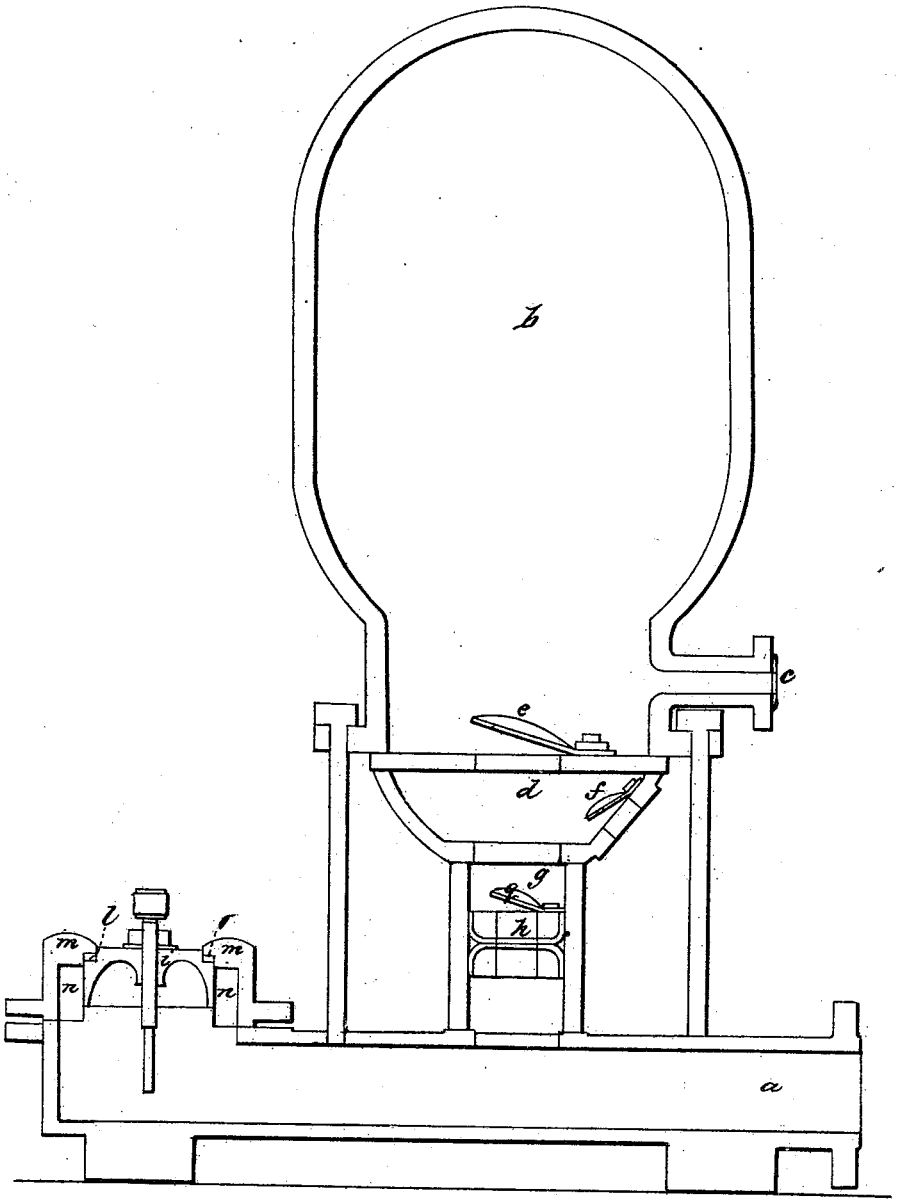
H. F. M. Birkenbine,

Water Ram.

No. 5,716. Patented Aug. 15, 1848.



UNITED STATES PATENT OFFICE.

H. P. M. BIRKINBINE, OF PHILADELPHIA, PENNSYLVANIA.

VALVE OF WATER-RAMS.

Specification of Letters Patent No. 5,716, dated August 15, 1848.

To all whom it may concern:

Be it known that I, H. P. M. BIRKINBINE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Water-Rams, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawing, which forms a part of this specification, and in which a vertical section is represented.

The nature of my invention consists in the construction of the valve, so as to form an air cushion therein, and fitting it to its seat with a water cushion, which is renewed at every stroke or pulsation of the ram; and also in forming a valve in the dividing piston, in double acting rams, as will be more clearly set forth in the description of its construction.

The main pipe, *a*, air chamber *b*, and rising main *c* are similar to those now in use; below the air chamber there is a second smaller chamber *d*, separated from it by a valve *e;* a valve *f* also opens into this chamber and admits the pure water to be raised; below said chamber *d* there is a cylinder *g*, in which a piston *h* works up and down; the bottom of this cylinder is open to the main pipe *a*, at the extreme end of which the valve *i* is situated on the upper side, as is the case with many well known rams now in use.

The construction of this valve *i* is novel, and consists of a cup-formed piston, the cup being inverted for the purpose of forming an air chamber. Through the center of this valve a set screw *k* passes, by which the length of the vibration is regulated; the outside of the valve is turned with a rabbet *l* around its upper edge; a similar rabbet is turned in the valve seat *m*, so that when the valve comes up to the seat it incloses a portion of water *o*, which relieves the valve from the shock and wear of a contact of the metals. The valve works up and down between ribs *n*, and is thus steadied in its place; by this arrangement it will be perceived that the water cushion and the stratum of air within the cup of the valve relieves it of a portion of the shock in closing, as it is evident that without this air cushion the valve will close with its own momentum and that of the column of water combined, which in large machines produces a very great concussion.

In the cylinder *g* a piston *h* works as before remarked. This is formed of metal, and may be packed or not as found desirable, and instead of being made solid as has heretofore been essayed, it is made hollow, or with an opening through the center on which fits a valve *g* that opens upward; this valve is for the escape of air which accumulates beneath the piston, and which would otherwise stop its operation when said air became sufficiently condensed; for this reason all solid pistons have been abandoned, and diaphragms without it would not be available; for if the supply of water above the piston or diaphragm is insufficient, it is prevented from falling; and the machine is then liable to be injured and broken.

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure Letters Patent, is—

1. The construction of the valve in the manner described, so as to inclose a water cushion between the moving and stationary parts; and also the cup or air chamber within the valve to relieve it from the shocks it is otherwise subject to, as described.

2. I claim the safety valve in a diaphragm, or in this piston *h*, for the purpose, and substantially in the manner set forth, by which the safety and perfect working of the parts is insured.

HENRY P. M. BIRKINBINE.

Witnesses:

J. J. GREENOUGH,

D. K. MORSELL.