

No. 731,438.

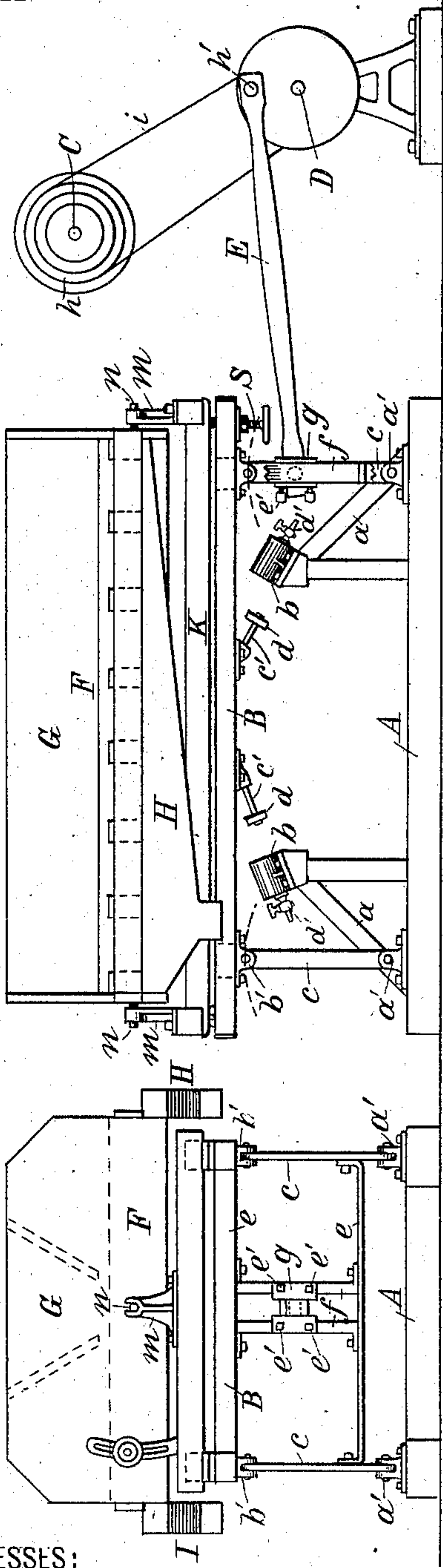
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D. S. DECKER.
MACHINE FOR SEPARATING ORES, &c.

APPLICATION FILED APR. 3, 1902.

NO MODEL.

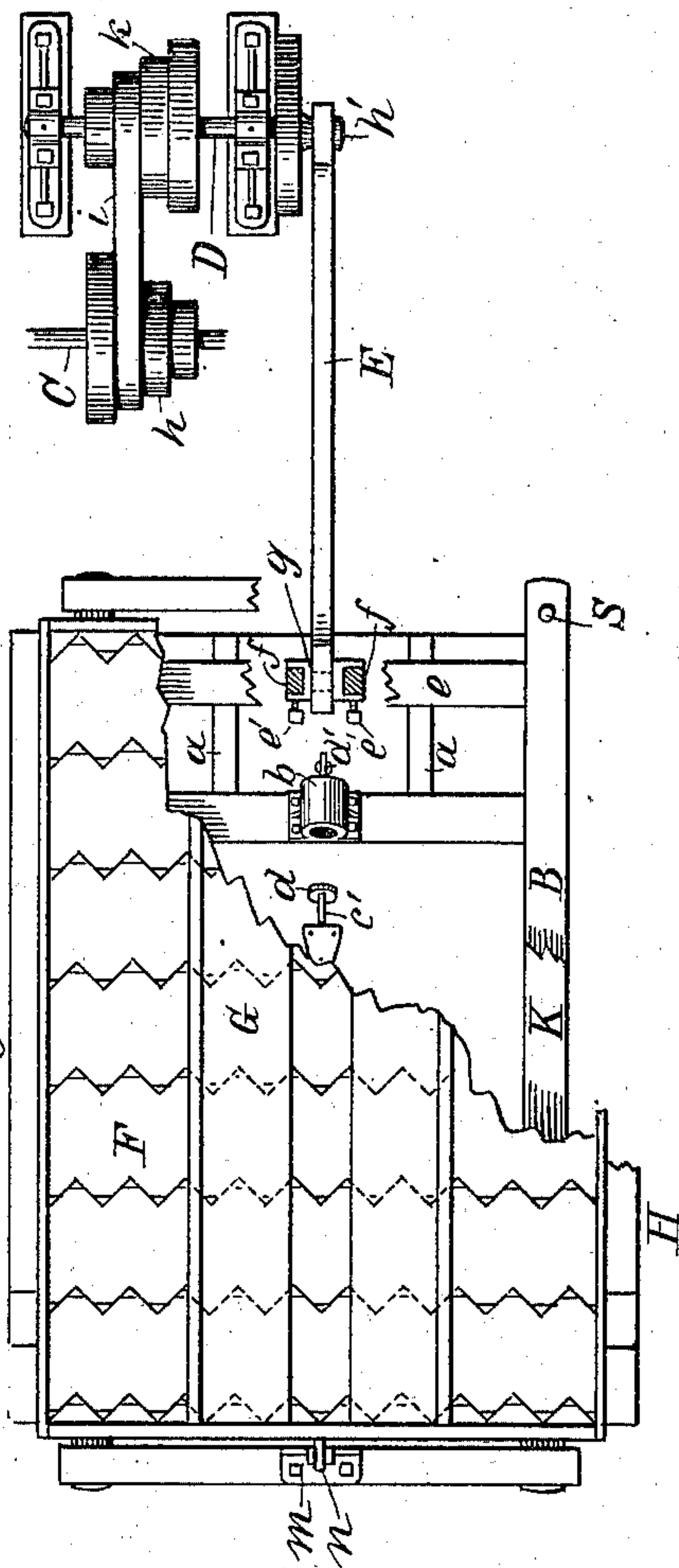
Fig. 2.



