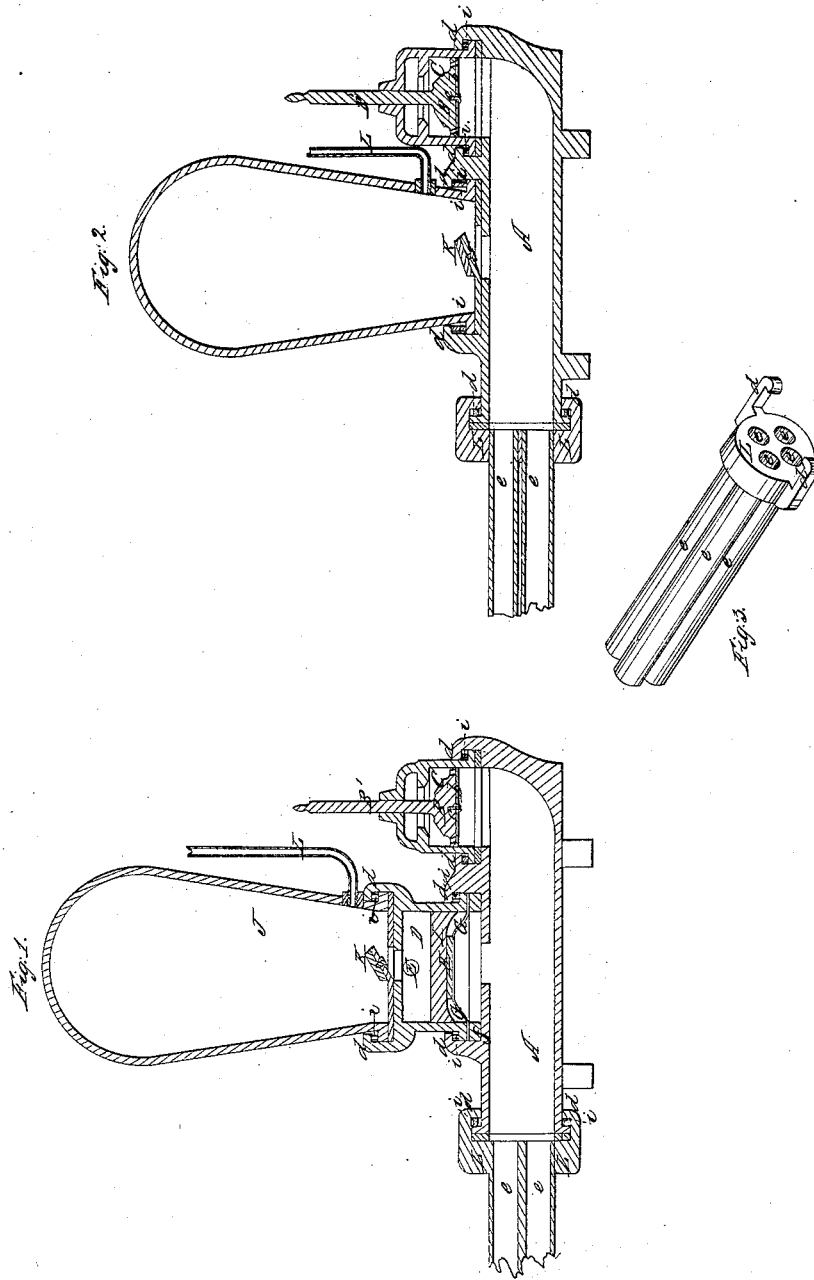


*J. L. Gatchel,*

*Hydraulic Ram,*

*N<sup>o</sup> 6,368.*

*Patented Apr. 17, 1849.*



# UNITED STATES PATENT OFFICE.

JOSHUA L. GATCHEL, OF ELKTON, MARYLAND.

## WATER-RAM.

Specification of Letters Patent No. 6,368, dated April 17, 1849; Antedated April 10, 1849.

