J. MICKELSON.

ORE CONCENTRATING APPARATUS.

APPLICATION FILED JULY 17, 1916.

1,219,128.

Patented Mar. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

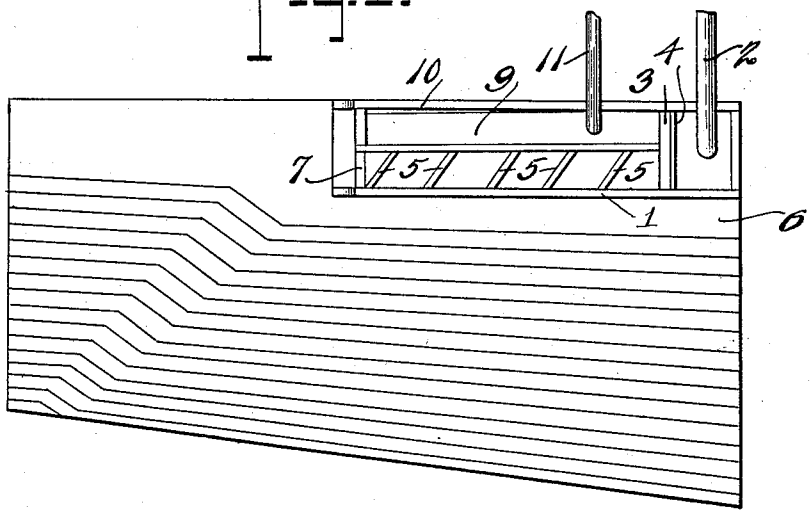


Fig. 2.

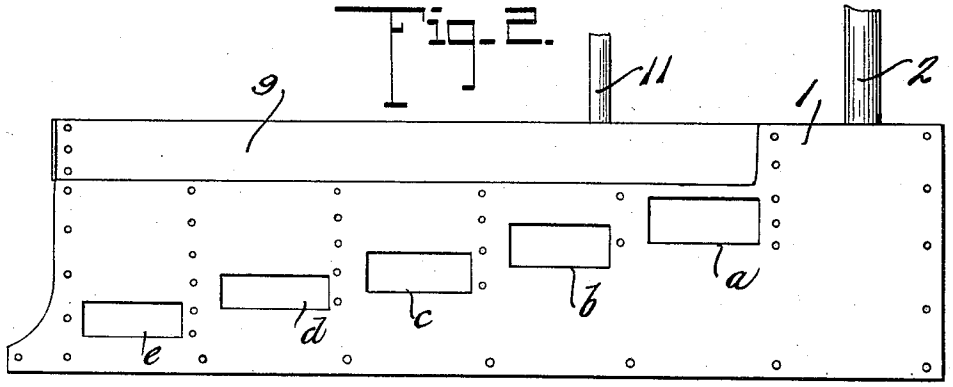
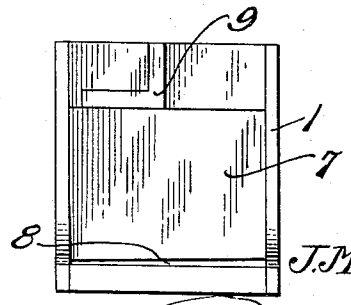


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

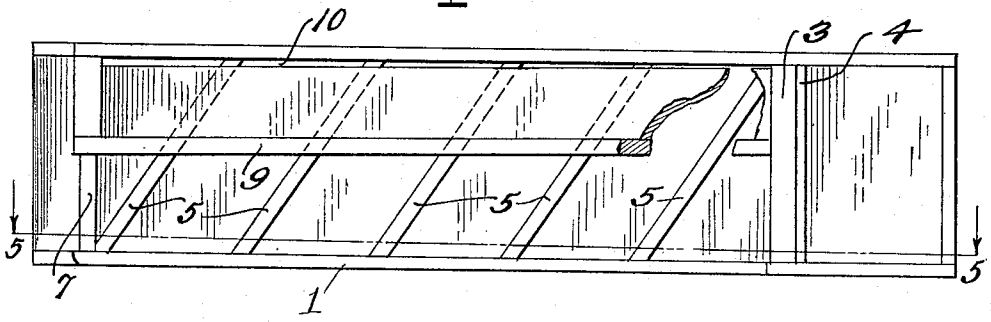
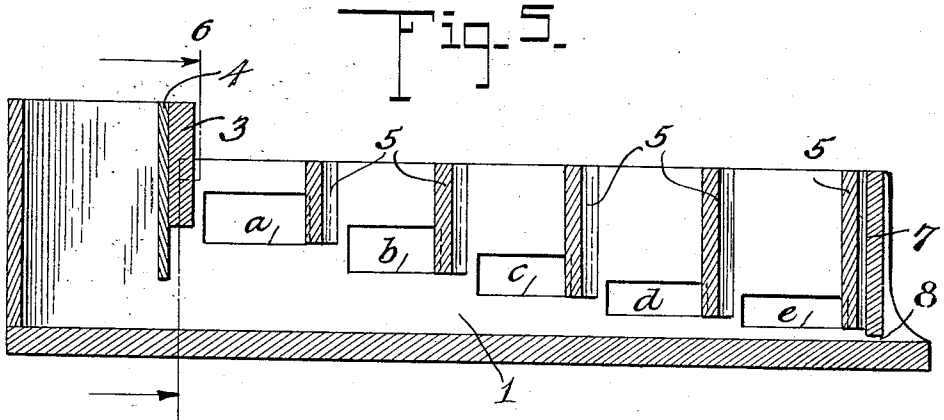


