

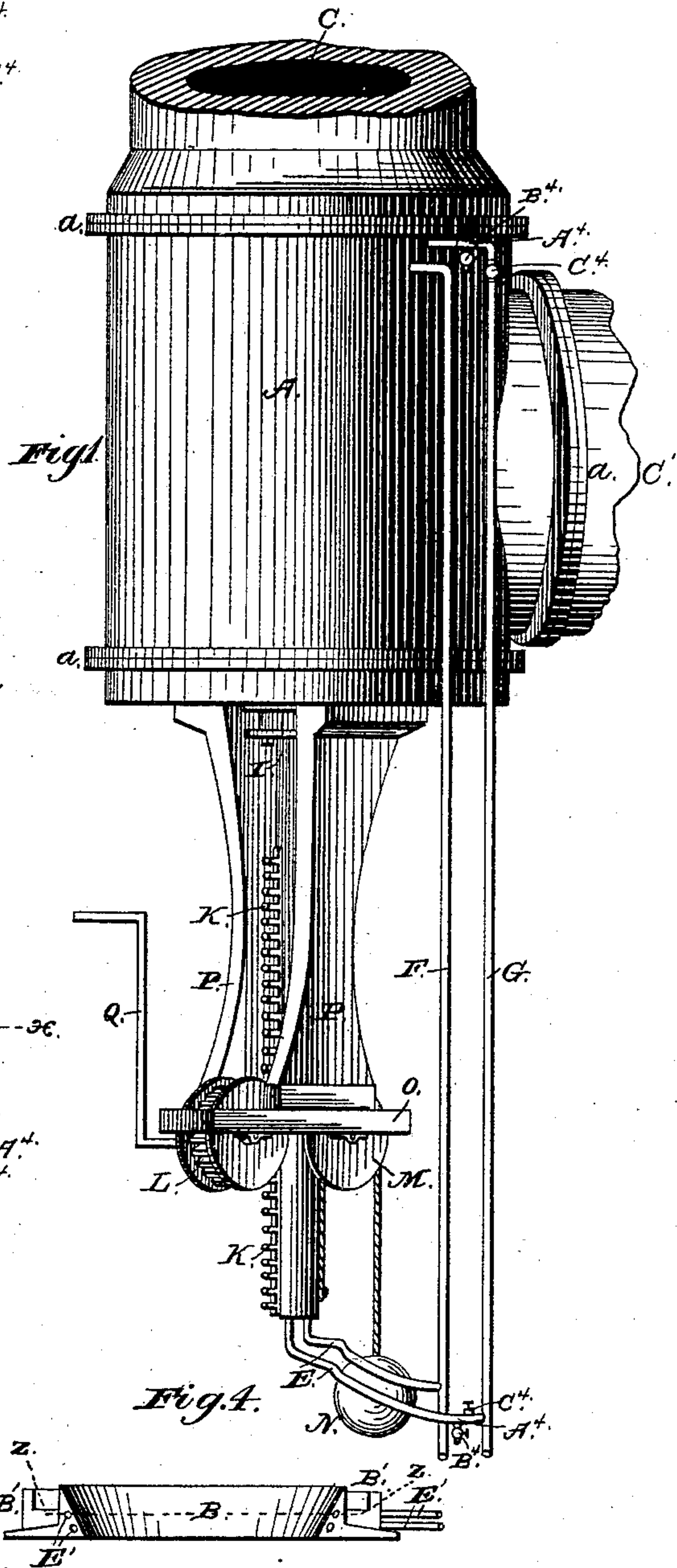
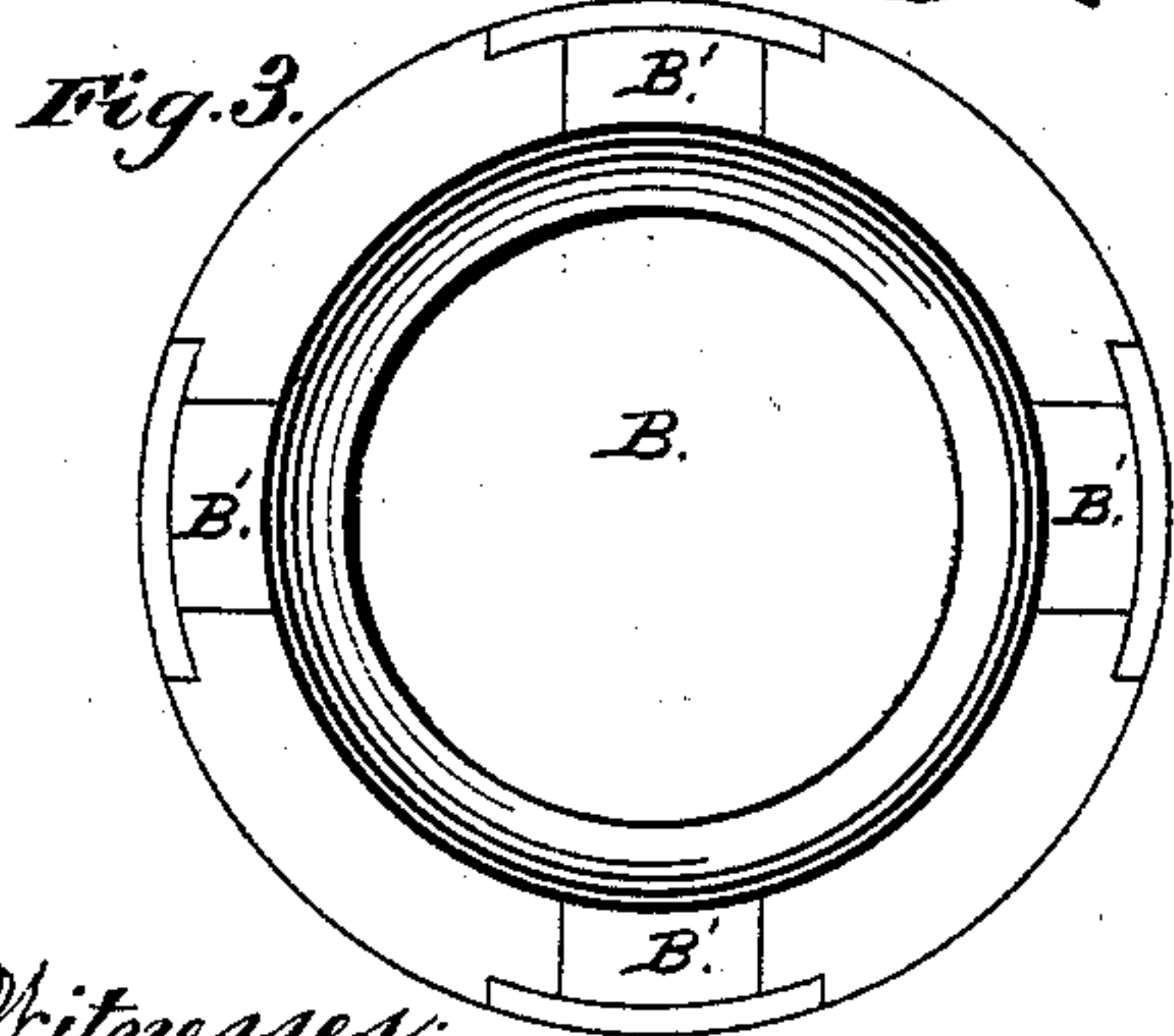
