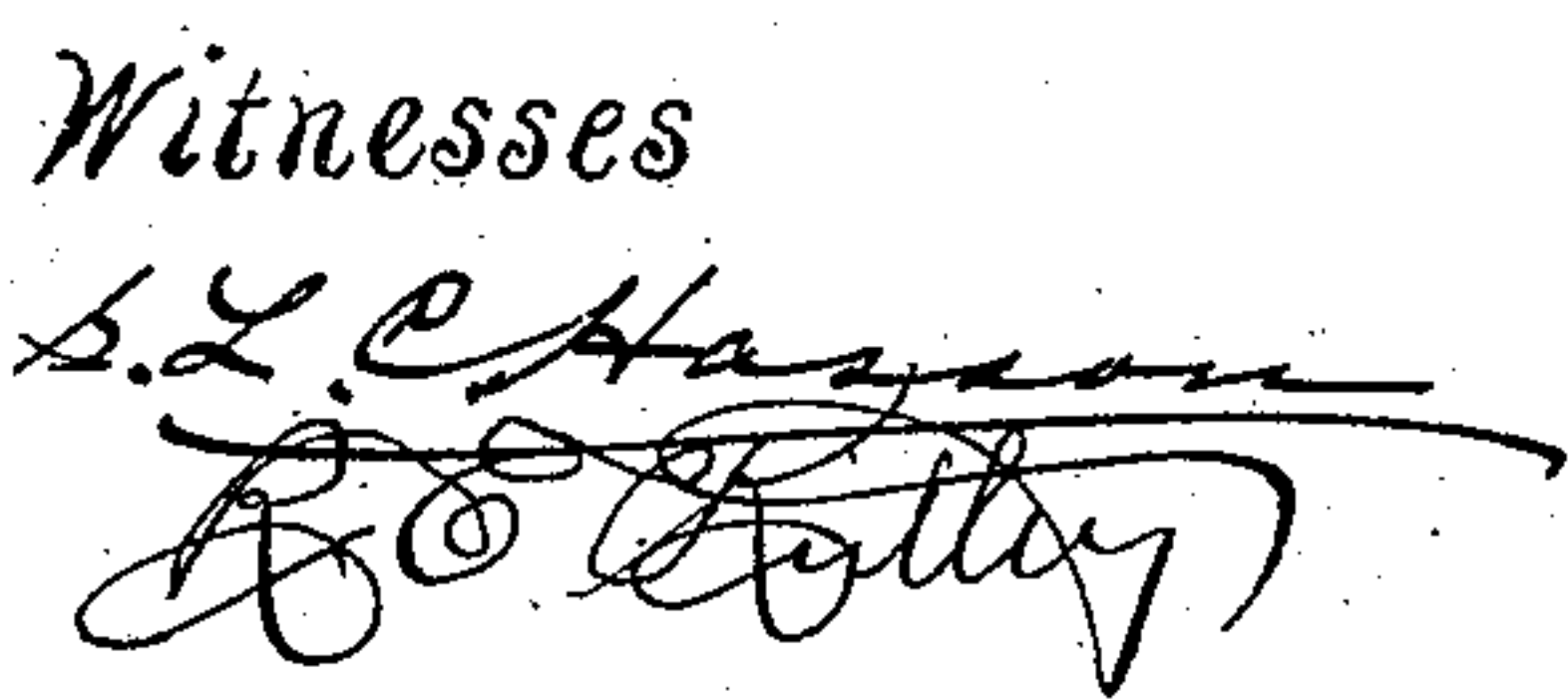


2 Sheets—Sheet 1.

DRY SEPARATOR FOR AURIFEROUS MATERIAL.

Patented Feb. 15, 1898.

