

No. 775,242.

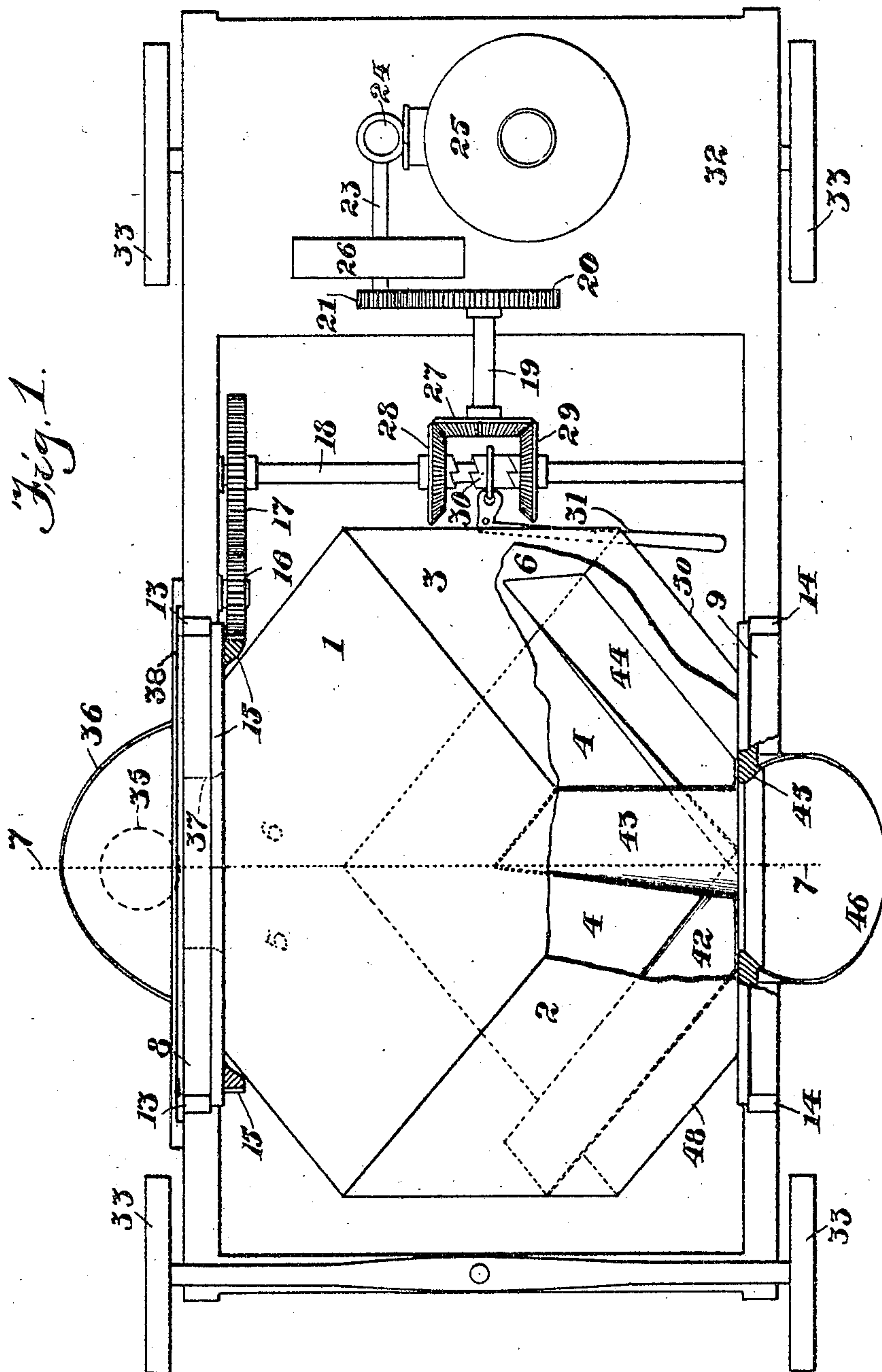
PATENTED NOV. 15, 1904.

W. J. JUDD.  
MIXER.

APPLICATION FILED JULY 9, 1904.

NO MODEL.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

Fig. 3.

