(No Model.) 3 Sheets—Sheet 1.

A. SCHULENBURG.

CONCENTRATOR.

No. 473,644. Patented Apr. 26, 1892.

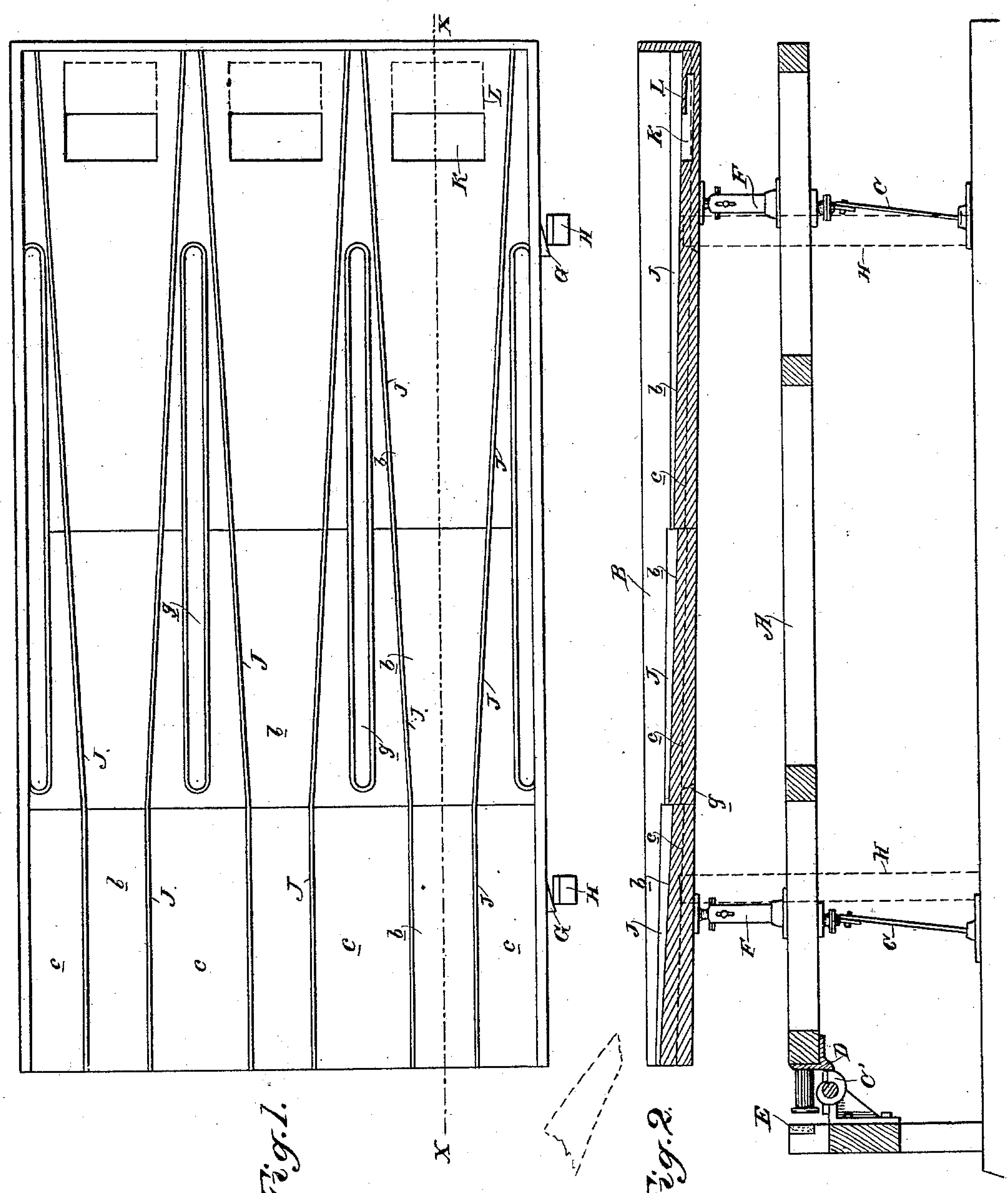

Fig.1. Fig.2.

