(No Model.) 3 Sheets—Sheet 1.

W. A. WOODS.

GOLD SAVER AND CONCENTRATOR.

No. 455,498. Patented July 7, 1891.

Fig. 1.

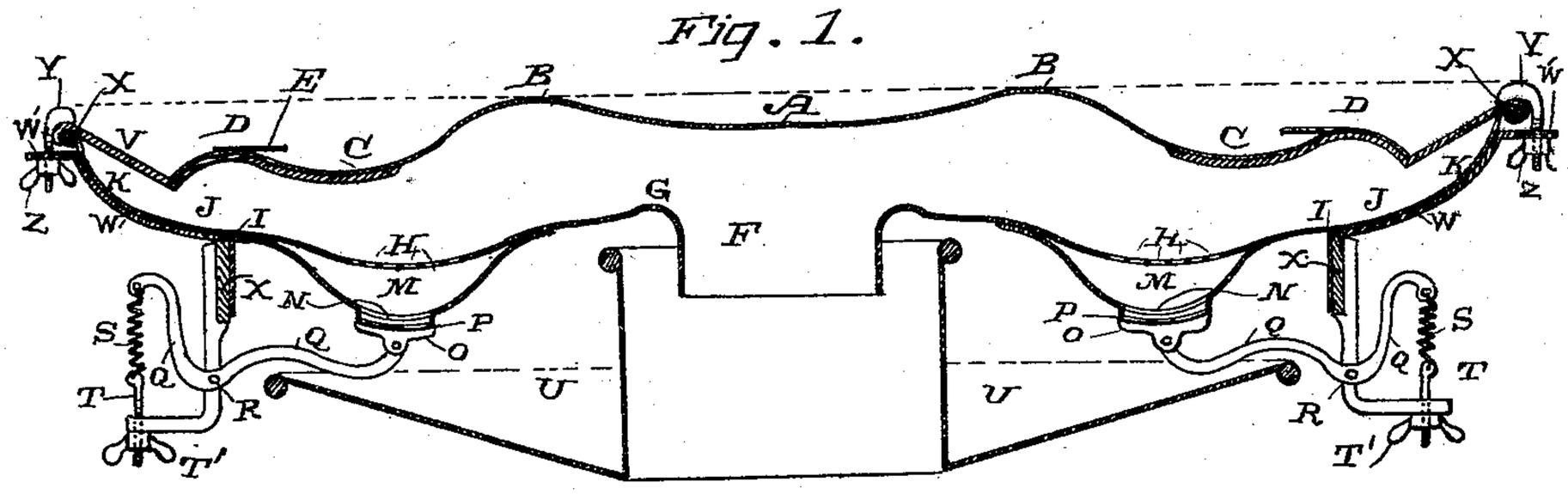

Fig. 2.

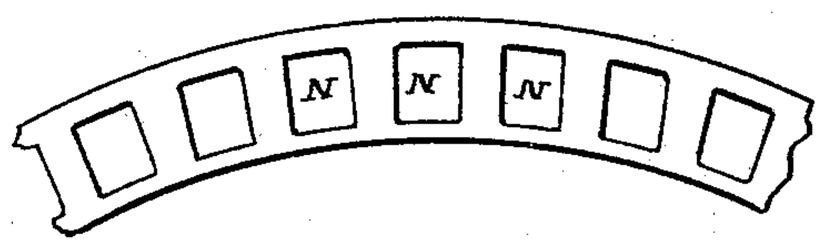

Fig. 3.

