

No. 723,052.

PATENTED MAR. 17, 1903.

W. G. SINNAMON.
COLLAPSIBLE PISTON VALVE.

APPLICATION FILED NOV. 15, 1902.

NO MODEL.

Fig. 1.

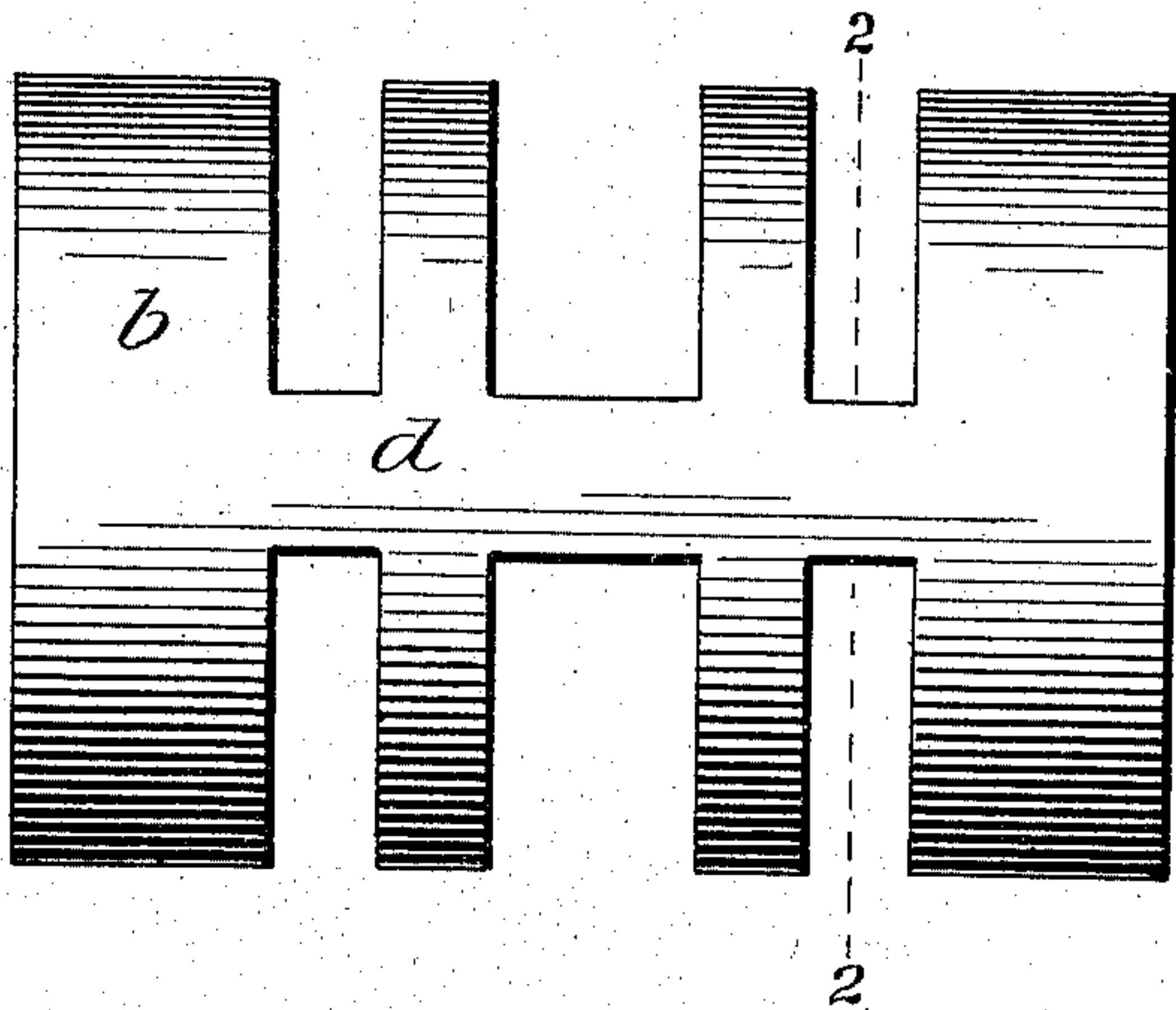


Fig. 2.

