

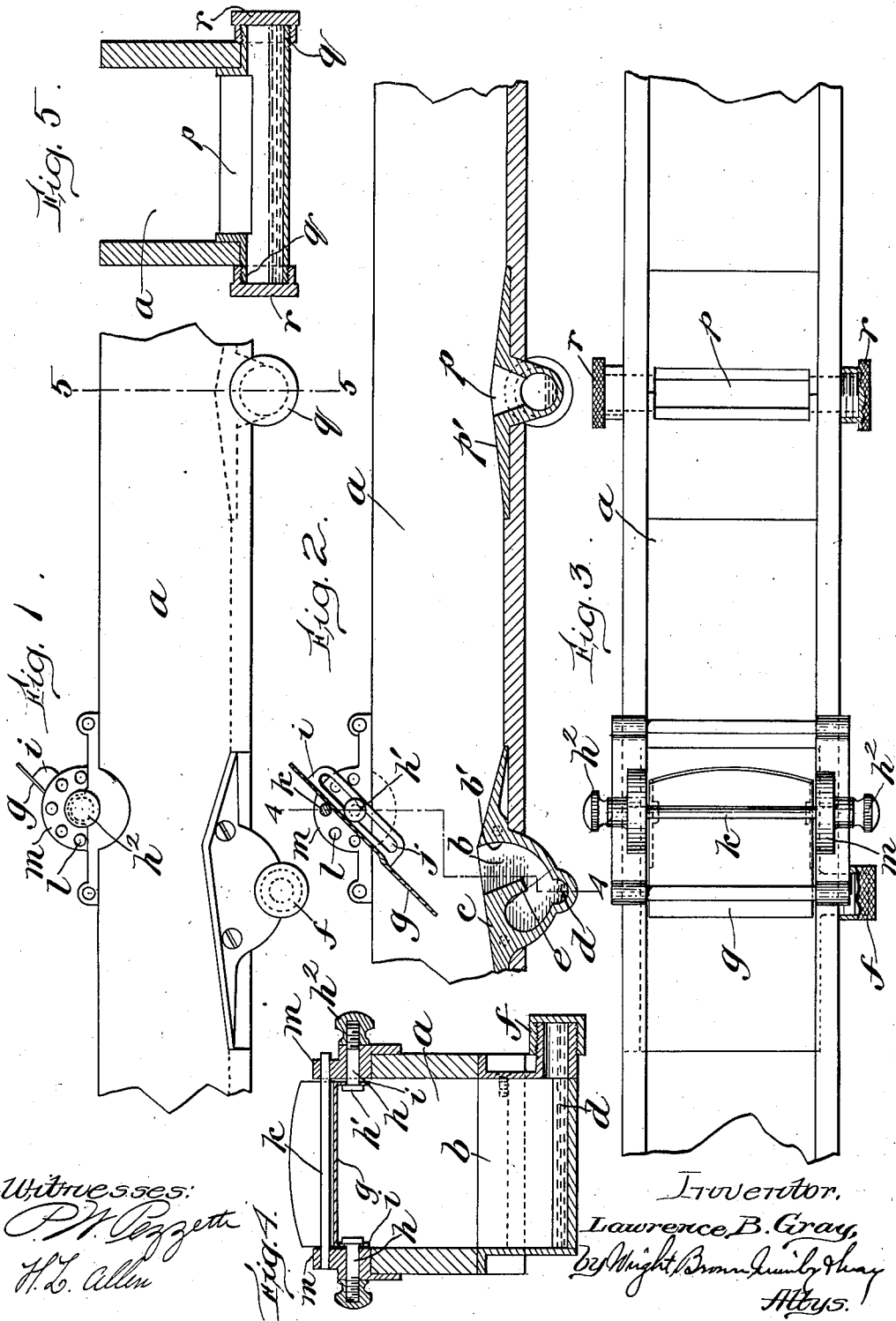
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APPARATUS FOR COLLECTING PRECIOUS METALS.

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1,056,663.

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Witnesses:

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UNITED STATES PATENT OFFICE

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APPARATUS FOR COLLECTING PRECIOUS METALS.

1,056,663.

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To all whom it may concern:

Be it known that I, LAWRENCE B. GRAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Collecting Precious Metals, of which the following is a specification.

This apparatus relates to placer mining, and has for its object to collect the gold or other precious metals or stones found mingled with sand, gravel, dirt and other relatively valueless material, from which it is separated by washing.

The general object is the retention, and saving of all gold which is being separated from the base material by washing, and the particular object by which the ends of the main object are served is to enable the non-amalgamating as well as the amalgamating gold or other precious metal to be retained and saved.

