(No Model.) 2 Sheets—Sheet 1.

G. GATES.

CONCENTRATOR.

No. 435,562. Patented Sept. 2, 1890.

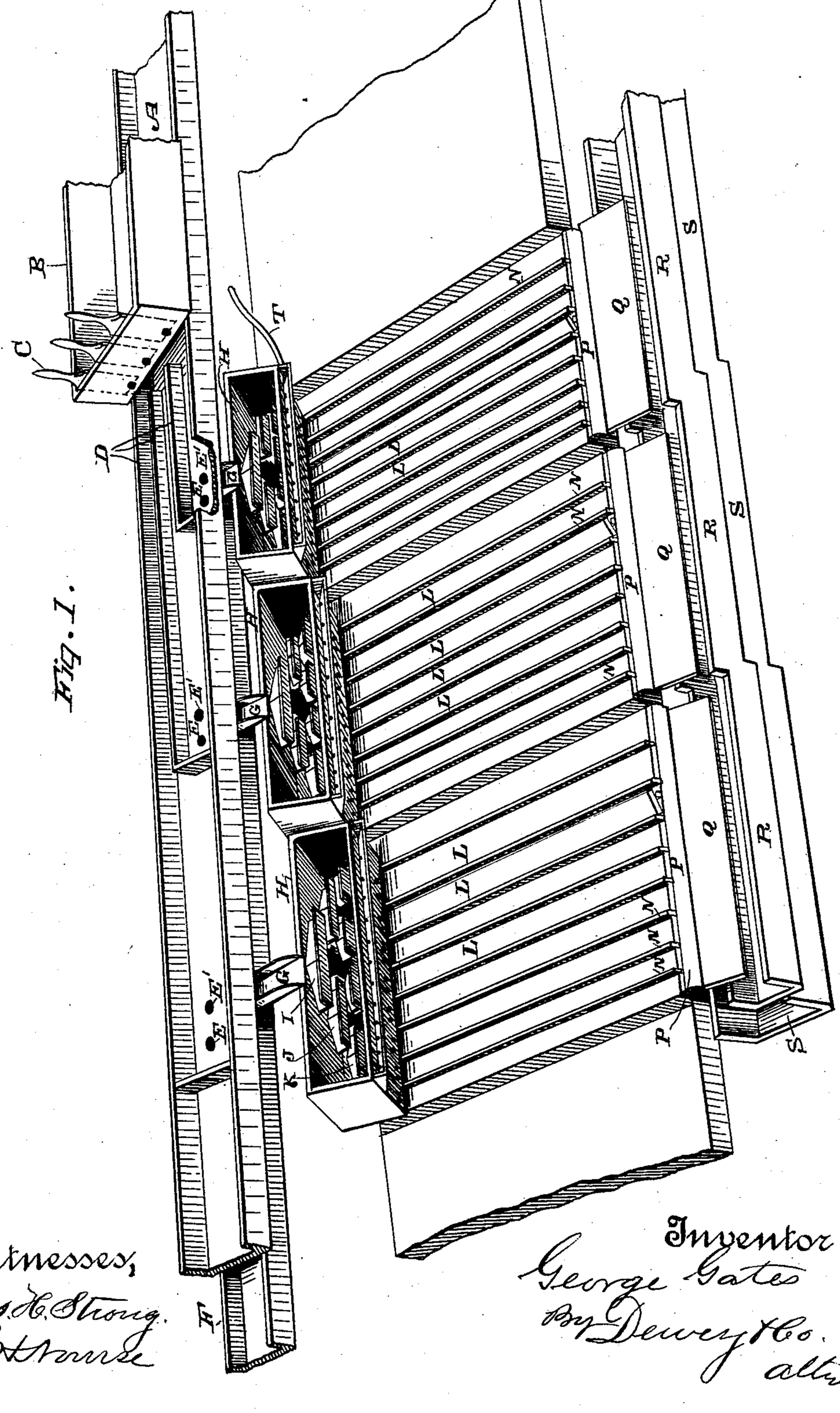

Fig. 1.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

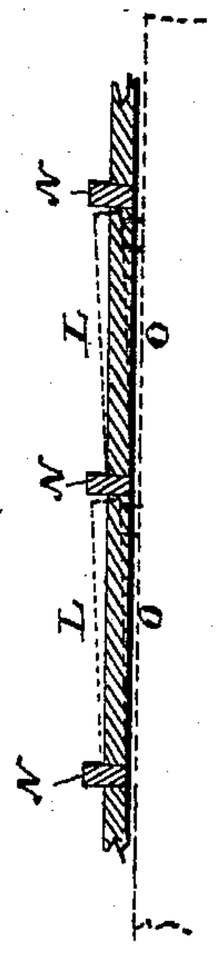


Fig. 2.

