

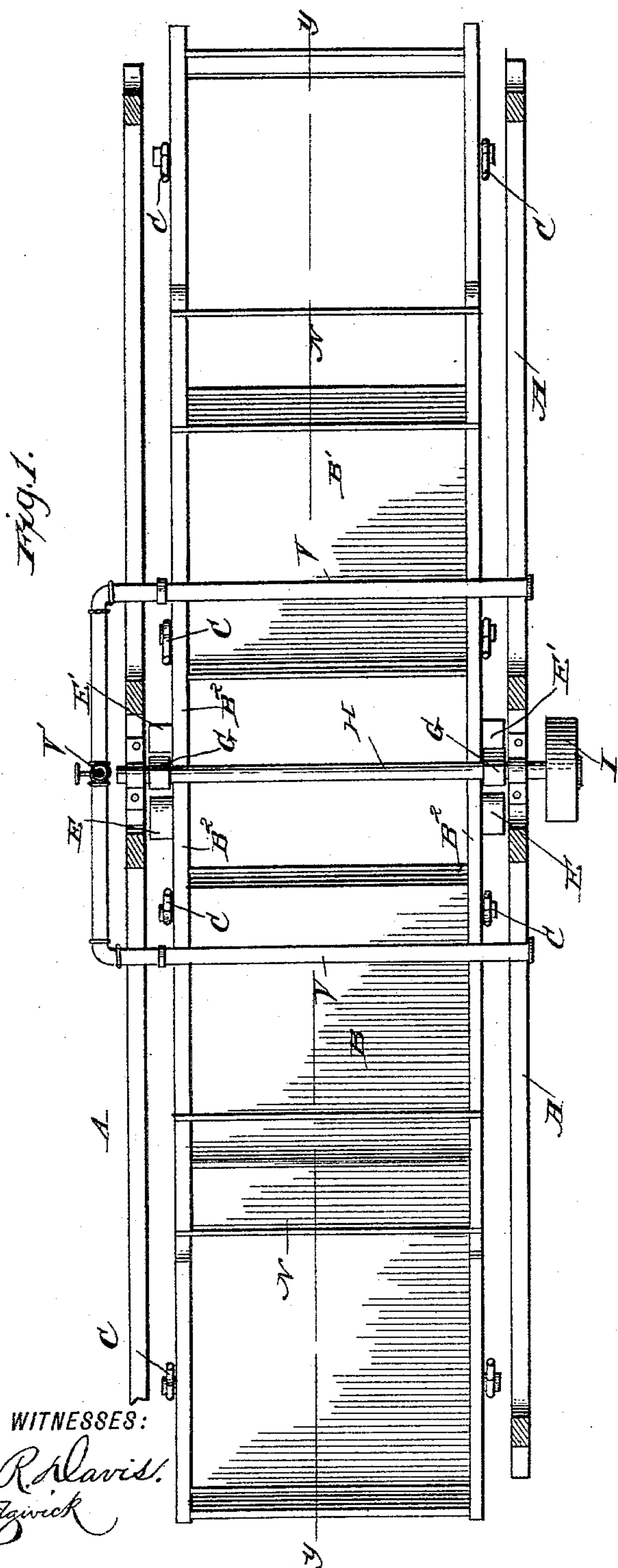
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