

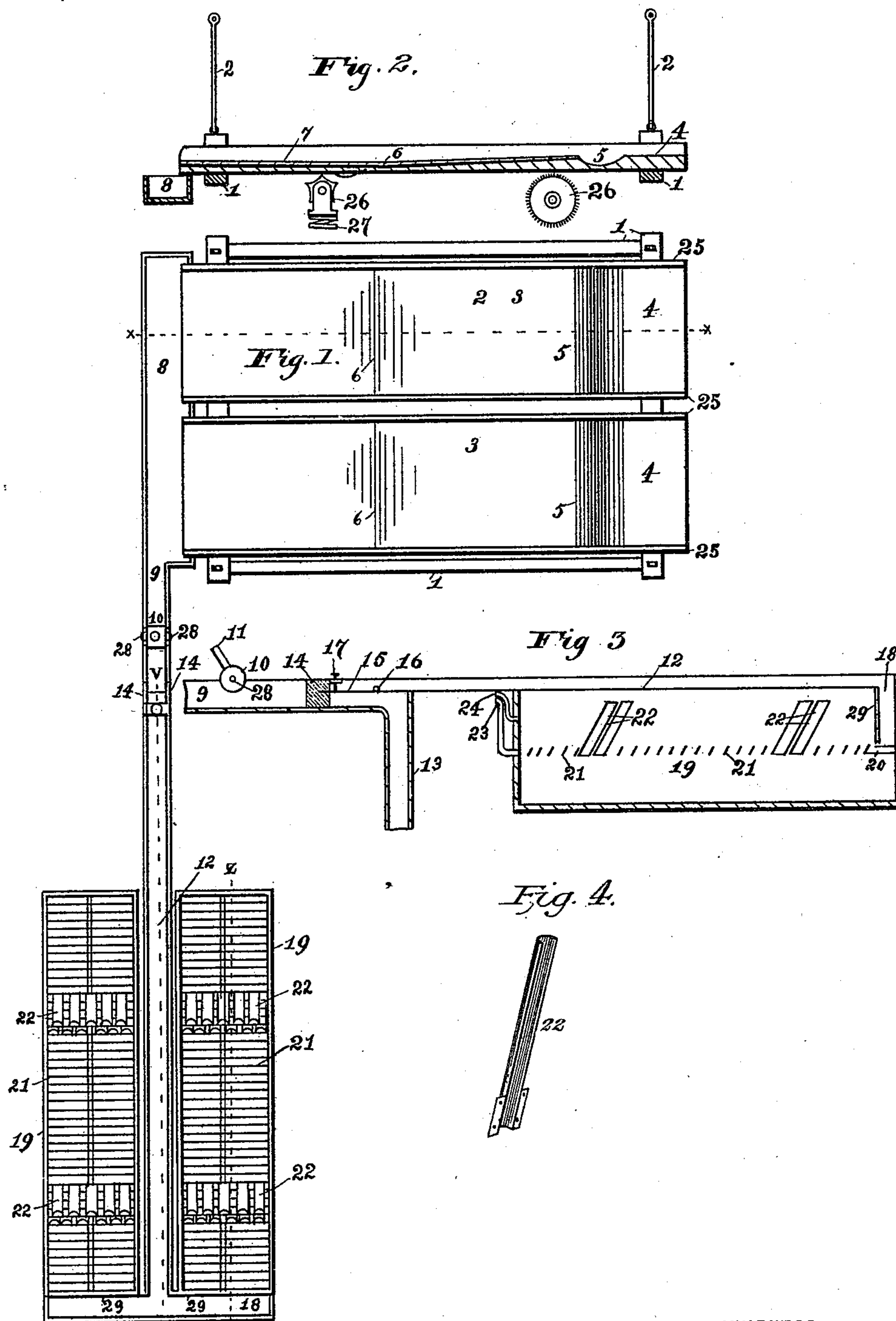
(No Model.)

S. HANSEN.

APPARATUS FOR SAVING SLIMES.

No. 395,826.

Patented Jan. 8, 1889.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

SOREN HANSEN, OF LEADVILLE, COLORADO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO JAMES C. STEPHENS, OF SAME PLACE, AND MARY E. STEPHENS AND HARVEY G. BREARLEY, BOTH OF DENVER, COLORADO.

## APPARATUS FOR SAVING SLIMES.

SPECIFICATION forming part of Letters Patent No. 395,826, dated January 8, 1889.

Application filed January 11, 1888. Serial No. 260,446. (No model.)

*To all whom it may concern:*

Be it known that I, SOREN HANSEN, a citizen of the United States of America, residing at Leadville, in the county of Lake and State of Colorado, have invented certain new and useful Improvements in Apparatus for Saving Slimes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a new and improved apparatus for concentrating ores and for saving the slimes, floating minerals, or floating values therefrom; and its objects are to furnish a simple, effective, and easily-operated apparatus therefor, one simple and economical in construction and readily and reliably operated; to which ends it consists in the features and combinations more particularly hereinafter described and claimed.

