

T. Hanson.
Hydraulic Ram.

No 12,549.

Patented Mar. 20, 1855

Fig. 1.

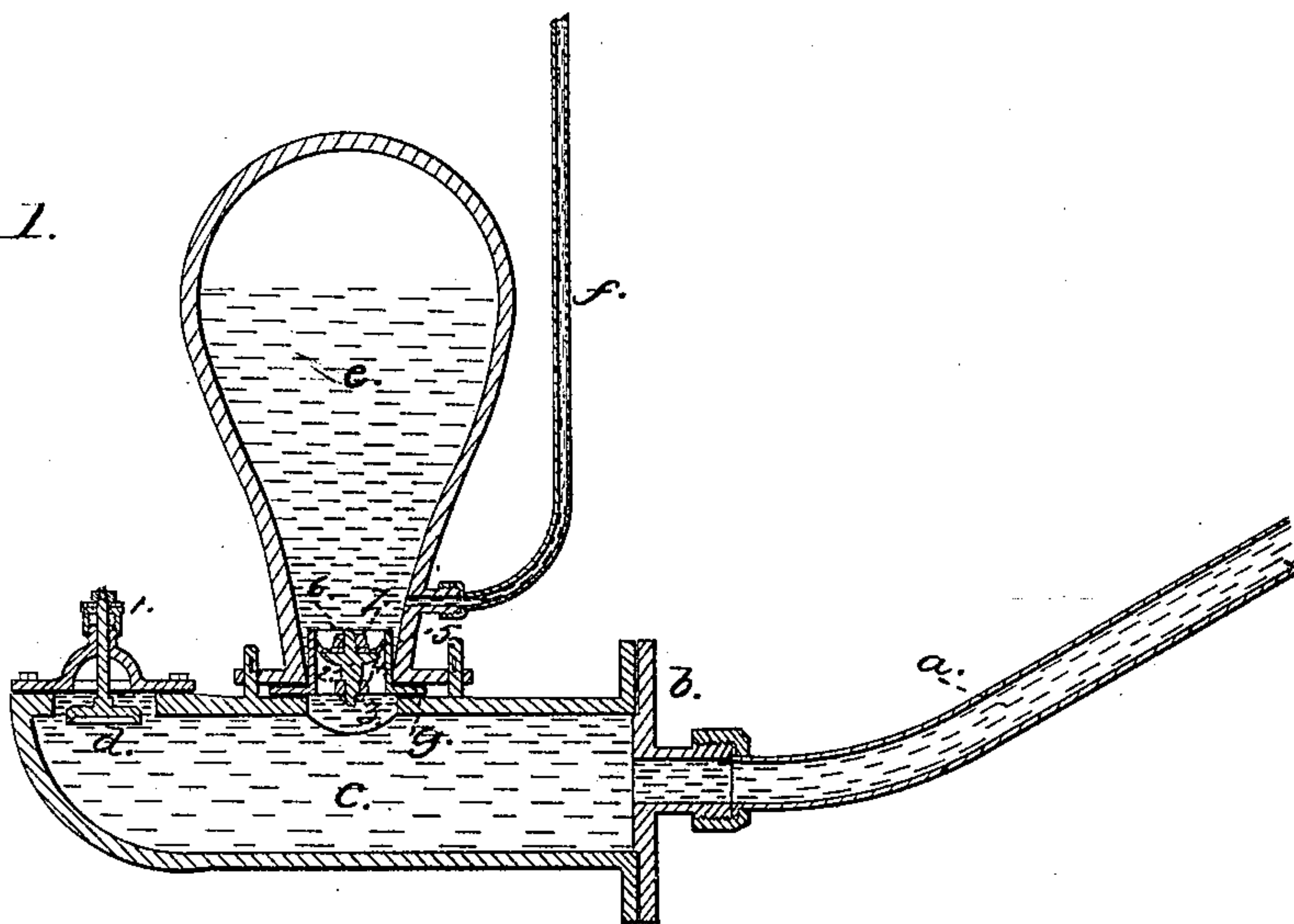


Fig. 2.

