No. 831,957. PATENTED SEPT. 25, 1906.

W. J. JUDD.

MIXING MACHINE.

APPLICATION FILED MAY 26, 1902.

3 SHEETS—SHEET 1.

Fig. 1.

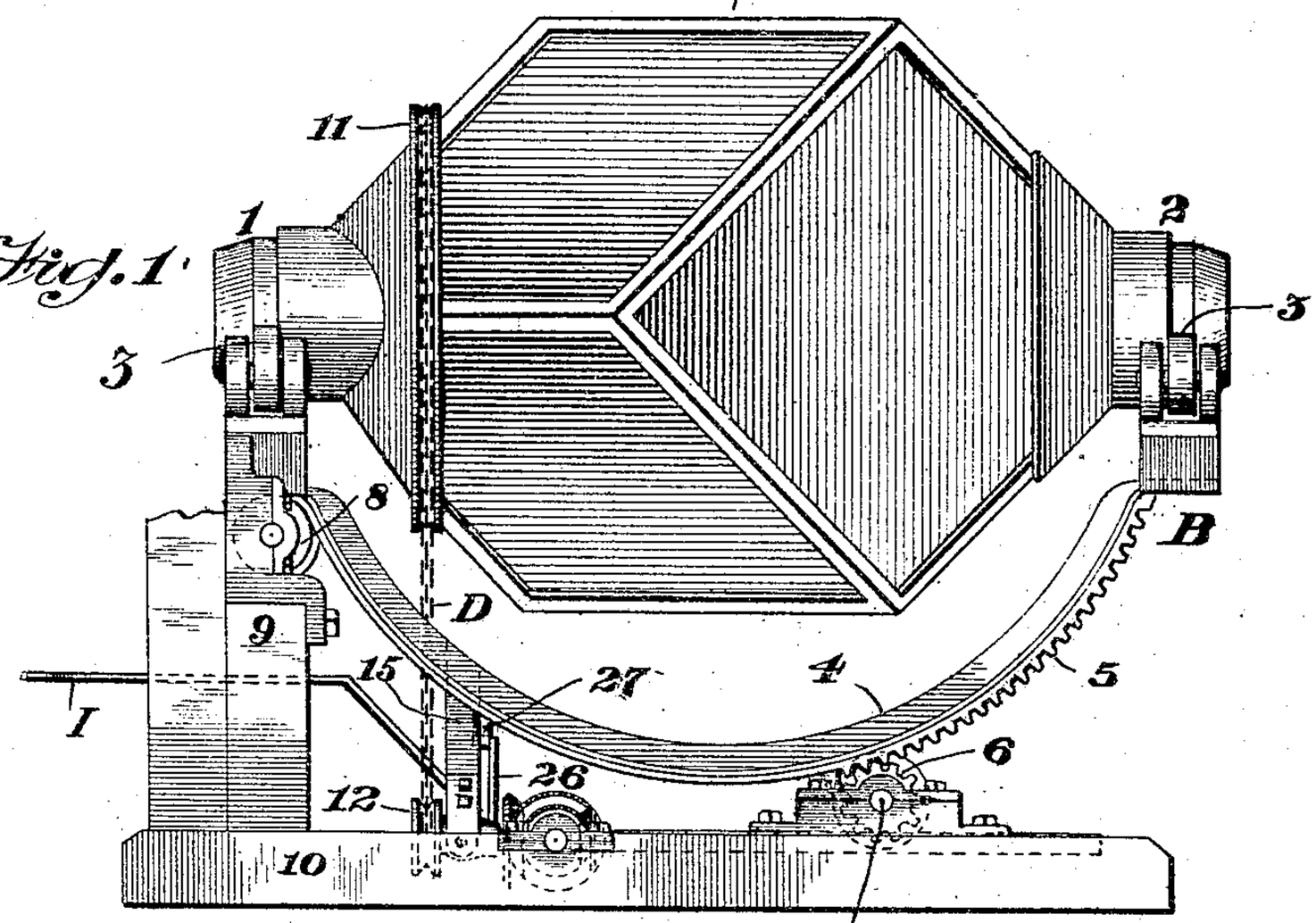
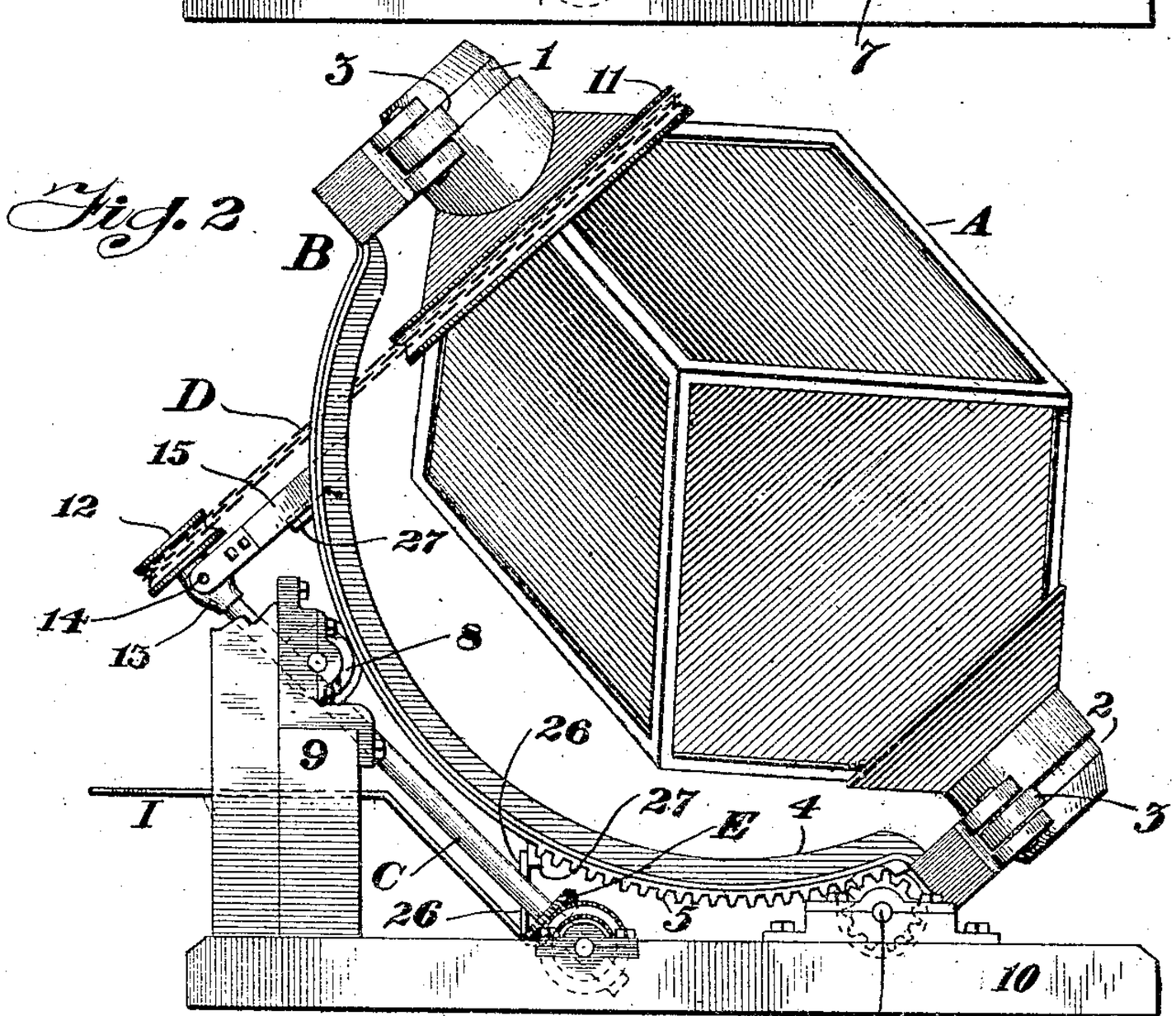


