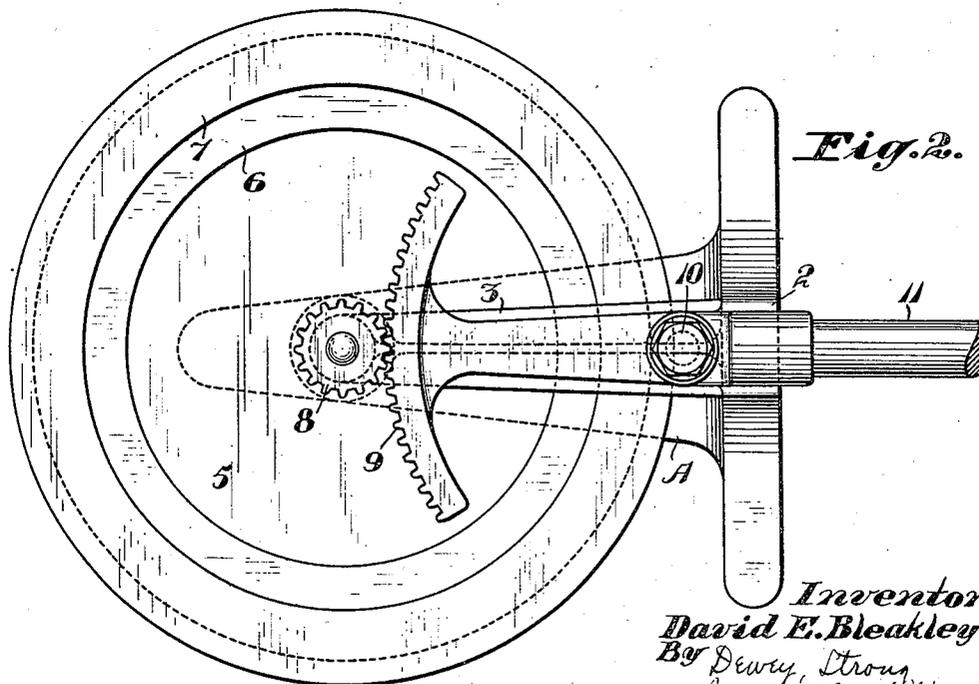
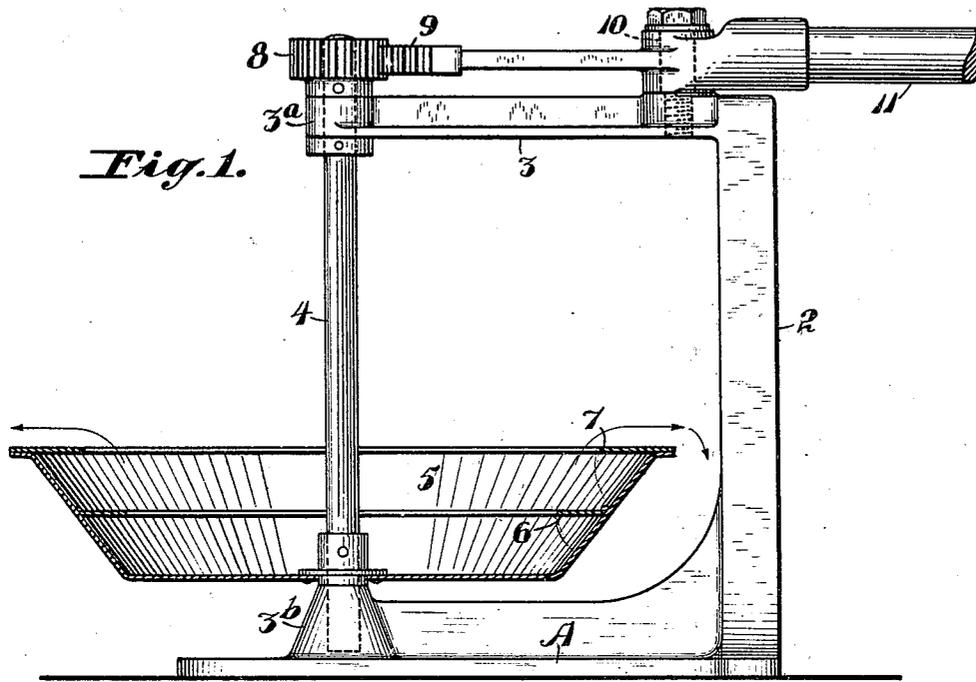


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CONCENTRATOR.
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UNITED STATES PATENT OFFICE.

DAVID E. BLEAKLEY, OF OAKLAND, CALIFORNIA.

CONCENTRATOR.

Application filed April 3, 1922. Serial No. 548,987.

To all whom it may concern:

Be it known that I, DAVID E. BLEAKLEY, a subject of the King of Great Britain, residing at Oakland, county of Alameda, and State of California, have invented new and useful improvements in Concentrators, of which the following is a specification.

This invention relates to concentrators and especially to concentrators of the centrifugal type.

In the working of placer or alluvial deposits containing precious metals such as gold, platinum and the like, a considerable percentage of the metals or values escape with the tailings due to the difficulty of catching or retaining the finer values, such as flour gold, etc. A great variety of concentrators, jigs, rockers, amalgamating devices, etc. have been employed for this purpose, but with comparatively little success, as practically all concentrates obtained from such sources contain a large proportion of black sand and other heavy matter, which packs behind the riffles and thereby prevents the finer values from lodging. Again water in fairly high velocity and a large volume must be employed in most cases to keep the material moving and to prevent excess packing behind the riffles and the finer values are not given an opportunity to settle. Again, when amalgam traps or other amalgamating devices are employed, scouring action takes place and the quicksilver flours and escapes. Such losses in most cases more than offset the value of the finer metals caught and are therefore useless and prohibitive. The problems and conditions just stated are by no means exceptional, but are rather common and every day difficulties, and it might here be stated that they present unsolved problems as no effective apparatus or method has so far been developed.

