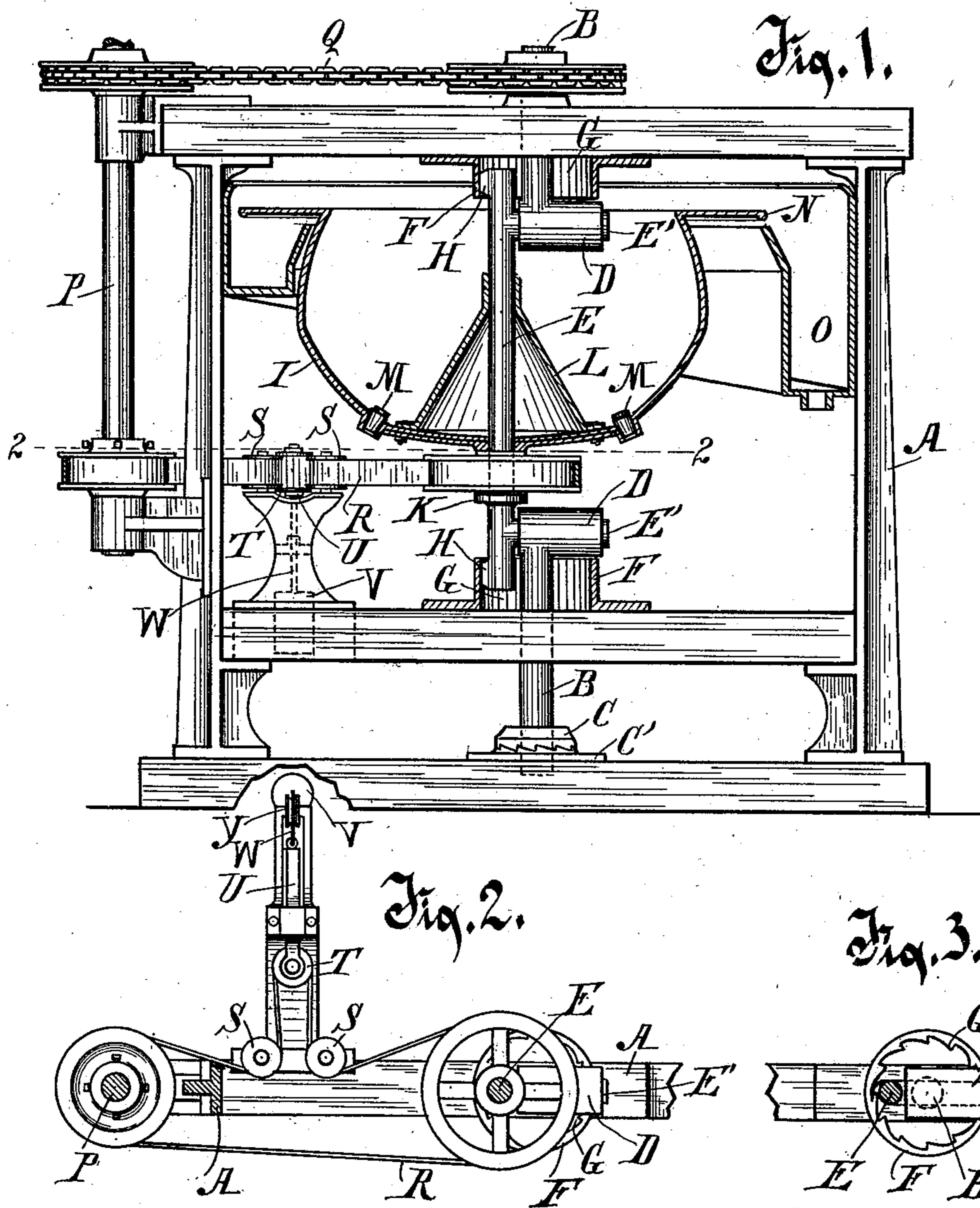


(No Model.)

C. E. SEYMOUR.  
ORE CONCENTRATOR.

No. 506,609.

Patented Oct. 10, 1893.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

CHARLES E. SEYMOUR, OF LAKE GENEVA, WISCONSIN.

## ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 506,609, dated October 10, 1893.

Application filed December 5, 1892. Serial No. 454,039. (No model.)

### *To all whom it may concern:*

Be it known that I, CHARLES E. SEYMOUR, of Lake Geneva, in the county of Walworth and State of Wisconsin, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in the ore concentrator for which Letters Patent No. 461,893 were issued to me October 27, 1891.

The machine is adapted for separating pulverized ores either in a dry state or in and by the aid of water, and to concentrate the mineral or heavier particles while the lighter gangue or refuse is thrown off by centrifugal force.

In my former machine described in Letters Patent No. 461,893, I provided means for giving the concentrator bowl a reciprocating vertical or jumping up and down movement in connection with a rotating and a whirling motion.

The object of my present invention is to provide for giving the bowl in addition to the motions before enumerated, a quick lateral or horizontal movement and shock, and in improvements in the devices adapted to accomplish these movements or subserve important functions therein.

