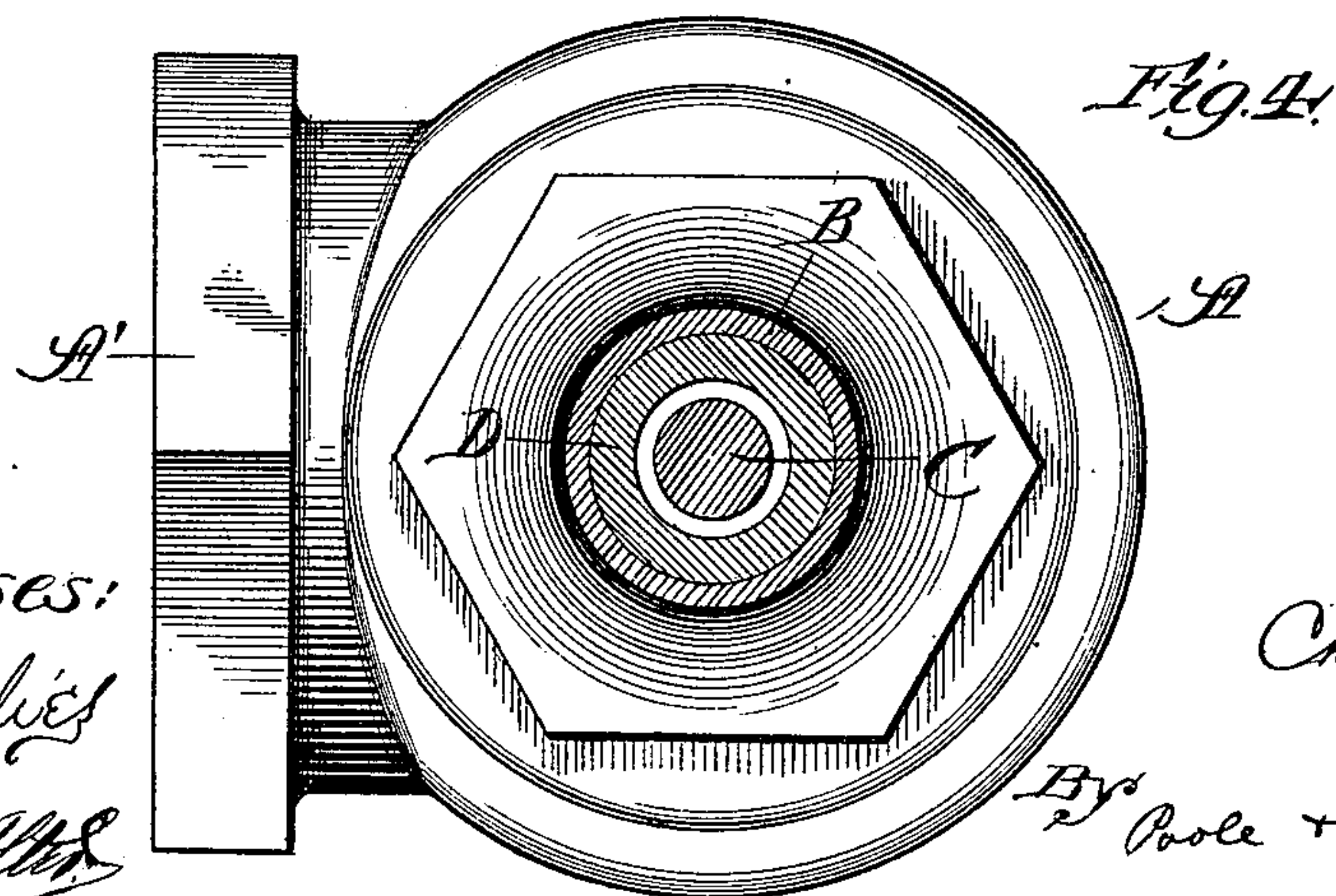
