

(No Model.)

2 Sheets—Sheet 1.

J. B. ROSSMAN.  
CONCENTRATOR AND AMALGAMATOR.

No. 563,806.

Patented July 14, 1896.

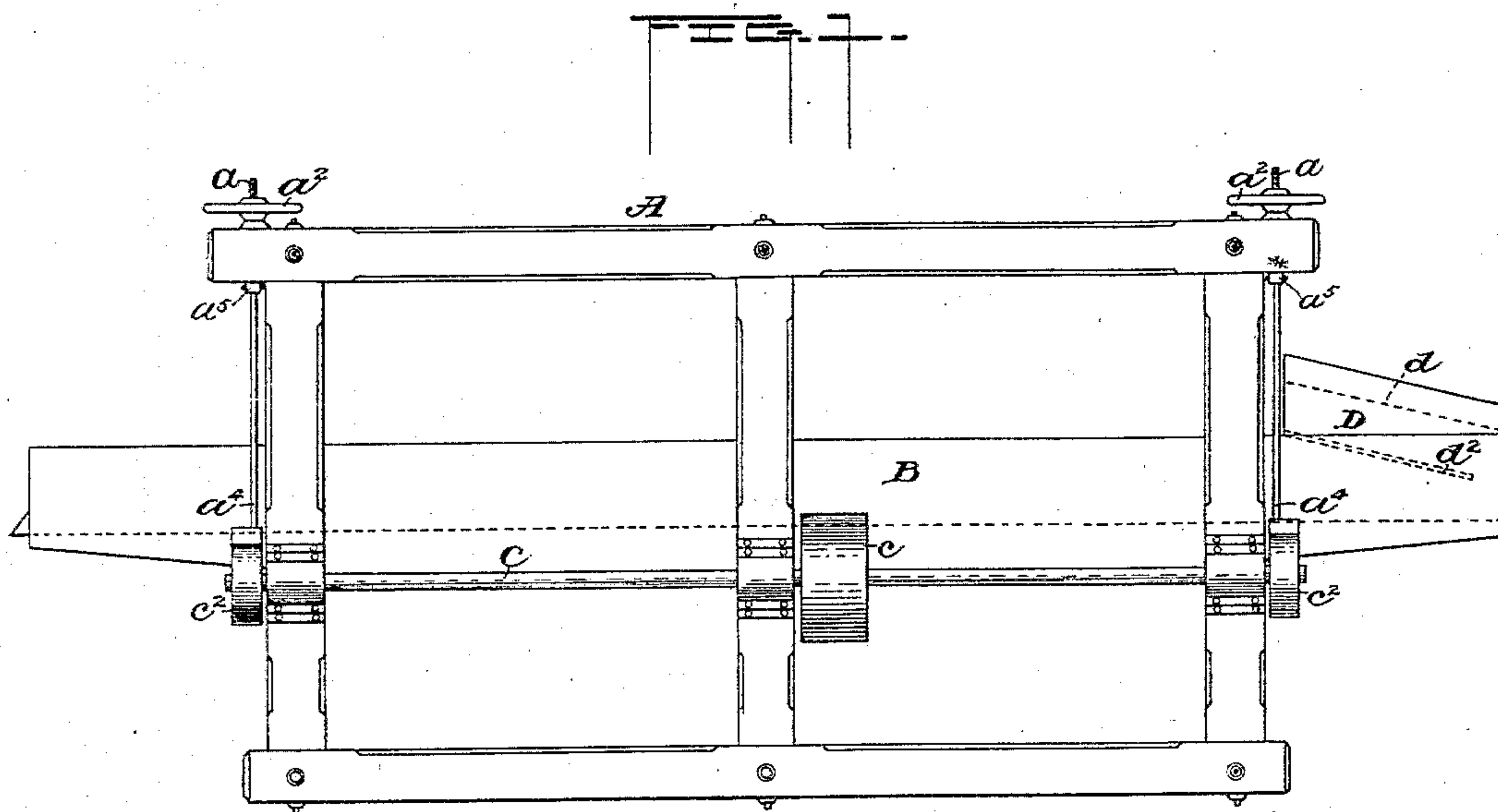


FIG. 1.

