

No. 750,321.

PATENTED JAN. 26, 1904.

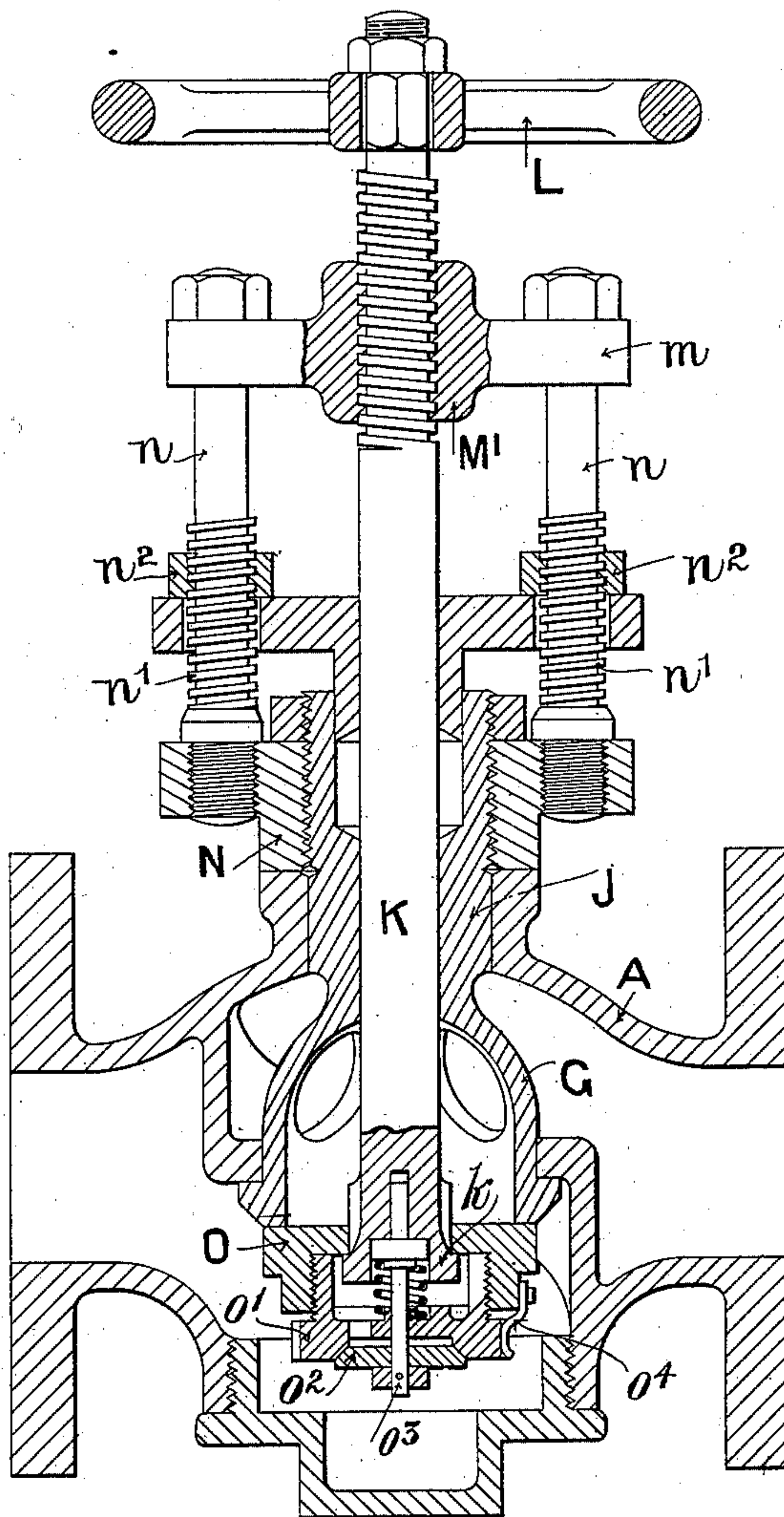
W. H. THOMPSON.  
VALVE.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

*W. V. Pymes.*  
*Hedley J. Harrop.*

INVENTOR.

