

T. J. CHUBB.
Ore Separator.

No. 18,085.

Patented Sept. 1, 1857.

Fig. 2.

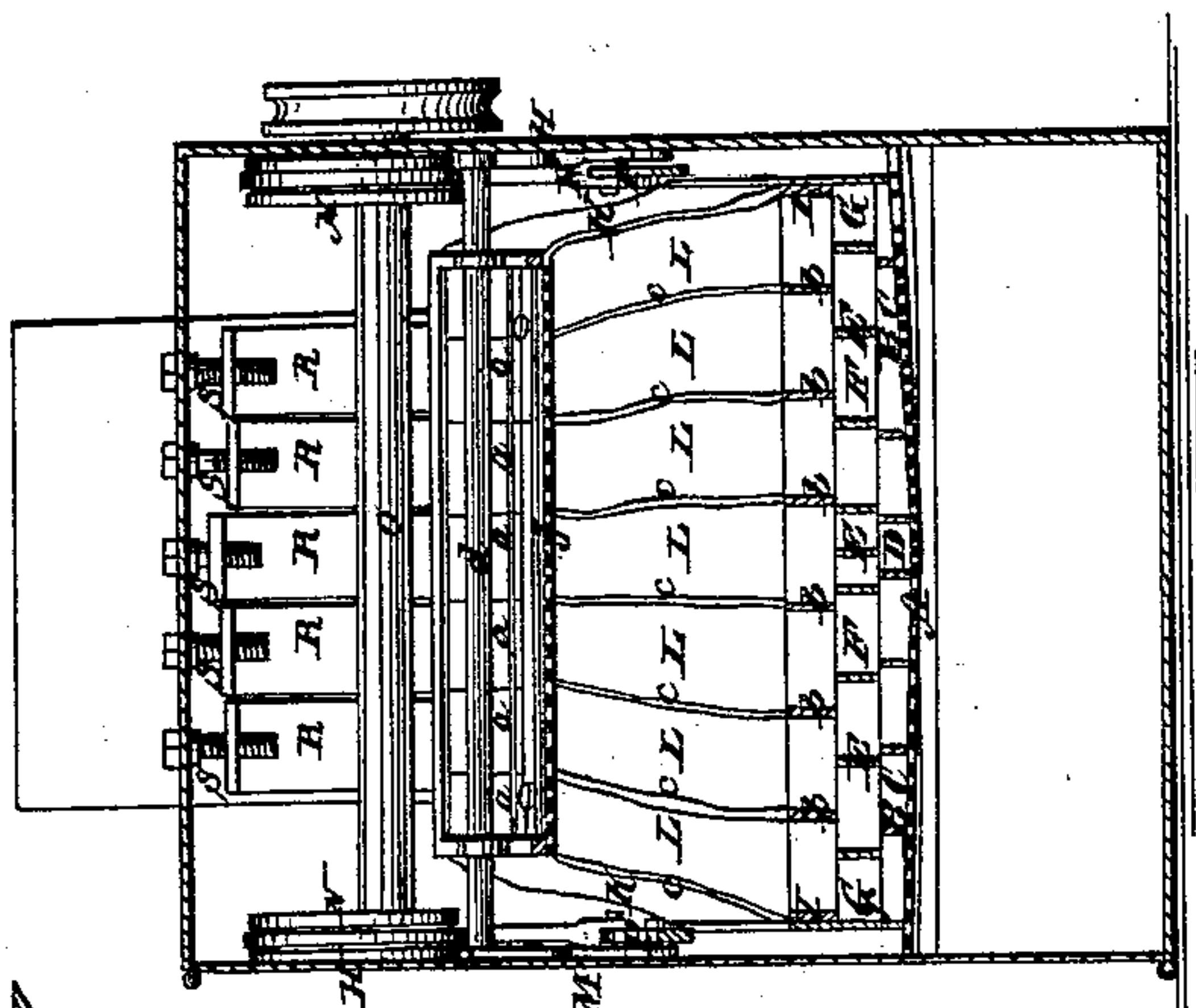


Fig. 1.