Witnesses,
J. H. Nourse
H. F. Ascheck

Inventor
Adolph Schulenburg.
By Dewey & Co
Attys

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

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Fig. 3.

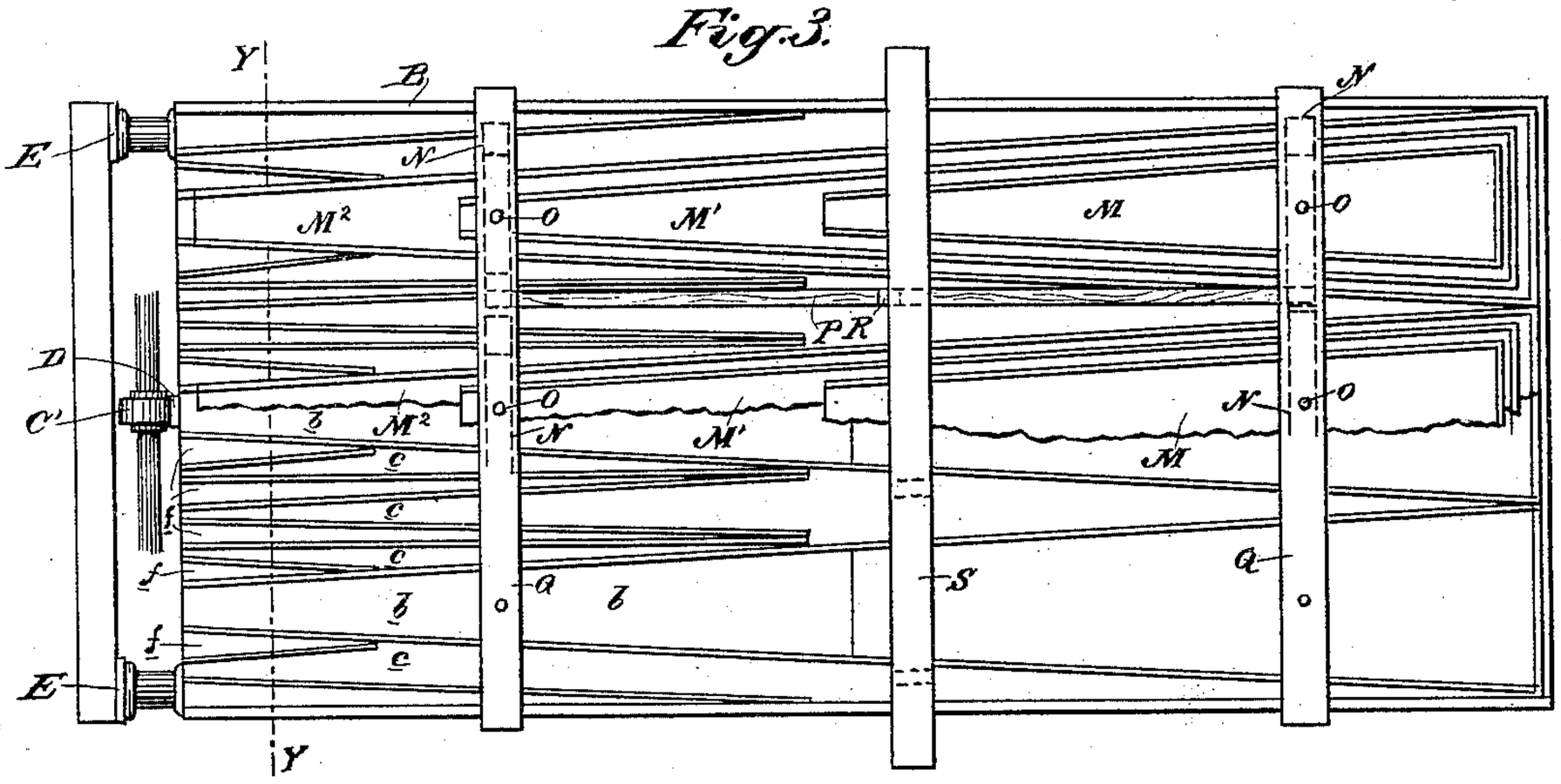
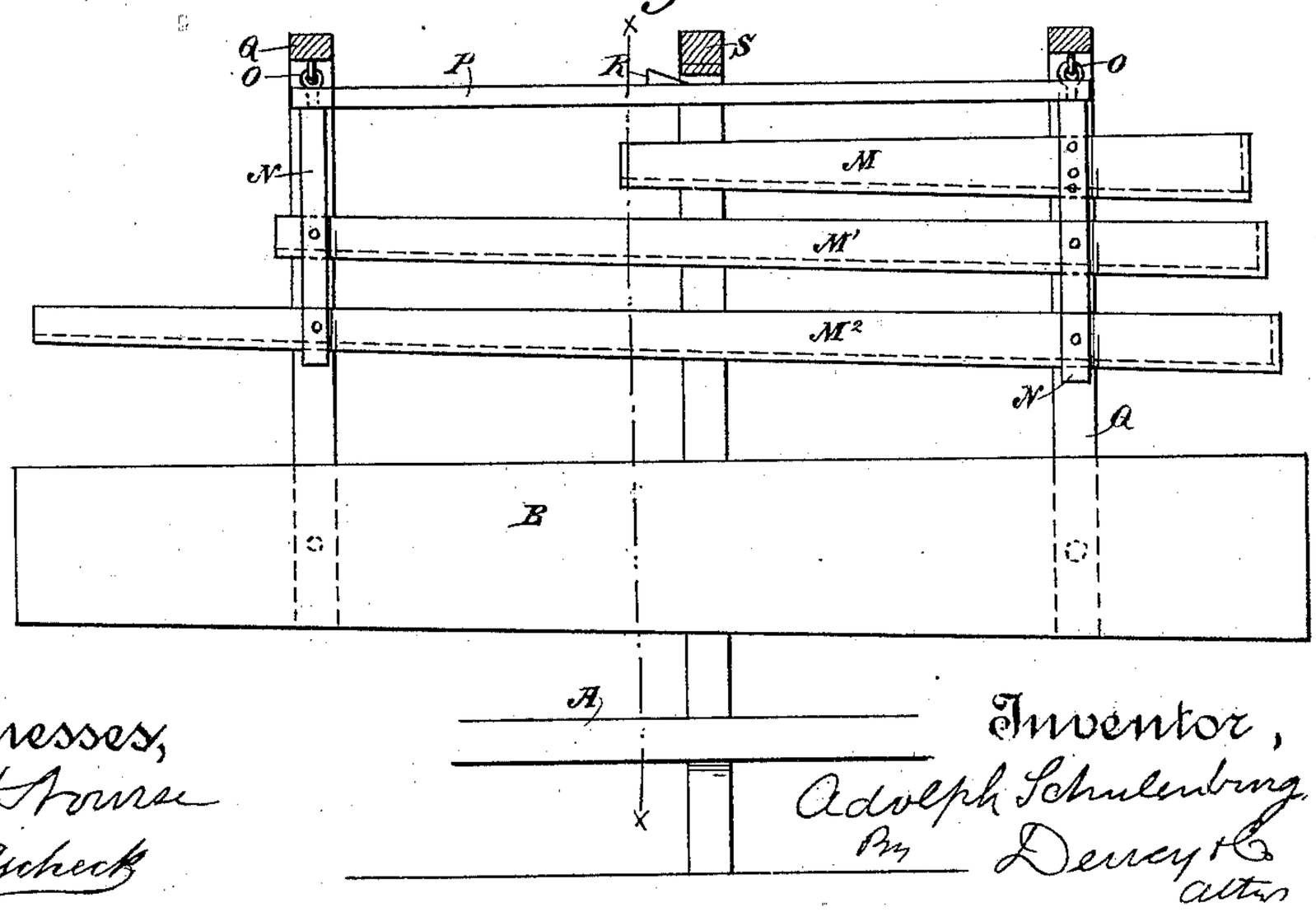


Fig. 4.

