

L. I. BLAKE.
ORE CONCENTRATOR.
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964,083.

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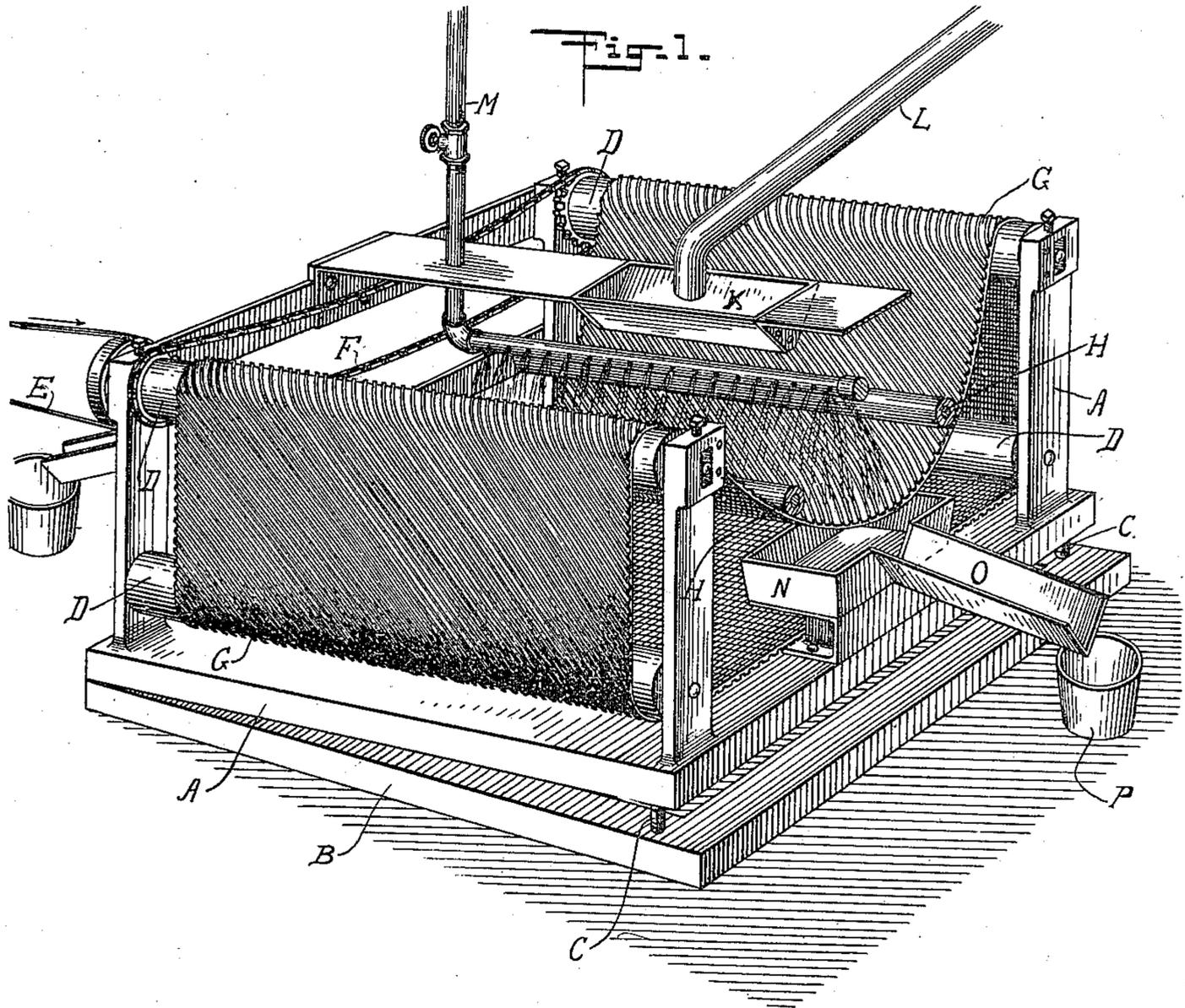
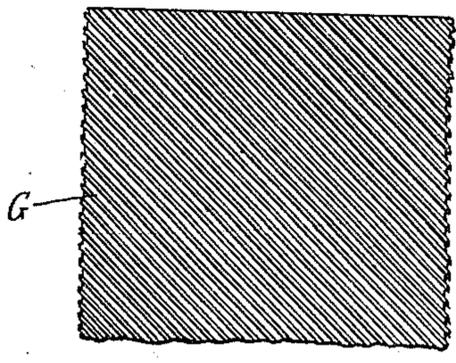


Fig. 2.



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UNITED STATES PATENT OFFICE.

LUCIEN I. BLAKE, OF BOSTON, MASSACHUSETTS.

ORE-CONCENTRATOR.

964,083.

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To all whom it may concern:

Be it known that I, LUCIEN I. BLAKE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Ore-Concentrators, of which the following is a full, clear, and exact description.