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3

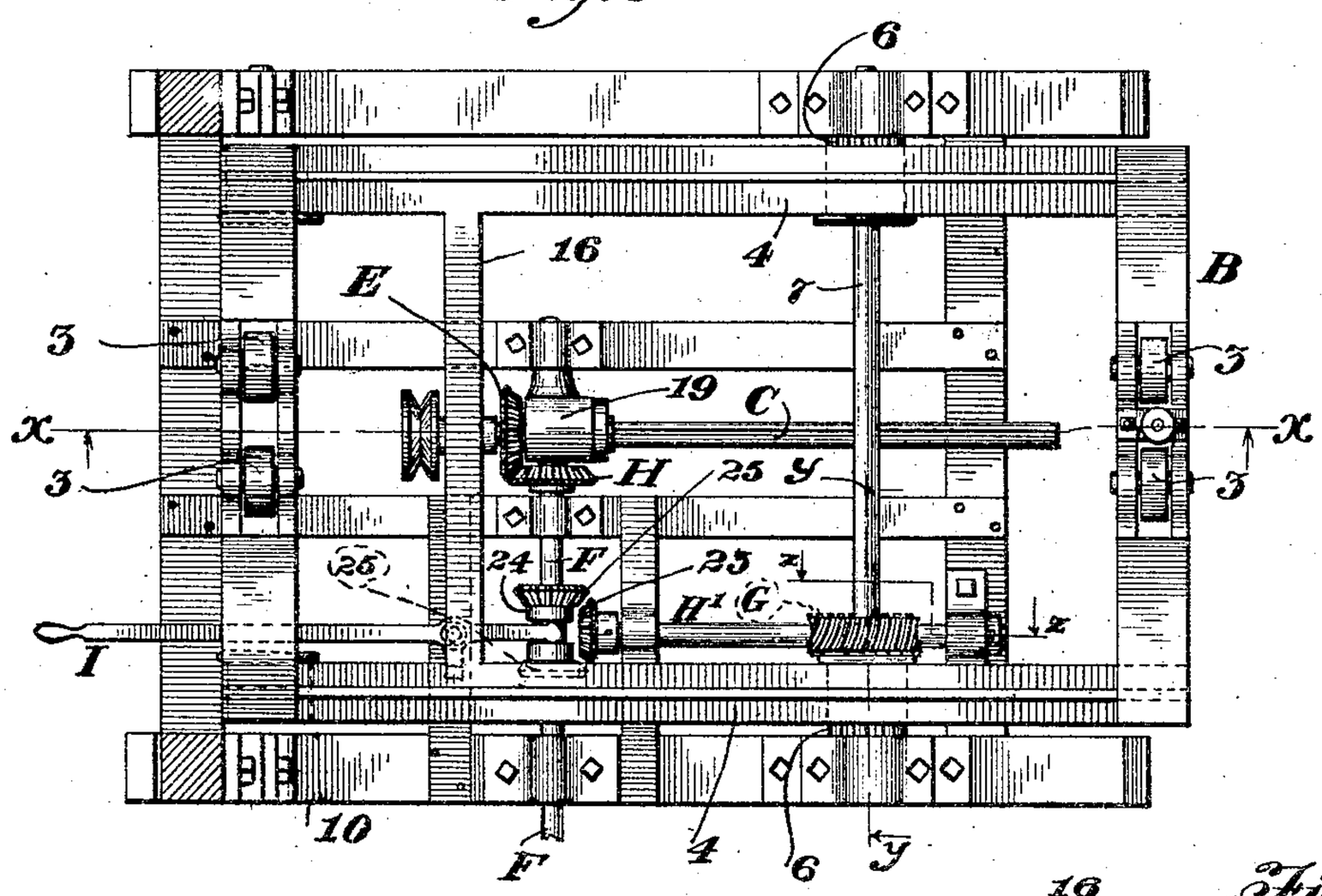


Fig. 4

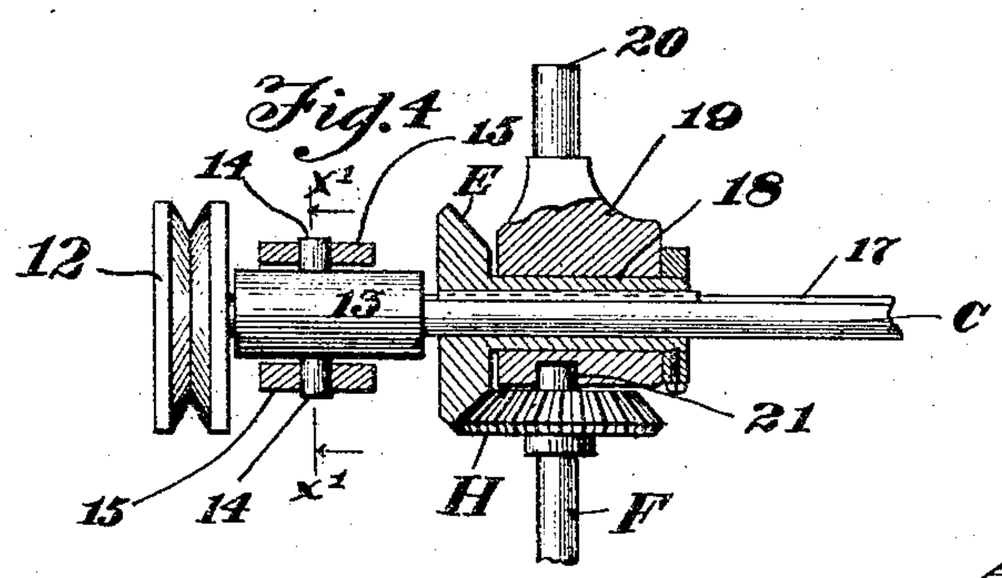


Fig. 5

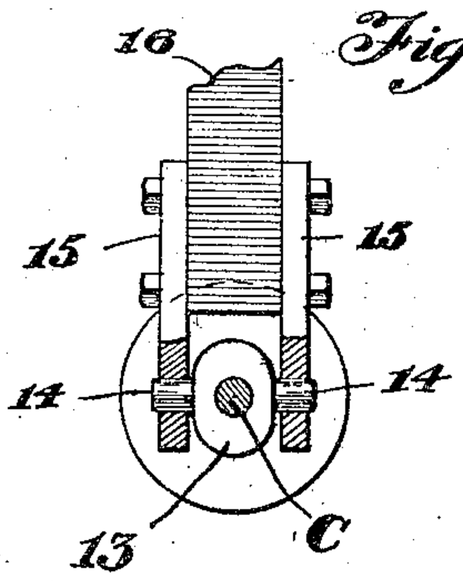


