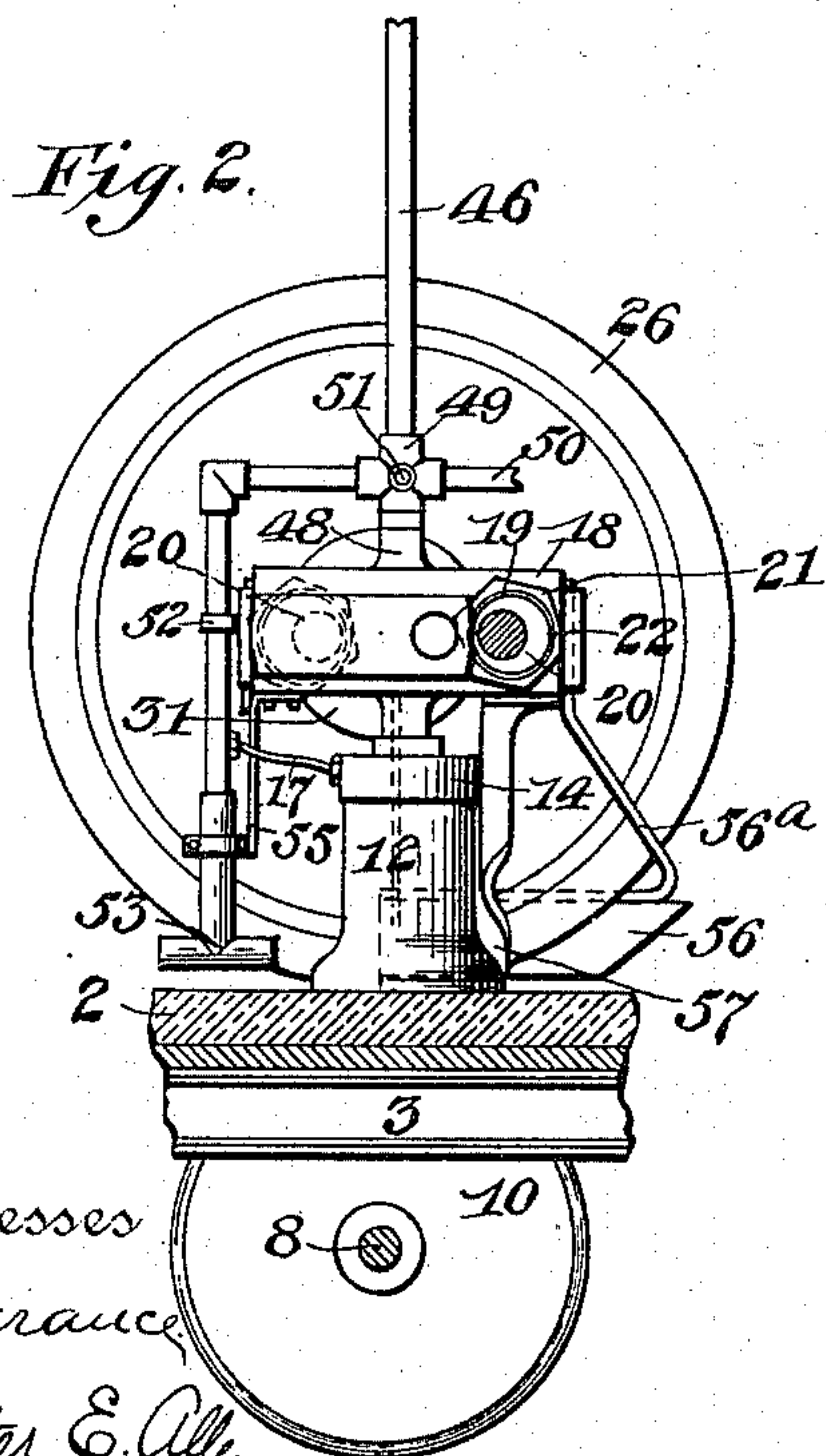
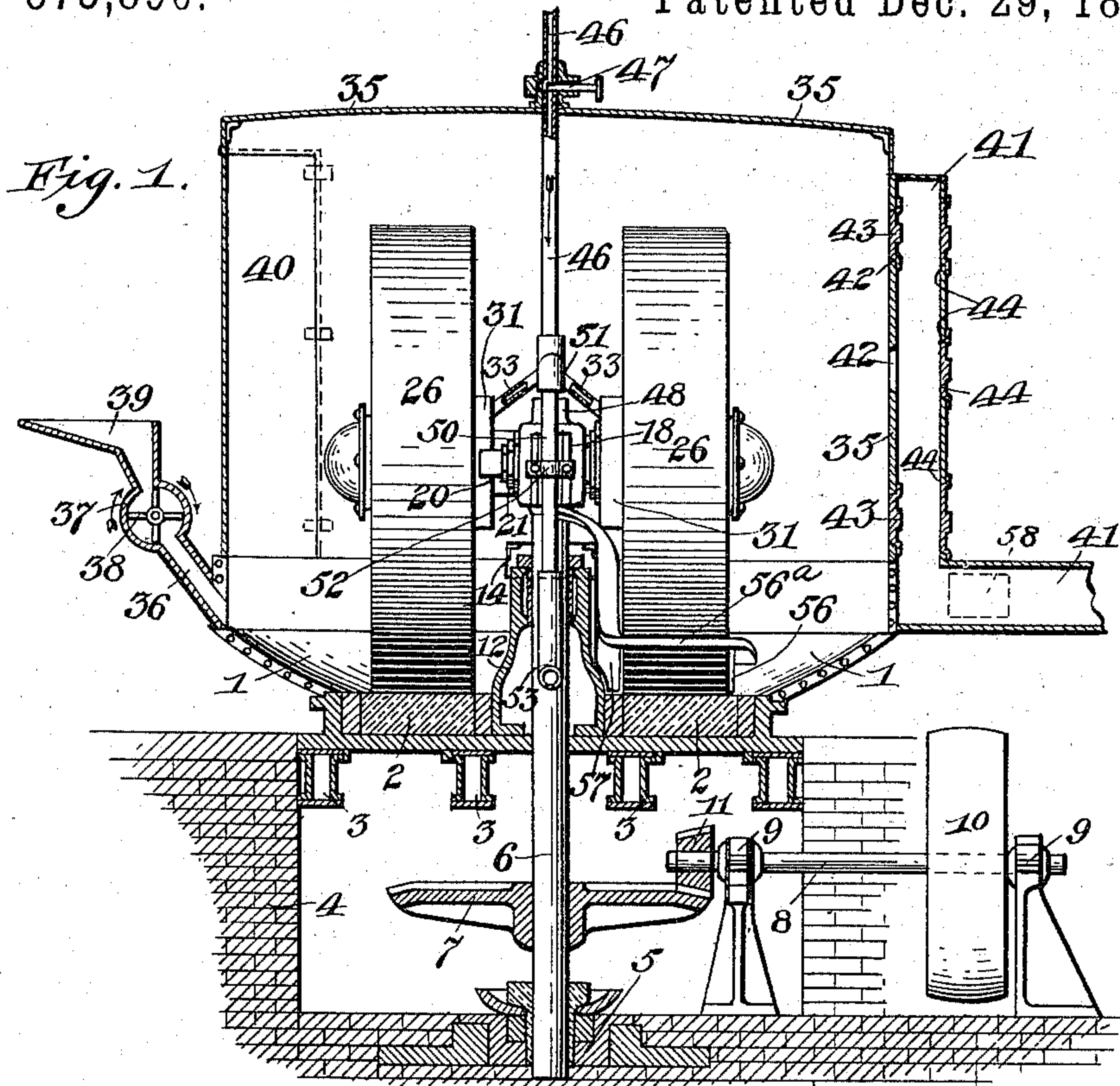


