

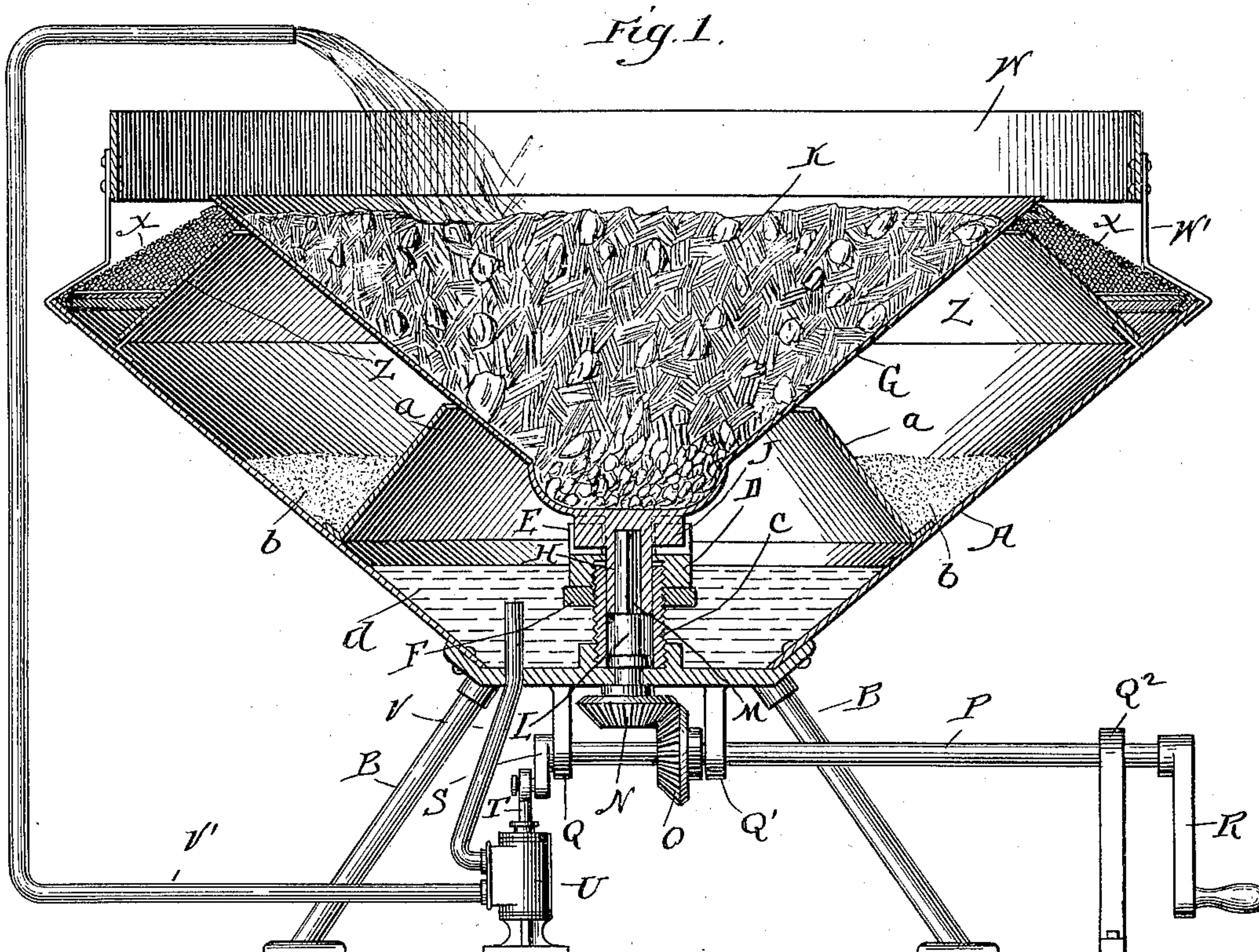
No. 628,697.

