

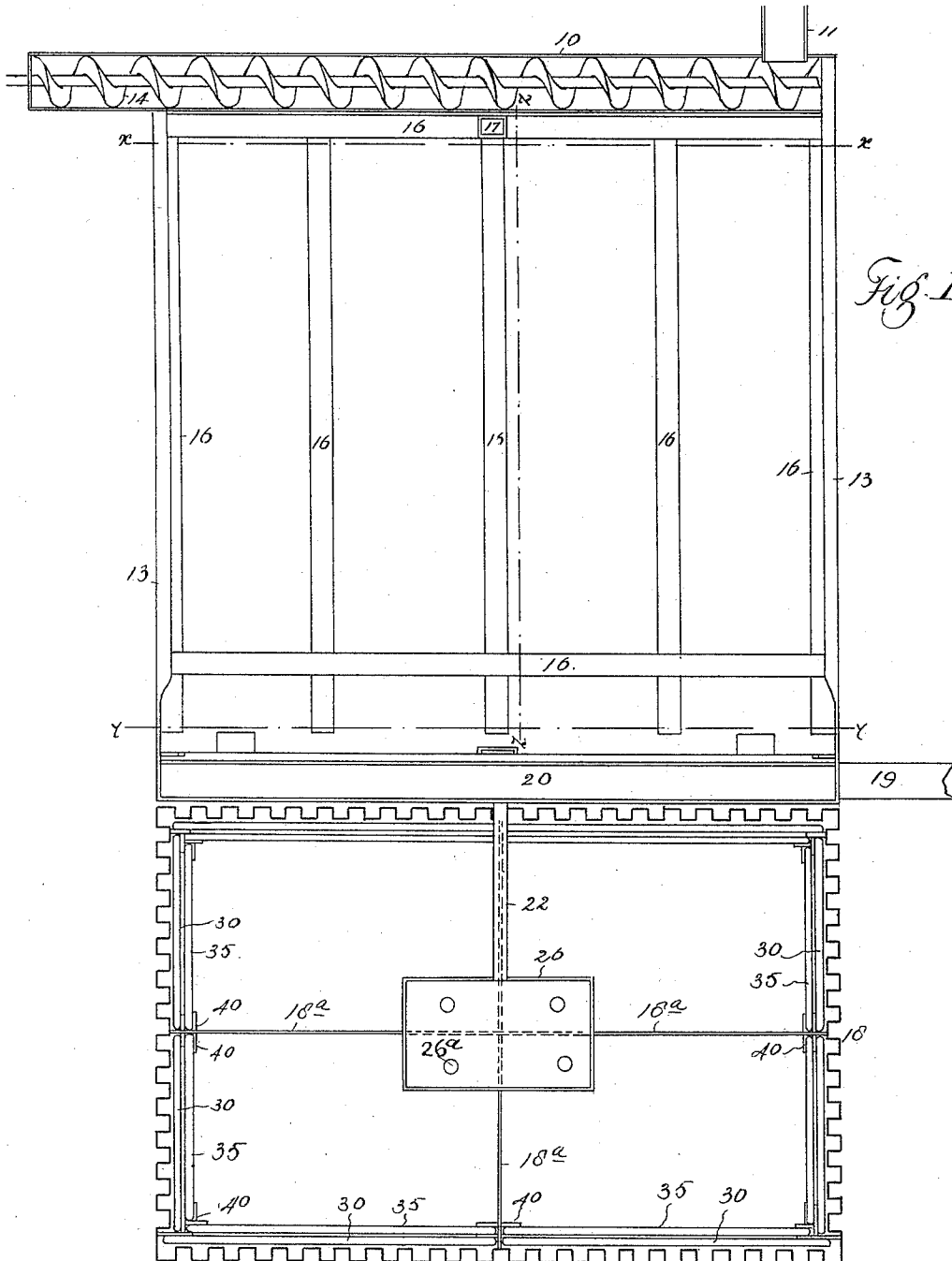
(No Model.)

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E. A. HOCKLEY.
ORE SLIMER.

No. 466,753.

Patented Jan. 5, 1892.



