2 Sheets—Sheet 1.

G. W. CRANSTON.

Hydraulic Mining Apparatus.

No. 209,661. Patented Nov. 5, 1878.

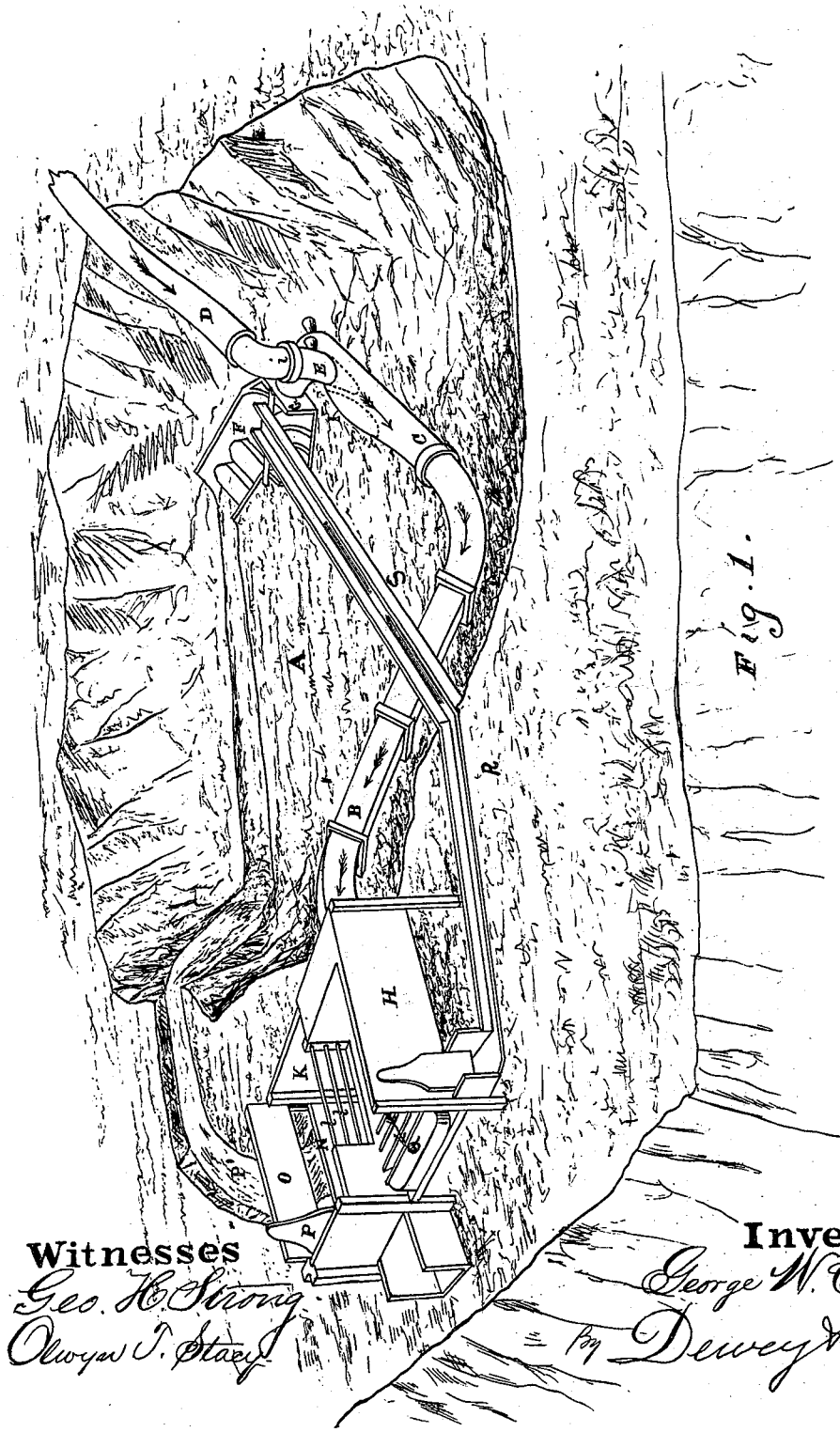

Fig. 1.

