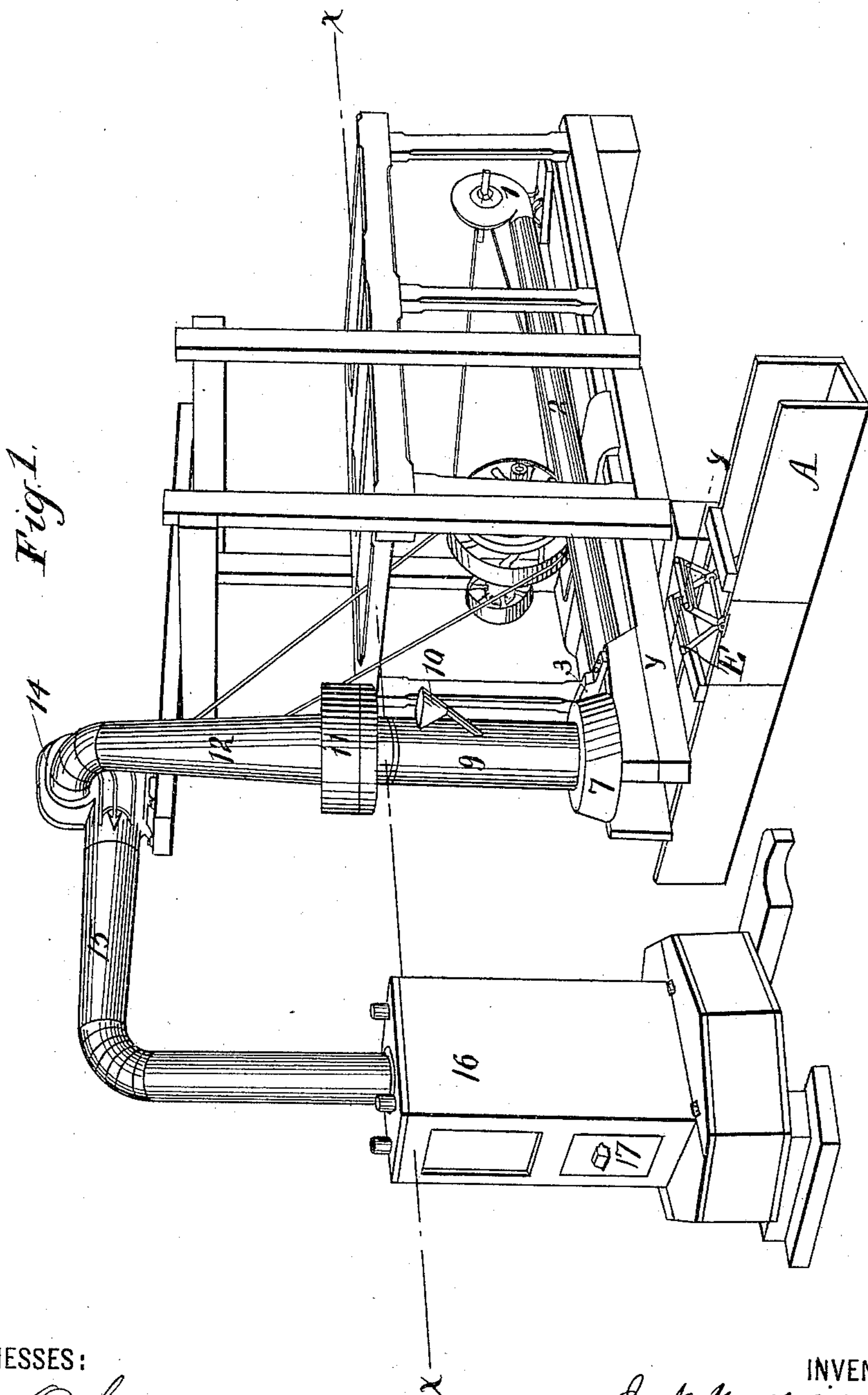


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MACHINE FOR SEPARATING FINE GOLD FLAKES FROM SAND.  
No. 604,566. Patented May 24, 1898.



