

(No Model.)

2 Sheets—Sheet 1.

J. J. TONKIN.  
CUT-OFF FOR ENGINES.

No. 376,616.

Patented Jan. 17, 1888.

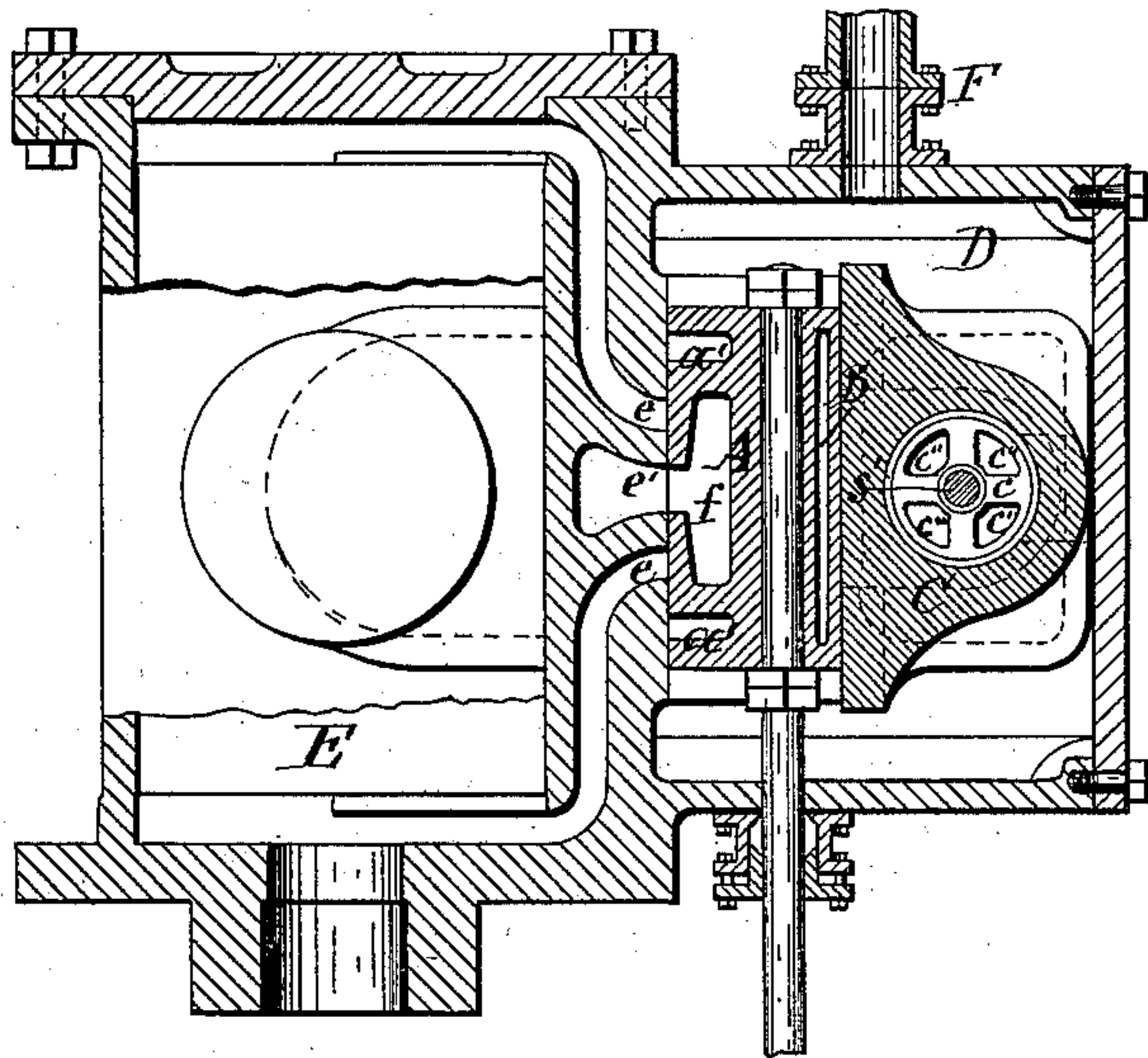


Fig. 1.

