A. C. BRANTINGHAM.

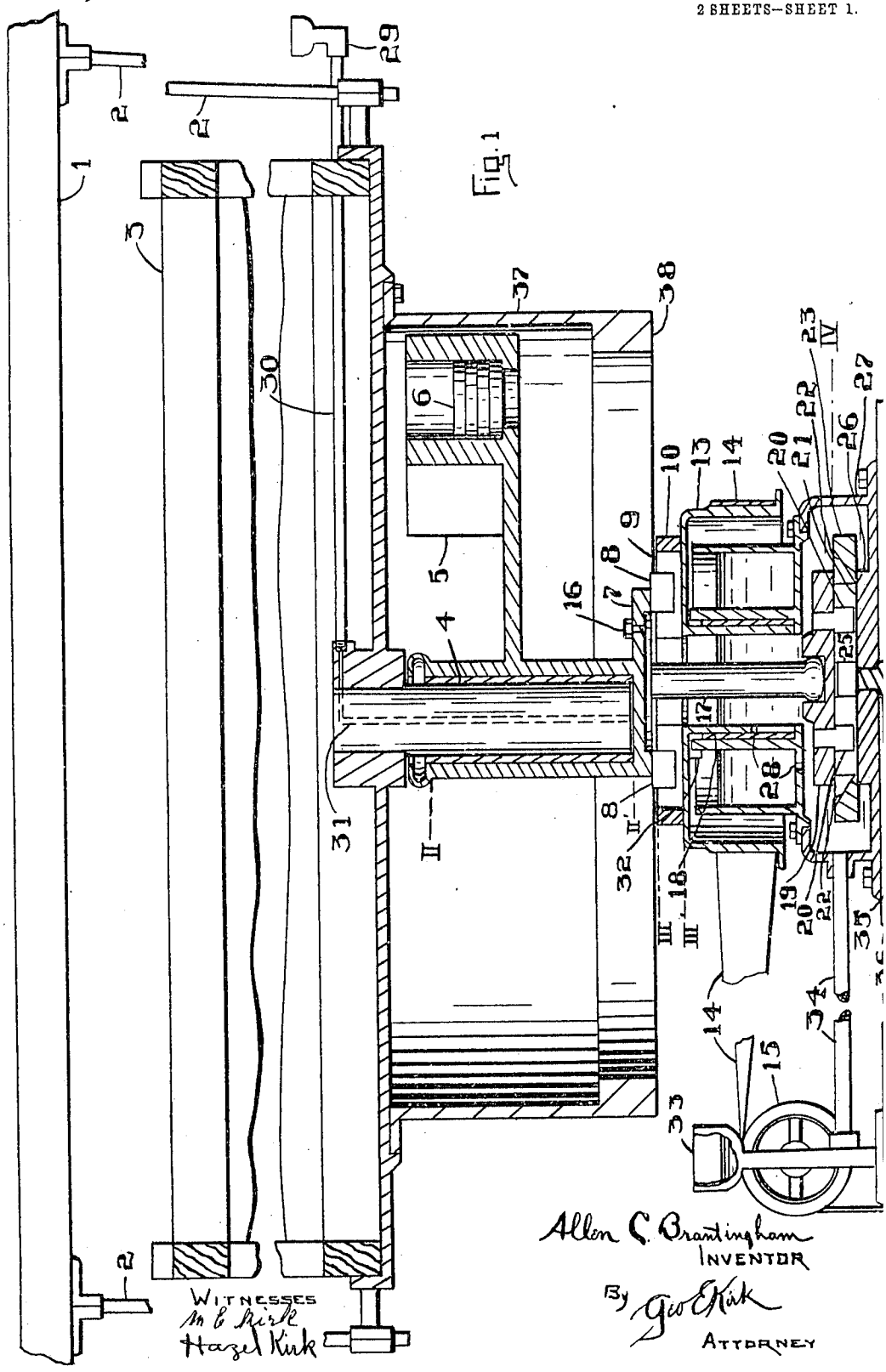
SELF BALANCING SIFTER CONTROL.

APPLICATION FILED AUG. 26, 1907.

