

No. 703,084.

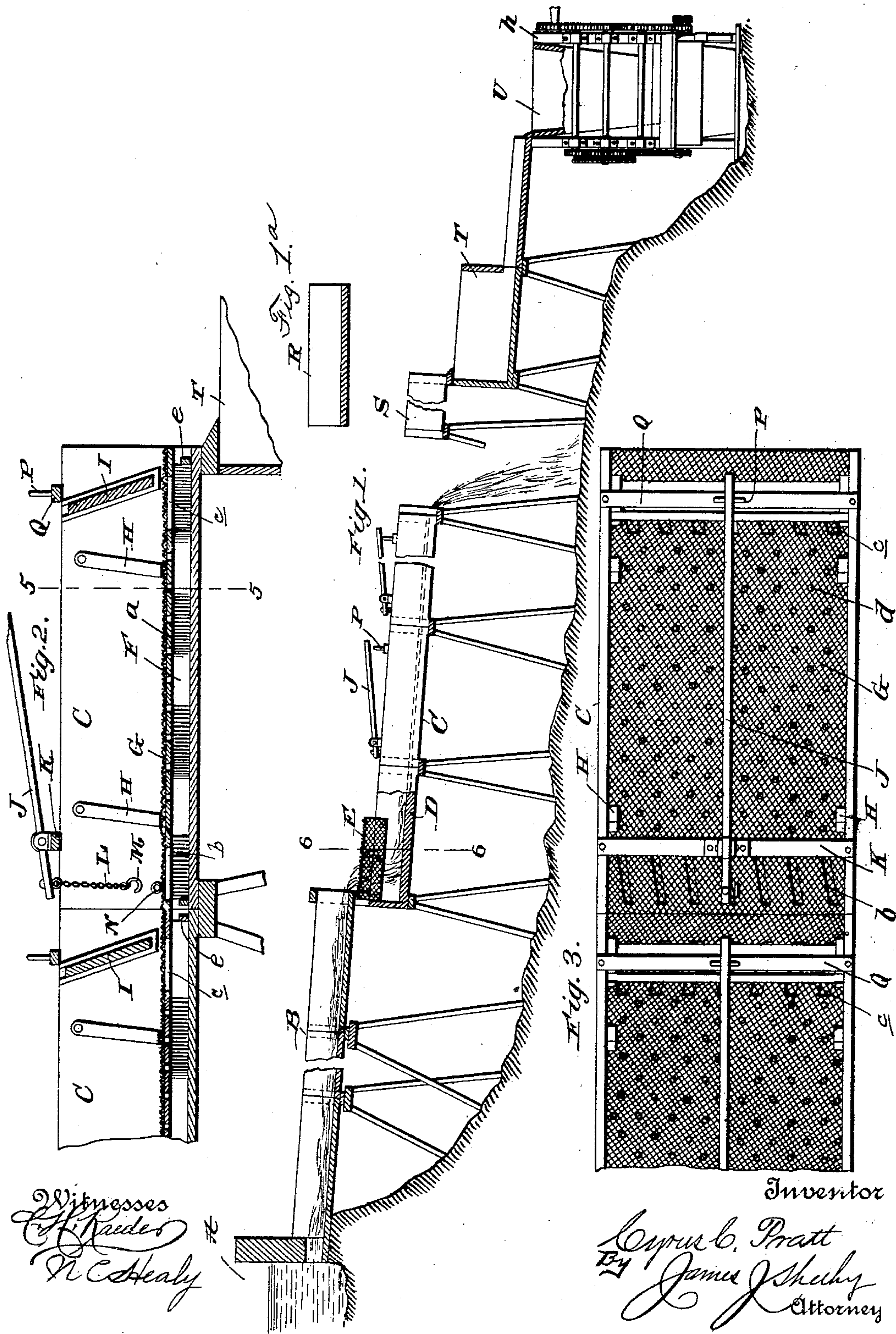
Patented June 24, 1902.