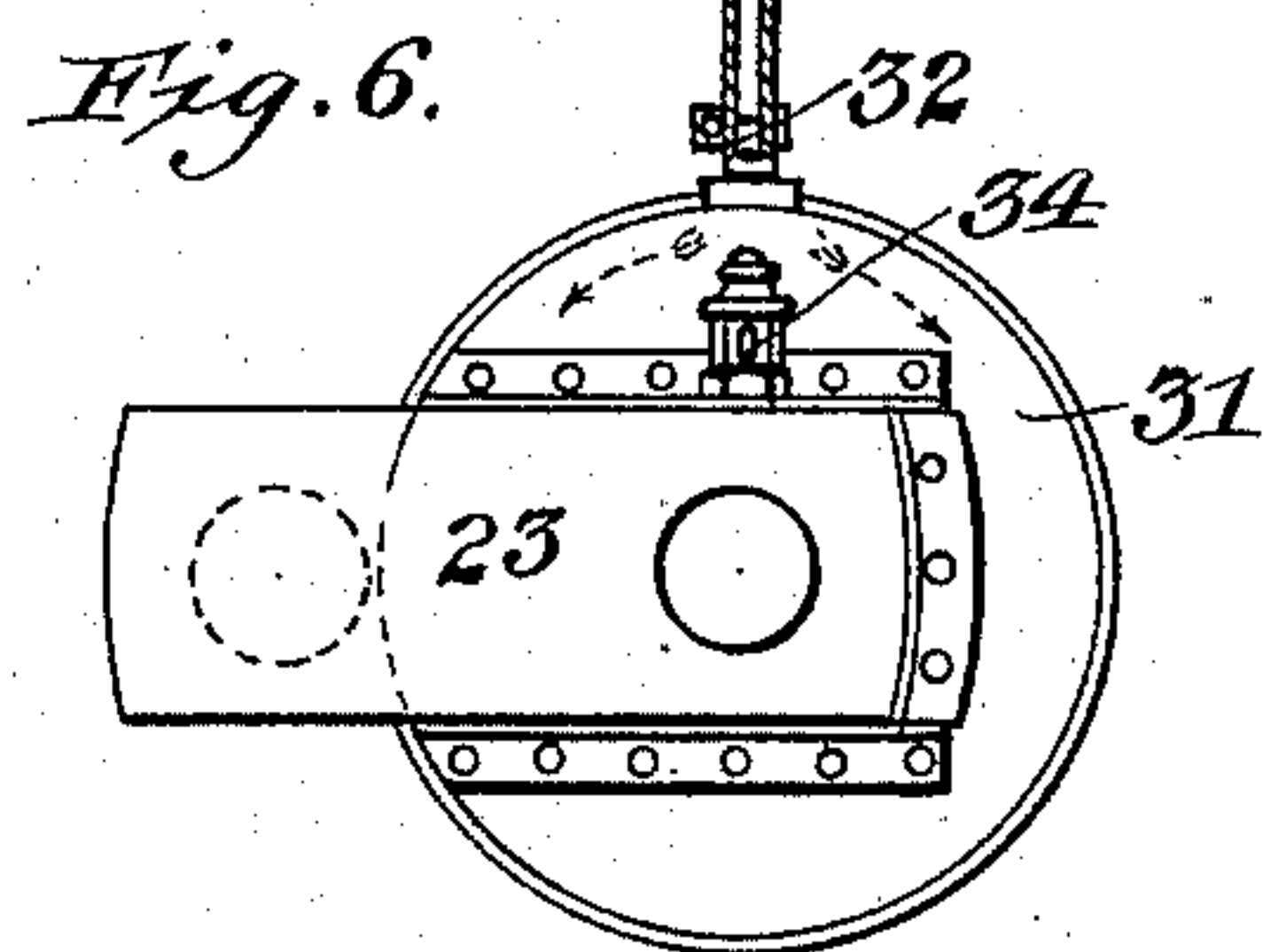
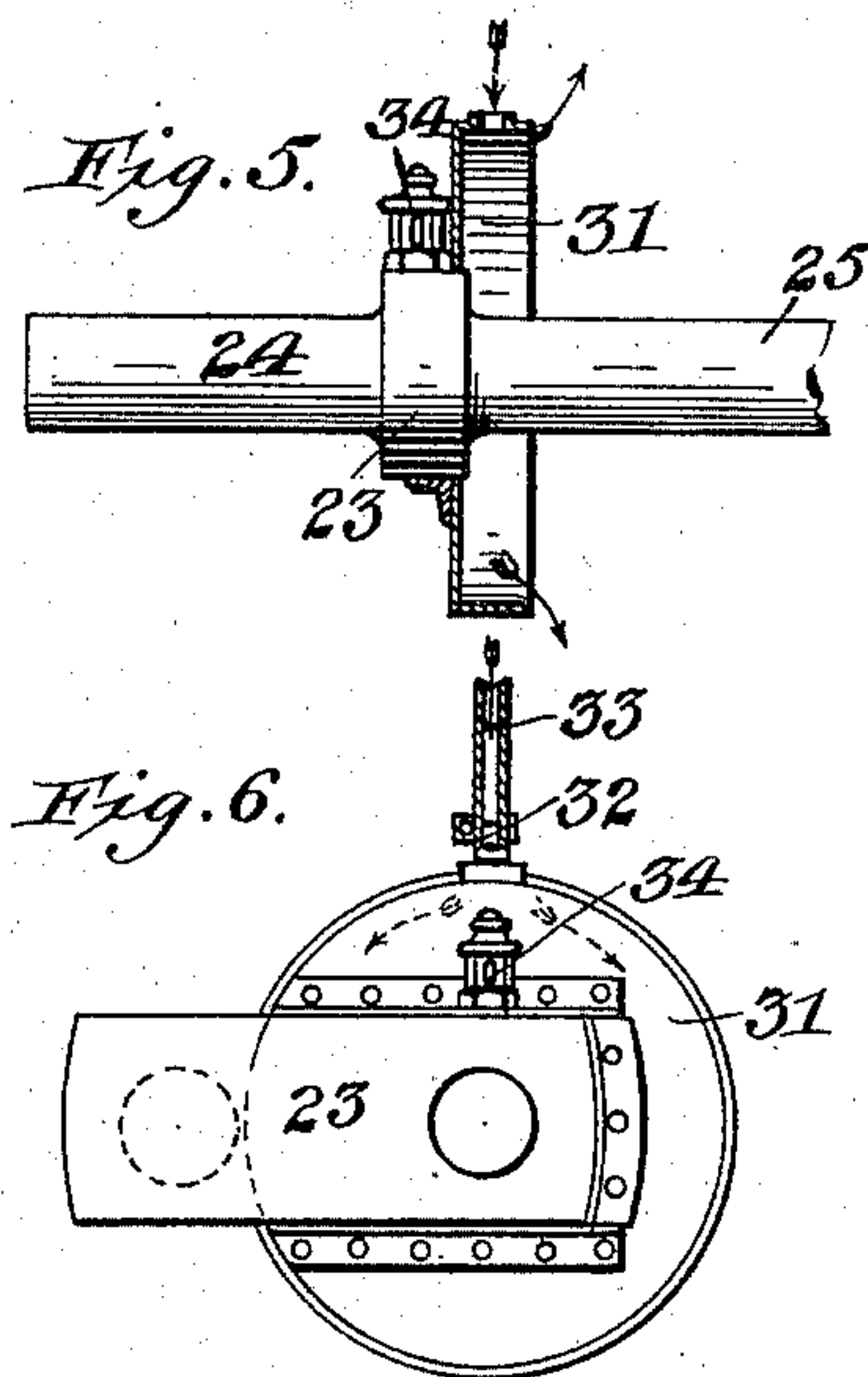
H. MANTEY.
EDGE RUNNER MILL.