Fig. 5.



Witnesses,
J. H. Morse
H. F. Bacheck

Inventor,
Adolph Schulenburg.
By Dewey & Co.
attys

(No Model.) 3 Sheets—Sheet 3.

A. SCHULENBURG.

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Fig. 6.

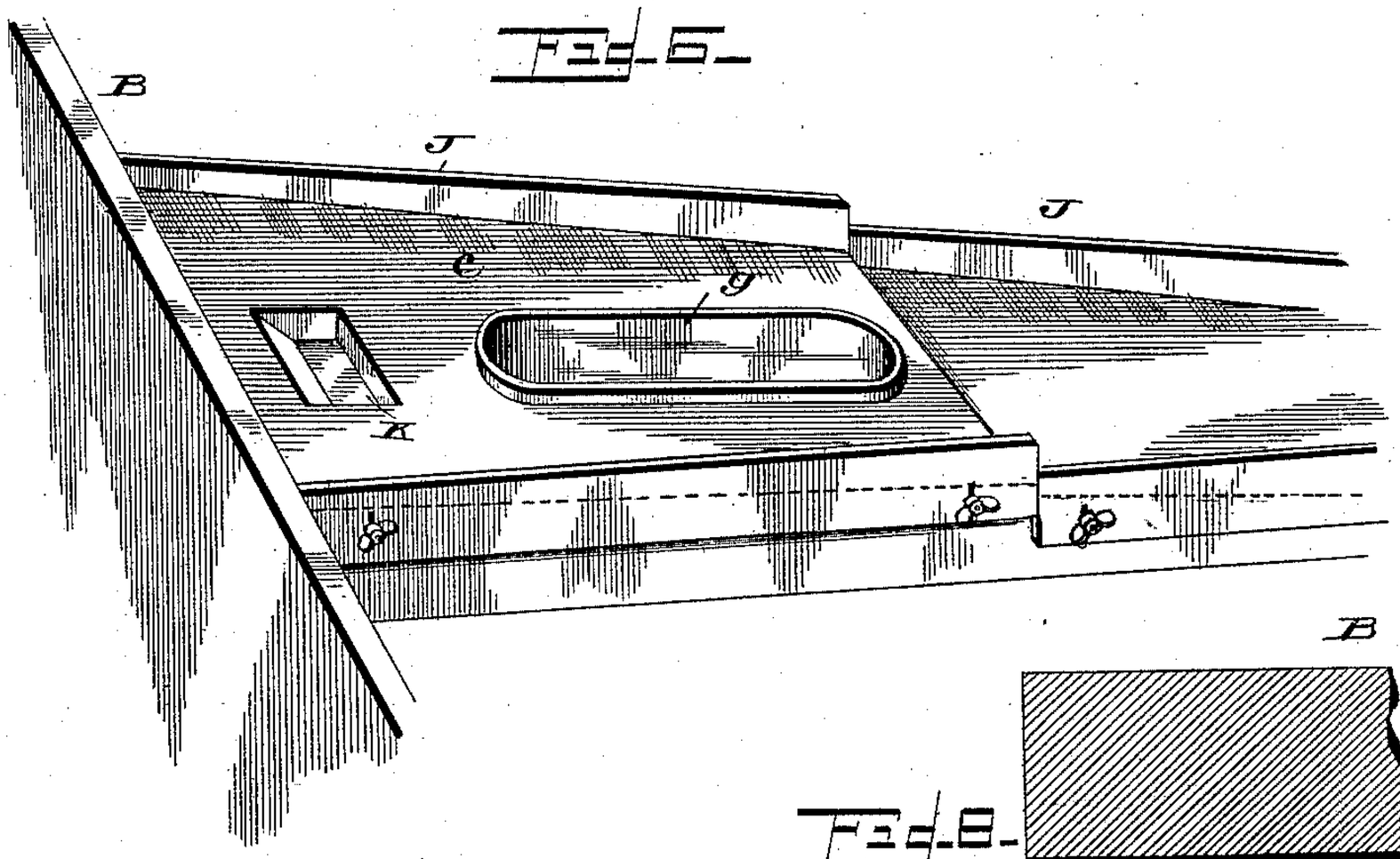


Fig. 7.