C. C. PRATT.
ORE SEPARATOR.

(Application filed June 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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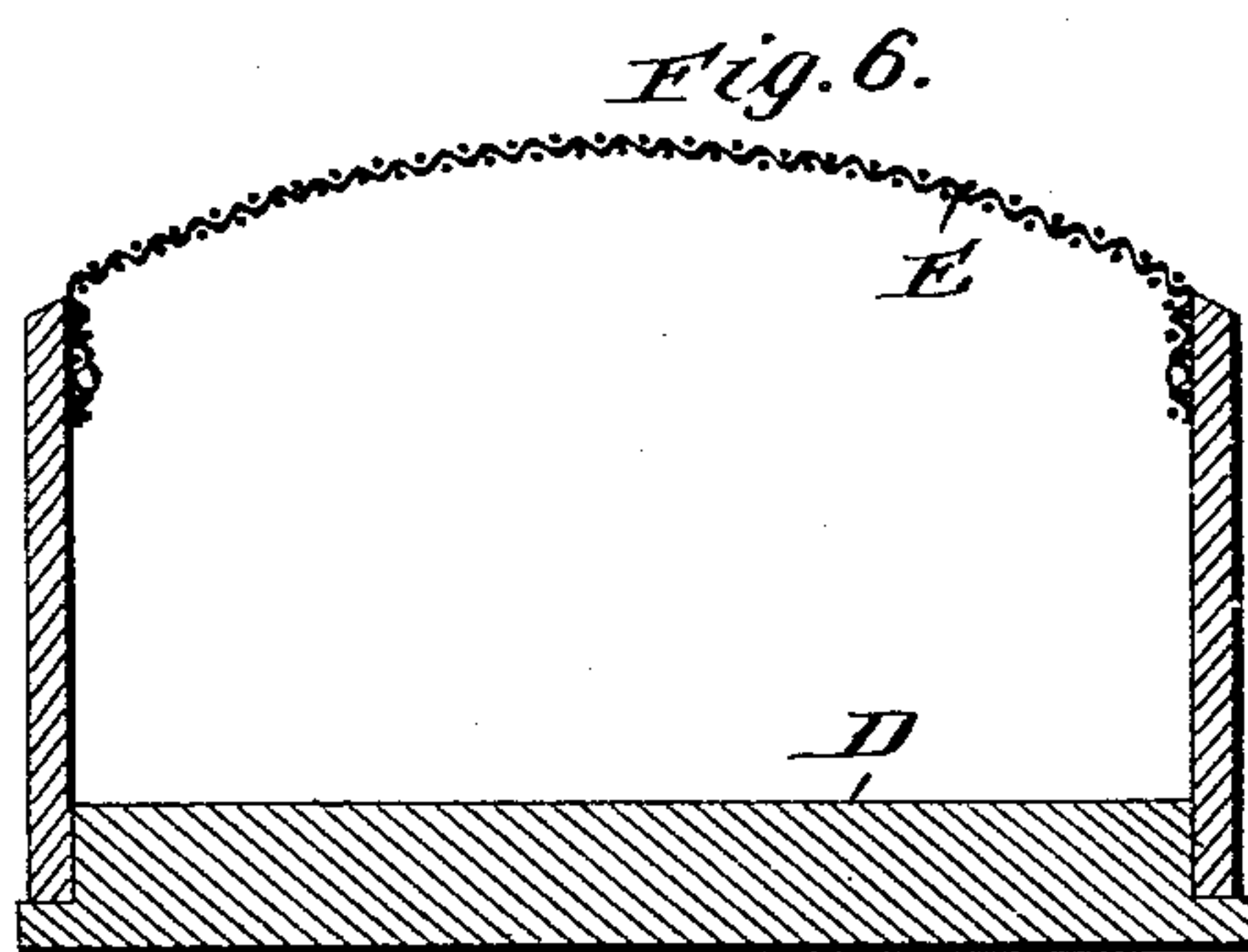
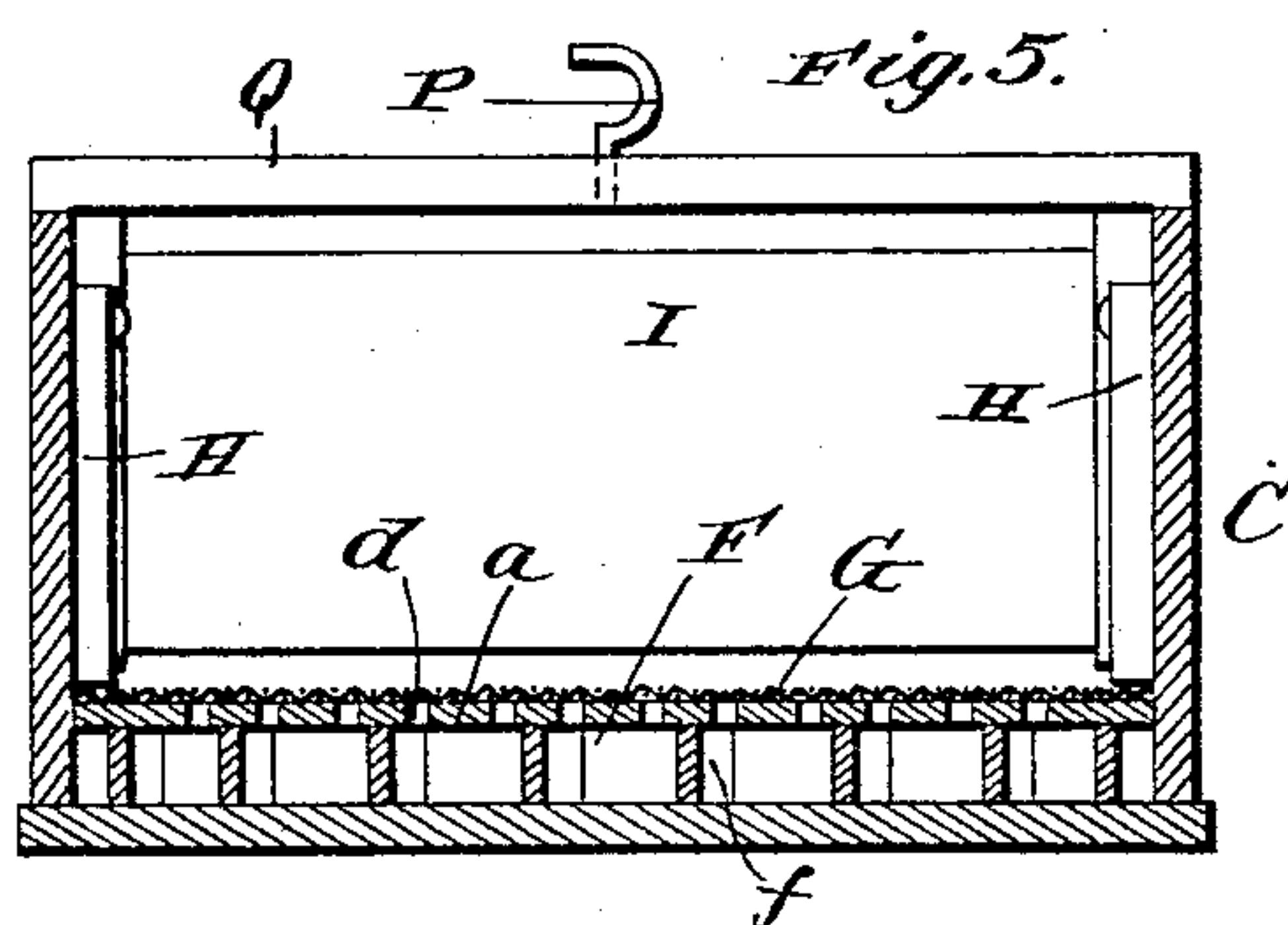
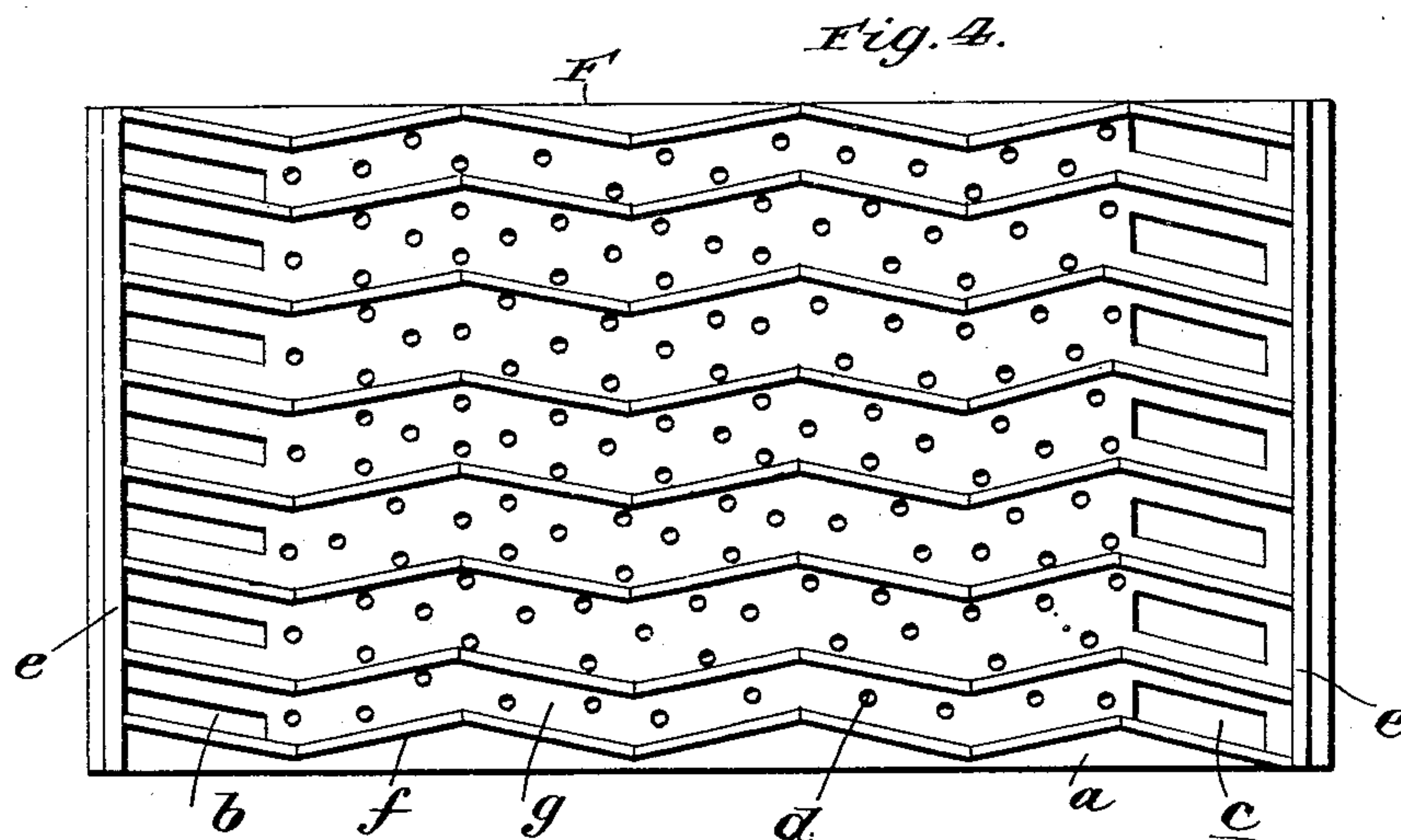
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(Application filed June 18, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

