April 20, 1926. 1,581,546

W. L. RANSON

LOCOMOTIVE SANDER VALVE

Filed May 8, 1923

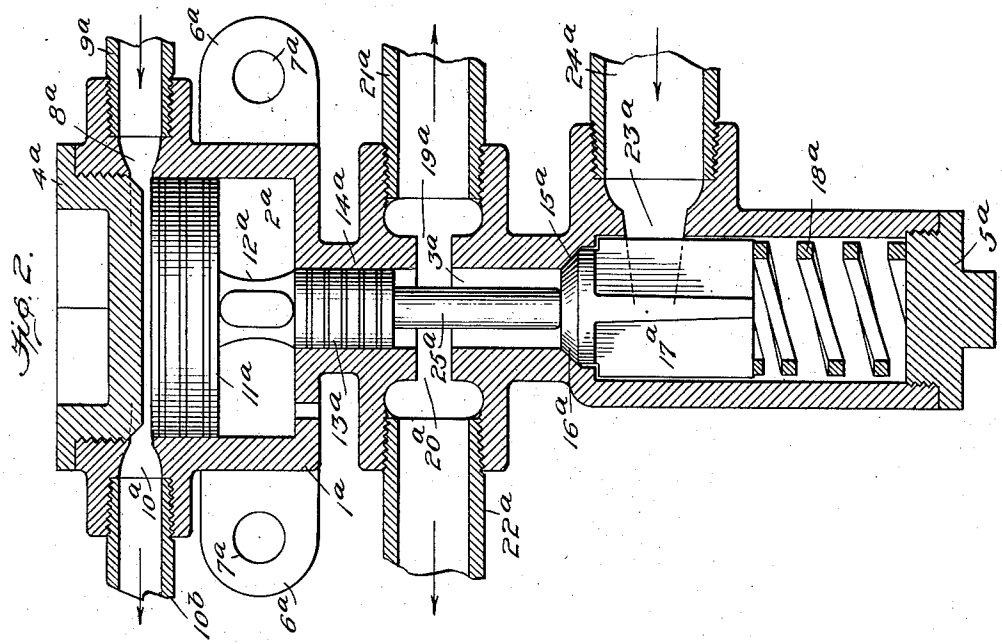


Fig. 2.

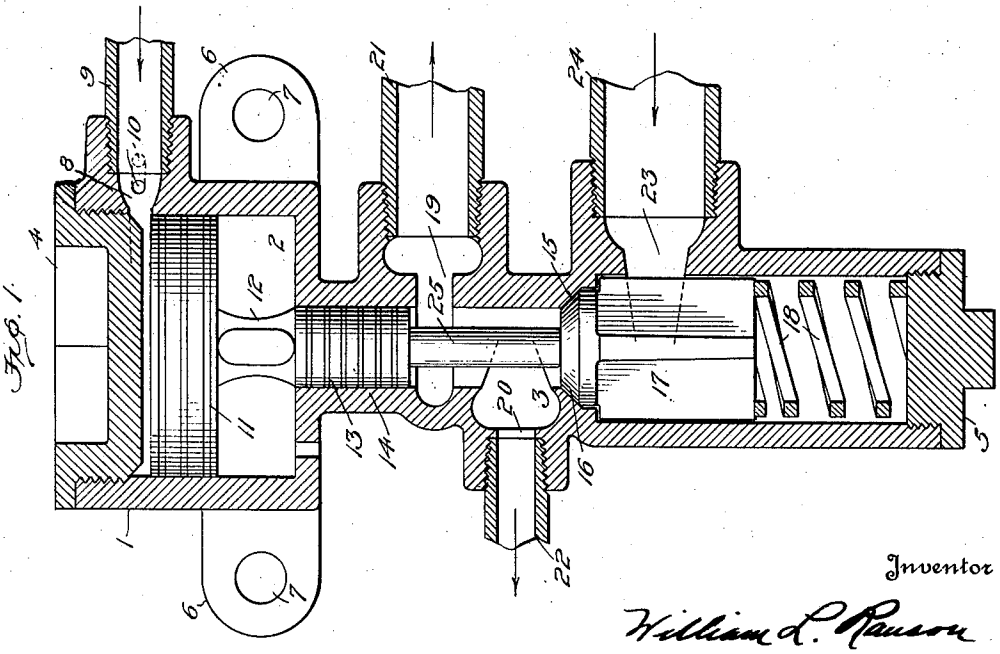


Fig. 1.