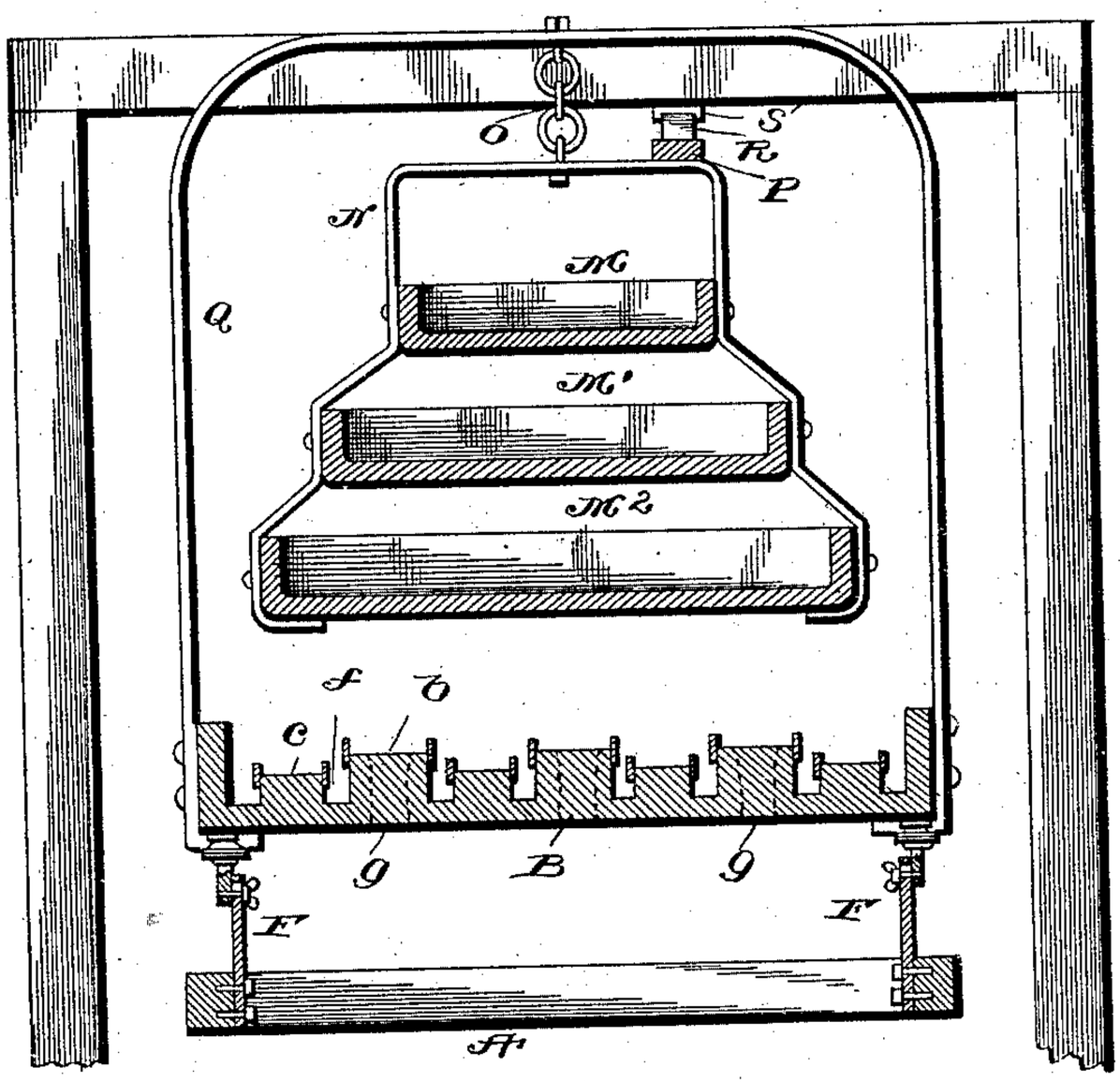
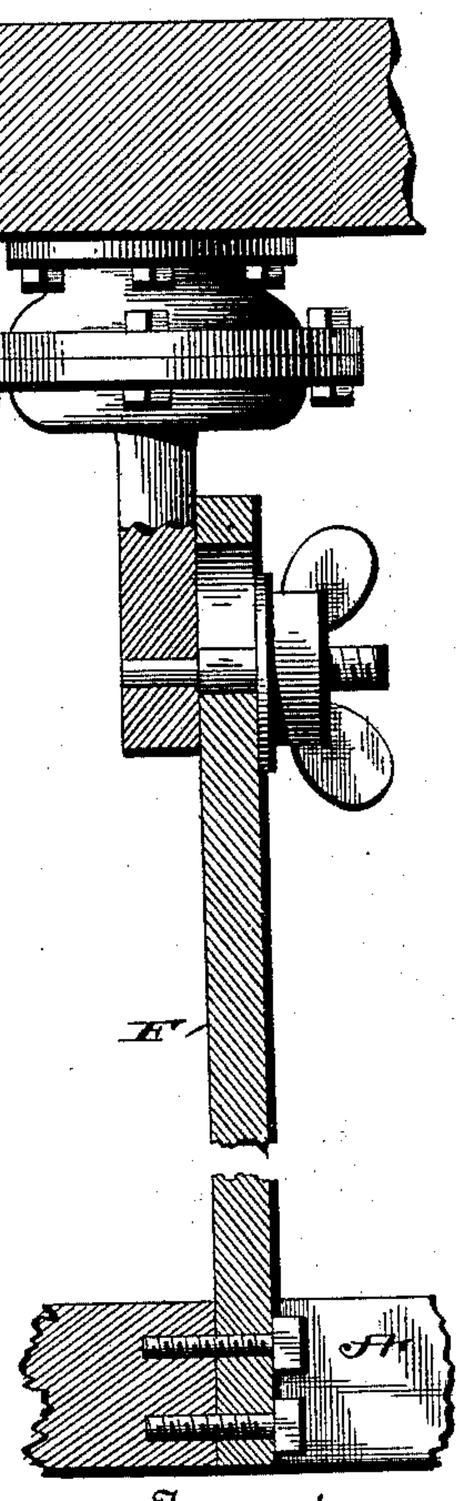


