(No Model.) 3 Sheets—Sheet 1.

J. J. TONKIN.

CUT-OFF VALVE.

No. 401,983. Patented Apr. 23, 1889.

Fig. 1.

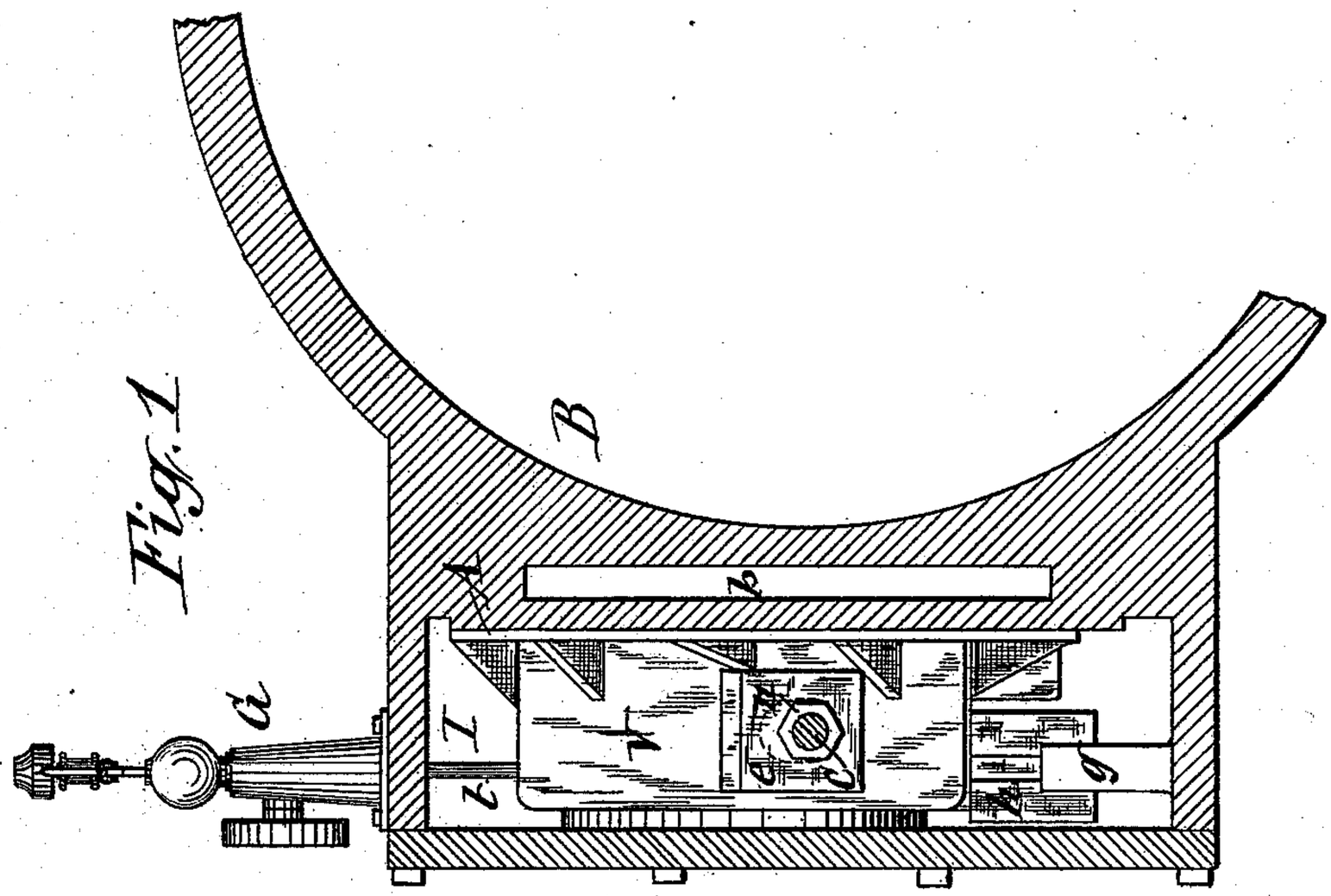
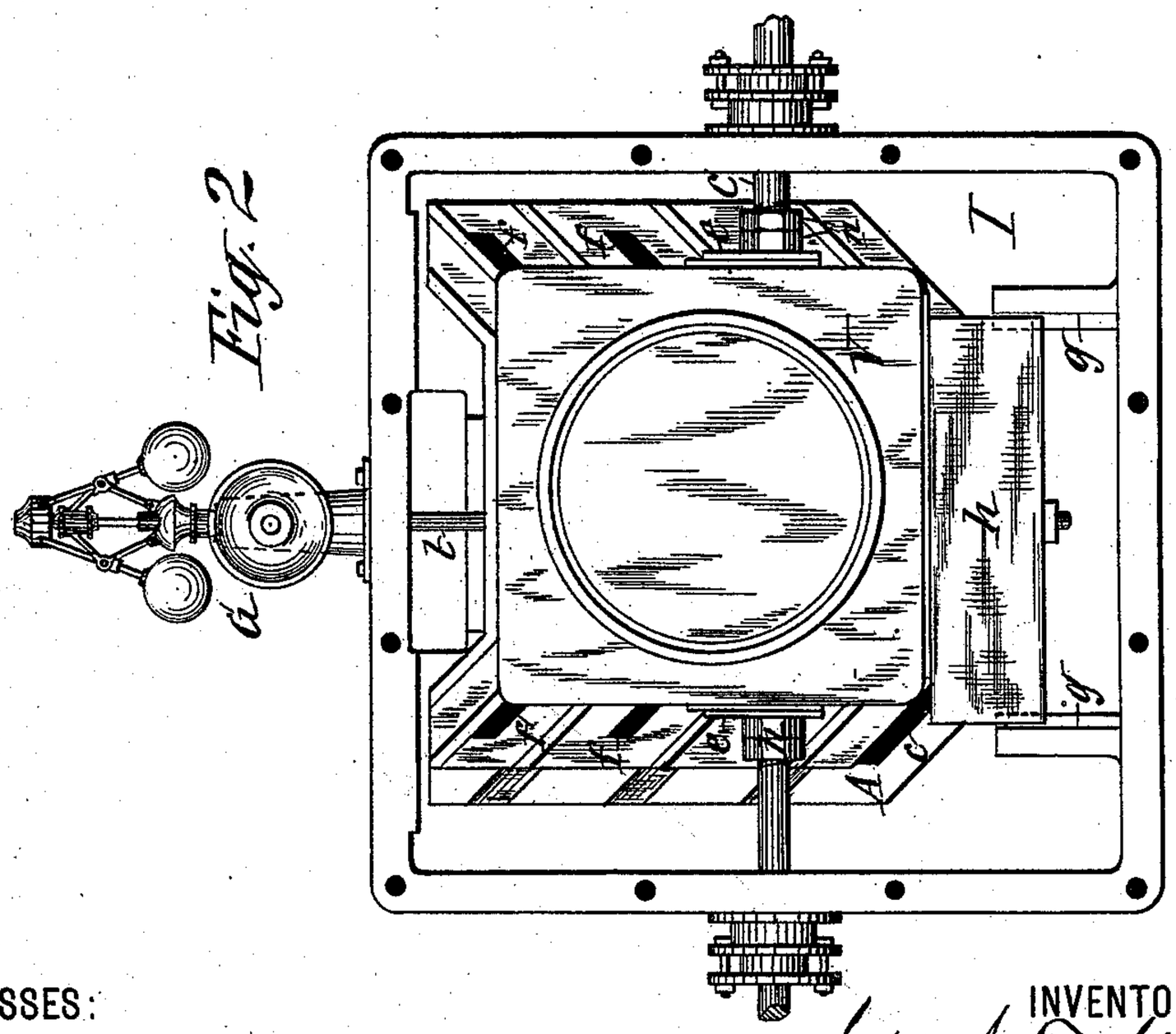


Fig. 2.



