No. 721,591. PATENTED FEB. 24, 1903.

J. H. MICHELSEN & M. LA M. BORGLUM.

ORE CONCENTRATOR.

APPLICATION FILED JAN. 27, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

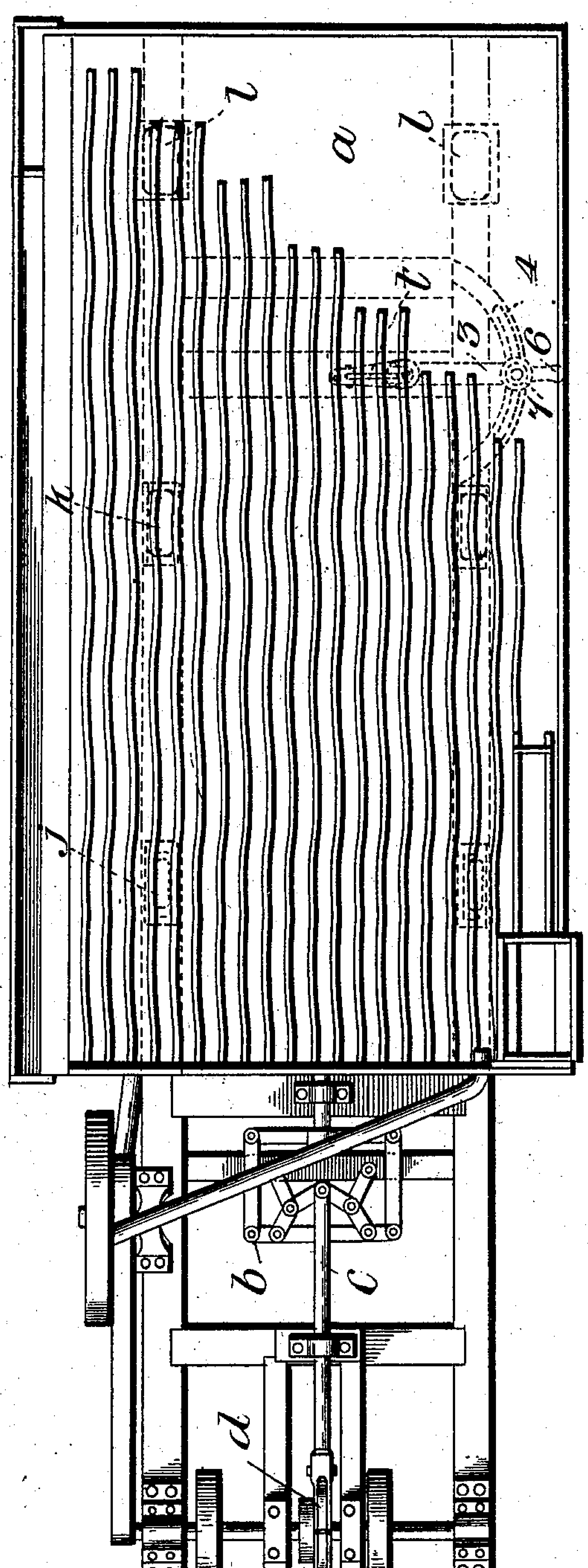
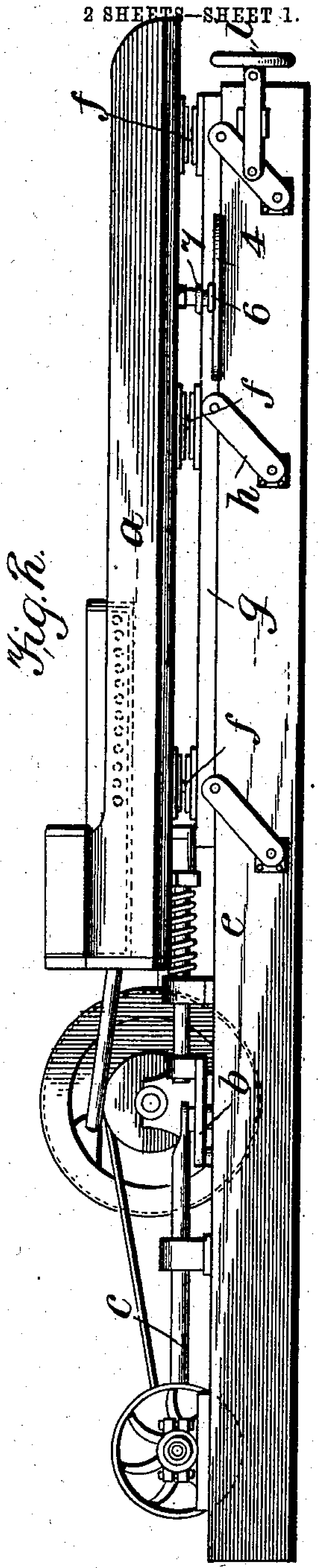