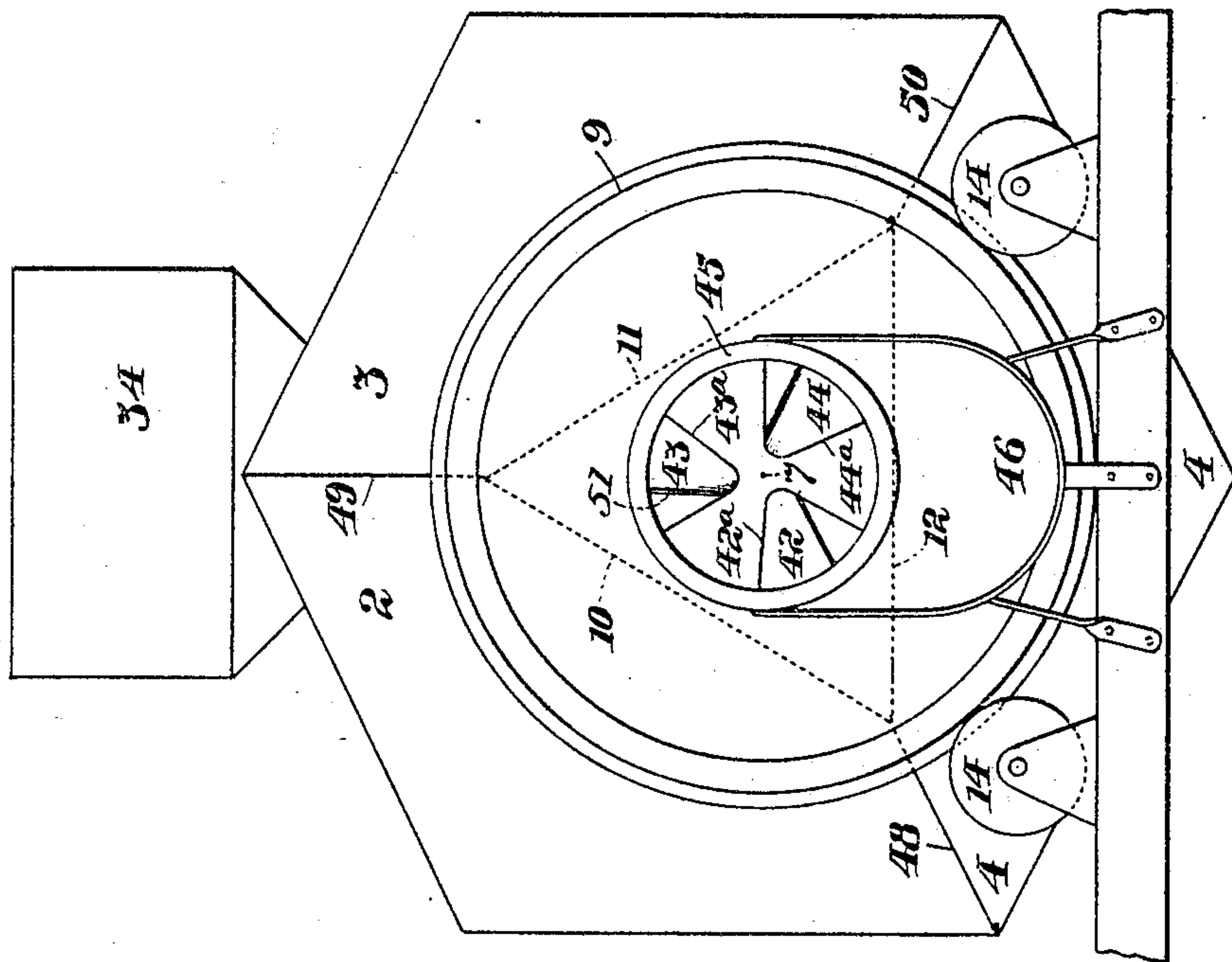
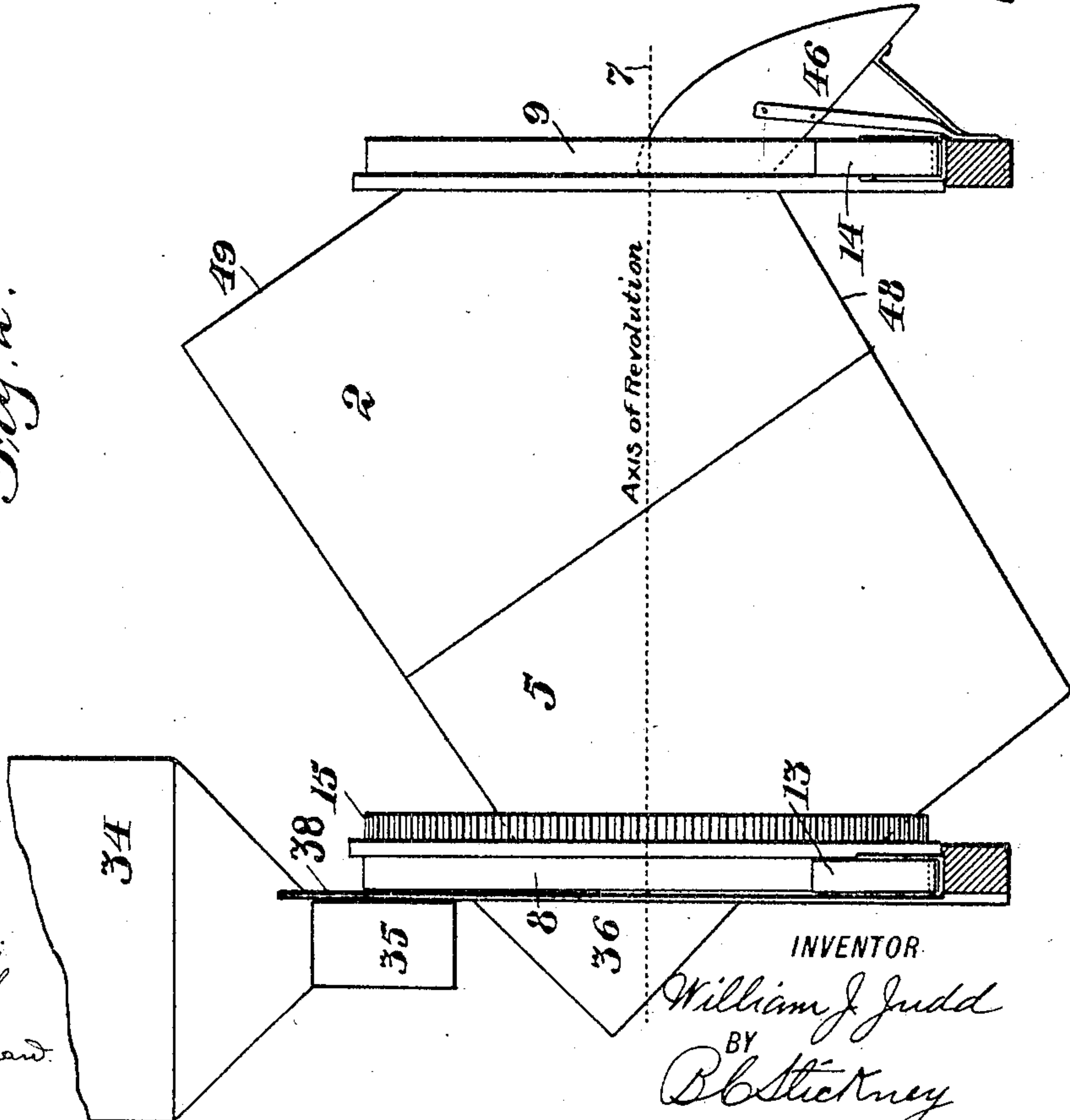


Fig. 2.



