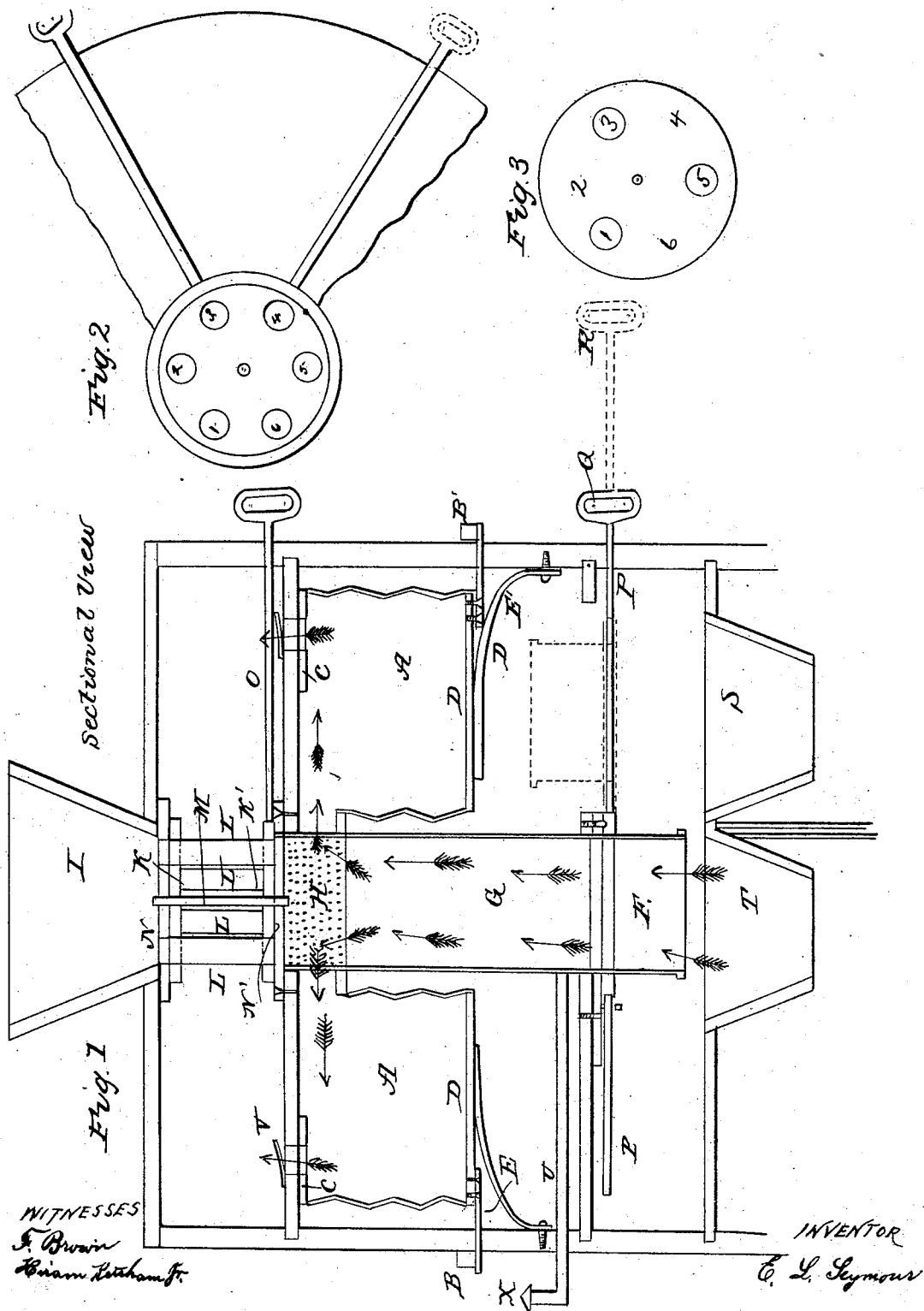


E. L. SEYMOUR.

Ore Separator.

No. 45,757.

Patented Jan. 3, 1865.



UNITED STATES PATENT OFFICE.

EDWARD L. SEYMOUR, OF NEW YORK, N. Y.

IMPROVED ORE-SEPARATOR.

Specification forming part of Letters Patent No. **45,757**, dated January 3, 1865; antedated December 3, 1862.

To all whom it may concern:

Be it known that I, EDWARD LOUIS SEYMOUR, of the city, county, and State of New York, have invented a certain new and useful Method of Concentrating Gold, Silver, and other Ores and Granular Matter of any Kind, of which the following is a full and clear explanation.

My present method is a modification of the method of operating heretofore employed by me, and for the adaptation of which Letters Patent have heretofore been issued. But as heretofore essayed by me there was employed a compressed-air current, the object of which was to lift the particles of sand, earth, gold dust, &c., "in suspension" for an instant in a forced blast of air, and then, during its cessation, permitting the particles, of whatever nature, to settle, according to their specific gravity, the heaviest settling lowest. In this method, however, I met with much difficulty in providing such mechanical arrangements as would effectually insure the air-current passing through the mass to be treated with an evenly-distributed flow and a uniform force, the latter being for the treatment of very fine dust, too dependent on the delicacy of manipulation and tact of the operator. Further, the forced blast tends to burst through the mass in self-separated or isolated jets, and thus project particles of gold through and above the upper strata of valueless and lighter matter, and so proportionately counteract the desired effect of separation according to relative specific gravities. As before remarked, mechanical means cannot (in an otherwise unobjectionable form) be adapted to obviate this difficulty in treating auriferous ores or earth and other substances containing very fine particles of gold, silver, or other metals, &c.; but I have discovered a method of action that does so effectually. This consists in the partial intermittent removal—i. e., rarefaction or dilation of the air above and within the mass of material under treatment—this being effected by "exhaustion" by means of a pump or bellows or device of that nature.

