

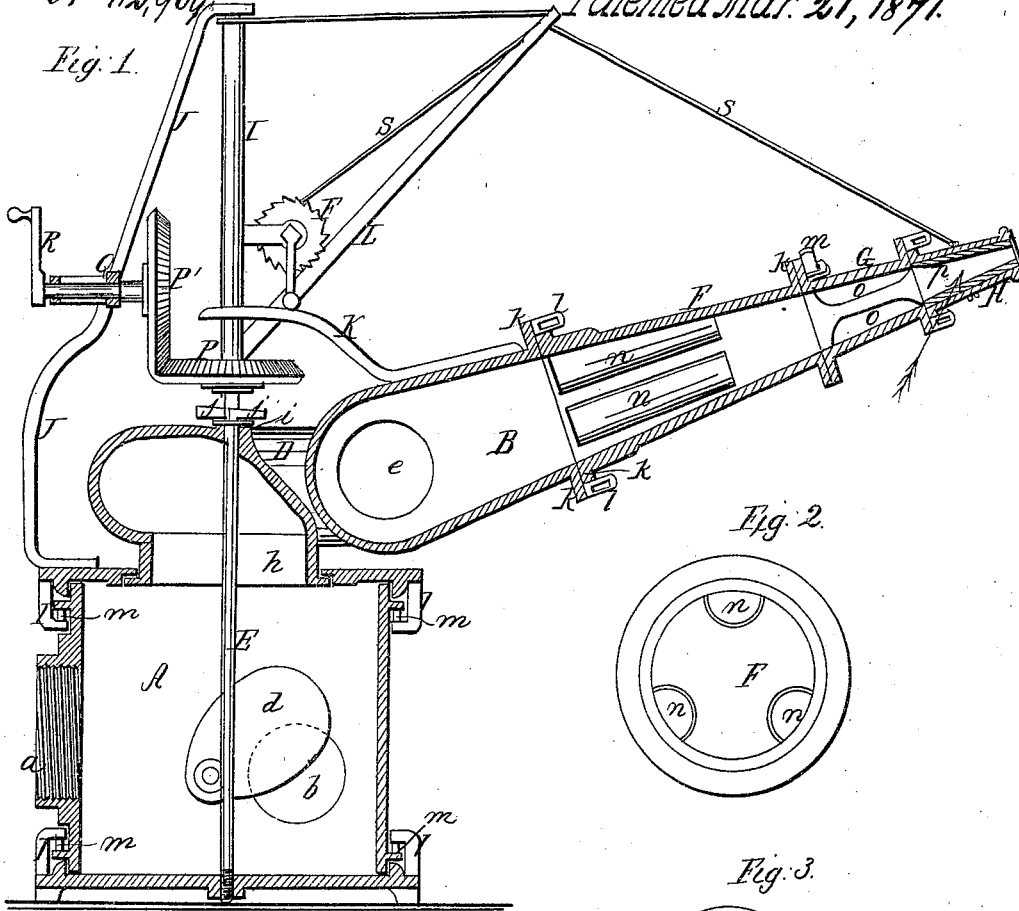
*H. Shaw.*

*Hydraulic Nozzle.*

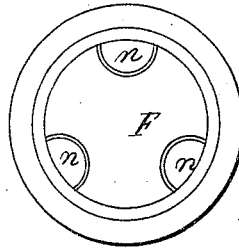
*N<sup>o</sup> 112,969.*

*Patented Mar. 21, 1871.*

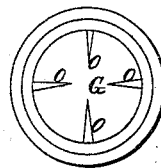
*Fig. 1.*



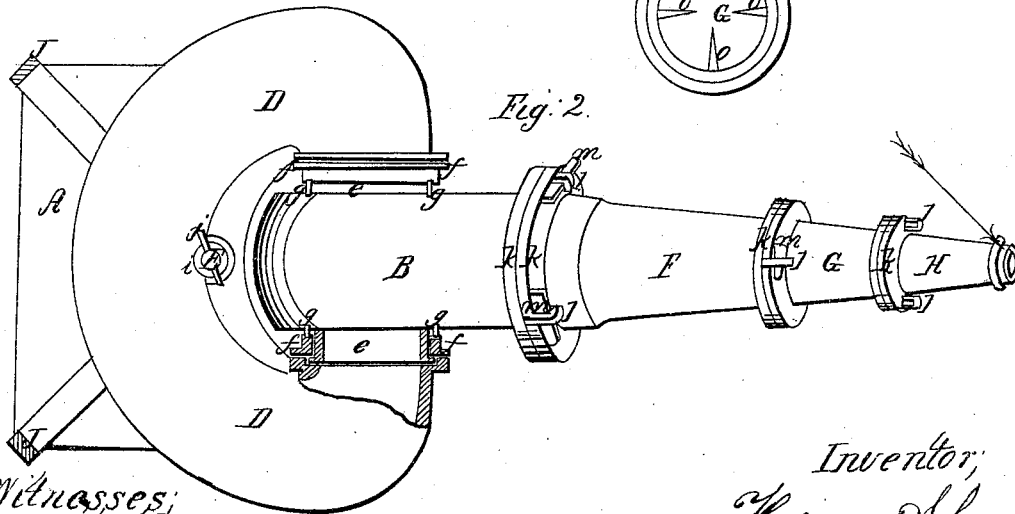
*Fig. 2.*



*Fig. 3.*



*Fig. 2.*



*Witnesses:  
Charles Brown  
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# United States Patent Office.

HENRY SHAW, OF NEVADA CITY, CALIFORNIA.

Letters Patent No. 112,969, dated March 21, 1871.

## IMPROVEMENT IN HYDRAULIC-NOZZLES.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, HENRY SHAW, of Nevada City, county of Nevada, State of California, have invented an Improved Hydraulic-Nozzle; and I do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

My invention relates both to the construction and method of operating the nozzles which are used principally in hydraulic mining for directing a stream of water under great pressure against a bank or other deposit for the purpose of washing it down and exposing the underlying or gold-bearing stratum.

My invention consists—

First, in connecting the nozzle with a water-chamber or distributor, from which the water issues through a peculiar connecting-pipe into the nozzle;

Secondly, in certain improvements in constructing the nozzle, especially its interior, so that the stream of water which is forced through it will be delivered without the twist given to it when the ordinary nozzle is used; and

Thirdly, in a novel manner of handling the nozzle, so as to change the direction and elevation of the stream according to the necessities of the case.

