

(No Model.)

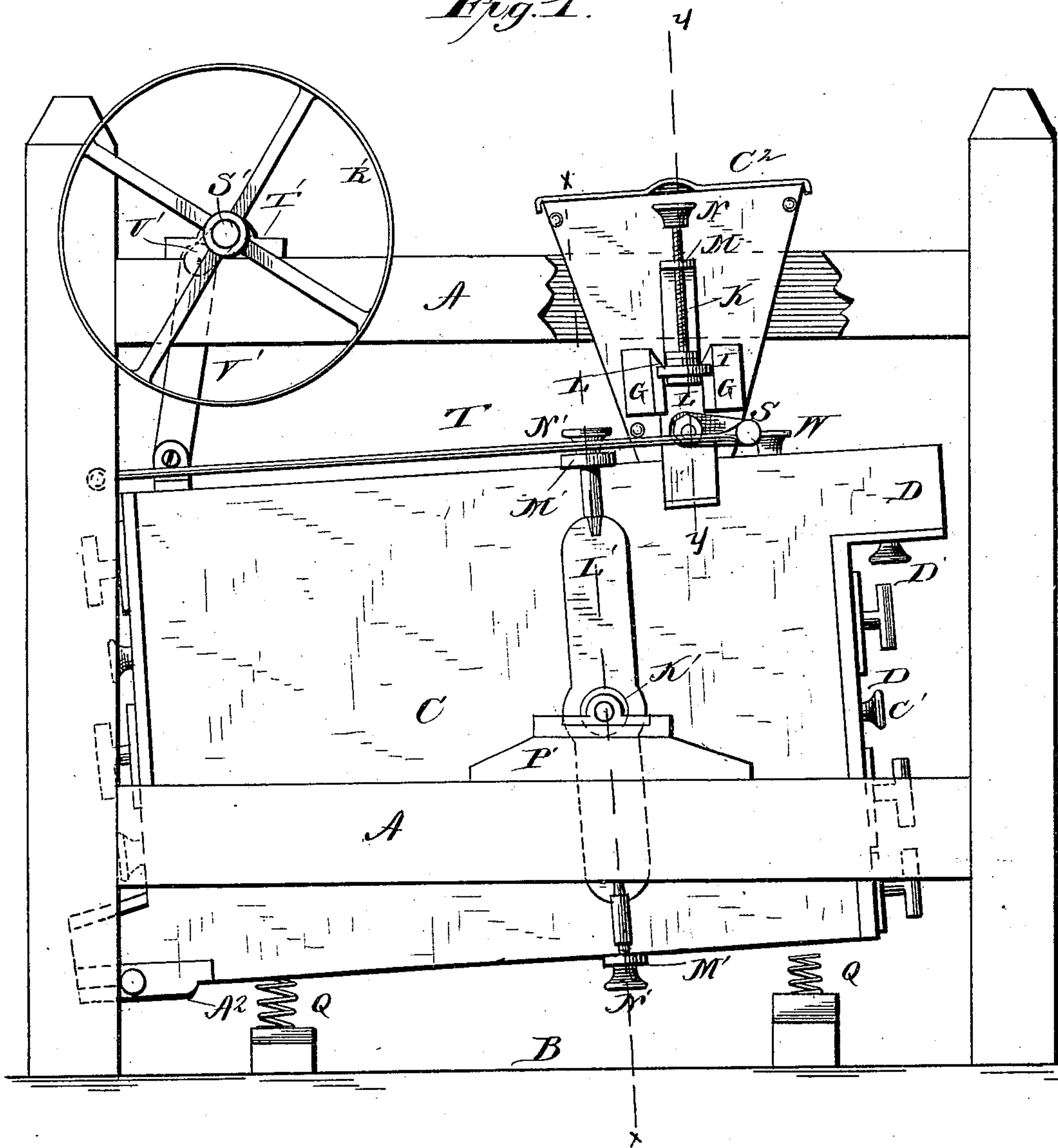
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G. HALL.

Machine for Separating Precious Metals from their Ores.
No. 234,565.

Patented Nov. 16, 1880.

Fig. 1.



