No. 823,842. PATENTED JUNE 19, 1906.

G. P. BRAND.

PNEUMATIC VALVE AND SEAT.

APPLICATION FILED JAN. 31, 1905.

Fig. 1.

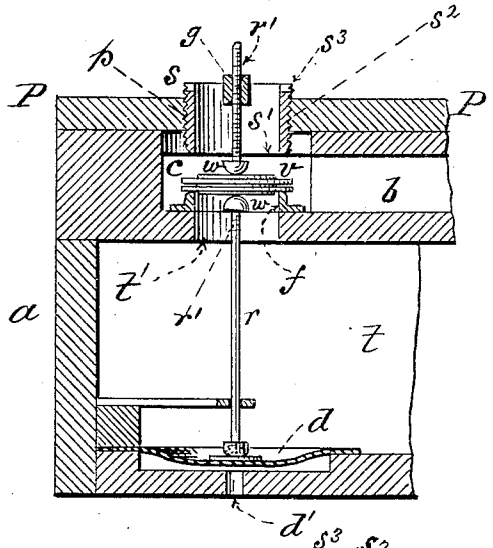

Fig. 2.

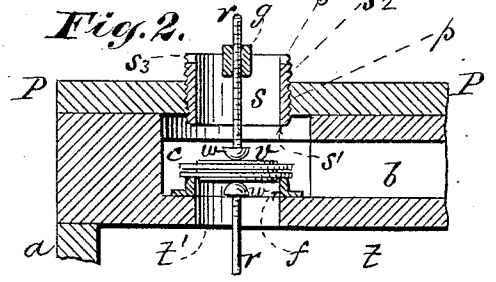

Fig. 3.

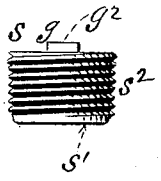

Fig. 4.

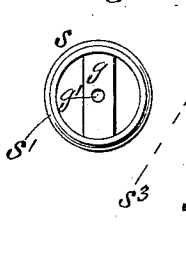

Fig. 5.

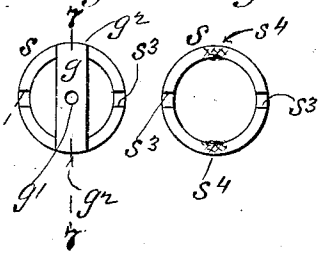

Fig. 6.

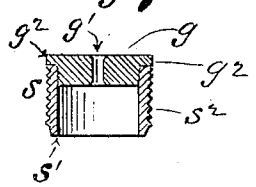

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE P. BRAND, OF NEW YORK, N. Y.

PNEUMATIC VALVE AND SEAT.

No. 823,842. Specification of Letters Patent. Patented June 19, 1906.

Application filed January 31, 1905. Serial No. 243,462.

To all whom it may concern:

Be it known that I, GEORGE P. BRAND, a citizen of the United States, residing in the city of New York, borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Pneumatic Valves and Seats, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

Heretofore it has been customary to adjust valves of this class upon their stems in regulating their relation to their seats. In other words, each seat has a fixed prescribed position when in place with relation to which the valve is adjustable. This is objectionable in that if a change in extent of throw or valve movement is desired the valve-seat has to be removed bodily to give access to the valve and stem, and even then the operation is inconvenient and uncertain and lacking in delicacy, since the degree of adjustment has to be guessed at and the result cannot be definitely ascertained until the seat is again secured in place. These disadvantages appertain also to the preliminary adjustment of the valve as well as to subsequent changes above referred to.

My invention consists in the specific construction and arrangement of parts hereinafter described and claimed, whereby I am enabled to quickly and conveniently adjust the relation of the parts with the greatest accuracy and without the removal or displacement of either. Thus after the preliminary adjustment of the valve upon its stem it need not be moved or changed in position, since the extent of throw may be increased or diminished by regulating the position of the seat, and when this is provided for by a screw-thread upon the barrel of the valve-seat engaging with a thread in the seat-plate substantially as herein described and shown it is obvious that great accuracy and delicacy of adjustment may be attained, since the screw adjustment is essentially micrometric in character.

Incidental features of my invention relate to the particular construction of the parts, as hereinafter described and claimed specifically.

