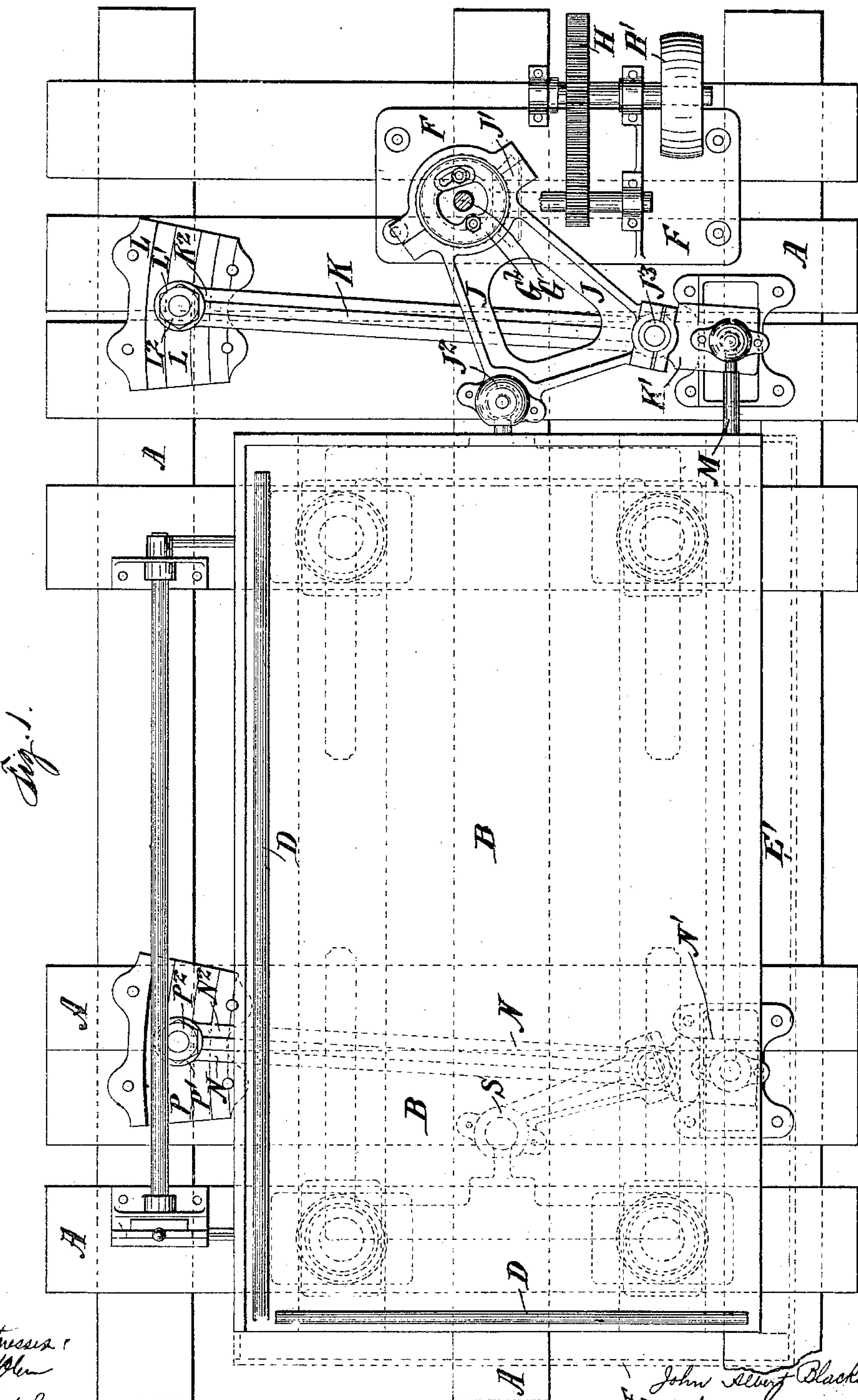
No. 692,495. Patented Feb. 4, 1902.