Fig. 6

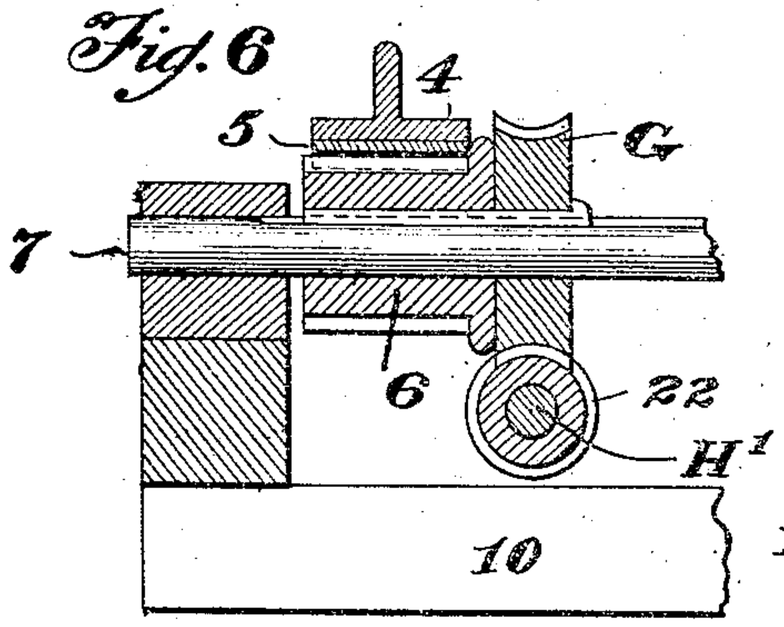
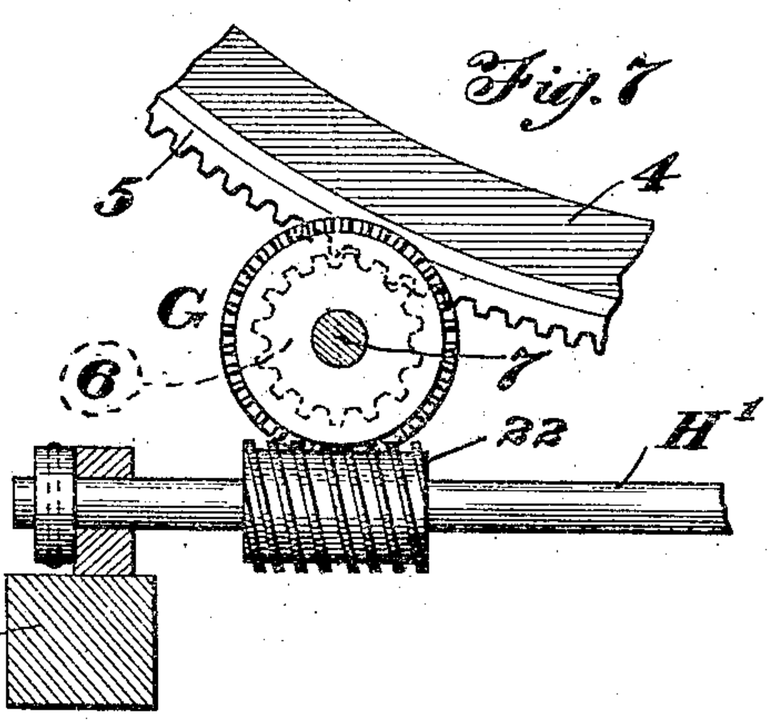


Fig. 7



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3 SHEETS—SHEET 3.