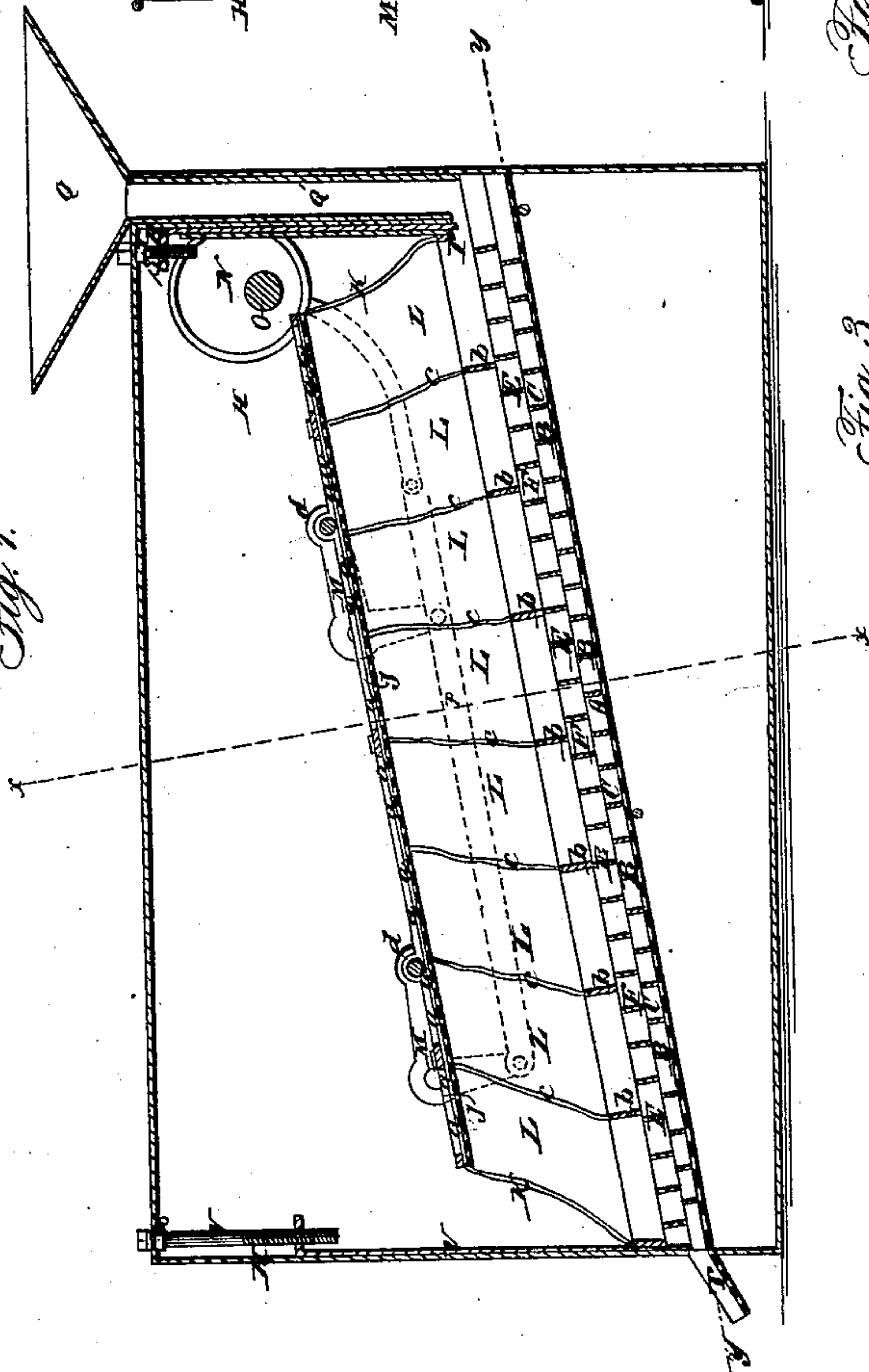


Fig. 5.