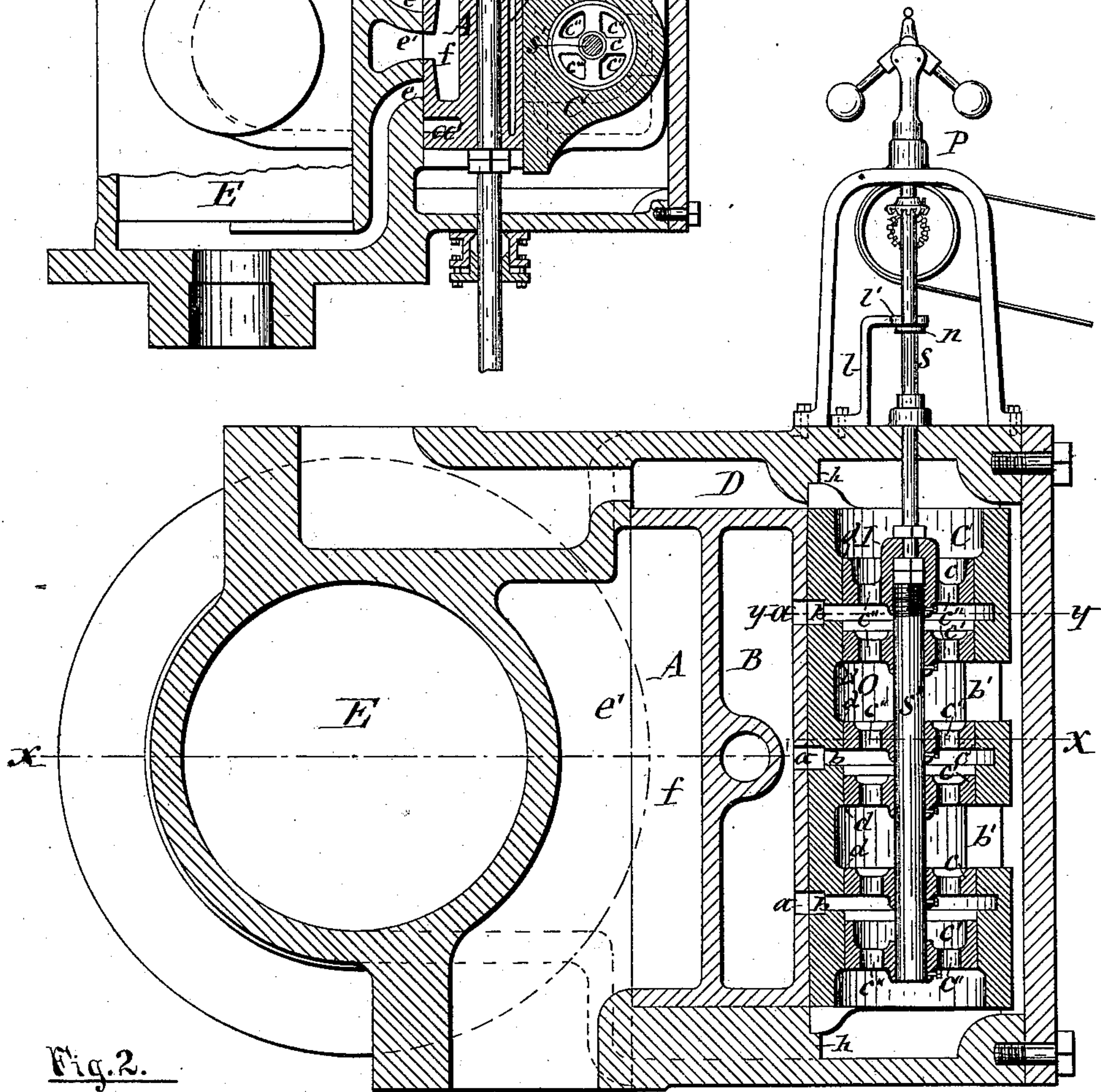


Fig. 2.