Fig. 8.



Witnesses

John Dwinie

Chapman Fowler,

Inventor

Adolph Schulenburg

By his Attorneys

Dewey & Co.

UNITED STATES PATENT OFFICE.

ADOLPH SCHULENBURG, OF SAN FRANCISCO, CALIFORNIA.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 473,644, dated April 26, 1892.

Application filed July 15, 1891. Serial No. 399,595. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH SCHULENBURG, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Concentrators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in apparatus for concentrating material which carries gold, amalgam, sulphurets, and other valuable material; and it consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the main table. Fig. 2 is a vertical longitudinal section on line *x x* of Fig. 1, showing also the agitating mechanism. Fig. 3 is another plan view of a modified main table in connection with overhanging chutes. Fig. 4 is a lateral section on line Y Y of Fig. 3. Fig. 5 is a side elevation of my concentrator. Fig. 6 is a detail showing in perspective a portion of the tables. Fig. 7 is a cross-sectional view of the line *x x* of Fig. 5. Fig. 8 is an enlarged detail to be referred to.

My concentrating-table is composed of two parts—the lower one A and an upper one B.

The frame A is supported upon hinged or spring-arms C, and has at one end a lug D, which is engaged by a rotary cam C′ to push the frame away from it, and when released from the cam the frame swings back by the action of the springs and strikes against a suitably-disposed bumper at E, which causes it to stop abruptly, and by means of the jar or shock given to the contents of the table above the heavier and lighter particles are separated from each other.

