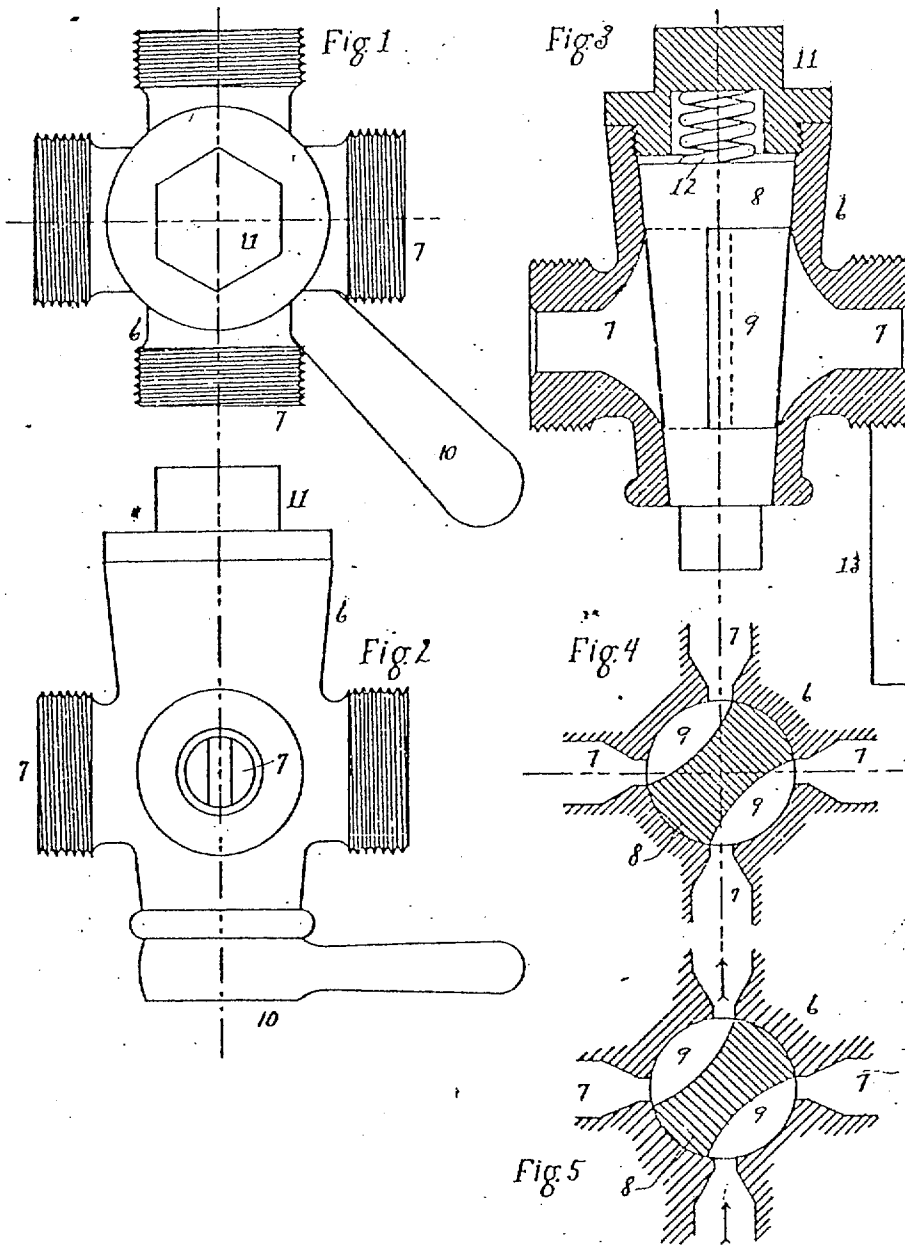


987,939.

Patented Mar. 28, 1911.



Witnesses

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UNITED STATES PATENT OFFICE

ALEXANDER B. ANDERSON, OF TOPEKA, KANSAS.

FOUR-WAY COCK.

987,939.

Specification of Letters Patent. Patented Mar. 28, 1911.

Application filed June 29, 1910. Serial No. 569,485.

To all whom it may concern:

Be it known that I, ALEXANDER B. ANDERSON, a citizen of the United States, residing in Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Improvement in Four-Way Cocks, of which the following is a specification.

It is the object of my invention to design a four-way cock comprising little metal and yet providing for the ports which do not in any degree restrict the passage of the fluid therethrough; that is, to construct a four-way cock that has a relatively small casing and plug and yet with large openings there-through, openings throughout their length of approximately the same area in cross section.

It is also the object of my invention to construct a four-way cock which is inexpensive to make, and which is simple and durable in construction, not necessitating the use of stuffing boxes, stuffing rings, or the like. And my invention comprises a casing with a tapered plug seated therein and with ports arranged therein, said ports being elongated and narrow at their inner ends and gradually expanding in width and shortening in length to a point where the opening corresponds with the pipe to which the port is to be connected, and said port having substantially the same area in cross section throughout its length; it also comprises an arrangement of the casing and plug with ports or openings through the plug and casing which are substantially the same area in cross section throughout their length; and it also comprises a special combination of casing, plug, spring, and cap for seating the plug in the casing and compensating for the wear, grinding, etc.; and it also comprises the parts, improvements, and combinations hereinafter set forth and claimed.

