A. C. BRANTINGHAM.

SELF BALANCING SIFTER.

APPLICATION FILED DEC. 20, 1915.

1,207,847.

Patented Dec. 12, 1916.

2 SHEETS—SHEET 1.

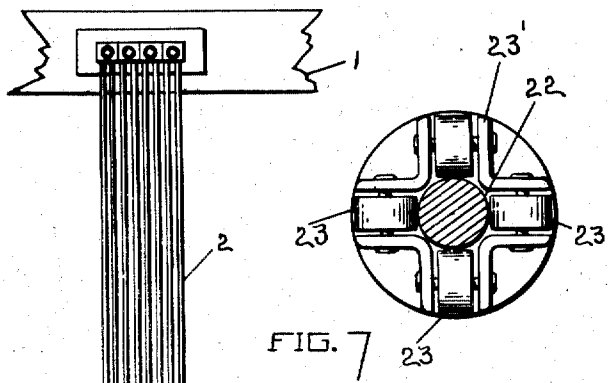
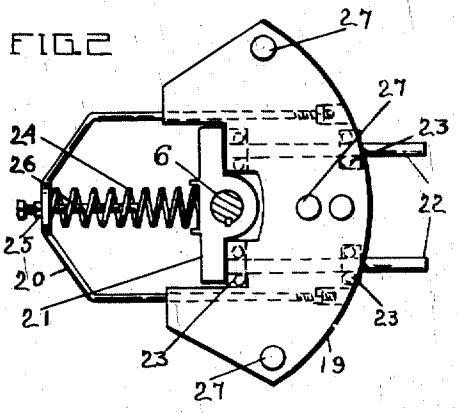


