T. R. TIMBY.

ORE SEPARATING AND AMALGAMATING MACHINE.

No. 246,245. Patented Aug. 23, 1881.

FIG-1-

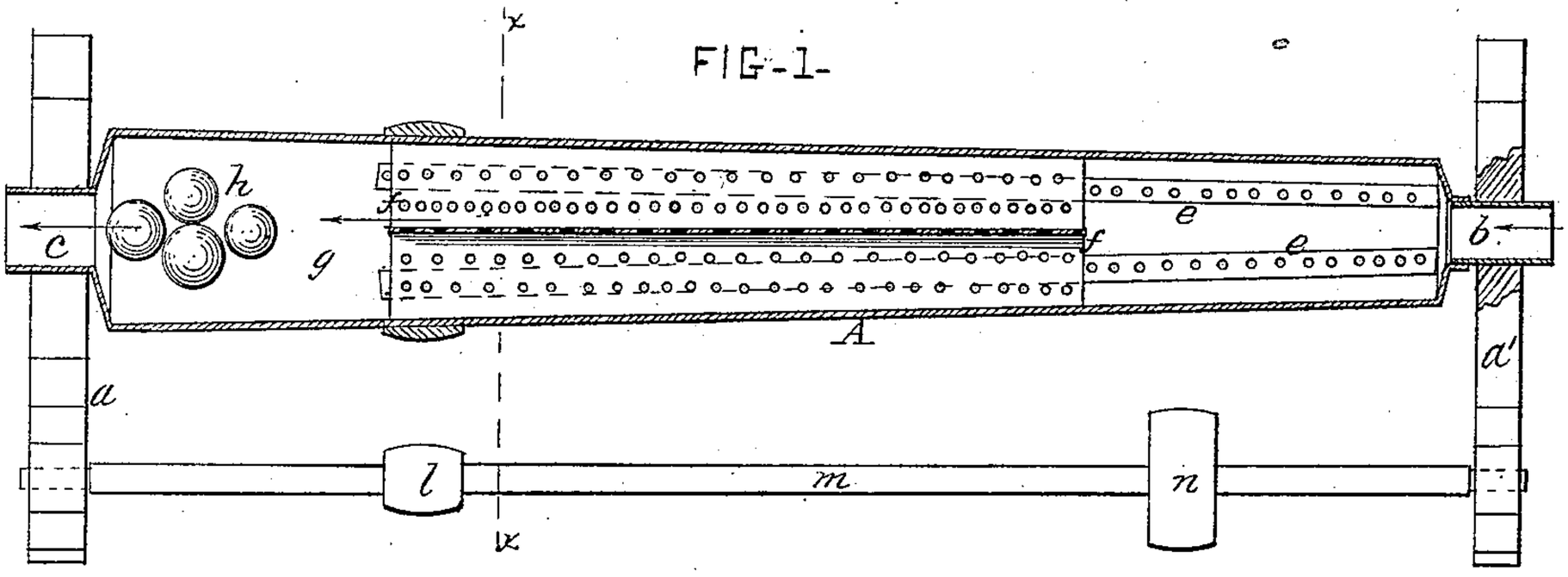


FIG-2-

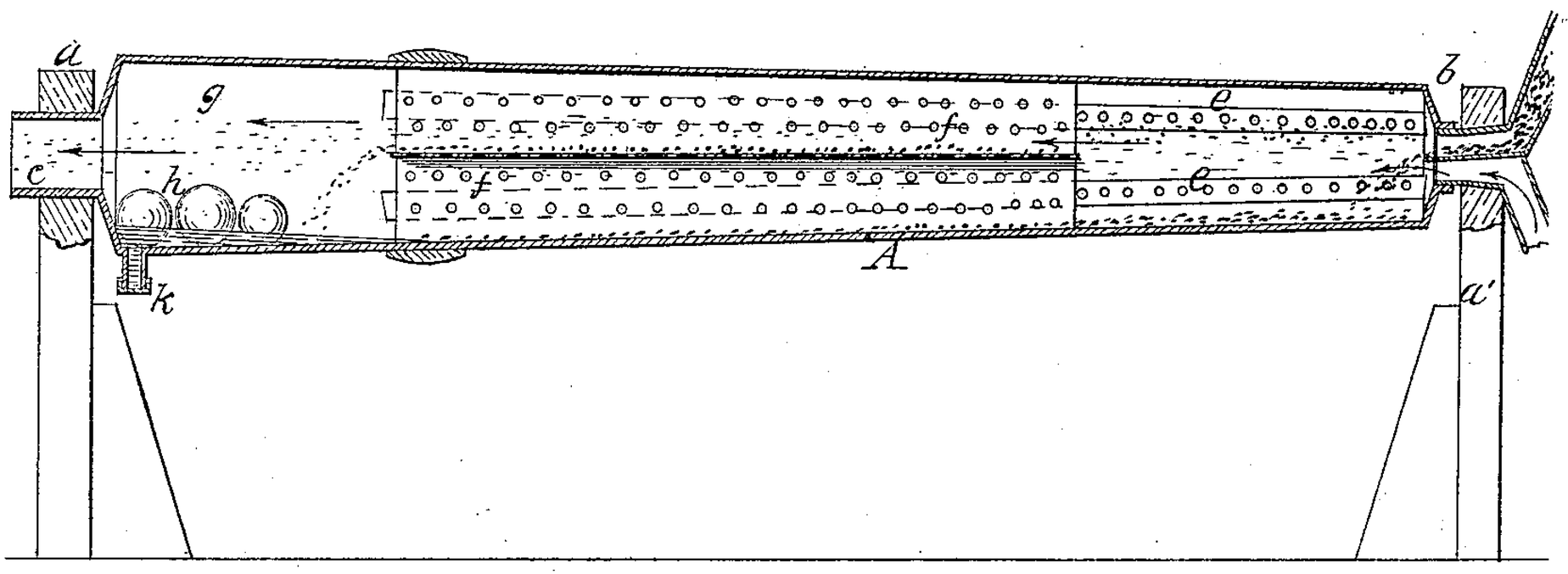


FIG-3-

