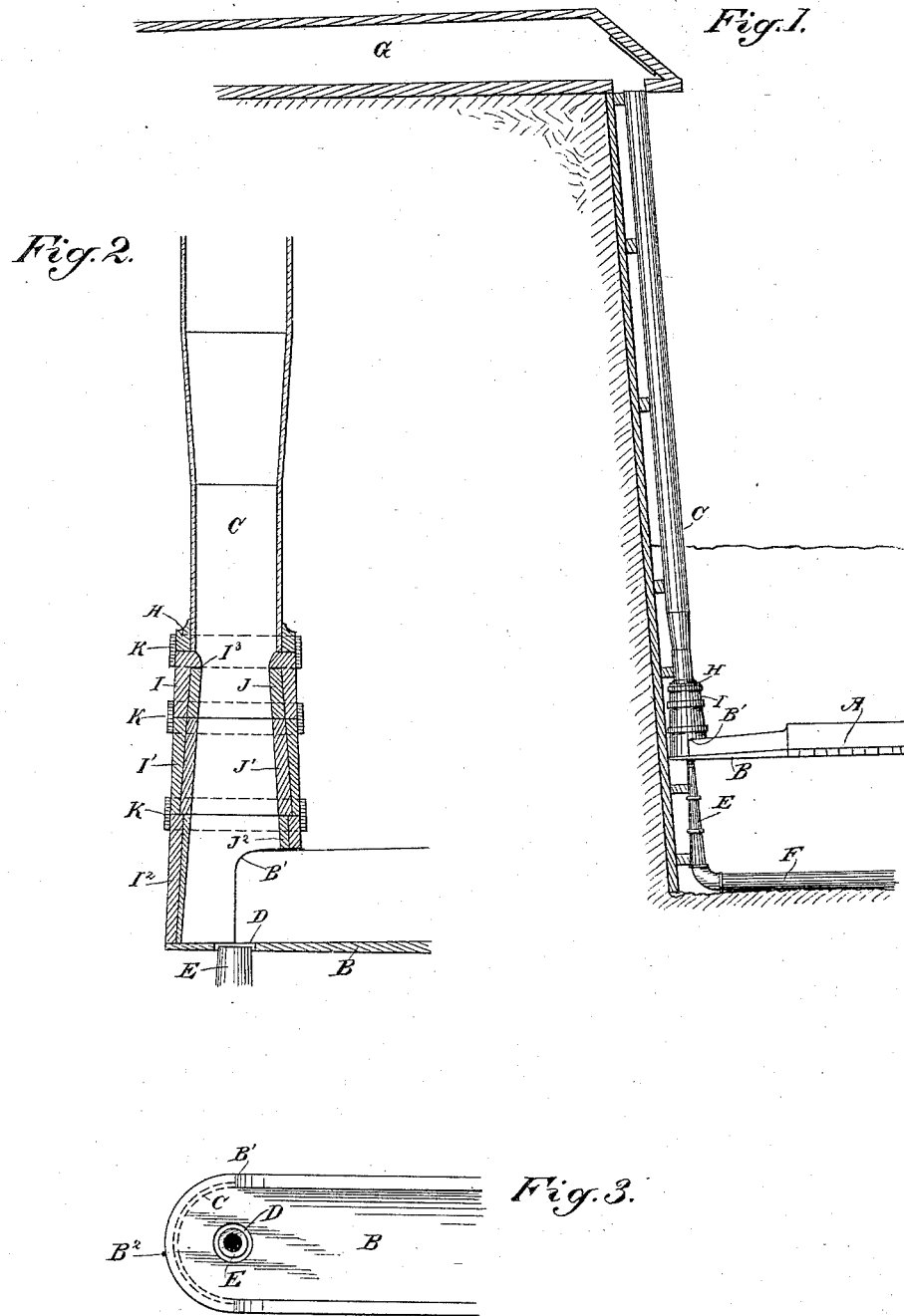


(No Model.)

N. C. MILLER.
HYDRAULIC MINING APPARATUS.

No. 489,751.

Patented Jan. 10, 1893.



Witnesses,
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UNITED STATES PATENT OFFICE.

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HYDRAULIC MINING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 489,751, dated January 10, 1893.

Application filed September 22, 1892. Serial No. 446,610. (No model.)

To all whom it may concern:

Be it known that I, NEWTON C. MILLER, a citizen of the United States, residing at French Corral, Nevada county, State of California, have invented an Improvement in Apparatus for Hydraulic Mining; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus to be used for hydraulic mining.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a general view showing the arrangement of the apparatus. Fig. 2 is a sectional elevation of the lower end of the discharge pipe and its connections. Fig. 3 is a plan view of the end of the sluice showing the nozzle and bottom opening.

Various devices have been employed in the attempt to raise gravel and other gold bearing and valuable earth from points where it may be deposited, to higher elevations, by the use of a jet of water under pressure, the operation being performed by introducing the jet nozzle into a closed sluice or carrying box, so that the velocity of the water will carry up the dirt or gravel which is deposited so as to be acted upon by the stream. The great difficulty encountered in this class of apparatus has been the clogging up of the discharge pipe by reason of so great an amount of heavy material accumulating in it that the momentum of the jet is so checked that it will not operate. My invention is designed to overcome this difficulty by introducing, along with the jet of water, a current of air which prevents the choking of the material within the pipe.

It also consists in the novel arrangement and construction of the parts of the apparatus.

