

(No Model.)

2 Sheets—Sheet 1.

R. NEWTON.  
REDUCING VALVE.

No. 282,557.

Patented Aug. 7, 1883.

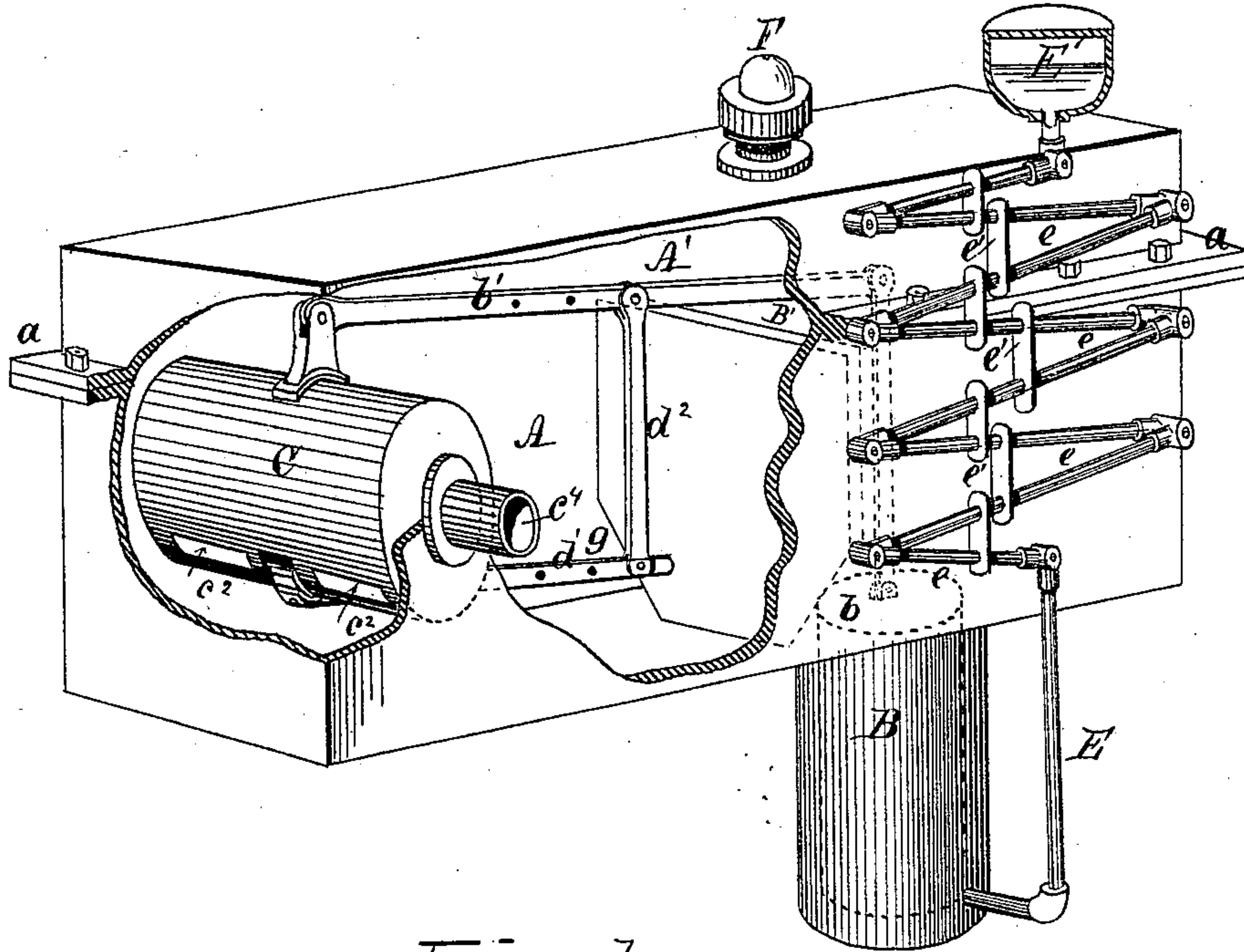


Fig. 1.

