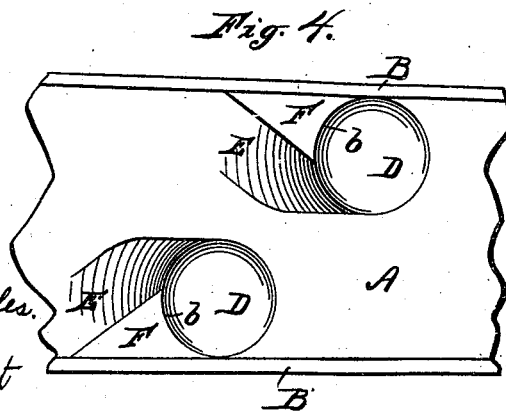
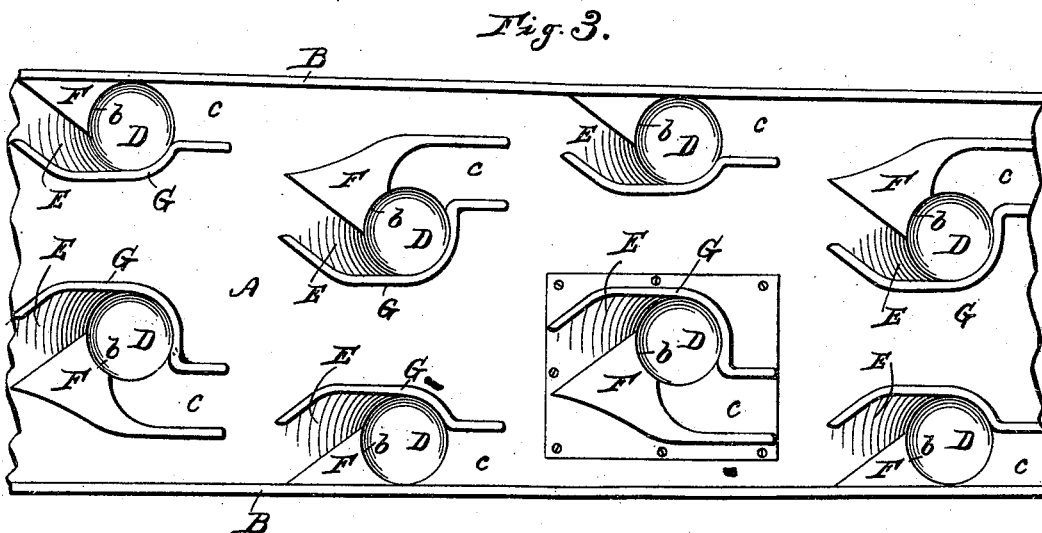
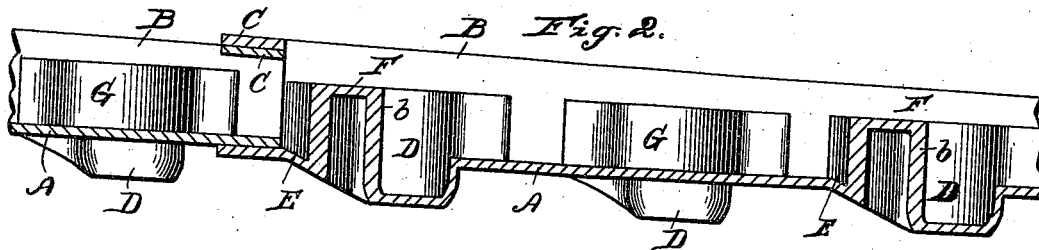
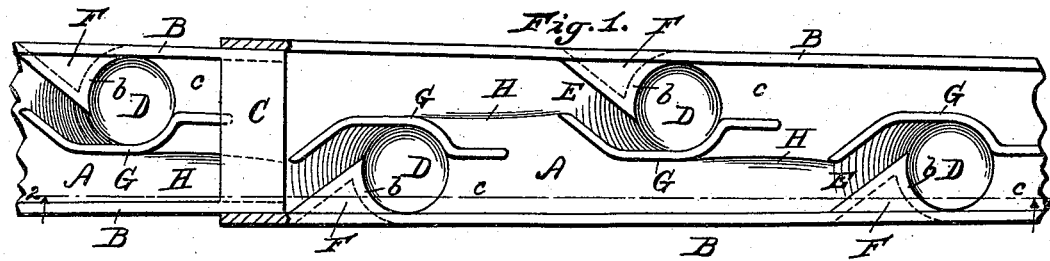


(No Model.)

F. SIMONSON,
RIFLE.

No. 492,057.

Patented Feb. 21, 1893.



Witnesses,
John C. Miles.
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UNITED STATES PATENT OFFICE.

FLAVEL SIMONSON, OF MILWAUKEE, WISCONSIN.

RIFFLE.

SPECIFICATION forming part of Letters Patent No. 492,057, dated February 21, 1893.

Application filed June 15, 1892. Serial No. 436,779. (No model.)

To all whom it may concern:

Be it known that I, FLAVEL SIMONSON, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Riffles; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to improve the method of separating gold or silver, amalgam and quicksilver from accompanying baser material during the process of washing dirt, sand and vein matter, obtained by various well known mining operations, whereby I not only effect a saving of said minerals and amalgam but also facilitate their amalgamation.

To this end my invention consists in riffles of certain peculiar construction hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings:—Figure 1 represents a plan view of two united sluice-boxes provided with riffles according to my invention, Fig. 2, a vertical longitudinal section taken on line 2—2 of the preceding figure, Fig. 3, a plan view of a portion of a sluice-box of greater capacity than those shown in the preceding figures, and having a greater number of riffles distributed over the bottom thereof, and Fig. 4, a like view illustrating riffles somewhat different in the matter of detail from those shown in the former figures.

