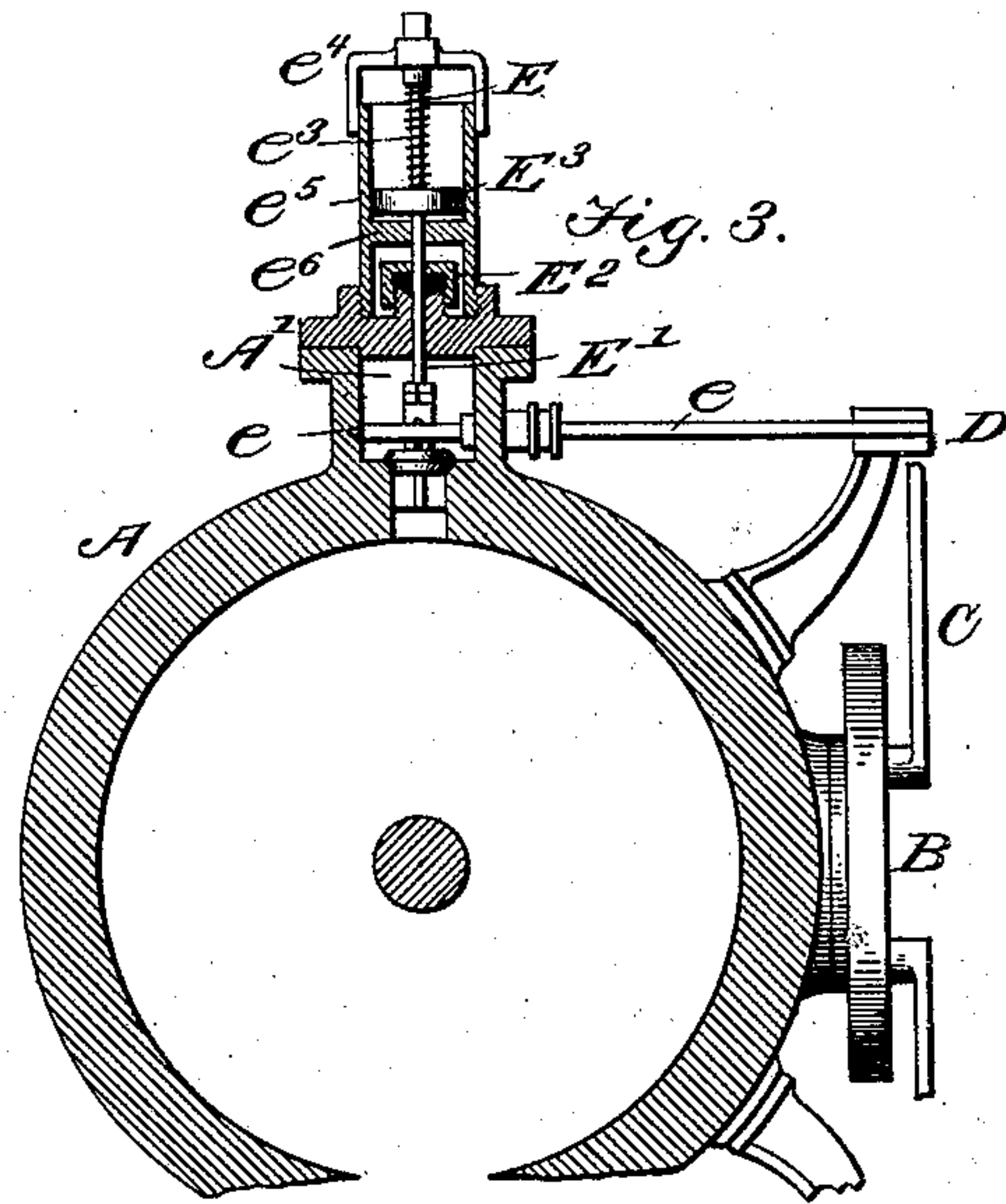
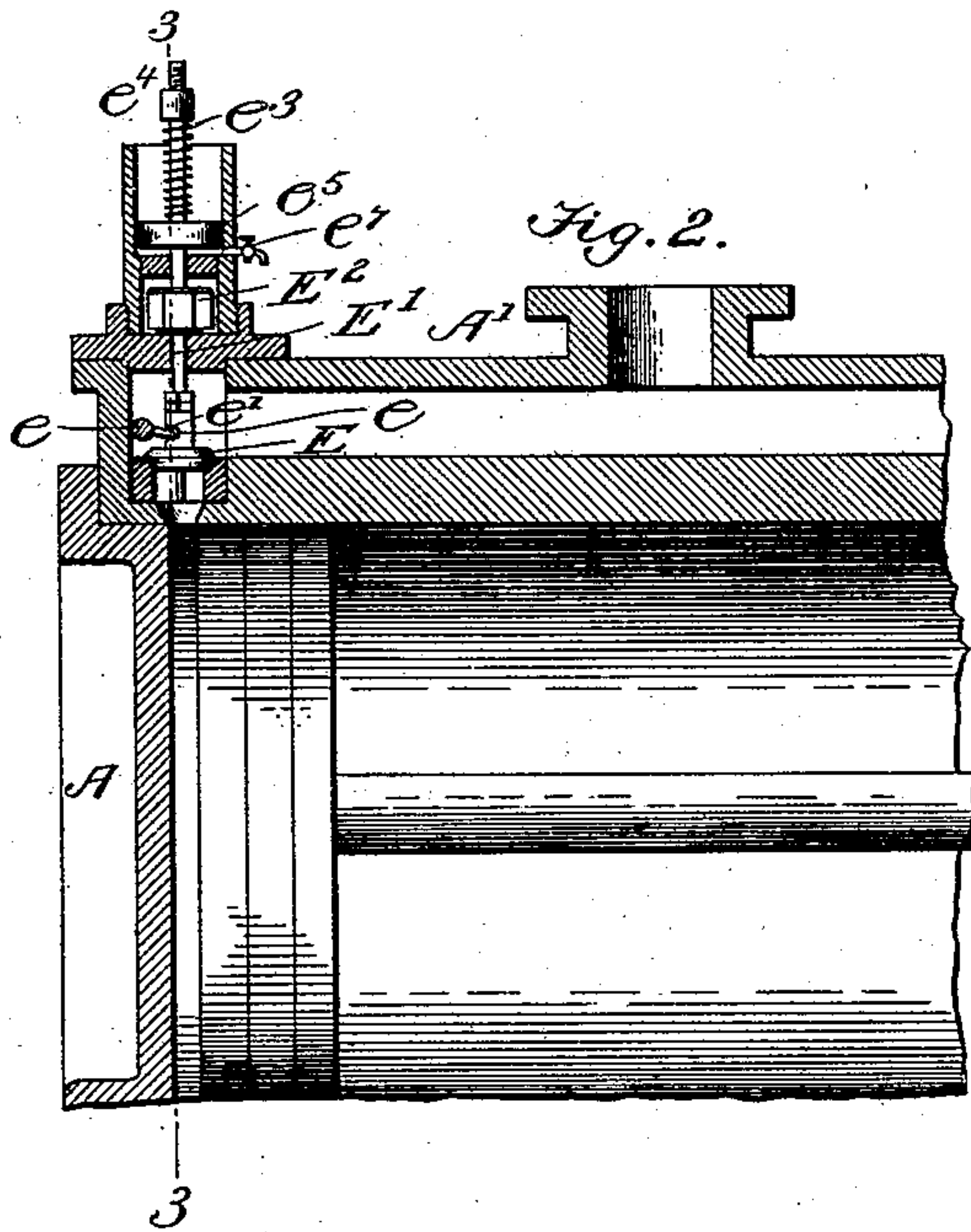
