

No. 765,430.

PATENTED JULY 19, 1904.

C. E. HUXLEY.
GATE VALVE.

APPLICATION FILED MAY 16, 1903.

NO MODEL.

Fig. 1.

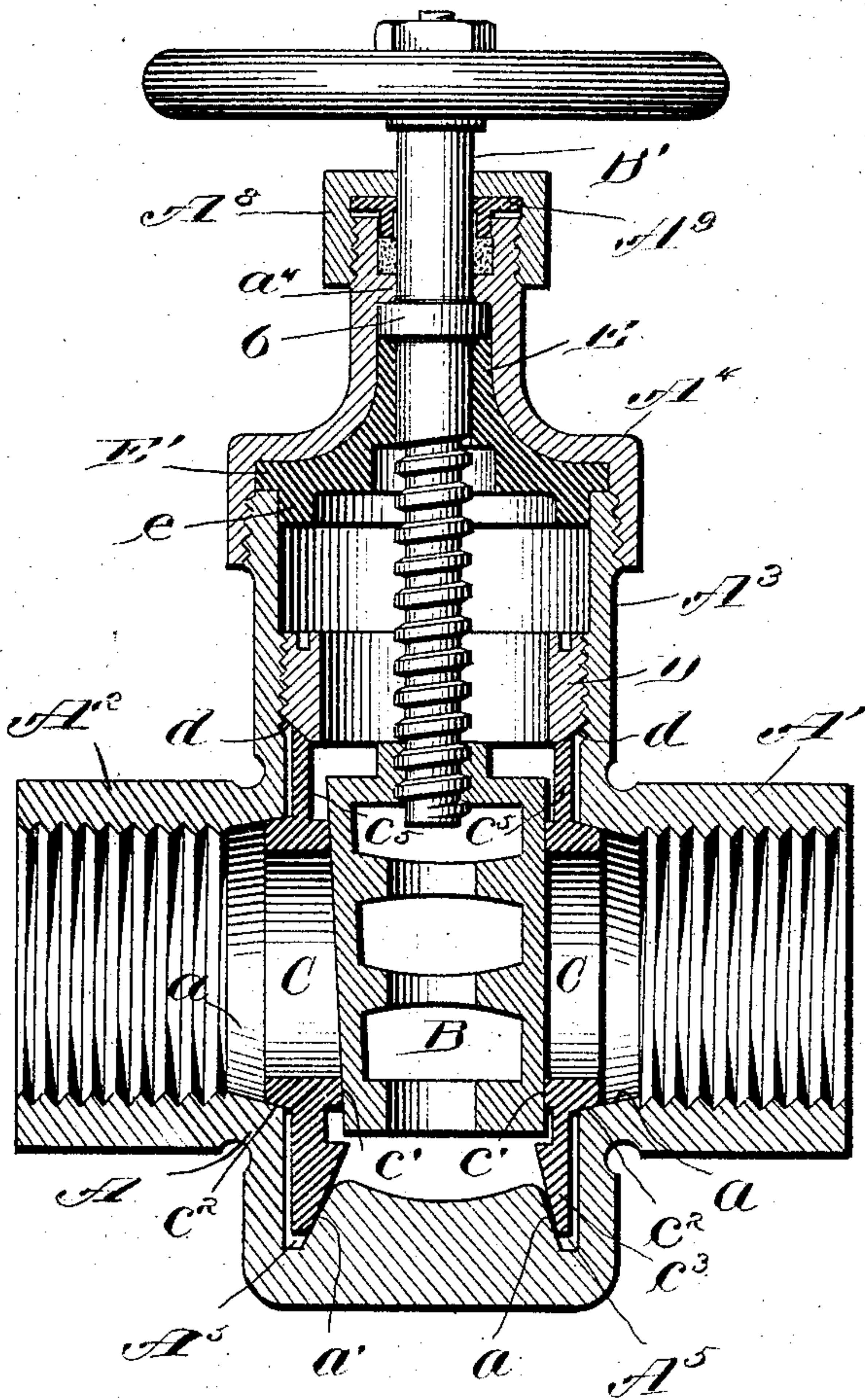


Fig. 4.