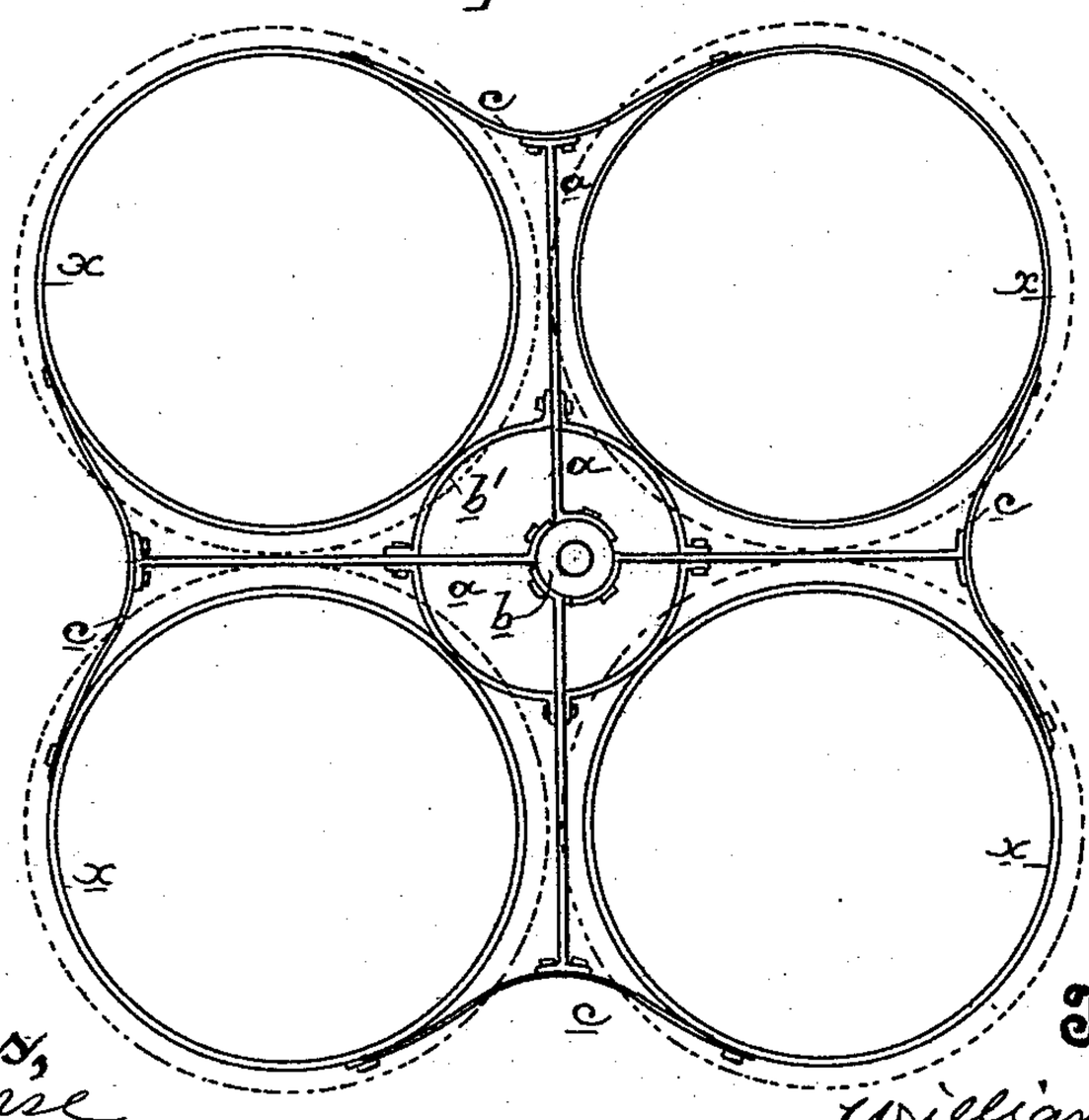

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Fig. 4.

