

J. K. STAYMAN.

Improvement in Automatic Steam-Traps.

No. 127,382.

Patented May 28, 1872.

Fig. 1.

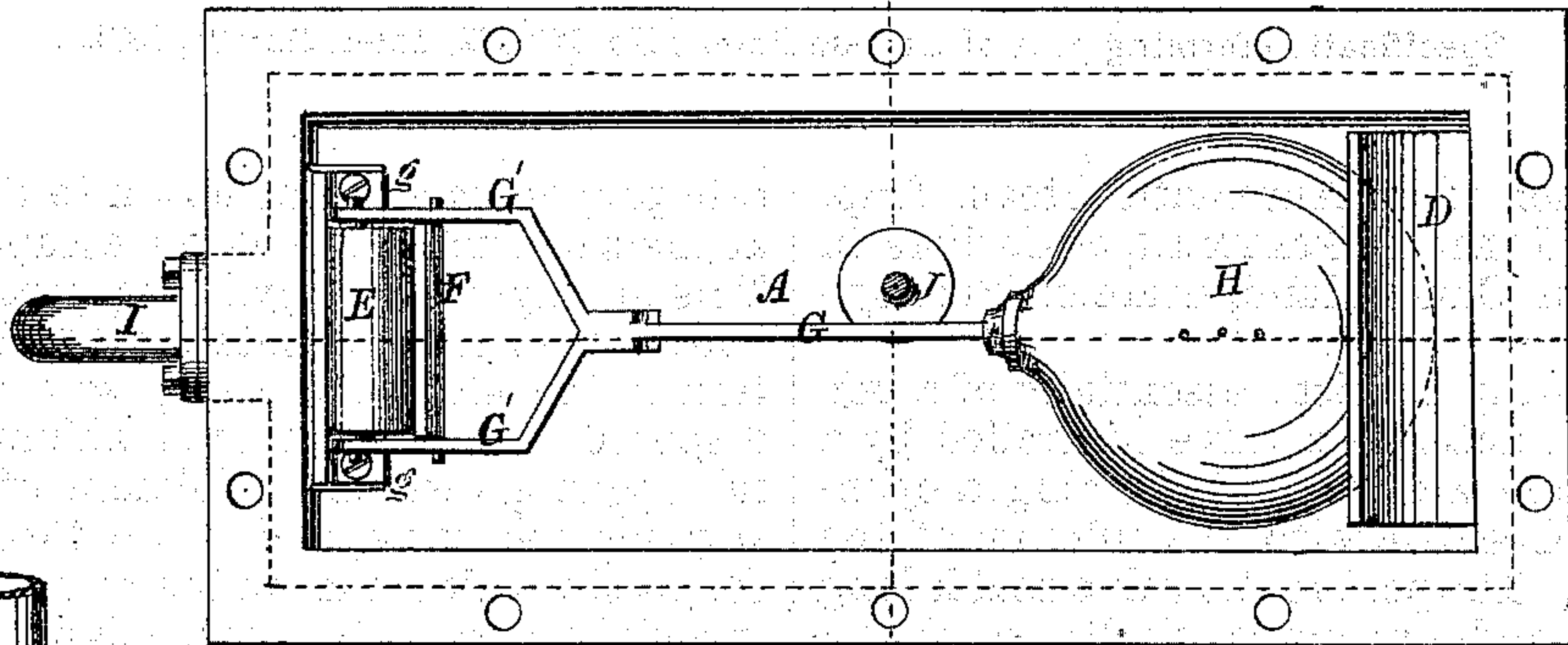


Fig. 2.

