

E. Webb,

Hydraulic Ram,

No 12,042

Patented Dec. 5, 1854

Fig. 1.

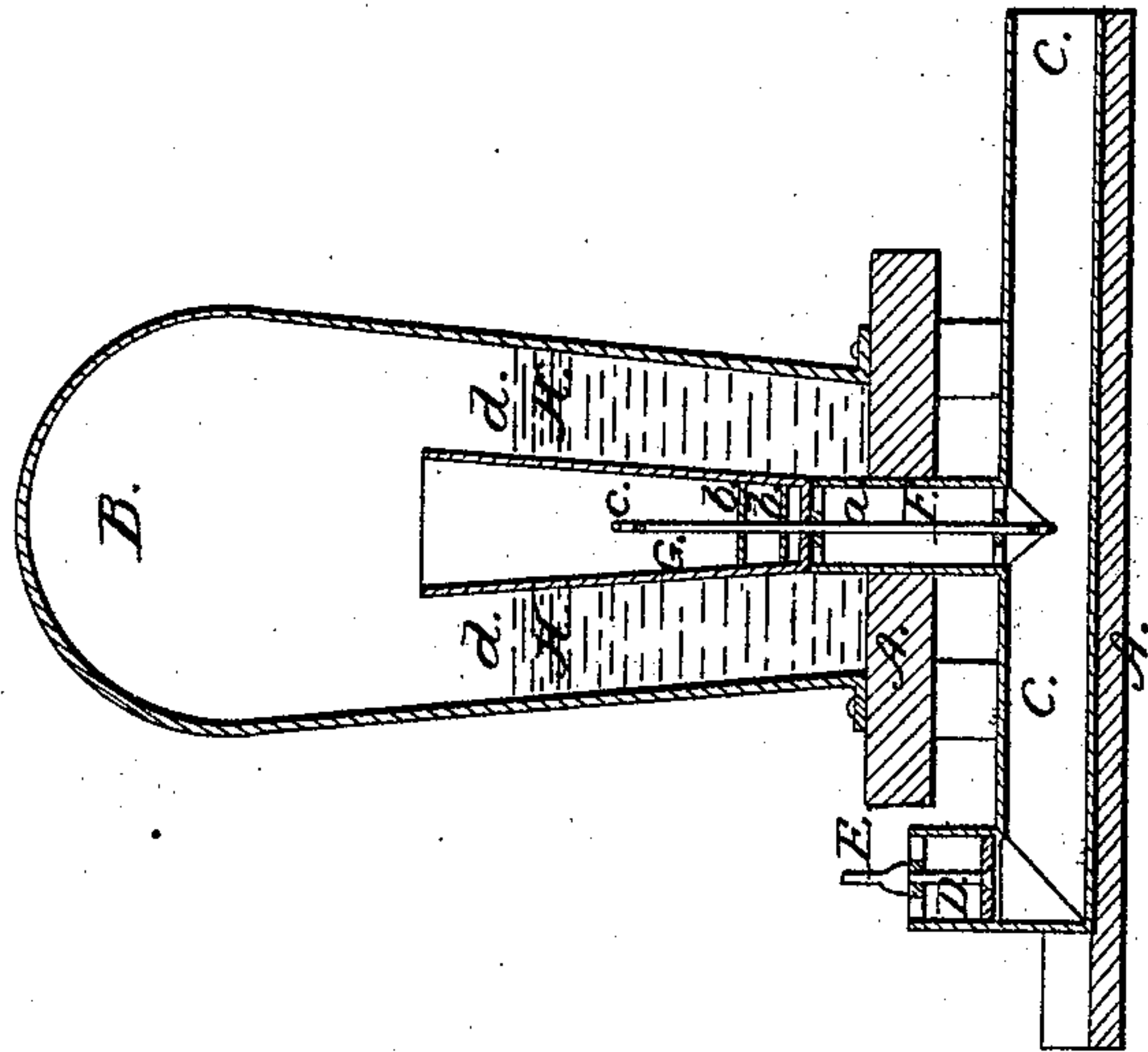
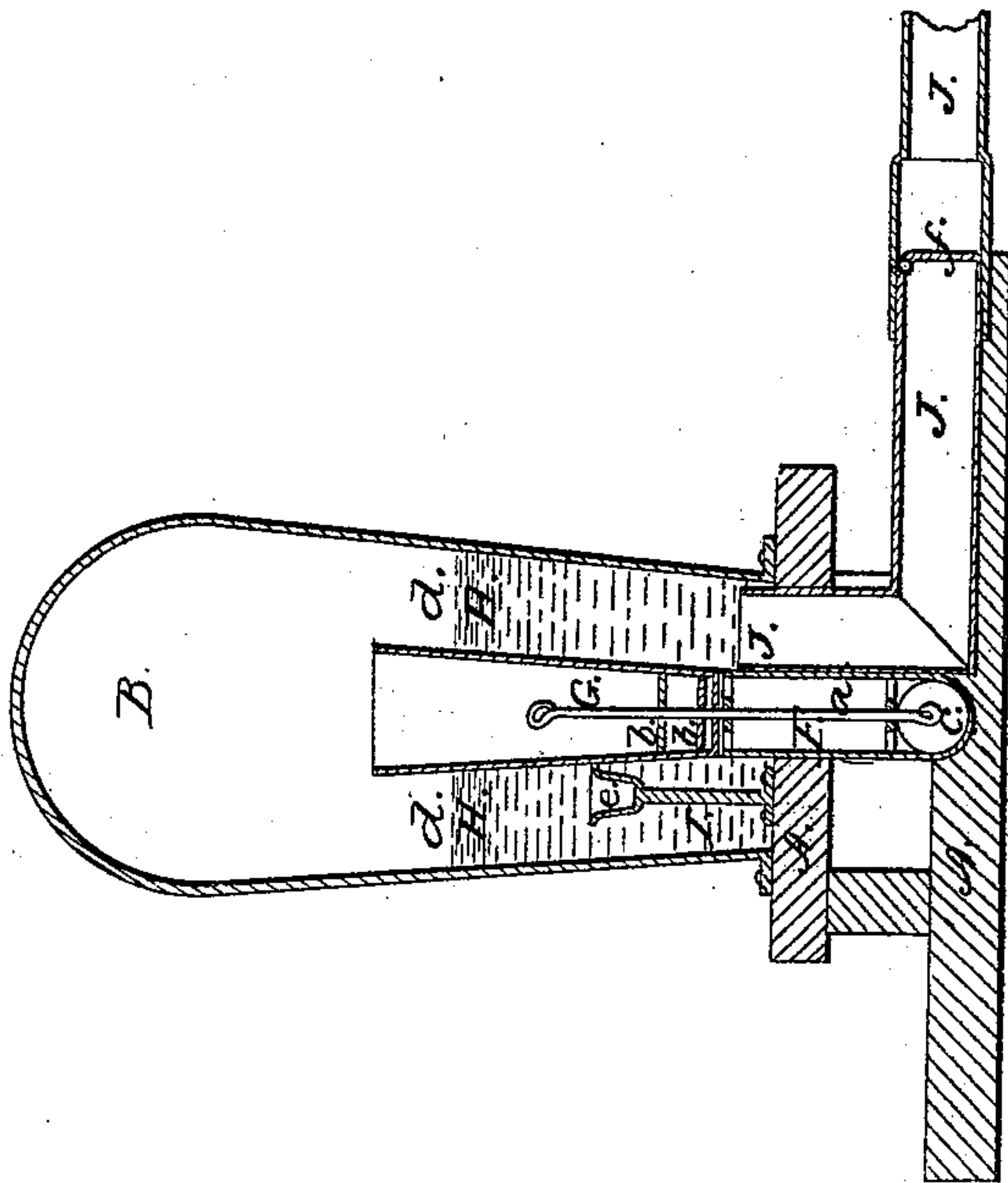