The upper table B is supported from the main frame by the spring-standards F, and it has upon one side one or more inclined or wedge-shaped lugs G, and by the longitudinal movements given the frame A and table B by the cam C′, these lugs engage stationary blocks H, which thus act to force the table to one side, so that each movement of the table consists of a simultaneous longitudinal and side motion. The table B will be returned by means of the springs F. Either or both ends may be relieved from side shake by adjusting-blocks H.

The surface of the table B is subdivided into as many channels as may be desired, and each of these channels is again subdivided into several more toward the discharge end, as shown plainly in Figs. 1 and 3. These compartments have a slight inclination from the head toward the discharge end. This inclination may either be continuous from one end to the other, or, as shown in the present case, the surface is divided into two or more sections *b*, each of which discharges upon the next section in line with it. The first or receiving section has a certain amount of inclination given it, the second section a little greater inclination, and the third the greatest inclination of all. Each of these sections has an elevated adjustable rim upon each side, as shown at J, which prevents the material delivered upon the sections from flowing off at once to the sides. The longitudinal percussive movement of the frame and table causes the material which is delivered upon the table to be gradually moved forward, the heavier portions being separated from the lighter portions, and the material moves up the first incline and is then delivered upon the second incline, which, being steeper, causes a more thorough separation, and the last incline, being the steepest of all, produces the slowest movement of the material. A sufficient supply of water is furnished to the pulp or material in the usual manner and the overflow of lighter material takes place over the edges or rims J, previously mentioned, during the gradual movement of the heavy material up these inclines. The material when first supplied is delivered into depressions or chambers K at the receiving ends of the table, and these chambers have a lip L, which extends a short distance over one end, and by means of this percussive action a certain amount of separation takes place at this point. Any mercury or amalgam which may be contained in the pulp will be delivered into these chambers, and the percussive action, together with the supply of water, agitates the mass and separates the amalgam, mercury, and the heaviest of the

sulphurets, which will remain in these chambers, the lighter material flowing out and passing up the tables, as before described.

Upon each side of the sections *b* are arranged another series of sections *c*, which are slightly lower than the sections *b*, and there are longitudinal channels *f*, extending between these sections, into which channels the heaviest of the material which flows over the sides of the sections *b* and *c* will eventually settle, as shown in Fig. 3. These sections *c* have at their narrowest ends slots or perforations *g* to allow the lighter particles which settle therein to pass through. A slight rim is made around these openings. These sections *b* are made tapering or converging from the receiving end toward the discharge end, as shown in the plan view, and the spaces between them become gradually wider from the receiving to the discharge end. The supplemental sections *c* are consequently introduced into these gradually-widening spaces and serve to still further subdivide and separate the material which flows over the sides of the sections *b* and falls into the spaces between these sections, where this further separation takes place. In addition to the varying inclinations of the sections *b* from the receiving to the discharge end I am enabled by means of adjusting-screws or other suitable devices to raise or depress the discharge end of the table to suit the character of the material which is being operated upon. In some cases it may be found necessary to depress the ends of these sections, and in other cases it may be necessary to elevate them. It is only necessary to pay attention to the final and steepest of these sections, the action of the sulphurets and material upon this section deciding the adjustment of the whole. In order to separate the least valuable portion of the pulp from that which is more valuable before the mass reaches these separating-sections, I have shown a series of chutes M, M′, and M². These chutes are held in position above the tables by means of arched bails N, which extend upwardly from the sides of the chutes arching over it and having links or other suspending devices at O, by which the bails containing these chutes are properly supported from standards Q, fastened to the sides of table B, and by this arrangement the chutes are subjected to the same movements as table B. A strip P connects these bails N on one side, and these strips carry about their center an inclined lug similar to the one on the table B, as shown at R, Fig. 5. These lugs, when the table gets its longitudinal shock, come in contact with other square lugs on a stationary cross-beam S, and that side of the chutes is consequently depressed or tilted and its release causes a rolling or swinging motion of the chutes, which will greatly assist in the preliminary separation on these chutes. By this arrangement it will be seen that the material on the first (uppermost) chute, which is suitably inclined, is agitated in such a manner that the heaviest portion of the material drawn back up the incline by the percussion or longitudinal motion will be washed over the feed end, while the less heavier portion of the material flows over the discharge end and falls upon the next lower chute, which is a little less inclined than the first and is there treated in the same manner as before, and from this one in the same manner to the following chute until it is delivered on the main table to undergo further separation. The lightest portion of the material flows over the sides of the different chutes by the help of the side and rocking motion into the lowest chute, from which it is finally discharged at either end and suitably disposed of.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a concentrator, a supporting-frame and a superposed concentrating-table supported one above the other, a cam and bumper and springs acting upon the lower table whereby a longitudinal percussive movement of the tables is produced, an inclined or wedge-shaped lug upon the side of the upper table and a corresponding stationary piece against which it acts when the tables are moved, and longitudinally-elastic connecting-arms F between this table and the lower one, whereby the upper table partakes of the longitudinal percussive movement and has in addition a side oscillating motion, substantially as herein described.