Fig. 5.



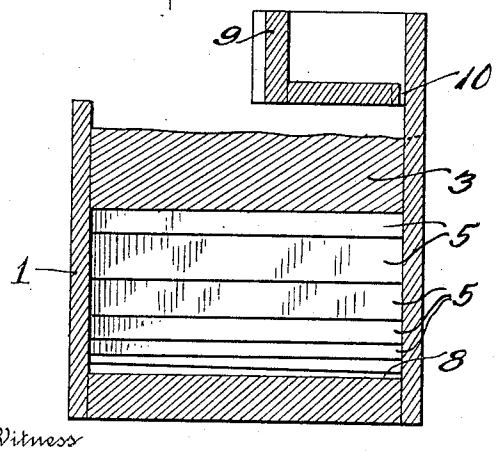


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN MICKELSON, OF ANACONDA, MONTANA.

ORE-CONCENTRATING APPARATUS.

1,219,128. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed July 17, 1916. Serial No. 109,710.

To all whom it may concern:

Be it known that I, JOHN MICKELSON, a subject of the Czar of Russia, residing at Anaconda, in the county of Deerlodge and State of Montana, have invented certain new and useful Improvements in Ore-Concentrating Apparatus, of which the following is a specification.

The present invention appertains to improvements in ore concentrating and classifying apparatus. The primary object is, as usual, to obtain higher recovery of the valuable contents of the ore and in carrying out the invention it is contemplated to employ means to separate the ingredients according to their specific gravities, the classified constituents being delivered from the apparatus through the medium of a counteracting pressure fluid progressively acting upon said constituents while in suspension at different levels.

An important feature of my invention is the provision of means for controlling this counteracting pressure so that its effect will be in proportionate ratio of increase to the increase in weights or gravities of the ore contents.

For a full understanding of the present invention, reference is to be had to the following description and the accompanying drawings, in which:

Figure 1 is a top plan view of the invention.

Fig. 2 is a side elevation.

Fig. 3 is an end elevation thereof.

Fig. 4 is an enlarged top plan view of the concentrator, partly broken away.

Fig. 5 is a longitudinal sectional view thereof on the line 5—5 of Fig. 4.

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 5.

Throughout the following detail description, and on the several figures of the drawings, similar parts are referred to by like reference characters.

Specifically describing the invention, 1 designates an elongated receptacle or tank into one end of which the ore flows through the feed pipe or conduit 2, this intake end of the receptacle being provided with a transverse partition 3 and a control gate 4 adjacent thereto. The receptacle 1 at one side is formed with a series of discharge outlets or openings *a*, *b*, *c*, *d*, and *e*, which outlets are arranged in stepped relation decreasing in height from the intake end of the receptacle. Intermediate each of these outlets the receptacle is provided with a diagonally arranged partition 5 each of which depends from the top of the receptacle to a point substantially on a level with the next succeeding outlet directly adjacent thereto. It will thus be apparent, particularly by reference to Fig. 5 that the ore contents which move longitudinally of the receptacle will be intercepted at different levels by these partitions or baffles and since the said contents are mixed with water, the particles of the ingredients will assume distinct strata, this stratification depending, of course, upon the specific gravity of such particles. The lighter of the particles will rise readily to assume the upper stratum which will, as more clearly explained hereinafter be held in suspension by the first of the baffles 5, the next stratum by the second of such baffles, etc., so that the lighter constituents, technically the slimes, will flow out of the receptacle through the outlets nearest the intake end thereof, the middlings passing out of the intermediate openings and the highest grade ore concentrates moving out of the end exits. This receptacle 1, it will be noted by reference to Fig. 1 of the drawings is supported upon a roughing table 6 onto which the ingredients of the ore material pass in classified grades. The end wall 7 of the receptacle is provided with a transverse opening 8, which opening is of gradually increasing width toward the side of the receptacle which is provided with the lateral outlets *a*—*e* above referred to.