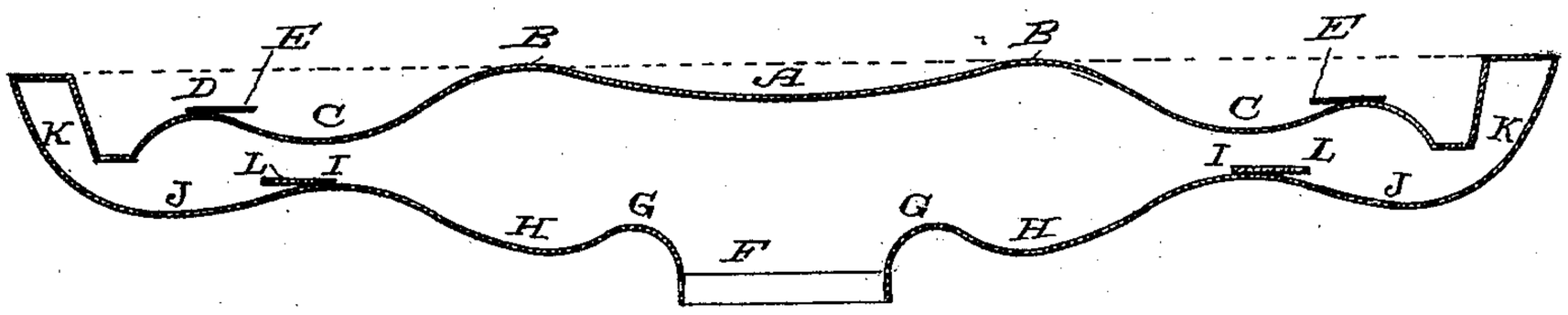


Fig. 6

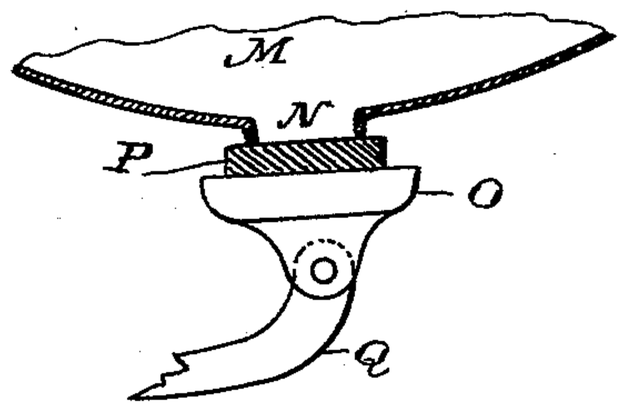
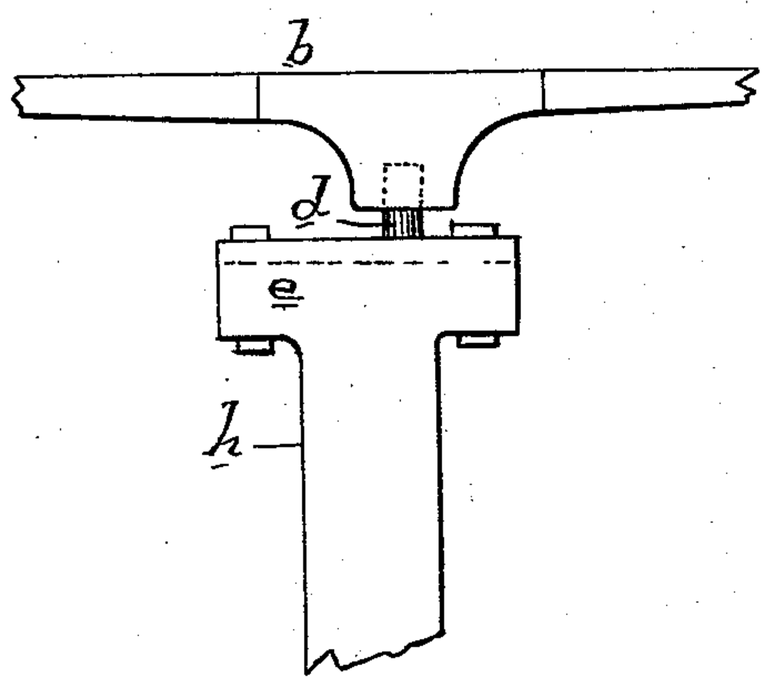


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

W. A. WOODS.

GOLD SAVER AND CONCENTRATOR.