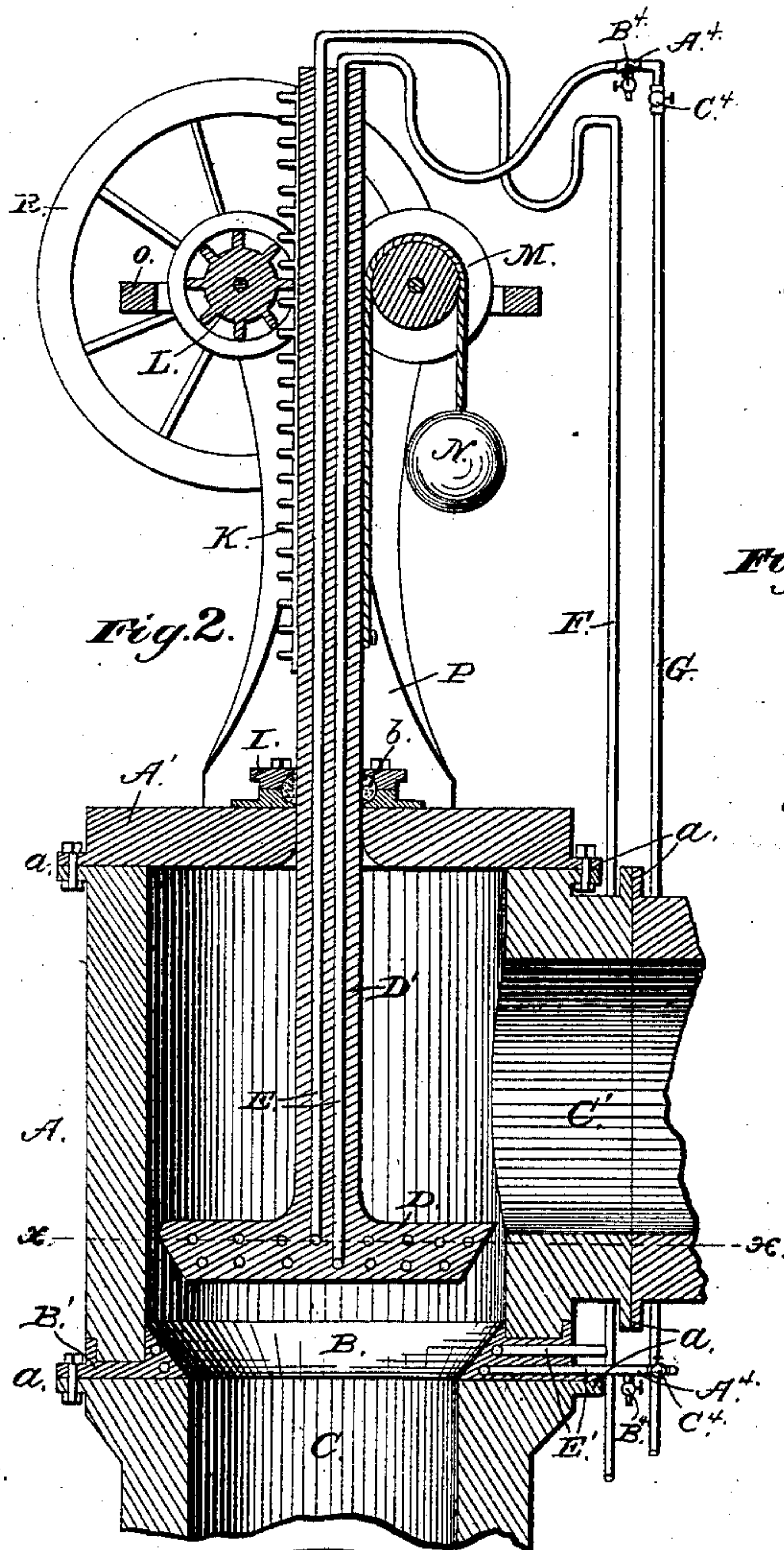
(No Model.)

