

No. 681,254.

Patented Aug. 27, 1901.

W. P. NORTHWAY.
GYRATOR.

(Application filed Jan. 28, 1901.)

(No Model.)

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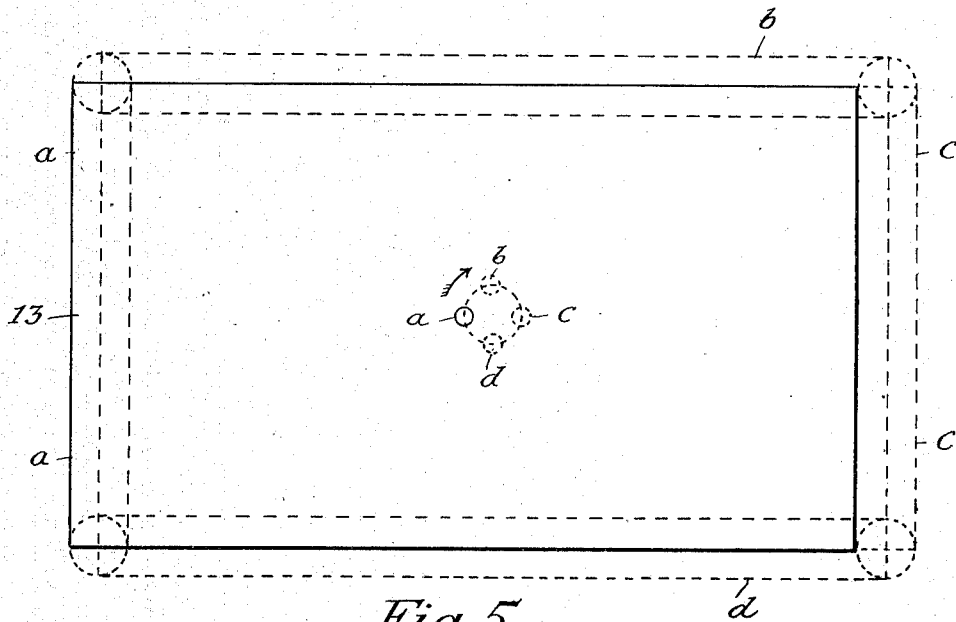
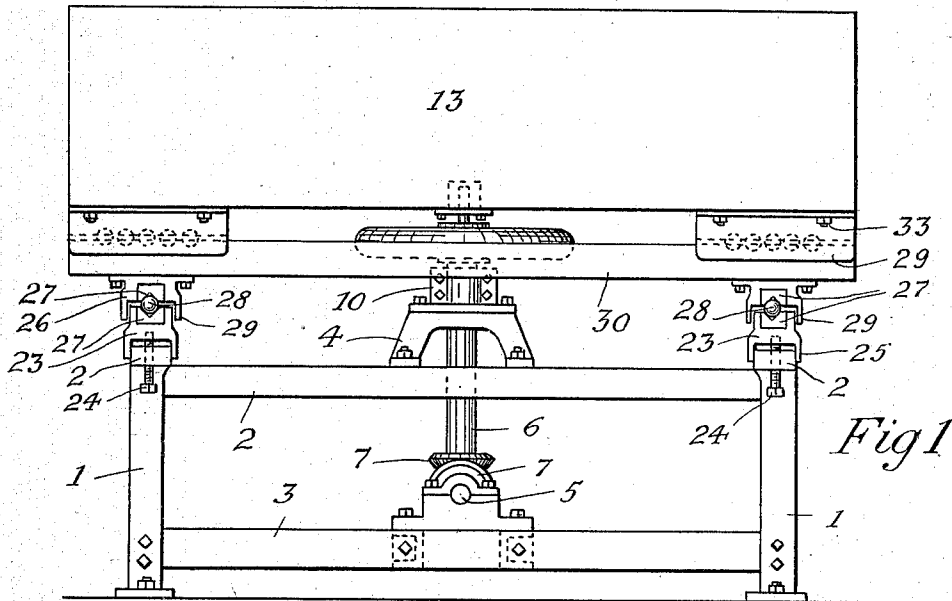