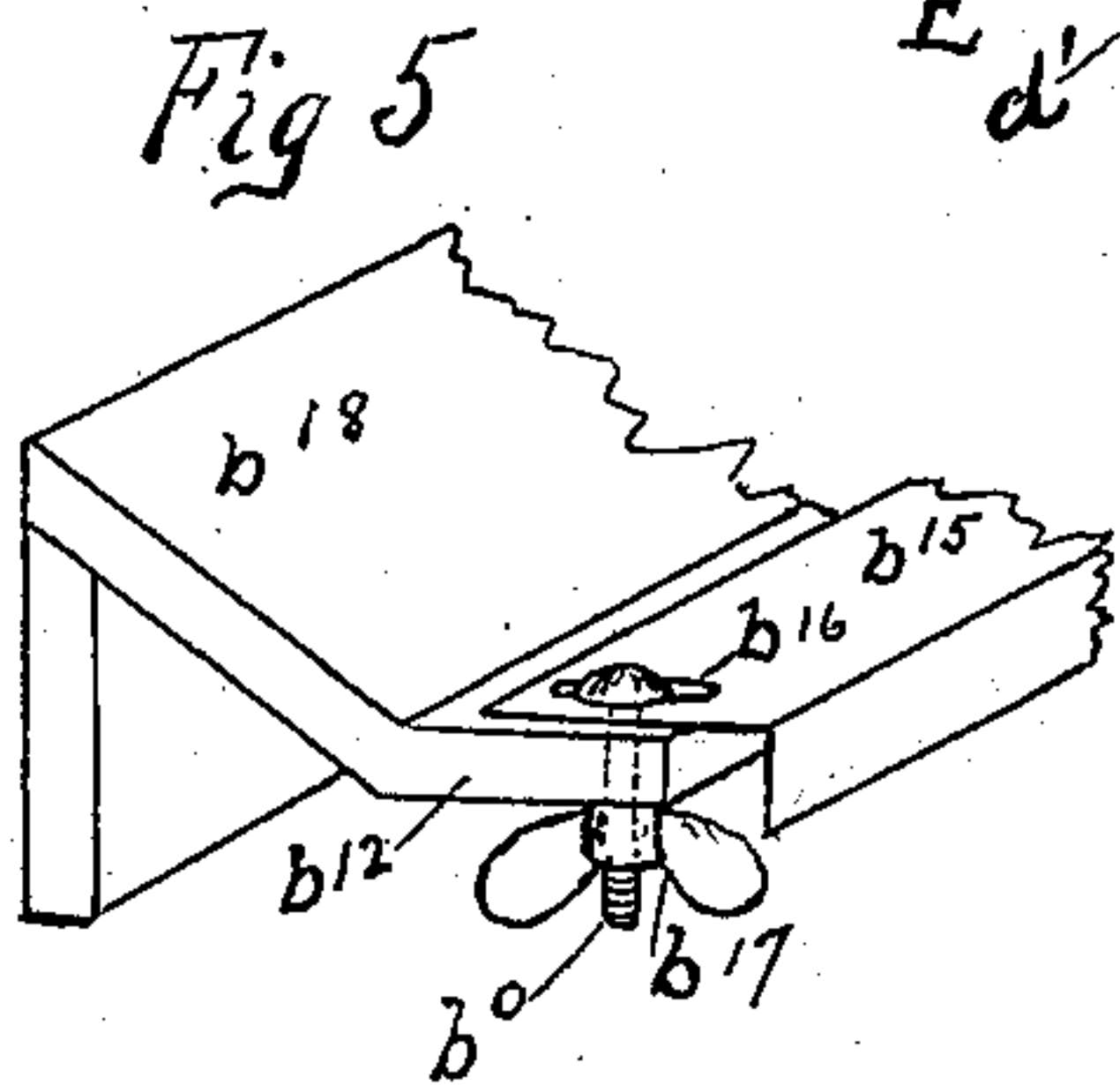