Inventor

William L. Ranson

By Frank H. Macklin

his Attorney

Patented Apr. 20, 1926. 1,581,546

UNITED STATES PATENT OFFICE.

WILLIAM L. RANSON, OF ROANOKE, VIRGINIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GRAHAM-WHITE SANDER CORPORATION, OF ROANOKE, VIRGINIA, A CORPORATION OF VIRGINIA.

LOCOMOTIVE SANDER VALVE.

Application filed May 8, 1923. Serial No. 637,555.

To all whom it may concern:

Be it known that I, WILLIAM L. RANSON, a citizen of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Locomotive Sander Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to locomotive sanders and more particularly to valves adapted to operate the sander mechanism.

The principal object of the invention, generally stated, is to provide a fluid pressure operated valve mechanism which will afford a cleaning blast of air or fluid pressure to the sander mechanism at the beginning and end of each operation of the valve, the valve being adapted to be positioned and arranged so as to economize in piping and pipe fittings and to permit of a certain and speedy action of the sanding mechanism when desired.

Still another object of my invention is to provide a valve arrangement for locomotive sanders in which the valve mechanism may be placed at any desirable point and operated from any other point, and which, at the same time, will insure a positive operation of the sander mechanism at the desire of the operator.

A still further object of the invention is to provide a valve mechanism comprising a valve casing having a plurality of inlet and outlet portions therein and having a plurality of valves arranged within the casing, the said valves being controlled by fluid pressure to provide for a cleaning blast, a stirring blast, and a sanding blast at the will of the operator.

A still further object of the invention is to provide a valve especially arranged and adapted for use with locomotive sanders of the fluid pressure type, said valve being arranged to be operated by fluid pressure and adapted to perform the necessary functions in respect to cleaning, stirring and sanding blasts.

The invention further consists in the various parts and combinations of parts hereinafter described, the novel features whereof are pointed out in the appended claims.

In the drawings in which I have illustrated two modifications of my device:

Figure 1 is a vertical central sectional view of a pneumatically operated locomotive sander valve.

Figure 2 is a corresponding view of a slightly modified form.

Referring first to Figure 1, the numeral 1 designates a valve casing having a plurality of spaced chambers 2 and 3 therein opening at the opposite ends of the casing, which ends thereof are preferably closed by screw-threaded plugs 4 and 5. The casing is provided with ears 6 having perforations 7 to receive attaching bolts or other suitable fastening means, not shown.

The chamber 2 is preferably cylindrical and is provided adjacent its upper end with an inlet port 8 connected to a pipe 9 which leads to the casing from the source of fluid pressure, preferably the main reservoir. A choke or bleed port 10 is provided adjacent the opening 8 to prevent the too sudden operation of the parts hereinafter to be described and to also permit the escape of fluid pressure at the close of the sanding operation as will be hereinafter set forth. It will be of course understood that there is interposed in the pipe 9 between the source of fluid pressure and the inlet port 8 a suitable valve mechanism under the control of the operator or engineer.

Within the chamber 2 there is provided a piston 11 having a stem 12, the latter extending downwardly from the lower face of the piston and adapted to contact the upper end of the piston valve 13 which is mounted within the upper cylindrical portion 14 of the chamber 3. At a point intermediate the ends of the chamber 3 there is provided a conical valve seat 15 which is adapted to co-act with the conical portion 16 of the wing valve 17 mounted within the lower portion of the said chamber. I preferably interpose between the lower extremity of the wing valve 17 and the plug 5 a spring

mechanism 18 which acts in conjunction with fluid pressure to insure the proper seating of the valve 17 on its conical seat 15.

At points between the adjacent portions of the valves 13 and 17 I preferably provide the chamber 3 with outlet ports 19 and 20 which ports are suitably connected, respectively, to the pipes 21 and 22. The pipe 21 is preferably connected to the cleaning pipe of the sander device while the pipe 22 is connected to the sander mechanism and forms the passage for the sanding blast.

At a point below the seat 15 I provide the chamber 3 with an inlet port 23 suitably connected, as by means of the pipe 24, with a source of fluid pressure which, for convenience, may be the main reservoir. Interposed between the adjacent faces of the piston valve 13 and the wing valve 17 is a stem or plunger 25 which may conveniently be formed integral with the piston valve 13.

