

(No Model.)

6 Sheets—Sheet 1.

J. WEYERMANN.
SHAKING BOLT.

No. 584,436.

Patented June 15, 1897.
Fig. 1.

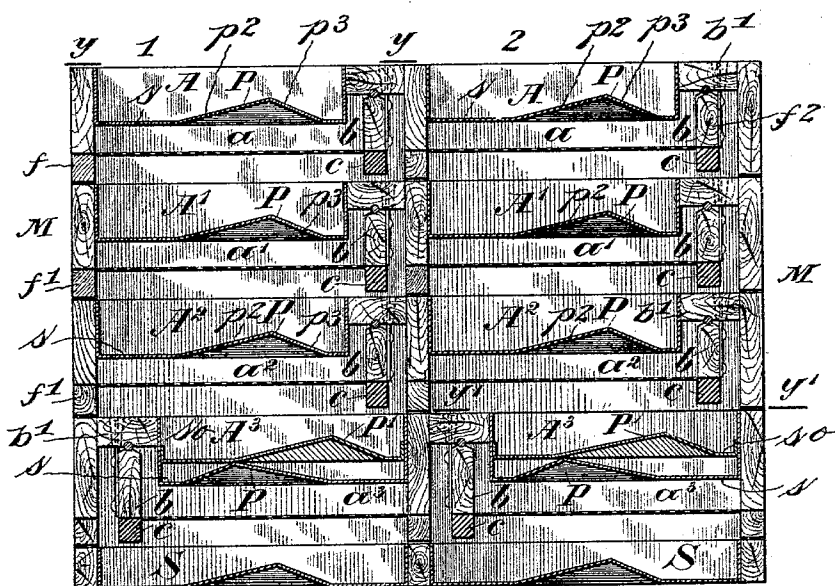
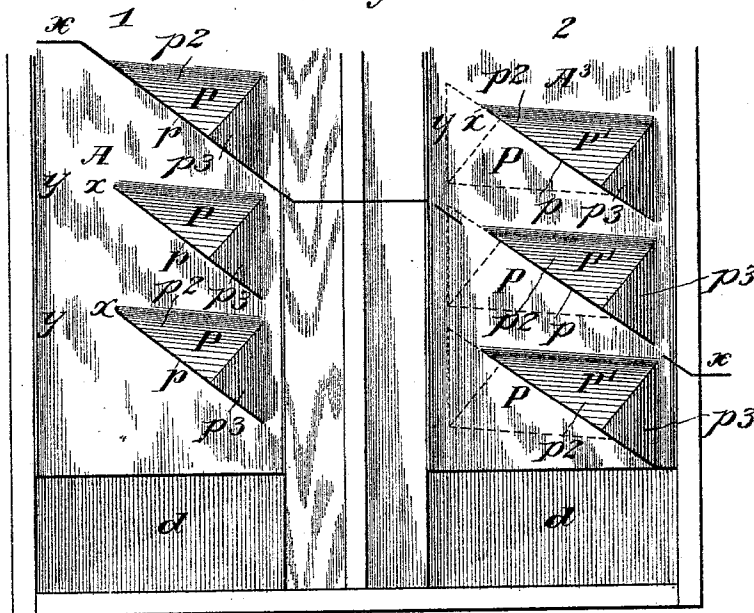


Fig. 2.



Witnesses:

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Inventor:

Jacob Weyermann.

By *Henry Orth*

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Fig. 6.

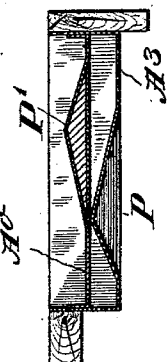


Fig. 5.

