No. 886,288. PATENTED APR. 28, 1908.

S. J. DAVIS.

BALANCE THROTTLE VALVE.

APPLICATION FILED JULY 18, 1907.

2 SHEETS—SHEET 1.

Fig. 2.

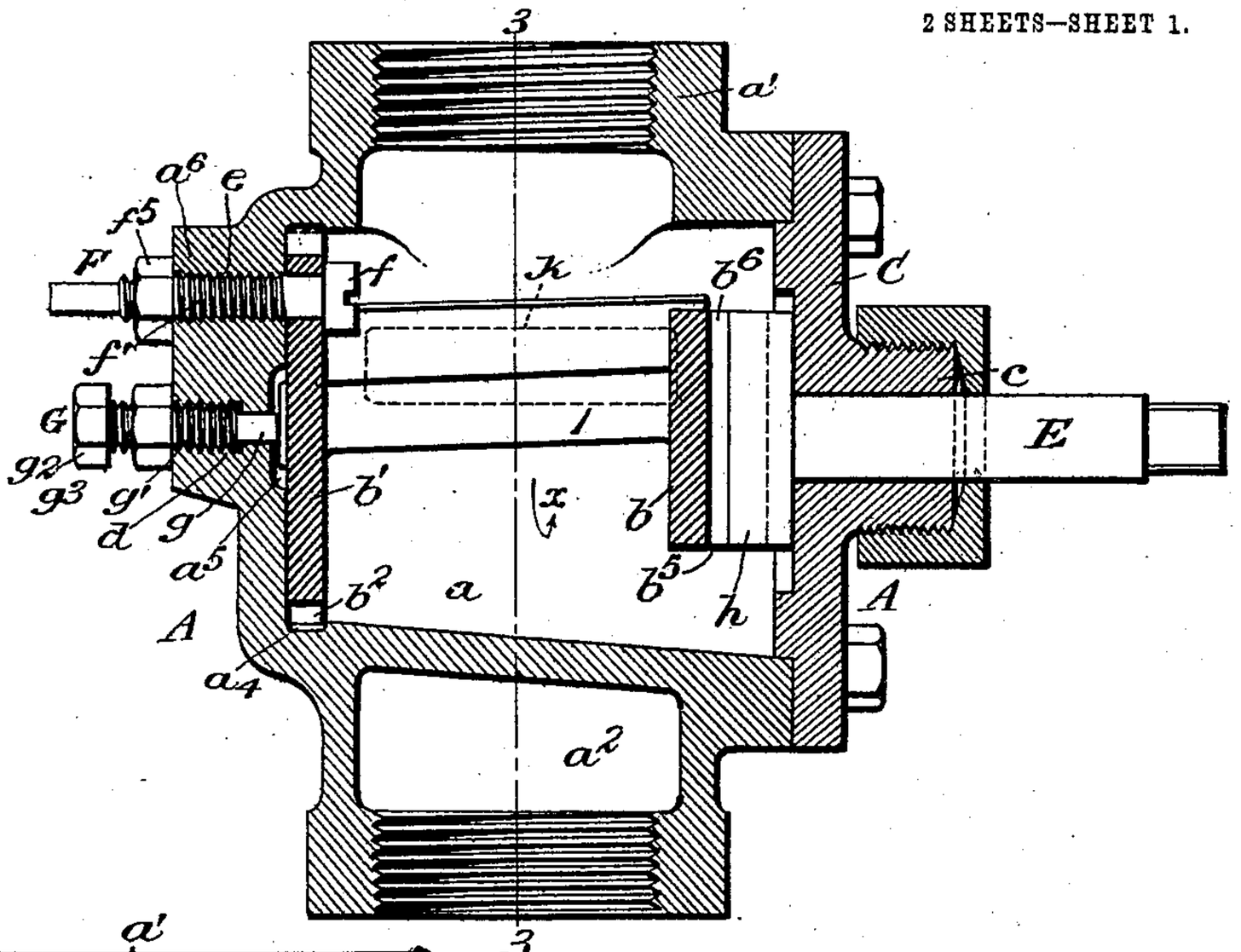


Fig. 3.

