

D. B. CAVE.
PLACER GOLD CONCENTRATOR.
APPLICATION FILED NOV. 22, 1918.

1,387,238.

Patented Aug. 9, 1921.

3 SHEETS—SHEET 1.

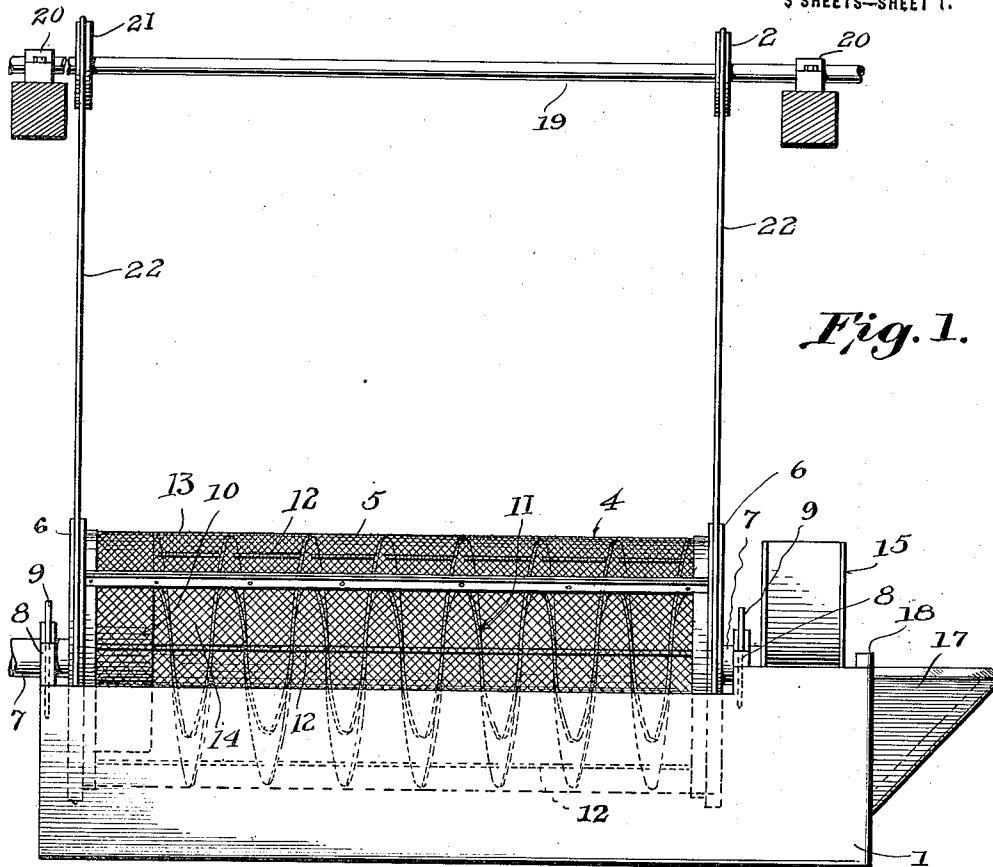


Fig. 1.