WITNESSES:

*S. Olsen*  
*G. Griffith*

INVENTOR

*J. N. Marion*

BY

*J. N. Mc. Intire*

ATTORNEY

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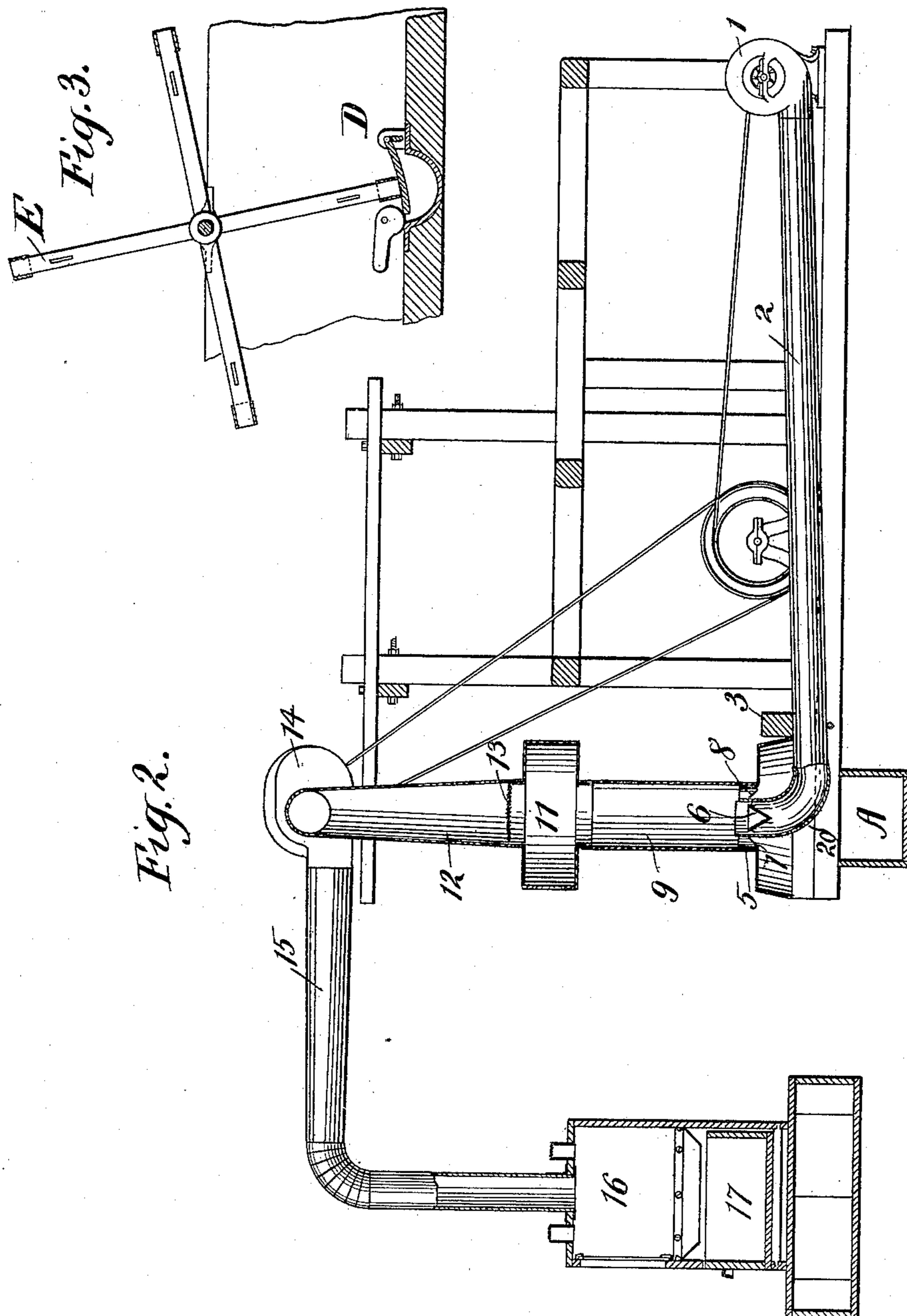
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# UNITED STATES PATENT OFFICE.

