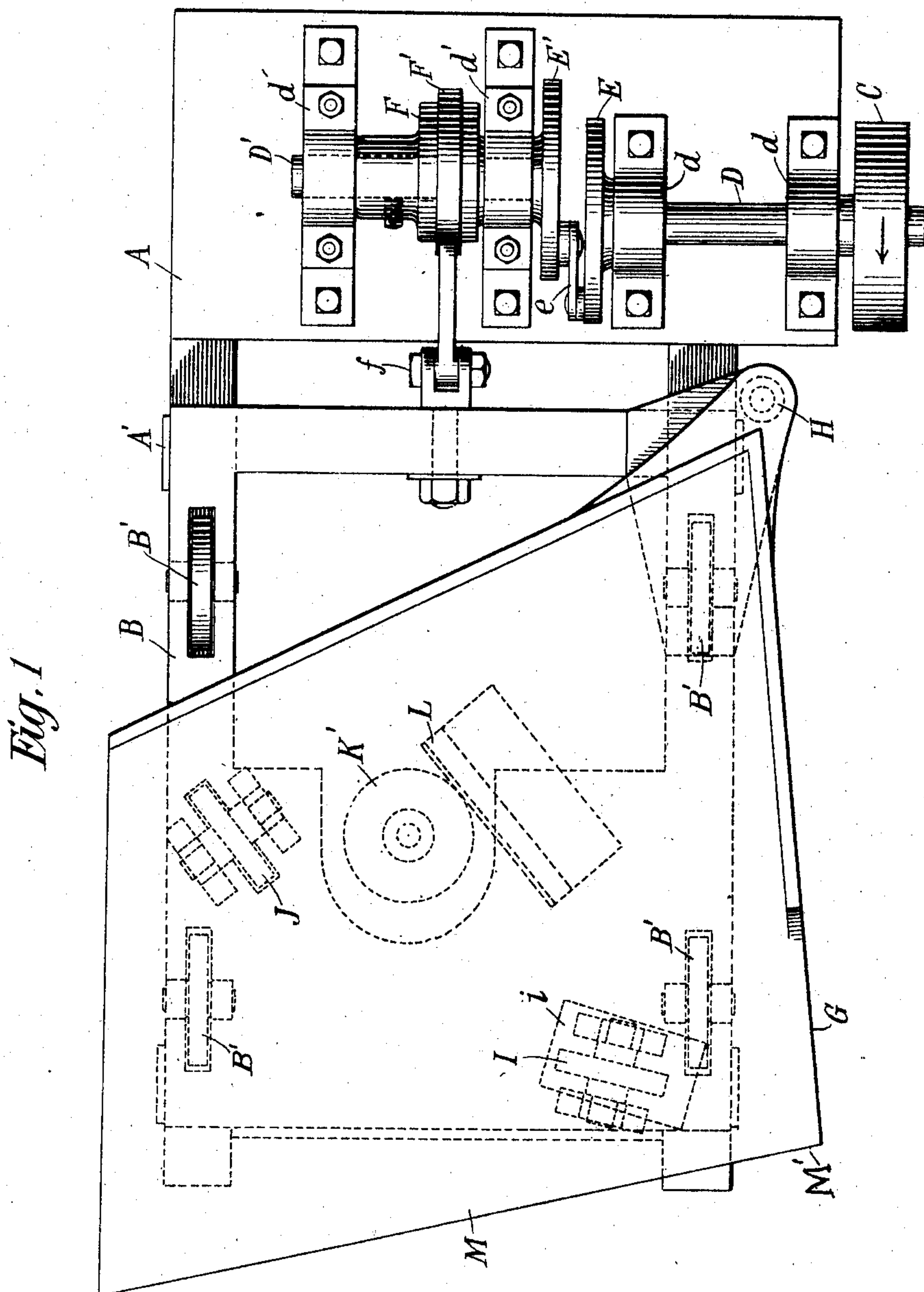


No. 879,250.