FIG. 7

FIG 2



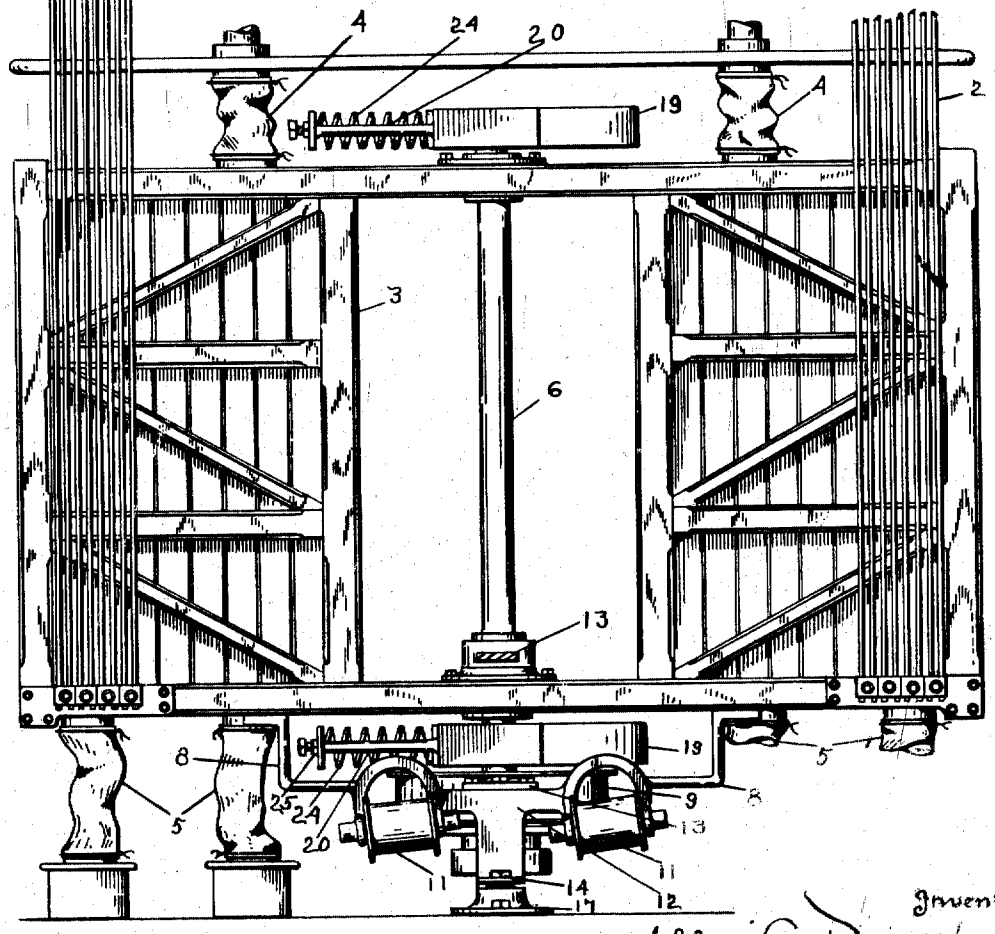


FIG. 1

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2 SHEETS—SHEET 2.