WITNESSES

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INVENTOR

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Attys

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2 Sheets—Sheet 2

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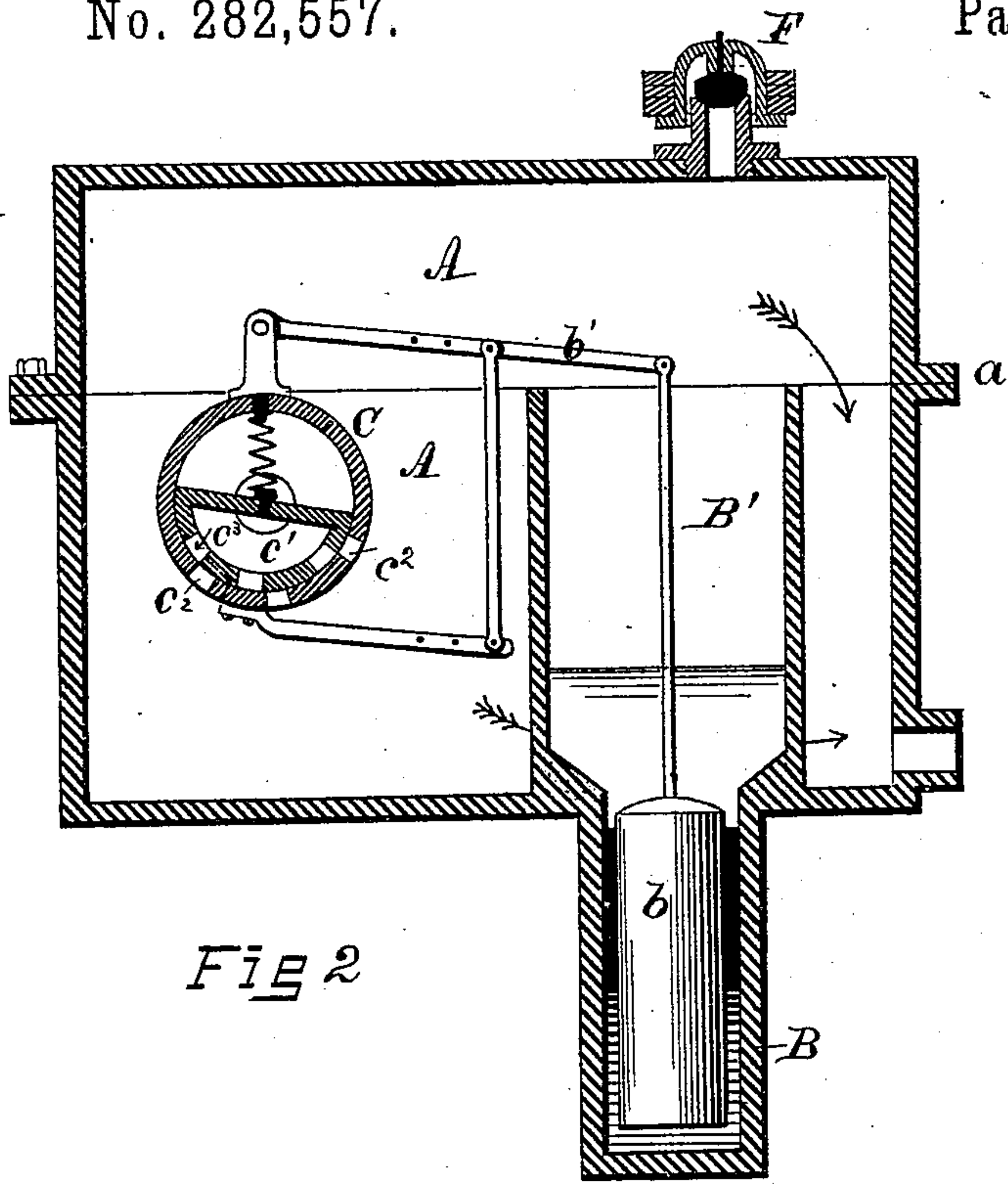