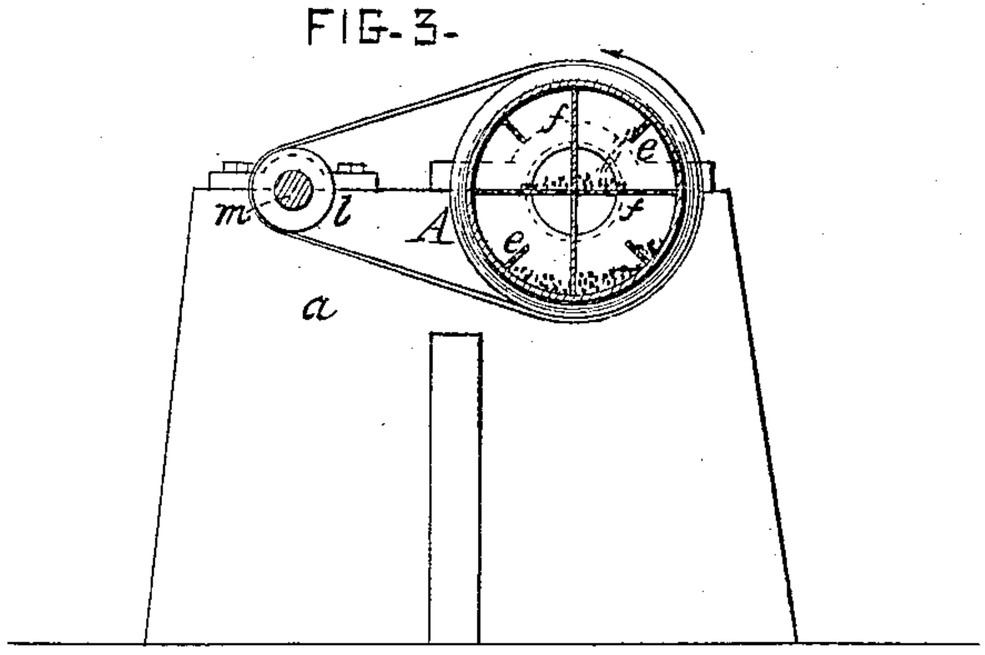
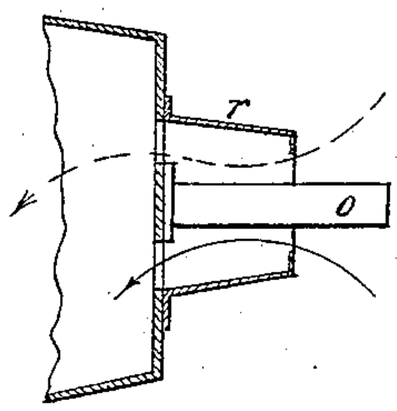


FIG-4-



ATTEST =
Chas. M. Higgins.
John E. Travis

INVENTOR =
Theodore R. Timby
by S. H. Wales Hsn
his attys.

