

(No Model.)

3 Sheets—Sheet 1.

G. M. REED.

SEPARATOR OR CONCENTRATOR FOR ORES OR OTHER SIMILAR MATERIALS.

No. 544,828.

Patented Aug. 20, 1895.

Fig. 1.

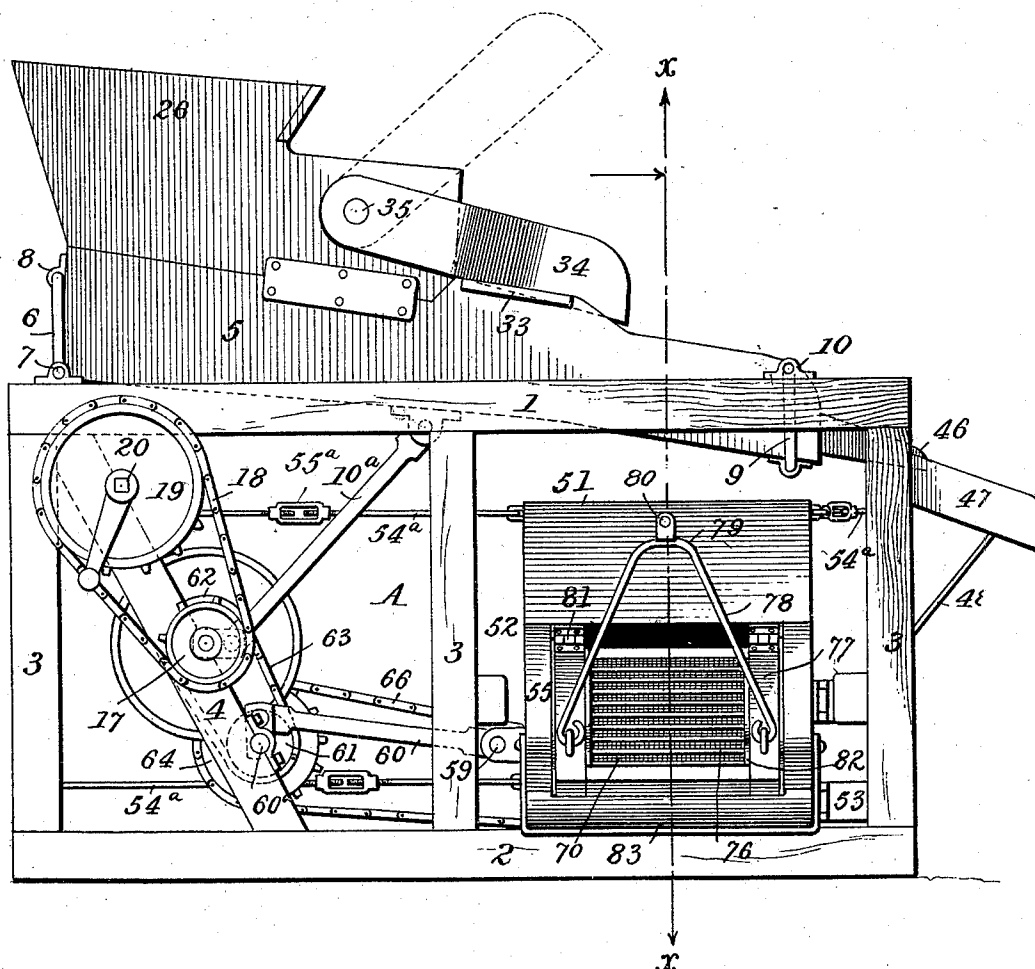
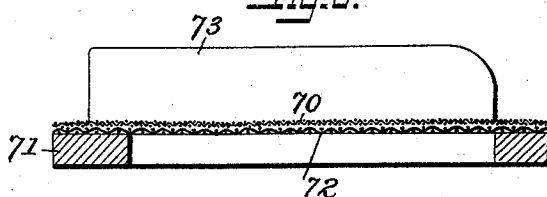


Fig. 5.



Witnesses

E. C. Ellis
J. A. Dobson

Inventor

George M. Reed
by *John Freeman*
Attorneys

(No Model.)