J. A. B. WESLEY.

CONCENTRATING TABLE.

(Application filed Mar. 1, 1901.)

(No Model.) 3 Sheets—Sheet 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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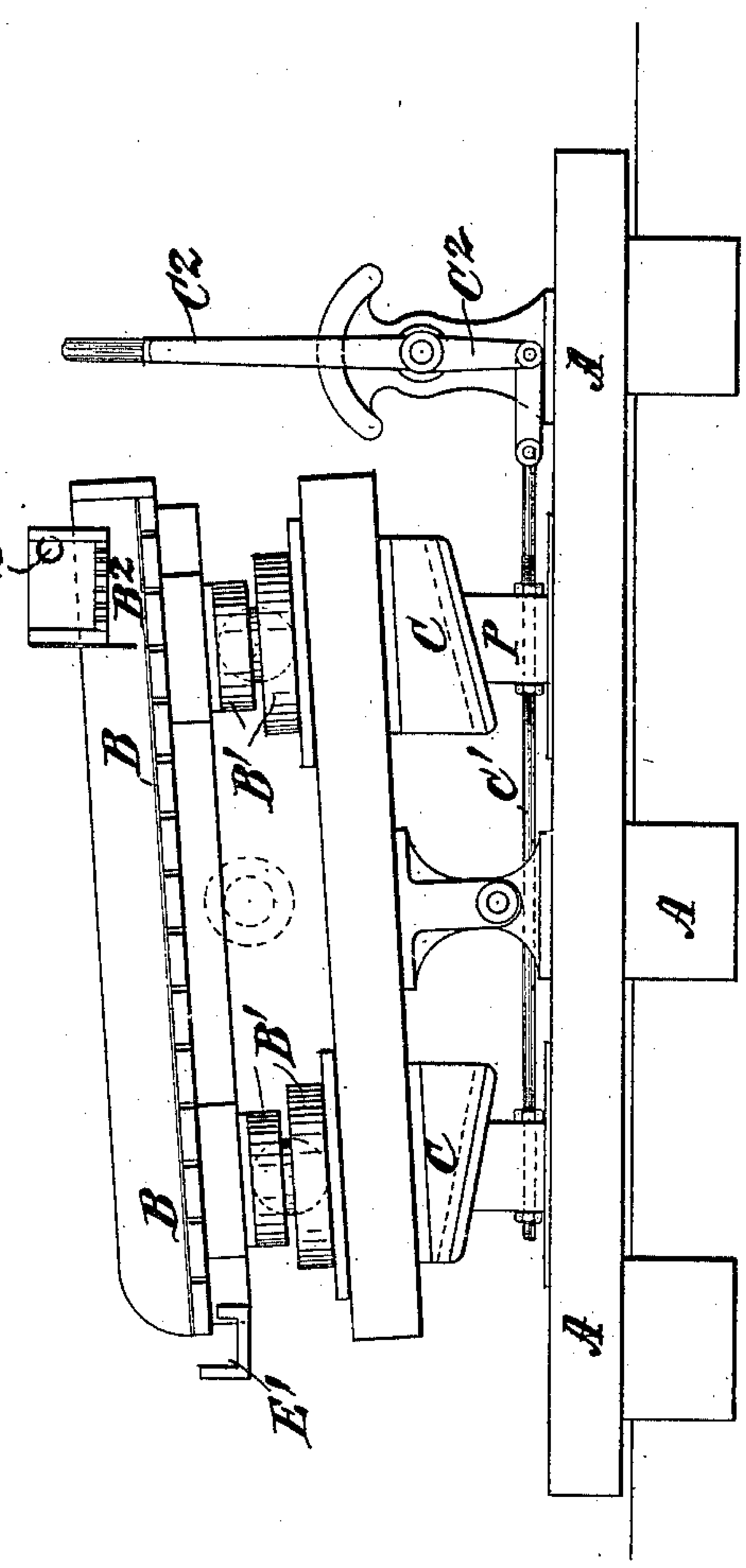
3 Sheets—Sheet 2.

