Jan. 21, 1930. T. W. DEMAREST 1,744,451

BLOWER VALVE

Filed Jan. 5, 1920 2 Sheets-Sheet 1

Fig. 2.

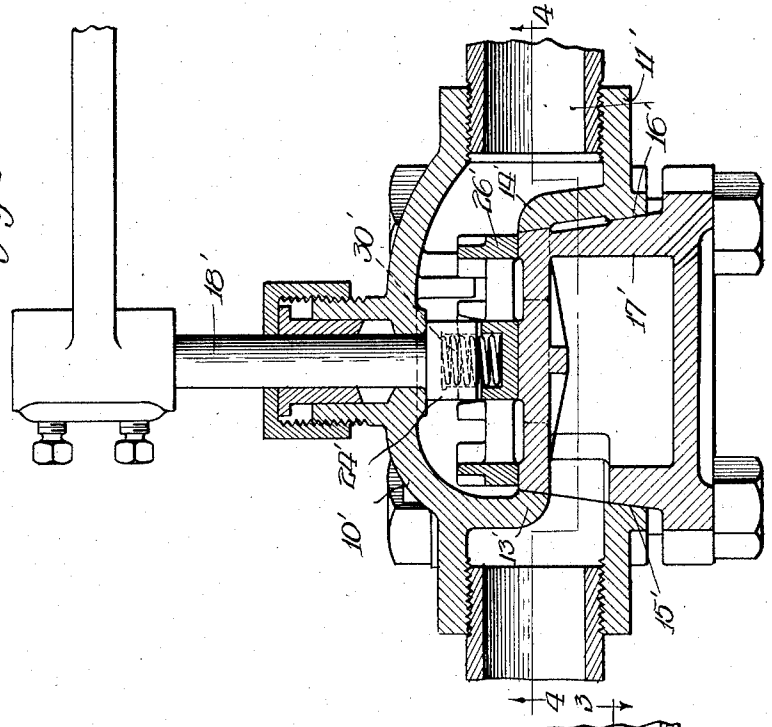
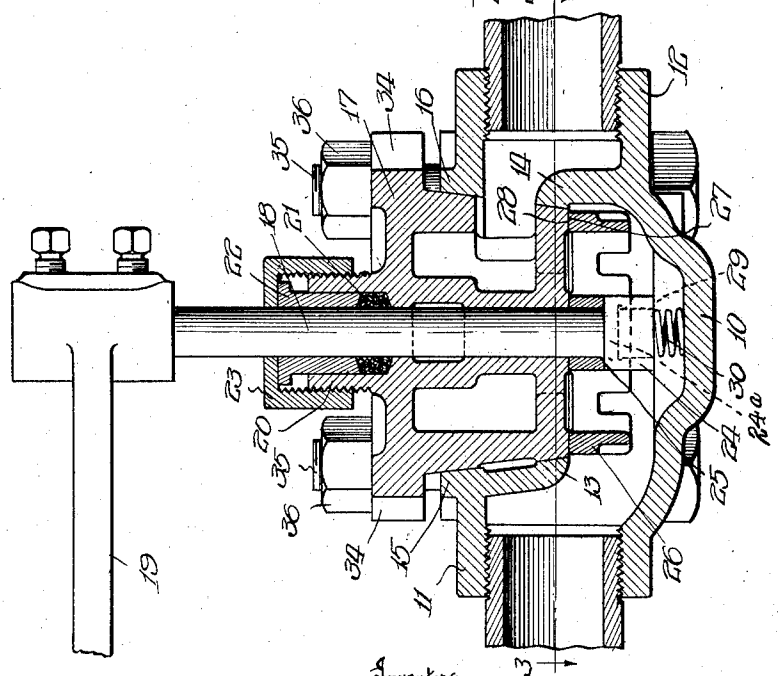


Fig. 1.



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Filed Jan. 5, 1920 2 Sheets-Sheet 2

Fig. 4.