Fig. 8

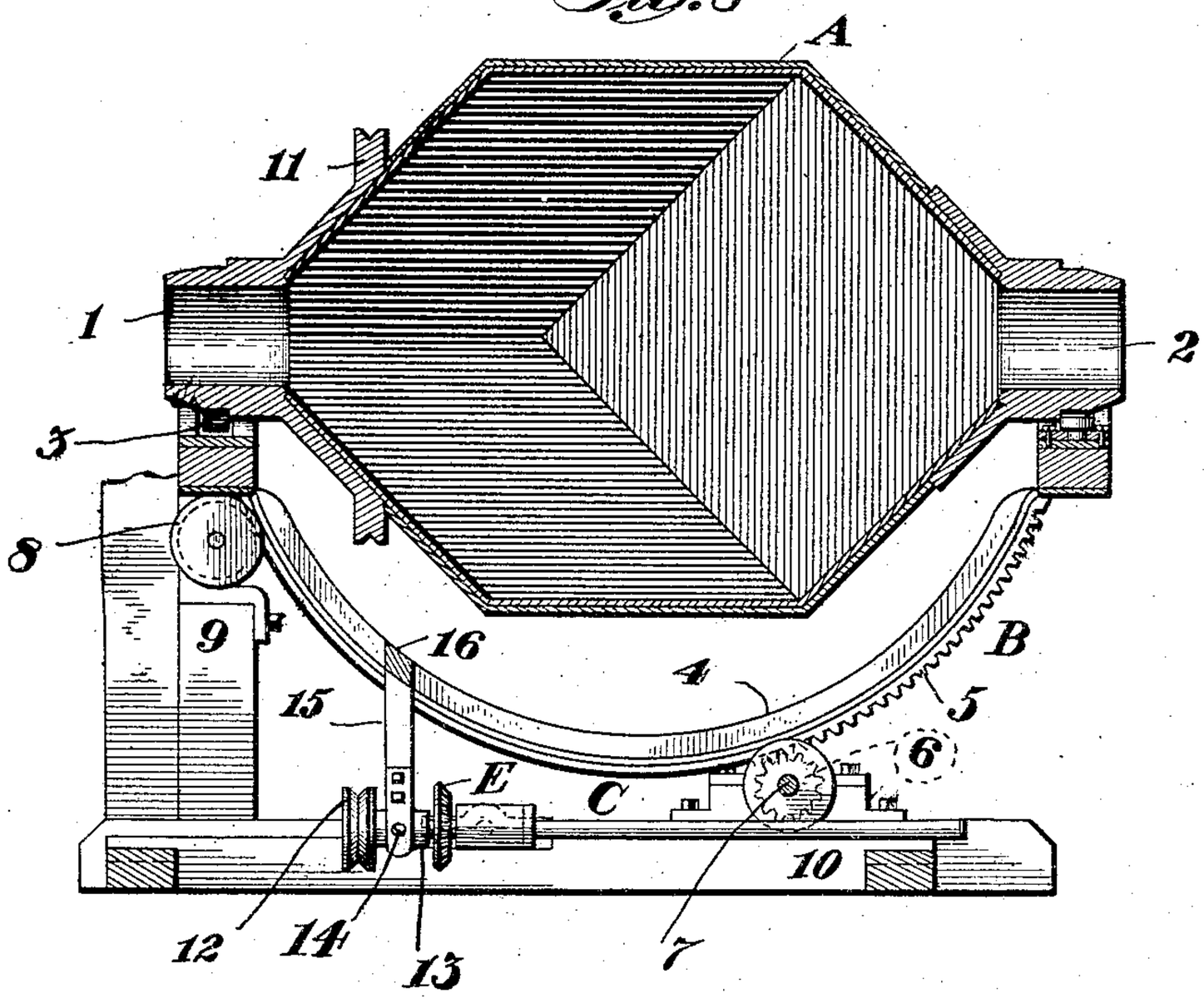


Fig. 9

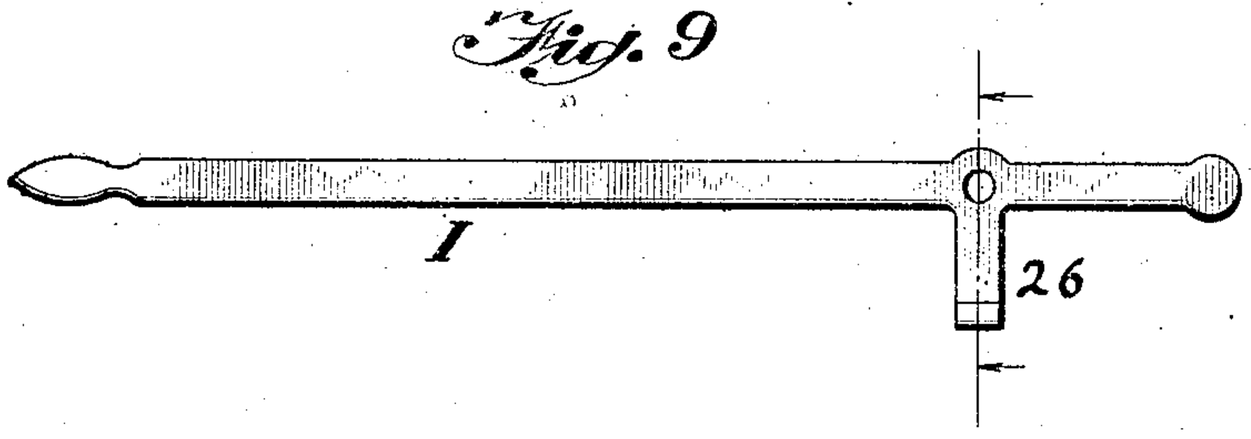
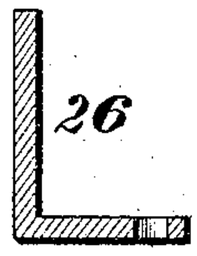


Fig. 10



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UNITED STATES PATENT OFFICE.

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

MIXING-MACHINE.

No. 831,957. Specification of Letters Patent. Patented Sept. 25, 1906.

Application filed May 26, 1902. Serial No. 109,024.

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 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 rotary mixing-receptacle arranged upon a movable frame or support which can be operated for the purpose of tilting the rotary mixing-receptacle.

Objects of my invention are to advantageously support the rotary mixing-receptacle and permit it to be readily tilted; to provide simple and efficient means for continuously rotating the mixing-receptacle; to provide simple and efficient means for operating the frame or support which serves to uphold and tilt the rotary mixing-receptacle; to apply power from an engine or motor for tilting the rotary mixing-receptacle from its receiving or mixing position to a position for discharge and also for tilting the mixing-receptacle from its discharging position back to its receiving or mixing position; to automatically disconnect such power at each end of the predetermined extent of such tilting movement and also to permit an attendant to readily disconnect the power for tilting at any point between said two extremes or limit of tilting movement whereby the tilt of the mixing-receptacle can be arrested at will; also, to simplify the operating mechanism shown and described in my application for Letters Patent of the United States filed April 15, 1902, and serially numbered 102,960.