2. In a concentrator, the supporting-frame and the superposed table connected together as described and having a combined longitudinal percussive and side shaking motion, surfaces formed upon the upper table for the reception of the material to be concentrated, said surfaces converging from the receiving to the discharge end having an upward inclination, and adjustable rims or sides over which the lighter portions of the material may flow while the heavier concentrates are retained upon the tables, substantially as herein described.

3. In a concentrator, the supporting-frame and superposed table, means whereby said frame and table receive a longitudinal percussive and a side shaking motion, and inclined surfaces with converging sides and rims formed upon the table, said surfaces being divided into sections from one end to the other, each section toward the discharge end having a greater upward inclination than the previous section which discharges upon it, substantially as herein described.

4. In a concentrator, the supporting-frame and superposed table having the longitudinal percussive and side shaking motion, surfaces formed upon the table, having an increasing upward slope from the receiving to the discharge ends and diverging in the same direction, rims or flanges upon the sides of said surfaces over which the lighter materials flow while the heavier sulphurets are retained

upon the surfaces, supplemental surfaces of similar shape and convergence fitted in the diverging surfaces of the table between the first-named surfaces, and longitudinal channels between these supplemental surfaces, substantially as and for the purpose herein described.

5. In a concentrator, the supporting-frame and superposed table, means whereby a longitudinal percussive and side shaking motion of the frame and table is produced, surfaces with converging sides formed upon the table side by side having an increasing upward slope from the receiving to the discharge end, and adjustable rims or flanges upon the sides of these surfaces to retain the heavier concentrates and allow the lighter to flow over, similarly-shaped supplemental surfaces formed in the diverging spaces intermediate between the first-named surfaces, and depressions or chambers at the receiving ends of the apparatus into which the material is delivered, said chambers having overlapping lips or plates whereby a preliminary separation and concentration takes place within these chambers, substantially as herein described.

6. In a concentrator, the supporting-frame and superposed table, a means whereby a longitudinal percussive and a side shaking motion of the frame and table is produced, surfaces and subdivisions of the table with sides converging toward the discharge end having rims or flanges whereby the concentrates are retained thereon and the lighter portions allowed to flow over said rims, preliminary concentrating-chambers at the receiving ends of the table, and chutes arranged in series above the table into which the pulp is first delivered and from which it flows to the concentrating-surfaces, substantially as herein described.

7. In a concentrator, the supporting-frame and superposed table, a means by which longitudinal percussive and a side shaking motion of the frame and table is produced, and surfaces and subdivisions of the upper table with overflow-rims, in combination with a series of superposed suspended chutes of different lengths, with side rims or flanges, and means for producing a longitudinal side and rocking motion of the chutes, substantially as herein described.

8. In a concentrator, the supporting-frame and superposed table, a means for producing a longitudinal percussive and a side shaking motion of the frame and table, subdivisions of the table with rims, and longitudinal channels between these subdivisions, with open slots through which the particles settling in the channels escape, substantially as herein described.

In witness whereof I have hereunto set my hand.

ADOLPH SCHULENBURG.

Witnesses:

S. H. NOURSE,

J. A. BAYLESS.