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Fig 7

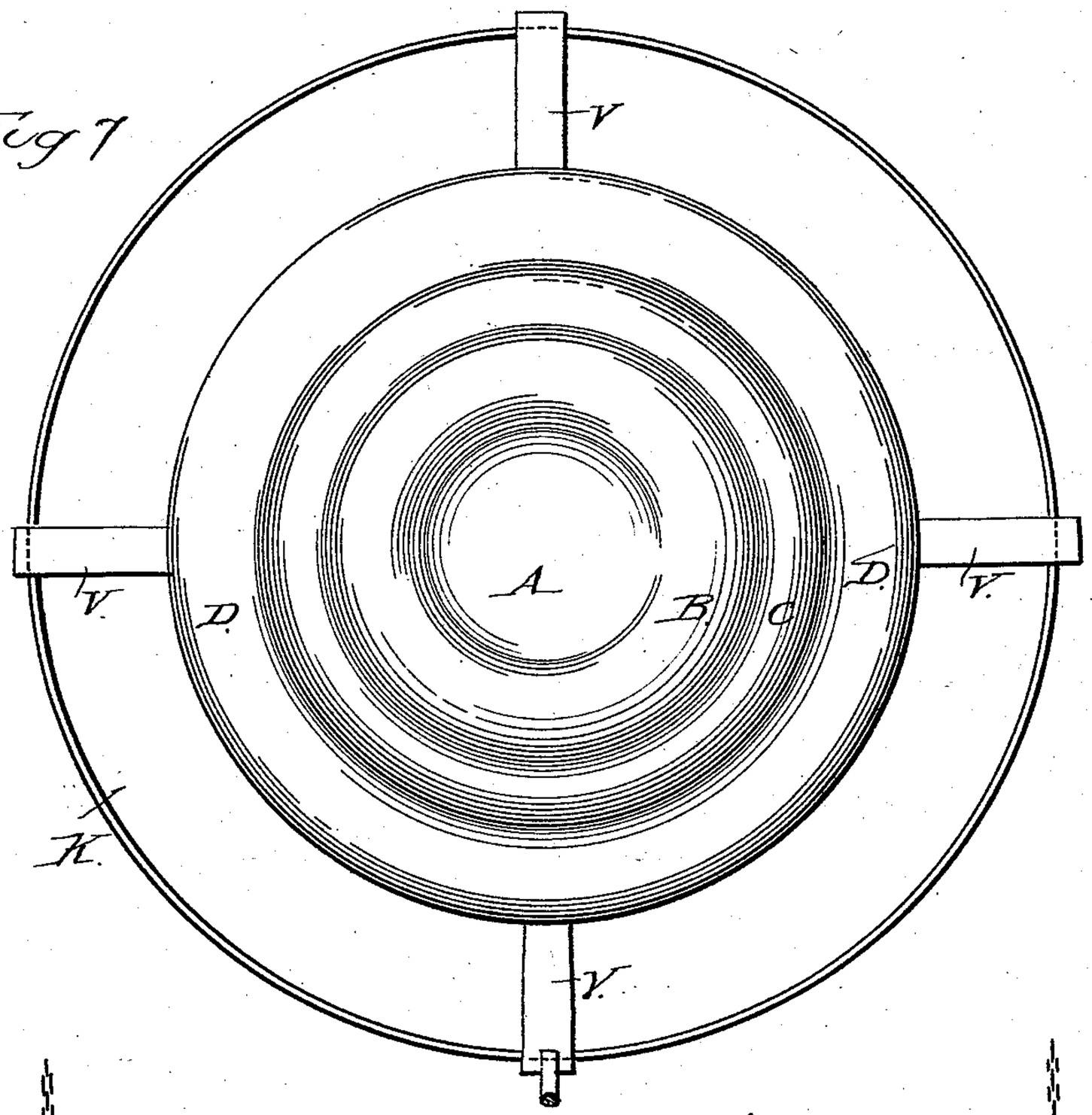
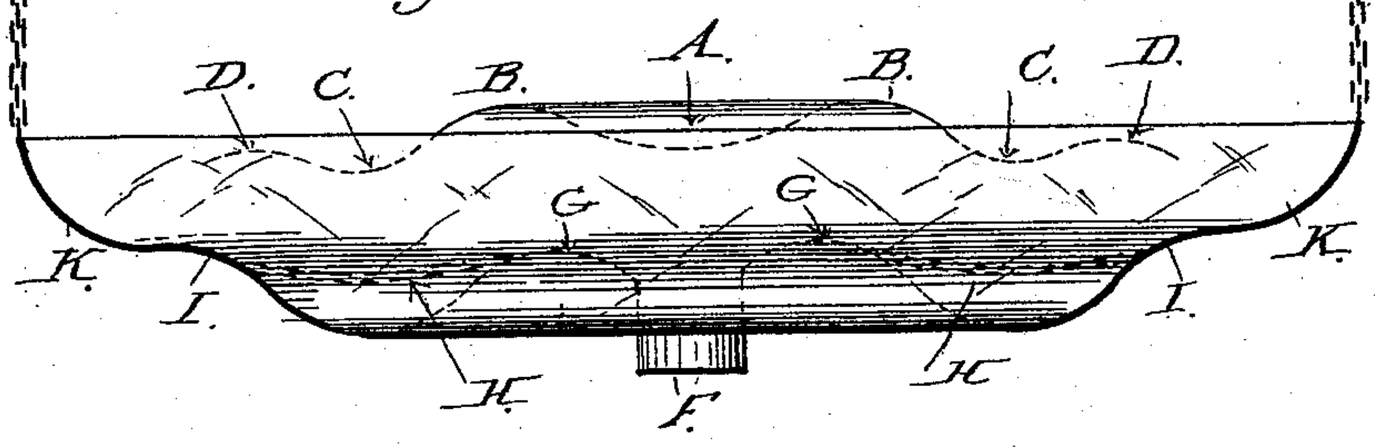


