

F. A. JONES.  
Automatic-Damper Regulator.

No. 223,446.

Patented Jan. 13, 1880.

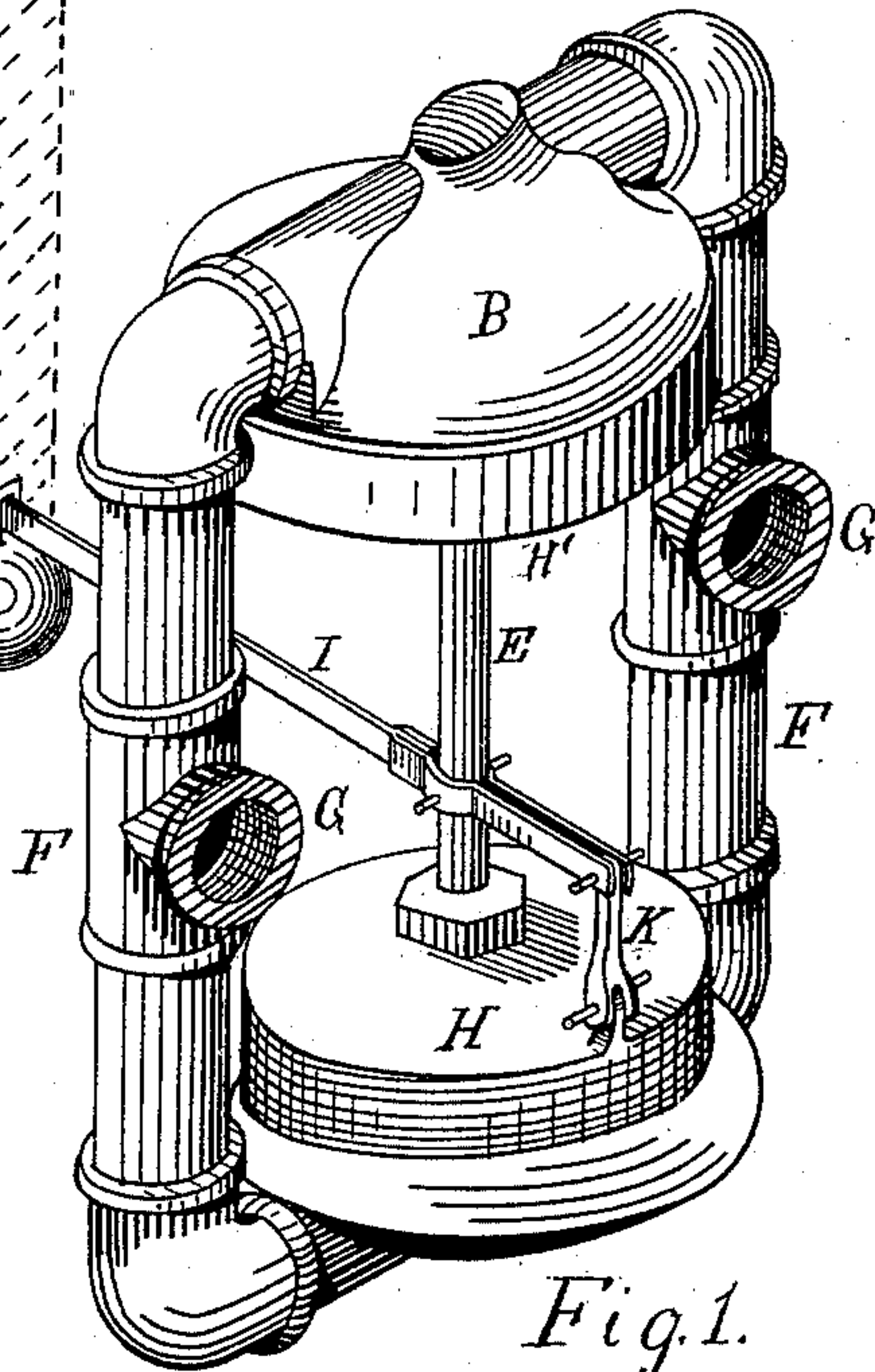
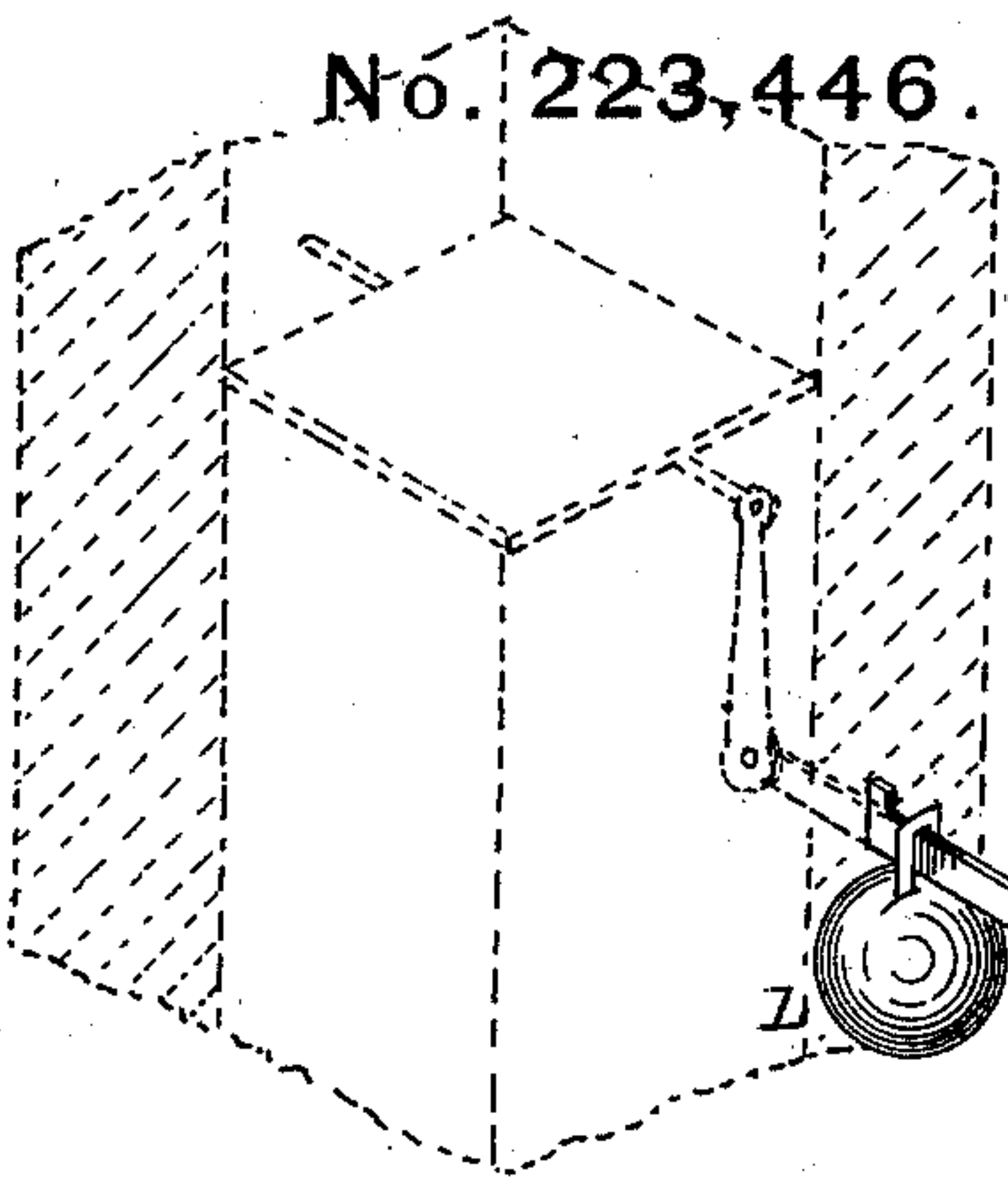


