

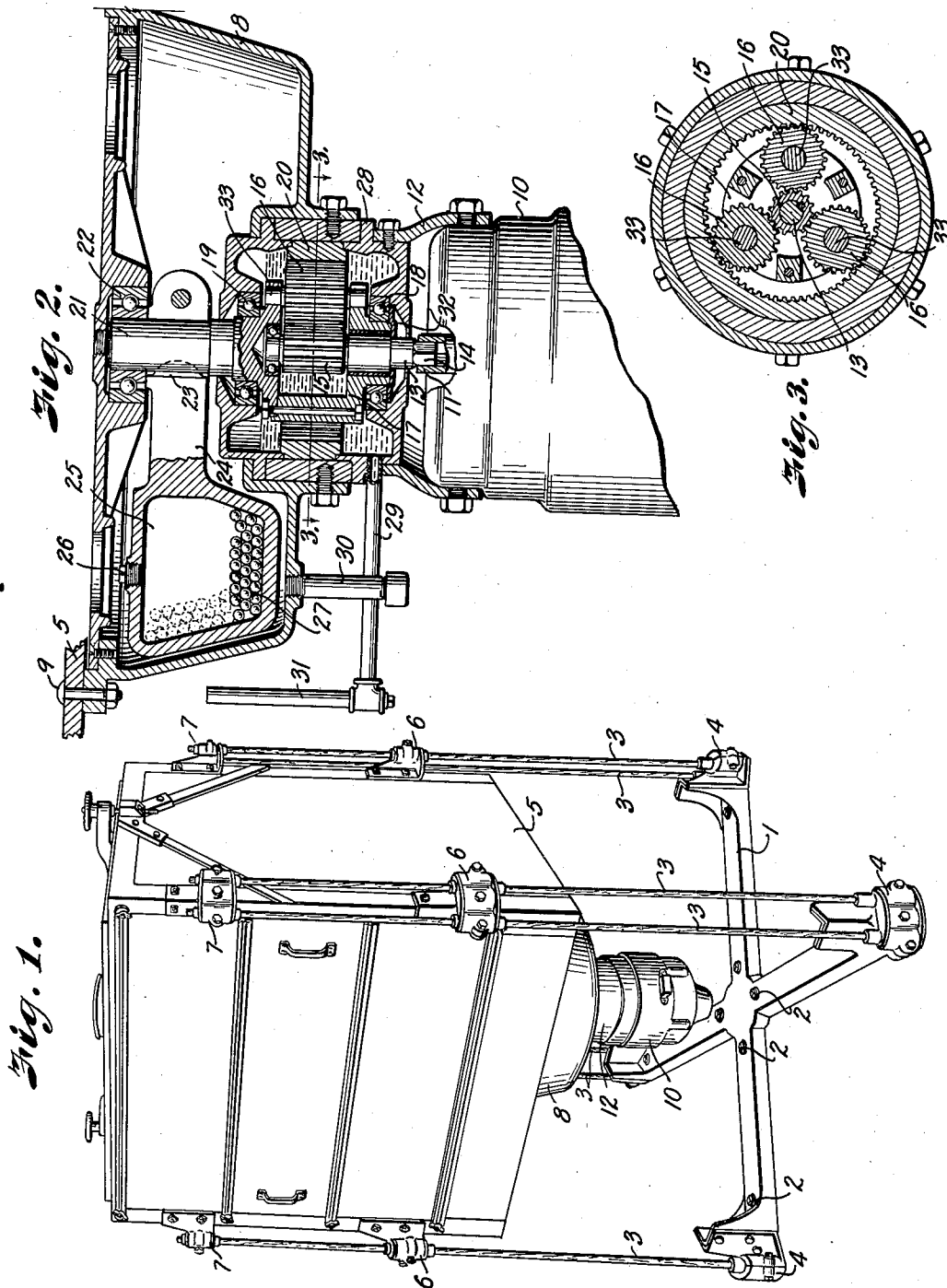
Aug. 27, 1940.

