

No. 756,292.

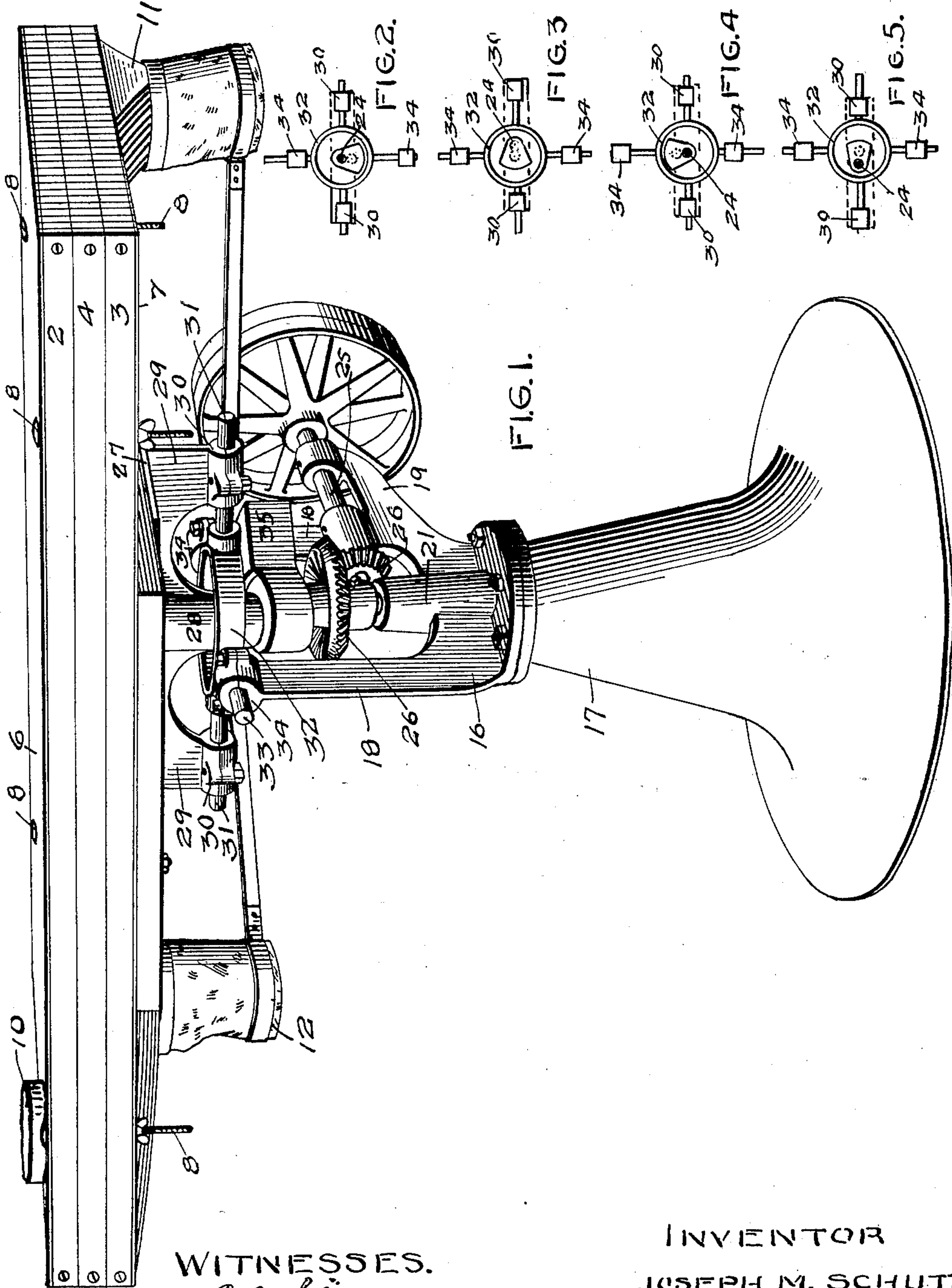
PATENTED APR. 5, 1904.

J. M. SCHUTZ.
GYRATING SIFTER.

APPLICATION FILED SEPT. 8, 1899.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES.

