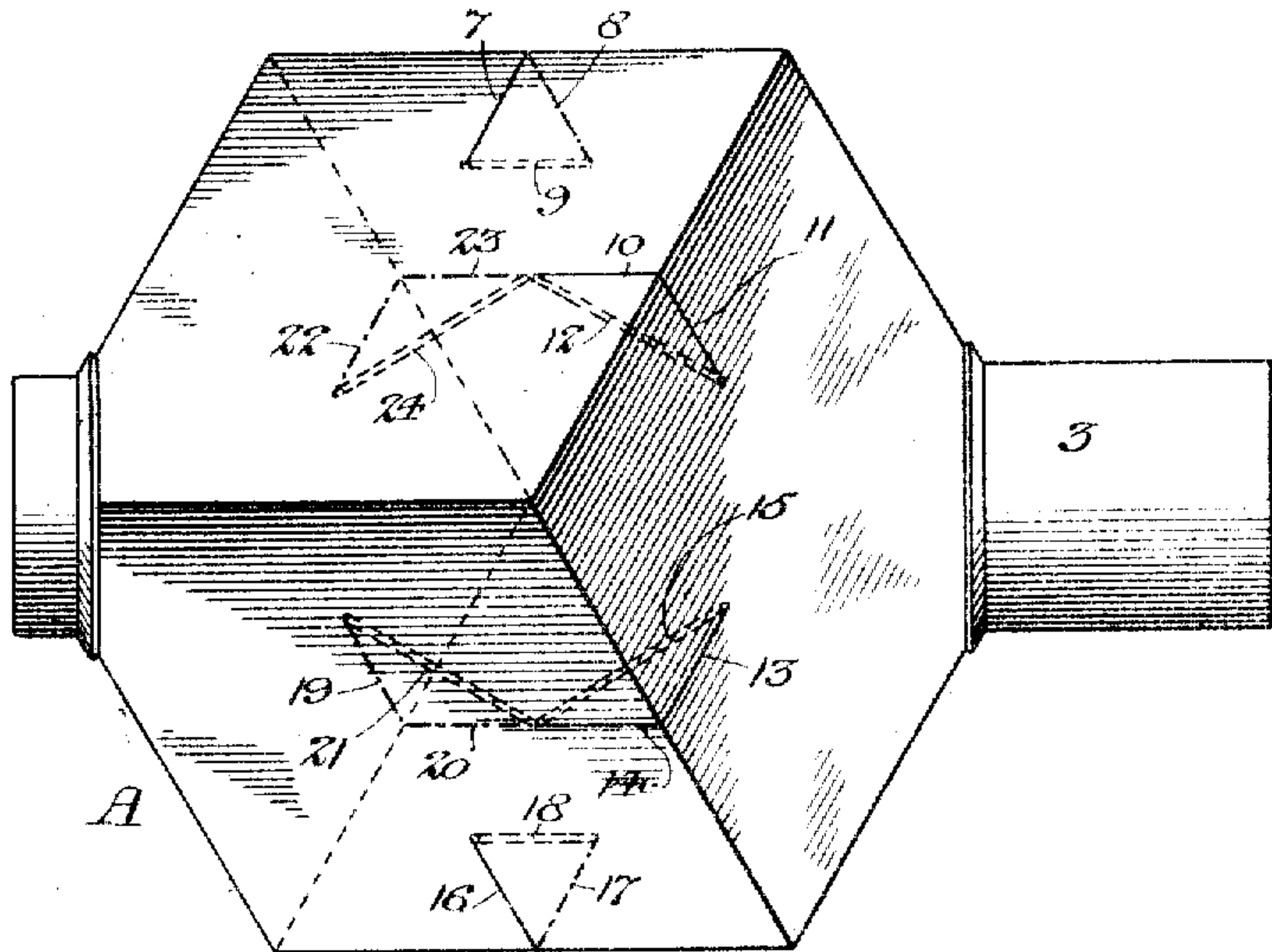