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 a charge of materials. Fig. 2 is a like view showing the mixing-receptacle tilted into position for discharging a mixed-up batch. Fig. 3 is a top plan view with the mixing-receptacle removed. Fig. 4 is an enlarged detail view, partly in section and partly in elevation, the section being on line $x\,x$ in Fig. 3. Fig. 5 is a section on line $x'\,x'$ in Fig. 4. Fig. 6 is a section on line $y\,y$ in Fig. 3. Fig. 7 is a section on line $z\,z$ in Fig. 3. Fig. 8 is a vertical transverse section of the mixing-machine. Fig. 9 is a detail view of the clutch-lever, and Fig. 10 is a section of the arm of the lever.

A indicates the rotary mixing-receptacle, and B denotes a movable support therefor. The rotary mixing-receptacle is driven from a counter-shaft C, arranged to have a bodily movement in unison with the movement of the support for the mixing-receptacle and connected with the latter by suitable power-transmitting means, such as connecting-gearing. The mixing-receptacle illustrated is cubiform and is provided with hollow journals 1 and 2, respectively arranged at diagonally opposite corners thereof and respectively providing the receptacle with charging and discharge passages or openings. These hollow journals of the mixing-receptacle are upheld by antifriction-rolls 3 on the movable support B.

The movable support B has a curved or segmental portion provided with a segmental rack, which is engaged and operated by a driving-pinion, a preferred arrangement being to construct the movable support as a frame having its segmental portion formed by curved side bars 4, each having a curved rack-bar 5. With such arrangement the rack-bars are engaged by pinions 6 on a transverse shaft 7, and in order to further guide the movable support its segmental bars 4 can also engage antifriction-rolls 8 on a standard 9, which rises from the bed-frame 10. This movable support or frame B can be sustained by a bed having any desired number of antifriction bed-rolls positioned at suitable intervals along the arc of a circle and will have a rotary reciprocative movement when operated to tilt the axis about which the mixing-receptacle revolves. The supporting-frame B is therefore arranged to oscillate about an axis transverse to the axis of rotation of the mixing-receptacle, and as a matter of course when it is thus operated its end portions which support the mixing-receptacle will tilt or tip, thereby varying the angle of the longitudinal axis about which the mixing-receptacle revolves.

The rotary counter-shaft C is shown connected with the rotary mixing-receptacle by an endless power-transmitting belt or chain D, and to such end the mixing-receptacle and the counter-shaft are respectively provided with sprockets 11 and 12 for such chain

or belt. The end portion of the counter-shaft, which is provided with the chain or belt sprocket 12, is supported by a sleeve or bearing 13, having a pivotal connection with the movable supporting-frame B, as illustrated in Figs. 2, 4, and 5, in which the bearing-sleeve 13 has a couple of oppositely-arranged pivots or trunnions 14, supported to turn in a bracket formed by cheek-plates 15, bolted to a cross-bar 16 on the movable supporting-frame, Figs. 3 and 5.

The counter-shaft C is operated by a driving-gear E and also has a sliding connection therewith, and to such end the gear E has an axial bore in which the counter-shaft is fitted to slide. The gear E and the counter-shaft C are connected by a spline 17, Fig. 4, on one of such members engaging in a groove in the other member, whereby rotation of the gear will drive the counter-shaft and at the same time the latter will be permitted to slide longitudinally in the gear. The gear E is also pivotally supported by trunnions, so as to permit it to rock or tilt in conformity with the tilt of the counter-shaft. As shown in Figs. 3 and 4, the hub portion 18 of the gear E is secured in a bearing 19, which is supported upon the bed-frame by trunnions 20 and 21, Fig. 4. With this arrangement the trunnion 21 is conveniently formed by one end of a transverse shaft F, having a bevel-gear H, which engages and operates the beveled gear E. When shaft F is operated, the counter-shaft C will be driven therefrom and the mixing-receptacle will be rotated by reason of its gear connection with such counter-shaft, and when the oscillatory frame B is moved for the purpose of tilting the axis of rotation of the mixing-receptacle the shaft C will slide one way or the other through the rotating gear E, and the latter will rock or tilt in conformity with the tilting motion of the rotating and longitudinally-moving counter-shaft. This longitudinal shift on the part of the counter-shaft E is illustrated by comparing Figs. 2 and 8. In Fig. 2 the rotary mixing-receptacle is tilted for the purpose of discharging the mixed-up batch, and in Fig. 8 the mixing-receptacle is in position for receiving and mixing. It will be seen, however, that in both positions the axis of the counter-shaft is parallel with the axis about which the mixing-receptacle revolves.

