No. 818,607. PATENTED APR. 24, 1906.

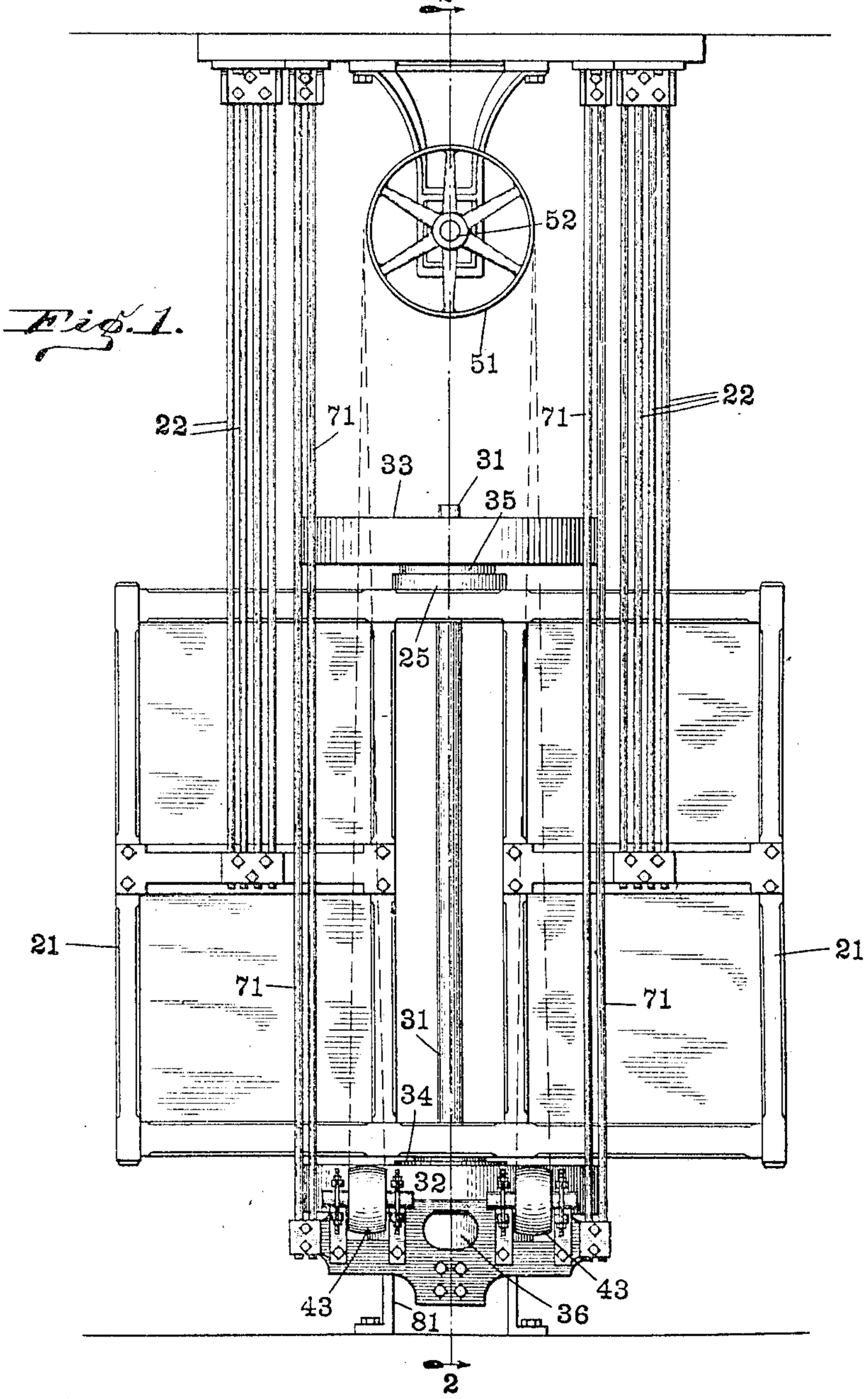
A. C. BRANTINGHAM.

GYRATORY SIFTER.