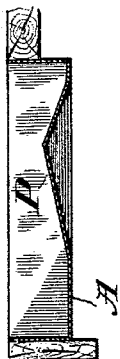
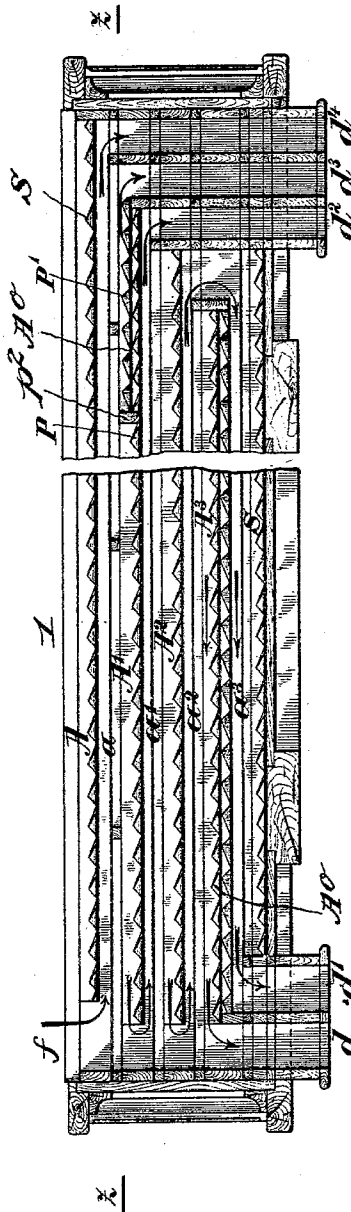


Fig. 3.



Witnesses:

B. S. Ober

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(No Model.)

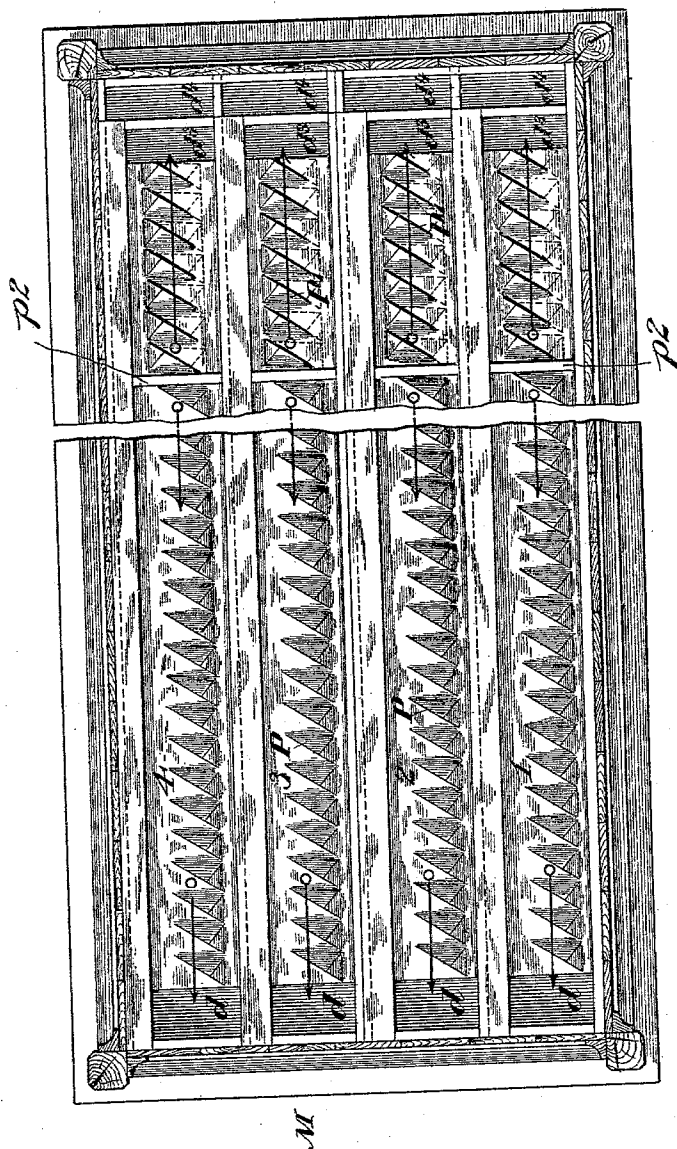
6 Sheets—Sheet 3.

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No. 584,436.

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Fig. 4.



Witnesses:

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Henry O. H.