As hereinbefore premised, an important feature of my invention is the provision of a special form of fluid conduit, which is designated in the drawings by the reference character 9. This conduit is in the form of a trough arranged on the top of the receptacle and at the end of the baffles 5 opposite the ends adjacent to the discharge outlets *a*—*e*. It will be noticed that the bottom of this trough is cut away to provide a continuous discharge opening 10 extending the full length of the trough substantially from one end of the receptacle to the other. This opening as will be observed in Fig. 4 gradually increases in width from the intake end of the receptacle toward the opposite end so that the fluid supplied to the receptacle by this conduit has a gradual increasing effect toward the discharge end of the receptacle

and this gradual increase of effect is substantially proportionate to the gradual increase in size or gravity of the ingredients of the ore. Being located at the opposite side of the receptacle with respect to the lateral discharge outlets *a*—*e*, the fluid which is introduced into the conduit or trough 9 by the supply pipe 11 induces a counteracting or transverse movement of the ore constituents so as to cause the same to pass out of these outlets on to the roughing table as hereinbefore mentioned. It thus follows that the respective strata of the ore are carried from the receptacle by a pressure which is commensurate with the specific gravity of the several strata. The arrangement of the fluid supply with respect to the receptacle not only induces this transverse movement but facilitates the separation of the particles and the diagonal arrangement of the baffles 5 enhances the tendency of the induced flow of the ore ingredients in classified form from the concentrator apparatus.

Having thus described my invention, what I claim as new is:

1. In ore concentrating apparatus of the class described, the combination of an elongated receptacle into which the ore is fed longitudinally having a bottom unobstructed as to the longitudinal flow and a series of lateral discharge outlets, and means arranged opposite said outlets and sufficiently above the receptacle for supplying a falling fluid pressure to said receptacle effective transversely of the feed whereby to separate and induce a transverse movement of the ore contents through said outlets.

2. In ore concentrating apparatus of the class described, the combination of an elongated receptacle into which the ore is fed in a longitudinal direction having a series of lateral discharge outlets arranged in stepped relation to the bottom of the receptacle, and supply means arranged over the surface of the ore stream in the receptacle having a varying discharge disposed longitudinally of the receptacle for supplying a downwardly acting separating medium in gradually increasing impinging force and effect proportionately to the increasing weight or size of the ore contents at a particular part of the receptacle.

3. In ore concentrating apparatus of the class described, the combination of a receptacle into which the ore is fed having lateral outlets, means in said receptacle arranged at different planes from the bottom of the receptacle for holding the ore contents in suspension in separate strata according to their specific gravities, and means for supplying a gravitating pressure medium arranged at different heights from the several strata for separating and inducing counteracting lateral movement of the respective strata through the lateral outlets.

4. In concentrating apparatus of the class described, a receptacle into which the ore flows and having separate compartments, and a fluid conduit extending longitudinally of the receptacle and having a continuous discharge opening extending the length of the receptacle to simultaneously feed into the several compartments.

5. In concentrating apparatus of the class described, a receptacle into which the ore flows divided into a series of compartments, and a fluid conduit extending longitudinally of the receptacle having a varying size continuous discharge opening extending throughout its length to feed the fluid into the compartments in volumes varying toward the discharge end of the receptacle whereby the contents of said compartments are varyingly affected.

6. In concentrating apparatus of the class described, a receptacle into which the ore flows, and a fluid conduit extending longitudinally above and at one side of the receptacle and having its bottom cut away to form a discharge opening gradually increasing in size from the intake end of the receptacle, the latter having lateral openings at the other side thereof arranged in stepped relation decreasing in height from said intake end.

7. In concentrating apparatus of the class described, a receptacle into which the material to be concentrated flows, diagonally arranged baffles extending transversely of the receptacle, the latter having a lateral discharge opening at one end of each of the baffles, and a fluid supply conduit at the other ends of the baffles and above the contents of the receptacle between the respective baffles.

8. In concentrating apparatus of the class described, a receptacle into which the material to be concentrated is supplied, transversely diagonally arranged baffles in said receptacle, the receptacle having a series of discharge openings arranged at different heights from the bottom of said receptacle, said baffles depending from the top of the receptacle intermediate said openings and each terminating substantially on a level with the next succeeding discharge opening directly adjacent thereto, and means for supplying water to said receptacle in a gradually increasing volume.

In testimony whereof I affix my signature.

JOHN MICKELSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."