Fig. 2.



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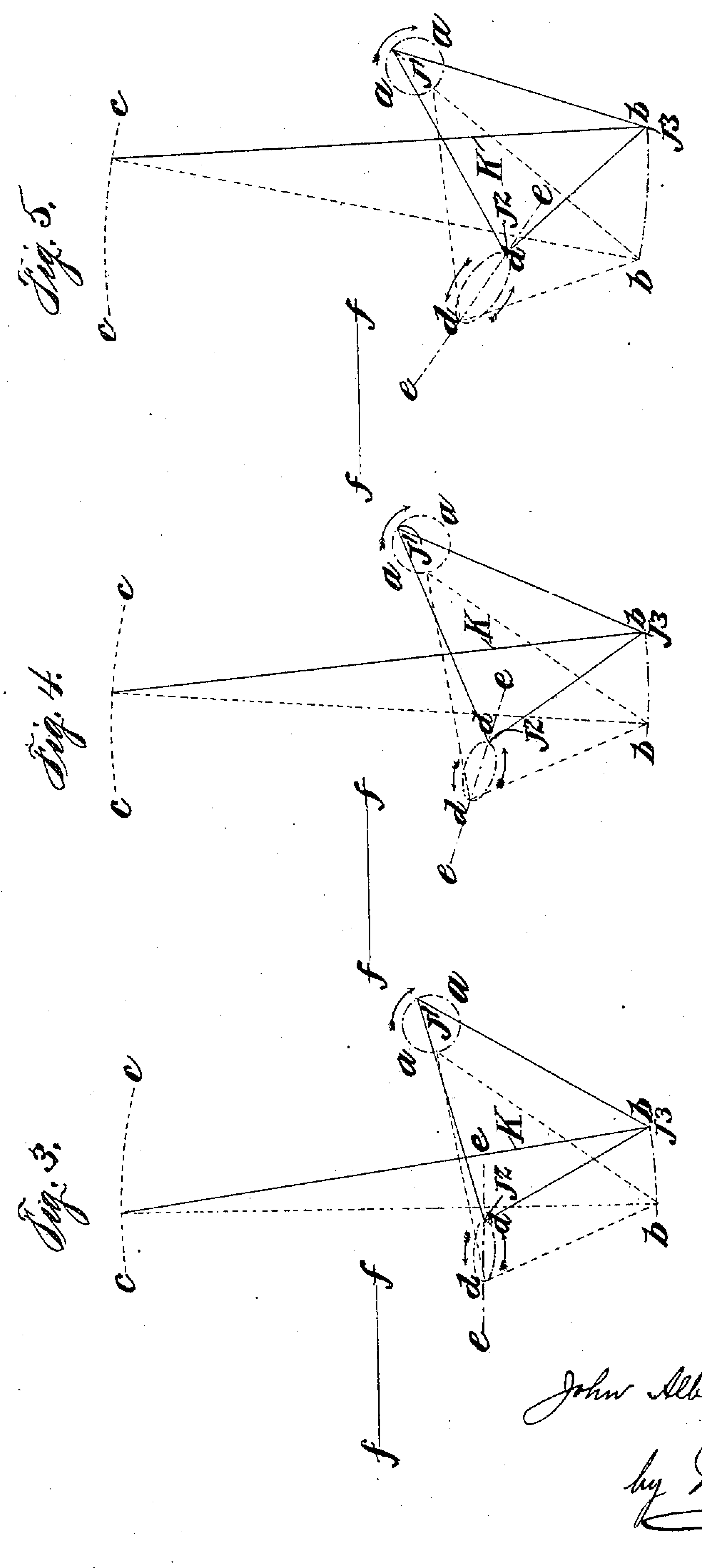

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UNITED STATES PATENT OFFICE.