Referring by letter to the drawings, A represents the bottom and B the sides of a sluice-box that is preferably of less width and depth at its lower end the inclination or grade being variable in proportion to the character of the material under treatment and the result to be obtained. The sluice-box is also preferably cast in one piece with a top-plate C at one or both ends, and in practice the smaller end of one box fits in the larger end of the other, under the adjacent top plate thereof. By this peculiar construction and engagement of the sluice-boxes, it will be seen that each will, in a measure, support the other, and thus it is possible, in practice, to place the trestles or other supports of a sluice-way at greater intervals apart and thereby lessen the number ordinarily employed, whereby the time and cost necessary to the building of the

structure are materially lessened. By having the boxes of cast-metal instead of wood, as is ordinarily the case, a further saving is effected in the construction of a sluice-way, and the latter is more durable and easier to clean up than those in common use.

All the sluice-boxes herein shown have their bottoms provided at intervals with cup-like depressions D and other depressions or valleys E leading thereto, the greatest depth of these valleys being the bottoms of the cups. Immediately adjacent to the cups and valleys are bluffs F that conform in general contour therewith. The cups, valleys and bluffs, just described, constitute riffles, and in certain forms of the latter I employ fences G that run along the edges of the valleys opposite the bluffs and partly encircle the cups, these fences being shown in all but Fig. 4 of the drawings.

As a matter of convenience, the riffles may be made integral with cast metal sluice-boxes, or they may be made separate and set in the bottoms of these sluice-boxes or those made from wood, as shown in Fig. 3, and it is to be understood that the metal part A with the riffles may be cast independent of the sides B to form a true or false bottom of an otherwise wooden sluice-box, or when made with said sides, the device thus constituted may serve as a lining for said wooden sluice-boxes, but in any event there is no departure from the spirit of my invention so far as concerns the peculiarities of the riffles, the latter necessarily implying a suitable base.

In practice, the gold or silver bearing material mixed with water and quicksilver is run down the sluice-way and the inclination or grade of the latter is such as may be necessary or desirable to obtain the best results from the material under treatment. In placer-mining, I propose to have the riffles of the upper boxes of a sluice-way devoid of the fences G, herein set forth, in order not to obstruct stones or coarse gravel in their flow toward what is generally termed a grizzly, the latter being a suitable grating that screens the very coarse particles from the remainder of the material flowing in a sluice. As shown in Fig. 1, I may also provide the bottom A of the sluice-box with other and more shallow valleys H that extend longitudinally from

one fence to another and lead to the valleys C, previously specified.

The gold or silver, amalgam and quicksilver gravitate to the bottom of the sluice and are diverted into the cups D by the valleys E, H, where the fine particles remain in constant motion as long as the flow continues, this flow being retarded by the bluffs F, whereby eddies are formed and the lighter materials of the tailings are forced toward the top of the current and float along therewith, having been thus separated from the minerals. The tailings pass riffle after riffle as they are carried along to be run off at the lower terminus of the sluice, but precious metals are caught in said riffles where the eddies are formed by the bluffs. It has been demonstrated in practice that when sufficient water is used the smaller particles of minerals or concentrates collecting in the cups D will back up against the adjacent faces b of the bluffs F, and whirl about with something of a planetary motion, or in other words they have a circular motion in two directions at the same time, that is they move horizontally in a circle or ellipse, and at the same time roll over and over from the bottom of said cups, the space within which this action takes place being of considerably less area than that of the cups themselves. The particles of mineral, deposited in the cups being kept in motion, as previously described, the constant rubbing of one against the other will insure cohesion and thus the gold or silver, and quicksilver are finally amalgamated or the rich concentrates left deposited in the cup-like riffles. The tailings from each cup pass on down the sluice and the heavier particles, gravitating toward the bottom, are deflected and guided to the next cup, in line with the former, by the intermediate valleys E, H, and thus a gradual deposition and concentration of the precious mineral or the amalgamation thereof with quicksilver is the result, it being possible by the proper inclination of the sluice and sufficient water to have everything wash out of the cups except the desired minerals.

The fences G serve to protect the materials caught in the cups from an overflow from the outside and aid in creating the peculiar motion of said materials, as above described.

Having now fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. A riffle comprising a suitable base having a cup-like depression therein and a valley that leads from the surface of the base to the bottom of said depression, substantially as set forth.

2. A riffle comprising a suitable base, a cup-like depression therein, a valley leading to the depression, and a bluff adjacent to said depression and valley, substantially as set forth.

3. A riffle comprising a suitable base, a cup-like depression therein, and a fence that partly encircles said depression, substantially as set forth.

4. A riffle comprising a suitable base, a cup-like depression therein, a valley leading to the depression, and a fence that partly surrounds said depression, substantially as set forth.

5. A riffle comprising a suitable base, a cup-like depression therein, a bluff adjacent to the depression, and a fence that partly surrounds said depression in opposition to the bluff, substantially as set forth.

6. A riffle comprising a suitable base, a cup-like depression therein, a valley leading to the depression, a bluff adjacent to said depression and valley, and a fence that partly surrounds the aforesaid depression in opposition to the bluff, substantially as set forth.

7. A riffle comprising a suitable base, a cup-like depression therein, a deep valley leading to the bottom of the depression, a bluff adjacent to said depression and valley, a fence partly surrounding the aforesaid depression in opposition to the bluff, and a shallow valley intercepting the deeper one, substantially as set forth.

8. A sluice-box having the bottom thereof provided at intervals with cup and valley-like depressions, the greatest depth of each valley being at the bottom of an adjacent cup, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

FLAVEL SIMONSON.

Witnesses:

N. E. OLIPHANT,
JOHN E. WILES.