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INVENTOR

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BY

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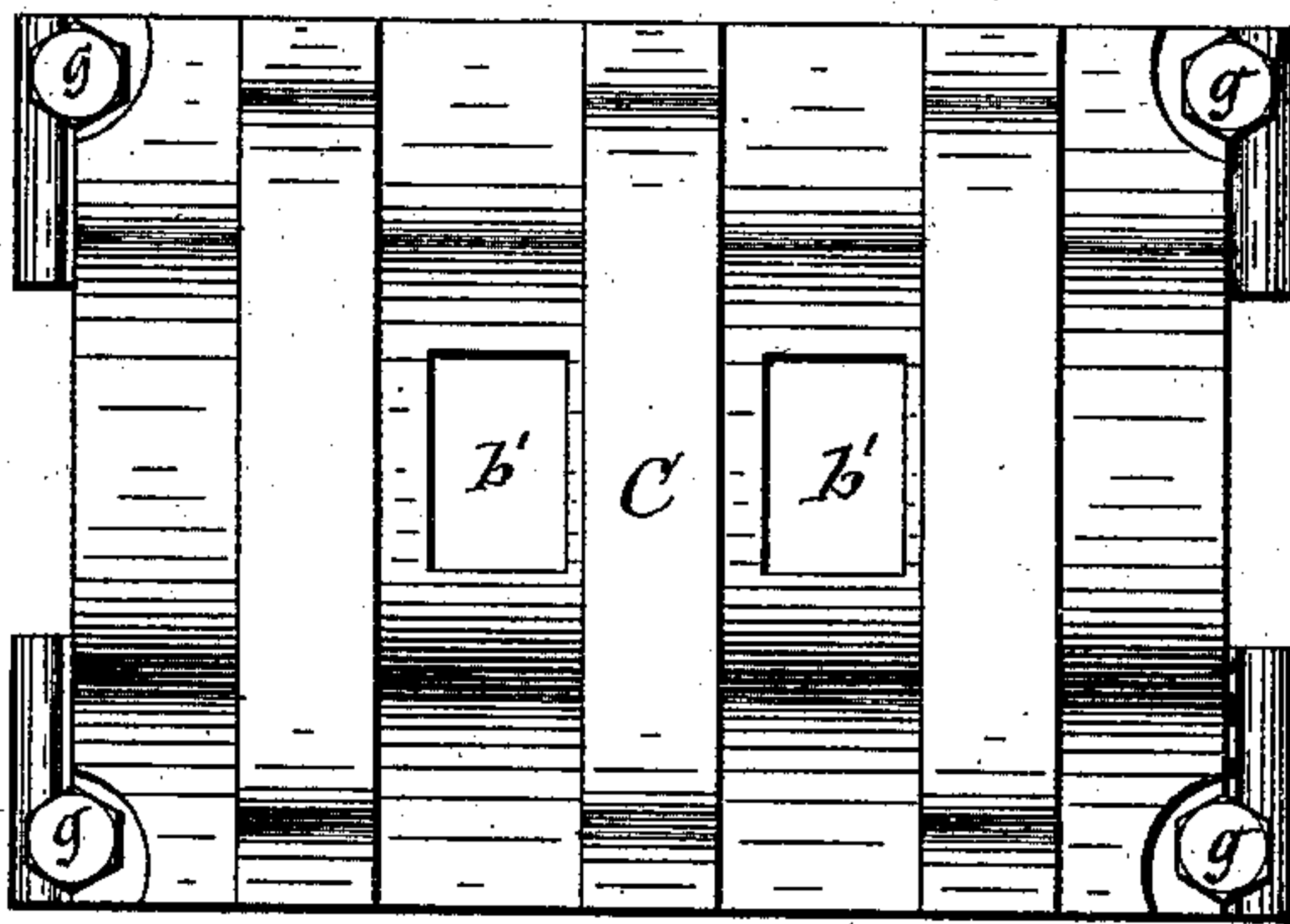