The operation of this modification is as follows:

When it is desired to operate the valve the operator or engineer admits fluid pressure through the pipe 9 in the direction indicated by the arrow and owing to the difference in area between the piston 11 and the wing valve 17 the piston 11 is moved downwardly and by means of the stem 12 forces the valves 13 and 17 downwardly within the chamber 3. As soon as the valve 17 is forced from its seat 15 the fluid pressure in the pipe 24 flows upwardly within the chamber 3 and escapes therefrom by means of the ports 19 and 20 and the pipes 21 and 22, as indicated by the arrows. A continual downward movement, however, of the piston 11 causes the piston valve 13 to close or blank the outlet port 19 whereupon the fluid pressure from the pipe 24 is forced to escape from the chamber 3 by the pipe 22 only. So long as the valve within the pipe 9 is maintained in this position the fluid pressure from the main reservoir is forced to flow through the sander pipe 22 and the sander is maintained in full operation. As soon, however, as the valve within the pipe 9 is closed the fluid pressure which has been acting upon the upper face of the piston 11 escapes through the bleed port 10 and the fluid pressure acting upon the lower face of the valve 17 in conjunction with the spring 18 forces the valves 17 and 13 to return to normal position. As these valves return to normal position it will be obvious that the piston valve 13 will again open the port 19 before the valve 17 has seated whereupon the blast of fluid pressure will again be divided between the pipes 21 and 22, and since the area of the pipe 21 is greater than the area of the pipe 22 and since the flow of pressure through the pipe 22 is further restricted by the sanding nozzle, the greater volume of fluid pressure will escape through the pipe 21. Since this pipe is connected to the cleaning port of the trap it is obvious that both at the beginning and at the end of a sanding operation there is provided, by means of the improved construction, a blast of fluid pressure through the cleaning port.

Referring now to Figure 2, there is provided a casing 1^a having chambers 2^a and 3^a substantially identical with the showing of Figure 1. These chambers open at the opposite ends of the casing and have their open ends closed respectively by the screw plugs 4^a and 5^a. The casing 1^a is also provided with ears 6^a having perforations 7^a to receive the attaching mechanism, not shown.

The chamber 2^a is provided with an inlet port 8^a suitably connected to a pipe 9^a leading from a source of fluid pressure and it will be understood in this instance also that there is provided at some convenient point intermediate the inlet opening 8^a and source of fluid pressure, a valve mechanism, not shown, to control the flow of fluid pressure. There is also provided at a suitable point within the chamber 2^a an outlet port 10^a suitably connected to a pipe 10^b, the said pipe leading to the sanding nozzle of the locomotive sander, not shown. Mounted within the chamber 2^a is a piston 11^a having a suitable stem 12^a normally adapted to contact the upper face of the piston valve 13^a which is mounted within the cylindrical upper portion 14^a of the chamber 3^a. At a suitable point intermediate the ends of the said chamber there is provided a conical valve seat 15^a which is adapted to cooperate with the correspondingly formed portion 16^a of a wing valve 17^a which is mounted within the lower portion of the chamber 3^a.

Intermediate the lower extremity of the valve 17^a and the plug 5^a I provide a spring mechanism 18^a which is normally adapted in conjunction with the fluid pressure to force the valve 17^a against its seat 15^a. At a point intermediate the adjacent portions of the valves 13^a and 17^a I provide a plurality of outlet ports 19^a and 20^a which are preferably diametrically opposite each other. The port or opening 19^a is suitably connected to a pipe 21^a which in the present embodiment is connected to the locomotive sander and forms the cleaning blast therefor. Suitably connected to the opening or port 20^a is the pipe 22^a which, in this instance, is connected to the sand dome or sand box and is adapted to afford a spreader blast to a sand spreader or stirrer of any suitable type placed within the sand dome or box of the locomotive to agitate the sand and to prevent the caking or clogging thereof, as will hereinafter more fully appear. At a point below the seat 15^a, where is provided an inlet port 23^a which is connected to the pipe

24ª, the latter being suitably connected to a source of fluid pressure, preferably the main reservoir. Interposed between the adjacent faces of the valves 13ª and 17ª is a stem or plunger 25ª which may conveniently be formed integral with the piston valve 13ª.