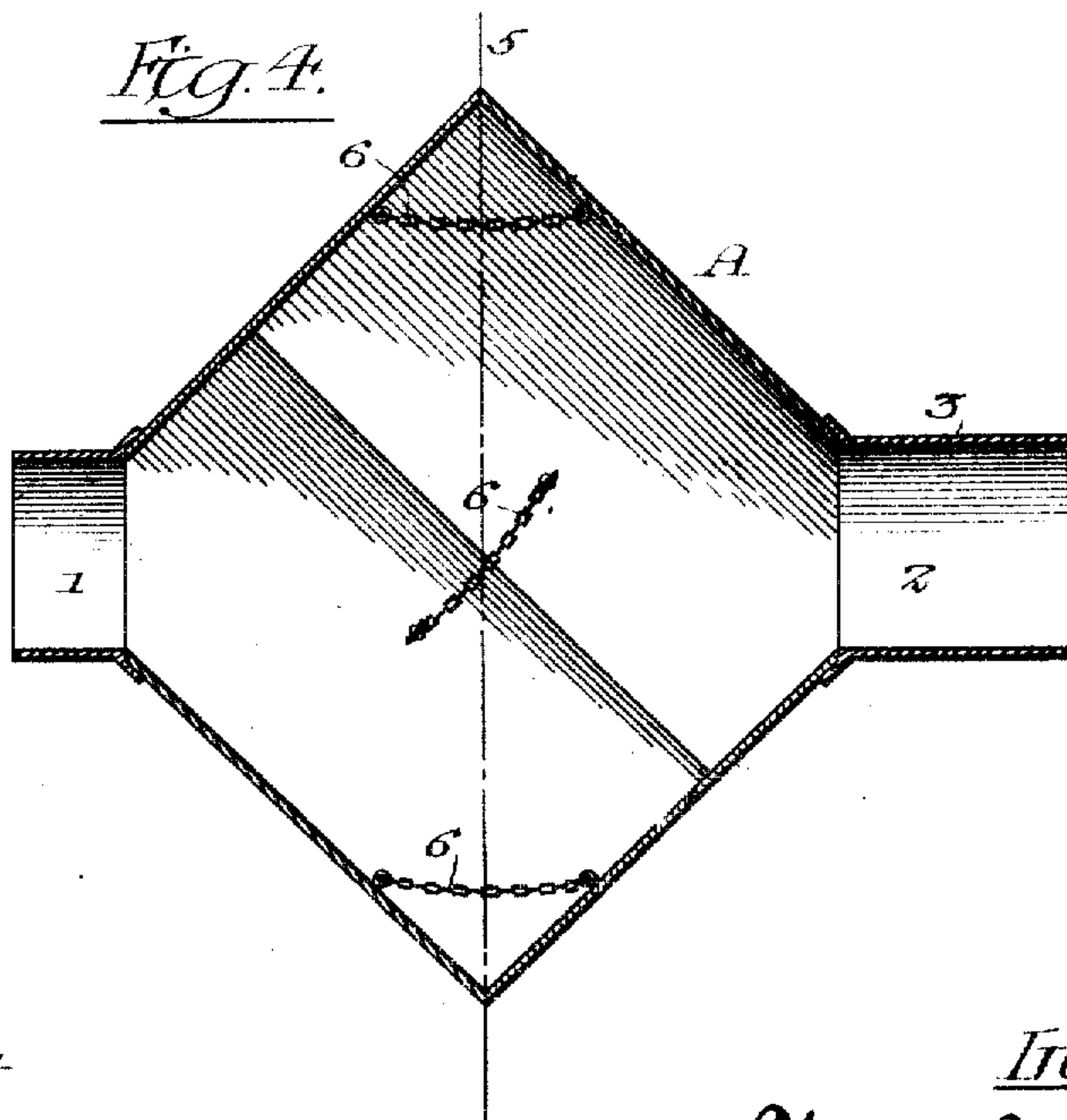


