A. C. BRANTINGHAM.

SIFTER DRIVING MECHANISM.

APPLICATION FILED JAN. 28, 1907.

1,104,870.

Patented July 28, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

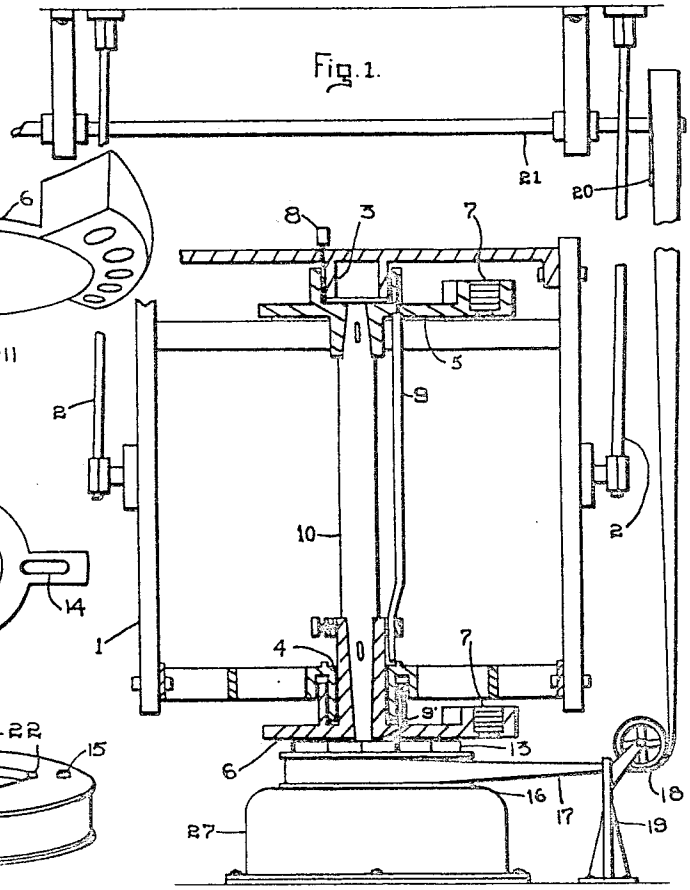


Fig. 4.

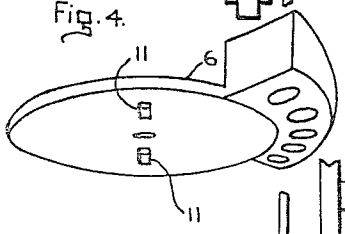


Fig. 5.

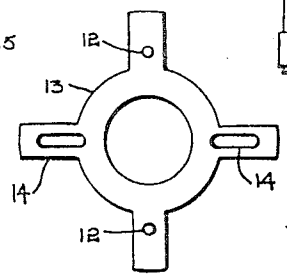


Fig. 6.

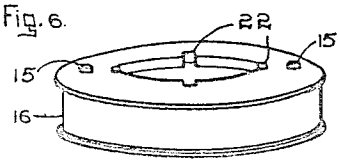


Fig. 7.

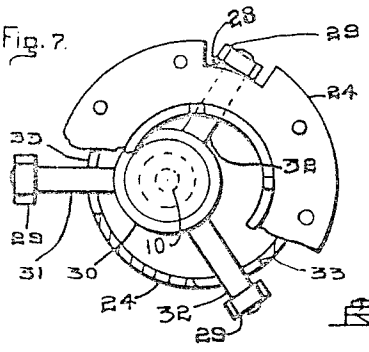
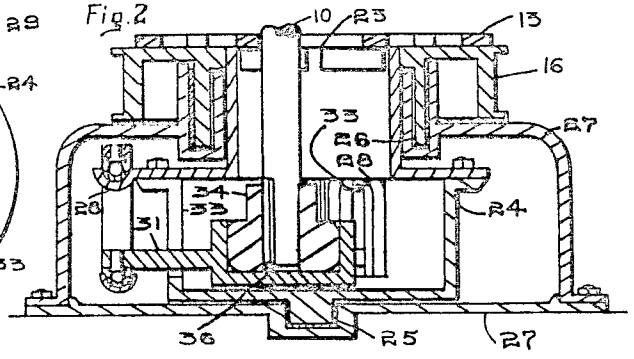