*W. H. Thompson.*  
*Robert E. Phillips.*  
*Attorney.*

*Per*

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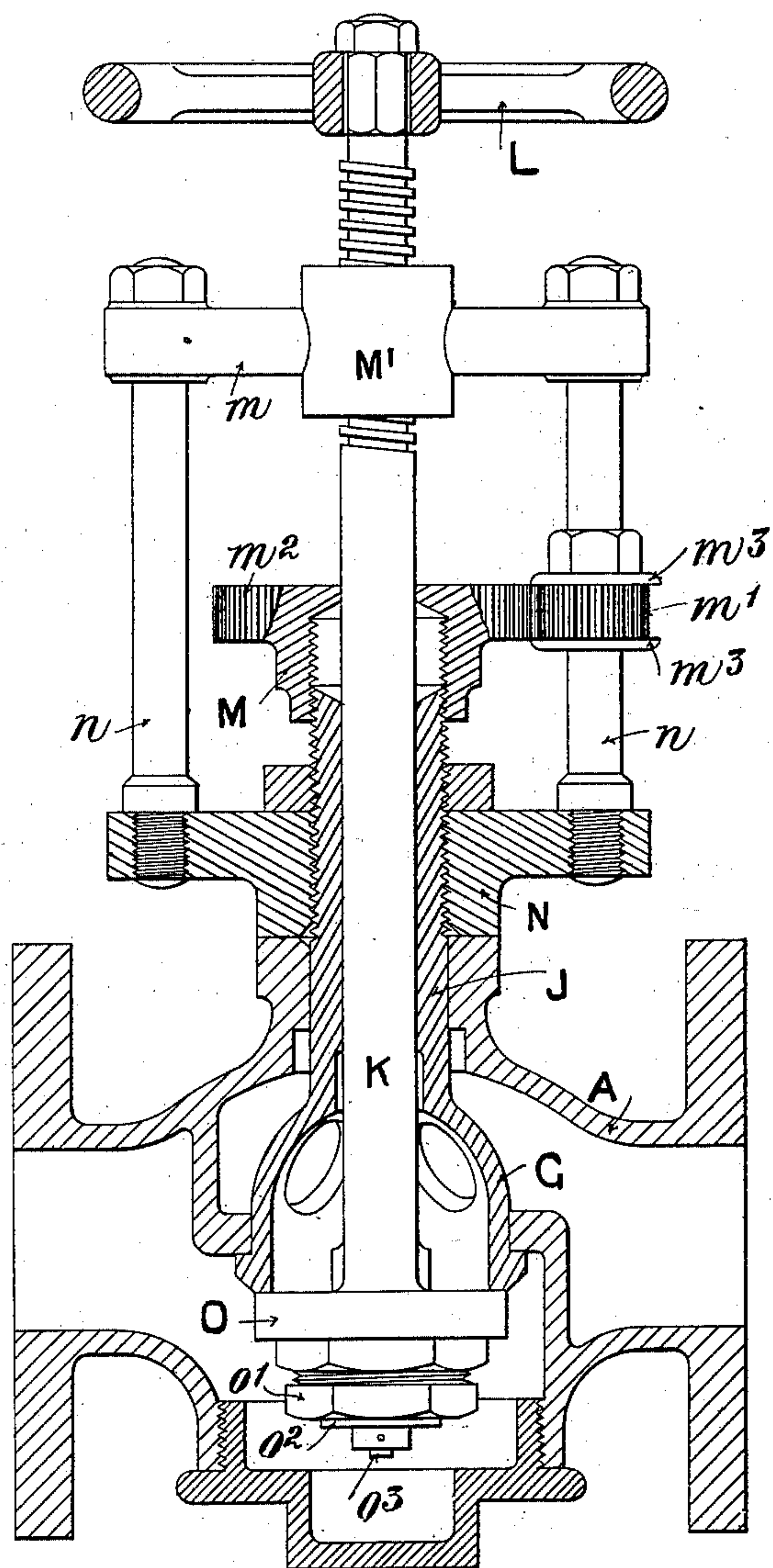
W. H. THOMPSON.  
VALVE.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

3 SHEETS—SHEET 2.

FIG. 2.



