No. 898,171. PATENTED SEPT. 8, 1908.

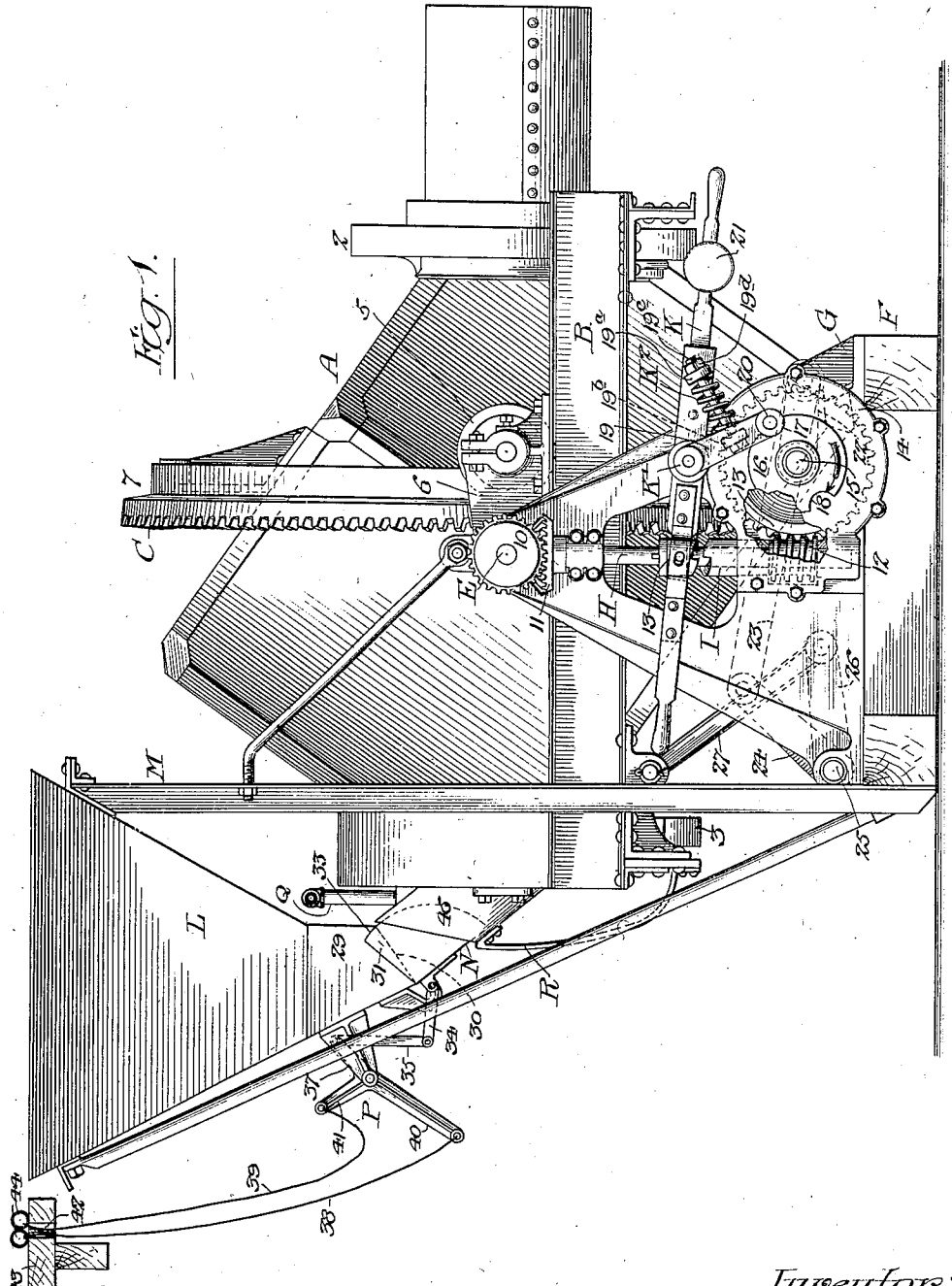
C. E. BATHRICK.

MIXING MACHINE.

APPLICATION FILED AUG. 14, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:-
Louis W. Hollenhead
O. C. Freiberg

Inventor:-
Charles E. Bathrick
By:- Chas. G. Page Atty:-

No. 898,171. PATENTED SEPT. 8, 1908.