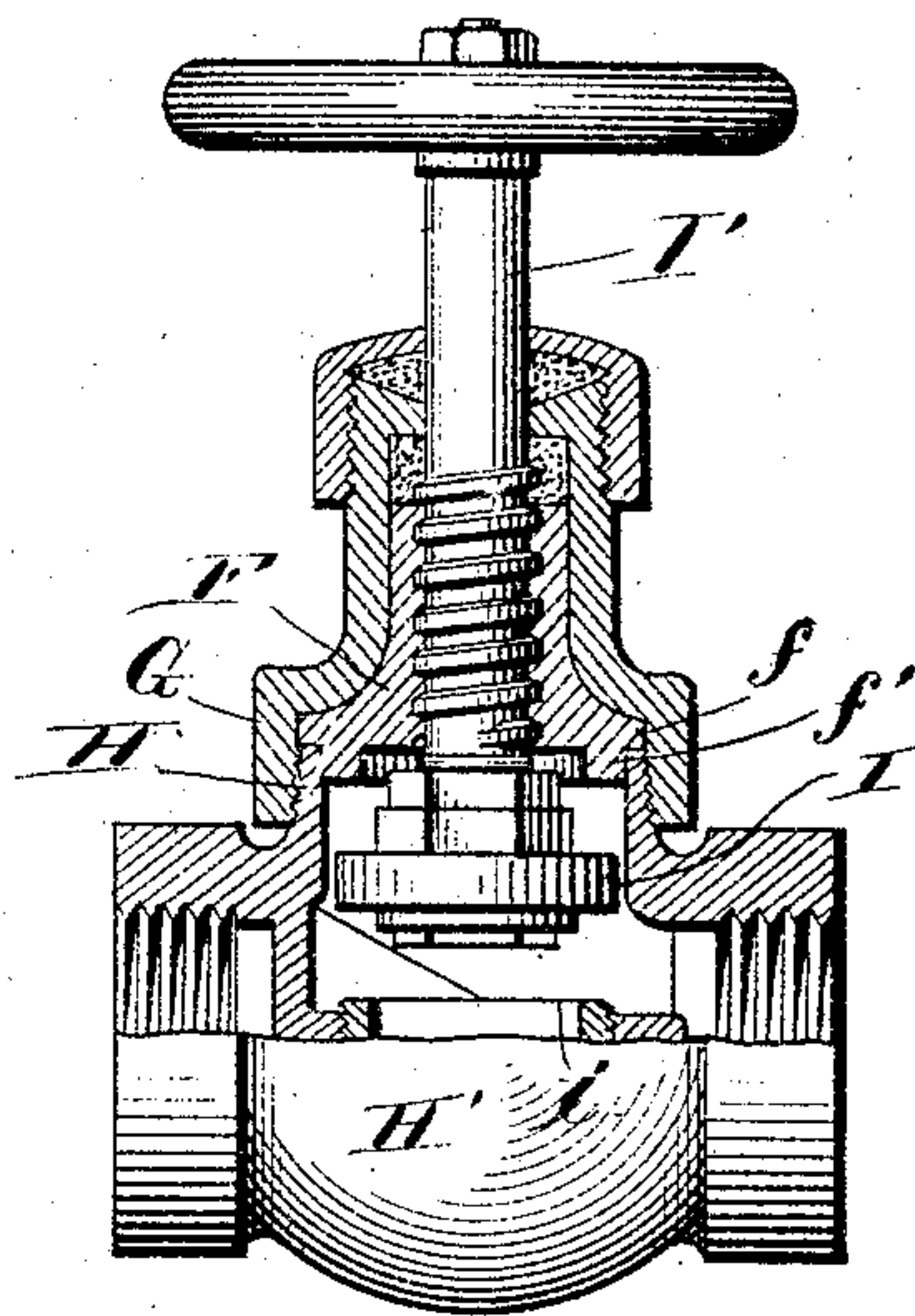


Fig. 2.