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

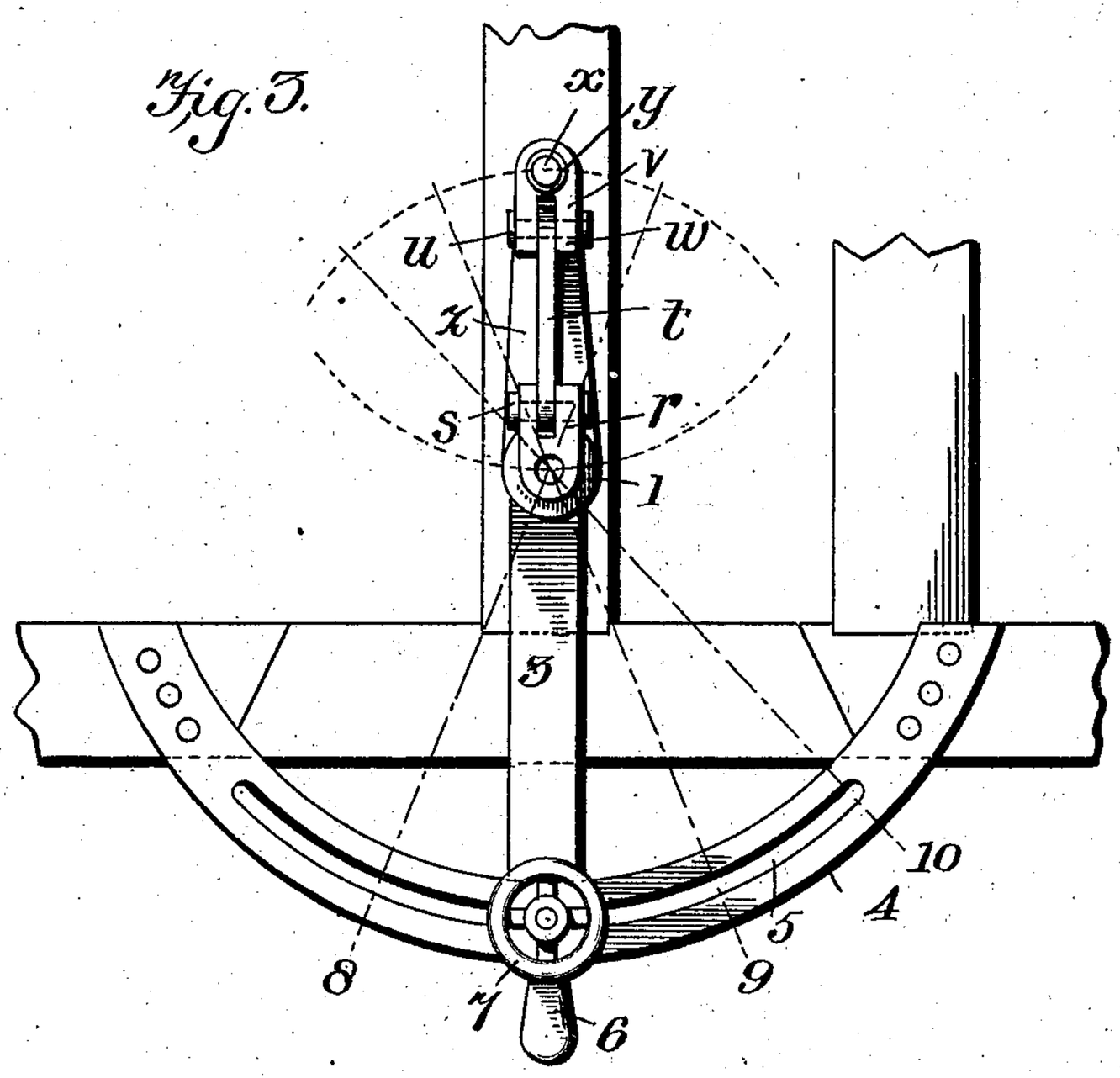
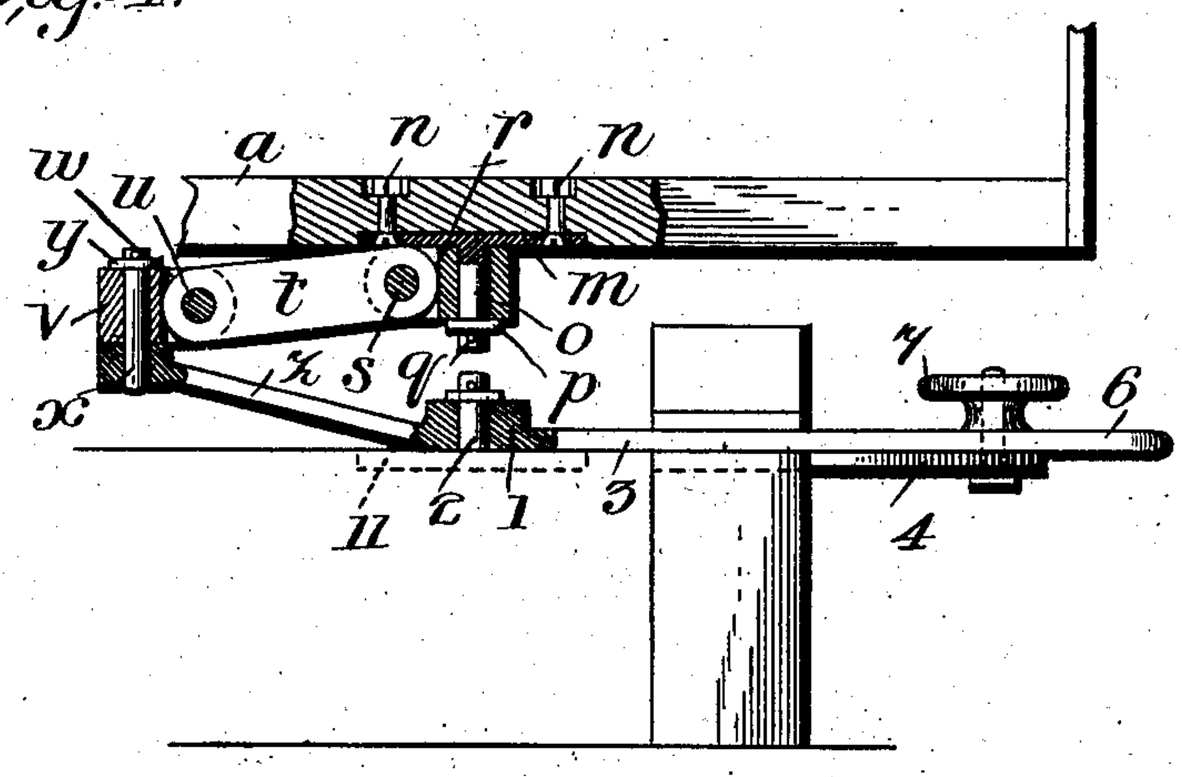


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN H. MICHELSEN AND MILLER LA MOTHE BORGLUM, OF BUTTE, MONTANA; SAID MICHELSEN ASSIGNOR TO JOHN H. CURTIS AND GREEN MAJORS, OF BUTTE, MONTANA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 721,591, dated February 24, 1903.