In the drawings is illustrated an apparatus embodying my invention, in which—

Figure 1 is a general plan view of the apparatus; Fig. 2, a section on line *x x*, Fig. 1; Fig. 3, a section of a settling-tank on line *z z*, Fig. 1, with a superimposed section of the flumes on line *v v*, Fig. 1; Fig. 4, an enlarged perspective view of one of the spoons.

In the figures, the reference-numeral 1 indicates the frame, upon which are mounted the concentrating-tables 3 3, two of which are here shown, but of which any desired number may be used. This frame is suspended by straps or rods 2, so that it may swing, motion being imparted to it for that purpose by any desired or any of the well-known mechanisms for that purpose. Each table 3 has side walls, 25, upon either side, and of a suitable height to prevent the material being thrown off. At its upper end is a plain flat surface, 4, whereon the ore or mineral may be spread and scattered as it comes thereon from the crushers or pulverizers or other sources. In front thereof is a concavity, 5, extending transversely across the table and forming a basin for the purpose of catching and discharging the crushed ore and mineral, some being thrown therein from 4 and some discharged therefrom upon lower end of the table at each swing or

stroke thereof. Below the basin the face of the table is formed with a transverse depression, 6, across its center. This portion of the table is covered or lined with smooth rubber cloth, 7. Beneath each table two cogged, spurred, or star wheels, 26, are arranged in supports upon springs 27, and so as normally to be held yieldingly in contact with the bottom of the table.

In operation, as the table is swung longitudinally with the frame by means of the rods 2 and some motive power therefor applied to the frame, and as it rests upon a projecting part of a wheel, 26, it causes the latter to turn, receiving therefrom a jarring or quivering motion in addition to its regular oscillation. Of these wheels 26, as shown, one is shown as a cogged wheel and the other as a star-wheel, as either may be used for the purpose. This jarring motion and the oscillating movement combined cause material from the spreading part 4 of the table to be thrown into the basin 5 (where some of the heaviest mineral may lodge and remain) and other material to be thrown from the basin upon the lower part of the table, where the heavy portion of the mineral sinks upon the rubber lining and forms in a bed or body thereon and in the transverse depression, the tailings, with what slimes or floating values there may be, passing over the end of the table into the discharge-flume 8, made so broad that the end of the table may not pass from thereover at any part of its oscillation. It connects with the narrower flume, 9, in which is placed, near the point of division of the flume 9 into the two flumes 12 and 13, a hollow drum, 10, of a length equal to or about to the width of the flume. At the center of its ends it should be provided with projections 28, supporting it on the sides of the flume and partially within and partially without the flume, so that its position along the length of the flume may be altered or varied, though any other means of supporting it and permitting same results may be used. It is connected by a tube or hose, 11, to any suitable water-supply, and is perforated underneath and toward its front to permit the



discharge of a jet or jets into the flume. Beyond the location of this drum the flume 9 is divided by a horizontal partition, 15, into two portions, the upper one becoming the flume 12, leading to settling-tanks 19, the lower becoming flume 13, leading to the dump or to any other desired point. The forward part of this partition 15 is pivoted or hinged at 16 to the other portion, (which, extended, becomes the bottom of flume 12,) and in this hinged or pivoted portion is secured the end of an adjusting-screw, 17, suitably seated in a bar across the top of the flume, whereby the free end of the hinged part may be adjusted in the flume.

14 14 are panes of glass let into the sides of the flume, through which, by the aid of good light on one side, the operator on the other side can see the condition of the discharge through 9 and at its various depths.

The operation from the table to this point is as follows: As the mingled tailings, slimes, and water pass along through flume 9, the jets from drum 10 set up an agitation therein, and the jets first trending to or toward the bottom of the flume, and thence by rebound upwardly, the lighter particles are thrown to or near the top just before arriving at the division 15, the forward or hinged end of which now acts as a skimmer or divider, dividing the flow, so that the lighter portion passes into flume 12, while the heavier refuse, &c., passes into flume 13. The operator, looking through glazed apertures 14 14, can observe the condition of the flow and by set-screw 17 adjust the hinged end of the skimmer and divider so that it skims the slimes, dividing them and their attendant water from the body of the flow.

19 19 are the settling-tanks, each constructed alike, and of which any desired number may be used. Each is divided horizontally by false bottoms or riffles 21, formed of slats secured in a suitable frame after the manner of the well-known slatted blinds, the slats inclining upwardly toward the inlet end of the tank, as seen in Fig. 3. They are removably supported in the tank by any suitable lugs or brackets secured upon the interior of the walls thereof.