Fig. 2

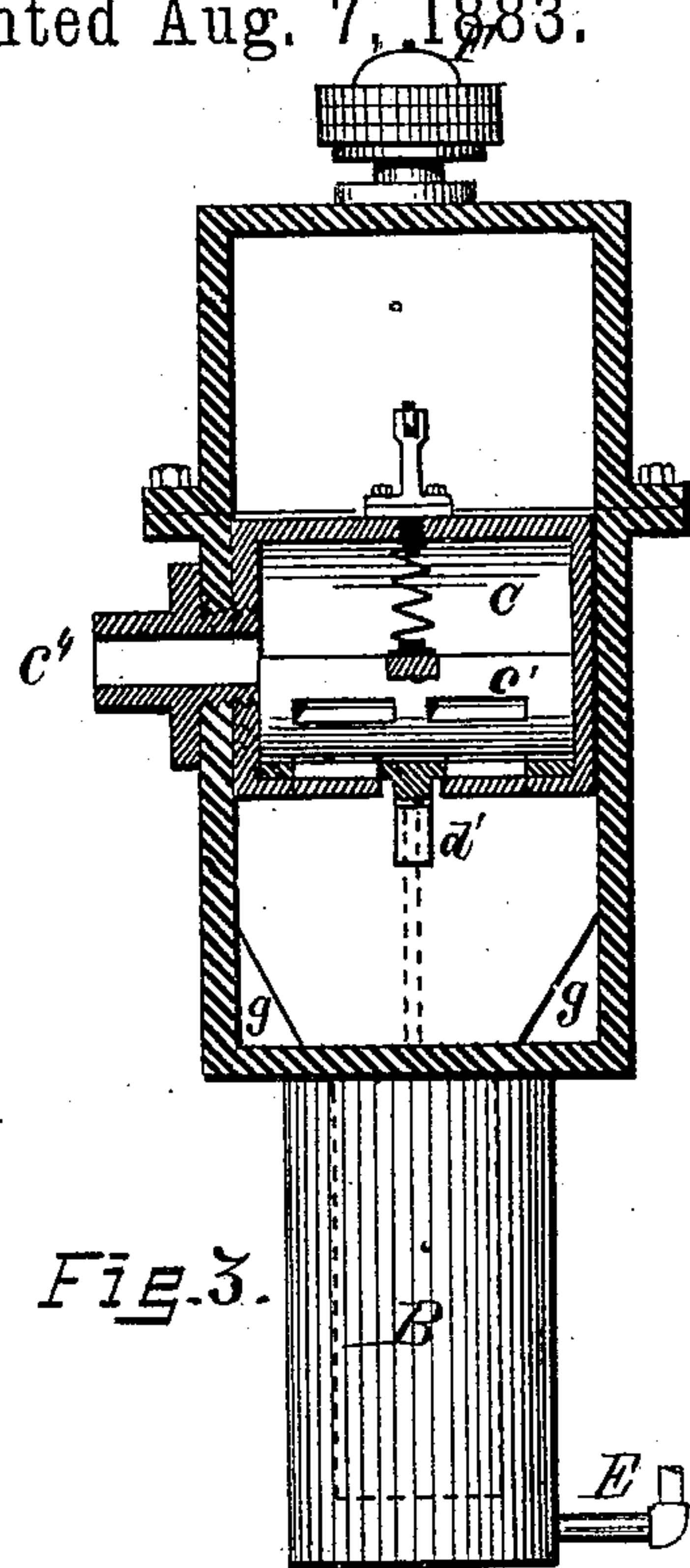


Fig. 3.

