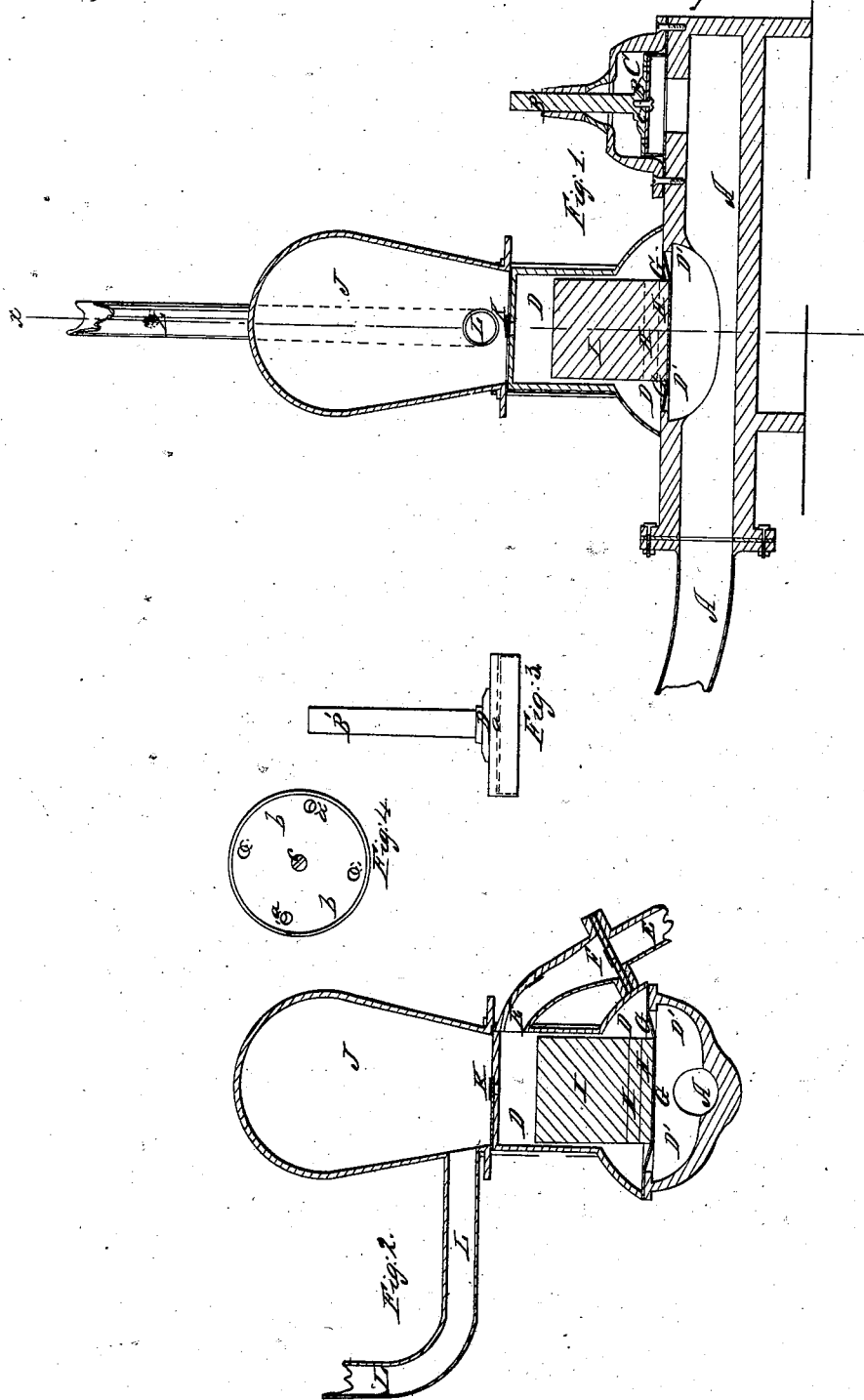


*J. L. Gatchel,*

*Hydraulic Ram.*

*N<sup>o</sup> 5052.*

*Patented Apr. 10, 1847.*



# UNITED STATES PATENT OFFICE.

JOSHUA L. GATCHEL, OF CHESTER COUNTY, PENNSYLVANIA.

## HYDRAULIC RAM.

Specification of Letters Patent No. 5,052, dated April 10, 1847.

*To all whom it may concern:*

Be it known that I, JOSHUA L. GATCHEL, of the county of Chester, Oxford post-office, in the State of Pennsylvania, have invented  
5 a new and useful Improvement in the Manner of Constructing Hydraulic Rams for the Raising of Water; and I do hereby declare that the following is a full and exact description thereof.