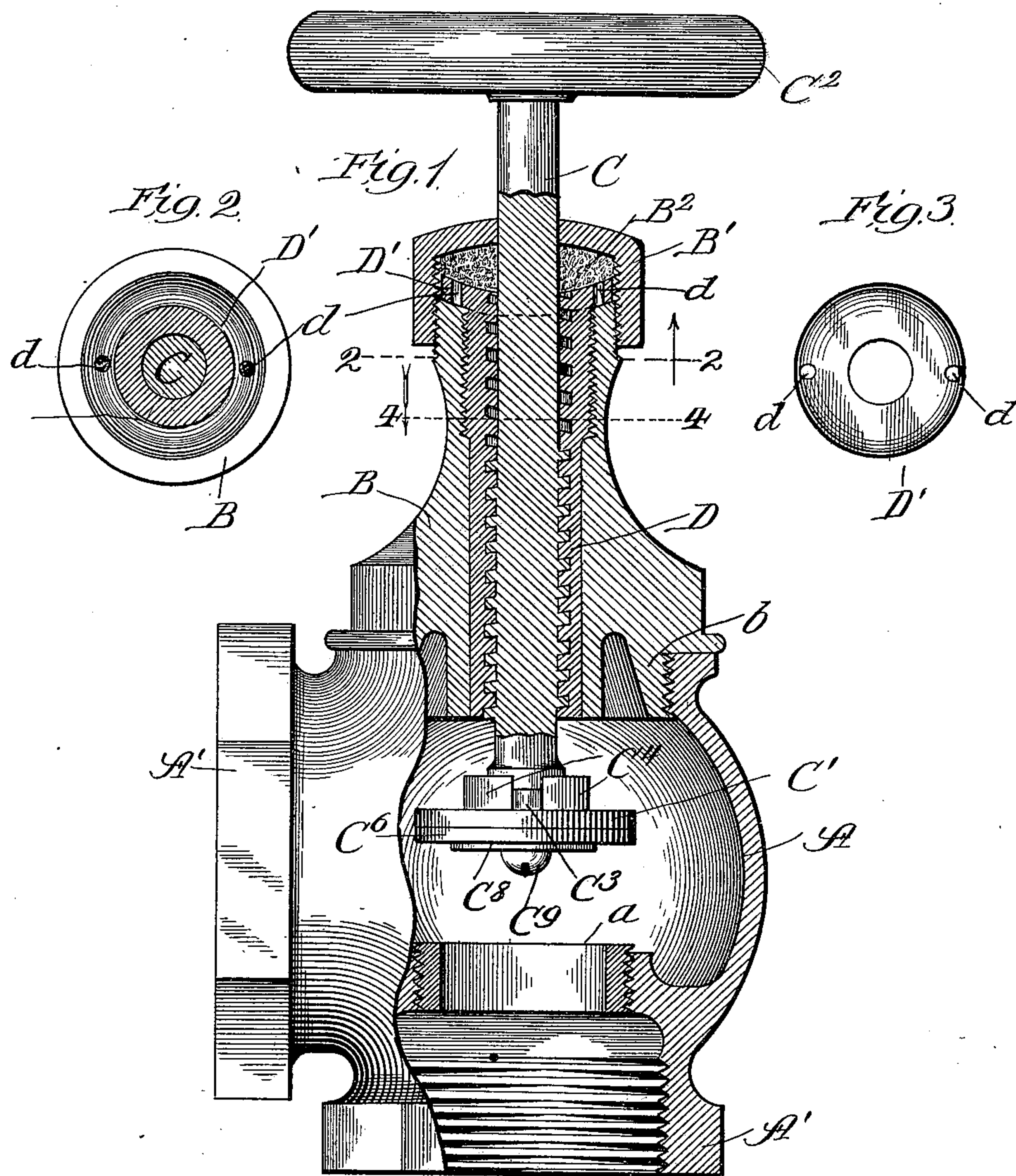