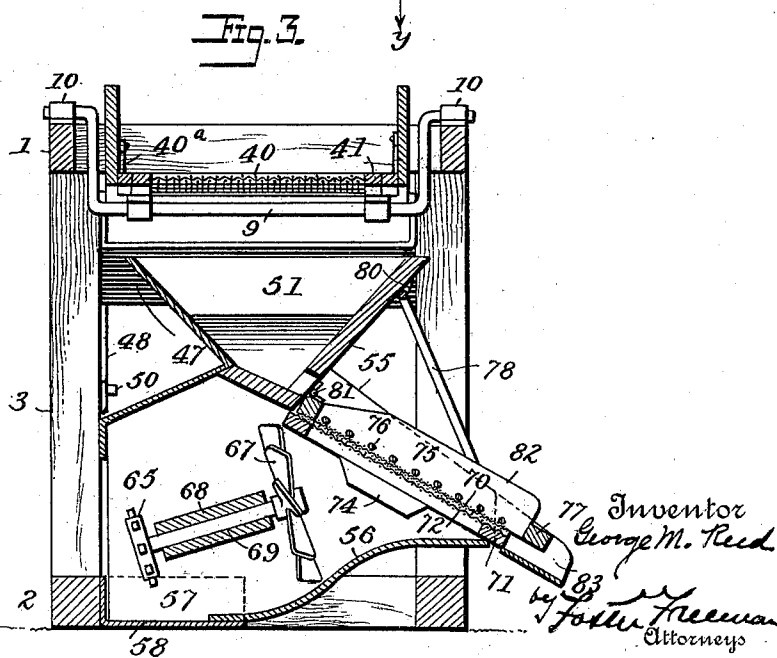
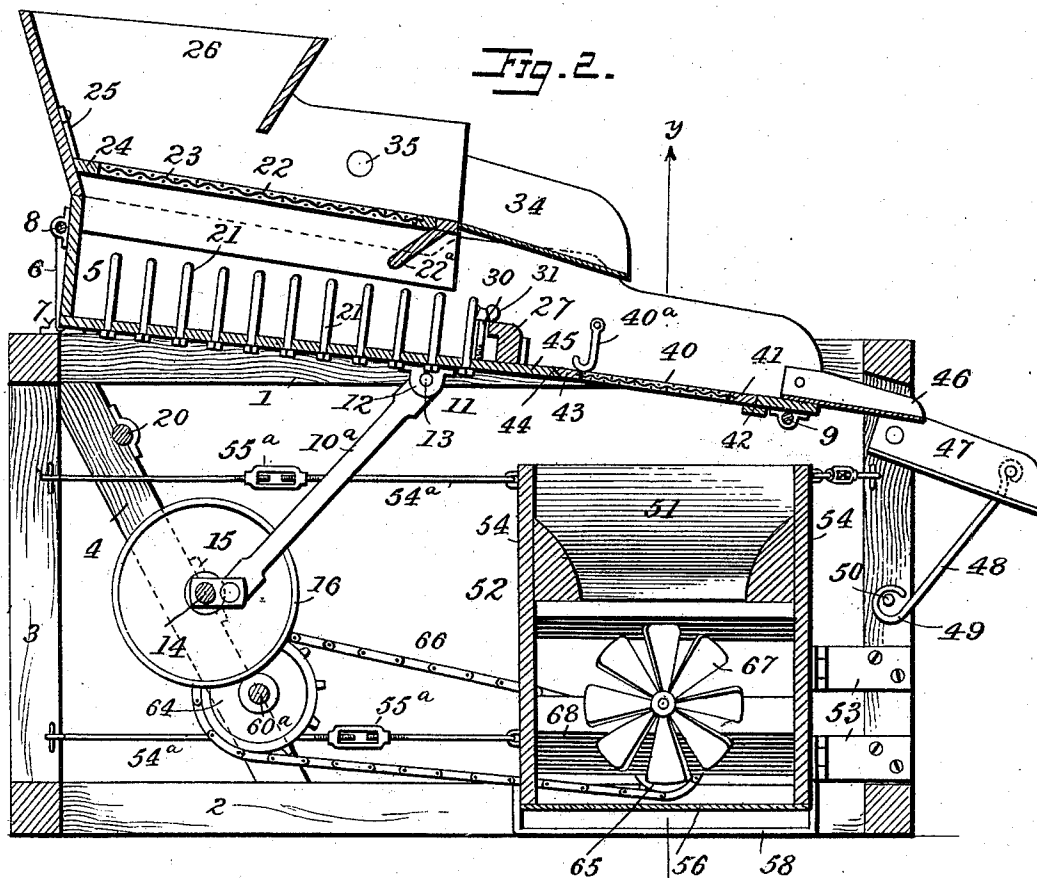
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Witnesses
E. Everett Ellis

A. N. Doherty

Inventor
George M. Reed

John Freeman
Attorneys

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Fig. 4.

