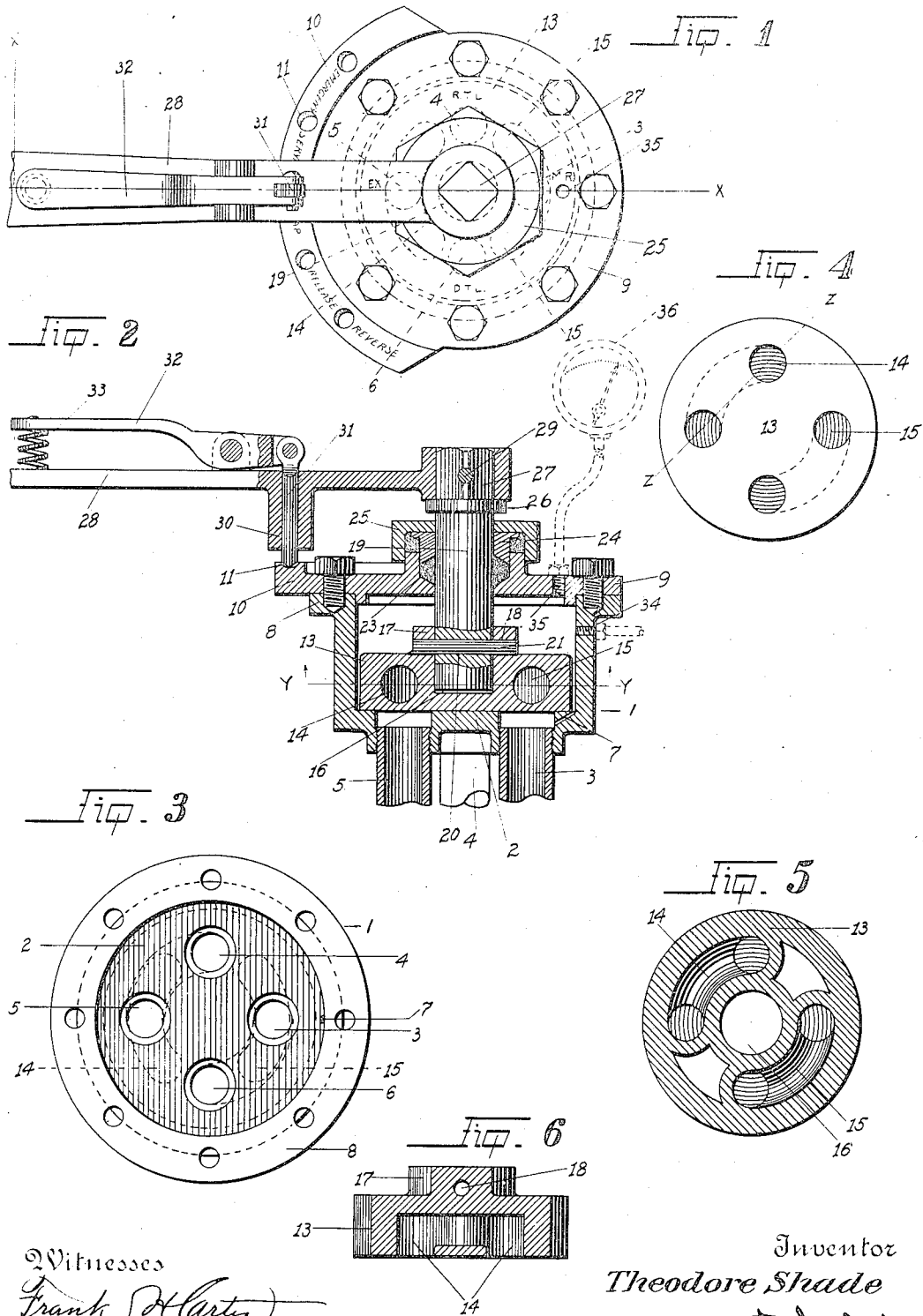


T. SHADE.
VALVE.

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961,466.

Patented June 14, 1910.



2 Witnesses

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[Signature]

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UNITED STATES PATENT OFFICE.

THEODORE SHADE, OF SACRAMENTO, CALIFORNIA, ASSIGNOR TO LIGHTNING VALVE
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VALVE.

961,466.

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To all whom it may concern:

Be it known that I, THEODORE SHADE, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Valves; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in valves and particularly to four-way valves used in connection with air brakes, water systems, oil lines etc., my object being to produce such a valve as may be used for air, water, steam and oil in such a manner as to permit the same to be under the utmost control at all times and particularly with air or steam to direct the same, either for direct or reverse application. With air brake systems the valve can be used both for directing a direct application of the brakes and also a reverse application for causing a direct release of the brakes. In steam the valve can be used to direct the steam both for direct driving and for reversing an engine. All these objects I accomplish by means of a valve head having four ports and a valve turnably disposed in said head and having diametrically disposed transverse ports adapted to register with the ports in said head for the purposes set forth above; also by such other and further construction as will appear by a perusal of the following specification and claim.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a top plan view of the complete device. Fig. 2 is a sectional view taken relatively on a line *x x* of Fig. 1. Fig. 3 is a top plan view of a valve head with the cap removed. Fig. 4 is a bottom plan view of a valve. Fig. 5 is a sectional view of a valve taken relatively on a line *y y* of Fig. 2. Fig. 6 is a sectional view taken relatively on a line *z z* of Fig. 4.