JOHN ALBERT BLACKALL WESLEY, OF GAWLER, SOUTH AUSTRALIA, AUSTRALIA.

CONCENTRATING-TABLE.

SPECIFICATION forming part of Letters Patent No. 692,495, dated February 4, 1902.

Application filed March 1, 1901. Serial No. 49,495. (No model.)

To all whom it may concern:

Be it known that I, JOHN ALBERT BLACKALL WESLEY, mining engineer, a subject of the King of Great Britain, residing at Church Hill, in the city of Gawler, in the State of South Australia and Commonwealth of Australia, have invented certain new and useful Improvements in Concentrating-Tables, of which the following is a specification.

My invention relates to improvements in concentrating-tables for the treatment of slimes or other metalliferous material in a finely-divided state, and refers more particularly to horizontal tables in which the material is separated by being subjected to the action of flowing water and the motion of the table.

In concentrating-tables as at present in use various motions are imparted to the tables for the purpose of maintaining the material in a constant state of agitation and causing the particles to separate form each other according to their specific gravities.

The object of my present invention is to provide a concentrating-table having a special motion capable of adjustment and of variation in speed of travel while in its orbit, so that the particles are caused to separate out from each other and the heavier particles to travel in a direction in opposition to the flow of water, which at the same time washes away the lighter particles or gangue. I accomplish this object by providing a concentrating-table having a movement of travel in an elliptical or quasi-elliptical path in a horizontal plane, such movement being adjustable and capable of being applied at varying angles in opposition to the flow of water. The movement or travel is also adjustable in speed over certain portions of the orbit, so that a slower or quicker return may be given to the table on the backward movement, according to the class of material under treatment, and, if necessary, a percussive shock may be imparted at any point of its travel. The material under treatment is thus caused to move on the face of the table in the direction of the major axis of the elliptical or quasi-elliptical path in which the table travels. Since this motion is adjustable and is capable of being applied at varying angles, so that its major axis may be at any desired angle to the longitudinal axis of the table, the particles are subjected more or less to the action of the table and the water, according to the class of material under treatment. The heavier particles are thus caused to travel along the table in opposition to the flow of water, which at the same time washes away the lighter particles or gangue, thereby effecting a complete separation. This particular motion may be imparted to the table by any convenient device, but preferably by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the table complete, while Fig. 2 is an end view of the same, partly in section, showing mechanism for adjusting the incline of the table. Figs. 3, 4, and 5 are diagrammatic views showing the different elliptical or quasi-elliptical motions which may be imparted to the table by the same mechanism arranged in different positions.

A is the main framework, preferably constructed of wood, upon which is supported the horizontal table B. The surface of this table B is covered with rubber, linoleum, or other suitable material and is mounted upon supports B′. These supports B′ work upon suitable bearings A′, preferably consisting of balls working in oil-cups, whereby the table may be moved in any direction and the required motion imparted to it, as hereinafter described. The table B is further mounted upon suitable inclined supports C, connected by means of a rod C′ to a lever C^2, whereby the incline of the table may be adjusted from time to time, as may be required in practice, according to the class of ore under treatment. Pipes D are further provided, whereby jets of water may be made to play upon the face of the table B in any direction. Suitable launders E E′ are arranged at the edge of the table, into which the products are discharged.

For the purpose of imparting the required movement to the table B in an elliptical or quasi-elliptical path the main framework A is provided with a cast-iron or other frame F, in which is mounted a vertical shaft G. This shaft G is driven by miter-wheels G′, actuated by the spur-wheels H. These spur-wheels H are preferably made elliptic-shaped, whereby a variable speed may be imparted to the shaft G; but it will be well understood that any device for imparting a variable motion may be employed, and that, further, the shaft G may be driven with a constant speed should it be required. Suitable pulleys H′ are provided for imparting motion from a belt in the ordinary way.