Fig. 8.



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Attorneys

UNITED STATES PATENT OFFICE.

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GOLD SAVER AND CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 455,498, dated July 7, 1891.

Application filed August 12, 1890. Serial No. 361,832. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. WOODS, a citizen of the United States, residing at Santa Cruz, Santa Clara county, State of California, have invented an Improvement in Gold Savers and Concentrators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in apparatus for saving free gold and for concentrating sulphurets and other heavy valuable particles which may be associated with the gold.

It consists in a novel arrangement of circular disks having the surfaces formed in concentric wave-line elevations and depressions, peculiarly arranged with relation to each other, and in certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of my apparatus, illustrating a single pan. Fig. 2 is a view of a portion of the perforated discharge-ring. Fig. 3 is a plan view showing an arrangement of a series of pans in one apparatus. Fig. 4 is a modified form of curve for the lower disk. Fig. 5 shows the eccentric-pin for giving motion to the pans. Fig. 6 is a section of a portion of the receiver M, showing the elastic ring for closing the openings N. Fig. 7 is a plan view of the pans. Fig. 8 is a side elevation of the same.

Each pan in my apparatus consists of an upper and a lower circular disk, these disks being formed by spinning, so as to have circular elevations and depressions, which are so arranged with relation to each other that by means of a constant discharge and flow of the material and a circular shaking movement which is given to the pans the gold and sulphurets will be separated from the lighter worthless particles and slimes and will be collected and deposited in suitable receivers. The upper disk has a central depression, as shown at A, and into this the pulp or material is discharged from any suitable spout or delivering-passage. Exterior to this central depression, which is rather broad and shallow, is the first elevation B, which is circular in form and surrounds the depression A. Exterior to the elevation B is a second depression C, and exterior to this again is a second elevation D, from which the periphery of the disk droops or descends, as shown, so that the material is finally discharged over its outer edge. Upon the outer elevation D is fixed a narrow ring or ledge E, the inner edge of which projects inwardly and above the outer portion of the depression C. This upper disk is formed of copper or other suitable metal, silvered or amalgamated and adapted to catch and save gold which may be contained in the pulp which is constantly flowing outwardly from the center over its surface, and the increasing diameter of this surface continually spreads and makes thinner the pulp which is flowing toward the edge, and whatever gold may be contained in it is thus brought more closely into contact with the amalgamated surface, and it will be mostly collected and retained upon these surfaces before the ring E is reached. As this ring projects inwardly over the depression C, it serves as a sort of dam or stop for heavier particles, to prevent their being carried too rapidly or easily over the elevation D. The lower pan is also made with curved surfaces in a like manner with the upper one, these surfaces differing slightly for concentration of sulphurets or for gold saving.