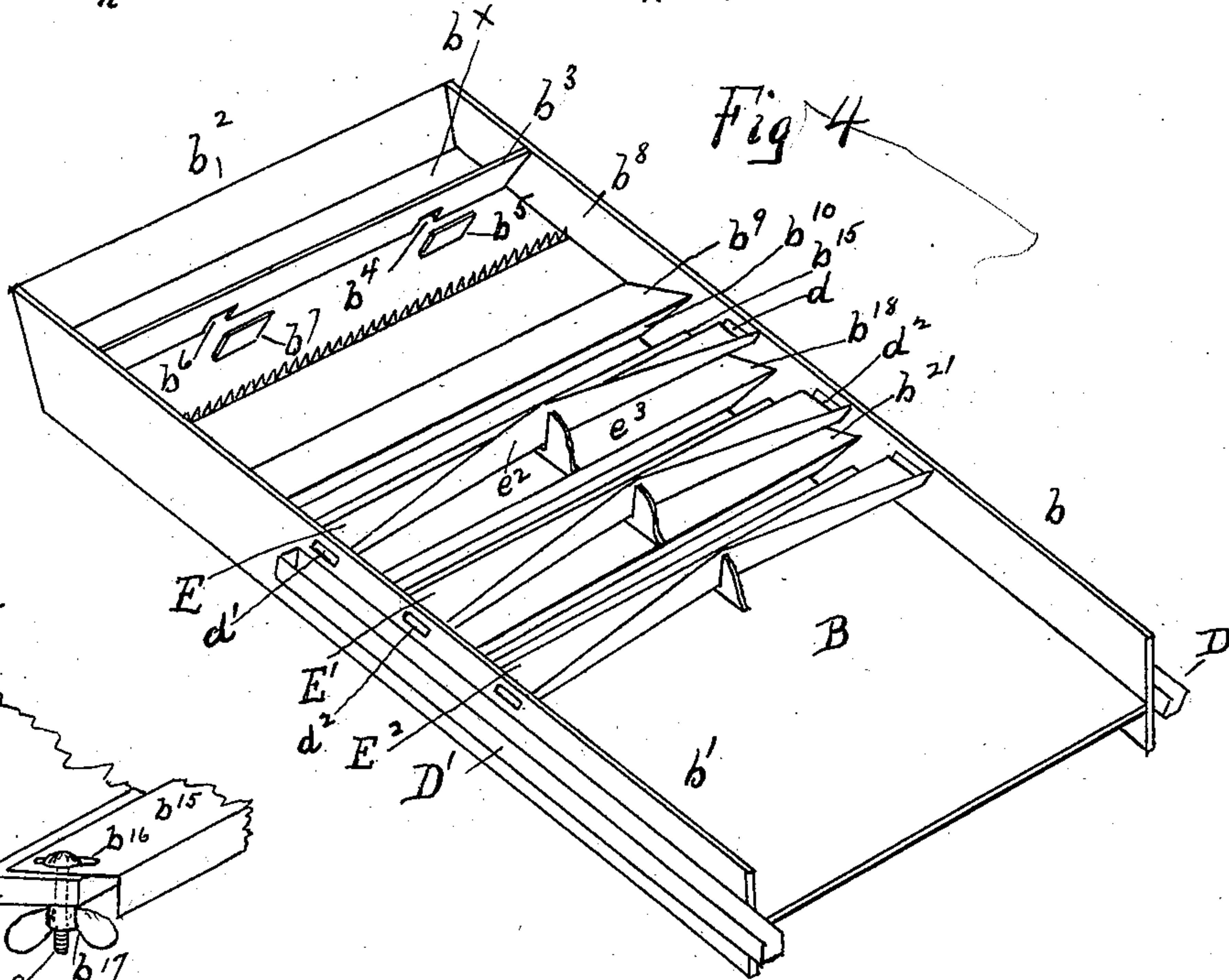
