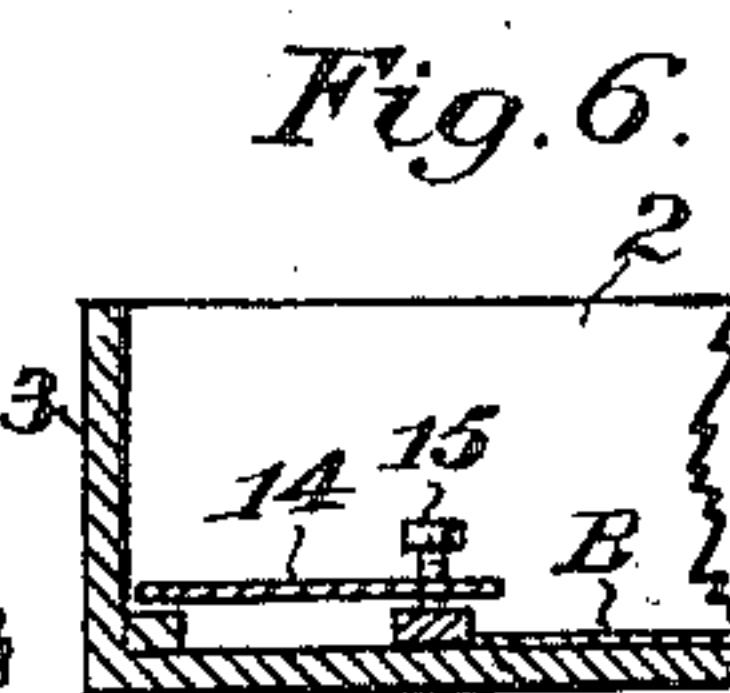
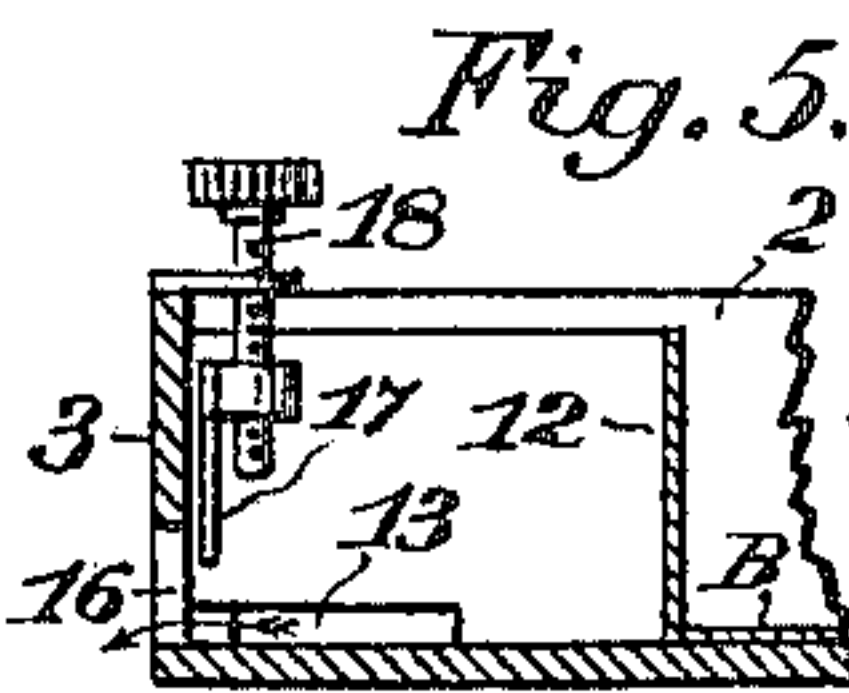