Fig 5

Witnesses
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Fig 2

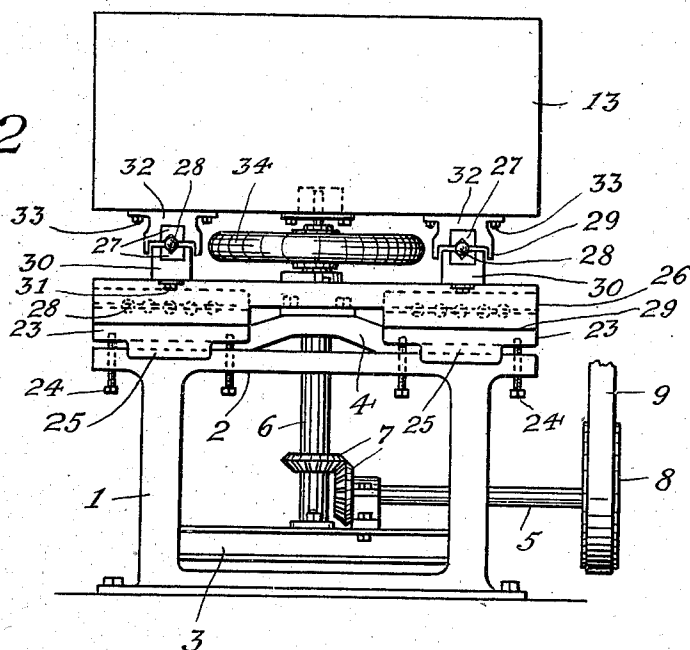


Fig 3

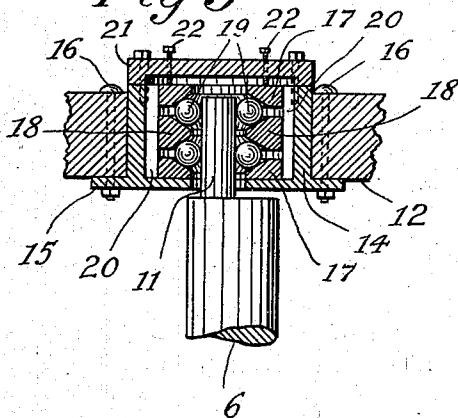
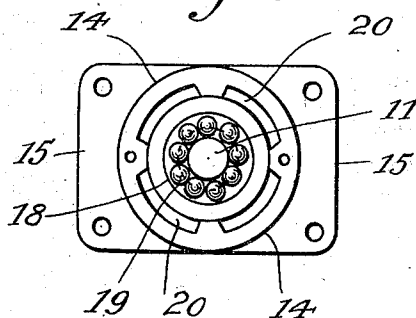