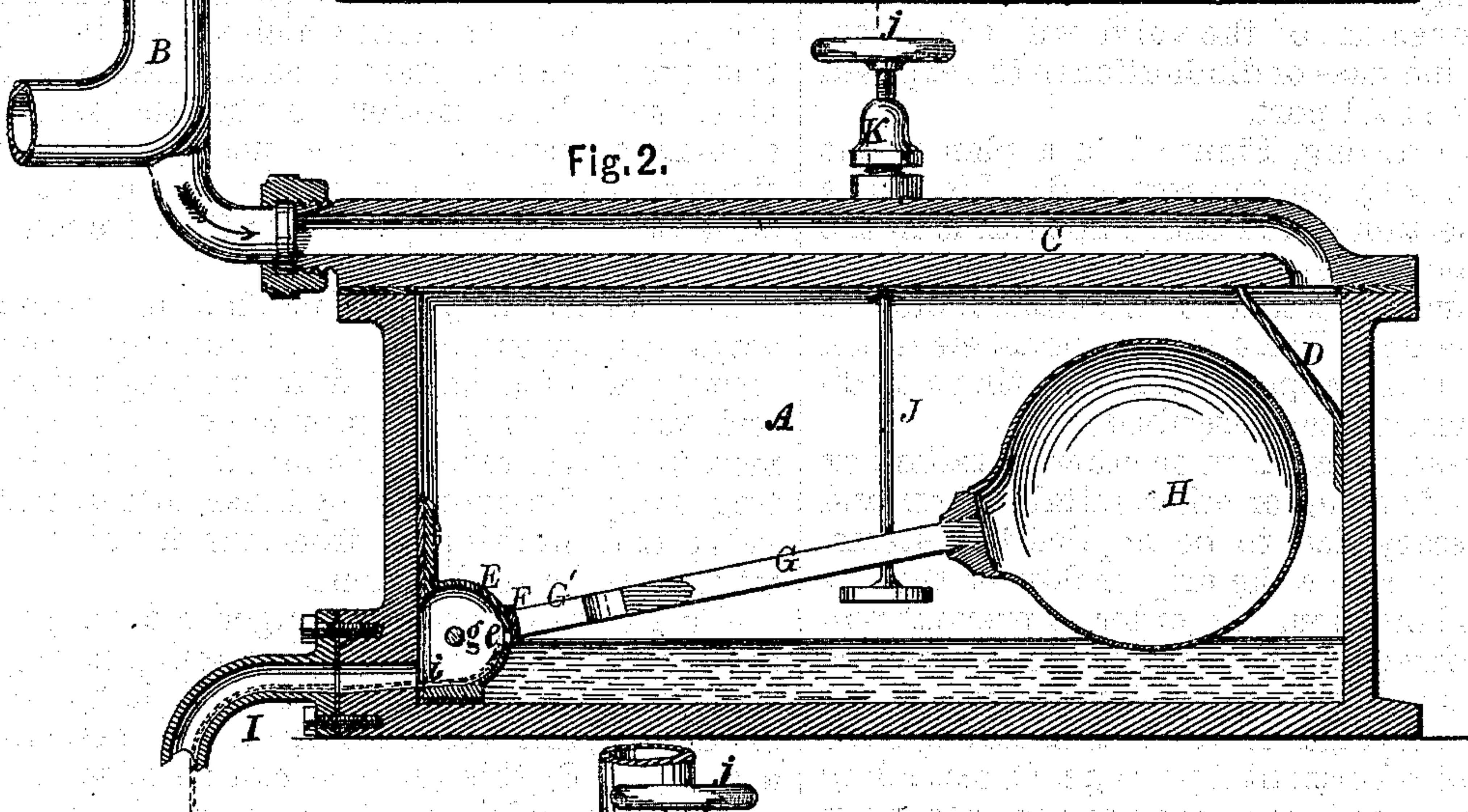


Fig. 3.