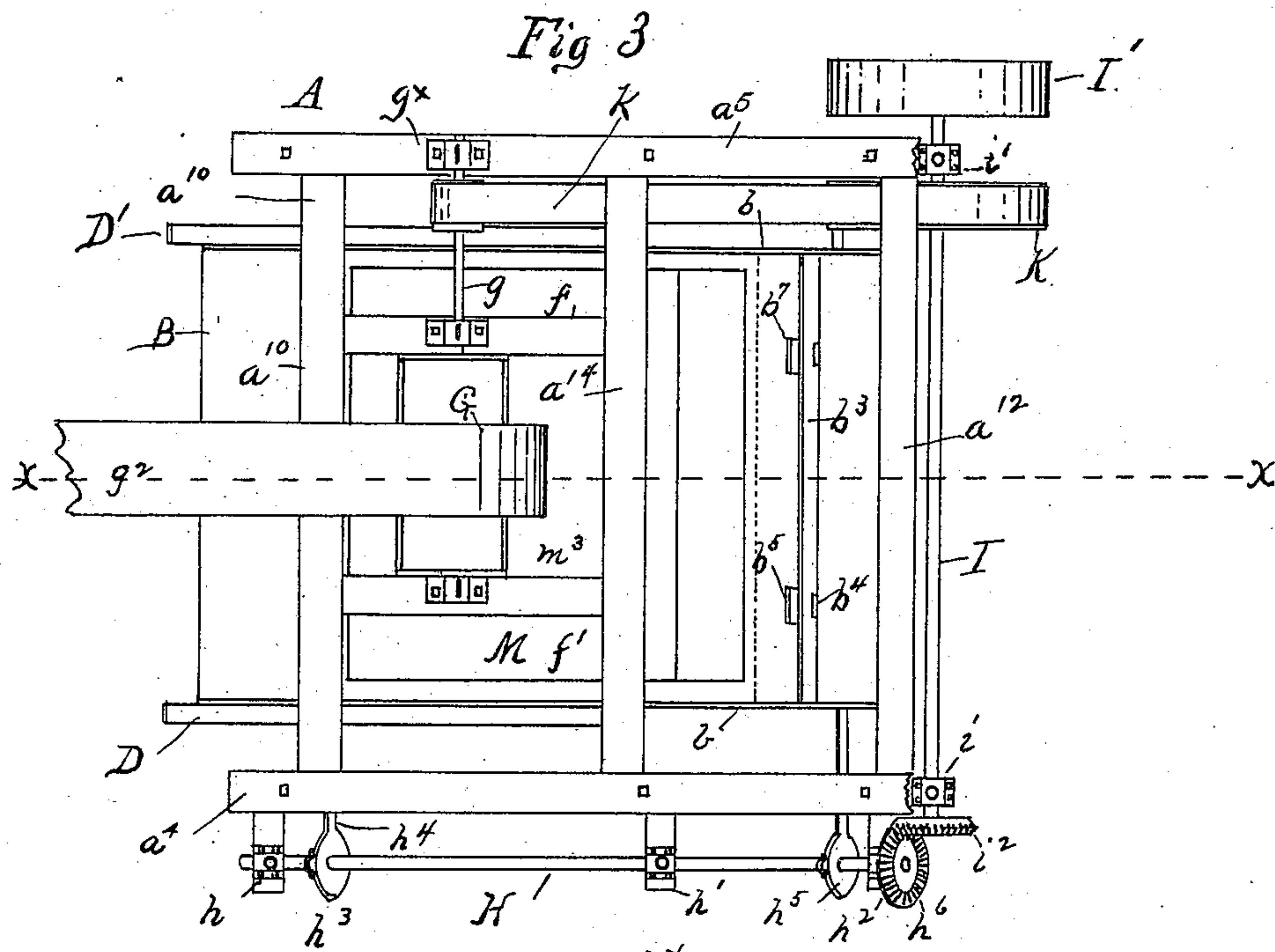


