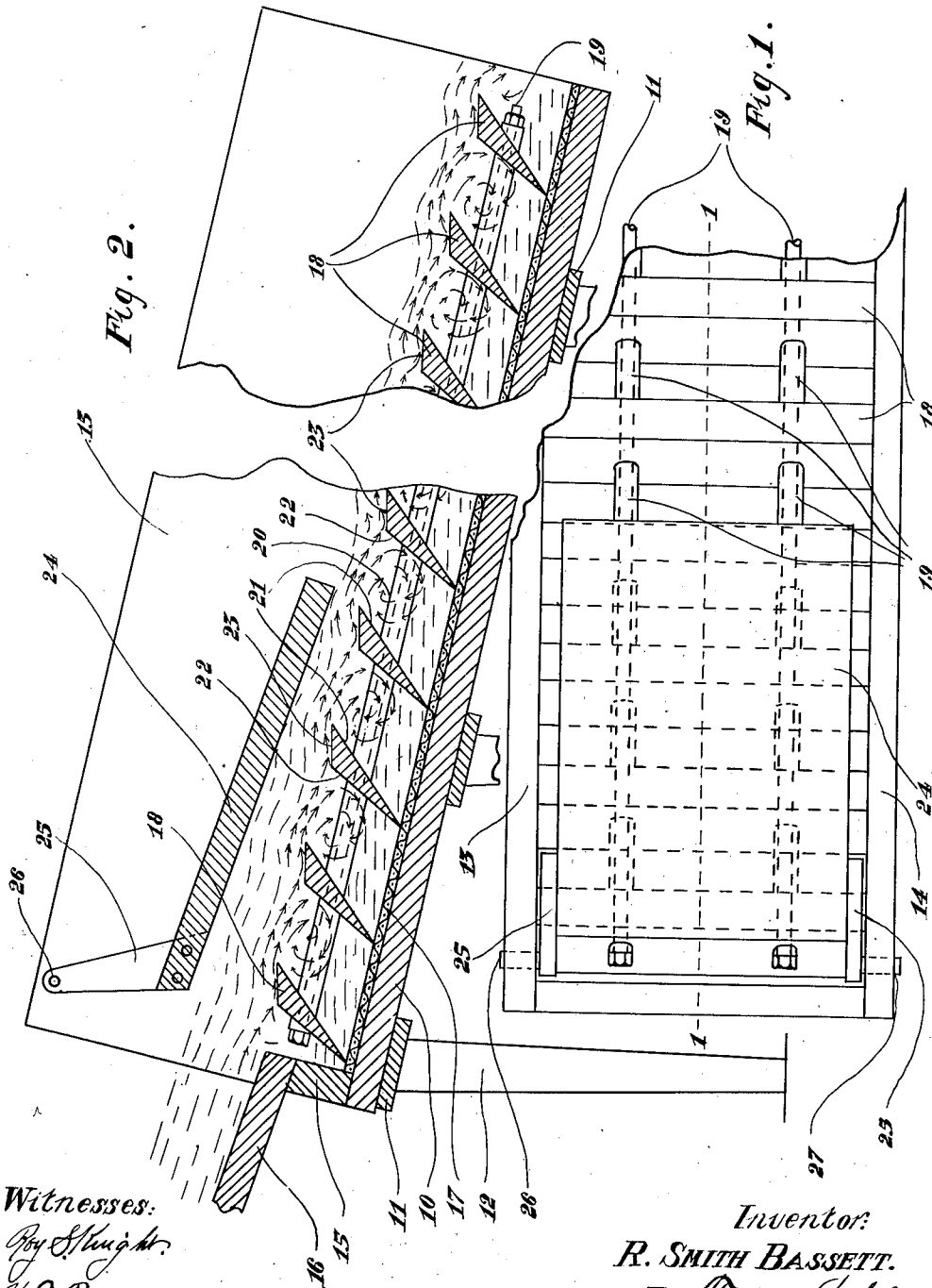


R. S. BASSETT.  
GOLD SAVING MACHINE.  
APPLICATION FILED MAR. 19, 1912.

1,050,598.

Patented Jan. 14, 1913.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## GOLD-SAVING MACHINE.

1,050,598.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed March 19, 1912. Serial No. 684,864.

*To all whom it may concern:*

Be it known that I, ROBERT SMITH BASSETT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Gold-Saving Machines, of which the following is a specification.

My invention relates to gold saving machines and particularly to machines of that type in which the gold is collected in a riffle at the bottom of the sluice-box through which the mixed gravel and water are run.

The object of my invention is to provide a device for the above purpose in which riffle bars of peculiar shape are arranged so as to cause whirling eddies between the bars which will permit settling of even the finest flour gold while carrying away the lighter material, without using a greater length of riffle than is ordinarily employed in saving only the coarser gold.