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M. E. Cooley

INVENTOR

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HIS ATTORNEYS

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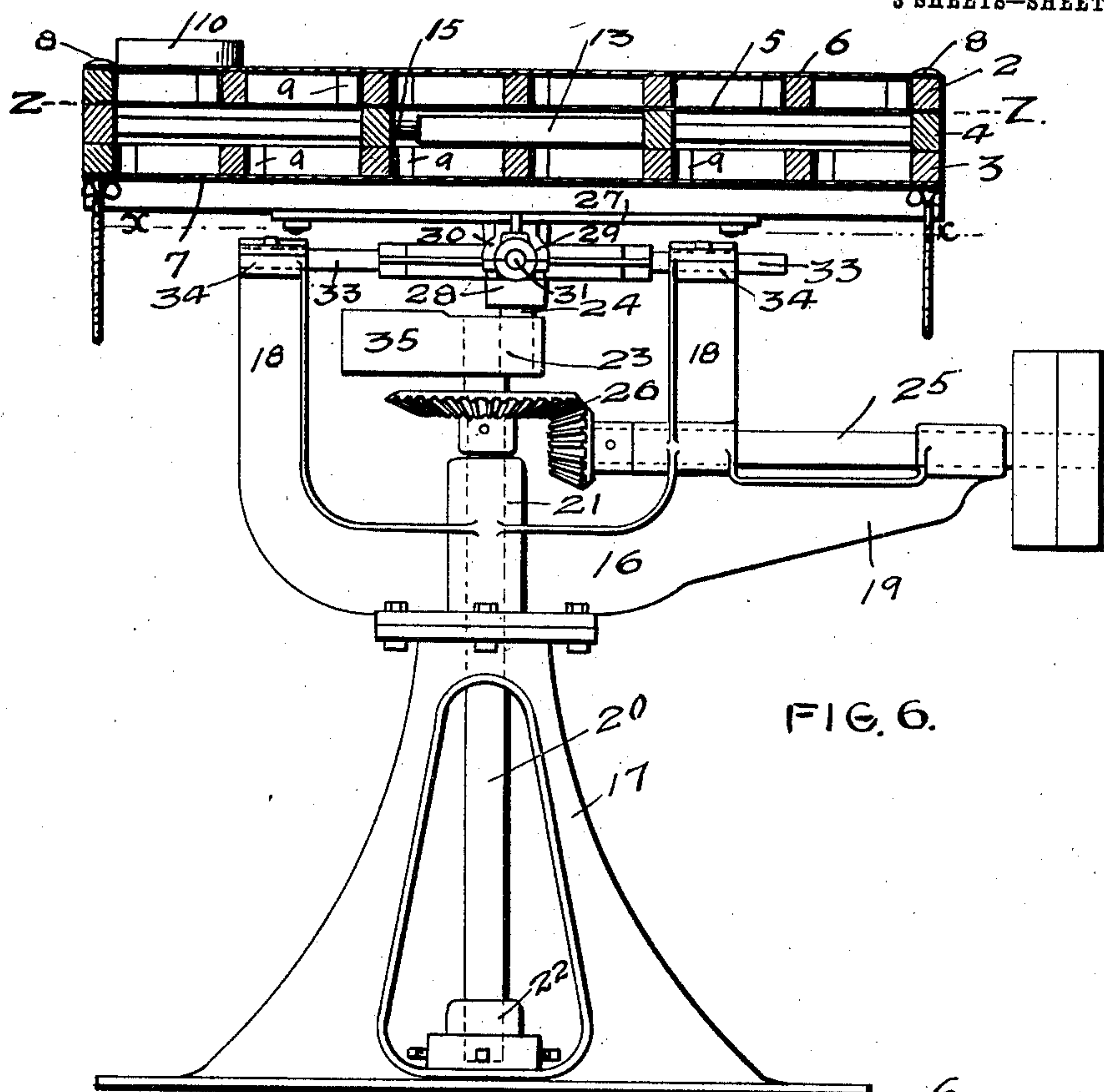


FIG. 6.