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By *Henry O. H.*

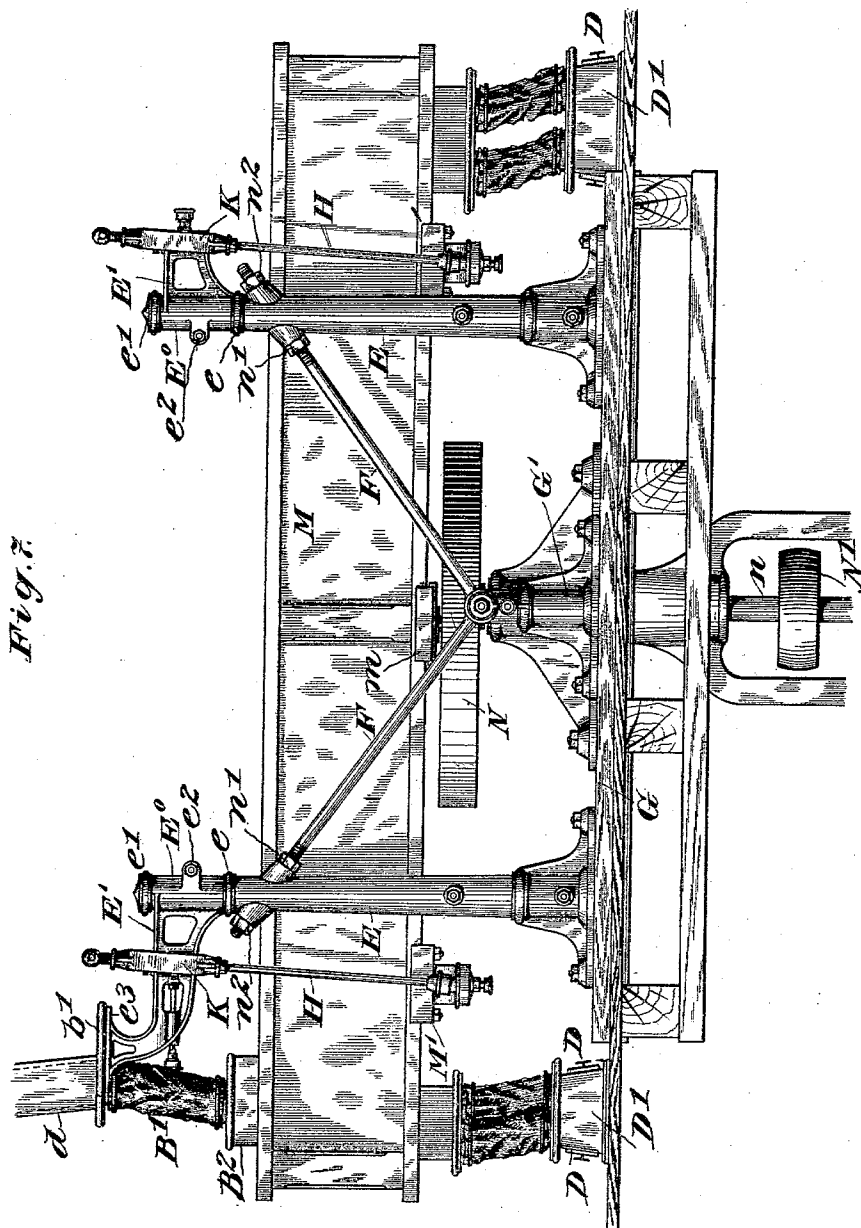
(No Model.)

J. WEYERMANN.
SHAKING BOLT.

6 Sheets—Sheet 4.

No. 584,436.

Patented June 15, 1897.



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Inventor:

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By *Henry Orth*
att'y.

(No Model.)