Fig. 2



WITNESSES

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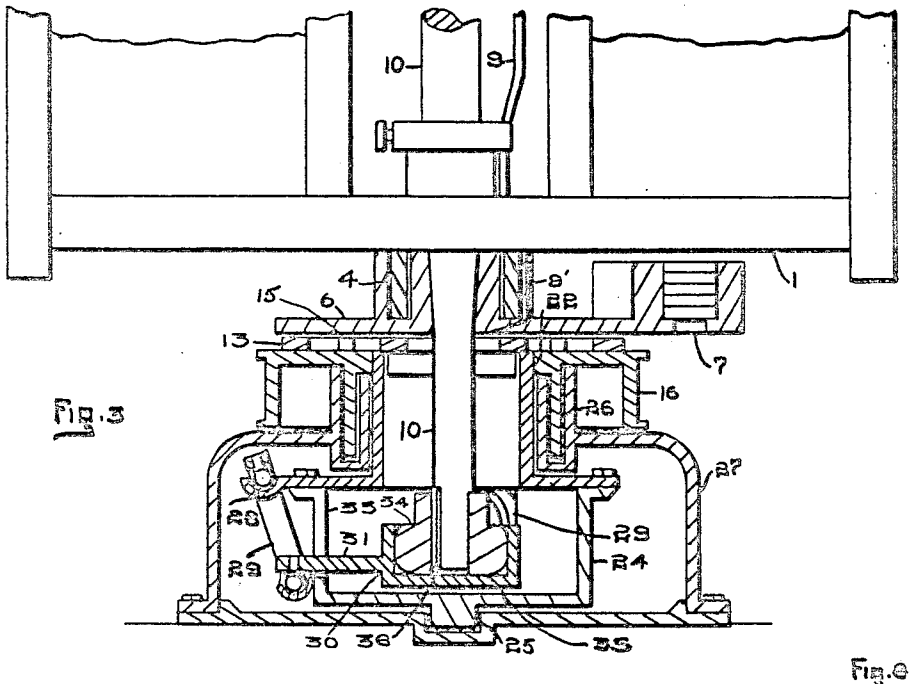


Fig. 3

Fig. 9

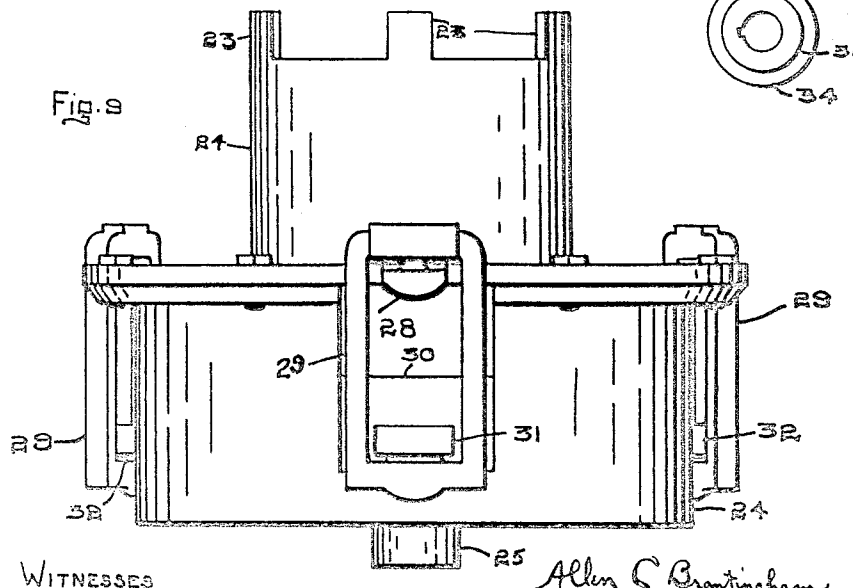


Fig. 6

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SIFTER-DRIVING MECHANISM.

1,104,870. Specification of Letters Patent. Patented July 28, 1914.

Application filed January 28, 1907. Serial No. 354,400.

To all whom it may concern:

Be it known that I, ALLEN C. BRANTINGHAM, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Sifter-Driving Mechanism, of which the following is a specification.

This invention relates to a driving and steadying device for gyratory bodies.