It is especially useful in cases where the gravel or earth is brought in sluices to points so much below the surface of the bed rock that further work cannot be done without first raising it sufficiently to allow another sluice to be put in.

A represents a line of sluice into which the material has been deposited and by which it has been carried down on the proper grade for work (which is usually about one half an inch per foot of length), until it has reached

a point below the surface of the bed rock, as illustrated in Fig. 1. At the end of this sluice I fix a steel plate B, the sides of which are sloped or cut away, as shown, sufficiently to allow the end to pass beneath the correspondingly cut away portion of the lower end of the discharge pipe C, as shown at B'. The end of the plate B, extending beyond the sides, is rounded as shown in Fig. 3, forming a curve B², which fits against the interior and rear side of the discharge pipe C where it extends down to or below the level of this plate, thus essentially closing this portion of the pipe. Through the bottom of the plate B is made an opening D of larger diameter than the nozzle E, through which water is to be discharged. The nozzle E is connected with a pipe F which brings water from any elevated source having sufficient head to produce the requisite pressure and force of discharge from the nozzle.

The sluice A is laid in a trench which is cut below the surface of the bed rock as shown, and a deeper channel is cut below this, of sufficient diameter to allow the pipe F to be carried along in it below the sluice, so that the nozzle E is turned upwardly and stands in direct line with the discharge pipe C. This pipe may be placed upright or at any suitable or desired angle. I have found that for the usual operation of mining, it may be set to an angle of fifteen to twenty degrees from the vertical, and it is properly supported by timbers or frame-work from the side of the trench, or other suitable support, so that the pipe C may be extended to the desired elevation above the surface, where it discharges into a second sluice G at a sufficient height above the surface of the ground to allow the proper grade to be given to this sluice, so that the material may be again carried on until the gold has all been extracted, or until the sluice again reaches the point where a second elevation is necessary.

In order to protect the discharge pipe from wear, I have shown it reduced in diameter toward the bottom and at the lower end of the main portion of the pipe a flange H surrounds it. Below this flange extend sections I, I' and I². These sections are made cylindrical and increasing in diameter from the flange I³ toward the bottom, thus forming a cone-

shaped receiving mouth. The upper section I has an inwardly projecting flange I³ which reduces the interior diameter at this point to less than the lower end of the pipe C, and also forms a shoulder against which the upper interior section J abuts. These sections J, J' and J² correspond with the sections I, I' and I² fitting therein and forming a line therefor. In order to retain these sections together, I have shown bands K surrounding the outside, and these bands are driven down over the meeting edges of the sections when they are put together, thus holding them all in place. This receiving cone with its lining, is thus easily taken apart for repairs and put together, and the lining receives the frictional action of the material which is being delivered through the pipe and largely relieves the discharge pipe from the wear which would otherwise take place on account of the peculiar shape and contraction of the upper end to a smaller diameter than that of the main discharge pipe.

The operation of my apparatus is as follows:—The gravel or earth is delivered into the sluice with a sufficient quantity of water and may pass over riffles containing mercury, or in other ways be operated upon, as it passes down the sluice until it reaches a point so low that no further grade can be profitably obtained. At this point it passes over the plate B, and around the opening D through which the nozzle E of the water pipe discharges. The force of the water discharging through the nozzle E is sufficient to constantly carry up the pulp through the discharge pipe C and the air which is admitted around the sides of the nozzle, acts to separate the particles of material and keep them loosened up so that they will not pack, and will also prevent too large a quantity of material being contained in the discharge pipe at any one time, to prevent a free delivery through the whole length of the pipe.

By means of the linings and receiving cone at the lower end of the discharge pipe, the wear of the pipe is greatly reduced and repairs can be easily made.

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

1. In a hydraulic apparatus, the sluice adapted to convey earth or material having an end plate B, as shown, a discharge pipe extending upwardly and having the lower end approximately fitted to the plate at the end of the sluice, an opening in the bottom of said plate essentially concentric with the discharge pipe, a nozzle through which water is delivered under pressure through said opening, said nozzle being of smaller diameter than the opening whereby a current of air is introduced through the opening in connection with the stream of water, substantially as herein described.

2. In a hydraulic apparatus, a sluice adapted to convey earth or pulp, and upwardly extending discharge pipe, the lower end of which approaches the end of the sluice, a hollow frustum of a cone at the bottom of said discharge pipe having one side cut away, an extension B of the sluice, the sides of which fit the cut away portion of the discharge pipe, and the bottom of which extends across the bottom of the discharge pipe, with its end rounded to fit the extension of the rear side of the pipe whereby it is closed at this point, an opening made through the bottom plate of the sluice approximately concentric with the discharge pipe, a water discharge nozzle of smaller diameter than said opening fixed concentric therewith and delivering a jet of water under pressure through the opening whereby air is drawn through said opening simultaneously with the discharge of the jet of water and delivered through the discharge pipe, substantially as herein described.

3. A hydraulic apparatus, a sluice, a pipe and nozzle delivering water under pressure upwardly through the discharge end of the sluice, a discharge pipe standing in line with said nozzle and fitting the discharge end of the sluice, the lower end of said discharge pipe being composed of sections I and J fitted together and secured by hoops, substantially as described.

In witness whereof I have hereunto set my hand.

NEWTON C. MILLER.

Witnesses:

S. H. NOURSE,
J. A. BAYLESS.