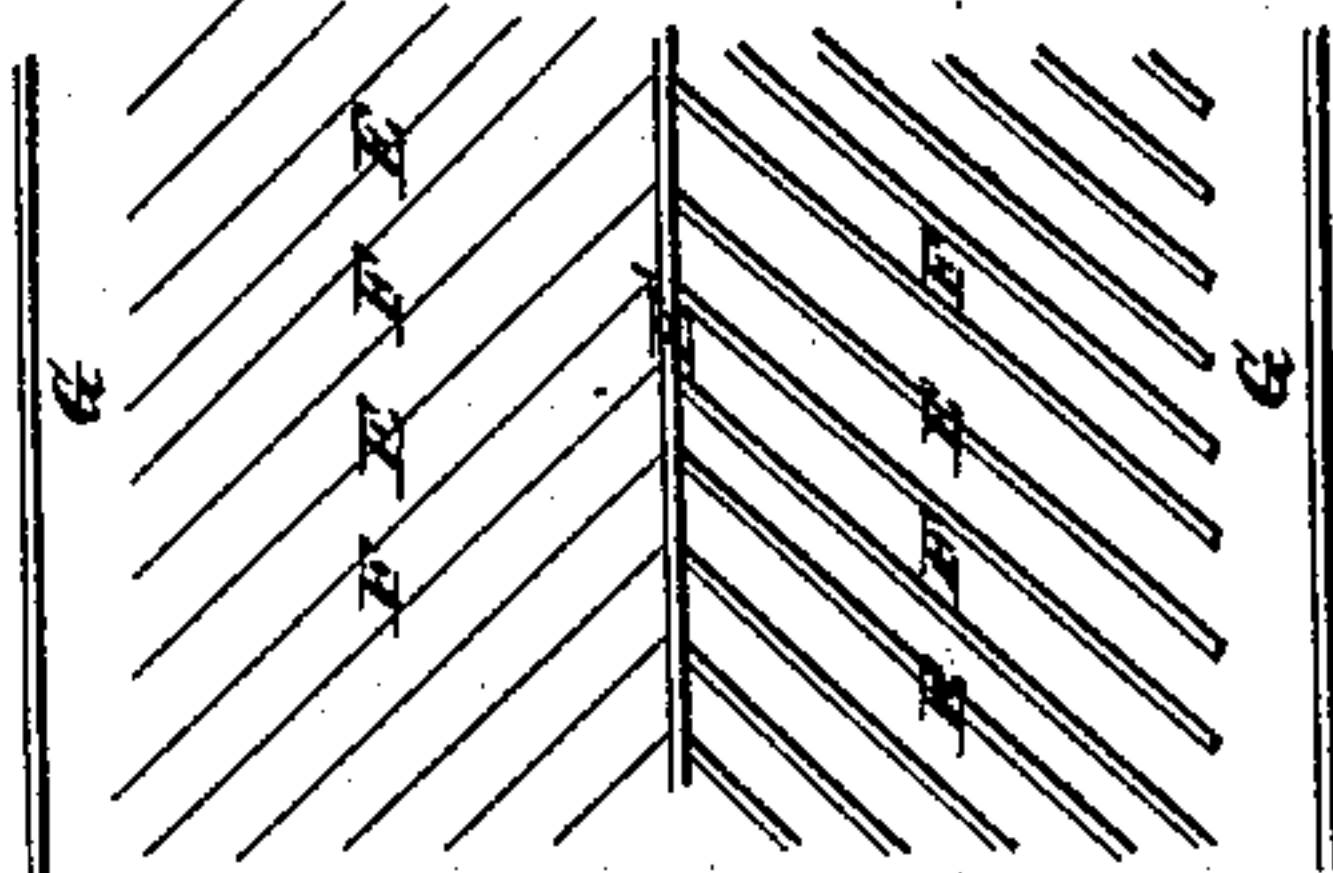


Fig. 4.

