No. 817,901. PATENTED APR. 17, 1906.

A. C. BRANTINGHAM.

GYRATORY SIFTER.

APPLICATION FILED MAY 8, 1905

Fig. 1.

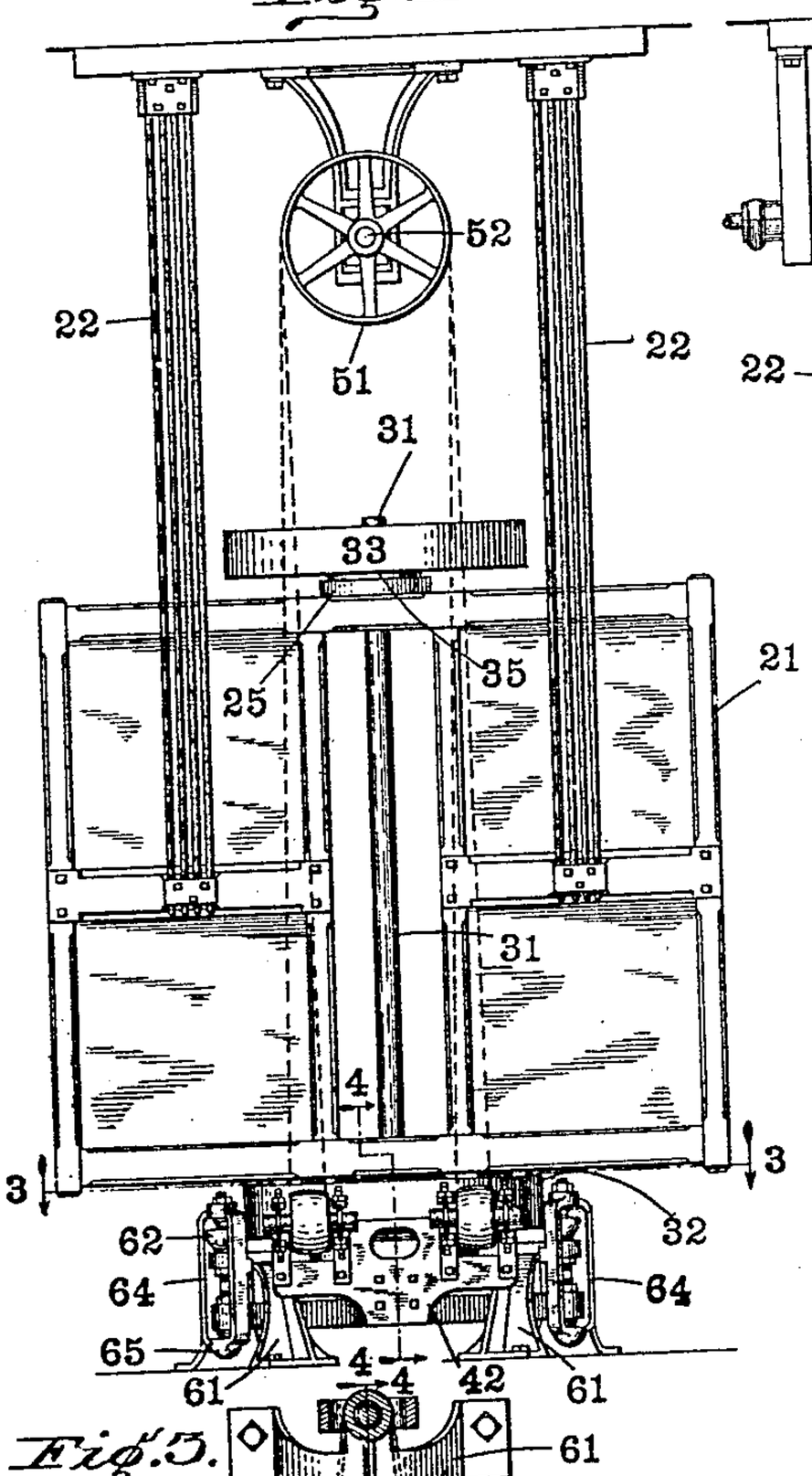


Fig. 2.

