(No Model.)

L. W. YOUNG & H. E. PARSON.

ORE CONCENTRATOR.

No. 450,280. Patented Apr. 14, 1891.

Fig. 1.

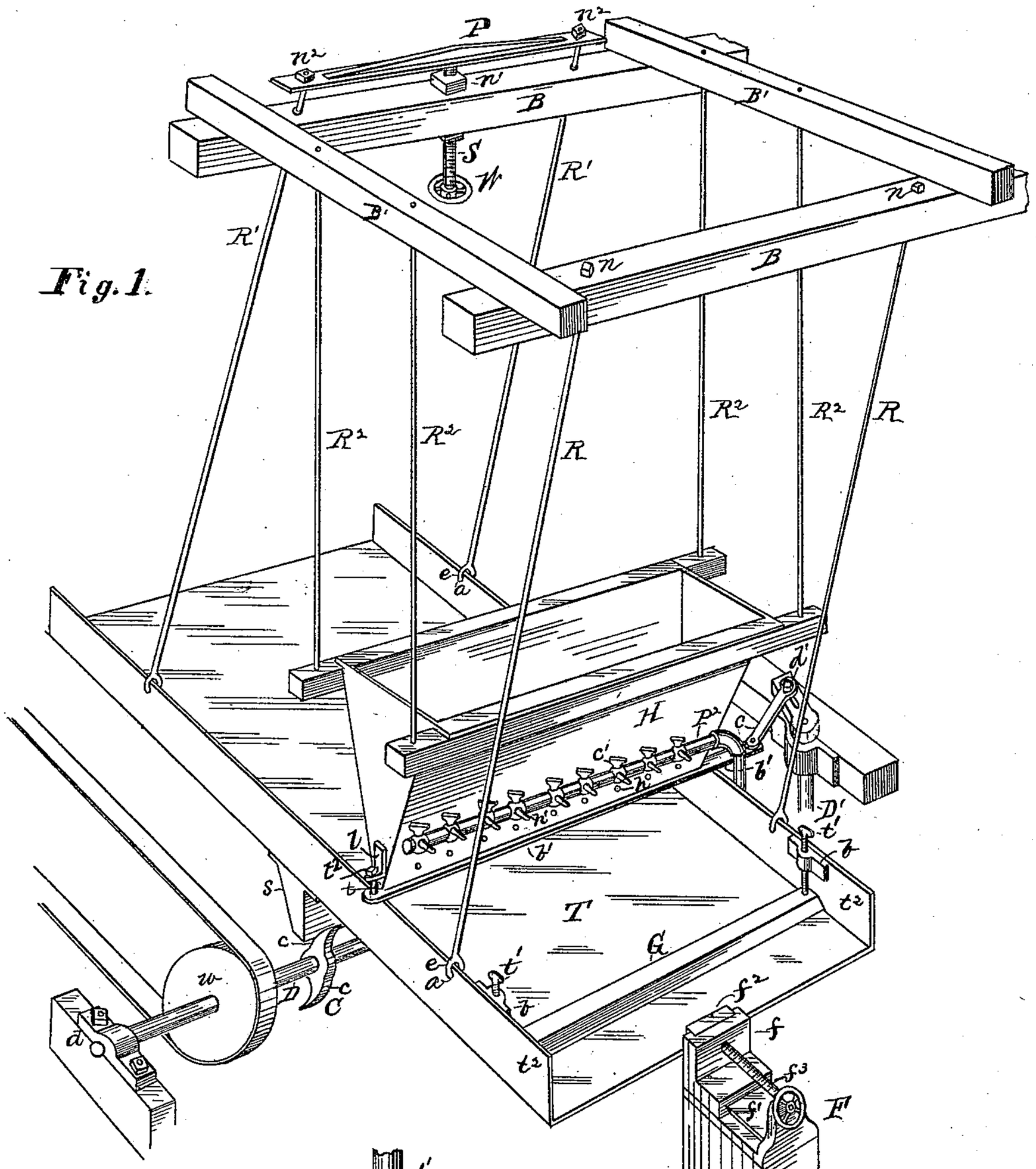
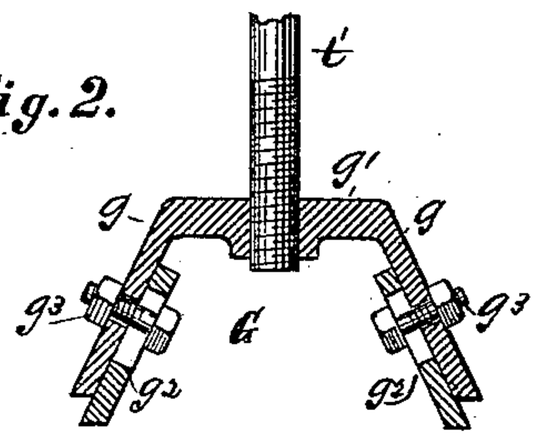