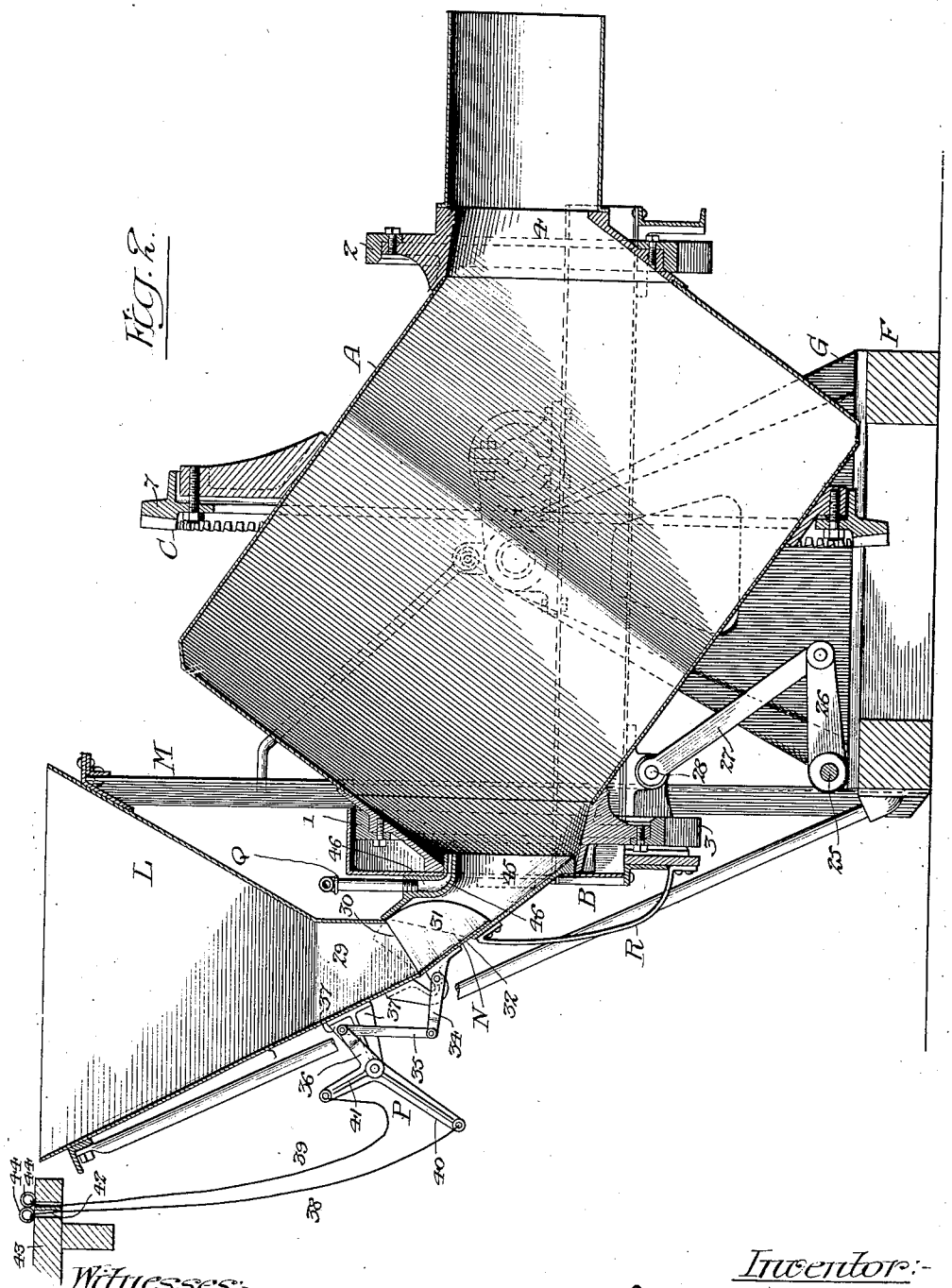
C. E. BATHRICK.

MIXING MACHINE.

APPLICATION FILED AUG. 14, 1905.

5 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Louis M. Whitehead
O. C. Freiberg

Inventor:
Charles E. Bathrick
By: Chas. G. Page
Atty.

No. 898,171. PATENTED SEPT. 8, 1908.

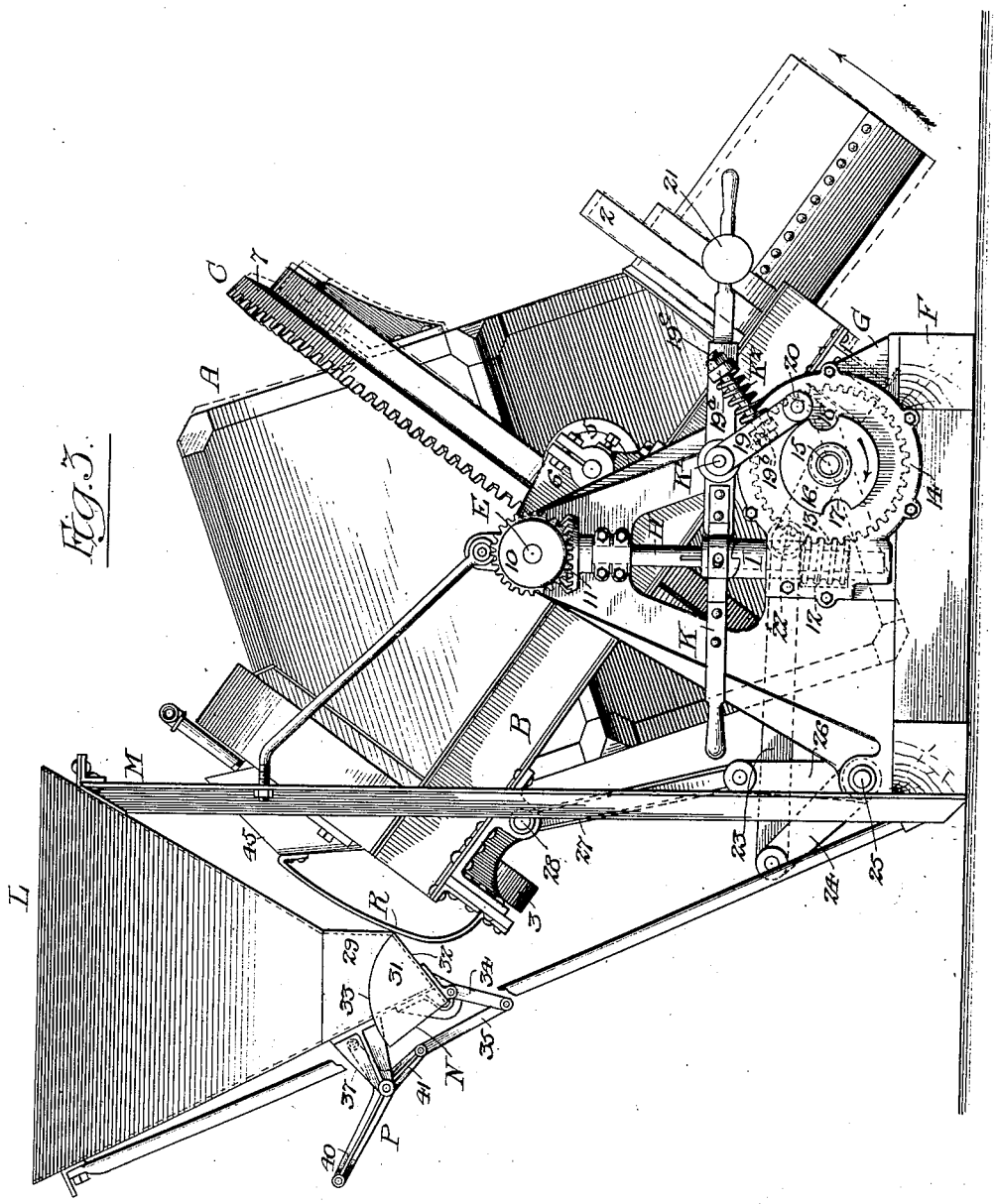
C. E. BATHRICK.