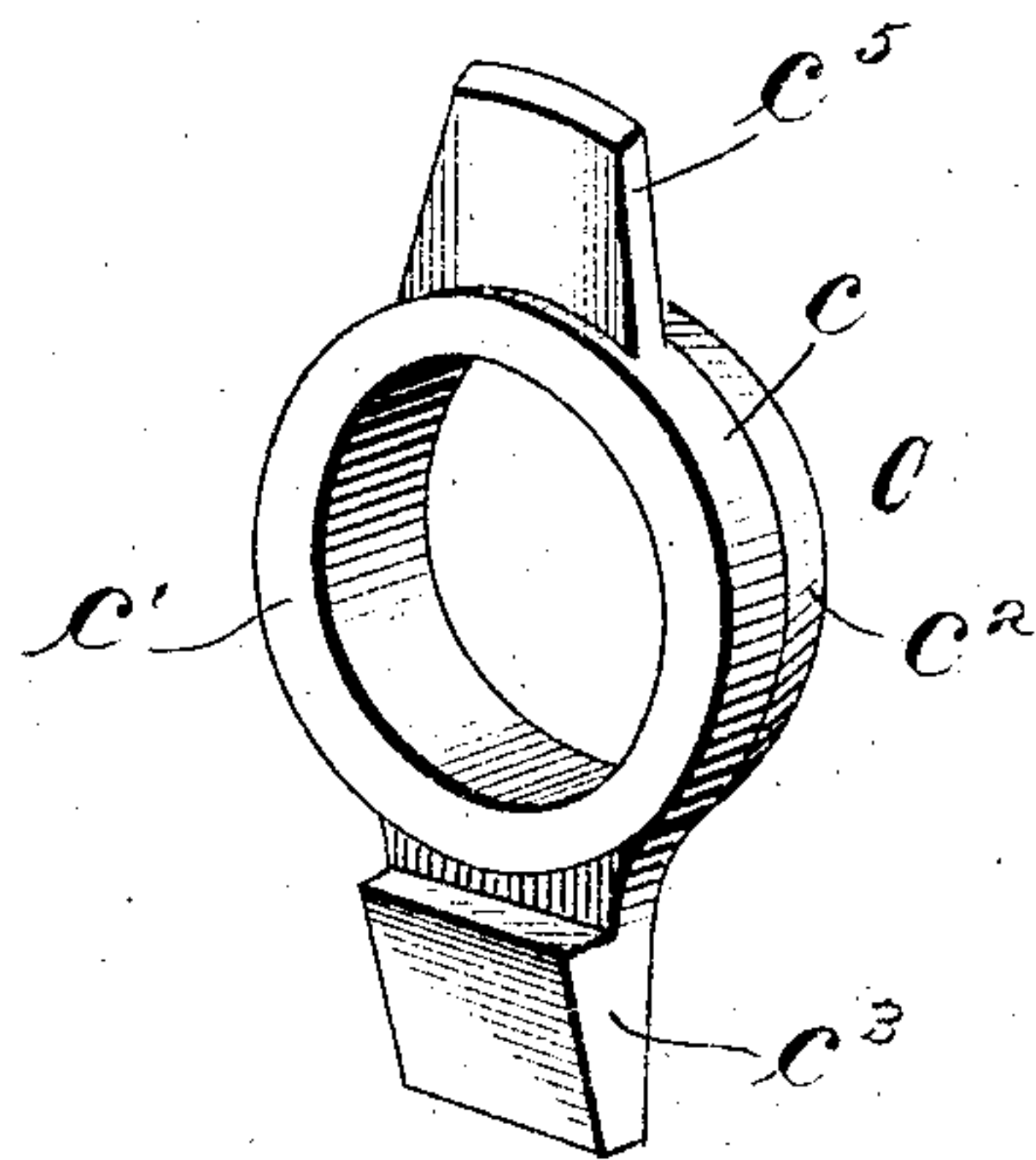
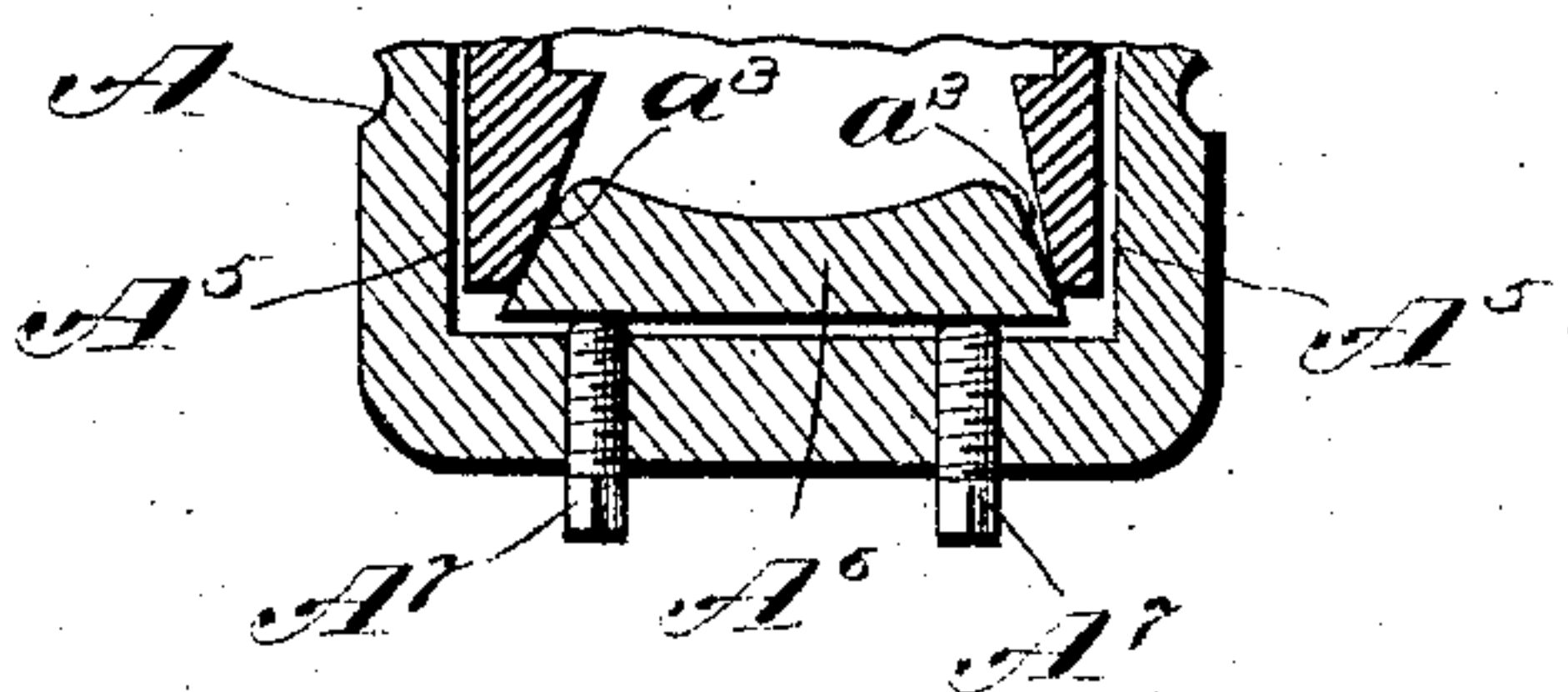


