L. E. SIMPSON.

SIFTING MACHINE.

APPLICATION FILED JULY 20, 1917.

1,265,267.

Patented May 7, 1918.

2 SHEETS—SHEET 1.

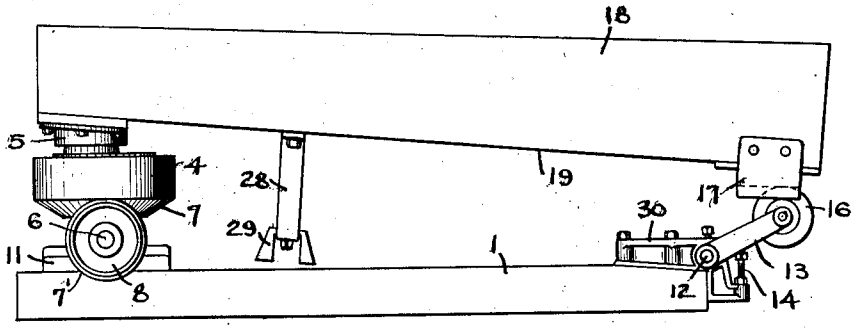


Fig. 1

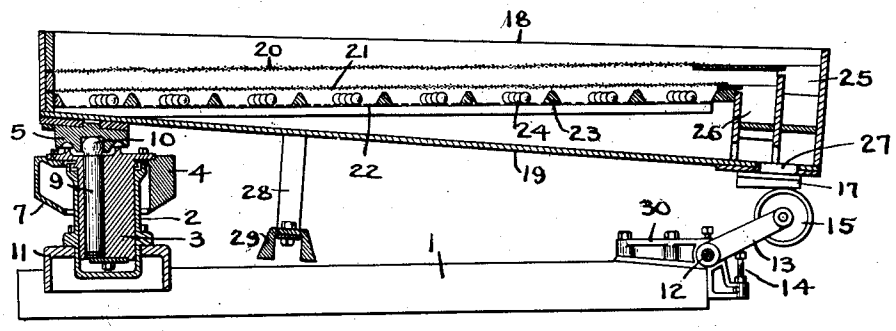


Fig. 2

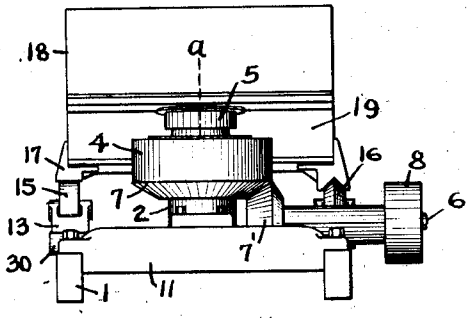


Fig. 3

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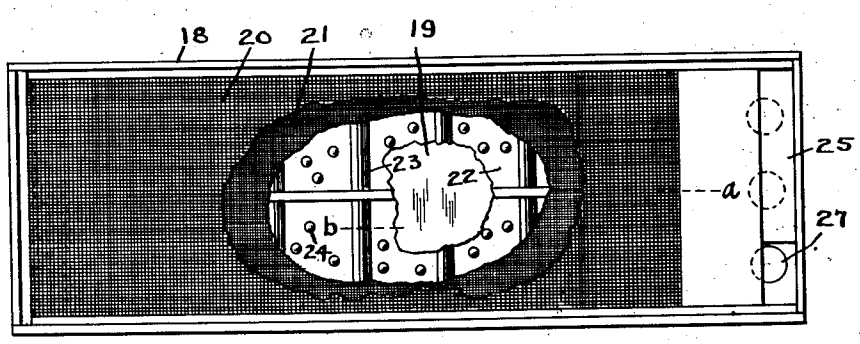