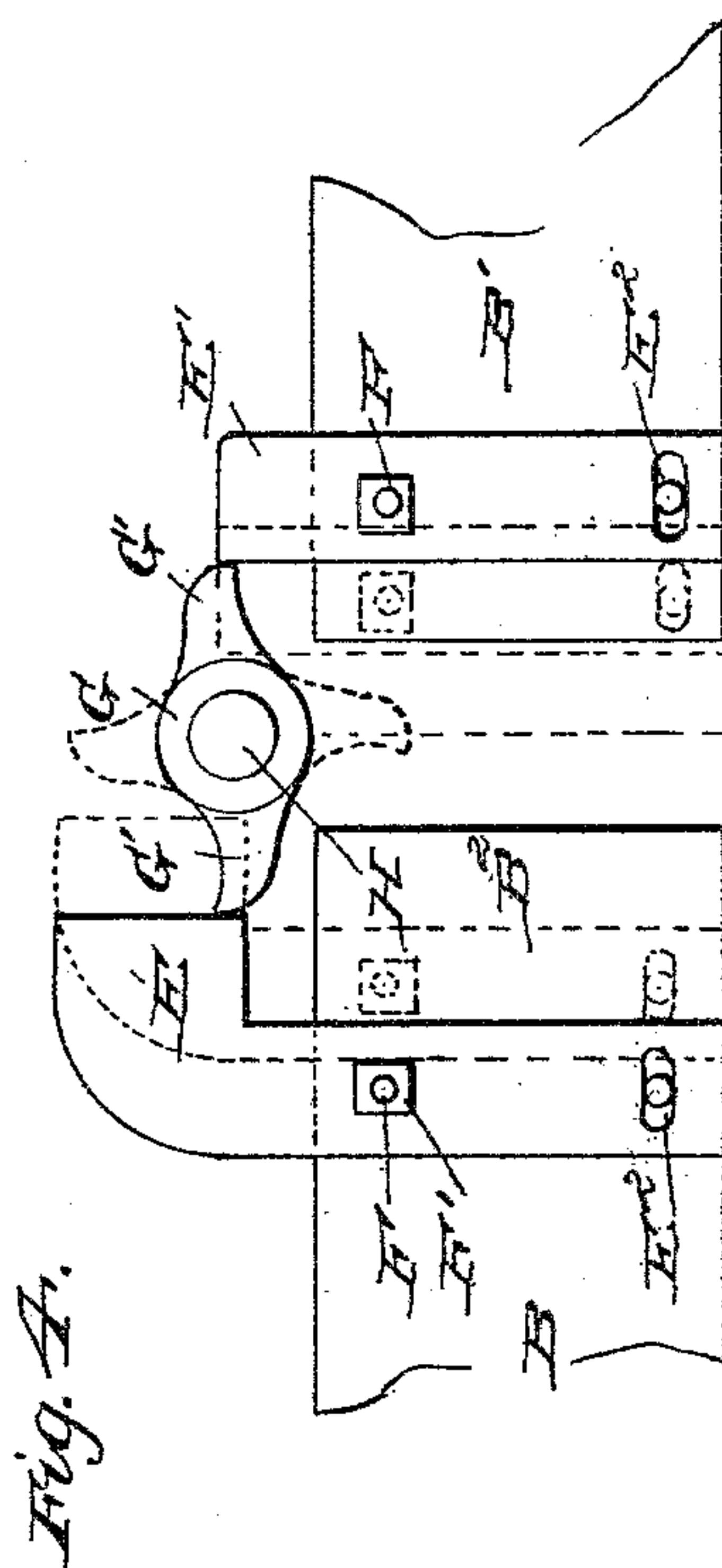
S. PORTER.  
ORE CONCENTRATOR.