Fig. 2.



UNITED STATES PATENT OFFICE.

ELLIS WEBB, OF PARKERSVILLE, PENNSYLVANIA.

HYDRAULIC RAM.

Specification of Letters Patent No. 12,042, dated December 5, 1854.

To all whom it may concern:

Be it known that I, ELLIS WEBB, of Parkersville, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Water-Rams and other Hydraulic Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1, represents a vertical longitudinal section through a water ram in the line of the pipe which carries the motive column of water, and also of the waste pipe. Fig. 2, represents a transverse similar section passing through the rising main or discharge pipe.

Similar letters in the two figures denote like parts.

This invention is not confined exclusively to water rams, but may be advantageously used in any and all forms of hydraulic engines, where an air chamber is used; or, where an air chamber is used in connection with any other motive power, as in a steam or water pump. And I intend to apply it to these several forms of machines, where an air or gas cushion is used.

The nature of my invention consists first in the construction of the valve within the air chamber, viz: so that in rising it shall not rise against the column of water in the chamber. Second, in the method of introducing the oleaginous, or other fluid packing on top of the column of water within the air chamber, for the purpose of preventing the water from carrying out with it the air or gas from the inside of the air chamber. Third, in the check valve in the rising main or discharge pipe, for the purpose of preventing the falling back of the column of water in said main, and to avoid any irregularity in the beating of the valves in the air chamber or waste pipe.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A, represents the base upon which the apparatus may be built or supported. B, is the air or gas chamber, and C the pipe for conveying the motive column of water, from the spring head or water source. D, is the waste pipe provided with a weighted or self operating valve E, for checking, and then allowing the water to waste. F, is a branch

pipe rising up from the pipe C, immediately underneath the center of the air chamber, and through this pipe F, the water is forced or let into the air chamber. All these parts of the ram may be constructed in any of the usual well known ways, and varied to suit the circumstances of the case.