PATENTED FEB. 18, 1908.

J. C. FISHER.  
CONCENTRATING TABLE.  
APPLICATION FILED MAY 18, 1906.

3 SHEETS—SHEET 1.



Witnesses  
Raphael letter  
Fred S. Kennedy

John C. Fisher Inventor  
By his Attorney S.  
Messinger Campbell

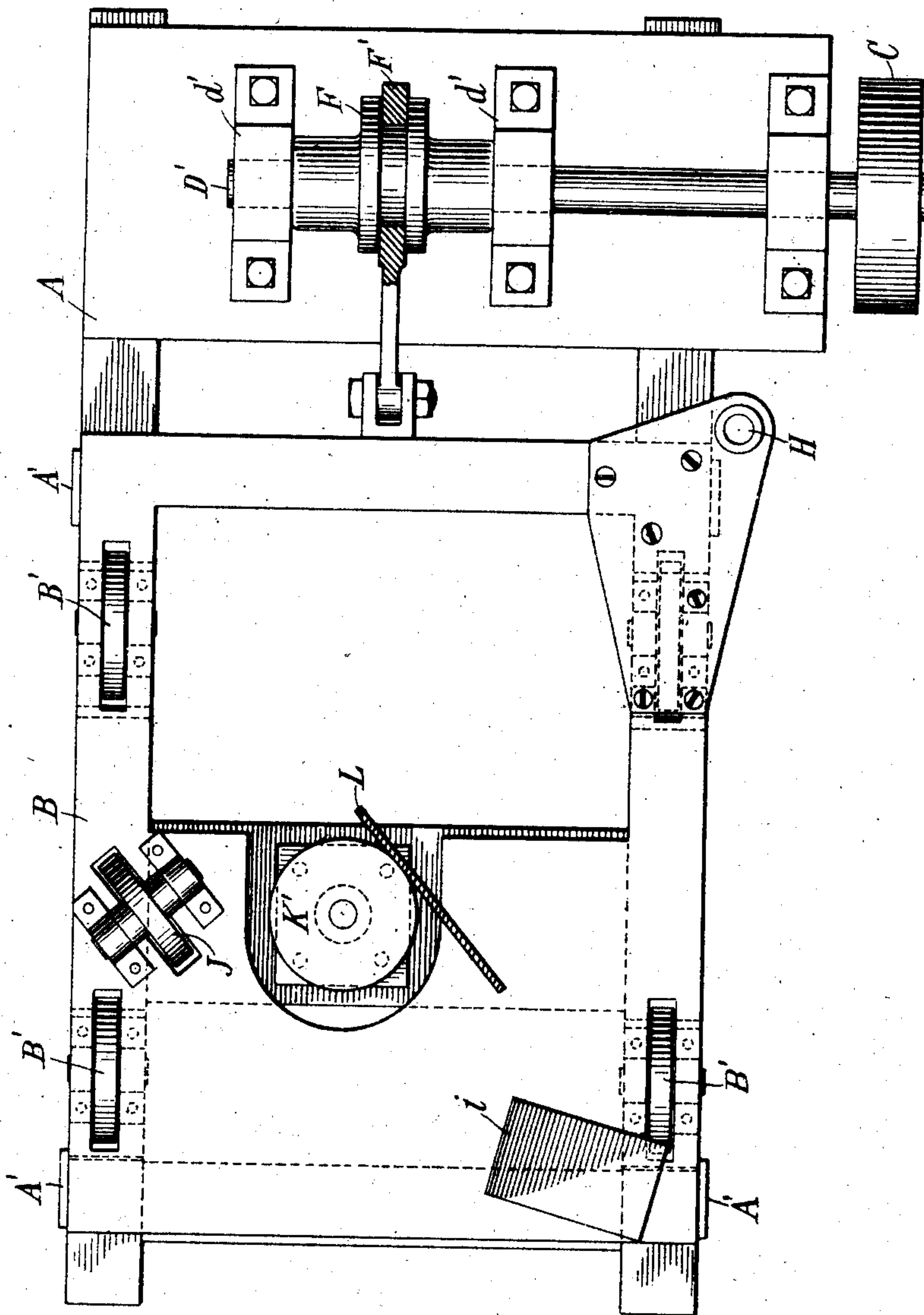
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APPLICATION FILED MAY 18, 1906.