2 Sheets—Sheet 1.

J. C. LONG.
VALVE.

No. 267,234.

Patented Nov. 7, 1882.



Witnesses:

Jas. E. Hutchinson.
 J. A. Rutherford

Inventor
 John C. Long.
 By his Attorney,
 James L. Norris.

(No Model.)

2 Sheets—Sheet 2.

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VALVE.

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Fig. 5.

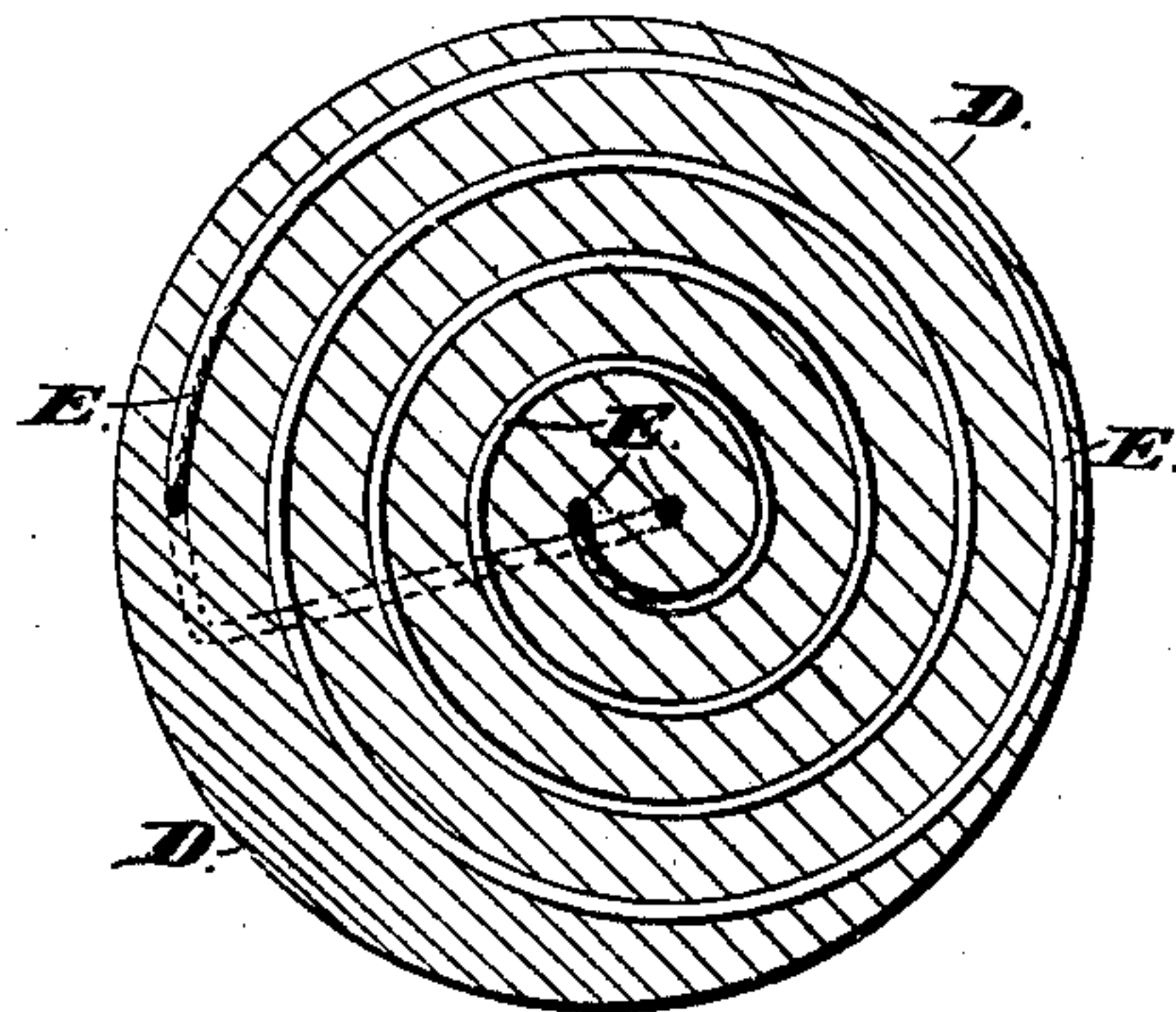
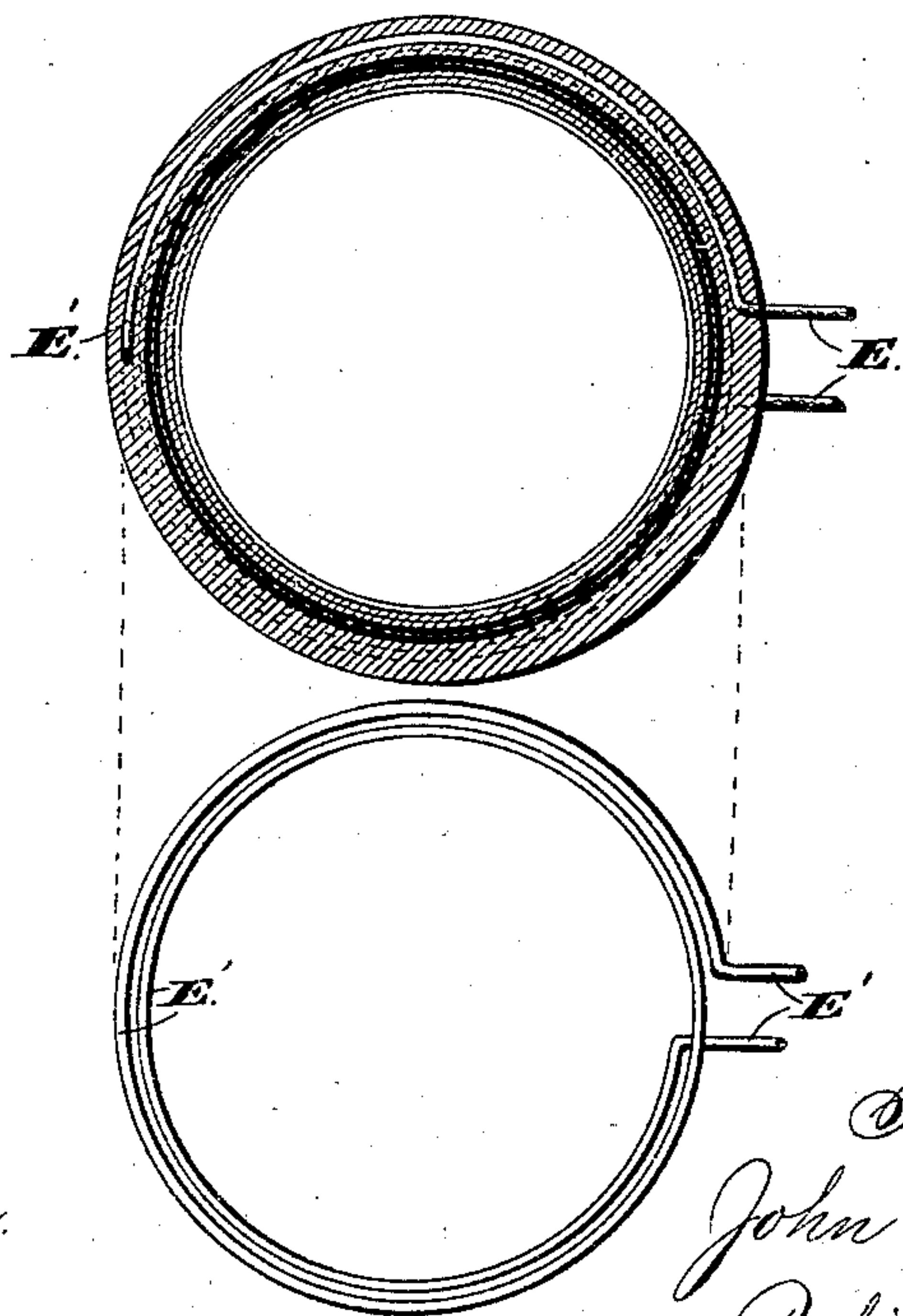