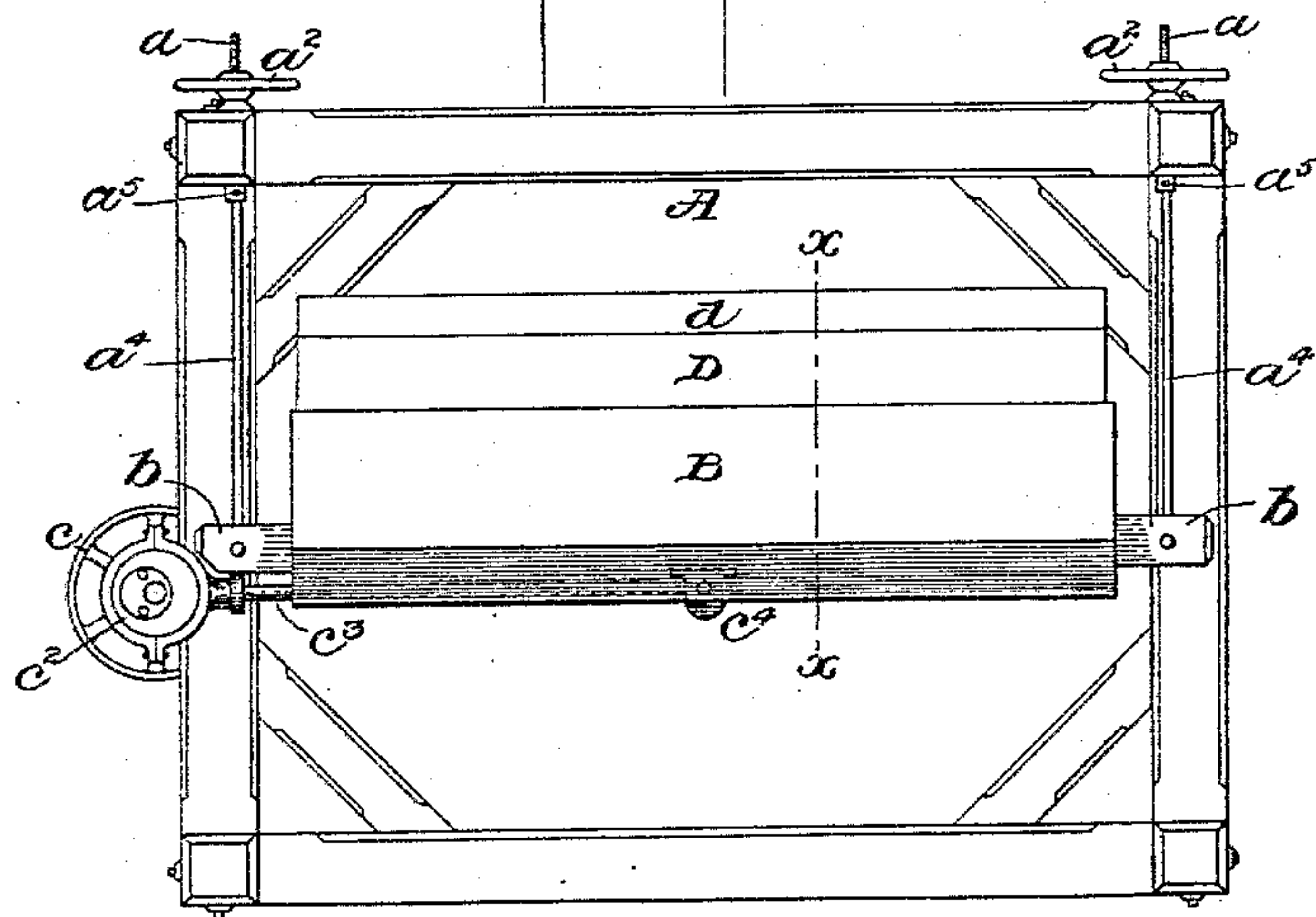
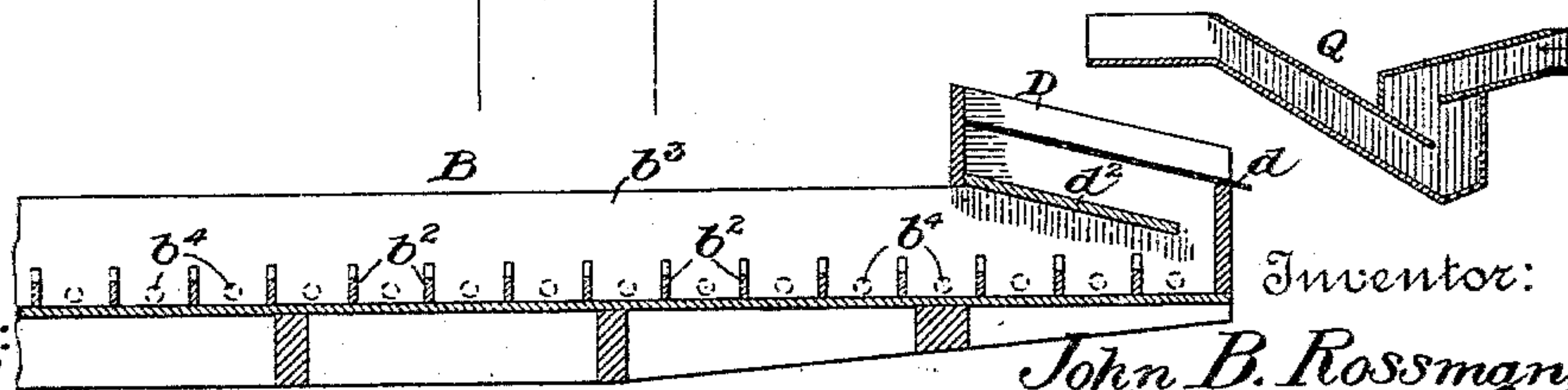