WITNESSES:

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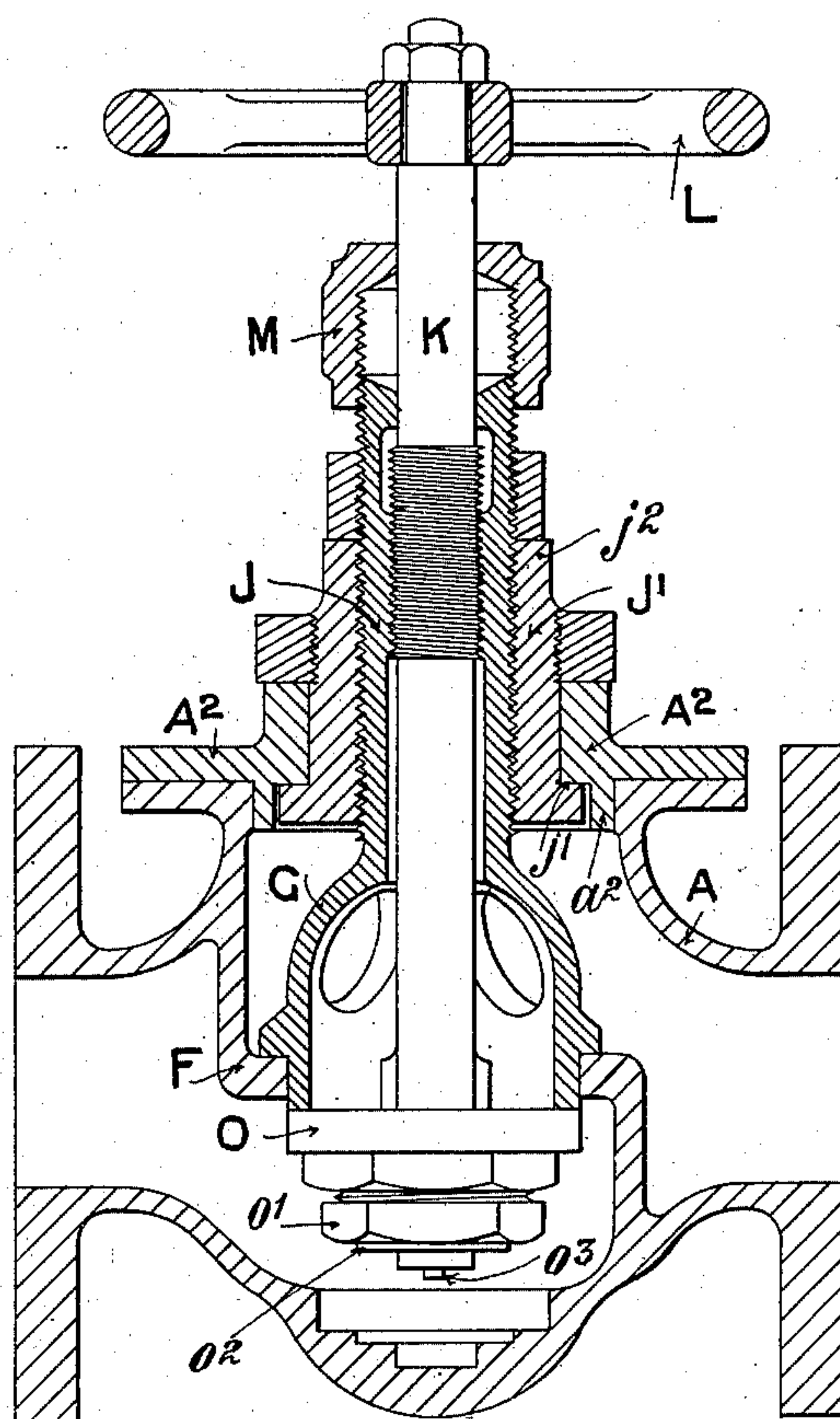
W. H. THOMPSON.  
VALVE.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

3 SHEETS—SHEET 3.

FIG. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM H. THOMPSON, OF LONDON, ENGLAND.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 750,321, dated January 26, 1904.

Application filed July 11, 1902. Serial No. 115,114. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY THOMPSON, a subject of the King of Great Britain, residing at 155 Fenchurch street, in the city and county of London, England, have invented certain new and useful Improvements in Valves, (for which I have applied for Letters Patent in Great Britain, No. 25,126, dated December 10, 1901,) of which the following is a full, clear, and complete specification.