Fig. 1.

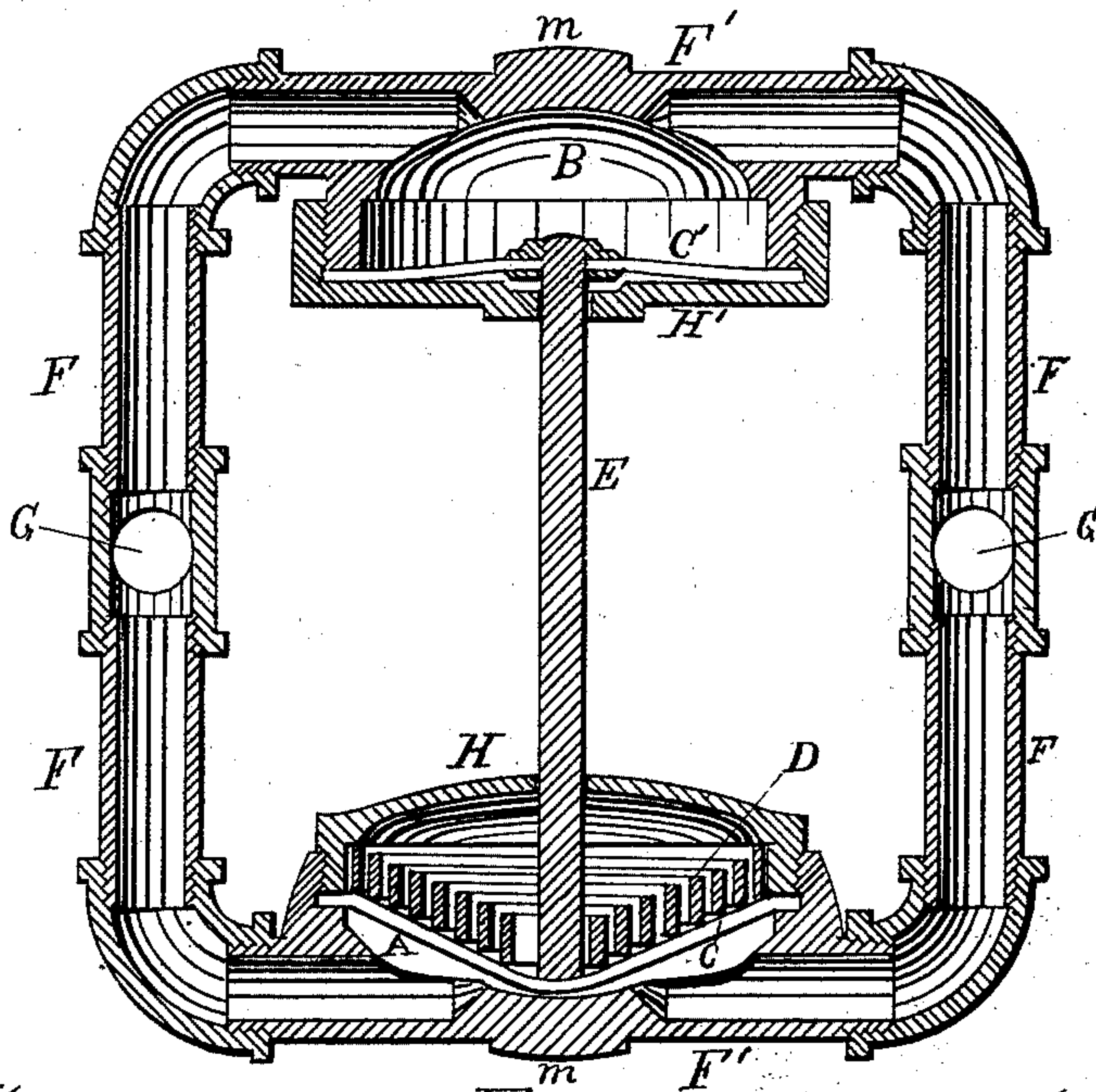


Fig. 2.

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# UNITED STATES PATENT OFFICE.

FLORENTINE A. JONES, OF NEW YORK, N. Y.

## AUTOMATIC DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 223,446, dated January 13, 1880.

Application filed April 29, 1879.

*To all whom it may concern:*

Be it known that I, FLORENTINE A. JONES, of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Automatic Damper-Regulators, of which the following is a specification.