Fig 4



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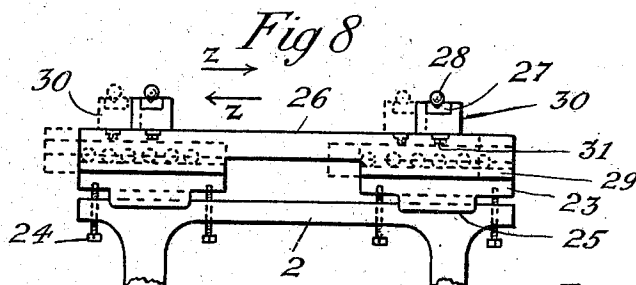
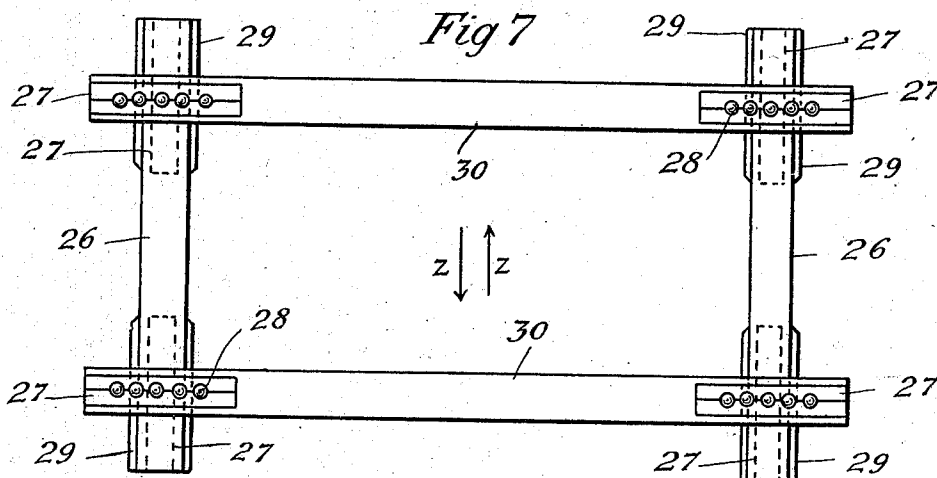
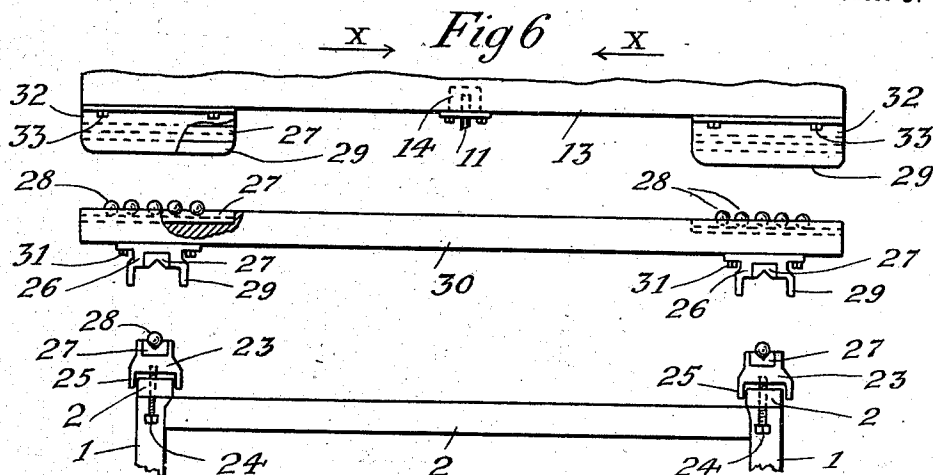
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WINSLOW P. NORTHWAY, OF MINNEAPOLIS, MINNESOTA.

GYRATOR.

SPECIFICATION forming part of Letters Patent No. 681,254, dated August 27, 1901.

Application filed January 28, 1901. Serial No. 44,988. (No model.)

To all whom it may concern:

Be it known that I, WINSLOW P. NORTHWAY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Gyra-

5 tors, of which the following is a specification. My invention relates to devices for imparting a whirling or gyratory motion to bodies and to devices for guiding and restraining the
10 movements of all portions of the body to circular courses of the same diameter; and its principal objects are to provide improved means for gyrating and guiding chop-graders and like separating and grading machines
15 and by supporting the gyrating body directly upon the devices that guide its movement to dispense with the hangers and similar devices usually employed in gyrating machines.
20 Stated briefly and generally, the machine comprises a main supporting-frame, a superposed box or body, together with mechanism engaging it centrally to gyrate it, and intermediate guides and slides arranged and
25 adapted to operate in pairs at right angles to each other for controlling the gyratory movements of the extremities of the box or body.