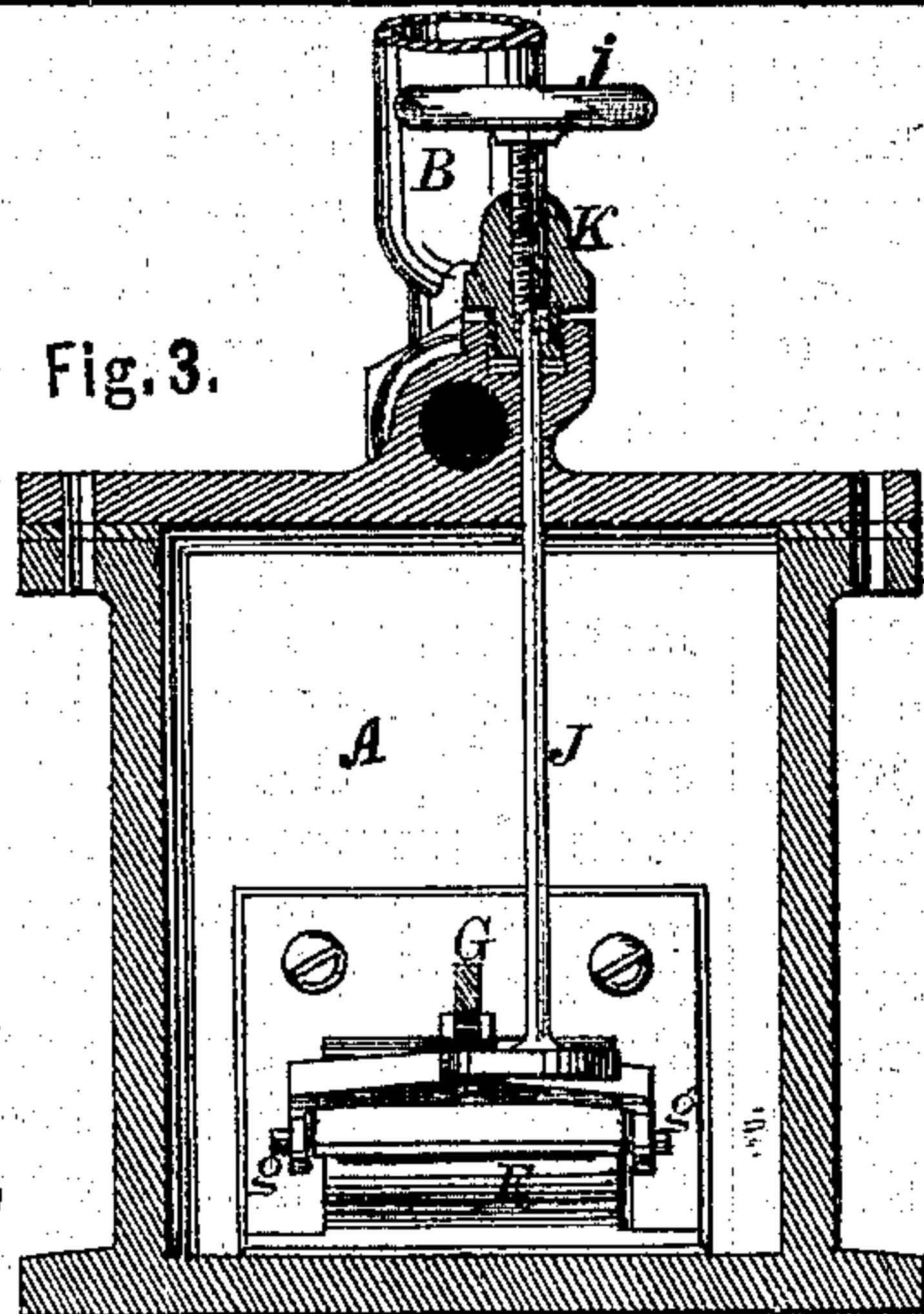
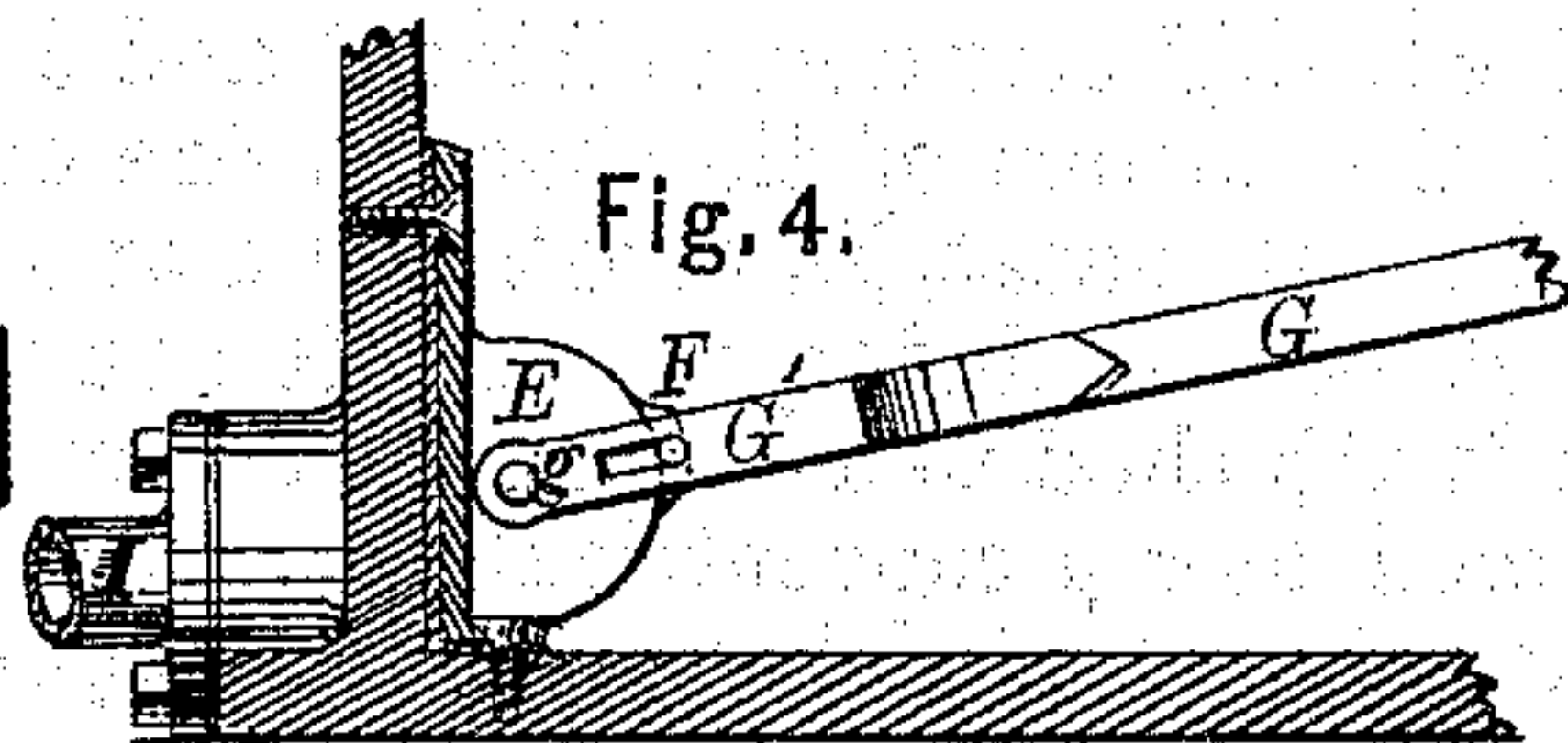