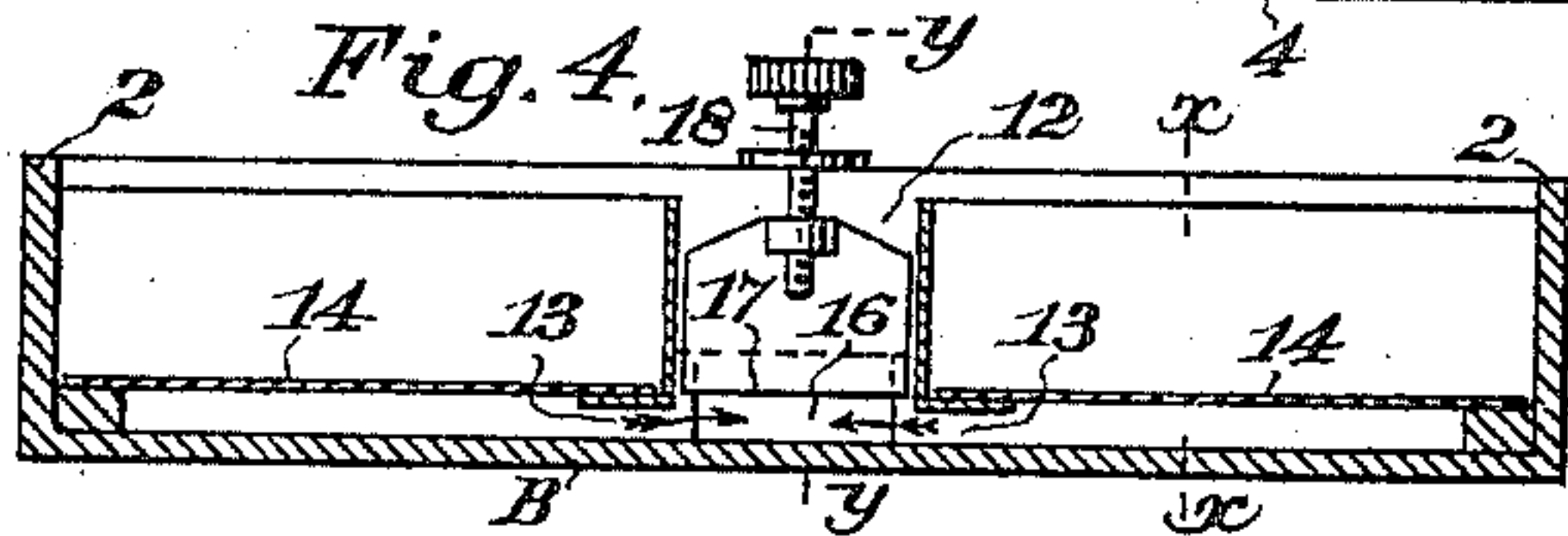