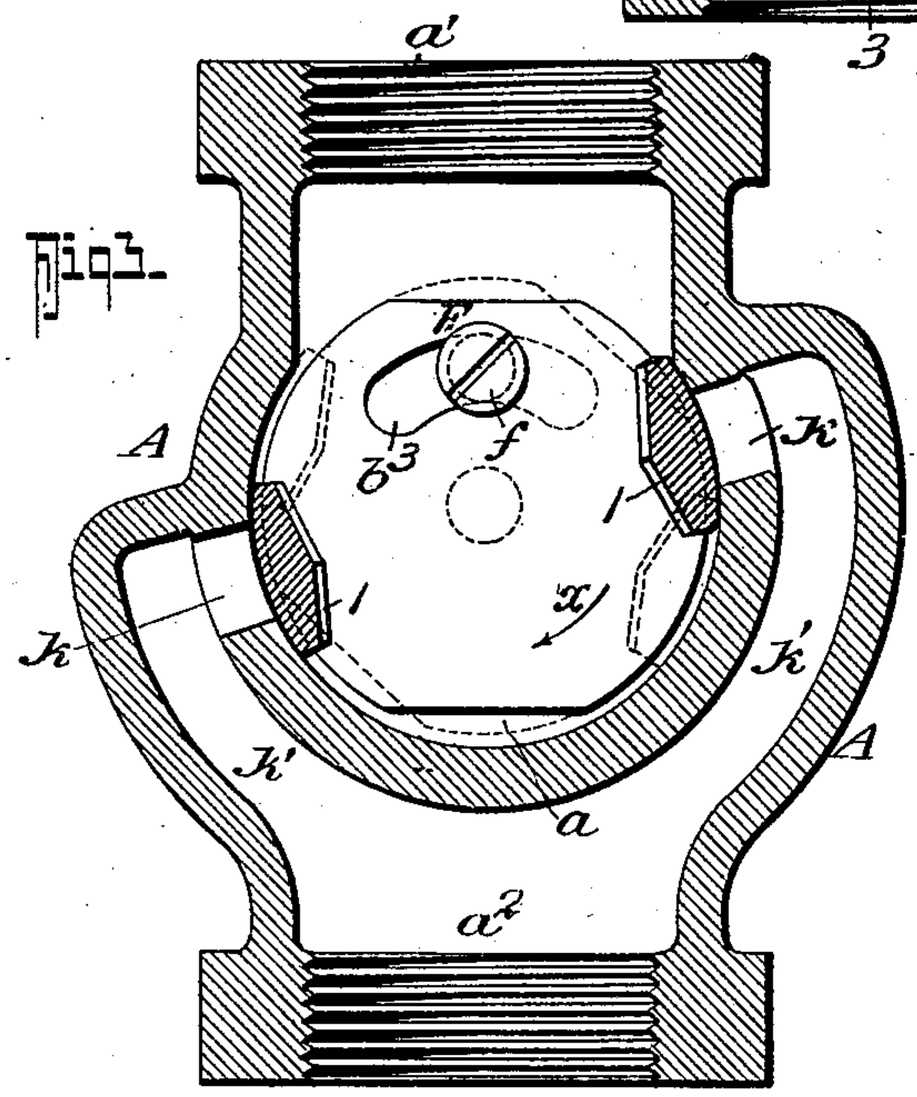