Witnesses.

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(No Model.)

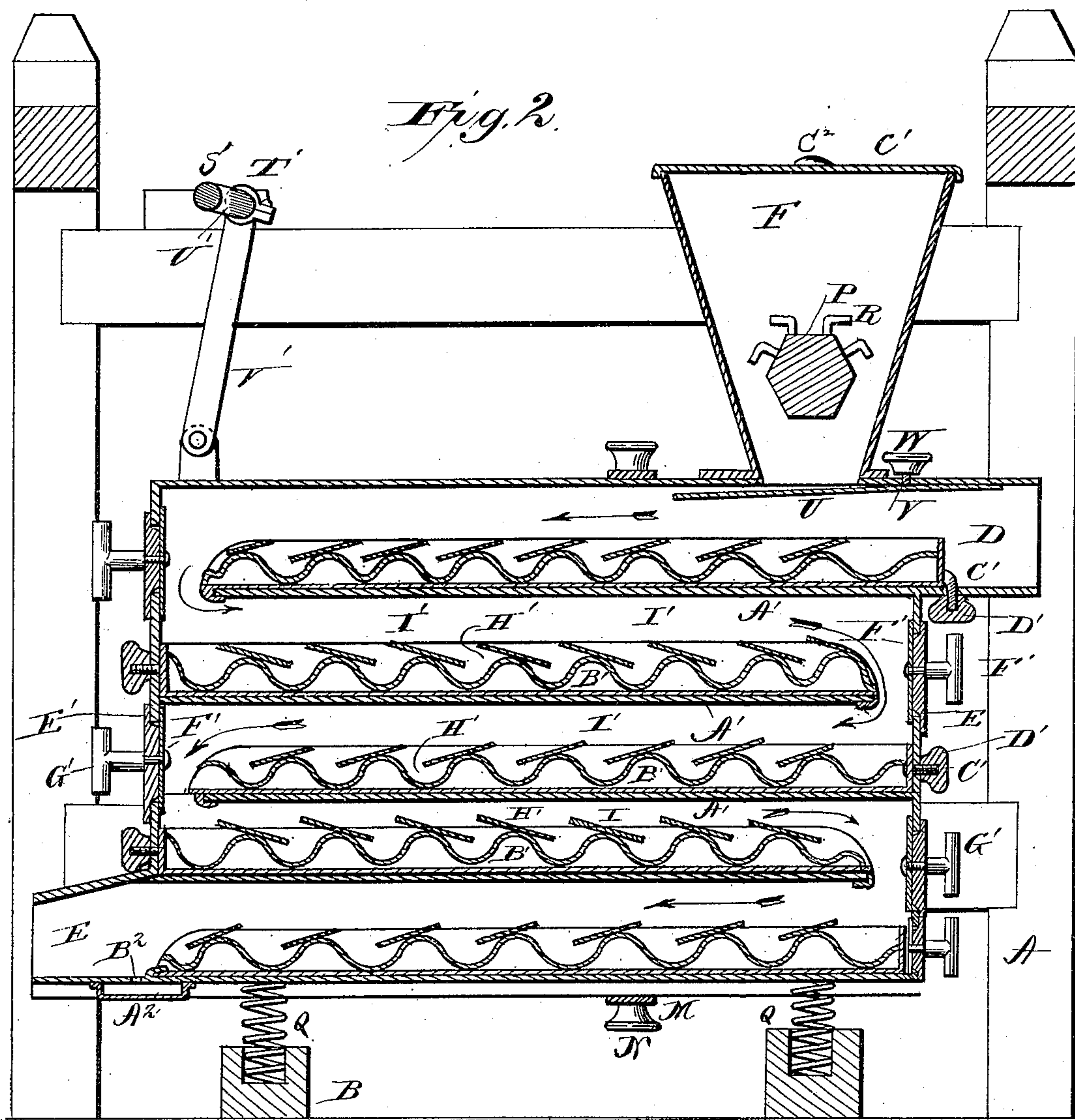
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No. 234,565.

Patented Nov. 16, 1880.



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(No Model.)

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Fig. 3.