MIXING MACHINE.

APPLICATION FILED AUG. 14, 1905.

5 SHEETS—SHEET 3.

Fig. 3.



Witnesses:-
Louis M. Hollibaugh
O. C. Freiberg

Inventor:-
Charles E. Bathrick
by:- Chas. G. Page Atty.

No. 898,171. PATENTED SEPT. 8, 1908.

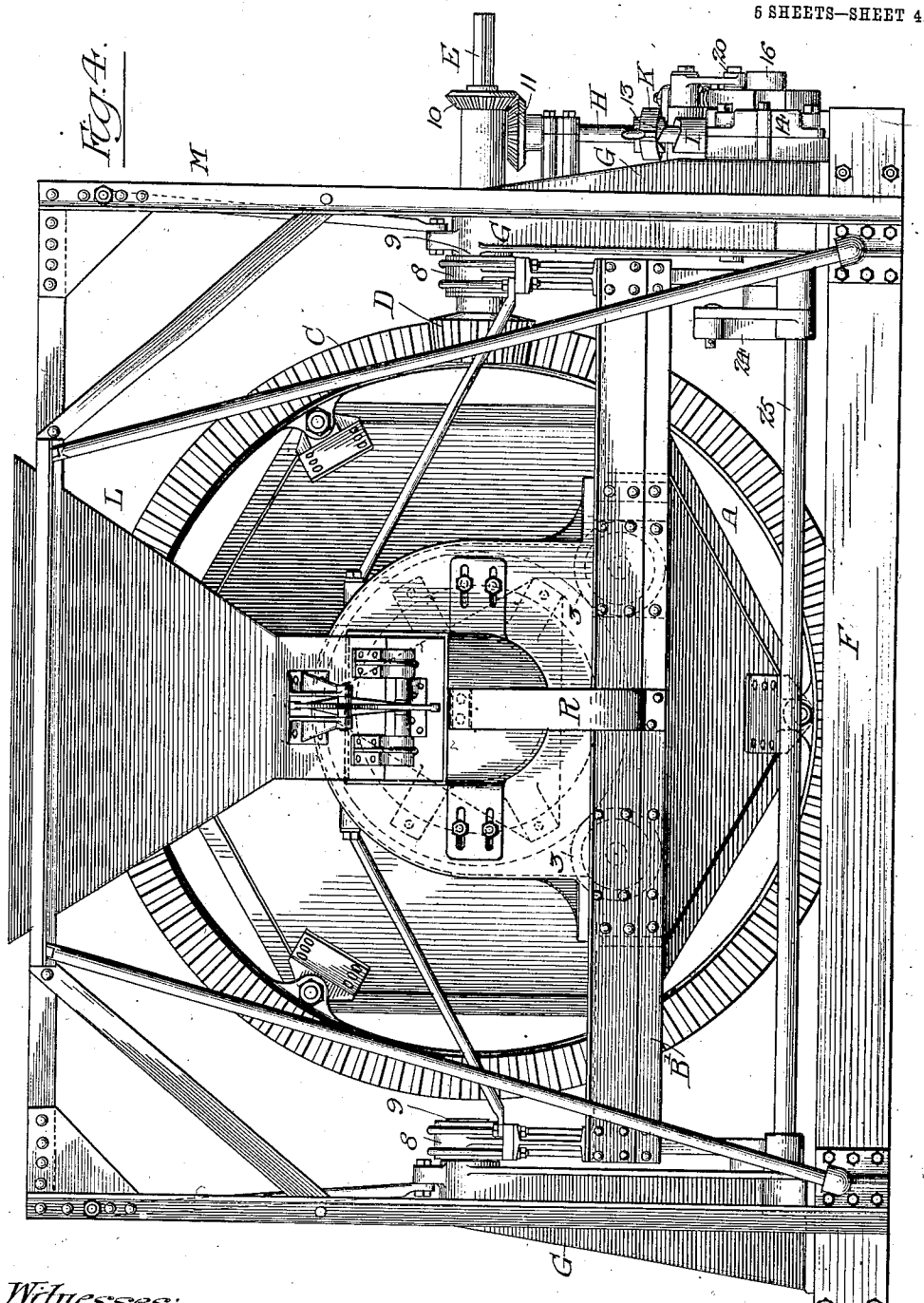
C. E. BATHRICK.

MIXING MACHINE.

APPLICATION FILED AUG. 14, 1905.

5 SHEETS—SHEET 4.

FIG. 4.



Witnesses:-
Louis W. Whitehead
O. C. Freiberg

Inventor:-
Charles E. Bathrick
by:- Chas. G. Page
Atty:-

No. 898,171. PATENTED SEPT. 8, 1908.