No. 573,890.

Patented Dec. 29, 1896.



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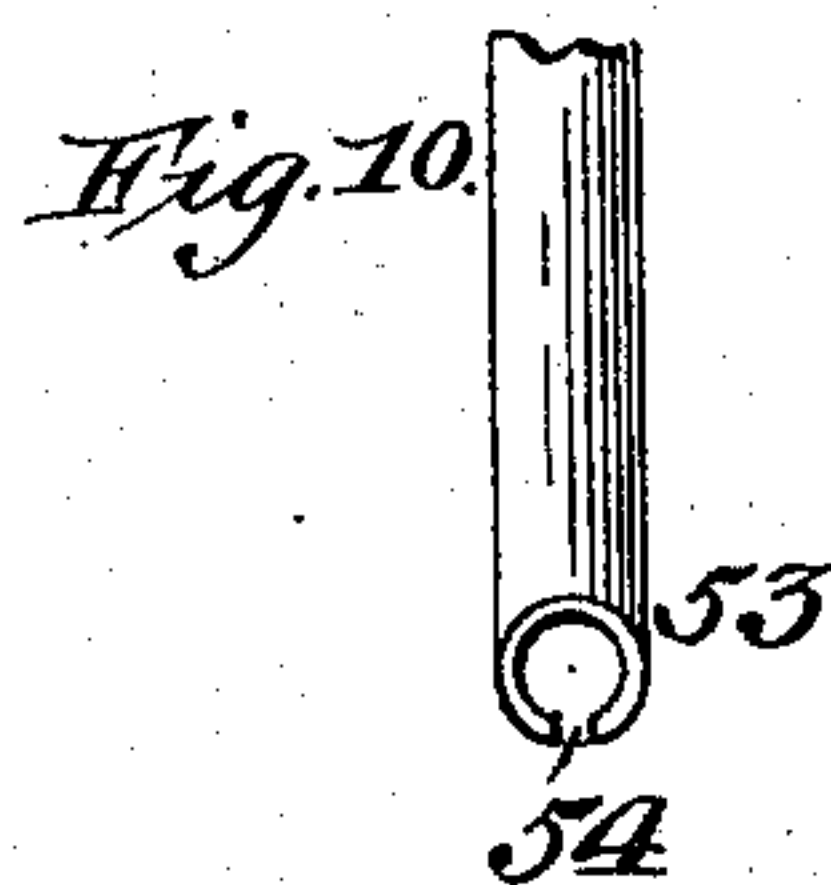
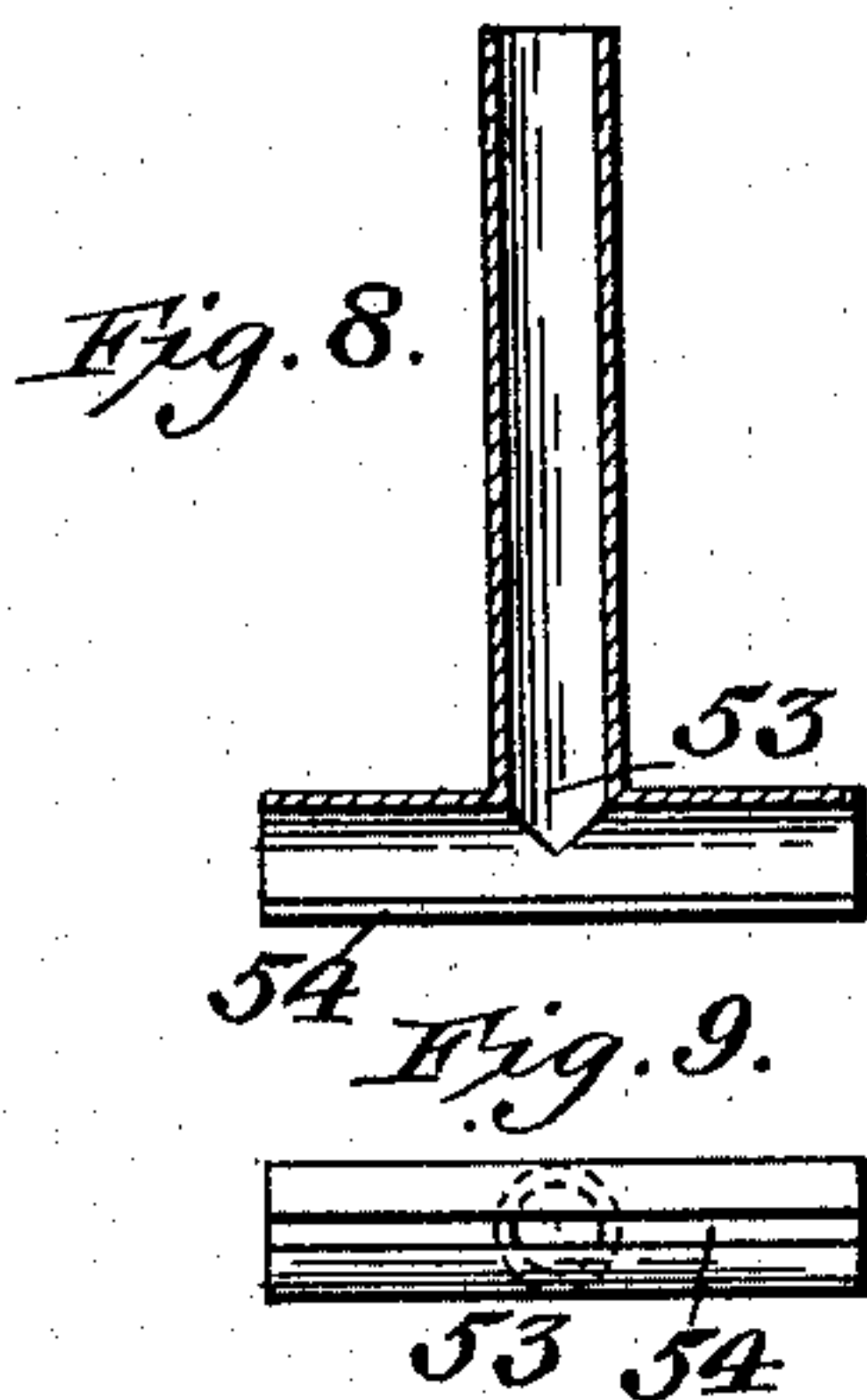
