No. 620,264. Patented Feb. 28, 1899.

S. W. WIBLE.

MINING APPARATUS.

(Application filed Feb. 18, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

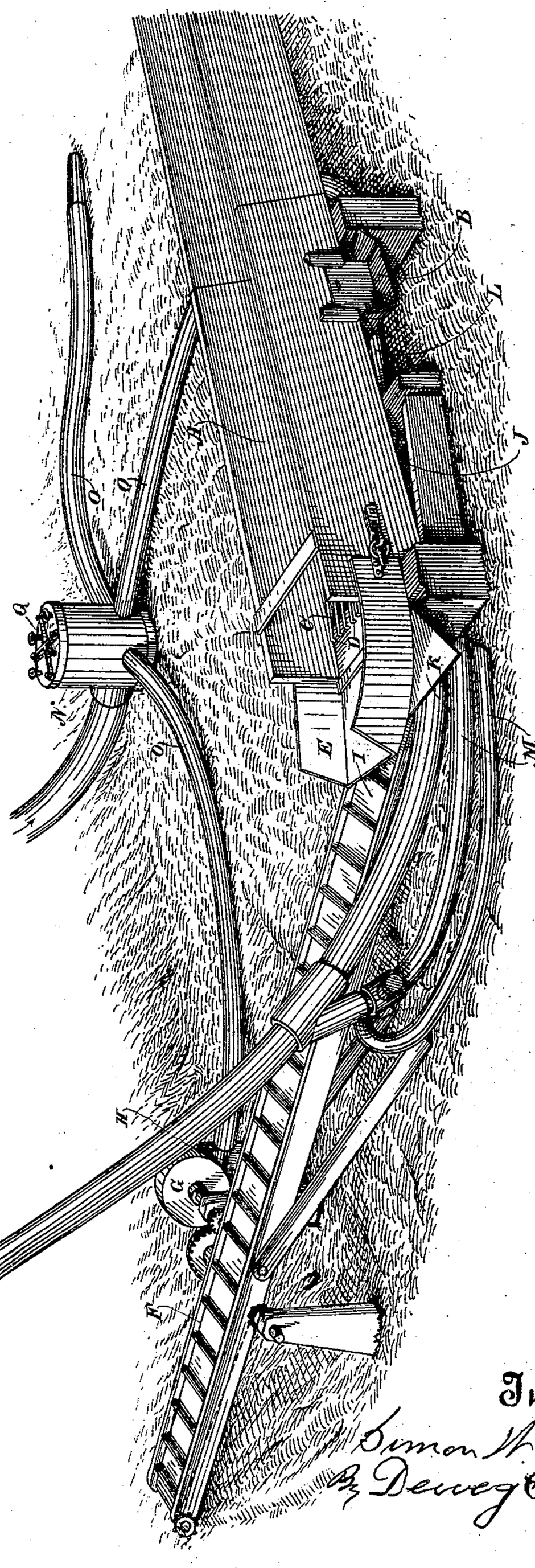

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Fig. 2.