In the drawings, Figure 1, is an elevation of the complete machine, portions being shown in section to better illustrate their construction. Fig. 2, is a plan of that portion of the mechanism below the line 2—2 on Fig. 1. Fig. 3, is a detail.

A is the frame of the machine of suitable form to properly support the operative mechanism. The shaft B has its journal bearings in the frame and is stepped and supported by means of the crown cam C fixed thereto in the corresponding crown cam box or step C' fixed on the frame. These cams are adapted to accomplish a rapid vertical or jumping up and down movement of the shaft and its load as the shaft revolves. The shaft B is in two independent parts terminating at their inner ends at a distance from each other in horizontal sleeves or boxes D D. A medial shaft E is provided with integral arms E' E' which

project therefrom at right angles thereto in the same vertical plane, which arms bear and are movable horizontally in the boxes D respectively. The shaft E is thus mounted in and forms a medial part or crank wrist of the shaft B being located eccentric to the axis of the shaft B and being whirled or carried around the axis of the shaft B by its revolution.

Sleeves or boxes F F are fixed to the frame about and concentric with the shaft B. These boxes F F are provided with internal spur cams G. The extremities of the shaft E are respectively within these boxes F F and are provided with bosses H H which are adapted to bear against and ride on the cams G. By means of this construction the shaft E during a considerable portion of each revolution with the shaft B of which it is a movable part, is, with the concentrator bowl I mounted thereon, carried inwardly eccentrically toward the axis of the shaft B and thereupon by centrifugal force as it jumps from the cams G is given a quick motion radially, terminated by a sudden stop and shock as it reaches the limit of its radial movement, the bowl and shaft being meantime constantly supported in vertical position.

The concentrator bowl I is mounted revolvably on the shaft E, the hub of the bowl resting on the collar K rigid on the shaft. The bowl is provided with a water tight flaring sleeve or apron L about the shaft E. Apertures closed by the plugs M are provided in the bottom of the bowl for discharging the heavier mineral contents therefrom. A trough O about the bowl is supported on the frame and is adapted to receive the water and refuse thrown over the top of the bowl by centrifugal force. The inner diameter of the trough is considerably greater than the diameter of the bowl, and the trough is located just outside the path of the bowl as carried around on the shaft E. The top of the bowl is preferably somewhat contracted and is provided with a horizontal rim N of sufficient extent to at all times cover the space between the bowl and the trough and to carry the contents of the bowl discharged therefrom over its top, into the trough. The shaft B is connected to the driving shaft P by the chain belt Q, whereby the shaft B is rotated. The bowl I is ro-

tated on the shaft E by the belt R running on pulleys on the hub of the bowl and on the shaft P.

To provide for maintaining the tension of the belt R while the shaft E is whirled around the shaft B, the belt R is carried around idle pulleys S S mounted on the frame, and intermediate thereto around the idle pulley T, mounted in the end of the block U reciprocable endwise in ways therefor in the frame and held rearwardly yieldingly by the weight V connected thereto by the cord W which runs over the idle pulley Y mounted on the frame.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an ore concentrator, the combination with a bowl mounted on a revoluble vertical shaft, of means for giving the bowl an eccentric orbicular and sudden radial movement horizontally, while the bowl is constantly in a vertical position substantially as described.

2. In an ore concentrator, the combination with a bowl mounted on a revolving vertical shaft, of means for giving the bowl an eccentric orbicular and sudden radial movement horizontally, and other means for giving the bowl a reciprocating motion vertically, substantially as described.

3. In an ore concentrator, the combination substantially as described, of a revoluble vertical shaft, a separate medial or wrist portion of the shaft furnished with arms radiating therefrom in the same vertical plane, which arms have bearings reciprocable horizontally in the main shaft, a bowl mounted on the medial portion of the shaft and encircling cams adapted to force the medial shaft inwardly toward its axis as it is whirled around and per-

mit it to jump therefrom radially whereby it is given a lateral horizontal movement.

4. In an ore concentrator, the combination substantially as described of a revoluble vertical shaft, crown cams about and rigid to the shaft, and complementary crown cams fixed on the frame adapted to jump the shaft up and down as it revolves, a separate medial or wrist portion of the shaft having radial arms in the same plane reciprocable horizontally in bearings therefor in the main shaft, sleeves or boxes having internal cams fixed on the frame about the shaft which receive the bearing of the medial portion of the shaft and force it radially toward the axis about which it is whirled, and a bowl revoluble on and about the medial or wrist part of the shaft.

5. In an ore concentrator, the combination with a vertical revolving shaft, a medial part or wrist of the shaft arranged eccentric to the axis of the shaft, and a bowl mounted revolvably on the eccentric or wrist part of the shaft, of a belt running from a power supply on a pulley on the hub of the bowl, and a pulley mounted in a weight-controlled reciprocable block, which pulley bears against and draws the belt yieldingly away from its principal line of motion thereby taking up the slack of the belt caused by the eccentric whirling of the wrist part of the shaft on which the bowl is mounted, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. SEYMOUR.

Witnesses:

CHAS. F. CASE,  
JOSIAH BARFIELD.