The object of this invention is to provide a simple and efficient means for operating the damper of a steam-boiler furnace, so that the degree of heat in the furnace may be automatically regulated for the requirements of the boiler.

The invention consists in the employment of one or more diaphragms, in connection with a spring or springs arranged in suitable steam-chambers, and actuated by steam-pressure in such a manner as to cause to be raised or lowered a connecting-rod, to which is attached a lever connected directly or indirectly with the arm of the damper in the furnace-flue.

Referring to the accompanying drawings, Figure 1 represents a perspective view of an instrument or apparatus embodying my invention, and Fig. 2 is a vertical longitudinal section of the same.

A and B represent two steam-chambers connecting with each other by means of the tubes F F, as shown, and the tubes F F are connected in any suitable manner with the boiler by means of tubes attached to the openings G G. Instead of connecting at G G, these openings may be closed, and the steam be made to enter openings at *m m* in the upper and lower steam-chambers, B A, by tubes properly connected with the boiler. In the chambers A and B are arranged, respectively, diaphragms C C', secured in the same by means of the caps H H, as shown. Within the chamber A is arranged a volute spring, D, above the diaphragm C, and pressing the same downward. To the center of spring D is secured a connecting-rod, E, which is also attached, at its upper end, to the diaphragm C' in chamber B. To the rod E is pivoted a lever, I, connected at one end to the lower steam-chamber casing by means of hinged link K, as shown. The free end of the lever I is to be connected, by means of one or more levers, to the flue damper-rod in any suitable manner. A weight, L, may be placed on the lever I for the purpose of accurately adjusting the closing of the damper.

For ordinary use one spring, in connection with the diaphragms, may be sufficient for the operation of the device. In case of very high pressure an additional spring may be similarly applied to the upper diaphragm, C', in chamber B.

In the application of my invention to boilers of very low pressure the diaphragm C and spring D in chamber A are sufficient to actuate rod E, and consequently the flue-damper, without the necessity of using the diaphragm C' in chamber B. In this case the upper portion of the device on a line with the openings G G may be dispensed with, the ends of the tubes closed, and steam be admitted to the chamber A through an opening made at *m* at the bottom of said chamber.

It will be seen that the diameter of the diaphragm C' is smaller than that of C in chamber A, so as to expose a smaller area to the action of the steam, for the reason that if the surfaces exposed to the action of the steam were of the same area in both diaphragms the force exerted upon one diaphragm would be equal to that upon the other, and consequently produce no effect upon the connecting-rod.

In operation, the steam is caused to enter the tubes F F by means of tubes connecting the openings G G with the boiler in any suitable manner. The steam then passes into the chambers A and B, exerting its force on the diaphragm C upward and on diaphragm C' downward. As diaphragm C presents the largest area, the pressure of steam on the same will be the greatest, thus carrying up the connecting-rod E and pressing up diaphragm C'. Inasmuch as diaphragm C cannot rise without compressing spring D, it follows that it will reach a point where the pressure downward of diaphragm C', aided by the resistance of spring D, will exactly equal the pressure upward of diaphragm C. When the pressure of steam is reduced in the boiler it will be correspondingly reduced on the diaphragms; but the force of spring D will remain the same, and will have the tendency to draw the rod E downward until it ceases to act, so as again, with the diaphragm C', to equal the pressure on diaphragm C, thus actuating the connections to the damper and causing the latter to open or close as the pressure of the steam diminishes or increases.

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

1. In an automatic draft-regulator, the combination of the diaphragm C' with the diaphragm C and spring D, and the rod E, all constructed and arranged as shown and described.

2. In an automatic draft-regulator, the combination of the diaphragm C' with the diaphragm C and spring D, and the rod E and lever I, all constructed and arranged substantially as shown and described.

3. In an automatic damper-regulator, the combination of two diaphragms, arranged each within a separate steam-chamber, substantially as and for the purpose described.

4. The combination, in an automatic damper-regulator, of two diaphragms, arranged each in a separate steam chamber, and connected together by a rod, E, or its equivalent, and one or more springs, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

F. A. JONES.

Witnesses:

J. H. ADAMS,

J. CUNNINGHAM.