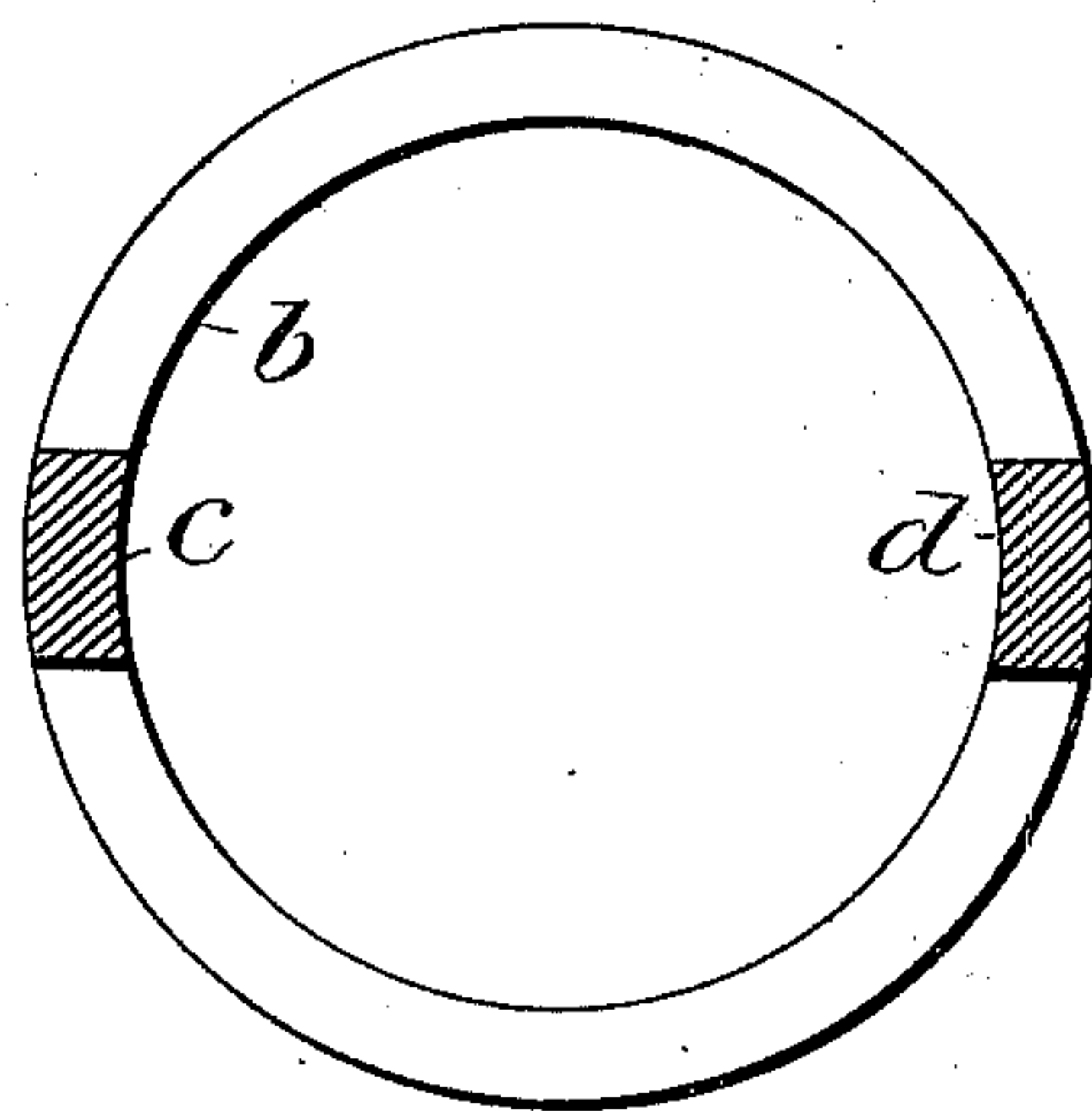


Fig. 3.