In the drawings accompanying and forming part of this specification, and in the description of the drawings, I have shown my invention in its preferred form, but it is to be understood that I contemplate changes in form, proportions, and materials, the transposition of parts, and the substitution of equivalent members, without departing from the spirit of my invention.

Figure 1 is a plan view of a cock made in accordance with the principles of my invention. Fig. 2 is a side elevation. Fig. 3 is a vertical center section of the casing and cap, the plug being shown in elevation. Fig. 4

is a transverse section. And Fig. 5 is a transverse section of a modified form of plug with the casing.

Similar reference characters indicate like or corresponding parts throughout the several views.

6 is the casing, which may be adapted to be connected with a union at each port 7. Each port is round at its outer end and is gradually elongated toward its inner end and at the same time narrowed in width, so that its inner end is a long slot; but this slot is of substantially the same area in cross section as the round opening at the outer end of the port, and substantially the same area in cross section is maintained from one end of the port to the other through the casing. The tapered plug 8 is seated in the casing which is correspondingly tapered inside, and is provided with the two side passages 9, 9 which, when connecting adjacent ports afford a passage whose minimum cross-sectional area is substantially the same as that of the ports, thereby giving an unrestricted passage for the flow of the fluid therethrough. The small end of the plug (preferably the lower end) is squared or angular, and thereon is secured the handle 10. At the other end, there is a cap 11 screwed into or onto the casing, and between the cap and the larger end of the plug is a spring 12 with sufficient tension to keep the plug firmly seated in the casing.

With the four-way valves as now constructed, the minimum passage through the cock is only a fraction in cross-sectional area of the cross-sectional area of the pipes to which they are adapted; hence the flow of the fluid through the cock is greatly restricted, making quick work impossible. This may, of course, be overcome in a measure by using a larger cock. But by properly arranging the ports as I have explained herein and shown in the drawings, I am able, with a smaller casing than has heretofore been used and having restricted passages through, to afford unrestricted passage for the flow of the fluid through the cock; thereby greatly saving in the cost of these articles which are extensively used in railroad and other work, and where the cost is closely reckoned by the weight of the metal used.

It is also to be noted that with my arrangement of the plug and cap, I afford a plug valve or cock of exceeding simplicity

and few parts, economically made, easily assembled, compensating for the wear, and readily taken apart for grinding the plug.

It is also to be noted that by elongating the ports at their inner ends, I am enabled to have a considerable lap when the ports are closed, the plug having quite a thick body between its two side passages, instead of a narrow web as in the case of other four-way cocks; so that my cock may be safely used as a stop-cock as well with safety and without danger of leaking.

I contemplate the use of this four-way cock in railroad work, especially for operating ash-pans by air pressure in locomotives; but obviously it is readily adapted for other service, and is especially desirable on account of its cheapness, durability, and simplicity.

In the modified form shown in Fig. 5, it will be noted that the part of the plug turned toward the exhaust port is slightly narrower than that turned toward the inlet port, the purpose being to permit the fluid to start its exhaust in advance of the inlet, and to provide a factor for insuring the complete exhaust from one side of a cylinder while the fluid under pressure is admitted to the other side; which is desirable in operating locomotive ash pans by air-pressure. But in other services, as in hoist service, where it is desirable to hold the piston and the load carried thereby rigid at any intermediate point, and to operate the piston in either direction from an intermediate point, the other form is preferable which gives a simultaneous inlet and exhaust.

The part 13 in Fig. 3 is a bracket which may be cast integrally with the casing, for bolting the cock to the under part of the locomotive, thereby eliminating the necessity of otherwise suspending the pipes.

What I claim is:

1. In a four-way cock, a casing having ports therethrough whose outer ends are

round, whose inner ends are elongated and narrowed and which gradually contract in length and expand in width from their inner ends toward their outer ends, and which maintain substantially the same area in cross section throughout their entire length.

2. In a four-way cock, the combination of a casing having ports therethrough whose inner ends are elongated and narrow and which gradually contract in length and expand in width toward their outer ends where they are rounded and which are of substantially the same area in cross section throughout their length, and a tapered plug seated in the casing having side passages adapted to register with adjacent ports, said side passages having a minimum cross-sectional area approximately equal to the cross-sectional area of said ports.

3. The combination of a casing having a tapered seat and four ports radiating therefrom equidistantly spaced apart, each of said ports having its inner end elongated longitudinally of said seat and narrowed transversely and thence gradually shortening longitudinally and expanding transversely toward the outer end where the port is rounded and said port being of substantially the same cross-sectional area throughout its length, a tapered plug seated in said casing and having passages on opposite sides thereof adapted respectively to connect adjacent ports the passage therethrough having a minimum cross-sectional area approximately equal to the cross-sectional area of said ports, and the stock of said plug between said side passages being capable of closing opposite ports and to overlap both edges thereof, substantially as set forth.

In testimony whereof I have hereunto signed my name in the presence of witnesses.

ALEXANDER B. ANDERSON.

Witnesses:

J. M. STARK,

C. J. ROSEN.