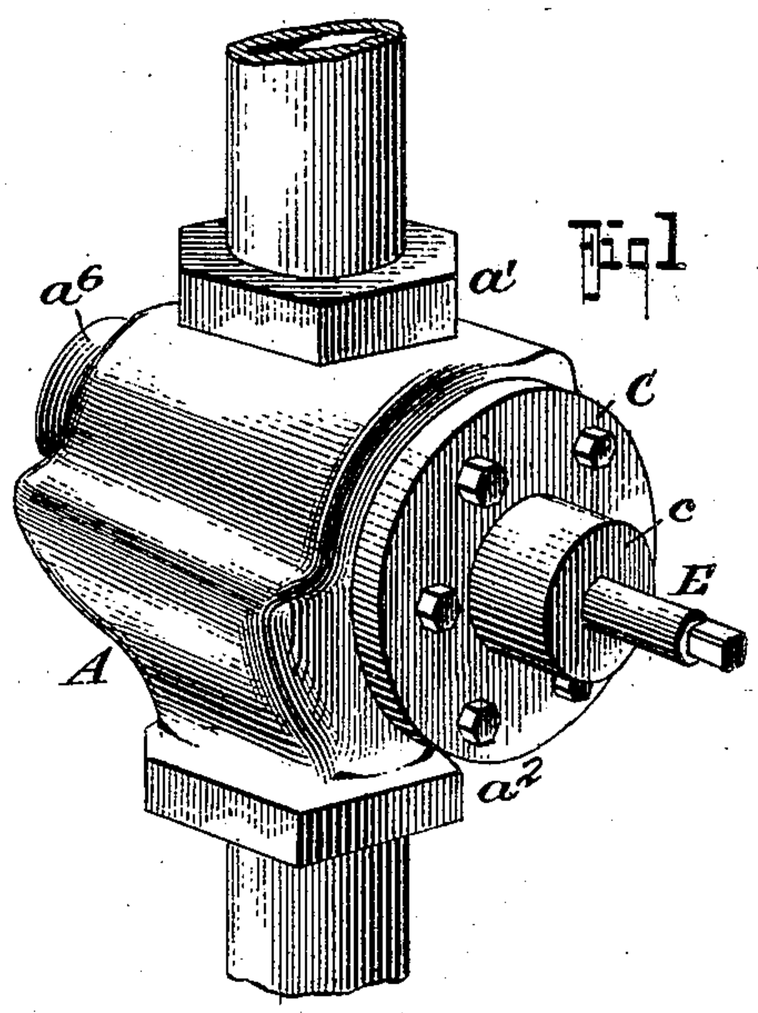