Fig. 4.



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IMPROVEMENT IN AUTOMATIC STEAM-TRAPS.

Specification forming part of Letters Patent No. 127,382, dated May 28, 1872.

Specification of an Automatic Steam-Trap, invented by JOHN K. STAYMAN, of Carlisle, in the county of Cumberland, State of Pennsylvania.

My steam-trap consists essentially of a box or casing, an automatic valve controlled by a float-lever, and a valve-seat, forming a cylindrical arc concentric with the fulcrum of the valve-lever. The port in the valve-seat is long horizontally and narrow vertically, so that a slight movement of the valve will effect considerable increase or diminution in the exposed area of the said port.

In the drawing, Figure 1 is a plan of the apparatus with the top removed. Fig. 2 is a vertical section of the entire apparatus in the plane indicated by the line *x x*, Fig. 1. Fig. 3 is a transverse section in the plane indicated by the line *y y*. Fig. 4 is a sectional elevation of a part of the apparatus, illustrating a modification hereinafter described.

A represents an iron or other metallic box or chest, of oblong or other suitable form and any necessary size, to be applied to a steam-pipe, B, to receive the drip or flow of the water of condensation. In order to prevent pulsation or irregular movement of the automatic valve mechanism hereinafter described, the water is delivered to the box A through the medium of a horizontal passage, C, extending from end to end, or it may be received upon an apron, D; or both these appliances may be combined, as illustrated in Figs. 1 and 2. At or near the bottom of the box, at one end, is formed a valve-seat, E, constituting an arc or segment of a cylinder, so that the valve F, which is attached to arms G' G' of a lever, G, fulcrumed at *g g* concentrically to the valve-seat, may be adapted to move freely upon the said seat and form a sufficiently tight joint therewith. The port or opening in the valve-seat consists of a narrow horizontal slit, *e*, which, by reason of this peculiar form, may be opened or closed with a slight movement of the valve. To the free end of the arm D is attached a float, H, so that the valve will be opened by any accumulation of water in the box A. Within or covered by the valve-seat E is a discharge-opening, *i*, communicating with the waste-pipe I. The parts are to be so adjusted and combined as to deliver into the waste-pipe the water of condensation at a

rate proportioned to its flow into the box, and at the same time permit no escape of steam. This arrangement of cylinder, port, and valve will be seen to constitute a valuable modification of the stop-cock, being so arranged and disposed as to present the maximum horizontal opening with the minimum of friction in working the same, and to produce the greatest possible difference in the opening and closing of the port by the least possible motion of the valve and the float which works it. By this arrangement great sensitiveness is combined with little motion, so that the perpendicular movement of the float and valve through an arc of a few degrees will either close the trap entirely or work it at its maximum capacity.