Upon the vertical shaft H is mounted a triangular lever J, having three corners J′ J^2 J^3. At the corner J′ the triangular lever J is connected with an eccentric sleeve G^2 upon the shaft G, by which an eccentric motion is imparted to it, and the amount of eccentricity may be regulated by adjusting the position of the sleeve G^2. At the corner J^2 this triangular lever J is connected with the head of the table B, while the remaining corner J^3 is connected to the end K′ of a lever K. This lever K is pivoted at its other end K^2 to a block L′, which is capable of being moved and fixed in any position in a quadrant L by means of the nut L^2. A connecting-rod M is further provided, pivoted to the end K′ of the lever K and attached at its other end to the end N′ of a lever N corresponding to the lever K. This lever N is also pivoted at its other end N^2 to a further block P′, capable of being moved and fixed in any position in a quadrant P, corresponding to the quadrant L, by means of a nut P^2. The end N′ of the lever N is connected to the tail of the table by a connecting-lever S, the end S′ of which is pivoted to the table B. As the shaft G rotates it imparts to the corner J′ of the triangular lever J an eccentric motion. Since this lever J is pivoted at J^3 to the end K′ of the lever K, it is compelled to move in the arc of a circle of which the lever K is the radius and the end K^2 the center. A movement in an elliptical or quasi-elliptical path is consequently imparted to the table B, as will be well understood by reference to Figs. 3, 4, and 5, in which the motion imparted is shown diagrammatically. In Figs. 3, 4, and 5 the dotted circle *a a* represents the circular path imparted by the eccentric sleeve G^2; but for the purposes of illustration the eccentricity is shown somewhat exaggerated in proportion to the length of levers, and consequently the motion imparted to the table is correspondingly exaggerated. The line *b b* represents the arc traversed by the corner J^3 of the triangular lever J and the end K′ of the lever K, being the arc of a circle of which the lever K is the radius and the end K^2 the center, while the dotted lines *c c* correspond to the quadrant L, upon which the position of the block L′ and the end K^2 of the lever K may be altered and adjusted as required. As the corner J′ of the triangular lever J travels around the circle *a a* the corner J^3 moves along the arc *b b*, and the point J^2 is thus caused to travel in an elliptical or quasi-elliptical path, as shown by the dot-and-dash lines *d d*. As this point J^2 is connected to the table B, it will be seen that the table B travels in the elliptical or quasi-elliptical path, as shown by the lines *d d*. In Fig. 3 the end K^2 of the lever K is so placed in in the quadrant L that a movement is imparted to the table B in an elliptical or quasi-elliptical path *d d*, as shown, having its major axis *e e* parallel to the longitudinal axis of the table, which is represented by the lines *f f*. In Fig. 4 the end K^2 of the lever K is shown as moved somewhat to the right-hand side of the quadrant L, when the movement imparted to the table is such that the major axis *e e* of the elliptical or quasi-elliptical path *d d* is at an angle to the longitudinal axis *f f* of the table. In Fig. 5 the end K^2 of the lever K is shown moved still more to the right hand of the quadrant L, and the movement imparted to the table in the elliptical or quasi-elliptical path *d d* has its major axis *e e* at a still greater angle to the longitudinal axis *f f* of the table. It will thus be seen that by adjusting the position of the end K^2 of the lever K in the quadrant L the direction of the elliptical or quasi-elliptical motion imparted to the table can be regulated as desired. Similarly the same motion is imparted to the tail of the table by means of the connecting-rod M and levers N and S, by means of which the motion is imparted evenly to the whole table. It will thus be seen that the end N^2 of the lever N and the block P′ must be placed in the same relative position in the quadrant P as the end K^2 of the lever K and the block L′ in the quadrant L.

According to the positions of the levers K and N a variable speed may be imparted to the elliptical or quasi-elliptical motion of the table while moving in its own orbit, and, if necessary, it may be made to travel faster or slower at some portions of its path than at others. Thus in the motion shown in Figs. 3, 4, and 5, with the shaft G and eccentric G^3 traveling in the direction shown by the arrows upon the circles *a a*, a slow forward movement is imparted and a quick return, and by reversing the direction of the shaft G a quick forward movement and a slow return may be imparted, according to the requirements of the material under treatment. This variable speed may be also used in conjunction with a variable driving-gear, as shown, should it be required.

