

No. 669,273.

Patented Mar. 5, 1901.

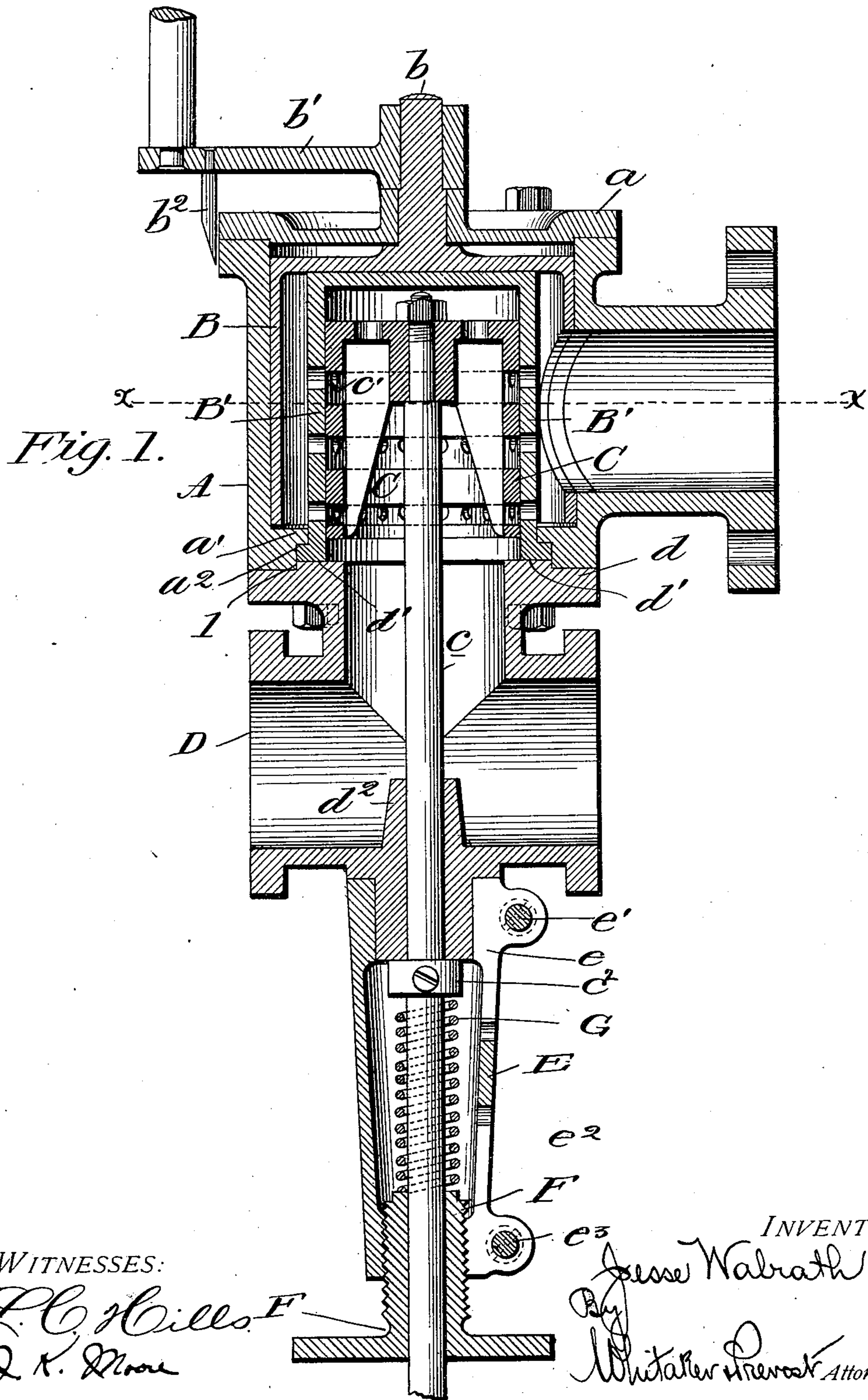
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REGULATOR VALVE FOR EXPLOSIVE ENGINES.