Fig. 4

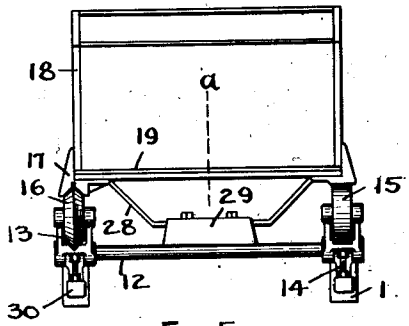


Fig. 5

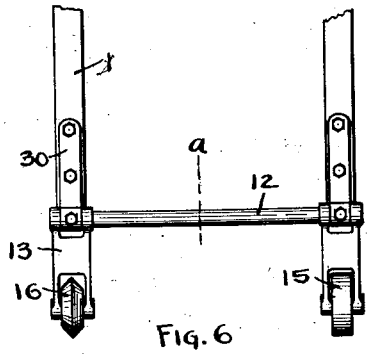


Fig. 6

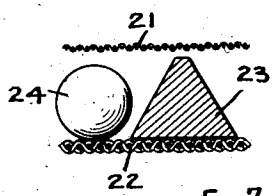


Fig 7

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UNITED STATES PATENT OFFICE.

LOWE E. SIMPSON, OF CINCINNATI, OHIO, ASSIGNOR TO THE ORVILLE SIMPSON COMPANY, OF CINCINNATI, OHIO.

SIFTING-MACHINE.

1,265,267. Specification of Letters Patent. Patented May 7, 1918.

Application filed July 20, 1917. Serial No. 181,739.

To all whom it may concern:

Be it known that I, LOWE E. SIMPSON, a citizen of the United States, residing at College Hill, Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Sifting-Machines, of which the following is a specification.

This invention relates to improvements in the character of sifting machines set forth in my former United States Patent No. 1,141,660 of June 1st, 1915, such machines comprising an inclined sieve-box containing sieves and arranged for a horizontal shaking motion.

The present invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a side elevation of a sifting machine embodying an exemplification of my present improvements, the end at the righthand being the discharge end of the machine:

Fig. 2 a vertical longitudinal section of the same, in the plane of line *a* of Figs. 3, 4, 5 and 6:

Fig. 3 an elevation of the receiving end of the machine, the end at the lefthand in Figs. 1, 2 and 4:

Fig. 4 a plan of the sieve-box, with parts broken away in order to expose lower parts:

Fig. 5 an elevation of the discharge end of the machine, the end at the right in Figs. 1, 2 and 4:

Fig. 6 a plan of the supporting rollers under the discharge end of the sieve-box: and

Fig. 7 a vertical section of parts, in the plane of line *b* of Fig. 4, and on an enlarged scale.

In the drawings:—

1, indicates the fixed base of the machine, illustrated as being formed of two parallel sills, this base being for the support of a sieve-box disposed over it:

2, a large vertical bearing supported rigidly by the sill at the receiving end of the machine:

3, a long eccentric journaled in this bearing:

4, a flywheel fast with the upper end of the eccentric:

5, a downwardly open cylindrical socket secured rigidly to and under the bottom of the sieve-box:

6, a horizontal driving-shaft journaled in a bearing supported by the base of the machine, the axis of this shaft lying below the flywheel and intersecting the axis of bearing 2:

7, a beveled surface on the lower portion of the flywheel, this surface causing the flywheel to form one member of a friction bevel-gearing:

7′, a bevel friction-pinion fast on the inner end of the driving-shaft and engaging the friction-gear formed by the flywheel:

8, a driving pulley fast on the outer end of the driving-shaft:

9, a long crank-pin journaled in an eccentric bearing in the eccentric 3:

10, the spherical upper end of the crank-pin, this spherical portion engaging within the socket 5:

11, a bridgetree uniting the two sills of the base at the receiving end of the machine and serving for the support of the vertical and horizontal bearings which have been referred to:

12, a horizontal shaft disposed across the tail end of the base and supported in suitable castings secured to the sills:

13, a pair of arms having their heels pivoted at this shaft:

14, vertical screws carried by the castings which support the shaft 12, one under each of the pivoted arms, these screws engaging upwardly against the arms and serving as a means for vertically adjusting the outer ends of the arms:

15, a wheel carried by the outer end of one of the arms and having its axis parallel with shaft 12, this wheel having a cylindrical periphery:

16, a wheel carried by the outer end of the other arms, the periphery of this wheel being V-shaped in cross-section, with the apex of the V radially outward:

17, downwardly presenting tracks secured to the under surface of the bottom of the sieve-box, over the two wheels, one of these tracks having a flat surface to engage the cylindrical wheel 15, while the other track is in the form of a V-shaped groove to engage the periphery of the other wheel:

18, a sieve-box, considered as a whole:

19, the floor of the sieve-box, sloping downwardly from the head end of the machine to its tail end:

20, the upper screen, supported in the

screen-box in the manner usual in this class of machines:

21, the lower screen, of finer mesh than the upper one, as usual:

22, an interstitial supporting floor disposed under and substantially parallel with screen 21, preferably under the entire effective area of that screen:

23, ribs disposed across and upon this floor and serving to divide the space between the floor and the screen above it into a number of ball-pockets, the sides of these ribs being beveled so that the ball-pockets have greater area above than below:

24, balls disposed loosely in the ball-pockets and resting on the floor 22, and of a size to keep them normally out of contact with the screen above them:

25, the cross-chute at the tail end of the screen-box to receive the tailings from screen 20:

26, the cross-chute to receive the tailings from screen 21:

27, the outlets from the screen-box to permit the discharge of all of the tailings therefrom:

28, a hanger projecting rigidly downward from the screen-box at an intermediate point in the length of the screen-box, preferably nearer the head than the tail of the machine:

29, a weight fixed to the lower portion of this projection: and

30, the castings heretofore referred to as being provided upon the sills for supporting the shaft 12.

The general construction and the general performance and the course of flow of the material is substantially the same as in my above-mentioned former patent. The head end of the screen-box is, by means of the eccentric, given a gyratory motion, while its tail end has a substantially reciprocating motion, during which the tracks 17 travel on the wheels. The inclination of the screen-box can be adjusted by means of the screws 14, and these screws, being stationary, can be adjusted while the machine is in motion, thus permitting the level of the screen to be adjusted to a nicety, when considered transversely. The screen-box is supported on three legs, so to speak, the crank-pin constituting the single leg at the head end of the machine while the two wheels constitute the two legs at the tail end of the machine. While the tail end of the machine reciprocates in a line which is nearly straight, its straightness is modified by reason of the fact that the head end of the screen-box gyrates. This calls for some degree of lateral freedom on the part of some portion of the tail end of the screen-box, and in this case the engagement of the V-shaped one of the wheels with its track forms a substantially constant side guide for one side of the tail end of the box, while the other side, by reason of the flat character of the track at that side, is unrestrained sidewise. This avoids the necessity for such nicety of construction as would be involved if both of the wheels had side-guiding functions.

In the absence of the weight 29, machines of this class have an undesired and erratic dancing tendency. The weight 29, of constant value, lowers the center of gravity of the moving screen structure and vastly improves the steadiness of motion.

The weight of the flywheel and eccentric is supported by the friction-pinion, and the weight of the head end of the screen-box is supported by the crank-pin which, in turn, is supported in the eccentric by a step-bearing, preferably a ball-bearing, at its lower end so that the crank-pin is free to turn easily in the eccentric. Rotary motion of the crank-pin in the socket of the screen-box is thus not essential, the globular character of the engagement between the crank-pin and the screen-box serving, however, to provide for certain peculiarities of motion due to the fact that the plane of movement of the screen-box may not maintain a constant angle with reference to the axis of the eccentric.

The flywheel and eccentric, while formed of separate pieces, have those pieces rigidly united into a single structure of admirable simplicity and efficiency. Vertical compactness is secured by extending the bearing of the eccentric well up into the flywheel which is hollow and carries within it a counterbalance to enhance the steadiness of motion of the parts.

For milling purposes, the screens 20 and 21 may be of bolting cloth, as usual, but ball-floor 22 while interstitial, is not a screening agent. Its office is to support the balls 24, without materially intercepting the downflow from the screen above it.