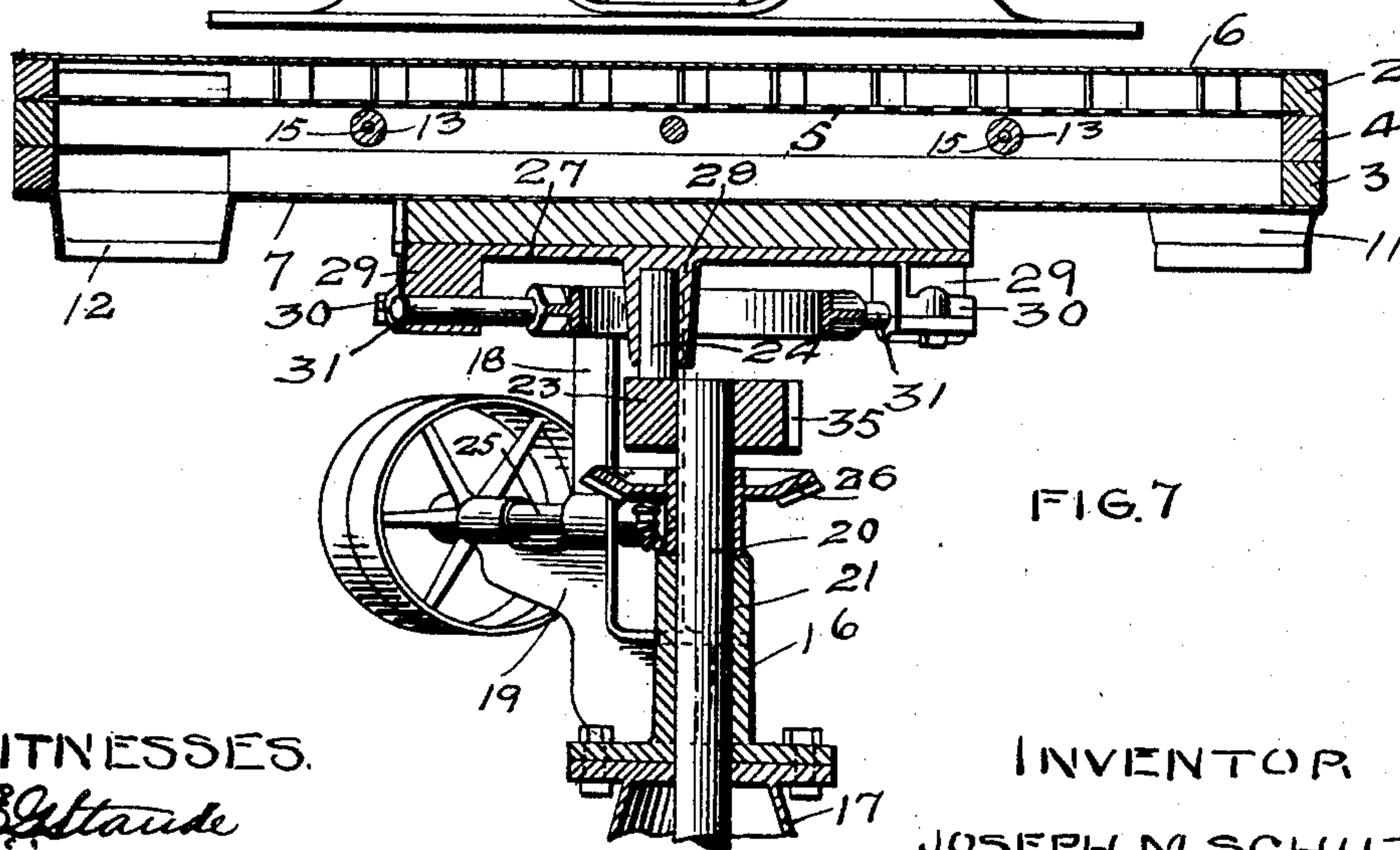


FIG. 7.

WITNESSES.