CYRUS C. PRATT, OF PORTLAND, OREGON, ASSIGNOR OF ONE-HALF TO
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ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 703,084, dated June 24, 1902.

Application filed June 18, 1901. Serial No. 65,041. (No model.)

To all whom it may concern:

Be it known that I, CYRUS C. PRATT, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Ore-Separators, of which the following is a specification.

My invention relates to apparatus for washing ores and separating precious metals therefrom; and it has for its general object to provide an apparatus calculated to automatically separate gold, silver, lead, zinc, and other precious metals from pulverized ore, gravel, loam, or the like, the said apparatus being highly efficient in practice and requiring but a minimum amount of attention incident to the separation of the precious metals from the ore, gravel, or loam and but a minimum amount of effort on the part of the attendant or attendants incident to the "cleaning up" of the riffle-sluiice.

With the foregoing in mind the invention will be fully understood from the following description and claims, when taken in conjunction with the accompanying drawings, in which—

Figure 1 is a view of my improved apparatus with some of the parts partly in side elevation and partly in vertical section and also with a machine for collecting the precious metals from fine sand, concentrates, and the like shown as disconnected from the riffle-sluiice. Fig. 1^a is a view of a box which is interposed between the discharge end of the riffle-sluiice and a sluiice leading to the tank arranged to discharge into the hopper of a separating machine or vanner precedent to the cleaning up of the sluiice. Fig. 2 is a longitudinal vertical section of a portion of the riffle-sluiice with the riffles in their proper operative positions. Fig. 3 is a plan view of the same. Fig. 4 is an inverted plan view of one of the riffles. Fig. 5 is a transverse section of the riffle-sluiice, taken on the line 5 5 of Fig. 2. Fig. 6 is a transverse section of the apparatus, taken on the line 6 6 of Fig. 1 and illustrating the screen for separating rock and coarse gravel from the smaller portions and preventing the former from entering the riffle-sluiice.

Similar letters of reference designate cor-

responding parts in all of the several views of the drawings.

A is a source of water-supply, which may be a reservoir, a dammed stream, or the like. 55

B is a sluiice or trough mounted on suitable supports and connected with the source of supply.

C is the riffle-sluiice, which is also mounted on suitable supports, and D is a box interposed between the riffle-sluiice and the sluiice or trough B and disposed below the lower end of the latter, so as to receive therefrom. The box D is provided, as best shown in Figs. 1 and 6, with an arched screen E, which serves 65 as a grizzly—that is to say, separates large rock and coarse gravel from the smaller portions of the pulp and prevents the former from reaching the riffle-sluiice. Such rock and coarse gravel are discharged from the screen E at the opposite sides of the box, 70 while the water, precious metals, and comparatively fine particles of ore or the like pass through the screen and into the box D.

The riffle-sluiice C is preferably composed 75 of a plurality of trough-like boxes arranged end to end, and since the said sluiice may be of any desired length it is obvious that any suitable number of boxes may be employed. In the said sluiice are arranged a plurality of 80 riffles F, disposed end to end, and when the sluiice is formed by boxes, as stated, I prefer to employ a riffle in each box, as illustrated in Figs. 2 and 3. The riffles respectively comprise a board *a*, having oblique slots *b* 85 adjacent to one end and oblique slots *c* of a slightly greater width than the slots *b* arranged adjacent to its opposite and lower end and also having comparatively small apertures *d* intermediate of the slots *b* *c*, transverse strips *e*, depending from the board at the ends thereof, and zigzag walls *f*, depending from the board intermediate of the transverse strips *e* and forming tortuous longitudinal channels *g* in communication with the 95 slots *b* and *c* and also with the apertures *d*. Over each of the riffles F is arranged a fine-mesh screen G, which corresponds in area to the board *a* of the riffle and is suitably connected to said board. 100