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(No Model.)

3 Sheets—Sheet 2.

J. J. TONKIN.

CUT-OFF VALVE.

No. 401,983. Patented Apr. 23, 1889.

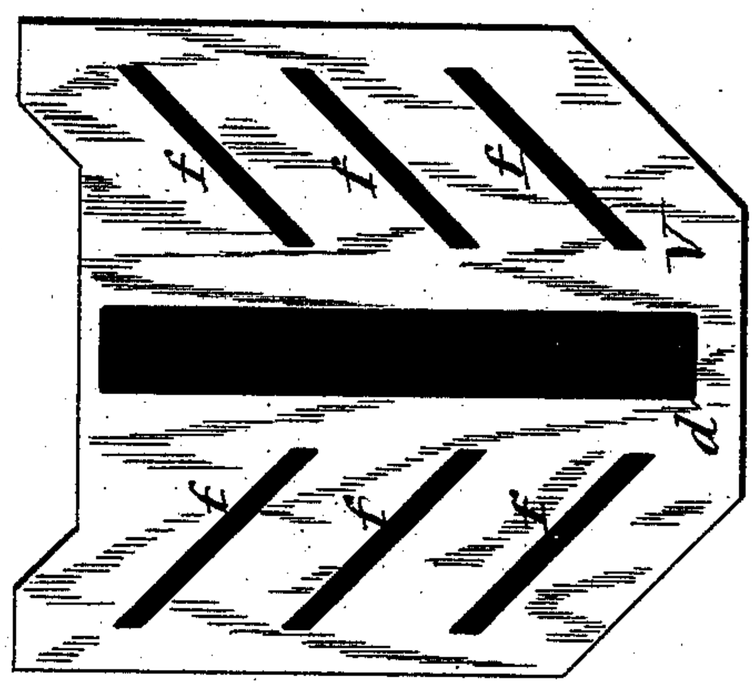

Fig. 4

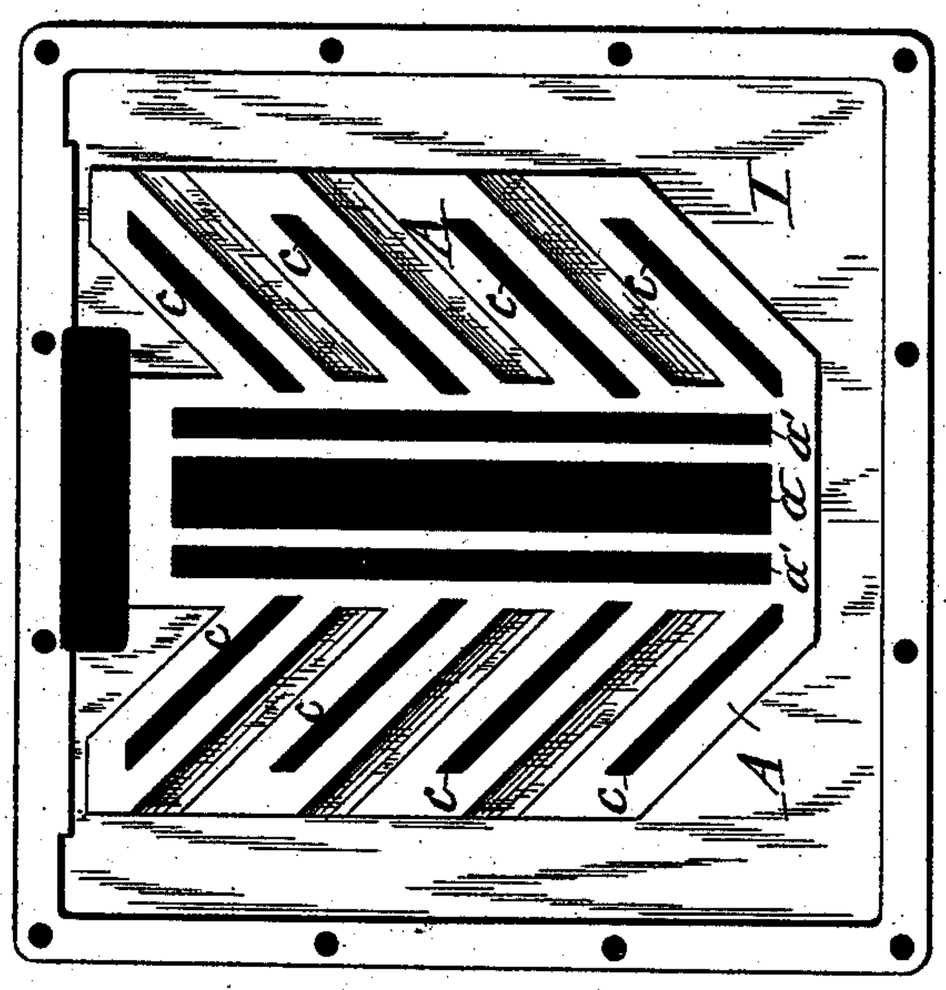

Fig. 3

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(No Model.) 3 Sheets—Sheet 3.

J. J. TONKIN.

CUT-OFF VALVE.

No. 401,983. Patented Apr. 23, 1889.