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 5.

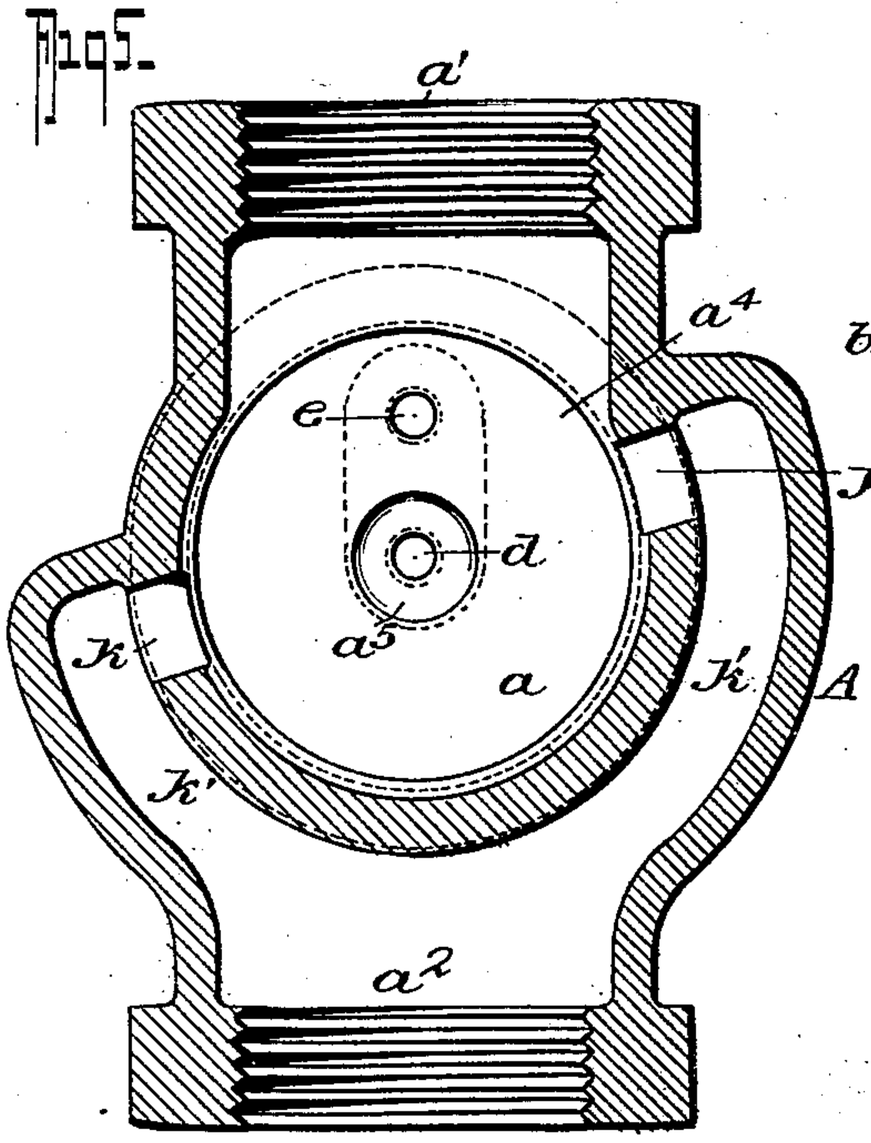


Fig. 7.

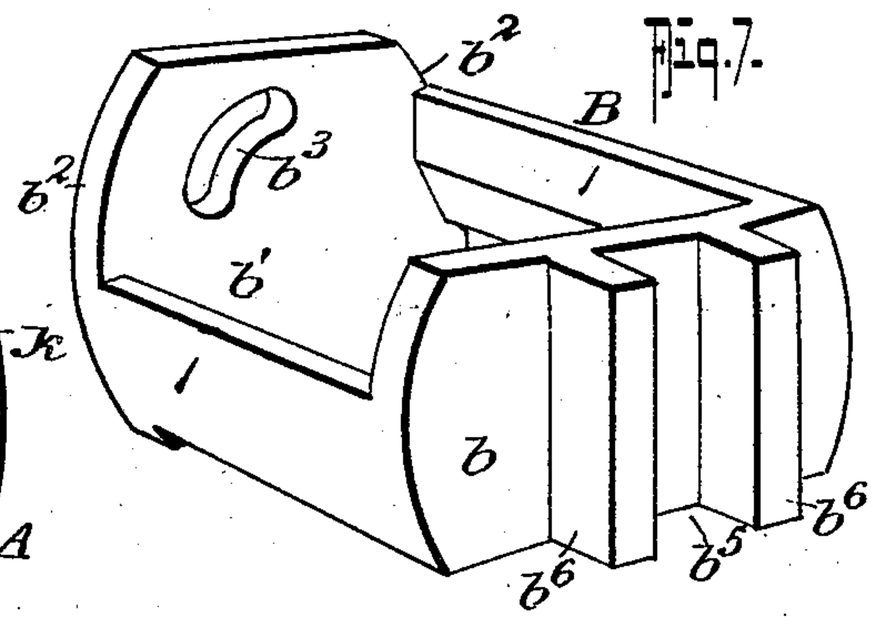


Fig. 4.