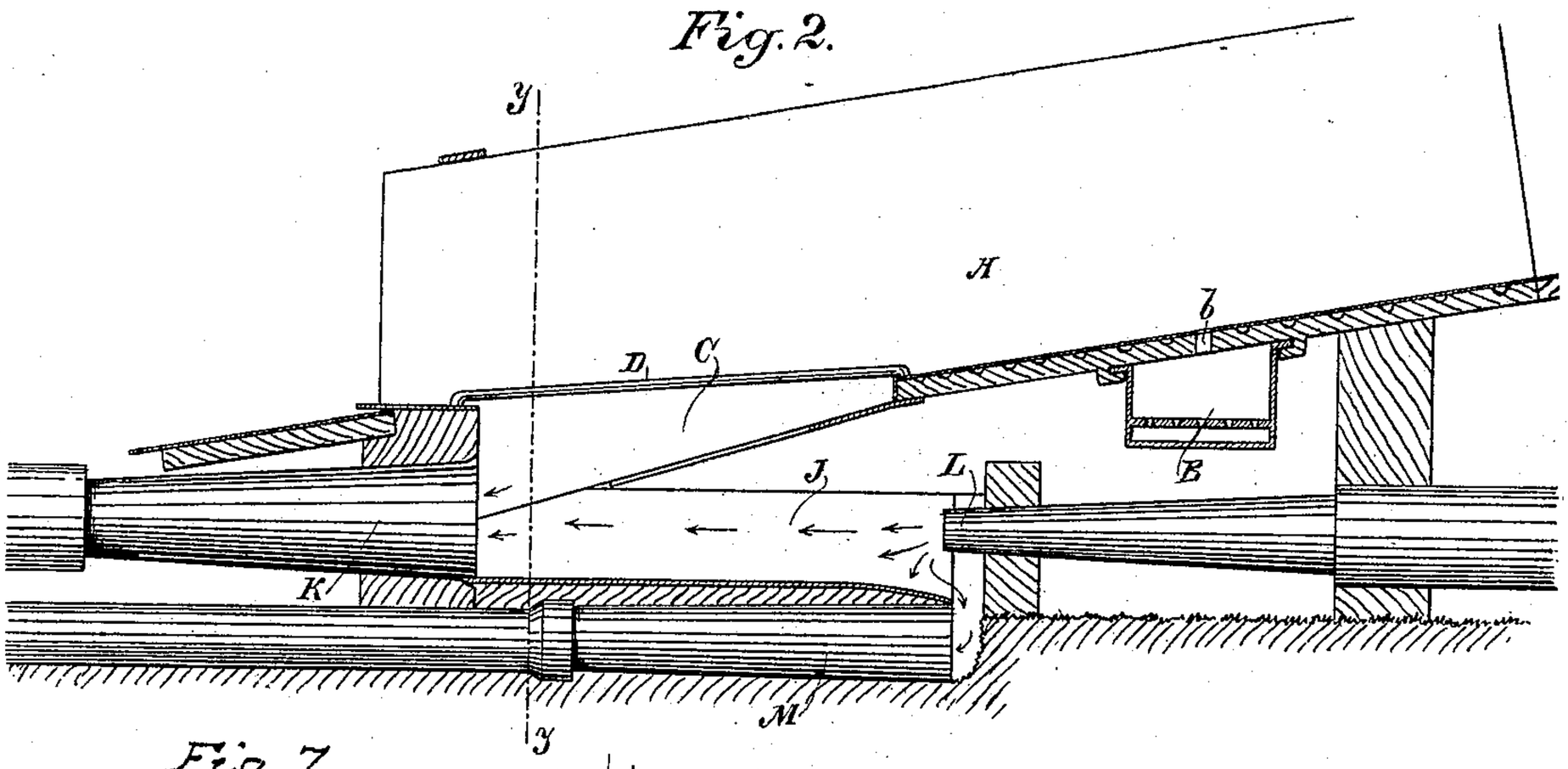


Fig. 7.

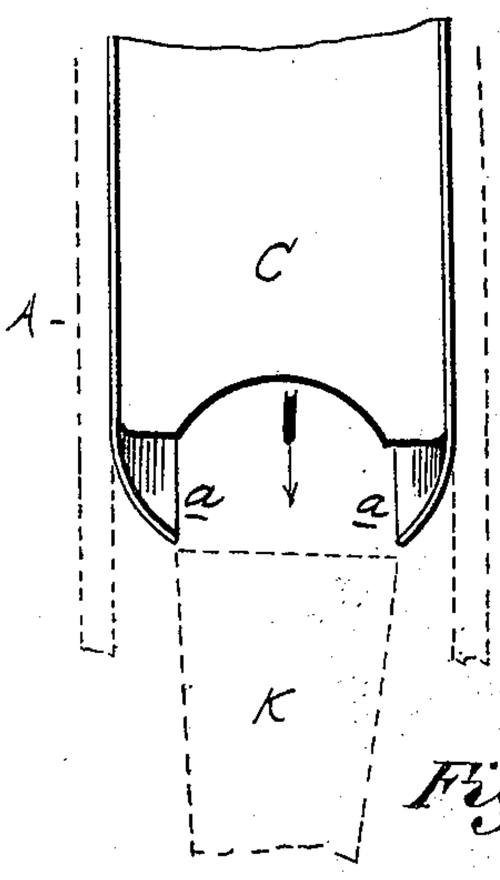


Fig. 3.