JONATHAN N. MARION, OF LOUISVILLE, KENTUCKY.

## MACHINE FOR SEPARATING FINE GOLD FLAKES FROM SAND.

SPECIFICATION forming part of Letters Patent No. 604,566, dated May 24, 1898.

Application filed January 25, 1897. Serial No. 620,510. (No model.)

*To all whom it may concern:*

Be it known that I, JONATHAN N. MARION, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and  
5 useful Machine for the Purpose of Separating Fine Gold Flakes or Flour Gold from Sand; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying  
10 drawings, forming part of this specification.

My invention relates to means for separating from the sand and gravel what is generally known as a "deposit" of flour gold and fine gold flakes, and has for its object to provide for use a machine for this purpose which  
15 will more effectually extract a larger percentage of the gold than has heretofore been extracted from this species of gold-deposit stuff.

To enable those skilled in the art to which my invention relates to make and use a machine or apparatus embodying the same, I will now proceed to more fully describe my said invention, referring by numbers and letters to the accompanying drawings, which  
25 form part of this specification, and in which I have shown the invention carried out in that precise form of apparatus which I have so far constructed and successfully operated, although, as will be readily understood, various modifications and changes in the details and construction of said machine may be made without departing from the spirit of my invention.

In the drawings, Figure 1 is a perspective view of a machine made according to my invention. Fig. 2 is a vertical section taken through planes indicated by the dotted lines  
35  $xx$  at Fig. 1. Fig. 3 is another partial vertical section taken on a plane indicated by the line  $yy$ , Fig. 1.

In the several figures the same parts will be found always designated by the same letters or numbers of reference.

9 indicates the lower section of a vertically-arranged tubular part of the machine, to the interior of which the material to be treated is supplied by feeding it into a receiving-hopper 10, the tubular leg of which passes ob-  
45 liquely through the wall of the body portion 9 until it reaches the central or axial line of said body portion, where it is bent down-

wardly, so as to discharge the material which flows through it in a vertical direction and in a column about coincident with the axis of  
55 the part 9. Directly over and connected with the upper end of the said part 9 is an enlarged cylindrical portion 11, from which extends upwardly the top section 12 of the vertical column or body portion of the machine, and  
60 the lowermost portion of this part 9, where it connects with the enlarged part 11, is provided with an interior diaphragm or horizontal screen 13, made, preferably, of about No. 60  
65 brass wire, through which, as will be presently explained, the finest particles or flour portion of the gold is forced by an air-blast, which fine particles of gold are caused to ascend or are assisted in a further ascent through  
70 the tubular column 12 by a suction fan or blower 14, located, as is clearly shown, at the upper end of 12 and connected with a horizontal tube or pipe 15, the descending vertical leg of which latter enters the top of a receiver or box-like receptacle 16, which is provided  
75 with a drawer 17, into which the flour gold descends or is deposited.

The lower end of the tubular body or receiving-tube 9 of the machine fits closely over the central flange 5 of a base-piece 7 of the  
80 machine, which base-piece rests upon suitable supports, as shown, and within this hollow base portion 7 are arranged certain devices which I will now explain. Concentrically within this base portion and extending  
85 slightly up into the lower end of the tubular body or column 9 is located the upper end of a pipe-elbow 20, the lower horizontal portion of which connects with a blast-pipe 2, which extends off some distance to a force fan or  
90 blower 1, and within the upper bent end of said elbow, securely fastened in place, with its upper edge a short distance below the upper end of the elbow and with its perimeter concentric with the tubular upper end of said  
95 elbow and located so as to leave an open annular space between the two devices of about three-sixteenths of an inch, is an inverted hollow cone or pan-shaped device 6, while secured exteriorly to the open upper end of  
100 said elbow is a sort of cape or frustum-shaped device 8, which has its upper smaller perimeter fastened to the exterior of said elbow at a level about coincident with the upper edge or

perimeter of the pan-shaped device 6, and which has its lower edge (of greater diameter) arranged so as to leave between it and the interior wall of the vertical body portion 9 an annular space of about three-sixteenths of an inch. The horizontal portion of the elbow 20 and its pipe connection 2 are held securely in place by a yoke 3 or equivalent means.