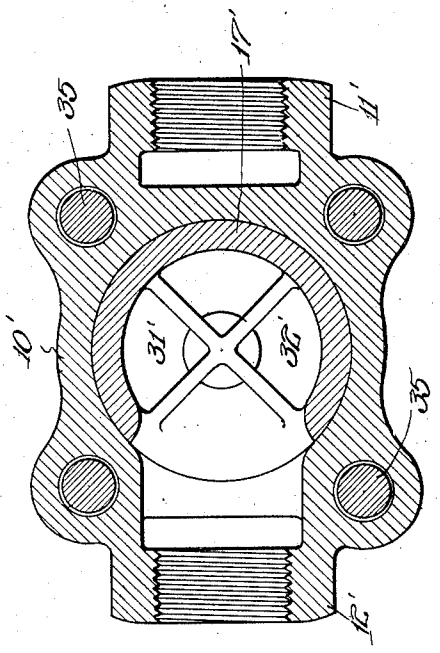
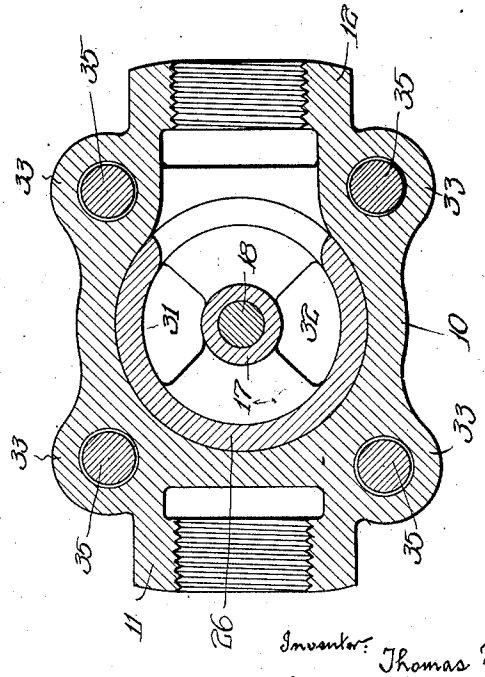


Fig. 3.



Inventor: Thomas W Demarest

by attorney

Paul Carpenter

Patented Jan. 21, 1930

1,744,451

UNITED STATES PATENT OFFICE

THOMAS W. DEMAREST, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE OKADEE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

BLOWER VALVE

Application filed January 5, 1920. Serial No. 349,554.

My present invention relates in general to valves, and more particularly to disc valves, and has special reference to the provision of an improved form of valve of the character described wherein the relatively rotatable valve and seat may be removed for inspection, cleaning, regrinding, repair or replacement.

The principal objects of my present invention are the provision of an improved form of valve structure wherein the valve and its seat may be removed from the valve casing without disturbance of the relation of the casing to the piping with which it is used; the provision of an improved form of disc valve and seat which may be simultaneously removed from the valve casing and again implaced in position without at the same time detaching the casing from the pipes; the provision of an improved form of valve wherein both the valve and the seat are adapted for grinding by a reciprocatory rather than a rotatory movement of the grinder; the provision of an improved valve structure wherein separable casing and seat members co-act to form the cage for the valve member; the provision of an improved valve device wherein the bonnet and valve seat form an integral structure; the provision of an improved valve device arranged for the ready removal of all parts thereof from the valve casing; the provision of an improved form of valve device wherein the bonnet carries all parts of the structure arranged within the casing; the provision of an improved valve structure wherein the valve bonnet has a tapered and wedging engagement with the valve casing; together with such other objects as may hereinafter appear.

Valves of the general character to which I have referred are useful for a wide range of purposes but find a field of particular utility in employment as blower valves for the steam boilers of railway locomotives and other analogous employment wherein the fluid pressure is ordinarily admitted against but one side of the valve device.

Within my experience, it is a point of great value if the valve and its seat may be removed from the casing in order that they may be reground without any necessity that at the same time the casing be removed for the regrinding of a valve seat formed therein, such removal of casing being not only inconvenient but quite often a laborious and complicated procedure in view of the various arrangements of inlet and discharge piping used and the cramped quarters in which such valves are often situated in the service.

Furthermore, as is known to those who are skilled in the art, valves and valve seats may often be ground and reground much more accurately, rapidly and inexpensively when they are so formed as to permit grinding by reciprocation relatively to a flat surface rather than by rotation.