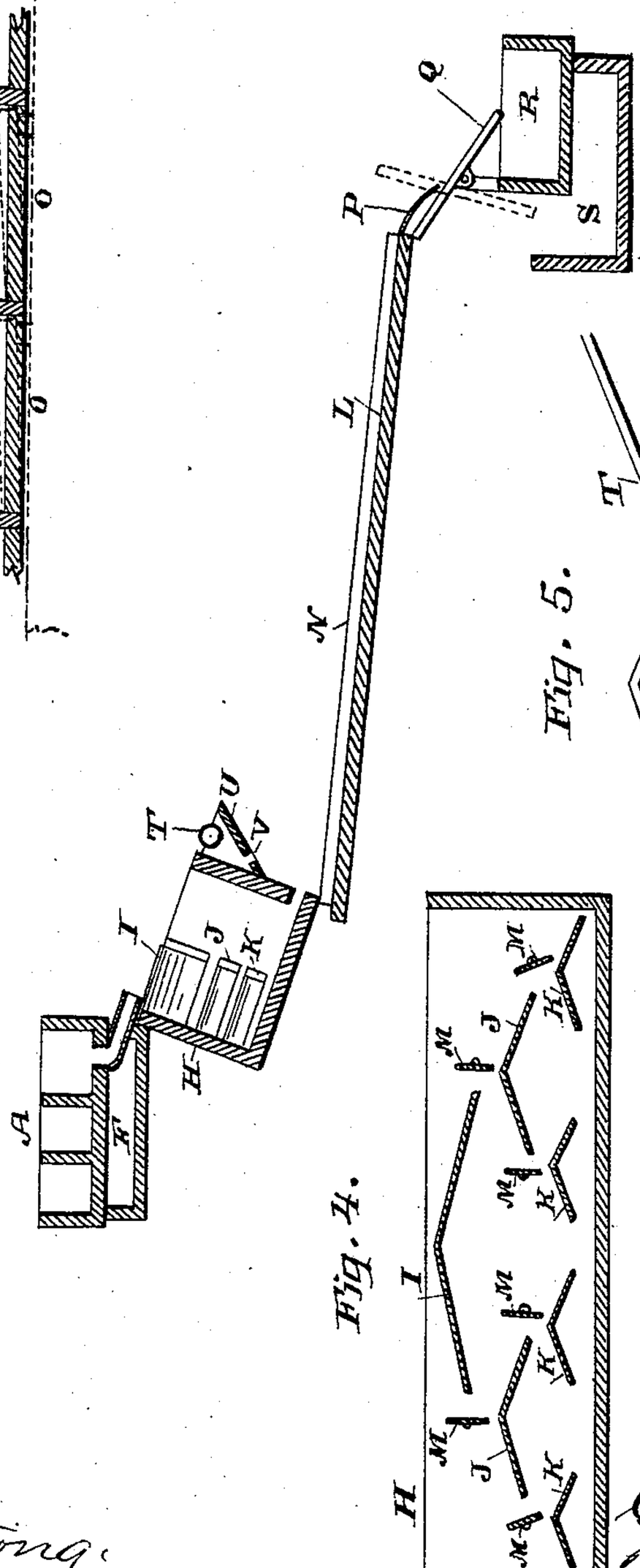
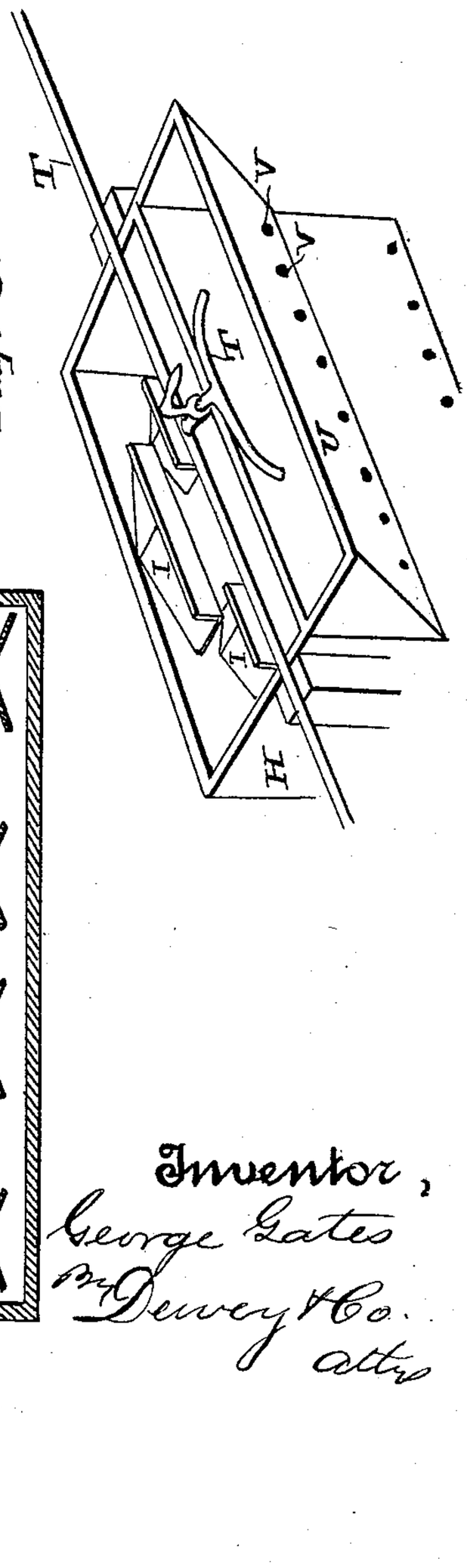


