

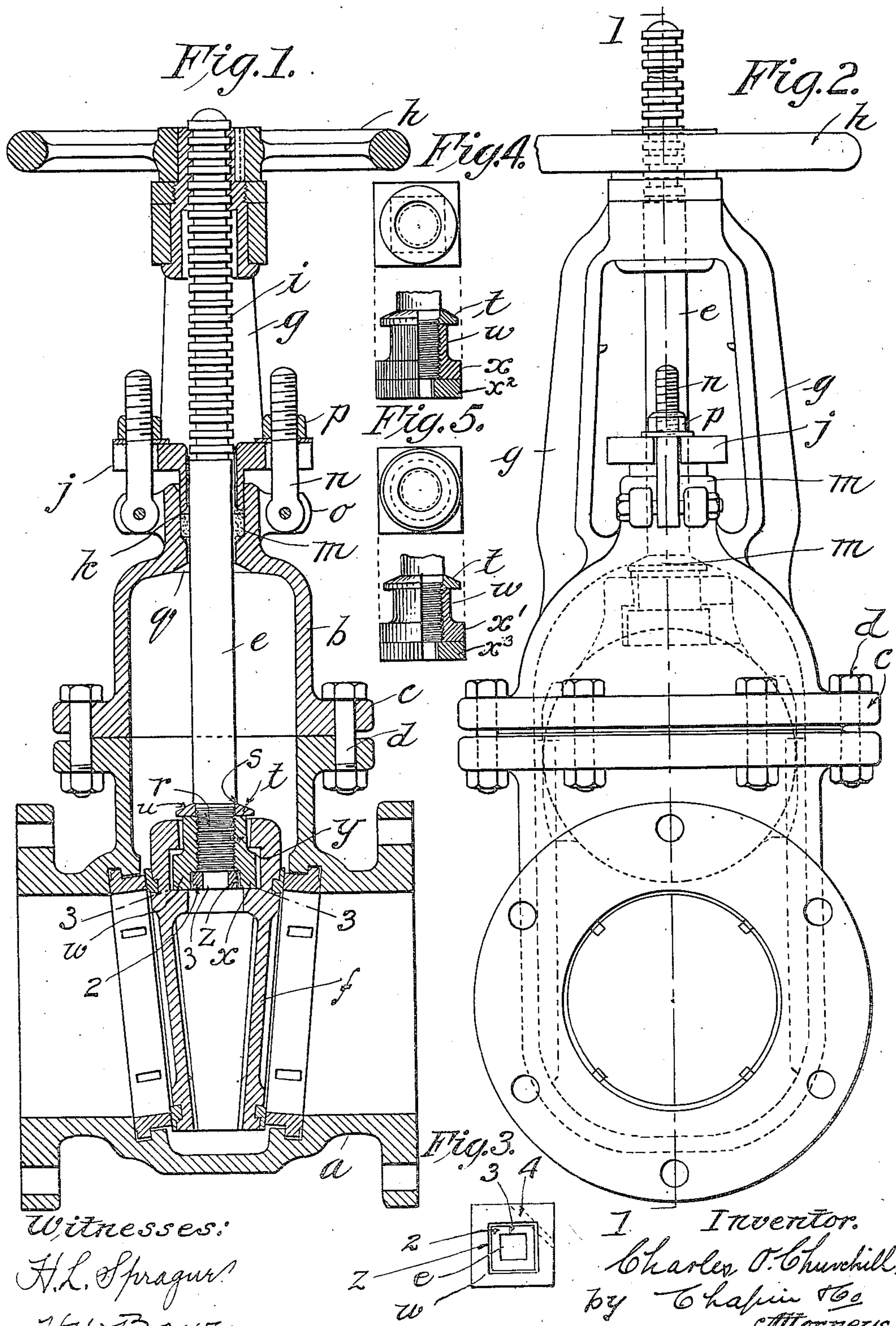
No. 855,385.

PATENTED MAY 28, 1907.

C. O. CHURCHILL.

VALVE.

APPLICATION FILED SEPT. 29, 1906.



UNITED STATES PATENT OFFICE.

CHARLES O. CHURCHILL, OF BLOOMFIELD, NEW JERSEY, ASSIGNOR TO THE FAIRBANKS COMPANY, OF NEW YORK, N. Y., A CORPORATION.

VALVE.

No. 855,385.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed September 29, 1906. Serial No. 336,767.

To all whom it may concern:

Be it known that I, CHARLES O. CHURCHILL, a citizen of the United States of America, residing at Bloomfield, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to an improvement in valves, particularly to that form known as rising spindle plug-valves, the main object being to secure the valve-spindle to the plug or gate proper so that when the plug is raised there is no danger of disconnecting or breaking the connection between the plug and spindle by the exertion of torsional strain on the spindle.