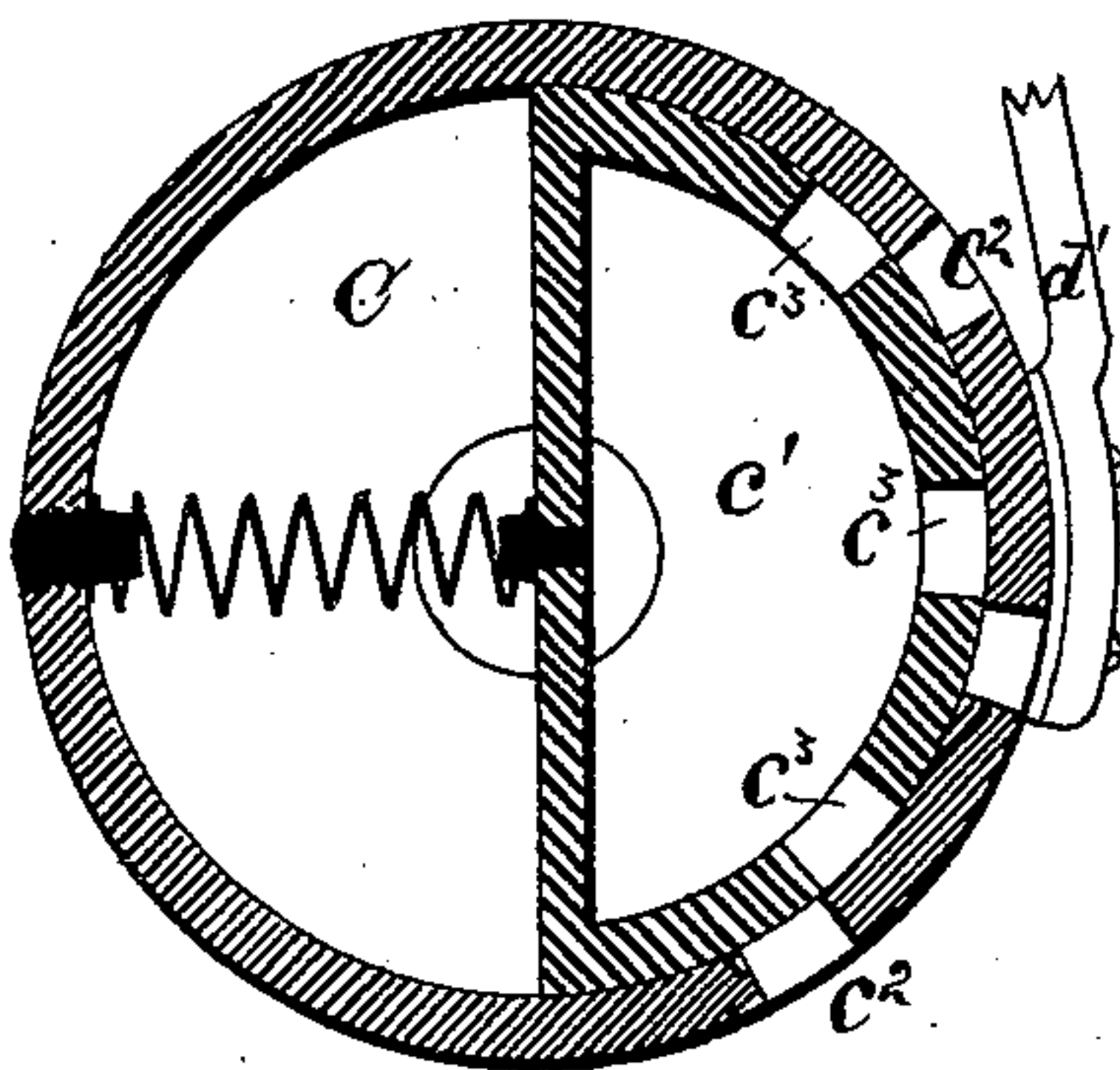


Fig. 4.