(Application filed June 13, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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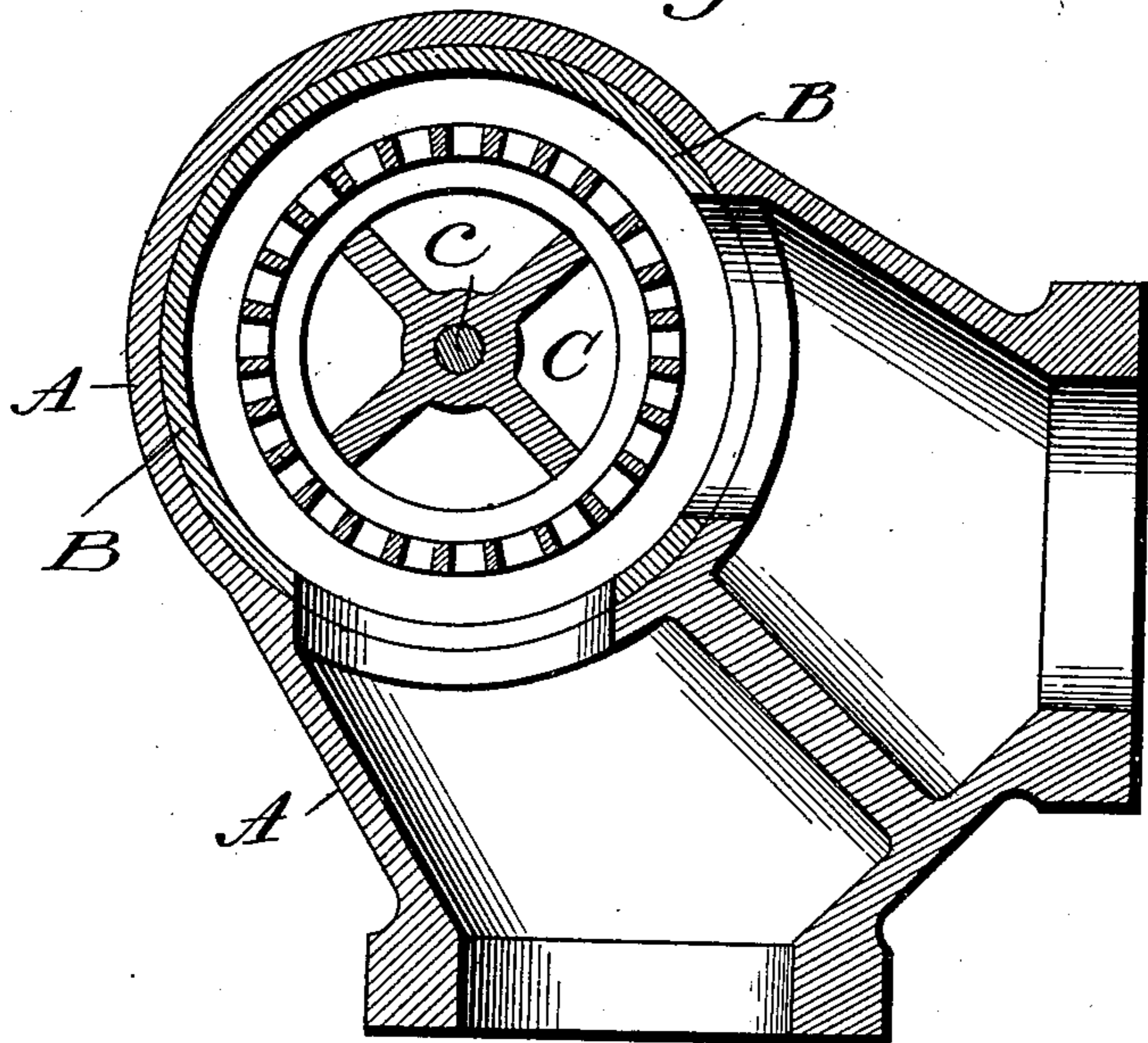
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