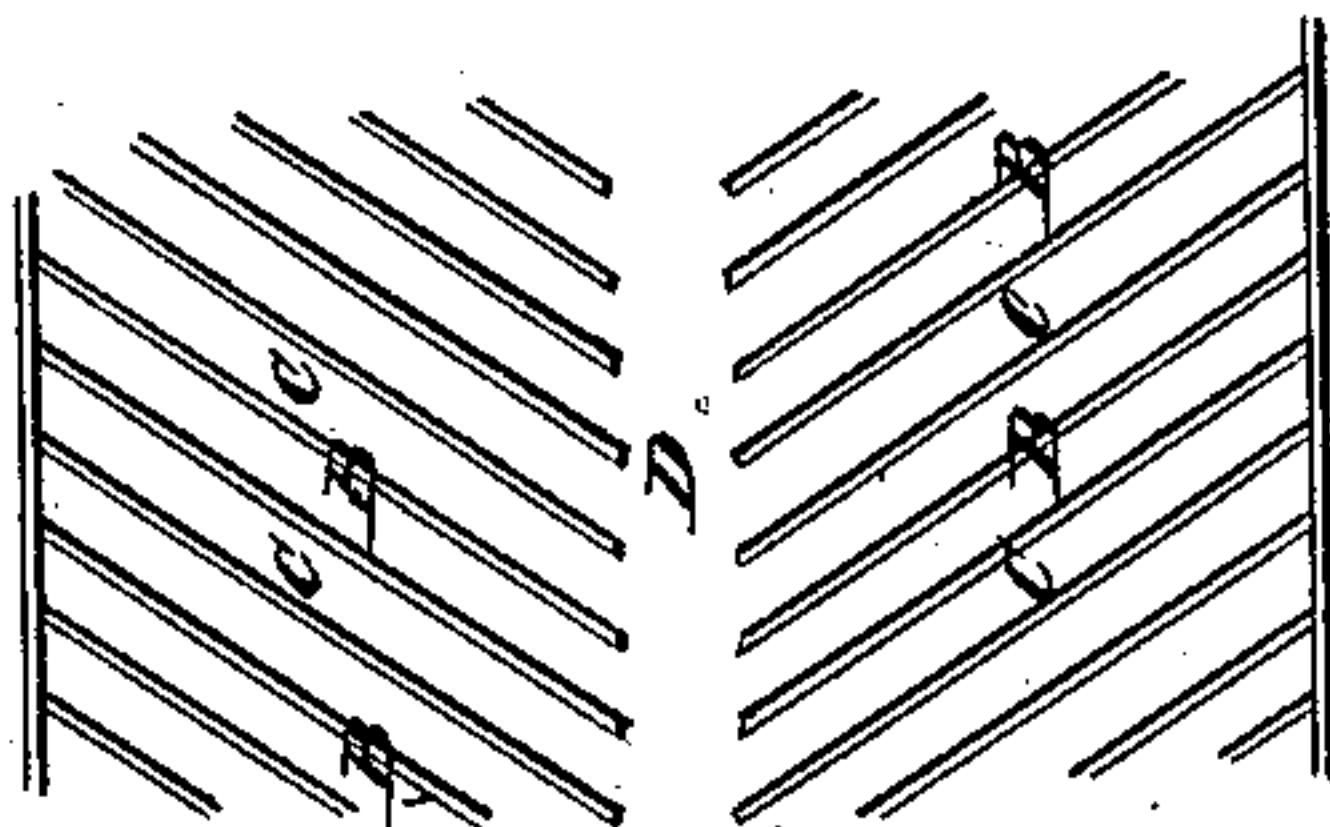
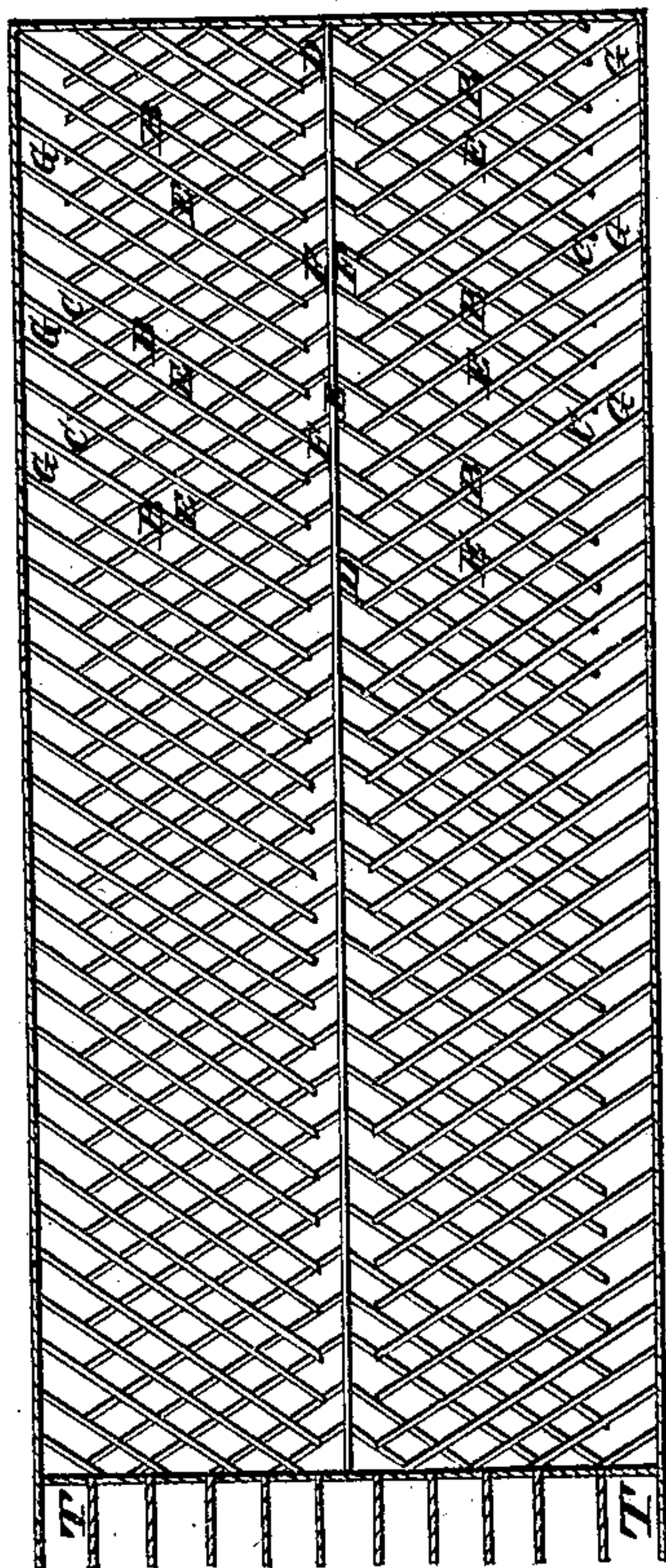