More specifically stated, the machine as a whole may be considered as made up of three
30 principal parts—viz., the gyrated body, the base or frame adapted to support the operative parts, and an intermediate sliding and guiding frame composed either of a single casting or of several parts secured together,
35 provided with upper and lower grooved guide-ways at the four corners and resting on balls or rollers in guides on the four corners of the base-frame. The guides at the four corners on the upper surface of the intermediate
40 frame are at right angles to those on the base-frame which support it and are also provided with balls or rollers on which the gyrated body, which is provided with suitable guides or ways, rests. The box or body receives a
45 circular motion from a crank or eccentric shaft supported by the main frame and slides on the intermediate frame, and necessarily imparts motion to that part in direction at a right angle to the direction of movement of
50 the body upon it, because the sliding frame rests only on the balls or rollers in the guides on the main frame, which are at right angles

to those on the upper surface of the sliding frame on which the gyrated body moves. This compound motion controls the gyratory
55 motion given to the box, so that every portion of the gyrated box will be restrained to circular motion of exactly the same extent and direction as that imparted to it at its center.

In the accompanying drawings, Figure 1 is
60 a side elevation of a machine embodying my improvements. Fig. 2 is an end elevation of the same. Fig. 3 is a sectional elevation of the journal-box for the crank-pin which im-
65 parts motion to the chop-grader. Fig. 4 is a plan view of the same, the cap-plate having been removed. Fig. 5 is a plan view illustrating diagrammatically the gyratory move-
70 ments of the machine. Fig. 6 is a side elevation showing portions of the base-frame, the box, and the intermediate sliding and guid-
75 ing frame separated from one another. Fig. 7 is a plan view of the sliding and guiding frame, and Fig. 8 is an end elevation of the same in position on the supporting-frame.

In the drawings the main frame is shown as consisting of posts 1 and bars 2, connect-
80 ing them. Bridge-trees 3 and 4 are provided for the support of a driving-shaft 5 and a vertical shaft 6, the shafts being operatively con-
85 nected by beveled gears 7. The shaft 5 may be driven by a pulley 8 and belt 9, and the spindle 6 is stepped in a suitable box on the bridge-tree 3 and has an upper bearing in a journal-box 10, mounted on the bridge-tree
90 4. On the upper end of the spindle 6 is a pin or projection 11, extending upward parallel with, but located eccentrically to, the axis of the spindle for engaging the base 12 of the box or body 13 to give it a gyratory motion.
95 To provide a suitable bearing for the pin, a tubular box 14, having flanges 15, is secured in an opening in the base 12 by bolts 16, extending through the base and flanges 15. In the box 14 are upper and lower rings 17 and
100 an intermediate ring 18, forming races for balls 19, with which the crank-pin 11 contacts. These rings are loose, and the spaces 20 at their sides permit them to be easily engaged for the purpose of removal or adjust-
ment. A cap 21 is used for covering the box to exclude dirt, and set-screws 22, inserted through the cap, serve to prevent upward movement of the rings when the pin is re-

volved. The step-box and the journal-box 10 for the spindle 6 should also be provided with suitable ball-bearings.

The whirling or gyratory movement given 5 the box by the crank-pin at its center is restrained and controlled as to the sides and ends of the box to cause all portions of the box to describe the same circular movement by means of a sliding frame composed of 10 guides and slides arranged and operating between the gyrating box and the main supporting-frame. This sliding frame is mounted on stationary guides 23, arranged upon and secured to the bars 2 of the machine-frame. The guides 23 are preferably supported by adjusting-screws 24 and have pendent 15 flanges 25, that overlap the sides of the cross-pieces 2 of the frame. The screws 24 enable the guides to be vertically adjusted 20 for leveling the machine, and the flanges 25 prevent lateral displacement. The sliding frame intermediate the guides 23 and the gyrating box, which is operated by the box and slides on the guides 23, comprises bars 26, extending transversely, and bars 30, extending 25 longitudinally of the machine-frame, the latter bars being secured on the former by bolts 31 or otherwise. The bars 26 and 30 thus constitute a frame, the lower bars 26 of which are 30 arranged to slide on the guides 23 and the upper bars 30 of which support the box and provide guides in which it may reciprocate in directions at right angles to the direction of movement of the sliding frame on the 35 guides 23.