10 The discharge end of the pipe of the supply-hopper 10 being arranged centrally within the body portion 9, it will be seen that, as illustrated at Fig. 2, the stream of mixed sand and gold deposit discharged from the hopper-pipe will descend so as to first strike the middle portion of the pan-shaped device 6, and when the supply shall have filled said pan to overflowing the sand will have assumed the shape of a conical pile, from which it will overflow the circular edge or perimeter of the said pan.

The flume of the machine, which may be constructed, as shown, of a bottom and two sides, has a proper degree of descent to insure the proper flow through it of the water-supply, and it is supplied at intervals with boxes or receivers arranged in its bottom and suitably supplied with quicksilver.

Over each of the receivers is revolved by the action of the stream of water a paddle-wheel mounted on its axis so as to freely turn and which operates to brush over the top of one of the receiver-boxes, all in a manner and for the purposes to be presently described. I have shown in Fig. 1 and in the sectional view, Fig. 3, one of these revolving wheels with its accompanying quicksilver-receptacle, and it will be understood that the other analogous devices are duplicates of the one shown.

In the operation of my machine, the force-fan 1 and the exhaust-fan 14 being set in motion by any suitable motive power and the flume being properly supplied with water at its receiving end, the fine sand and gravel containing the gold deposit, after having been sifted and dried, is properly fed into the supply-hopper 10 and, being discharged in a comparatively small vertical column at the lower end of the hopper-pipe, first fills the pan 6, and then as the supply-column is kept up overflows said pan, and at the same time the air-blast from pipe 2 and elbow 20 strikes the overflowing annular mass of sand at the perimeter of the pan 6 and forces upwardly the finer sand and gold into the body portion 9, or all the particles of both sand and gold that the blast is capable of blowing up, the heavier and larger particles of the mass of material, or the coarse sand and larger gold flakes, overflowing the frustum-shaped cape 8 and descending into the flume or the water therein. Of that portion of the mass, including the fine sand and flour gold, which has been blown up toward and against the screen 13 the flour or fine gold and the dust pass through said screen, and after having passed there-

through are lifted or have their ascent continued up to the exhaust-fan at 14, through which they pass and by which they are forced on through the tube 15, and thence downwardly into the receiver 16, where by gravity they finally settle in the drawer 17 of the said receiver. This drawer is of course closely fitted to slide in and out of the interior of the receiver 16, and there is a slightly-projecting horizontal molding on the interior of said receiver, a little over the upper edges of the drawer, which insures the guidance and deposit of all the flour gold and dust within the said drawer. This receiver 16, it will be observed, has at its upper end four vent-tubes for the escaping of the air forced in with the flour gold and dust, the tops or open ends of said tubes, however, being covered by wire of such fine mesh—say No. 80 mesh brass wire—that only the air escapes through it. While this separation of the flour gold and dust or very fine sand from the rest of the mass and their discharge into the receiver is progressing, as just explained, the coarser particles of sand and gold which overflow the cape 8 and descend into the initial or leading end of the flume A are washed or carried on by the flow of the water in the flume and pass successively over the series of quicksilver-receptacles or amalgamating devices D, and in their passage on through the flume and over and through the said series of amalgamating-boxes the remaining and larger particles of gold are washed or separated from the baser material and amalgamated with or absorbed by the quicksilver in said boxes. Each of said boxes is made, as shown, so as to equal in length the width of the interior of the flume and is semicylindrical in form, being let into the bottom plate of the flume, so that the rear and the forward horizontal flanges at the edges of each quicksilver-box are flush with the upper surface of the flume-bottom, to which they are secured by screws or in any other suitable manner, and each of said boxes is formed with a hinged lid the pintle of which is mounted in vertical ears which project upwardly at each end at one side of the semicylindrical receiver, each of the said lids being so made and arranged that when closed its rear edge lies in plane with the rear flange of the semicylindrical box, but so as to leave a space or opening between these two parts of about one-eighth of an inch, while the upper surface of the lid lies in a curve or arc of a circle matching the curve in which move the extreme outer devices or arms of the paddle-wheel before alluded to, the rear forward portion of the hinged lid being provided with a gate which when the lid is down will leave an open space between its lower edge and the rear top flange of the quicksilver-box of about one-sixteenth of an inch.