The device may be modified in various ways—as, for example, by introducing a horizontal port of (slightly) different proportions, and cutting away the outside cylinder into a mere valve, (to reduce friction, &c.) or by cutting away the internal cylinder into a mere valve and working it from the interior, as might also be readily done.

J is a metallic hook or flanged rod, adapted to engage beneath the lever G, passing through a stuffing-box or steam-fitting, K, in the top of the box, and terminating on the outside in a knob, *j*. By this the float can be raised and the valve opened and kept open for any desired time, so as to remedy all difficulties connected with the freezing of the water in the trap, to gain other ends to be hereafter specified.

The valve may be connected with the arms of the lever G by either of the two following methods, and I propose to use either mode in any trap, as it may be found to be most desirable. By the first method the valve is attached immovably to the lever, as seen in Fig. 2, so as to be in proper contact with the port of the cylinder or valve-seat surrounding the slit or port. By this arrangement I secure the working of the valve independently of the friction produced by the pressure of the steam upon said valve. By the wear due to the presence of impurities, &c., in the water, there may arise the escape of a very thin sheet or film of water, even when the valve is closed; but the escape of this film will be no disadvantage if it is always less than the minimum

inflow of water into the trap. The other method consists in placing the ends of the valve in its grooves in the arms of the lever, as illustrated in Fig. 4, so that the pressure of the steam will always keep the valve hard against the face of the cylinder or valve-seat, the slots allowing the valve to fall back toward the center of motion as it and the seat wear away. This method can be used in cases where the inflow is very irregular, or where it would at certain times be less than the leakage possibly occurring in the former method, thus making that method objectionable.

The box or steam-chest may be of any desired size and proportions. It is intended to cast it in two sections, as will best suit the convenience, for insertion of cylinder, lever, float, &c. It will also be cast with such flanges or projections as may best suit the fitting of it together steam-tight.

K represents the apron applied in the inside of the trap. It serves to protect the float, and at the same time necessitates no increase in the size of the trap, nor any difficulty in the casting of the same. It consists of a mere sheet of brass fastened to the side of the trap, as shown in Figs. 1 and 2.

As a substitute for the ordinary float I purpose in some cases to use the following modification: This float may be made of thin copper, as it will not be required to withstand the pressure of the steam. It will be open at the top by a small hole or perforation of such size as will be found on trial best to answer the end in view—namely, to provide for the ingress and egress of steam under changes of temperature, and the speedy removal of any water that may condense therein by the raising of the said float by means of the outside knob and the hook, thus subjecting it to a steam-bath and thereby evaporating its contents.

Advantages.

My apparatus possesses the following general advantages: First, smallness of size; second, convenience and ease of application; third, simplicity of construction; fourth, non-liability to get out of order. Also the following special advantages: First, by the use of

my concentric sliding valve and its connection with the port and lever it may be rendered independent of the pressure of steam, and of the friction consequent thereon, in the operation of said valve. Second, by the same arrangement of valve and port it is rendered independent of the currents established and maintained by the outflow from the trap in the operation of said valve. Third, by the peculiar form and position of the long and narrow horizontal port and valve the apparatus is made to possess great sensitiveness and promptness of adjustment on the part of trap, so that it shall accurately proportion the delivery of the water to the inflow. This continuous and regular action, by which all the water is delivered and the steam completely trapped, constitutes the excellence of its automatic character. Fourth, the position of the port and valve will not permit the latter to clog or become embarrassed in its action by foreign substances entering the trap. Fifth, the apparatus possesses great advantages over plug and other valves which must be operated against the pressure of the steam in the trap, and which act more or less intermittently, and I am thus enabled to make a smaller, cheaper, more convenient, and better trap than is possible by such other arrangements.

Various modifications may be adopted in the mode of connecting the trap with the pipes, to suit the necessities of any particular case.

Stop or trial cocks may be added, if desired.

Claims.

I claim as my invention—

1. The segmental or curved valve-seat E, having a long and narrow horizontal port, e, and used in connection with a valve, F, controlled by a float-lever, G H, fulcrumed concentrically to the valve-seat.

2. The steam-trap herein described, consisting of the box A, cylindrical valve-seat E, valve F, lever G, float H, and rod J, arranged to operate substantially as and for the purposes described.

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Witnesses:

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