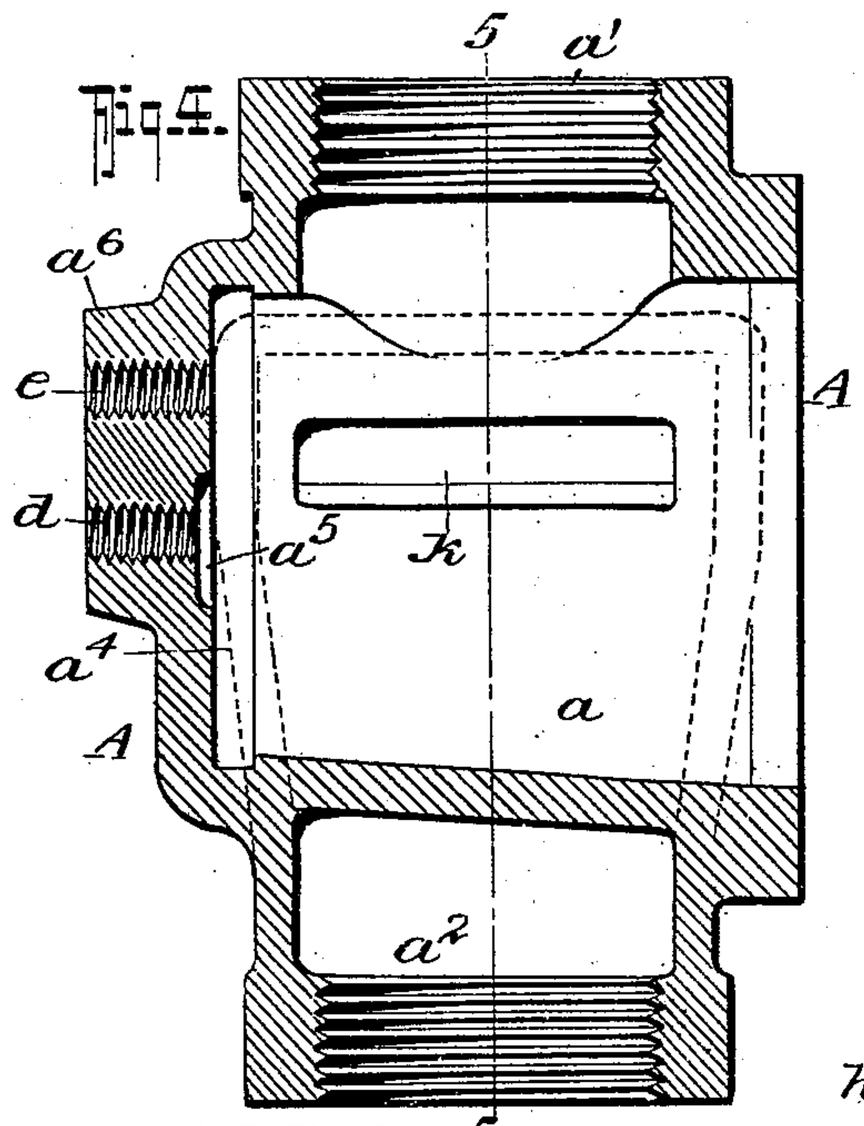


Fig. 6.

