F. C. CROWE.

HYDRAULIC RAM.

APPLICATION FILED APR. 30, 1918.

1,285,629.

Patented Nov. 26, 1918.

2 SHEETS—SHEET 1.

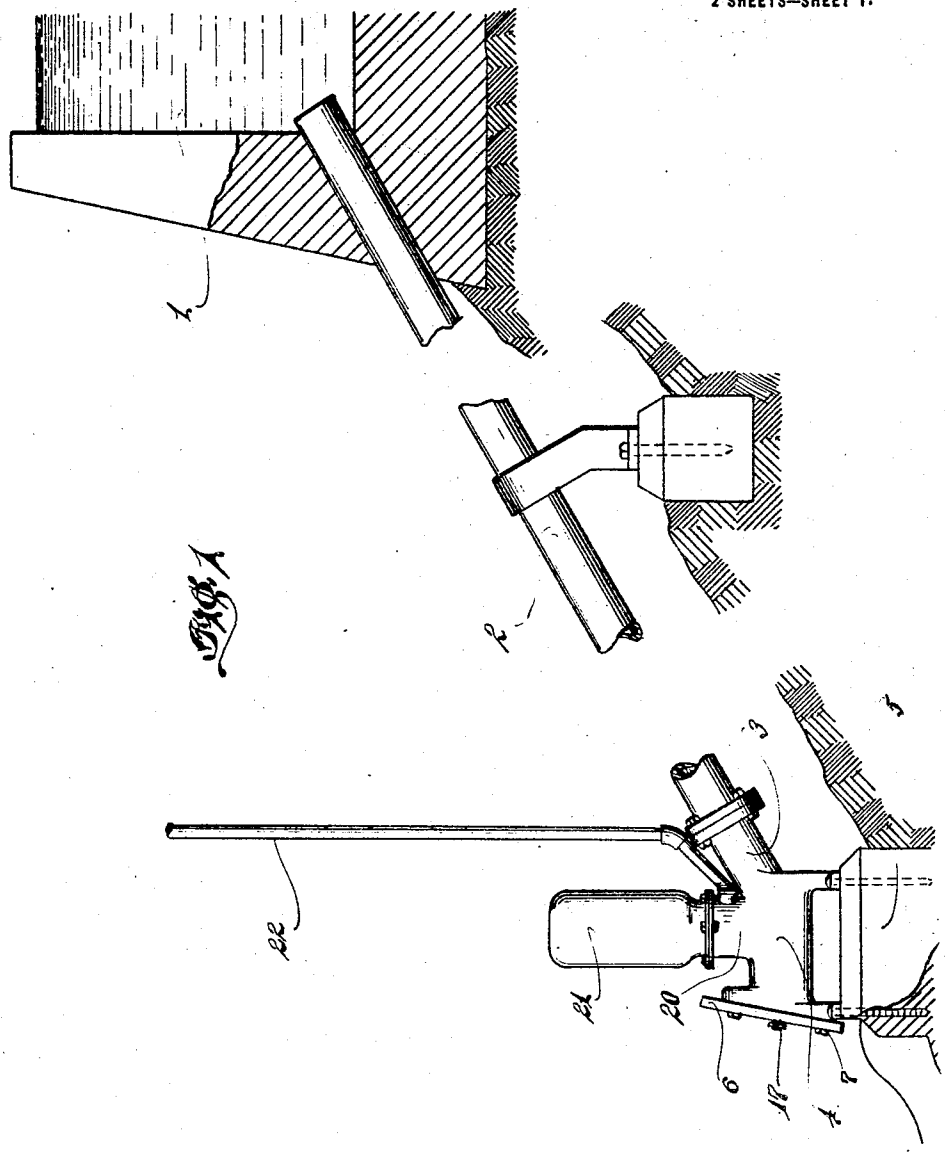


Fig. 1.

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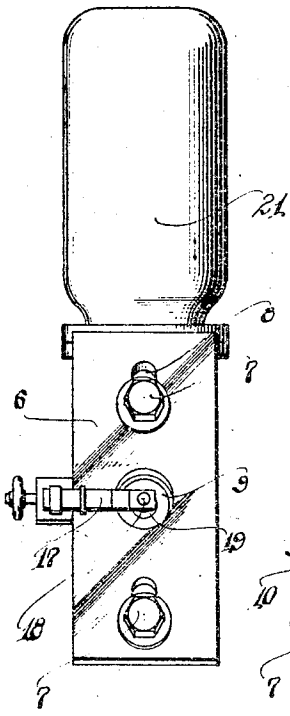