The operation of this embodiment is as follows:

When fluid pressure is admitted to the pipe 9ª in the direction indicated by the arrow, the resistance to the passage of the fluid pressure through the sander nozzle which, it will be understood, is connected to the pipe 10ᵇ, is sufficient to overcome the combined spring and fluid pressure acting upon the valve 17ª due to the area of the piston 11ª being much greater than the area of the valve 17ª, and will cause the piston 11ª to move downwardly within the chamber 2ª and hence cause a corresponding movement of the valves 13ª and 17ª. As soon as the valve 17ª is moved from off the seat 15ª a blast of fluid pressure passes within the chamber 3ª and is led out therefrom through the pipes 21ª and 22ª to the cleaning port or blast and to the spreader or stirrer before the continued downward movement of the piston 11ª forces the piston valve 13ª across and closes or blanks the ports 19ª and 20ª, whereupon the sanding blast is continued but the passage of fluid pressure through the outlet ports 19ª and 20ª is stopped. As soon, however, as the pipe 9ª is disconnected, by means of the valve mechanism, from the source of fluid pressure the combined spring and fluid pressure acting upon the valves 13ª and 17ª force these valves upwardly and here again the valve 13ª will clear the outlet ports 19ª and 20ª before the valve 17ª is seated, whereupon there will be again a cleaning and a spreading blast of fluid pressure through the pipes 21ª and 22ª prior to the closing of the valve 17ª.

From the foregoing description it will be seen that I have provided a fluid pressure operated valve in which the parts are so arranged that at the beginning and end of each sanding operation there is provided a cleaning blast of fluid pressure and in the modification shown in Figure 2 there is provided in addition a spreading blast which in this particular instance is preferably arranged simultaneously with the cleaning blast. The latter type of device is particularly applicable for use on locomotives which have very wide sand boxes or those in which the sand boxes are so formed that the sand does not readily flow to the outlets of the box by gravity.

I claim:

1. In a locomotive sander valve, the combination with a casing having a plurality of chambers therein, one of said chambers having a plurality of outlets therefrom, pipes connecting said outlets to the sanding device, of a plurality of valves positioned within said last named chamber, a piston mounted within said other chamber, and fluid pressure means associated with said piston for operating said valves in unison.

2. In a locomotive sander valve, the combination with a casing having a plurality of chambers therein, one of said chambers having an inlet port and an outlet port therein, of a plurality of valves slidably mounted within said last named chamber, one of said valves being adapted to control the flow of fluid pressure from said chamber, said other valve being operatively interposed between said inlet port and said first named valve and reacting against the fluid pressure in said port and adapted to control the flow of fluid pressure to a portion of said chamber, a piston mounted within said other chamber, and fluid pressure means associated therewith for operating said valves.

3. In a locomotive sander valve, the combination with a casing having a plurality of chambers therein, one of said chambers having an inlet and a plurality of outlet ports therein, pipes connecting said outlets to the sanding device, a plurality of valves mounted within said last named chamber, one of said valves being adapted to control the flow of fluid pressure through said inlet port, said other valve being adapted when moved from normal position to close at least one of said outlet ports, a piston mounted within said other chamber and fluid pressure means associated with said piston to move said valves from normal position.

4. In a locomotive sander valve, the combination with a casing having a plurality of fluid pressure inlet and outlet ports therein, pipes connecting said outlet ports to the sanding device, of a plurality of valves within said casing and arranged for simultaneous movement combined spring and fluid pressure means for maintaining said valves in inoperative position, and fluid pressure means acting in opposition to said first named means for forcing said valves to operating position.

5. In a locomotive sander valve, the combination with a casing having a plurality of outlet ports, of a piston valve positioned within said casing, a wing valve arranged beneath said piston valve, said wing valve controlling the admission of fluid pressure to said outlet ports, means acting upon said wing valve for maintaining said valve in normal position and fluid pressure means acting upon said piston valve to move the same, to thereby unseat said wing valve and subsequently blank said outlet ports.

6. In a locomotive sander valve, the combination with a casing having a plurality of chambers therein, one of said chambers having a plurality of outlet ports therein, a pis-

ton valve mounted therein and adapted to close one of said outlet ports, a second valve mounted within said chamber and normally adapted to close a portion of said chamber to fluid pressure, a piston mounted in said other chamber and adapted to control said piston valve, and fluid pressure means including inlet and outlet ports for operating said piston to move said valves from normal position.

In testimony whereof I affix my signature.

WILLIAM L. RANSON.