S. H. STOLTZFUS

2,212,818

BOLTER

Original Filed Nov. 20, 1936



INVENTOR
Sylvanus H. Stoltzfus
BY
Thos. E. Hoofield
ATTORNEY

UNITED STATES PATENT OFFICE

2,212,818

BOLTER

Sylvanus H. Stoltzfus, Kansas City, Mo., assignor
to General Mill Equipment Company, Kansas
City, Mo., a corporation of Missouri

Application November 20, 1936, Serial No. 111,903
Renewed May 20, 1939

4 Claims. (Cl. 209—332)

My invention relates to a bolter, and more particularly to a motor driven bolting arrangement for sifting or screening comminuted materials, such as molder's sand, enamelling powder, cement, flour, or the like.

One object of my invention is to provide a bolting arrangement which is entirely self-contained so that it may be set on any available floor space or suspended from the ceiling.

Another object of my invention is to provide a motor driven sifting arrangement in which "bucking" or "wandering" because of belt pull is eliminated.

Another object of my invention is to provide a bolter in which the use of eccentrics and an awkward belt drive is avoided.

Other and further objects of my invention will appear in the following description.

In general, my invention contemplates the provision of any suitable sifting or bolting arrangement mounted upon a flexible support and carrying integral therewith a prime mover and an eccentric weight adapted to impart to the entire assembly a gyratory motion. In the accompanying drawing, which forms a part of the instant specification and which is to be read in conjunction therewith, and in which like reference numerals are used to indicate like parts in the various views;

Fig. 1 is a perspective view of a bolter showing one embodiment of my invention.

Fig. 2 is an enlarged sectional elevation of the drive mechanism of the bolter shown in Fig. 1.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

More particularly, referring now to the drawing, upon any suitable base member 1 which is adapted to be bolted by bolts 2 to the floor or ceiling, I mount vertical reeds 3 by means of support clamps 4. The reeds 3 are made of hickory or any other suitable flexible material, it being understood that I prefer to use wood, since crystallization will thus be avoided and sufficient resiliency is present to provide for the gyratory motion necessary for sifting, bolting or screening. In any suitable housing 5, I provide a bolting or screening arrangement, the particular bolting or screening arrangement does not form part of my invention, and any of the known screening arrangements may be employed. The bolting housing 5 is likewise supported with clamping members 6 and 7 in alignment with clamping members 4, so that the bolting housing 5 is supported by the reeds 3 through clamps 6 and 7. It is to be understood that while I have shown a

pair of reeds 3 at each corner of the bolting housing 5, any desired number of reeds may be employed. Secured to the bolting housing 5 is actuating weight housing 8, which is adapted to be secured to the bolting housing 5 in any suitable manner, as, for example, by means of bolts 9, so that the housing is rigidly supported by bolting housing 5. An electric motor 10 having a drive shaft 11 is rigidly supported from the actuating weight housing in any suitable manner, as, for example, by means of supporting member 12. The drive shaft 11 is directly connected to driven shaft 13 by means of any suitable connecting means, as, for example, a squared end 14. The driven shaft 13 is mounted in suitable bearings, as can readily be seen by reference to Fig. 2, and carries for rotation therewith a pinion 15. Pinion 15 meshes with three planetary gears 16, as can readily be seen by reference to Fig. 3. The planetary gears are mounted upon a rotary spider 17 adapted to rotate in bearings 18 and 19, as can readily be seen by reference to Fig. 2. A stationary ring gear 20 has its teeth in engagement with planetary gears 16. The spider 17 is formed with a shaft 21 extending upwardly therefrom, as can readily be seen by reference to Fig. 2, the upper end of shaft 21 being supported in a bearing 22. Keyed to shaft 21 by means of key 23 is a weight arm 24, the outer end of which is formed with chamber 25. The chamber 25 is provided with an opening normally closed by a plug 26 and is adapted to contain shot 27. The shot is a shiftable weight and can be replaced by mercury or any suitable material adapted to be moved by centrifugal force. The gear assembly just described is surrounded by a housing 28 into which a pipe 29 is adapted to pass. The lower portion of weight housing 8 is provided with a drain pipe 30. Oil for the gearing is adapted to be introduced into housing 28 through stand pipe 31, which communicates with pipe 29. An oil retaining ring 32 is provided on shaft 13.