*To all whom it may concern:*

Be it known that I, JOSHUA L. GATCHEL, of Elkton, in the county of Cecil and State of Maryland, have invented sundry Improvements in the Hydraulic Ram for Raising Water; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

My first improvement consists in so proportioning some of the parts of the double acting hydraulic ram—represented in Figure 1, of the accompanying drawings—that it can be readily converted into a single acting ram, by removing some of its component parts and combining the remaining portion thereof, in the manner represented by Fig. 2.

By a double acting hydraulic ram, I mean one so arranged that water for use can be elevated thereby from a well or spring, or other reservoir of pure water, that is situated at a lower level than the run water that actuates the ram: a particular description of the construction and operation of which, will be found in the patent granted to me on the 10th of April 1847.

The base of the air vessel J, and the base of the diaphragm chamber D, correspond with each other in size, and the seat upon the upper end of the diaphragm chamber—for the reception of the air vessel—corresponds in size with the seat upon the upper side of the pipe A; consequently, the air vessel, diaphragm chamber, and pipe, (A,) may be so combined with each other as to form a double ram; or, the air vessel (J,) may be combined directly with the pipe (A,) so as to form a single ram. In combining the respective component parts for the formation of a double ram, I insert the ring F, between the base of the diaphragm chamber and the seat upon the pipe A, and confine the periphery of the diaphragm G, between the ring (F) and the base of the diaphragm chamber. The ring F, is combined with the other parts of the ram for the purpose enlarging the space for the diaphragm G, to rise and fall in.

My second improvement consists in the manner in which I connect the respective parts of the hydraulic ram to each other, by which I avoid the use of screw bolts; to wit. By the casting of hooks or lugs *d, d,* upon the flange or extremity of one of the

parts, that rise up and turn inward at right angles over the flange of the other part of the ram that is to be united thereto,—so that by the insertion of a wedge or key *i,* between each of the hooks and the flange embraced thereby, (as shown in the drawings,) the joint between any two component parts of the ram can be as closely united as by the employment of any other means.

I find by experience that the screw bolts, by which the joints of a hydraulic ram have been confined, become so thickly coated with oxyd after a few months exposure, that it is with great difficulty they can be loosened with the best wrench when repairs are required. To obviate this difficulty, and to enable anyone—simply by the use of a stone or a billet of wood—to easily disconnect any of the joints of the ram when necessary, I have made this my second improvement. The simplicity and great utility of this mode of connecting joints that are to be exposed to the action of moisture will readily be appreciated.

My third improvement consists in making the pipe A, merely of sufficient length to constitute the body of the ram,—with which to combine the operating parts thereof,—and the combination therewith of a cluster of small tubes *e, e,* which extend to the fountain head and conduct the water to the ram. My object in making this improvement is to attain a much greater degree of compactness in the construction of the hydraulic ram. Where the main pipe A, is extended to the spring or fountain head, it has to be made of very great length to prevent the water from recoiling back to its source at each pulsation of the ram; by which a loss of its impulsive power is sustained: but by substituting a cluster of small tubes (*e, e,*) for the conducting portion of the pipe A, I find that—to operate a ram with the same power—the cluster of tubes (of sufficient number,) has to be only one tenth the length required for the large pipe.

My fourth improvement consists in curving the lower extremity of the pipe A, and continuing its full size to the impetus valve B, for the purpose of conducting the water in an unbroken current directly to the impetus valve, and causing it to receive the entire force of the blow that ensues from its closing.

Having thus fully described the nature of

my improvements in the hydraulic ram, what I claim as my invention and desire to secure by Letters Patent, is—

The conducting the water from the spring  
5 or fountain head, to the ram, through a cluster of small tubes (*e, e,*) combined with the pipe A, that forms the body of the ram,

substantially in the manner and for the purpose herein set forth.

JOSHUA L. GATCHEL.

Witnesses:

Z. C. ROBBINS,

JOHN GALLAGHER.