The present invention embodies a concentrator of the pan type, and one which utilizes centrifugal force and an agitating movement; the object being to project the values by centrifugal action and to trap all values and then settle them by stratification caused by difference in specific gravity. The invention also embodies a simple and substantial form of apparatus in which is supported a concentrating pan in which the material to be concentrated is delivered. The invention further embodies a mechanism for imparting an oscillating movement to

the pan as will hereinafter be described.

Other objects will hereinafter appear.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Fig. 1 is a side elevation of the machine partially in section.

Fig. 2 is a plan view thereof.

Referring to the drawings in detail, A indicates a base plate and 2 a standard or vertical frame, which supports a horizontal arm or bracket 3. Formed on the outer end of the bracket 3 is a journal member 3^a, and similarly formed in alignment therewith on the base A is a bearing member 3^b. Vertically positioned and journalled in the bearing members is a shaft 4, and secured on the lower end of the shaft is a concentrating pan generally indicated at 5. Formed or otherwise secured in the pan is a series of superposed annular ring like riffles 6 and 7, and adapted to impart an oscillating movement to the shaft 4 and the pan carried thereby, a pinion 8 and a segmental gear 9 are employed. The segmental gear is journalled on a pin 10 and it is provided with an operating handle or lever 11 by which an oscillating movement may be imparted thereto. The segment or gear 9 intermeshes with the pinion 8 and as this is secured to the shaft 4 alternate or reverse revolutions will be imparted to the shaft and the pan.

In actual operation the material to be concentrated, together with a sufficient amount of water to insure washing of the material and removal of the tailings and waste, is delivered to the center portion of the pan from any suitable source and in any suitable manner. At the same time an oscillating movement is imparted to the lever 11 and the segmental gear 9 and a succession of rotating movement will thus be imparted to the pan. For instance the gear ratio may be such that the pan will turn one revolution in one direction, then reverse its movement and rotate one revolution in the opposite direction. Such turning movement of the pan sets up a centrifugal action which is more than sufficient to throw the material outwardly in under the riffles, but as the material is gradually being delivered it can readily be seen that the material assumes an inverted cone shaped formation and that the

heavier concentrates will have a tendency to penetrate the mass material undergoing treatment to such an extent as to finally lodge in under the riffles 6. Any concentrates which have not had an opportunity to penetrate the mass of material at this point will continue penetration and will finally lodge in under the upper riffle 7, where it is finally and permanently caught. In this connection it should be remembered that the concentrates contain a large proportion of black sand and other heavier materials, and that all of these materials, due to their weight, will lodge behind the riffles where they will gradually stratify, the materials of heaviest specific gravity penetrating the lighter materials and finally lodging in the innermost position behind and in under the riffles. Another important feature is that packing of the concentrates is entirely avoided as each reversing movement sets up an agitating movement which thoroughly loosens the mass of concentrates and thereby prevents packing of the same. The finer values, such as flour gold and the like, are thus given an opportunity to penetrate the heavier black sands and the like and will thus work through the mass where they will be trapped by the riffles, and as they build up in quantity, together with other metals trapped or caught, black sand will be gradually liberated by displacement and will escape over the riffles and discharge with the water and tailings. A tailing launder may be arranged exterior of the pan to receive and remove the tailings, but as such launder may be arranged in any suitable manner and carried to any point desired, it is obvious that illustration is here thought unnecessary.

The present apparatus may be employed for prospecting purposes in placer deposits; it may be employed for cleaning up concentrates from dredges, sluice boxes and the like, or it may be employed for sampling purposes where ground or ores are being tested; its range in use in connection with work of this kind being almost unlimited as a true test of the samples taken may be obtained due to the fact that all values are retained. The capacity of the machine may be varied by increasing or decreasing the depth and diameter of the pan and the number of riffles employed, and it may further be increased by placing one or more series of pans on a common shaft or such as that illustrated in Fig. 1. Automatic feeding devices may also be employed, but as such features do not form any part of the present invention, they are not here illustrated.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or various uses may demand.

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

1. A concentrator of the character described comprising a frame including a base provided with an upstanding bearing and at one side provided with an upright, an arm extending inwardly from the upper end of the upright over the base and at its outer end provided with a bearing disposed in vertical alinement with the aforesaid bearing on the base, a shaft journaled in said bearings, a pinion on the shaft above said arm, a segmental gear having pivotal mounting on said arm and intermeshing with said pinion, a handle connected to the segmental gear for oscillating the latter, a pan concentric with and secured on the shaft over said upright bearing for rotation with the shaft, said pan consisting of a relatively large, flat imperforate bottom, save for the passage of the shaft therethrough, an outwardly flaring rim section and a plurality of spaced annular superposed riffle members secured to the flaring rim of the pan and positioned substantially parallel with relation to the bottom section, whereby to agitate the material in the pan upon oscillation of said segmental gear and to effect discharge of the water and tailings from the pan over the upper edge of the rim.
2. A concentrator of the character described comprising a frame, a vertically disposed straight shaft journaled in the frame, a pan concentric with and secured on the shaft to rotate therewith, in one true circle of rotation, said pan consisting of a relatively large, flat imperforate bottom and a relatively narrow and outwardly, upwardly flaring rim, a plurality of spaced annular superposed riffle members secured to the rim of the pan and positioned substantially parallel with relation to the bottom, the uppermost riffle being disposed at the free edge of the flaring rim, and means for transmitting an oscillating movement to the shaft and pan whereby to agitate the material and to effect discharge of the water and tailings from the pan over the upper riffle member and over the upper edge of the rim.

DAVID E. BLEAKLEY.