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4 SHEETS—SHEET 3

Fig. 3.

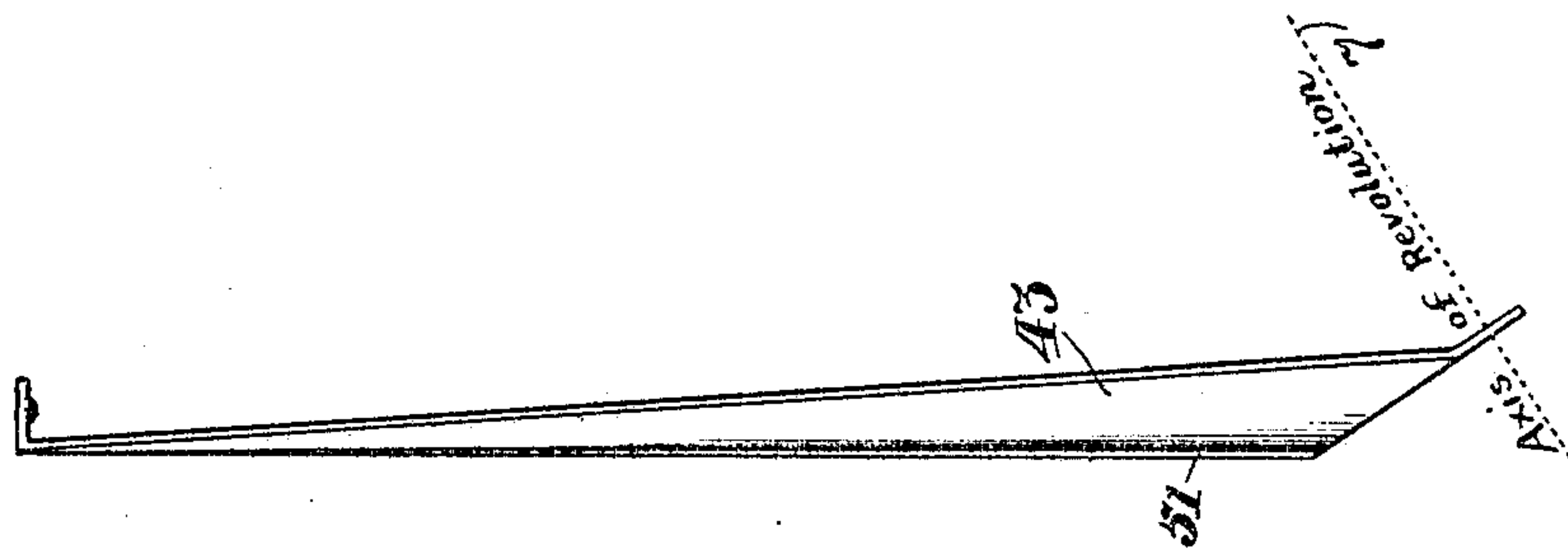
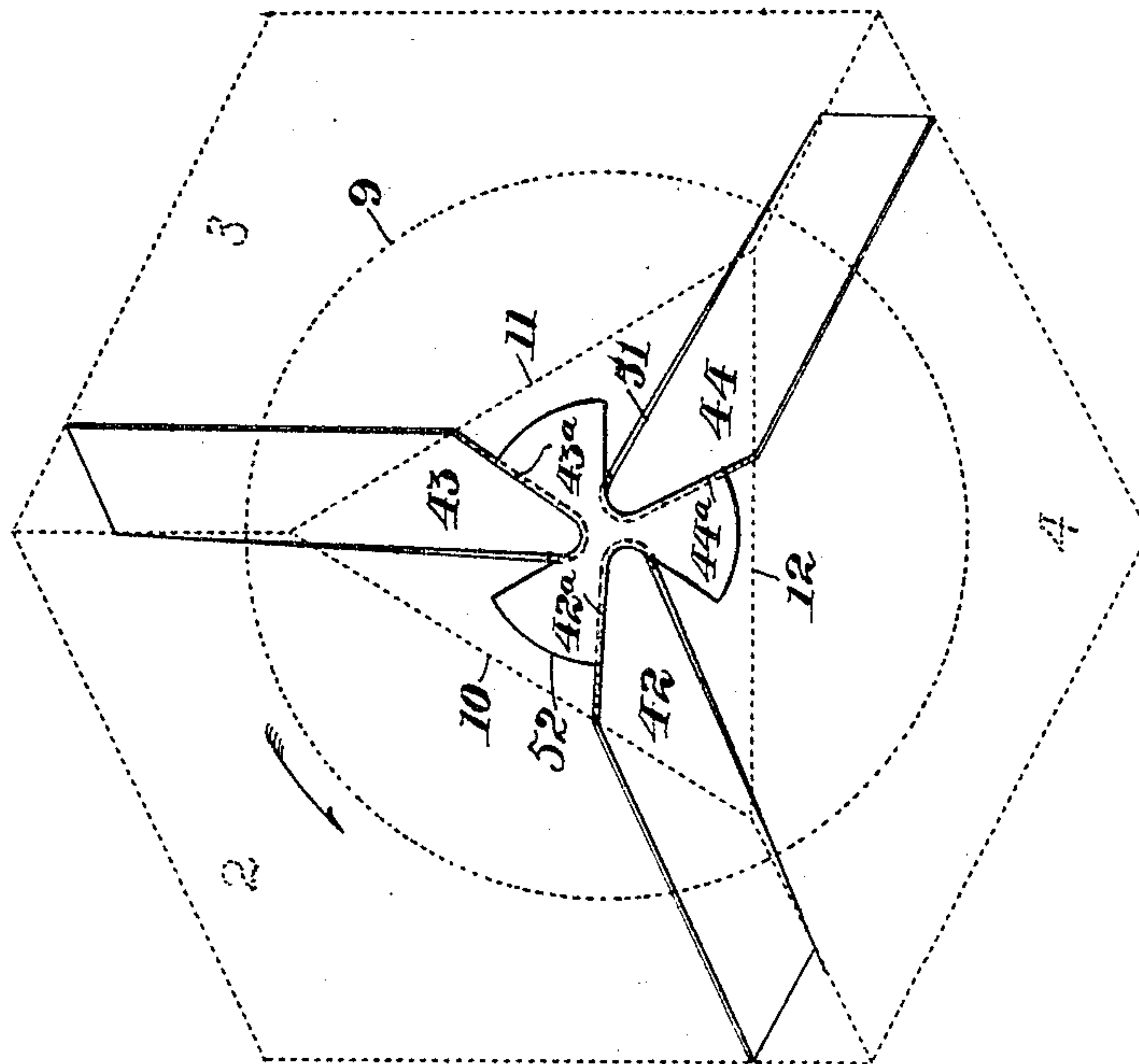