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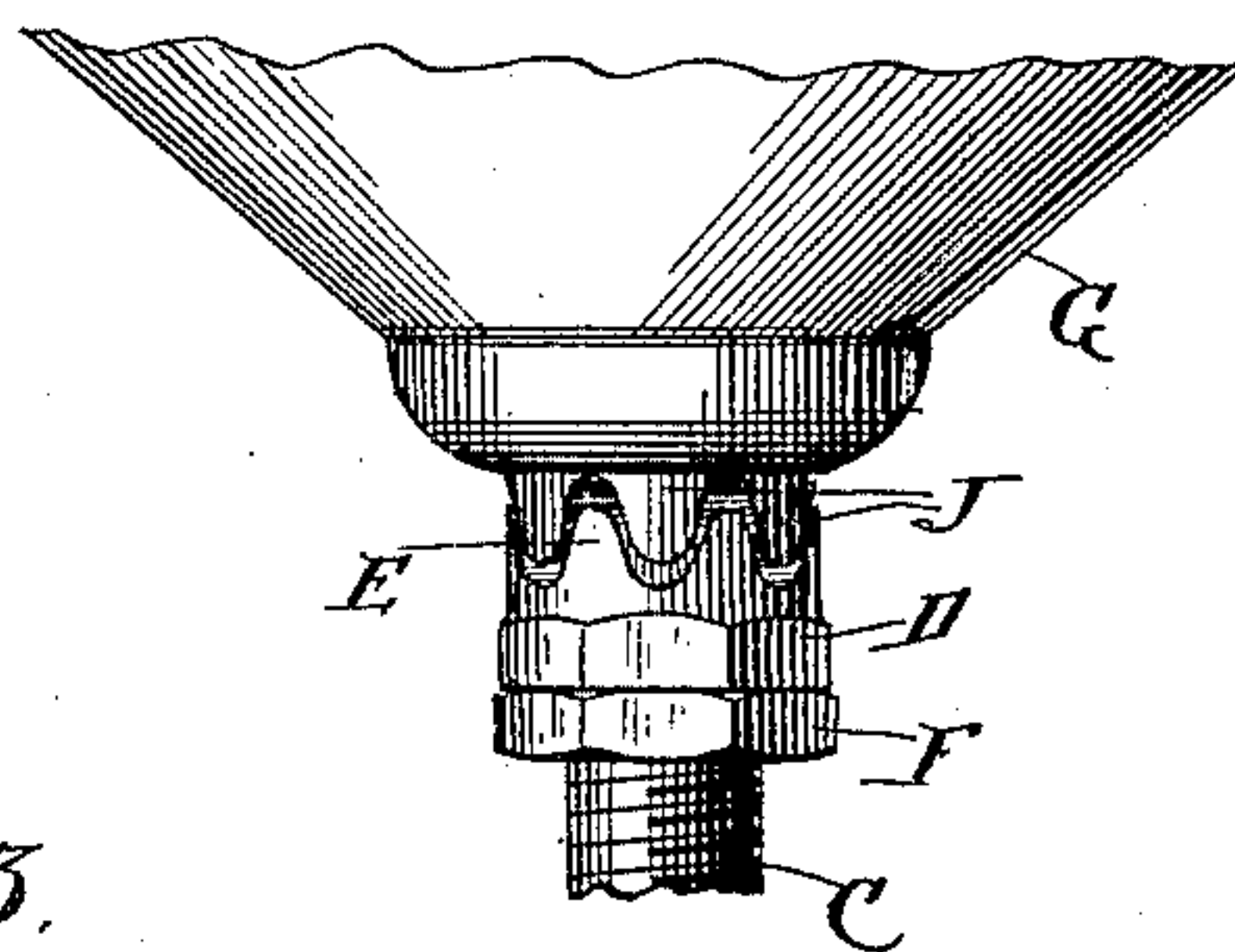
G. R. COULS & P. P. DOHLGREEN.  
CONCENTRATING AND AMALGAMATING MACHINE.

(Application filed May 28, 1898.)