UNITED STATES PATENT OFFICE.

THEODORE R. TIMBY, OF NYACK, NEW YORK.

ORE SEPARATING AND AMALGAMATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 246,245, dated August 23, 1881.

Application filed August 15, 1879.

To all whom it may concern:

Be it known that I, THEODORE R. TIMBY, of Nyack, Rockland county, New York, have invented certain new and useful Improvements in Ore Separating and Amalgamating Machines, of which the following is a specification.

My present invention aims to provide a simple and effective separating-machine which will separate the earthy or lighter particles from the heavy or metallic particles by a continuous agitation of the ore, together with an air-blast blown over and through the agitated mass, the earthy portion being blown out with the air, while the metallic portion gravitates to one end of the machine, where its amalgamation may be effected immediately after its separation, and before leaving the machine.

The main feature of my invention may be stated to consist in a separating-machine formed of a close cylinder or tube arranged to rotate, and provided on its interior with peripheral and radial flanges, ribs, partitions, or equivalent projections, and having either end mounted on hollow journals, through one of which the stream of ore, together with a blast of air, is admitted, while through the opposite journal the spent blast, together with the light particles, escapes, while the heavier particles gravitate to one end of the cylinder, preferably into an amalgamating-chamber.

The invention also embodies additional features, as hereinafter fully set forth.

Figure 1 of the annexed drawings presents a plan view of my improved machine, the cylinder being shown in section. Fig. 2 is a longitudinal sectional elevation thereof, and Fig. 3 a cross-section on *x x*.

In the drawings, A indicates a long tube or drum, preferably of circular section, as seen in Fig. 3, which is mounted in a proper manner on strong uprights *a a'* of a suitable framework or foundation. The drum, as shown, is preferably arranged with its axis horizontal, and is formed slightly tapering, so that its contents will naturally tend to gravitate slowly toward its broad end; but it will be observed that the drum may be cylindrical, and set slightly inclining, if preferred, with equivalent effect. Each end of the drum is journaled, so as to be capable of revolving in the top of the uprights *a a'*, the journals being either supported in journal-boxes of ordinary form or on friction-rollers, as may be thought best. The drum may be slowly revolved by an encircling-belt from the pulley *l* on the shaft *m*, which is itself revolved by power applied to the pulley *n*, as will be easily understood from Figs. 1 and 3. It will be observed that the journals of the drum are hollow, and form at the same time, respectively, the inlet and outlet of the machine.

The journal *b*, at the small end of the machine, which forms the inlet thereto, is fixed in the upright *a'*, and a tubular neck on that end of the drum rotates therein, as illustrated in Figs. 1 and 2. The journal *c*, at the opposite end of the drum, forms the outlet of the machine, and revolves in the bearing on the upright *a*, as illustrated. The fixed journal *b* is divided, as seen best in Fig. 2, by a central partition into two passages, through the upper one of which the pulverized ore is admitted into the cylinder by a chute extending therefrom to a hopper or reservoir of the ore, while the lower one connects by a pipe with a fan-blower or other air-blast apparatus, from which an energetic air-current is passed through the journal and blown through the cylinder, escaping therefrom through the eduction-journal at the opposite end, as illustrated in Figs. 1 and 2.

The interior of the drum is provided with a series of flanges, ribs, or equivalent projections, *e f*, extending from the inner periphery of the drum, preferably in a radial direction, toward the center. These flanges may extend but a short distance from the periphery, or may be extended fully to the center of the drum, forming a series of compartmental partitions, dividing the drum into distinct segments or compartments, and they may extend the full length of the cylinder, or but a part of its length. I prefer, however, to form a combination of these two possible arrangements, as shown in the drawings. Thus I prefer to fit the interior of the drum with one series of narrow flanges, *e*, projecting but a short distance radially from the periphery of the drum, and extending in a longitudinal direction thereon, preferably from the inlet end to nearly the outlet end, and I prefer to combine with these narrow ribs or

flanges two full diametric partitions, *f f*, arranged at right angles to each other, and alternating with the narrow ribs *e e*, as shown best in Fig. 3. These partitions *f f* are preferably about half the length of the drum, and arranged midway therein, so as not to extend to either end, as shown clearly in Figs. 1 and 2, and these partitions, as well as the flanges, are preferably perforated over their whole extent with fine perforations, as illustrated.