By virtue of the construction thus far described it will be seen that when ore, sand,

loam, or the like is shoveled or otherwise discharged into the sluice or trough B it will be carried down the latter by the head of water and discharged on the grizzly or screen E, which will throw rock and large pebbles out of the apparatus, while permitting the water, precious metals, and small particles of foreign substance to pass down into the box D. From the said box the water, fine sand and the like, and precious metals pass through the riffle-sluice, when by reason of the screens G on the riffles a large percentage of the small gravel will be prevented from gaining access to and clogging the perforations *d* in the riffle-boards, thus insuring the rapid flow of water through the apertures *d* and slots *b c* of the board into the channels *g* beneath the same and through the said channels. The rapid flow of water through the channels *g* of the riffles serves, in conjunction with the zigzag walls of said channels, to create eddies, and thereby effects the precipitation of the precious metals. The slots *b c* and apertures *d* in the boards of the riffles permit the free flow of water into and out of the zigzag channels *g*, while the screens G, which practically constitute a continuation of the screen E and form a part of the grizzly, serve, as before stated, to prevent sand or particles of ore or loam from clogging the said apertures or slots. The screens G also serve to cause the fine particles carrying precious metals to drag along over the riffles, so that when the said particles fall through the screens they will soon find one of the many apertures or slots in the board *a* and drop into the zigzag channel below, this being advantageous, since it practically renders it impossible for the most minute particle to escape. If any of the small particles of precious metal pass the many turns afforded by the zigzag form of the channel and are not deposited in such turns by the eddies due to the rebound of the water, they will bring up against the transverse strips of the riffles and remain there, while the lighter small gravel and sand will be carried over the transverse strips by the stream.

H H are turn-buttons pivotally connected to the side walls of the boxes comprised in the riffle-sluice C and having for their purpose to normally hold the riffles F down on the bottoms of said boxes, as shown in Fig. 2, and I I are transverse inclined boards which are arranged in suitable cleats on the side walls of the boxes at the opposite ends of a battery of riffles—that is to say, about twelve or fourteen feet apart—and are adapted to throw the upper portion of the stream of water down, this in order to deflect any small particles that are floating on the water down to the screens over the riffles and materially lessen the liability of the said particles escaping. When desired, it is obvious that in lieu of having the transverse strips *e* at the opposite ends of each riffle F they may be arranged at the opposite ends of a battery

of riffles—*i. e.*, twelve or fourteen feet apart—without departing from the scope of my invention.

The riffle-sluice is designed to be worked with a strong head of water about six inches deep, and the water passing into the channels of each riffle must force its way upward at the lower end of such riffle. While this is so, it will be observed that the buttons H will securely hold the riffles on the bottom of the sluice and prevent the head of water from raising said riffles.

When desirable, in lieu of having the slots *b c* at the opposite ends of each riffle the said slots, like the transverse strips *e*, may be arranged at the ends of a battery—that is to say, approximately twelve or fourteen feet apart.

In order to facilitate raising of the riffles when the riffle-sluice C is to be cleaned up, I provide the mechanism best shown in Figs. 1 to 3 of the drawings. This mechanism comprises levers J, fulcrumed on transverse bars K on the sluice C and having chains L at their forward ends terminating in hooks M, eyes N on the riffles adapted to be engaged by said hooks, and keepers P, mounted on cross-bars Q, connected to the sluice. When it is desired to raise the riffles, the attendant or attendants have but to raise the buttons H into a horizontal position, place the hooks M in engagement with the eyes N on the riffles, and rock the levers, so as to carry the rear arms thereof into engagement with the keepers P, when the riffles will be held in a raised position. From this it follows that all of the riffles in the sluice C may be readily secured in a raised position and as readily lowered to and secured in their proper operative positions with but a minimum amount of effort on the part of the attendant or attendants; also, that when the riffles are secured in their raised position the stream of water passing through the sluice C will carry with it all the metal or metals deposited in said sluice and thoroughly “clean up” the same. Precedent to raising and securing the riffles in their raised position with a view of cleaning up the sluice C, as described, I contemplate interposing a box R between the discharge end of the riffle-sluice and a sluice S, leading to a tank T, which in turn is arranged to discharge into the hopper U of a machine for separating the precious metals from the fine sand, concentrates, and the like and collecting the said precious metals. The said machine may be of any suitable construction; but I prefer to construct it in accordance with the invention forming the subject-matter of my contemporary application, filed November 20, 1901, Serial No. 82,976, which application constitutes a division of this.