In the accompanying drawings, Figure 1 is a sectional view of a portion of the chestwork of pneumatic apparatus sufficient to illustrate the practical application of my invention. Fig. 2 is a similar view illustrating a change in the position of the adjustable valve-seat; Fig. 3, a side elevation of the valve-seat. Fig. 4 is a view of the seat or face side of the adjustable valve-seat; Fig. 5, an elevation of the outer end of the adjustable valve-seat; Fig. 6, a similar view, the cross or guide bar being omitted. Fig. 7 is a section upon plane of line 7 7, Fig. 5.

I have herein shown more or less symbolically parts of pneumatic apparatus essential in illustrating the practical use and application of my invention, although I do not limit myself in this respect, since the essential features of the invention may be utilized in various forms and classes of pneumatic valves and apparatus. With this understanding *a* represents a portion of chestwork, having the tension-chamber *t* communicating with the valve-chamber *c* through the port *t'*, the valve-chamber *c* communicating with the atmosphere through the valve-seat body *s* and with a pneumatic or other device to be actuated through the port *b*.

f is a stationary valve-seat for the port *t'*.

v is a valve secured to the rod *r* by any suitable means, as by the leather nuts *w w*, engaging the screw-thread *r'* on the valve-rod *r* in the usual manner.

The body *s* of the adjustable valve-seat is cylindrical externally and formed with a male screw-thread s^2 for engagement with a female screw-thread *p*, formed in the seat-plate P or other part to which the adjustable valve-seat *s* is applied. It is to be understood in this connection that I herein use the term "adjustable valve-seat" *s* as applying to the valve-seat piece as a whole, the face or seat proper being designated by the character *s'* and being preferably, through not necessarily, of annular form. s^3 s^3 are shoulders formed in or on the outer edge or portion of the adjustable seat *s* to facilitate its rotation upon its axis by means of a suitable implement when in engagement with the screw-thread *p* in the seat-plate P or other support.

The primary object being to support the valve-seat *s* in such manner that it is adjustable with relation to the valve *v*, it is obvious that this adjustment may be effected by resort to various well-known mechanical expedients, although the cylindrical form of valve-seat and the use of screw-threads as herein shown is preferable on account of simplicity. Furthermore, it affords accuracy and delicacy of adjustment in a high degree, since considerably less than a complete rota-

tion of the valve-seat upon its axis may be resorted to in effecting its final adjustment in position. It is to be remembered also that this adjustment is attained without removing or disturbing the seat-valve or any other part. A valve-seat of this form also affords a convenient means of support for a cross bar or guide *g* for the outer end of the guide-rod *r*. Thus a guide-bar *g*, formed with the eye *g'* and preferably of wood or other relatively soft compressible or fibrous material, may be forced upon or into the outer end of the valve-seat *s*, as shown, the underlying edge or portion being roughened or upset by any desired means, as at s^4, Fig. 6, to increase the frictional contact and hold the cross-bar in place by positive engagement therewith. While it is desirable to thus roughen the surface of the seat-body *s* for the purpose stated, still this is not an indispensable feature, since the elasticity of the material of which the guide-bar *g* is formed will ordinarily insure its retention in position after it has been forcibly seated within and upon the valve-seat body, so that I do not limit myself in this respect.

In applying the cross-bar *g* to the valve-seat *s*, formed with the upset or roughened surfaces above referred to, I find it expedient to insert the cross-bar in the end of the valve-seat between the unroughened portions and then turn it so as to force its ends into intimate contact with such prepared surfaces, the protuberances thus forcing themselves into the relatively soft ends of the cross-bar laterally, and thereby locking it in position against accidental displacement. The guiding-eye *g'* is drilled in the cross-bar *g* after the latter is thus placed and secured in position so as to insure its perfect centralization with relation to the seat *s'*.

The ends of the cross-bar or guide-bar *g* are preferably formed with shoulders g^2, which overlap the edge of the valve-seat, and thereby limit the protrusion of the guide-piece into the valve-seat and insure the proper alinement of the eye *g'* with relation to the valve-rod *r*. The opposite end of the valve-rod *r* rests against a disk on the diaphragm *d* in the usual manner, the diaphragm being actuated through the port *d'* in any well-known or desired manner and by any means that may be found most expedient in the form of pneumatic apparatus to which my improvements may be applied. I treat the female screw-thread *p* in the seat-plate P with paraffin to positively attain a perfectly air-tight seal between the opposed surfaces of the male and female threads.

