

(No Model.)

T. S. LA FRANCE, Dec'd.

A. LA FRANCE, Executrix.
PUMP VALVE.

No. 556,507.

Patented Mar. 17, 1896.

Fig. 1.

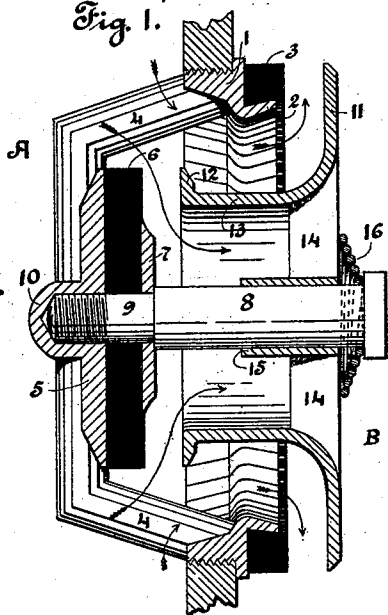


Fig. 2.

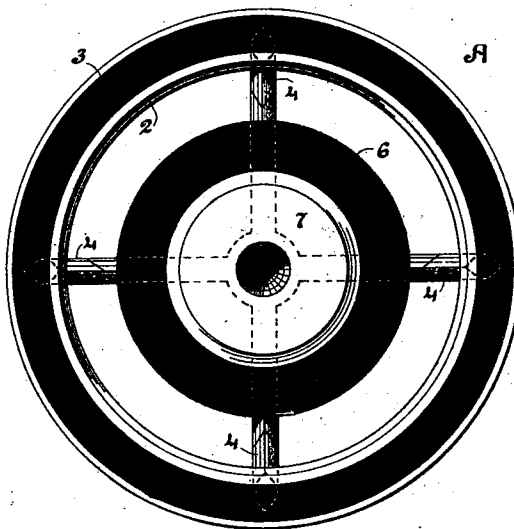


Fig. 3.

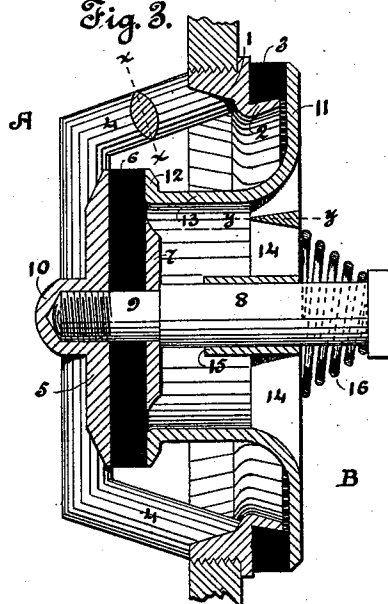
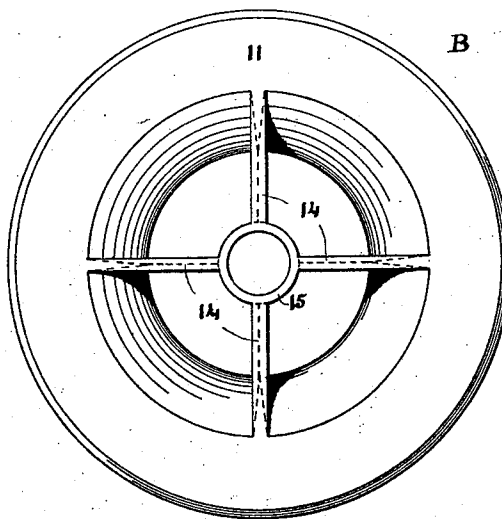


Fig. 4.



WITNESSES:

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TRUCKSON S. LA FRANCE, OF ELMIRA, NEW YORK; ADELIA LA FRANCE
EXECUTRIX OF SAID TRUCKSON S. LA FRANCE, DECEASED.

PUMP-VALVE.

SPECIFICATION forming part of Letters Patent No. 556,507, dated March 17, 1896.

Application filed August 14, 1895. Serial No. 559,306. (No model.)

To all whom it may concern:

Be it known that I, TRUCKSON S. LA FRANCE, a citizen of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented a new and useful Improvement in Pump-Valves, of which the following is a specification.

My invention relates more particularly to improvements in valves adapted for use in steam fire-engine pumps, and especially applies to the valves used upon the suction side of such pumps.

The objects of my improvement are to so construct the valve and its seat as to provide the largest possible port-area in any given size of valve, to reduce the lift of the valve, and to provide a valve that shall close or open quickly upon the change of stroke of the pump-plunger. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the valve and its seat, the valve being shown in its open position. Fig. 2 is a front view of the valve-seat, the valve and valve-stud being removed. Fig. 3 is the same section shown in Fig. 1, the valve being shown in its closed position. Fig. 4 is a front view of the valve detached.

Similar letters and figures refer to similar parts throughout the several views.