Fig. 4.



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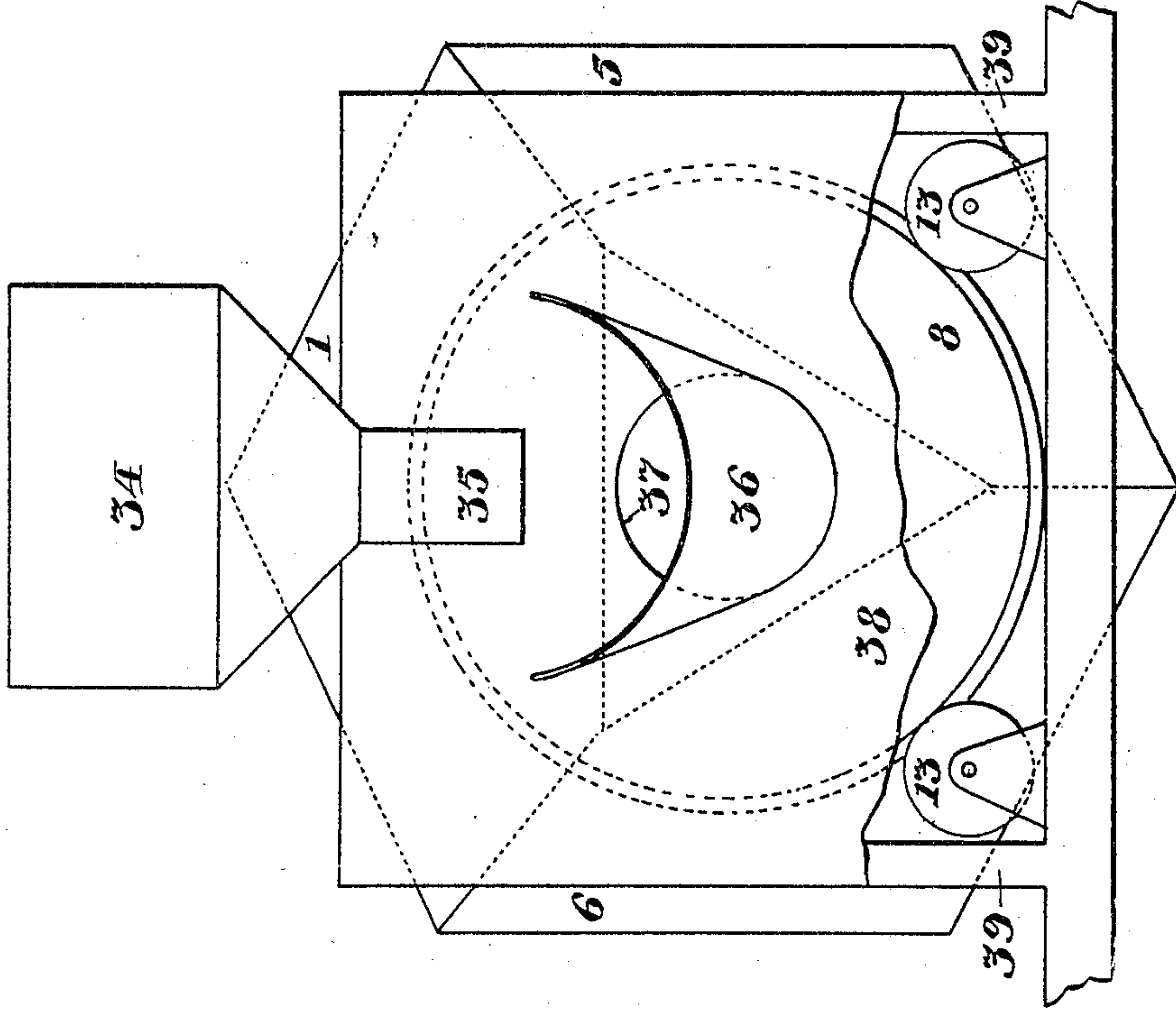
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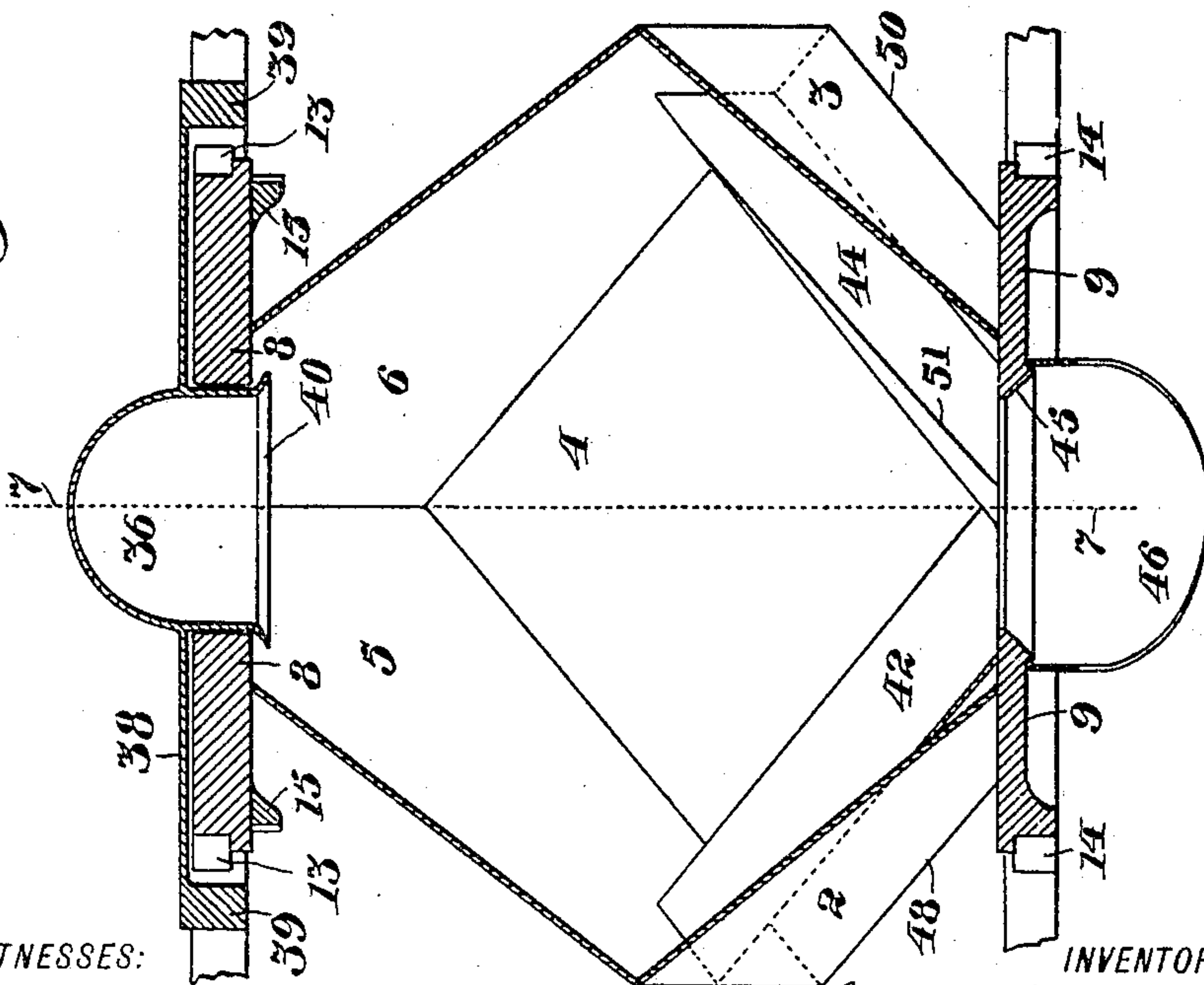
NO MODEL.