I have entered into a detail description of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention as a whole in order to impart a full, clear, and exact un-

derstanding of the same. I do not desire, however, to be understood as confining myself to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my claims.

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

1. In an apparatus for separating metals from ore, gravel, loam and the like, a sluice adapted to be connected with a suitable source of water-supply and having a riffle comprising a board provided with openings, longitudinal zigzag walls interposed between the board and the bottom of the sluice and forming tortuous channels in communication with the openings in the board, means for retarding the flow of water through said channels, and a screen arranged upon the upper side of the board for causing the pulp to drag along the riffle and preventing large particles from entering the openings of the board.

2. In an apparatus for separating metals from ore, gravel, loam and the like, a sluice adapted to be connected with a suitable source of water-supply and having a riffle susceptible of being raised therein, and comprising a board provided with openings, longitudinal zigzag walls connected to the under side of the board and forming tortuous channels, and a screen connected to the upper side of the board and adapted to cause the pulp to drag along the riffle, and also to prevent large particles from entering the openings of the board.

3. In an apparatus for separating metals from ore, gravel, loam and the like, the combination of a conduit, a sluice arranged to receive from said conduit and having a grizzly disposed below the same, and also having riffle-sections arranged end to end on its bottom and susceptible of being raised; the said riffle-sections respectively comprising a board having openings, longitudinal zigzag walls connected to the under side of the board and forming tortuous channels, one or more transverse strips connected to and depending from the board, and a screen connected to the upper side of the board, one or more transversely-disposed inclined boards arranged in the sluice and disposed a slight distance above the riffle, adjustable devices adapted in one position to retain the riffle-sections in their operative position on the bottom of the sluice and in another position to permit of the said riffle-sections being raised, and suitable means on the sluice for raising the riffle-sections.

4. In an apparatus for separating metals from ore, gravel, loam and the like, a sluice adapted to be connected with a suitable source of water-supply and having a riffle comprising one or more boards provided at intervals with slots, and also provided intermediate of the slots with comparatively small apertures, longitudinal tortuous channels arranged below the board or boards and in communication with the slots and openings thereof, one or more transverse strips intersecting the said channels, and a screen arranged upon the upper side of the board or boards and adapted to prevent rocks and large particles from entering the slots and comparatively small apertures therein.

5. In an apparatus for separating metals from ore, gravel, loam and the like, the combination with a conduit adapted to be connected with a suitable source of water-supply; of a sluice having an arch-shaped screen or grizzly disposed below the discharge end of said conduit and also having a riffle comprising one or more boards provided at intervals with slots, and also provided intermediate of the slots with a plurality of comparatively small apertures, longitudinal tortuous channels arranged below the board or boards and in communication with the slots and openings thereof, one or more transverse strips intersecting the said channels, and a screen arranged upon the upper side of the board or boards and adapted to prevent rocks and large particles from entering the slots and comparatively small apertures therein.

6. In an apparatus for separating metals from ore, gravel, loam and the like, a sluice adapted to be connected with a suitable source of supply, and having a riffle comprising a board provided with openings, longitudinal tortuous channels disposed below the board, means for retarding the flow of water through said channels, and a screen arranged upon the upper side of the board for causing the pulp to drag along the riffle and preventing large particles from entering the openings of the board, and one or more transversely-disposed inclined boards arranged in the sluice and disposed a slight distance above the screen.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CYRUS C. PRATT.

Witnesses:

J. S. ALLISON,
L. R. WATTS.