WITNESSES:

Elliot Danforth
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Fig. 3. I



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MACHINE FOR SEPARATING ORES, &c.

SPECIFICATION forming part of Letters Patent No. 731,438, dated June 23, 1903.

Application filed April 3, 1902. Serial No. 101,145. (No model.)

To all whom it may concern:

Be it known that I, DANIEL S. DECKER, a citizen of the United States, residing in the borough of Manhattan, in the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Machines for Separating Ores, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an end elevation and partial transverse sectional view of a machine made according to my invention. Fig. 2 is a side elevation and partial longitudinal sectional view thereof. Fig. 3 is a plan view and partial horizontal sectional view thereof.

This invention is primarily designed for separating the several constituents of granular or pulverized ores, but may also be used for separating mixed grains and the like. It relates to that class of such machinery in which the separation is effected by a substantially to-and-fro movement of an oscillating separator-bed provided with adjuncts of such character as to cause the heavier particles to descend by gravity to a suitable receptacle, while the lighter particles are impelled in a contrary direction to another receptacle, the constituents of different gravities being thus segregated one from another.

My invention comprises certain new and useful combinations of parts whereby jar or concussion at the end of each shake or oscillation of the separator-bed is softened to facilitate the smooth working of the apparatus, also whereby the said bed may be adjusted to any angle required by the exigencies of any particular occasion of its use, and also whereby the rapidity and the length of the oscillations of the separator-bed may be changed or adjusted to meet the requirements of different materials, so that one and the same machine may be used for separating into their component parts granular or pulverulent materials of widely-different kinds.

A is a base or frame which supports the working parts of the apparatus and which may be of any suitable construction. As shown in the drawings, it has standing brackets *a*, which support pneumatic dash-pots *b*,

the purposes of which latter are hereinafter set forth.

B is a horizontal platform which is supported from the frame A by swinging standards *c*, which at their lower ends are pivotally connected to the frame A and at their upper ends pivotally connected to the platform, as shown at *a'* and *b'*, respectively. Upon the under side of the platform are provided pistons *d*, of which the rods are shown at *c* in Figs. 2 and 3. The platform, supported upon the swinging standards, as described, is capable of an oscillating or to-and-fro motion. Toward the end of an oscillation of the platform in one direction the foremost piston *d* enters the adjacent dash-pot *b* and is of course cushioned upon the air contained therein as the platform, and consequently the piston, approaches and attains the limit of its movement in that direction. In the reverse movement or oscillation of the platform the other piston *d* comes into play in connection with the other of the dash-pots with a corresponding result. By this means any sudden jerking or jarring of the platform and of parts carried thereby when the oscillations reach their limits in opposite directions are avoided. In order that this cushioning effect may be modified or adjusted to due relation with any given length or speed of the oscillating movement of the platform and the parts carried by the latter, each dash-pot has an adjustable outlet-opening at its closed back, the said opening being provided with means for changing its discharge capacity. As shown in Fig. 2, this device may comprise a cock or faucet *d'*, so arranged that by turning the same the outflow of air from the dash-pot may be facilitated or retarded, as the case may be, the resistance of the air in the dash-pot varying from that of air entirely inclosed and compressed in advance of the piston to a minimum resistance when a considerable portion of the air is allowed to flow out, and thus to a considerable degree escape compression. Thus by means of these pneumatic dash-pots and their pistons a smooth non-jarring character is given to the oscillations of the platform and the parts which are carried by said platform.