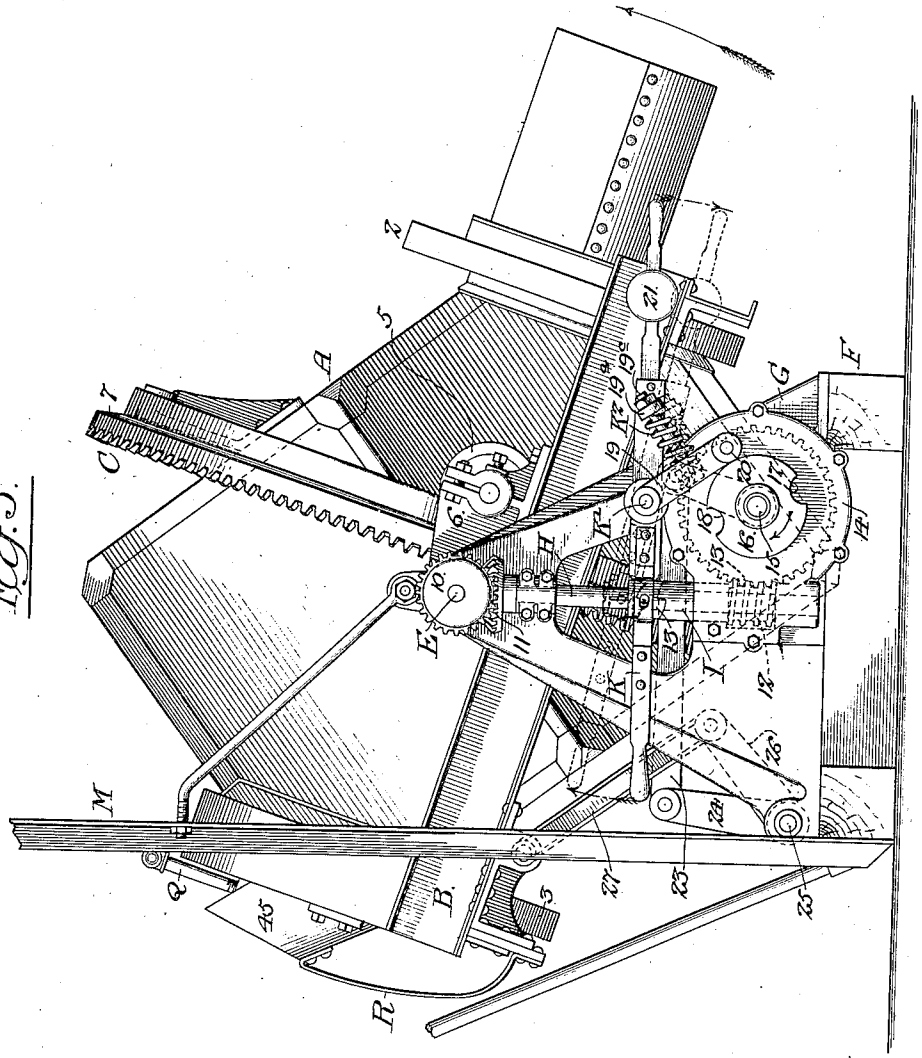
C. E. BATHRICK.

MIXING MACHINE.

APPLICATION FILED AUG. 14, 1905.

5 SHEETS—SHEET 5.

FIG. 5.



Witnesses:-

Louis M. T. Whitehead

O. C. Freiberg

Inventor:-

Charles E. Bathrick

By:- Chas. G. Page

Atty:-

UNITED STATES PATENT OFFICE.

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

MIXING-MACHINE.

No. 898,171. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed August 14, 1905. Serial No. 274,075.

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 Mixing-Machines, of which the following is a specification.

My invention relates to machines adapted for mixing concrete, mortar, and the like, and involving a mixing receptacle arranged to revolve upon a tilting support; means for continuously rotating the mixing receptacle, and means for tilting the support for the mixing receptacle so as to tilt the latter into position for discharging a mixed-up batch, and then reversely tilt such support so as to again bring the mixing receptacle into position for charging and mixing.

In a mixing machine characterized by my invention, power for tilting the mixing receptacle support is taken from continuously operating means employed for rotating the mixing receptacle, the connection between such operating means and the tilting device being established and interrupted by a device which is manually operated to establish connection, and automatically operated to interrupt such connection at the moment the mixing receptacle has been tilted into position for discharge, and also at the moment the mixing receptacle in tilting back from its discharge position has reached a proper position for charging.

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 for receiving and mixing together the materials employed for forming mortar, concrete or the like. Fig. 2, is a section taken through the machine of Fig. 1 on a vertical, central plane coincident with the axis about which the mixing receptacle revolves. Fig. 3, is a view similar to Fig. 1, but showing the mixing receptacle and its tilting supporting frame in position to permit the discharge of a mixed-up batch from the mixing receptacle. Fig. 4, is an elevation of the mixing machine as seen from the left in Fig. 1. Fig. 5, is a side elevation with the support B slightly tilted.

The mixing receptacle A is revolubly supported upon a rectangular tilting frame B. As a preferred arrangement, the mixing receptacle is supported upon the tilting frame by suitably arranged anti-friction rolls and to such end, it is provided with annular bearings 1 and 2, (Fig. 2), and the tilting frame is provided with anti-friction rolls upon which the bearings 1 and 2 are supported, as illustrated for example, in Fig. 4, in which the annular bearing 1 and a pair of supporting anti-friction rolls 3 therefor are illustrated in dotted lines, it being understood that a like arrangement of anti-friction rolls is provided for the remaining annular bearing 2.

The mixing receptacle illustrated is provided with a discharge opening 4 (Fig. 2), and an oppositely arranged charging opening, both of said openings being coincident with the axis about which the mixing receptacle revolves. During the operation of mixing and discharging successive batches of material, it is customary to revolve the mixing receptacle continuously as in preceding mixing machines, and to such end the mixing receptacle is provided with a bevel ring-gear C, which is secured upon the mixing receptacle and arranged between the charging and discharge openings.

The bevel-gear C is engaged by a pinion D (Fig. 4), fixed upon a rotary shaft E, which said shaft is driven from any suitable engine or motor in any desired or suitable way. The teeth of the gear C are on one side of the ring-plate as shown, and the opposite plane side of the ring-plate is engaged by an idler roll 5, supported by a bearing 6 on one side of the tilting frame B, and preferably a like idler roll is supported upon the opposite side of the tilting frame and likewise arranged to engage the plane face 7 of the ring gear plate as indicated by dotted lines in Fig. 2.

F denotes a base-frame upon which standards or upright side pieces G are secured. The upper portions of these side pieces G are provided with suitable bearings upon which the frame B is hung, as best illustrated in Fig. 4, wherein the frame B is provided with hangers 8 extending upwardly from opposite sides of said frame and hung upon studs or pivots 9 on the standards or frame portions G, it being observed that the shaft E shown in Fig. 4 extends through one of these pivots or bearing-portions 9, which is of course suitably bored for such purposes.