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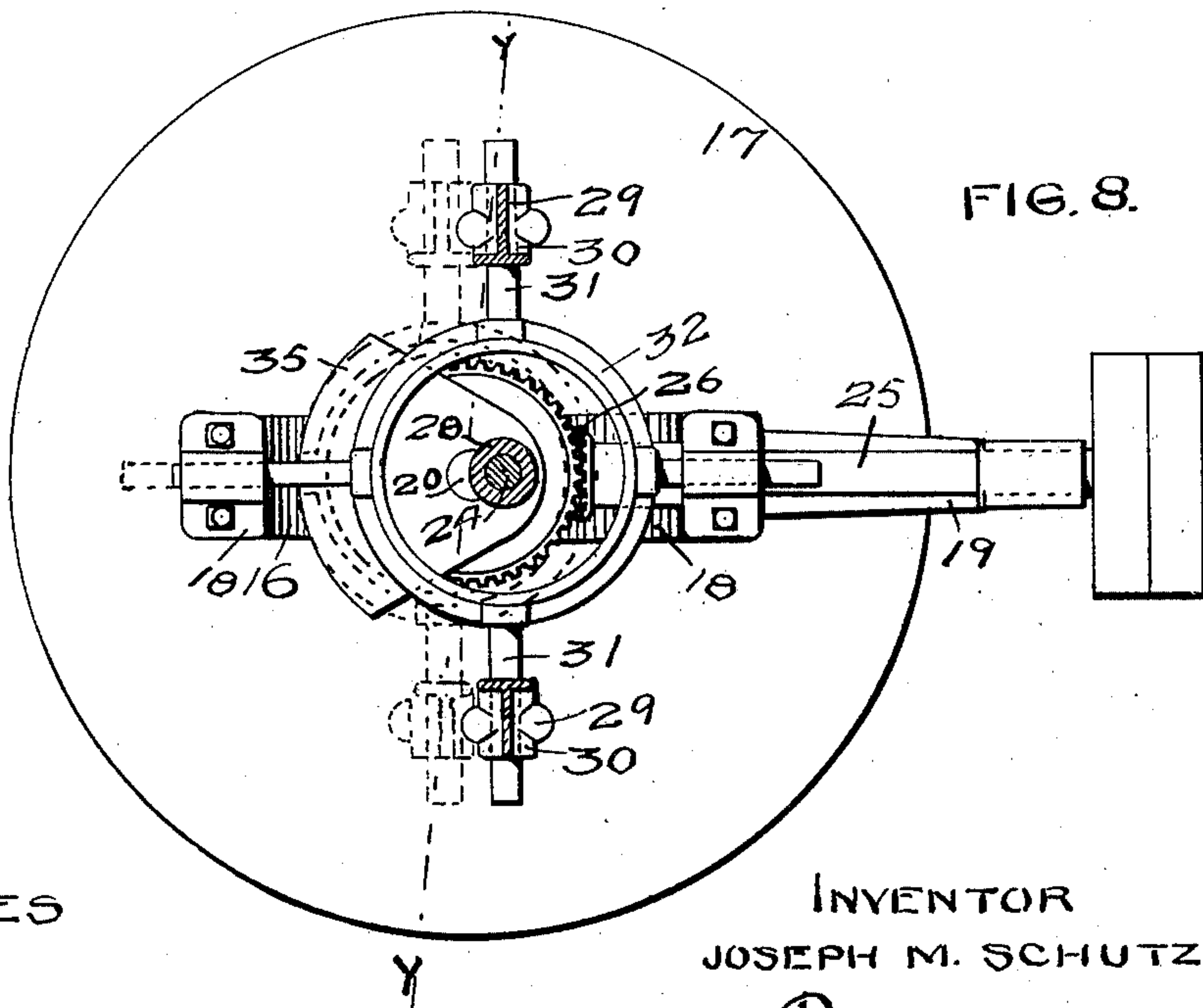
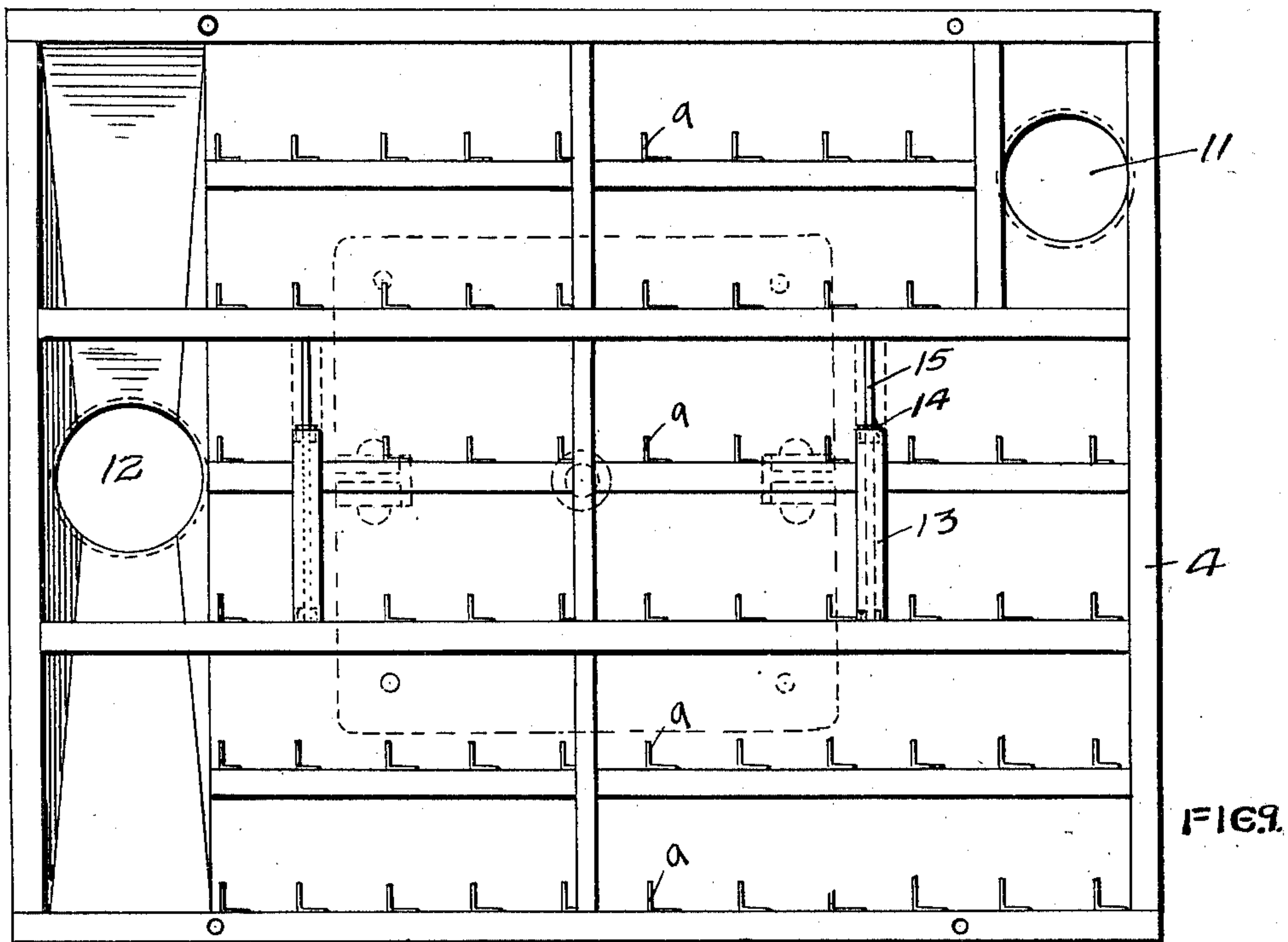
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3 SHEETS—SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOSEPH M. SCHUTZ, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE SCHUTZ-O'NEILL COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