It has long been known that in certain types of placers a large amount of gold exists in a very finely divided state, sometimes called flour gold. In attempting to collect this gold sluice-boxes several hundred feet long have been employed. In such cases all of the coarser gold will be collected in the first eight or ten feet of the riffle and some of the flour gold will be collected thereafter, although with the best systems a very considerable percentage of the flour gold runs off with the tailings. But with the long riffle structure it is usually the case that the concentrates toward the discharge end of the riffle are so poor in gold and what gold there is so mixed with black sand and other minerals from which it may be separated only with extreme difficulty, that the expense of recovering the gold from such concentrates may be greater than the value of the gold recovered. With the new riffle which I have invented I am able to obtain fully as high if not higher saving of flour gold in an ordinary twelve foot sluice-box as has been secured by the use of the afore-said sluice-boxes and riffles extended several hundred feet in length, and, of course, the separation of the gold from the concentrate will be a matter of no more expense than the separation of the coarse gold from the first twelve feet of concentrates of the said long riffles.

These objects I accomplish by means of

riffle bars formed with top surfaces and positioned relatively so that as the stream of gravel-bearing water passes over the riffle bars the peculiar slope of said top surfaces will give the water or the gravel-bearing part of it next to the riffle a peculiar whirling movement which gives opportunity for the flour gold to sift through edgewise and become settled in the concentrate while the lighter material of the gold-bearing sand is lifted out from between the riffles.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and the novelty is particularly pointed out in the claims.

In the drawings, illustrating the application of my invention in one form,—Figure 1 is a plan view of a part of a sluice-box employing a riffle constructed in accordance with my invention. Fig. 2 is a broken longitudinal sectional elevation on line 1—1 of Fig. 1.

The sluice-box is of usual construction consisting of a bottom member 10 supported by cross bars 11 and legs 12 of such length, relatively, that the bottom 10 is given a downward incline, which in the practice of my invention may be quite sharp and greater than is customary with other devices of this general character. The sides of the sluice-box 13 and 14 are of usual construction and a head 15 is provided into which leads a chute or trough 16 for conveying the sand and water into the sluice-box.

Upon the bottom 10 is laid a piece of textile or other fabric 17, a very good fabric for the purpose being cocoa matting, and resting loosely upon this cocoa matting within the sluice-box is the improved riffle which I have devised. As shown this comprises a series of transverse bars 18, each bar being triangular in cross section. These bars are strung upon threaded rods 19 which pass through openings therein, the bars being properly spaced by means of washers 20, said washers having obliquely disposed end faces so that when the rods are screwed up the bars will be rigidly connected together and held with their corresponding edges falling in common planes. When, therefore, the riffle is placed upon the bottom of the sluice-box or on the cocoa matting 17 with the most acute angled edges of the bars in contact therewith the other acute angled edges of the bars will have the highest parts

thereof falling in a plane parallel with the plane of the bottom of the sluice-box, the shortest faces 23 of the bars extending back from the highest edges obliquely or at an angle to the common plane passing through said edges or the plane of the bottom of the sluice-box. The longest sides 21 of the riffle bars are thus turned away from the direction of travel of the water in the sluice-box and inclined forward at a sharp angle while the intermediate sides 22 extend upwardly from the bottom of the sluice-box at a much less acute angle, thereby providing between pairs of riffle bars chambers which are considerably wider at the bottom than at the top and which have a much longer wall on the side away from the direction of travel of the stream than on the side which fronts that direction of travel. The dead water space or settling space between the bars is therefore relatively very much increased, especially toward the bottoms of these chambers where it is of most value. The stream of material passing over the riffle includes water mostly at the top and gravel or sand at the bottom, which will comprise approximately two layers, the heavier lowest down and the lighter above, the heavier particles in the upper of these two layers constantly gravitating toward the lower layer. Owing to the slope of the faces 23 the riffle bars, at an angle to the plane of the bottom of the sluice-box or the plane of forward movement of the stream, the meeting point of walls 22 and 23 will be such as normally to divide this sheet of material, the lighter sliding up the faces 23 and the heavier being caused to roll or whirl by the drop over the upper edges and the impact with the walls 22. This turning or whirling movement is in a vertical plane and throws back the lighter particles into the layer which is carried over the faces 23 and gives opportunity for the finely divided lenticular particles of flour gold to gravitate edgewise to the bottom of the chambers between the riffle bars where it will be trapped with the concentrates, especially beneath the forwardly sloping walls 21.

The usual construction of a riffle for use in gold saving devices of this character is to provide flat faced blocks secured in relative position so that there are spaces between the blocks about equal to the top faces of the blocks, the blocks usually being about an inch square in cross section and the spaces between the blocks about one inch, so that in the common twelve-foot sluice-box there will be seventy-two such riffle bars. In my construction I have found a practical size to be bars having the longer faces 21 one inch, the faces 22 three-quarters of an inch and the faces 23 approximately three-eighths of an inch. The bars are placed apart exactly one inch so that there will be

one hundred and forty-four of such riffle bars in a twelve-foot sluice box instead of seventy-two as in the common type, and although the aggregate of the dividing surfaces 23 of my riffle will be considerably less than the aggregate of the top surfaces of the old style riffle, owing to the angular slant of these faces with respect to the plane of the top edges of the riffle bars and of the bottom of the sluice box the effective separating value of the faces 23 will be greater face for face than that in the common sluice-box, while the fact that there are twice as many of such separating faces and that the dead water chambers between the bars are greater causes my riffle as regards the upper faces only to be enormously more efficient than the old style riffle. There are also twice as many settling pockets between the riffle bars and owing to the relation of the walls 21 and 22, so that these pockets are narrower at the top than at the bottom and a large part of the pocket is overhung by the walls 21 of the riffle bars, the dead water settling space in each of these pockets is both greater and more efficient than in the usual form of riffle.