It also consists in constructing the entire machine so that it can be put together without the necessity of using bolts, rivets, or screws, thus avoiding the necessity of transporting it in bulk, as it can be put together at the place where it is to be used by any person without the necessity of other tools than a hammer.

In order to describe my invention so that others will be able to understand its construction and operation, reference is had to the accompanying drawing forming a part of this specification, in which—

A represents an iron chest or distributor, having at one side the flanged opening *a*, to which the hose which conveys the water from the reservoir is attached in the usual manner, so as to deliver the water into the chest.

Other flanged openings *b* may be made upon the other two sides of this chest, to which other pipes may be attached when it is desired to increase the pressure inside the chamber above that given by the main hose, or they may serve to draw off the water from the chamber when it is desired either to exhaust it or relieve the pressure.

These holes or openings *b*, when not in use, are closed by valves, *d*, which fall across their faces inside the chamber, being held in place by gravity. The pressure of the water inside keeps them water-tight.

In the top of the chest A is a circular opening, of larger diameter than the main opening *a*, through which the water in the chamber inside the chest is driven by hydrostatic pressure into the nozzle, as will be hereafter described.

The nozzle is constructed in two or more parts or sections. The rear section B has its rear end closed by being cast in that manner, and has inlet openings, which pass through arms, *e*, at each side, into the interior of the section, thus forming hollow trunnions.

The hollow trunnions *e* bear against the opposite ends of a horizontal pipe, D, which is bent to the form of a "C."