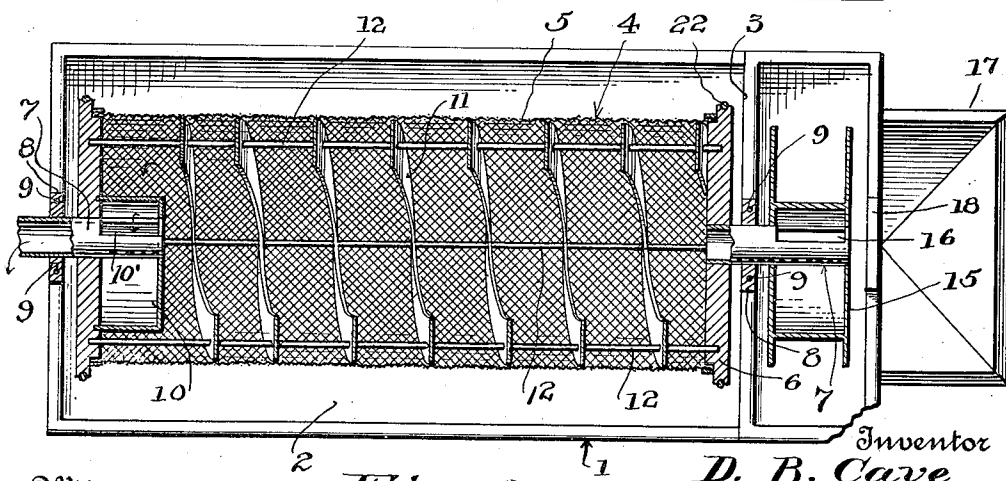


Fig. 2.

Witnesses

J. J. McParthy

Inventor
D. B. Cave

By *Victor J. Evans*
Attorney

D. B. CAVE.
PLACER GOLD CONCENTRATOR.
APPLICATION FILED NOV. 22, 1918.

1,387,238.

Patented Aug. 9, 1921.
3 SHEETS—SHEET 2.

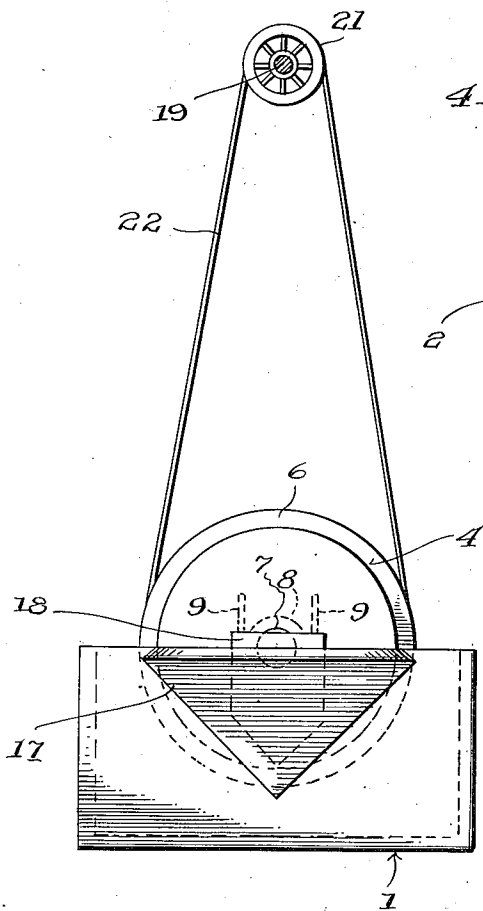


Fig. 3.

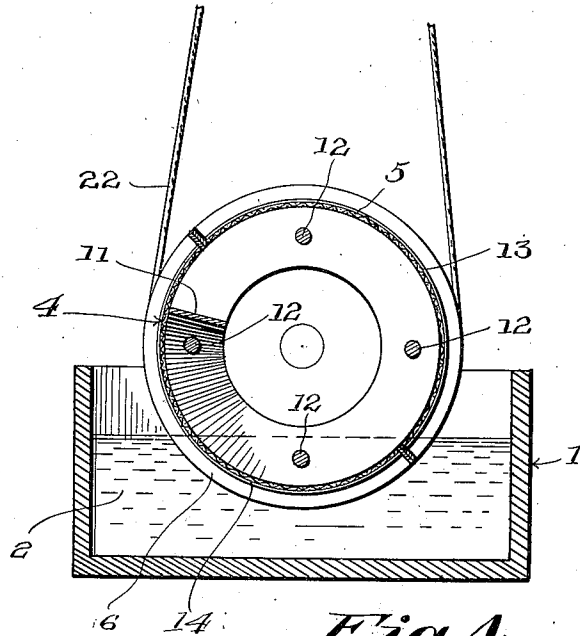


Fig. 4.