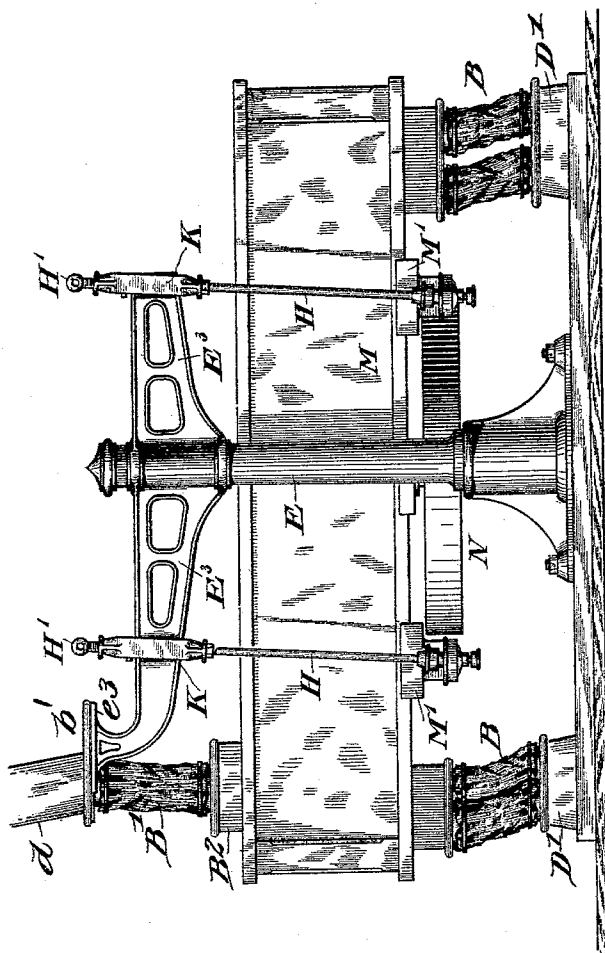
6 Sheets—Sheet 6.

J. WEYERMANN.
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No. 584,436.

Patented June 15, 1897.

Fig. 9.



Witnesses:

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UNITED STATES PATENT OFFICE.

JACOB WEYERMANN, OF BARCELONA, SPAIN.

SHAKING-BOLT.

SPECIFICATION forming part of Letters Patent No. 584,436, dated June 15, 1897.

Application filed March 13, 1896. Serial No. 583,105. (No model.) Patented in Spain April 10, 1894, No. 15,689; in France July 16, 1894, No. 239,994, and in Switzerland October 5, 1894, No. 9,414.

To all whom it may concern:

Be it known that I, JACOB WEYERMANN, a citizen of the Republic of Switzerland, and a resident of Barcelona, in the Kingdom of Spain, actually at Zürich, in the Republic of Switzerland, have invented certain new and useful Improvements in Sifting-Machines, (for which I have obtained patents in France, No. 239,994, dated July 16, 1894; in Spain, No. 15,689, dated April 10, 1894, and in Switzerland, No. 9,414, dated October 5, 1894,) of which the following is a specification.

My invention has relation to flour-bolts, and more particularly to bolts in which the material is kept in motion or alive by imparting to the bolt a circular or gyrating motion in a horizontal plane.

The invention consists in means for suspending the bolt from its supports, whereby a uniform and regular gyrating motion can be imparted to such bolt and the detrimental irregular vibrating, shaking, or jarring movements due to centrifugal action and inherent to this class of machines are reduced to a minimum, if not altogether avoided.

The invention further consists in the means for forwarding or moving the material through the machine, in the means for preventing the meshes of the bolt-cloth from choking up, and in structural features, as will now be described in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical transverse section through the bolt-casing, taken on the irregular line xx of Fig. 2, which latter is a fragmentary plan view of the bolt-casing. Fig. 3 is a longitudinal vertical section through one of the compartments or divisions of the bolt-casing. Fig. 4 is a horizontal section taken on the line zz of Fig. 3. Figs. 5 and 6 are transverse sections of the collecting and forwarding plates or boards. Fig. 7 is a side elevation, and Fig. 8 an end elevation, of a bolt such as shown in Figs. 3 and 4. Fig. 9 is a side elevation of a smaller bolt, and Figs. 10 and 11 are sectional detail views.

Referring to Figs. 7 to 11, M indicates the bolt-casing, having on its under side a cross-girth m , midway of its length, that is provided with a socket-bearing for a wrist-pin projecting from a crank-disk N, that is secured to a

vertical shaft N', carrying also a belt-pulley n' , whereby a circular or gyrating motion can be imparted to said casing. The shaft N' has its bearings in a suitable tubular standard 55 secured to a bed-plate G, to which are also secured the standards E, from which the bolt-casing M is suspended, said standards being arranged on opposite sides of said casing and are tied and braced together in pairs by 60 means of cross-braces E^2 and by means of tie-rods F. The lower or inner ends of the tie-rods F are pivotally connected with a standard G', while the upper or outer screw-threaded ends of said rods extend through their respective 65 standards E and are tied thereto by means of nuts n^2 and n' , whereby the rigidity of the supports for the bolt-casing M is insured.