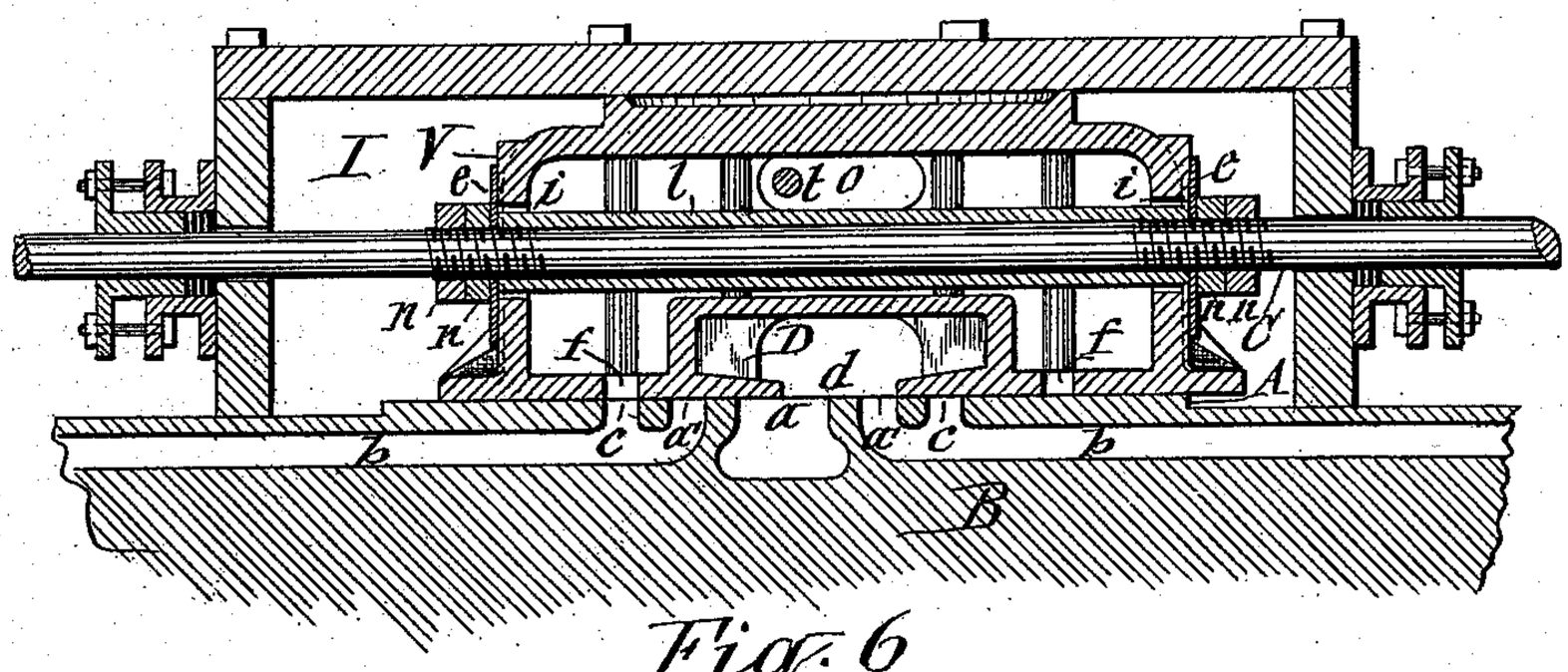

Fig. 6

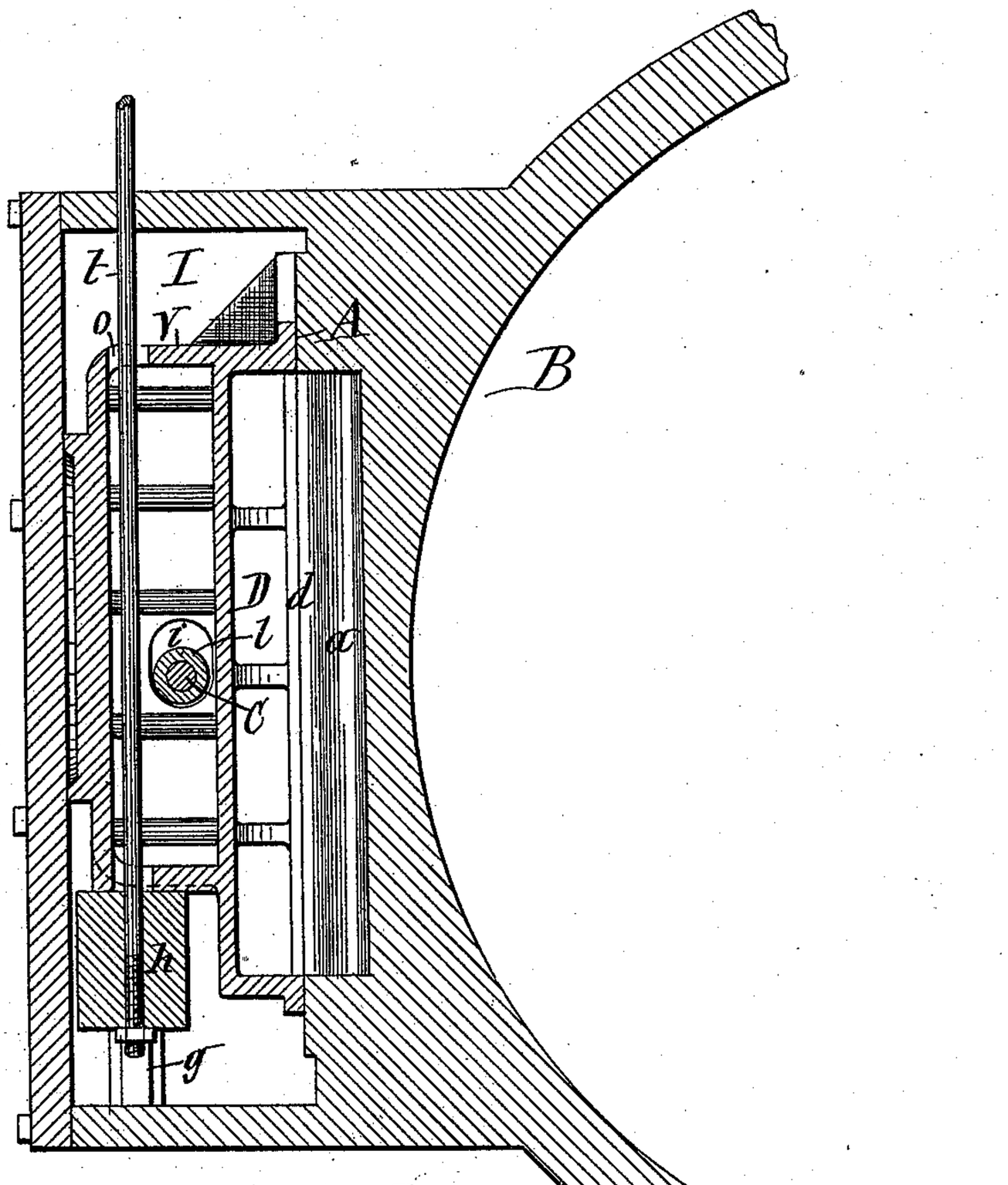

Fig. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN JAY TONKIN, OF OSWEGO, NEW YORK, ASSIGNOR TO THOMSON KINGSFORD, OF SAME PLACE.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 401,983, dated April 23, 1889.

Application filed January 30, 1889. Serial No. 298,055. (No model.)

To all whom it may concern:

Be it known that I, JOHN JAY TONKIN, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Automatic Cut-Off Valves for Steam-Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to slide-valves in the steam-chests of engines; and it consists, first, in a novel construction of said valve, which is steam-balanced, or nearly so, and has its steam-ports disposed diagonally to the line of travel of the valve, in combination with the valve-seat provided with correspondingly-disposed steam-ports, and, secondly, in the combination, with the valve formed as aforesaid, of a governor-stem connected thereto at right angles to the line of travel and parallel with the plane of the valve, said construction and combination of parts forming an automatic cut-off, which operates directly on the valve of the engine and regulates the passage of the steam to the cylinder without affecting the passage