My invention relates to improvements in valves, more particularly such as are described and claimed in Letters Patent No. 680,209 of the United States of America, granted to me jointly with Robert Thompson on the 6th day of August, 1901; and it has for its object the rendering of such valves more convenient and more efficient in their action.

In the accompanying drawings, Figure 1 is a view in vertical elevation, partly in section, showing some of the improvements. Fig. 2 is a similar view showing a modification, and Fig. 3 is a similar view showing a further modification.

Throughout the views similar parts are denoted by like letters of reference, the said letters of reference being the same and indicating the same parts as in the specification of the prior Letters Patent, No. 680,209.

In carrying my invention into practice I form the valve O with a central hole for the passage of the valve-spindle K. The exterior of the valve is so shaped as to form a nut, so that it can be held from rotating by a spanner. The valve is recessed on its under side to receive a head *k* on the bottom end of the valve-spindle K, the difference between the diameter of the valve-spindle hole and the diameter of the recess aforesaid forming a shoulder for the aforesaid head *k* of the valve-spindle to contact with, so as to support or hold the valve on the lower end of the valve-spindle when the valve is properly arranged on the said spindle. The recess in the main valve O is threaded to receive a screw-plug *o'*, which is preferably recessed, so as to cover the head *k* on the lower end of the valve-spindle K, and when screwed into the recess in the valve it contacts with the shoulder formed by the difference in the diameters of the recess and

valve-spindle hole and prevents the escape of steam or other fluid between the head of the valve-spindle supporting the valve and the shoulder or surface of the valve contacting therewith. The external diameter or periphery of that part of the valve forming the nut is made of hexagon form or other form suitable for the application of a spanner or its equivalent for the purpose of holding the valve, while another spanner or its equivalent is applied to a similar form on the exposed end of the screw-plug *o'*, so as to set the said plug into position in the valve or to withdraw it for the purpose of moving the valve on or from the spindle K.

The screw-threads by which the plug *o'* engages the valve A are preferably cut in an opposite direction to those by which the spindle is operated when opening and closing the valve, the arrangement being such that in the action of turning and depressing the valve-spindle K for forcing the valve O open against the steam-pressure the head *k* on the lower end of the valve-spindle contacts with the screw-plug *o'* with such an amount of force as will cause the spindle to have a tendency to tighten and keep the plug set in the valve to the exclusion of the steam, so preventing its escape as aforesaid.

As it is desirable that the steam-pressure should be admitted on both sides or on the top and bottom surfaces of the valve, so as to balance the action of the pressure, I arrange a pilot-valve *o''* in the main valve O. In the valve O is a suitably-shaped aperture formed with a valve-seating with which a pilot-valve *o''* contacts. One or more suitable passages are arranged through the valve-spindle or valve, so that the steam may flow past the pilot-valve *o''* and through such passages until it contacts with the upper surface of the main valve O. The exit of the steam is controlled by the pilot-valve operating in combination with the aforesaid valve-seating and aperture formed in the screw-plug *o'*, such valve being arranged at the bottom end of a suitable spindle *o'''* and in such a manner as to present the top end of the said spindle to the head *k* of the valve-spindle K, the arrangement being such that the pilot-valve *o''* is held to its seat-



ing by the pressure of the steam until the depression of the valve-spindle K in the action of forcing open the main valve O causes the head  $k$  of the said spindle to first act on the spindle  $o^3$  of the pilot-valve, so as to force open the said valve and admit the steam to the upper surface of the main valve O before the said head contacts with the screw-plug in the action of forcing open the said main valve.

The complete closing of the main valve O by the operation of the valve-spindle K withdraws the head  $k$  of the spindle K from contact with the spindle  $o^3$  of the pilot-valve, which being relieved of the pressure of the spindle K of the main valve admits of the pilot-valve being again closed by the steam-pressure.

The arrangement and combination of the pilot-valve  $o^2$  with the screw-plug  $o'$  admits of its being readily removed and a duplicate substituted for it in the event of necessary repair or otherwise.

To prevent the screw-plug  $o'$  or its equivalent from working loose, a spring-finger, such as  $o^4$ , mounted on the valve O and engaging teeth or detents in the periphery of the plug, may be employed, as shown in Fig. 1.