This invention has utility when embodied in a self-balancing sifter, in which adaptation the driving and steadying feature results in a simple, compact and strong construction, uniform in operation. As the driver is axially fixed, power may be conveniently and readily delivered. This results in no abnormal whipping of belts or irregular traveling transmissions to cause trouble or absorb excessive power. The gyrator for the body may be sustained independently of the body, thereby permitting of most effective control. A feature materially adding to the advantage in this regard is a support, orbitally movable and concentric to the engaged portion of the gyrator. As shown, this support has its mean point of movement coincide with the normal running eccentricity of the gyrator, and when so operating the support is accordingly relatively stationary.

Referring to the drawings: Figure 1 is an elevation, partly in central section, and having portions broken away, of an embodiment of the invention in a sifter or bolter of the gyratory type; Fig. 2 is a central vertical section of the driving, sustaining and steadying feature on an enlarged scale and in the position shown in Fig. 1; Fig. 3 is a fragmentary elevation of portions of the sieve boxes of the bolter and shows the driving, sustaining and steadying feature in central vertical section, the position being that of rest, or in which the gyrator would give no throw to the box or body, the view of the bolter being at 90° to that shown in Fig. 1, while the rotating parts are turned through an equal angle; Fig. 4 is a perspective view of one of the eccentrically weighted elements of the gyrator; Fig. 5 is a plan view of a slidable transmission device or plate which has driving connection with the weighted element shown in Fig. 4; Fig. 6 is a perspective view of the axially fixed driver or pulley which has driving connection with the plate of Fig. 5; Fig. 7 is a plan view of the rotatable sustainer with portions broken away to better show the supporting member, which is in the same position as in Figs. 1 and 2, that is; of regular operation with normal throw or eccentricity for the shaft of the gyrator; Fig. 8 is a bottom plan view of the bushing or sleeve for the shaft; and Fig. 9 is a view in elevation of the rotary sustainer having the support swingably mounted therein.

The body or container 1 is so supported by the rods 2 that it may have some movement, or is free to gyrate. Carried by the container 1 for the substance to be treated, is an upper bearing 3 and a lower bearing 4. Coacting with the upper bearing 3 is a bearing flange on wheel 5, while coacting with lower bearing 4 is a bearing flange on wheel 6. These fly wheels 5 and 6 may be adjustably eccentrically weighted by inserting or removing weights 7 from the recesses provided therefor. Oil cup 8 supplies lubricant to bearing 3, from which the overflow is conducted by pipe 9 to lubricate bearing 4. The overflow from bearing 4 is through duct 9' into the base frame vessel.

Spacing the fly wheels 5 and 6 and rigidly attached thereto is rotatable shaft or stem 10 of the gyrator concentric to double sifter box or body 1. Recesses or slots 11 in fly wheel 6 afford slidable engagement for pins 12 of transmission plate 13 surrounding eccentrically weighted central shaft 10. This plate 13 has slots 14 which slidably engage pins 15 carried by axially fixed driver or pulley 16. This pulley 16 is driven by flexible driving means or belt 17 which passes over guide pulleys 18 mounted on bracket 19, from whence the belt passes over pulley 20 on line shaft 21. Accordingly guide pulleys 18 are rotative elements having fixed axial spacing from the driver 16. These guide pulleys 18 coact with the belt 17 to direct it to and conduct it from the driver 16. Power from shaft 21, through belt 17 drives pulley 16, which through plate 13 rotates shaft 10 with its fly wheels 5 and 6. Recesses 22 in driver 16 engage teeth 23 of the sustainer or rotary frame 24 which has central step bearing 25. The sustainer 24 is laterally controlled by flange bearing 26 of pulley 16, which coacts with the base frame 27. Extending from sustainer 24 are a plurality of ears 28, from each of which suspends a link 29 to carry the orbitally

movable support 30 having arms 31 and 32 engaging the links 29. The arms extend through openings 33 in the sustainer 24.