4 SHEETS—SHEET 4.

*Fig. 7*



*Fig. 6*



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# UNITED STATES PATENT OFFICE.

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## MIXER.

SPECIFICATION forming part of Letters Patent No. 775,242, dated November 15, 1904.

Application filed July 9, 1904. Serial No. 215,906. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. JUDD, a citizen of the United States, residing in Parkridge, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Mixers, of which the following is a specification.

This invention relates to machines for mixing miscellaneous materials, such as mortar, concrete, and other semiliquid or dry materials.

The principal object of my invention is to provide a machine, simplified as to both construction and operation, which will churn or mix the ingredients as long as may be desired and will then rapidly and effectively discharge the mixture. This result has heretofore been obtained by mounting a cubiform or other mixing barrel so that it may be revolved any desired length of time and so that it may be also tilted up in order to dump the finished mixture; but machines of this description have numerous and complicated parts, are expensive to produce, require great care and skill in their management, and are apt to get out of order and require frequent repairs.

While I preferably illustrate my present improvements in connection with a cubiform mixing-barrel, still any other form of barrel may be used where desired. This mixing-barrel I mount so that it revolves upon a single axis, and provision is made whereby its revolution upon said axis effects the mixture of the ingredients for any length of time desired and then quickly drains the mixed contents from the barrel. The mixing is kept up during the discharging operation, and thereupon the recharging of the barrel may begin instantly, so that the efficiency of the machine is very high, it being practicable to keep the mixing-barrel in operation for many successive charges with hardly the loss of a moment.

Owing to the simplicity of the apparatus, it may not only be manufactured at low cost, but is very compact, which is a desideratum. Moreover, there is little or no liability of a breakdown, which is often a serious matter in the use of prior machines.

Other objects and advantages will herein- after appear.

In the accompanying drawings, Figure 1 is a plan of a portable mixing-machine made in accordance with my improvements, a boiler and engine being shown for driving the mixing-barrel and a portion of the latter being broken away to disclose the discharging-blades provided therewithin. Fig. 2 is a front elevation of the mixing-barrel and its mountings. Fig. 3 is a side elevation showing the discharge end of the mixing-barrel. Fig. 4 is a diagram of the mixing-barrel and a set of discharging blades or buckets therein, the barrel being shown in dotted lines and the buckets in full lines, the position of the parts being the same as at Fig. 3. Fig. 5 shows another form of blade adapted to form a discharging bucket or scoop within the mixing-barrel, this form being provided with flanges for attaching to the sides of the barrel. Fig. 6 is a sectional plan of the mixing-barrel, taken upon the plane of its axis of revolution. Fig. 7 is an elevation of the charging end of the mixing apparatus.