During operation the shaft E is usually driven continuously so as to revolve the mixing receptacle without stops. While the

driving mechanism for thus revolving the mixing receptacle is in operation, the tilting frame B can be tilted from the position shown in Fig. 1 to the position shown in Fig. 3, and then tilted back into the position shown in Fig. 1. As a means for thus tilting the frame B, the shaft E is provided with a bevel-gear 10, which is suitably fixed or keyed thereon, and arranged to engage a lower bevel-gear 11, which is secured upon the upper end of a vertically arranged rotary counter-shaft H. A worm-sleeve I is loosely fitted upon the lower portion of the counter-shaft H and arranged with its threaded portion 12 in engagement with a rotary gear-wheel 13. The worm-sleeve I also forms one member of a clutch by which power can be taken from the counter-shaft H, the other member 13^a of said clutch being splined to slide upon and rotate with the counter-shaft H. When, therefore, the clutch member 13 is moved downward into position to engage the upper end of the worm-sleeve I, the latter will revolve with the counter-shaft H and in turn serve to rotate the gear-wheel 13. The gear-wheel 13 is arranged within a casing 14, which is partially broken away in Fig. 1, so as to show portions of the worm portion 12 and the gear 13 in elevation. The gear 13 is fixed upon an axle 15 having one end portion projecting outwardly through the casing 14 and provided with a stop device 16, which as shown, is practically a cam-disk consisting of a circular plate having oppositely arranged peripheral notches or low portions 17 and 18. The cam is rotated from a suitable source. Thus the upper clutch member 13^a is engaged by a clutch shifter K, which has a pivotal connection with said clutch member, it being understood that the clutch member 13^a has, for example, a loose ring provided with pivots which project through slots in opposite sides of an annular portion of the clutch shifter K, and that as this is a common arrangement in clutches, it is not considered necessary to illustrate details of this portion of the machine. It will be observed, however, that one of the pins on the clutch member is shown projecting through one of the slots in the clutch shifter.

The clutch shifter K is pivoted at K′ on one of the standards G and is provided with a pendent swinging arm 19, which is in the nature of a pivoted catch or latch device. This arm 19 is hung at its upper end and swings about pivot K′ for the lever K, and is provided at its outer free end with an anti-friction roll 20, adapted to fit in one and the other of the recesses 17 and 18 of disk 16, in alternation. The bar or lever which forms the clutch shifter K, is also provided with a weight 21, arranged between the arm or catch 19 and the next adjacent end of the said bar. A spring K^2 is arranged between lugs 19^a and 19^b respectively on the lever K and the arm 19, and as a preferred arrangement a rod 19^c extends through the spring and lugs and has nuts on its end portions which project beyond the lugs, at least one of such lugs having a hole for the bolt of such size that the arm 19 can swing independently of the bar K. When the parts are in the position shown in Fig. 1, the roll 20 rests in notch 17 of plate 16, the weighted end portion of the clutch shifter K being depressed and kept down by reason of the weight 21, and the clutch member 13 being thereby maintained in a raised position and free from the clutch member I, which also forms a worm-sleeve.

As shown in Fig. 1, the axis of rotation of the mixing receptacle is horizontal when the mixing receptacle is in position to receive materials from an elevated hopper L, and also to mix the said materials. At this juncture, the driving shaft E and the counter-shaft H are understood to be revolving, while on the other hand, the gear 13 and the worm-sleeve I are stationary. When it is desired to tilt the frame or support for the mixing receptacle so as to tilt the latter to an extent to permit it to discharge its contents, an attendant will raise the weighted end portion of the clutch shifter K, or what is the same thing, depress the opposite end of the clutch shifter to an extent to bring the clutch member 13^a into engagement with the combined worm-sleeve and clutch member I. This action causes the combined clutch member and worm-sleeve I to be driven by counter-shaft H, and at the same time the rise of the weighted end of the clutch shifter K will raise the latch 19 out of notch 17 in the cam-disk and thereby permit said cam-disk 16 to revolve in the direction indicated by the arrow in Figs. 1 and 3. The worm-sleeve I being thus operated by the counter-shaft H, will turn the gear 13 to the right and the lower end of the arm or catch 19, will ride upon the high peripheral portion of the cam-disk 16 until the latter has made a half revolution, and at such juncture the lower end of the arm or catch 19 will drop into the notch 18, so as to lock said disk and permit the weight 21 to operate the clutch shifter in a way to raise the clutch member 13^a and thereby disconnect the combined clutch and worm-sleeve I from the driving power. During this half revolution of the cam-disk or plate 16, the frame B is tilted in a direction and to an extent to bring the mixing receptacle into the discharging position shown in Fig. 3, it being observed that the notches 17 and 18 of the cam disk are timed with reference to such extent of movement on the part of the supporting frame B. As a means for thus tilting the supporting frame B, the axle 15 of the gear 13, is provided with a crank-arm 22, shown in dotted lines in Figs. 1 and 3. This crank-arm has its outer end jointed

to a link 23 shown in dotted lines in Fig. 1, and in full and in dotted lines in Fig. 3. One end of the link 23 is jointed to the outer end of one of the arms 24 of a bell-crank, which is arranged upon a rock-shaft 25, the outer end of the remaining arm 26 of said bell-crank being jointed to the lower end of a link 27, (Figs. 2 and 3) which has its upper end pivotally connected with the tilting frame B, as at 28.