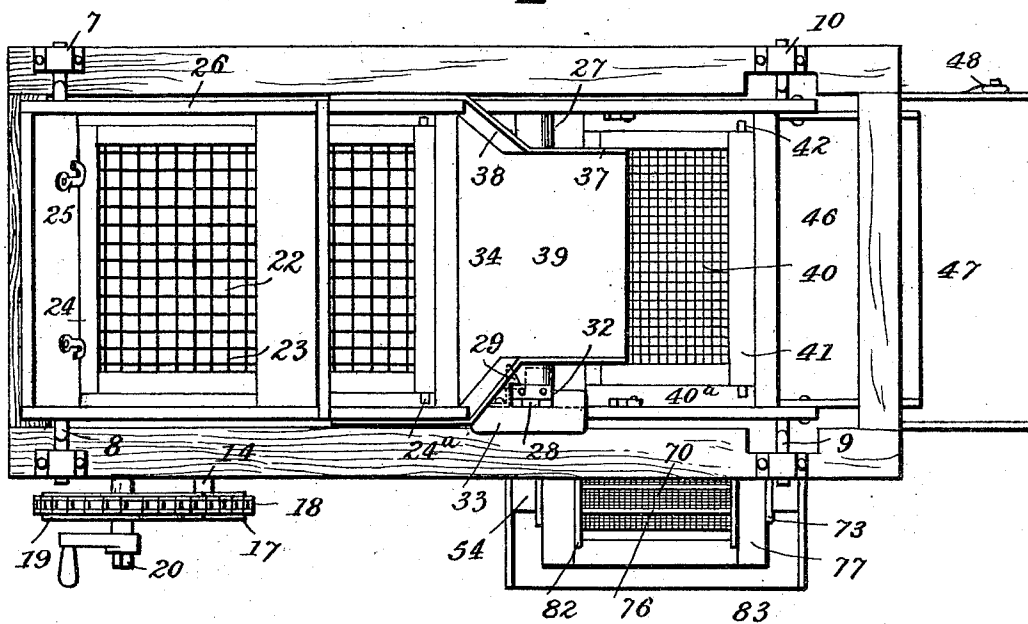
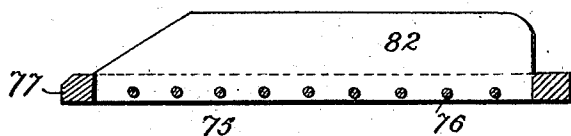


Fig. 5.



Witnesses

E. Everett Ellis
A. A. Doherty

Inventor

George M. Reed
by *Foster Freeman*
Attorneys

UNITED STATES PATENT OFFICE,

GEORGE MELVILLE REED, OF WALTHAM, MASSACHUSETTS.

SEPARATOR OR CONCENTRATOR FOR ORES OR OTHER SIMILAR MATERIALS.

SPECIFICATION forming part of Letters Patent No. 544,828, dated August 20, 1895.

Application filed July 28, 1894. Serial No. 518,893. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MELVILLE REED, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Placer-Machines, of which the following is a specification.

This invention relates to certain new and useful improvements in separators or concentrators for ores and other similar materials; and it consists substantially in such features of construction, arrangement, and combinations of parts as will hereinafter be more particularly described.

The invention is intended more particularly for the dry separation of the smaller particles of ores from the coarser or larger particles, and, while specially adapted for the separation or concentration of ores in which the precious metals are found, is also well adapted for the separation of coal ores and sand from gravel, as well as all other substances or materials the concentration of which is effected by gravity assisted by agitation.

The invention has for its object to effect the dry separation or concentration of ores and other substances or materials in a more perfect manner, as well as to materially lessen the time consumed, as compared with many former inventions heretofore made on this subject.

The invention also has for its object to increase the facility with which the different parts of the machine are handled or controlled, as well as to permit the ready removal of certain parts whenever required for the purpose of gathering or collecting the finer concentrates.