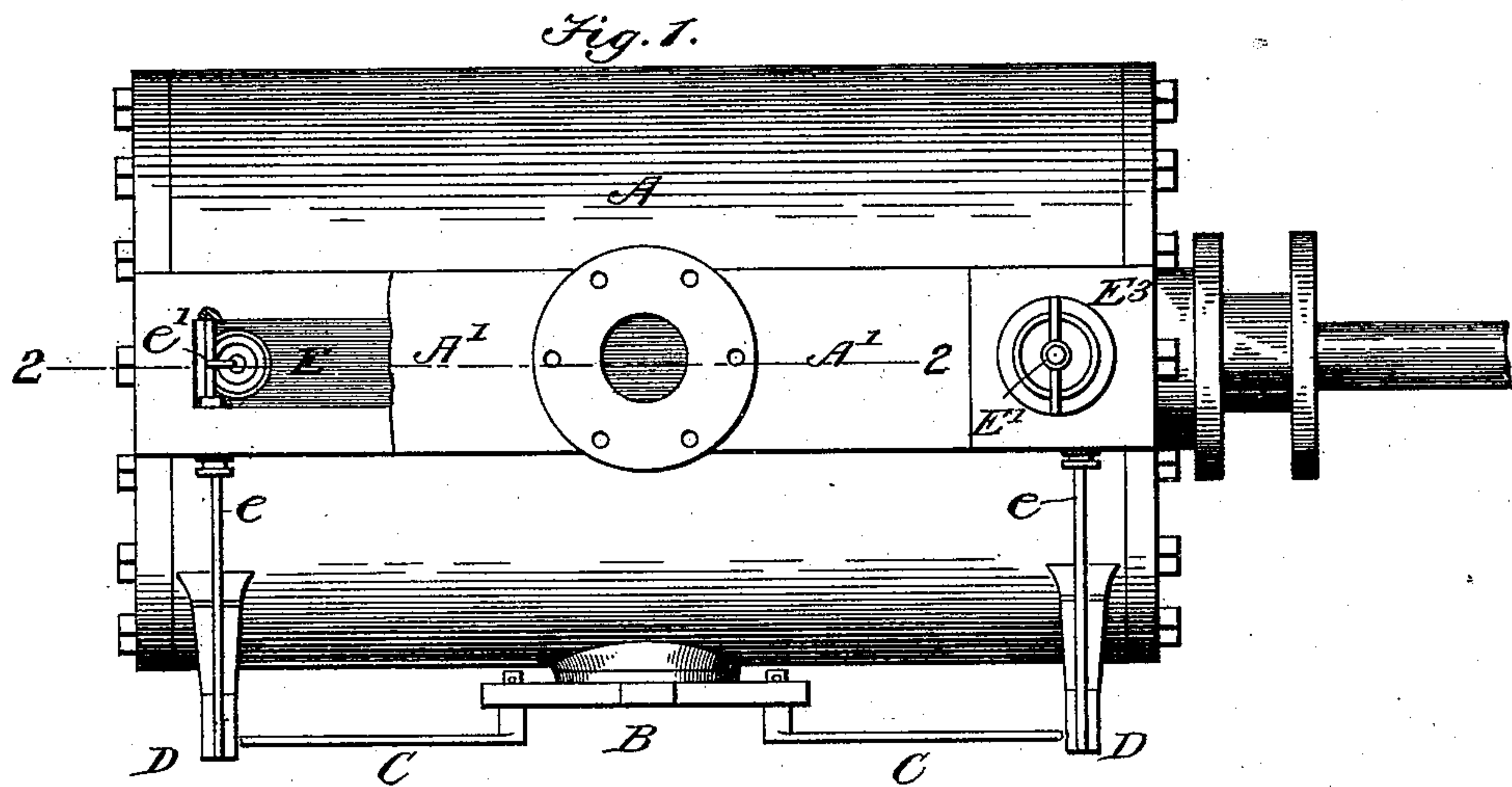