In attaining the objects referred to and those hereinafter pointed out, and such other benefits and advantages as may hereinafter appear, I have provided certain embodiments of my invention which are illustrated in the accompanying drawings wherein—

Figures 1 and 2 are central vertical sectional views taken longitudinally of the valve casing and axially of the inlet and outlet openings therein; and

Figures 3 and 4 are sectional views taken on the lines 3—3 of Figure 1 and 4—4 of Figure 2 respectively.

The essential difference between the devices of Figures 1 and 2 reside in the fact that in the device of Figure 1, the valve handle, stem, disc, and associated parts may be removed as a unit by movement upwardly from the position shown therein, whereas in the device of Figure 2 the valve and valve seat are removed by movement downwardly from the position shown therein, the valve stem and associated parts in the stuffing-box being conveniently allowed to rest without disturbance from the position therein shown.

Referring now more particularly to the device of Figures 1 and 3 of the drawings, it will be observed that I have provided a valve casing 10 having oppositely disposed threaded extensions 11 and 12 serving as connections to which, respectively, inlet and discharge pipes may be screwed.

Within the valve casing 10 are arranged septa 13 and 14, which, as well as the upper

margins of the casing as indicated at 15 and, 16, are preferably formed with complementarily sloping inner peripheries in order that a wedging action and a fluid-tight joint between them and the valve seat may be attained in a manner hereinafter set forth, an opening of an inverted generally truncated cone form into the casing from the top thereof, being thus produced.

Within the opening just referred to is disposed a combined valve seat and bonnet member 17 apertured for the passage of a valve stem 18 having an operating handle 19. The member 17 may be provided with a stuffing-box 20 arranged interiorly for the insertion of packing 21 and a gland or follower 22, such housing 20 being threaded externally for engagement with a cap-nut 23 bearing on the gland 22.

At its lower end, the stem 18 is provided with an enlarged rectangular portion 24 of rectangular cross section forming a shoulder 25 for the support of the valve disc 26 which disc has an upper flat plane surface 27 adapted to seat against a similar flat plane surface 28 on the under side of the member 17. The portion 24 seats in a complemental recess 24^a in the valve member.

The enlarged stem portion 24 is recessed as indicated at 29 for the reception of one end of a spring 30 whose opposite end abuts against the lower portion of the valve casing 10, and serves to hold the valve and seat surfaces 27 and 28, in contact in the absence of fluid pressure entering the said casing 10 through the inlet connection 11, said stem and valve member having relative axial movement for such purpose.

The valve member 26 and the seat member 17 are provided with a registering ports 31 and 32 which may be brought into register by means of the handle 19 in opening the valve, or the valve may be fully closed by moving said handle through an arc of 90°.

For forcing the combined seat and bonnet member 17, which is of a generally inverted truncated cone form, into contact with the portions 13, 14, 15 and 16 of the casing 10, heretofore referred to, the casing 10 and the member 17 are preferably formed with a number of projections, 33 and 34, respectively, apertured for the passage of bolts 35 threaded for the reception of nuts 36 by which the member 17 may be drawn towards and into close contact with the member 10.

Referring now more particularly to the device of Figures 2 and 4, it will be observed that the structure herein disclosed differs from that of the device of Figures 1 and 3 in a number of respects, notably the following: Firstly, the portions 15′, 16′ are at the bottom of the casing 10′ and the tapering portions 13′, 14′ and 15′, 16′ form a generally conical opening which is not inverted; again, the spring 30′ which is disposed in and acts against the enlarged rectangular portion 24′ of the valve stem 18′ does not abut against the casing 10′ but seats in a complemental recess in the valve disc 26′; further, consequently upon the construction above described the fluid entering through the inlet passages 11′ presses the valve 26′ downwardly against the member 17′ instead of upwardly.

In the sense that every thing but the casing may be removed from the structure of Figure 1 by loosening the nuts 36 and removing the bolts 35, in some circumstances such structure may be the preferable one, but in the sense that such loosening and removal of the nuts and bolts permits only the removal of the valve seat member 17′ and the valve member 26′, all other parts remaining in the casing of the structure of Figure 2, for certain purposes such structure may be the preferable one.

