

(No Model.)

A. N. CARVER & N. J. STONE.

2 Sheets—Sheet 1.

RELIEF VALVE.

No. 396,858.

Patented Jan. 29, 1889.

Fig. 2

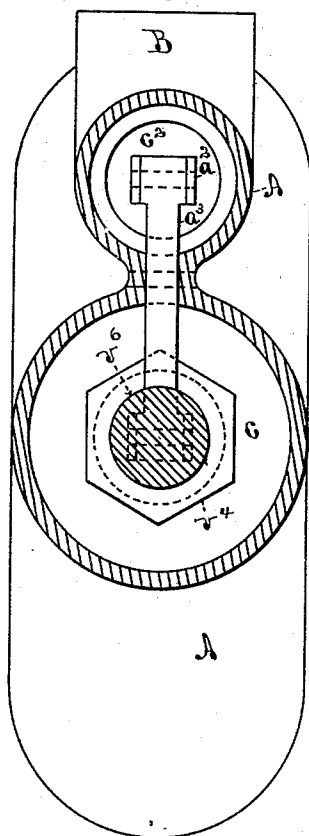
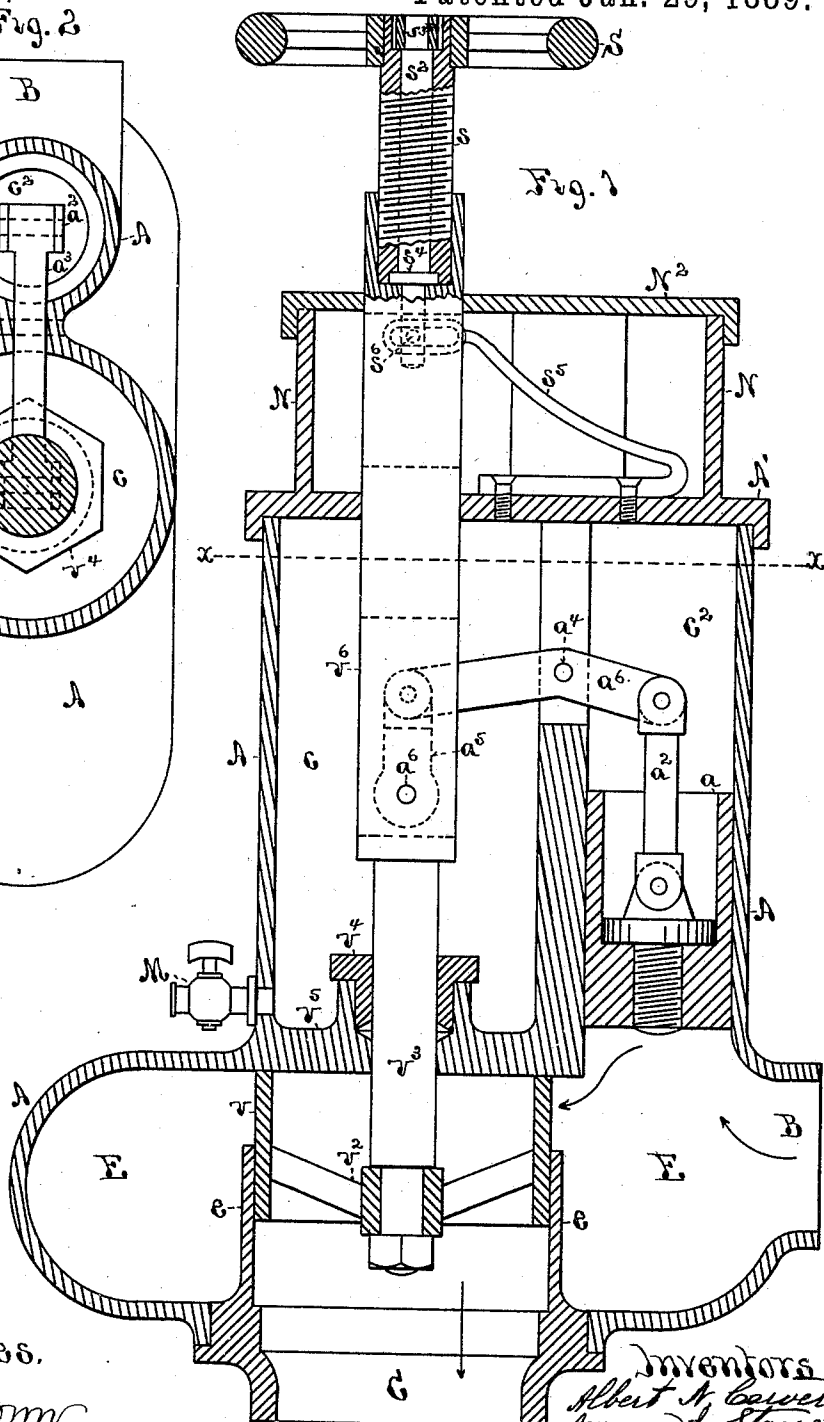