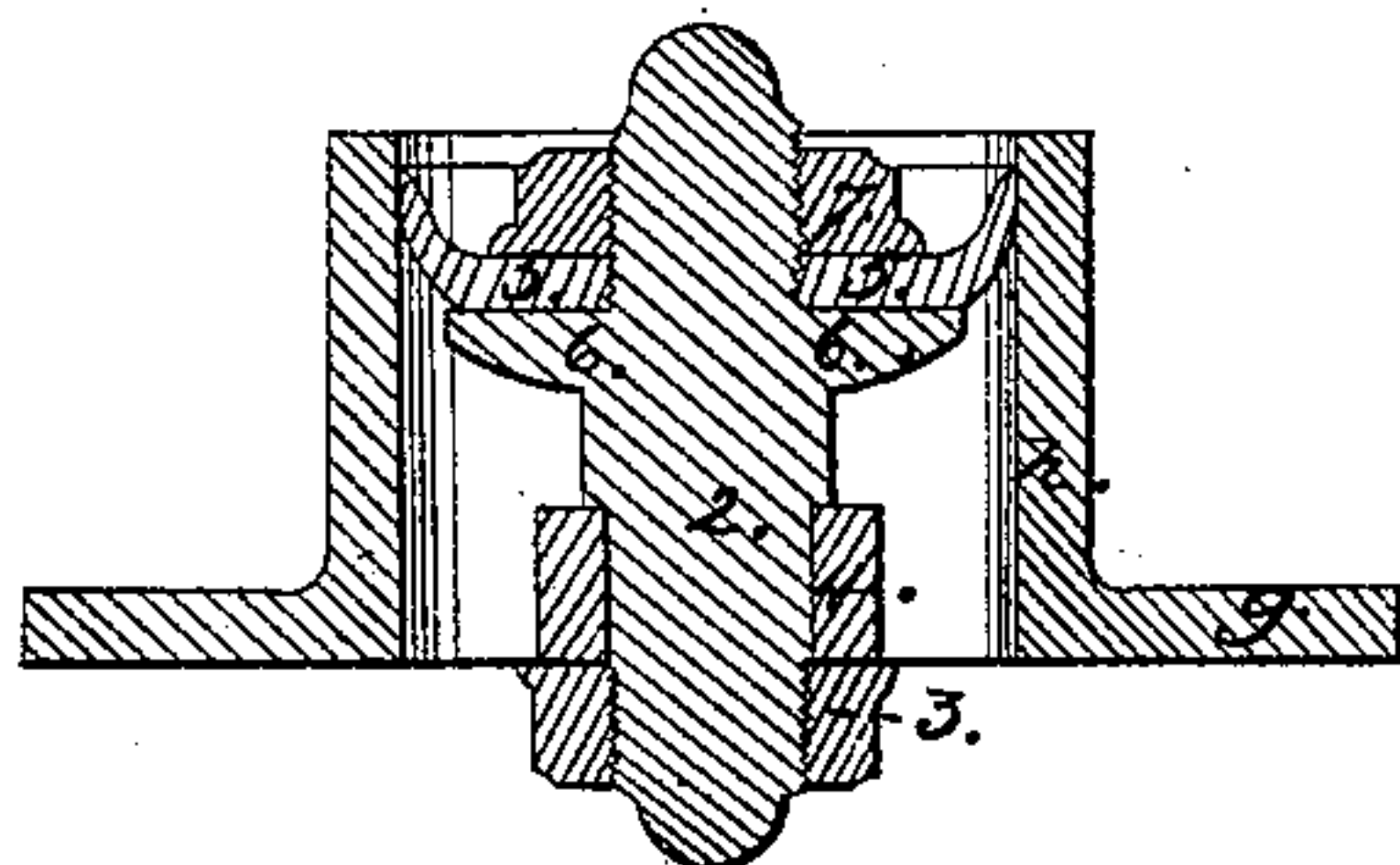