FIG. 3

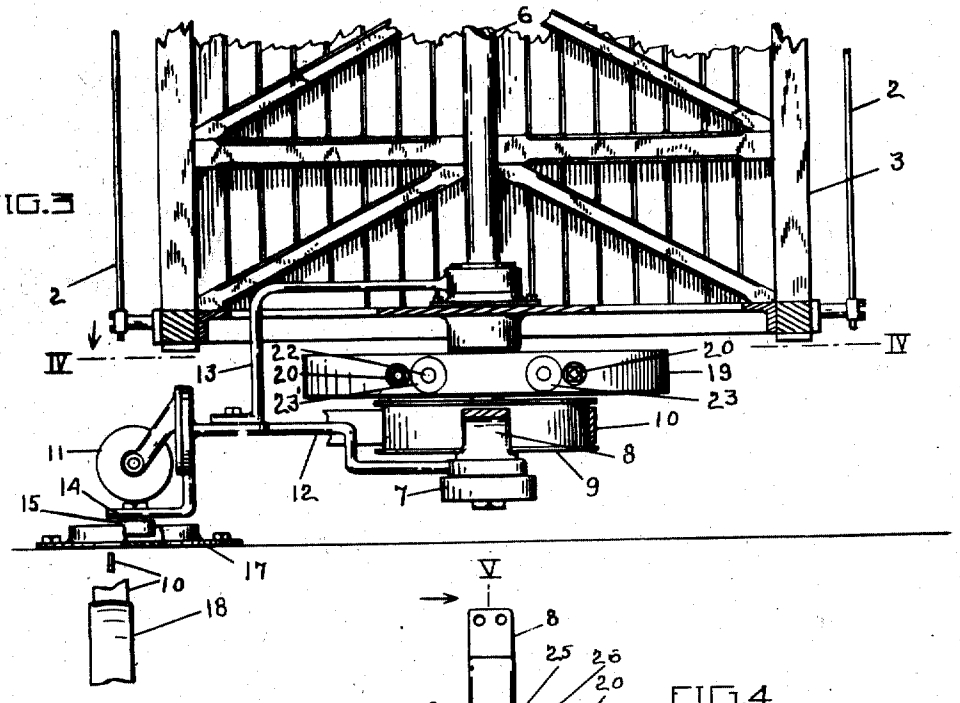


FIG. 4

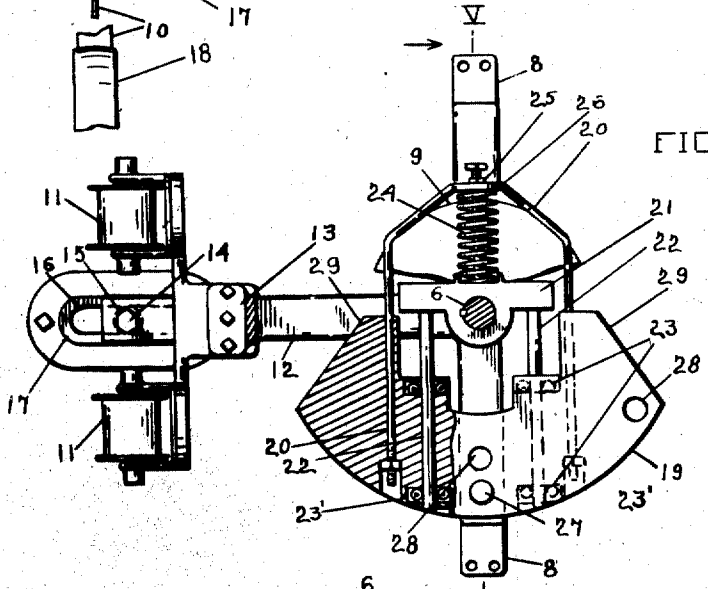


FIG. 5

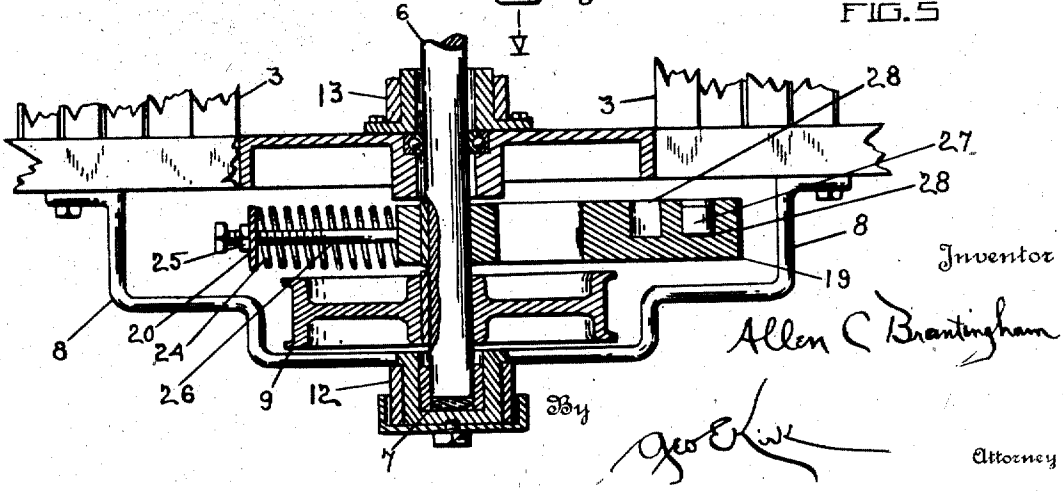
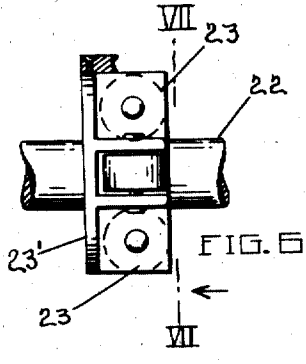


FIG. 6



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UNITED STATES PATENT OFFICE.

ALLEN C. BRANTINGHAM, OF TOLEDO, OHIO, ASSIGNOR TO NORDYKE & MARMON COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

SELF-BALANCING SIFTER.

1,207,847. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed December 20, 1915. Serial No. 67,715.

To all whom it may concern:

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

This invention relates to driving and control devices, especially for sifters.

This invention has utility when incorporated in driving and control devices for cereal graders of the freely gyrating type.

Referring to the drawings: Figure 1 is a side elevation with parts broken away of an embodiment of the invention in a high box type of self balancing gyratory sifter for grading finely divided material, as flour; Fig. 2 is a plan view of the adjustable throw gyrator device or flyweight, with the parts disposed in closed or quiet position; Fig. 3 is a fragmentary view of the drive and control device; Fig. 4 is a plan view of the control device or gyrator of Fig. 3 showing the parts in distended or running position, being on the line IV—IV Fig. 3; Fig. 5 is a section on the line V—V, Fig. 4; Fig. 6 is a detail of the anti-friction mounting for the flyweight; and Fig. 7 is a view on the line VII—VII, Fig. 6.

From the stationary support 1 the flexible reeds 2 may carry the sifter for freedom of movement, as travel in an orbit, or gyration. The stock to be treated my be delivered to the sifter 3 by flexible tubes 4 and the graded material therefrom discharged to flexible tubes 5.