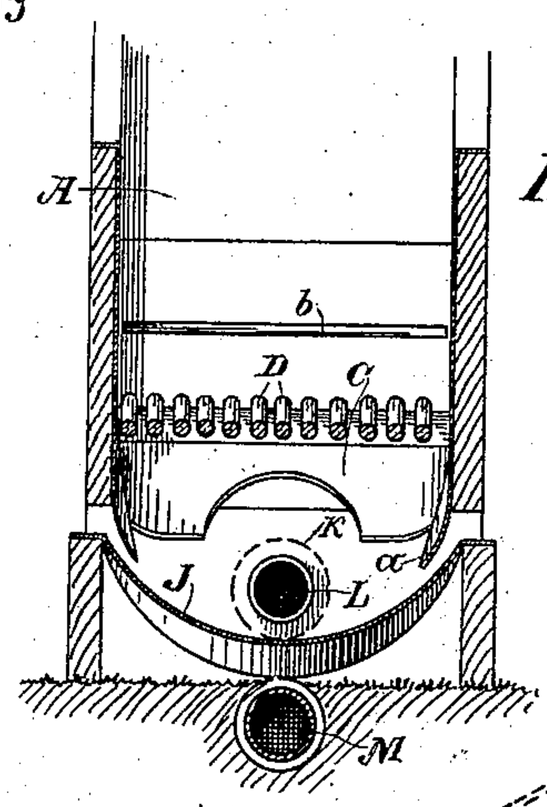


Fig. 6.

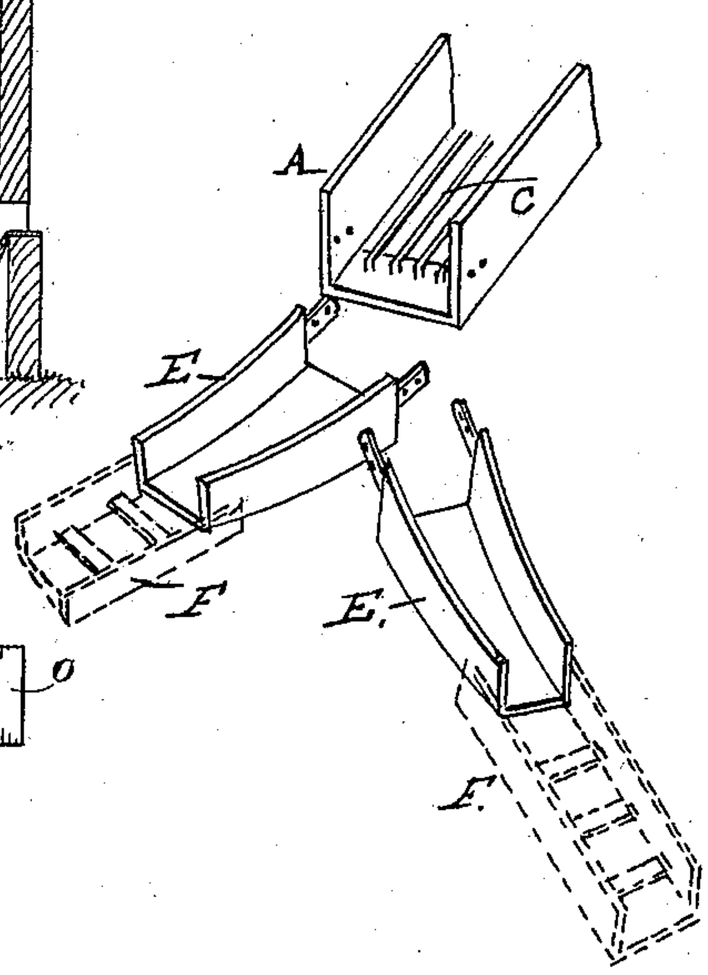


Fig. 4.