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES E. HUXLEY, OF CHICAGO, ILLINOIS.

GATE-VALVE.

SPECIFICATION forming part of Letters Patent No. 765,430, dated July 19, 1904.

Application filed May 16, 1903. Serial No. 157,359. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HUXLEY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Gate-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
10 form a part of this specification.

This invention relates to an improvement in valves, and refers more specifically to a renewable seat-ring or member designed for use with gate-valves and the manner of fastening
15 the same in the casing and also to a bushing for the valve-stem which is capable of application to other forms of valves.

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

In the drawings, Figure 1 is a central vertical section of a gate-valve, showing my invention applied thereto. Fig. 2 is a perspective view of one of the seat-rings of said valve.
25 Fig. 3 is a fragmentary view of the valve-casing, showing a modification. Fig. 4 is a view, partly in section and partly in elevation, of a globe-valve containing one of the features of my invention.

30 As shown in the drawings, A designates the casing or shell of a gate-valve, provided with an inlet branch A' and an exit branch A².

A³ designates the neck of the valve, to which the usual bonnet A⁴ is attached, the lower end
35 of said bonnet being interiorly screw-threaded to fit over the exteriorly-screw-threaded neck.

B designates the valve gate or closure, which is located in the casing between the branches A' A² and engages when seated seats at the
40 inner ends of the branches. The gate is adapted to be lifted or drawn upwardly into the neck A³ by means of a rotative endwise-immovable screw-shaft which extends upwardly through the neck and has screw-threaded engagement
45 with the gate, as shown in Fig. 1.