Patented May 30, 1899.

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(No Model.)

2 Sheets—Sheet 1.



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UNITED STATES PATENT OFFICE.

CHARLES E. HUXLEY, OF AURORA, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO
FREDERICK WAHL, SR., AND GEORGE E. RICKER, OF QUINCY, ILLINOIS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 625,954, dated May 30, 1899.

Application filed July 13, 1898. Serial No. 685,841. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HUXLEY, of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in valves, and has reference more especially to that class of valves in which the valve-plate is attached to an endwise-movable stem, which stem has screw-threaded connection with the valve-casing, by means of which the valve-plate carried thereby is moved toward and from the valve-seat and in which the screw-threads of the valve-stem are adapted to engage a removable part carried by the casing, whereby when screw-threads become inoperative by reason of wear said removable part of the valve-casing may be renewed without the necessity of renewing the main parts of the valve.

The invention relates, more specifically, to an improvement in valves whereby the removable part or bushing may be easily removed and inserted into the casing.

The invention has reference also to an improvement in such valves whereby the disk may be cheaply and securely attached to the lower end of the valve-stem.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the claims.

In the drawings, Figure 1 illustrates in longitudinal vertical section a globe-valve constructed in accordance with my invention. Fig. 2 is a section taken on the indirect line 2 2 of Fig. 1. Fig. 3 is a top plan view of the removable bushing. Fig. 4 is a plan section taken on line 4 4 of Fig. 1. Fig. 5 is a top plan view of the valve-disk. Fig. 6 is a side elevation of the same. Fig. 7 is a bottom plan view of the disk with parts broken away. Fig. 8 is a vertical section of the valve-stem and disk, taken on line 8 8 of Fig. 7. Fig. 9 is a bottom plan view of a valve-disk and plate of a modified form, and Fig. 10 is a cross-section of the same.

As shown in said drawings, A designates a valve-casing of an ordinary globe-valve, the same being provided with a valve-seat *a*, which is herein shown as consisting of a removable ring secured in the opening in the lower end of the casing by screw-threaded connection therewith. Said seat may, however, be of ordinary construction, such as commonly used in valves of this character. Said casing A is provided on two sides thereof with tubular extensions A', which are interiorly screw-threaded and by means of which branch pipes may be connected therewith.

B designates a head which is connected at one end with the casing A and is provided axially with an elongated opening which is in open communication with the interior of the casing and through which passes a valve stem or spindle C, which stem has screw-threaded connection with the head and carries at its inner end a valve disk or head C'. As herein shown, the inner end of said head is provided with a reduced portion *b*, which is exteriorly screw-threaded and engages an interiorly-screw-threaded opening in the casing, by means of which the head is secured thereto. Said head is provided at its outer end with a cap B', which has screw-threaded engagement therewith and between which and the outer end of the head is inserted a suitable packing B², by which the escape of steam or liquid from the valve is prevented.

The valve-stem C is provided at its outer end with the usual hand-wheel C², by means of which the stem may be turned and the disk moved toward and from its seat. Said valve-stem has swiveled connection with the valve-disk C', as will hereinafter more fully appear.

The axial opening within the head B, through which the stem passes, is of greater diameter than the said stem, and within said opening is removably placed a cylindric bushing or sleeve D, which fits tightly within and is adapted to have detachably-interfitting connection therewith, so as to be readily held within the head and to form, in effect, a part of said head. Said bushing is provided with interior screw-threads, which are engaged by the screw-threads of the stem C and by means of which the valve-disk C' is moved toward and from its seat *a* within the casing. Said