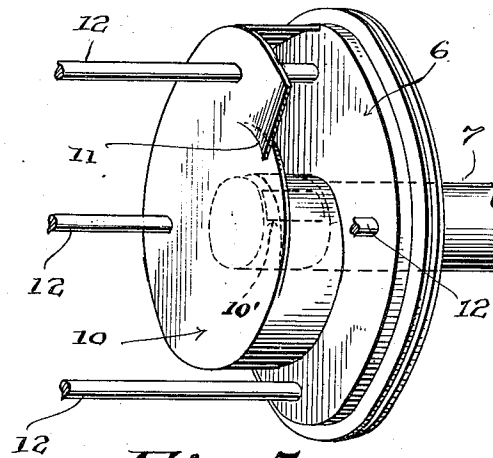


Fig. 5.

Witnesses

J. J. McCarthy

Inventor
D. B. Cave

By *Victor J. Evans*
Attorney

D. B. CAVE.
PLACER GOLD CONCENTRATOR.
APPLICATION FILED NOV. 22, 1918.

1,387,238.

Patented Aug. 9, 1921.

3 SHEETS—SHEET 3.

Fig. 6.

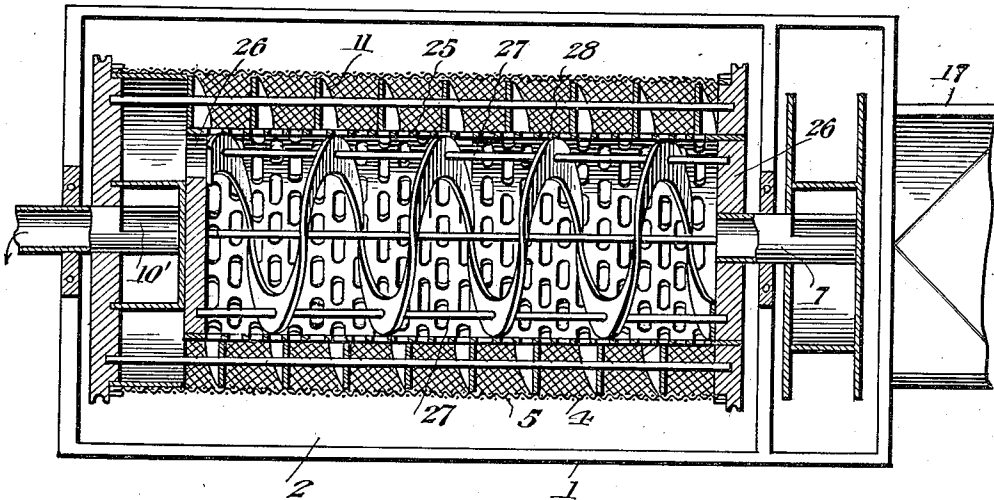


Fig. 7.

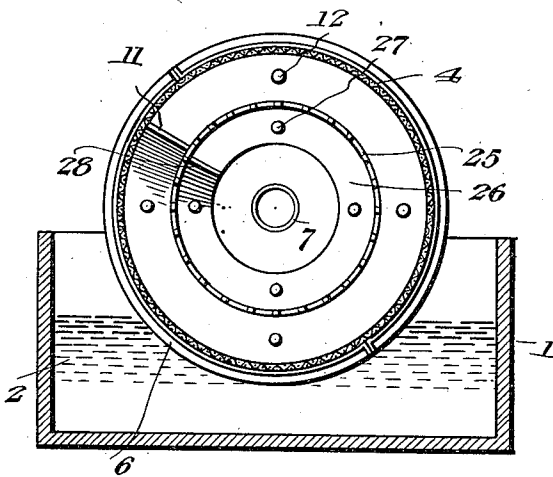
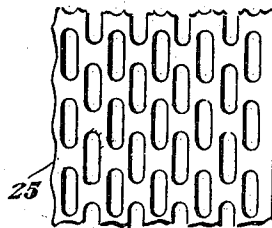


Fig. 8.