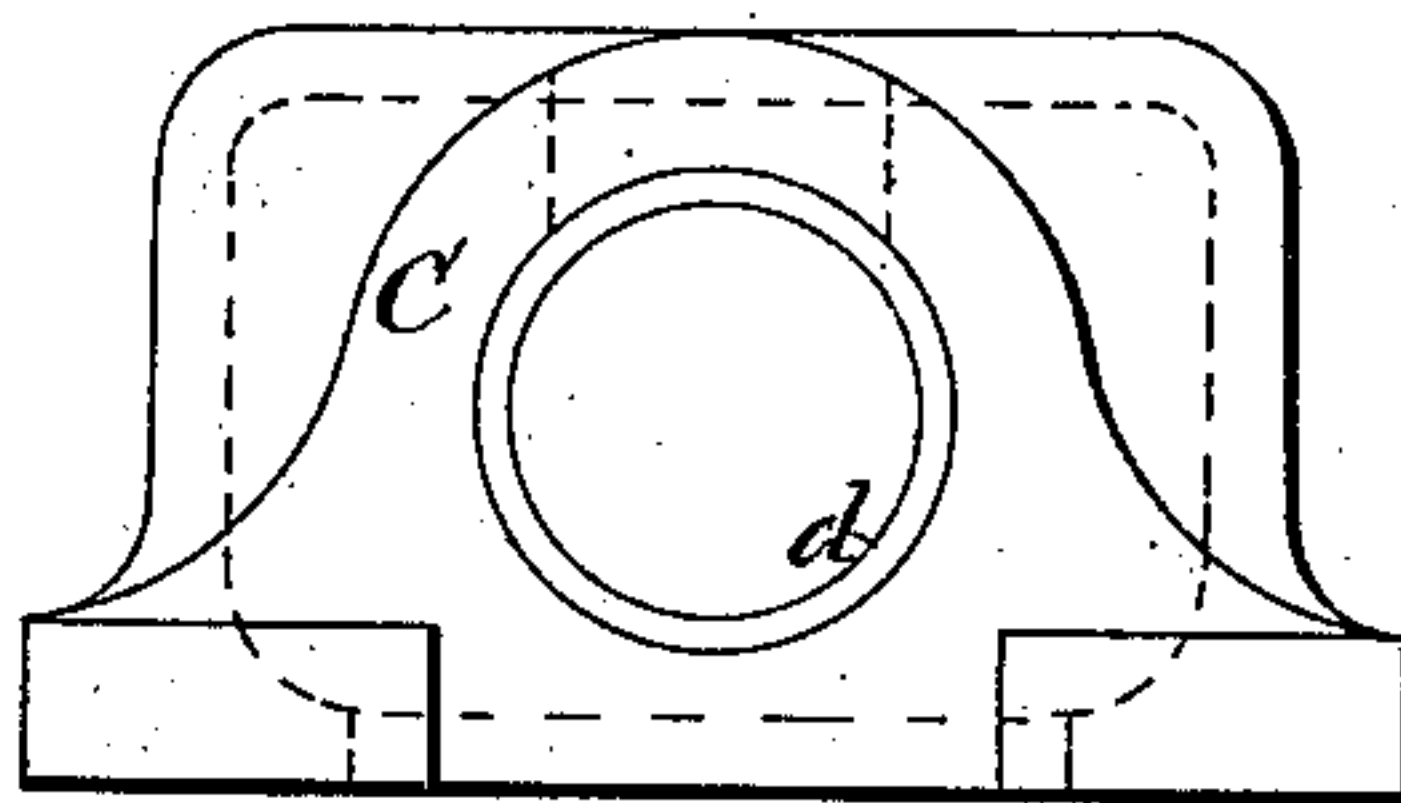
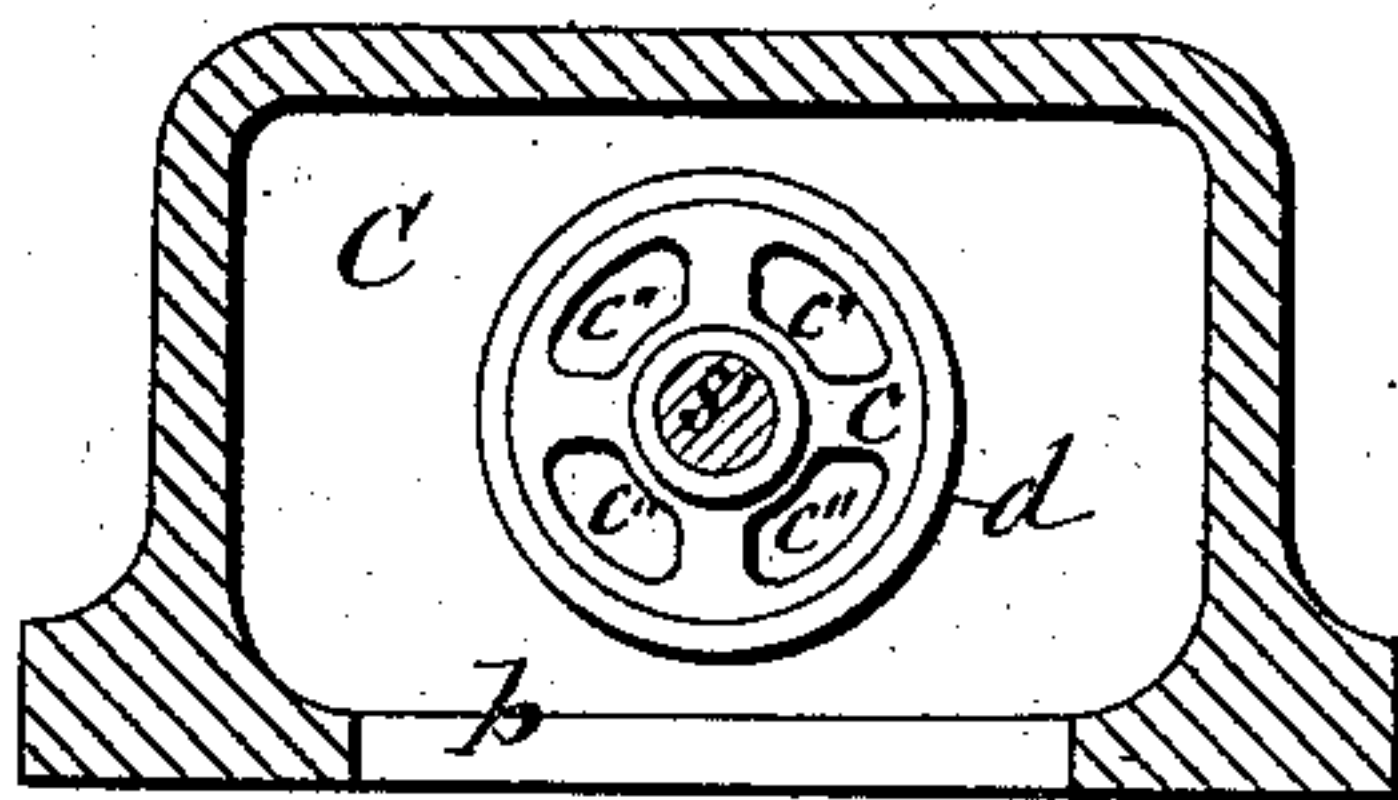
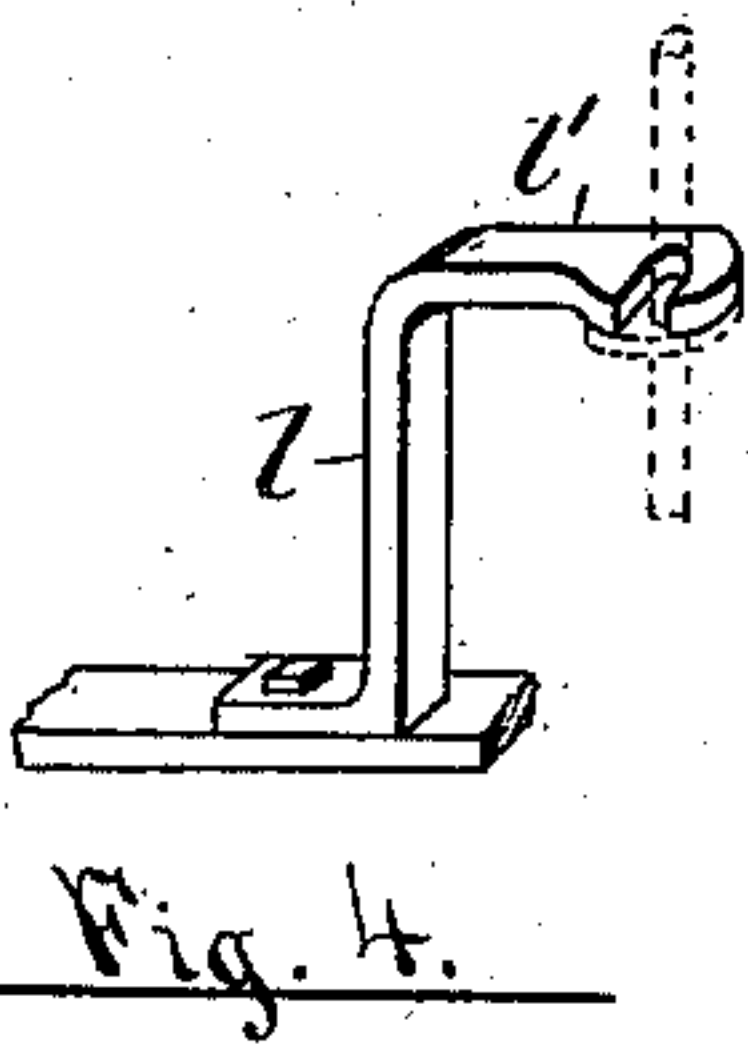