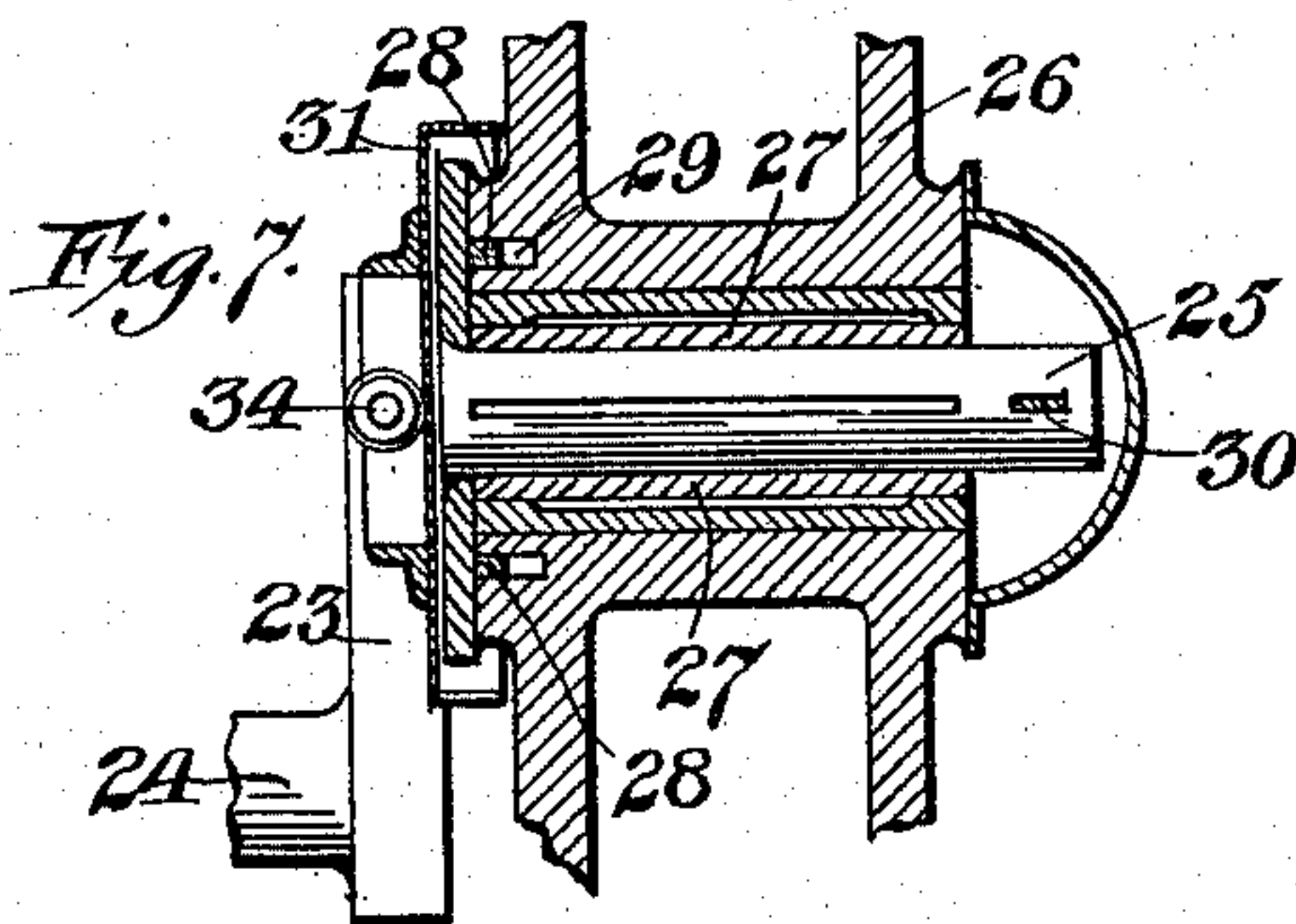
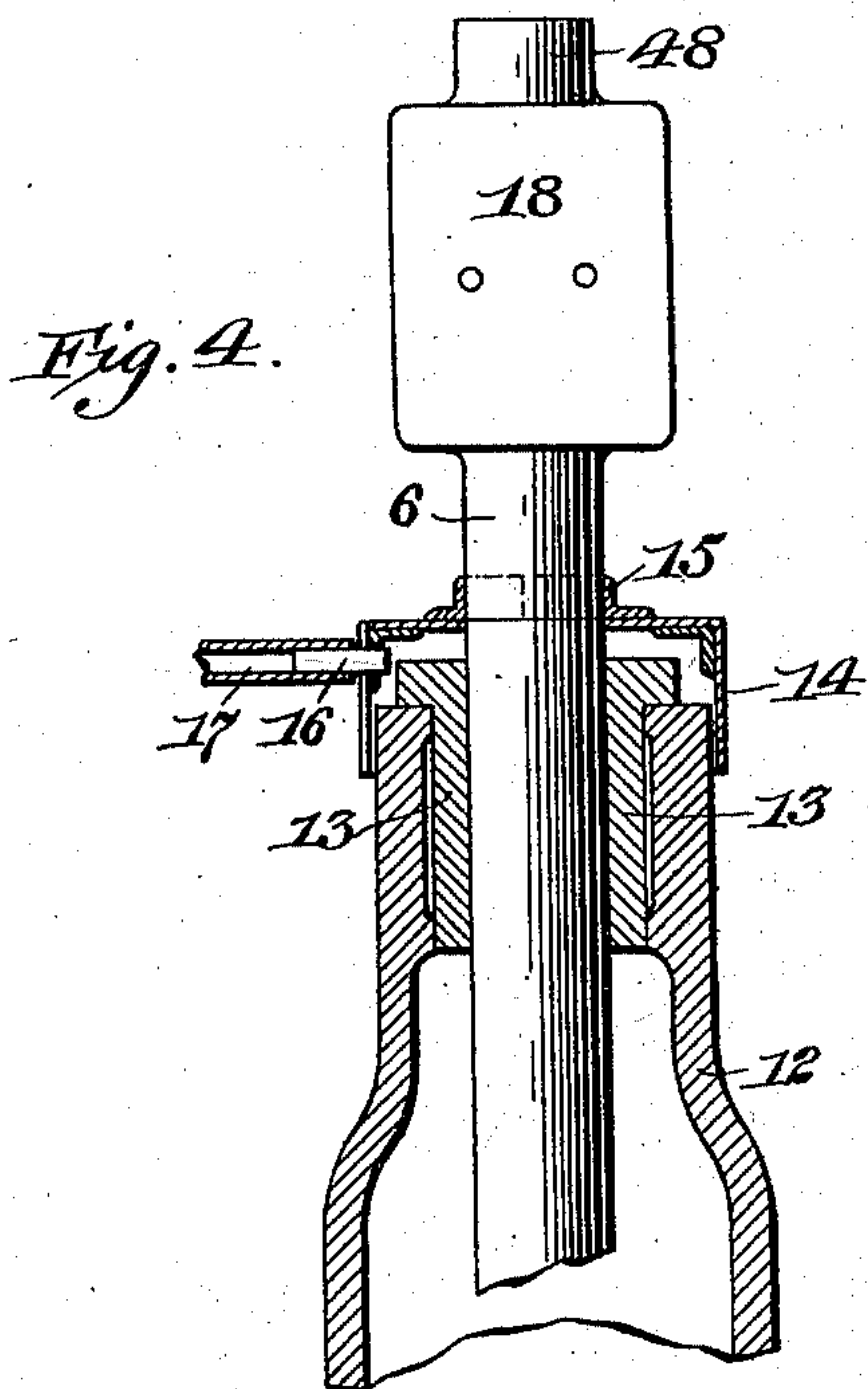