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2 Sheets—Sheet 2

DRY SEPARATOR FOR AURIFEROUS MATERIAL.

Patented Feb. 15, 1898.



Witnesses

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DRY SEPARATOR FOR AURIFEROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 598,963, dated February 15, 1898.

Application filed May 3, 1897. Serial No. 634,959. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM C. SOOY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Dry Separators for Auriferous Material; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of separators in which induced currents of air are employed in the separation; and it has for its objects, first, to obtain a number of separations of the material, according to the specific gravity, without loss of the fine particles of the metal, and, second, to provide for the disparity in the grades of material undergoing the intermediate separation.

My invention consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my improved separator. Fig. 2 is a vertical sectional view of the separator, enlarged, on line *xx* of Fig. 3. Fig. 3 is a plan view of the separator. Fig. 4 is a detail view in perspective of the reciprocating inclined table. Fig. 5 is a detail view of one of the adjustable plates on the ledge opposite the opening for the passage of the heavy material.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents the frame of the machine, which is composed of separate longitudinal side frames A' A², arranged in an upright position and at a considerable distance from each other. The frame A' consists of the horizontal base or beam *a*, near one end of which beam is rigidly connected the standard *a'*. Near the other end of beam *a* is connected the lower end of standard *a*². With the beam *a*, at a point a little over one-third the described distance in the direction of standard *a'* from standard *a*², is connected the lower end of the standard *a*⁸. With the upper ends of the respective standards *a'* *a*² *a*³ is connected a horizontal beam *a*⁴. The other frame A² is composed of the

upper and lower horizontal beams *a*⁵ *a*⁶ and standards *a*⁷ *a*⁸ *a*⁹, which correspond in position and are of the dimensions as the respective horizontal beams *a*⁴ and *a*⁹ and with the standards *a'* *a*³ *a*² of frame A', respectively. With the beam *a*⁴, near the standard *a'*, is connected one end of a cross or tie beam *a*¹⁰, the other end of which beam is connected with the beam *a*⁵ near the standard *a*⁷. Near the respective standards *a*² *a*⁹ and connected with the beams *a*⁴ *a*⁵ is a cross-beam *a*¹², and at a point on said beams *a*⁴ *a*⁵ equidistant from the cross-beams *a*¹⁰ *a*¹² and connected with said beam is a cross-beam *a*¹⁴.

Between the respective side frames A' A² of frame A is arranged the inclined separating-table B, the upper end of which is in a position between the opposite standards *a*² *a*⁹ and at an elevation from the plane of beam *a* a little over one-half the described distance from the plane of beam *a* to the plane of beam *a*⁴. The lower end of the table B extends to a position between the standards *a'* *a*⁷ and at an elevation a short distance above the plane of the beams *a* *a*⁶. In width the table B extends from a position a short distance from the inner side of the frame A' to a position a short distance from the inner side of the frame A², so as to provide space for the reciprocal movements of the table.

The table B is provided with longitudinal sides *b* *b'*, each one of which sides extends a considerable distance above the plane of the upper surface of the table and a short distance below the plane of the under surface of said table. At the upper end of the table is a transverse end plate *b*², which extends from the inner portion of the side *b* to the inner portion of the side *b'* and is inclined outwardly at an angle to the table B.

Beneath the upper end of the table B is a transverse bar C, one end of which bar extends in one direction to a position in line with the outer side portion of the standard *a*² of frame A' and in the other direction in line with the outer side portion of standard *a*⁹. With said end of bar C, near standard *a*², is rigidly connected one end of a rod *c*, the other end of which rod extends in an upward direction through the beam *a*⁴ and is screw-threaded and provided with a nut *c'*. With the end of bar C, near standard *a*⁹, is rigidly

connected one end of a rod c^2 , the other end of which rod extends upwardly through the beam a^5 and is provided with a screw-threaded end portion and nut c^3 .

5 Beneath the lower end of the table B is a transverse bar C' , which is precisely the same length as the bar C and is supported at each end by the respective rods $c^4 c^5$, which rods are connected with said bar and also with the
10 respective beams $a^4 a^5$ in the same manner as described of the rods $c c^2$. At the upper end of the table B and with the inner side portion of the side b , a short distance from the end b^2 , is connected one end of a plate b^3 , the other
15 end of which plate extends to and is connected with the inner side portion of the side b' of the table, and between which plates b^2 and b^3 is the hopper b^x , which receives the auriferous material. In the plate b^3 , near one end
20 of said plate and extending upwardly from the lower edge portion of said plate a short distance, is an opening b^4 for the passage of the material. With the upper surface of the table, a short distance from and opposite the
25 opening b^4 , is connected an upright distributing-post b^5 , which is slightly wider than the opening b^4 . At the other end of plate b^3 is an opening b^6 and a distributing-plate b^7 , which is arranged in position in the same manner
30 as the post b^5 . In the direction of the lower end of the table B and a short distance from the plate b^3 is a plate b^8 , which extends from the inner portion of the side b to the inner portion of the side b' of the table and at a less
35 distance upwardly than is described by plate b^3 , the upper edge portion of which plate is notched or serrated.