Each of the wheels E, it will be seen, is composed of four arms or paddle-like devices, the extremities of each of the bars or arms

being provided with a flat rubber paddle-like band which during the rotation of the wheel sweeps over the closed lid of the quicksilver-box, brushing away any of the fine sand that might otherwise enter said box and get mixed with the quicksilver, while each pair of said arms is also provided with another set of floats or paddles which are acted upon by the flow or run of water in the flume that operates to drive said paddle-wheels. In the operation of this part of the machine the combined coarse sand and gold carried or swept on over the quicksilver by the flowing stream of water is acted upon in such a manner that while the sand is continuously carried forward and finally discharged at the exit of the flume the particles of gold mechanically mixed with the sand and fine gravel, passing on at the lower portion of the moving mass and in passing under the lids of the quicksilver-boxes and on over the surface of their contents, are absorbed or amalgamated by the quicksilver contained in these receptacles, and thus are separated or extracted from the sand, which is washed out of the flume.

It will be observed that in my new machine the novel mode of operation lies in the treatment of gold-deposit sand, first by the operation solely of the air-blast, until all the finer particles or flour gold and dust sand are separated and carried off to one place and deposited, while the remaining larger and heavier portions escape the action of the blast (by which, however, all the particles of the mass fed into the machine are separated and blown up) and descending into the flume are there separated from the entire waste mass of sand and gravel by the washing out and amalgamating process described. I wish it to be understood that I consider this peculiar mode of operation as the essential point or pith of my invention, and that therefore I desire to have my claims cover a machine involving this mode of operation, whether the details of construction be such as I have shown or its construction be materially modified.

I therefore claim as new and desire to secure by Letters Patent—

1. The combination, with a receiving-chamber; a supply-hopper; and a nozzle, for depositing centrally within the receiving-chamber the mass of material fed from said hop-

per to the machine, of means for supplying an air-blast which operates to force upwardly within said chamber the finer portions of the sand and also all the finest particles, of the gold; a screen, located at the upper end of said chamber, and adapted to permit the passage through it of only the dust and flour gold; and a pipe extending upwardly from said screen and provided with an exhaust-fan, operating to enforce the ascent of said flour gold, and fine particles of dust, and discharge them into a suitable receiver, or receptacle.

2. In combination with a vertical, tubular, receiving-chamber, provided with a supply-hopper and nozzle as specified, a centrally-located receiving-pan, 6, arranged within the open, upper, end of a blast-pipe, located within the lower end of said receiving-chamber; the frustum-shaped cape, or deflector, 8, arranged and operating as specified; a force-fan, 1; and a flume, A, located beneath the sand-receiving blast devices as shown; the whole arranged and operating so that the overflowing mass of material fed into the pan, 6, will be acted upon by the blast which forces upwardly its finer particles, and disintegrates the overflowing mass, while at the same time the coarser sand and the bulk of the entire mass will finally descend into the flume; substantially as and for the purpose hereinbefore set forth.

3. The combination, with the vertical, tubular chamber 9, into which the mass of material is centrally discharged and within which the flour gold and dust are separated by a blast operation; and the flume A, into which the coarser sand and gold particles descend from said chamber, of a series of quicksilver-receptacles, or amalgamating-boxes D, each of which is let into the flume-bottom, each of which is provided with a hinged lid and is made as specified; and a series of wheels each arranged relatively to one of said boxes in the manner specified and revolved by the action of the water in the flume; the whole constructed and operating substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereto set my hand this 14th day of December, 1896.

JONATHAN N. MARION.

In presence of—

C. L. BROWNING,  
MORGAN S. YOUNG.