GYRATING SIFTER.

SPECIFICATION forming part of Letters Patent No. 756,292, dated April 5, 1904.

Application filed September 8, 1899. Serial No. 729,816. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. SCHUTZ, of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Gyrating Sifters, of which the following is a specification.

My invention relates, primarily, to means for producing gyratory motion; and the invention relates particularly to gyrating machines for sifting flour and powder of various materials.

The object of the invention is to provide simple means to gyrate a working part or machine member, such as the sieve of a bolting-machine, a concentrating-belt, or the like.

The particular object of the invention is to dispense with gyrating body-hangers and pivotal supports, both of which are commonly employed in such machines.

A further object of the invention is to improve and cheapen the construction and lessen the cost of operating sifting, bolting, and separating machines; and still another object is to perfectly balance gyrating machines, whereby the same may be made to operate smoothly and will require little power for their operation.

With these objects in view my invention consists generally in a plate on the machine body or member that performs the work and a driving crank-shaft that is preferably perpendicular to said plate, in combination with positively-operating and preferably sliding means interposed between said plate and a fixed support preventing the rotation of the plate or body and restricting its movement to gyration; and my invention also consists particularly in a machine the working member of which (the sieve) is wholly supported and driven from beneath; and, further, the invention consists in various details of construction and in combinations of parts, all as hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a perspective view of a gyrat-

ing sifter embodying my invention. Figs. 2, 3, 4, and 5 are small diagrams illustrating the gyratory movement. Fig. 6 is a side elevation of the machine with the sieve-frame in section. Fig. 7 is a perspective section on line *y y* of Fig. 8. Fig. 8 is a plan view on the line *x x* of Fig. 6. Fig. 9 is a plan view of the sieve-frame on the line *z z* of Fig. 6.