Application filed January 27, 1902. Serial No. 91,448. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. MICHELSEN and MILLER LA MOTHE BORGLUM, citizens of the United States, residing at Butte, in the county of Silverbow and State of Montana, have invented certain new and useful Improvements in Ore-Concentrators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in ore-concentrators, and it is a specific improvement upon the structure shown in Patent No. 636,679, dated November 7, 1899, and Patent No. 671,348, dated April 2, 1901.

The object of our invention is to provide an ore-concentrating table which shall have in addition to the reciprocating motion described in said patents a side motion at the rear or tail end thereof, which motion may be increased or diminished, as preferred.

In the accompanying drawings, Figure 1 is a plan view of our improved ore-concentrator. Fig. 2 is a side elevation thereof, and Figs. 3 and 4 are enlarged views showing details.

The table *a* is driven by the shaft *c* through the toggle mechanism *b*, and the shaft *c* is actuated by the eccentric *d*. The table is supported upon balls *f*, resting in sockets on the frame *g*, which frame is carried on links *h* and the height of which may be adjusted by the hand-wheel *i*. A spring *e* is used to prevent the motion from being too sudden. These parts are as previously described in the patents referred to. The supporting-balls *f* are carried in sockets *j*, *k*, and *l*, which increase in size successively. This is to provide for the side shake of the rear end of the table. Attached to the lower part of the table by means of bolts *n* is a plate *m*, provided with a projecting pintle *o*. On this pintle is mounted a casting having projecting ears *r*. A washer *p* supports this casting in position, and a pin *q*, passing through the pintle *o*, supports the washer.

t represents a link, which is pivoted in the ears *r* by means of the pin *s*. A pin *u* at the other end of the link or arm *t* passes through ears *w* in a casting *v*, which is supported on a pin *x*, provided with a washer *y*. A lever or arm *z* is also pivoted upon the pin *x* and near its center is enlarged, as shown at 1, and is perforated for the passage of the pin 2, which is carried by the plate 11. This lever has an outwardly-extending portion 3, extending outside of the framework, and is provided with a handle 6. The part 3 rests upon a curved support 4, fastened to the framework of the machine and provided with a curved slot 5, whereby the part 3 may be moved back and forth into various positions in regard to the plate 4. A hand-wheel 7 serves to secure the part 3 in any desired position.

With the parts as shown in Fig. 3—that is, with the pivots in a line perpendicular to the longitudinal axis of the machine—the table being pivotally connected to the link *t*, pivoted on the stationary arm or lever 3, a longitudinal movement of the table by the reciprocating mechanism will cause it to swing sidewise on one side of the before-mentioned perpendicular in the arc of a circle around the point *x* as a center, and a reverse or reciprocal longitudinal movement of the table will cause the table to be deflected to an equal extent circularly in the opposite direction on the other side of the perpendicular. Thus we have a simple reciprocal side or end shake of the table. Moving the arm 3 to the right coincident with the line 9 shifts the line of pivots to a position oblique to the transverse axis of the table. Therefore the table on its forward swing—that is, to the right on Fig. 1—will approach much nearer the central line than on its backward swing. If the lever or arm 3 is moved still farther to the right to a position indicated by the dotted line 10, a motion similar to that of a hand-pan is obtained. Shifting the arm 3 to the position indicated by the line 8 will move the line of pivots to a position oblique to the transverse axis, but in an opposite direction to that in the previous case, causing the table in its forward motion to swing sidewise farther from the transverse axis than in the backward motion. By actual experiment

with the particular kind of ore under treatment the position most favorable for concentration is found, and by this simple means of adjustment we provide a table which will effectively concentrate almost any kind of ore.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an ore-concentrator, the combination of a table, means for reciprocating said table, a lever mounted on the frame of the machine and movable thereon, and a link pivoted to the table, said lever and link being pivoted together in a substantially horizontal plane, substantially as described.

2. In an ore-concentrator, the combination of a table, means for reciprocating said table longitudinally, the framework of the machine, a lever pivoted thereon, means for securing said lever in different positions upon said framework, and a link or arm pivoted to said table, said link and lever being pivoted together in a substantially horizontal plane, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN H. MICHELSEN.
MILLER LA MOTHE BORGLUM.

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