Each standard E has a bracket-arm E' on 70 a split or clamping sleeve E^0 , fitted on a cylindrical portion of said standards between a circular flange e and a flanged cap-nut e' , said sleeves being provided with lugs or ears for the clamping-bolts e^2 , whereby the position 75 of the bracket-arms from which the bolt-casing is suspended relatively to said casing may be varied within certain limits, and therethrough the circular or gyrating motion of said casing. 80

When a short bolt-casing is employed, two standards E will suffice for supporting the same, as shown in Fig. 9, the supporting or bracket arms E^3 in this case being made 85 slightly longer.

The arms E' , Figs. 7 and 8, or E^3 , Fig. 9, projecting toward the feed end of the machine, are extended and constructed with a console e^3 , to which is secured the board b' , attached to the discharge end of the feed 90 ducts or spouts d , to which the material to be bolted is supplied, the outlet to said ducts being connected by flexible hose B' to the feed-box B² at the feed end of the machine. The bracket-arms E' have a socket-bearing 95 e^4 for a bearing-block h' , in which is formed a hemispherical socket for a sphere or ball h at the end of a suspension-spindle H', a two-part block h^0 , having a like socket or bearing, being arranged above the ball h and forming 100 with the lower block h' a spherical bearing for said ball, the parts being thus connected

by a ball-and-socket or universal joint, said bearing-blocks h' h^6 being held in proper position by a flanged nut h^3 , screwed into the aforesaid socket-bearing e^4 .

- 5 The spindle H' screws into the bridge k of a strap K , into which the upper end of the hanger-rod H is screwed, so that said rods and the bolt-casing supported therefrom can be adjusted vertically within certain limits, which is of importance in that the horizon-
10 tality of the bolt-casing relatively to the driving-crank can thus be readily maintained and a binding of the latter in its bearings in the cross-girth m avoided. At their lower ends
15 the hanger-rods H are provided with a hemispherical head h^0 , that fits a corresponding socket h^2 in the under side of bracket-arms M' , secured to and projecting from the under side of the bolt-casing M , thus also forming
20 a universal or ball-and-socket joint between said bolt-casing and its hanger-rods. The bearings for the lower end of the hanger-rods are protected against dust or other foreign matter by means of a nut h^4 , screwing into
25 the bracket-bearing, and by means of a cap h^5 , fitting onto said bearing, the construction described being clearly shown in Figs. 10 and 11.

- By means of the described connections the
30 detrimental irregular movements of the bolt-casing M , due to centrifugal action in this class of machines and hereinbefore referred to, are reduced to a minimum, if not altogether avoided.

- 35 The arrangement of the means for forwarding the material through and delivering the same from the machine and their arrangement relatively to the bolt cloths or screens will of course depend upon the intended capacity of the machine and upon the grading
40 or division of the material—i. e., upon the number of bolting-cloths of varying fineness of mesh over which the material is passed.

- Inasmuch as my invention is applicable to
45 separating or screening machines generally, the number of cloths or screens used in the machine will depend upon the nature of the material treated and upon the extent of its subdivision or grading, and although I have
50 illustrated my invention in its application to flour-bolts I do not desire to limit myself thereto.

- In Figs. 1 and 2 I have illustrated a flour-bolt in which the casing M is divided longitudinally into two separate or independent
55 bolting-compartments 1 and 2, each containing four bolt cloths or screens, while in Figs. 3 and 4 I have shown the bolt-casing divided longitudinally into four separate or independent bolts 1, 2, 3, and 4, each provided
60 with four superposed bolt cloths or screens, (indicated in Figs. 1 and 3 by the symbols a a' a^2 a^3 , respectively.) It will of course be understood that the bolting cloths or screens
65 are of different degrees of fineness—that the upper cloth a has the coarsest or most open mesh and the cloth a^3 the finest. It will also

be understood that in one or more or all of said cloths or screens the degree of fineness of the mesh may vary from the feed to the delivery end of the cloth or screen, as is commonly the case, the variations in the mesh of a single cloth or in the mesh of the different cloths depending upon the degree of subdivision of the material.