Devices for concentrating ore have heretofore been designed which comprised a revolving cylinder inclined from the horizontal and having an internal spiral groove or a series of grooves or riffles, upon which the pulverized ore is fed and by the action of which in conjunction with a suitable supply of wash water or a blast of air, the heavier particles are continuously conveyed up the inclined tube, while the lighter superincumbent particles roll over the edges of the riffles, if of proper height, and thus travel down the tube.

The invention which forms the subject of this application is an improvement in apparatus for the concentration of ores embodying the broad principle of operation characteristic of devices of this class, but designed to more fully meet the requirements of practical use, mainly in affording the advantage of free accessibility to the portions of the apparatus upon which the ore is fed, and where the wash water is delivered, and in exposing to view the material under treatment throughout the entire process of separation or concentration.

Broadly stated, my improvement consists in a concentrator in which an endless flexible belt is suitably supported on an inclined system of rollers or their equivalents with a sufficient amount of sag between the supports to form a sloping trough or concentration area, the surface of which is caused to move at right angles to the longitudinal axis. The upper or concentrating surface is formed with a series of parallel or substantially parallel grooves running obliquely to the direction of travel and at such angle that the heavier particles settling in the grooves will be carried upward and delivered over the higher edge of the belt while the lighter particles or tailings will descend and flow over the lower edge with the wash water or other medium used to assist concentration.

The details of construction of my improved concentrator may be very greatly varied, but in the accompanying drawings

I have illustrated the invention in the form which I have found best adapted to practical use.

Figure 1 is a perspective view of the apparatus complete. Fig. 2 is a plan view of the upper or concentrating surface of a portion of the flexible belt.

The operative parts of the apparatus are mounted on and carried by a frame A, A, hinged at one end to a base B, and adjustable to the desired angle of inclination to the horizontal by screws C, or any equivalent devices.

The supports for the traveling belt G, are preferably, composed of four parallel rolls D, mounted in the corners of the frame A, the upper rolls being rotated by a driving belt E working on a pulley carried by one, which is geared to the other by a chain belt F. The flexible belt G passes around the system of rolls and is caused to sag between the two upper rolls, preferably by means of idlers H, the supports for which, in order to avoid complication, are omitted from the drawings, but which are mounted over the belt and somewhat below the two upper rolls D. The belt G may be of any flexible material that is suited for the purpose, the most available and satisfactory that I have found being rubber. The upper surface is corrugated or grooved obliquely, as shown in Fig. 2, thus forming a series of staggered riffles equivalent in effect and operation to the spiral grooves in the rotating cylinders heretofore used in apparatus of this kind.

In the use of the device the ore in the form of pulp is delivered to a suitable hopper K, by a feed pipe L, and from the former deposited upon the traveling belt against the motion of the same. A wash water pipe M is also supported in vicinity to the upper surface of the belt, and delivers through a series of openings a supply of water onto the pulp as it is deposited on the belt, and as it is undergoing separation thereon. Air jets may be used in place of water, and may be directed upon a mass of dry ore so as to cause the lighter particles to roll over the riffles and travel down the inclined trough formed by the sagging belt, while the heavier particles, retained in the grooves are rolled or conveyed up toward the higher edge of the belt. The concentrates are thus deposited in a suitable trough N, and run down a chute O, into a receptacle

P. A similar means is employed at the opposite lower edge of the belt to receive the tailings.

As in the case of concentrators of this general type employing rotating cylinders, the endless belt which I have devised may be more or less submerged in a body of water, and other obvious dispositions made for facilitating the recovery of fines, the washing of the surface and the like.

I am aware that traveling belts both plain and corrugated have been used in apparatus for concentrating ores, but their form and mode of application and use are radically different from those involved in my improvement. In vanners, for example, under which name traveling belt apparatus for this purpose are known, the corrugations are at right angles to the travel of the belt and merely assist in preventing the concentrates from slipping back with the gangue. Moreover such belts have a shaking or oscillating motion in their plane, and the materials move up or down the line of travel and not transversely to it as in my apparatus.

Having now described my invention, what I claim is:

1. An ore concentrator comprising in combination an endless flexible traveling and obliquely corrugated belt carried by supports and sagging between the same to form an inclined trough-like concentration sur-

face, and means for feeding ore particles upon said surface, substantially as set forth.

2. An ore concentrator comprising in combination an endless flexible, obliquely corrugated or riffled belt mounted to travel about an axis inclined from the horizontal and sagging between its supports, means for feeding a finely divided ore onto the sagging surface and means for supplying a medium to assist in carrying the lighter particles over the lower edge of the sagging portion of the belt, as set forth.

3. An ore concentrator comprising in combination a system of inclined rolls, an endless belt with oblique grooves or riffles in its upper surface, mounted on and traveling over said rolls, and sagging between the upper rolls to form a trough, and means for feeding ore and a fluid medium into the trough upon the riffled surface, as set forth.

4. In an ore concentrator, an endless, flexible, traveling and obliquely corrugated concentrating surface, inclined from the horizontal and sagging to form a trough-like surface for the concentration of ore particles fed thereon.

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

LUCIEN I. BLAKE.

Witnesses:

E. SEGERSTROM,
J. C. EVANS.