FIG. 2.



Witnesses:  
C. W. Smith  
R. H. Smith

Inventor:  
John B. Rossman,  
by R. S. Symonds,  
his Attorney

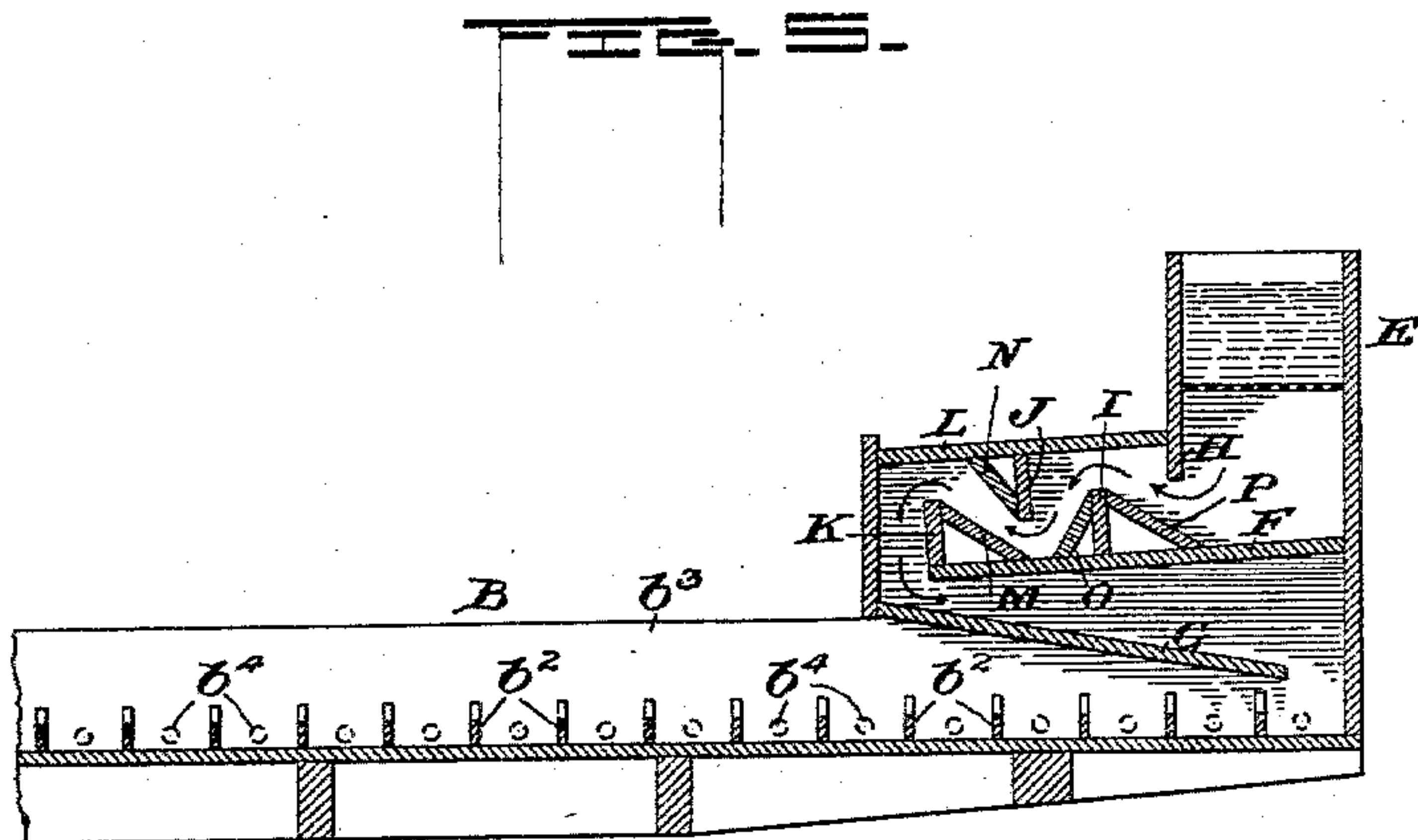