Over the top of the inlet pipe F, is arranged a valve G, which is cylindrical, or slightly conical; it is open at top and closed at the bottom, and provided at its seat on the pipe F, with suitable packing (represented by a red line), to make it water tight when on its seat. This valve rises and falls perpendicularly, and as it rises presents an uniform opening to the ingress of the water, and avoids that agitation in the air chamber which is incident to a flap or hinged valve which admits the column on one side as it were, and causes the water to swirl around to find its level. To admit of the valve G rising and falling in a true line so as always to come upon its seat over the opening in the pipe F, a guide rod *a*, is suitably supported within the said pipe, and passes up some distance in the inside of the hollow valve G. Guide strips *b*, *b*, may extend across the inside of the valve, through which the guide rod *a* passes, and these keep the valve in its perpendicular descent, so as to bring it to its seat when closing. The top of the rod *a*, should have a stop or eye *c* turned on it, to prevent the valve at the first beat of the water, when the ram is started, from throwing it too high. After the ram is started the pressure of the air or gas above it will prevent it from rising too high.

H, represents the water line in the air chamber when at or near its highest point. This point is only assumed however, to show the relative position, of the water, the fluid packing, and the top of the valve, to each other, for by extending farther up, the top or crown of the valve, the water and packing may rise higher—never, however, above the top of the cylinder valve. On top of the water H, I use an oleaginous, or other fluid packing, *d* lighter than water, so as to float thereon. This packing is interposed between the water and the air or gas in the top of the chamber, for the purpose of preventing the water from carrying out said air or gas from said chamber, which it effectually accomplishes.

The fact that, a ram or other hydraulic engine often becomes, for the time being,

perfectly useless from the want of air in the air chamber, it having been gradually taken up and carried out by the water; and that, this inconvenience happens very often, and is only overcome by the opening up of the air chamber, or by use of a force pump renders this improvement of mine obvious, for it is found by several months' experience that the air will not escape through the oil packing. And although I have only thus far used oil because of its cheapness, and convenience, yet any other fluid packing which will float on water, and be impervious to air, will answer a similar purpose. It is the effect produced by the packing that I claim to have discovered in connection with air chambers in general.

In order to get this oleaginous packing into the air chamber, without its being liable to be carried out by the first pulsation of the apparatus upon starting it, I arrange upon a pedestal I, extending up some distance into the air chamber, an oil cup e, into which the oil is placed, before the ram is started. As before stated the first pulsations of the ram are irregular, and the water that then comes in and goes out is agitated and would carry out the oil mixed with the water, but as the water gradually rises in the air chamber, it becomes placid, and when it arrives at the oil cup, it takes up the oil, and retains it floating on the surface thereof. There is no danger of the oil being carried out of the chamber, because the operation of the ram is such, as to merely raise up the column of water as the water enters, and then the compressed air or gas as gently forces it down again. It is therefore the water which has just entered the air chamber that is forced out of the discharge main, and not that, which lies near the top of the column.

Heretofore atmospheric air has been used only in the air chamber, and although it serves a good purpose, I propose to use hydrogen, or any other of the light, elastic gases, which I find in practice to serve a better purpose. These gases may be used with the greatest propriety, as they can not through the packing mingle with the water which passes through the ram, while their lighter qualities, with their equal and sometimes increased elasticity, makes a better air or gas cushion, than atmospheric air does.

J, is the rising main or discharge pipe, leading from the inside of the air chamber, to any convenient point where it is desirable to carry or use the water. When this rising main J, is of any considerable length, there is a back lash, or reactive motion of the water in said pipe, which if allowed to extend into the air chamber would cause irregularity in the working of the ram. To avoid this, I place in said rising main a

check valve f, which while it allows free escape to the water in the direction in which it is desired to have it go, yet upon the least reactive motion of the water in said main, would close, and receive the momentum of the column upon itself, instead of allowing it to pass into and through the air chamber, and disarrange or injure the other moving parts of the machine.

I have herein particularly described these improvements as applied to a water ram. But I desire it to be distinctly understood that, I do not limit the invention to water rams alone, for the improvements are equally applicable to all hydraulic engines, or pumps, where compressed air or gas is used for raising up or forcing water through pipes or mains, and whether said pumps are worked by steam or other power, and I so intend to apply and claim their use.

Instead of a guide rod, and guides a, b, as herein described, other guides may be arranged which would not require packing as these would; as for instance they may be outside of the valve, and arranged around it so as to produce an equal result, and with less resistance to the rising of said valve. Or the guide rod a, may be permanently attached to the hollow cylindrical valve G, and the guides for allowing it to come to its seat, be in the pipe or tube below, and thus save packing it. In this case the eye should be turned on the guide rod at its lower end, to prevent it from rising too high, at the first beat or pulsation of the ram.

Having thus fully described the nature of my invention, what I claim therein as new and desire to secure by Letters Patent is,

1. The valve composed of a hollow cylinder, having its upper end open, and its lower end closed, and extending up above the water and packing line, so that in rising, it will rise against the air instead of the column of water within the air chamber substantially as described.

2. I also claim the method herein described of introducing the oleaginous packing or its equivalent on top of the water in the air chamber, for the purpose of preventing the water from taking up and carrying out with it the air which should be contained therein, as described.

3. I also claim in combination with the rising main or discharge pipe, the check valve, for preventing any reaction in said pipe from extending back into and endangering any of the operating parts of the machine.

ELLIS WEBB.

Witnesses:

JOS. P. WILSON,
WALTER HIBBARD.