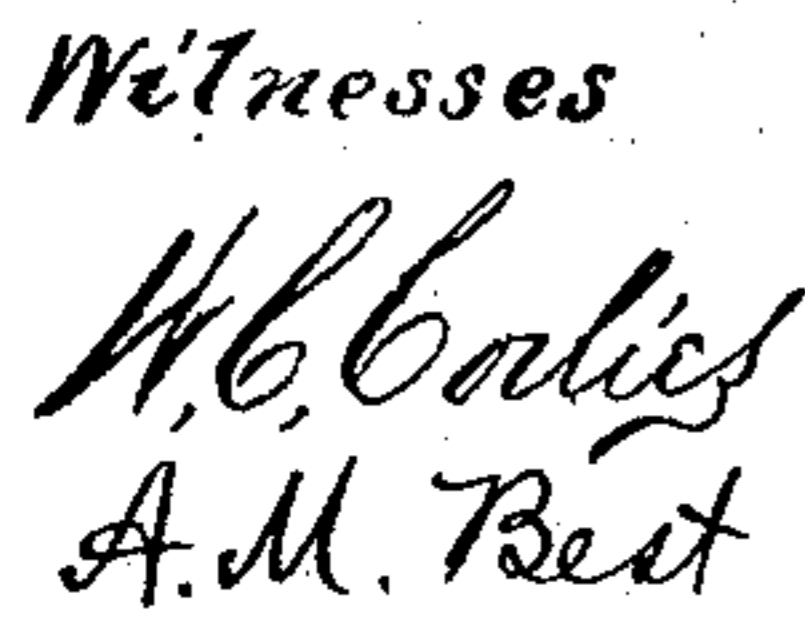



A. F. NAGLE.
DOUBLE SEATED VALVE.

Patented July 23, 1889.



 Inventor
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Atty.

UNITED STATES PATENT OFFICE.

AUGUSTUS F. NAGLE, OF CHICAGO, ILLINOIS.

DOUBLE-SEATED VALVE.

SPECIFICATION forming part of Letters Patent No. 407,676, dated July 23, 1889.

Application filed May 3, 1889. Serial No. 309,494. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS F. NAGLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Double-Seated Valves, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

10 Figure 1 is a vertical sectional view of a construction embodying my invention; Fig. 2, an enlarged detail sectional view of the main valve; Fig. 3, a plan view of the same; and Fig. 4 a detail sectional view similar to
15 Fig. 2, illustrating a modification of my apparatus.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to valves, and more particularly to that class of double valves of which an instance will be found in the construction set forth in Letters Patent No. 387,179, granted to me July 31, 1888. For the purpose of illustration I have shown my present invention embodied in an automatic fire-extinguishing apparatus substantially like that shown in my said prior Letters Patent; but it is obvious that my present invention is not limited in its application to that or any
30 other form of apparatus, being capable of use wherever a double-seated valve of this general type may be employed—for instance, in steam-engines and elsewhere. Heretofore in valves of this description considerable difficulty has been experienced in preventing
35 leakage, owing to variations in the distance between the valve-seats and the valve-heads, due to unequal expansion or contraction or to other causes.

40 It is the object of my present invention to overcome this difficulty by providing a valve composed of two independently-movable parts, which shall automatically adjust themselves to the valve-seats, so that the distance
45 between the valve-heads will always correspond to the distance between the valve-seats.

I will now proceed to describe a construction in which my invention is practically carried out in one form, and will then particularly point out in the claims those features which I deem to be new and desire to secure by Letters Patent.

In the drawings, A represents the valve-casing, which is constructed substantially as in my prior Letters Patent, hereinbefore referred to, being provided with the inlet-aperture *a*, outlet-aperture *a'*, and central chamber A', formed between the lower valve-seat B and upper valve-seat B'. These valve-seats are stationary, being screwed into position, as shown, or secured in any other suitable manner.

A² represents the chamber formed in the top of the casing A, between the valve-seat B' and the cap A³ of the casing. A by-pass *a*² leads from the inlet *a* to the top chamber A², into which it opens through a small aperture *a*³. Above the cap A³ is a chamber C, containing the waste-valve *c*, said chamber being provided with an air-inlet pipe C', opening into the same above the valve *c*, and with a waste or outlet aperture *c'* below the said valve. The valve *c* is provided with the upwardly-projecting pin *c*², which, when the said valve is raised, serves to close the mouth of the air-inlet pipe C'. The valve C is provided with a detent-pin *d*, which engages, when depressed, a spring-bolt D, which bolt, when released, serves to give an alarm by closing an electric circuit, or in any other suitable manner.

