S. THOMAS.

Ore-Separators.

No. 200,360. Patented Feb. 12, 1878.

Fig. 1

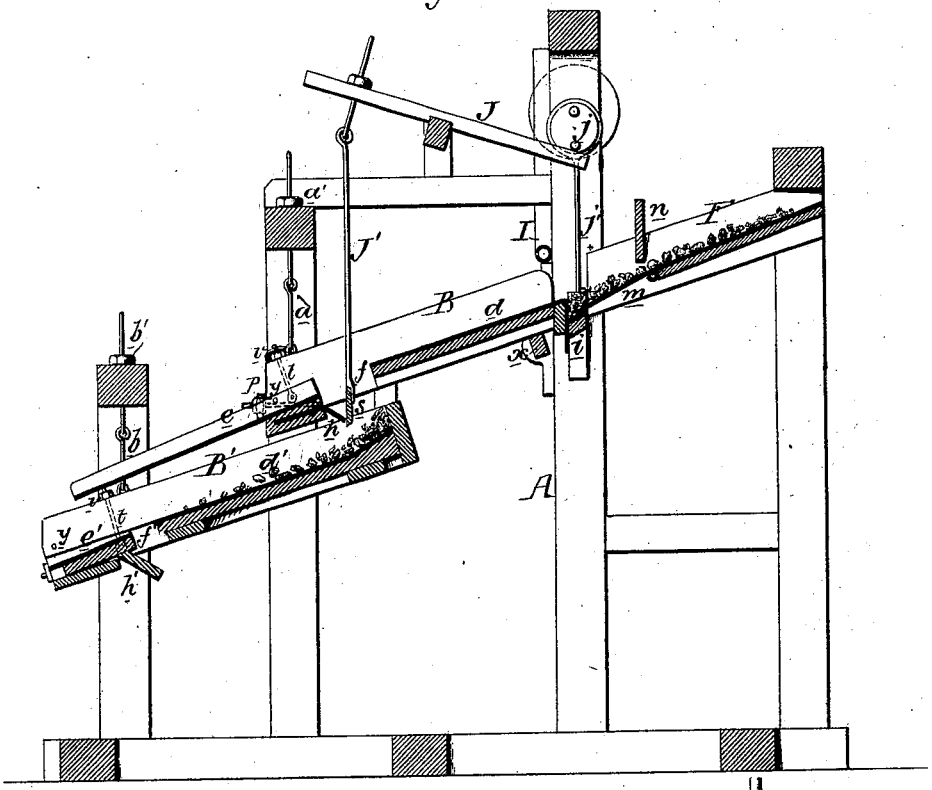


Fig. 3

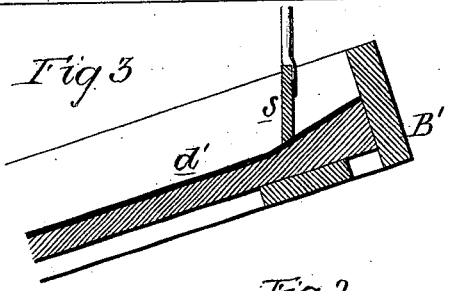


Fig. 4

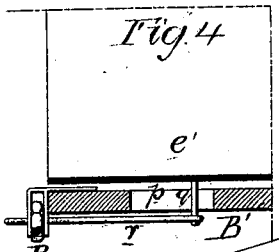


Fig. 2

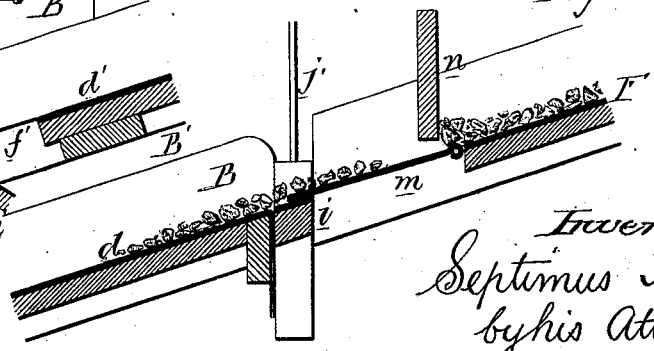
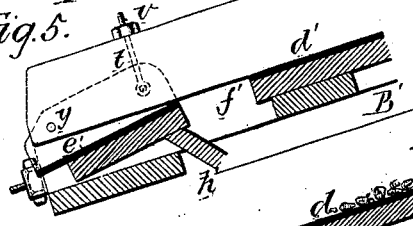


Fig. 5.



Witnesses

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Harry Smith

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UNITED STATES PATENT OFFICE.

SEPTIMUS THOMAS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ORE-SEPARATORS.

Specification forming part of Letters Patent No. **200,360**, dated February 12, 1878; application filed February 16, 1877.

To all whom it may concern:

Be it known that I, SEPTIMUS THOMAS, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Processes and Mechanism for Separating Mineral Substances, of which the following is a specification:

My invention relates to certain improvements in machines for separating impurities from coal, ores, &c., such as described in the patent granted to me on the 6th day of April, A. D. 1875, the object of my present invention being to simplify the construction and improve the operation of a machine of this class. This object I attain in the manner hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of my improved separating-machine; and Figs. 2, 3, 4, and 5, detached views, drawn to an enlarged scale, of parts of the machine.