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 450,280, dated April 14, 1891.

Application filed February 11, 1890. Serial No. 340,047. (No model.)

To all whom it may concern:

Be it known that we, LOUIS W. YOUNG, of New York, county of New York, and State of New York, and HENRY E. PARSON, of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a specification.

We will describe a concentrator embodying our improvement, and then point out the novel features in the claims.

In the drawings, Figure 1 is a perspective view of a concentrator embodying our improvement, and Fig. 2 is a transverse section of a dam employed.

Similar letters of reference designate corresponding parts in both figures.

This apparatus is employed in separating the valuable from the worthless products of ores, the construction and action being such that the "tailings" or valueless portions are carried or precipitated over the tail of the table and the valuable portions are collected or concentrated at the head of the table and finally forced over the head of the table into an appropriate receptacle.

Referring by letter to the drawings, B designates rigidly-fixed beams or girders, and B′ designates transverse bars secured to the girders B. The girders B and bars B′ constitute a rigid frame from which the apparatus is suspended.

T represents a table upon which the ore is deposited for separation. The table T we preferably construct of steel, of any desired length and width, and the sides are turned upward, as at t^2, so that material acted upon can only escape at the ends of the table.

The table T is suspended from the girders B by means of rods R R′, which are preferably of resilient or spring metal—such, for instance, as steel. The upper ends of the rods R are rigidly connected to a girder B. We have here shown the upper ends of the rods as passing through openings in the girder and provided with nuts n. The lower end of each rod R is connected to the table T near its forward end by a loose coupling, here shown as a ring e passing through an opening a in the upturned sides t^2. It is evident that these connections may be made in other ways without departing from the spirit of our invention. The rods R′ may be also of resilient or spring metal, and they are connected to the table near its tail end in a manner similar to the rods R. In operation the table T must have a downward inclination from the tail to the front end. Therefore in order to vary or adjust the inclination the rods R′ are adjustable. As a means of securing this adjustment, the upper ends of the rods R′ are passed through openings in a girder B, and also through openings in a cross-head P, and the threaded ends are provided with nuts n^2. A screw S passes through an opening in the girder B and engages with a tapped block or nut n', secured to the girder. The upper end of the screw impinges against the cross-head P, and the lower end is provided with a hand-wheel W. It will be seen that an upward or downward movement of the screw will move the rods R′ simultaneously, and will cause a corresponding adjustment of the inclination of the table.

Having described a means for suspending the table and imparting to it a motion in one direction, we will now describe a means for imparting to it a motion in the reverse direction.

D designates a shaft rotating in bearings d and driven by any desired power. We have here shown a band-wheel w affixed to the shaft and a band leading to a power.

C shows a double cam removably fixed to the shaft D by means of an ordinary set-screw (not shown) provided with oppositely-curved surfaces c. Only one cam C is shown in the drawings; but it is to be understood that two or more of them are to be employed. At each half-revolution of the shaft D the cams C strike against the front face of a tappet-bar s, rigidly secured to the bottom of the table, and impart a rearward motion to the table.

F designates a rigid standard, upon which is supported a head-block f, which is adjustable for the purpose of varying the degree of shock when the table T strikes against it. The head-block f is adjustable in a slideway f', and is adjusted by means of a screw f^3, which engages with the head-block and passes

through a tapped opening or nut on a bracket extended from the standard F. A cushion f^2, of rubber or like material, may be secured to the block f to soften the blow.