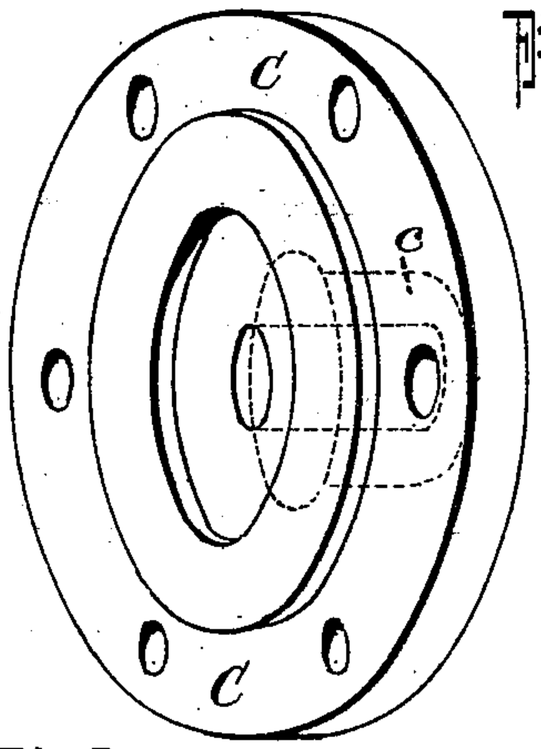
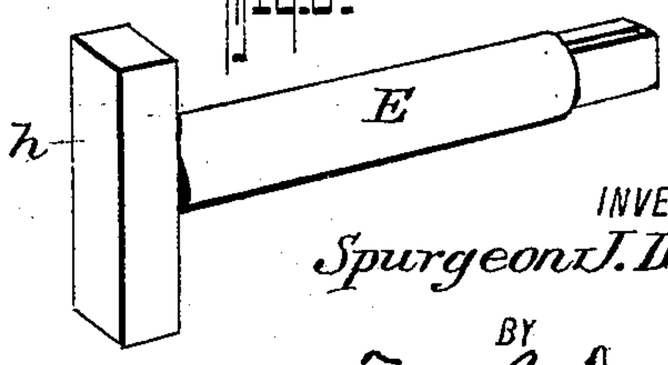


Fig. 8.



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UNITED STATES PATENT OFFICE.

SPURGEON J. DAVIS, OF OSTRANDER, WASHINGTON, ASSIGNOR TO DAVIS McGREGOR MANUFACTURING COMPANY, OF PORTLAND, OREGON, A CORPORATION.

BALANCE THROTTLE-VALVE.

No. 886,288. Specification of Letters Patent. Patented April 28, 1908.

Application filed July 18, 1907. Serial No. 384,401.

To all whom it may concern:

Be it known that I, SPURGEON J. DAVIS, residing at Ostrander, in the county of Cowlitz and State of Washington, have invented a new and Improved Balance Throttle-Valve, of which the following is a specification.

In some types of throttle valves, commonly used, the steam feed or adjustment is such whereby the valve proper is caused to lay or press heavily against its seat and thereby make the valve work so hard that it is difficult for the operator to properly regulate the engine to run at the desired speed, and furthermore, the strain on the valve stem is frequently such that it is twisted off while the throttle is open, thereby often causing the engine to run away or become wrecked when the load on the engine is being released.

The primary object of my invention is to provide an improved construction of throttle valve of the type stated that is especially designed for overcoming the objectionable features noted, and which shall be positive and dependable in its action.

Generically, my invention comprehends a new coöperative arrangement of parts that constitute my complete valve mechanism, in which is included means for providing a proper adjustment and regrinding of the valve member, and for sustaining or holding the said member at such position whereby to prevent its binding or sticking to the walls of the valve casing or body.

In its more subordinate features, my invention consists in certain detailed arrangements and combination of parts, all of which will be hereinafter fully described, specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:—

Figure 1, is a perspective view of my type of valve applied to the steam pipe. Fig. 2, is a cross section of the valve casing with the valve in its operative position therein. Fig. 3, is a longitudinal section taken practically on the line 3—3 on Fig. 2. Fig. 4, is a longitudinal section of the casing with the rotatable valve removed. Fig. 5, is a cross section taken on the line 5—5 on Fig. 4. Fig. 6, is a detail perspective view of the cover plate for the valve casing and the stuffing box gland that fits therein. Fig. 7, is a perspective view of the rotary valve member. Fig. 8, is a similar view of the valve stem.

In the practical application of my invention, the valve casing or body portion A has a valve seat or compartment a of cylindrical shape transversely, and bored on a taper in longitudinal direction, see Fig. 4, to allow for a proper adjustment and re-grinding of the valve B and also to prevent it from binding or becoming tightly wedged within the body A.

a' designates the inlet end of the valve casing which has the usual internal screw tap, and k—k designate the outlet ports of the valve chamber that are disposed diametrically opposite and have an elongated shape lengthwise of the valve casing, as clearly shown in Fig. 4. The outlet ports k—k discharge into channel ways k'—k' that unite and lead to the outlet end a^2 of the valve casing which end also has the usual screw tap for connecting with the steam pipe, as shown.