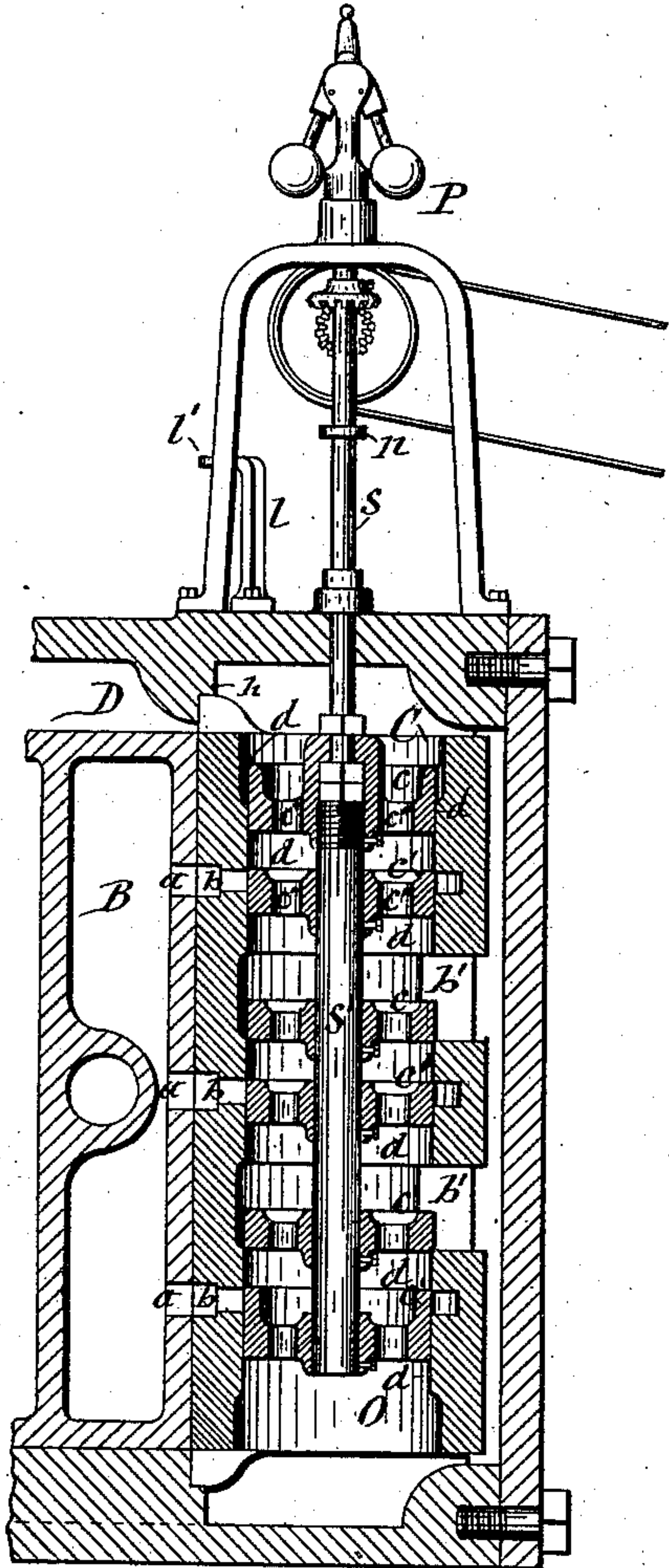
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN JAY TONKIN, OF OSWEGO, NEW YORK.