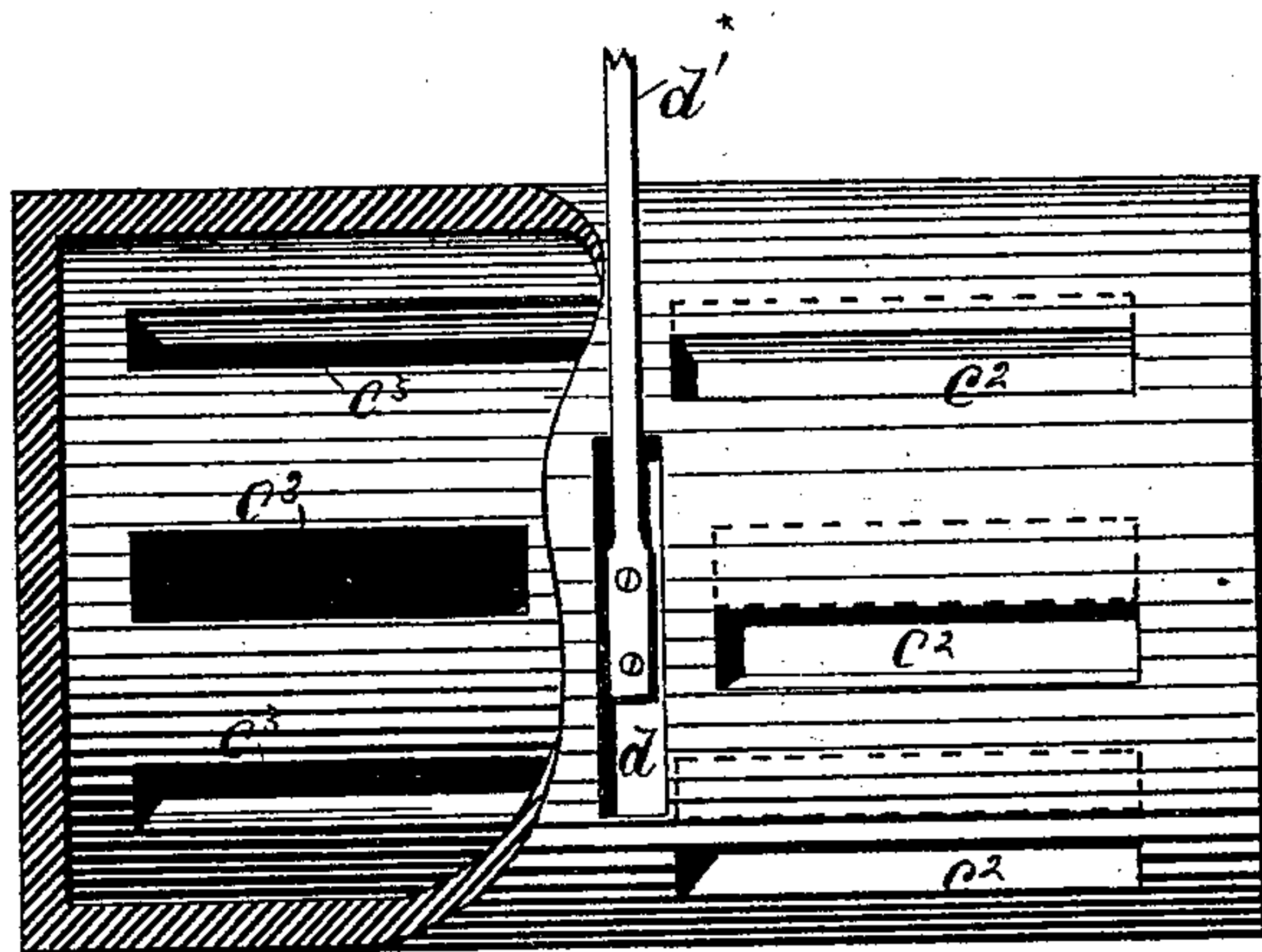


Fig. 5.

WITNESSES

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# UNITED STATES PATENT OFFICE.

ROBERT NEWTON, OF PROVIDENCE, RHODE ISLAND.

## REDUCING-VALVE.

SPECIFICATION forming part of Letters Patent No. 282,557, dated August 7, 1883.

Application filed January 2, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT NEWTON, of the city and county of Providence, and State of Rhode Island, have invented a new and useful  
5 Improvement in Reducing-Valves; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

10 This invention has reference to an improvement in devices for reducing the pressure of steam as supplied by the steam-generators, so that steam of a lower pressure may be used in drying cans, boiling, heating, and for other  
15 purposes.

The invention consists in the peculiar and novel construction of the inlet-valve, the mercury-chamber, and the connections with the same, by means of which the pressure of the re-  
20 duced steam can be regulated as described.

Figure 1 is a perspective view of my improved device for reducing the pressure of steam, part of the case being broken away so as to show the interior of the same. Fig. 2 is a longitudinal  
25 sectional view of the same. Fig. 3 is a cross-section through the center of the valve. Fig. 4 is a cross-section of the valve and valve-case. Fig. 5 is a view of the valve, part of the case of which is broken away to show the segmental  
30 valve.

In the drawings, A is the lower and A' is the upper part of a rectangular box or case. The connections for the inlet and outlet of the steam are made to the lower part, A. The upper part  
35 can therefore be removed at any time for repairs.