A further object is to provide means for renewing the self-packing collar on the spindle so that the stuffing-box can be repacked when the water or steam is under compression without any danger of leakage from the casing around the spindle.

In the drawings forming part of this application,—Figure 1 is a vertical sectional view through the valve-spindle and valve-casing on the line 1—1 of Fig. 2. Fig. 2 is an outline view of the parts shown in Fig. 1 with the plug in raised position for repacking the valve-spindle, and the valve wide open, and also showing how the self-packing collar adapts itself to its seat inside of the bonnet. Fig. 3 is a bottom plan view of the lower end of the spindle and plug-nut, showing my improved means for securing the spindle to the plug. Figs. 4 and 5 show a partial sectional and plan view respectively of modifications of my improved means of attaching the spindle to the plug and also show the removable packing collar on the spindle which enables the valve to be packed when under pressure and wide open.

In the construction of valves at the present time, the packing collar is formed on the spindle by turning the same from large stock material, or else by welding the collar or packing-ring onto the valve-spindle and turning down the same to the size and shape required. Both of these methods are expensive and unsatisfactory.

In the construction that I employ for securing the packing-ring to the valve-spindle, the same is selected from stock material of the proper diameter. On the lower end of the same is cut for a short distance a thread.

The external diameter of the threaded portion is of less diameter than the unthreaded portion whereby a shoulder is formed between the two portions. The packing collar, which is an entirely separate piece, is slipped over the threaded portion and against the shoulder, the collar being held in place against the shoulder by means which engage the remainder of the threaded portion of the spindle. This construction permits me to readily renew the packing collar in case it is necessary for any reason, and also lessens very materially the cost of manufacture.

Referring to these drawings, *a* designates the valve-body proper to which is bolted in the usual manner the bonnet *b* by means of the usual flange and bolt connection *c* and *d*.

e designates the spindle which is for the purpose of raising and lowering the plug *f*.

g is the yoke-shaped piece that is shown integral with the bonnet *b* through which passes the spindle *e* at its upper end, or the piece *g* may be bolted onto the bonnet *b*.

h designates the usual hand-wheel having threaded connection with the threads *i* on the upper end of the rising spindle.

j is the packing-gland encircling the spindle and having the depending portions *k* for entering the usual stuffing-box chamber *m*.

n are threaded bolts pivotally connected to the ears *o* and the bonnet *b*.

p indicate nuts threaded on the upper end of the bolts *n* for forcing the gland *j* downward into the stuffing box *m* for compressing the packing material contained therein tightly against the valve-stem, as readily understood.

q designates a finished surface in the upper part of the bonnet *b* adjacent the spindle *e*. The lower end of the spindle is threaded, as shown at *r*, and it will be noticed that the diameter of this threaded portion is less than the diameter of the unthreaded portion of the spindle thus forming a shoulder portion *s* between the threaded and unthreaded portion of the spindle.

It will be noticed that the lower end of the spindle *e* below the threaded portion *r* is made rectangular and preferably square in shape, as shown in plan in the view of Fig. 3. Slipped over this threaded portion is a packing collar *t* having a bearing against the finished surface *q* of the bonnet, when the valve is wide open. The upper surface of the col-

lar t is beveled at an angle corresponding with the finished beveled surface q of the bonnet so that when the valve is raised to full open position, as shown in dotted line in Fig. 2, the surfaces q and u are brought firmly together, thus forming a steam or water-tight joint between the interior of the valve-casing and the valve-spindle. The nuts p can then be loosened and the threaded bolts n turned back permitting the packing-gland j to be raised free from the stuffing-box m and new packing material placed therein without shutting off the flow of steam or water as the case may be. In the actual construction of the valve, the collar t is preferably made of some non-corrosive substance, as brass or bronze.

The most important feature of my invention is the means I have devised for securing the spindle to the plug, whether the valve is of the rising or stationary spindle type.

A usual manner of constructing valves is to thread the spindle into the plug and then pin the plug and spindle together. This plan is objectionable for the reason that in operating the plug to raise and lower the same, should any great amount of torsional strain be placed on the spindle, the pin is often broken rendering the valve totally inoperative. Such a break is difficult to repair, and then only by shutting off the flow of steam or water, and completely dismantling the valve. To overcome this serious objection, I place on the threaded portion r of the spindle an element w that I term a "plug-nut" which at its lower end is a rectangular flange, as shown in Figs. 3, 4 and 5 respectively. The shank portion of the plug-nut is screwed firmly against the packing collar or ring t , as shown in Fig. 1, the lower end thereof being flush with the lower end of the spindle when in place. This plug-nut is formed with a flange x or x^1 for entering a recess or cut-out portion y in the upper portion of the plug f . The lower side of the plug-nut w has a rectangular cut-out recess or portion z , as shown in Figs. 1 and 3. Located within this cut-out recess portion is a correspondingly shaped part 2 which, in turn, has a rectangular opening 3 for receiving the lower end of the spindle e , as shown in plan view, Fig. 3. The part 2 is therefore in effect a rectangular bushing or sleeve.