At the inlet end a projection, 20, is fixed upon the interior and in the plane of the false bottom or riffle, and a wall, 29, extends across this tank and down to within a short distance—say an inch—from 20, forming the chamber 18, into which passes the flow from flume 12, the exit from chamber 18 and into tank 19 being at the bottom of chamber 18. The flow passes into tank 19, and at first immediately through the false bottoms or riffles to the lower half. Projecting upwardly and inclined in the direction of the inlet are several series of "spoons," 22, preferably arranged in two or more rows, those in one row breaking joints with those in the adjacent row or rows. They are simple strips concaved toward the inlet, formed with flanges or

other means by which they may be secured to the slats of the riffle-bottoms, one being shown in Fig. 4. The discharge-pipes are shown at 23 and 24, two series entering the tank at different levels; but either or both series may be used, so that such series or a single pipe, if such be used, projects upwardly upon the outside from its point of entrance into the tank, or from the point at which it receives water from the tank. They are so secured in the walls of the tank as to be capable of rotation in their seats therein. Then, as they are turned to or from a perpendicular position, their outlets are raised or lowered, so that their discharging height may be varied and the level of water desired to be maintained in the tank regulated and controlled. As the water rises in the tank, the flow is from chamber 18 to the pipes; but as it is with a gentle current in the upper half, and practically none in the lower half, much of the slime is deflected by the riffles and falls into the lower half, where it settles, it (the lower half) forming a simple quiet settling-pool therefor. Most of that borne along by the current strikes against the spoons 22, and by them is deflected down to the settling-pool. As the points of discharge from the tank to the discharge-pipes is lower than the level of water maintained, there is a quiet body of water upon and near the surface, to which the very lightest and that which has escaped deflection by the riffles and the spoons may rise and there be prevented from escaping, the middle body of water from which is the discharge by the pipes being free from slimes or floating values or mineral.

In operation the heavier material passes over the head of the concentrating-table in the well-known way, while the lighter gangue, tailings, floats, &c., pass over the tail into the sluice or flume 8, whence they pass into flume 9, wherein they are subjected, if desired, to the action of jets of water from the drum 10, such jets by the eddies and commotion they cause aiding in throwing and keeping the lighter slimes or floats upon or near the surface of the water in the flume. Arriving at the partition 15, the water and its suspended material are divided thereby, the upper portion, containing the floats, being conveyed by flume 12 to the settling-tanks, while the lower, containing heavier material, is conveyed by flume 13 to the dump. The lighter material, conveyed by flume 12 to the settling-tanks, first fills the space therein below the removable riffles 21, after which there is a gentle current from the inlet to the outlet pipes 23 24. The material contained in the water in the passage of the latter from the inlet to the outlet is deflected in part by the slats of the riffle-bottoms to the space or quiet settling-pool beneath them and in part by the concave inclined spoons 22 to the same place. As the discharge is from the middle body of water, the top and bottom remaining comparatively quiet, any floats which escape the



slats and the spoons rise to the top, whence they may be collected. By these devices thus operating any floats carried off from the concentrating-table may be saved, making in many cases an important addition to the commercial value of the ores.

It is evident that this arrangement of flumes and settling-tanks may be applied to save the floats from the tailings of any form of concentrator; that its efficiency and operation do not depend on any particular form of such table, it simply being necessary that the flumes be arranged to receive the tailings and convey the proper part thereof to the settling-tanks, the horizontally-divided flume being located between the table or tables and the tanks.

It should be noted that the parts 4 and 5 of table 3 should be covered or lined with copper plates for use with gold ores and with iron plates for use with silver ores.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An apparatus for separating and saving slimes or floats, comprising a main flume leading from a concentrator or other source of supply of material to be treated, a horizontal and longitudinal partition dividing such main flume into two branch flumes, and a settling-tank, into which one of the branch flumes leads, having removable false bottoms or riffles dividing it into an upper and a lower compartment, such false bottoms being provided with a series or number of upwardly and forwardly projecting spoons for deflecting the

slimes, substantially as set forth.

2. A tank for settling and saving slimes, floats, &c., having false bottoms or riffles dividing it into an upper and a lower portion, and provided with one or more series of upwardly-projecting spoons for deflecting the slimes, &c., an inlet leading into the upper portion of the tank, and a discharge pipe or pipes rotatably seated in the walls of the tank, and then bent upwardly so that their point of discharge may be higher than their inlet, substantially as set forth.

3. A tank for saving and settling slimes, &c., having false bottoms or riffles dividing it into an upper and a lower compartment, said false bottoms or riffles being provided with a series of upwardly and forwardly projecting spoons for deflecting the slimes, &c., substantially as set forth.

4. The combination, in a settling and saving tank, of an inlet for the material thereinto, a discharge for the water therefrom, false bottoms or riffles dividing the tank into upper and lower compartments, and series or a series of forwardly and upwardly inclined spoons for deflecting the matter in the water passing through the tank, substantially as set forth.

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

SOREN HANSEN.

Witnesses:

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