While the member 17 of the device of Figures 1 and 3 has for convenience been termed a bonnet, it will be appreciated that the member 17′ of the device of Figures 2 and 4 serves in part a similar function since it acts to close the casing, and the valve member 26′ is removable with it.

It will be apparent on inspection of the drawings that in both forms of my improved valve device, the casing 10 and the bonnet, 17 and casing 10′ and member 17′ serve to form a cage for the loose valve member 26 or 26′, and that the bonnet and valve member may be removed from the casing without disturbance of the relation of the valve stem 18 or 18′ and stuffing-box 22 or 22′, thereby avoiding any need for repacking the stuffing-box as an incident of the removal of the bonnet 17 or 17′ and valve 26 or 26′.

One of the marked advantages of my improved valve device resides in the fact that the valve member and the valve seat therefor may be remove from the casing without any disturbance whatsoever of the associated piping.

This is true of the structure of Figure 2 as well as that of Figure 1, but the device of Figure 1 presents the additional advantage that in it the entire assembly of valve member, valve seat, valve stem, stuffing-box and operating handle, in fact of all parts save the casing alone, may be removed without moving the casing relatively to the pipes.

By virtue of the tapered relation between the bonnet 17 and casing 10, which is readily formed, in case of any trouble involving any of the removable parts, they may be removed as an entirety and a new assembly substituted with a minimum of delay, which is a feature of convenience generally and in railway practice one especially important.

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

1. A valve device comprising, in combina-

tion, a valve casing having inlet and outlet ports, a bonnet forming the sole closure for the casing and provided with a fluid passageway and a valve seat at one end of said bonnet, a valve mounted externally of said bonnet within said casing and having a detachable stem passing through the bonnet and valve, a non-rotatable connection between the valve and stem, and said valve being rotatable upon and coacting with said seat to close said fluid port, and means abutting a part of the casing and said stem for maintaining operative said connection between the valve and stem and for holding the valve on its seat.

2. A valve device comprising, in combination, a valve casing composed of a body having integral inlet and outlet ports, a separate bonnet extending into the casing and provided with a fluid passage and a valve seat, arranged between said ports and detachably connected to the casing, a valve member coacting with said seat for opening and closing said passage, means on the bonnet extending therethrough and through said seat for rotating the valve member relatively to the seat, said valve member being movable relatively to said last mentioned means, and means engaging the casing and one end of said rotating means for forcing the valve member towards the seat.

3. A valve device comprising, in combination, a valve casing having integral inlet and outlet ports and an apertured partition disposed between said ports, a bonnet disposed in an opening in said casing and engaging in said apertured partition and thereby forming the sole closure for said casing and partition, said bonnet having a fluid passageway and a valve seat on its inner end, said valve seat being disposed between said ports adjacent to said partition, a valve member on said seat for controlling the flow of fluid through said passageway, said valve seat and valve member being provided with flat contacting surfaces, a valve stem for imparting movement to and having detachable engagement with said valve, and means abutting the casing and one end of said stem for keeping said valve and valve stem in operative connection.

4. A valve device comprising, in combination, a valve casing having integral inlet and outlet ports and an apertured partition disposed between said ports, a bonnet disposed in an opening in said casing and engaging in said apertured partition and thereby forming the sole closure for said casing and partition, said bonnet having a fluid passageway and a valve seat on its inner end, said valve seat being disposed between said ports adjacent to said partition, a valve member on said seat for controlling the flow of fluid through said passageway, said valve seat and valve member being provided with flat contacting surfaces, and a valve stem for imparting movement to and having detachable engagement with said valve, and yieldingly resistant means abutting one end of said stem and said casing for keeping said valve and valve stem operatively connected and thereby maintaining said valve on its seat.

5. A valve device comprising, in combination, a valve casing having inlet and outlet ports, a bonnet forming the sole closure for the casing and provided with a fluid passageway and a valve seat at one end of said bonnet, a valve mounted externally of said bonnet within said casing and having a detachable stem passing through the bonnet, provided with an enlargement abutting a complemental portion on said valve, said valve and stem being rotatable on the seat, and a spring member between the end of the valve stem and casing and abutting said enlargement for maintaining operative connection between the valve and stem.

In testimony whereof I have hereunto signed my name.

THOMAS W. DEMAREST.