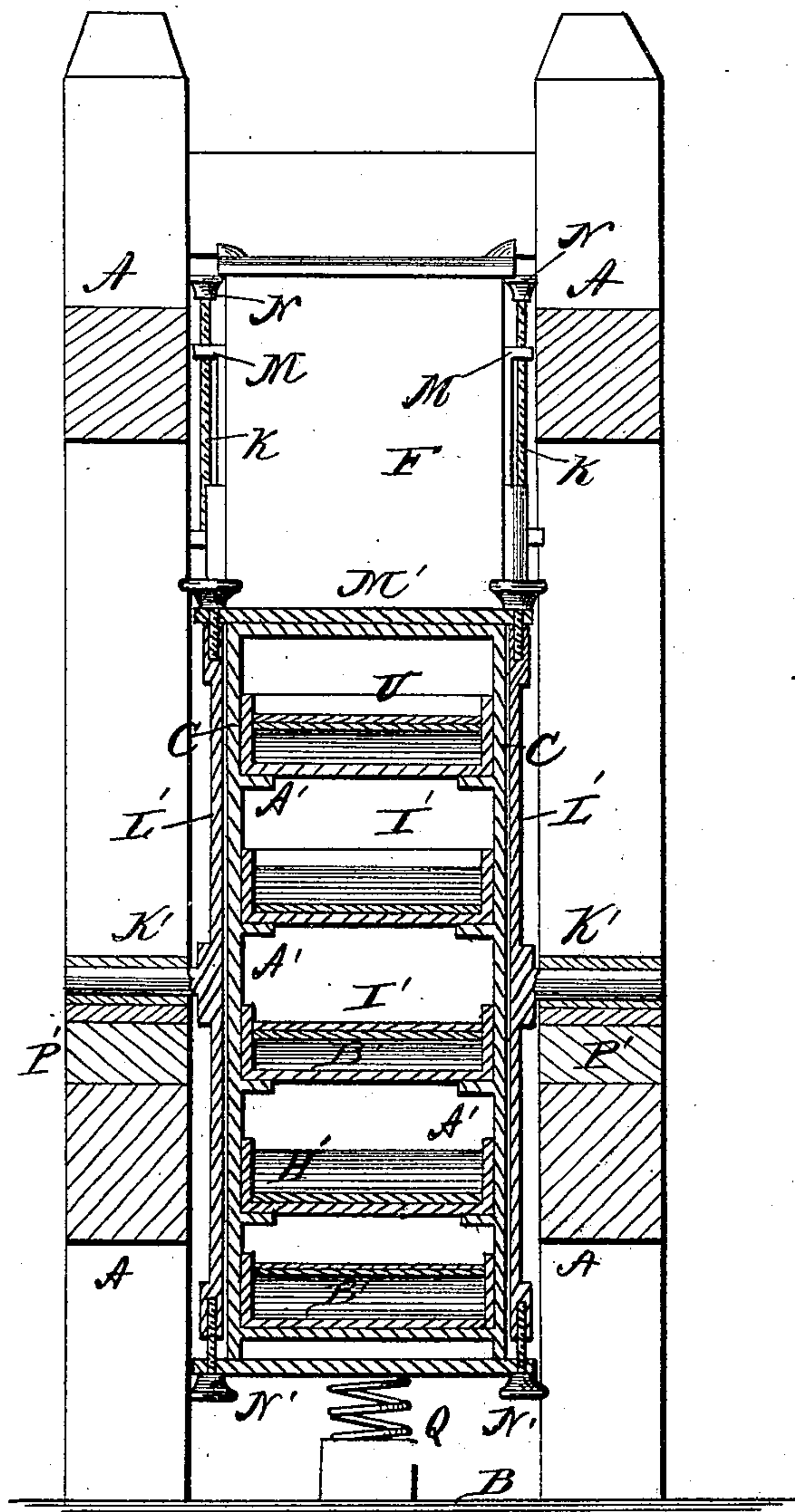