As a means for operating the oscillatory supporting-frame B the rotary shaft 7, having pinions 6, which engage the racks on such frame, is also provided with a worm-wheel G, which is engaged by a worm 22, Fig. 7, on the rotary worm-shaft H′, Fig. 7. The shaft H′ is mounted upon the bed-frame and is also provided at one end with a bevel-gear 23, Fig. 3. The shaft H′ is operated from the main driving-shaft F by suitable clutch mechanism, such as clutch hub or sleeve 24, Fig. 3, feathered to slide along and rotate with shaft F and having a couple of bevel-gears 25, which can be alternately placed in engagement with gear 23 for the purpose of moving the support B in opposite directions. In this connection I indicates a clutch-lever pivoted upon the bed-frame and arranged for shifting the clutch device on shaft F. The lever I can also be automatically operated for the purpose of arresting the movement of the oscillatory support B at either of the two extreme positions of the latter. To such end the shifting clutch member I has an arm 26, and the tilting frame upon which the mixing-receptacle is mounted is provided with two tappets or stops 27 27, spaced with reference to their required terms of service, one being provided for engaging arm 26 of the lever, so as to shift the latter, and thereby automatically disconnect the power from shaft H′ when the mixing-receptacle has been tilted to an extent to place it in a predetermined position for discharge, the other one of said stops or projections 27 being provided to engage said lever-arm and shift the lever so as to automatically disconnect the power from shaft H′ when the mixing-receptacle has, for example, been tilted back from the discharging position illustrated in Fig. 2 to the receiving or mixing position shown illustrated in Fig. 1. When the mixing-receptacle is positioned as in Fig. 1, the two stops or tappets on the tilting frame forming the mixing-receptacle support are respectively at opposite sides of a vertical plane coincident with and passing through the transverse axis about which such support tilts, and when the said support tilts these stops are carried in the arc of a circle, whereby one or the other will at a predetermined moment engage and move the clutch-shifting member or lever I according to the direction in which the support is tilting. In Fig. 3 the right and left clutch comprising a hub or sleeve 24 and bevel-gears 25 25 thereon is in its middle position, whereby its gears 25 25 are both free from the bevel-gear 23 on the rotary shaft H′. The said clutch being in its middle position and it being desired to tilt the mixing-receptacle from the position shown in Fig. 1 to the position shown in Fig. 2, the attendant will swing lever I in one direction, so as to cause one of the constantly-revolving clutch-gears 25 to engage bevel-gear 23, whereupon the power thus applied will tilt the frame or support whereon the mixing-receptacle is arranged, such tilting movement being continued until stop 27 (shown at the right in Figs. 1 and 2) engages arm 26 of the lever and shifts the latter until the clutch is disconnected from gear 23. To now return the mixing-receptacle from the position shown in Fig. 2 to the position shown in Fig. 1, the operator will thereupon swing lever I in a direction reverse to that in which he first manually swung it, (as hereinbefore mentioned,) thereby applying the other one of

the clutch-gears to gear 23, and hence when stop 27 (shown at the left) engages arm 26 of the lever I it will shift the latter, and thereby shift the clutch into the middle position. (Shown in Fig. 3.) By this construction the tilting movement of the mixing-receptacle is automatically arrested at predetermined points, and, if desired, it can be arrested before reaching either of said points by manually shifting the right and left clutch from its right or left position to its middle position.

Matter shown or described and not claimed herein is reserved in a pending application.

What I claim as my invention is—

1. In a mixing-machine, a rotary tilting mixing-receptacle; a rotary counter-shaft supported to tilt in unison with the tilt of the rotary mixing-receptacle; power-transmitting gearing connecting the rotary counter-shaft with the rotary, tilting mixing-receptacle; a rocking bearing with which the rotary counter-shaft has a sliding connection; and driving mechanism for rotating the counter-shaft.

2. In a mixing-machine, a rotary tilting mixing-receptacle; a rotary counter-shaft supported to tilt in unison with the tilt of the mixing-receptacle; power-transmitting gearing connecting the rotary counter-shaft with the rotary tilting mixing-receptacle; a rotary rocking bearing with which the counter-shaft has a sliding key connection; and driving mechanism applied to the rotary rocking bearing to rotate the same and thereby rotate the counter-shaft.

3. In a mixing-machine, a rotary mixing-receptacle; an oscillatory support for the rotary mixing-receptacle; a rotary shaft having a bearing on the oscillatory support; power-transmitting connection between the rotary shaft and mixing-receptacle for rotating the latter; a rotary tilting gear with which the rotary shaft has a sliding key connection permitting the shaft to reciprocate longitudinally; and mechanism for driving said rotary tilting gear.

4. In a mixing-machine, a rotary mixing-receptacle; a tilting support for the rotary mixing-receptacle; a rotary shaft supported to tilt in unison with the mixing-receptacle and connected therewith by power-transmitting connection; a gear E provided with an axial bore in which the rotary shaft is keyed to slide; a rocking bearing upon which the gear E is arranged to rotate; and driving-gear engaging said gear E.

5. In a mixing-machine, a rotary mixing-receptacle; an oscillatory base-support for the rotary mixing-receptacle; a rotary power-driven shaft; power-transmitting connection between said shaft and the rotary mixing-receptacle, power-transmitting connection between said shaft and the oscillatory base-support; and a clutch device for reversing the operation of the power-transmitting connection between the oscillatory base-support and said shaft.