WITNESSES:

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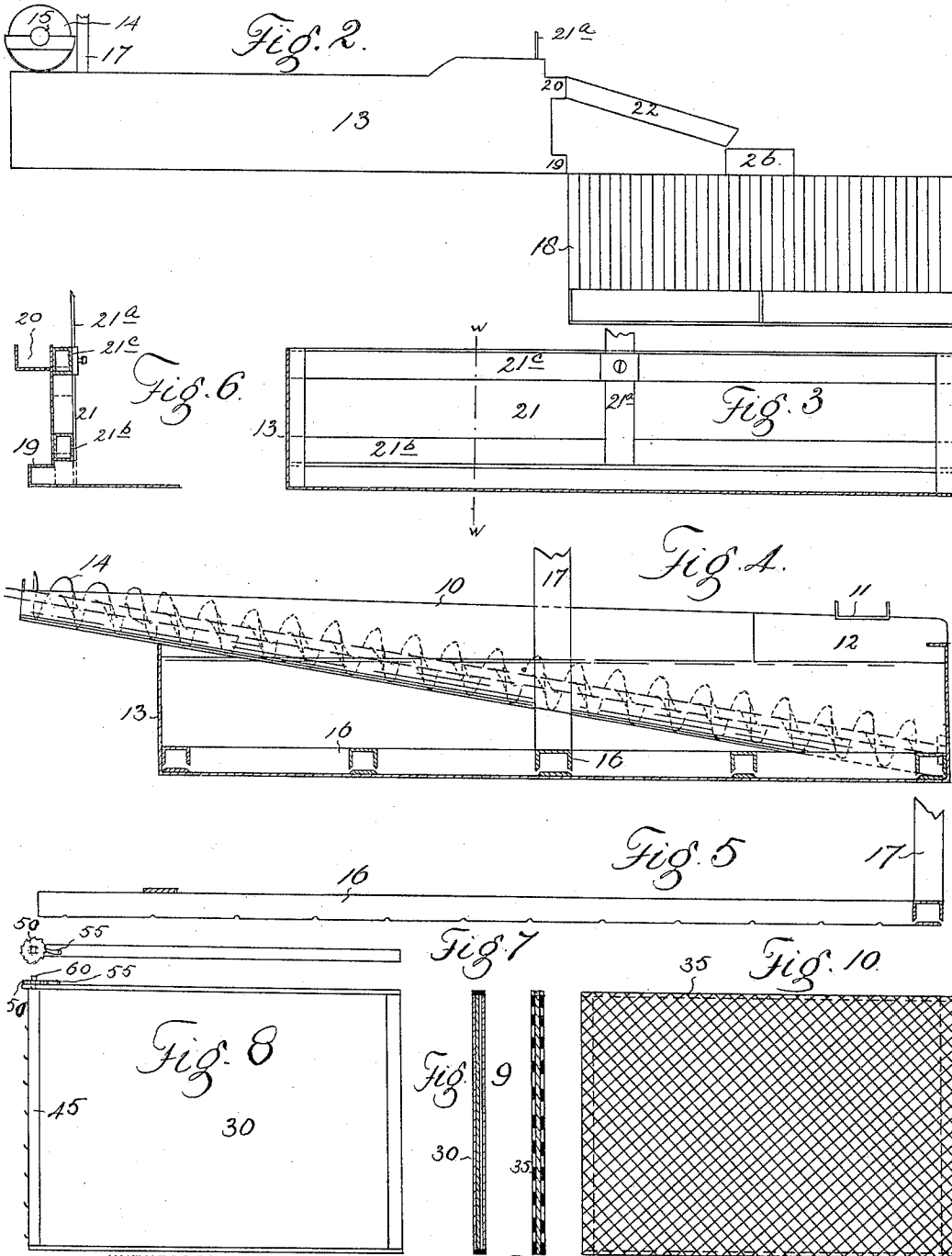
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Fig. 11
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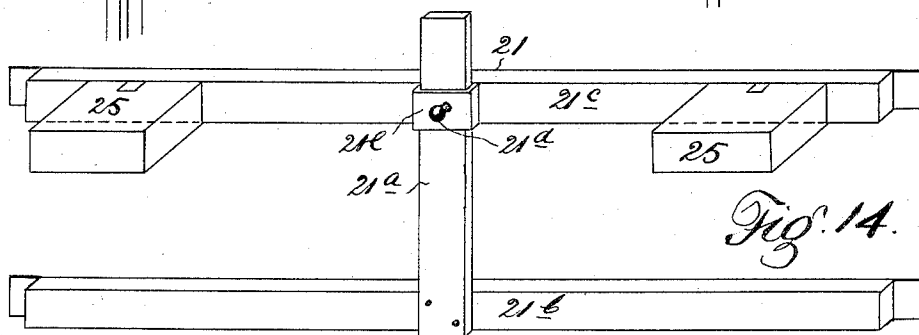
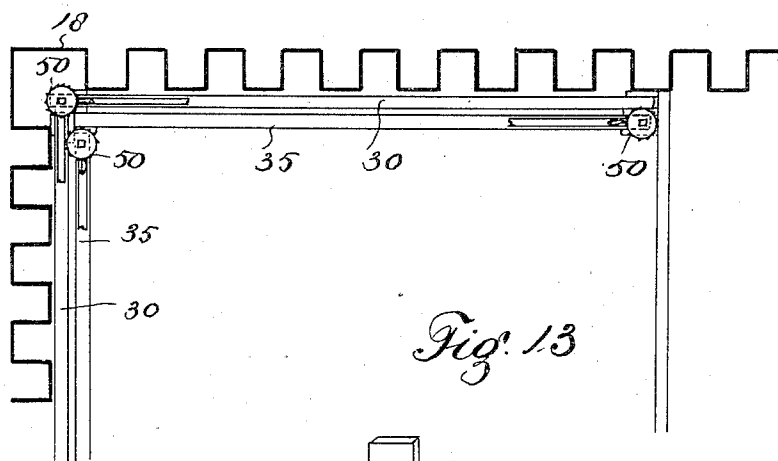
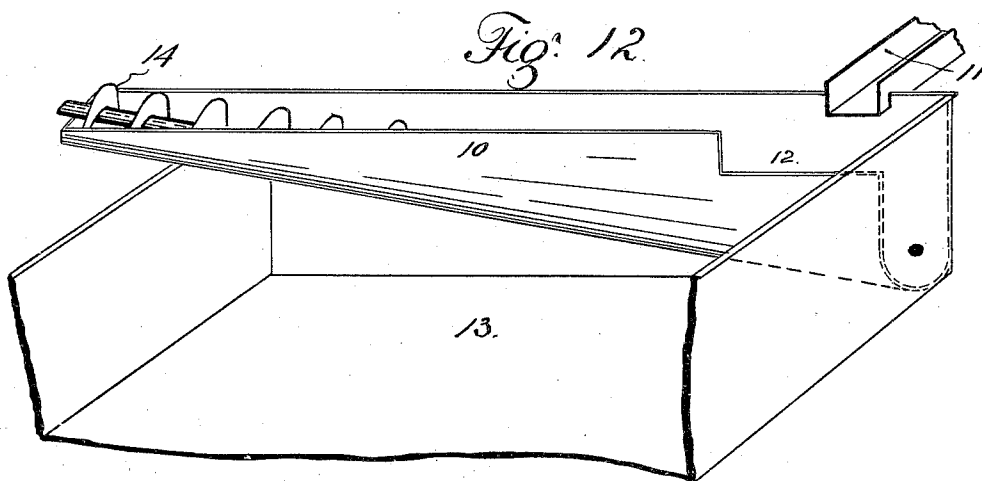
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UNITED STATES PATENT OFFICE.