of the exhaust-steam, all as hereinafter more fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a vertical transverse section of a steam-chest and showing one end of the valve. Fig. 2 is a side view of the interior of the steam-chest, and showing the means for carrying the valve by the governor-stem. Fig. 3 is a face view of the valve-seat or cylinder-face. Fig. 4 is a face view of the valve, and Figs. 5 and 6 are respectively transverse and longitudinal sections of the valve and the adjacent portion of the cylinder.

Similar letters of reference indicate corresponding parts.

A denotes the cylinder-face or valve-seat formed vertically on the side of the steam-cylinder B and inclosed by the steam-chest I in the usual and well-known manner. The valve-seat A is provided with the usual central exhaust-port, *a*, at right angles to the line of travel of the valve, and with ports *a' a'* at opposite sides of and parallel with the exhaust-port *a*. The ports *a' a'* communicate with opposite ends of the cylinder B by channels *b b*, and with these channels communicate the steam-ports *c c c*, which are arranged parallel in the valve-seat A and diagonally or obliquely in relation to the line of travel of the valve, as illustrated in Fig. 3 of the drawings.

V represents the valve, which I form hollow and provide it with steam-inlets *o o* to its interior for the purpose of steam-balancing the valve. The said valve I provide with an exhaust-port, *d*, which is also at right angles to the line of travel of the valve, and over this exhaust-port is formed a cage, D, which isolates said port from the interior of the valve and from the steam-ports *f f* at opposite sides of said exhaust-port. These latter steam-ports are disposed diagonally in relation to the line of travel of the valve and correspondingly with the ports *c c* of the valve-seat. The described valve is arranged movably vertically, or at right angles to its regular travel, and is supported upon a slide, *h*, arranged between vertical guides *g g*.

Upon the steam-chest I is mounted a steam-governor, G, of any suitable and well-known form, as represented in Fig. 2 of the drawings. The governor-stem *t* enters the steam-chest and passes through the ports *o o*, hereinbefore mentioned, and has its lower end connected to the slide *h*, the said ports *o o* being elongated to allow the necessary travel of the valve.

In order to allow the valve to move vertically, or at right angles to its line of travel, I provide the ends of the valve with vertically-elongated eyes *i i*, through which the valve-stem C passes.