When the several members are in the position shown in Fig. 1, the crank-arm 22 projects from the axle 15 to the right as indicated and the bell-crank and links will also be in substantially the relative position indicated in dotted lines. When the cam-disk 16 makes a half revolution so as to transfer the lower end of latch 19 from notch 17 to notch 18, the crank-arm 22 will swing downwardly and then forwardly toward the clutch sleeve I, and during such movement the link or connecting rod 23 will be actuated by the crank-arm so as to in turn operate the bell-crank and cause the latter to tilt the frame B, by reason of its connection therewith, substantially as illustrated in Fig. 3. It is understood, however, that in Fig. 3, the attendant desiring to tilt the frame B back so as to again bring the mixing receptacle into position for charging and mixing, has again manipulated the clutch shifter K, so as to connect the worm-sleeve I with the power and lift the lower end of latch 19 from notch 18 in the cam-disk 16, and that in said figure the cam-disk 16 and gear 13, are understood to be moving in the direction of the arrow, and that as such movement continues, the crank-arm 22 will swing upwardly and back to its first position illustrated in dotted lines in Fig. 1, and that in so doing it will operate the bell-crank in a direction reverse to the preceding operation thereof and thereby cause the link 7 to tilt the frame B back to the position shown in Fig. 1.

It will, therefore, be seen that while the clutch shifter K is manually operated to start the tilting mechanism, the latter is automatically arrested at each of its two desired movements, that is to say—it is automatically arrested when the mixing receptacle reaches a position for dumping or discharging, and also when the mixing receptacle has moved back into position for charging and mixing.

From the foregoing it will be seen that the notches or low cam portions 17 and 18, are timed with reference to the two extremes of the permitted vibratory movement of the mixing receptacle support, and that when the latter reaches either extreme, the tilting power is automatically disconnected from it, and it is also automatically and temporarily locked in position. In Fig. 1, the tilting means is shown locked by latch 19 engaging the notch or low cam portion 17, the clutch member 13^a being raised free of the clutch member I, so as to disconnect the operating power, and the weighted end of the clutch shifter K being depressed to permit latch 19 to thus engage in the notch 17, it being observed that the permitted extent of expansion on the part of spring K^2 is not sufficient of itself to depress the lower end of latch 19 into the notch 17. In Fig. 3, the latch 19 is understood to have just left notch 18, by reason of the weighted end of the clutch or shifter K having been raised to cause clutch member 13^a to engage clutch member I, and a consequent movement of cam-plate 16 in the direction of the arrow. When the weighted end of the clutch shifter K is raised as in Fig. 3, the spring K^2 will be compressed between lugs on the shifter or lever K and the arm or latch 19. It oftentimes happens, however, that it is desirable to dump only a small portion of the mixed-up batch, as for example, in filling a wheelbarrow. In order to secure such result, an attendant can arrest the dumping tilt of the mixing receptacle at any point between the two extremes hereinbefore mentioned. In Fig. 5, the cam-plate or disk 16 has turned from the position shown in Fig. 1 to an extent to permit the frame B to tilt sufficiently to depress the discharge port of the mixing receptacle, the tilt, however, being at this point less than that shown in Fig. 3. When the parts for example are as in Fig. 5, the attendant can depress the weighted end of the lever or shifter K, and this can be easily done by raising the opposite end of such lever. This action disconnects clutch member 13^a from clutch member I, and thereby stops the tilting action, it being observed that the lower end of latch 19 will still bear on the high portion of cam 16, and that this rise of the unweighted end and depression of the weighted end of lever K will further compress spring K^2 which being free to thus yield, permits such action on the part of lever K.

The hopper L is shown supported upon a frame portion M, which rises from the stationary base frame F, F. The hopper is also provided at its lower end with a discharge neck or chute portion 29, having the edge of its discharge orifice in an inclined plane as indicated by line 30, in Fig. 2. This discharge end portion of the hopper is provided with a combined valve and chute N constructed with two oppositely arranged side portions 31, and a back or bottom portion 32. Each of the two side portions 31 is formed with a curved edge portion 33, and these two side portions 31 are placed so as to receive between them the lower discharge portion 29 of the hopper when said combined valve and chute N is swung back as in Fig. 3. The combined valve and chute N is attached to one arm or member 34 of a two arm toggle, the remaining arm 35 of said toggle having

its outer end pivoted to an arm 36 (Fig. 2) on the bell-crank P. The bell-crank is supported by a bracket 37 upon the hopper, and cords or chains 38 and 39 are attached to the arms 40 and 41 of the bell-crank and carried up through an opening 42 in a suitably elevated fixture 43, and provided with rings or stops 44 on their ends which extend above the opening 42.

The tilting frame which supports the mixing receptacle is provided with a receiving spout or chute 45, which is fixed upon said frame and arranged to extend into the receiving opening of the mixing receptacle. When the mixing receptacle is tilted to the position for charging as in Figs. 1 and 2, portions of the sides 31 and bottom 32 of the gate or valve N project within the chute 45 on the tilting frame and the toggle 34 and 35, and the bell-crank P will be in or substantially in the relative positions shown in said two figures. When the frame is tilted for the purpose of bringing the mixing receptacle into the discharge position shown in Fig. 3, the upward movement of the receiving spout or chute, or mouth-piece 45 on the frame B, will tilt the hopper gate N upwardly and away from the mixing receptacle and cause it to assume the position shown in Fig. 3, wherein it will be seen that the back or bottom 32 of the gate N temporarily closes against and covers the discharge opening of the hopper, the said gate being temporarily locked in such position by the toggle arms 34 and 35, which become folded substantially as illustrated.

After the material has been discharged and the mixing receptacle has been brought back into the position shown in Figs. 1 and 2, an attendant can unlock the gate N by operating the bell-crank P, and if convenient, he can operate said bell-crank by first drawing upwardly the cord or wire 39 and then drawing upwardly the cord or wire 38. When, therefore, the mixing receptacle is tilted for purposes of discharge, the hopper will be temporarily closed by the gate N, and when the mixing receptacle is in receiving position, the gate N can be swung forward and downwardly so as to form a continuation of the discharge passage in the lower discharge portion 29 of the hopper, it being seen that the back or bottom portion 32 of said gate bridges a space between the hopper and the mouth-piece 45, and that as the said gate N is trough-shaped, the spilling of fine materials on their way from the hopper to the mouth-piece 45, will be avoided.