10 In my improved hydraulic ram the water to be raised for use is to be taken from a well, a spring, or other reservoir of pure water that is situated below the bevel of the run water that actuated the ram, and  
15 the parts are so arranged that there is not any possibility of the accidental intermingling of the two portions of water with each other, an accident to which most of the rams as heretofore constructed, are more or less  
20 liable. I have also made improvements in the manner of constructing the impetus valve through which the waste water is to be discharged, by so constructing it as that the openings in it through which the water is  
25 to pass may be regulated in size so as to gage the quantity, and thereby to adapt it to the varying force of that from the run; by which means the action of the valve is greatly improved, and it will always fall  
30 at the right time without its being necessary to apply the action of a spiral, or other spring to force it down. I also cause this valve to make a partial revolution every time that it rises, in consequence of which  
35 it will in falling, assume a new position on its seat, and will be made to wear equally, and always to bed itself correctly.

In the accompanying drawing Figure 1, is a longitudinal section through a portion  
40 of the tube or pipe along which that portion of the run water is to pass that is to actuate the instrument, and through those parts of the ram in which my improvements are embraced; and Fig. 2, is a transverse section  
45 thereof in the line *x, x*, of Fig. 1.

A, A, is the pipe for the conveyance of the run water to the impetus valve B; which is contained within the chamber C, as in other machines for a like purpose.

50 D, D, is what I will denominate the diaphragm chamber, into which the pure water is to be raised from a well, or spring. E, is a pipe, or tube which is to lead from the upper part of the diaphragm chamber into

the well, spring, or other reservoir of pure 55 water. This pipe is furnished at F, with a valve opening upward, to retain the water that has been raised. G, G, is a flexible diaphragm of india-rubber cloth, or other suitable material that is loosely stretched 60 over the lower opening of the diaphragm chamber, so that it is capable of rising and falling to the necessary distance to enable it to operate in raising the pure water. Upon the middle of this diaphragm weights 65 H, H, are to be placed, which weights must be such as will by their gravity suffice to raise the water through the pipe E, and this will, of course, depend upon the height and diameter of the column to be raised. 70

I, represents a cylinder of wood which may rest on the weights H, H, and is intended merely as a guide within the chamber D. Below the chamber D, there is a corresponding enlargement D', D', of the pipe 75 A serving as a seat to said chamber, and allowing free motion to the diaphragm.

J, is the air vessel which surmounts the chamber D, and with which it communicates by means of a valve K, opening up- 80 ward.

L, L, is the ascending pipe along which the pure water from the air vessel is to be elevated.

In Fig. 3, I have shown the impetus valve 85 B, drawn to a larger scale than in Fig. 1; and in Fig. 4, I have shown the under side of it. Through its outer rim it has four, or any other preferred number of holes *a, a*, drilled, to admit the escape of a portion of 90 waste water, which portion it is of much importance to be able to regulate according to the varying power of the stream from which the impulse is to be derived. Below the valve insert a thin plate of metal *b, b*, 95 having holes drilled through it corresponding with the holes *a, a*, in the valve rim. The plate *b*, is held in place by means of a screw *c*, at its center, thus admitting of the turning of the plate around so as to cover the 100 holes *a, a*, to any desired extent, and, of course regulating the quantity of water that will pass through them, a regulation which renders the action of a spring upon the stem B', of the valve unnecessary. To 105 cause this valve to rotate to a short distance every time that it rises, I drill the holes *a*, obliquely through it, as shown by the dotted

lines at *a*, Fig. 3, which gives the valve a new seat at each impulse, causing it to wear equally, and to remove any adhering particles which may be deposited on its seat.

5 Under the within described arrangement when the impulse of the water takes place, the diaphragm with its weight will be raised thereby, and a portion of the water contained in the diaphragm chamber will be  
10 forced through the valve K, into the air vessel, and a corresponding portion will be forced from this vessel up the pipe L; on the cessation of the impulse, the weight H, H, will force down the diaphragm, and a fresh  
15 supply of pure water will pass up the pipe E, into the diaphragm chamber. It will be manifest that a weighted piston fitted nicely to its cylinder might be substituted for the flexible diaphragm, but its cost, and its liability to friction will probably preclude its  
20 being used.

Having thus fully described the nature of my improvements in the hydraulic ram, and shown the operation of the same, what I

claim therein as new and desire to secure by 25 Letters Patent is—

1. The employment of the weighted elastic diaphragm G, G, in combination with the descending pipe E, leading down into a well or other reservoir of pure water from which 30 a portion will be raised at every impulse of the ram. I do not claim the use of a flexible diaphragm in apparatus for raising water; but I do claim it as making a part of the combination necessary to the raising, and 35 the preserving unmixed, of the pure water under the arrangement set forth.

2. I also, claim, in combination, the particular manner of constructing the impulse valve, with the regulating plate *b*, and the 40 holes *a*, bored obliquely through the rim of the valve, in the manner and for the purpose set forth.

JOSHUA L. GATCHEL.

Witnesses:

THOS. P. JONES,  
LEML. WILLIAMS.