Fig. 1



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

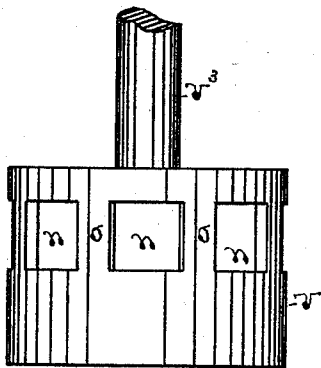
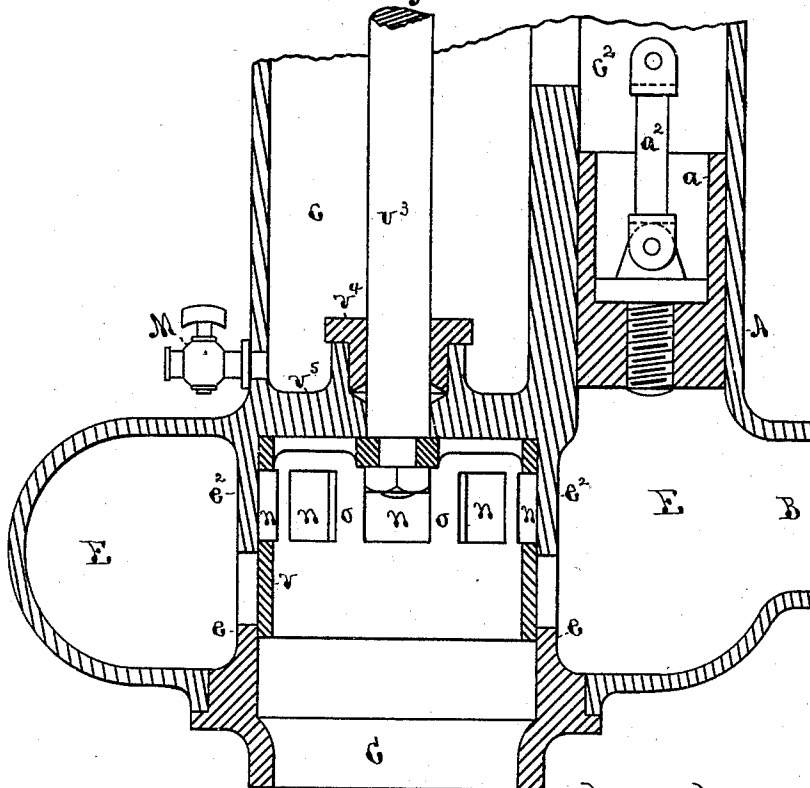


Fig. 3



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UNITED STATES PATENT OFFICE.

ALBERT N. CARVER AND NORMAN J. STONE, OF BOSTON, MASSACHUSETTS.

RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 396,858, dated January 29, 1889.

Application filed June 16, 1888. Serial No. 277,323. (No model.)

To all whom it may concern:

Be it known that we, ALBERT N. CARVER and NORMAN J. STONE, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Relief-Valves, of which the following is a specification.

Our invention relates to relief-valves for fire-engines and pumps; and it consists in certain new and useful constructions and combinations of the parts of the same, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a central vertical section of a relief-valve and its casing constructed according to our invention. Fig. 2 is a section on the line $x x$ of Fig. 1. Fig. 3 represents the lower portion of Fig. 1, with a modification of the relief-valve. Fig. 4 is a side view of the relief-valve shown in Fig. 3.

A is the casing of the relief-valve.

B is the induct-pipe leading from the pump-cylinder of the fire-engine, or the cylinder of any other pump to which the valve is to be applied, by a spout on the delivery side thereof.

C is the educt-passage of the valve leading to the suction of the engine or pump.

In the lower part of the casing A a chamber, E, is formed around the valve V. This valve consists of a section of a cylinder or tube of metal, which is attached to the piston-rod v^3 by arms v^2 . The valve works up and down in the tubular casing e , located centrally in the chamber E, and its rod v^3 passes through the upper wall, v^5 , of the chamber, being kept water-tight therein by the stuffing-box v^4 . This rod passes into a chamber, c , above the first one, and is attached to an enlargement of itself, v^6 . Alongside of the chamber c is another cylindrical chamber, c^2 , within the casing, opening downward into the chamber E on the induct side of the valve V. In this cylindrical chamber c^2 the piston a works up and down snugly. To the piston a is pivoted the link a^2 at its lower end, which is also pivoted at its upper end to the lever a^3 . This lever is pivoted at a^4 to the wall of the casing which divides the chambers c and c^2 . The opposite end of this lever a^3 passes into a slot made transversely through the rod v^6 , and is pivoted in that slot to the link a^5 , which is in turn pivoted to the rod v^6 by the pivot a^6 , passing transversely through the same.