Rings or bands, *f*, are placed around the trunnions *e* previous to their being placed in the ends of the curved pipe D, and keys *g* are driven between these bands and the section B, so as to bind them firmly against the ends of the pipe D, and thus allow the nozzle to be moved up and down, while a perfectly water-tight joint is formed.

At the center of the C-shaped pipe D is a circular connecting-pipe or rim, *h*, which projects downward and passes through the circular opening in the top of the chest A, a horizontal rim or flange on its lower end retaining it in place and serving to form a water-tight joint when acted upon by the pressure in the chest.

The C-shaped pipe which carries the nozzle turns upon this joint from right to left in giving a new direction to the stream.

A vertical shaft, E, passes directly through the center of the chest A, being held by a nut beneath its bottom. This shaft also passes through the center of the pipe or rim *h* and C-shaped pipe D.

Just above where the shaft E passes through the C-shaped pipe D a washer, *i*, is slipped over it, and a key or wedge, *j*, is passed through a slot in the shaft above it, and driven in until it presses downward upon the pipe D, thus relieving the moving joint in the top of the chest, so that it will turn easily notwithstanding the inside pressure.

The section F of the nozzle is usually made of great length, and is connected with the section B in the following manner:

Both sections B and F are provided with flanges, K, one of which is provided with slotted projecting lugs, *l*, which pass through corresponding slots in the other flange.

A key or wedge, *m*, is then driven through the slot in the lug *l*, which firmly binds them together.

Inside of this section F are placed longitudinally three or more semi-circular plates, *n*, which taper gradually toward the point of the nozzle. These plates carry the body of water in the pipe in a direct

line, and prevent the screw-like movement which is usual in water-pipes working under pressure.

The short section G is secured to the section F in the same manner as above described, and has placed longitudinally along its interior guide plates, *o*, which project a short distance toward the central line of the pipe, and are made thinner as they approach the center, similarly to the ordinary gun-sight.

The extreme end section H of the nozzle is secured to the section G by means of the flanges and keys, as above described, and has an inside lining, *p*, which consists simply of a glass tube which fits inside of it. This lining will allow the stream to issue with less friction than a metal-pipe, and can be renewed at any time without trouble.

For operating the nozzle, I place upon the upper end of the shaft or spindle E a derrick or crane, I, which is supported by guy-rods, J J, which are secured to the top of the chest and serve to keep it firmly in place.

A bifurcated bar, K, is secured to the section B of the nozzle, and has its separated arms extending up so as to pass upon each side of the boom L, so that, as the derrick is turned from side to side, it will carry the nozzle with it.

A bevel-wheel, P, is secured upon the mast of the derrick, which engages with the bevel-wheel P', which bears in the cross-bar Q, and is operated by a crank, R, so that by simply turning the crank, the nozzle can be directed so as to throw the stream to any desired point.

The elevation and depression of the nozzle are accomplished by a rope or cord, S, which is secured to

it, and passes up over a pulley in the extreme end of the boom L, thence it passes to a windlass, T, by turning which the nozzle can be given any desired elevation.

The entire machine is put together with keys entering slotted lugs, in the same manner as described for uniting the nozzle sections, so that it can be transported from place to place in pieces, and put together at the mine without difficulty.

Having thus described my invention,

What I claim, and desire to secure by Letters Patent, is—

1. The combination of the C-shaped pipe D with the chest A and section B, arranged, as described, to form a double-jointed connection between them, substantially as specified.

2. The combination of devices for connecting the two ends of the pipe D to the pipe B, consisting of the loose trunnions *e e*, rings *f f*, and wedges *g*, arranged to operate as described.

3. The glass lining P, fitted in the nozzle H, by making it conical on the outside, and fitting its base against the end of the pipe G, to which the nozzle H is fastened.

4. The arrangement of the conical guides *n*, upon the interior surface of the section F, substantially as and for the purpose specified.

In witness that the above-described invention is claimed by me I have hereunto set my hand and seal.

HENRY SHAW. [L. S.]

Witnesses:

CHARLIE BROWN,  
J. LEE BOONE.