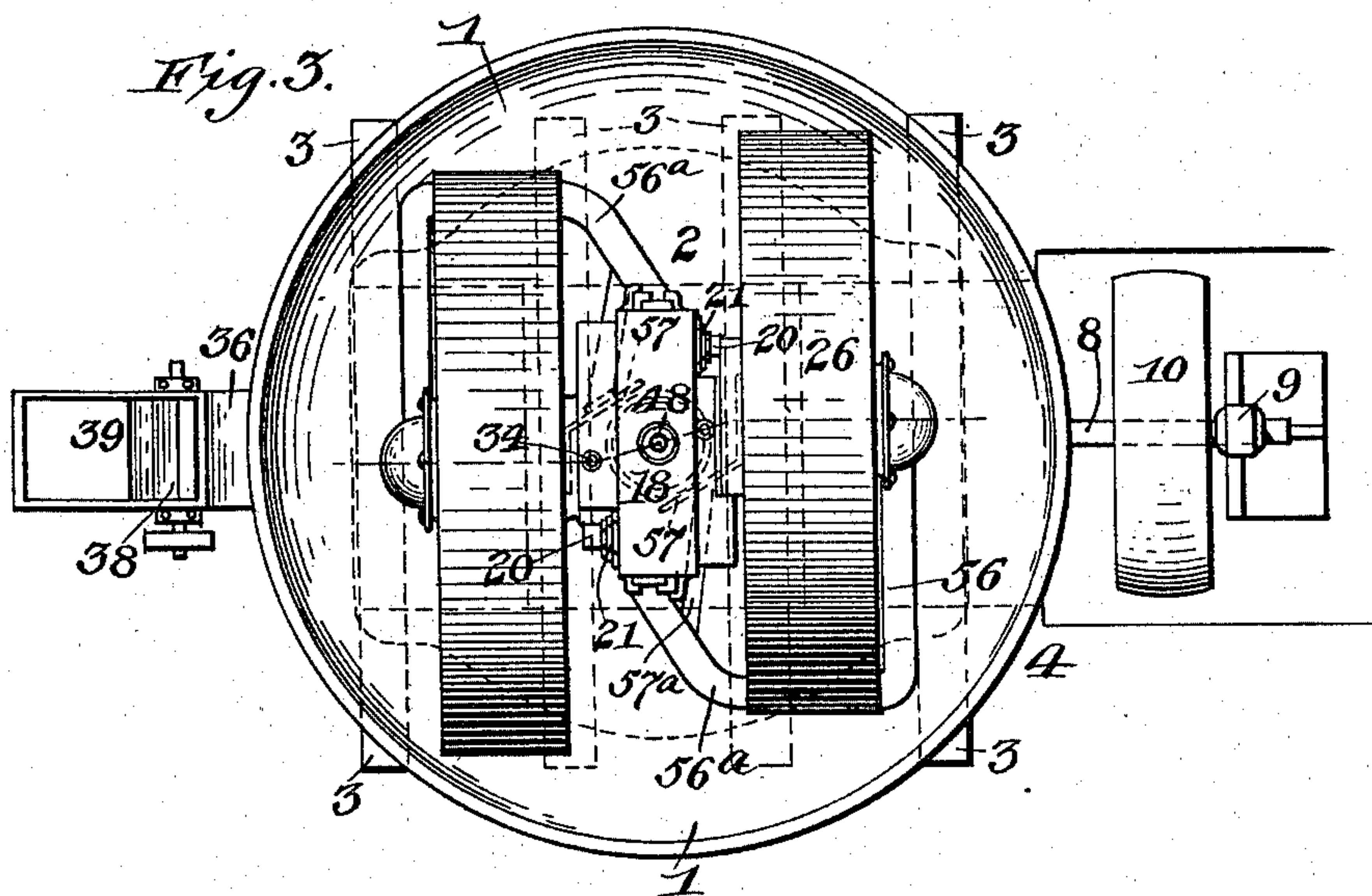
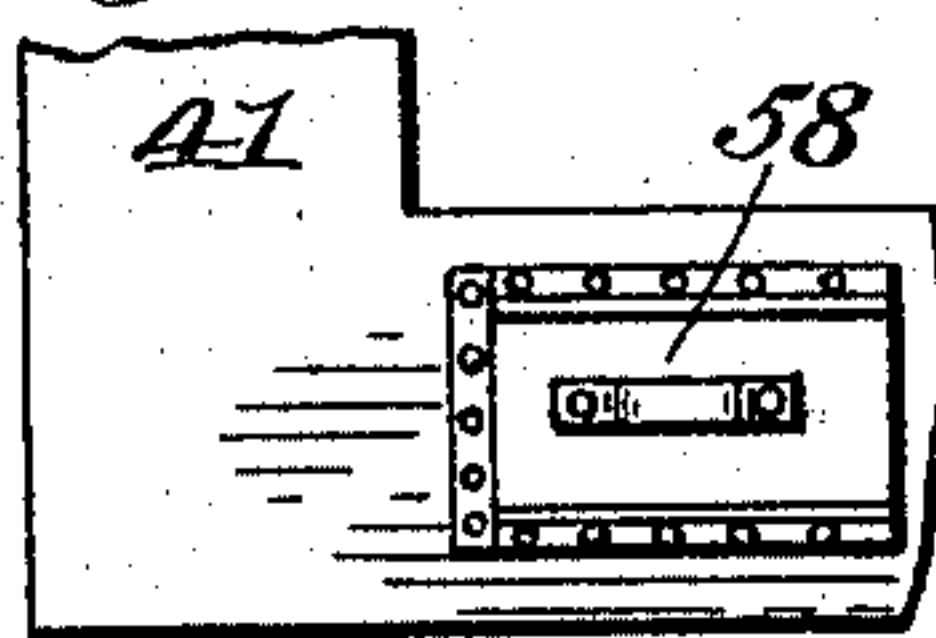