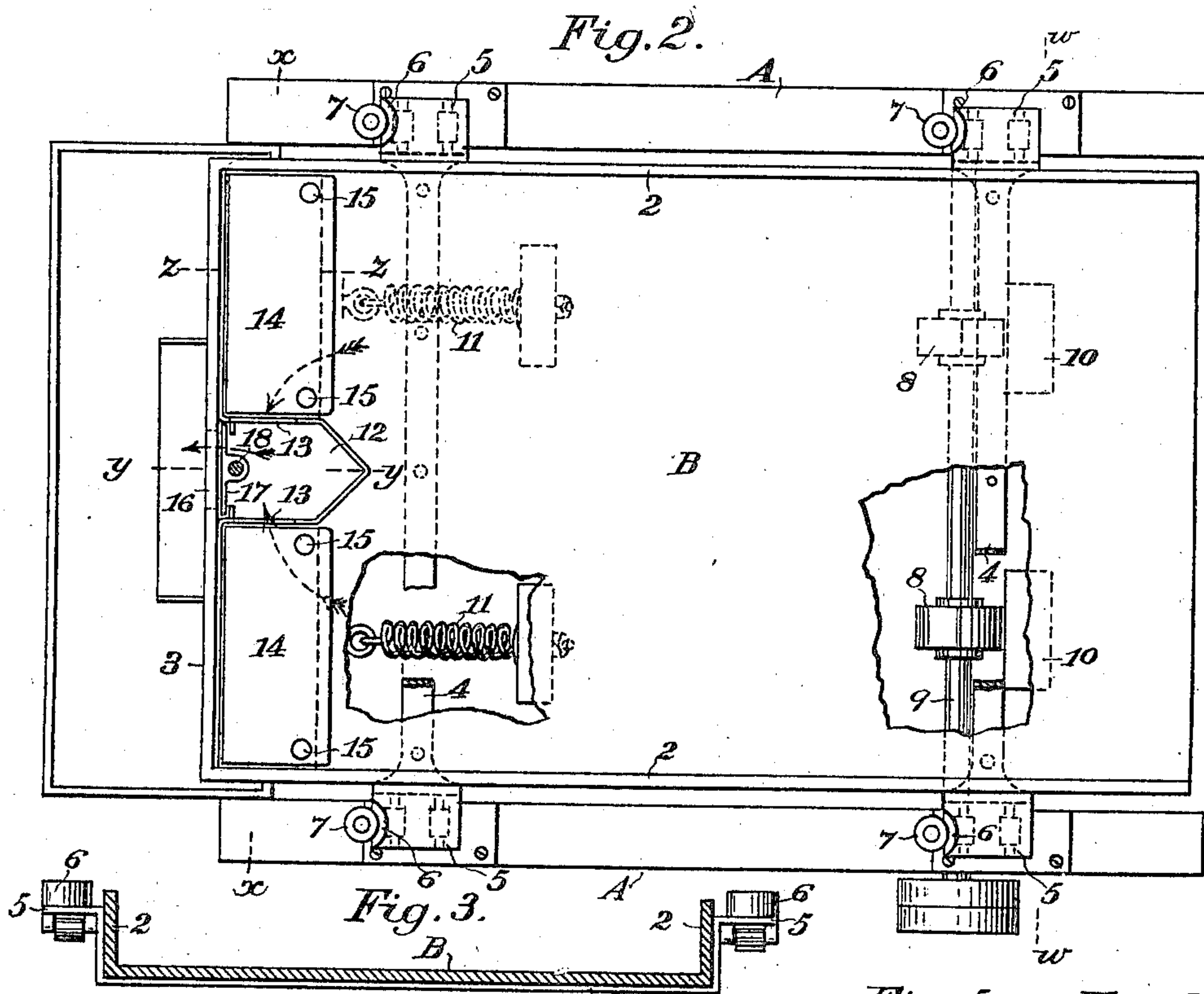
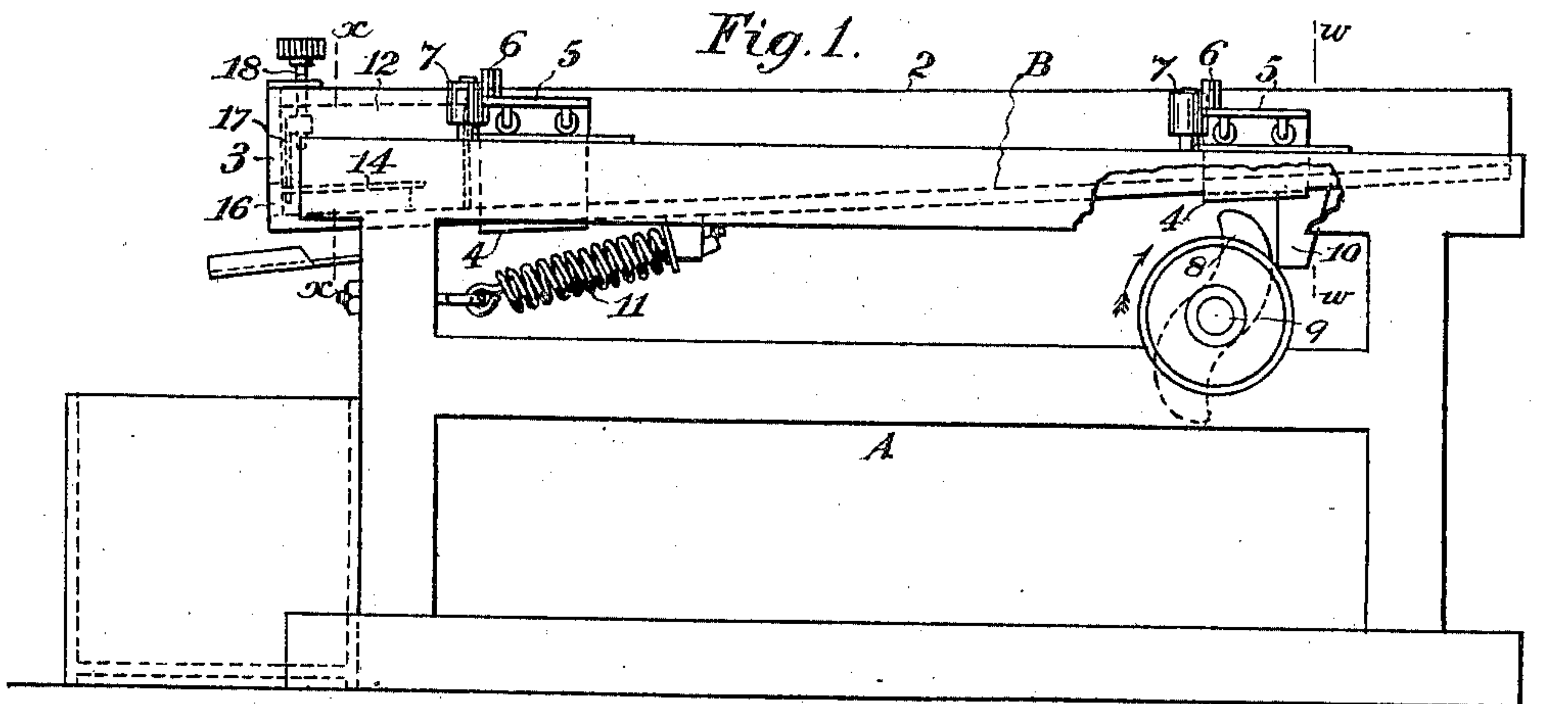