C C designate my improved seat-rings, against the inner margin of which the gate or closure seats. As herein shown, two of such
50 seat-rings are employed, one at each side of the gate; but, if desired, a single removable

seat-ring may be employed—that at the induction side of the valve. Said rings are made substantially alike, each consisting of a ring member c, formed on its inner side to provide
a seat c', against which the gate seats. The
55 outer margin of each ring member is provided with an exteriorly-tapered or wedge surface c², which bears against an opposing annular inwardly-facing tapered wedge-surface a at the inner end of the adjacent or associated
60 branch. The ring members c of the seat-rings are provided at their lower sides with lugs c³, which are designed to enter pockets A⁵, formed in the lower side wall of the valve-casing just below the branches. The inner walls a' of
65 said pockets are tapered, and the inner faces of the lugs or extensions c³ of the seat-rings are correspondingly tapered and are adapted to bear against said tapered surfaces a'. When inserting and fastening the rings in place,
70 said rings are dropped downwardly through the neck A³, which is made large enough to receive the same, with said lugs or extensions c³ entering the pockets A⁵ above referred to. When each ring is first dropped into the cas-
75 ing, (which of course is before the gate is in place,) the upper side thereof is inclined toward the center of the valve-casing with the tapered inner face of the lug c³ engaging the inclined inner wall of the pocket and the lower
80 part of the tapered ring member extending into the lower side of the adjacent branch. The ring is thereafter swung laterally toward the adjacent branch, and by reason of the taper of the outer margin of the ring member c,
85 which reduces the diameter of said outer margin of the ring, said outer margin readily enters the opening at the inner end of the branch, so as to bring the wedge surfaces c² and a, respectively, of the ring and the branch
90 into contact, and thereby provide a joint between the ring and casing.

Any suitable means may be employed for forcing and locking the seat-rings in place. The means herein shown consists of a ring D,
95 located inside the neck A³ and having exterior screw-threads adapted to engage interior screw-threads in the neck. Said ring is provided on its lower margin with an exterior tapered surface d, adapted to engage corre-
100

sponding and opposing inclined surfaces on lugs or extensions c^5 at the upper side of the seat-rings, as clearly shown in Fig. 1, said coacting inclined or wedge parts being constructed to force the upper parts of the seat-ring toward the wall of the casing. By reason of the fulcrum afforded said rings by engagement of the lugs or extensions c^3 at the lower sides of said rings with the inclined walls of the pockets A^5 outward or lateral pressure exerted against the lugs c^5 at the upper sides of the rings acts to force the tapered outer margins of said rings into close contact with the tapered surfaces at the inner ends of the branches and affords fluid-tight joints between said parts.

I have herein shown both sides of the valve as provided with the seat-ring C, both being held in place by the same locking-ring D. I may employ, however, but a single removable and renewable seat-ring and locate the same at the induction side of the valve, and ordinarily this will be sufficient, as under usual conditions it is only this side of the valve which needs to be closely packed. The side of the gate or closure facing the inlet branch A^1 is made vertically flat, while the opposite side of the gate is tapered and the associated seat-ring C is correspondingly tapered. If the seat-ring be omitted on the tapered side of the gate, said tapered side of the gate will bear against a correspondingly tapered seat formed on the metal wall of the casing surrounding the branch A^2 . Said wedge-shaped parts of the gate and casing act to force the opposite side of the gate in close-fitting engagement with the seat-ring C at the induction side of the valve. If desired, both sides of the gate may be tapered.

When the ring C is worn or has otherwise become disabled, it may be readily removed by first removing the bonnet and unscrewing the ring D, whereupon the seat-ring is made easy of access to be removed from the casing.

In some instances the pocket or pockets A^5 may be formed between the side walls of the casing and a removable or separate block A^6 ; (shown in Fig. 3,) having tapered outer ends a^3 , which constitute the inner walls of said pockets. In this construction the lower sides of the rings are forced outwardly by forcing upwardly said block, which is accomplished by set-screws A^7 , extending upwardly through the lower wall of the casing and impinging against the lower side of said block. When said block is thus forced upwardly, the tapered ends thereof engage the tapered faces of the lugs c^3 and act to force or spread the same outwardly, and thereby force or hold the lower side of the ring in close contact with the tapered inner surfaces of the branches.