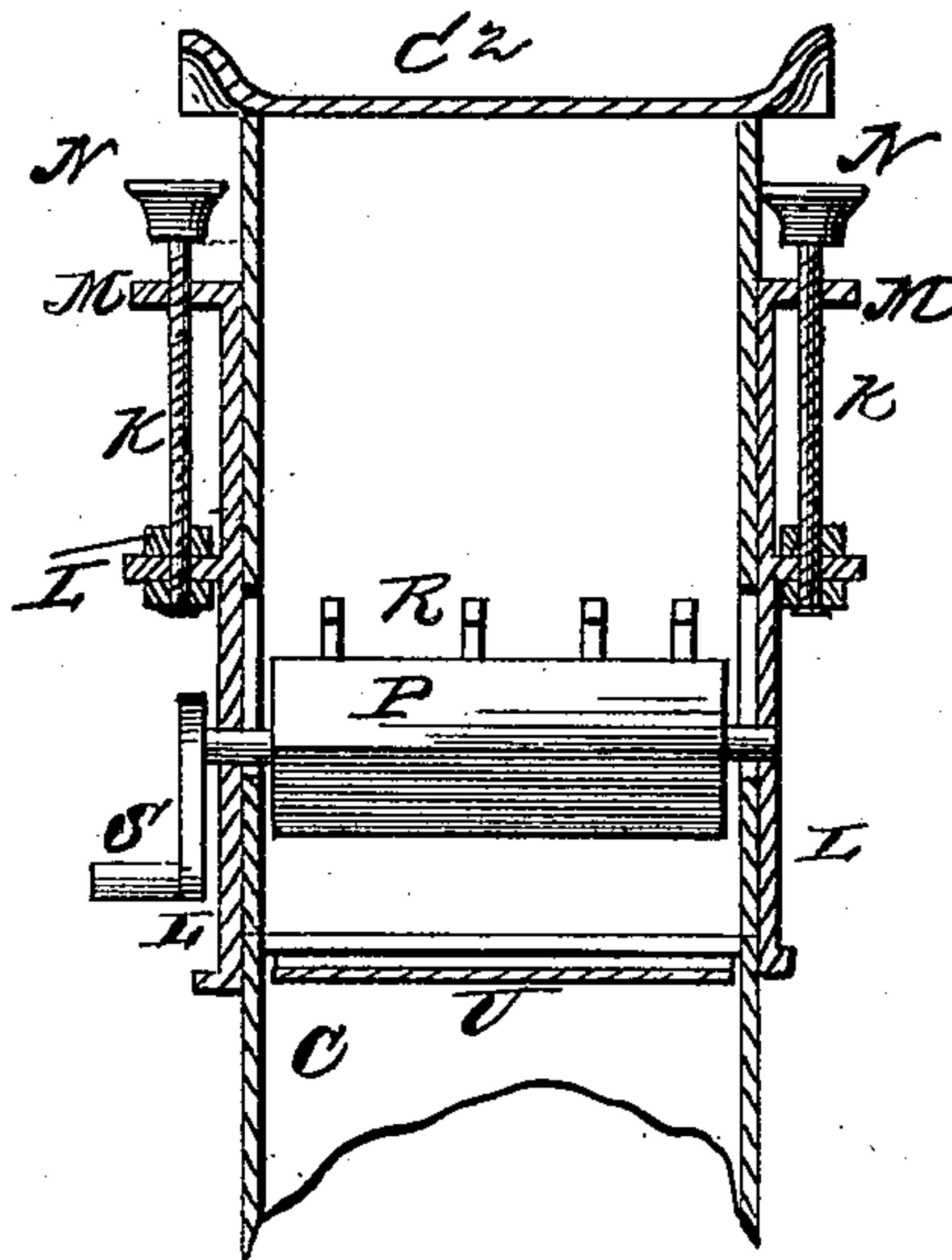