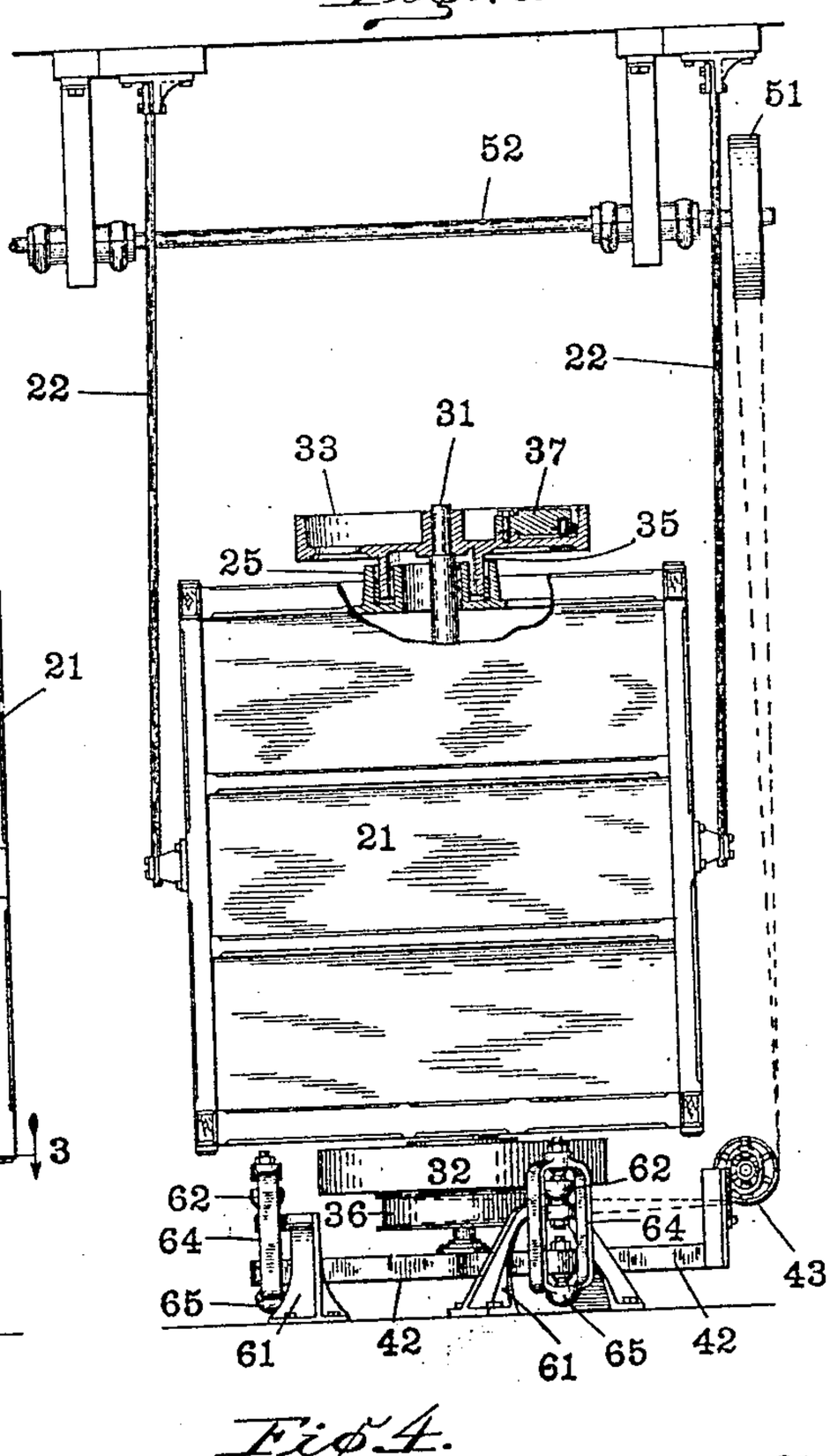


Fig. 3.