Witnesses

E. A. Ackman Jr.

Inventor
D. B. Cave

By *Victor J. Evans*
Attorney

UNITED STATES PATENT OFFICE.

DANIEL B. CAVE, OF LINCOLN, NEBRASKA, ASSIGNOR OF ONE-FOURTH TO HAROLD M. GEORGE, ONE-FOURTH TO E. ALFRED WILLNER, ONE-EIGHTH TO C. PETRUS PETERSON, AND ONE-EIGHTH TO ROBERT W. DEVOE, ALL OF LINCOLN, NEBRASKA.

PLACER-GOLD CONCENTRATOR.

1,387,238.

Specification of Letters Patent.

Patented Aug. 9, 1921.

Application filed November 22, 1918. Serial No. 263,773.

To all whom it may concern:

Be it known that I, DANIEL B. CAVE, a citizen of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented new and useful Improvements in Placer-Gold Concentrators, of which the following is a specification.

This invention relates to improvements in concentrators and has particular application to a device for concentrating and saving the fine flour gold contained in auriferous gravels of placer deposits or soil.

In carrying out the present invention it is my purpose to provide a concentrator for placer deposits whereby the fine flour gold contained in the auriferous gravels may be concentrated into such form as to contain the least possible amount of waste material, and, at the same time, retain all the values so that such values of gold deposits may be quickly and economically prepared for treatment by a mechanical or electrical amalgamating apparatus or process.

It is also my purpose to provide a concentrator of the class described which will be constructed in such manner that the fine particles of flour gold will be subjected to the least possible agitation thereby preventing the gold particles from being held in solution and carried away with the waste material or tailings.

A further object of my invention is the provision of a concentrator of the type set forth whereby large quantities of placer deposits may be handled and concentrated at low cost of operation and with a minimum supply of water or other concentrating liquid or fluid.

A still further object of the invention is the provision of a placer gold concentrator whereby the sand or soil bearing the precious metal will be thoroughly and effectively separated and sifted in such a manner that the fine particles of gold will be precipitated, by the action of gravity, into the concentrating solution, while at the same time the material being treated cannot be unduly or unnecessarily agitated.

Still another object of my invention is the provision of a concentrator for placer deposits which will embrace the desired features of simplicity, efficiency and durability, which may be installed and maintained at a

minimum expense and which will operate efficiently for its intended purpose.

With the above recited objects in view and others of a similar nature the invention resides in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claim.

In the accompanying drawing:—

Figure 1 is a view in side elevation of a concentrator constructed in accordance with my present invention.

Fig. 2 is a horizontal sectional view through the same.

Fig. 3 is an end view thereof.

Fig. 4 is a vertical cross sectional view through the concentrator.

Fig. 5 is an enlarged detail view showing one of the scoops.

Fig. 6 is a longitudinal sectional view showing a modified form of concentrator.

Fig. 7 is a cross sectional view through the same.

Fig. 8 is an enlarged fragmentary elevation of a cylindrical side wall of the inner drum used in the modified construction.

Referring now to the drawings in detail 1 designates a tank which, in the present instance, is substantially rectangular in contour. The tank 1 is partly filled with a concentrating liquid 2, such, as for instance, water and the upper end of the tank is open. Extending across the tank 1 adjacent to one end thereof is a partition 3 that cooperates with adjacent portions of the side walls and the adjacent end walls to form intake sections.

Rotatably mounted within the tank 1 between the partition 3 and the remote end wall of the tank is an agitating or sifting drum 4. In the present instance, this drum 4 comprises a foraminous side wall circular in cross section and an end plate or disk 6 engaging the respective ends of the side wall 5 and closing such ends. Extending through the end plate or disk 6 at the center of the latter or hollow shafts 7 respectively. These shafts 7 are revolubly mounted in guide blocks 8 slidably mounted upon pins 9 carried by the upper ends or edges of the partition 3 and the remote end wall of the tank 1 respectively. The inner ends of the shafts 7 project a short distance into the drum and the outer end of one hol-

low shaft 7 projects beyond the corresponding end wall of the tank, while the outer end of the other end of the other shaft 7 terminates beyond the partition 3 and short of the adjacent end wall of the tank 1.