Fig. 3.



UNITED STATES PATENT OFFICE.

THOS. J. CHUBB, OF NEW YORK, N. Y.

ORE-SEPARATOR.

Specification of Letters Patent No. 18,085, dated September 1, 1857.

To all whom it may concern:

Be it known that I, THOMAS JONAS CHUBB, of the city, county, and State of New York, have invented certain new and useful improvements in machinery for separating foreign mineral or earthy substances from ores or other metallic substances and for separating ores and other substances of different specific gravities; 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, forming part of this specification, in which—

Figure 1, is a longitudinal vertical section of a machine with my improvements. Fig. 2, is a transverse vertical section of the same, in the line *x, x*, of Fig. 1. Fig. 3, is an inverted horizontal section of the same, in the line *y, y*, of Fig. 1. Figs. 4 and 5 are detail views of portions of the machine.

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

This invention consists in the combination of an inclined perforated or reticulated table or bed, to receive the substances to be separated; a bellows for drawing or forcing irregular currents of air through the said inclined perforated or reticulated bed and the substance thereon; and a number of channels, formed by strips of metal or other material, arranged upon the inclined perforated or reticulated table or bed, and leading in different directions, obliquely to the direction of the inclination of the said bed; the whole operating as hereinafter described, to effect the separation of the substances.