The mixing-barrel is preferably cubiform, comprising six sides, numbered, respectively, 1, 2, 3, 4, 5, and 6. It is mounted so as to revolve upon a horizontal axis, (designated at 7,) said axis intersecting opposite apices of the cube. The purpose of mounting the cube to revolve in this manner is to secure rapid and thorough mixture of the ingredients therein. At the apices referred to the cube is of truncated form and abuts against disks or wheels 8 9. The cube is partially closed by and attached to the wheels, between which it is supported. The intersection of the cube sides with the wheels is indicated by the dotted lines 10 11 12, Figs. 3 and 4. The wheel 8 rides upon a pair of antifriction-rolls 13 and the wheel 9 upon a similar pair 14, whereby the cube or barrel may revolve about the axis 7, this being preferably the only movement of which the barrel is capable. By means of flanges upon the wheels 8 and 9 axial movement of the barrel is prevented, said flanges engaging the rolls 13 14, which are incapable of axial movement.



As one means for revolving the barrel I secure to wheel 8 an annular gear 15, which surrounds this end of the barrel and is fixed to the rear side of said wheel behind the flange thereon. By means of an idle pinion 16 the gear 15 is connected to a gear 17, the latter fixed upon a transverse shaft 18, and said shaft being driven by a transverse shaft 19, connected by gear 20 thereon and pinion 21 to crank-shaft 23 of an engine 24, fed by a boiler 25. If desired, the engine and boiler may be omitted and the mixer driven by a fly-wheel or pulley 26, shown on shaft 23. Shaft 19, it will be observed, is connected to shaft 18 by means of a reversing-gear comprising three miter-pinions 27, 28, and 29, the two latter being loose on shaft 18 and 27 being fast on shaft 19. Either pinion 28 29 (both constantly revolving in opposite directions) may be thrown into operative connection with shaft 18 at will by sliding in one direction or the other along the shaft a clutching-sleeve 30, which is splined on shaft 18 and operated by a lever 31, each of the pinions 28 29 having suitable provision to clutch said sleeve. Any other form of reversing-gear may be used, or the reversing-gear may be omitted and the engine driven in opposite directions, as desired, or in case the engine is omitted a suitable set of fast and loose pulleys with reversing-belts or belt mechanism may be substituted for the pulley 26. All of the described devices are preferably mounted upon a wagon body or truck 32, running upon four wheels 33.

The materials to be mixed are put into a hopper 34 at the receiving end of the barrel and descend through the spout 35 of the hopper into an inclined chute 36, from which they enter through a round axial charging-opening 37 into the mixing-barrel. These ingredients, it will be understood, pass through the wheel 8, in which is formed the central opening 37, and enter the triangular opening in the cubiform barrel, which is formed by truncating its apex. This triangular opening is duplicated at the opposite apex of the barrel and is indicated by the lines 10 11 12 at Figs. 3 and 4. Said chute 36 is fixed upon the outer side of a vertical screen 38, supported by a framework 39, rising from the truck 32, and at its lower end terminates in an apron 40, which extends through the wheel-opening 37, so that the ingredients are deposited directly within the barrel and cannot foul the moving parts. Ingredients may be supplied from time to time as required, even though the mixing-barrel is in motion, since the chute 36 is in constant communication with the mixing-barrel.

By means of the power-driven gearing the barrel may be revolved until the materials are sufficiently mixed. Then the motion of the barrel is reversed, the reversal being effected by means of the reversing-gearing shown,

and by this reverse movement the contents of the barrel are automatically discharged. The discharge is effected by the operation of a set of three blades 42 43 44, fixed within the barrel and revolving therewith. While the barrel is revolving in one direction, these blades are wholly ineffective, except in so far as they assist in mixing the materials; but when the revolution of the barrel is reversed, as indicated by the arrow at Fig. 4, the blades act as scoops or buckets for discharging the mixed material at the end of the barrel opposite from the charging end. The blades are similar and symmetrically disposed about the axis of revolution 7, toward which axis they converge at their discharging ends, which are seen at Fig. 3 just within the inner edges 45 of wheel 9, a suitable spout 46 being fixed upon the framework in position to receive the discharge and conduct it away from the apparatus. It will be noticed that the upper edge of the spout 46 fits under a rim 47, Fig. 6, which surrounds the aperture 45, so as to insure against escape of material between the wheel and the spout.

Each blade or vane is preferably long and narrow and is secured edgewise to one side of the cube—that is, to one of the three sides that converge to the apex at the discharging end of the barrel. The blade 44 is secured to the side 4 and projects at about right angles therefrom and extends from the wheel 9 to the side 6 of the cube and extends about parallel to the adjoining side 3 of the cube, forming in conjunction with the latter a pocket or bucket, which while at the lower part of the revolving barrel receives a portion of the contents thereof, and as the barrel revolves in the direction of the arrow, Fig. 4, rises with a movement analogous to that of the spoke of a wheel until the receiving end of the bucket is tilted above the discharging end, whereupon the contents of the bucket flow out of the discharging end of the bucket and escape through the aperture 45 in the wheel 9 and are deposited in the spout 46, the bucket being entirely discharged by the time it reaches its highest position, in which position the blade is indicated at 43, Figs. 1 and 4. It will be observed that the inner end of the bucket is closed, since the inner end of the blade 44 abuts against the opposite side 6 of the cube, thereby preventing dripping or escape of material from this end of the bucket during the upward movement thereof. The three blades 42, 43, and 44 are similarly constructed and placed, and owing to their relative positions one is always picking up a charge of the contents of the barrel, while another is discharging, so that the discharge from the barrel is nearly continuous and sufficiently copious to empty it in a very short time. During the discharging operation the mixing, of course, is continued, which is a desideratum. The blades or buckets extend to the portions of the



barrel which are most remote from the axis of revolution, so that the barrel is completely drained thereby, since these remote portions become lowermost when beneath the axis of revolution, and hence must receive even the dregs of the contents of the barrel, which hence are duly discharged by the movements of the buckets. The mouths of the buckets are indicated at 42<sup>a</sup>, 43<sup>a</sup>, and 44<sup>a</sup>. The bucket blade or rib is provided with a retaining-ledge 51, which narrows or tapers toward the receiving end of the bucket. A shield 52 closes the discharging end of the barrel, but does not cover the discharging ends of the buckets.

