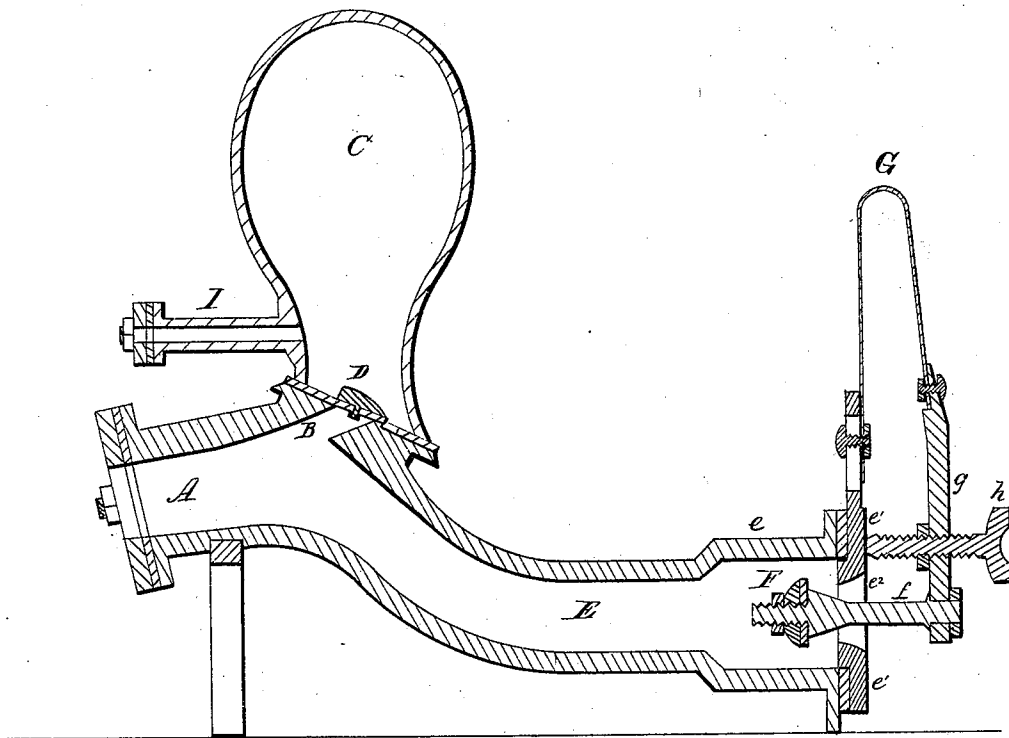


I. B. MILLINGTON.
HYDRAULIC RAMS.

No. 177,144.

Patented May 9, 1876.



WITNESSES-

Phil. W. Hale,
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UNITED STATES PATENT OFFICE.

ISAAC B. MILLINGTON, OF SAFE HARBOR, PENNSYLVANIA.

IMPROVEMENT IN HYDRAULIC RAMS.

Specification forming part of Letters Patent No. **177,144**, dated May 9, 1876; application filed February 21, 1876.

To all whom it may concern :

Be it known that I, ISAAC B. MILLINGTON, of Safe Harbor, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Rams; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

My improvement in hydraulic rams consists in providing the terminus of the ram-tube with a horizontally-acting spring-valve, so arranged as to receive the full head of water flowing through said tube, and in providing the air-chamber with an inclined flap-valve, which easily yields to the pressure occasioned in the tube by the closing of said spring-valve.

The object of these improvements is to reduce water-friction to the minimum, and thus utilize the greatest possible degree of the force of the flow of water in the tube, in order to supply a strong head at a greater elevation than has hitherto been practicable by self-acting apparatus.

I will particularly describe my improvements with reference to the accompanying drawing, which is an outline central vertical section of a hydraulic ram constructed according to my invention.

A is the ram tube or cylinder, having two branches, the shortest of which, B, terminates in the inclined bottom of the air-chamber C, and is closed by the inclined flap-valve D. The other and longest branch, E, curves downward, and extends a short distance beyond the air-chamber, terminating in a slight enlargement, *e*, which is open at end, and has both an inward and outward flange, *e'*, around its edge. Within this enlargement *e* is a valve-head, F, arranged directly in front of the opening, and concentric with the branch E. From the center of this valve-head F a spindle, *f*, extends outward through the opening *e''*, and is attached to a plate, *g*, which to its upper end has attached a bent spring, G, the

other end of which is secured to an upward projection of flange *e*. Through the plate *g* passes a thumb-screw, *h*, which impinges against flange *e*. I is the nozzle of the air-chamber, from which a pipe leads upward to the point where water is to be delivered. The driving-pipe, leading from a more or less elevated source of water-supply to the ram, connects at the front.

It will not be necessary for me to explain the operation of a hydraulic ram, as that is very generally understood.

The spring-valve F stands normally open, and is kept so by spring G, the extent of its opening being regulated by thumb-screw *h*. It will be seen from the position of this valve that the full head of water flowing through the tube strikes it, and receives no previous check to destroy the force of its impact. I make the tension of spring G such as to simply open the valve, and to allow it to close suddenly when the full force of the water strikes it. It will also be seen, from the position of the flap-valve D, that said valve will be easily and quickly opened by the increased pressure of water in the tube, resulting from the closing of the valve F, and that the force of the impact will not be dissipated in overcoming friction, but be almost entirely utilized in forcing water into the air-chamber and pipe J. It will also be seen that as soon as the escape of water through valve D has relieved said valve of upward pressure it will quickly and certainly fall to its seat, thus securing the proper action of the air-chamber in providing a continuous flow through pipe J. I usually provide the valves with leather or rubber seats.

Having now described my invention in such manner as to enable those who are acquainted with the class of apparatus to which it belongs to construct and use hydraulic rams with my improvements, I claim—

1. In a hydraulic ram, the horizontally-acting spring-valve F, substantially as described.

2. In a hydraulic ram, the air-chamber closed by inclined flap-valve D, substantially as set forth.

3. The ram-tube A, having branch B opening into air-chamber C, and guarded by in-

clined flap-valve D, in combination with branch E, the outlet of which is provided with horizontally-acting valve F, as shown.

4. The combination, with a hydraulic-ram tube, of the spring-valve, consisting of head F, spindle *f*, and bent spring G.

5. The combination of valve-head F, spindle *f*, plate *g*, bent spring G, and regulating-screw *h*.

In testimony that I claim the foregoing as my own invention I affix hereto my signature in presence of two witnesses.

ISAAC B. MILLINGTON.

Witnesses:

GEO. M. FRANKLIN,
JAS. H. BESTOR.