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2 Sheets—Sheet 2.

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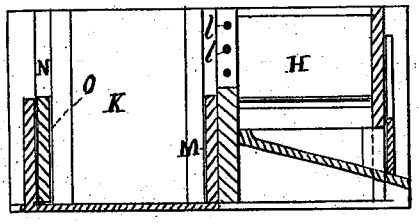
Fig. 2.



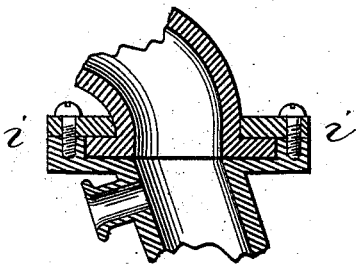
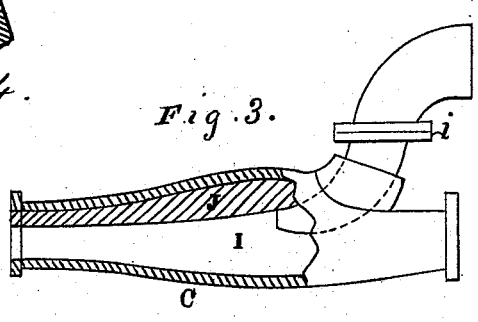


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE W. CRANSTON, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN HYDRAULIC MINING APPARATUS.

Specification forming part of Letters Patent No. **209,661**, dated November 5, 1878; application filed July 25, 1877.

To all whom it may concern:

Be it known that I, GEORGE W. CRANSTON, of the city and county of San Francisco, and State of California, have invented Improvements in Apparatus for Hydraulic Mining; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements upon the hydraulic-mining apparatus for which Letters Patent No. 185,216 were issued to me on the 12th day of December, 1876.

In my former patent I described the pipe-conduction through which the earthy matter was forced by the hydraulic stream as having an enlarged chamber formed in it directly in front of the hydraulic nozzle. I find, however, by experience that the size of this chamber must be made larger or smaller, according to the nozzle employed and the quantity of water delivered by it. When a sufficient head of water can be obtained, as in the winter season, I prefer to employ a large nozzle and run the machine to its full capacity; but when the supply of water decreases, as in the summer, a smaller nozzle must be used, and the chamber in the conducting-pipe must be decreased correspondingly. To avoid the necessity of removing the nozzle-section of the conducting-pipe and substituting one with a smaller chamber therefor, where this contingency does occur, I have devised a simple arrangement for filling a portion of the chamber-space, which will be more fully described hereinafter.

In connection with my improved hydraulic-current elevator and mining-sluice, I have also arranged a wasteway, by means of which I can draw off from the flume or sluice a portion of the water after it has been utilized for raising the tailings or earthy matter, and conduct it back into the tail of the machine, where it can be reused as a diluent for the new matter which enters the conductor-pipe.

Referring to the accompanying drawings, Figure 1 is a perspective view of my invention. Fig. 2 is a sectional view of sluice and tank. Fig. 3 is a sectional view of ring-joint *i* and chamber I; Fig. 4, a detail of the swivel or ring joint.

Let A represent the excavation from which the auriferous material is to be raised. B is the upright spout, through which the material is forced by the current. C is the ground-section inside of the excavation. D is the pipe which leads from the elevated reservoir or source of water-supply. E is the nozzle. F is the tail-section. G is the receiving-box. H is the sluice or flume at the upper end of the spout B, into which the material is discharged, all arranged as described in my former patent.

It frequently becomes necessary to shift the position of the machine in the excavation, and to allow me to do so without detaching the pipe D, which conducts the water from the elevated reservoir, I make a ring-joint or swivel-coupling at *i*, (see Fig. 4,) which permits me to adjust the machine to any desired position about the vertical center of the joint.