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE GATES, OF DRYTOWN, CALIFORNIA.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 435,562, dated September 2, 1890.

Application filed May 23, 1889. Serial No. 311,866. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GATES, of Drytown, Amador county, 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 an improved apparatus for separating fine heavy valuable substances and sulphurets from the coarser sand, gravel, and gangue, so as to concentrate and save the former and allow the latter to pass off and be washed away.

It consists of a series of tables with peculiarly-arranged supply and distributing devices and certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a general perspective view showing the principal features of the device. Fig. 2 shows a transverse section of the feed and discharge sluices and a longitudinal section of the table. Fig. 3 is a transverse section of a part of the table, showing its construction. Fig. 4 is an enlarged section of the distributing-box. Fig. 5 is a perspective view of the same, showing the water-distributing tank attached thereto.

A is a sluice or carrying-trough, in which the tailings or substances to be separated and concentrated are brought to a point where the separation is to take place, and B is the water-supply trough, having gates, as shown at C, by which the supply of fresh water may be discharged and regulated upon different portions of the sluice A. The sluice A is provided with longitudinal partitions D, dividing it into any desired number of equal troughs or sluices, the ends of these partitions being presented up the stream or toward the flowing current of material, which is thus distributed evenly into each of the channels formed in the body of the sluice. The water which is discharged from the gates C of the trough B is delivered into these channels, so that either one or all of them may have a greater or less supply of water, as may be desired. Each of these channels is provided with two openings E and E′, the first of which discharges into a sluice F beneath the main sluice and the channels, and the second into a spout or trough G, which delivers the material into the distributing-box H. There are as many of these outlets from the sluices and distributing-boxes as there are tables to be supplied therefrom, and the number of tables will depend upon the amount of materials flowing in the sluice and which it is necessary to separate. The longitudinal partitions D divide the main sluice into as many channels as there are distributing-boxes and tables, and thus I am enabled to regulate exactly the amount of material which is to be handled on each of any number of tables.

The distributing-boxes H have inclined tables I, meeting each other in the form of a flat roof, and the material which is discharged from the spout G falls upon the uppermost of these convex roofs or tables and falls off from each of the lower edges, falling from that point upon the second set of convex tables J, which again subdivide the amount of material, and from the edges of these convex tables J the material again falls upon the third set K, so that with the use of three sets of these dividing or distributing convex tables the material will be divided into eight equal portions, which are discharged off the lower edges of the lower tables K. From these final distributing-tables the material falls through holes or openings in the front of the distributing-boxes and into the channels L upon the inclined tables, which are situated just beneath the front of the distributing-box, as shown in Fig. 2.

In order to more perfectly regulate the discharge from the different distributing-platforms I and J, I have shown the gates or boards M, which extend across the distributing-box above the apex of each table I, J, and K. The boards may be turned upon the pivots which support them, so that the angle may be changed, and the material falling from the table above, striking these boards, is deflected by them, so that more or less will flow to one side or the other side of the apex of the table below, thus regulating with any desired degree of exactness the amount of material which flows on either side of the apex of any of the tables. This enables me to divide the material in each distributing-box with great exactness, so that an equal

amount, both in quantity and quality, will be discharged into each of the troughs or channels L upon the table.

The tables may be made of any suitable or desirable size. I have found that about fourteen feet in width and eighteen feet in length is a very satisfactory proportion for my tables in the work to which I have applied them, these tables being divided longitudinally into channels L, which receive the material from the distributing-boxes, as above described. The division-strips N (shown in Fig. 3) form the channels. The bottom boards may be covered with canvas or any suitable fibrous or other material which will check and retain the fine sulphurets and valuable material, while allowing the sand and worthless gangue to flow over the surface and be eventually discharged at the lower end of the channels. The bottom boards of these channels are preferably made independent of the vertical dividing-strips N, as shown at O in Fig. 3, so that in case the bottom of any one of the channels becomes tilted to one side or the other, so that the flow of material tends to either side, this channel may be leveled up by moving the bottom O independent of any of the other channels or parts of the table. This enables me to keep all portions of the table at a proper angle and inclination for proper work.