An attempt has been made to indicate by means of dotted lines the course which the stream of gravel-charged water takes in passing over my riffle. The overhang of the upper edges, the fact that these edges are sharp and the angular slope of the faces 23 up to these edges all have the effect of causing the stream to dip sharply as it passes over the edges and striking against the face 22 to curl over and under in a smooth vertical whirl without any boils or whirlpool currents, which have a tendency to suck up matter from the bottom of the compartments between the riffle bars. This action results in constantly breaking up the stream of matter gravitating over the riffle toward the discharge end of the sluice-box, the breaking up resulting in the lighter material always being thrown to the upper layer and the heavier particles having opportunity to gravitate to the lower layer and from there into the dead water settling spaces. The gold, of course, is likely to be the heaviest material carried, and the only reason that it is not always possible to effect separation is because fine or flour gold, although divided into extremely minute particles, does not exist in granular form but in tiny flakes or scales which present a large surface in proportion to their mass to the action of the water currents. These scales gravitate very readily edgewise, but if suspended in water with the flat sides down they pass through the same very slowly. The dividing and breaking up action of my riffle, however, constantly tends to change the positions of these little gold particles and get them on edge, when they gravitate

down beneath the overhanging walls 21 and become entangled in the concentrates, from which they may be recovered with the coarser gold.

5 In order to regulate the incoming stream of water from the chute 16 so as to spread the same evenly and particularly to enable the mineral sands to be accumulated at once into the layers heretofore mentioned I suspend a gate 24 by means of arms 25 secured to the end of said gate and extending at an oblique angle thereto, the arms being pivoted at 26 and 27 to the side walls 13 and 14 of the sluice-box, and the arrangement being such that the lower surface of the gate 24 will extend downwardly at an oblique angle to the plane extending through the highest points of the riffle bars, said angle being oppositely disposed from that of the top surfaces 23 of the riffle bars. The gate 24 is thus positioned to float upon the incoming stream of gravel-charged water. It may be lifted thereby but will constantly tend to control and regulate the flow and to produce quickly the said layering of the solid contents of the water.

I have given the operation of my device and the principles upon which it works very fully. It is simple and cheap in construction, can be made in any desired size and applied to any sluice-box construction in many different sorts of gold saving systems.

I claim:

1. In combination, a sluice, a riffle therefor comprising a series of bars, each bar having a cross sectional outline consisting of an obtuse triangle, means independent of the sluice for holding said bars with the walls parallel and corresponding edges in parallel planes and with none of the sides falling in the planes of the edges, so that when the apices of the two longest sides rest upon the bottom of the sluice the shorter side will be turned toward and reversely inclined to a direction fall of the current.

2. A gold-saving machine comprising an inclined sluice-box, a strip of fabric loose on the bottom of the sluice-box, a riffle formed of transverse bars removably positioned in the sluice-box with the lower edges of the bars engaging the fabric, said bars be-

ing held with corresponding sides parallel and the highest parts of said bars being held in a common plane parallel with the bottom of the chute, said highest parts being angularly advanced with respect to the parts of the bars contacting with the fabric, and the top surfaces of said bars extending back from said highest parts obliquely to the plane thereof.

3. A gold saving machine comprising an inclined sluice-box and a riffle therein, said riffle being formed of a series of transverse bars of triangular cross section, said bars being held with corresponding sides parallel and with the shortest side up, the bars being positioned so that said top sides each extend from the highest part thereof obliquely to the plane of the bottom of the sluice-box.

4. A gold saving machine comprising an inclined sluice-box and a riffle therein, said riffle being formed with a series of transverse bars triangular in cross section, the bars resting with their most acute angled edges engaging the bottom, their longest sides turned down and sloping at an angle to the bottom, and shortest sides turned up and extending backwardly from the edge formed by their junction with the longest sides obliquely to the plane of the bottom of the sluice-box.

5. A gold-saving machine comprising an inclined sluice-box and a riffle therein, a sheet of fabric removably positioned on the bottom of the sluice-box, said riffle being formed of a series of transverse bars triangular in cross section and having the most acutely angular edges thereof resting upon the fabric, their longest sides turned down and sloping at an angle to the bottom, and shortest sides turned up and extending backwardly from the edge formed by their junction with the longest sides obliquely to the plane of the bottom of the sluice-box.

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

R. SMITH BASSETT.

Witnesses:

H. A. BOWMAN,  
F. A. WHITELEY.