At a considerable distance from the serrated plate b^8 in the direction of the lower end of
40 table B a portion of said table extending from the side b to the side b' is inclined upwardly at an angle to the plane of the table, forming a step b^9 , upon the outer edge of which step is a riser b^{10} , which extends down-
45 wardly therefrom to a position in line with the lower edges of the sides $b b'$ of the table B and at right angles to the plane of said table. A short distance from the riser b^{10} , in the direction of the lower end of the table, is
50 a transverse ledge or slat b^{12} , extending from one side b to the other side b' of the table and in the same plane as the said table. Between the upper edge of slat b^{12} and the riser b^{10} is an opening b^{14} . Upon the upper surface of
55 the slat b^{12} is an adjustable plate b^{15} , extending in the longitudinal direction of the slat b^{12} , one longitudinal edge portion of which plate is bent downwardly at right angles to said plate and extended over the upper edge
60 of the slat b^{12} in the opening b^{14} . In one end portion of plate b^{15} is a slot b^{16} , and through the slat b^{12} is extended an adjusting-bolt b^0 , upon one end of which is a flat head and the other screw-threaded and provided with a thumb-
65 screw b^{17} . In the other end of plate b^{15} is a slot and adjusting screw-bolt, as described of slot b^{16} and bolt b^0 . From the lower edge of

the slat b^{12} is extended upwardly at an angle to the plane of the table B a step b^{18} , which is precisely the same in construction as the
70 step b^9 and its riser b^{10} . A short distance from the riser on the step b^{18} in the direction of the lower end of the table is a slat b^{19} , upon which is an adjustable plate b^{20} , as described of the slat and plate $b^{12} b^{15}$, and between said
75 slat and riser is an opening b^x , which is the same general width as the opening b^{14} between the slot b^{12} and the riser b^{10} . From the lower edge of the slat b^{19} extends a step b^{21} , from which extends downwardly a riser b^{22} in the
80 same manner as the step and riser $b^9 b^{10}$. Beyond the riser b^{22} the table is continued in one plane to the lower end, and between the said riser and the adjacent portions of the said table is an opening b^{23} , which is the same
85 general width as the opening b^{14} . On the upper surface of the table, near said opening b^{23} , is an adjustable plate b^{24} , which is the same as the plate b^{20} and connected with the table in like manner as with the slat b^{19} .
90

In the side b of the table B, at a point nearly equidistant between the slab b^{12} and the upper edge of the said side b , is an opening d ,
(see Fig. 4,) which extends in length a slight
95 distance beyond the described plane of the step b^{18} . In the other side b' of the table is an opening d' , which in respect to the slat b and the step b^{18} is in a like position as described of the opening d .

Upon the outer portion of the side b of the
100 table B is rigidly connected a narrow trough D, the upper end of which trough extends beneath the lower edge of the opening d and the lower end extends a short distance beyond the lower end of the table B.
105

Upon the outer portion of the side b' of the table is a trough D' , the upper end of which extends beneath the opening d' in said side. Directly beneath opening d' and with the inner side portion of the side b is connected
110 one end of a flat shelf or plate E. The upper edge of plate E extends in a direct line from one side b of the table to the other side b' . The rear edge e' of said table describes two inclined planes extending from the said
115 sides $b b'$ and inwardly in the direction of the upper edge of said plate. With the rear edge of said plate E is connected the lower edge portion of a plate e^2 , which extends from the inner portion of the side b close in position
120 to the lower edge of the opening d and is bent inwardly to the intermediate point of said inclined planes described by the lower edge of plate E, thence extended to the inner portion of the side b' , close in position to the lower
125 edge of the opening d . Said plate E extends in an upward direction to the plane of the upper edge of the sides $b b'$ and is inclined rearwardly in a slight degree.

Beneath the under surface of the plate E
130 and the upper surface of the slat b^{12} is an opening e^4 for the passage of the material, as hereinafter described. The plate e^2 is supported in position at a point equidistant from

the sides $b\ b'$ of the table by the upright bracket e^3 , which is connected rigidly with the table and extends close in position to the back of plate e^3 . Above the slat b^{19} is a plate E' , which is constructed in precisely the same manner as the plate E and beneath which is a passage for the material, as described, beneath the said plate E . In the sides $b\ b'$ of the table are openings d^2 , each communicating with the trough D on one side and with the trough D' on the other, as described of the openings $d\ d'$. Above the adjustable plate b^{24} is a shelf or plate E^2 , which is also constructed and arranged in position in precisely the same manner as described of the shelf E , and at each end of said shelf in each side $b\ b'$ are openings for the passage of the material to the respective troughs, as described of the openings $d\ d'$.