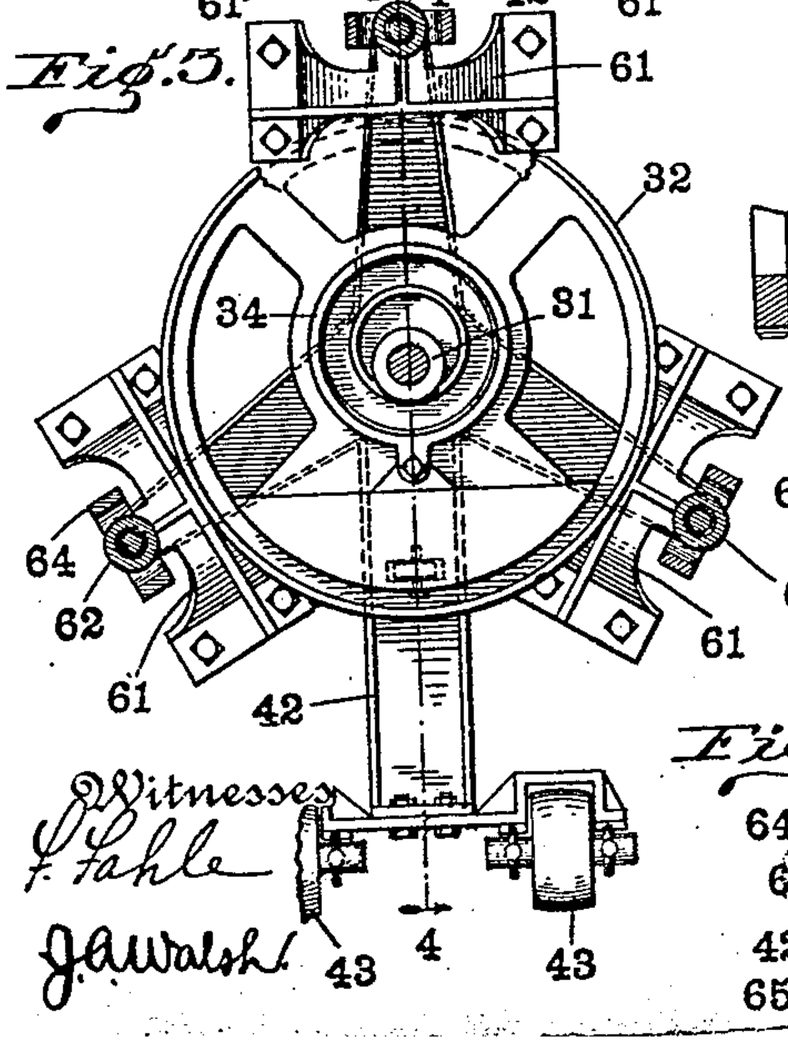


Fig. 4.

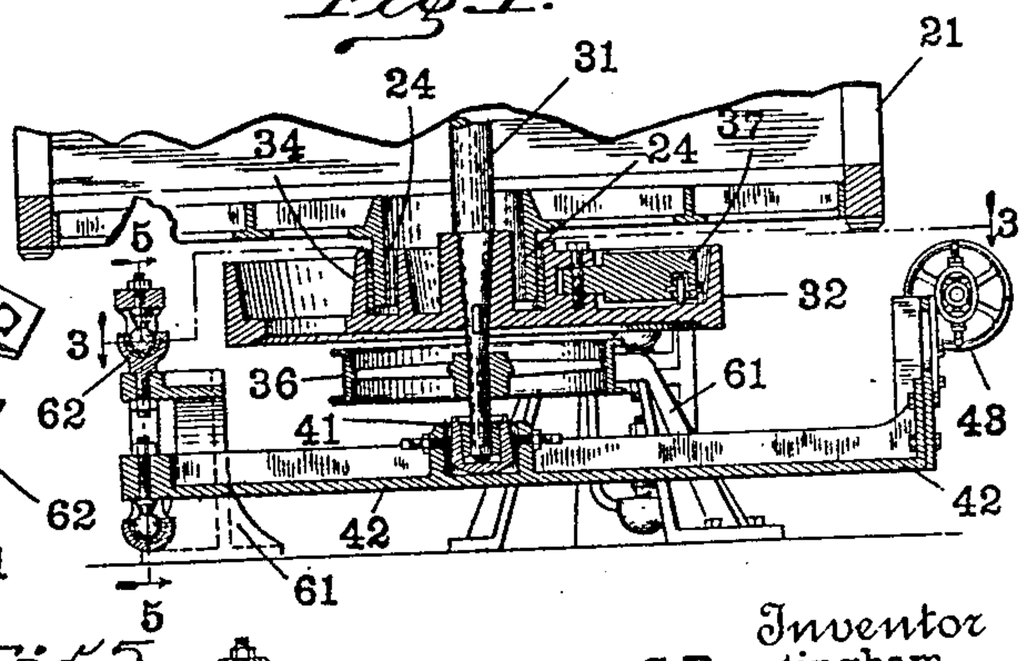
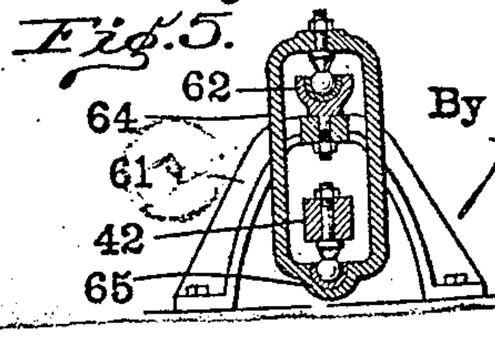


Fig. 5.



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UNITED STATES PATENT OFFICE.

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GYRATORY SIFTER.

No. 817,901. Specification of Letters Patent. Patented April 17, 1906.

Application filed May 8, 1905. Serial No. 259,372.