In the case under consideration, if it be assumed that the mesh throughout each bolting-cloth is uniform and that said mesh increases in fineness in the successive cloths from the upper to the lower four delivery-spouts would be required for each bolting-compartment in the machine shown in Figs. 1 to 4. It may, however, be desirable, especially in bolting-machines, to obtain the coarse and fine middlings separately, in which case the upper cloth a may for the greater part of its length have a mesh too fine to admit of the passage of the coarser middlings, while for a portion of its length at the tail end the mesh may be sufficiently open to admit of the passage of such coarse middlings, but of course not sufficiently open to let the bran pass through. In this case a fifth delivery-spout is necessary, and such an arrangement is shown in Figs. 3 and 4, although I have deemed it unnecessary to show the varying mesh in the said upper cloth.

The feed-spout d receives the coarser flour that passes through the cloths a , a' , and a^2 , the spout d' the finer flour that passes through the aforesaid cloths, d^2 the fine middlings passing over cloth a' , d^3 the coarser middlings passing through the tail end of screen a , and d^4 the tailings from said screen a , while the finest flour or dust passing through screen a^3 collects on the collecting-floor S , from which it is discharged through a suitable spout. (Not shown.)

The means for forwarding the material through the machine are more clearly shown in Figs. 1, 2, 4, 5, and 6. Above the upper cloth a , below the lower cloth a^3 , and between the cloths a' and a^2 a^3 are arranged what I may term "collecting and forwarding" or "propelling" plates or boards A , A' , A^2 , A^3 , and S , respectively. They are, with the exception hereinafter referred to, similar in construction, in that they are provided with hollow pyramidal projections P , preferably three-sided, projecting from their upper faces and integral with or secured to the plates or boards which are preferably made of sheet metal and secured rigidly to the bolt-casing M . Two of the sides p^2 and p^3 of the pyramidal projections P are comparatively flat—that is to say, they rise gradually from the plate, while the third and wider side p is substantially perpendicular to said plate. These projections P are arranged at suitable distances apart along one side or edge of the plate, so that the substantially vertical side p will lie at an angle to the longitudinal plane of such plate in the direction in which the material is to be moved and so as to

leave a sufficient space between the angle x and the opposite edge y of the plate.

It is obvious that if provision is made to impart to the cloth or screen below a plate constructed as described a motion by which said material is thrown up against the inner face of the substantially vertical side p of the hollow pyramids and at the same time a movement whereby the material is moved alternately from one side of the plate to the other, as is the case when the screen receives a gyrating motion, the material will be caused to move in a zigzag path from one end to the other of a cloth or screen below such plate. It is obvious that if the upward movement of the material is so timed relatively to the gyrating movements of the plate and screen as to take place when said material is caused to move toward the edge y of the plate the oblique face of the pyramid will direct the movement in an oblique or forward direction, so that at each gyration of the plate and cloth or screen the material on the latter is thrown forward a distance substantially equal to that between the apices x of the acute angles formed by the sides p and p^2 of two pyramids, thereby effecting not only a very rapid movement of the material from one end of the cloth or screen to the other, but said material is constantly kept scattered or alive during its passage over such cloth or screen, thereby materially expediting the bolting or screening and at the same time avoiding the choking up or clogging of the meshes of the cloth or screen. There is, however, another very important advantage derived from the described construction of collecting and forwarding plates, in that the same plate also serves to move the material that passes through a cloth or screen above such plate to a cloth or screen below the same, the material on the plate moving, of course, in an opposite direction to the motion of the material on the cloth or screen above and below such plate, as indicated by arrows in Fig. 3. Although the material, under the gyrating or centrifugal action of the machine, is not only thrown or caused to move alternately from one side to the other on the cloths or screens and on the collecting-plates, but also upwardly to some extent, whereby such material is moved along said plates and the cloths or screens as described, yet this movement would be a comparatively slow one unless the screens and plates were arranged in close proximity to each other, or unless a violent gyrating movement were imparted to the bolt, which is not desirable. This can be avoided by reversing the position of the pyramidal projections P , so as to project from the under side of the plates to or close to the material, as will be readily understood, in which case said projections need not be hollow. I prefer, however, to impart to the material on the cloths successive upward movements, so timed relatively to the movements of the material from side to side of said cloths