With the cross-beam a^{10} , connecting the respective frames $A'\ A^2$ at the upper ends, is connected one end of a beam f , the other end of which beam is connected with the beam a^{14} . Parallel with the beam f and connected with said beam $a^{10}\ a^{14}$ is a beam f' , both of which beams are at short distances from the respective beams $a^4\ a^5$. Upon said beams $f\ f'$ is journaled a fan-shaft g , the outer end of which shaft is journaled on the beam a^4 . Upon the shaft g are fan-blades g' , and extending around said blades and shaft is a circular fan-case G , with the upper side of which case is connected one end of a spout g^2 , the other end of which spout extends over beam a^{10} , and at a suitable distance from said fan-case upon shaft g is a belt-pulley g^x .

Upon the outer side portion and near the lower end of the standard a^7 , a short distance below the plane of the table B , is a shaft-hanger h , and upon the standards $a^2\ a^3$, at the same described distance from the plane of the lower edge of the side b , are shaft-hangers $h'\ h^2$, in which hangers is a shaft H . Upon shaft H , near the lower end, is an eccentric h^3 , with which is connected an eccentric-rod h^4 , which rod is connected with the under side portion of the table B . Near the upper end of shaft H is an eccentric h^5 , which is connected with the table in the same manner as eccentric h^3 . Upon the upper end of rod H is a bevel-gear h^6 .

Extending in a transverse direction to the frame of the machine and journaled in the journal-hanger $i\ i'$ on the respective standards $a^2\ a^4$ is a shaft I , on one end of which shaft is a bevel-gear i^2 , which meshes with the bevel-gear h^6 on shaft H . The other end of shaft I extends beyond the outer side of the standard a^9 , and upon said end of said shaft is a power-driven pulley I' . On said shaft I on the inner side of the standard a^9 is a belt-pulley K . Over the pulley K is extended one end of a belt k , the other end of which belt is extended over the pulley g^x on shaft g , operating the fan-blades g' , and the two ends of the belt connected together in the usual manner.

Directly above the reciprocating table B is a stationary dust-receiving chamber or box M , which is rectangular in shape and composed of the sides $m\ m'$, ends $m^1\ m^2$, and top m^3 . The front end m' of the chamber M extends downwardly to within a short distance of the upper surface of the table B at a point near the step b^9 in the direction of the serrated plate b^8 . The rear end m^2 of the chamber extends downwardly to within a short distance of the upper surface of the table B , a short distance in rear of the shelf E^2 . The sides $m\ m'$ of the chamber extend downwardly to within a short distance of the plane of the upper edge of the sides $b\ b'$ of the table B . With the outer side portion of the chamber M and near the lower edge of the side m is connected the upper edge and one end of a strip of cloth m^5 , the other end of which strip is extended around the end m^2 , thence along the outer side m , and across the end m' , and the two ends connected in a suitable manner, the lower edges of the strip of cloth extending over the sides $b\ b'$ of the table, and also from the front end m' and rear end m^2 of the chamber a short distance between the said sides to the upper surface of the table.

With the upper side portion of the chamber M , near the lower end portion, is connected rigidly one end of a conduit O , the other end of which conduit is connected rigidly with both side portions of the fan-case G .

