

(No Model.)

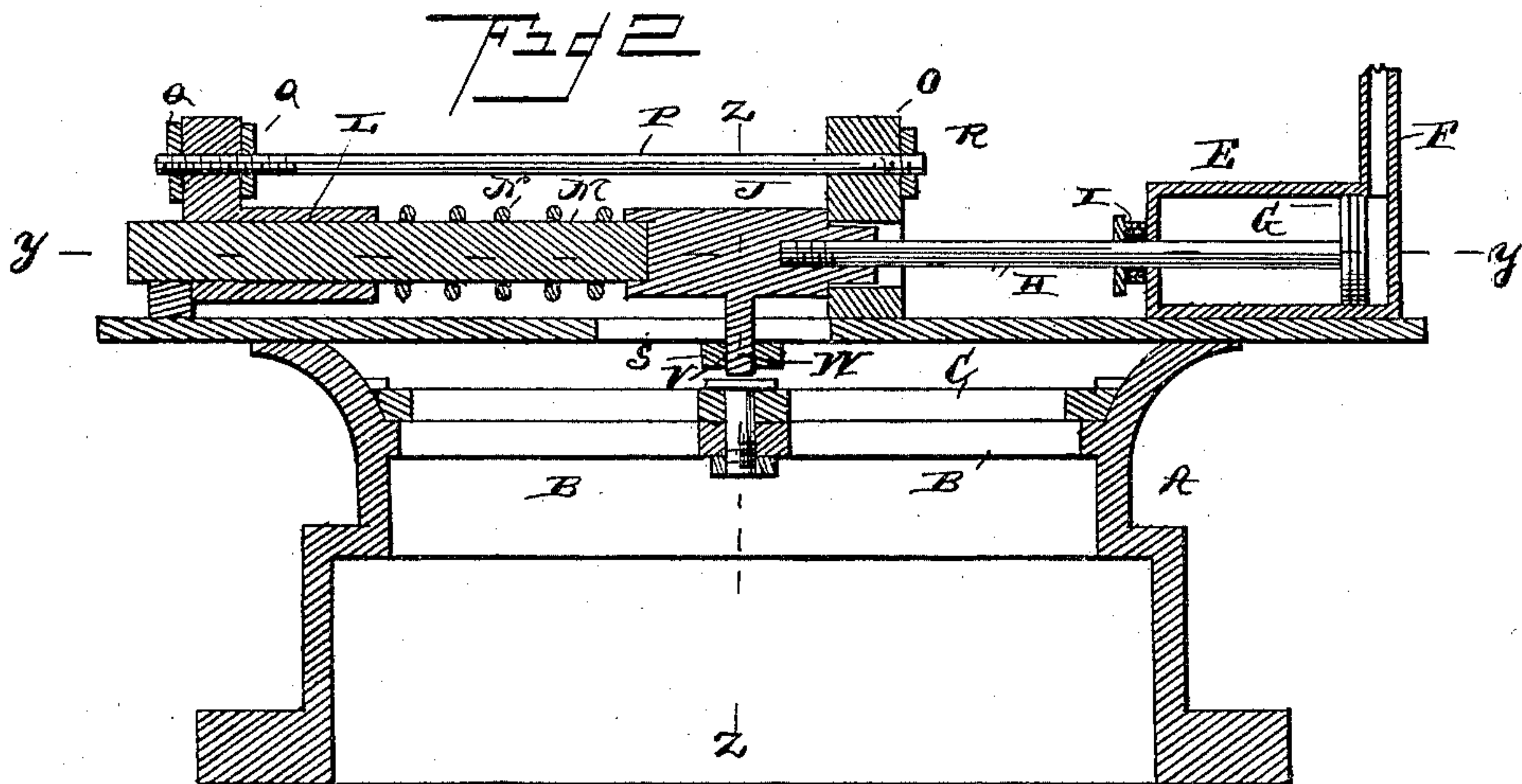
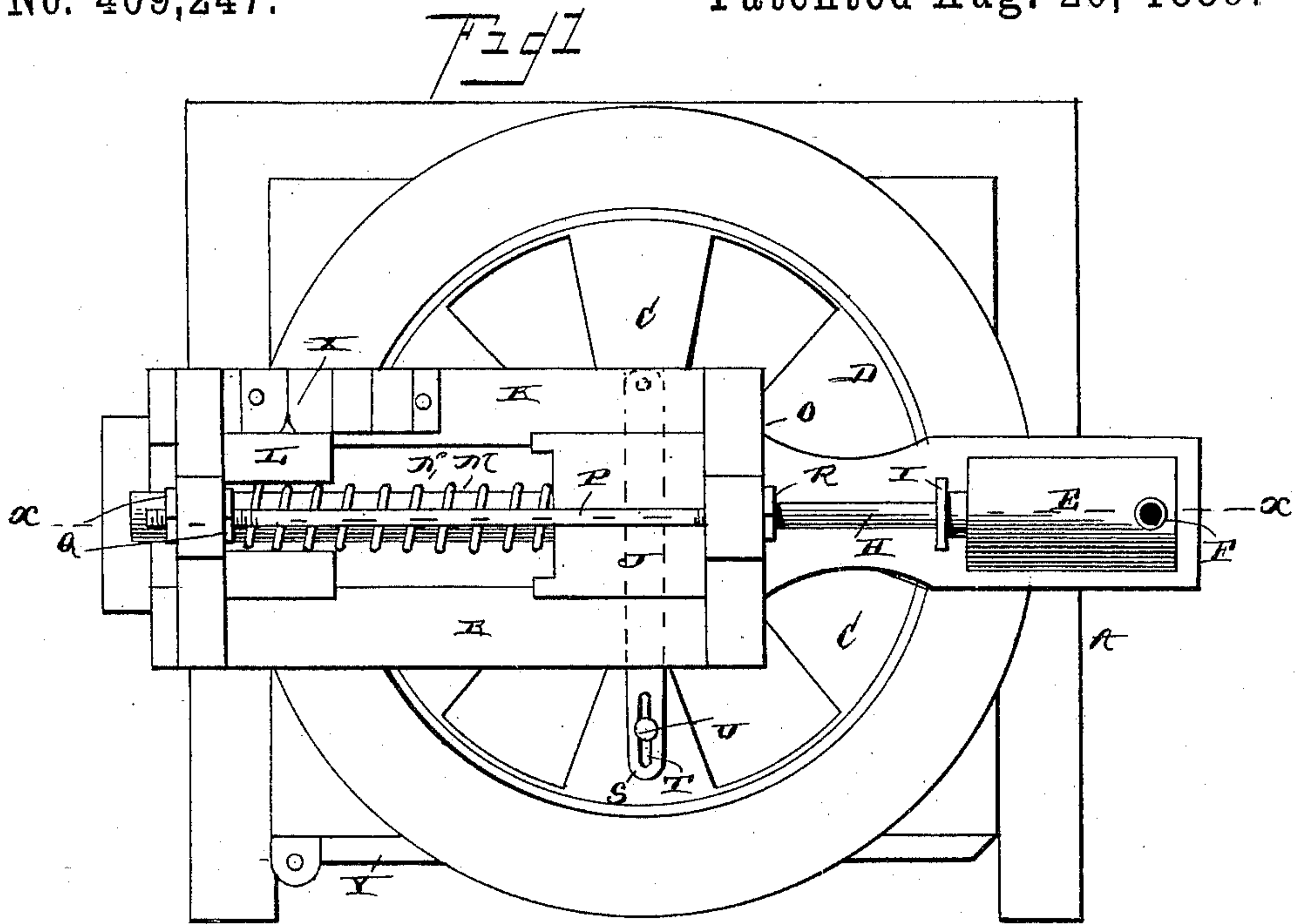
2 Sheets—Sheet 1.