E represents the main valve considered as a whole. It is to the construction of this valve that my present invention more particularly relates. This valve, instead of being constructed in a single piece, as heretofore, is constructed in two separate pieces or sections E' and E², the former provided with a seating-surface *b*, adapted to fit and rest upon the seat B, and the latter provided with a seating-surface *b'*, adapted to fit and rest upon the seat B'. The hollow cylindrical body of the upper section E² incloses the body of the lower section, which fits within the same, so as to permit the two sections to move freely relatively to each other. A screw *e* extends outward from the section E' through a slot *e'* in the section E², and thus serves to limit the extent of this motion and prevent rotation of the two sections relatively to each other. The upper section E² of the valve is provided at its upper margin with an upwardly-extending flange *e*², threaded longitudinally, as shown, and within the circular space formed by this

flange there is placed a thin flexible disk F, which rests upon a suitable seat f , provided therefor at the bottom of the flange e^2 , said disk closing the top of the section E^2 of the valve. This disk is preferably constructed of brass, and is held in position by means of a nut G, threaded to correspond with the threaded flange e^2 , and screwing down within the same to bear upon the disk F, an annular washer or gasket F' being preferably interposed between the said nut and disk, as shown. Through the nut G there are formed perforations g , which permit the water in the chamber A^2 to flow freely from said chamber into the space or chamber G' between the disk F and nut G.

Now, bearing in mind that the two sections of the valve are movable relatively to each other, it will be seen that when the valve is in the position shown in Fig. 1 of the drawings and held to its seat under water-pressure on both sides thereof, in case of any increase in the distance separating the seats B and B' , the water in the chamber A^2 , passing freely through the perforations g into the space G' between the nut G and diaphragm F, will exert its pressure upon the said diaphragm, which latter, under pressure, being flexible, will in turn exert a pressure upon the head of the section E' , and will cause the two sections of the valve to separate to a sufficient extent to compensate for any increase in the distance between the seats B and B' . The effective area presented to the water-pressure by the upper section E^2 being greater than the effective area presented by the lower section E' , a constant downward pressure upon both of the sections will result, which will hold both of them firmly to their seats, while at the same time, in case of any diminution in the distance between the seats B and B' , the two sections will approach each other to make up for any such variation in the distance between said seats. It will thus be seen that I have provided a double-seated valve, which will automatically adjust itself to the distance separating its seats, and will thereby compensate for all variations affecting the distance between said seats, thereby effectively overcoming a frequent cause of leakage in such valves.

The operation of the remaining portions of the apparatus shown may be readily understood from an examination of my prior Letters Patent, hereinbefore referred to, and I therefore give no detailed description of the same here, since they form, as hereinbefore stated, no portion of my present invention.

It is obvious that various modifications in the details of construction may be made without departing from the principle of my invention. For instance, although I prefer to employ the flexible disk F for the reason that it closes completely the head of the outer section of the valve, and thereby prevents the necessity of so fitting or packing the two sections of the valve as to prevent leakage, it

will be seen, however, that the disk may be dispensed with if desired, along with those features of the construction which serve the purpose of retaining it in position; but in this case, as just stated, the fit or packing between the two sections of the valve must be accurate enough to prevent serious leakage. If the disk be employed, its form may be varied, and in Fig. 4 of the drawings I have shown a modification in which the disk is annular in form and serves to cover the joint between the two sections of the valve, being placed on top of these two sections in such a position as to cover the said joint, its inner margin being secured to the inner section E' and its outer margin being secured to the outer section E^2 . This attachment is preferably effected in the manner shown, an annulus F^2 and bolts f' serving to clamp the outer margin of the disk F to the outer section E^2 , while a similar annulus F^3 , provided with bolts f^2 , serves to clamp the inner margin of the said disk to the inner section E' . The flexibility of the disk is of course sufficient to permit the slight motion of the sections relatively to each other necessary to cause them to set properly.

Various other modifications in the details of construction will readily suggest themselves, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described, and shown in the drawings.

Having thus described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination, with the valve-casing provided with two stationary seats, of the valve composed of two sections movable relatively to each other, and each provided with a seating-surface to fit the corresponding seat of the valve-casing, said sections being held to their seats under pressure independently of each other, substantially as and for the purposes specified.

2. The combination, with the valve-casing provided with two stationary valve-seats, of the valve composed of two independently movable sections, each provided with a seating-surface to fit the corresponding valve-seat, and consisting of an inner section closed at one end and an outer hollow cylindrical section surrounding said inner section, substantially as and for the purposes specified.

3. The combination, with the valve-casing provided with two stationary valve-seats, of the valve composed of an inner and an outer section movable the one upon the other, and each provided with a seating-surface to fit the corresponding valve-seat, and a flexible disk covering the joint formed by the meeting surfaces of the two sections, substantially as and for the purposes specified.

4. The combination, with the valve-casing provided with two stationary valve-seats, of a differential valve composed of two sections movable relatively to each other, and each

provided with a seating-surface to fit the corresponding valve-seat, the effective external area of one section being greater than the similar area of the other, substantially as and
5 for the purposes specified.

5. The combination, with the valve-casing provided with two stationary seats, of the valve composed of an inner and an outer section movable the one upon the other, and
10 each provided with a seating-surface to fit the corresponding valve-seat, and a flexible disk closing the head of the outer section and adapted to bear upon the head of the inner section, substantially as and for the purposes
15 specified.

6. The combination, with the valve-casing

A, having seats B and B', of the valve E, composed of the inner section E', having seating-surface b , and the outer section E², fitting over and movable upon the section E', and
20 provided with seating-surface b' and upwardly - extending threaded flange e^2 , the flexible disk F, resting on a suitable seat at the base of said flange, and the nut G, threaded to fit said flange and having aper-
25 tures g , substantially as and for the purposes specified.

AUGUSTUS F. NAGLE.

Witnesses:

CARRIE FEIGEL,
IRVINE MILLER.