EDGAR A. HOCKLEY, OF OURAY, COLORADO.

ORE-SLIMER.

SPECIFICATION forming part of Letters Patent No. 466,753, dated January 5, 1892.

Application filed May 19, 1891. Serial No. 393,346. (No model.)

To all whom it may concern:

Be it known that I, EDGAR A. HOCKLEY, a citizen of the United States of America, residing at Ouray, in the county of Ouray and State of Colorado, have invented certain new and useful Improvements in Ore-Slimers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to a novel form and construction of mechanism for treating ores, and is designed to save the float mineral, usually called "slimes" and sometimes termed "flour" gold and silver. Whichever term may be employed the meaning is the same to practical miners and to those skilled in the art to which this invention appertains, since these terms are applied to that portion of the mineral which is too light to be saved by the ordinary gravity processes, which depend upon the greater specific gravity of the mineral, which causes the same to settle and separate from the gangue or lighter portion of the material. In all classes of ore there is more or less of this light flour or float mineral, which is held in suspension by the water, while in some kinds of ore this class of mineral amounts to a very large proportion of the value, which is therefore ordinarily lost or carried to the dump with the so-called "tailings."

The object of this invention therefore is to save this light mineral either by the original treatment of the ore or by retreating the tailings which have passed through other machines.

The principle of the invention is to aid or increase the natural floating tendency or buoyant condition of the mineral particles, whereby the valuable portion is made to float, while the gangue, which is heavier, settles, thus effecting the separation.