as to take place when said material is moving along the side p of the projections P toward the space $x y$, whereby the material so thrown up is brought into contact with the inner face of the side p of said projections P and caused to be more rapidly forwarded in the direction of the length of the cloth or screen, thereby also keeping the material more thoroughly scattered or alive on such cloth or screen for the purpose of expediting the operation of bolting or screening. This upward movement of the material has heretofore been generally produced by imparting to the cloth or screen a vibratory movement independent of its gyrating or to-and-fro movement by means of abutments in the path of such cloth or screen or by means of knockers. These means are, however, undesirable, chiefly because insufficient to prevent the choking up of the meshes of the cloth or screen, requiring additional means, as brushes, for the purpose, which are also undesirable on account of the rapid wear of the cloths or screens. This I effectually avoid and at the same time am enabled to keep the meshes of the cloths or screens free or unobstructed by securing the cloths or screens rigidly along one side only and by securing the other side to a pendulous bar b , weighted by a bar c , said pendulous bar being hinged to a longitudinal girth b' , Fig. 1. It will readily be seen that during the gyrating motion of the bolt the bar b will swing alternately from one side toward the other of the bolt-case M , thereby alternately slackening and stretching the cloth or screen a , the material being more or less violently thrown up and the cloth or screen more or less violently shaken during the stretching movement—that is to say, during the movement of the weighted bar $b c$ from the fixed side of the cloth or screen, thereby shaking out such material as is held fast in the meshes.

In order to avoid the location of all of the discharge-spouts at one end of the machine, it becomes necessary to provide means whereby the material passing through one cloth or screen a and collecting upon one of the gathering and forwarding plates A and the material on the cloth or screen immediately below such plate be moved in the same direction. To effect this, I arrange above a plate A an additional plate A^0 , which may have solid pyramidal projections P' , if desired, as shown in Fig. 6, and also in Fig. 3, where two such plates $A^0 A^3$ are arranged between the cloths or screens a^2 and a^3 . Of course the position of the hollow projections P on the plate A^3 will be reversed relatively to the positions of the projections P' on plate A^0 , in order to cause the material on said plate A^0 and on the cloth or screen A^3 below to move in the same direction, as shown in Fig. 6 and in dotted lines in Figs. 2 and 4.

The same arrangement will be necessary when a cloth or screen has a variable mesh and when a portion of the material passing

through a section of such cloth or screen is to be separately discharged, as shown on the right-hand end of Figs. 3 and 4, where the space between the screen a' and the plate A' is partitioned off by a cross-partition p^2 and an additional plate A^0 is arranged above the plate A' at its right-hand end, so that the material passing through the cloth or screen to the right of said partition p^2 will be directed by the projections P' on plate A^0 into delivery-spout d^3 , while the material passing through the cloth a' to the left of the partition will be directed to the left end of the machine and delivered from plate A' to the screen a' below it and caused to move toward the right on said screen to the discharge-spout d^2 .

By means of the construction and arrangement of collecting and forwarding plates and cloths or screens much greater quantities of material can be effectually treated within a given time than is the case with any bolting, screening, or separating machine now in use, so far as known to me, while there is comparatively little wear of parts owing to the absence of detrimental irregular movements of the bolt itself, due to centrifugal action, to the absence of the usual knockers or other appliances for imparting to the screen that peculiar shaking or vibrating motion, and to the absence of clearing-brushes.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with the bracket-arm E' of standard E provided with a socket h' , the socketed blocks $h' h^6$, and the confining-nut h^3 of the hanger-rod H provided at one end with a strap K and the spindle H' screwing into the bridge k of said strap, said spindle provided with a ball-bearing fitting the sockets in the blocks $h' h^6$, substantially as and for the purpose set forth.

2. The combination with the casing M , the bracket-arm M' provided in the under side of its outer end with a socket-bearing, and the confining-nut h^4 and protecting-cap h^5 , of the hanger-rod H provided with a ball-bearing at its end fitting the socket-bearing in the bracket-arm, for the purpose set forth.

3. The combination with the casing M and the standards E from which said casing is suspended, of the cross-braces E^2 , the adjustable tie-rods F , and the standards G' to which one end of said tie-rods is connected, substantially as and for the purpose set forth.