The invention also consists in a certain construction of the bellows, to obtain, as nearly as practicable, an equal distribution of air through all parts of the perforated or reticulated bed.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

A, is the stationary perforated or reticulated table or bed, composed of wire gauze or perforated sheet metal supported at its edges in such manner that, in its transverse section, it forms a segment of a cylinder, the concave side being upward, as shown in Fig. 2, and that it has a longitudinal inclination, as shown in Fig. 1. Above this bed or table A, is an upright box H, H, of the full size of the said bed or table.

B, B, (shown in Figs. 1, 2, and 3 and

separately in Fig. 4, which is a plan view,) are a series of strips of metal plate, placed edgewise upon the inclined table or bed A, and fitting close to the upper surface thereof; said strips of metal extending in two rows from the sides nearly to the center of the table or bed, and arranged parallel with each other, obliquely to the sides thereof, with their inner extremities toward the lowest end thereof. The spaces C, C, between the said strips of metal, constitute a series of channels, communicating with the space D, between the inner ends of the two rows of strips, which constitutes a channel extending along the center of the bed or table, A, from end to end thereof.

E, E, (shown in Figs. 1, 2, and 3, and separately in Fig. 5, which is a plan view,) are a second series of strips of metal, placed edgewise above and resting upon the strips B, B, whose upper edges occupy a plane as nearly as possible parallel with the upper concave surface of the bed A; the said strips E, E, extending in two rows from a line or plane drawn longitudinally above the center of the inclined table or bed to within some distance of the sides thereof, and arranged parallel with each other, obliquely to the sides of the table, or bed; but their obliquity being in an opposite direction to that of the strips, B, B, so that their outer extremities are toward the lower end of the table. These strips are connected with a long central strip E¹, of similar depth, extending the whole length of the bed or table A. The spaces F, F, between the strips E E, constitute a series of channels, communicating with the spaces G, G, between the outer ends of the strips E E, and the sides of the box H, H, which constitute channels leading from end to end of the inclined bed or table A, over the outer portions thereof.

I, J, K, is an exhausting bellows, placed above the channels C, C, and the channels F, F, and covering the entire area of the perforated bed or table A, except a short space all across the higher end thereof, which is occupied by the trunk of the feeding hopper. This bellows is composed of an open frame I, placed directly on the top of the strips E, E, and a perforated metal plate J, connected with the said frame I, by means of the leather side pieces K, K, and provided with a number of valves *a, a*, of leather or india-rubber. This bellows is divided into a number of chambers

L, L, L, by partition pieces *b, b*, in the frame I, that are connected by sheets of leather *c, c*, or other flexible material, with the perforated plate K, and each chamber is provided with a separate valve or valves; thus constituting in itself a complete bellows. In Fig. 1, each chamber is represented as being provided with two valves *a, a*. The valves are made of such size as, in the aggregate, to cover the whole plate J. M, M, are two-armed rockers, four in number, viz., two on each side of the machine, for operating the bellows, working on studs secured in the sides of the box H. These rockers are connected with the top plate K, of the bellows, by means of shafts *d, d*, extending all across the bellows, and are actuated by two eccentrics N, N, on a rotary shaft O, which is placed transversely above the bellows; said eccentrics being connected with the rockers by means of rods P.

Q, is the feeding hopper, placed above the highest end of the inclined perforated or reticulated bed A, and having its trunk extending down to within a short distance of the upper series of strips of metal E, E.

R, R, are a series of narrow sliding shutters operated by screws S, S, to close or open the space between the bottom of the trunk Q¹, of the hopper, and the top of the strips E. By regulating the opening of the several shutters R, R, the supply of the material to the bed or table A, may be regulated at all parts of its width.

T, is a spout, at the lower end of the table or bed A; and U, is one of a series of narrow sliding shutters, operated by screws V, to regulate the width of the entrance to the said spout from the lower end of the bed or table A, for the purpose of regulating the escape at different points in the width of the bed or table. The spout is divided into a number of compartments equal to the number of shutters U, U; the said compartments coinciding with the shutters.