As shown in the drawings, the sieve box or body instead of being made up of a number of sieves placed within a box of a given size, as is the usual custom, is composed of a number of sections—namely, the top and bottom sections 2 and 3 and one or more sieve-sections 4, which latter, as shown, carries the cloth 5. The top of the top section is closed by a wooden or sheet-metal plate 6, and the bottom of the lower section 3 is closed by a similar plate 7. The outer frames of the sections and the top and bottom plates compose the sieve-box, and the sections are fastened by bolts 8 passing through the outer frames. These bolts, as shown in Fig. 6, are preferably longer than are required for but a three-section box in order that other sieve-sections may be added without changing the bolts. The sections 2 and 3 are provided with dividing-strips that have flights 9 for advancing the stock. The stock is fed into the top section and upon the sieve through the spout 10. The tailings are taken from the sieve through the spout 11, and the good stock is taken from the bottom section through the spout 12. This sieve-box is vibrated or gyrated at a high speed by the mechanism that is arranged beneath the box between the same and the base whereon the sieve-box is supported, as will appear hereinafter. To keep the sieve-cloth clear, I employ the automatic knocker or knockers illustrated in the drawings. As shown in Figs. 6, 7, and 9, the knocker comprises the simple metallic tube 13, preferably of lead, having its ends protected by steel bushings 14 and adapted to slide upon a small rod or wire 15, that extends between the dividing-strips of the sieve-frame 4. I prefer to employ two such knockers in each sieve-frame. Such devices are not required in the top and bottom box-sections 2 and 3.

The throw of the weights is preferably slightly less than the gyratory throw of the sieve, and with each movement of the sieve-frame the knocker or tubular weight will be struck forcibly against the sieve-frame to jar the cloth thereof. It is of distinct advantage to apply the jarring strokes of the knocker to the inner or middle portion of the sieve-frame, as the shock is then distributed throughout the sieve cloth and frame. Although the knockers are preferably concealed within the sieve-box, it is obvious that they may be arranged on rods on the exterior of the frame.

The machine-base, before referred to, is preferably made in upper and lower parts 16 and 17. The gyrating mechanism, including the slide, is arranged in the upper part of the base, which upper part is provided with the arms 18 18 and the bracket 19.

20 represents a vertical shaft having a vertical bearing 21 in the upper base part and preferably extended to the bottom of the lower part of the base, where it is provided with an adjustable step-bearing 22. Upon the upper end of the shaft 20 is a crank 23, having a crank-pin 24, and the shaft 20 is rotated from the horizontal driving-shaft 25, having bearings in the arm and bracket and connected with the shaft 20 by bevel-gears 26. There are a fixed and a loose belt-pulley on the outer end of the shaft 25.

The sieve-box rests upon the plate 27, which plate is provided with a depending sleeve or boss 28, into which the crank-pin 24 projects, thus forming the connection between the sieve-box and the vertical driving-shaft. The crank-pin preferably carries the weight of the sieve-box. It is obvious that unless means are provided to hold the sieve-box said box would rotate with the crank and about the same as a center and would partake of but little gyratory movement. It is therefore necessary to interpose between the crank-shaft and the plate or the working member—namely, the sieve—some means capable of angular movement and not capable of rotation to hold or restrain the sieve-box and limit the same to gyration. For this purpose I prefer to employ a slide preferably composed of two or more angularly-related arms, forming a sliding tie or working connection between the plate 27 and the base of the machine and preventing vertical movement of the sieve-box and also preventing the rotation thereof. These slide-arms are preferably rigidly joined in the form of a cross and have slidable connections with the base and plate, respectively. The plate 27 is provided with two hangers 29 29, having slide-bearings 30, that are in line with the boss or sleeve 28 to slide upon the cross-arms 31, that extend from opposite sides of the reciprocating ring 32, from the other quarters of which the slide-arms 33 extend. The last-mentioned arms 33 are adapted to slide back and forth in the bearings 34, provided at