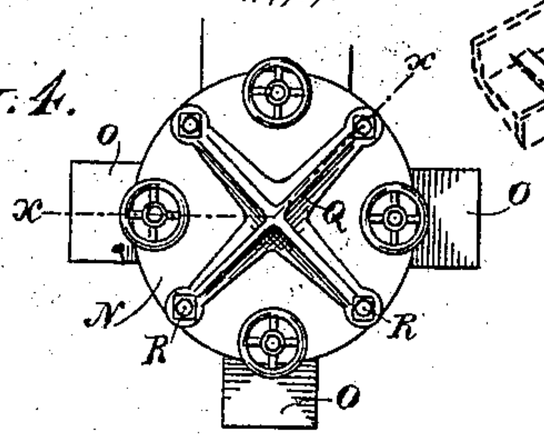
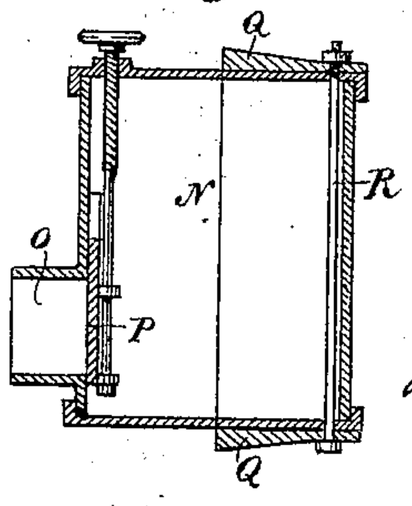


Fig. 5.



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UNITED STATES PATENT OFFICE.

SIMON W. WIBLE, OF BAKERSFIELD, CALIFORNIA.

MINING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 620,264, dated February 28, 1899.

Application filed February 18, 1898. Serial No. 670,774. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WIBLE, a citizen of the United States, residing at Bakersfield, county of Kern, State of California, have invented an Improvement in Mining Apparatus; 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 especially designed for use in the saving of gold and heavy valuable material which is intermixed with sand, gravel, or other valueless gangue.

It consists in the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a general view of the apparatus. Fig. 2 is a longitudinal section through the sluice-box. Fig. 3 is a transverse section of the same on line *y y* of Fig. 2. Fig. 4 is a top view of the water-distributer. Fig. 5 is a vertical section of the same on line *x x* of Fig. 4. Fig. 6 is a detail showing right and left spouts. Fig. 7 is a detail in plan of the lower portion of the sluice.

The object of my present invention is to combine in a single continuous apparatus devices for separating and saving gold from its intermixture with foreign substances and in so combining the various devices as to economize labor and expedite the work by making all parts of it essentially continuous and automatic.

This apparatus is more especially designed for use in river-beds and low places where there is not a sufficient natural fall to allow the work to be done and to dispose of the debris, and where it is therefore necessary to employ what is termed a "siphon-elevator," by which the material can be raised from the pit in which the work is being done and it and water constantly cleared out, so that the work can progress.

A is a sluice of any well-known or suitable construction having transverse riffles and pockets for mercury, and into this sluice the auriferous sand, gravel, and other material is deposited, flowing down the sluice, and the gold intermixed therein, being brought into contact with the mercury in the riffles, will be arrested and saved. The grade of the sluice ordinarily is such that much fine gold will continue to travel along the sluice with the water and waste material, and in order to separate this fine gold and save it I employ what is known as an "undercurrent" B, which consists of a sluice standing transversely beneath the main sluice, having a steeper grade or incline, and slots or channels *b* are made in the main sluice at points where the undercurrents are placed, so that part of the water and the fine material moving along the bottom of the sluice will pass through these channels into the sluice beneath, the action of the undercurrent being similar to that of the main sluice; but the fine heavy gold is associated with a much less quantity of waste material, which has passed through the channel with it, and the increased grade allows the lighter material to travel faster than the gold, so that it will eventually be discharged, while the gold, moving more slowly over the bottom of the sluice, will be amalgamated with mercury contained in the riffles of this sluice. The main body of material passing along the sluice finally arrives at the point where it is to be transferred to the elevator. At this point a considerable opening C is made in the bottom of the sluice, and this opening has longitudinal bars D fixed in it, with intermediate spaces of sufficient size to allow only such material to pass through as can be taken care of by the elevator to be hereinafter described. The remainder of the material, consisting of the larger rocks, cobbles, and worthless refuse, passes on over the bars and into a delivery-spout E, which is removably connected with the end of the sluice and which diverts the material to one side or the other of the line of the sluice. I employ two of these delivery-spouts, one diverging to the right and the other to the left, so that they may connect with the carrier or conveyer, which can thus be set upon either side of the line of sluices, as found most convenient. In Fig. 1 I show but one of these spouts; but in the detail Fig. 6 I show the right and left spouts and a portion of the conveyer. This carrier consists of a long sluice or trough F, having chains, with transverse bars traveling within it, and the material delivered into this carrier is transferred to the outer end and to a point of delivery as far distant from the sluice and other apparatus as may be necessary. This carrier is provided with legs