My improved mechanism consists of a pulp-box, a separator, and a filtering-tank. The material to be treated is first discharged into the pulp-box, which catches the greater part of the gangue, and is provided with a screw conveyor for removing the same as fast as it

settles, the lighter and valuable portion of the mineral passing thence into the separator, into the bottom of which is forced air, steam, water, or other suitable material, producing such an agitation at the bottom as will cause the mineral to float after first separating or washing it from the gangue, when it passes into a filtering-tank, in which the water is drawn off by suitable means, leaving the mineral. This mechanism will be better understood by reference to the accompanying drawings, in which is illustrated an embodiment of the invention.

In the drawings, Figure 1 is a top or plan view of the mechanism; Fig. 2, a side view or elevation of the same; Fig. 3, a section on the line *yy*, Fig. 1; Fig. 4, a section on the line *xx*, Fig. 1; Fig. 5, a section on the line *zz*, Fig. 1; Fig. 6, a section on the line *ww*, Fig. 3; Figs. 7 and 8, a top and side view, respectively, of the outer filter; and Fig. 9 a section of the same. Figs. 10 and 11 are a side view and a section, respectively, of the inner filter. Fig. 12 is a perspective view of the pulp-box, showing its connection with the separator-tank, which is partially broken away. Fig. 13 is a top fragmentary view, on an enlarged scale, of the filtering-tank, showing the filter ing-walls and the rollers to which they are attached. Fig. 14 is a perspective view of the gate which controls the discharge of the material from the separating-tank.

In the views, wherein similar reference characters designate corresponding parts or elements of the mechanism, let the numeral 10 designate the pulp-box into which the material to be treated is discharged through chute or spout 11. Enough water is discharged into the box 10 with the ore to float the light and valuable portion of the same, which float material or scum passes through a suitable opening 12 into the separating-tank 13, while the gangue or worthless portion passes to the bottom of the box 10, which is provided with an inclined conveying Archimedean screw 14 for removing the gangue from this box. The bottom of this box is inclined correspondingly with the inclination of the screw. The lower end of this screw is journaled in the receiving extremity of the box, whence the gangue is carried upward the entire length thereof, the inclination of this screw and the bottom

of the box being such that the gangue is above the water-level before it is discharged therefrom. The upper extremity of the screw shaft is journaled in a suitable support and is provided with a pulley 15, by means of which motion may be communicated to the screw from any suitable motor. The screw being in motion, the material in box 10 is kept in a state of continuous agitation, so that as the gangue passes upward toward the discharge extremity of the box the float mineral is washed therefrom and rises to the top in a scum, which passes thence to the separator, as before stated. The size and location of the screw are such that its threads reach close to the sides and bottom of the box, by which it is enabled to remove the material very clean from the box. A considerable portion of the gangue which is more closely associated with the mineral will find its way to the separator, which consists of a tank of any desired capacity, preferably located contiguous to the pulp-box. In the bottom of this separator is located a series of perforated tubes or conduits 16, all communicating with each other and forming in effect one continuous perforated conduit. One branch of this conduit is in communication with a stand-pipe or upright tube 17, through which air, water, steam, &c., may be forced into tubes 16 and thence into the bottom of the tank for the purpose of agitation, whereby the light mineral is washed or separated from the heavier gangue and an increased upward or buoyant tendency given said mineral, keeping the same upon the surface of the water until discharged into the filtering-tank 18, hereinafter described. At the bottom of the discharge end or sides of the tank is located the lower trough 19 for carrying away the gangue which settles in the bottom of the tank and the upper trough 20, into which the float mineral passes, which collects in the form of a scum upon the surface of the water. The discharge into the troughs 19 and 20 is controlled by the gate 21, consisting of a stem or standard 21^a, centrally located, a lower valve 21^b, rigidly secured to the stem, and an upper valve 21^c, adjustable thereon by means of a set-screw 21^d, which passes through a metal strap 21^e, secured to the valve and through which the stem passes. The valves are simply cross bars or slats centrally connected with the stem and having their extremities guided in grooved ways 40, formed in the sides of the tank. The gate is also provided with one or more floats 25, preferably two, as shown in the drawings. The floats are secured to the upper or adjustable valve in any suitable manner and are designed to rest upon the surface of the water and to regulate the gate automatically and maintain a uniform quantity of water in the separating-tank. For instance, when the proper amount of water is in the tank valve 21^c, with its floats, is set at the proper height—that is, with the floats resting upon the surface of the water—valve 21^b being partly

opened or sufficiently so to carry off the surplus-water supply, or that which enters with the material treated. Then if the water-supply is increased the floats will rise and increase the opening below valve 21^b, so as to carry away this increased or excessive supply, while as soon as the supply is diminished the floats lower and partially close valve 21^b. It will thus be seen that this gate is capable of such adjustment that the proper level of the water in the separating-tank may be automatically maintained.