3 SHEETS—SHEET 2.

Fig. 2



Witnesses  
Raphael Petter  
Fred. D. Kennedy

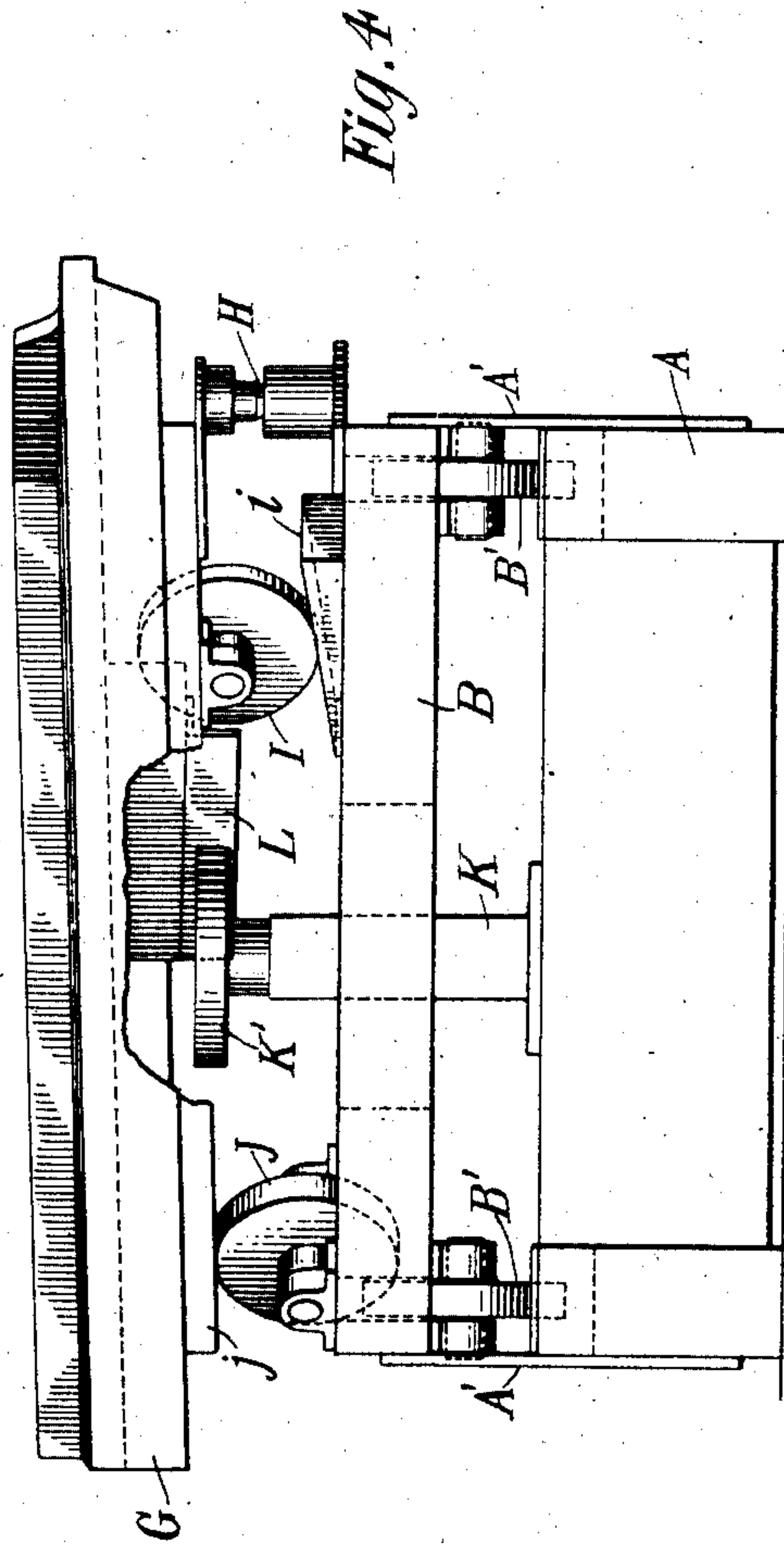
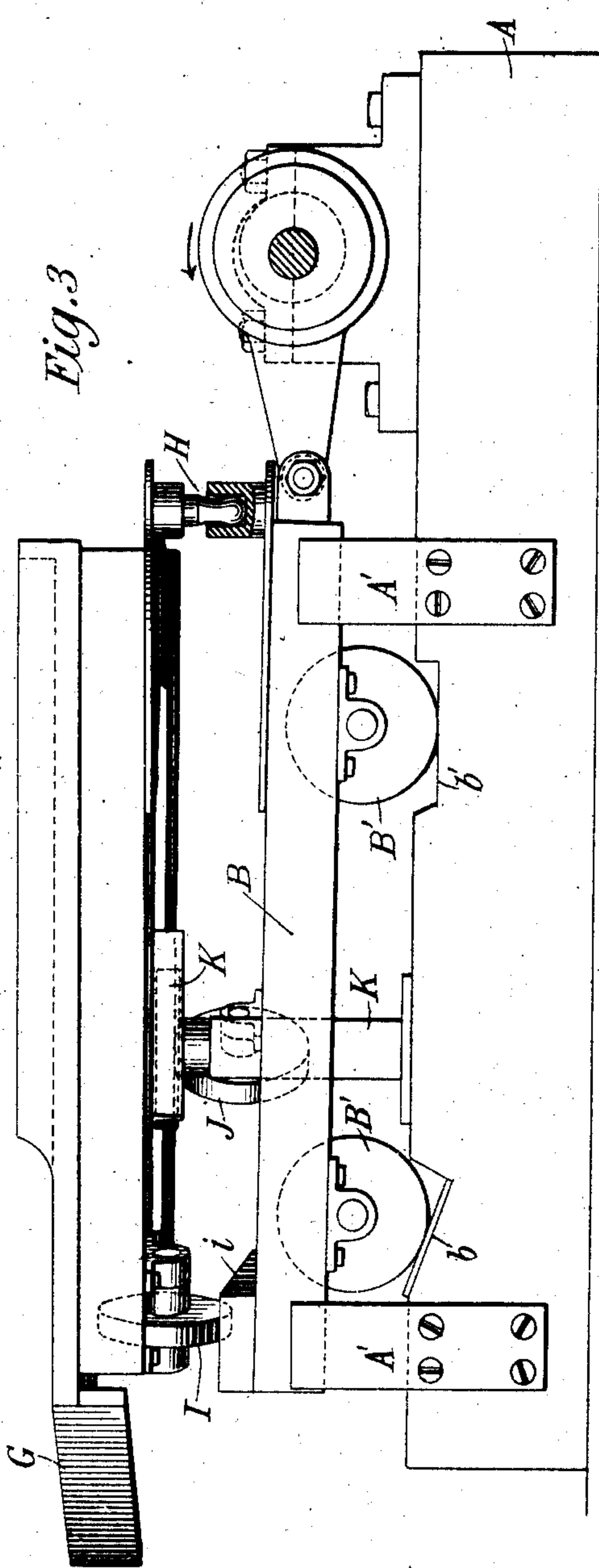
John C. Fisher Inventor  
By his Attorneys  
Messinger & Campbell

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3 SHEETS—SHEET 3.