Fig. 4.



Witnesses:

Chas. H. Whitehead  
O. P. Freiberg

Inventor:

Charles E. Bathrick  
By Chas. E. Page  
Atty.



# UNITED STATES PATENT OFFICE.

CHARLES E. BATHRICK, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

## CONCRETE-MIXER.

No. 920,416.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed June 29, 1906, Serial No. 324,077.

*To all whom it may concern:*

Be it known that I, CHARLES E. BATHRICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete-Mixers, of which the following is a specification.

My invention relates to improvements in mixing machines for concrete and the like involving a cube-shaped or cubiform mixing box or receptacle, a tilting frame or support arranged to revolve thereon about a diagonal axis, the said receptacle being provided with one or two openings concentric or substantially concentric with its axis of rotation, and being revolved by suitable driving means adapted for operation continuously.

Objects of my invention are to provide the mixing receptacle with efficient means for breaking up lumps of sand and the like during the operation of mixing concrete, and to adapt such breaking means to accentuate the peculiar operation of the cubical mixing receptacle. Also to avoid retardation of the mixing action, and to avoid retardation of discharge when the mixing receptacle is tilted for such purpose.

In the accompanying drawings: Figure 1 is a side elevation of a mixing machine in which my invention is understood to be embodied. Fig. 2 is a longitudinal section taken through Fig. 1 on a vertical central plane, the mixing receptacle in Fig. 1 being in the usual mixing position, while in Fig. 2 it is tilted for the purpose of discharging its contents. Fig. 3 is an isometric perspective view of the cube-shaped mixing receptacle with certain full and dotted lines illustrating the relative position of the breakers. Fig. 4 is a central section through the cube mixing receptacle on a plane through and coincident with the diagonal axis of rotation, the breakers being formed by chains, while in Fig. 2 the breakers are formed by rods.

The cubiform mixing box or receptacle A is mounted upon a tilting frame or support B and arranged thereon so as to revolve about a diagonal axis. This cubical mixing receptacle is provided with a charging opening 1 and a discharging opening 2, these two openings being concentric or substantially concentric with the diagonal axis of rotation. The discharging opening is also prolonged by a spout or nozzle 3, particularly when it is intended to provide a charging opening 1 and

to use the opening 2 for discharge only. The box can be charged from any suitable chute, hopper or the like, in any suitable way. Preferably the tilting support B is in position to maintain the diagonal axis of rotation horizontal or substantially so, as in Fig. 1, during the mixing operation, and to discharge a mixed-up batch of concrete the support B can be tilted as in Fig. 2. The mixing receptacle is continuously revolved about the diagonal axis by any suitable driving means, for example, the mixing receptacle is journaled on the tilting support B and provided with a ring-gear C, which is understood to be engaged by a pinion on a rotary driving shaft 4. Means for tilting the support B are not shown, as the same are now well known in the art.

During the process of mixing concrete it frequently happens that lumps of sand are supplied to the mixing receptacle, and it frequently happens that these lumps are not broken up during the mixing operation, whereby imperfect and faulty work results. Blades or like agitators in concrete mixers have also been avoided if possible, owing to the fact that while they tend to break up large lumps in case the lumps contact therewith during operation, the presence of a large number of blades or like agitators collect material which adheres thereto and soon becomes hard, thereby necessitating time and expense in cleaning out the mixer. It is also evident that this trouble will increase proportionally to an increase in the number of agitators employed.

In carrying out my invention, the interior of the cube or cubiform mixing receptacle is provided with a series of breakers consisting of short rods or chains attached at their ends to the planes which constitute the sides of the cubical receptacle and arranged to cross certain angles thereof, each breaker being in effect the hypotenuse of an angle, or in other words, forming the hypotenuse of an angle produced by the intersection of two of such planes. This arrangement has special relation to the action of the cubical box or receptacle upon a contained mass of concrete when the receptacle is revolved about a diagonal axis, and accentuates the peculiar action involved while the axis of the revolving receptacle is in repose, as in the operation of mixing, and while such axis of the still revolving box is being tilted for the pur-



pose of discharging the product. When the diagonal axis of the cubical mixing receptacle is horizontal or substantially so, and such cubical mixing receptacle is revolved, each of the six sides or planes of such receptacle acting alternately in one revolution serves to throw the concrete from a plane following a curve of ascension against a plane with a curve of descension. This change of position with regard to the contents of the cubical receptacle occurs with each one sixth revolution of the cubical receptacle about its axis, and thus the concrete is thrown from one side to another of the cube six times during one revolution. 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 the 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.