In order to connect the spindle with the plug, first slip on the packing-collar against the shoulder s , the nut is then screwed onto the spindle firmly against the packing collar t , and the rectangular bushing or sleeve is next placed in position on the square end of the spindle and into the recess of the plug-nut, and is held in position by the pin 4 (see Fig. 3.) The rectangular bushing thus securely locks together the spindle and plug-nut, and the torsional strain on the spindle is

thus taken care of by the squared or rectangular end of the spindle e . After the spindle-collar t and the plug-nut are thus assembled, the plug-nut is simply placed into the recess of corresponding shape in the plug, before the valve is assembled.

As a precaution for preventing the bushing from getting out of place, a hole is drilled through the plug-nut and the corner of the square bushing and, as shown in Fig. 3, a pin 4 is inserted therein. This method of connecting the spindle and plug allows the plug ample flexibility to adjust itself to the valve-seats in the valve-body a .

It is a well known fact in this art that the spindle and plug can not be rigidly connected together, without danger of breaking the connection.

My method of connecting the spindle and plug is also applicable when the self-packing collar on the spindle is not required. The construction is identical, only the plug-nut is screwed directly against the shoulder on the spindle.

Fig. 4 shows a modification of the construction for accomplishing the same results. In this figure, the square washer x^2 , instead of being fitted into a recess in the plug-nut, is the same in size as the flanges x on the plug-nut w and the flange x on the plug-nut is therefore made correspondingly thinner, and when they are assembled and placed in the recess in the plug they accomplish the same results as the arrangement previously described.

Fig. 5 is the same as Fig. 4 with the exception that it shows a round shank and round flange, while Fig. 4 shows a square shank and square flange. This shank can be made any shape as in Figs. 1 or 3. The flange could be round and shank square. This method of attaching the spindle and plug is not only applicable to the valves with wedge-shape plugs but also to two piece parallel face-plugs, globe-valves, etc.

It is to be understood that the plug-nut is applicable equally well to the stationary spindle, as well as to the rising spindle herein described, since the construction of the plug-nut would be practically the same in both cases, and any claims herein presented are intended to cover this feature.

I have not deemed it necessary to illustrate the plug-nut as applied to the stationary spindle, as the same is within the scope of the present invention.

What I claim is:—

1. In a valve construction of the class described, a valve-spindle having a threaded lower end and a rectangular portion, a shoulder portion between the threaded and unthreaded portion, a packing-collar engaging the shoulder portion, a plug-nut interiorly threaded and engaging the packing-collar and the threaded lower end of the spindle, a

rectangular bushing carried by the spindle and located within the plug-nut and on the rectangular portion, and means for securing the plug-nut to said bushing, the plug-nut being located in the upper portion of the plug, as described.

2. In a valve of the class described, a plug having a recess therein, a valve-spindle provided with means for connecting the plug to the said spindle, said means consisting of a bushing carried by the lower end of the valve-spindle, a plug-nut located within the recess of the plug and inclosing said bushing, a pin connecting the bushing and plug-nut whereby all torsional strain is removed from the pin, as described.

3. In a valve of the class described, a spindle having its lower extremity threaded, the diameter of the threaded portion being less than the diameter of the unthreaded portion whereby a shoulder is formed between the said portions, a packing collar, one side of which engages the shoulder, an inte-

riorly threaded plug-nut engaging the threaded portion of the spindle and the opposite side of the collar, a bushing engaging the lower end of the spindle and located within the lower portion of the plug-nut, a pin passed through the bushing and plug-nut whereby the parts are retained in place on the spindle, as described.

4. In a valve construction of the class described, a valve spindle having a threaded lower end and a rectangular portion, a shoulder portion between the threaded and unthreaded portion, a packing collar engaging the shoulder portion, a plug-nut interiorly threaded and engaging the packing collar and the threaded lower end of the spindle, an element carried by the spindle and located on the rectangular portion of the spindle and engaging the plug-nut.

CHARLES O. CHURCHILL.

Witnesses:

RALPH H. WHITE,
LUDWIG HOLST.