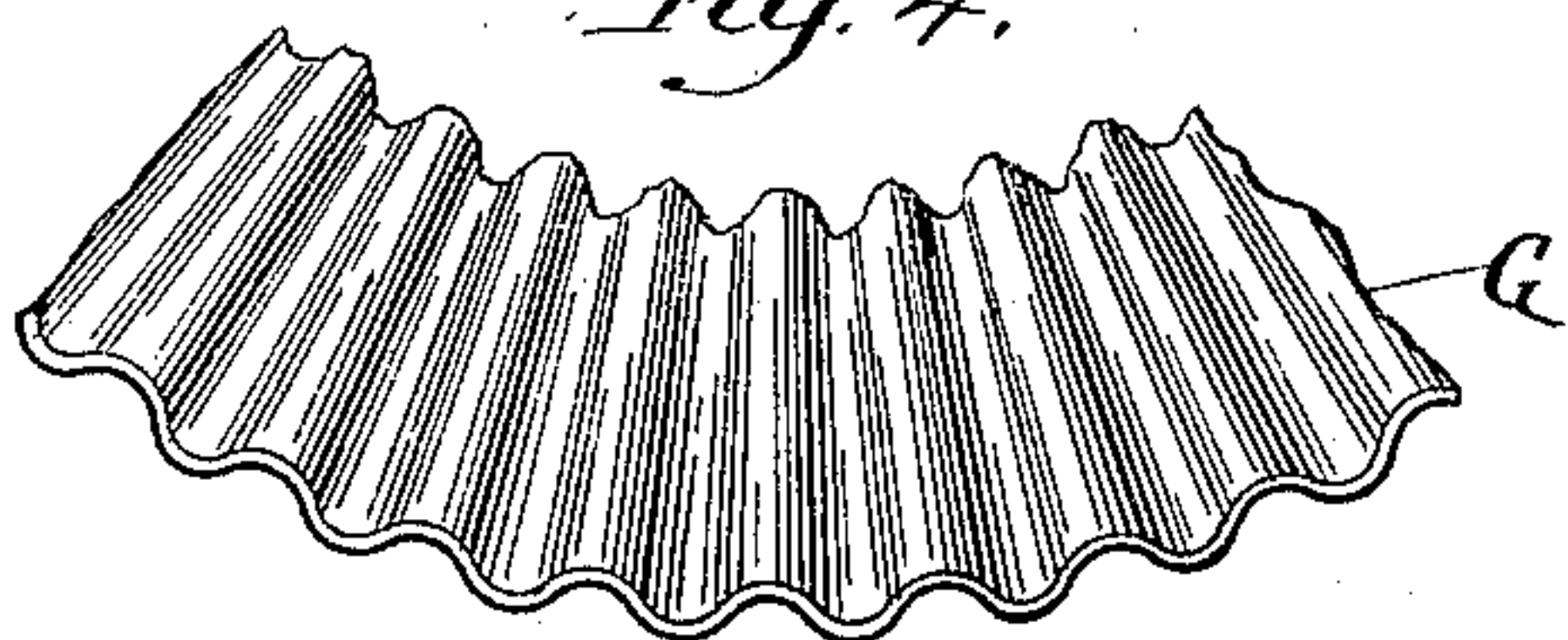
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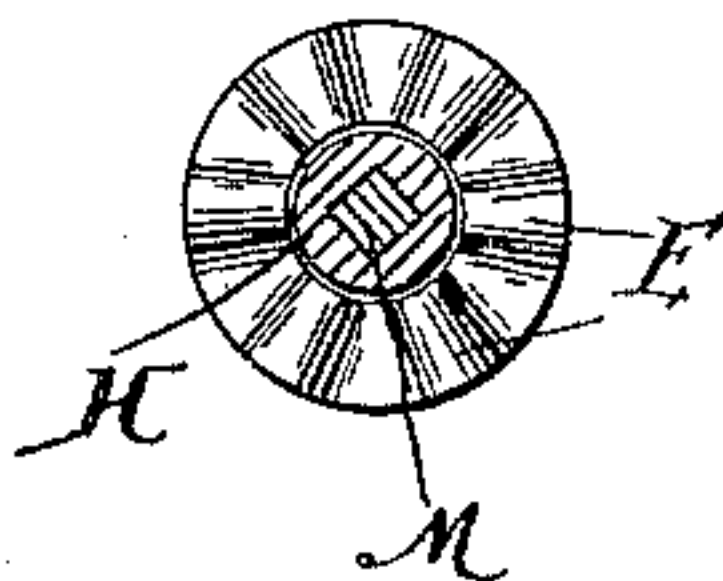
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

GEORGE R. COULS AND PETER P. DOHLGREEN, OF TACOMA, WASHINGTON.