In the end portions of the bars 26 and 30 and in the guides 23 are inserted ways or races 27 for balls or rollers 28. Guides 32 are secured by bolts or otherwise to the under 40 surfaces of the box-corners, and these guides, as are also the guides 23, are provided with ways 27 for balls 28. The end portions of the bars 26 have downward flanges 29, overlapping the sides of the guides 23, to prevent 45 lateral displacement during the operation of the machine, and the slides 32 have similar flanges 29, overlapping the sides of the bars 30, for the same purpose.

A suitable counterbalance-wheel 34 is secured 50 on the spindle 6, as near as practicable to the bottom of the box 13.

In operation the rotation of the spindle 6 will cause the crank-pin 11 to impart to the central portion of the box 13 a circular or gyratory motion, and its four corners will be 55 restricted to similar movements by the guides. This is illustrated by the diagram, Fig. 5, in which the box and crank-pin are arbitrarily shown in initial positions by full lines *a*, and their opposite extremes of movement are indicated by dotted lines *b*, *c*, and *d*. As the intermediate frame, composed of the bars 26 60 and 30, in operation slides on the guides 23 and as at the same time the guides 32 on the box-bottom slide on the frame at right angles to its movements in the guides 23, it is obvious that the sides and ends of the box

must at all times during the travel of the crank-pin maintain positions on lines parallel with the lines of their initial positions, and 70 as their distance from the pin is invariable it follows that the extent and direction of the movements of the box as a whole must correspond with the throw of the crank-pin. This intermediate sliding and guiding frame 75 and the means for operatively connecting it with the gyrator and base-frame may be varied considerably in structure without affecting their mode of operation, and therefore I do not limit my claim to the specific form and 80 structure of the devices shown and described.

In illustrating the means for producing and controlling the gyratory motion I have not deemed it necessary to show in connection therewith anything more than a mere outline 85 of a box or body 13, for while the improvements were designed primarily for operating the class of flour-mill machines termed "chop-graders" I do not wish to confine their use to that or any particular class of machines. 90

Having described my invention, what I claim is—

1. The combination with a supporting base or frame, and a superposed gyrating body, of an intermediate slide supporting the latter 95 on the former, and guides therefor extending in directions at right angles to each other on the gyrator and base, substantially as set forth.

2. The combination with a supporting base 100 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 body for controlling the movements 105 of such body, substantially as set forth.

3. The combination with a supporting base or frame, and a superposed gyrating body, the former having guides on its upper surface and the latter having guides at its under surface 110 at right angles to the guides on the base, of an intermediate slide engaging said guides, for the purpose set forth.

4. The combination with a gyrating body having guides at its under surface, of a slide 115 engaging said guides and supported on other guides extending at right angles to the former guides, substantially as set forth.

5. The combination with a gyrating body having guides at its under surface, and underlying independent guides extending at 120 right angles thereto, of an intermediate slide operated by the gyrating body and operatively engaging such guides, substantially as set forth. 125

6. The combination with a gyrating body having guides at its under surface, and underlying independent guides extending at right angles thereto, of an intermediate slide operated by the gyrating body and operatively engaging such guides, and ball or roller 130 bearings for said slide in said guides, substantially as set forth.

7. The combination with a gyratory body

having guideways at its under surface, of a supporting - frame, guideways thereon arranged at right angles to the said guideways, intermediate slides secured together at right angles to one another, and ball-bearings between said slides and guideways, and a shaft and crank-pin for imparting gyratory motion to said body, substantially as set forth.

8. In a gyrator, a supporting base or frame, a gyratory body and means for gyrating it, a slide intermediate the base and gyratory body 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.

9. 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 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.

In testimony whereof I have hereunto set my hand this 19th day of January, 1901.

WINSLOW P. NORTHWAY.

In presence of—

P. H. GUNCKEL,
A. L. WHELAN.