The end of the drum remote from the partition 3 constitutes the discharge end of the concentrator and surrounding the inner end of the shaft 7 within the drum at the discharge end thereof is an involute carrier or trough 10, the inner end of which opens into the hollow shaft 7 through a slot 10' in such shaft, while the outer end of the carrier is in open communication with the drum so that in the rotation of the drum and carrier the tailings and other waste matter at the discharge end of the drum will be raked and conveyed by the carrier to the slot 10' to the hollow shafts 7 whence they may be discharged from the concentrator.

Arranged within the drum 4 and extending longitudinally thereof is a helical or spiral conveyer 11 one end of which terminates adjacent to the carrier 10 while the other extremity terminates in the disk or plate 6 at the intake side of the concentrator. This conveyer 11 revolves with the drum and acts to carry the placer deposits or gravel through the drum in the rotation of the latter and in the rotation of the drum and conveyer the placer material thoroughly, yet slowly, is agitated and sifted while traveling from the intake end of the drum to the discharge end thereof thereby insuring precipitation of the concentrates into the concentrating liquid in the tank 1, while the tailings or waste matter are delivered to the carrier 10 to be discharged from the concentrator through the hollow shaft 7 communicating with the carrier 10. In the present instance, the longitudinal brace rods 12 extend through the vanes of the involute conveyer 11 and the ends of such brace rods are secured to the respective end plates or disks 6. Thus motion from the drum is transmitted to the conveyer and the side wall and end plates of the conveyer are rigidly connected to one another.

The foraminous side wall 5 in the drum is preferably made of two sections 13 and 14 having their meeting edges thereof flanged and bolted together. By means of this construction it will be seen that the sections of the foraminous side wall may be readily disconnected from each other when desired and detached from the end plates or disks so that the drum may be cleaned whenever necessary.

Fixed upon the end of the shaft 7 between the partition 3 and the adjacent end wall of the tank 1 is an involute intake or delivery carrier 15 having the inner end in open communication with the hollow shaft 7 by way of a slot 16' formed in such shaft with the outer end in open communication with

the intake section formed by the partition 3 and the adjacent portions of the side walls and the adjacent end walls of the tank 1. In the present instance, the end wall of the tank 1 adjacent to the partition 3 is equipped with a feed hopper 17 adapted to receive the placer deposit and the communication between the feed hopper 17 and the intake section is controlled by means of a gate or valve 18.

The placer gravels or soil together with a suitable quantity of concentrating liquid may be fed to the hopper 17 either automatically or by hand and when the gate 18 is opened the contents of the hopper 17 flow into the intake section of the tank. In the rotation of the drum corresponding movement is imparted to both shafts 7 and in the revolving of the shaft 7 at the intake end of the concentrator, the involute conveyor or carrier 15 in the intake section delivers the contents of the intake section to the drum by way of the shaft 7. As the drum revolves the spiral conveyer therein carries the placer deposits over the foraminous side wall of the drum and along such side wall thereby thoroughly and effectively sifting the material so that fine flour gold may be delivered to the concentrating liquid through the foraminous wall of the drum, while the coarser materials or tailings will be confined within the drum and delivered to the involute conveyer 10 in the discharge end of the drum. Thus it will be noted that provision is made for the delivery and discharge of the material handled, that is controlled to effect a proportionate amount in both cases, that is determined by reason of the relative sizes of the involute intake and discharge means, and their rotation respectively on the shaft 7, to prescribe the intervals during which they function.

By means of the carrier or conveyer 15 at the delivery end of the drum and the carrier or conveyer 10 at the discharge end of the drum it will be seen that the placer gravels are delivered to the drum in practically the same quantity as the tailings discharged from the drum thereby preventing overloading of the concentrator and insuring the proper separating of the flour gold from the tailings or waste.