The invention also has such other objects in view as will more fully hereinafter appear, when taken in connection with the accompanying drawings, in which—

Figure 1 is a side view of an ore concentrator or separator embodying my improvements. Fig. 2 is a longitudinal sectional elevation of the separator, taken about centrally. Fig. 3 is a transverse sectional elevation of the separator, taken on the lines xx and yy , Figs. 1 and 2, respectively. Fig. 4 is a top or plan view. Fig. 5 is a sectional view, in detail,

to more clearly indicate the construction of the finer and bottom sieve; and Fig. 6 is a similar view of the riffle which rests upon and operates in conjunction with said bottom sieve.

In the practice of my invention the material is practically subjected to two independent treatments or modes of separation, yet preferably in a continuous manner, so as to effect the desired results quickly and with the least possible labor. Under some circumstances or conditions it would perhaps be desirable to carry on the first treatment at a particular place or locality and to subsequently resort to the second treatment at some other or distant place, in which event the several parts of my improved separator or concentrator are easily divided into two sets, and each set could then be employed at whatever place desired. As before stated, however, the two sets are preferably employed together, the first consisting of the main separating or concentrating devices, which sort out or separate the larger nuggets or lumps of ore into different sizes during the descent of the finer parts by gravity, and then immediately succeeding this the finer particles so separated are passed to the second set of devices, where they are subjected to a blast of air to separate the impurities therefrom, and the precious metal is caught or collected all ready for the washing or any other of the usual and well-known final processes of treatment.

In the accompanying drawings, A represents the main supporting-frame as a whole, which is composed chiefly of the upper and lower longitudinal strips 1 2, the vertical strips or posts 3, and the diagonal strip 4. The said frame may be constructed in any manner desired and is intended to be stationary, although, if desired, suitable rollers or wheels or lifting-handles could be employed for carrying or moving the separator from place to place. Mounted on top of said supporting-frame A is a sluiceway 5, which is loosely supported at its rear end by means of a raised hanger 6, having its bearings at 7 and loosely working therein and being loosely attached to said sluiceway at 8. In like manner the forward end of the sluiceway 5 is loosely supported by means of a depressed hanger 9, swinging loosely in bearings 10 on

top of the frame and being in movable connection with the under side of said sluiceway. Thus the sluiceway is suspended in a downwardly-inclined direction, so as to cause the ore or other material to gravitate toward the lower end during the process of separation or concentration.

To assist the separation of the material the sluiceway is given a jiggling or reciprocating motion by means of a connecting-rod 10^a, loosely connected to the under side of the way at 11 by means of lugs 12 and a pin 13, the said connecting-rod being eccentrically and movably connected with the main driving-shaft 14, mounted or supported in bearing-boxes 15, arranged or secured upon the diagonal strips 4 of the main supporting-frame A. The said main shaft 14 is provided with a balance-wheel 16, and at one of its ends is provided with a chain or band pulley 17, which connects by means of a chain 18 with a main driving-wheel 19 carried by or on an independent shaft 20, the said drive-wheel to be driven either by hand or other suitable power. It will thus be seen that when motion is imparted to the drive-wheel the sluiceway will be reciprocated by the connections described and in an obvious manner. The said sluiceway 5 is formed or provided in its bottom with a number of pegs or pins 21, which are for the purpose of breaking up or separating the material falling onto the same from or through the interstices of an upper sieve or screen 22 of large mesh, and which is composed of cross rods or bars 23, having their ends secured in the frame 24 in any suitable manner, and which frame occupies an inclined position and is formed on each side at its forward end with a projection 24^a, supported in corresponding recesses in the sides of the way. The opposite end of said screen-frame is loosely supported, and when down in place is fastened by movable pawls or hooks 25. In this way the sieve or screen 22 is firmly supported in place to receive the material or ore that falls upon it through the hopper 26, which is built or constructed at the upper end of the sluiceway, and at the same time the forward end thereof may be released and the screen turned back to throw off any rock or gravel that may be caught in the meshes. In order that the material passing through the screen 22 be made to fall upon the pins in the desired manner an inclined ledge or chute 22^a is extended across the way between its sides and at a point beneath the forward edge of the said screen.

The pegs or pins 21 in the bottom of the sluiceway are substantially the same in purpose and construction as those which are shown and described in my former Letters Patent, No. 488,452, which were granted on the 20th day of December, 1892; and arranged across the said sluiceway immediately in front of the forward row of these pegs or pins is a sluice-gate 27, which is hinged at one end at 28, so as to be raised and lowered, and this

gate is for the purpose of enabling the material on the bottom of the way between the pins being shaken down upon the second or intermediate sieve or screen hereinafter referred to.