Centrally mounted in the sifter 3 is the rotary shaft 6, the weight of which is carried by the sifter through the step bearing 7 and the frame 8. Fast on the shaft 6 and concentric therewith is the pulley 9 to which may extend belt 10 to pass over the angularly adjustable idlers 11 axially spaced from the pulley 9 by the strut or forked vertically stiffened bracket 12, 13. The bracket 12 has the pin 14 carrying the roller 15 for reciprocation in the slot or pocket 16 of the lower plate 17 anchored to the fixed part of the building, as the floor in the mill. The roller 15 has no support in the slot 16 but is laterally guided thereby and may have this anti-friction side travel minimized by a lubricant in the pocket 16. These idlers 11, besides being axially spaced as to the pulley 9, are movable relatively to the sifter or box 3 but are carried by said box 3 through the brackets 12, 13. In this drive connection the idlers may be adjusted to care for leading on or off the pulley 18 at the desired angle without having the whole belt interfere with the uniform orbital travel or gyration of the sifter 3. Rotation of the pulley 9 and through it of the shaft 6 would normally accomplish no control or driving action as to the sifter 3. However, mounted on the shaft 6 are a pair of gyrator devices each including a U-shaped flyweight 19 coacting with an opposing U-shaped holder 20 for fully embracing the shaft 6. Fast on the shaft 6 is a yoke 21 carrying a pair of guides 22, which yoke 21 and guides 22 form a third U-shaped device. The guides 22 coact with the anti-friction rollers 23 mounted in the cages 23′ in the flyweight device 19 permitting ready radial travel of this flyweight 19 as to the shaft 6. The U device 22 carries the weight 19, while the weight 19 carries the U device 20. The centrifugal action of the flyweight 19 is resisted by the compression spring 24 acting between the U devices 20, 21, while the maximum throw of the flyweight may be positively adjusted by the nut 25 on the stop stem 26 carried by the U-shaped holder 20. The flyweight loading of the member 19 may be adjusted by insertion or removal of weights 27 from the pockets 28.

In operation from a position of rest wherein the sifter hangs true as to the reeds 2, the belt 10 may be started to rotate the shaft 6 through the pulley 9. As the shaft 6 speeds up, the center of gravity of the flyweights 19 being slightly eccentric of the axis of rotation of the shaft 6 has its momentum increase to overcome the resistance of the compression or retrieving spring 24 and as these flyweights begin to move away from the shaft 6, their mass on that side of the shaft 6 increases, for as the radius to center of gravity increases, the leg portions 29 of the U-flyweight move over to supplement the action of the major portion of the weights 19. Accordingly, in the adjusted normal travel, the flyweights 19 have an increased controlling mass when up to speed and due to this mass eccentric of the shaft 6, the shaft 6 is compelled to travel in an orbit. This travel in an orbit of the rotating shaft

6 carries with it the non-rotating sifter 3 giving the shaking action to effect the treatment of the stock. Accordingly, in the normal operation of the machine the pulley 9 is gyrating. However, the whips of the reaches of the belt 10 are minimized in the modified movements of the guide pulleys 11 for the roller 15 travels to and fro instead of in an orbit like pulley 9. Thus there is distribution of the travel of the pulley 9 in its effect upon the belt 10 from the driving source of the fixed pulley 18.

In the driving and control of the sifter there is no rigid connection between the sifter and its building or supporting structure, and the control lunges or vibrations of the sifter may not be transmitted as concussion to disturb the building, or react to modify the gyratory travels.

The maximum throw adjustment of the sifter may be readily modified by adjusting the stem 26 or the loading of the flyweights 19, while a variation in the stock loading of the sifter 3 will be taken up in the machine travel itself. However, this variation in the load of the sifter need not modify the effective action of the sifter with the controlling mass of the flyweights of sufficient momentum to maintain mastery up to the adjustment of the stop 26.

