A. MAYER.

Relief-Valves for Fire-Engines.

No. 143,920. Patented Oct. 21, 1873.

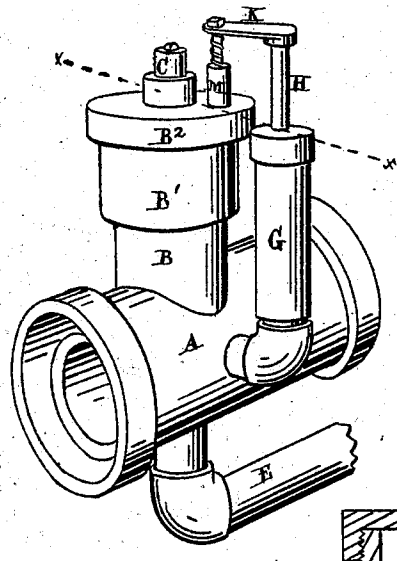

Fig. 1.

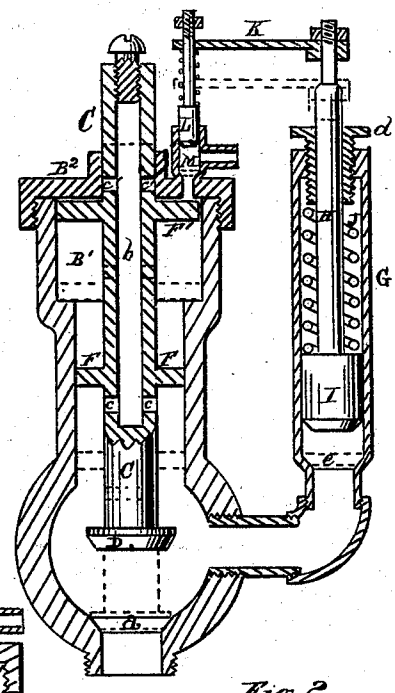

Fig. 2.

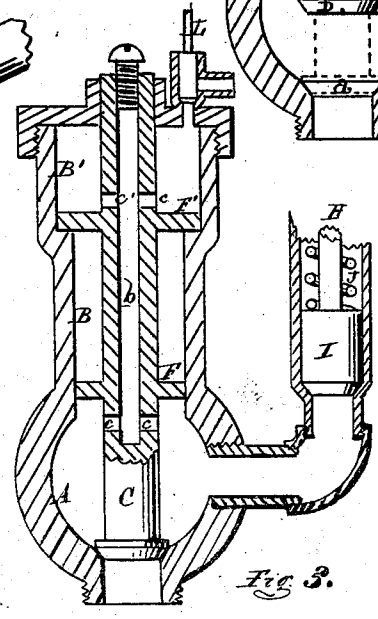

Fig. 3.

ATTEST:
H. F. Eberts.
H. N. Sprague

INVENTOR:
Alvarado Mayer
per attorney.
Hort. N. Sprague

UNITED STATES PATENT OFFICE.

ALVARADO MAYER, OF DETROIT, MICHIGAN.

IMPROVEMENT IN RELIEF-VALVES FOR FIRE-ENGINES.

Specification forming part of Letters Patent No. **143,920**, dated October 21, 1873; application filed June 3, 1873.

To all whom it may concern:

Be it known that I, ALVARADO MAYER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Relief-Valves for Fire-Engines; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is a perspective view of my improvement. Figs. 2 and 3 are cross-sections on *x x*, Fig. 1, the former showing the relief-valve open, and the latter representing it closed.

Like letters refer to like parts in the several figures.