The angles produced by the breakers and intersecting planes or sides of the cubical box or receptacle have their vertices in a plane transverse to the diagonal axis of rotation and midway of the opposite openings or corner portions of the box through which such axis extends. This arrangement is illustrated in Fig. 4 by the assistance of dotted line 5, which indicates a plane transverse to the diagonal axis of rotation and midway of the diagonally opposite open corner portions of the cubical mixing receptacle, each of the three breaker chains 6, therein shown being the hypotenuse of a triangle whereof the apex is intersected by the plane indicated by said dotted line. The breakers cross the angles formed by intersecting sides or planes at points midway of certain corners of the cubical box, as best illustrated in Fig. 3. In this figure which is an isometric perspective view of a cube, the six angles formed by breaker rods or chains in conjunction with intersecting sides or planes are as follows: The two sides of one angle are indicated by full line 7 and dotted line 8, and the hypotenuse of such angle formed by a breaker rod or chain is indicated by dotted line 9. The two sides of the next angle are indicated by full lines 10 and 11, and the hypotenuse consisting of a breaker rod or chain by dotted lines 12. The two sides of the next angle are indicated by full lines 13 and 14, and the hypotenuse consisting of a breaker rod or chain by dotted lines 15. The two sides of the next angle are indicated by full line 16 and dotted lines 17, and the hypotenuse consisting of a breaker rod or chain by dotted line 18. The sides of the next angle are indicated by dotted lines 19

and 20, and the hypotenuse consisting of a breaker rod or chain by dotted lines 21. The two sides of the next angle are indicated by dotted lines 22 and 23, and the hypotenuse consisting of a breaker rod or chain by dotted lines 24. Where chains are employed they are preferably a little slack so as to yield and swing to some extent during operation. The breakers whether consisting of rods, links or chains, are preferably detachably secured in place, illustration of breaker rods thus attached being afforded by Fig. 2. In this figure the outer apex portions of the angles formed by intersecting planes are flattened down, but in this case as in the case of Figs. 3 and 4, the angles formed by the breakers and the sides involve apices formed by intersecting planes in which such sides are arranged. The breaker rods or chains thus arranged, rapidly and effectively break up lumps of sand and the like, and do not retard the foregoing described peculiar movement of the mass of material. To the contrary, they accentuate such movement and also do not retard the ejection of the concrete when the cubical mixing receptacle is tilted as in Fig. 2 and revolved. This arrangement therefore avoids clogging and free discharge, and also materially assists in the operation of mixing. It also involves a minimum number of breakers in position to produce what may be termed a maximum effect.

The term "substantially cubiform" hereinafter employed in the claim, is intended to cover a mixing receptacle sufficiently similar to a cube to involve substantially the characteristic mixing action hereinbefore described.

The apices of the triangle involving the breaker rods or chains are all shown in the plane hereinbefore described, but I desire to also cover the apices substantially in such plane, and at points either midway or substantially midway of certain corners of the receptacle whereby the relative arrangement of breaker rods or chains is substantially as set forth, in order to provide adjunctive means for breaking up lumps and also serving to accentuate the peculiar mixing action described.

The general action of the cube shown in Fig. 11, is further illustrated by the fact that when it is revolved about a diagonal axis passing through the two corner portions reserved for charging and discharge openings, the three of the six remaining corners will move in one and the other remaining three in another of two parallel planes transverse to the axis of rotation and parallel with a transverse plane intersecting the mixing receptacle at points between these last mentioned corners and indicated by dotted line 5 in Fig. 4, and where the breakers are arranged substantially as therein shown, their points of attachment are in or substantially in series in



planes parallel or substantially parallel with the two planes in which the said six corners revolve, said planes being respectively at opposite sides of and parallel with the middle transverse plane indicated by dotted line 5. It will also be seen that with reference to the cut away corners through which the diagonal axis of rotation passes, the transverse plane indicated by dotted line 5 is between such corners and that the breakers arranged in series about the axis of rotation intersect said plane and are oblique thereto.

What I claim as my invention is:

In a machine for mixing concrete, and the like, a cubiform or substantially cubiform mixing receptacle mounted upon a tilting

support and arranged to revolve about a diagonal axis, and breakers consisting of chains or rods arranged within the mixing receptacle in annular series about the axis of rotation, the breakers in conjunction with intersecting planes or sides of the receptacle forming a series of triangles, the apices of which are in or substantially in a plane transverse to and intersecting the axis of rotation, said plane also being oblique to and intersecting each breaker forming the hypotenuse of a triangle such as herein set forth.

CHARLES E. BATHRICK.

Witnesses:

CHARLES G. PAGE,  
OTILIE C. FREIBERG.