

(No Model.)

J. C. WILLIAMS.
VALVE MECHANISM.

No. 391,445.

Patented Oct. 23, 1888.

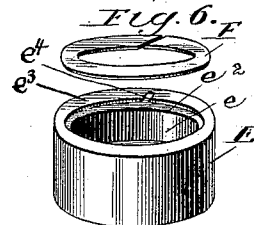
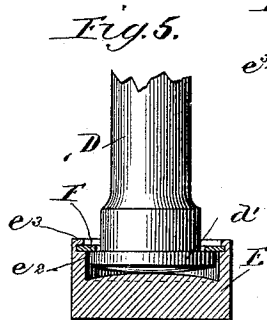
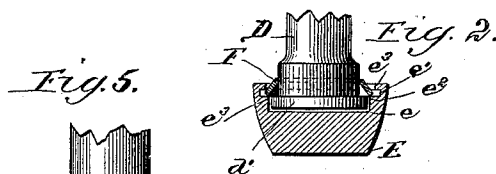
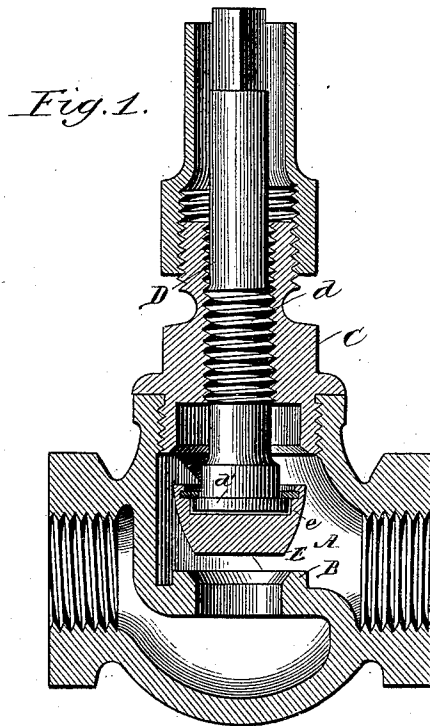


Fig. 3.

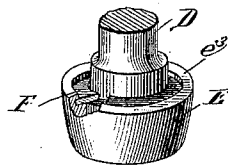
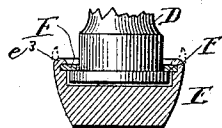


Fig. 4.



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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 391,445, dated October 23, 1888.

Application filed January 24, 1888. Serial No. 261,769. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. WILLIAMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valve Mechanism, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention has relation to the improvement of valve mechanism designed to control the flow of gas, steam, or liquid through pipes, and more particularly does it relate to the improvement of that class of valves commonly known in the art as "globe-valves." In this class of valves it is desirable that the valve shall be formed separate from and attached to the end of its stem, for the reason, among others, that a swivel-union can thereby be had between the stem and valve, which will secure a more effective bearing of the valve upon its seat and will avoid in great measure the grinding wear of the valve upon its seat incident to the turning of the stem, and for the further reason that in case the valve should become worn out or unfit for use before the life of the valve-stem is exhausted it becomes possible to replace the old and worn valve by a new one. Numerous means have been heretofore devised for effecting a swivel-connection between the valve-stem and its valve and for providing for the renewal of the valve when worn. Thus, for example, it has long been a common practice to unite the valve and its stem by means of a retaining-ring provided with a screw-thread adapted to engage with corresponding threads cut upon the inner wall of a recess formed in the valve to receive the end of the stem. This construction, while possessing advantages, is objectionable, for the reason that the cutting of the screw-threads upon the inner wall of the valve and upon the exterior of the retaining-ring is an expensive and difficult operation, particularly where the valve is designed for use in connection with small valve-chambers—such, for example, as have but a quarter or an eighth inch seat-opening. It has also been heretofore proposed to connect the valve-stem and the valve by means of a coupling-shell adapted to encircle both the shoulder of the valve-stem and the

periphery of the valve, and provided with inwardly bent flanges or lugs to retain the shell in proper position with respect to the valve and stem. This construction, however, is also expensive and somewhat difficult of manufacture.