Concentric with shaft 10 is mounted bushing 34 having concentric rounded toe or step 35. The bushing is held in position on the shaft 10 by key 36. This sleeve or bushing 34 determines the position of the shaft 10 concentrically in the laterally movable swingable support 30. The engagement of sleeve 34 with concentric supporting member 30 is such that shaft 10 may take its proper aligned position as to bearings 3 and 4. As the transmission device 13 constitutes the driving connection for the gyratory, while the engagement of recesses 22 and teeth 23 constitute an independent driving connection for the steadying device, some very slight differences in angular velocity in abnormal operation may occur between bushing 34 and support 30 which is taken care of by slight relative movement. Shaft 10 is concentric to gyrated body 1, to bearings 3 and 4, and to its support 30. Member 30 is normally eccentric to sustainer 24. As the rotatable means 10 is eccentrically weighted, the line of the center of gravity of these rotating parts 5, 6, 7, 10, is without the center line of the shaft 10 and nearer to the ears 28 supporting arms 32 than to ear 28 supporting arm 31. In properly controlled and normal operation, the center of gyration and center of gravity are coincident. This center of rotation or gyration, as well as center of gravity, is normally concentric to axially fixed rotatable sustainer 24. As the center of gravity is not at the center of support 30, the hangers or links 29 are unequally loaded, notwithstanding the arms 31, 32, are of equal length, but as the load is concentric to sustainer 24, there is no tendency to tilt the sustainer in regular running. The radius of rotation or gyration being equal to the distance of the center of normally eccentric support 30 from the center of sustainer 24, there is no tendency to orbitally move member 30.

The position of rest is that shown in Fig. 3, the shaft 10 being overpowered by the box 1 and swung toward central position as to the steadying device comprising the rotatable movable support 30. This is not a normal position, and the movement of support 30, besides being lateral, is a little upward, owing to the swing of links 29 away from perpendicular. This lifts shaft 10 slightly as well as the fly wheels 5 and 6. The center of gravity of these lifted parts acts to urge them to the position shown in Fig. 2, the normal position for gyration, and that in which the center of gravity of the "driving irons"—the shaft 10 and fly wheels—is lowest. These links 29 of the yieldable steadying device are means coacting with the concentric means 30 to restrict abnormal throws of the bolter outward or inward during gyration. Upon starting up, the inertia of rest of the box will at first cause the rotations, transmitted through the plate 13 radially slidable as to driver 16 and also as to fly wheel 6, to be taken up in the supporting member 30, which in its orbital movements and slight longitudinal actuation of shaft 10, so increases resistance to these abnormal actions that before the parts have well gotten under way, the gyrator with its weights has the mastery of the box and normal throw is taking place. The sustainer 24, rotating with approximately the same angular velocity as driver 16, shaft 10 and its fly wheels about their center of rotation, permits the shaft to assume an eccentric position of relative rest as to support 30 carried eccentrically by the sustainer 24. The axis of rotation of the steadying device is in alinement or in parallel with the axis of the gyrator, and perpendicular to the plane of gyration of the sifter box or body. Slight unbalancing influences in operation are hardly perceptible, while greater unbalancing tendencies, though resisted by the lifting action of support 30, are taken care of by lateral or swing movements which can occur in any direction in the zone of action of this support 30. While support 30 is so mounted that it may have orbital movement relative to sustainer 24, inasmuch as it is rotatably carried, its starting and stopping abnormal movements are relatively to sustainer 24 only lateral.

The idea of the invention herein disclosed is not to be limited by the drawings and description to any greater extent than the ordinary meaning of the terms of the claims demand. In other words, the elements set forth in the claims are to be interpreted broadly, giving me the advantage of equivalents in the protection of my idea.

What is claimed and it is desired to secure by Letters Patent is:

1. The combination with a sifter, supporting means therefor, and a gyrator for the sifter, of a rotatable steadying means for the sifter to longitudinally actuate the gyrator relatively to the sifter.

2. The combination of a sifter, supporting means therefor, a gyrator for the sifter, and a control device for the sifter comprising a rotatable member engaging the gyrator and rotatable sustaining means carrying the member, said means effective to longitudinally actuate the gyrator relatively to the sifter.

3. The combination of a body, supporting means therefor, a gyrator for the body, a rotatable swingable member mounted independently of the body and supporting the gyrator, and a driver for the gyrator.

4. The combination of a movable body, supporting means therefor, a gyrator for

the body, a yieldable rotatable sustainer for the gyrator, said sustainer mounted independently of the body, a rotatable driver for the gyrator, flexible driving means for the driver, and a rotatable element having a fixed axial spacing from the driver and coacting with the flexible driving means to direct the driving means to the rotatable driver.