Fig. 3

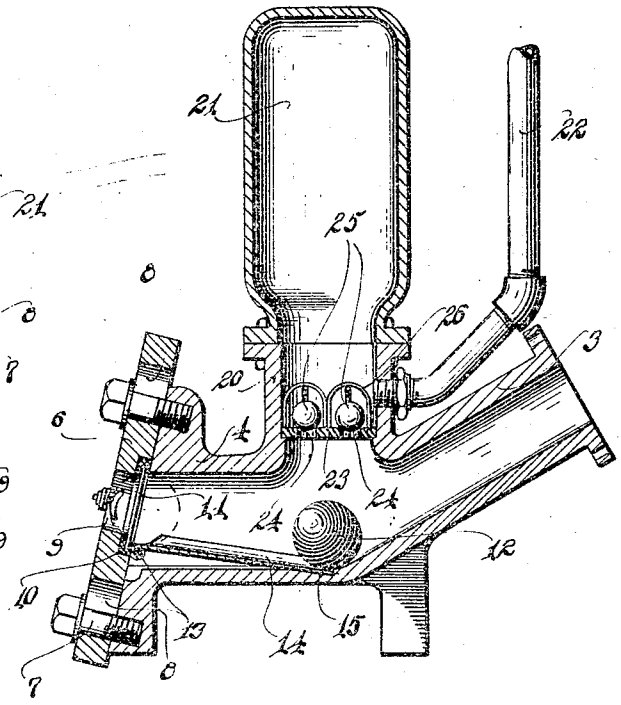


Fig. 2

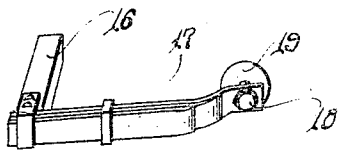


Fig. 4

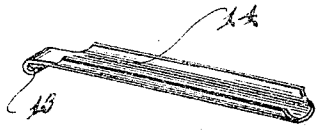


Fig. 5

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UNITED STATES PATENT OFFICE.

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HYDRAULIC RAM.

1,285,629. Specification of Letters Patent. Patented Nov. 26, 1918.

Application filed April 30, 1918. Serial No. 231,625.

To all whom it may concern:

Be it known that I, FREDERICK C. CROWE, a citizen of the United States, residing at North Yakima, in the county of Yakima and State of Washington, have invented certain new and useful Improvements in Hydraulic Rams, of which the following is a specification.

This invention relates to new and useful improvements in hydraulic rams and the principal object is to provide a simple and efficient device of this character with an improved valve construction.

A further object of the invention resides in providing an impetus valve operating on an inclined track way which is capable of being adjusted to accommodate various pressures.

A still further object of the invention resides in providing a removable plate at the end of the ram chamber to which the inclined track way is pivotally connected, the plate being adjustable to dispose the track way to various angles, with respect to the bottom wall of the chamber.

With these and other objects in view my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings forming a part of this application:—

Figure 1 is a side elevation partly in section showing the application of my invention to use;

Fig. 2 is an enlarged vertical section through the ram chamber and adjunctive parts;

Fig. 3 is a front elevation thereof;

Fig. 4 is a perspective view of the spring member, its support and the buffer carried thereby; and

Fig. 5 is a perspective view of the inclined track way removed.

In describing the invention, I shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views and in which 1 designates a reservoir, the water from which is adapted to flow downwardly through a downwardly inclined supply pipe 2, the latter connecting with a tubular extension 3 of a casting 4, the latter forming what may be termed the ram chamber proper. This casting may be mounted on a base or pedestal as shown at 5 in Fig. 1 of the drawings and properly positioned for operation.

The end of the chamber 4 opposite the extension 3 has a removable plate 6 applied thereto and secured by means of the set screws 7, the latter operating through slots 8 in the plate, whereby to adjust said plate with respect to the chamber for a purpose to be hereinafter and more particularly set forth. The plate 6 is provided with a central opening 9 and the inner face of said plate surrounding said opening is provided with a seat 10 in which is positioned a packing 11 which is adapted to receive thereagainst a ball valve 12 which operates in the chamber 4. Pivotally secured to the inner face of the plate 6 as shown at 13 is a track member 14 which is designed concavo-convex and designed to receive said ball valve therein. The track member is so pivoted with respect to the plate and the bottom wall of the chamber that the same is inclined, as clearly shown in Fig. 2 of the drawings and the lower free end of the same operates in a groove or guide way 15 formed in the bottom wall of said chamber. The ball valve 12 is normally positioned at the lower end of the channel-shaped track 14, but is adapted to be directed upwardly thereon by pressure of water entering the chamber through the supply pipe 2 and thus be directed against the valve seat 10. In order to provide a cushioning means for the ball valve and the seat and also afford means for assisting the ball valve to return to its initial position when pressure is released therefrom, a yielding buffer or the like is provided. To this end an adjustable arm 16 is carried on one side of the chamber 4, the outer end thereof having a leaf-spring member 17 secured thereto. The free end of the leaf-spring member 17 terminates in alinement with the opening 9 in the plate 6 and adjustably secured to the outer end of said leaf-spring member by means of a set screw 18 is a buffer 19 which is designed concavo-convex to conform to the outline of the ball valve 12.

The casting 4 has an upper outlet extension 20 to which is secured an air or equalizing chamber 21 and leading from this extension 20 is a delivery pipe 22.