Witnesses  
*Raphael better*  
*Fred S. Kennedy*

*John C. Fisher* Inventor  
By *his* Attorney  
*Messner Campbell*



# UNITED STATES PATENT OFFICE.

JOHN C. FISHER, OF HOUGHTON, MICHIGAN, ASSIGNOR OF ONE-FOURTH TO FRANK L. VAN ORDEN, OF HOUGHTON, MICHIGAN; AND ONE-FOURTH TO HENRY FISHER, OF LAKE LINDEN, MICHIGAN.

## CONCENTRATING-TABLE.

No. 879,250.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed May 18, 1906. Serial No. 317,440.

*To all whom it may concern:*

Be it known that I, JOHN C. FISHER, a citizen of the United States, residing at Houghton, county of Houghton, and State of Michigan, have invented certain new and useful Improvements in Concentrating-Tables, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention relates to concentrating tables designed to separate out the valuable metals from the lighter materials held in suspension in a stream or body of water, particularly where the coarser particles have been previously separated by jigs or otherwise.

The object of my invention is to impart to the table a peculiar motion so that the metal, which being heavier settles on the table, is kept moving in one direction while the flow of water over the surface of the table washes the other matter, held in suspension, in another direction. This motion of the table is made up of four distinct movements which I secure by providing an intermediate carriage on which I mount the table. This carriage reciprocates and in the forward movement its front end is raised. Furthermore, the forward movement is slow and the backward movement is fast, as will be explained hereafter. The table being mounted on this carriage has these two motions and two others in addition. On the forward movement of the carriage it swings about its pivoted connection thereto and at the same time is tilted at one corner, and on the backward movement of the carriage the table returns to its original position. This may be accomplished by various mechanical arrangements, one of which I have shown in the accompanying drawings, but I wish it to be understood that this may be altered in various ways in the details of construction without departing from the spirit of my invention.

In the drawings, Figure 1 is a plan view, the carriage being shown partly in dotted lines. Fig. 2 is a plan view with the table removed and some of the details of the driving mechanism omitted. Fig. 3 is a side elevation, and Fig. 4 is an end elevation.

A is a base on which is mounted the carriage B. At the rear end of the base is located the driving mechanism (see Fig. 1) which consists of a pulley C fixed on a shaft

D journaled in bearings *d d* mounted on the base. At the other end of this shaft is fixed a disk E which is connected by a link *e* to another disk E' which is fixed on another shaft D' which is journaled in the bearings *d' d'* mounted on the base. The shaft D' is parallel to the shaft D but slightly out of line therewith so that when the disk E is moving at a constant speed the disk E' will be moving at a variable speed. Obviously cranks may be substituted for the pulley C or the disks E E'.

On the shaft D' is an eccentric F which is provided with the usual eccentric strap F'. The eccentric rod from the strap F' is pivotally connected to the carriage B at *f*. The carriage B is mounted on wheels B', which rest on the base A, and is held in position by guides A'. The forward wheels of the carriage travel on an incline plane *b* (see Fig. 3) while the rear wheels travel on a level plane *b'*. The result of this construction is that when motion is imparted to the pulley C it is transmitted to the eccentric F, which causes the carriage B to reciprocate, but because of the off centering of the shafts D and D' and the link connection, the carriage moves forward slowly and back quickly. As the carriage B moves forward the front wheels B' ride up the incline plane *b'*, causing the entire front end of the carriage to rise, and as the carriage moves back the front end drops back. It will be seen therefore that this carriage has two movements, viz., reciprocating and tilting, and that the reciprocating movement is not uniform as to speed in both directions.

Mounted on the carriage B is the table G which bears on the carriage at three points. At the rear end it is detachably connected to the carriage by a ball and socket joint H, while at the forward end it rests on two wheels I and J, the former being preferably journaled in the table itself and the latter in the carriage. The wheel I rides on an inclined plane *i*, while the wheel J rides on a level plane *j*.