The swinging motion of the standards *c* and the consequent oscillating motion of the

platform B is produced by means of horizontal cross-bars *e*, which, as shown in Fig. 1, connect the standards *c* at one end of the machine. From one to the other of these cross-bars *e* extends a vertical guide *f*, in which is placed an adjustable block *g*, the grooved edges of which fit over the suitably-shaped edges of guide *f* and are provided with set-screws *e'*, by which the block may be tightened in place at any desired place in the length of the guide, and thus fixed at any position to which the block may be adjusted in the guide.

C is a driving-shaft which has fast upon it the one half, *h*, of a system of cone-pulleys, which connect by a suitable belt *i* with the other or opposite half, *k*, of said system, this part *k* of the cone-pulley system being fast upon a counter-shaft D, which carries a crank *h'*. Shown at E is a connecting-rod, one end of which is attached to the crank *h'*, while its opposite end is pivoted to the block *g*, so that the rotation of the crank actuates the adjacent standards to rock or oscillate the platform and parts carried thereby, as described.

The platform B serves to sustain and to transmit motion to the separator-bed F, with which it is connected, as presently explained. The separator-bed, so far as concerns the separating devices carried by and upon it, may be of any construction, usual or approved, in the class of separating apparatuses to which my invention relates—as, for example, the shaking-bed shown in United States Letters Patent No. 559,815, dated May 12, 1896, or the shaking device shown in United States Letters Patent No. 483,286, dated September 27, 1892, or other suitable shaking or separating mechanism, of which many are known in the art—my said invention relating not to the separating devices *per se*, but to means for more advantageously adjusting and operating them. It may also have above it the usual hopper G for supplying thereto the material to be treated and along its sides the receiving-chutes H and I, one for receiving the heavier constituents of the materials treated as the same fall from the depressed edge of the separator-bed and the other for receiving the lighter constituents when the latter by the operation of the separating devices on the bed are thrown over the elevated edge of the said bed in a manner well known in the art. The angle to the horizontal of the separator-bed should be varied to meet the conditions imposed in the treatment of different materials. To provide for this, I interpose between the platform B and the separator-bed F a framework K, which has bearings *m*, that receive trunnions *n*, which project from the ends of the separator-bed, so that the latter may be tilted to bring one of its lateral edges lower than the other, thereby bringing the separator-bed transversely to an angle to the horizontal. To provide for the adjustment of the framework K, and consequently for the bed F, with one of its ends higher than the other, the plat-

form B is provided with screws S underneath said end portion of the framework, as shown in Fig. 2, so that the end of the framework may be raised or lowered by manipulating said screws. The separator-bed is capable, therefore, of adjustment approximately as upon a universal joint to any angle required or preferred in the operation of the machine.

By adjusting the block *g* higher or lower in the guide *f* the length of the oscillations of the platform, and therefore of the bed F, may be diminished or increased, as the case may be, and by changing the speed of the counter-shaft D by shifting the belt on the system of cone-pulleys the number of oscillations in a given time may be varied at will. By suitably adjusting the pneumatic dash-pots any desired degree of cushioning, as hereinbefore explained, may be secured. To the part *k* is provided a slotted sector *m'*, and to the end of the separator-bed is provided a threaded pin *n'*, which projects through the slot in said sector and has at its outer end a nut *s'*, which when the separator-bed is adjusted upon its trunnions *n* is tightened to retain the separator-bed in the desired position. Each of these working parts being thus adjustable for joint operation with regard to each of the others, the machine is fitted for use in the separation into their constituent parts of many and various granular or pulverized or pulverulent materials of widely-different kinds and characters, it being only essential that in any given case there shall be a substantial difference in the specific gravities of the separable constituents of the materials operated upon.

What I claim as my invention is—

1. The combination, in a separator of the class mentioned, with a supporting-frame and an oscillating platform arranged over said frame and constructed to carry separating devices, of pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform and the parts carried thereby, as set forth.

2. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and provided with separating devices, swinging standards for supporting the platform and permitting its oscillation, and means for giving an oscillating motion to the platform, of pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform, and the parts carried thereby upon the standards, as set forth.

3. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame, and swinging standards for supporting the platform and permitting its oscillation, of a trunnioned separator-bed carried by the platform, a framework interposed between the platform and the separator-bed and having bearings for receiving the trunnions of the separator-bed, means for changing the angle

to the horizontal of said framework, and pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform and the parts carried thereby, as set forth.

4. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame, and swinging standards for supporting the platform and permitting its oscillation, of a trunnioned separator-bed carried by the platform, a framework interposed between the platform and the separator-bed and having bearings for receiving the trunnions of the separator-bed, vertical screws provided to the platform and arranged for changing the angle to the horizontal of said framework, and dash-pots and their pistons arranged to cushion the oscillations of the platform and the parts carried thereby, as set forth.

5. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said platform and constructed to carry separating devices, of pistons arranged to cooperate with pneumatic dash-pots constructed with adjustable air-outlets for cushioning the oscillations of the platform and the parts carried thereby, as set forth.

6. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and constructed to carry separating devices, of pistons provided to cooperate with pneumatic dash-pots constructed with adjustable air-outlets and arranged to cushion the oscillations of the platform and parts carried thereby, and mechanism for adjusting the length of the oscillations of the platform and parts carried thereby, as set forth.

7. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and constructed to carry separating devices, and swinging standards which support the platform above the frame, of a vertical guide provided to said standards a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block, and pneumatic dash-pots and their pistons arranged to cushion the oscillations produced by the operation of the crank, as set forth.

8. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and constructed to carry separating devices, and swinging standards which support the platform above the frame, of a vertical guide provided to said standards a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block, pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform and parts carried thereby, and means for providing an adjustable outlet for the air in the dash-pots under the

action of their pistons, whereby the cushioning effect of the dash-pots may be adjusted to due relation with the length of the oscillations as set forth.

9. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and constructed to carry separating devices, and swinging standards which support the platform above the frame, of a vertical guide provided to said standards, a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block, and a system of cone-pulleys arranged to vary the speed of the crank-shaft, whereby the length of the oscillations of the platform and the parts carried thereby and the rapidity of said oscillations may be adjusted in due relation with each other, as set forth.

10. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform arranged over said frame and constructed to carry separating devices, and swinging standards which support the platform above the frame, of a vertical guide provided to said standards, a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block, a system of cone-pulleys arranged to vary the speed of the crank-shaft, pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform, and devices for adjusting the discharge of air from the dash-pots under the pressure of the pistons, whereby the length, the speed of the oscillations, and the cushioning thereof may be adjusted to any desired relations with each other, as set forth.

11. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform, a trunnioned separator-bed carried by said platform, a framework having bearings to receive the trunnions of the separator-bed and interposed between the platform and the separator-bed, and swinging standards which support the platform and the parts carried thereby, of a vertical guide provided to the standards, a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block, a system of cone-pulleys arranged to vary the speed of the crank-shaft, pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform and the parts carried thereby, and devices for adjusting the discharge of air from the dash-pots under the pressure of the pistons, whereby the transverse angle of the separator-bed, and the length, rapidity, and cushioning of the oscillations of the platform may be adjusted to due relations with each other, as set forth.

12. The combination, in a separator of the class mentioned, with a supporting-frame, an oscillating platform, a trunnioned separator-bed carried by said platform, a framework

having bearings to receive the trunnions of the separator-bed and interposed between the platform and the separator-bed, means for elevating and depressing an end of the frame-
 5 work to change the longitudinal angle thereof, and swinging standards which support the platform and parts carried thereby, of a vertical guide provided to the standards, a block adjustable in said guide, a crank-shaft,
 10 a rod which connects the crank of the crank-shaft with the adjustable block, a system of cone-pulleys arranged to vary the speed of the crank-shaft, pneumatic dash-pots and their pistons arranged to cushion the oscilla-
 15 tions of the platform and parts carried thereby, and devices for adjusting the discharge of air from the dash-pots under the pressure of the pistons, whereby the transverse and the longitudinal angles of the separator-bed
 20 and the length, speed, and cushioning of the oscillations may be adjusted to due relations with each other, as set forth.

13. The combination, in a separator of the class mentioned, with a supporting-frame, an
 25 oscillating platform, a trunnioned separator-bed carried by said platform, a framework

having bearings to receive the trunnions of the separator-bed and interposed between the platform and the separator-bed, adjustable devices which work through the platform at
 3 one end of the framework to raise or depress the same to change the longitudinal angle thereof, and swinging standards which sup-
 3 port the platform and the parts carried thereby, of a vertical guide provided to the stand-
 3 ards, a block adjustable in said guide, a crank-shaft, a rod which connects the crank of the crank-shaft with the adjustable block,
 4 a system of cone-pulleys arranged to vary the speed of the crank-shaft, pneumatic dash-
 4 pots and their pistons arranged to cushion the oscillations of the platform and parts car-
 4 ried thereby, and faucets provided to the dash-pots, to adjust the outflow of air from the latter under pressure of the pistons, the
 4 whole coördinated for joint use and operation, substantially as and for the purpose herein set forth.

DANIEL S. DECKER.

Witnesses:

ELLIOT DANFORTH,
 EDWARD FASSETT.