To prevent the steam from escaping from the interior of the valve through the said eyes, I envelop that portion of the valve-stem which is inside of the valve in a sleeve, *l*, the ends of which are flush with the ends of the valve, which latter I form with smooth faces, upon which I place washers *e e*, covering the eyes *i i*, the washers being held tightly against the end faces of the valve by nuts *n n* on the valve-stem. In the operation of the engine the governor G forces down the stem *t*. As the speed of the engine increases, the said

movement of the governor-stem lowers the valve V, and thereby closes to a greater or less extent the steam-ports *f f* of the cylinder-face or valve-seat without effecting the opening of the exhaust-ports *a a' a'*, which are disposed at right angles to the line of travel of the valve, as aforesaid, or parallel with the governor-stem. The angle of the steam-ports may be reversed, and in that case the governor must be arranged to draw the valve up as the velocity of the engine increases.

This automatic cut-off, with constant completely-open exhaust-ports, is one of the most salient features of my invention.

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

1. A slide-valve provided with an exhaust-port arranged at right angles to the line of travel of the valve, and with steam-ports disposed diagonally to said line of travel, in combination with a valve-seat provided with correspondingly-arranged exhaust and steam ports, as set forth.

2. A slide-valve provided with an exhaust-port arranged at right angles to the line of travel of the valve, and with steam-ports disposed diagonally to said line of travel, in combination with a valve-seat provided with correspondingly-arranged exhaust and steam ports, a valve-support arranged movably at right angles to the travel of the valve, and a governor-stem connected to said valve-support parallel with the plane of said valve, substantially as set forth.

3. The combination of the valve-seat A, provided with the exhaust-port *a*, ports *a' a'* at opposite sides of and parallel with the said exhaust-port, steam-passages *b b*, extending from the ports *a' a'* to opposite ends of the cylinder, and steam-ports *c c*, intersecting said passages, and the valve V, formed hollow and with steam-inlets to the interior thereof, and with the exhaust-port *d* in cage D over said port, and steam-ports *f f* at opposite sides of said cage, substantially as described and shown.

4. The valve V, formed hollow and with steam-inlets to its interior, the exhaust-port *d* at right angles to the line of travel of the valve, the cage D, over said port, and steam-ports *f f*, disposed diagonally in relation to the line of travel of the valve, in combination with the valve-seat A, provided with the exhaust-port *a*, likewise at right angles to the line of travel of the valve, ports *a' a'* at opposite sides of and parallel with the port *a*, the steam-passages *b b*, extending from the ports *a' a'* to opposite ends of the cylinder, steam-ports *c c*, disposed diagonally and correspondingly with the steam-ports of the valve and intersecting the steam-passages *b b*, the slide *h*, supporting the valve, and the governor-stem *t*, connected with said slide, substantially as described and shown.

5. The combination of the slide-valve V, provided with the eyes *i i*, elongated in directions parallel with the plane of the valve, the valve-stem C, passing through said eyes, nuts *n n* on the valve-stem, washers *e e* on the ends of the valve, the slide *h*, supporting the valve, and the governor-stem *t*, connected with said slide at right angles to the line of travel and parallel with the plane of the valve, substantially as described and shown.

6. The combination of the hollow slide-valve provided with steam-inlets to its interior, and with eyes *i i*, elongated in directions parallel with the plane of the valve, the valve-stem passing through said eyes, the sleeve *l*, surrounding the valve-stem inside of the valve and terminating flush with the end faces of the valve, the washers *e e* on the said faces and on the ends of the sleeve, the nuts *n n* on the valve-stem, the slide *h*, supporting the valve, and the governor-stem *t*, connected to said slide at right angles to the line of travel and parallel with the plane of the valve, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Oswego, in the county of Oswego and State of New York, this 26th day of January, 1889.

JOHN JAY TONKIN. [L. S.]

Witnesses:

B. W. BURLEIGH,

HENRY L. HOWE.