The rotative valve stem or shaft B' extends upwardly through a bushing E, located within the bonnet A^4 , and with which bushing said stem or shaft has bearing. Said bushing con-

forms exteriorly to the interior shape of the bonnet and is provided at its lower end with an integral radial flange E' , which extends outwardly and is clamped between the upper margin of the neck A^3 and internal downwardly-facing shoulder in the bonnet. The shaft or stem is provided near its upper end with an annular radial flange b , which is interposed between a downwardly-facing internal shoulder a^4 in the bonnet and the upper face or margin of the upper end of said bushing E. The interposition of said stem-flange between said opposing shoulders holds the stem or shaft from endwise movement and at the same time permits said shaft to freely turn or rotate. The shaft extends outwardly through a cap A^8 , which closes the upper end of said bonnet and has screw-threaded engagement therewith and is provided at its upper end with the usual hand-wheel for rotating the shaft. Between said shaft and the part of the bonnet between the outer end thereof and said flange a^4 is placed an annular body of packing, which is held in place by means of a gland A^9 , which is held in place by said screw-cap A^8 . The lower side of the flange E' of said bushing is provided with a depending flange e , which fits closely within the upper open end of the neck A^3 . The purpose of said flange is to prevent the upper margin of the neck from being distorted or pressed inwardly when the bonnet is turned down in place. The screw-threads of the meeting ends of said parts are usually slightly tapered, so that when the parts are turned tightly together the outer surrounding part or flange of the bonnet exerts such stress on the neck as to tend to force the upper margin of the neck inwardly and contract the same. As a result of such distortion the area of contact between the screw-threads is lessened, with a result of weakening the joints between the neck and bonnet. Moreover, such contraction of the neck prevents the ready withdrawal of the locking-ring D when its removal is desired. The presence of the flange e on the lower end of the bushing supports the upper end of the neck against such stress and prevents distortion of the same. This last-described feature of my invention—to wit, the depending flange on the lower end of the bushing—is applicable for use in a globe-valve—such, for instance, as shown in my prior application for United States Letters Patent, Serial No. 148,685, filed March 20, 1903, and as also illustrated in Fig. 4. As shown in said Fig. 4, F designates a bushing which corresponds with the bushing E hereinabove described. Said bushing F is located within a bonnet G, which has screw-threaded connection with the neck H of the valve-casing H' and provided with an integral flange f , which is clamped between the upper end of the neck and an internal shoulder in said bonnet. The valve disk or closure I is in this instance

moved toward and from its seat z by means
 of a screw-threaded stem I' , to the lower end
 of which said closure is attached and which
 stem has screw-threaded engagement with
 5 said bushing. The bushing is provided at its
 lower end with a depending integral flange f' ,
 which fits within the open end of the neck
 and supports the upper end of the neck from
 inward distortion when the bonnet is turned
 10 down home in the same manner as does the
 similar construction shown in Fig. 1. In the
 construction shown in said Fig. 4 contrac-
 tion of the open end of the neck prevents the
 valve disk or closure from being removed
 15 from the casing through the neck the same
 as such a contraction of the neck of the cas-
 ing shown in Fig. 1 would prevent the ready
 removal of the locking-ring D.

It will of course be understood that the po-
 20 sition of the valves may be changed from that
 illustrated, depending upon the direction of
 the pipe-line in which the valves or either of
 them may be included. The reference to the
 horizontal and vertical relation of the parts
 25 of the valves are therefore to be regarded as
 employed only for the sake of convenient ref-
 erence to the parts illustrated.

I claim as my invention—

1. In a gate-valve, the combination with the
 30 casing and its tubular branch provided at its
 inner end with an annular tapered surface, of
 a seat-ring having an exterior tapered sur-
 face adapted to enter and engage the tapered
 surface of the branch; said seat-ring having
 35 wedging engagement at its lower side with
 the casing and a part having screw-threaded
 engagement with the casing and wedging en-
 gagement with the upper side of the seat-ring.