In the present instance the driving mechanism for the drum comprises an outer shaft 19 trained above the drum and journaled in suitable bearings 20. Fixed upon the outer shaft 19 are sheaves alining vertically with the respective end disks or plates 6 on the drum and formed in the periphery of each end plate or disk is a groove. Over the sheave 21 and around the groove in the end plate is trained endless belts 22 whereby motion may be transmitted from the counter shaft 19 to the drum. These belts 22 in addition to acting as driving elements for

the drum also serve to hold the drum suspended in the concentrating tank thereby enabling the drum to be revolved with a minimum friction from a comparatively small source of power.

From the foregoing description taken in connection with the accompanying drawing, it will be seen that I have provided a concentrator wherein the revolving drum and conveyer will subject the placer sands to a thorough washing, separation and shifting process aided by the action of the water or other concentrating liquid and wherein owing to the comparatively slow revolution of the drum, the sands will be caused to tumble over one another with as little agitation as possible thereby enabling the fine flour gold to be sifted through the foraminous wall of the drum and into the concentrating tank.

In the modified construction shown in Figs. 6, 7 and 8 of the drawing, I have shown my improved concentrator as comprised of a double drum and in this case the second drum is arranged within the space defined by the flight of the conveyer 11 and this second drum embodies an outer foraminous cylindrical wall 25, end pieces 26, and brace rods 27. Within this drum is a spiral or helical conveyer 28 that extends from one end of the drum to the other and pass through the flight of the conveyer 28 of the brace rods 27, the ends of the brace rods being connected with the respective end pieces 26 of the drum. The intake end of the drum is in open communication with the hollow shaft 7 at the intake end of the concentrator, while the discharge end of the second named drum is in open communication with the discharge carrier or involute conveyer.

In the present instance, the perforations in the cylindrical wall 25 of the inner drum are oblong in shape and are arranged in rows, and the perforations in one row are staggered relatively to those of the adjoining row, as clearly illustrated in Fig. 8 of the drawing. In operation, the placer sands are delivered to the interior drum through the intake conveyer and owing to the fact that the perforations in the cylindrical wall 25 of the inner drum are relatively large as compared with the perforations in the outer drum, only the finer sands and gravels are delivered to the exterior drum. The coarser sands and gravels will be carried along the interior drum by means of the spiral con-

veyer therein and delivered to the involute discharge carrier at the discharge end of the concentrator.

By means of the modification just described, it will be seen that I have provided a means whereby coarser sands and waste materials may be separated from the finer gold bearing deposits thereby allowing only the gold values to be precipitated into the concentrating tank. The action of the two drums enables the sands of placer deposits to be thoroughly washed and sifted so as to insure recovery of the gold values in the concentrating tank.

If desired a circular metal guard or shield may be mounted upon the outer drum at the discharge end thereof so as to relieve the foraminous cylindrical wall of such drum of any undue waste or wear incident to the discharge of the coarse gravel from the inner drum to the outer drum at the discharge end of the concentrator.

While I have herein shown and described one particular form of my invention by way of illustration, I wish it to be understood that I do not limit or confine myself to the precise details of construction herein described and delineated, as modification and variation may be made within the scope of the claim and without departing from the spirit of the invention.

I claim:—

An apparatus of the class described comprising a tank, a rotatable drum arranged therein and consisting of end walls and foraminous sides, an involute receiver arranged within said drum at one end of the same, a spiral conveyer secured within said drum for rotation with the same and adapted for directing material into said involute receiver, a hollow shaft extending through one of said end walls and having communication with said receiver, a partition arranged in said tank and defining an intake section, a second involute receiver arranged in said intake section, a hollow shaft extending through one end wall of said drum and extending through said second named receiver, said second named shaft being provided with a slot establishing communication between the second named shaft and the second named receiver, the capacity of the first and second named receivers being approximately equal, and means rotating said drum.

In testimony whereof I affix my signature.
DANIEL B. CAVE.