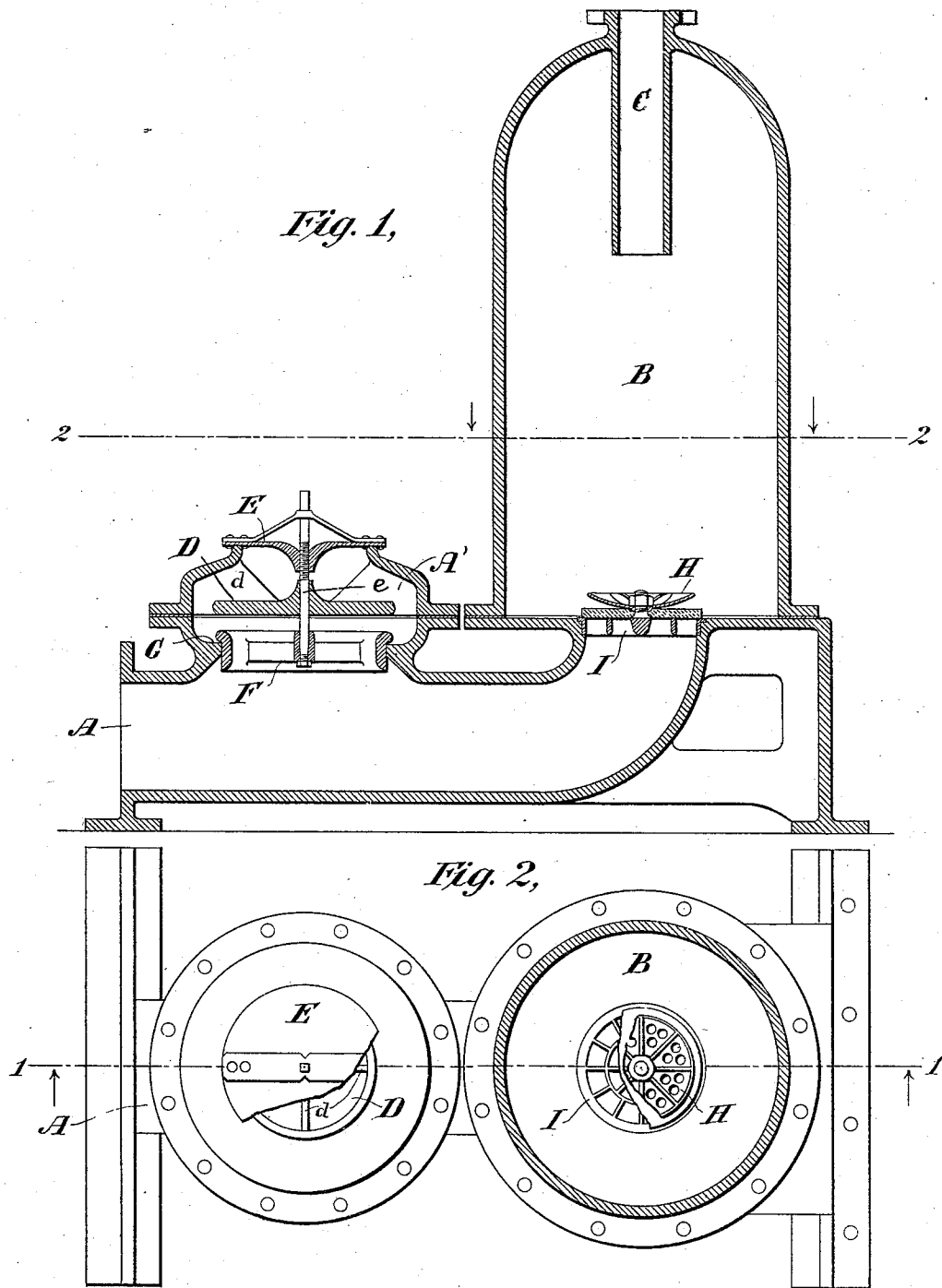


(No Model.)

G. LAND.
HYDRAULIC RAM.

No. 532,673.

Patented Jan. 15, 1895.



Witnesses
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By his Attorney
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UNITED STATES PATENT OFFICE.

GORDON LAND, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO
JOSEPH W. KINSEY AND PARVIN WRIGHT, OF SAME PLACE.

HYDRAULIC RAM.

SPECIFICATION forming part of Letters Patent No. 532,673, dated January 15, 1895.

Application filed June 22, 1893. Serial No. 478,438. (No model.)

To all whom it may concern:

Be it known that I, GORDON LAND, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have made a new and useful Invention in Hydraulic Rams, of which the following is a specification.

My invention is directed particularly to the valve portion of apparatus of this general type, and to this end it consists in a novel form of balance valve designed for use and combined with such an apparatus.

In existing forms of hydraulic rams the valves are usually controlled by springs, and it is found that, under different conditions of pressure due to variable heads of water, adjustment is required of the springs to meet such variable pressure in order that the valves may operate. This necessity for adjustment is an objectionable feature in hydraulic rams and renders them unreliable in action, and it is with a view to overcome such objection that my present invention has been devised.

Generally stated, the invention consists in an automatically operated balanced valve combined with an overflow valve chamber communicating with the inlet pipe leading to the air chamber of the ram, said valve being controlled entirely by the head of water and requiring no springs or other means for adjustment, but arranged and operating so as to accommodate itself to the varying pressures and heads of water, and which will work under all conditions of pressure and without any attention whatever.