The object of my present invention is to provide improved means for attaching the valve to its stem which shall possess features of simplicity, durability, and cheapness not to be found in the constructions of valves heretofore existing.

To this end my invention consists in the novel features of construction hereinafter described, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a view in central vertical section through a valve-casing and valve embodying my invention. Fig. 2 is a detail view, partly in vertical section and partly in side elevation, of a portion of a valve-stem and a valve. Fig. 3 is a perspective view of a valve-stem, a valve, and retaining plate or washer connected thereto, parts being broken away for better illustration. Fig. 4 is a view, partly in vertical section and partly in side elevation, of a valve and valve-stem, illustrating a modified mode of uniting the two. Fig. 5 is a view similar to Fig. 4, illustrating a modified construction. Fig. 6 is a perspective view of a valve and a ring for attaching the valve to the stem.

A designates the valve-chamber, which will be provided with a valve-seat, B, of any well-known or suitable construction, and C denotes a hood or center piece of well-known form threaded to engage with a suitable opening in the valve-chamber and provided with interior threads to receive the correspondingly-threaded portion *d* of the valve-stem D. The lower end of this valve-stem D is provided with a shoulder or flange, *d'*, and the end of this stem may be formed either flat or convex in well-known manner. The valve E, the exterior of which may be of usual or any suitable shape, is provided with a recess, *e*, to receive the shoulder *d'* of the valve-stem, and the upper portion of this recess *e* is preferably peripherally enlarged—that is, formed of greater diameter than the portion adjacent the shoulder *d'* of the valve-stem—for a purpose to be presently stated. In the inner face of the re-

cess *e* of the valve, and preferably near its upper portion, is formed a groove, *e'*, by preference of annular shape and adapted to receive the outermost portion of the retaining plate or washer F, that engages with the shoulder *d'* of the valve-stem. I prefer to form the plate or washer F of annular shape, with its opening of sufficient size to slip freely over the threaded portion *d* of the valve-stem, and to connect this washer F with the valve in the following novel manner: The washer F when first applied to the valve-stem will be of slightly dished or concavo-convex shape, as shown in Fig. 2 of the drawings, and when in this shape will enter the upper and larger portion of the recess *e* of the valve and will rest upon the ledge *e'* of the wall of such recess. I next vertically compress this washer F, and thereby flatten the same to such extent that its diameter is expanded sufficiently to enter the annular groove *e'* of the valve, and when the periphery of the washer is thus forced into the groove *e'* it will engage with the upper rim or lip, *e'*, of the valve and with the shoulder *d'* of the valve-stem, and thus securely retain the parts in proper relative position for use.

It is obvious that if the opening in the washer F be of such size that the washer loosely encircles the valve-stem the stem can turn freely within the washer and a swivel action between the valve and stem be thus secured; or if the opening in the washer be of such shape or so closely fitted to the stem as to prevent the rotation of the stem, then the swivel action of the valve may be effected by allowing a freedom of movement between the periphery of the washer F and the valve; or, if desired, (and such may be the action in the constructions illustrated,) both the valve and the stem may turn freely with respect to the washer. I do not wish it to be understood, however, as absolutely essential to my invention that there should be a swivel between the valve-stem and the valve, although the best results are thereby attained, since it is apparent that certain features of my invention may be employed with good effect without following the details of construction as an entirety.

So long as the valve-stem and valve are suitably interspaced to admit the retaining-plate at an incline between them it is plain that upon flattening the plate, and thus forcing its periphery into engagement with the valve-wall, the stem and valve are thereby securely held, as desired, whether the joint thus established be a revoluble swivel-like joint or be fixed and rigid.

