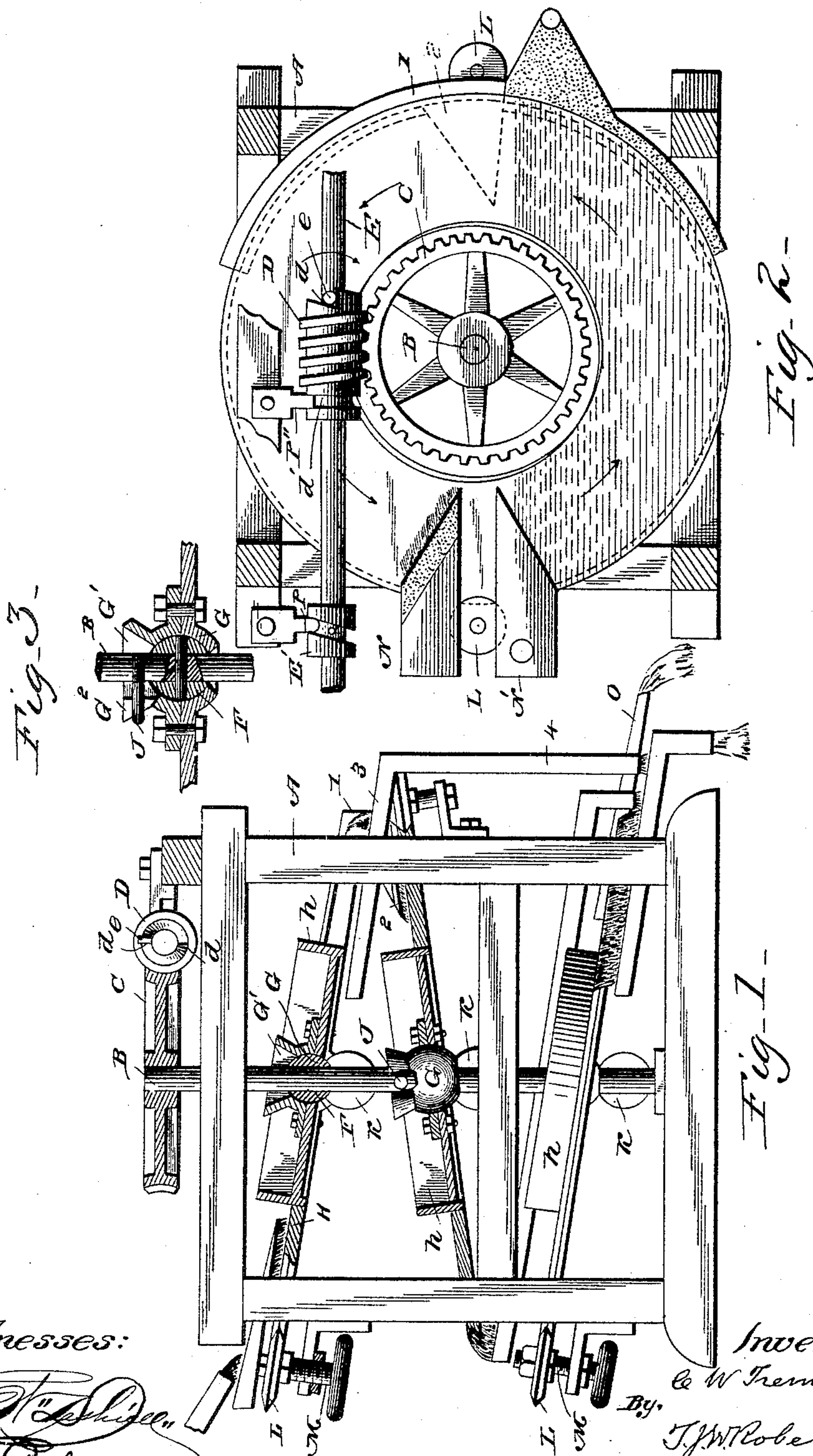


(No Model.)

C. W. TREMAIN.
ORE CONCENTRATOR.

No. 437,875.

Patented Oct. 7, 1890.



Witnesses:
[Signature]
J. B. Robertson

Inventor:
C. W. Tremain
By: *[Signature]*
J. W. Robertson
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES W. TREMAIN, OF PORTLAND, OREGON.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 437,875, dated October 7, 1890.

Application filed July 30, 1889. Serial No. 319,223. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. TREMAIN, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Ore-Concentrators, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in ore-concentrators, and has for its object the production of a machine which will possess merit in point of cheapness, durability, and general efficiency.

The invention consists in certain features of construction and combination of parts hereinafter more fully described and then definitely claimed.

In the accompanying drawings, Figure 1 represents a side elevation, partly sectional, of an apparatus embodying my invention. Fig. 2 represents a top plan view thereof, and Fig. 3 represents a detail view.