As is well known, the simplest and most commonly used method of collecting the gold which is found in a free state mingled with base material and separated therefrom by washing, is to amalgamate the gold by carrying it in contact with mercury. Some gold, however, will not amalgamate, owing either to the fact that it is coated with some material which prevents the mercury from acting upon it, or that it is combined with other elements, or from other causes.

The object of the present invention, therefore, is to provide a means by which the non-amalgamating gold may be withdrawn from the stream which washes it. In carrying this object into practical effect, I make use of the fact that the specific gravity of gold is much greater than that of the material in company with which it is found, and upon the further well-known fact which results from this characteristic, that when gold is once thrown down by centrifugal action from the stream which carries it, it will not again be picked up by the stream.

The means by which I make practically effective the above objects, and one of the many possible forms of apparatus in which the principles of my invention may be embodied, is shown in the accompanying drawings, in which,

Figure 1 represents a side elevation of the apparatus. Fig. 2 represents a longitudinal section of the same. Fig. 3 represents a plan

view of the same. Fig. 4 represents a cross-section on line 4—4 of Fig. 2. Fig. 5 represents a cross-section on the line 5—5 of Fig. 1.

The same reference characters indicate the same parts in all the figures.

In the following description I shall principally refer to the precious metal which is collected by the means described, as gold, this being because gold is the metal most commonly collected in this manner, and also for convenience and brevity of description. I desire at the outset, however, to make it distinctly understood that I do not limit myself to gold as the metal capable of collection by this apparatus, but that I propose to use it in connection with any metal or precious stones having a sufficiently high specific gravity for the purpose, as hereinafter appears. Hence it is to be understood that wherever the word "gold" appears in the specification or claims, I have in mind and intend to refer to any substance which, when acted upon, is not cohesively joined with the other materials among which it occurs, and which has a sufficiently greater specific gravity than the materials with which it is mingled to act in the manner hereinafter described.

The apparatus consists in the first place in a sluice or flume *a*, which serves as a conduit for leading a flowing stream used in washing the gold or other metal to be collected from the materials with which it is mingled. In the bottom of the sluice is contained a pocket or chamber *b* of peculiar form, designed to give a whirling motion to the water which enters it, and thereby cause the heavy solids carried by the water to be thrown out and down, while the lighter solids continue with the stream out of and beyond the pocket. For this purpose the bottom of the sluice is somewhat elevated on a gradual slant, as shown at *c*, reaching its highest elevation at the point where the rear wall of the pocket commences. It should be noted that the flow of the stream is supposed to be from left to right with reference to the drawings. The flowing stream and solid matter carried by it thus enter the pocket and strike the farther wall *b'* thereof. This wall is curved and extends downwardly and back oppositely to the direction of flow of the stream. In the bottom of the pocket is

formed a narrow recess *d*, the walls of which make abrupt angles with the wall *b'*. Across the center of the pocket extends a rib *e*, which is almost directly above the recess *d*, and the under and rear surface of which joins the upwardly and backwardly extending part of the pocket wall *b'* on a smooth curve of sharp radius. For convenience of construction the pocket *b* with its bottom recess *d* and rib *e* is formed in a metal piece, which is inlaid into the bottom of the sluice, the latter being ordinarily of wood. The pocket may be built directly into the sluice, however, and would ordinarily be so if some such material as concrete were used for the construction of the sluice. The pocket extends entirely across the sluice from one side to the other, and at one end, in line with its bottom recess *d* and outside of the sluice, it has a cap *f*, which is removable to permit the collected gold to be withdrawn.

Above the pocket is a baffle *g*, which is adjustably hung upon studs *h* extending across the top of the sluice. The baffle has at its ends flanges *i* provided with slots *j* through which the studs *h* pass. It is adjustable about the studs and is retained at various angles by a pin *k*, which is adapted to be passed through any one of a number of holes *l* in plates *m* which secure the studs *h*, these holes being arranged angularly around the apertures which contain the studs *h*. The frictional clamping means for securing the baffle is found in the heads *h'* of the studs *h* which press the flanges *i* against the plates *m* when drawn outwardly by the nuts *h²* which are threaded on the outer ends of the studs. The baffle may be set at various angles with respect to the flowing stream, and may be made to extend to greater or less depths below the surface thereof, according as best serves the purpose of producing eddies in the water, causing it to enter the pocket. The plates *m* rest on the walls of the sluice and have flanges *m'* which lie against the sides of these walls as shown in Figs. 1 and 4. They are secured together by bars *p*, as shown in Fig. 3, which form with the plates a frame carrying the baffle. As this frame rests on the sluice walls (as shown) being unconfined except by the flanges *m'*, it may be moved along the sluice to place the baffle at any position desired with respect to the pocket, so that when the angular adjustments above described are made, the bottom edge of the baffle may be in the best position for securing the desired effects.