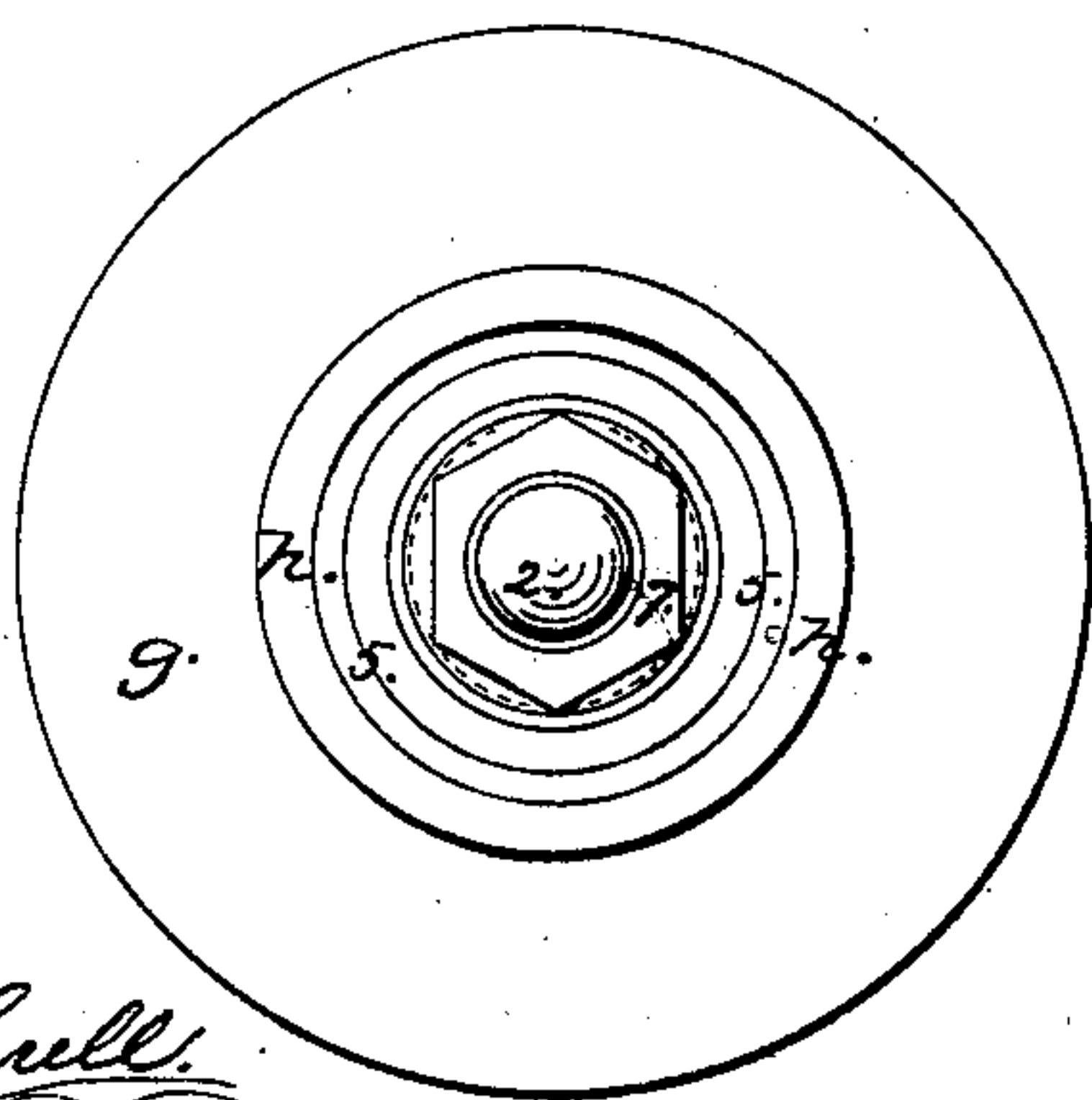


