

J. S. CHAMBERS.  
THROTTLE VALVE.

(Application filed Jan. 20, 1902.)

(No Model.)

Fig: 2.

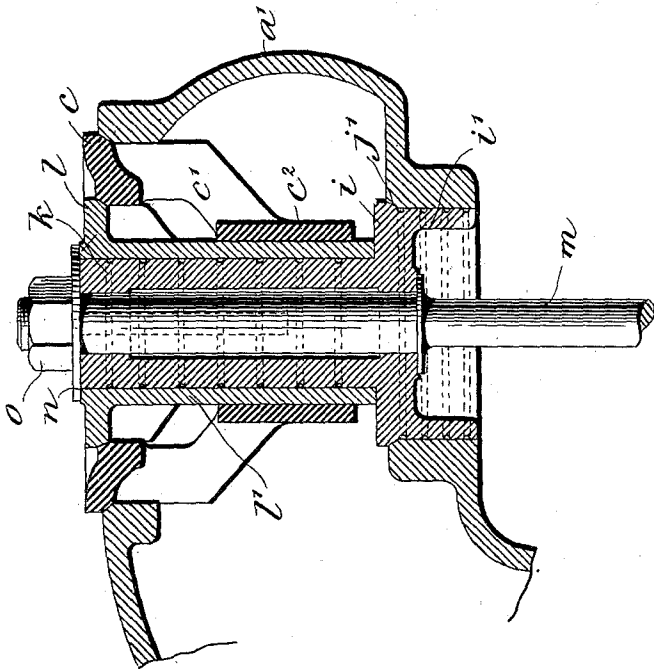
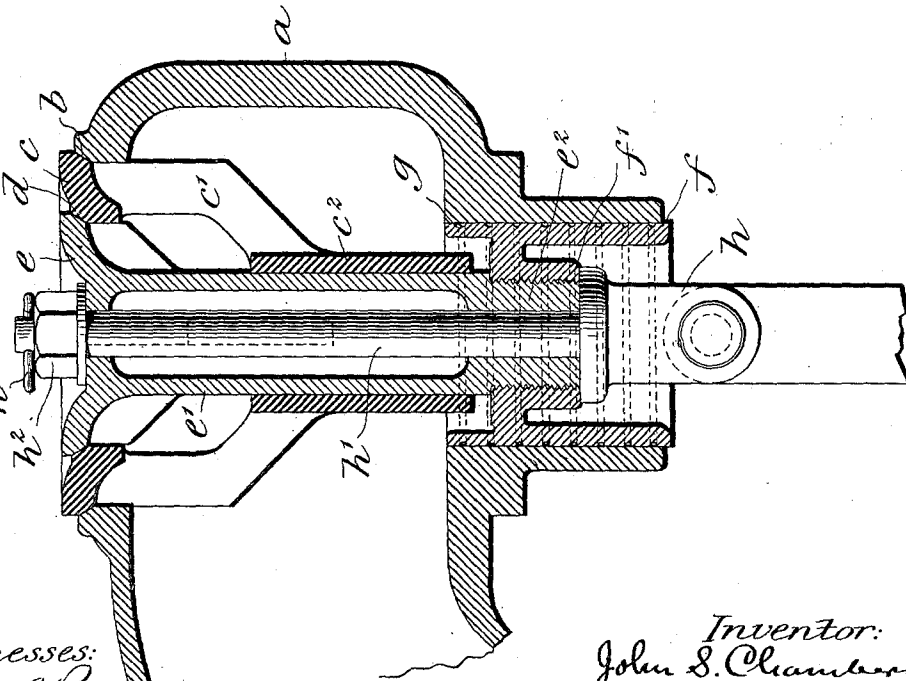


Fig: 1.



Witnesses:  
*John A. Hennig*  
*George Barry*

Inventor:  
*John S. Chambers*  
 By *Brown & DeWald*  
 his Attorneys

# UNITED STATES PATENT OFFICE.

JOHN S. CHAMBERS, OF WILMINGTON, NORTH CAROLINA.

## THROTTLE-VALVE.

SPECIFICATION forming part of Letters Patent No. 706,300, dated August 5, 1902.