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

1. A freely supported body, and driving means for the body including a shaft, a fly-weight on the shaft adjacent the body, a pulley on said shaft concentrically mounted as to the body, said pulley being disposed on the side of the fly-weight away from the body, and a shaft engaging frame extending from the body to the shaft beyond the pulley from the body.

2. A freely supported body and driving means for the body including a fly-weight, a rotary shaft concentrically mounted as to the body, a pulley on the same side of the fly-weight and body concentrically mounted on the shaft, a driving belt for the pulley and guiding means for the belt axially spaced from the pulley and movable relatively to the body, said guiding means engaging the shaft on the side of the pulley remote from the fly-weight.

3. A body supported for gyration and driving means for the body including a fly-weight, a pulley on the same side of the fly-weight and body, and normally gyratable with the body, a belt for the pulley, and guiding means for the belt movable relatively to the body, said guiding means engaging the shaft on the side of the pulley remote from the flyweight.

4. A body supported for gyration and driving means for the body including a pulley normally gyratable with the body, a belt for the pulley, and guiding means for the belt automatically movable relatively to the body, said guiding means carried by the body.

5. A body supported for gyration and means for gyrating the body including a member coacting with the body and having an axis of rotation, a support below the body for the member, an adjustable weight rotatable with the member and movable to a plurality of positions as to said member, and a single adjustable compression spring to resist weight movement, a portion of said weight being disposed for opposite control action at one position to its control action at another position.

6. A body supported for gyration and means for gyrating the body including an adjustable member coacting with the body having an axis of rotation, a flyweight of increased controlling mass as its momentum increases, and a single adjustable compression spring coacting to resist momentum increase of the flyweight.

7. A body supported for gyration and means for gyrating the body including a member coacting with the body having an axis of rotation, an adjustable flyweight of decreased controlling mass as its effective radius decreases, and a radius increasing resistance offering single adjustable compression spring for the flyweight.

8. A body supported for gyration and means for gyrating the body including a member coacting with the body and having an axis of rotation, an adjustable flyweight having its center of gravity disposed for outward travel from the axis of rotation of the member, and a single adjustable compression spring carried by the member on the opposite side of said axis of rotation for acting upon the weight.

9. A body supported for gyration, a rotatable member coacting with the body, an adjustable relatively movable flyweight device therefor having its center of gravity approach nearer the axis of the rotatable member than the outer edge of the flyweight on a line through said axis and center of gravity and a single adjustable compression spring for resisting outward flyweight travel.

10. A body supported for gyration and driving means for the body including a shaft having a pulley thereon and a step bearing for the shaft carried by the body, said bearing being below the pulley.

11. A body supported for gyration, and driving means for the body including a shaft, and a driving pulley for the shaft, a frame carried by the body and extending therebelow, and a step bearing in the frame for the shaft, said bearing being below the pulley.

12. A body supported for gyration and driving means for the body including a belt,

guiding means for the belt, and a travel limiting device for the means independent of the support for the means.

13. A body supported for gyration and driving means for the body including a belt, guiding means for the belt, a supporting bracket including a pair of vertically spaced arms connected to gyrate with the body, and a travel limiting device for the means independent of the body.

14. A body supported for gyration and driving means for the body including a belt, guiding means for the belt eccentric of the driving means, and a travel limiting device for the guiding means independent of the support for the guiding means embodying a fixed way having a lateral directing face forming the side walls of a lubricant chamber for the device.

In witness whereof I affix my signature.

ALLEN C. BRANTINGHAM.

Corrections in Letters Patent No. 1,207,847.

It is hereby certified that in Letters Patent No. 1,207,847, granted December 12, 1916, upon the application of Allen C. Brantingham, of Toledo, Ohio, for an improvement in "Self-Balancing Sifters," errors appear in the printed specification requiring correction as follows: Page 2, lines 82-83, strike out the words "an adjustable" and insert the article *a;* same page and claim, line 84, strike out the article "a" and insert the words *an adjustable;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of March, A. D., 1917.

[SEAL.]

F. W. H. CLAY,

Acting Commissioner of Patents.

Cl. 83—38.