The parts described are so arranged and proportioned that when the valve V is drawn upward, so as to close the annular space above the wall e , connecting the chamber E with the educt-pipe C, the piston a will be at the lowest point of its movement in the cylinder c^2 .

The rod v^6 passes through the cover A' of the chambers c and c^2 into and through the supplemental chamber formed by the vertical wall N and the cover N'. In this chamber another slot is made transversely through the rod, and the spring s^5 is attached by screws at one end to the cover A' and has its free end, which is slotted transversely, as shown in dotted lines, entering this slot in the rod v^6 . The upper end of the rod v^6 is made tubular and has a thread cut in its interior, with which a corresponding thread on the exterior of the tubular rod s engages, so that the tubular rod s may be raised and lowered in the rod v^6 by means of the hand-wheel S, attached to its upper end. A cylindrical rod, s^2 , passes downward through the tubular rod s , being held in place therein by a collar, s^4 , and a nut, s^3 , at its upper end, so as to allow of the tubular rod s revolving freely about its exterior. The lower end of this rod s^2 passes downward through a hole in the rod v^6 into the upper transverse slot which is formed therein, and this rod has a corresponding transverse slot cut through it, through which the free end of the spring s^5 extends. A pivot, s^6 , passes transversely through the rod s^2 and the slotted free end of the spring, so as to carry the end of the spring up and down with the rod s^2 . By this construction the rod s^2 is secured in its position up and down in the tubular rod s , and the latter is secured by its screw-thread in the rod v^6 , thus causing the adjustment of the tubular rod s in the rod v^6 , to bring a greater or less strain of the spring upward upon the rod v^6 , and hold the relief-valve attached to the latter in its closed position.

When the stream is shut off from the hose of the fire-engine, or the pump of the latter is run faster, so as to unduly increase the pressure of the water and endanger the bursting of the hose, the increased pressure of the water upon the piston a forces the latter upward in its cylinder, turning the lever a^3 on its pivot and forcing the valve-stem v^3 v^6

downward against the tension of the spring s^5 , carrying the valve V with it and opening the passage between the chamber E and the educt-pipe C, thus relieving the pressure upon the delivery side of the pump.

5 A waste-cock, M, is attached to the lower part of the chamber c , so that in case the water leaks past the piston a and overflows into this chamber it may be drawn off.

10 In Figs. 3 and 4 a modification of the valve V is shown and of the wall e , which is here divided into two parts, e and e^2 , the latter projecting downward from the bottom v^5 of the chamber c , and the valve V is made in the form of a cylinder, with vertical struts o connecting it to a ring, o^2 , to which the spider v^2 and rod v^3 are attached. When the valve V is moved downward by the piston a , as before, the water flows through the openings nn between the vertical struts o and escapes through the educt-passage C, as before. The advantage of this arrangement is that the valve is balanced and the pressure of the water upon the struts oo , in flowing past them, is transverse to the rod v^3 , and the water exercises no friction or pressure upon the arms of the spider v^2 , which would tend to keep the valve open against the action of the spring s^5 , and we consider this construction preferable to that first described, although the former may be employed to good advantage.

30 What we claim as new and of our invention is—

1. In combination with the induct-pipe B, 35 connected to the delivery of the pump, and

the educt-passage C, connected to its suction, the piston a , pivoted lever a^3 , and valve V, arranged to allow the water by its pressure to open the valve and permit the water to flow from passage B outward through passage C, substantially as described. 40

2. In combination with the induct-pipe B, connected to the delivery of the pump, and the educt-passage C, connected to its suction, the piston a , pivoted lever a^3 , valve V, arranged to allow the water by its pressure to open the valve and permit the water to flow from passage B outward through passage C, and the spring s^5 , arranged to close the valve V when the pressure is diminished upon the piston a , substantially as described. 45 50

3. The combination of the valve V, its valve-stem v^3 , the tubular rod s , adjustable within the rod v^6 by its screw-thread, the rod s^2 , passing through the same and carried therewith, and the spring s^5 , pivoted to the latter rod, substantially as described. 55

4. The combination of the induct-passage B, the educt-passage C, the chamber E, the tubular walls e e^2 , and the valve V, fitted to and arranged to move up and down within said walls and connected to its rod v^3 by the vertical struts o around its upper edge, substantially as described. 60

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Witnesses:

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