949,144.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2

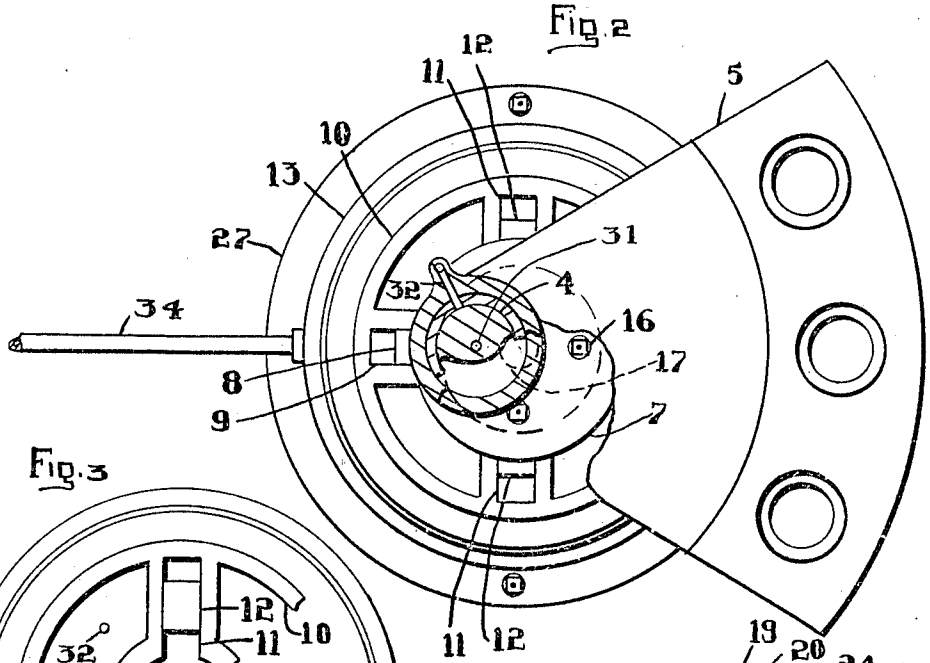


Fig. 3

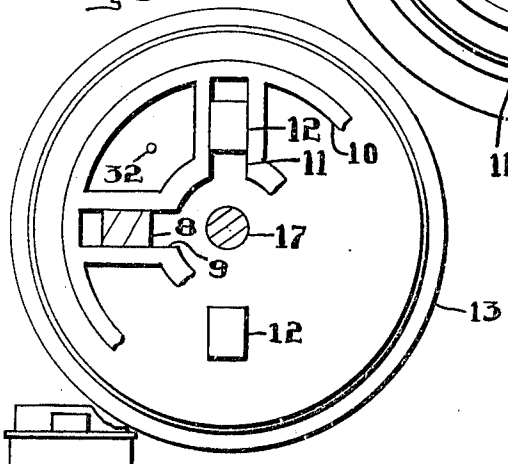
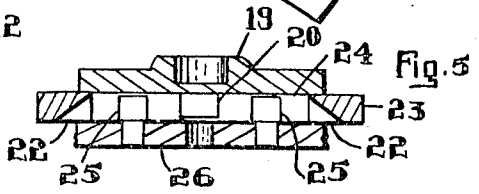


Fig. 5



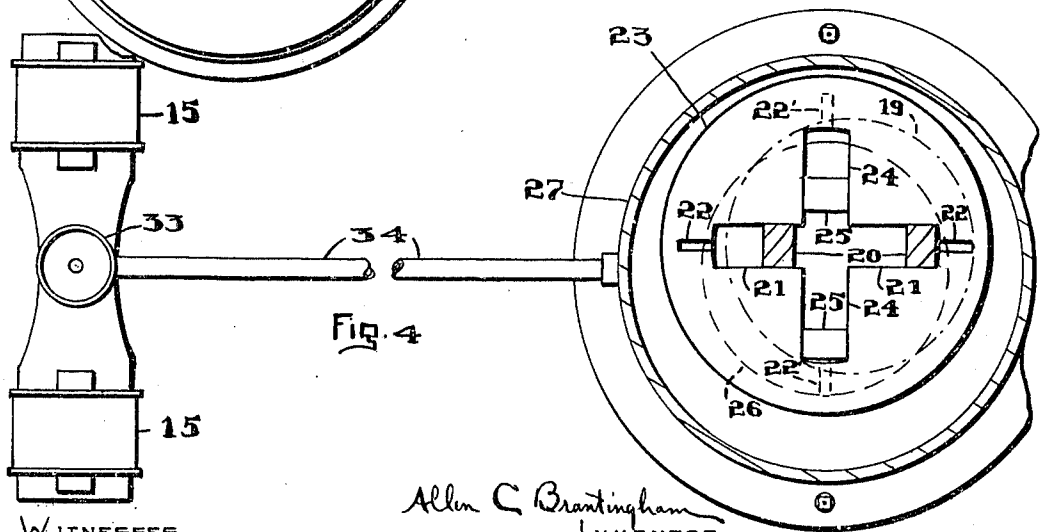


Fig. 4

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UNITED STATES PATENT OFFICE.

ALLEN C. BRANTINGHAM, OF TOLEDO, OHIO.

SELF-BALANCING-SIFTER CONTROL.