F. E. SHANK.

AUTOMATIC DAMPER FOR BOILER FURNACES.

No. 409,247.

Patented Aug. 20, 1889.



Witnesses

John Murie

Wm. Bagger

Inventor

Freeman E. Shank

By his Attorneys

Chas. H. Snow & Co.

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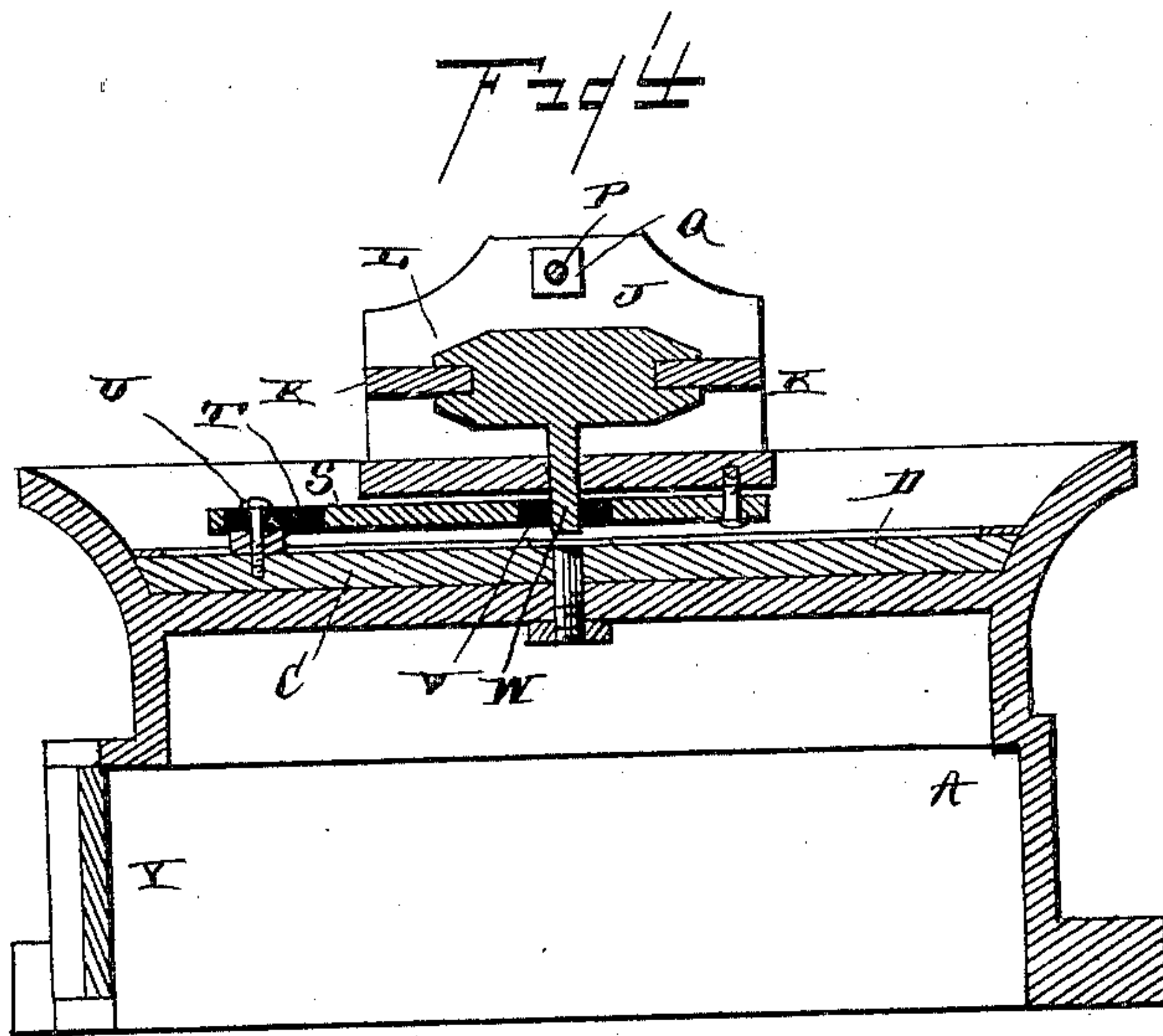
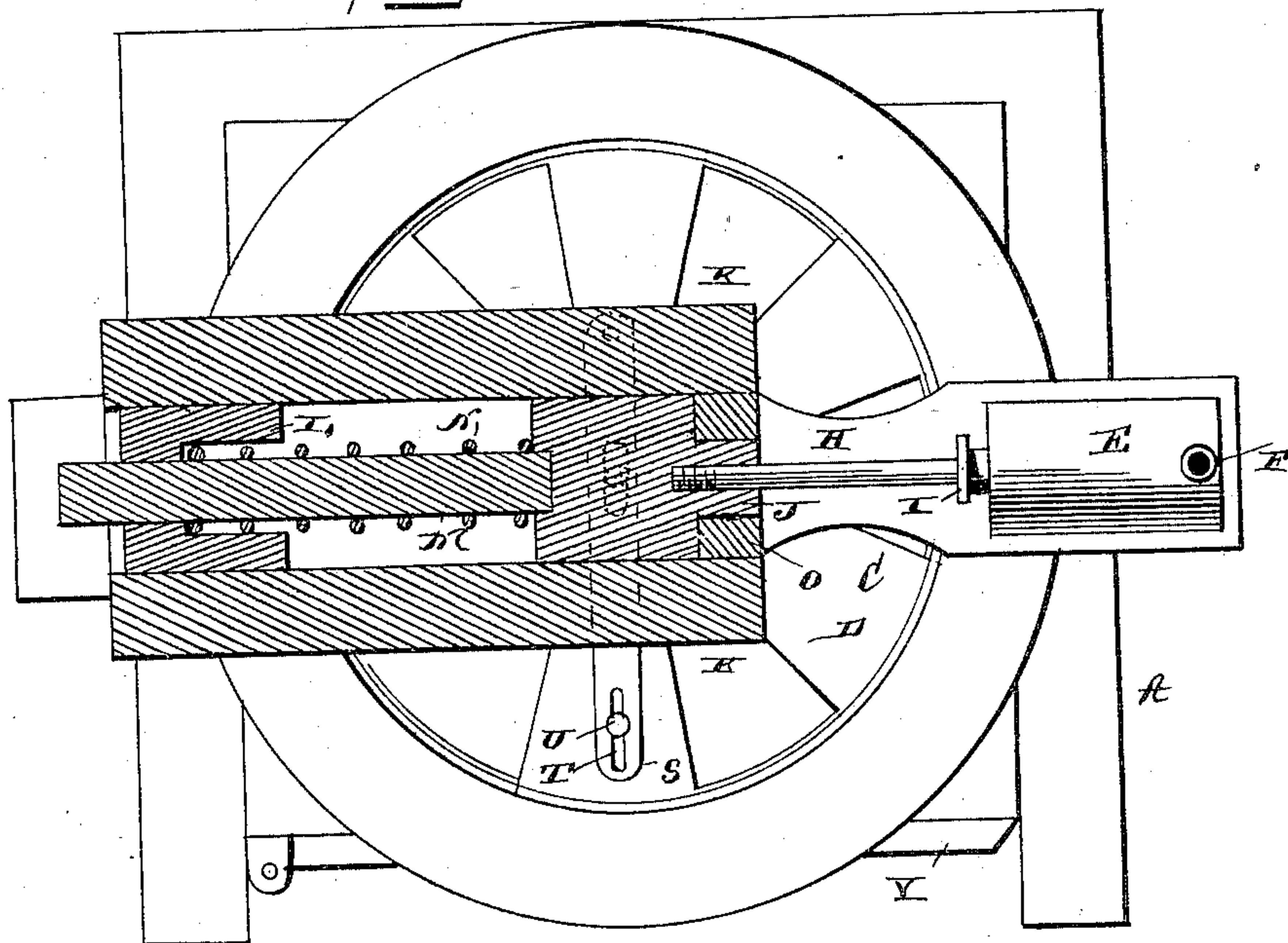
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UNITED STATES PATENT OFFICE.