In order that the invention may be fully understood reference is had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a hydraulic ram embodying my improved balance valve, said view being taken on the line 1 1, Fig. 2, and as seen looking in the direction of the arrows from the bottom toward the top of the drawings. Fig. 2 is a part sectional and a part plan view of a hydraulic ram embodying my improvement, said section being taken on the line 2 2, Fig. 1, and as seen looking in the direction of the arrows from the top toward the bottom of the drawings.

B indicates the usual air chamber of a well known form of hydraulic ram.

A indicates the inlet pipe leading to the

chamber, and C the outlet pipe leading therefrom.

H, I denote a check valve of any preferred form located between the inlet pipe and the air chamber and operating in the usual manner.

As thus far described the construction does not differ materially from many of the now well known forms of hydraulic rams.

A' indicates an overflow valve chamber connected with the inlet pipe A and communicating with the interior of said pipe by means of a throat-way or opening G.

E denotes a cover or top plate resting by its weight loosely upon and closing the open top of the valve chamber.

D is a plate or disk secured in fixed position in the valve chamber A' by means of vertical radial fins *d* extending from the wall of the dome of the chamber. This disk constitutes a seat for a rim-valve which works in the throat-way between the inlet pipe and the valve chamber and which controls communication between the pipe and chamber, as will presently be described in detail.

The flat valve seat D occupies a position about centrally of the valve chamber, so as to leave a free open space between its edges and the wall of the chamber. It overlies the throat-way G, as shown in Fig. 1, and, like the throat-way, is preferably circular in form, but may be of any other form desired.

F is a rim valve working in the throat-way or opening G and adapted to close against the under side of the plate D when raised. This valve has an imperforate rim corresponding in shape to and fitting snugly in the opening G. It is open in the center, as shown in Fig. 1, and the width of the rim is slightly greater than the distance of the plate D from the opening G, so that the upper edge of the rim may close against the under side of the plate and completely close the throat-way.

The letter *e* denotes a stem connected to the rim valve at its lower end, and passing through the plate D to the top or cover E to which it is connected in any convenient manner. As shown in Fig. 1, this connection is made by means of a screw-thread so as to permit of an adjustment between the rim valve and the cover plate.

The construction being as thus described,

the operation is briefly as follows: The inlet pipe has normally free communication with the overflow valve chamber, the weight of the valve F and the cover plate E keeping the parts in the position shown in Fig. 1. When the flow of water through the inlet pipe is checked by the pressure of the air confined in the chamber B, it rushes or backs up into the chamber A through the open valve in the throat-way, and, passing around the edge of the plate D, lifts the top plate or cover E and overflows from the top of the chamber. The action of the water in lifting the top plate E raises the rim-valve F and causes it to approach the under side of the seat D and shut off communication between the chamber and the inlet pipe, thus preventing the further escape of water through the valve chamber. When the valve F closes against the seat D the pressure on the under side of the cover E is, of course, relieved, and the cover and valve fall of their own weight, thus re-establishing communication between the inlet pipe and the chamber A'. When the flow into the air chamber B is again established, the above operation is repeated, and the objectionable hammering and pounding due to the sudden checking of the rush of water into the ram chamber is thus automatically relieved. It will be understood that the above operation is repeated whenever the flow of water into the air-chamber is checked, and that the movements described take place in sequence in the same manner as in the ordinary valves in this class of devices; also that by reason of the balancing action of this valve variable heads of water cannot change its action as it always works by reason of its own weight, the pressure being utilized simply for the raising of the valve as has been described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a hydraulic ram, the combination with the air chamber, the inlet pipe, an automatic valve between the pipe and the chamber, a normally closed overflow passage or chamber communicating with the inlet pipe, a nor-

mally open valve controlling communication between the pipe and chamber, and a cover for the overflow passage, said cover being connected with the valve so that when the valve is closed the cover is open.

2. In a hydraulic ram, the combination with the inlet pipe, of an overflow chamber communicating therewith, a valve controlling communication between the chamber and the inlet pipe, and a cover or valve controlling the overflow opening from said chamber, said valves being connected together so that when the chamber communicates with the inlet pipe the overflow is closed.

3. In a hydraulic ram, the combination with the inlet pipe, of an overflow valve chamber communicating therewith, a valve-seat in the chamber, and an automatic rim-valve working in the throat way or opening between the chamber and the inlet pipe and co-operating with the seat in the chamber.

4. In a hydraulic ram, the combination with the inlet pipe, of an overflow valve-chamber communicating therewith, a disk or plate-like valve seat overlying the throat-way or opening between the chamber and the pipe, and a rim valve working in said throat-way and adapted to close against the seat to shut off communication between the inlet pipe and the overflow chamber.

5. In a hydraulic ram, the combination with the inlet pipe, of an overflow valve chamber communicating therewith, a disk or plate-like valve seat overlying the throat-way or opening between the chamber and the pipe, and secured in the chamber so to leave a space for the passage of water around the seat, a rim valve working in the throat-way and adapted to contact with the seat to shut off communication between the inlet pipe and the valve chamber, and a top plate or cover for the chamber connected to said rim valve.

In testimony whereof I have hereunto subscribed my name this 27th day of May, 1893.

GORDON LAND.

Witnesses:

F. A. GILLESPIE,
PARVIN WRIGHT.