## CONCENTRATING AND AMALGAMATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 628,697, dated July 11, 1899.

Application filed May 28, 1898. Serial No. 682,003. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE R. COULS and PETER P. DOHLGREEN, citizens of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a certain new and useful Improvement in Concentrating and Amalgamating Machines, of which the following is a specification.

Our invention relates to a certain new and useful improvement in machines for separating gold and other metals from sand, dirt, or other lighter material by the use of a revolving hopper so mounted as to have a violent vibratory movement, and has for its object to so construct a machine of this description as to greatly facilitate the separation of precious metals from material of less specific gravity and to utilize a given quantity of water by using the same over and over again with little or no waste, thus rendering the machine especially adapted for use in localities where there is a scarcity of water. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section of our amalgamating and concentrating machine, parts being in elevation; Fig. 2, a detail elevation of a portion of the hopper, showing the cam-points carried thereby, which act in conjunction with stationary cam-points; Fig. 3, a face view of the cam-points carried by the hopper, the spindle upon which said hopper revolves being sectioned; and Fig. 4, a detail view illustrating the form in which the hopper may be corrugated.

In carrying out our invention as here embodied A represents the reservoir or body of the machine, which may be made of sheet metal or other suitable material, and this reservoir is supported upon the legs B, here shown as made of tubing, and from the bottom of the reservoir a nipple or short piece of pipe C projects upward, being threaded into the boss formed in the bottom of the reservoir, and to the upper end of this nipple is rigidly secured a cam-block D, having the cam-points E formed thereon for the purpose hereinafter set forth, and this cam-block is made adjustable upon the nipple C by being threaded thereon and having a jam-nut F run thereagainst for binding it in position, as will be readily understood.

A hopper G, having the general shape of a

funnel, is mounted within the reservoir so as to rotate, the shank H of said hopper projecting downward into the nipple, by which means it is held concentric with the reservoir, while the cam projections J, formed upon the bottom of the hopper, engage with the cam projections E, so that when the hopper is rotated these projections will ride upon each other in such manner as to give the hopper a limited vertical movement, which will impart thereto a violent vibration, the object being to agitate the material K, placed therein, to settle the heavy metal in the bottom of the hopper. The rotating of the hopper is brought about by the spindle L, which is journaled in the bottom of the reservoir, the upper portion thereof being squared, as indicated at M, so as to fit within the squared socket formed in the shank H. All this, as is obvious, will cause the hopper to rotate with the spindle and yet permit it to rise and fall independent thereof. A beveled gear N is secured to the lower end of the spindle and meshes with the corresponding gear O, secured upon the horizontal shaft P, the latter being mounted in the bearings Q, Q', and Q'' and carrying at its outer end a crank-handle R, by means of which power is imparted to the machine. Upon the inner end of the shaft P is secured a crank S, to which is attached the plunger-rod T of the pump U, so that when this shaft is rotated it not only rotates the hopper through the beveled gears, but also operates the pump to draw water through the pipe V from the bottom of the reservoir and force it through the pipe V' to a sufficient height above the hopper to project it upon the material contained therein, and this water in performing its function of disintegrating and conveying the material from the hopper will again flow, as hereinafter described, to the bottom of the reservoir, from which it may be again pumped for utilization.

A guard-band W surrounds the hopper at some distance therefrom and is supported by the standards W', the object of this band being to prevent the water and material in the hopper when being rotated from being thrown past the screen and amalgam plate and to prevent the water being wasted. A screen X extends from the lower part of the amalgam plate to the edge of the reservoir and is upon such an incline as to readily shed stone or material of a size too great to pass through said netting. An amalgam plate Z may be