5. The combination of a sifter, supporting means therefor, an orbitally movable gyrator for the sifter including eccentrically weighted rotatable means, a rotatable driver for the gyrator, flexible driving means, a rotatable element having a fixed axial spacing from the driver and coacting with the flexible driving means to guide the driving means to the rotatable driver, and a rotatable yielding device coacting with the gyrator to steady the sifter.

6. The combination with a body supported for gyration having a bearing, a rotatable shaft concentrically engaging the bearing, a weight carried by and rotating with the shaft, of a sustainer independent of the body for the rotating shaft, said sustainer being eccentric to and carrying the weight of the shaft, and yieldable steadying means to control the shaft.

7. The combination of a sifter, supporting means therefor, an independently supported gyrator for the sifter having a shaft concentric with the sifter and a rotatable yieldable device concentric with and engaging the shaft and permitting the shaft to have orbital movement.

8. The combination of a sifter, supporting means therefor, a gyrator for the sifter having a shaft concentric with the sifter, a driver, and a transmission device between the driver and shaft and surrounding the shaft, said device automatically adjustable radially relatively to the driver and shaft to permit orbital movement of the shaft.

9. The combination of a sifter, a gyrator for the sifter having a normally orbitally movable shaft, a driver, a transmission device connecting the driver and a normally orbitally movable portion of the gyrator shaft, said device radially movable independently thereof, and a steadying device for the sifter.

10. The combination of a sifter, a gyrator for the sifter having a normally orbitally movable shaft, a driver, a transmission device radially movable independently of the driver and shaft and connecting the driver and a normally orbitally movable portion of the gyrator shaft, and a steadying device for the sifter.

11. The combination with an orbitally movable sifter supported for gyration, of an eccentrically weighted rotatable member engaging the sifter and rendering the sifter self-balancing in gyration, a step concentric with the rotatable member, said step being orbitally movable during normal gyration, and holding means coacting with the step for yieldingly restricting abnormal throw of the sifter during operation.

12. The combination with a body supported for gyration having a gyrator, of a driver, driving connections between the driver and gyrator, a steadying device rotatable on an axis perpendicular to the plane of gyration of the body, and driving connections between the driver and steadying device.

13. In combination, a suspended structure, suspending means therefor, a support independent of said structure, said support consisting of individually rigid elements, a laterally movable, vertically-positioned shaft engaging said structure and said support, a weight connected to said shaft whereby it is given a tendency when in motion to cause the structure to travel in a gyratory path, a fixed bearing surrounding the axis of movement of said shaft, a driver engaging in said bearing, and yielding connections independent of the suspending means between said driver and said shaft whereby the latter may be driven from the former notwithstanding the difference between the axis of rotation of the driver and the axis of gyration of the latter.

14. In combination, a suspended body, a bearing member arranged centrally thereof, a weight mounted to produce a gyratory movement, a laterally movable rotatable stem engaging said bearing member, a step bearing for the stem whereby the weight of the stem and gyratory weight are supported, a fixedly mounted driver surrounding the axis of rotation of the stem, and a bearing in which said driver is mounted.

15. In combination, a suspended body, a bearing member arranged centrally thereof, a weight to produce a gyratory movement, a laterally movable rotatable stem engaging said bearing member, a step bearing for the stem whereby the weight of the stem and gyrator weight are supported, a driver having a central opening through which said stem extends but free of contact therewith, and a bearing in which said driver is mounted.

16. The combination in a gyratory sifter of a sifter body, means whereby the same is suspended, a bearing member arranged centrally of said body, laterally movable rotatable means coacting with said bearing including an eccentric weight and a movable shaft, a step bearing supporting said rotatable means and its eccentric weight, a fixedly-mounted driver arranged adjacent thereto and surrounding the axis of movement of the rotatable means, and yielding connection between said driver and said rotatable means.

17. In combination, a suspended structure carrying a vertically positioned shaft, weights connected with said shaft whereby it is given a tendency when in motion to travel in a gyrator path, a driver mounted in a fixed bearing adjacent to the end of said shaft and surrounding the axis of movement, a support for the shaft independent of the driver, and yielding connections independent of the suspending means between said driver and said shaft whereby the latter may be driven from the former notwithstanding the difference between the axis of rotation of the driver and the axis of gyration of the latter.

In testimony whereof I affix my signature in the presence of two witnesses.

ALLEN C. BRANTINGHAM.

Witnesses:
JENNIE NASH.
GEO. E. KIRK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."