(No Model.)

G. ROTHENBÜCHER.
VALVE GEAR.

No. 477,848.

Patented June 28, 1892.



Witnesses
E. P. Reed
Edwin L. Bradford

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UNITED STATES PATENT OFFICE.

GEORGE ROTHENBÜCHER, OF NEW YORK, N. Y.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 477,848, dated June 28, 1892.

Application filed April 28, 1891. Serial No. 390,802. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ROTHENBÜCHER, a citizen of the United States, residing at New York city, in the county and State of New York, have invented certain new and useful Improvements in Valve-Gears for Corliss Steam-Engines, of which the following is a specification.

In the valve-motion for Corliss steam-engines for which Letters Patent were granted to me, No. 398,751, dated February 26, 1889, the steam-chest is provided with transverse guide-boxes, in which are guided spring-pressed and rectilinear reciprocating inlet-valves, that are operated by means of toes on transverse spindles, which spindles are oscillated by the customary bell-crank connection with the wrist-plate. By practical tests made with an engine built according to the Letters Patent referred to it was found that my valve motion had two serious defects which impaired the usefulness and efficacy of the engine. These defects were, first, the hammering action produced by the blows of the inlet-valves when the inlet-ports of the cylinder were closed, and, secondly, the great transverse length of the inlet-valves, which sometimes produced an unequal setting of the valves to their seats, and consequently the imperfect shutting off of the steam. These defects are intended to be remedied by the improved construction which forms the subject-matter of this specification, and which consists of a valve motion for Corliss steam-engines in which the steam-inlet valves are made of circular shape and adapted to close inlet-ports of corresponding shape, said inlet-valves being operated by the toes of oscillating spindles, which are actuated by bell-crank connections with the wrist-plate. The inlet-valves are provided with valve-stems guided in stuffing-boxes of cylindrical casings arranged at the ends of the steam-chest, said valve-stems being spring-cushioned and provided with pistons which form air-cushions in the cylindrical casings, so as to neutralize the hammering blows of the inlet-valves when closing the ports, as will be fully described hereinafter, and finally pointed out in the claims. In the present case, also, any suitable Corliss type of tripping or cut-off mechanism

is intended to be used on those ends of the oscillating valve-spindle to which the ends of the connecting-rod are attached, the said mechanism, however, not being shown in the drawings.