In the operation of the improved separator the auriferous material is placed in a dry condition within the hopper b^x at the upper end of the table B . This material in ordinary placer-mining localities consists of sand and pulverized quartz with more or less soil, in which the metals are found in different degrees of fineness and which require to prevent loss of metal a separation at every stage. Power being applied to the pulley I' and the shaft I , a reciprocating movement is imparted to the table B . In the same movement power is transmitted to the fan-wheel g' and a suction is caused in the air-chamber M , the air being drawn into said chamber through the respective openings $b^{14}\ b^{18}\ b^{20}$. The reciprocal movements of the table cause the material to regulate its discharge through the openings $b^4\ b^6$ and is further directed in meeting the posts $b^5\ b^7$, and upon reaching the plate b^8 the quantity of material is spread in the direction of the sides of the table, thence passes to the horizontal plane of the step b^9 , and upon reaching the outer edge of the said step in the direction of the riser b^{10} the heavy material and the heaviest metal will fall over the outer edge of said step through the opening b^{14} unaffected by the currents of air. The material of less specific gravity is immediately acted upon by the air-currents, the finer parts as well as the dust being carried over the opening b^{14} and deposited upon shelf E , the reciprocal movements of the table causing the said separated material to pass through the openings $d\ d'$ into the respective

troughs D D' and deposited a short distance from the machine. The grade of material which is too heavy to be carried onto the shelf E and at the same time prevented from falling through the opening b^{14} lodges upon the slat b^{12} and plate b^{15} and passes beneath the plate E and upon the step b^{18} , and thence passes over the outer edge of said step over the opening between said step and the slat b^{19} . Thence it is subjected to another separation, the light material being carried into the troughs D D' and the heavy into the space between the shelf E' and the step b^{21} , a thorough separation being given during its passage upon the table.

In certain grades of material, more particularly where sand predominates, the rapid action of the air-currents are found necessary, so that the light material raised within the air-chamber by the force of the air-currents may fall upon the shelves E E' E² and the fine metal saved. The plates b^{15} b^{20} b^{24} are adjusted so as to narrow the width of the respective openings in the bottom of the table, the thumb-screw b^{16} being released for that purpose and, after adjustment of the plates, again turned to clamp the plates upon the slats.

In order to observe the progress of the separation, I have formed in the side m of the chamber Man opening m^5 , and upon the outer side of said chamber is arranged the frame m^6 , which extends around said opening and which contains a pane of glass m^7 .

The power of the fan may be increased, so as to cause whirling currents within the air-chamber, where the dust is found in large quantities, and the separation obtained by the gradual deposition of the metal upon the shelves E E' E².

In my improved machine large quantities of the auriferous material may be separated and a gain effected in less handling of the material than where successive operations are required. The risers b^{10} may be dispensed with when found desirable.

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

1. In a separator for auriferous material, the combination with an inclined table, having longitudinal sides extending above the plane of said table, and transverse openings in said table for the passage of the heavy material, extending from one side of the table to the other side, of steps upon opposite sides of each opening on separate elevated planes, and a slat extending in the plane of said table from

one of said steps in the direction of said transverse opening, a shelf above said slat, connected with the sides of said table, having an upward extension in the path of the material inclined rearwardly at an angle to said sides from an intermediate point on said table between said sides, troughs upon the outer portions of the sides to said table, said sides having an opening opposite the point of connection of the shelf with said sides, communication with each trough, means for reciprocating said table laterally and a fixed air-chamber above said table, a fan-chamber and fan, a conductor connected with said fan-case and said air-chamber and flexible connections of the sides and ends of said air-chamber extending over the sides of said reciprocating table as and for the purpose described.

2. In a separating-machine for auriferous material the combination with the frame of said machine of an inclined table, having sides extending above the plane of said table, and transverse openings for the passage of the heavy material, transverse supporting-bars at each end of said table, and rods connected with said bars and the frame of said machine, a hopper at the upper end of said table, having openings for the passage of the material, material-distributers upon said table in the path of said material, and a combined slat and upwardly-inclined step on opposite sides of the separate transverse openings in said table, having risers, means for reciprocating said table and adjustable plates upon each slat extending in the direction of said risers on said step, as and for the purpose described.

3. In a separating-machine for auriferous material the combination with the frame of said machine of an inclined table having longitudinal sides extending above the plane of said table, and transverse openings for the passage of the heavy material, a combined slat and step on opposite sides of separate transverse openings in said table, said step being inclined upwardly at an angle to the plane of said table, means for reciprocating said table and a fixed air-chamber above said table, a fan-chamber and fan and a conductor connected with said fan-case, and the end portion of said air-chamber, and flexible connections of the sides and ends of said dust-chamber extending over the sides of said reciprocating table, as and for the purpose described.

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Witnesses:

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