The nature of this invention relates to a relief-valve to be applied to the pumps of steam fire-engines, its object being to enable the firemen to use a stop-cock or valve on the branch-pipe which may be closed at will while the pump is working without danger of bursting the hose, as the water forced into it will pass through a return-pipe into the suction, and circulate in that way so long as the cock in the pipe at the end of the hose remains closed. The present invention is more especially designed as an improvement upon the relief-valve for which Letters Patent No. 134,435 were issued to me December 31, 1872; and it consists in the peculiar construction and arrangement of the relief-valve and its hollow stem, carrying two pistons of different diameters, playing in cylinders above the water-way, the relief-valve outlet being in the bottom of the latter, in connection with the adjustable pressure or test gage shown and described in the aforesaid Letters Patent. The object of the present invention is to render the relief-valve instantaneous in its action, and to avoid the temporary increase of water-pressure in the hose at the time its stop-cock is closed before the relief-valve will open, experienced in the use of valves of this class.

In the drawing, A represents a horizontal water-way, which may be screwed to one of the gates of a fire pump or engine, its outer end being threaded or fitted with a compression-coupling for connecting the hose thereto. From the top of the water-way, and communicating therewith, rises a cylinder, B, whose upper half, B^1, is enlarged in diameter, and closed at the top by a cap, B^2, through which plays a hollow valve-stem, C, carrying at its lower end the relief-valve D, which seats at *a*, closing an opening in the water-way bottom, from which the return-pipe E is led to the suction-pipe of the pump. F is a piston secured to the stem C, and is fitted to the bore of the cylinder B. A second piston, F′, is also secured to said stem, and is fitted to the cylinder B^1. The piston F is a little greater in diameter than the relief-valve, and the piston F′ is of greater diameter than the piston F. The stem is longitudinally drilled from the top, as at *b*, closed by a screw, with one or more lateral apertures, *c*, drilled to intersect the passage *b* below the lower piston. Above the upper piston one or more lateral apertures, *c′*, are in like manner drilled into the passage *b*. Water under pressure, filling the water-way, presses against the lower side of the piston F, tending to lift it and the valve-stem. The water passes through the passage in the stem to the upper side of the piston F′, and exerts a downward pressure upon it; and, the upper piston being of greater diameter than the lower one, the relief-valve will be kept seated so long as the pressure upon the upper piston is maintained. G is a small vertical cylinder, with an elbow at its lower end, which is tapped into the side of the water-way. H is a piston-rod playing through a screw-gland, *d*, in the top of the cylinder G, and carries at its lower end a valve, I, which seats at *e* in the bottom of said cylinder. J is a strong spiral spring coiled about the stem H between the valve and gland. K is an arm at the top of the stem H, projecting over the top of the cylinder B^1, carrying a pendent valve, L, playing in a case, M, communicating with the upper part of the cylinder B^1. By screwing down the gland *d* upon the spring J the latter may be adjusted to prevent the valve I from lifting at less than a determined pressure, say, of one hundred pounds per square inch, as described in the said Letters Patent. The spring being adjusted to resist a given pressure in the water-way, and in the hose connected therewith, whenever that pressure is exceeded the valve I lifts, and, through the arm K, lifts the valve L, and discharges the water from the up-

per side of the piston F′, when the pressure upon the under side of the piston F′ instantly shoots it up, carrying the relief-valve with it, which thus opens an outlet for the water to flow back through the pipe E to the pump-suction, thereby preventing that sudden but temporary increase of pressure between the pump and the cock in the hose-pipe when the latter is shut off, before the relief-valve opens, as frequently occurs in the relief-valves heretofore used, sometimes the pressure being increased to such an extent as to rupture the hose. This cannot occur in the use of this device, as its action is instantaneous. When the cock in the hose-pipe is again opened, the pressure in the water-way is lowered until the spring in the small cylinder seats the valves I and L, when the pressure is again placed on top of the piston F′, causing it to seat and close the relief-valve.

What I claim as my invention, and desire to secure by Letters Patent, is—

The construction and arrangement of the water-way A, cylinders B B^1, cap B^2, stem C, having the passage *b c c′* formed in it, and carrying the relief-valve D, and pistons F F′, with relation to the return-pipe E, cylinder G, rod H, valve I, spring J, arm K, and valve L, substantially as and for the purpose set forth.

ALVARADO MAYER.

Witnesses:
H. F. EBERTS,
CHAS. E. HUESTIS.