In case the pan is to be used as a gold-saver, it will be made as shown in Fig. 4, having a central discharge-opening, as shown at F. Around this discharge-opening is an elevation G, exterior to this depression H. Exterior to the depression H is another elevation I, and exterior to this a final depression J with an elevated rim or periphery, as shown at K. This lower pan is of larger diameter than the upper one, so that the elevated rim K surrounds the outer depressed edge of the upper disk, and the material from the upper disk is discharged all around its periphery and falls into the exterior depression J of the lower disk.

Upon the elevation I is fixed a ring L, similar to the ring shown at E upon the upper disk; but this ring L is so fixed that its upper edge projects over the inner portion of the

depression J, and it acts as a check for the flow of the material toward the center of the lower disk. The pulp flowing inwardly from the depression J, into which it first falls, passes over the elevation I, flowing inwardly from all sides into the depression H, and lastly, flowing over the elevation G, passes out through the discharge-opening F. It will be seen that the pulp is in its most concentrated form when it falls upon the central depression A of the upper pan or disk; that it is rapidly spread and made thinner as it flows outwardly from this point until it falls over the exterior depressed edge of the upper disk into the depression J, which is formed just inside of the periphery of the lower disk. Both surfaces being amalgamated, the gold is continually brought into contact with these amalgamated surfaces until it is almost entirely caught and retained upon these surfaces, and as it flows from the depressions over the elevations the pulp becomes so thin at these points that the gold, even if extremely light and inclined to float where the material is deep enough for that purpose, will be brought into contact and caused to rub over the amalgamated surfaces of these elevations, so that what is known as "float gold" can be readily caught and saved by this apparatus. As the pulp approaches the center of the lower disk it will be again somewhat concentrated, and will be eventually discharged, as before described, through the opening F; but as the gold will have been mostly caught before this time the concentration at the discharge is not found objectionable.

The curvature of the lower disk, as shown in Fig. 1, is slightly different from that described in Fig. 4. From the periphery K the disk curves downward, as shown at J, and at this point the discharge from the upper disk falls upon the lower one. From the point I the curvature is increased until the depression H is reached, which is the lowest point in this pan. From this point it rises toward the inner discharge-opening F, and has a slightly elevated rim, as shown at G, surrounding the discharge-opening. When this lower pan is intended for the concentration of sulphurets, it may be made of iron or other suitable material. The depression H is perforated with small holes or openings of sufficient size to allow the sulphurets to pass through and fall into a supplemental depressed annular pan M, which is fixed to the lower disk below the depressed portion H. The concentrates, consisting of heavy sulphurets, black sand, and mercury or amalgam, which may have been carried to this point by the flow of the material, will pass through the openings H and collect in the annular receiver M below. The lowest point of the receiver M has holes stamped out of it, as shown at N in the plan view, Fig. 2, and beneath this is a ring O, having a rubber or flexible ring P, fixed upon this surface and adapted to close up against the bottom of the receiver M. In stamping out the openings N the die will naturally force the edges of the openings N outward a little, so as to form a sort of lip, which projects downwardly around each of the openings, and this lip resting upon the elastic ring P will tend to form a tight joint at this point. The metallic ring O, upon which the rubber ring P is fixed, is supported by three or more lever-arms Q, which are fulcrumed in standards, as shown at R. The outer ends of the lever-arms Q are connected with springs S, and the tension of these springs is adjustable by means of screw-bolts T, having thumb-nuts T', as shown. The tension upon these springs is sufficient to act through the levers Q and press the ring O upward, so as to retain the rubber ring P against the bottom of the chamber M, and thus close the openings N until the concentrates have accumulated within the chamber M to such an extent that their weight will be sufficient to overcome the tension of the springs S and force the valve-ring P downward, so as to allow the concentrates to flow out through the openings N. When the pressure is sufficiently reduced by the escape of the concentrates, the spring will act to close the valve again.

U is a chamber of any suitable shape and dimensions surrounding the discharge-opening and extending outwardly to a point beneath the annular receiver M, so that when the concentrates are discharged from the openings N they will be received into this chamber, from which they may be removed from time to time in any suitable manner.