B is a mercury-chamber, and B' an enlargement extending across the width of the box A. The object of this enlargement is to prevent the  
40 loss of mercury when the pressure is suddenly reduced and the mercury rushes into the mercury-chamber.

b is a float supported by the mercury in the chamber B. This float is connected with the lever b', hinged on a standard placed on the valve-  
45 case C. This valve-case is cylindrical in form, and is bored out and finished inside, so as to give a true bearing to the segmental valve c'. The valve-case C is provided with the elongated

openings c<sup>2</sup> c<sup>2</sup>, and the valve c' also with corresponding openings, c<sup>3</sup> c<sup>3</sup>. As there are three sets of openings in each, the area of the same is so large that a slight motion of the valve will materially increase or decrease the discharge of  
55 steam, which enters the valve by the inlet c<sup>4</sup>. The valve-case C is provided with the opening d. The arm d' is secured to the valve and connected with the lever b' by the rod d<sup>2</sup>. A series of holes are made in the lever b' and arm d', so that the rod d<sup>2</sup> may be connected at different  
60 points and the valve adjusted in the valve-case.

Connected with the mercury-chamber B is the pipe E, a portion of which is made up of a number of short pieces of pipe, e e, connected by means of swiveled connections, so that they  
65 may be adjusted to any desired angle, to the upper end of which the mercury-cup E is secured. e' e' are supports for the swiveled pipes e e. They consist of a flat piece of metal having two holes, through which the pipes e e pass. These  
70 supports may be moved closer to or farther from the swiveled connection of the pipes e e, and thereby the mercury-cup can be raised or lowered.

F is a dead-load safety-valve of the ordinary  
75 construction. gg are openings formed between the enlargement B' and the wall of the case A, to allow any water of condensation to flow out through the outlet G. A separate outlet for the reduced steam may be made above the outlet G,  
80 and to the lower outlet a steam-trap may be connected to draw off the water automatically.

The operation of this device is as follows: The live-steam-supply pipe being connected with the inlet c<sup>4</sup> and the pipe carrying off the  
85 reduced steam with the outlet, the mercury-cup E' is now raised to such height as will be necessary to allow a column of mercury the weight of which per square inch or any fraction thereof is equal to the pressure that it is desired  
90 to maintain in the reduced steam. In this condition the mercury will be in the chamber B standing as high in the pipe E as it does in the chamber B. The float b is supported on the mercury, and the openings c<sup>3</sup> in the valve will  
95 be opposite the openings c<sup>2</sup> in the valve-case. All the parts being properly adjusted, steam is let-on and rushes through the openings in the



valve, filling the box or case quickly. The pressure, rapidly increasing, acts on the surface of the mercury and forces the same up the pipe E into the cup E'. The float *b*, of less specific gravity than the mercury, but of considerable weight, descends as the mercury leaves the chamber B, and, through the lever *b'*, rod *d''*, and arm *d'*, partially closes the valve by rotating the same. As soon as the pressure falls the mercury runs from the cup E' and the pipe E into the chamber B, raises the float *b*, and again opens the valve. Thus the pressure of the steam in the box or case A is balanced by the column of mercury, and as the height of this column can be readily adjusted outside of the case, the pressure can be regulated and maintained at any desired point, as the slightest change will change the level of the mercury in the chamber B, the float *b*, and through it the steam-supply.

As steam may be, and frequently is, drawn suddenly in large quantities, the mercury in the cup E' and pipe E is liable to rush into the chamber B, so as to leap over the edges of the same, and a portion of the mercury is lost. To prevent such loss of mercury and the consequent derangement of the device, I extend the chamber B upward, forming the enlargement B' of such dimensions that no mercury can under any condition escape. The loss of even a small quantity of mercury changes the position of the float, and through the same of the valve,

and consequently the utility of the device. The peculiar construction of the valve permits the regulation of the admission of the live steam quickly at the slightest change of pressure, and thus prevents the excessive agitation of the mercury.

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

1. The combination, in a reducing-valve operated by a float sustained by mercury or other fluid, with the chamber containing the float, of lengths of pipe connected together by swivel-fitting constructed so that the height of the column can be adjusted to balance the desired pressure, as described.

2. The combination, with the float *b* and chamber B, of the pipe E, the pipes *e e*, and the cup E', constructed to regulate the pressure in a reducing-valve, as described.

3. The combination, in a pressure-reducing valve, with the float *b* and means for controlling the steam-supply, of the chamber B, the pipes E and *e e*, the cup E', and the supports *e' e'*, constructed to support the pipes, as described.

ROBERT NEWTON.

Witnesses:

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