Fixed to the base A is a vertical post K which passes up through the central opening in the carriage B and carries at its upper end a horizontal idle wheel K'. Fixed to the under side of the table G is a plate L, which bears against the wheel K' and is at an angle to the line of movement of the carriage and table due to the eccentric F. It will be seen



therefore that the table G has not only the two movements of the carriage B, but that in addition on the forward movement of the carriage B the plate L bearing against the wheel K' causes the table to turn slightly around the joint H as a center, and as the table turns the wheel rides up the incline plane *i* tilting that corner of the table. Furthermore, inasmuch as the carriage B moves forward slowly and back quickly, the table moves forward, rises, turns and tilts slowly and drops back into its original position quickly. It is obvious that the degree of rise of the forward end of the carriage B may be adjusted by altering the inclines *b*, and the degree of tilt of the table by altering the incline *i*.

The operation of my concentrating table is as follows: The water containing the mineral in suspension is fed on to the table at a point adjacent to the joint H and in just sufficient quantities to cause it to constantly flow over the surface of the table in a thin stream. The metal being heavier sinks, while the water washes away the sand and other substances contained in the water. The peculiar motion of the table causes the metal to gradually "work" toward the edge of the table, approximately between the points M, M' (see Fig. 1), where it drops off, while at the same time the water is being thrown back by the tilting motion and drops off at the other side of the table carrying the sand and other minerals with it. The result is a constant washing of the mixture and a gradual separation of the heavier from the lighter matter held in suspension.

Having described my invention, what I claim is:

1. In a concentrating table, a base, a carriage thereon, means for reciprocating said carriage and at the same time raising and lowering one end thereof, in combination with a table mounted on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

2. In a concentrating table, a base, a carriage thereon, means for reciprocating said carriage, the forward stroke being slow and the return stroke fast, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

3. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted

on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

4. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

5. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

6. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage and means for oscillating said table with each reciprocation of said carriage and at the same time raising and lowering one corner thereof, substantially as described.

7. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a pivot at the rear end and wheels at the front end and means for oscillating said table about said pivot with each reciprocation of said carriage.

8. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a pivot at the rear end and wheels at the front end and means for oscillating said table about said pivot with each reciprocation of said carriage.

9. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to re-



reciprocate said carriage, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a pivot at the rear end and wheels at the front end and means for oscillating said table about said pivot with each reciprocation of said carriage.

10. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a pivot at the rear end and wheels at the front end and means for oscillating said table about said pivot with each reciprocation of said carriage.

11. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, and means for oscillating said table about said ball and socket joint with each reciprocation of said carriage.

12. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, and means for oscillating said table about said ball and socket joint with each reciprocation of said carriage.

13. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, and means for oscillating said table about said ball and socket joint with each reciprocation of said carriage.

14. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a ball and socket

joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, and means for oscillating said table about said ball and socket joint with each reciprocation of said carriage.

15. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, a plate on said table at an angle to the line of movement of said carriage, and a roller against which said plate bears.

16. In a concentrating table, a base, a carriage thereon, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, means for raising the front end of said carriage on the forward stroke and lowering it on the return stroke, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, a plate on said table at an angle to the line of movement of said carriage, and a roller against which said plate bears.

17. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, a plate on said table at an angle to the line of movement of said carriage, and a roller against which said plate bears.

18. In a concentrating table, a base, a carriage thereon said carriage being mounted on wheels, driving mechanism adapted to reciprocate said carriage, with a slow forward stroke and quick return stroke, inclines on said base on which the front wheels of said carriage travel, in combination with a table mounted on said carriage by a ball and socket joint at the rear end and wheels at the front end, an incline on which one of said wheels travels, a plate on said table at an angle to the line of movement of said carriage, and a roller against which said plate bears.

In witness whereof I have hereunto set my hand in the presence of two witnesses, at Houghton, county of Houghton and State of Michigan, this 7th day of May, 1906.

JOHN C. FISHER.

Witnesses:

P. H. PAINE,  
NEIL M. GILLIES.