In operation, when it is desired to sift material previously placed in the bolting housing 5 above the screens thereof, the motor 10 is energized to rotate drive shaft 11 to driven shaft 13 to rotate pinion 15 and its intermeshing planetary gears 16. Gears 16, rotating and meshing with the stationary ring gear 20, will be forced to rotate the spider 17 through the shafts 33 upon which the planetary gears 16 are mounted. The rotation of the spider 17 will rotate the shaft 21, which is integral therewith, and thus cause rotation of the weight arm 24, which is keyed to the shaft 21. The gear ratio is such as to provide the

proper speed for the weight. Since the whole assembly is mounted upon flexible reeds 3, the bolting housing being under the influence of the centrifugal force exerted by the weight arm will commence to gyrate. When the machine is started, the radius of gyration will be small and the gyration will be somewhat out of phase with the weight lagging in phase angle. If the speed of the centrifugal weight is too great, a position of parts will take place in which the centrifugal force is pulling one direction and bolting housing 5 is moving in an opposite direction, causing what is known as "bucking."

This phenomenon will also take place when the machine is shut down for any reason, in that the weight will tend to slow down more quickly than the bolting housing mounted on the flexible reeds. Bucking is reduced by means of the gear ratio and by bringing the motor to speed slowly. As the motor speed is increased, the shot 27 will tend to be thrown out by centrifugal force, so that when the motor is up to speed the shot will assume the position shown by the dotted lines in Fig. 2. In this manner the centrifugal force exerted will vary as an algebraic function of the speed, being greatest at higher speeds, not only due to the speed but also due to an increased effective weight due to the shifting of the shot. It will be seen that during starting and during stopping, reducing the effective weight of the arm, that bucking will be minimized. When the machine is up to speed, the bolting housing will gyrate at the same speed as the weight. Due to the fact that no belts are used, there will be no wandering, that is, a tendency to "change phase" due to belt fault. Any oil which is thrown out of the gearing housing into the weight housing 3 will drain into the drain pipe 30, which acts as a sump, and can be removed therefrom periodically.

It will be observed that I have accomplished the object of my invention. I have provided a bolting arrangement provided with a direct motor drive, mounted in a compact frame for imparting a gyratory motion to a bolting arrangement containing any suitable series of sieves or the like. Bucking or wandering because of belt pull is avoided. The bolter may be suspended from the ceiling or mounted upon the floor in a simple and expeditious manner; for example, in order to mount the bolter shown in Fig. 1 from the ceiling, all that is necessary is to secure the base No. 1 to the ceiling, loosen clamps 6 and 7 and reverse the bolter and clamp it in suspended position by means of clamps 6 and 7. The bolter will describe a perfect circle without influence from driving belts and restraining devices. If desired, a restraining device may be easily fitted by using the housing 8 and surrounding it with any suitable restraining device to insure that the bolter will remain within a predetermined radius

of gyration in the event the device is placed close to the other bolters or machinery.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. In a bolter, a base member, reeds secured to said base member, a bolter housing supported by said reeds, a second housing supported by said bolter housing, an electric motor supported from said second housing, reduction gearing drivingly connected with said electric motor, a shaft driven by said reduction gearing, said shaft being positioned within said second housing, an arm secured to said shaft, and a weight carried by said arm, said second housing and said motor having their axes in alignment with the axis of said bolter housing.

2. In a bolter as in claim 1 wherein said weight is provided with a shiftable mass.

3. In a bolter, a base member, reeds secured to said base member, a bolter housing supported by said reeds, a second housing supported by said bolter housing, an electric motor supported from said second housing, reduction gearing drivingly connected with said electric motor, a shaft driven by said reduction gearing, said shaft being positioned within said second housing, an arm secured to said shaft, a weight carried by said arm, said second housing and said motor having their axes in alignment with the axis of said bolter housing, said weight comprising a hollow member and shiftable weight means within said hollow member.

4. In a bolter, a base member, reeds secured to said base member, a bolter housing supported by said reeds, a second housing supported by said bolter housing, an electric motor supported from said second housing, reduction gearing drivingly connected with said electric motor, a shaft driven by said reduction gearing, said shaft being positioned within said second housing, an arm secured to said shaft, a weight carried by said arm, said second housing and said motor having their axes in alignment with the axis of said bolter housing, said reduction gearing comprising a stationary ring gear, a spider, planetary gears carried by said spider and engaging said ring gear, and a pinion driven by said motor engaging said planetary gears.

SYLVANUS H. STOLTZFUS.