The valve-seat A has the attaching-rim 1, shown, as I prefer to make it, circular in form and screw-threaded into the valve-partition. Projecting from this rim is the outwardly-inclined flange 2. A seating-surface 3, of rubber or other resilient material, is sprung around the flange, and, in addition to being held in place by its incline, is cemented thereto and also to the face of the attaching-rim. From the opposite side of the attaching-rim the inwardly-inclined rims 4 extend into the suction-chamber of the pump, and hold therein the plate 5 to which is attached the second seating-surface 6 of the same material as the first-named surface. The ribs are lozenge-shape in cross-section, as shown at *x x* in Fig. 3, so as to present sharp edges to the water flowing between them, and also so as not to reduce the port-area. The diameter of the seating-surface 6 is less than the inner diameter of the rim 1, and said surface is set away

from said rim to such a distance that the area of the frustum-shaped opening between them shall be equal to the area of the annular opening between the said rim and the valve-stud 8. The valve-stud 8 is formed with a reduced portion 9, which is screw-threaded into the plate 5, a socket of sufficient depth being formed therefor by means of the boss 10 which projects from the back of the plate. This reduced portion of the stud is of such length that when it bottoms in the socket the shoulder on the stud will hold the washer 7 snugly against the seating-surface 6. The seating-surface 6 is also cemented to the plate 5, but the washer forms the main securing means.

The valve B is made with two rims 11 and 12, upon which are formed seating-faces to correspond with the seating-surfaces of the valve-seat, these rims being joined together and held the required distance apart by the shell or tubular body portion 13, which is curved outwardly where it joins the rim 11. The rim 11 is broad and has a flat surface of considerable area on either side thereof. Arms 14 extend from the curved portion of the valve-shell inwardly to the hub 15, which guides the valve upon the stud 8. The arms 14 have a depth equal to or less than the radius of the curved portion of the shell, and are also V-shaped in cross-section, as shown at *y y*, Fig. 3, in order that they may present sharp edges to the water flowing through the valve, and also that they may not reduce the port-area, as explained farther on.

The arrows in Fig. 1 indicate the course of the water through the valve, and it will be seen that there are two channels through which it passes, the one outside of and around the shell 13 and the other within the shell and around the valve-stud. The curve in the shell prevents an eddy in the outer current of water and also increases the area of the inner channel, so as to provide for the increasing thickness of the arms 14 and to prevent the obstruction of the outlet of this channel by the light helical spring 16 commonly used in this class of valves. The shell 13 in practice will be made thinner than it is shown in the drawings and will subtract little from the port-area. The valve is so propor-

tioned that the area of the passage within the shell 13 shall be equal to that of the passage between the rim 12 and seating-surface 6, and the area of the passage around the shell shall be equal to that of the passage between the rim 11 and seating-surface 3 when the valve is fully open. By constructing the valve and its seat in this manner it will be seen that they are, so to speak, submerged in the suction-chamber, and the water has easy access to and is provided with two free and direct channels through and around the valve, obstructions being reduced to a minimum. It will also be seen that in this way I attain a minimum lift of the valve for a maximum port-opening.

The flat surfaces of the outer valve-rim make the valve more sensitive to the inflow and backflow of fluid through the valve, and in this way I provide a valve that will open or close more rapidly upon the change of stroke of the pump-plunger.

In fire-engine pumps it is a desideratum to get the water into the pump as quickly as possible, and in pumping with a considerable lift the more rapidly the valves close the more rapidly will the air be pumped out of the suction-pipe and the required degree of vacuum be attained. As there is a free channel within the shell 13, no air or water can be trapped in front of the seating-surface 6 to retard the closing of the valve.

As this valve is especially designed for use in pumps where it must be set in the vertical position shown in the drawings, and as there necessarily will be wear in the hub 15 as it slides upon the valve-stud, it is essential that the seating-surfaces shall be in parallel vertical planes to allow for the settling of the valve.

I do not wish to be understood as confining myself to the circular form of valve shown, as it may be readily seen that other forms may be adopted without departing from the spirit of my invention.

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

1. A valve-seat comprising an attaching-rim

having a seating-surface attached thereto, ribs projecting from the opposite side of said attaching-rim, a supporting-plate held by said ribs in a plane at some distance away from that of the attaching-rim, a valve-stud standing out from said plate, and a second seating-surface parallel to the first secured to said plate by means of a washer held against it by a shoulder on the valve-stud, substantially as shown and described.

2. A valve-seat made up of an attaching-rim provided upon one side with an outwardly-inclined flange for retaining thereupon a resilient seating-surface, inwardly-inclined ribs extending from the other side of said attaching-rim and projected into the receiving side of a pump, a supporting-plate held in place by said ribs, a valve-stud standing out from said plate and a second resilient seating-surface smaller in diameter than the first secured to said plate by means of a washer held in place by a shoulder on the valve-stud; in combination with a valve made up of two seating-rims adapted to seat upon said seating-surfaces, the outer one of said rims presenting flat surfaces of considerable area parallel to the planes of the seating-surfaces, a shell, or tubular body portion, joining said rims and holding them the required distance apart, said shell being curved outwardly where it joins the outer seating-rim, and arms connecting this curved portion with a central hub which is guided upon the valve-stud.

3. In a valve, the combination of two seating-rims, a shell, or tubular body portion, holding them the required distance apart, said shell being curved outwardly where it joins the outer seating-rim, and arms connecting the curve of the shell with a central guiding-hub, said arms being, in depth, the same as, or less than, the radius of said curve, and tapering in cross-section, substantially as shown and for the purpose set forth.

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Witnesses:

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