Fig. 11.



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UNITED STATES PATENT OFFICE.

HENRY MANTEY, OF ORIZABA, MEXICO.

EDGE-RUNNER MILL.

SPECIFICATION forming part of Letters Patent No. 573,890, dated December 29, 1896.

Application filed January 12, 1894. Serial No. 496,656. (No model.)

To all whom it may concern:

Be it known that I, HENRY MANTEY, a citizen of the United States, residing in the city of Orizaba, in the State of Vera Cruz, Mexico, have invented certain new and useful Improvements in Edge-Runner Mills, of which the following specification, taken in connection with the accompanying drawings, is a full, clear, and exact description, such as will enable those skilled in the art to make and use the same.

In grinding with edge-runner mills there are two methods employed—the wet and the dry. The greatest difficulty which has been experienced with the wet method is in keeping the ores well under the grinding-wheels, while with the dry method the difficulty has been to properly remove the finely-ground ore.

My present improvements relate particularly to dry grinding, and while they may be applied most satisfactorily to the form of edge-runner mill covered by my Patents Nos. 488,146 and 487,930, both dated December 13, 1892, they will be found to also apply to other forms of edge-runner mills.

The main object of my improvements is to remedy the above-noted defect in dry-grinding mills and to render dry grinding more practicable than the wet method in every respect in order to take advantage of the known fact that a greater quantity of ore can be crushed in a given time by the dry method than by the wet.

In my improved form of mill I completely inclose the grinding-basin and runners with an air-tight casing, which is provided with a suitable valved inlet for the ore to be crushed and valved outlets for the ground ore, and apply a blast to the grinding-surface of the basin for removing the finely-ground ore and an exhaust at the outlet-opening for assisting in the removal of the ground ore. The blast is also applied to the journals of the mill in such a manner as to prevent the accumulation of dust therein. Suitable valves are provided for the blast and exhaust in order that the removal of the ground ore and the fineness of grinding can be gaged or regulated to a nicety. Suitable scrapers are also provided for keeping the ore in the path of the runners.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings and then more particularly point out the novel features in the annexed claim.

In said drawings, Figure 1 is a sectional elevation of my improved mill. Fig. 2 is a sectional elevation taken at right angles to Fig. 1. Fig. 3 is a top plan view, the top of the casing being omitted. Fig. 4 is an enlarged sectional elevation of a portion of the vertical power-shaft. Figs. 5, 6, and 7 are detail views of the runner-journals, showing the manner of protecting the journals from dust. Figs. 8, 9, and 10 are detail views of one of the terminals of the main blast-pipe. Fig. 11 is a detail view of the exhaust-pipe, showing the regulating-valve.

1 is the grinding-basin, having the customary sloping circular wall and the grinding-bed 2. The basin is built upon suitable girders, such as 3, which are supported in brickwork 4. Directly below the basin ample room is provided for the operating mechanism.

5 is the central bearing, in which rotates the lower end of the vertical drive-shaft 6.

7 is the large bevel gear-wheel, keyed to the shaft 6 above its bearing 5, and 8 is the power-shaft, supported in suitable bearings 9 and provided with a power-pulley 10 at one end and a bevel-pinion 11 at the other end, which meshes with the bevel gear-wheel 7 and thereby drives the vertical shaft 6.

It will be seen that the driving mechanism is located below the main floor of the mill and under cover in order that it may be kept free from dust.

The central shaft 6 extends up through the grinding-basin and is surrounded by a central support or standard 12, which is provided at its upper end with the flanged bearing or bushing 13. The flange of bearing 13 rests upon the top of the support 12. This bearing 13, if unprotected, would soon become clogged with dirt and dust which constantly rises from the basin, but in order to protect it I provide a cap 14, which is secured around the shaft 6 by means of the collar 15 and extends down around the upper end of the support 12. The cap 14 fits loosely around the support 12 in order to allow a small air-space

between them and revolves with the shaft 6. Tapped into one side of the cap 14 is a short pipe 16, which is connected with one of the main blast-pipes by a flexible tube or hose 17 in order that there will be a constant blast of air into the cap around the bearing and out through the space between the cap and the support, which will effectually prevent the entrance of any particles of dust to the bearing.