A. B. PAUL.
CONCENTRATOR.

(Application filed Mar. 13, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 680,938, dated August 20, 1901.

Application filed March 13, 1901. Serial No. 50,972. (No model.)

To all whom it may concern:

Be it known that I, ALMARIN B. PAUL, 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 an apparatus which is designed for the concentration of black sands, fine metallic copper, sulfurets, and like heavy and valuable substances, which are associated with lighter and worthless gangue.

It consists of a longitudinally-guided inclined movable table, with means for producing a longitudinal concussive movement, a closure for the lower end of said chamber, one or more compartments formed interior to said closure, with adjustable discharge-gates, slots or channels made in the bottom of said compartments and transversely of the line of movement of the table, and horizontal plates extending upon each side of said slots and adjustable above the bottom of the table.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my invention. Fig. 2 is a plan. Fig. 3 is a transverse section on the line *ww* of Figs. 1 and 2. Fig. 4 is a transverse section on the line *xx* of Fig. 2. Fig. 5 is a longitudinal section on the line *yy* of Fig. 2. Fig. 6 is a longitudinal section on the line *zz* of Fig. 2.

The object of my invention is to provide for a regulated and more accurate concentration of heavy valuable substances by the use of a concussion-table with lateral discharges.

My apparatus may be variously constructed in carrying out the invention. As here illustrated it consists of a framework A, of any suitable form designed to support the working parts of the apparatus.

B is a table having two sides 2 and an end 3. This table is mounted so that the bottom is inclined at angles suitable to material to be concentrated, the lowest portion being adjacent to the closed end 3. The table is supported and guided between the side timbers of the frame A in any suitable manner. I have here shown

it as provided with transverse bars or plates 4, fixed across the bottom, turning up exterior to the sides 2 and having horizontal outwardly-projecting plates or flanges 5. These plates or flanges rest upon the upper surfaces of the horizontal frame-timbers A, and to insure freedom from friction suitable wear-plates, rollers, or other antifrictional supports may be interposed between the flanges 5 and the supporting-timbers. The ends of the flanges 5 which are presented in the direction of the closed end of the table B are preferably provided with vertically-disposed segmental or other suitably-formed plates 6, and these are adapted to contact with elastic buffers 7, fixed upon the frame-timbers, so that when the table is drawn back and impelled forward by the action of a spring or weight these segments 6 will strike the elastic buffers, so as to suddenly arrest the movement of the tables and produce a concussive movement thereof, which tends to carry the material upon the table-surface toward the lower closed end. The upward bend of the plates 4 and the flanges 5 resting upon the frame-timbers serve as guides to keep the table in position and insure its longitudinal movement while being operated.

I have here shown a means for retracting the table consisting of cams 8, mounted upon a shaft 9, beneath the table, and this shaft is driven by any suitable motor connection. Beneath the table are blocks or tappets 10, against which the points of the cams impinge when they are rotated, so as to withdraw the table until the points of the cams pass the tappets and release them.

Springs 11 of any suitable form or construction connect the table with some stationary part of the frame, and these springs are extended or compressed, as the case may be, by the withdrawal of the table, and when the cams release the tappets the springs act to move the table forward until the segments 6 strike the cushion 7 and arrest the table with an abrupt stoppage. These cushions or stops may be placed at any relative position with relation to the table. I have preferred to make a number of them, the number in the present case being four and located two upon each side of the table and with such relation to the

flanges and stop-plate that the latter come in contact with all of the stops simultaneously. The closed end of the table is provided with one or more chambers 12, the number of these chambers depending upon the width of the table. In the present case I have shown a single centrally-located chamber, the sides of which are high enough to prevent any flow over the top and curved or angular front. This chamber is made with the sides parallel with the sides 2 of the table, and through the bottom of these sides slots 13 are made. Extending transversely in each direction from the sides of the chamber and located above the slots are plates 14, which cover or inclose the lower end of the table, extending above the slots 13, as shown, and a little wider than the length of openings 13. These plates may be made vertically adjustable by means of screws or other devices, as at 15. They may be made from copper or other amalgamated or silver-coated metal, and the bottom of the table, when desired, may be similarly plated for the purpose of saving any mercury or metal which is capable of being amalgamated. The front openings beneath these plates 14 are closable at first until concentrates have sufficiently accumulated.