G designates a dam extending across the table near its forward end. The dam consists of the top plate g', having downwardly-extending diverging sides g, and extension-plates g^2 are adjustably secured to the sides g by means of bolts g^3 passing through perforations in the sides g and slots in the extension-plates. The dam may be adjusted vertically by means of screws t' passing through blocks b, secured to the sides of the table and having a threaded engagement with the plate g' of the dam. The screws t' may have a swivel engagement with the dam and a thread engagement with the blocks, if so desired. The effect would be the same in either event. Obviously when the upper portion of the dam is raised the plates g^2 will still remain in contact with the table.

H is a hopper suspended above and transverse to the length of the table T. It is here shown as suspended from the bars B′ by means of resilient rods R^2. The hopper H has downwardly-converging sides and has a narrow opening lengthwise in its bottom, and the front side has a series of perforations h near the bottom. A bottom board b' is adjustably connected to the hopper by means of thumb-screws t passing through tapped holes in arms t^2 and having a loose connection with the bottom b'. By making this bottom b' adjustable we are enabled to entirely close the narrow opening in the bottom of the hopper, or to adjust the bottom b' away from the hopper, so that the ore may pass through the narrow opening as well as through the perforations h.

The hopper H is intended to have a longitudinal vibratory motion imparted to it, and for this purpose a pitman c has one end pivoted to the bottom board b', and the other end is pivoted to a wrist-pin adjustable in a slot in the crank d'. The crank d' is secured to a vertical shaft D′, which may be rotated by a bevel-gear connection (not shown) with the shaft D or otherwise. By making the wrist-pin adjustable on the crank d' a long or short vibration may be imparted to the hopper by merely changing the wrist-pin with relation to the axis of the crank.

P^2 is a water-pipe extended above the table T forward of the hopper. Water is admitted to this pipe from any desired source, and is ejected through perforations or nipples h', which are provided with controlling-cocks c'.

The operation of this device is very simple and may be stated as follows: The crushed ore, either in a dry or wet state, is placed in the hopper and water is allowed to flow through the nipples h' onto the table. The vibratory motion of the hopper forces the particles of ore through the perforations h, and the mixture of water and ore is thoroughly agitated by the reciprocation of the table T. The percussion of the table against the block f forces the lighter and worthless portions of the ore with an amount of water over the tail of the table, and the heavy or valuable part of the ore is dammed up against the dam G, and eventually forced over the dam by percussion into a receptacle provided to receive it.

As before stated, the force of the percussion may be varied by moving the head-block f to or from the end of the table, and it is evident that the several adjustments of the machine may be made while the concentrator is in full operation.

The object of adjusting or varying the inclination of the table is to adapt the machine to different grades of ore.

Having described our invention, what we claim is—

1. The combination, with an adjustable suspended table, of mechanism, substantially such as described, for moving the table in one direction, mechanism, substantially such as described, for moving the table in the reverse direction, and an adjustable dam on said table, consisting of the top plate having downwardly-extending sides and extension-plates on said sides, substantially as specified.

2. In a concentrator, the combination, with a reciprocating table having a dam, of a head-block to receive and vary the shock of said table, the said head-block consisting of a block adjustable in slideways on a standard, and a screw engaging with the block to vary the adjustment, substantially as specified.

3. The combination, with a suspended reciprocating table, of a suspended vibratory hopper having a discharge opening or openings above the table, means for changing the length of movement of the hopper, and mechanism, substantially such as described, for vibrating the hopper transversely to the movement of the table, substantially as specified.

4. The combination, with a reciprocating suspended table, of a vibratory hopper above and transverse to the table, a water-supply above the table, and mechanism, substantially such as described, for imparting motion to the table and hopper, the one transverse to the other, substantially as specified.

5. In a concentrator, the combination, with a table, of a rigid frame, resilient rods rigidly connected at one end to the frame and at the other end to the table, other rods connected at one end to the table and the other end extended through openings in the frame, a cross-head connecting with the upper ends of said rods, and a screw having a hand-wheel and impinging against the cross-head, whereby the rods may be simultaneously adjusted to vary the inclination of the table, substantially as specified.

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Witnesses:
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