In operation the material is fed upon the face of the table at the corner B^2, and the shaft G is then driven at any suitable rate of speed by the pulleys H′. A movement in an elliptical or quasi-elliptical path is thus imparted to the table B, and the material is subjected to the action of such motion, being thrown in the direction of its major axis. At the same time jets of water are caused to play upon the table from the pipes D and tend to wash the material down the face of the table. The direction of the elliptical or quasi-elliptical motion imparted to the table may be regulated by adjusting the position of the levers K and N in the quadrants L and P in such manner that the particles of the material under treatment are thrown in any particular direction, according to their respective specific gravities. Thus in order to effect a better separation it may be necessary to impart to the table movement in an elliptical or quasi-elliptical path having its major axis parallel to the longitudinal axis of the table, as shown in Fig. 4, when the positions of the levers K and N would be correspondingly adjusted. In the treatment of some materials it will be found necessary to impart a movement in an elliptical or quasi-elliptical path having its major axis more or less at an angle to the longitudinal axis of the table, that the particles may be thrown in a direction in opposition to the flow of water, and this may be accomplished by the adjustment of the levers K and N. The heavier particles are thus thrown in opposition to the flow of water, which washes away the lighter particles or gangue, and thus effects a complete separation. At the same time the incline of the table may be adjusted by means of the lever C^2. The heavier particles or concentrates are delivered over the end of the table into launders E, while the other products are received into the launders E′, according to their respective specific gravities.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. The combination with a concentrating-table, of a horizontally-disposed triangular lever connected at one angle to the table, a driven eccentric at the second angle thereof, a horizontally-disposed lever-arm pivoted at one end to a stationary element and at the other end to the third angle of the triangular lever, substantially as described.

2. The combination with a concentrating-table, of a parallel motion comprising two horizontally-disposed lever-arms, each pivoted at one end to a fixed element, and means to connect their free ends, a link connecting one of said levers to the table, a triangular lever connected at one angle to the table and at the other to the end of the second lever-arm, and means for moving the third angle of the triangular lever in a circle, whereby an elliptical motion will be imparted to the whole table, substantially as described.

3. The combination with a concentrating-table, of a parallel motion comprising two horizontally-disposed lever-arms, fixed arcs in which said lever-arms are adjustably pivoted at one end and a rod connecting their free ends, a horizontally-disposed triangular lever having sides of different lengths and connected at one angle to the free end of one of said lever-arms, at the second angle to the end of the table and means at the third angle to move it in a circular path, whereby the table will receive a practically elliptical motion in a horizontal plane, substantially as described.

4. The combination with a concentrating-table, of a horizontally-disposed parallel motion, a link to connect said parallel motion to the table, supports for the table having a universal motion in a horizontal plane, means to adjust the relative heights of said supports to vary the inclination of the table, a horizontally-disposed triangular lever connected at one angle to the parallel motion, at the second angle to one end of the table and a driven eccentric at the third angle, whereby a substantially elliptical motion is imparted to the table, substantially as described.

5. The combination with a concentrating-table, of a horizontally-disposed parallel motion, a link to connect said parallel motion to the table, rolling ball-supports for the table, two coöperating wedges under each support, means to simultaneously move one of the wedges under each support to vary the inclination of the table, a horizontally-disposed triangular lever having sides of unequal length, one angle of said lever connected to the parallel motion, a second angle universally jointed to one end of the table, an eccentric at the third angle of the lever and elliptical gear to drive the eccentric, whereby a practically elliptical motion in a horizontal plane can be imparted to said table, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ALBERT BLACKALL WESLEY.

Witnesses:

CHARLES A. BURGESS,

CLEM. A. HACK.