FREEMAN E. SHANK, OF TROTWOOD, OHIO.

AUTOMATIC DAMPER FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 409,247, dated August 20, 1889.

Application filed April 25, 1889. Serial No. 308,499. (No model.)

To all whom it may concern:

Be it known that I, FREEMAN E. SHANK, a citizen of the United States, residing at Trotwood, in the county of Montgomery and State of Ohio, have invented a new and useful Automatic Damper for Boiler-Furnaces, of which the following is a specification.

This invention relates to automatic dampers for boiler-furnaces; and it has for its object to provide a device of this class which shall be simple in construction and efficient in operation, and which may be conveniently regulated so as to close the draft under any desired head or pressure of steam.

The invention consists in the improved construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view of my improved automatic damper. Fig. 2 is a sectional view taken on the line xx of Fig. 1. Fig. 3 is a vertical sectional view taken on the line yy of Fig. 2. Fig. 4 is a sectional view taken on the line zz in Figs. 2 and 3.

The same letters refer to the same parts in all the figures.

A designates the valve-casing, which may be attached in any convenient position to a furnace of ordinary construction—for instance, to the front wall—in such a position as to communicate with the ash-pit at a point directly below the grate, and which is provided with radial slots B B, adapted to be closed by the arms C C of a rotary valve D, which is mounted in suitable bearings in the valve-case.

E designates a cylinder, suitably mounted upon one side of the valve-case and having its outer end connected by a steam-pipe F with the boiler.

G designates a piston working in the cylinder, and H is the piston-rod which extends through a packing-box I in the front end of the latter. The end of the piston-rod is connected with a cross-head J, working between suitable guides K K.

L designates a cross-head working between the opposite ends of the guides K K, and through the said cross-head L extends a rod M, extended from the cross-head J, between

and parallel to the guides K K. Upon the rod M is coiled a spring N, the ends of which bear against the cross-heads J and L, and the tendency of which is to force the latter in an outward direction.