Application filed January 20, 1902. Serial No. 90,547. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN S. CHAMBERS, a citizen of the United States, and a resident of Wilmington, in the county of New Hanover and State of North Carolina, have invented a new and useful Throttle-Valve, of which the following is a specification.

My invention relates to a throttle-valve, with the object in view of providing a plurality of valve-sections under the control of a valve-operating rod to operate at intervals and so constructed and arranged as to require the steam to pass over the top of the valve-casing before passing either valve-section, thereby materially reducing the liability of water passing through the valve to the cylinder.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents the valve and its casing in vertical section, and Fig. 2 represents in vertical section a modified form of valve.

In the form shown in Fig. 1 the valve-casing is denoted by  $a$  and in the form shown in Fig. 2 by  $a'$ .

Referring to Fig. 1, the valve-casing  $a$  is provided with a valve-seat  $b$  at its top, in which is seated the outer valve-section  $c$ . This outer valve-section  $c$  is annular in form and is provided with depending arms  $c'$ , connecting with a cylindrical sleeve  $c^2$ . The inner edge of the exterior valve-section  $c$  is provided with a valve-seat  $d$ , on which the interior valve-section  $e$  seats. The valve-section  $e$  has a depending hollow extension  $e'$ , terminating in an exteriorly screw-threaded end  $e^2$ , which screws into the hub  $f'$  of a piston  $f$ . The piston  $f$  has a vertically-reciprocating movement in a bore  $g$  at the bottom of the casing  $a$ , and the said bore is intended to be nearly or not quite the size of the interior valve-section  $e$  for the purpose of having the pressure of the steam on the valve-section  $e$ , tending to hold it closed, a little greater than on the piston  $f$ , tending to open it. The valve-operating rod (denoted by  $h$ ) is provided with an extension  $h'$ , passing through the interior of the depending hollow projection  $e'$  on the valve  $e$  and is provided at its upper end exterior to the valve  $e$  with a nut  $h^2$  and cotter

$h^3$  for locking the nut in position to hold the rod firmly to the interior valve-section. The sleeve  $c^2$ , connected with the exterior valve-section  $c$  by the arm  $c'$ , is intended to have a sliding fit with respect to the depending projection  $e'$  on the interior valve-section  $e$ , and the distance of the lower end of the sleeve  $c^2$  from the hub of the piston  $f$  determines the distance which the interior valve-section  $e$  may be lifted from its seat by the valve-operating rod  $h$  before the exterior valve-section is lifted from its seat. In practice a distance of a half-inch space between the lower end of the sleeve  $c^2$  and the hub of the piston has been found to be suitable.

In operation the valve is opened by the outward sliding movement of the piston  $f$ , carrying with it the interior valve-section  $e$ , which will permit the steam to pass the valve  $e$  between it and the exterior valve  $c$ . Whenever it is necessary to admit more steam than will readily pass between the interior valve-section  $e$  and the exterior valve-section when the interior valve is opened a distance corresponding to the distance between the hub of the piston-head and the lower end of the cylindrical sleeve  $c^2$ , a further upward sliding movement of the piston  $f$  will carry with it the exterior valve-section  $c$  and admit steam between it and the seat  $b$  on the casing. In any event the steam will be caused to enter over the top of the valve-casing whether it pass through the space between the interior and exterior valve-sections or between the exterior valve section and casing, as the piston  $f$  will form at all times a closure at the bottom of the casing between the interior and exterior of the casing. The interior valve-section  $e$  will be nearly balanced because of the upward pressure of the steam on the piston, which is only a little less in amount than the downward pressure of the steam on the valve  $e$ , and when the valve  $e$  has been opened up to the point where the exterior valve-section  $c$  is about to be opened the pressure under the valve-section  $c$  due to the admission of steam within the casing will be nearly equal to the pressure on the upper surface of the exterior valve-section  $c$ , so that it in turn will become substantially balanced before it is lifted. This provides a substan-

tial balance for both the valve-sections, while the steam is admitted over the top of the casing only.