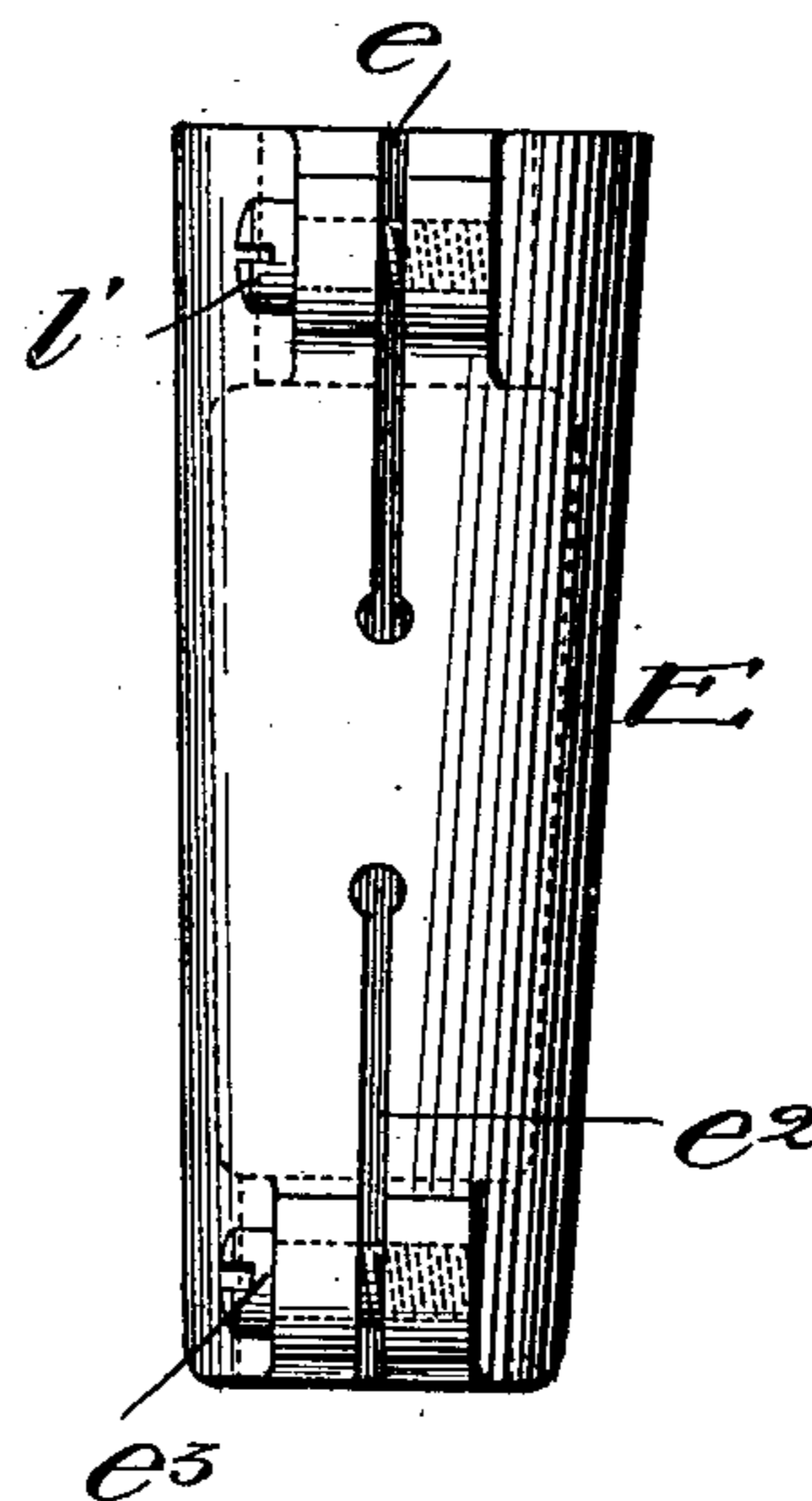
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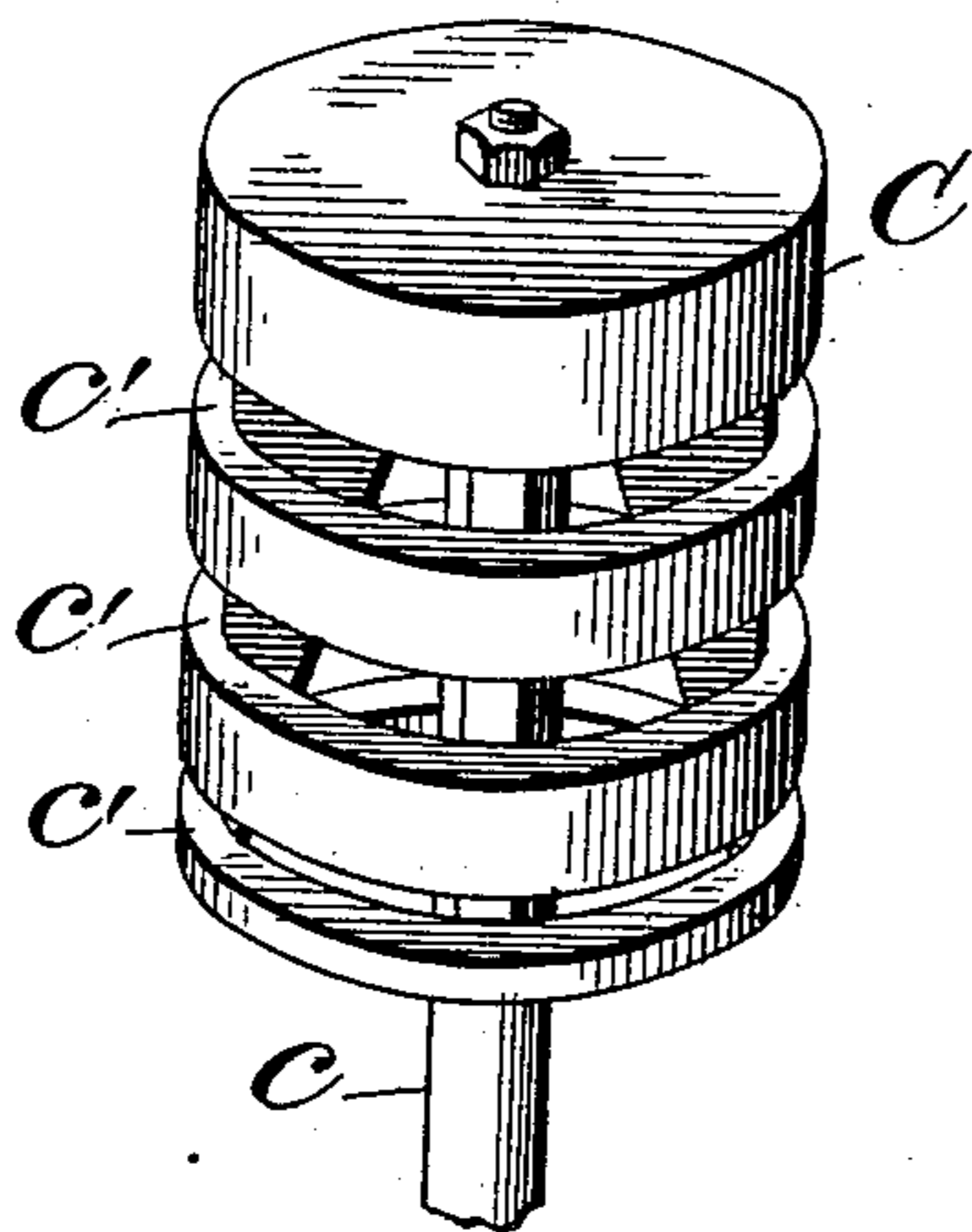
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JESSE WALRATH, OF RACINE, WISCONSIN.