The ground-section C is made with an enlarged chamber, I, just in front of the nozzle, as described in my former patent. In order to reduce the size of this chamber when a smaller nozzle is used, I secure a block, J, in the chamber, just in front of the nozzle. This block is fitted to the upper half of the section in the chamber, and can be made of any desired size, according to the size of chamber or throat it is desired to provide. This block diminishes the size of the passage, so that a less quantity of water will have sufficient force by the resulting concentration to carry the material up through the spout.

Alongside of the sluice or flume H, I construct a box or tank, K, the ends of which are as high as the flume. I then cut away that portion of the side of the flume which is next to the box, and secure wires *l l* horizontally, at a short distance apart, across the opening. Outside of these wires, and next to the side of the flume, I construct a vertical sliding gate, M, which forms the side of the box. The opposite side, N, of the box K, I make half as high as the ends, and inside this half side I arrange another vertically-sliding gate, O. I also make an opening in the lower part of one end of the box, which can be closed by a sliding gate or valve, P, as represented in Fig. 1.

When the machine is in operation the material which enters the flume from the spout B will immediately begin to settle to the bottom, leaving the surface-water in a degree

clear. I then lower the gate M, so that a portion of the surface-water will flow over it into the tank K. I then lower the opposite gate, O, so as to provide an overflow from the tank. Any heavy material which may be carried over into the tank will settle to its bottom, while the clear surface-water is skimmed off by overflow on the outside of the tank, and will be carried by a dug-out channel, P′, back into the excavation and into the tail of the machine, where it can be again used to carry up the new material which enters the spout. When a sufficient quantity of heavy material has accumulated in the tank K, I open the end gate or valve, P, and allow it to wash out. I thus utilize a portion of the water after it has once passed through the spout.

By these improvements I render my improved hydraulic-current earth-elevator and mining-sluice much more convenient and useful for utilizing the water and saving the gold contained in the material operated on.

I do not design the joint to be flexible in any instance while the machine is in operation; but for the greater convenience of setting the machine in different localities, and for adjusting and connecting the nozzle-pipe with the hydraulic pipe in the different positions and angles in which it is required, I find it convenient to loosen the upper flange of the joint by raising the screws. The hydraulic pipe is then disconnected, and I move the machine to the required position. After it is set the joint is turned so as to connect at its exterior with the hydraulic pipe. The loose flange is then screwed down solid and tight, and the joint is not designed to be moved again until the machine is again moved and reset. The object of this is to enable me to set my machine and accommodate the two pipes to the varying angles at which they meet, incident to their relative positions, without the necessity of having a new casting with a different angle for each new position.

Although I have described minutely a special settling-tank in the above specification, I do not desire to confine myself to this particular means for clearing the water, the main point being to clear it from the sand and sediment with which it is loaded, so that the comparatively clear water may be used over again in the claim for mining purposes. It will readily be seen that there will be a surplus of water at the outlet, because the water which is brought to the nozzle under pressure will take into my apparatus a quantity of water and material, carrying it up and out through the discharge, as has been before described. Only a part of this water is needed after this point is reached, and if it can be cleared of the principal part of the sediment, sand, gravel, and other substances which have been brought out, it may be carried directly back into the claim, to be used over again, with a great economy and saving of expense.

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

1. In a hydraulic earth-elevator, the pipe D, provided with a joint at *i*, in combination with the ground-section C and spout B, substantially as and for the purpose described.

2. In a hydraulic earth-elevator, the ground-section C, provided with the chamber I and block J in the upper part of said chamber, for diminishing the area thereof, substantially as and for the purpose set forth.

3. In a hydraulic-mining apparatus, the settling-tank K, having the overflow-gates M and O, and the gate P, in combination with the return channel or spout P′, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand and seal.

GEORGE W. CRANSTON. [L. S.]

Witnesses:

GEO. H. STRONG,

FRANK A. BROOKS.