At the lower end of each of the channels is a plate P, over which the discharge takes place, falling down upon the angularly-adjustable guide-board Q, which may be tilted so as to discharge the worthless material which is flowing from the lower end of the channels into a sluice R. When the table has become sufficiently charged with sulphurets or valuable material, so that it is necessary to clean them up, the plug is removed from the opening E in the supply-sluice and is placed in the opening E′, thus cutting off any further supply to that particular distributing box and table. A supply of clear water for washing off the remaining sand and valueless material from the tables is brought by a pipe T and delivered into water boxes or tanks U, which are suitably fixed with relation to the distributing-boxes H. In the present case I have shown them as secured to the front of these boxes and provided with discharge-openings V, having suitable controlling-gates, through which the water may be delivered into the channels. Any number of these openings or holes may be made for each of the channels. I have found that two for each channel produce very good work. The cleaning up then takes place by means of a current of clear water, which is discharged upon the tables in sufficient quantity and strength, preferably by a peculiar hydraulic nozzle, to wash the valuable settlings off the surface of the table, and these boards Q are then inclined, so as to discharge these valuable concentrates into a second sluice or box S, which is so situated with relation to the inclined guide Q that when it is turned, as previously described, it will direct all the flow from the table into this sluice. By this construction I am enabled to divide any amount of material to be separated into very exact portions and to discharge these portions very evenly and regularly into as many channels and upon as many tables as may be necessary for the most perfect separation and concentration of the valuable portions, the whole work being easily attended to by one or two men. Whenever any table has been run as long as is desired, the flow is cut off from that table by means of the secondary discharge-opening E, which delivers the material from the feed sluice or channel A into the sluice F below and cuts it off entirely from the particular table which is to be cleaned up, and this operation is performed by the aid of fresh water, as above described.

The number of tables may be increased in proportion to the amount of tailings or the number of crushing-stamps from which the supply is derived. The sluice A may be continued indefinitely, and the successive tables extending at right angles from it are dropped, each below the preceding one, like steps, so as to conform to the grade of the supply-sluice. Only as much material is diverted from the sluice to each table as that table can take care of, and the whole contents of the sluice are worked in separate and in independent lots, instead of being all run over large tables. The material which passes into the lower sluice F through the passages E is separated in like manner by a supplemental table or tables similar to those here described, but not shown.

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

1. The main sluice having the longitudinal dividing-partitions, a corresponding number of inclined channeled tables standing at right angles therewith and distributing-boxes interposed between the tables and sluices, openings made in the bottom of said sluice and troughs leading therefrom to the distributing-boxes, a supplemental sluice extending beneath the main one, and openings discharging from the subdivisions of the main sluice into the supplemental sluice, substantially as described.

2. The distributing-boxes having the convex or double-inclined tables arranged in series, increasing in number from the top downward, as shown, an inclined table situated below said boxes and having channels corresponding with the number of discharge-surfaces of the lower set of distributers, and perforations or openings made in the box and corresponding with the distributing-tables and channeled surfaces of the inclined table, substantially as described.

3. The inclined tables having the vertical partitions extending longitudinally and subdividing them into channels, in combination

with the independent bottoms intermediate between the partitions and independently adjustable, substantially as described.

4. A sluice having longitudinal independent channels with discharge-openings E and E′ in each, and a second sluice beneath the first one, into which one of the discharge-openings E in each channel leads, a series of inclined channeled tables at right angles with the sluices, with intermediate distributing-boxes, into each of which one of the sluice-openings E′ discharges, and a water-supply trough having discharge-gates C for each of the sluice-channels, whereby the supply in each is independently regulated, substantially as herein described.

5. The sluice with the independent longitudinal channels and the inclined tables corresponding in number with the channels and having independent discharge-openings for each, in combination with the intermediate distributing-tables I, J, and K, situated one above the other, substantially as herein described.

6. The sluice with the independent channels and the distributing-boxes, into each of which one of the channels discharges, the double-inclined tables I, J, and K, arranged one above another within the boxes in series, increasing from the top downward, and the inclined channeled tables upon which the lower series of distributers discharge, in combination with the vertical direction-boards journaled above the apices of the distributers and adjustable with relation thereto, substantially as herein described.

7. The independent supply-channels with discharge-openings, the distributing-boxes with the series of inclined superposed distributing-surfaces, and the inclined channeled tables upon which the distributers deliver the material, in combination with the water-supply tank U, the receivers R and S, and the directing boards or tables Q, hinged above the receivers, so as to direct the discharge from the tables into one or the other, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE GATES.

Witnesses:
S. H. NOURSE,
H. C. LEE.