In the reciprocations of the screen-box the balls lag, by reason of their inertia, and eventually become struck by the inclined sides of the ribs and knocked upward thus giving sharp blows to the screen above them and lessening the tendency of that screen to clog. In anti-clogging balls as heretofore proposed for this purpose, the upward movement of the balls was dependent on the rough character of the floor which supported them, and their action was not reliable. In the present case the upward motion of the balls, in performing their office, is due to the bevel character of the margins of the ball-pockets and, instead of roughness of the ball-floor being an advantage, it is a disadvantage in interfering with the freedom of movement of the balls as they move relatively to and from the margins of the ball-pockets.

In the illustration I show the machine as

being provided with but two screens, the lower one only of which is provided with anti-clogging balls. This is on the presumption that, for a given use, two screens will be sufficient, and the upper one coarse enough to avoid serious clogging. The machine may, however, be provided with as many screens as is desired, following the usual custom in this class of machines, and, if needed, a pocketed ball-floor with its balls may be provided below each screen instead of below only a single one of the screens.

I claim:—

1. A body to have a portion gyrated horizontally, a base disposed below the body, mechanism supported by the base for giving horizontal gyrating motion to one end of the body, a cylindrical supporting wheel disposed under one side of the opposite end of the body, a flat track carried by the body and resting on said wheel and adapted to move endwise and shift sidewise thereon, a second supporting wheel disposed under the opposite side of the body at the same end with the first mentioned wheel and provided with a peripheral surface V-shaped in cross-section, and a track carried by the body and having a V-shaped cross section engaging the periphery of said second supporting wheel, combined substantially as set forth.

2. A sifting machine comprising, a base, a sieve-box free for horizontal motion and disposed over the base, means disposed between the base and the sieve-box for giving vertical support to the sieve-box, mechanism supported by the base and connected with the sieve-box and adapted to gyrate a portion of the sieve-box horizontally and a weight of constant value secured in fixed relationship to the sieve box, and disposed between the base and the point of connection between said mechanism and the sieve-box, combined substantially as set forth.

3. A gyrating-device comprising, a base, a vertical bearing carried by the base, an eccentric journaled in the bearing and having a crank-pin bearing bore extending lengthwise of it parallel with its axis, means for rotating the eccentric, and a crank-pin journaled in the bearing bore of the eccentric and projecting above the eccentric and adapted for articulate connection with the body to be gyrated, combined substantially as set forth.

4. A gyrating-device comprising, a base, a vertical bearing carried by the base, an eccentric journaled in the bearing and having a crank-pin-bearing bore extending lengthwise of it parallel with its axis, means for rotating the eccentric, a crank-pin journaled in the bearing bore of the eccentric and projecting above the eccentric, an articulate connection between the body to be gyrated and the projecting upper end of the crank-pin, and a hollow fly-wheel surrounding said vertical bearing and rigidly connected with the upper end of said eccentric, combined substantially as set forth.

5. A gyrating-device comprising, a base, a vertical bearing carried by the base, an eccentric journaled in the bearing and having a crank-pin-bearing extending lengthwise of it parallel with its axis, means for rotating the eccentric, a crank-pin journaled in the eccentric bearing of the eccentric, a downwardly open socket disposed over the crank-pin and adapted for attachment to the body to be gyrated, and a sphere fast on the upper end of the crank-pin and engaging the socket, combined substantially as set forth.

6. A sifting machine comprising, a sieve-box, a substantially horizontal screen therein, mechanism for vibrating the sieve-box horizontally, an interstitial ball-floor carried by the sieve-box below the screen, balls freely supported by said floor and having their tops free of the screen, and ribs disposed upon the floor and dividing the space between the floor and screen into ball-pockets, the surfaces of the ribs being beveled so as to present inclines to the balls as the balls and ribs approach each other, combined substantially as set forth.

7. A sifting machine comprising, a horizontally shakable screen, an interstitial floor disposed below the screen, ball-pockets formed on the floor by means of ribs having inclined sides margining the pockets, and balls supported by the floor with their upper surfaces free of the screen and adapted to be knocked upwardly against the screen when struck by the inclined ribs, combined substantially as set forth.

LOWE E. SIMPSON.

Witnesses:
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CHAS. WEIDNER, Jr.