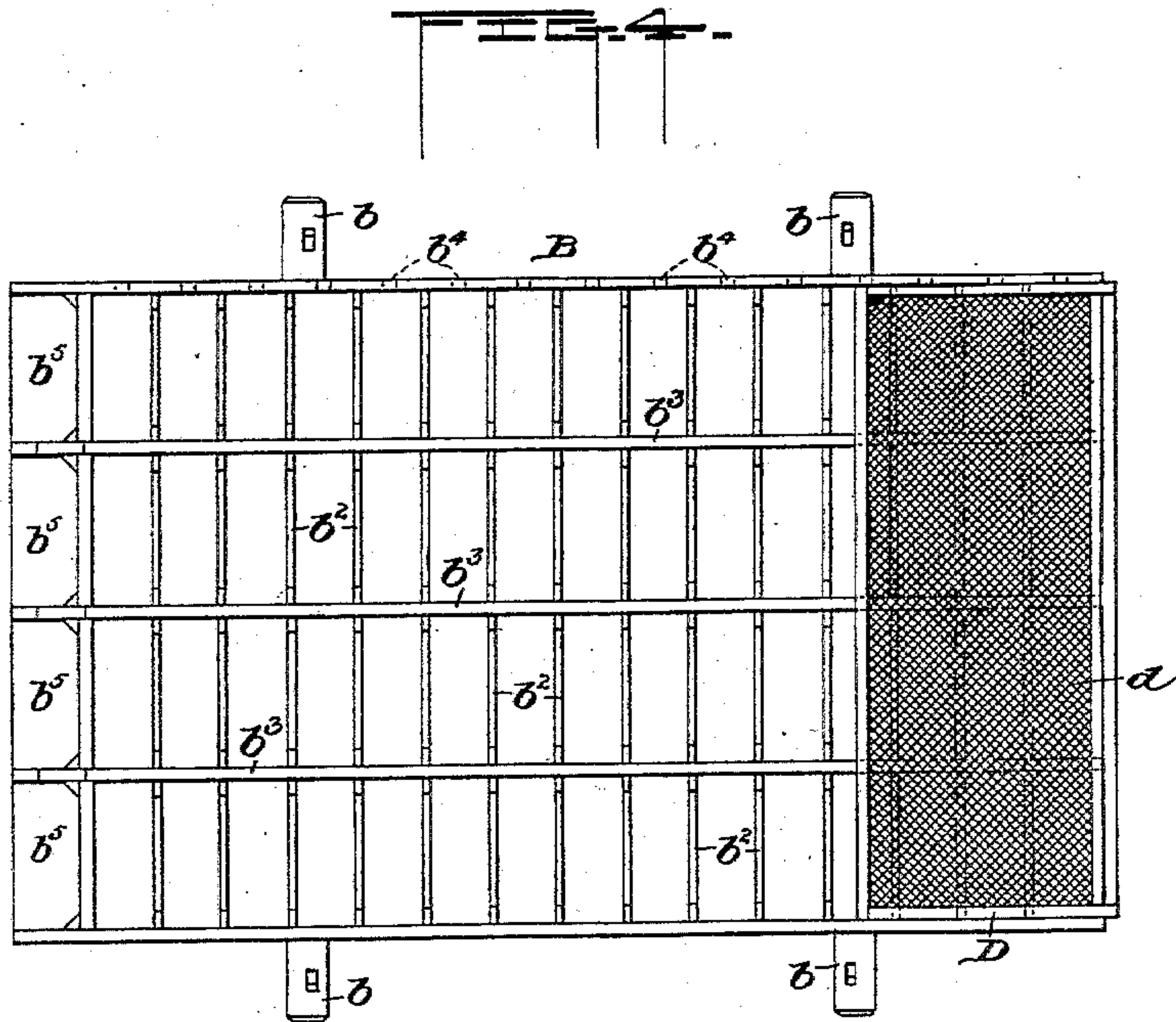
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Witnesses:  
*C. W. Smith*  
*R. H. Elliott*