Fig. 4.



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UNITED STATES PATENT OFFICE.

GILES HALL, OF EAST ST. LOUIS, ILLINOIS.

MACHINE FOR SEPARATING PRECIOUS METALS FROM THEIR ORES.

SPECIFICATION forming part of Letters Patent No. 234,565, dated November 16, 1880.

Application filed August 3, 1880. (No model.)

To all whom it may concern:

Be it known that I, GILES HALL, of East St. Louis, in the county of St. Clair, and in the State of Illinois, have invented certain new and useful Improvements in Machines for Extracting Gold and other Metals from Auriferous Deposits; and I do hereby that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to certain improvements in machines for extracting the precious metals from auriferous and argentiferous ores, gravel, sand, or other deposits or tailings; and it is particularly designed to furnish an apparatus whereby such extraction may be thoroughly effected by means of a pressure-blast of air or compressed air in connection with suitable chemicals, although the apparatus may be employed with advantage in connection with hydraulic pressure.

The invention further has for its objects to provide an apparatus which shall be simple in construction, so that it can be readily taken apart and conveniently packed for transportation and expeditiously put together when required for use, and by means of which the finest particles of gold, silver, or other metals may be separated from foreign substances and concentrated, as more fully hereinafter specified.

These objects I attain by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved machine complete; Fig. 2, a longitudinal vertical section thereof. Fig. 3 represents a transverse vertical section of the machine, taken through the trunnions; and Fig. 4, a transverse vertical section taken through the hopper.

The letter A indicates the frame which supports the various working parts of my machine, constructed of wood or other material, and mounted on a suitable base, B.

The letter C indicates the separating and concentrating chamber of the apparatus, consisting of a box or casing in the shape of a hollow rectangular prism, constructed of metal. The said box or casing is preferably formed in one piece, of cast metal, although it may be

constructed in separate parts of any other suitable material, secured together in any suitable manner. The said casing is provided at the upper corner, at one end, with a hollow extension, D, open at its end, and may be connected with a blower or other air or hydraulic pressure supply by means of a flexible tube. At the lower corner, at the opposite end of the box or casing, is an eduction or escape opening, E.

The letter F indicates the feed-hopper, secured to the upper part of the casing and opening into the same. The walls of the hopper are slotted vertically on opposite sides, and on the outside are provided with guides or ways G, in which are located and adapted to be moved back and forth the adjustable slides H, which are provided with horizontal extensions I, each having an aperture, through which the lower end of an adjusting-screw, K, passes, the said screw being provided with confining-collars L, and its threaded portion passing through threaded apertures in the studs M, secured to the hopper in such manner that the slides can be adjusted vertically by turning the screws, which are provided with heads N for the purpose.

The letter P indicates a transverse shaft, journaled in bearings in said slides and provided with a series of bent arms or agitators, R, as shown in Fig. 2 of the drawings. The shaft, at one end, is provided with a crank, S, to which is secured one end of a rod, T, the other being secured to the frame A at one side, for the purpose more fully hereinafter explained.

The letter U indicates a throttle-valve, consisting of a plate of spring metal secured to the side of the casing just below the entrance from the hopper, so as to automatically close the opening against the escape of air, but at the same time admit the ore from the hopper, as more fully specified hereinafter. The said valve is provided with a screw-threaded projection or pin, V, which extends through an opening in the top of the casing and is provided with a set-screw or nut, W, by means of which the tension of the valve may be adjusted. The opposite sides of the casing on the inside are provided with a series of parallel cleats, A', of any suitable number, four on

each side being represented in the present instance. These cleats form supports for the pans B', a pan being also supported on the bottom of the casing. The pans are removable, and when in position are secured alternately to opposite ends of the casing by means of the threaded pins C', which pass through suitable openings in the ends of the casing, and are provided with binding-nuts D', by which they are held in place. The ends of the casing are provided with alternating openings E', through which the pans are inserted, the said openings being provided with flanged air-tight doors provided with suitable packing, and with clamping cross-bars F', secured to the ends of the pivoted handles G', by means of which said doors may be clamped in place. The pans are each provided with a series of pockets, H', and to the upper edges of the pockets are secured the irritating-plates I', the plates being inclined in the direction of the draft through the machine, which is alternately in opposite directions over the pans, as indicated by the arrows. The plates serve to retain the chemicals employed in the pockets and to direct the air into the same, so as to agitate the contents thoroughly in thin passage through the apparatus.