I prefer to mount my adjustable valve-seat *s* upon a removable seat-plate P, substantially as shown in Figs. 1 and 2 of the drawings. By this means I am enabled to use an adjustable valve-seat of considerably less diameter than the valve-chamber, and thereby effect a saving in metal, while rendering the valves and chamber readily accessible. Thus if the removable seat-plate were not used it would be necessary to make the adjustable seat-body or the full width of the valve-chamber in order to provide for the insertion or removal of the valve, &c.

An important advantage attained by the use of my adjustable valve-seat is that I am thereby enabled to use a single valve in lieu of the two heretofore indispensable in a valve-chamber of this character, owing to the fact that adjustment had to be made with relation to each seat in the chamber. A great saving is thus involved in the time heretofore essential in adjusting the two valves with relation to each other on their stem, so as to give only the desired play or extent of motion between the valve-seats. After primarily adjusting the two valves in a general way they had to be inserted, the outer seat applied, and their action tested, after which the outer seat had to be again removed, the valves adjusted with more accuracy, and again replaced and tested. This operation might be necessarily repeated several times before the attainment of a final and satisfactory adjustment of parts. Furthermore, after actual use the conditions are modified and changed by the pressure to which the parts are subjected, so that in the old form the seat has again to be removed and the valves readjusted to compensate for the change. All these difficulties I obviate by a simple adjustment of my improved valve-seat while in position, at the same time saving the cost of one valve disk and leather washers, and thereby simplifying and cheapening the structure.

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

1. In combination with a pneumatic valve, a metallic cylindrical valve-seat formed with a male screw-thread and with a cross-bar having an eye for the support of the valve-rod, said cross-bar being formed of a relatively soft material and being forced into position on the valve-seat, and a support formed with a female screw-thread for the reception of said cylindrical valve-seat, whereby the latter may be adjusted with relation to the pneumatic valve.

2. In combination with a pneumatic valve, a metallic cylindrical valve-seat formed with a male screw-thread, and with roughened surfaces for contact with a cross-bar of relatively soft material, said cross-bar formed with an eye for guidance and support of the valve-rod, and a support formed with a female screw-thread for the reception of said cylindrical valve-seat, whereby the latter may be adjusted with relation to the pneumatic valve.

3. In combination with a pneumatic valve, a cylindrical metallic valve-seat formed with

a peripheral male screw-thread, a cross-bar having an eye for the support of a valve-rod, said cross-bar being formed of relatively soft material with end shoulders for engagement with the rim of the valve-seat body and being forced into position on said valve-seat body, and a support formed with a female screw-thread for the reception of the peripheral thread on said cylindrical valve-seat, for the purpose described.

4. In combination with a pneumatic valve, a cylindrical valve-seat formed with a peripheral male thread, and a removable seat-plate formed with a female screw-thread for the reception and support of said cylindrical valve-seat, for the purpose described.

5. In pneumatic apparatus, the combination of a cylindrical valve-seat body formed with a valve-bearing consisting of the edge of the cylinder of which the valve-seat is formed, said cylindrical valve-seat being also formed with an external peripheral male screw-thread, a support for said adjustable cylindrical valve-seat formed with a female thread for engagement with the male screw-thread on said valve-seat, a pneumatic valve of greater diameter than the bearing edge of said adjustable cylindrical valve-seat, and a secondary stationary valve-seat for said pneumatic valve, whereby the extent of motion or play between the opposed valve-seats may be varied for the purpose described.

6. In pneumatic apparatus, the combination of a cylindrical valve-seat body formed with a valve-bearing consisting of the edge of the cylinder of which the valve-seat is formed, said cylindrical valve-seat being formed with an external peripheral male screw-thread, a removable valve-plate formed with a cylindrical threaded bore for the reception of said valve-seat body, a pneumatic valve of greater diameter than the bearing edge of the said valve-seat body and a secondary fixed valve-seat for said pneumatic valve, whereby the motion or play between the opposed valve-seats may be adjusted, for the purpose described.

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