It will be observed that the buckets are equidistant and that each is effective while traveling below the axis of revolution to scoop up some of the contents of the barrel and while traveling above said axis to discharge itself; that the sides 2, 3, and 4 of the barrel at the discharge end thereof converge toward the axis 7, said sides being substantially plane and forming corners 48, 49, and 50 at their junctions, the blades or vanes being near said corners; that the discharging-buckets extend to the exterior of the barrel; that each bucket is inclined to the axis of revolution 7, said axis being recumbent and preferably horizontal; that a portion of the barrel's contents is discharged at each revolution in the direction of the arrow, Fig. 4; that the buckets discharge near the axis of revolution 7, thus making it practicable to employ a small opening 10 11 12 in the barrel and a small opening 45 in the wheel 9 and conducing to compactness of the structure as well as to high efficiency for its size, and that either of the blades or scoops may be regarded as an interior revoluble discharging device, which may at will be rendered either effective to discharge the barrel or ineffective to discharge the same during the mixing operation.

The invention is not limited to the precise construction or form of discharging-buckets, barrel, &c., illustrated. Portions of the improvements may be used without others—as, for instance, one or more of the discharging-buckets may be omitted.

Having thus described my invention, I claim—

1. In a mixing-machine, the combination of a revoluble mixing-barrel having at one end a charging-opening, a discharge-bucket therein and revolving therewith; said mixing-barrel being larger at its body portion than at its discharging end, so that its contents tend to settle in the larger portion of the barrel during the revolution thereof, and said bucket extending to said body portion and being closed at its inner end and inclining therefrom toward the axis of revolution.

2. The combination with a cubiform mixing-barrel, of a discharge-bucket fixed therein and closed at its inner end and extending from the body of the barrel along one of its sides

toward the axis of revolution and capable of draining the barrel; and means for revolving said barrel in either direction at will.

3. In a mixing-machine, the combination of a revoluble mixing-barrel having at one end a charging-opening and having a relatively large body portion and being relatively small at its discharging end, a series of discharging-buckets within said barrel and extending along the sides thereof from the discharging end of the barrel and at their inner ends abutting against the opposite sides thereof and capable of draining the barrel, and means for revolving the barrel in either direction at will.

4. In a mixing-machine, the combination of a revoluble mixing-barrel whose sides slope from the middle portion of the barrel to the opposite ends thereof, said barrel being provided with a series of relatively long and narrow interior discharging-buckets, extending to the largest portion of the barrel and closed at their inner ends, and at their discharging ends converging toward the axis of revolution, and means for revolving said barrel either forwardly or backwardly at will; said buckets being so formed that they are ineffective when the barrel is revolved in one direction.

5. In a mixing-machine, a cubiform mixing-barrel truncated at its ends and having at one end a charging-opening, blades fixed within said barrel and extending from one end of the barrel along its sides, and at their inner ends abutting against other sides of the barrel, for discharging the same, means between the truncated ends of the barrel upon which it is supported for revolution, and means for revolving the barrel in either direction at will.

6. In a mixing-machine, a revoluble mixing-barrel having a discharge end, the sides of said barrel converging at said discharge end toward the axis of revolution, said sides being substantially plane and forming corners at their junctions, and a series of converging vanes fixed within said barrel upon said sides near said corners and forming a series of converging buckets which alternately gather up and discharge the contents of the barrel exteriorly thereof; said buckets extending at their inner ends to the opposite sides of the barrel and abutting thereagainst, whereby these ends of the buckets are closed.

7. In a mixing-machine, a truncated cubiform mixing-barrel mounted for revolution and having at one end a charging-opening, and provided with an interior discharging-bucket closed at its inner end and extending from the middle thereof obliquely to the opposite end of the barrel.

8. In a mixing-machine, the combination with a truncated cubiform mixing-barrel and means for revolving the same in either direction at will, said barrel having at one end a charging-opening, of a device fixed within the barrel and extending from the other end of the barrel to an opposite side thereof, and



abutting against said opposite side, for draining the barrel; said draining device being so constructed as to be rendered effective by the revolution of the barrel in one direction only.

5 9. In a mixing-machine, the combination with a truncated cubiform mixing-barrel, of means between its ends whereon it is supported for revolution, means for revolving it in either direction at will, said barrel being provided  
10 at one end with a charging-opening, an inclined receiving-chute at said opening, converging blades fixed within the barrel and extending from the discharging end of said barrel to and against the opposite sides of the  
15 barrel, and effective when the latter is turning in one direction to discharge its contents; and an inclined discharge-spout exterior to the barrel.

10 10. A revoluble mixing-barrel larger at its body portion than at its end portions and having substantially plane sides and provided with a charging-opening, and having a discharging-bucket extending from the body portion at an angle to the axis of revolution, and at its inner end abutting against one of said sides, and  
25 discharging near said axis exteriorly of the barrel.

11. In a mixing-machine, the combination of a barrel having substantially plane sides that  
30 slope from the middle portion of the barrel to the ends thereof, means supporting said barrel for revolution, a charging-opening being provided in one end of said barrel, an inclined receiving-chute for said charging-opening, blades fixed within said barrel and at their inner ends abutting against the sides of the barrel near the middle portion thereof and extending thence to the end of the barrel opposite from said charging-opening, a discharge-  
35 spout exterior to said barrel, and means for revolving said barrel in either direction at will.

12. In a mixing-machine, a revoluble mixing-barrel having at each end sides which converge toward the axis of revolution, and having  
45 at one end an axial charging-opening, and having at the opposite end a series of converging discharging-buckets which extend along the converging sides at that end of the barrel and are closed at their inner ends and open exteriorly of the barrel near its axis of revolution.  
50

13. In a mixing-machine, the combination with a mixing-barrel mounted for revolution, of an interior blade or bucket extending longitudinally of the barrel to form a scoop which is closed at its inner end and is effective only to mix the contents when the barrel is revolved in one direction, but effective to drain the barrel when the latter is revolved in the  
55 opposite direction; and means for revolving the barrel in either direction at will.