The chamber 12 is provided with an outlet slot or channel 16, which is controlled by a gate 17, operated by a screw 18 or equivalent controlling device, by which the opening of the gate may be accurately controlled.

Means are provided for delivering the pulp or material to be separated upon the table-surface with a suitable amount of water, and the cam-shaft being set in operation the table is caused to reciprocate with the concussive motion previously described. This action causes a precipitation and movement of all the particles toward the closed lower end of the table, while the water and lighter slimes will continually flow off over the upper and open end to any suitable point of discharge. The spaces below fronts of plates 14 are at first closed and the sulfurets, black sand, fine copper, or other heavy material will soon rise to the surface of the plates 14 and rising above will deposit upon the upper surfaces of said plates. After the table has been run upon any lot of material for a certain length of time it can be determined how fast the concentrates are accumulating. The spaces below plate 14 are then opened, and the gate 17 is also opened, so that the concentrates will gradually pass through the spaces beneath the plates 14 and the slots 13 in the sides of the chamber 12 and into its interior, thence discharging through the discharge-passage 16. By inspection and regulating the opening of the gate 17 a mass of concentrates sufficient to just cover the tops of the plates 14 can be always maintained in the spaces beneath the plates at the lower end of the table, and the discharge through the slots 13 at right angles with the line of movement of the table will be even and gradual,

this transverse line of discharge in connection with chamber 12 being an especial feature of my apparatus.

The size of openings or slots in the sides of the chamber should be a fraction larger than the screen-openings through which the material is passed when being reduced, and the apparatus will pass the concentrates, whether fine or coarse, in a very clean condition.

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

1. In a concentrating apparatus, the combination of an inclined table having the lower end and sides closed, one or more closed chambers formed at the closed end of the table with a discharge therefrom through said end, slots formed in the sides of said chamber parallel with the sides of the table, plates extending between the sides of the chamber and the sides of the table and covering said slots, and a means for producing a longitudinal concussive movement of the table.

2. In a concentrating apparatus, the combination of an inclined table having closed ends and sides, one or more chambers formed in the lower end with the sides parallel with the sides of the table, a discharge-slot from said chamber through the end of the table, and a gate by which said slot is controlled, slots made in the lower sides of the chamber, transverse to the line of movement of the table, plates extending between the sides of the chamber and the sides of the table above the slots, means for adjusting said plates and means for producing a longitudinal concussive movement of the table.

3. The combination in a concentrating apparatus of a longitudinally-movable table having inclined bottom, closed sides and lower end, with one or more chambers located at the lower end having controlled discharge-opening and slots opening into the lower part transversely of the line of movement of the table, plates above said slots, extending from the sides of the chamber to the sides of the table, a frame composed of longitudinal side timbers between which the table is suspended, plates projecting from the table above the frame-timbers having contact-surfaces formed upon the front ends, elastic buffers fixed upon the frame-timbers in the line of movement of the plates, and means for retracting the table and moving it suddenly forward, so that it will produce a concussive movement between the contact-plates and the buffers.

4. The combination in a concentrator of a longitudinally-movable inclined table closed at the sides and lower end having a chamber with slotted sides and controlled discharge-opening, plates covering the side slots of the chamber, straps or plates extending across the bottom of the table and upturned at the sides of the table with projecting flanges, a frame upon which said flanges are movable and by which the table is guided, elastic buf-

5 fers fixed upon the frame in the line of travel of the plates, and contact segments or surfaces carried by the plates adapted to strike the buffers, retracting-cams, tappets or blocks upon the table against which they act and springs by which the table is given a sudden forward movement when the cams release it.

10 5. The combination in a concentrator of an inclined longitudinally-reciprocating concussion-table, having closed sides and lower end, a closed chamber at said end, with a discharge and a controlling-gate therefor, inlet-openings on the sides of the chamber at right

angles with the line of oscillation of the table, plates of greater width than the length 15 of said openings extending above them to the sides of the table, and means for adjusting and closing the admission-spaces beneath said plates.

In witness whereof I have hereunto set my 20 hand.

ALMARIN B. PAUL.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.