In order to utilize the second nut N threaded on the stem J of the cup G for supporting the hand-wheel L, I arrange or form it with two pillars  $n$ , extending upward to a suitable height, so as to admit of their top ends being connected by a cross-head  $m$ , carrying a threaded boss or nut  $M'$ , through which the threaded part of the valve-spindle K passes.

In order to facilitate the operation of the gland-nut M, I may arrange a pinion  $m'$  with suitable teeth on one or both pillars  $n$ , so as to gear with the teeth of a spur-wheel  $m^2$ , arranged or formed with the gland-nut M, such pinion or pinions being extended in hexagon or other suitable form to enable them to be operated by a spanner or its equivalent. The said pinions are also provided with suitable flanges  $m^3$  to engage the sides of the spur-wheel and insure the pinions keeping in gear with the said spur-wheel.

When the operation of the valve-spindle by a separate screw or other conditions of working the spindle make it expedient to employ a form of gland other than a gland-nut, such gland may be depressed or operated by arranging the aforesaid pillars with screw-threads  $n'$  to receive two nuts  $n^2$ , as shown in Fig. 1, the gland being extended to the pillars in such a manner as to be guided by them and at the same time contact with the nut on each pillar, so as to admit of the nuts when turned in the proper direction on the screws formed on the pillars depressing the gland on the packing.

The aforesaid arrangement of mechanism and parts by which the valve and valve-spindle are supported and operated and gland or gland-nuts adjusted or the valve controlled may vary according to the manner in which

the valve has to be presented to the pressure or variation of the design or arrangement of the valve to which they have to be adapted.

In order to adapt the valve-cup G, stem J, valve O, spindle K, gland-nut M, and hand-wheel L to other forms of valves, I construct and arrange the body A so that the cup G can be passed through an aperture or passage in the top of the said body, as shown in Fig. 3. The screw-thread on the stem J of the valve-cup G is continued a sufficient length to receive a sleeve-nut or screwed socket  $J'$ , formed with a shoulder  $j'$  at its bottom end and preferably with a hexagon  $j^2$  at its top end. Over this sleeve-nut  $J'$  is passed a flanged cap  $A^2$ , having a central hole for the passage of the sleeve-nut  $J'$ . This flanged cap  $A^2$  rests on and is attached to a flange formed around the aperture or passage in the top of the body A and is guided therein by a flange  $a^2$ . The bottom edge of the central hole of this cap engages the shoulder  $j'$  on the lower end of the sleeve-nut  $J'$ , so that when the said sleeve-nut is rotated in the proper direction by means of a spanner applied to the hexagon  $j^2$  on its upper end it will cause the nut to rise on the screw-thread of the stem of the valve-cup until its shoulder  $j'$  contacts with the under side or surface of the cap  $A^2$  and by such action thrust the valve-cup G into such contact with the valve-cup seating F as to prevent the escape of steam up to certain pressures, the aperture on which such seating is prepared being of sufficient diameter to admit of the passage of the valve to its seating or that part of the valve-cup seating prepared for it to contact with.

The bottom end of the valve-cup G may be shouldered, so as to allow the valve-seating proper to enter and pass below the aperture on which the valve-cup seating is prepared.

The arrangement of the seating contacting with the valve-cup or valve or other parts of the valve or mechanism connected therewith may vary as may be necessary or expedient according to the design of valve to be employed.

What I claim, and desire to secure by Letters Patent, is—

1. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup and having a recess on its lower or under side, a screw-plug closing the said recess, a hollow stem formed by an upward extension of said cup passing through an aperture in said casing and screw-threaded externally, a spindle on which said valve is mounted and supported passing up through said hollow stem and movable therein, a pilot-valve mounted in the main valve and held to its seating by the pressure of the steam, one or more passages putting the upper side of the main valve into communication with the under side thereof when the pilot-valve is opened, a gland-nut



provided with screw-threads and adapted to screw on the top of the said hollow stem, means for adjusting and holding said valve-cup in position, means for operating said valve, and an opening with movable cover in the bottom of said casing for withdrawing the valve, substantially as set forth.

2. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup, and having a recess on its lower or under side, a screw-plug closing said recess, a hollow stem formed by an upward extension of said cup passing through an aperture in said casing and screw-threaded externally, a spindle on which said valve is mounted and supported passing up through said hollow stem and movable therein, a pilot-valve mounted in the main valve and held to its seating by the pressure of the steam, one or more passages putting the upper side of the main valve into communication with the under side thereof when the pilot-valve is opened, a gland-nut provided with screw-threads and adapted to screw on the top of said hollow stem a second nut below the said gland-nut engaging the screw-threads on said hollow stem and adapted to adjust and hold said valve-cup in position, means for operating said valve, and an opening with movable cover in the bottom of said casing for withdrawing the valve, substantially as set forth.

3. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup and having a recess in its lower or under side, a screw-plug closing said recess, a hollow stem formed by an upward extension of said cup passing through an aperture in said casing and screw-threaded externally at its upper end, a spindle on which said valve is mounted and supported passing up through said hollow stem and movable therein, a flanged nut provided with screw-threads engaging the screw-threads on said hollow stem and adapted to adjust and hold said valve-cup in position, pillars carried by the flanged nut and supporting a cross-bar carrying a threaded boss with which the threaded part of the spindle carrying the valve engages, means for operating the spindle, a gland closing the upper end of the stem of the valve-cup, means for adjusting the said gland, and an opening with movable cover in the bottom of said casing for withdrawing the valve, substantially as set forth.

4. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup and having a recess in its lower or under side, a screw-plug closing said recess, a hollow stem formed by an upward extension of said cup passing through an aperture in said casing and

screw-threaded externally at its upper end, a spindle on which said valve is mounted and supported passing up through said hollow stem and movable therein, a pilot-valve mounted in the main valve, one or more passages putting the upper side of the main valve in communication with the under side thereof when the pilot-valve is opened, a flanged nut provided with screw-threads engaging the screw-threads on the said hollow stem and adapted to adjust and hold the said valve-cup in position, pillars carried by the flanged nut and supporting a cross-bar carrying a threaded boss with which the threaded part of the spindle carrying the main valve engages, means for operating the said spindle, a gland for closing the top of the stem of the valve-cup, means for adjusting the said gland, and an opening with movable cover in the bottom of said casing for withdrawing the valve, substantially as set forth.

5. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup, a hollow stem formed by an upward extension of said cup passing through an opening or aperture in the upper side of said casing and screw-threaded externally, a spindle on which said valve is mounted passing up through said hollow stem and movable therein, a sleeve-nut provided with screw-threads internally to engage the threads on the hollow stem of the valve-cup, a flanged cap adapted to fit over the sleeve-nut and close the aperture in the casing and also engage a shoulder on the lower end of the sleeve-nut, a lock-nut threaded on the exterior of the sleeve-nut and adapted to adjust and hold said sleeve-nut in position in the flanged cap, a gland-nut provided with screw-threads and adapted to screw on the top of said hollow stem, a second nut below the said gland-nut engaging the screw-threads on said hollow stem and adapted to adjust and hold said valve-cup in position in the sleeve-nut, and means for operating said valve, substantially as set forth.

6. In a valve, the combination of a valve-casing, a valve-cup seating in said casing, a perforated valve-cup bearing against said seating, a valve closing the open bottom of said cup, a hollow stem formed by an upward extension of said cup passing through an opening or aperture in the upper part of said casing and screw-threaded externally, a spindle on which said valve is mounted passing up through said hollow stem and movable therein, a pilot-valve mounted in main valve, one or more passages putting upper side of main valve in communication with lower side thereof when pilot-valve is opened, a sleeve-nut provided with screw-threads internally to engage the threads on the hollow stem of the valve-cup, a flanged cap adapted to fit over the sleeve-nut and close the aperture in the casing and also engage a



shoulder on the lower end of the sleeve-nut, a  
lock-nut threaded on the exterior of the sleeve-  
nut and adapted to adjust and hold said sleeve-  
nut in position in the flanged cap, a gland-nut  
5 provided with screw-threads and adapted to  
screw on the top of said hollow stem, a sec-  
ond nut below the said gland-nut engaging  
the screw-threads on said hollow stem and

adapted to adjust and hold said valve-cup in  
position in the sleeve-nut, and means for op- 10  
erating said valve, substantially as set forth.

WM. H. THOMPSON.

Witnesses:

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A. MILLWARD FLACK.