bushing is herein shown as provided on its outer end with exterior screw-threads, which engage interior screw-threads in the adjacent outer end of the head, by means of which said bushing is held in place. Said screw-threads are formed upon an enlarged portion of the outer end of the bushing, so that the inner end thereof, which is not screw-threaded, may pass freely through the screw-threaded portion of the head. Said bushing is provided inside of said enlarged screw-threaded portion with a smooth cylindric surface, which fits closely within the smooth cylindric portion of the head C. Said bushing is provided on its outer end with a radial flange D', which is of such diameter as to overlap the outer end of the head B within the cap B' and fits closely upon the same. The meeting surfaces of said head and flange are formed in such manner as to prevent the escape of steam or water past the same. Between the cap and flange is interposed the packing B². Said flange is provided in its upper face with notches or apertures d, which are adapted to be engaged by a suitable tool, as a spanner, by means of which the sleeve may be removed from the head. Said bushing B will be made of a softer metal than the metal forming the stem of the valve, so that the wear due to friction between these parts is taken up entirely by said bushing. The bushing will usually be made of brass, Babbitt metal, or the like, and will be manufactured in quantities and of different sizes to fit different-sized valves.

The provision of the screw-threaded connection between the bushing D and the head B forms a very simple and effective means of renewing said bushing when it has become worn so as to render the working parts of the valve inoperative, as it is obvious that it requires but a very short time to remove the worn sleeve and to insert a new one in its place.

It has been proposed heretofore in valves of this character to provide that part of the valve which is engaged by the valve-stem with a removable threaded portion, said removable portion consisting of a sleeve or bushing which is cast into the bore of the neck and afterward screw-threaded by a suitable tap for the reception of the screw-threaded portion of the valve-stem. In such construction, however, when the bushing has become inoperative from wear and it is desired to replace the same by a new one it is necessary to heat said head to cause the bushing to fuse, so that it may be removed in a molten form, after which a new sleeve or bushing must be cast into the tubular interior of the head and threaded by means of a tap, as before. The construction herein shown is obviously much less expensive and requires much less time to renew the temporary parts thereof than the construction mentioned. Moreover, the construction herein shown obviates the necessity of heating the head of

the valve, which, as is well known, is objectionable for many reasons. An important feature of the construction described in the bushing D is that no special form of holding device is required to prevent the bushing from being unscrewed or dislodged from its place, inasmuch as the outer end or thread of said bushing is in contact with the packing B², which is compressed against the flange when the cap B' is tightened upon the head.

As a further and separate improvement in valves of this character means are provided by which the valve-disk C' may be quickly and easily attached to and detached from the stem, said means affording a swivel connection between said stem and disk. These parts are constructed as follows: The extreme inner end of the valve-stem is provided with a radial flange C³, which engages, as herein shown, a recess in the outer face of the disk C'. Said disk is provided on its outer face, around said recess, with a plurality of outwardly-extending lugs C⁴, which are arranged on a circular line about the flange C³, and are provided with inwardly-extending flanges C⁵, which overlie the outer edge of the flange C³ of the valve-stem and prevent detachment of the disk from said stem. Said lugs will be preferably formed integral with the disk and will be made of such material as to enable them to be readily bent outwardly in order that the flange C³ of the stem may pass between the inwardly-extending flanges C⁵ thereof, after which they will be bent inwardly toward the flange by suitably-applied pressure. Preferably the upper and inner margins of the flanges C⁵ will be beveled or inclined inwardly, as shown at c, so that when the flange C³ of the stem is applied thereto with pressure it will act to separate said lugs and afford an entrance for the flange between the same. The lugs are herein shown and will preferably be made of considerable width, and are made of curved shape in horizontal section, so as to conform at their inner sides to the circular flange of the valve-stem. Said lugs are shown in dotted lines in Fig. 10 as bent outwardly to receive the valve-stem of the flange. The annular space between said lugs is made of greater diameter than the diameter of the flange C³, which permits a sufficient lateral movement of the disk upon the stem to insure an accurate fitting of said disk to the valve-seat when the valve stem or sleeve has become slightly worn, so that said stem is out of alinement with the valve-seat.