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN C. LONG, OF RICHMOND FURNACE, PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 267,234, dated November 7, 1882.

Application filed January 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. LONG, a citizen of the United States, residing at Richmond Furnace, in the county of Franklin and State of Pennsylvania, have invented new and useful Improvements in Valves for Regenerative Hot-Blast Apparatus, of which the following is a specification.

My invention relates to certain improvements in valves adapted for use in connection with regenerative hot-blast apparatus such as described in Letters Patent Nos. 248,483 and 248,484, granted to me October 18, 1881. In the apparatus referred to, which is especially adapted to produce a degree of temperature or intensity of heat that is only limited by the resistance of the refractory materials composing the apparatus, it is desirable that the valved connections through which the blasts of heated air and gas are made to pass should be so constructed as to resist the destructive effects of the intense heat employed in the metallurgical operations for which such apparatus is particularly designed. It is also necessary that convenient means should be provided for operating said valves, and for causing them to be firmly and positively seated, when desired, regardless of the position in which they may be placed. It is also desirable that means should be provided for the ready and efficient cleaning of the water-passages when required.

To this end my invention consists in providing the valve, valve-stem, and valve-seat with pipes or tubes embedded therein and adapted to convey air or water to the interior of said parts for the purpose of preventing overheating of the same; and, further, in providing means for positively and accurately seating the valve by means of a curved counterbalance-pulley and pinion gearing with a rack on the valve-stem, as hereinafter more fully set forth.

In the annexed drawings, which fully illustrate my invention, and in which like parts are indicated by like letters in the several views, Figure 1 is a perspective view of my improved valve reversed. Fig. 2 is a vertical longitudinal section taken at right angles to the pinion-shaft and illustrating the valve in its normal position. Fig. 3 is a plan view of valve-seat, and Fig. 4 is a transverse section of the

same. Fig. 5 is a horizontal sectional view through the valve, taken on the line xx of Fig. 2. Fig. 6 is a horizontal sectional view through the valve-seat, taken on the line zz of Fig. 4, also showing the cooling-pipe detached.

The letter A indicates the valve-case. B is the conical or beveled valve-seat, and C C' are branches or connections through which the heated air or gas is passed toward and from the valve. The valve-case is provided with a removable head, A', having an opening for the passage of the valve-stem, and this head as well as the branches C C' are connected with the case by means of suitable flanged couplings, $a a$, which may be attached by bolts, or otherwise connected in any suitable and durable manner.