By referring now more particularly to Figs. 4 and 5 it will be noticed that at the inner end the valve chamber is cored as at a^4 and centrally thereof the cored portion a^4 has an axial depression a^5 in line with a longitudinal threaded aperture d that is formed in the boss or enlargement a^6 on the outside of the closed end of the valve casing. At a point above the aperture d the boss a^6 has another threaded aperture e that opens into the core a^4 for a purpose presently explained.

The valve B, the peculiar construction of which is best shown in Fig. 7, comprises a head b having a substantially circular shape, an opposing head b' in the nature of a rectangular shaped member having its end curved on the arc of a circle, whose center is the axis of the valve and whose diameter is such, whereby the curved ends b^2 will ride in the annular seat formed by the core a^4 in the closed end of the valve casing as before stated, and clearly shown in Figs. 3 and 4. The valve heads b—b' of the valve are joined by a pair of diametrically oppositely disposed wings in the nature of segments l—l whose circumferential faces are formed to snugly travel over the inner wall of the casing and under the throttling adjustment of the valve to form closure members for the ports k—k, as clearly shown in Fig. 2, by reference to which it will also be seen that when the valve is adjusted for throttling, that is, positioned as shown in the said Fig. 2, the segments or wings l—l fit over the ports k—k and cut off the flow of steam through the steam pipe.

To provide for controlling the rotary movement of the valves and preventing its becoming dislodged or off its proper seat, the head *b* of the said valve is formed with a curved slot b^3, with which coacts the bolt F, the head *f* of which is positioned on the inside of the valve head and assists in preventing the valve from having endwise movement toward the valve opening in the casing. The shank *f'* of the bolt is threaded and fits the casing aperture *e* and the outer end of the said bolt is squared to receive a suitable tool for adjusting it.

G designates another bolt, the head *g* of which seats in a central depression a^5 of the core a^4, the shank *g'* being threaded to engage the aperture *d*, its end g^2 being squared to receive an adjusting wrench or like screw clamping means, a jam nut g^3 being also mounted on the said bolt G, exteriorly of the casing for providing for a fixed adjustment of the said bolt G, the bolt F being similarly equipped to a lock nut f^5 as shown.

E designates a valve stem which, in my construction, has no fixed relation with the valve, it being so maintained as to not interfere with the exact location of the position of the valve G, and for such purpose it is mounted axially of the casing, in the axial head *c* of the cap plate C that is removably mounted on the open end of the valve casing, as shown. The outer end of the stem E is formed to receive a turning or adjusting lever and whose inner end terminates in a rectangularly shaped flat head *h*, so formed as to readily seat within a recess b^5 formed between the parallel cleats b^6 on the outer faces of the head *b'*, as clearly shown in Fig. 2.

So far as described, it will be readily understood, by now referring more particularly to Fig. 2 that when the valve rotates in the direction of the arrow *x* and reaches the position shown in dotted lines, the steam will pass through the two ports *k*—*k* and thereby permit the free flow of the said steam into the conveying pipe portion below the valve casing.

By reason of the sides or wings of the valve B being firmly connected to the end heads and the steam being admitted to the inside of the valve, whether its wings *l*—*l* are on or off the ports *k*—*k*, an equal pressure is exerted to the valve, thus making it a balance valve. Again, the corelation of the valve, its wings *l*—*l* and ports *k*—*k* is such that it provides for a quick opening of the steam as it enters the two ports *k*—*k* at the same time, and since the edges of the valve, the wings *l*—*l* and heads are made in a circle, it allows of an easy and quick grinding process.