It will now be readily understood that when the apparatus is in action, the drum being slowly revolved while the ore and air are admitted thereto, the current of air, being first admitted under the falling stream of ore, scatters the same effectively on its entrance to the drum, after which it is at once further agitated and carried up in small masses by the flanges *e* on the rising side of the drum, from which it soon slides in thin descending masses through the air-current, which is blowing rapidly through the drum, and which effectively carries off the lighter particles of the ore, which are thus freely exposed to its influence, and discharges the same through the outlet, while the metallic particles gravitate to the bottom of the drum and gradually travel to the lower end thereof. It will also be observed from Fig. 3 that as the ore slides off the flanges *e* it falls on the perforated partitions *f*, toward the center thereof, where it is momentarily retained under exposure to the central or strongest portion of the blast, which effectually blows out the lighter particles, while the heavier particles fall through the perforations. It will hence be seen that by this construction, which is simple and inexpensive, a certain and rapid winnowing action is produced, which effectually separates the non-metallic from the metallic particles; and it will be readily understood that by regulating the force of the air-blast the apparatus may be adjusted to suit various ores, it being only necessary to adjust the force of the blast so that it will be just sufficient to carry off the lighter particles without affecting the heavier ones, and hence allowing the latter to remain within the drum.

I prefer to leave an unobstructed chamber, *g*, at the delivering end of the drum, into which the separated metallic portion of the ore gradually travels during the operation of the machine, and in which the ore may be amalgamated just as its separation occurs. A shallow depth of quicksilver is therefore placed in this chamber, as illustrated, and in this are arranged several metallic balls, *h*, which, as the drum revolves, roll about therein and thus assist in keeping the ore mixed with the quicksilver, and thus promote the amalgamating action thereof, as will be readily understood. When the amalgamation is sufficiently advanced the quicksilver may be removed through the tap *k* for distillation, and a fresh charge being again inserted the action of the machine may be continued. By this means it will be seen that the separating and amalgamating actions are performed continuously and harmoniously in the same machine, thus rendering the treatment of the ore rapid, certain, and economical.

The journal ends of the drum A may sometimes be formed as shown in Fig. 4, which is a simple equivalent or modification of the construction shown in the main figures—that is, the cylinder may revolve on the solid journal or gudgeon *o*, fixed to the end thereof, while the stream of ore and blast of air may be admitted through a tubular neck, *r*, around the journal, as indicated by arrows.

What I claim as my invention is—

1. The ore separator and amalgamator herein described, consisting, essentially, of an inclined or tapering drum or cylinder revolving on hollow journals with internal agitating and sifting flanges, an amalgamating-chamber, and appliances for introducing ore, and an air-blast at one end, and discharging the lighter particles of ore at the other, all as herein shown and described.

2. The combination, in the drum A, of the longitudinal partitions *f*, separating it into different compartments, and the interposed ribs *e*, for agitating and sifting the ore, as explained.

3. The combination, in the ore-cylinder A, of the partitions and ribs *f e*, and amalgamating-chamber *g* and balls *h*, as shown or described.

4. The rotary drum A, provided with an inlet and an outlet at its respective axial ends, with internal agitating partitions or ribs, and having its delivering and separating end formed into an amalgamating-chamber, *g*, whereby amalgamation immediately occurs after separation, and the two operations are performed continuously and harmoniously in the same machine, substantially as herein shown and described.

5. In combination with a cylindrical ore-separator, an amalgamator connected with the waste-discharge end thereof, consisting of a mercury-trough forming an integral part or continuation of said separator.

6. In combination with the separating-cylinder A, having expanded end forming an amalgamating-trough, a ball or roller, *h*.

THEODORE R. TIMBY.

Witnesses:
EDWARD H. WALES,
CHAS. M. HIGGINS.