The operation of the machinery is as follows: The crushed ore or other material to be operated upon,—having been preferably sorted into sizes by screening or otherwise, so that all the particles introduced to the machinery at the same time will be of nearly uniform size,—is fed into the hopper, and received on the upper part of the inclined perforated bed or table A. The action of the bellows, whose top plate J, rises and falls about 400 times a minute, causes the material to rise and fall a corresponding number of times, rising always in a line perpendicular to the face of the table or bed, under the influence of the currents of air drawn into the bellows as the plate J rises, but falling vertically under the influence of gravitation as the said plate descends, and consequently gradually passing from the higher toward the lower end of the table

or bed. The supply should be so regulated by the shutters R and U, as to keep the quantity upon the table or bed A, of a depth reaching to the top of the strips of metal, F F, or nearly so. The agitation of the material by the combined effects of the bellows and the attraction of gravitation cause those particles of matter having the greatest specific gravity to subside nearest to the face of the bed, and those of lesser specific gravity to rise above them; thus arranging the particles of matter in stratified layers. The strips B, B, and E, E, prevent the material from passing directly from the higher toward the lower end of the inclined perforated table or bed, and cause them to follow the direction of the channels C, C, and F F; and as the heavier matter finds its way into the lower series of channels C C, which lead toward the main channel D, in the middle of the machine, and the lighter matters into the upper series of channels F, which lead toward the main channels G, G, the heavier pass onward to the center of the spout T, while the lighter pass onward to the extreme sides thereof; each being received in one or more separate receptacles. When the material contains substances of several specific gravities, the heaviest will escape at the middle compartment of the spout T, the lightest at the compartments at the extreme sides, and the others at the compartments nearer to or farther from the center and sides, according as their specific gravity is greater or less. Any fine dust that may be caused to rise from the substances being separated will be extracted by the bellows, and expelled by the valves *a, a*.

By dividing the bellows into a number of chambers, as specified, I obviate the inconvenience that, in the use of a bellows with a single chamber, would result from the settling of the matters in a more dense or compact form on some parts of the table or bed A, than on other parts, the effect of which would be that the air meeting with an obstruction at one part of the table or bed, easily finds a free passage at another point, and fills the whole bellows; and consequently, the agitation of the matters, where they are densely packed, is not effected.

It will be readily understood that, when the bellows is divided into compartments, the partial vacuum formed above that part of the table or bed where there is an obstruction cannot be supplied with air passing through a distant part, but will continue to become more perfect as the bellows continues to open, till the excess of pressure of the atmosphere will almost certainly be sufficient to remove the obstruction. This division of the bellows into compartments is applicable to a forcing bellows as well as to an exhausting bellows.

I will remark that this operation differs entirely from the operation of screening; as the separation takes place all on one side of the perforated or reticulated bed A, which
5 merely constitutes a resting place for the substances to be separated, while acted upon by the bellows. I will also remark that the bellows may be placed below the perforated bed, instead of above it, as represented and
10 hereinbefore described, and that the table or bed may be flat instead of concave on its upper face; the only advantage in making it concave is that it will retain its form, while if flat it will sag down at the center.

15 I will further remark that the bellows may be so modified that the divisions or dividing strips may be of sheet metal or other material lapping over each other and that the strips of metal plate B, B, and E, E,
20 may extend the whole distance across the bed A similar to dividing the machine, through the center longitudinally at E'.

I do not claim the separation of substances of different specific gravities, by submitting

them to the action of a blast of air through 25 a screen; but—

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. The employment in combination with an inclined perforated table or bed, and a 30 bellows, operating as specified, of a number of channels applied and arranged substantially as described, relatively to the bed and to each other, to convey away the separated substances in different directions, as herein 35 set forth.

2. The division of a bellows, applied and operating in connection with a perforated bed for the separation of articles of different specific gravity, into numerous chambers or 40 compartments, each having its separate valve or valves and constituting in itself a complete bellows, for the purpose herein specified.

THOS. J. CHUBB.

Witnesses:

S. H. WALES,
J. F. BUCKLEY.