4. In a gyrating bolting or screening machine, a forwarding-plate provided with pyramidal projections of unequal sides on its upper face, one of said sides extending partly across the plate in oblique direction, whereby the direction of motion of the material on such plate due to the gyrating or centrifugal forces is changed into successive movements in the direction of the length of the plate, for the purpose set forth.

5. In a gyrating bolting or screening ma-

chine, a forwarding-plate provided with pyramidal projections of unequal sides on its upper face, the longer side being substantially perpendicular and extending partly across such plate in an oblique direction, whereby the direction of motion of the material on the plate, due to the gyrating or centrifugal forces, is changed into successive movements lengthwise of said plate, for the purpose set forth.

6. In a gyrating bolting or screening machine, the combination with a cloth or screen, of a forwarding-plate above such cloth provided with hollow projections forming pockets on its under side, one of the walls of which extends partly across the plate in an oblique direction, whereby the direction of motion of the material on the plate and on the cloth or screen due to the gyrating or centrifugal forces is changed into successive movements lengthwise of but in opposite directions over said cloth or screen and plate, respectively, for the purpose set forth.

7. In a gyrating bolting or screening machine, the combination with a cloth or screen, of a forwarding-plate provided with hollow pyramidal projections of unequal sides whose longer sides are substantially perpendicular to and extend partly across the plate in an oblique direction, whereby the direction of motion of the material on the cloth or screen and on the plate, due to the gyrating or centrifugal forces is changed into successive movements lengthwise of but in opposite directions over said cloth or screen and plate, respectively, substantially as set forth.

8. In a gyrating bolting or screening machine, the combination with a cloth or screen, of a plate above the same provided with hollow pyramidal projections on its upper face, one side of said projections extending partly across the plate in an oblique direction, whereby the direction of motion of the material on the plate and cloth or screen due to the gyrating or centrifugal forces is changed into successive movements in the direction of the length of said plate and cloth or screen respectively, for the purpose set forth.

9. In a gyrating bolting or screening machine, the combination with a cloth or screen of two superposed forwarding-plates each provided with hollow pyramidal projections one side of which extends partly and obliquely across the respective plates in opposite directions whereby the movement of the material on the upper plate and on the cloth or screen due to the gyrating or centrifugal forces is changed into successive movements lengthwise of said upper plate and cloth or screen in the same direction, for the purpose set forth.

10. In a gyrating bolting or screening machine, a cloth or screen fixedly secured along one side and a pendulous bar to which the opposite side of such cloth or screen is secured for the purposes set forth.

11. In a gyrating bolting or screening machine, the combination with a cloth or screen

adapted to be alternately slackened and stretched by the gyrating or centrifugal forces, of a plate above such cloth or screen provided with projections extending partly
5 across the same in an oblique direction, whereby the movements of the material due to such gyrating or centrifugal forces and to the alternate slackening and stretching of the cloth or screen are changed to successive
10 movements in the direction of the length of such cloth or screen, for the purpose set forth.

12. In a gyrating bolting or screening machine, the combination with a cloth or screen, of two plates arranged respectively above and
15 below such cloth or screen, said plates provided with hollow pyramidal projections projecting from their upper faces, one side of said projections extending partly across the plates in an oblique direction, for the purpose
20 set forth.

13. In a gyrating bolting or screening machine, the combination with a cloth or screen, of a plate arranged above, and two superposed plates arranged below the same, said plates
25 provided with pyramidal projections projecting from their upper faces, one side of said

projections extending partly across their respective plates in an oblique direction, the position of the projections on the two lower plates being reversed so that the oblique sides
30 will extend in opposite directions across their respective plates, for the purpose set forth.

14. In a gyrating bolting or screening machine, the combination with a plurality of superposed cloths or screens adapted to be
35 alternately slackened and stretched by the gyrating or centrifugal forces, of plates arranged above and below the upper and lower cloth or screen and between the intermediate
40 cloths or screens, said plates provided with hollow pyramidal projections projecting from their upper faces, one side of said projections extending partly across their respective plates in an oblique direction, substantially as and
45 for the purpose set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 20th day of November, 1895.

JACOB WEYERMANN.

Witnesses:

H. LABHARD,
MONTZ VEITH.