949,144. Specification of Letters Patent. **Patented Feb. 15, 1910.**

Application filed August 26, 1907. Serial No. 390,113.

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 Self-Balancing-Sifter Control, of which the following is a specification.

This invention relates to control of an orbitally movable member.

This invention has utility when embodied in a gyratory sifter of the self-balancing type, with which it effectively coacts to confine the movements to that of normal throw.

Referring to the drawings: Figure 1 is an elevation with parts broken away of a sifter of the "low-box" type in running position, the gyrator and steadying device being shown in section, the latter constituting an embodiment of the control scheme of this invention; Fig. 2 is a plan view of the gyrator, the upper portion being on line II—, while the broken away portion being to section on line II′—, of Fig. 1; Fig. 3 is a plan view of the driving mechanism for the gyrator, the upper left hand portion being on line III—, while the lower right hand portion is broken away to line III′—, of Fig. 1; Fig. 4 is a horizontal section of control on line IV—, Fig. 1, but with members moved to an off center position, showing in addition a plan view of idlers spaced from fixed pulley actuating the gyrator; and Fig. 5 is a vertical section of the controlling or steadying device on a plane at right angles to the showing in Fig. 1.

From the frame 1, by means of rods 2 is movably supported the body 3, or container for the substance to be treated. The rods 2 and box 3 are partially broken away in Fig. 1 to permit of the more clear showing by use of larger scale than limitations of drawing sheet would otherwise allow. This sifter 3 has extending centrally from its lower side and rigid therewith the stem 4 with which coacts the sleeve of fly weight 5. This eccentrically weighted member has a series of pockets into which may be introduced weights 6 thereby permitting adjustment of the balance of this rotatable member as against the weight of the non-rotatable gyratory body or box 3. Eccentric to the sleeve or bearing of fly weight 5 is a circular plate portion 7 having a pair of diametrcally arranged lugs 8 (Fgs. 1, 2 and 3) coacting with ways 9 in the transmission element or plate 10. In element 10 and arranged perpendicularly to ways 9 are diametrically positioned ways 11 with which lugs 12 on pulley 13 coact. The element 10 is, therefore, slidably mounted on the web of pulley 13. The pulley 13 is driven by belt 14, constituting a flexible driving member passing over guide pulleys 15. In driving the gyrator 5, 7, diametrically disposed lugs 12 on pulley 13, coacting with ways 11 of transmission element 10, through ways 9 and lugs 8 rotate flyweight 5 by a connection which thus permits the eccentrically weighted gyrator to have an orbital movement. Bolts 16 through plate 7 attach the shaft section or stem 17 to the gyrator eccentrically of shaft section 4 of box 3 on a line between the weight and shaft 4, so that in normal gyration of box 3 the stem 17 does not have translation. The shaft or stem 17, while normally concentric with bearing 18 of pulley 13, has such freedom of movement therein as to permit of translation.

A combined sustainer for the gyrator and control or restrainer is provided in the steadying device. The weight of the gyrator is supported on step member 19 therebelow, which is orbitally movable with shaft 17. Member 19 has a pair of diametrically disposed studs 20 coacting with way 21 having a tapering vent 22 near each end thereof, in member 23. This recessed member 23, on which the member 19 rests, has a second way 24 intersecting way 21 at right angles. At the extremities of this second way 24 are vents 22′ which taper to the lower side of member 23 instead of to the upper side thereof as vents 22. Coacting with way 24 is a pair of diametrically disposed studs 25 carried by fixed base member 26. The members 19, 23 and 26 of the control device are relatively slidable. The interposed recessed member 23 has only reciprocable movement, to which it is confined by studs 25, while opposing studs 20 limit relative movement of member 19 to reciprocation as to member 23.

The vessel 27, having therein the step bearing 19, 23, and also carrying on its upwardly extending flange portion the pulley 13, provides a reservoir for a medium, as oil, which through openings 28 may lubricate bearing 18 of the pulley 13. From oil cup 29, leads pipe 30 to connect with duct 31 in shaft 4, whereby lubricant may be conveyed to bearing between shaft 4 and sleeve of fly wheel 5, from which bearing

it overflows through duct 32 into chamber surrounding bearing 18 which is in communication with reservoir 27 by openings 28. By maintaining lubricant in cup 33 at a certain level, pipe 34 connected to vessel 27 permits the keeping of bearing 18 lubricated as well as providing means for insuring the continued submerging of the control or steadying device. Cup 33, Fig. 1, is broken away to show that height of oil therein corresponds with height of oil in vessel 27. The stud 35 in floor 36 provides a convenient means for setting up the machine in the desired location.