## CUT-OFF FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 376,616, dated January 17, 1888.

Application filed May 10, 1887. Serial No. 237,111. (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  
5 Improvements in Cut-Offs 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 the class of steam-engines which have a cut-off valve arranged  
10 inside of the steam-chest to admit steam into passages extending through the main valve.

The object of this invention is to dispense with the extra gearing heretofore employed for  
15 transmitting motion from the governor to the cut-off valve; also, to reduce as much as possible the friction of the said valve; also, to effectually steam-balance both the main valve and cut-off valve; also, to render the cut-off valve  
20 capable of automatically shutting off the steam from the cylinder in case the governor-belt is accidentally broken; and to these ends my invention consists in the improved construction and combination of parts, as hereinafter de-  
25 scribed, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a horizontal transverse section on line *x x* in Fig. 2. Fig. 2 is an enlarged vertical transverse section of an engine embodying my invention,  
30 showing the cut-off or governor valve in its operative position. Fig. 3 is a vertical transverse section of the main valve and governor-valve, with the latter in its dormant position. Fig. 4 is a detached perspective view of the  
35 device for supporting the governor-valve in its open position. Fig. 5 is a transverse section of the governor-valve and its case taken on line *y y*, Fig. 2. Fig. 6 is a detached end view of the aforesaid case, and Fig. 7 is a side  
40 view of the said case.

Similar letters of reference indicate corresponding parts.

E represents the steam cylinder of the engine, provided with the usual steam and ex-  
45 haust ports, *e e* and *e'*, at the side to which the steam-chest D is attached.

A denotes the rectilinearly-reciprocating main valve, which receives motion from an eccentric on the driving-shaft in the usual and  
50 well-known manner, and not necessary to be here illustrated. This main valve is provided with the usual exhaust-passage, *f*, and over

the side of the passage *f* is the steam-chamber B, from which are extended the steam-ports *a'*  
*a'*, all formed inside of the main valve. 55

The steam-chamber B is provided with steam-receiving ports *a a a* at the outer side or side opposite to that which faces the cylinder, and against said outer side of the main valve rests  
60 a pressure-plate or valve-case, C, which is secured to the interior of the steam-chest by bolts *g g*, passing through the base of said valve-case at the corners thereof, as shown in Fig. 7 of the drawings, and into screw-tapped pro-  
65 jections *h h* on the sides of the steam-chest. The said valve-case is formed with an internal cavity, O, extending through it at right angles to the movement of the main valve A, and from said cavity are extended steam-ports *b b*  
70 *b*, leading to and coinciding with the ports *a a* of the main valve, and at opposite sides of each of the ports *b* the cavity O has formed in it cylindrical valve-seats *d d*, and between each set of said valve-seats the valve-case I is pro-  
75 vided with a steam induction-port, *b'*, leading to the cavity O. Inside of this cavity is arranged the reciprocating governor-valve I, which is connected directly to the governor-stem *s*, which projects through a suitable stuff-  
80 ing-box on top of the steam-chest and receives motion from a centrifugal governor, P, mounted on the steam chest, as illustrated in Fig. 2 of the drawings.

The governor-valve I consists of bridges *c c'*, projecting from a central longitudinal stem, *s'*,  
85 and fitted closely to the valve-seats *d d*; and in order to properly distribute the steam throughout the valve-case C and properly steam-balance the governor-valve I provide the bridges *c c'* with perforations *c'' c''*, through which the  
90 steam is allowed to pass lengthwise the governor-valve. The bridges are arranged in sets or pairs and respectively with the bridge *c* above the port *b* and the bridge *c'* below said port. The bridges *c c c* constitute the main  
95 steam governing-valves, which are pushed down over the ports *b b b* by the governor-stem *s* as the speed of the engine increases. The lower bridges, *c' c' c'*, serve as safety stop-  
100 valves, which are drawn up to close the ports *b b b* in case the governor-belt is accidentally broken or run off from the pulleys. The governor-balls in such a case drop and cause the governor-stem *s* to draw up the governor-valve



I, as represented in Fig. 3 of the drawings. Inasmuch as the bridges  $c' c' c'$  or safety cut-off valves are also in the last-described position when the engine is at rest, it becomes necessary to depress the governor-stem  $s$  sufficiently to cause the bridges  $c' c' c'$  to open the ports  $b b$  when starting the engine; and to effect this a suitable catch is to be employed to hold the governor-stem in its depressed position until the engine has acquired sufficient velocity to actuate the governor. Then the catch can be moved to release the governor-stem. This catch admits of many modifications; and I therefore do not limit myself to the specific construction shown in the annexed drawings, which are designed merely as an exemplification of a device adapted for the aforesaid purpose.