Referring now more particularly to the characters of reference on the drawing 1 designates a valve head having a seat 2 into which open four ports 3, 4, 5 and 6, while 7

is a bleed port leading from the port 3 to the head, for a purpose as will appear. The upper end of the head 1 is formed with a flange 8 to which is bolted a cap 9, which cap is formed with a quadrant 10 formed with a plurality of sockets 11 for the purpose as will appear. Seated on the seat 2 is a valve 13 having two curved ports 14 and 15 disposed through the body of said valve and opening into the bottom thereof, said ports being diametrically opposite one another and adapted to be brought into register with the ports 3, 4, 5 and 6 in a manner and for the purpose as will appear. In the center of said valve 13 is an orifice 16 surrounding which is an upwardly extending shoulder 17 provided with an orifice 18.

19 is a valve stem seated in the orifice 16 and provided with a cross orifice 20 adapted to register with the orifice 18 and receive a pin 21 which secures the two together. Said stem 19 extends upward through the cap 9 and is surrounded by a packing box 22 formed as a part of the cap 9 and filled with packing 23 held in position by means of a washer 24 and cap 25. The top of the stem 19 is formed with a ring 26 upward from which is a shoulder 27 on which a handle 28 is secured by means of a cross pin 29. Said handle 28 is formed with a sleeve 30 in which is disposed a pin 31 adapted to engage the sockets 11 as desired, said pin being pivoted to an auxiliary handle 32 pivoted to the handle 28 and having an end regulating spring 33.

34 is a port in the side of the head 1, while 35 is a port in the cap 9 both for the purpose as will appear.

I will now describe the use of this valve as I would use it in connection with air brake systems, it being of course understood that the valve may be used in any place where the type of valve described is adaptable.

In using this improved valve in connection with air brakes I do away with all auxiliary reservoirs and run a train line pipe direct from the port 6 to the front end of the brake piston cylinder and a reverse train pipe from the port 4 to the rear end of the brake cylinder, the port 3 being connected with the main reservoir tank pressure, while the port 5 leads to the atmosphere. On the quadrant 10 the sockets 11 indicate the points of the different positions of the valve

such as "Emergency", "Service", "Lap", "Release" and "Reverse", and the same are suitably designated on said quadrant as shown in Fig. 1.

5 For the purpose of this description I will suppose the valve to be on "lap" position as shown, all ports thus being lapped or closed.

10 The engineer desires to make an application of the brakes and so grasps the handle 28 and releases the pin 31 from its engagement by means of the member 32, and then moves the handle to the position marked "Service". This opens the port 15 from
15 the port 3 to the port 6, thus turning main reservoir pressure into the front of the brake cylinder, thus setting the brakes with a service application. If an emergency application is desired the engineer turns the handle 28 to point marked "Emergency" on
20 the quadrant 10. This opens the port 15 full from the port 3 to the port 6 thus driving the brakes on hard with a full reservoir pressure. Having set the brakes, if the engineer desires to release them, he turns the
25 handle 28 to the point marked "Release". This opens the port 14 from the port 6 to the port 5, thus exhausting the air from the front of the brake cylinder to the atmosphere, and at the same time the port 15
30 opens slightly from the port 3 to the port 4, thus turning main reservoir pressure into the rear of the brake cylinder and driving the brakes to release. If the brakes refuse
35 to respond readily to this application the engineer turns the handle 28 to the position marked "Reverse". This throws the port 15 full open from the port 3 to the port 4, thus driving immediate and direct pressure
40 into the rear of the brake cylinders, thus driving the brakes hard to release. Then when the brakes are set again the port 14 opens from the port 4 into the port 5, thus exhausting the air from the rear of the brake
45 cylinder to the atmosphere.

The main reservoir pressure from the port 3 bleeds through the port 7 into the head 1,

thus holding the valve 13 balanced in place without the need of a spring or other mechanism.

The port 34 may lead to the governor on the air pumps thereby leading main reservoir pressure thereto, as is desired.

The port 35 may lead to the air pressure gage 36, thus showing the condition of the
55 main reservoir pressure.

The above description applies to the device as it is used in connection with the air brake system. In practice, however, it may be used in connection with steam, water, oil or other matter as desired and connected in a manner as is essential for the purpose.

Thus it will be seen that I have produced such a valve as fulfils all the objects of the
65 invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of my invention, still in practice many deviations from such specific detail may be resorted to without departing from the spirit
70 of the invention.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:—
75

A valve comprising in combination a casing having a removable cap on its upper side and four ports in its lower side, a valve seated in said casing and having ports adapted to communicate said ports in said
80 lower side with each other as desired, said valve having a central orifice in its upper side, an upwardly projecting flange disposed on said valve around said orifice, a valve stem projecting through said cap and
85 into said orifice, a pin projecting through said flange and said stem, and an operating handle on said stem.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE SHADE.

Witnesses:

JOSHUA B. WEBSTER,

PERCY S. WEBSTER.