Inventor:  
*John B. Rossman,*  
by *A. E. Dyrenforth,*  
his Attorney



# UNITED STATES PATENT OFFICE.

JOHN B. ROSSMAN, OF ST. PAUL, MINNESOTA.

## CONCENTRATOR AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 563,806, dated July 14, 1896.

Application filed September 17, 1895. Serial No. 562,785. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN B. ROSSMAN, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Concentrators and Amalgamators; and I 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.

This invention relates to concentrators and amalgamators.

The object is to produce a machine which will, in a ready and comparatively inexpensive manner, effect the separation and saving of gold, platinum, magnetic sand, and other minerals and metals in a finely-divided state; furthermore, to provide for the separation of the metals and minerals into separate heaps or collections—that is to say, to provide means whereby gold will be caught and held in one portion of the machine, platinum at another, rubies at another, and so on.

With these objects in view the invention consists in the novel construction and arrangement of parts of an amalgamator and concentrator, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts, I have illustrated an embodiment of my invention, with a modification thereof, although other forms of embodiment thereof may be employed without departing from the spirit of the invention, and in these drawings—

Figure 1 is a view in side elevation of the complete apparatus. Fig. 2 is an end elevation from the front or right-hand end of Fig. 1. Fig. 3 is a detail sectional view taken on the line *xx*, Fig. 2. Fig. 4 is a detail plan view of the vibratory sluiceway or shaker, showing also the separating-screen at one end thereof; and Fig. 5 is a sectional elevation showing a modified form of amalgamating-chamber.

Referring to the drawings, A designates the frame of the apparatus, consisting of suitable base-pieces, uprights, and top cross-bars, the projecting ends of the latter being

provided with openings through which pass rods *a*, the upper ends of the rods being screw-threaded and provided with hand-wheel nuts *a*<sup>2</sup>. The sluiceway or shaker B is suspended by means of rods *a*<sup>4</sup>, having their lower ends secured to lugs or projections *b* on the shaker, and their upper ends by a pivotal connection *a*<sup>5</sup> to the rods *a*.

Secured to the uprights, forming one side of the frame, are suitable bearings for a shaft C, carrying a driving-pulley *c* and two eccentrics *c*<sup>2</sup>, which, as the shaft is revolved, serve to vibrate the sluiceway B through the medium of pitman-rods *c*<sup>3</sup>, the ends of which are pivotally connected to the under strips of the sluiceway, as shown at *c*<sup>4</sup> in Fig. 2.

The sluiceway or shaker B is composed of a suitable frame having two side walls and one end wall and a smooth bottom of wood or metal. Across the latter, from side to side, there are secured strips *b*<sup>2</sup>, of wood or metal, and longitudinal strips *b*<sup>3</sup>, the two sets of strips dividing the shaker into a number of spaces or pockets, which are shown in this instance as square, but it is to be understood that they may be made of different contours, if desired or expedient. The longitudinal strips *b*<sup>3</sup> are preferably set so as to permit of their being raised, for a purpose that will hereinafter appear. One of the side walls of the shaker is provided with a series of openings *b*<sup>4</sup>, (indicated by dotted circles in Fig. 3,) which openings are plugged when the shaker is in use. In some instances a number of the pockets at the upper end of the shaker may be fitted with boxes of heavy copper and silver amalgam plates, these boxes being of any preferred shape.

At the upper end of the shaker is secured a separator consisting of a frame D, in which is arranged a suitable screen, as indicated at *d* in Figs. 3 and 4, and underneath the screen is a spreader-board *d*<sup>2</sup>, covered with amalgam plates, the screen and spreader-board being inclined, as shown, with the lower edge of the latter extended downward to a position below the operative level of the water when the apparatus is in use.