Positioned in the extension 20 just below the entrance of the delivery pipe 22 thereto is a partition wall or the like 23 which is pro-

vided with valve seats 24. Discharge or check valves 25 of the ball type are positioned on the member 23 to be seated in said valve seats and the cages 26 are provided therefor.

The operation of the machine is as follows:—As the water flows from the reservoir 1 through the pipe 2 to the chamber 4, the same gains considerable velocity and pressure, due to the fact that the valve 12 is normally in its open position with respect to the valve seat 10. As the pressure and velocity increases, the same will become sufficiently great to roll the ball valve 12 up the inclined track 14, seating the ball and thus stopping the flow of water through the opening pipe 6. The water flowing through the pipe and into the chamber with such pressure and momentum seeks another outlet, which it finds through the check or discharge valves positioned in the extension 20. The water flowing through these latter valves enters the air or equalizing chamber and thence through the delivery pipe 22 and it may be here stated that the air in the chamber 21 acts as a cushion to the sudden inflow of water to maintain substantially a constant pressure in the chamber and a steady flow through the delivery pipe.

When all the energy of the moving column of water is used in forcing water into the air chamber, the pressure in the chamber tends to start a back-flow similar to the oscillations in a U-tube. This instantly closes the check valves 25, retaining the water pumped and the tendency to back-flow together with the sudden closing of the check valve causes a momentary reduction of pressure in the ram chamber 4 which allows the ball valve 12 to roll down the inclined track 14 to its initial position, thus opening the waste opening 9. The water is now free to flow as before and the cycle is completed.

From the foregoing it will be seen that I have provided a simple and efficient hydraulic ram which is inexpensive to manufacture, extremely durable in construction and one which will be most efficient in carrying out the purposes for which the same is designed.

While I have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in the form, proportion and in the minor details of construction may be resorted to, without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a hydraulic ram, a casting designed to form a chamber and having an inlet and a pair of outlet ports therein, means to supply water to the chamber, check valves in connection with one of the outlets of the chamber, a ball valve in the chamber for coöperation with the other outlet thereof, and an inclined trackway for the last mentioned valve.

2. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, means to supply water to said chamber, valve seats formed in the outlet ports, check valves arranged in the seats of one of said outlet ports, a ball valve disposed in the chamber to coöperate with the valve seat in the other outlet port, and an adjustable inclined track way for said ball valve.

3. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, means to supply water to the chamber, said outlet ports being provided with valve seats, check valves arranged in the seats of one outlet port, a ball valve in said chamber adapted to coöperate with the valve seat in the other outlet port, an inclined track way for said ball valve leading to the last-mentioned valve seat, and means for adjusting the degree of inclination of said track way.

4. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, check-valves in connection with one of said outlet ports, the other outlet port being provided with a valve seat, a ball valve in said chamber adapted to coöperate with said valve seat, an inclined track way for said ball valve, and a yielding buffer in connection with the valve seat for coöperation with said ball valve.

5. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, means to supply water to the inlet port, check valves in connection with one of said outlet ports, a plate secured to the casting and provided with an opening, registering with the other outlet port, a valve seat in connection with said plate, a ball valve in said chamber adapted to coöperate with said valve seat, and an inclined track way for said ball valve leading to said valve seat.

6. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, means to supply water to the inlet port, check valves in connection with one of said outlet ports, a plate adjustably secured to the casting and having an opening therein registering with the other outlet port, said plate being provided with a valve seat, adjacent the opening therein, a ball valve in said chamber adapted to coöperate with said valve seat, and a track way pivoted at its one end to said plate and inclined downwardly to rest upon a lower wall of the chamber whereby to guide the ball valve to the valve seat.

7. In a hydraulic ram, a casting designed to form a chamber and provided with an in-

let and a pair of outlet ports, means to supply water to the inlet port, check valves in connection with one of said outlet ports, a plate adjustably secured to the casting and having an opening therein registering with the other outlet port, said plate being provided with a valve seat adjacent the opening therein, a ball valve in said chamber adapted to coöperate with said valve seat, a track way pivoted at its outer end to said plate and inclined downwardly within the chamber to form a guide for the ball valve and a yielding buffer carried by the casting and projecting in the opening of said plate to cooperate with said ball valve.

8. In a hydraulic ram, a casting designed to form a chamber and provided with an inlet and a pair of outlet ports, means to supply water to an inlet port, an air chamber cooperating with one of said outlet ports, a delivery pipe in connection with the outlet port in advance of the air chamber, check valves also arranged in the aforesaid outlet port, in advance of the delivery pipe, a valve seat arranged at the other outlet port, a ball valve in said chamber for coöperation with said valve seat, and an inclined track way for the ball valve leading from within the chamber to the aforesaid valve seat.

In testimony whereof I affix my signature.

FREDERICK C. CROWE.

Witnesses:

WINIFRED E. HOLMES,

LEILA TRIVESS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."