The valve-disk C' is provided with a removable valve-plate C⁶, whereby when said plate has become worn from constant use it may be easily and quickly removed and a new plate substituted in lieu thereof. Said valve-plate C⁶, as shown in Figs. 5 to 8, inclusive, consists of a ring which is located in an annular recess c', which is concentric with and formed on the inner face of the disk. Said valve-plate is held in place by means of a holding-plate C⁸, which is attached to the disk C' by means of

a screw C⁹, which passes through said plate and into the disk C'. Said holding-plate is of such diameter as to overlap the ring C⁶ at its inner margins and hold said ring closely in place against the disk. Said valve-plate is made of a diameter equal to the diameter of the valve-disk and is supported throughout its width thereby. The valve-plate will usually be made of a softer metal than that forming the disk and will be removed from the disk by removing the screw C⁹ and plate C⁸, after which the ring will drop out of engagement from the disk. The valve disk and plate shown in Figs. 5 to 8, inclusive, is designed more especially for use with valves having relatively large seats.

I have shown in Figs. 9 and 10 a somewhat-modified construction, which is desirable for use with valves having seats of smaller area. In said figures, C¹⁰ designates a valve-disk which consists of a plain flat annular plate provided on its outer side with an annular concentric recess within which the flange of the valve-stem is adapted to rest and with attaching-lugs C⁵ like those heretofore described. C¹¹ designates a valve-plate which consists of a solid annular plate and is made of a diameter equal to the diameter of the valve-disk C¹⁰ and fits closely upon the inner side of said disk. Said valve-plate is secured to the disk by means of a holding-screw c², which passes centrally through the plate and engages a screw-threaded aperture in said disk. In this construction the holding-plate shown in the figures previously described is dispensed with and the holding-screw directly engages the valve-plate.

I claim as my invention—

1. In a valve, the combination with the hollow casing thereof, a valve-seat in said casing a tubular head connected at one end with said casing, and a screw-threaded valve-stem extending through said head and projecting into the casing, a valve on said stem of an interiorly-screw-threaded bushing which has screw-threaded connection with said head and which is engaged by the screw-threaded stem, a cap on the outer end of the head, and packing between said cap and adjacent outer ends of the head and bushing.

2. In a valve, the combination with the hollow casing thereof, a valve-seat in said casing

a tubular head in open communication at one end with the interior of said casing, and a valve-stem passing through said head and projecting into the casing, a valve on said stem of an interiorly-screw-threaded bushing which has screw-threaded connection with said head and which is engaged by the screw-threaded stem, said bushing being provided on its outer end with a flange which overlaps and fits upon the outer end of the head, a cap fitting over the outer end of said head, and packing inserted between said cap and flange.

3. In a valve, the combination with the hollow casing thereof, a valve-seat in said casing a tubular head connected at one end with said casing, a screw-threaded valve-stem extending through said head and projecting into the casing, a valve on said stem of an interiorly-screw-threaded bushing which has screw-threaded connection with said head and which is engaged by said stem, and a flange on the outer end of said bushing which overlaps and fits closely upon the outer end of said head, said flange being provided with notches or apertures adapted to be engaged by a spanner.

4. In a valve, the combination with the stem provided at its inner end with a radial annular flange, of a valve-disk provided with a plurality of lugs surrounding said flange and having inwardly-projecting parts which overlap said flange of the stem, said lugs being provided on their outer margins with inwardly-inclined oblique surfaces.

5. The combination with a valve-stem having at its inner end an annular radial flange, of a valve-disk provided with a plurality of outwardly-projecting lugs having at their outer ends inwardly-projecting parts which overlie said flange of the stem, said lugs being adapted to spread apart to permit the entrance of the flanged stem between the same and to be bent into engagement with said stem to hold the disk upon said stem.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 17th day of May, A. D. 1898.

CHARLES E. HUXLEY.

Witnesses:

GEO. E. RICKER,

AUG. H. WEHMEYER.