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 certain new and useful Improvements in Gyratory Sifters, of which the following is a specification.

In the work of bolting or grading mill products what are commonly known as "gyratory sifters" have proven to be the most satisfactory machines for the purpose. The best type of such machines embody a vertically-positioned centrally-arranged driving-shaft. Such machines when their driving-shafts are mounted in bearings fixedly connected to the building produce heavy strains upon the building structure in operation. A construction wherein the supports for the sifter structure and also for the shaft are of a yielding character is therefore desirable. It has been discovered that such sifters can be suspended upon flexible or pivotally-connected suspending-rods, so as to have a pendulum-like movement in operation, and thus relieve the building of the lateral strains which are present when such sifters are carried by rigidly-positioned supports. The shaft in such cases carries one or more weights at one side of its center, so that it is "unbalanced," as it is called, and thus enabled when rotated to impart the required gyratory movement to the sifter. In such sifters as heretofore constructed the shaft and the sifter have traveled together, so that both have partaken of the gyratory movement, with obvious disadvantages, the chief of which can only be overcome by a construction wherein the shaft shall have only a rotary movement and the sifter alone shall have the gyratory movement. I have therefore provided eccentric connections between the shaft and the sifter, so that when the parts are properly proportioned and arranged the force of the weights will so far act oppositely to the inertia of the sifter that the latter will be driven with a gyratory movement equal to the throw of the eccentrics, while the shaft itself will remain stationary, or substantially stationary, during the ordinary operation of the machine.

In a sifter suspended in the manner in question there is a tendency to "lunge," as it is called, at the beginning of the operation when the sifter is first put in motion, or, in other words, the sifter is apt in starting to be thrown outside of its regular and proper path of movement through which it travels after having "struck its gait" or reached the regular motion which it is designed to have.

It is a further object of my invention to provide means by which this lunging shall be restrained during the initial stages of the operation, but which shall not have the effect to communicate any of the objectionable lateral strains to the building after the sifter has been put in operation and has reached its regular motion. I accomplish this object by providing a bridge-tree carrying a step-bearing for the lower end of the shaft, said bridge-tree being independent of the sifter structure and independently mounted. The supports of said bridge-tree, like those of the sifter structure itself, are flexibly or pivotally connected, so as to avoid communicating the heavy lateral strains consequent upon the operation to the building; but in order to restrain the objectionable lunging during the initial stages of the operation I provide means by which the possible travel of the bridge-tree is limited.

It is of course not possible to prevent all gyratory movement of the shaft under all conditions, although such movement is substantially eliminated when the machine is doing its ordinary work. When it is underloaded or overloaded, however, the movement is inclined to so increase or diminish as to fall below or exceed the throw of the eccentrics, and in such cases the shaft itself will participate to some extent in the gyratory movement of the sifter. The machine is, however, substantially self-balancing and self-regulating.

The accompanying drawings illustrate a construction embodying my invention.

Figure 1 is a side elevation of a sifter of the character in question; Fig. 2, an end elevation thereof; Fig. 3, a sectional plan view, on an enlarged scale, as seen when looking downwardly from the dotted lines 3 3 in Figs. 1 and 4; Fig. 4, a central vertical sectional view as seen when looking in the direction indicated by the arrows from the dotted lines 4 4 in Figs. 1 and 3, and Fig. 5 a detail sectional view at the point indicated at the dotted line 5 5 in Fig. 4.

The sifter structure 21 is or may be any suitable structure of the character in question and is adapted to contain a series of sieves (not shown) suitable for the purpose required. This structure is supported by suitable rods 22 from a point overhead,

which rods are sufficiently flexible or yielding to permit of the proper gyratory movement of the sifter structure appropriate to the sifting operation. A shaft 31 is arranged vertically and centrally in said sifter structure and carries the fly-wheels 32 and 33 at or near its lower and upper ends. Suitable eccentric-flanges 34 and 35 are provided on these fly-wheels which engage with corresponding flanges 24 and 25, secured rigidly to the sifter structure 21. Weights, as 37, are secured to these fly-wheels and constitute, in the construction shown, the means which act oppositely to the inertia of the sifter structure and govern the gyratory movement of the latter. Through the comparatively large openings through the center of these flange structures 24 and 25 the shaft 31 passes, said openings being sufficient in size to permit the shaft to remain in position without interfering with the gyratory movement of the sifter.

Upon the shaft 31 at or near its lower end is a pulley 36, by which it is driven. The construction might be so modified as to make the fly-wheels 32 also serve as such pulley.