A hinged chute 34 is attached at 35 to the sides of the hopper 26, so as to conduct or carry onto the second or intermediate sieve 40 such of the material as passes over the screen 22, and said chute 34 is capable of being raised or elevated, as shown in dotted lines, Fig. 1, so as to enable access to be had to the sluice-gate 27 whenever desired to open the same. Said chute 34 is constructed in any suitable way, but preferably as shown, and consists of the two sides 37, bent outwardly at 38 to embrace the sides of the hopper and having the bottom 39, which of course occupies an inclined position when the chute is down.

Between the sides of the sluiceway at the forward end thereof beyond the sieve 22 is the middle or intermediate sieve 40 of somewhat finer mesh than said sieve 22 and having its frame 41 loosely supported at 42 on the extreme forward end of the sluiceway and at the bottom of the latter. The forward part 43 of the frame 41 is beveled inwardly at 44, and the cross-piece 45 at the bottom of the way is beveled reversely, so that when the sieve 40 is lowered in its place the same will be securely supported by reason of the fact that the said beveled part of the frame will rest upon the said beveled cross-piece, and thus is the intermediate sieve capable of withstanding all the weight imposed upon it. By being supported in the manner described the intermediate or middle screen can be raised at any time, so as to cause the ore or other material to be passed directly to the hopper of the blowing and separating devices beneath and which are to be described. Hooks or paws 40^a are preferably employed to hold the inner end of the screen down in place.

In order that such of the ore or other material as will not pass through the sieve 40 will be properly carried off at the end of the sluiceway I provide a chute 46, leading out of the end of said sluiceway and emptying upon a lower hinged or loosely-supported chute 47, which is suspended between the forward uprights of the main frame and which is held in the desired inclination from the end of the separator by means of a loose rod 48, hung to one side of said chute and provided with an eye 49 on its lower end, which fits over a pin or lug 50 on the inner side of the adjacent upright of the separator. Thus, if desired, the chute 47 may be held at the positions shown in the drawings, or it may be made to hang straight down by simply unfastening the lower end of the rod 48 from the said pin or lug 50.

The construction of the separator or concentrator, as thus far described, is sufficient for the purposes of separation down to certain stages or degrees of fineness, and in some

instances would answer as a full and complete machine; but in order that the separation or concentration be effected to the utmost degree, which is desirable with the ores containing the precious metals, I preferably employ the additional devices now to be described.

Located directly beneath the middle or intermediate sieve 40 is a hopper 51, which is formed with or held by a box or casing 52, that is loosely supported at 53 by a hinge or other suitable fastening attached to one of the forward uprights of the frame A, and also having supporting-wires 54^a connecting the casing with the main frame, each wire being provided with a turnbuckle 55^a, to enable the casing and the inclosed riffle to be brought to the proper level or position, the said box or casing being formed or provided with sides 54, having inclined edges at 55, and being also formed or provided with an inclined bottom 56, so as to properly conduct the finely-divided material to the rear of said casing, where the latter empties at 57 into a receiving-pan 58, into which the fine or powdered material is collected and by which such material is carried to any place desired, as to an amalgamator or washing apparatus.

In order to assist the process of separating it is desirable to give the box or casing a side-wise shaking motion, and to effect this I attach to the side of said box or casing, by means of a loose connection 59, the end of a pitman 60, which is eccentrically mounted on or connected to a counter-shaft 60^a, and it is evident that in unison with the reciprocating movement of the sluiceway the desired shaking movement will be imparted to said casing. The counter-shaft 60^a carries a small pulley 61, which connects with the pulley 62 on the shaft 14 by means of a chain or belt 63, and it is in this way that the motion is transmitted. Carried also by the counter-shaft 60^a is a belt or chain wheel 64, which connects by means of a chain or belt 66 with a smaller wheel 65, carried on the outer end of the spindle of a fan or blower 67, said blower being thus operated indirectly from the main shaft and creating an air-blast in a direction transverse to the length of the sluiceway above. Said fan or blower could of course be supported or held in any suitable manner; but preferably I insert a block 68 between the sides of the box or casing, and the spindle of the fan passes through an opening 69 in said block, and thereby the fan has an easy working bearing.