When the stream flowing through the sluice encounters the baffle, it is checked and eddies are set up which cause the solid matter to be carried into the pocket with a portion of the water. This checking of the water also causes an additional head to accu-

mulate in front of the baffle, and the restriction of the passage through which the water may flow causes, together with the accumulation of head, a greater force of flow of the water through the narrow space below the baffle. This baffle is an important feature of the invention, as it causes the water to move with sufficient force, and particularly to have such directions of movement as to wash the gravel out of the pocket as well as into it. The rapid changes in direction of the material flowing through the pocket causes the heavy material to be thrown outward by centrifugal force, and as the gold is the heaviest of all the materials propelled by the water, it finds its way to the wall of the pocket, crowding back the lighter solids and entering the recess *d*. If any gold carried by the water travels as far as the rib *e*, it is thrown down by its own momentum into the recess *d* when the water passes upward around the rib. I have found that this device is effective for entrapping all of the gold which is heavy enough and in large enough particles to sink in the water. At the same time that the gold is caught, the sand and mud are carried out from the pocket with the outflowing water and across the stream entering the pocket. The reason that the sand, etc., is carried out of the pocket and leaves the gold behind is that gold which has once been precipitated upon the bottom of a flowing stream will not be again picked up by the water, but will remain on the bottom, while lighter solids, like pieces of stone are picked up and carried great distances by the stream. The abrupt walls of the recess *d* in the bottom of which the gold collects, also assist greatly in preventing the gold from being removed by the impact of other floating particles.

In the bottom of the sluice is another pocket or receptacle *p* for collecting the gold which is in such a condition that it will amalgamate. This pocket may be arranged either in advance of or in rear of the pocket *b* as may be desired. In *p* is located a quantity of quick silver, which rises nearly to the top of the pocket. The bottom of the sluice is inclined upwardly, somewhat as shown at *n'* in front of the pocket, so as to retard the gold, etc., and assist in precipitating it into the pocket. The gold will sink in the quick silver while the sand, mud and stones will float on its surface and be washed away by the water. At the ends the lower part of the pocket is formed with tubular nipples *q* which extend beyond the sides of the sluice and are closed by detachable caps *r* which can be removed to withdraw the amalgam.

I claim,—

1. The combination of a sluice through which a stream of water carrying minerals is caused to flow, with a pocket element in the bottom of the sluice, said pocket element

having its wall farthest from the feed or entrance end of the sluice spirally curved downwardly, reversely with respect to the stream flow, upwardly beneath the bottom of the sluice, and again downwardly, whereby a whirling motion is given to the portion of the stream which enters the pocket and the materials of greatest specific gravity are thrown to the bottom of the pocket.

2. The combination of a sluice through which a stream of water carrying minerals is caused to flow, with a pocket element in the bottom of the sluice, said pocket element having its wall farthest from the feed or entrance end of the sluice spirally curved downwardly, reversely with respect to the stream flow, upwardly beneath the bottom of the sluice, and again downwardly, and having a recess in its bottom, whereby a whirling motion is given to the portion of the stream which enters the pocket and the materials of greatest specific gravity are thrown to the bottom of the pocket and caused to lodge in said recess.

3. The combination of a sluice through which a stream of water carrying minerals is caused to flow, with a pocket element in the bottom of the sluice, said pocket element having its wall farthest from the feed or entrance end of the sluice elevated above the rest of the pocket and presenting a sharp angle to the stream, adapting it to deflect the lower stratum, said wall being spirally curved downwardly, reversely with respect to the stream flow, upwardly beneath the bottom of the sluice, and again downwardly, whereby a whirling motion is given to the portion of the stream which enters the

pocket and the materials of greatest specific gravity are thrown to the bottom of the pocket.

4. In combination, a sluice and a deflector, said deflector consisting of a baffle, plates supported on the walls of the sluice and adjustable longitudinally thereof, alined, horizontal pivots connecting said baffle with the respective plates, whereby the inclination of the baffle with respect to the stream flow may be regulated, and a bar extending across between the plates, the latter having provisions for holding the bar in various positions eccentric to the pivots and near the plate for maintaining the plate in its adjustments against the pressure of a stream flowing through the sluice.

5. The combination with a sluice having upright side walls, of an adjustable deflector, comprising plates mounted and longitudinally slidable on the walls of the sluice and provided with flanges overlying the sides of such walls to retain them thereon, horizontal pivot studs in the respective plates, a baffle between said plates having slotted flanges at its ends bent at right angles to the plane of the baffle and lying close to the plates through which said studs pass, whereby the baffle is adjustable both angularly and as to height, and clamping nuts on the studs for binding the flanges against the plates.

In testimony whereof I have affixed my signature, in presence of two witnesses.

LAWRENCE B. GRAY.

Witnesses:

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