the upper ends of the arms 18 upon the base. These bearings 34 are in line with the center of the shaft 20. It is also obvious that as the crank rotates the ring 32 and the arms thereon will be thrown from side to side between the arms 18, while in the same revolution the plate will be moved transversely, sliding upon the cross-arms 31. As before stated, the boss or sleeve and the crank-pin hold the plate, so that there is no tilting of the sieve-box, and the plate 27 may, if desired, be carried by the bearings 34. It is obvious that the opposite slide-arms 31 and 33 need not be in the same plane, and, further, that the plate 27 may be inclined, if desired, and that the oscillation of said plate in addition to gyration may be obtained by simply arranging the cross at a slight angle. The throw and the weight of the parts above the crank are compensated by the counterbalance weight or sector 35 upon the driving-shaft 20, by which the whole machine is perfectly balanced to operate without undue wear upon its bearings and so that the machine may be worked with comparatively little power. It is evident that a cam may take the place of the crank and that the angularly-movable slide-arms may be arranged in a vertical instead of a horizontal plane; but I prefer the construction shown, because the single sliding cross serves not only to prevent any movement other than gyration, but also holds together the base and the vibrating plate, making other ties, hangers, or joints unnecessary.

While the gyrating mechanism herein exemplified is particularly adapted for sifting-machines upon the order of "plan-sifters," I do not confine my invention thereto; nor do I confine my invention to the specific constructions herein shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a gyrating sifter, the sieve-box in combination with the base, the rotary mechanism in said base engaging said sieve-box to operate the same and the rigid slide having oppositely-arranged connections with said box and base and limiting the movement of said box to gyration, substantially as described.

2. In a gyrating machine, the combination of the gyrating plate or member with power actuating means for driving said plate, suitable bearings movable with said plate and substantially parallel thereto, suitable base-bearings thereon substantially parallel to said plate and at right angles to aforesaid bearings, and a slide operating in said bearings and thereby supporting said plate and limiting the movement thereof to gyration, substantially as described.

3. The combination, in the gyrating machine, of the gyrating member carrying bearings substantially parallel to the plane thereof, a suitable base having bearings at right angles to the bearings upon said member, a

slide member having parts held in the bearings of said member and base and tying said member upon said base and limiting the movement thereof to gyration and means for driving said
5 gyrating member, substantially as described.

4. The combination in a gyrating machine of the gyrating member carrying bearings substantially parallel to the plane thereof, a suitable base having bearings at right angles
10 to the bearings upon said member, a slide member having parts held in the bearings of said member and base, tying said member upon said base and limiting the movement thereof to gyration and rotary means substantially
15 perpendicular to said member for gyrating the same, substantially as described.

5. The combination, in a gyrating machine, of the gyrating member with the crank-shaft for operating it, and base-bearings, upon said
20 member and base, at right angles to one another and a slide interposed between said base and member and having arms slidably held in said bearings and limiting the movement of said member to gyration, substantially as de-
25 scribed.

6. The combination, in a gyrating machine, of the gyrating plate, with the crank-shaft substantially perpendicular thereto, a base or fixed part, bearings arranged respectively
30 upon said fixed part and plate, at right angles to one another, and the rigid arms slidably held in said bearings and permitting the gyration only of said plate by said crank-shaft, substantially as described.

7. In a machine of the class described, the combination, with the base, of a crank-shaft, suitable means for rotating the same, a bed-plate carried upon the crank-pin, and the four
40 horizontally-sliding parts interposed between said bed-plate and the base of the machine in a plane perpendicular to said crank-pin and supporting said plate, substantially as described.

8. In a machine of the class described, the combination, with the base, of a crank-shaft, and means for driving the same, the bed-plate carried upon the crank of said crank-shaft to gyrate in a plane substantially perpendicular
50 to said crank-shaft, and the sliding cross having two of its arms engaged with said bed-plate and two engaged with said base, substantially as described.

9. The combination, in a machine of the class described, of the base, with the vertical crank-shaft, the bed-plate mounted upon the crank of said shaft as a center, and the sliding cross having two of its arms held in bearings upon said base and the other two held in
55 bearings upon said bed-plate, and a counter-balance upon said crank-shaft, substantially as described.