Referring by letter to the drawings, A designates the frame of my machine, in which is journaled a vertical shaft B, on the upper end of which is mounted a gear-wheel C, operated by a worm D on the driving-shaft E, thus imparting motion to the vertical shaft.

On the vertical shaft, at predetermined distance, are secured balls F, which fit the cup-bearings G of the disks or wheels H and the cups G'. By means of this construction it will be seen that the wheels H are adapted to be tilted or inclined on the balls, and engaging the cups G' are pins J on the vertical shaft, the cups having slots G² to receive said pins, and thus the disks or wheels H are driven.

The wheels or disks H have rims h, outside of which their surfaces may be covered with carpet or other fabric adapted to the purpose, and the peripheries of the disks are grooved, and in said grooves engage the peripheries of the wheels L on the adjusting-screws M, by means of which the disks and rims are held in any desired adjustment, said screws being mounted in brackets on the frame.

N designates the chute for feeding the pulp, N' the chute for supplying the water, and O the spout for carrying off the residue.

On shaft E is firmly secured a grooved cylinder E', and at P is a pin firmly secured to the frame of the machine and engaging in the groove in the cylinder. The worm D is loosely mounted on the shaft E and is prevented from endwise motion by the pin P', which engages in a groove d' in one end of the worm D. In the other end of the worm are two notches d, in which alternately engages a pin e on the shaft E.

Beneath each disk H are a series of supporting-wheels (represented at K) arranged at proper intervals on the frame.

The operation is as follows: Motion being transmitted to the shaft E by any suitable means in the direction of the arrow on said shaft, it gives motion to the worm by the pin e engaging with one of the notches d, which worm in turn gives motion to the disks through the worm-wheel and the vertical shaft, as shown. As the shaft revolves it is moved endwise by the engagement of the pin P in the groove of the cylinder E', and by the time the shaft E and cylinder E' have made one-half of a revolution the pin e has moved out of engagement with the notch d, with which it has been engaged, and thus the shaft moves for a part of its circumference without giving motion to the worm, and consequently no motion is then imparted to the disks at the time the pin is out of engagement with the notch. As the shaft continues to revolve the pin and grooved cylinder cause the shaft to move in the opposite direction and to bring the pin in engagement with the other notch d on the opposite side of the worm, and thus again give motion to the worm and disks. This being the operation of the mechanism, I will now proceed to describe the operation on the material. The pulp is fed upon the chute N, from whence it falls upon the ascending side of the top disk H', where the heavy ore settles. The pulp that does not settle runs down on the same side to the receiver 1, from whence it passes to the chute 2 and to the second disk H, while the ore settled on the top disk passes around to the descending side and is washed off by water from the chute N' or otherwise into receiver 3, from which it passes through spout 4. After the pulp has passed the second disk it is treated in a similar way, and

from thence to the third disk, where it receives similar treatment, so that by the time the material has left the last disk all the precious metal has been separated from it. Owing to the peculiar hitching motion due to the worm D, shaft E, cylinder E', and pin P, the ore settles very quickly. The operation is very rapid and the waste material thoroughly separated.

10 What I claim as new is—

1. In a concentrator, a series of disks inclined in opposite directions set around and deriving motion from a vertical shaft, and each disk always running in the same plane and at an angle to one above it, substantially as described.

2. In a concentrator, a series of revolving disks inclined in opposite directions on a vertical shaft and guides to retain each disk always in the same plane and at an angle to one above it, substantially as described.

3. In a concentrator, a series of revolving disks inclined in opposite directions on a vertical shaft, guides to retain each disk always in the same plane and at an angle to one above it, and mechanism for giving the disks an intermittent motion, substantially as described.

4. In a concentrator, a shaft, a disk driven thereby, a worm-wheel on the shaft, and an intermittently-moving worm engaging with said worm-wheel, substantially as described.

5. In a concentrator, a shaft, a disk driven

thereby, a worm-wheel on said shaft, a worm engaging with said wheel, a constantly-moving shaft, and means, as the notches *d d* and pin *e*, for connecting said worm and shaft, giving an intermittent motion to the worm and worm-wheel, substantially as described.

6. In a concentrator, a vertical shaft, a series of disks driven by the same, a worm-wheel, the grooved and notched worm D, the shaft E, carrying said worm, the grooved cylinder E', and the pins P, P', and *e*, substantially as described and shown.

7. In an ore-concentrator, the combination of a frame, a vertical shaft mounted thereon, a gear-wheel and worm-shaft for rotating said shaft, balls on said shaft, disks having cups fitting on said balls, and wheels engaging the disks and having screws for operating them, substantially as described.

8. In a concentrator, a frame, a vertical shaft mounted therein, disks arranged on said shaft in a zigzag line, devices for adjusting the incline of said disks, mechanism for rotating the disks, and mechanism for giving an intermittent motion to said disks.

In testimony whereof I affix my signature, in presence of two witnesses, this 18th day of July, 1889.

CHARLES W. TREMAIN.

Witnesses:

A. OHLHOFF,

WM. E. POPE.