The water and gangue passing through trough 19 may, if desired, be carried or drawn off into any suitable receptacle, whereby they may be allowed to settle in the ordinary way, while the floats or slimes passing into trough 20 are carried by a conduit 22 to the filtering-tank 18. As shown in the drawings, this tank is divided into four compartments by suitable partitions 18^a, which at their intersections in the center of the tank support a box or receptacle 26, into which the material is discharged directly from conduit 22. Receptacle 26 is provided with openings 26^a, adapted to distribute its contents equally into the compartments of the filtering-tank. It will be observed that the dividing of this tank into compartments is only for convenience and not an essential feature, since it may consist of a single compartment or a plural number, as may be desired. The outer walls of this tank 18 are corrugated, as shown in the drawings, but may be of any construction adapted to permit the escape of the water after having passed through the inner filtering-walls of the tank. The filtering-walls are double and consist of an outer wall 30 and an inner wall 35. These walls 30 and 35 are preferably formed in sections adapted to slide in grooved ways or guides secured to or formed within the outer walls of the tank. The filtering-walls are constructed in any suitable manner, the outer being the finer mesh. A suitable construction for the inner wall 35 is a sheet of asbestos paper placed between two sheets of wire-cloth. The asbestos forms the filter, while the wire-cloth gives it protection and support. The whole is attached to a skeleton frame of suitable strength and composed of any desired material. The outer wall 30 may be composed of filtering-paper secured between two layers of cloth attached to a suitable frame. This cloth is preferably made stationary at one end of the frame and secured to an adjustable roller at the other end. This roller is provided with hooks, to which the cloth may be secured, while the top of the roller is provided with a small ratchet-wheel 50, the teeth of which are engaged by a pawl or dog 55, secured to the upper stationary cross-bar of the frame. It will thus be seen that by placing a suitable crank upon the upper extremity 60 of the roller and turning the same the tension of the cloth forming part of the filter may be adjusted to suit the purpose or the requirements of the case. It

will thus be seen that by this construction the mineral will be retained in the tank, while the water is allowed to escape. In cleaning up a portion of this mineral will be found between the filters. This may, however, be easily removed by raising the inner filter and brushing this mineral out into the tank.

Having thus described my invention, what I claim is—

1. In an ore separator or slimer, the combination, with a receiving-box provided with an inclined screw conveyer, of a separating-tank provided with perforated tubes located in the bottom or lower portion thereof, a stand-pipe connected with said tubes, a bottom discharge-opening for the tank, and a vertically-movable gate automatically regulated by means of floats, whereby said discharge-opening is controlled, substantially as described.

2. A tank provided with filtering-walls supported upon suitable frames provided with rollers, the filtering material being made fast to the frame at one extremity and to the roller at the opposite extremity, whereby its tension may be regulated as desired, the roller being provided with suitable locking mechanism, as set forth.

3. A tank provided with double filtering-walls of unequal mesh, each wall being supported upon a frame provided with an adjusting-roller, to which the filtering material is attached at one end, substantially as described.

4. A tank provided with removable filtering-walls, each wall consisting of a frame provided with a roller, and a strip of suitable

filtering material made fast to the frame at one extremity and to the roller at the opposite extremity, whereby the tension of the filter may be regulated at will, as set forth.

5. A separator provided with perforated tubes located in the bottom or lower portion of the tank and communicating with each other, a stand-pipe leading to the tubes, a bottom discharge-opening, and a gate provided with floats, whereby said opening is automatically regulated, substantially as set forth.

6. A filtering-tank provided with outer corrugated walls and inner removable filtering-walls provided with rollers for regulating the tension of the filtering material, as set forth.

7. An ore separator or slimer consisting of a receiving-tank provided with an inclined screw conveyer, a separating-tank provided with perforated pipes located at or near its bottom and a stand-pipe connected therewith, said tank being provided with a top and bottom discharge, a vertically-movable gate provided with valves and floats, whereby the discharge of material from the tank is automatically regulated, and a suitable filtering-tank, the three tanks being arranged and connected substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of witnesses.

EDGAR A. HOCKLEY.

Witnesses:

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L. C. KINIKIN,
W. B. VANATTA.