In the accompanying drawings, Figure 1 represents a plan of the steam-cylinder of a Corliss steam-engine with my improved valve motion, the covering-plate of the left-hand valve-box being removed, so as to show the interior construction. Fig. 2 is a vertical longitudinal section of the cylinder and valve-gear on line 2 2, Fig. 1, the lower portion of the cylinder being broken away; and Fig. 3 is a vertical transverse section on line 3 3, Fig. 2, the bottom being broken away.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the steam-cylinder of a Corliss steam-engine; B, the wrist-plate, which is centrally pivoted to the side of the steam-cylinder; and CC are pivot-rods that connect the wrist-plate B with the bell-cranks D, which are applied to the outer ends of spindles *e* and by which the steam-inlet F is intermittently operated, as customary in steam-engines of this type. Intermediate of the valve-spindles and connecting-rods any suitable form of tripping or cut-off mechanism (not shown) is employed. The wrist-plate B is operated in the usual manner by an eccentric on the driving-shaft and suitable connecting-rods to open and close the valves at regular intervals, as shown and described in my Letters Patent before mentioned. The inlet-valves E are located at the top part of the steam-cylinder A and are preferably made of circular shape and fitted into corresponding seats of the inlet-ports of the steam-cylinder A. Each inlet-valve E is guided by downwardly-extending guide-lugs in the inlet-port and by a valve-stem E' in a stuffing-box E², that is applied to the top plate of the steam-chest A' above the inlet-valve E, as shown in Figs. 2 and 3. Each oscillating spindle *e* is provided with a toe *e'*, which engages a recess *e*² in the stem of the inlet-valve E. The upper ends of the valve-stems E' are acted upon by spiral springs *e*³, that are interposed between a fixed yoke *e*⁴, attached to the upper part of a cylindrical casing E³, and

a piston e^5 , attached to the upper part of the valve-stem. The piston e^5 is guided in the cylindrical casing E^3 , which is provided with a horizontal partition e^6 above the stuffing-box and with a small air-opening e^7 above said partition, which air-opening may be closed by a small stop-cock. The spiral spring e^3 exerts a downward pressure on the piston e^5 of each inlet-valve E and will quickly close the valve as soon as the lifting motion imparted by the toe of the oscillating spindle e is interrupted. This downward motion is, however, retarded by the action of the piston e^5 , which, in connection with the air-cushion in the cylinder E^3 , prevents the hammering blows exerted by the valve in closing the steam-port of the cylinder. The air-cushion formed in the casing E^3 between the piston and the partition of the casing retards the downward motion of the valve, as the air below the piston can but slowly escape through the air-opening, and undergoes thereby a certain compression, so that the sudden blows of the valve are prevented in a similar manner, as the dash-cups prevent the too sudden motion of the valves heretofore used in Corliss steam-engines. By the upward motion of the inlet-valve E , which is imparted by the upward motion of the toe of the spindle, the air is drawn in again, said motion being slightly retarded by the counteracting influence of the spiral spring on the piston, so that the vertically-reciprocating motion of the inlet-valve does not take place in a sudden and jerky manner, but in a steady and easy manner, whereby the hammering noise is prevented and the more positive and reliable opening and closing of the inlet-valve obtained.

The exhaust-valves F may be constructed in any well-known or ordinary manner and

operated by any of the usual means and form no part of this invention.

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

1. The combination, with a steam-cylinder and steam-chest, of spring-pressed rectilinear reciprocating inlet-valves, valve-stems on said inlet-valves, oscillating spindles having toes for engaging recesses of said valve-stems, pistons on said valve-stems, and guide-cylinders having air-openings and forming air-cushions for the inlet-valves, substantially as set forth.

2. The combination, with a steam-cylinder and steam-chest, of spring-pressed rectilinear reciprocating inlet-valves, valve-stems on said inlet-valves, oscillating spindles having toes for engaging recesses of said valve-stems, stuffing-boxes for said stems, pistons on said valve-stems, and guide-casings provided with partitions and air-openings, so as to form air-cushions for the pistons of the inlet-valves, substantially as set forth.

3. The combination, with a steam-cylinder and steam-chest, of steam-inlet valves guided in the inlet-ports of the cylinder, valve-stems provided with recesses, oscillating spindles operated by bell-crank connections with the wrist-plate, and toes on said spindles for engaging the recesses of the inlet, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

GEORGE ROTHENBÜCHER.

Witnesses:

PAUL GOEPEL,
A. M. BAKER.