The lower end of the shaft 31 is mounted in a suitable step-bearing, as 41, in a yieldingly-mounted bridge-tree 42. This bridge-tree carries idler-pulleys 43, and motion is imparted to the shaft 31 by a belt running from the pulley 36 thereon over said idler-pulleys 43 to a pulley 51 on a driving-shaft 52, as indicated by the dotted lines in Figs. 1 and 2. As the distance between the shaft 31 and the pulleys 43 is a constant or unvarying one, notwithstanding that the structure upon which they are mounted may swing about to a certain extent, and as the distance between the pulleys 43 and the driving-pulley 51 is comparatively so great as to make the change in distance between them (as the structure carrying the pulleys 43 swings) inappreciable, it will be readily seen that any swinging about of the shaft 31 when the sifter is in motion will not appreciably alter the driving capability of the belt.

The form of supports for the bridge-tree which I prefer are illustrated in the drawings forming part of the present application. Said supports are in the form of brackets 61, secured to the floor of the building and provided with ball-and-socket bearings 62, carried on the ends of suitably-formed arms thereon, and the bridge-tree 42 is carried therefrom by means of links 64, having other ball-and-socket joints 65 as the immediate means of connection thereto. As shown in Fig. 3, three sets of these bracket-supports are preferably employed, there being also, preferably, three bearing-arms on the bridge-tree. The links will easily yield for a short distance in any direction, yet the distance between the ball-and-socket bearings 62 and 65 is so short that the limit of movement is comparatively small. While, therefore, there is no rigid connection between the gyratory sieve structure and the building in a machine of this character, the supporting-links will effectually restrain the lunging which is apt to occur at the time of the starting up of the machine unless means is provided to counteract it.

I claim as my invention—

1. The combination of a sifter structure, means whereby the same is yieldingly suspended, a shaft arranged vertically to said sifter structure and weighted more on one side than the other, eccentric connections between said shaft and said sifter structure, a bridge-tree supporting said shaft, yielding supports carrying said bridge-tree having a limited movement, idler-pulleys carried by the bridge-tree, a driving-shaft, and a belt running from a pulley on the driving-shaft over the idler-pulleys on the bridge-tree to a pulley on the sifter-shaft.

2. The combination of a sifter structure, means whereby the same is yieldingly suspended, a vertical shaft weighted more on one side than on the other and having a driving connection with the sifter structure, a bridge-tree mounted independently of the sifter structure and supporting said shaft, and yielding supports for the bridge-tree having a limited movement.

3. The combination of a sifter structure, means whereby the same is yieldingly suspended, a shaft arranged vertically to said sifter structure, eccentric connections between said shaft and said sifter structure, and independently yieldingly-supported power-transmission devices leading to said shaft.

4. The combination of a sifter structure, means whereby the same is yieldingly suspended, a bridge-tree arranged below said sifter structure, means whereby the same is yieldingly suspended, a shaft supported by said bridge-tree, eccentric connections between said shaft and said sifter structure, and power-transmission devices in part carried by said bridge-tree leading to said shaft.

5. The combination of a sifter structure, suspending-links upon which the same is mounted, a bridge-tree, suspending-links for said bridge-tree, a shaft mounted on said bridge-tree, eccentric connections between said shaft and said sifter structure, devices mounted upon said shaft heavier upon one side than upon the other, means whereby the swing of the bridge-tree is limited, and power-transmission devices leading to the shaft.

6. The combination of a sifter structure, means whereby the same is yieldingly suspended, a shaft arranged vertically to said sifter structure, a bridge-tree supporting said shaft, supports for said bridge-tree consisting of suitable brackets secured to the building structure, and pivoted links connected to said brackets and to arms on the bridge-tree.

7. The combination with a machine structure and its driving-shaft, of a bridge-tree supporting said shaft and provided with three points of support, three corresponding brackets, and three corresponding links uniting said brackets and said points of support by universal joints.

8. The combination with a machine structure and its driving-shaft, of an independent bridge-tree supporting said shaft, power-transmission devices also carried by said bridge-tree, and yielding supports by which said bridge-tree is carried.

9. The combination of a machine structure, yielding supports therefor, an independent bridge-tree, yielding supports therefor, an eccentric connection between said bridge-tree and said machine structure and means for rotating said connection.

10. The combination of a machine structure, yielding supports therefor, an independent bridge-tree, yielding supports therefor, an eccentric connection between said bridge-tree and said machine structure, and power-transmission devices carried by said bridge-tree.

In witness whereof I have hereunto set my hand and seal, at Toledo, Ohio, this 29th day of April, A. D. 1905.

ALLEN C. BRANTINGHAM. [L. S.]

Witnesses:
WM. BONIFIELD,
JOHN F. LIBBY.