O is a bridge-piece connecting the inner ends of the guides K K, and through the said bridge-piece extends the rod P, the outer end of which is screw-threaded and passes through the cross-head L, on both sides of which it is provided with jam-nuts Q, whereby the said cross-head is retained securely in any position to which it may be adjusted. A nut R also serves to retain the rod P securely in the bridge-piece O.

S is a lever pivoted to the under side of one of the guides K, and provided at its outer end with a slot T, working upon a stud U, projecting from the said rotary valve. Said lever is also provided between its pivotal point and its outer end with a slot V, in which works the stud W, projecting from the cross-head J. The rotary valve is normally open, and it may be closed by moving the said cross-head J in an outward direction. One of the guides K is provided with a suitably-arranged scale X to indicate the position of the cross-head J under any given pressure of steam, and the valve-casing is provided with a suitably-hinged door Y, through which ashes and cinders accumulating in said casing may be removed.

The operation of my invention is as follows: The spring N is so constructed as to be compressible under a certain given pressure—say one hundred pounds. The said spring bearing against the cross-head J will counterbalance the pressure of the steam in the cylinder E, which tends to force the piston I and cross-head J outwardly against the tension of the spring. When the steam-pressure overcomes that of the spring, the cross-head J will move outwardly, and its stud W will operate the lever S, so as to close the damper. When the steam-pressure decreases, the pressure of the spring forces the cross-head J back to its original position, and the damper is automatically opened. The tension of the spring may be regulated by properly adjusting the cross-head L by means of the rod P and jam-nuts Q Q, thereby causing the damper to be

closed at any desired pressure of steam. By means of this device the damper is at all times automatically regulated, and any desired pressure of steam may be maintained in the boiler, without waste of steam escaping through the safety-valve, and without constant attention of the fireman.

Having thus described my invention, I claim—

10 1. The combination of the valve-case, the cylinder mounted upon the same, the piston working in said cylinder, a pipe connecting the outer end of said cylinder with the steam-boiler, the rotary valve, a lever connected
15 with said valve, and the cross-head at the outer end of the piston-rod, working between suitable guides and having a stud working in a slot in the valve-operating lever, substantially as and for the purpose set forth.

20 2. The combination of the valve-case, the rotary valve, the steam-cylinder, the piston working in the latter, the cross-head at the outer end of the piston-rod, a spring bearing against the said cross-head, and a lever connecting said cross-head with the rotary valve
25 and having slots working upon studs extending from said cross-head and valve, substantially as and for the purpose set forth.

30 3. The combination of the valve-case, the rotary valve, the steam-cylinder, the piston working in the latter, the cross-head at the outer end of the piston-rod, a lever connecting said cross-head with the rotary valve, and a spring arranged to bear against the
35 outer end of the cross-head and against a cross-head adjustable between suitable guides, substantially as and for the purpose set forth.

40 4. The combination of the valve-case, the rotary valve, the guides, the bridge-piece connecting the same, the cross-head adjustable between the outer and inner ends of said guides, the adjusting-rod connecting said cross-head with the bridge-piece, the steam-

cylinder, the piston, the cross-head at the 45 outer end of the latter, the spring interposed between the cross-heads and the lever connecting the cross-head at the outer end of the piston-rod with the rotary valve, substantially as and for the purpose set forth. 50

5. The combination of the valve-case, the rotary valve, the steam-cylinder, the piston working in the latter, the cross-head at the outer end of the piston-rod, the rod extending forwardly from said cross-head, the spring 55 coiled upon the said rod and bearing against an adjustable cross-head, and a lever connecting the cross-head at the outer end of the piston-rod with the rotary valve, substantially as set forth. 60

6. In an automatic damper, the combination, with a rotary valve, of a steam-actuated cross-head connected with and adapted to operate the same, a spring arranged to force the said cross-head against the pressure of the 65 steam, and mechanism for regulating the tension of the said spring, substantially as and for the purpose set forth.

7. In an automatic damper, the combination of the valve-case provided with a suitable door, the rotary valve, a steam-actuated cross-head, a lever connecting the latter with a rotary valve for the purpose of operating the same, a spring arranged to force the said cross-head against the pressure of the steam, 75 an adjustable cross-head to regulate the tension of said spring, and a scale secured upon one of the guides of the sliding cross-head, substantially as and for the purpose herein shown and specified. 80

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

FREEMAN E. SHANK.

Witnesses:

L. O. SHANK,
DAN H. PFOUTZ.