The casing C is supported on journals K'. In order that said casing may be accurately balanced and that it may be readily taken apart and removed from the frame for transportation, the journals are secured to the vertical metallic strips or straps L', which embrace the sides of the casing and are confined to the said casing adjustably by means of the upper and lower cross-pieces, M', which are secured to the respective straps or strips by means of the screw-nuts N'. The journals have their bearings in suitable boxes P', secured to the frame A.

The casing is adapted to oscillate on the journals, and below each end of said casing is located an elastic bumper, Q, consisting of spiral springs in the present instance, against which the casing abuts as it oscillates, to prevent any excessive shock.

The letter R' indicates the driving-pulley of the machine, mounted on a transverse driving-shaft, S', journaled in bearings T', secured to the frame on opposite sides. The said shaft is provided with a crank, U', which connects with one end of the casing by a pivoted connecting-rod, V', whereby an oscillating motion may be imparted to the casing through the medium of any suitable driving power.

The letter A² indicates a drawer located below the delivery end of the casing, and B² a series of apertures, through which any of the chemicals which may by accident be dislodged from the pockets will be caught and collected in the drawer below.

The hopper is provided with a hinged cover, C², by means of which it can be closed to prevent the ore from being blown out when it is desired to clear the hopper or toward the end

of the operation, when the hopper is nearly empty.

The operation of my improved apparatus will be readily understood in connection with the above description, and is as follows: Two sets of pans are employed, one set being placed in the machine while in operation, the other set being held in reserve to take the place of the first-mentioned set when the same have to be removed to discharge the mercury or chemicals and extracted metals. The pans being properly charged with chemicals and secured in the machine, the doors are properly closed, making the machine air-tight, except at the induction and eduction air-openings. The ore, which may be in the form of gravel, sand, placer ore, or other natural deposits or tailings, is fed into the hopper, the casing being oscillated by rotating the driving-shaft. The ore, by means of the agitating-shaft and its arms, is fed from the hopper in a finely-divided condition into one end of the upper pan. Here it meets with the incoming draft of air from the blowing-machine and is carried in the direction of the arrows by the draft of air, which, meeting with the irritating-plates, is by them, together with the ore, directed into the pockets containing the mercury or chemicals, violently agitating the same and forcing the ore into intimate contact therewith. The ore, after being thoroughly deprived of the precious metals, escapes through the eduction-opening at the lower corner of the machine.

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

1. The combination, in a machine for separating precious metals from ores by means of a forced blast, of a series of pans provided with pockets for containing chemicals and irritating-plates, whereby the ores are intimately mixed with the chemicals by means of a forced blast or pressure of air, substantially as herein specified.

2. In combination with the oscillating casing provided with a series of pockets and inclined plates, as described, the hopper and agitating shaft and arms, with mechanism for operating the same by the movement of the casing, substantially as and for the purposes specified.

3. In combination with the feed-hopper and casing, the throttle-valve and its tension-adjusting mechanism, substantially as specified.

4. In combination with the removable pans, the supporting-cleats, and threaded pins and nuts for securing the pans alternately to opposite ends of the casing, substantially as specified.

5. In combination with the casing and the pans located therein, the doors arranged alternately at opposite ends of the casing, whereby provision is made for the insertion of the pans and for closing the casing to make the same air-tight, substantially as specified.

6. In combination with the casing, the pans

provided with pockets and irritating-plates, and the mechanism for oscillating the casing, the bumpers for relieving the casing of excessive shock, substantially as specified.

5 7. In combination with the casing and the pans, the drawer located below the eduction-passage of the casing and apertures in said casing, whereby any chemicals accidentally dislodged from the pockets may be collected
10 and saved, substantially as specified.

8. The combination of the hopper and its adjustable feed-shaft and actuating mechanism, the casing provided with a series of pans

provided with pockets and irritating-plates, and the mechanism for oscillating the casing, 15 the alternating doors and their air-tight covers, and the bumpers against which the casing abuts as it oscillates, all substantially as herein shown and described.

In testimony that I claim the foregoing I 20 have hereunto set my hand this 27th day of July, 1880.

GILES HALL.

Witnesses:

GEO. W. DAUSET,
M. MILLARD.