In Fig. 1, the belt 14, pipe 34 and floor 36 are partially broken away between vessel 27 and cup 33, as in practice the idler 15 and cup 33 are placed beyond the limit of movement of the box 3. In Fig. 4, the pipe 34 is medially broken away.

Surrounding the path of flyweight travel and extending from the underside of box 3 is annular flange 37 having a weighted portion 38, which serves to cause the center of gravity of sifter 3 to approach the center of gravity of gyrator thereby preventing irregular or tilting action of box.

Operation: At rest, the box 3 would tend to be supported with its stem 4 approaching a position concentric with vessel 27, thereby forcing stem 17 to an eccentric position. Upon starting to rotate the gyrator fly weight 5 through belt 14 and transmission connections, as stem 4 would be abnormally close to central position, the action would be to impart an orbital movement to stem 17. The oil medium, filling the recesses of member 23 about the studs 20 and 25, serves as a non-reacting resistance means to relative movement of slidable members of steadying device, which resistance increases as eccentricity increases owing to movement of stud carrying members as to recessed member 23 to close vents 22 and 22′ gradually. In attempting orbital travel the stem 17 is held seated by weight of gyrator in step member 19, and assuming steadying device in position of eccentricity of Fig. 4, a travel of 90° clockwise would have a component in line with studs 20 and another component in the intersecting line of studs 25, and these studs acting along those lines would effectively coact to resist circumferential travel of shaft 17, with the result in actual practice that it is quickly brought to a central position in bearing 18 to coincide with center of gyration, with the steadying device ever ready to counteract any unbalancing influences which might arise in regular running or stopping. The normal radial arrangement of ways 21, 24, permits them to be effective in resisting radial movements of stem 17 to an eccentric position, while their combined action minimizes circumferential travel by interposing resistance in one or the other of the intersecting directions or both combined.

The transmission for driving the gyrator from pulley 13 includes the element or plate 10 slotted in intersecting directions (Figs. 2 and 3). The slots are engaged by lugs 12 on the pulley 13 (Fig. 3) and by lugs 8 on gyrator plate 7 (Fig. 1). It is to be noted that in the showings herein the pins or lugs working in intersecting slots, or this trammel like construction, is adopted in the transmission, while in a not very different form, but for a very different purpose, this general arrangement is effective in an unlike and new operation to control or steady the self balancing sifter.

The control members 19, 23 and 26, embodying the recesses or chambers and coacting studs, are non-rotatable. The incompressible nature of the medium when oil is used, renders the restraining non-reacting. The oil, besides providing the resisting medium, provides an effective lubrication system not only for the lateral bearings but for the step incorporated in the control device.

The gyrator supported independently of the sifter box 3 has all its movements confined to a plane in this instance shown as horizontal, for the control is not incident to changing vertical position of center of gravity of rotating mass. The steadying is accomplished regardless of any axial change of gravity center of gyrator.

The effectiveness of this device for attachment or use in connection with a sifter mechanism is due not only to the fact that any abnormal movement causes an element to assume an eccentric position against a resistance, but to the vital point that the effort toward control does not rest here. The element is not permitted to freely assume an orbit of travel incident to an abnormal condition of running. During the entire circumference the resistance is so persistent that the eccentric resisting is a quick and sure central positioning force, making possible normal gyration in a most wide range of speeds.

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

1. A mechanism comprising a container for the substance to be treated, a gyrator for the container mounted to permit of normal and abnormal gyration, and a steadying device embodying a step member carrying the weight of the gyrator, said device in its carrying and control of the mechanism yieldingly permitting abnormal gyration and keeping the center of gravity of the gyrator in a common plane.

2. A mechanism comprising a container for the substance to be treated, a support therefor, a gyrator for the container mounted to permit of normal and abnormal gyra-

tion, and a non-reacting steadying sustainer yieldingly permitting abnormal gyration, said sustainer embodying a step member carrying the weight of the gyrator.

3. A self balancing mechanism comprising a body supported for gyration, a gyrator for the body mounted to permit of normal and abnormal gyration, and a steadying device for the mechanism comprising opposing stud carrying members, an interposed recessed member engaged by the studs and means coacting with the stud carrying and recessed members resisting relative movement of the same.

4. The combination of a body supported for gyration, a gyrator for the body, and a steadying device including a fixed and two movable members, said members having stud and slot engagement, and means coacting with the members resisting relative movement of the same.

5. A sifter, a gyrator therefor, and a steadying device comprising superposed relatively movable interfitting members forming chambers for a fluid, said chambers varied in size by the relative movement of the members, and said gyrator mounted on the members to maintain the members in assembled relation.

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

ALLEN C. BRANTINGHAM.

Witnesses:
C. H. Rauch,
Geo. E. Kirk.