It will be presently perceived that my principle of action may be applied in many modifications of apparatus and to the separation or concentration of various pulverized mineral ores, as well as granular substances of any

and every kind. I will therefore illustrate it only in the simplest of the several forms which I have employed with complete success.

Figure 1 of the accompanying drawings is a vertical section of a simple machine on my new system.

A is an exhausting-bellows, operated by the levers B B'. The top of this bellows is stationary. (See C.) The bottom of the same, D, when at rest, is supported and kept in close vicinity to the top by means of the springs E E', or by counter-weights, or any other convenient arrangement.

F is a movable box with perforated bottom, made of metal, sieve-cloth, or any other convenient material, closely fitting into the lower extremity of the hollow cylinder or trunk G, the upper part of which, H, is made of a perforated plate of tin, zinc, copper, iron, or any other suitable material. The cylinder in question is surmounted by a supplying-funnel, I.

K K' are two movable plates or diaphragms, connected together by six metallic tubes or pipes, L, (the section only shows four of them,) the extremities of which are exactly fitted into the six holes of each of the two plates or diaphragms aforementioned. The relative position of the six holes is shown in Fig. 2, and marked, respectively, 1, 2, 3, 4, 5, 6. These two plates thus connected form a single vessel or instrument, with six equal and equidistant compartments or receptacles of any convenient capacity moving around a common center, M, between two stationary plates or diaphragms, N N', with three holes each, as shown in Fig. 3, marked 1, 3, 5. The solid portions 2, 4, 6 of the lower plate, N', are so placed that they face exactly the open spaces 1, 3, 5 of the upper plate, N. The ore or granular matter in the funnel rests on the solid spaces 2, 4, 6 of the lower stationary plate, N'.

By operating with the rod or handle O, attached to the lower movable plate, K', in shifting the same from right to left, or vice versa, it is easily understood how regularly the machine can be fed, and requires, therefore, no further description. It must, however, be remarked that each separate charge of ore or grain, &c., (as the case may be,) which the feeding-funnel I supplies, and which falls down and rests upon the perforated bottom of the

drawer F, must be more than sufficient to fill the said drawer—sometimes twice, thrice, or even four times as much—according to the relative richness or poverty of the matter under treatment.

The machine is operated as follows: The charge of ore or grain, &c., as the case may be, being let down upon the bottom of the drawer F, the exhausting-bellows A is expanded by means of the levers B B' or any other suitable arrangement. The air within the trunk or cylinder G above the layer or charge of ore or grain, &c., resting upon the bottom of the aforesaid drawer, is rarefied. This causes the air within the mass to dilate, and, with the help of the ambient air which rushes through the open interstices of the bottom of the drawer (as shown by the arrows) to lift, separate, and momentarily suspend and isolate the particles, imparting to the mass an action the appearance of which to the eye may be best expressed as "breathing." This being repeated for some time the particles settle according to their relative specific gravity. When, by withdrawing the drawer F from under the trunk or cylinder G by means of the rod P, attached to the drawer, and by turning half-ways, or nearly so, the said rod P, as soon as the handle from the position it occupies at Q has reached that at R, the contents of the drawer F—viz., the concentrated matter—will be upset, and thus suffered to fall down into the trough S after the superincumbent refuse had already fallen out of the open or bottomless trunk or cylinder G into the other trough, T. The drawer is now brought back to its original position, the funnel is made to supply a fresh charge, and the same process of working is repeated over and over again until the whole mass has been worked.

In concentrating and separating grains

which contain much chaff, or husks, smut, &c., I employ the air-pipe U in connection with the cylinder G, so that when, after each stroke of the levers B B', the fine dust out of the ore or grain which passes through the perforated or upper portion, H, of the cylinder G, into the bellows A, and thence escaping through the valves V V' into the air, the husks or chaff, smut, &c., will pass through the air-pipe U by lifting the valve X into a separate receptacle, box, or room.

After all the stuff on hand has been worked the concentrated matter, if desirable, can be made to undergo the same manipulation and treatment over and over again until it is perfectly pure. The same can be done with the refuse if likely to pay for the trouble. The depth of the drawer F varies from one to eighteen inches, according to the nature, quality, and size of the particles of the matter to be concentrated.

Having now fully described my improved method of concentrating metalliferous ores, earths, and other granular matter, what I claim, and desire to secure by Letters Patent, is—

1. The combination of trunk or cylinder G with the movable drawer F, for the purpose of separating and separately delivering the refuse and the concentrated portion of each separate charge, as described.
2. In combination with the cylinder G, the air-pipe U, as described, and for the purpose described.
3. The combination of the exhausting apparatus A, or its equivalent, with the movable box F, with or without the cylinder G, as described, and for the purposes described.

E. LOUIS SEYMOUR.

Witnesses:

LEWIS KETCHUM,
HIRAM KETCHUM, Jr.