Between two substantial frames, A, is hinged at *x* a frame, B, which, by means of a jointed rod, *a*, and nut *a'*, can be adjusted to any desired inclination. The frame B carries an inclined plane, *d*, of stone or other material best adapted to the mineral to be operated on. Below the inclined plane *d* is a second plane, *e*, there being between the two planes an opening, *f*, and below the latter an inclined chute, *h*, secured to the plane *e*, the latter being carried by the frame B. To the frame B is suspended the upper end of a similar frame, B', having planes *d'* and *e'*, an opening, *f'*, between them, and an inclined chute, *h'*, the lower end of the said frame B' being suspended from a cross-bar of the frame A by means of a jointed rod, *b*, having a nut, *b'*, so that by turning the nut the frame can be adjusted to different inclinations independently of the upper frame. Near the top of the frame A is an inclined platform, F, down which the broken coal, ore, or other granular material is permitted to pass to the feeder, the latter consisting of a slide, *i*, arranged immediately adjacent to and extending across the whole width of the upper end of the plane *d*. A vertical reciprocating movement is imparted to the slide by the eccentric *j* and rod *j'*, and the said slide is caused to operate in conjunction with a hinged section, *m*, of the platform F and an adjustable gate, *n*, the parts being arranged in the manner shown in Figs. 1 and 2, so that when the slide *i* is depressed, as in Fig. 1, the material can pass beneath the gate and down the section *m;* but when the slide is raised so as to deliver the material onto the plane *d*, the section *m* is so close to the gate *n* that the passage of the material is prevented. Immediately over and extending across the upper end of the plane *d* is a perforated pipe, I, for discharging a number of small streams of water onto the said plane *d* near the upper end.

As regards the planes *d* and *d'*, they must, as before remarked, be made of a substance best adapted to the material to be separated. For separating broken coal, for instance, they may consist of slate, marble, or other stone, as described in my former patent; but for separating broken iron ore they may be of cast-iron, the substance being in all cases such that the waste portions of the mineral to be separated will have a greater or a less frictional affinity for the surface of the plane than the more valuable portions. Thus, in separating impurities from coal, the slaty particles of coal, owing to their granular structure, are retarded by friction against the stone-surface of the plane and fall abruptly therefrom, while the particles of coal being without grain are not retarded to the same extent as the slaty matter, and acquire greater velocity, and pass across the opening between the planes, as described in my former patent.

In separating ores, &c., however, with a cast-iron or other suitable plane, it is the valuable portion of the ore which is retarded and falls through the opening *f*, the waste portions passing the opening. It will thus be seen that, while the process is substantially the same in both cases, the character of those portions of the material treated which pass through the opening *f* depends upon the nature of the material itself.

I wish it to be understood, however, that I do not confine myself to any specific material whereof to make the inclined planes. They may, for instance, be made of cast-iron, or of wood covered with plates of cast or sheet iron, or removable slabs of stone or other material suitable for the mineral to be separated. In most cases, however, I find it advisable to

cause water to constantly flow down the planes, for the purpose of maintaining the surface in proper retarding condition.

The slide *i* is reciprocated at a proper speed for permitting the granular material to be deposited on the upper end of the first plane *d* in such quantities that a thin layer of each particle in contact with the surface of the plane will slide and not roll down the latter.

As the material which passes through the opening *f* is still somewhat mixed, however, I direct it, by the chute *h*, to the second plane *d'* of the frame B', so that there may be a further separation, and a third or even fourth plane may be employed in some cases.

By inclining the chute *h* for directing the material from one plane to the other in a direction the reverse of the inclination of the planes, the material is delivered to the lower plane with comparative uniformity; but, in order to insure the proper sliding of the material down the second plane, I place near the top of the same a gate, *s*, Figs. 1 and 3, to which a vertical reciprocating motion is imparted from the eccentric *j* through the medium of the lever J and rod J'. This gate serves to collect the material at the upper end of the plane *d'*, and, when open, to permit the same to pass down the plane in the proper condition.

To prevent such a slow movement at the start as would render the material liable to be caught under the gate in its descent, I make the head of the plane *d'* more steeply inclined than the body of the same.

I have found that it is important in many cases to arrange the lower planes at a different inclination to that of the plane above; hence the frames B and B' are provided with separate appliances for independent adjustment.

It is also important that provision should be made for enlarging or contracting the opening *f* between the two planes of each frame, and for varying the relative vertical positions of the adjacent edges of the same. This I accomplish by the device shown in Figs. 4 and 5.

The planes *e* and *e'* are hung to the sides of the frames B B' at *y*, and the front ends of the frames are supported by rods *t* having nuts *v*, which bear on the edges of the frames. Projecting from each side of each of the planes, and through slots *p* in the side frames, are pins *q* connected to stems *r*, threaded at the outer ends, and adapted to nuts P turning in rigid frames secured to the side bars of the frames B B'.

It will thus be seen that by turning the nuts *v* the upper ends of the planes *e e'* can be elevated or depressed, while by turning the nuts P said upper ends may be caused to approach or recede from the lower ends of the planes *d* and *d'*.

I claim as my invention—

1. The combination of the inclined platform F, hinged section *m*, and a vertically-reciprocating slide or gate, *i*, with the frame B and its inclined plane *d*.

2. The combination of the frame B and its inclined plane *d*, and the vertically-reciprocating slide *i* with the platform F, its hinged section *m*, and the gate *n*, as described.

3. The combination of the frame B, with its inclined planes *d* and *e*, leaving an intermediate opening, *f*, and the inclined chute *h*, with the frame B', its planes and opening.

4. The combination of the planes *d* and *e* leaving an intermediate opening, *f*, with the plane *d'* and the reciprocating gate *s*.

5. The combination of the frame B, carrying the planes *d e*, with the frame B', carrying the planes *d' e'*, the two frames being independently adjustable at different inclinations.

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

SEPTIMUS THOMAS.

Witnesses:
HERMANN MOESSNER,
HARRY SMITH.