Located between the sides of the box or casing at the beveled or inclined edges thereof is a sieve 70 of exceedingly fine meshes, and which is stretched over a frame 71 and properly secured, said sieve being backed by an extra piece of wire-cloth 72 of coarser mesh, and which is to lend stiffness and rigidity to the sieve. Said sieve is provided with metal side pieces 73, so as to prevent the fine

material falling off at the sides, and it is supported in an inclined position directly in front of the fan or blower by means of inclined ribs or projections 74, formed with or secured to the inner surfaces of the walls of the casing. Thus this bottom or lower sieve 70 is removable whenever desired, so that it can be carried away to empty the same of the valuable particles caught thereby or adhering thereto; but when in position this said sieve is held firmly in place by means of the riffle 75, which is composed of a number of rods, bars, or cross-pieces 76, arranged at suitable distances apart and having their ends secured in any desired manner to the side pieces 77 of the riffle-frame, a spring-bail 78, of wire or other suitable material, being loosely attached by its ends to the side pieces 77, at or near their lower ends, and the bail having the bight 79 thereof forced or sprung beneath a catch 80, projecting from the adjacent side of the lower hopper. Thus it will be seen that both the riffle and the sieve beneath it will be firmly and rigidly held in position. The said riffle is hinged at 81 to the under side of the lower hopper, so as to be raised and lowered, while the side pieces 77 of the riffle-frame are formed or provided with wings or guards 82 for also preventing escape of material from the sides. The riffle serves to prevent the particles or lumps of ore or other material passing too rapidly over the upper surface of the sieve 70 by means of the cross-pieces, and the material is thus held in suspension, as it were, for a time sufficient to get the full effect of the air-blast created by the fan.

By referring to Figs. 5 and 6 the construction of both the sieve 70 and the riffle will be thoroughly understood, and it is thought further detailed description is unnecessary.

A chute 83 is fastened to the sides of the box or casing immediately or directly beneath the lower or forward end of the riffle, which facilitates the fall or passage of such of the material as will not pass through the bottom sieve.

From the foregoing description it is thought the construction and operation of my improved separator or concentrator will be fully understood, and it is evident that all of the parts contributing to the same will work in the most effective manner. As the ore or other material is passing down from the upper set of devices to the lower set it will be met by the blast of air from the fan or blower, and thus will the separator be rendered clean and perfect.

It is obvious that the general construction and arrangement of the several parts could be altered or changed in immaterial respects and still be included within my invention.

Without limiting myself, therefore, to the precise details of construction and arrangement shown and described, I claim—

1. In a separator or concentrator, the com-

5 bination of a reciprocating sluice-way, a shaking or vibrating fan case, means for altering the position of said fan case, a fan, and separate or independent means for operating each of the parts, substantially as described.

10 2. In a separator or concentrator, a reciprocating sluice-way provided at its forward end with a sieve in combination with a fan case pivotally suspended beneath said sieve, a fan within the case, and an inclined removable sieve located before the fan, and separate or independent means for operating the way, the case, and the fan, substantially as described.

15 3. In a separator or concentrator, the combination with the sluice-way, and the pivotally suspended fan case together with means for adjusting said case, of the main shaft and connecting rod, and the counter-shaft, and pitman, the latter being eccentrically connected with the fan case, substantially as shown and for the purpose described.

20 4. In a separator or concentrator, the combination with a sluice-way, of a fan case having an inclined bottom opening into a receiving pan, a fan mounted in said case and means for operating the same, an inclined sieve located before the fan, and a pivoted or hinged riffle resting upon said inclined sieve, and a spring bail loosely attached to the riffle and

adapted to be sprung beneath a projection of the case, substantially as described. 30

5. In a separator or concentrator, the fan case provided with a hopper and having its sides beveled or inclined at the front, in combination with the removable inclined sieve supported between said sides upon projections from the case, a riffle pivoted or hinged to the case, and a spring bail loosely attached to the lower end of the riffle and adapted to be sprung beneath a projection on the hopper, substantially as described. 35 40

6. In a separator or concentrator, the combination with the fan-case, having a hopper and fan, and means for operating the two, of the inclined sieve having side pieces and formed with the backing of wire gauze, and the riffle frame provided with riffles and projecting side wings, and a spring bail loosely attached to the riffle and adapted to be sprung beneath a projection on the hopper, substantially as described. 45 50

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE MELVILLE REED.

Witnesses:

WILLIAM W. BROWN,
WILLIAM H. SAWTELLE.