The operation of this form of apparatus is as follows: The placer material, or the material from the stamp-mill or crushers, is carried by a suitable stream of water and falls



from the sluice-boxes onto the screen  $d$ , which latter removes the sticks, stones, and large gravel, and permits the same to drop over the end of the shaker, which is being vibrated by the eccentrics, the latter being preferably given a speed of from two hundred to three hundred revolutions a minute, or a speed necessary to keep the materials in a perfect state of suspension. The material passing through the screen falls onto the spreader-board and then flows out over the inside surfaces of the shaker, filling the boxes and the spaces thereof. As soon as the spaces are filled the rapid motion of the shaker keeps the water and materials in a constant state of agitation and allows the materials to move freely past each other. The gold, platinum, and magnetic iron being of greater specific gravity than the other minerals, settle to the bottom of the boxes or spaces, and the lighter materials are pressed upward and are carried by the water over the numerous spaces or pockets, and finally pass out at the lower end of the shaker. All the gold that will amalgamate will be found on the plates of the boxes, and that which will not amalgamate, on account of being rusty or greasy, will, in connection with the platinum, be found in the upper boxes or spaces, and will be separated by another process.

When the machine has run until rubies are found in the lower boxes or spaces, the material will be stopped running, and only clear water will be permitted to run until the operation is completed, when it will be found that the magnetic iron with the gold and platinum will be deposited in the upper boxes or spaces, the pure magnetic-iron sand in the spaces in the central portion of the shaker, and the rubies in the lower spaces, thereby effecting the separation of the metals and minerals into separate heaps or collections, as before referred to.

The side of the shaker opposite the plug-holes will now be raised by means of the nuts  $a^2$ , and the longitudinal strips  $b^3$  will be lifted in order to permit the materials in a row of spaces across the shaker to have access to the holes or openings  $b^4$ . The plugs of these openings will then be withdrawn, and the materials in the spaces will be drawn off into suitable boxes for the purpose.

While the terms "upper end" and "lower end" have been used in referring to the shaker, it is to be understood that it may be desirable to have the outlet end as high or even higher than the inflow end, in order that there may always be a sufficient depth of water at the inflow end to insure the lower end of the spread-board being immersed in dead water from two to ten inches or more, thus causing all of the materials to pass through this dead water and thereby reduce the force of the current that might otherwise sweep away the flour or invisible gold. When

the amalgam-boxes have taken up all the gold that they will amalgamate, they will be removed, cleaned, and replaced.

In Fig. 5 I have illustrated a modified form of amalgamator, the remaining portion of the machine being the same as that already described. In this latter construction there is arranged at the front end of the shaker a separator E and an amalgamator, which consists of a chute sloping to one side of the machine and covered on the bottom with a suitable wire-screen to let the sand and materials through. These materials, together with the water, pass over the amalgam plates F and G and over and under the amalgam-plated projections H, I, J, and K and against the top L of the amalgamator and then fall onto the front end of the shaker, where they are treated in the manner already described. In addition to the amalgam-plated projections H, I, J, and K there are a series of inclined plates M, N, O, and P, which also operate to collect the gold held in suspension.

When the material contains a great quantity of gray sand and has but a small quantity of gold in it, it will all first be run through the siphon-amalgamator Q, arranged at the head or above the apparatus. This siphon has its interior covered with amalgam plates, which catch the float-gold, and only the heavier parts of the material will be conveyed to the amalgamator proper, the lighter sand being carried off in the upper part of the stream of water.

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

1. A concentrator and amalgamator having its bottom provided with fixed transverse dividing-strips and removable longitudinal dividing-strips, and openings in a side of the shaker between the transverse strips, substantially as described.

2. A concentrator and amalgamator comprising a frame, adjustable rods  $a$  carried thereby, a shaker B having its bottom provided with fixed transverse dividing-strips  $b^2$ , removable longitudinal strips  $b^3$ , and escape-openings  $b^4$  in the side of the shaker between the transverse strips, rods  $a^4$  secured to the shaker and pivotally connected with the rods  $a$ , a drive-shaft C carrying eccentrics  $c^2$ , pitman-rods connecting the eccentrics and the shaker, a separator D arranged at the inlet end of the apparatus, an inclined screen  $d$  and a spreader-board  $d^2$  arranged therein, and a siphon-amalgamator Q arranged above the separator, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. ROSSMAN.

Witnesses:

H. E. BARKULOO,  
A. P. NELSON.