The valve D and its stem or spindle D' are preferably cast in one piece, and have embedded therein a wrought-iron pipe, E, which passes down the spindle D' to the bottom of the valve, then, in a spiral direction, around the bottom and the edges of the valve D, then returns, either directly or in spiral form, to the spindle through the same, and is connected by suitable couplings with supply and waste pipes F and G, respectively. By passing a current of cold air or water through the pipe E it will be seen that the valve and its stem will be cooled, and thus enabled to resist the destructive effects of the heated air and gas in contact with and surrounding the same. These pipes may be provided with T-connections A⁴, steam-cock B⁴, and water-cock C⁴, if desired. By this means the pipes may be readily and effectively cleaned when required, either by the use of water alone under an increased pressure or by the use of steam, or both water and steam, as found convenient. The valve stem or spindle D' passes through a stuffing-box, I, having an annular groove, b , which is filled with asbestos packing, by means of which an air-tight connection is secured. Attached to the spindle D' is a rack, K, which meshes with a pinion, L, having curved sides corresponding with the curved periphery of a counterbalance-pulley, M, placed directly opposite, which pulley fits the spindle accurately and carries the counterbalance-weight N, secured to a cord which moves in the groove formed in the pulley. The shafts of the pinion L and pulley M have bear-

ings in the frame O, supported by the standards P. Motion is imparted to the device by means of the crank Q, or by a rope or chain passing over the grooved wheel R, fastened to the crank-shaft. Both the pulley M and the curved sides of the pinion L are turned so as to accurately fit the valve-spindle, thus forming a support equal to that of a second stuffing-box, but involving much less friction. The spindle and valve are thus kept accurately in line, thereby avoiding one of the great difficulties usually incident to valves of this character.

The valve-seat B, Figs. 3 and 4, is cast in one piece, having lugs B', by means of which it is fastened directly to the sheet-iron valve-casing A. It is cooled by currents of air or water flowing through the embedded pipe E', which is connected with the supply and waste pipes F G, and passes through the valve-seat in a manner similar to that in which the pipe E passes through the valve and its stem. The seat and the valve and its spindle are turned up accurately, and so joined as to form close air-tight joints.

The valve-casing may be lined with fire-brick or other refractory material; or a cast-iron valve-chest having pipes or tubes embedded therein, in a manner similar to that above described, for the passage of cooling-currents of air or water, may be employed, if desired.

By separating the valve-chest and its connections at the joints or couplings a all necessary repairs can be readily executed when required, or a substitution of parts made, if necessary, without difficulty or delay.

It will be seen that the valve can be readily operated in any necessary position or at any angle. In Fig. 1 the valve is shown as arranged to be seated downward, while in Fig. 2 its position is reversed. This is owing to the construction of the valve-stem, by which it is adapted to engage with a pinion on the crank-shaft, a slight movement of which will serve to positively seat the valve, regardless of the position in which it may be placed, and entirely independent of the effects of gravity. When the valve is used in a reversed position,

as shown in Fig. 1, it is only necessary to place the counterbalance-cord on the opposite side of the pulley and end of the spindle, and change the location of the air or water pipe, when the valve can be as readily operated as before.

I do not wish to be understood as broadly claiming a valve for hot-blast pipes having embedded in it a bent pipe for the passage of cold air or water to cool the valve; nor as broadly claiming a water-conducting pipe extending through a valve-stem into a hollow valve; but,

Having thus described my invention, what I claim is—

1. A valve and its stem, having a pipe or pipes for the passage of cooling-currents of air or water, said pipe passed down through the stem, then coiled throughout the valve, near its edges, and passed back through the stem and connected with a supply and waste pipe, substantially as and for the purpose set forth.

2. The combination, with the valve, its stem, and the pipe passing through the stem and coiled spirally throughout the valve, and passed back through the stem and connected with a supply and waste pipe, of the valve-seat B, fixed within the valve-case, and provided with a pipe extending into and through the same for the passage of currents of cool air or water to keep the valve-seat cool, substantially as shown and described.

3. The combination, with the valve and its stem D', having the rack K, of the pinion L, having flanges, and the pulley M, also provided with flanges, and having a weighted cord passed over it and connected to the stem, the flanges of the pinion and pulley extending alongside of the stem, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN C. LONG.

Witnesses:

CHARLES S. LUCAS,
M. CROMER.