Fig. 3.



Witnesses:

Samuel W. Serrell.
Charles Serrell.

Inventor:

Thomas. Hanson.

UNITED STATES PATENT OFFICE.

THOMAS HANSON, OF NEW YORK, N. Y.

VALVE FOR HYDRAULIC RAMS.

Specification of Letters Patent No. 12,549, dated March 20, 1855.

To all whom it may concern:

Be it known that I, THOMAS HANSON, of the city, county, and State of New York, have invented a new and useful Improvement in Hydraulic Rams, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a longitudinal vertical section of an hydraulic ram with my improvement. Fig. 2, is an enlarged section of the valve forming the connection between the cylinder and air vessel; and Fig. 3, a plan thereof.

The same letters indicate like parts in all the figures.

In all hydraulic rams made prior to my invention the connection between the driving cylinder or chamber and the air vessel has been made by means of a clock or other valve closing onto a seat surrounding the aperture and in consequence presenting three serious difficulties. The first is that the valve, when closed, presents a greater area to the pressure in the air vessel than it does to the pressure of the water in the driving chamber below by the extent of the lap on the seat, the consequence of which is that a much greater pressure must be produced in the driving chamber by the driving column of water than there is in the air vessel before the valve will be opened to admit the water to the air vessel; so that the amount of water actually forced in the air vessel is less than could be obtained by the driving column of water if the area of the valve presented to the two opposing pressures was equal, and in consequence the bulk or height of column of water forced up to the reservoir is proportionally reduced. The second is that as the valve moves in, or nearly in the line of the motions of the water when the valve is closed by the preponderance of the pressure above all the water within the air vessel but below the opened valve is forced back into the driving chamber thus causing a dilatation in the air vessel which must be recompressed by the next impulse. And the third is that as the valve is closed suddenly and with violence by the rebound, there is a hammer like action of the valve on the seat, the blows of which follow each other in rapid succession corresponding to the pulsations of the driving column, these rapid and vio-

lent blows of the valve on its seat very soon wears the valve and the seat, thereby inducing leaks which destroy the efficient action of the ram. And besides, particles of sand, gravel, and other hard foreign substances are frequently caught between the packing of the valve and its seat which becomes imbedded in the packing of the valve by the violence of the blows, thereby destroying the action of the ram and requiring it to be taken apart for repair.

The object of my invention is to avoid these difficulties, and to this end my invention consists in combining with the cylinder or driving chamber of a water ram and the air vessel thereof a cylindrical tube or any equivalent thereto, the bore of which for the passage of water is provided with a cup of leather or other equivalent substance, secured and held at or about the center of the said tube, so that when spread out by the preponderance of the pressure in the air vessel above it shall be brought in contact all around with the bore of the tube and thus close the passage to the driving chamber; and when contracted by the preponderance of the pressure in the driving chamber it shall open the said tube for the direct passage of water from the driving chamber to the air vessel.

In the accompanying drawings *a*, represents the drive pipe, from the head of water, connected at *b*, in any suitable or ordinary manner with one end of the driving cylinder or chamber *c*, provided toward the other end and on top with the usual escape valve *d*, the stem of which is provided with an adjusting nut 1.

In the top of the driving cylinder or chamber there is a hole surmounted by the usual air vessel *e*, provided with the pipe *f*, leading to the reservoir. Over the hole and in line with it is placed a short cylindrical tube *h*, secured by a flange *g*, at its lower edge which is embraced between the outer surface of the driving cylinder or chamber and the flange of the air vessel *e*, by which the whole is properly secured together. At the lower end of the tube *h*, there is a bridge 4, to which is secured by a nut 3, a central spindle 2, which is formed with a flat or cup formed collar or flange 6, on which is placed a flexible cup 5, made of leather or other equivalent substance; and this cup is firmly held down by a screw nut 7. The flexible cup if flattened would be of greater

diameter than the bore of the cylindrical tube, so that the edge thereof, when spread, will be brought in contact with the bore of the tube, and close the passage, but when
5 contracted will leave the surface of the tube to permit the passage of water. The leather or other substance of which this cup is formed should be crimped so that when inserted in the tube its outer periphery or
10 edge will present a smooth surface to bear against the bore of the tube.

From the foregoing it will be seen that the leather cup will yield in either direction as the columns preponderate. The moment the pressure in the driving chamber
15 exceeds the pressure in the air vessel the cup will be contracted and permit the water to pass so that the whole impulse will be exerted in forcing water into the air vessel minus the force necessary to bend the cup.
20 And the moment the rebound takes place and the pressure in the driving chamber is reduced below the pressure in the air chamber the cup will be spread and close up the tube without permitting the water in the air
25 vessel from running back into the driving chamber to the injurious extent heretofore experienced. And this latter advantage is due to the fact that the cup in spreading
30 out to close the tube moves at right angles or nearly so to the line of motion of the

water, whilst on the old plan the valve moves in the direction, or nearly so, to the line of motion of the water, thus necessarily causing a dilatation of the air in the vessel to
35 an extent equal to the bulk of water forced back into the driving chamber by the descending valve.

From the very form of the cup and its position in the tube foreign substances can
40 not lodge and remain between the edge of the cup and the bore of the tube; and as the cup in spreading moves nearly at right angles to the line of motion of the water passing through the tube, the shock or hammer like action of the valve is much reduced.
45

I do not wish to be understood as limiting myself to the special construction herein specified so long as the same ends are attained by equivalent means.
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What I claim as my invention and desire to secure by Letters Patent is—

The mode substantially as specified, of forming the connection between the driving chamber and air vessel of water rams by
55 the tube and flexible cup placed within it, substantially as and for the purpose specified.

THOMAS HANSON.

Witnesses:

WM. H. BISHOP,
ANDREW DE LACY.