18 is the cross-beam, keyed to the upper end of the shaft 6 above the protected bearing 13. In the opposite ends of the cross-beam 18 are the openings 19, in which are journaled the rotatable bushings 20, which are formed with the squared or polygonal heads 21 (by means of which they can be turned or adjusted) and with the eccentric longitudinal openings 22 for the axles.

23 are the crank-axles, having the inner journal ends 24, which are journaled in the eccentric openings of the bushings 20, and the outer journal ends 25, upon which the runners are journaled. The journal ends 24 are secured in place in the bushings 20 by means of a nut or other suitable device.

26 are the vertical runners, which are journaled upon the ends 25 of the crank-axles, a flanged bushing 27 being interposed in each bearing and a rawhide ring 28 being mounted in an annular groove 29 in the inner face of each runner and serving to form a close joint with the flange of the bushing 27. The runners are kept in place on the axles by means of linchpins 30.

For the purpose of effectually preventing the entrance of particles of dust to the bearings of the runners I provide a cap 31, which is rigidly supported from the crank-axle 23 and surrounds the flanged bushing 27. Tapped into the upper wall of said cap is a short tube 32, through which a constant blast of air is supplied from the main blast-pipe, which is connected thereto by a flexible tube 33. In this manner the blast is constantly entering the cap and escaping around the bearing for preventing the entrance of particles of dust.

34 are the oil-cups for supplying oil to the millstone-bearings.

Extending up from the basin 1 and surrounding the runners and basin is a suitable air-tight casing 35. Into one side of the casing is tapped an ore-supply chute 36, which has an enlarged circular portion 37, in which rotates a pocketed feed-wheel 38. 39 is the hopper into which the ore to be ground is placed. By rotating the feed-wheel in the direction indicated by the arrows a supply of ore is fed to the basin without allowing the entrance of the outside air. 40 is a suitable door, which is kept normally closed, by means of which entrance can be had into the basin for cleaning and examining the machine.

Extending up the side of the casing 35, opposite to the ore-supply, is an air-tight conduit 41, which has a series of openings 42 opening into the mill-inclosure, which are normally closed by removable stoppers 43,

which are preferably provided with suitable handles. Corresponding to the openings 42 in the opposite wall of the conduit 41 are a series of normally-closed openings 44, which provide access to the openings 42. When it is desired to remove the stopper from either of the openings 42, the covering is taken from the opening 44 corresponding therewith and the stopper 43 taken out. The purpose of this series of openings will be explained presently.

Extending down from the top of the casing 35 is a blast-pipe 46, having a controlling-valve 47 for regulating the flow of air there-through. The blast-pipe 46 extends down in line with the main shaft 6 until directly over the cross-beam 18, at which point it is supported by an extension 48. 49 is a coupling from which extend the branch pipes 50 and the branch nipples 51. Each branch pipe 50 projects out parallel to the cross-beam 18, and then down past the ends of the cross-beam, at which points they are braced by the metal straps 52. The branch pipes 50 are formed at their lower ends with T-terminals 53, having the outlet-slot 54, through which the air-blast passes. The terminals are supported very close to the bed 2 of the basin, so that the blast will keep the finely-ground particles of ore constantly agitated and floated.

55 is another brace-rod extending from the underneath side of the cross-beam 18 to each of the branch pipes 50. The flexible tubes 17 connect with the branch pipes 50 below the cross-beam 18, while the flexible tubes 33 connect with the nipples 51 of the coupling. In this manner the air-blast is supplied to all of the points which it is desired to reach.

56 are scraper-blades supported by the curved rods 56^a, which are keyed to the ends of the cross-beam 18 and extend around in front of the runners. Each of the scrapers 56 extends parallel to the cross-beam 18 on the outside of one of the runners.

57 are angular scraper-blades supported inside of the runners a little forward of the axis of rotation. The scrapers 57 are supported by the curved rods 57^a, which are bolted to the under side of the cross-beam 18. The arrangement of the scrapers 56 and 57 is such as to effectually keep the ore under the runners.

The lower end of the conduit 41 extends off at right angles and leads to any suitable exhaust-fan.

58 is a slide-valve in the conduit 41, by means of which the exhaust can be regulated by allowing the entrance of the outside air.

By the employment of a blast and exhaust, as above described, I am enabled to regulate the discharge of the ground material to such a nicety that I can grind the ore to any desired fineness without difficulty. The blast keeps the finely-ground ore constantly floating within the casing 35 and the exhaust removes it as fast as it reaches the desired fine-

ness. The series of openings 42 are for the purpose of assisting in regulating the fineness of the material discharged. If the ore is not to be ground very fine, it is discharged through the lowest opening, but if it is to be ground to an extreme fineness the highest opening is utilized.

It will be seen that all particles not ground to the desired fineness will be too heavy to be raised to the high opening, whereas if extreme fineness is not desired the larger-ground particles can be discharged through the lower openings without trouble.

Having thus described my invention, what

I claim as new therein, and desire to secure by Letters Patent, is—

The combination of the basin, the central driving-shaft, the cross-beam secured to the shaft, the adjustable bushings supported in the cross-beam and formed with eccentric openings extending through them, the axles journaled in the openings, the runners mounted on the axles, and means for adjusting the bushings; substantially as described.

HENRY MANTEY.

Witnesses:

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JORGE POWELL.