APPLICATION FILED MAY 11, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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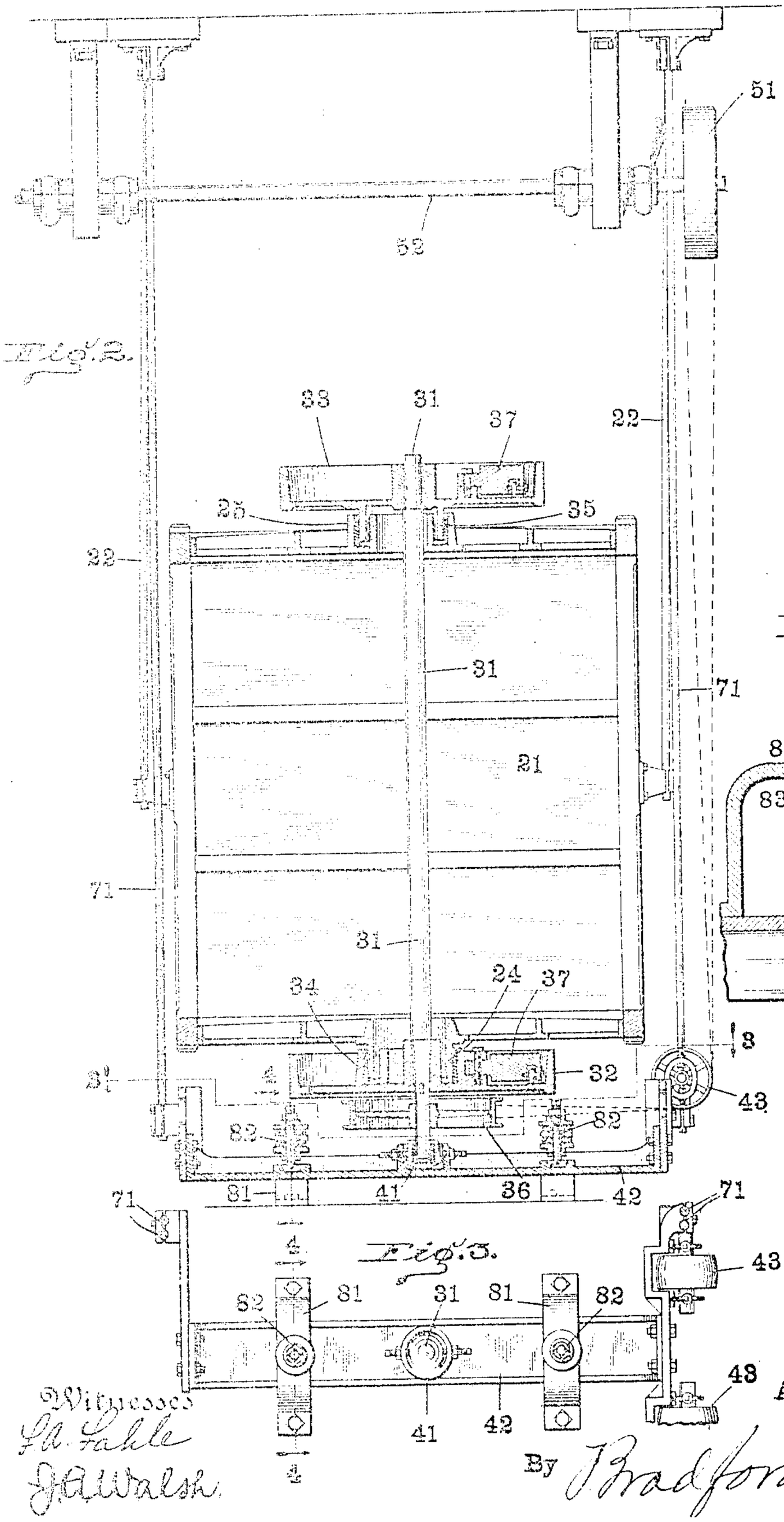
2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE.

ALLEN C. BRANTINGHAM, OF TOLEDO, OHIO.

GYRATORY SIFTER.