## REGULATOR-VALVE FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 669,273, dated March 5, 1901.

Application filed June 13, 1900. Serial No. 20,160. (No model.)

*To all whom it may concern:*

Be it known that I, JESSE WALRATH, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Cut-Off and Regulator Valves for Explosive-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to explosive-engines, and has for its object the improvement of the controlling-valves of said engines.

It consists more particularly in an improved controlling-valve combined with a cut-off, the same being adapted to be applied to a multi-cylinder engine.

The best form in which I have contemplated embodying my said invention is illustrated in the accompanying drawings, and my said invention is disclosed in the following description and claims.

In the drawings, Figure 1 is a vertical sectional view of my improved cut-off and controlling-valve. Fig. 2 is a horizontal sectional view of said devices, taken on line  $xx$ , Fig. 1; and Figs. 3 and 4 are detail views of parts of my construction, which are more particularly described hereinafter.

In the drawings my said invention is shown as applied to an engine provided with two cylinders. I desire it to be understood that the same may be applied to an engine with a single cylinder or one with more than two cylinders.

In the drawings, A indicates the main body of the casing, which is provided with a valve-recess and two passages leading to the two cylinders. This main body is bored out at the top to permit the insertion of the closely-fitting but freely-moving cut-off valve B. The upper end of the valve-chamber is closed by the closing-plate  $a$ , which is provided with a central opening, through which passes the shaft  $b$  of the cut-off valve. Outside of the valve-chamber the shaft  $b$  is provided with a controlling arm or crank  $b'$ , secured thereto, which at the periphery of the covering-plate is provided with the indicator  $b^2$ , and there

are preferably placed upon the outer edge of the covering-plate and on the outer edge of the flange surrounding the valve-chamber marks to show the position occupied by the cut-off valve when the crank is turned to bring the indicator  $b^2$  opposite the same. This cut-off valve is provided with two openings corresponding to the passages to the cylinders and when properly placed permits the free inflow of the explosive mixture.

The lower end of the main body A is provided with an inwardly-extending flange  $a'$ , and this flange has an annular shoulder  $a^2$ . This flange is bored to admit the insertion of the interior regulator-valve casing B'. This interior casing has a shoulder  $l$ , that engages the shoulder  $a^2$  of the main body, which limits its upward movement. The regulator-valve C is placed within the casing B' and the main casing A is closed and the parts held in position by the three-way pipe-union D, the upward-extending member of which is provided with a flange  $d$ , fitted to engage the lower end of the casing A. This flange  $d$  has an annular upwardly-projecting part  $d'$ , which bears against and supports the lower end of the interior regulator-valve casing, and this part of the union extends upwardly far enough to be under the movable part of the valve and prevents the escape or removal of the same. The upper covering-plate  $a$  and the union D are secured to the main body by screws or bolts.