Q indicates a pipe secured upon the mouth-piece 45, and 46 (Fig. 2), indicates a passage extending from pipe Q into the mixing receptacle, its discharge end being at a point over the inner end of the mouth-piece 45. The pipe Q is screwed into the upper end of the channel 46, and in practice, a flexible hose pipe is attached to the pipe Q, which is in the nature of a rigid nozzle.

From the foregoing, it will be seen that the member 16 is in the nature of a rotary cam having stops or low portions which permit a part or member of the clutch device to drop or move in a direction to cause the shifting clutch member to automatically shift in a direction to disconnect the tilting device and the rotary cam from the driving power. On the other hand, when the clutch shifter is moved by an attendant in a direction to connect the driving power with the tilting device and rotary cam, the said part or member of the clutch shifter previously engaging the low part of the cam will be drawn away from such low part and be permitted to engage and ride upon the high portion of the cam, so as to keep the power on until it is in register with the next low part of the rotary cam. Also that the clutch shifting means can be operated so as to disconnect the tilting power from the frame when the latter is at any desired angle.

When the mixing receptacle is tilted from the position shown in Figs. 1 and 2, toward the position shown in either Fig. 3 or Fig. 5, the chute or mouth-piece 45 which is supported upon the tilting frame B, will act upon the tilting chute 34 and swing the same back into the position shown in Fig. 3, and in order to prevent the hinged chute N which in Fig. 3 forms a bottom for the hopper, from accidentally swinging forward when the frame B is in the position shown in Fig. 3, or Fig. 5, the said frame is provided with a guard R which maintains the combined chute and bottom N in the position shown in Fig. 3 until the frame B carrying the mixing receptacle has been tilted back into substantially the position shown in Figs. 1 and 2. It is observed that the mouth-piece 45 which is fixed on the frame B, projects within the mixing receptacle, which latter revolves independently of the said mouth-piece, the latter being stationary upon the tilting frame.

By my arrangement, the transverse portion 32 of the combined chute and valve or gate, forms a chute which leads from the hopper spout 29, and which is practically continued by an inclined bottom portion of the mouth-piece 45 when the mixing receptacle is in receiving position, as in Fig. 2, and the combined valve or gate and chute N has been swung forward into the position shown in said figure. It will also be seen that the discharge spout 29 of the hopper has its lower open end formed transversely on an inclined plane, which inclines upwardly and forwardly toward the mixing receptacle so that when the combined valve and chute 31 is swung back from its position shown in Fig. 2, its transverse portion 32 which may properly be termed its bottom portion, is brought close against the inclined end 30 of the hop-

per spout. This arrangement also permits each side 31 of the combined valve and chute to be made as a segment pivoted at or substantially at the apex of the angle, as illustrated in Figs. 2 and 3, whereby when the combined valve and chute is swung forward, it can readily project into the upper end portion of the mouth-piece 45, and this arrangement as shown in Fig. 2, permits the upper end of the mouth-piece 45 to be in juxtaposition to the lower end of the hopper spout 29 when the mixing receptacle is in receiving position. When, therefore, these parts 29 and 45 are thus brought together or into close juxtaposition, a practically continuous passage is established between the hopper and the mixing receptacle, whereby leakage of sand and fine material passing from the hopper to the mixing receptacle is avoided. It will also be observed that the opposite segmental sides 31, 31, of the combined valve and chute N, are arranged against opposite sides of the hopper spout 29, whereby when the combined chute and valve N is in position to conduct material from the hopper into the mixing receptacle, its straight upper edges being outside the planes of two sides of the chute, will not form obstructions tending to cause collection of material which is being discharged from the hopper.

It will also be seen that when the combined valve and chute N is in the position shown in Fig. 3, it temporarily closes the outlet opening of the hopper spout 29, first, because its bottom 32 is against the lower end 30 of the hopper spout 29 thereby closing the discharge orifice of the hopper spout, and furthermore, when the combined chute and valve N is in this position, its sides 31 embrace the hopper spout and by reason of their union with the said bottom 32, a close joint is secured. It will also be seen that the device R is also a cam for acting against the combined valve and chute N.

What I claim as my invention is:

1. In a mixing machine, a rotary mixing receptacle; a tilting frame upon which the mixing receptacle is revolubly mounted; a mouth-piece secured upon the tilting frame and arranged for directing materials into the mixing receptacle; a hopper; and a valve for opening and closing the hopper, said valve being arranged to direct material into the mouth-piece when it is open, and being arranged to be swung back and closed by the mouth-piece when the frame is tilted, and a guard R for the purpose set forth.

2. In a mixing machine, a rotary mixing receptacle provided with an annular gear; a tilting frame upon which the mixing receptacle is mounted to revolve; a rotary main driving shaft gear-connected with the annular gear on the mixing receptacle as means for revolving the latter; a rotary counter-shaft gear-connected with said main driving shaft; a clutch having one of its members provided with a worm, and adapted for connecting and disconnecting said member with and from the counter-shaft; a rotary worm-wheel engaged by said worm; a crank rigid with the worm-wheel and connected with one arm of a vibratory bell-crank by a link or pitman; a link connecting the other arm of the bell-crank with the mixing receptacle support as a means for tilting the latter; a cam-disk 16 rigid with the worm-wheel and having peripheral notches 17 and 18; a vibratory clutch shifter K pivoted to the shifting clutch member and weighted at one side of such clutch member; and a locking arm 19 pivoted to the clutch shifter and having at one end an idler roll adapted to engage in one or the other of notches 17 and 18 of the disk 16, and to ride upon the periphery of said disk when not in engagement in the said notches.

3. In a mixing machine, a rotary mixing receptacle; a tilting support upon which the mixing receptacle is mounted to revolve; a vibratory bell-crank arranged below the mixing receptacle support; a link or pitman connecting one arm of the bell-crank with one end portion of the tilting mixing receptacle support; a rotary crank; power transmitting connection between said crank and the remaining arm of the bell-crank, and means for revolving the crank.