6. In a machine for mixing concrete, mortar and the like, a rotary mixing-receptacle having a discharge-opening coincident with its axis of rotation; mechanism for continuously rotating the mixing-receptacle; an oscillatory base-support upon which the mixing-receptacle is mounted with its axis of rotation transverse to the horizontal axis about which the base-support revolves, said base-support being provided with curved portions arranged to traverse roller-bearing which sustain the weight of the base-support; a rack on the oscillatory base-support, a pinion engaging the rack, and means for applying the driving power to and disconnecting it from the pinion.

7. In a mixing-machine, a mixing-receptacle; a tilting support for the mixing-receptacle; reversibly-operative mechanism for tilting the mixing-receptacle support; and a right and left clutch device for applying and disconnecting driving power to and from said reversibly-operative mechanism for tilting the mixing-receptacle support; the tilting mixing-receptacle support being provided with two stop devices respectively at opposite sides of the axis about which it tilts, said stop devices being carried in the arc of a circle when the said support is tilted in either direction, and the clutch device being provided with a shifting member which is engaged and automatically shifted by one or the other of the two stop devices, to disconnect the power, according to the direction of tilt on the part of the mixing-receptacle support, the clutch-shifting member being also manually shiftable in directions for applying and disconnecting the driving power to and from said mechanism, independently of the stop devices.

8. In a mixing-machine, a mixing-receptacle; a tilting support for the mixing-receptacle; reversibly-operative mechanism for operating the mixing-receptacle support; and a right and left clutch device for applying and disconnecting driving power to and from said reversibly-operative mechanism for tilting the mixing-receptacle support; the mixing-receptacle support being gear-connected with the mechanism by which it is tilted, and being also provided with two stop devices respectively at opposite sides of the axis about which it tilts, said stop devices being carried in the arc of a circle when said support is tilted in either direction, and the clutch device being provided with a shifting member which is engaged and automatically shifted by one or the other of the two stop devices to disconnect the power, according to the direction of tilt on the part of the mixing-receptacle support, the clutch-shifting member being also manually shiftable in directions for applying and disconnecting the

driving power to and from said mechanism independently of the stop devices.

9. In a mixing-machine, a rotary mixing-receptacle; a support for the mixing-receptacle having a segment-gear; reversibly-operative mechanism for tilting the mixing-receptacle support and comprising a reversible gear engaging the said gear-segment; a right and left clutch device for connecting and disconnecting driving power to and from said mechanism for tilting the mixing-receptacle support; a hand-lever for shifting the clutch, and means for automatically shifting the clutch comprising a couple of stops arranged upon the mixing-receptacle support and carried by said support in the arc of a circle when the support is tilted, said stops being arranged for engaging and shifting the said lever in alternation, according to the direction in which the mixing-receptacle support is tilted.

10. In a mixing-machine, a rotary mixing-receptacle having oppositely-arranged charging and discharge openings in alinement with the axis of rotation; a tilting support for the rotary mixing-receptacle; a rotary tilting counter-shaft supported at one end by the tilting support for the mixing-receptacle and arranged for end tilt in unison with the tilt of the mixing-receptacle and its tilting support, and a rocking bearing for the other end of the rotary counter-shaft, said bearing being independent of the tilting support for the mixing-receptacle; power-transmitting connection between the rotary tilting counter-shaft and the mixing-receptacle to rotate the latter, and driving mechanism for continuously rotating the tilting counter-shaft.

11. In a mixing-machine, a rotary mixing-receptacle having an opening for the passage of materials in alinement with its axis of rotation; a tilting support upon which the mixing-receptacle is mounted to revolve with its axis of rotation at right angles to the axis about which its support tilts, said support being provided with a curved line of teeth; a pinion for engaging said teeth as a means for tilting the support; reversible mechanism for driving the pinion in opposite directions in alternation; means for automatically arresting said driving mechanism and means for manually arresting said driving mechanism.

12. In a mixing-machine, a rotary mixing-receptacle; a tilting support upon which the rotary mixing-receptacle is mounted; mechanism for tilting the support for the mixing-receptacle and comprising in its organization a bevel-gear; a clutch device comprising a pair of bevel-gears splined to slide along a rotary power-driven shaft and arranged whereby one or the other of said gears can be brought at will into engagement with the bevel-gear of the mechanism for tilting the mixing-receptacle support; a hand-lever for shifting said clutch, and devices on the tilting support for the mixing-receptacle arranged for throwing said lever respectively in opposite directions.

13. In a mixing-machine, a rotary mixing-receptacle; a tilting support for the rotary mixing-receptacle; a power-driven shaft arranged transversely to the axis of rotation of the mixing-receptacle; a double-clutch device splined on said shaft and comprising a pair of relatively spaced bevel-gears; a rotary shaft having a bevel-gear which can be engaged by the bevel-gears of the said clutch in alternation; power-transmitting connection between the said shaft having the bevel-gear and the tilting support for tilting the latter, a hand-lever for operating the double clutch to disconnect the same from the intermediate bevel-gear and to throw either of such clutch-gears into engagement with said bevel-gear which is intermediate of the two clutch-gears.

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