No. 813,607. Specification of Letters Patent. Patented April 24, 1906.

Application filed May 11, 1905. Serial No. 259,966.

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 machine embodying my present invention.

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

The sifter structure 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.

In the construction illustrated in the drawings forming part of the present application the bridge-tree is supported by long suspending-rods 71 from overhead, the point of suspension, as shown in said drawings, being substantially the same as that from which the sifter structure itself is carried. This form of support of the bridge-tree, if no restraining means were provided, would permit of the objectionable lunging hereinbefore described. I therefore provide stops by means of which the possible movement of the bridge-tree is limited. These stops may be of any desired form; but I have shown as a desirable form yokes 81 carrying pins 82, which pins extend down to within suitable cavities formed in the bridge-tree 42. Said cavities, however, are sufficiently larger than the pins to permit all the necessary movement of the bridge-tree in the ordinary operation of the machine, while serving as stops to effectually restrain the lunging in question. It is necessary in order when these stops or pins come in contact with the bridge-tree that too great stress or shock be not imparted to the structure that said stops or pins shall be yieldingly mounted. The orifice through the yoke 81 is therefore of such a form that the pin 82 will loosely fit therein, and I also provide a yielding element in the mounting. This yielding element is necessarily of a spring character or construction, but may be of any desired construction so long as its yielding character is retained. As shown in Fig. 4, I have found that to provide two collars 83 and 84 on the pin and interpose rubber washers 85 and 86 between said collars and the adjacent faces of the yoke is an efficient means for the purpose. The rubber being compressible permits the pin to yield slightly in any direction under the impact of the bridge-tree when it comes in contact therewith, thus taking up the shock and providing the necessary elasticity to avoid injury to any part of the structure from this cause.

A bridge-tree which is supported and restrained by the means shown and described in the present application may, as shown in Fig. 3, be substantially a plain straight bar of the simplest imaginable character, and when the machine has reached its regular movement to which it has been preadjusted it is not connected in any manner to the floor of the building, but is wholly supported from overhead. Contact with the stop-pins 82 only occurs at the time of the starting of the machine before it attains its regular movement, and after said movement is attained there is no contact or engagement whatever between the bridge-tree and the stops.

In my companion application, Serial No. 259,372, filed May 8, 1905, I show and describe another variety of machine for the same purpose.

I claim as my invention—

1. 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 driving-shaft for the sifter structure supported by said bridge-tree, connections between said shaft and said sifter structure, yieldingly-supported power-transmission devices leading to said shaft, and yieldingly-mounted stops adapted to limit the movement of said bridge-tree.

2. The combination of a sifter structure, supports by means of which the same is yieldingly suspended from overhead, a bridge-tree arranged below said sifter structure, supports by means of which the same is yieldingly suspended from overhead, a driving-

shaft for the sifter structure supported by said bridge-tree, connections between said driving-shaft and said sifter structure, and yieldingly-mounted stops adapted to limit the movement of the bridge-tree.

3. The combination of a sifter structure, overhead suspending devices therefor, a bridge-tree arranged below said sifter structure, overhead suspending devices therefor, a driving-shaft for the sifter structure supported by said bridge-tree, and yieldingly-mounted stops carried from an adjacent portion of the building adapted to engage with and limit the movement of the bridge-tree.

4. The combination of a sifter structure, overhead suspending devices therefor, a bridge-tree arranged below said sifter structure, overhead suspending devices therefor, a shaft supported by the bridge-tree, eccentric connections between said shaft and said sifter structure, suitable power-transmission devices leading to said shaft, and stops adapted to limit the movement of the bridge-tree.

5. 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 driving-shaft for the sifter structure supported by said bridge-tree, eccentric connections between said shaft and said sifter structure, and independently-supported stops arranged to engage with and limit the movement of the bridge-tree.

In witness whereof I have hereunto set my hand and seal, at Toledo, Ohio, this 8th day of May, A. D. 1905.

ALLEN C. BRANTINGHAM. [L. S.]

Witnesses:
JOHN HARDY,
G. M. ALEXANDER.