In operating the valve B, the stem E is turned to make the valve rotate in the direction of the arrow *x* as before stated and during such movement, the bolts G and F keep the valve B at all times in a proper location, as the area of the valve B is greater at the opening of the casing or body A than at the inlet end and consequently the valve has a slight tendency to press against the end of the bolt G, the purpose of the latter being to provide an adjustable center bearing without taking up such pressure or inthrust of the valve.

The head or bolt F does not bear tightly against the head of the valve, such arrangement being provided to prevent sticking or binding of the valve.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. A throttle valve, comprising a casing having a hollow circular valve chamber formed with a port that connects the inlet and outlet of the casing, a hollow valve rotatably mounted in the casing, having a closure member for coöperating with the said port, means connected with one end of the valve for rotating it, another means that engages the other end of the valve for limiting its rotary movement, the latter means including devices for preventing endwise movement of the valve.

2. A throttle valve comprising a casing having a valve chamber, formed with a port that connects with the inlet and outlet of the casing, end bearings for the valve, one of which forms the means for turning the valve, said valve having a closure member for cooperating with the steam port in the chamber, and means for limiting the rotary adjustments of the valve, as set forth.

3. In a throttle valve, the combination with the casing having a valve chamber formed with a port that connects the inlet and outlet of the casing, a rotary valve mounted in said chamber, an axial end thrust bearing for one end of the valve, a valve stem connected with the other end of the valve, said stem and valve having relatively independent movement, the said valve having a port closing member and means for limiting the rotary movement of the valve, as set forth.

4. In a throttle valve, having a tapered valve chamber, the latter having a port that connects with the inlet and outlet of the casing; a tapered valve rotatably mounted in the said chamber, axial end thrust bearings for the valve, one of which forms the valve turning means, said valve having a port closing portion, and means on the casing for coöperating with the valve to limit the rotary movement of said valve, substantially as set forth.

5. The combination with the valve casing, the removable cap therefor, said cap bearing having an axial bearing, the casing having a valve chamber formed with a port that connects with the inlet and outlet of the casing, said valve chamber having an annular seat at one end; of a valve having circular

head portions for engaging the said annular seat, and having a transverse wing for closing the valve chamber steam port, a valve stem rotatably mounted in the axial bearing of the cap member, having a shiftable connection with the valve and adapted for rotating the said valve substantially as shown and for the purposes described.

6. In a throttle valve, the combination with the casing having a valve chamber formed with a pair of oppositely disposed ports that connect with the inlet and outlet of the casing, a hollow valve rotatably mounted in the casing, a valve stem loosely connected to one end of the valve and adapted to turn it, an adjustable central thrust bearing that engages the other end of the valve, said valve consisting of opposing heads and a pair of oppositely disposed port closing wings, and means for limiting the rotary movement of the valve, as set forth.

7. In combination with the casing having a circular valve chamber formed with a steam port that connects the inlet and outlet of the casing, a valve rotatably mounted in the casing, said casing including a removable end cap, said valve consisting of heads having circular edges to travel over the inner wall of the valve chamber, one of said heads having a segmental slot, a stem axially mounted in the casing cap connected with the valve for turning it, a headed bolt mounted in the segmental slot in the valve head and in casing, substantially as shown and for the purposes described.

8. The combination with the casing having a tapered valve chamber formed with oppositely disposed steam ports, an adjustable central end thrust bearing in one end of the chamber, a removable cap plate for the other end of the chamber, a tapered valve rotatably mounted in the chamber, said valve having cross wings for coöperating with the steam ports, and having end heads, one of the heads having a segmental slot, the other head having parallel guide flanges on its outer face, a valve stem mounted in the casing cap provided with a head for fitting between the guide flanges on the valve head, and a headed bolt that passes outwardly through the segmental slot in the other valve head, and is adjustably mounted in the casing end, all being arranged substantially as shown and for the purposes described.

SPURGEON J. DAVIS.

Witnesses:
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A. T. LEWIS.