No. 411,609.

Patented Sept. 24, 1889.



WITNESSES:  
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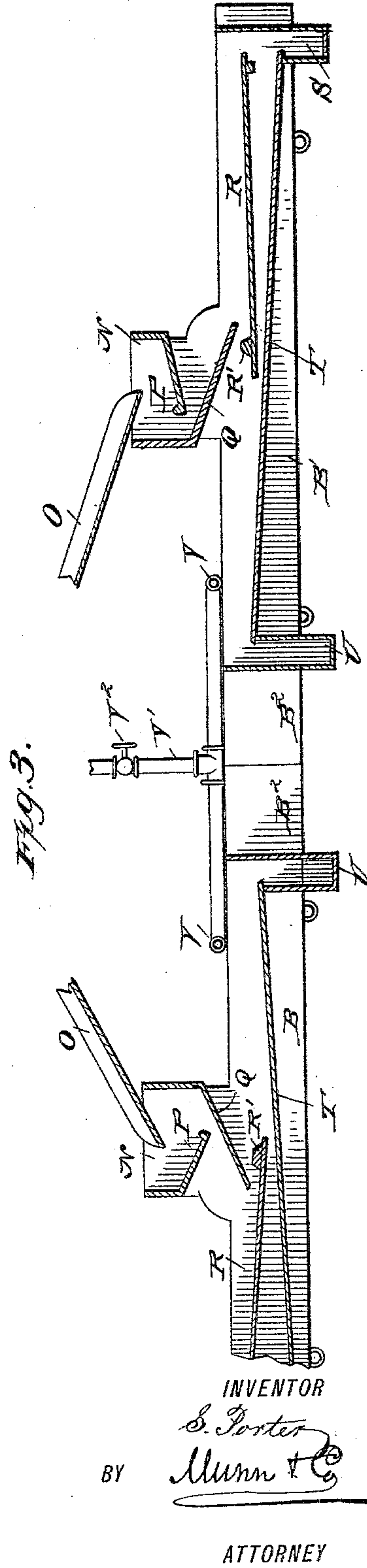
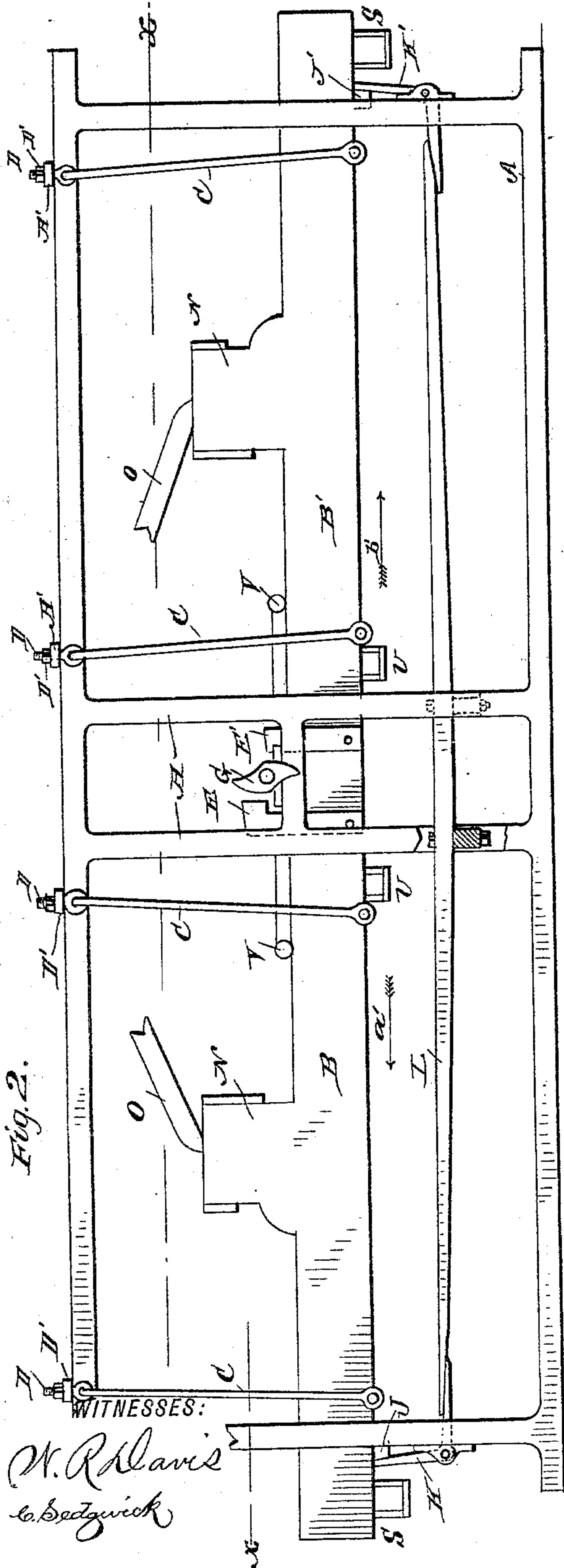
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

SAMUEL PORTER, OF DENVER, COLORADO.

## ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 411,609, dated September 24, 1889.

Application filed June 6, 1888. Serial No. 276,204. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL PORTER, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and Improved Ore-Concentrator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved ore-concentrator, which is very simple and durable in construction and effective in operation.