The upper and lower disks are supported with relation to each other by means of arms V and W. The arms W, of which there may be four equidistant from each other, are bolted or secured to a ring X, and they extend outwardly, curving upwardly at the same time from this ring and having a flattened portion W' at the periphery, through which the hook-bolts Y are passed. The arms V extend beneath the periphery of the upper disk and their outer ends are curved over the rim or periphery of the lower disk, this periphery resting upon the horizontal portion W' of the arms W, and the hook-bolts W curve over the arms V. When the nuts Z are turned up, the whole will be firmly clamped together at this point and held with relation to each other, as shown in Fig. 1.

If a single pan composed of the parts herein described is employed, this pan will be suitably suspended, and will have a circular shaking motion given to it by means of a crank or eccentric connecting with a central support.

Fig. 3 shows the union of four of these concentrators by supporting them from a spider composed of the arms *a*, which radiate from a central hub *b* and have a ring *b'* fixed to them. The inner sides of the concentrator-rings *x* are secured to this ring. *c* are curved straps, the central portions of which are fixed

to the outer ends of the arms *a*, and the ends are curved outwardly and around the concentrators, to which or the rings *x* they are bolted or riveted, so that any suitable number of these concentrators may be supported upon the one spider, as shown in Fig. 3.

In order to provide the necessary circular shaking motion, the central hub *b* has a downwardly-projecting pin *d*, which connects it with a crank or eccentric *e*, formed of the upper end of the vertical shaft *h*, this shaft having a rotary motion given to it while rotating the central hub *b*, the spider, and the supported pans or concentrators, so that each one has a rotary shaking motion about its own center, and this motion, taken in connection with the peculiar curvature and relative arrangement of the surfaces, produces a very satisfactory result as a gold saver and concentrator.

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

1. A gold saving and concentrating apparatus consisting of the upper and lower disks fixed with relation to each other, as shown, and having the surfaces formed into alternate depressions and elevations, so that material discharged upon the central depression of the upper disk will flow outward and be discharged over the periphery and upon the lower disk, perforations made in the depression H of the lower disk, and the annular receiver M, fixed below said perforated portion of the lower disk to receive the concentrates, which pass through the holes, while the waste is discharged through the central opening, substantially as herein described.

2. The upper and lower disks having their surfaces formed into alternate annular depressions and elevations, said disks being fixed and supported with relation to each other, as shown, a central discharge from the lower disk, perforations formed through the disk at the bottom of the annular depression H, an annular receiver fixed below said perforated depression and having openings made in its lowest portion, an upwardly-closing ring or valve fitting over said openings in the receiver, levers upon which said ring is supported, and springs or weights at the outer end of said levers to act as a counter-balance and retain the valves in a closed position, substantially as herein described.

3. A gold saver and concentrator consisting of the upper and lower disks having the annular depressions and elevations and fixed with relation to each other, as shown, perforations made in the depression H of the lower pan, an annular receiver fixed beneath said depression, having the holes made through the bottom with the outwardly-projecting lips, a flexible ring or valve closing upwardly against said apertures, the spring-actuated arms or levers whereby said valve is closed upwardly against the openings, and the tension-adjusting screw and nut connected with the spring, substantially as herein described.

4. A gold saver and concentrator consisting of the upper and lower disks having the annular depressions and elevations and a central discharge through the lower disk, perforations made in the annular depression of the lower disk, an annular receiving-chamber fixed below said perforated portion, having discharge-openings and valves by which the contents of the receiver are allowed to escape by gravitation, and a receiver U, fixed beneath the apparatus, to receive and collect said concentrations, substantially as herein described.

5. A gold saver and concentrator consisting of the upper and the lower disks having the annular depressions and elevations, the arms V and W, fixed to and projecting from the edges of said disks, the hook-bolts Y, by which they are secured together, and the supporting-ring X, to which the arms W are bolted and by which the disks are supported, substantially as herein described.

6. A gold saver and concentrator consisting of the upper and lower disks fixed with relation to each other, having the annular depressions and elevations, central discharge, and receiver for concentrates, arranged and operating as shown, in combination with the spider, rings and arms by which a series of pans are secured to said spider around a common center, a central hub having a projecting pin, and a crank or eccentric fixed to a vertical rotating shaft and engaging said central hub, whereby a rotary movement of the apparatus is effected, substantially as herein described.

In witness whereof I have hereunto set my hand.

WILLIAM A. WOODS.

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