4. In a mixing machine, a rotary mixing receptacle; a tilting support for the rotary mixing receptacle; a shaft rotatable in one direction and means for rotating the receptacle therefrom; a toggle comprising a vibratory arm 26 and a link 27 connecting said arm with the tilting mixing receptacle support, and a crank operated from said shaft for vibrating the arm 26.

5. In a mixing machine, a rotary mixing receptacle; a tilting support for the rotary mixing receptacle; mechanism for tilting the support for the rotary mixing receptacle; a rotary cam device for automatically limiting the extent to which the mixing receptacle support can be tilted in each direction; means for driving said cam device, and means for shifting the connection between the rotary cam device and the tilting device and the driving means therefor.

6. In a mixing machine, a rotary mixing receptacle provided with a ring-gear; a tilting frame upon which the mixing receptacle is supported to revolve; a power driven shaft gear-connected with the ring-gear on the mixing receptacle; a counter-shaft gear-connected with the said power driven shaft; a device for tilting the mixing receptacle support; a clutch device for connecting the counter-shaft with the device for tilting the mixing receptacle support; and a rotary cam device for automatically disconnecting the tilting device from the counter-shaft, and a member of the clutch device for engaging the

high portion of the cam device and maintaining the clutch members in temporary relative engagement.

7. In a mixing machine, a rotary mixing receptacle; a tilting frame upon which the mixing receptacle is supported to revolve; a mouth-piece supported upon the tilting frame and registering with an opening in the mixing receptacle; a suitably supported hopper; a hinged gate N for opening and closing the lower end of the hopper, said gate being arranged to project within the said mouth-piece when the mixing receptacle is in charging position, and a toggle device for locking the said gate in position to close the discharge orifice of the hopper.

8. In a mixing machine, a rotary mixing receptacle provided with a ring-gear; a power driven shaft gear-connected with said ring-gear; a tilting support upon which the mixing receptacle is arranged to revolve; idler rolls 5 engaging the plane back face of the ring-gear; an upright counter-shaft gear-connected with said driving shaft; a rotary gear-wheel rigid with a cam device and means for connecting and disconnecting said gear-wheel with and from the counter-shaft; said rotary cam device being provided with high and low portions; a vibratory clutch shifter for operating the clutch; an arm 19 engaging the cam, and a weight on the clutch shifter for causing said arm to engage in the low portions of the cam.

9. In a mixing machine, a rotary mixing receptacle; a tilting support upon which the mixing receptacle is arranged to revolve; mechanism for tilting said mixing receptacle support and means for limiting the extent of movement on the part of said tilting device and comprising a rotary cam having high and low portions.

10. In a mixing machine, a rotary mixing receptacle; a tilting support upon which the mixing receptacle is mounted; a rotary cam; means adapted for operating the rotary cam and comprising a clutch; a clutch shifter for operating the clutch; a latch engaged by the cam; and a spring arranged to hold the latch in engagement with the cam with a yielding spring pressure.

11. In a mixing machine, a rotary mixing receptacle; a tilting support upon which the rotary mixing receptacle is mounted; a rotary power driven shaft; a rotary cam; means for connecting and disconnecting said cam with and from said shaft; a lever for shifting one of the clutch members; a latch hung to swing about the pivotal axis for the lever, and arranged to engage the cam; and means for tilting the mixing receptacle support connecting the latter with the rotary cam.

12. In a mixing machine, a rotary mixing receptacle; a tilting support upon which the rotary mixing receptacle is mounted; a rotary cam 16; a clutch shifting lever K; a latch 19 engaging the cam; a spring between the latch and lever; a rod connecting the latch and lever and having a limited sliding connection with one of such members; means for operating the cam, and a clutch for controlling such operating means.

13. The combination with the rotatable receptacle and tilting support therefor, of a driving shaft and connections for rotating said receptacle, a rotatable cam and means for driving the same, devices operable from said cam for tilting the support, and means for automatically disconnecting the cam from its driving means when the receptacle is in its terminal positions.

14. The combination with the rotatable receptacle and tilting support therefor, of a driving shaft and connections for rotating said receptacle, a rotatable cam and means for driving the same, devices operable from said cam for tilting the support, and means for automatically disconnecting the cam from its driving means when the receptacle is in its terminal positions, said means including yielding connections to permit the positive disconnection of the cam and driving means with the receptacle in any position.

15. In a mixing machine, the combination of a rotary mixing receptacle revolubly mounted upon a tilting support and having an inlet opening coincident with its axis of rotation; a mouth-piece for said inlet mounted upon the tilting support, the mixing receptacle being revoluble independently of its mouth-piece; a hopper supported independently of the mixing receptacle and its tilting support and having a discharge opening; and a swinging combined valve and chute for closing the discharge orifice of the hopper, and in alternation therewith for opening the discharge orifice of the hopper and for discharging material from the hopper into the mouth-piece, the said combined valve and chute being a single member constructed with a bottom which forms a valve for closing the discharge orifice of the hopper and in alternation therewith a chute bottom adapted for bridging the space between the discharge orifice of the hopper and the passage within the mouth-piece on the tilting support.

16. In a mixing machine, the combination of a hopper having a discharge spout formed with its discharge opening on an inclined plane; a rotary mixing receptacle mounted upon a tilting support and having an inlet coincident with its axis of rotation; a mouth-piece for said inlet mounted upon the tilting support, the mixing receptacle being revoluble independently of its mouth-piece, and a combined chute and valve for directly closing the discharge orifice of the hopper spout and in alternation therewith for bridging the space between the discharge outlet of the hopper and the mouth-piece and also adapt-

ed for projecting into the latter, the said combined valve and chute being a single member constructed with sides for embracing opposite sides of the hopper spout and with an intervening bottom which abuts against the inclined end of the hopper spout and directly closes the discharge orifice at said end of the hopper spout when the combined valve and chute has been swung back and away from the mouth-piece and swung to a suitable extent toward the hopper spout.

CHARLES E. BATHRICK.

Witnesses:
JAMES C. BENNET,
THEO. BUDD.