or other means by which the angle may be changed so as to carry the material up any desired grade from the sluice.

The driving mechanism consists, essentially, of a momentum water-wheel G, which is driven by a jet of water under high pressure from a nozzle H. Upon the shaft of this wheel is a gear or chain sprocket-wheel, and from this power is transmitted to the driving-wheels of the carrier I by intermediate gear, chain, or other well-known means for transmitting power.

Returning to the sluice at a point beneath the bars D over which the larger rocks have been carried is a concaved trough J, into which the material which falls through the grizzly is received and is concentrated toward the center of this concaved trough. In line with this trough is a receiving nozzle or pipe K, with which is connected what is known as a "siphon-elevator," consisting of a pipe the dimensions of which are proportioned to the amount of material to be carried and the power of the jet by which it is operated. This pipe extends upwardly to the desired height, and in line with its open end and at the opposite end of the concave is the hydraulic nozzle L, through which water is delivered under a high pressure directly in line with the receiving-nozzle K. The action of this jet of water is to transfer all the material which falls into this trough or channel into the passage K, and the momentum of the water and the moving material is sufficient to carry it up the pipe to any desired height. The rear end of the trough or channel is made divergent and depressed, so as to rest upon the bottom of the space occupied by the apparatus, and this serves as a suction-drain, so that any water which collects at this point upon the ground will also be sucked up and transferred, with the remaining material, into the elevator, thus preventing an accumulation of water at that point and keeping the ground practically dry enough for work.

Beneath the grizzly D the bottom of the sluice is made convergent, as shown at *a*, and it has also an inclined bottom with a curved opening through which the jet of water from the hydraulic nozzle discharges, the object of this construction being to converge and concentrate the material directly into the line of the jet of water, so that it will be at once transmitted into the elevator-pipe.

In order to assist the action of the elevator, I have shown one or more supplemental jet-pipes M, into which water under pressure is delivered, and these pipes open into the main elevator-pipe at different elevations beyond their receiving end, so that an additional momentum is given to carry the material up out of the pit.

Water for operating the elevator and also for washing down the banks by the use of hydraulic nozzles is supplied from sources at a high elevation, which may be several hundred feet. The water is brought from the ditch or source of supply through pipes and is delivered into a distributer N. This distributer consists of an iron cylinder having essentially flat heads, and from the sides of the cylinder the various pipes O lead, so that water can be transmitted into either of these pipes as needed by opening the gates P, which control the supply. These gates may be any usual or well-known form of water-gate. In the present case I have shown the gates in the form of sliding plates operated by a hand-screw the shaft of which extends up through the top of the distributer, so that it can be operated from the outside. In order to strengthen the heads and resist the outward pressure, I have shown heavy transverse bars Q extending across each of the heads and connected by rods R, extending down through the heads within the distributer from one end to the other. The lower ends of the rods are provided with heads and washers of sufficient size, and the upper ends are screw-threaded and have nuts and washers, as shown, so that the strengthening-bars may be clamped firmly down upon the heads. As the connecting-rods pass interior to the ends of these bars, it will be seen that any outward pressure which would tend to curve the bars in the center would act through the rods as fulcrums, so that the outer ends of the bars would press more strongly upon the outer edges of the distributer, and thus resist this tendency of the center of the bars to be pressed outwardly.