The catch herein shown consists of an arm,  $l$ , pivoted on the steam chest, and having its free end  $l'$  bifurcated and adapted to embrace the governor stem, as represented in Fig. 2 of the drawings. To the governor-stem is rigidly secured a collar,  $n$ , in such a position that by depressing the governor-stem, as aforesaid, said collar is carried down sufficiently to allow the bifurcated end of the arm  $l$  to engage the governor-stem above the collar, and by the engagement of the said arm with the collar the governor-stem is retained in its depressed position. After the engine has attained its desired velocity the arm  $l$  can be turned to release the governor-stem, as represented in Fig. 3 of the drawings.

The governor-valve I may be formed in one piece—*i. e.*, the bridges  $c c'$  may be cast on the central stem,  $s'$ ; but I prefer to make said bridges, especially the safety-bridges  $c' c' c'$ , adjustable in their position by forming the bridges separate from the stem and providing the former with a central eye through which the stem passes. Said bridges are thus adapted to be shifted, so as to cause them to close the ports  $b b$  either quicker or slower, as may be desired. They are secured in their adjusted positions by set-screws passing through hubs of the bridges and engaging the stem, as shown in Figs. 2 and 3 of the drawings.

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

1. In combination with the cylinder and steam-chest, the reciprocating main valve having steam-ports extending through it, a valve-case provided with steam-ports coinciding with the ports of the main valve, steam induction-ports in said valve-case between the aforesaid steam-ports, and a reciprocating governor-valve in the said valve-case, substantially as set forth and shown.

2. In combination with the steam-cylinder and steam-chest, the main valve A, formed with the steam-chest B, and with the receiving-ports  $a a a$ , and discharge-ports  $a' a'$ , the valve-case C, secured to the interior of the steam-chest and provided with the ports  $b b b$ , coinciding with the ports  $a a a$ , and provided also with the steam induction-ports  $b' b'$ , and the reciprocating governor-valve I, provided with bridges  $c c'$ , having perforations  $c'' c''$ , substantially as described and shown.

3. In combination with the steam-chest and the main valve A, provided with ports  $a a a$ , the valve-case C, provided with the ports  $b b b$  and  $b' b'$ , the governor-valve I, provided with the governing-bridge  $c$ , and safety stop-bridge  $c'$ , respectively at opposite sides of the port  $b$ , substantially as described and shown.

4. In combination with the steam-chest and main valve A, the valve-case C, provided with the ports  $b b b$  and  $b' b'$ , and the governor-valve I, provided with the governing-bridges  $c c c$ , at one side of the respective ports  $b b b$ , and having the stop-bridges  $c' c' c'$  adjustably in their position at the opposite side of said ports, substantially as and for the purpose set forth.

5. In combination with the steam-chest, the reciprocating main valve A, provided with the ports  $a a a$ , the valve-case C, secured to the steam-chest, and having a cavity, O, extending through it at right angles to the movement of the main valve, steam-ports  $b b b$ , extending from the cavity O to the ports  $a a a$ , valve-seats  $d d$  at opposite sides of each port  $b$ , and steam-receiving ports  $b' b'$  between the sets of valve-seats  $d d$ , the governor-valve I, extending longitudinally through the cavity O, and provided with the bridges  $c c'$ , the governor P, mounted on the steam-chest, and the stem  $s$ , connecting the governor with the valve I, substantially as described and shown.

6. In combination with the steam-chest, main valve, and governor-valve inside of said steam-chest, the governor P, mounted on the steam-chest, the governor-stem  $s$ , connecting the governor with the aforesaid governor-valve, and a catch adapted to temporarily retain the governor-stem in its depressed position, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Oswego, in the county of Oswego, in the State of New York, this 7th day of May, 1887.

JOHN JAY TONKIN. [L. S.]

Witnesses:

A. U. RADCLIFFE,  
S. P. MORTON.