secured within the reservoir, but in such manner that its lower edge does not come in contact with the walls of the reservoir, nor its upper edge with the sides of the hopper. This  
 5 leaves the hopper free to rotate without undue friction, and also permits material precipitated upon said plate to slide therefrom and pass over the lower edge thereof, so as to fall downward within the reservoir. When  
 10 this material, which is usually sand, has passed from the amalgam plate it will be caught in the pocket formed by the partition *a*, said sand being indicated at *b*. This partition may be rigidly secured within the reservoir  
 15 or removably attached thereto and is here shown of the general shape of a truncated cone, its upper edge not coming in contact with the hopper, so as to permit the water when rising to the proper level to flow over  
 20 this edge to the compartment in the bottom of the reservoir, where it is indicated at *d*. From this it will be seen that in practice material, such as dirt and sand, bearing precious metal may be introduced to the hopper, and  
 25 when the machine is set in operation by the revolving of the crank-handle *R* this hopper will be given not only a rotary movement, but a violent vertical vibration, which will thoroughly agitate and settle the larger pieces  
 30 of the material contained therein, while at the same time the water pumped from the bottom of the reservoir and projected upon this material will to a certain extent disintegrate the latter and convey it over the edge of the  
 35 hopper onto the screen or amalgam plate. From this point that portion of the material which is sufficiently disintegrated to pass through the screen will fall upon the amalgam plate. The sand and disintegrated material falling upon said amalgam plate will  
 40 flow downward with the water in a thin sheet, so that the precious metal, which has an affinity for the amalgam, will adhere to said plate, while the worthless material will be precipitated to the pocket formed within the reservoir by the partition *a*. As the water accumulates within this pocket it will rise to the  
 45 height of the partition *a* and then flow over the upper edge thereof and into the bottom of the reservoir, from whence it will be again withdrawn by the pump and again utilized for disintegrating and conveying the material, as just described.

The formation of the pocket within the reservoir causes the material contained within  
 55 the water when passing from the amalgam plate to be retained and permits the water to flow therefrom comparatively free from foreign matter, so that it will be in a better condition to pass through the pump and be re-utilized.

If desired, the hopper may be corrugated and amalgamated, as indicated in Fig. 4, and  
 65 such corrugations would further agitate the material within the hopper when the latter is rotated.

From this description it is obvious that our

improvement is well adapted for hand-separators and for use in localities where it is difficult to install heavy machinery. A further advantage of our improvement is that it may be conveyed from place to place with but little effort.

Having thus fully described our invention, what we claim as new and useful is—

1. A separator of the character described consisting of a reservoir, a hopper mounted to rotate therein, means for giving said hopper a vertical vibration when being rotated, a screen extending from the upper edge of the hopper to the upper edge of the reservoir for screening the material passing from the hopper, an amalgam plate arranged beneath the screen, a partition located within the reservoir so as to form a pocket, a pump, a pipe leading from the bottom of the reservoir to the pump, and a pipe leading from the pump to a point above the hopper, as shown.

2. In combination, a reservoir consisting of a suitable casing, a spindle journaled in the bottom of said reservoir, a stationary cam-block, a hopper having cam projections upon its under side, said projections resting upon the cam-block, a shank projecting downward from the hopper and having a socket therein for the reception of the squared end of the spindle, means for rotating the spindle, a pump adapted to be actuated in unison with the rotating of the spindle, a pipe leading from the bottom of the reservoir to said pump, a second pipe leading from the pump to a point above the hopper, a guard *W* surrounding the hopper to prevent the spilling of the water, sand and flour gold so that it must of necessity fall on the said amalgam plate, a screen extending from the upper edge of the reservoir, an amalgam plate located beneath the screen, and a partition so placed within the reservoir as to form a pocket for the retention of sand and the like, as specified.

3. In combination with an apparatus of the character described, a hopper mounted to rotate within the reservoir, means for giving said hopper a vertical vibratory motion when rotating, a pump for withdrawing the water from the lower portion of the reservoir and projecting it upon the material within the hopper, means for screening the material in passing from the hopper to the reservoir, means for collecting the precious metal from said material, and a pocket formed in the reservoir for catching and maintaining sand and the like so as to permit the water to pass to the bottom of the reservoir free from such material as and for the purpose set forth.

In testimony whereof we have hereunto affixed our signatures in the presence of two subscribing witnesses.

GEORGE R. COULS.  
 PETER P. DOHLGREEN.

Witnesses:

A. A. KNIGHT,  
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