2. In a gate-valve the combination with the
 40 casing and its tubular branch, of a seat-ring
 at the inner end of the branch having tapered
 or wedging engagement therewith, and formed
 at its inner side to constitute a seat, and a
 wedge-shaped locking-ring having screw-
 45 threaded engagement with the neck of the
 valve-casing for locking the seat-ring in place.

3. In a gate-valve the combination with the
 casing and its tubular branch, of a seat-ring
 at the inner end of the branch having an ex-
 50 teriorly-tapered outer margin adapted to en-
 ter and engage the interiorly-tapered inner
 end of the branch, and formed on its inner
 side to constitute a seat, a part at the lower
 side of said seat-ring adapted to enter a pocket
 55 formed in the casing, and a locking-ring hav-
 ing screw-threaded engagement with the
 valve-casing and provided on its lower mar-
 gin with a tapered or wedge surface adapted
 to engage a corresponding surface at the up-
 60 per side of said seat-ring.

4. In a gate-valve the combination with the
 casing and its tubular branch, of a seat-ring
 having an exteriorly-tapered outer margin
 which fits within the interiorly-tapered part
 65 of the inner end of the branch and is formed

at its inner side to constitute a seat, a lug on
 the lower side of the seat-ring adapted to en-
 gage a tapered abutment in the lower part of
 the casing, and a locking-ring having screw-
 threaded engagement with the casing and pro-
 70 vided with a tapered lower margin adapted to
 engage a corresponding tapered surface on a
 lug projecting from the upper side of said
 seat-ring.

5. In a gate-valve the combination with the
 75 casing and its tubular branch, of a seat-ring
 at the inner end of the branch having an ex-
 teriorly-tapered outer margin adapted to enter
 and engage the exteriorly-tapered inner end
 of the branch and formed at its inner side to
 80 constitute a valve-seat, a lug on the lower side
 of said ring, a block in the lower part of the
 casing having a tapered or wedge-shaped end
 adapted to engage said ring-lug, and means
 acting on the block for forcing the wedge-
 85 shaped end thereof against said lug.

6. In a gate-valve, the combination with the
 casing and the tubular induction and eduction
 branches thereof, of seat-rings at the inner
 ends of the branches provided with tapered
 90 outer margins which are adapted to engage
 corresponding tapered surfaces at the inner
 ends of the branches; said seat-rings having
 wedging engagement at their lower sides with
 the casing, and a locking device having screw-
 95 threaded engagement with the casing and
 wedging engagement with the upper sides of
 both seat-rings.

7. In a gate-valve the combination with the
 casing and its tubular induction and eduction
 100 branches, of seat-rings at the inner ends of
 said branches having tapered or wedging en-
 gagement therewith and a wedge-shape lock-
 ing-ring having screw-threaded engagement
 with the neck of the valve-casing for locking
 105 both of said seat-rings in place.

8. As a new article of manufacture, a valve-
 seat ring formed on one side to constitute a
 valve-seat and exteriorly tapered on its other
 margin and lugs on the opposite sides of said
 110 ring, the upper lug being provided on its in-
 ner face with a tapered or wedge surface.

9. The combination with a valve-casing pro-
 vided with a tubular neck, a seat, a closure
 engaging said seat, a rotative stem attached
 115 to said closure and extending outwardly
 through said neck and a bonnet having ex-
 teriorly-screw-threaded engagement with the
 outer end of said neck, of a bushing in said
 bonnet with which the stem has rotative en-
 120 gagement and a curved flange on the lower end
 of said bushing which enters the upper end of
 said neck and supports it from inward distor-
 tion.

10. The combination with a valve-casing
 125 provided with a neck, a seat, a closure engag-
 ing said seat, a rotative stem attached to said
 closure and extending outwardly through said
 neck and a bonnet having exteriorly-screw-
 threaded engagement with the outer end of
 130

said neck, of a bushing in said bonnet with
which the stem has rotative engagement, a
radial flange on said bushing which is clamped
between said neck and bonnet and a curved
5 flange in the lower end of the bushing which
enters the upper end of said neck and supports
it from inward distortion.

In testimony that I claim the foregoing as

my invention I affix my signature, in presence
of two witnesses, this 12th day of May, A. D. 1903.

CHARLES E. HUXLEY.

Witnesses:

WILLIAM L. HALL,
GERTRUDE BRYCE.