I prefer to form the washer F of very thin sheet metal—such, for example, as brass—as by so doing I am enabled not only to more readily expand the washer and cause its outer portion to be embedded in the wall of the valve, but I am also thus enabled to more readily effect the removal of a worn-out valve from its stem, since the flexibility of the washer will permit the valve to be knocked or drawn off the end of the stem by a suitable tool. It

will be understood, however, that other suitable material may be employed instead of sheet-brass in forming the washer, and it is obvious that without departing from the spirit of my invention the precise shape of the washer may be modified, the groove in the wall of the valve E being correspondingly modified.

It is plain that without departing from the scope of my invention the outermost portion of the plate or washer F may be embedded in the inner wall of the recess of the valve in any other suitable manner than that above described, (although I prefer to groove the wall of the valve for such purpose,) so long as the outermost portion of the plate or washer F is securely held by the portion of the valve-wall above it. Thus, for example, in the construction illustrated in Fig. 4 of the drawings the rim or lip *e'* at the top of the recess of the valve is formed by turning or spinning the upper portion of an upright wall (shown by dotted lines) over the edge of the flat washer F a sufficient distance to retain the valve in position on the stem.

In the construction illustrated in Figs. 5 and 6 of the drawings, in which the valve E is shown of exterior cylindrical shape, the interior cavity recess, *e*, of the valve is formed with a convex base, against which will bear the convex end of the valve-stem. In this construction, as in that illustrated in Figs. 1, 2, and 3 of the drawings, the wall of the recess of the valve is provided with a ledge, *e'*, and a rim or lip, *e'*; but in this construction the rim or lip is provided with a slot or opening, *e'*, communicating with the annular groove *e'*, and in this construction the washer F is a split ring of thin metal. In order to unite the parts together when thus constructed, the valve-stem will be placed within the recess of the valve, one end of the washer F will be inserted through the slot *e'*, and the washer will then be turned until it is completely within the annular groove *e'* of the valve.

In the several constructions illustrated in the drawings the washer F not only serves to unite the valve and its stem together in a manner for effective operation, but it is obvious that in case it is desired to renew a worn-out valve such valve can be readily removed by a suitable tool and replaced by a new valve. A further advantage incident to the use of a thin metal plate or washer, F, for uniting the valve and its stem is that I am enabled to form the valve of a much cheaper quality of brass than would be required if it were necessary to cut screw-threads thereon, since when screw-threads are to be cut upon small or thin cast-brass it is necessary, in order to prevent breakage, that the metal should be of superior quality. So, also, by the use of a washer instead of a threaded ring, as in the construction heretofore commonly practiced, I am enabled to form such washer very thin, as in the upward movement of the valve there is no pressure thereon tending to force it from the stem.

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

1. The combination, with a valve-stem having an expanded shoulder projecting therefrom, and with a valve recessed to seat said shoulder and peripherally enlarged above the recess to form a lip or rim, of an interlocking plate engaging the stem-shoulder, spanning the peripheral enlargement, and having its outer portion received within the valve-wall, substantially as described.

2. The combination, with a valve-stem having an expanded shoulder projecting therefrom, and with a valve having a recess to seat said shoulder, of a flexible retaining plate or disk engaging, respectively, with the valve-stem shoulder and the valve proper, said stem and valve being interspaced above the shoulder to admit the loosely-set retaining-plate at an incline between them and permit the same

to be forced into locking engagement with said shoulder and the valve-wall, substantially as described.

3. The combination, with a valve stem having a shoulder about its end, and with a valve having a recess to seat the same, of a flexible retaining plate or disk engaging, respectively, with the valve-stem shoulder and the valve proper, said valve being peripherally enlarged above the recess to form a ledge or rest and having a groove in the valve-wall beyond the same, whereby the retaining-plate may be loosely set upon the ledge at an incline between the valve-stem and valve and be forced into locking engagement with said groove in the valve, substantially as described.

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Witnesses:

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