The invention consists of a concentrator provided with two beds having a reciprocating motion and one abutting against the other at the inward stroke of the two beds.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, is a horizontal section of the improvement on the line  $xx$  of Fig. 2. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal sectional elevation of the same on the line  $yy$  of Fig. 1, and Fig. 4 is an enlarged side elevation of the mechanism for imparting motion to the beds.

The improved ore-concentrator is provided with a suitably-constructed frame A, on which are hung to rock the beds B and B', which are alike in construction, each being pivotally connected with the rods C, pivotally connected with the hook-bolts D, passing through transverse bars A', secured to the main frame A. On the outer ends of the hook-bolts D screw the nuts D', against the tops of the transverse bars A', so as to adjust the bolts vertically in order to raise the beds B and B'. The inner ends B<sup>2</sup> of the sides of the beds B and B' rest against each other when the said beds B and B' are in their innermost position, as shown in Figs. 2 and 3.

On the inner ends B<sup>2</sup> of the said beds B and B' are secured the posts E and E', held longitudinally adjustable by means of bolts F, secured to the said ends B<sup>2</sup>, and passing through slots E<sup>2</sup>, formed in the said posts E and E'. Nuts F' screw on the said bolts F, for

securing the posts E and E' in place whenever adjusted to the desired position. Against the upper ends of the posts E and E' operate the arms G' of a cam G, secured to a shaft H, mounted to rotate in suitable bearings formed on the main frame A. On the outer end of the shaft H is held a pulley I, connected with suitable mechanism for imparting a rotary motion to the shaft H, so that when the latter is rotated the cams G, acting on the posts E and E', force the beds B and B' apart, as is plainly shown in Fig. 4.

On the outer ends of the beds B and B', and on the bottoms of the same, are secured the lugs J and J', respectively, against which rests one arm of the bell-crank lever K or K', respectively pivoted on the main frame A, and engaged at their other arms by the free ends of a hard-wood spring L, secured in its middle to the main frame A. The spring L, acting on the bell-crank levers K and K', forces the beds B and B' toward each other, unless the latter are separated by the cams G, as above described.

On the top of each of the beds B and B' is secured a hopper N, into which discharges a sluice O, containing the ore to be concentrated. In each hopper N is formed an inclined bottom P, discharging onto the second inclined bottom Q, leading to an inclined table R, extending upward at its rear end and discharging at this end into a trough S, secured to the under side of the respective bed B or B'. On the inner end of the table R, directly under the lower end of the bottoms Q, is formed a transverse ridge R', and the lower end of the said table R discharges onto an inclined table T, fastened in the bed B or B', respectively, its outer end discharging into the trough S, before mentioned. The inner upper end of the inclined table T discharges into a box U, held on the respective bed B or B', and leading to one side of the same.

A transverse perforated pipe V is held above the respective bed B or B', over the upper end of the table T, as shown in Fig. 3, and the said pipes V V connect with the main supply-pipe V', provided with a valve V<sup>2</sup>.

The operation is as follows: The ore to be concentrated passes down the sluices O and



into the hoppers N N, on the beds B and B'. The latter receive a reciprocating motion by the action of the cams G and the spring L. When the shaft H is set in motion, the arms

5 G' of the cams G, acting on the posts E and E', force the beds B and B' apart in the direction of the arrows a' and b', so that the lugs J and J' impart a swinging motion to the bell-crank levers K and K', whereby the free

10 ends of the spring-board L are raised and tension is given to the said spring. As soon as the arms G' of the cam G disengage the posts E and E', the force of the spring L, acting on the bell-crank levers K and K', will

15 cause an inward movement of the said beds B and B' in the inverse direction of the arrows a' and b'. The inner ends B<sup>2</sup> of the sides of the beds B and B' thus come together with considerable force, whereby the ore

20 passes into the hoppers N, and, falling down the bottoms P and Q onto the tables R and T, is actuated in such a manner that the tailings of the ore on the table R pass to the outer elevated end of the said table R