In the form shown in Fig. 2 the general operation is quite similar to that hereinabove stated with reference to the form shown in Fig. 1, the difference in structure shown in Fig. 2 being as follows: The part corresponding to the piston *f* in Fig. 1 consists of a downward extension *i'* on the lower valve *i*, seated on a seat *j* at the bottom of the casing *a'* in a manner similar to that shown in Letters Patent No. 663,599, granted to me December 11, 1900. This valve *i* has an upwardly-extended barrel-like portion *k*, on which the interior valve-section *l*, corresponding to the interior valve-section *e* in the first form shown, is seated in a tubular extension on the valve *k*, reaching down to the top of the valve *i*. The exterior valve-section *c* is in all respects of the same construction as the exterior valve-section *c* of the form described, the depending arms *c'* serving to connect the exterior valve-section *c* with the sleeve *c<sup>2</sup>*, having a sliding fit with respect to the depending projection on the interior valve *l*. The valve-rod *m* extends centrally through the projection *k* and is provided with a washer *n* sufficiently large to overlap a portion of the top of the interior valve-section *l*, held in place by a nut *o*, screwed onto the top of the rod. This structure shown in Fig. 2 may be substituted for the form shown in my Letters Patent above referred to, and while the valve *i* at the bottom of the casing forms a tight closure when seated the piston extension *i'* serves to sufficiently close the opening in the bottom of the casing when the valve *i* is lifted, so as to prevent any water from passing into the casing through that opening while the steam is introduced, as in the first form shown over the top of the casing, first, past the inner valve-section *l* and, finally, past the inner and outer valve-sections when the outer is lifted by the further lifting of the inner. The structure is a simple and effective one for the purposes in hand, both valve-sections being free to rotate to compensate for wear.

What I claim is—

1. A throttle-valve comprising a casing extending into a steam-space, valve-sections, means for balancing the valve-sections and a valve-operating rod arranged to operate the valve-sections, the passage-way for steam between both the valve-sections and their seats being over the top of the casing.

2. A throttle-valve comprising a valve-casing extending into a steam-space and provided with a valve-seat at its top, a valve-section fitted to said seat, a second valve-section seated within the aforesaid valve-section, means for balancing the valve-sections and a valve-operating rod for operating the sections, substantially as set forth.

3. A throttle-valve comprising a valve-cas-

ing extending into a steam-space and provided with a valve-seat at its top, a valve-section fitted to said seat, a second valve-section seated on said first-named valve-section and having a limited movement relative to the first-named valve-section, means for balancing said second valve-section and a valve-operating rod for operating the sections, substantially as set forth.

4. A throttle-valve comprising a casing having a valve-seat at its top, a valve-section fitted to said seat, a piston having a sliding movement in an opening at the bottom of said casing, a second valve-section connected with said piston and seated within the first-named valve-section and a valve-operating rod for operating the sections, substantially as set forth.

5. A throttle-valve comprising a suitable casing having a valve-seat at its top, a valve-section fitted to said seat, a piston having a sliding movement in an opening at the bottom of the casing, a valve-section seated within the aforesaid valve-section and connected with the piston and means for operating the piston, the said piston and the valve carried thereby having a movement relative to the other valve-section whereby the interior valve-section may be opened before the exterior valve-section is opened, substantially as set forth.

6. A throttle-valve comprising a casing extending into a steam-space and having a valve-seat, an annular valve-section fitted to the seat and provided with a depending sleeve connected with the annular valve-section by arms, an interior valve-section seated within the annular valve-section and having a limited movement with respect to the annular valve-section, means for balancing the interior valve-section and a rod for operating the two sections, substantially as set forth.

7. A valve box or casing provided with one valve-seat only, the said valve-seat being located at its top, and with a piston-receiving cylinder located at its bottom, in combination with a valve and piston fitted to said seat and cylinder, respectively.

8. The combination with a valve box or casing, of two valves located at the top of the box or casing, a rod for operating the valves at intervals with respect to each other and means connected with the valve-operating rod for balancing one of the valves, the opening of said balanced valve serving to admit fluid-pressure to balance the other valve.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of January, 1902.

JOHN S. CHAMBERS.

Witnesses:

FREDK. HAYNES,  
GEORGE BARRY, Jr.