To the valve C is secured the rod  $c$ , which rod passes downward through the upwardly-extending branch of the union and through the opposite side of the union. The union is at the lower side provided with the projection  $d^2$ , through which the rod  $c$  passes, and to this projection is secured the spring-closing extension E. The upper end of this extension is fitted to the projection  $d^2$  and is provided with the slit  $e$  and clamping-screw  $e'$ , by which it is secured upon the projection. Within the lower end of the extension is fitted the hollow screw F, and the lower end of the extension is in like manner provided with the slit  $e^2$  and clamping-screw  $e^3$ , by which when the screw F has been adjusted to its proper position it is clamped to hold it against accidental movement. This is a very eco-

nomical construction. The regulator-valve being located within the cut-off valve but small space is taken by the two.

Within the extension E the rod *c* is surrounded with the spring G, which bears upon the top of the screw F and against the collar *c*<sup>2</sup>, secured to the rod. By loosening the screw *e*<sup>3</sup> of the extension the screw F may be turned to increase or diminish the tension of the spring G.

The interior regulator-valve casing is provided with three horizontal rows of openings, as shown, and the valve C, which is of cylindrical form, is provided with three annular openings *c*'. This valve is connected with the governor of the engine in such a manner that when at rest or running at ordinary speed the valve shall be at the upper part of its movement and the openings in the valve-casing open to permit the passage of the greatest amount possible of the explosive mixture, and when the governor is affected by high speed the valve will be drawn downward, the annular rings of the valve partially closing or entirely closing the openings in the casing, reducing the amount of the explosive or cutting it off entirely.

By manipulating the cut-off valve either cylinder or both may be entirely cut off and thrown out of action at will or both can be in action at the same time, or in case very slight power is required of the engine the cut-off valve can be made to reduce the size of the passage to the cylinder to reduce the inflow of the explosive mixture to the desired amount. In case, also, it is desired to make an examination or repairs to one cylinder the cut-off valve can be manipulated and the work proceeded with while the other cylinder is in operation. The explosive mixture is taken in through the side openings of the union and is drawn upward through the regulator-valve and into the cylinder or cylinders through the appropriate passages.

It will be seen that in case one cylinder is put out of operation by the cut-off valve the regulator-valve continues in operation and performs its functions the same as though the engine were running under full power.

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

1. In a controlling-valve for explosive-engines, the combination with the cylindrical casing provided with a plurality of apertures each leading to an engine-cylinder, a rotatable cylindrical valve fitting said casing and provided with apertures adapted to simultaneously register with said apertures in the

casing each of said valve-apertures being adapted to register with any of the apertures in said casing, and an operating device outside of said casing, connected with said valve whereby the explosive mixture may be admitted to one or more cylinders and the amount admitted to each cylinder regulated, substantially as described.

2. In a controlling-valve for explosive-engines, the combination with the cylindrical valve-casing provided with two outlet-apertures each connected with a cylinder of the engine, of a rotatable cylindrical valve in said casing, provided with two apertures adapted to simultaneously register with those in the casing each of said valve-apertures being adapted to register with either of the apertures in said casing, an arm outside of said casing operatively connected with said valve and an indicator secured to said arm, whereby the explosive mixture may be admitted to one or both cylinders and the amount of said mixture can be regulated whether one or both cylinders are in operation, substantially as described.

3. In a controlling-valve for explosive-engines, the combination with the outer cylindrical valve-casing provided with a plurality of apertures connected each with a separate working cylinder, of a cylindrical valve rotatably mounted in said casing and provided with apertures adapted to simultaneously register with those of the casing, each of said valve-apertures being adapted to register with any one of the apertures in said casing, a stationary interior casing within said valve secured to said outer casing, and provided with a series of apertures, a movable governor-actuated valve within said inner casing provided with apertures adapted to register with those of said inner casing and an actuating arm or handle outside of said outer casing operatively connected with said rotatable cylindrical valve, whereby explosive mixture may be admitted to one or more of the engine-cylinders by said rotatable valve and its admission regulated thereby, and whereby the admission of the mixture to the cylinder or cylinders at work will always be under the control of the governor, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JESSE WALRATH.

Witnesses:

MARTIN J. GILLEN,  
EFFA M. CHADWICK.