25 and fall into the trough S. The heavier ore passes in the inverse direction of the arrows a' and b' and over the ridge R' onto the table T. The ore on the table T, by the shock given to the beds B and B', as above de-

30 scribed, travels upon the said tables T T and falls into the troughs U U, leading to one side of the beds B B', respectively. The tailings or lighter particles of the ore on the table H travel down the same and fall into the trough

35 S, before mentioned. It is understood that the ore entering the hoppers N and rolling over the inclined bottoms P and Q is partly separated, the tailings passing to the outer ends of the tables R and T and into the trough

40 S, as above described. The tailings remaining in the ore pass up the table T and are washed out by the stream of water forced into the said ore through the perforated pipes V, said tailings being washed down the inclined

45 table T and into the trough S. The concentrated ores passing into the trough U are washed out of the same by a stream of water or other suitable means to one side of the machine.

50 The object in having the upper table is that that the ore will be there about half concentrated and the water and lightest of the waste rock will pass off at the rear end in the trough S. The partly-concentrated ore will pass up

55 and over the ridge R' and fall on the table T, so that the clear water from the pipe V will finish the washing on this table T, as if all this water and washing were done on one table the flow of water would be so great as

60 to carry off at the rear end the lighter part, which is sometimes the most valuable part of the ore.

The ridge R' on table R is about three-fourths of an inch higher (that is, the top of

65 of it) than the rear end of said table R.

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

1. In an ore-concentrator, two beds having a reciprocating motion in opposite directions 70 and one abutting against the other at the inward stroke, and means for operating the beds, substantially as shown and described.

2. In an ore-concentrator, two beds having a reciprocating motion in opposite directions 75 and one abutting against the other at the inward stroke, said beds being provided with inclined tables and an operating mechanism, substantially as shown and described.

3. The combination, with the reciprocating 80 bed having transversetroughs S U at its ends, and a table T, inclined upwardly from the front to the rear trough, of the upper table R, rigidly secured in the bed and inclined downwardly and rearwardly from a point 85 above the front trough S, into which it discharges to a point just above the middle portion of the lower table, and the hopper fixedly secured to the bed and having oppositely-inclined bottoms P Q, the bottom Q be- 90 ing inclined forwardly and terminating just above the inner edge of the table R, substantially as set forth.

4. The reciprocating bed having troughs S 95 U at its front and rear ends, the table T, inclined upwardly and rearwardly from the front to the rear trough, the hopper N, fixedly secured to the bed about midway of its length and having oppositely-inclined bot- 100 toms P Q, the bottom Q being inclined toward the front end of the bed, the upper table R, inclined rearwardly and downwardly from a point above the trough S to a point between the bottom Q and the lower table, the rib R' on the upper side of the rear end 105 of the table R, just in rear of the delivery end of the bottom Q, in combination with the perforated water-pipe extending across the bed between the hopper and the rear trough, substantially as set forth. 110

5. The combination, with two beds reciprocating toward and from each other and abutting at their inner ends, troughs at opposite ends of the beds, a table T, inclined up- 115 wardly and rearwardly from the front to the rear trough, the shorter upper table inclined downwardly and rearwardly from a point above the front trough, the hopper fixedly secured to the bed and having oppositely-in- 120 clined bottoms, the lower one of which is inclined downwardly and forwardly to a point just above the lower inner end of the upper table, and the transverse water-pipe between the rear trough and the hopper, of a rotary cam acting upon both beds simultaneously to force 125 them apart, and springs throwing the beds suddenly into contact at their inner ends when released by the cams, substantially as set forth.

6. An ore-concentrator consisting in the 130



frame, the oppositely-reciprocating beds, their  
troughs, tables, and hoppers, a rotary cam act-  
ing simultaneously upon both beds to force  
them apart, bell-crank levers mounted on the  
5 frame with their vertical members engaging  
the forward ends of the beds and their hori-  
zontal members extending toward each other,  
and the longitudinally-extending spring L,

secured to the frame between its ends and en-  
gaging at its ends the inner ends of the hori- 10  
zontal members of said bell-crank levers, sub-  
stantially as set forth.

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Witnesses:

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