The material is supplied into the upper end of the long sluice or sluices A by washing down the banks, by shoveling, or by any means by which it can be conveniently delivered. It is usually washed in by the hydraulic nozzles, which also carry a sufficient quantity of water to cause the material to separate and flow freely, and the length of the sluice, together with the undercurrents previously described, is sufficient to allow the greater portion of the gold to be separated before it reaches the elevator. The elevator serves to carry the remaining smaller debris and the water, which continually collects at the bottom of the pit, up to such a height that it can be delivered into another sluice and carried away to any desired point of deposit, and this sluice may, if necessary, be also used for a further amalgamation of gold which may have escaped the previous apparatus, and also the settling and saving of sulfurets or other valuable material if such are found in conjunction with the gold.

The combination of the apparatus is such that it forms a continuous and labor-saving device largely automatic in its operation.

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

1. The combination with a sluice having a grating at its discharge end adapted to separate the larger from the smaller material said sluice having an inclined bottom below the grating and made convergent at its discharge

end, a conveying-pipe, the inlet of which is substantially in line with and receives the discharge of said bottom, a concave segmental receiver in line with said pipe and having its forward portion intersecting the discharge of the said inclined bottom at a point proximate to the inlet end of the conveying-pipe, and a jet-nozzle in line with the receiver and substantially in line with the flow of material down the sluice whereby the jet discharged thereby joins the material moving down the inclined bottom of the sluice and directs the same into said pipe.

2. The combination of a sluice having a grating at its discharge end, a conveying-pipe substantially in line with the discharge of the sluice and a jet-nozzle in line with said pipe, the bottom of the sluice beneath the grating inclining downwardly to accelerate the movement of the material passing over it and the discharge end of the bottom made convergent to concentrate said material in line with and in advance of the jet, said bottom also provided with an opening in the plane of and through which the jet of water from the nozzle discharges to force the material into the conveying-pipe.

3. The combination of a conveying-pipe, a receiver and a jet-nozzle each disposed substantially in line with the others, a sluice discharging into the receiver in the plane of the jet-nozzle and pipe, and a supplemental hydraulic pipe connecting with the conveying-pipe, said receiver having its rear end adapted to direct drain-water into the supplemental hydraulic pipes.

4. In a mining apparatus of the character described, the main sluice with a separating-grating forming a continuation in line therewith, directing-spouts and conveyers for the material discharged over the grating, a water-wheel with jet-nozzle and intermediate mechanism whereby the conveyer is actuated, a concaved receiver situated beneath the grating, a conveying-pipe forming a continuation in line with the end of the receiver, a hydraulic jet-nozzle discharging through the rear of the receiver and axially in line with the conveying-pipe, supplemental hydraulic pipes discharging into the conveying-pipe at intervals beyond its receiving end, a receiving and distributing chamber, a pipe by which water is brought into said chamber under pressure, connections between the hydraulic jet-nozzles and the distributing-chamber and gates controlling the supply to said nozzles.

5. In a mining apparatus of the character described, a sluice through which the material passes, a device at the lower end of the sluice for separating the larger and finer material, a receiver beneath the sluice into which the fine material is delivered, said receiver consisting of a concaved tray, a hydraulic elevator, the mouth of which is in line with one end of the bottom of the tray, a hydraulic nozzle discharging water in line with said pipe at the opposite end of the tray whereby the material falling therein is continuously carried by the momentum of the water into the elevator-pipe, and converging wings at the bottom of the sluice whereby the material delivered therein is constantly concentrated to the center of the tray.

6. In a mining apparatus of the character described, a conveying sluice or sluices, a device at the lower end thereof by which the larger material is separated from the finer, a concave segmental tray into which the finer material falls from the sluice, an elevator-pipe, the receiving end of which opens in line with the bottom of the tray, a hydraulic nozzle to which water is supplied under pressure opening at the opposite end of the tray and in line with the elevator-pipe whereby the material is constantly discharged from the tray into the elevator, said tray having the rear end made divergent and opening into the pit where it is placed whereby any water collecting in the pit will be drawn up by suction and discharged through the elevator.

In witness whereof I have hereunto set my hand.

SIMON W. WIBLE.

Witnesses:
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JESSIE C. BRODIE.