14. In a mixing-machine, the combination with a revoluble mixing-barrel, of means for revolving the same either forwardly or backwardly at will; said barrel being provided

with a series of internal discharging-buckets which are closed at their inner ends and converge toward the axis of revolution of the barrel at their discharging ends; said buckets discharging when the barrel is revolved in  
70 one direction but being ineffective when it is revolved in the other direction.

15. In a mixing-machine, the combination with a revoluble mixing-barrel of means for revolving it in either direction at will; said  
75 barrel being provided with a series of discharging-buckets converging toward the axis of revolution of the barrel at their discharging ends and so constructed that their receiving ends receive the contents of the barrel at  
80 the lower portion thereof and then rise above their discharging ends, whereby such contents are discharged; said buckets being closed at their inner ends and being formed for receiving the material along their sides.  
85

16. In a mixing-machine, the combination with a revoluble truncated cubiform mixing-barrel and means for revolving it in either direction at will, of a discharging-bucket fixed within said barrel and inclining at its discharging  
90 end to the axis of revolution and extending to the opposite side of the barrel and closed thereby and so formed as to be effective only when said barrel is turning in one direction.

17. In a mixing-machine, the combination  
95 with a cubiform mixing-barrel and means for revolving the same in either direction at will, of a discharge-bucket fixed therein and inclined toward the axis of revolution at its discharging end, and closed at its receiving end  
100 and extending to a position to drain the barrel.

18. In a mixing-machine, the combination with a cubiform mixing-barrel mounted to revolve upon its opposite apices and means for revolving the same in either direction, of three  
105 blades or vanes clustered about one of the apices and extending interiorly along the adjoining three sides of the barrel to and against the remaining three sides of the barrel; each vane cooperating with the adjoining barrel side to  
110 form a long bucket, and the buckets being capable of draining said barrel and having discharge-openings near said axis.

19. In a mixing-machine, the combination with a revoluble cubiform mixing-barrel and  
115 means for revolving it in either direction at will, of buckets fixed within said barrel and closed at their inner ends and capable of discharging the barrel when it is revolved in one direction but incapable of discharging when  
120 it is revolved in the other direction; said buckets extending to the exterior of the barrel and being capable of draining the same.

20. In a mixing-machine, the combination with a revoluble cubiform mixing-barrel  
125 mounted to revolve upon its opposite apices, and means for revolving it in either direction at will, said barrel being provided at one end of said apices with a charging-opening, of buckets closed at their inner ends and effective  
130



ive when said barrel is being revolved in one direction but not the other, for causing a portion of the contents of the barrel to be discharged at each revolution until the barrel is drained, said discharging means being constructed to discharge said contents at the other of said apices; said buckets extending to the exterior of said barrel and being capable of draining the same.

21. In a mixing-machine, the combination with a revoluble cubiform mixing-barrel and means for revolving it in either direction at will, of interior discharging-buckets closed at their inner ends and formed partly of the sides of the barrel and converging toward the axis of revolution and effective only when the barrel is revolved in one direction, and extending to the exterior of the barrel.

22. In a mixing-machine, the combination of a cubiform mixing-barrel, a pair of wheels between and upon which said barrel is mounted, rolls upon which said wheels ride, gearing connected to said wheels for revolving the barrel in either direction at will, and a discharge-bucket within said barrel and closed at its inner end and discharging through one of said wheels, the barrel being provided with a charging-opening within the other of said wheels, and the discharge-bucket being effective only when the barrel is turned in one direction.

23. In a mixing-machine, a revoluble mixing-barrel formed at one end with three substantially plane intersecting sides which converge toward the axis of revolution, and vanes fixed within the barrel upon said sides and extending longitudinally of the intersecting edges of said sides, one vane upon each of said sides; said vanes converging toward the axis of revolution, and each vane cooperating with the next side to form a bucket capable of discharging itself exteriorly of the barrel when the vane is above the axis of revolution.

24. In a mixing-machine, the combination with a revoluble mixing-barrel and means for revolving it in either direction at will, of a discharging-bucket fixed within said barrel and inclining at its discharging end to the axis of revolution and extending at its receiving end to the body of the barrel, and so formed as to be effective only when said barrel is turning in one direction.

25. In a mixing-machine, the combination with a mixing-barrel mounted for revolution,

and means for revolving it either forwardly or backwardly at will, of a set of relatively long discharging-buckets fixed within said barrel and at their discharging ends converging toward said axis and at their receiving ends extending to the body of the barrel in position to drain the same.

26. In a mixing-machine, the combination with a cubiform mixing-barrel and means for revolving the same in either direction, said barrel being mounted to revolve upon its opposite apices, of three discharge-buckets clustered at their discharging ends about one of said apices and extending therefrom to positions to drain the barrel.

27. In a mixing-machine, the combination of a cubiform mixing-barrel, a pair of wheels between and upon which said barrel is mounted, rolls upon which said wheels ride, a gear upon one of said wheels, a power-driven reversing-gear connected to said gear, and a set of discharge-buckets within said barrel and effective to drain the same while the barrel is revolving in one direction but ineffective while the barrel is revolving in the other direction; said buckets discharging through one of said wheels, and means being provided for charging the barrel through the other of said wheels.

28. In a mixing-machine, the combination of a cubiform mixing-barrel revoluble upon a horizontal axis, the cube being truncated and abutting against wheels, between and whereby it is supported, two pairs of antifriction-rolls whereon said wheels ride and whereby axial movement of the barrel is prevented, an annular gear upon one of said wheels, said gear surrounding one end of the barrel and fixed to the rear side of the wheel, a reversing-gear connected to said gear, an inclined receiving-chute, a vertical screen upon whose outer side said chute is fixed, and blades 42, 43, 44 fixed within the barrel, said blades being similar and symmetrically disposed about the axis of revolution, toward which axis they converge at their discharging ends, and each blade having one edge contiguous to a side of the cube and abutting against another side of the cube.

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