10. In a gyrating sifter, the combination, with the base, of the crank-shaft, the bed-plate having the crank of said shaft as its center,
65 the four-way cross slidably in bearings upon

said base and in bearings upon said bed-plate to prevent the rotation of said bed-plate while permitting the gyration of said bed-plate by said crank, and the sieves arranged upon said bed-plate, substantially as described. 70

11. In a gyrating machine, the combination of the gyrating member provided with the bearing perpendicular thereto and also provided with bearings parallel to said member and base, a crank-shaft mounted therein and
75 having its crank-pin journaled in the first-mentioned bearing and preventing the tilting of said member with respect to the base, a slide held in the parallel bearings of said member and slidably movable upon said base
80 in a direction perpendicular to its bearings upon said member, substantially as described.

12. The combination in a gyrating machine, of the horizontally-gyrating member with the vertical base, the vertical crank-shaft provided
85 in said base for operating said member and the horizontal non-rotative slide interposed between said base and member and limiting the movement of said member to gyration, substantially as described. 90

13. The combination in a gyrating machine, of the gyrating plate, with the base, the rotating mechanism in said base for operating said plate, and the rigid slidable means consisting
95 of an oscillating cross interposed between said plate and said base, angularly operative and limiting the movement of said plate to gyration, substantially as described.

14. The combination, in a gyrating machine, of the gyrating plate, with the machine-base, the rotating mechanism provided in said base
100 to operate said plate, and positively-operating means consisting of a sliding cross moving in bearings on said base and plate interposed between said base and plate and limiting the
105 operation of said plate, by said rotating mechanism, to gyration, and said means also tying said plate and base together, substantially as described.

15. The combination with a supporting base
110 or frame, and a superposed gyrating body, of an intermediate slide supporting the latter on the former, and guides therefor extending in directions at right angles to each other on the gyrator and base, substantially as set forth. 115

16. The combination with a supporting base or frame, and a superposed gyrating body, of centrally-located means for gyrating the body, guides arranged at right angles to each other, and a slide operated therein by the gyrating
120 body for controlling the movements of such body, substantially as set forth.

17. The combination with a supporting base or frame, and a superposed gyrating body, the former having guides on its upper surface and
125 the latter having guides at its under surface at right angles to the guides on the base, of an intermediate slide engaging said guides, for the purpose set forth.

18. The combination with a gyrating body 130

having guides at its under surface, and a slide engaging said guides and supported on other guides extending at right angles to the former guides, substantially as set forth.

5 19. The combination of a gyrating body having guides at its under surface, with underlying independent guides extending at right angles thereto in a parallel plane, and an intermediate slide operated by the gyrating
10 body and operatively engaging such guides, substantially as set forth.

20 20. In a gyrator, a supporting base or frame, a gyratory body and means for gyrating it, a slide intermediate the base and gyratory body
15 and supporting the latter on the former, and straight-line guides on said base and body engaged by said slide, the guides on the base extending at angles to those on said body, substantially as set forth.

20 21. In a gyrator, a supporting base or frame, a gyratory body and means for gyrating it, parallel guides extending on the base, parallel guides provided on the bottom of the gyrating
25 body and extending at angles to the former guides, and intermediate connected sliding devices engaging both of said sets of guides and adapted to be actuated by the gyratory body, for the purpose set forth.

30 22. In a gyrating machine, the combination of the body with the base, bearings upon said body and base, parallel therewith and at right angles to one another, a member engaged with

said bearings, preventing the rotation of said body upon its axis, and a rotary device engaged with said body and causing the gyration thereof, substantially as described. 35

23. The combination in a gyrating machine of the body to be gyrated, with a suitable base, bearings upon said body and base, parallel therewith and at right angles to one another, 40 a member engaged with said bearings, preventing the rotation of said body upon its axis and confining its movement to gyration, a driving-shaft, a crank thereon engaged with said body, and a counter weight or balance
45 upon said shaft, substantially as described.

24. In a gyrating machine, the combination of the body to be gyrated with a suitable support or base therefor, bearings provided upon said body and base, parallel therewith and at
50 right angles to one another, a connecting mechanism engaged with said bearings, securing said body upon said support, preventing the rotation of said body upon said support and permitting only gyratory motion thereof, and
55 a body-driving means located centrally of the body, substantially as described.

In testimony whereof I have hereunto set my hand this 19th day of August, 1899.

JOSEPH M. SCHUTZ.

In presence of—

C. G. HAWLEY,
M. E. GOOLEY.