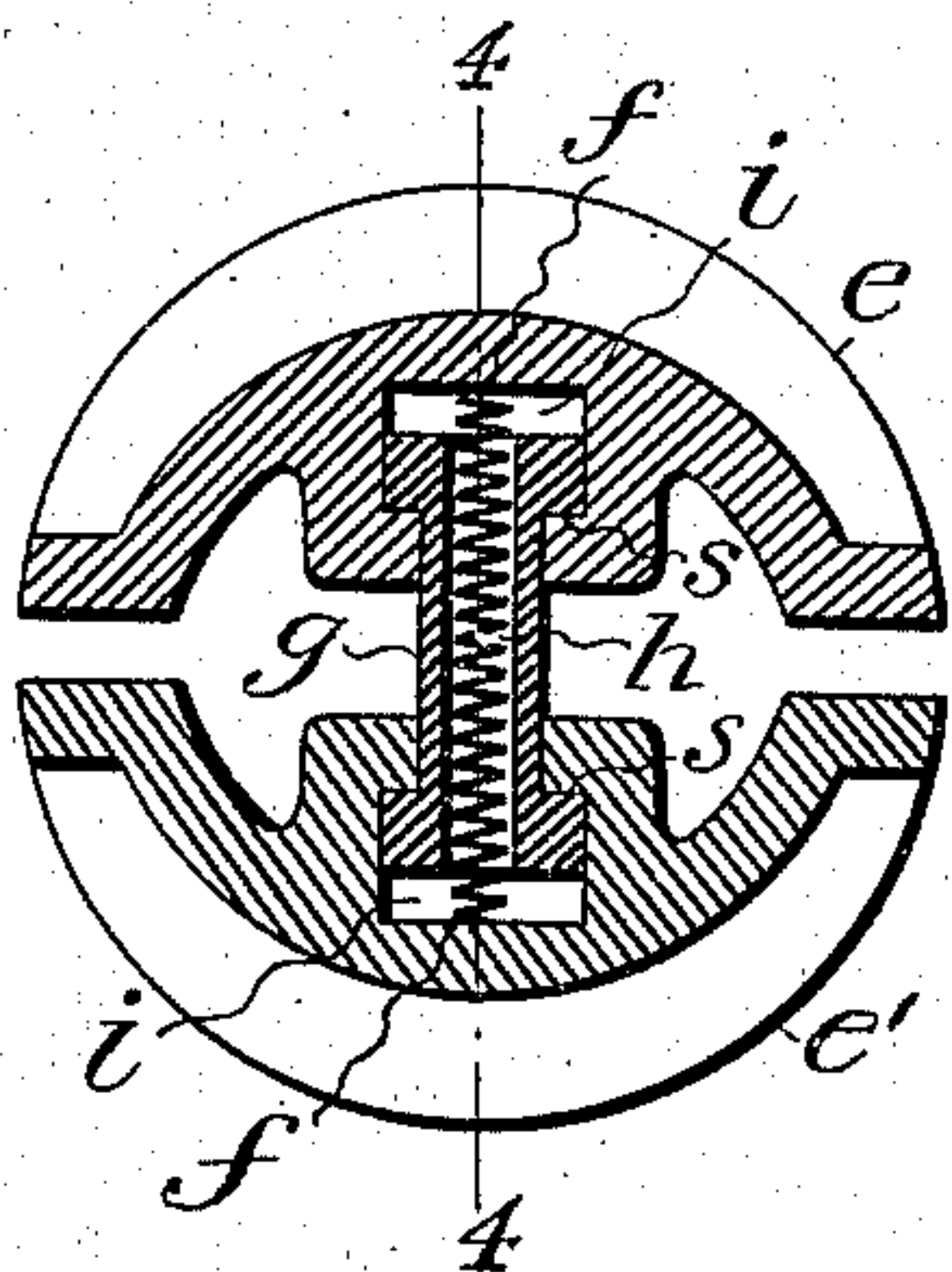


Fig. 4.

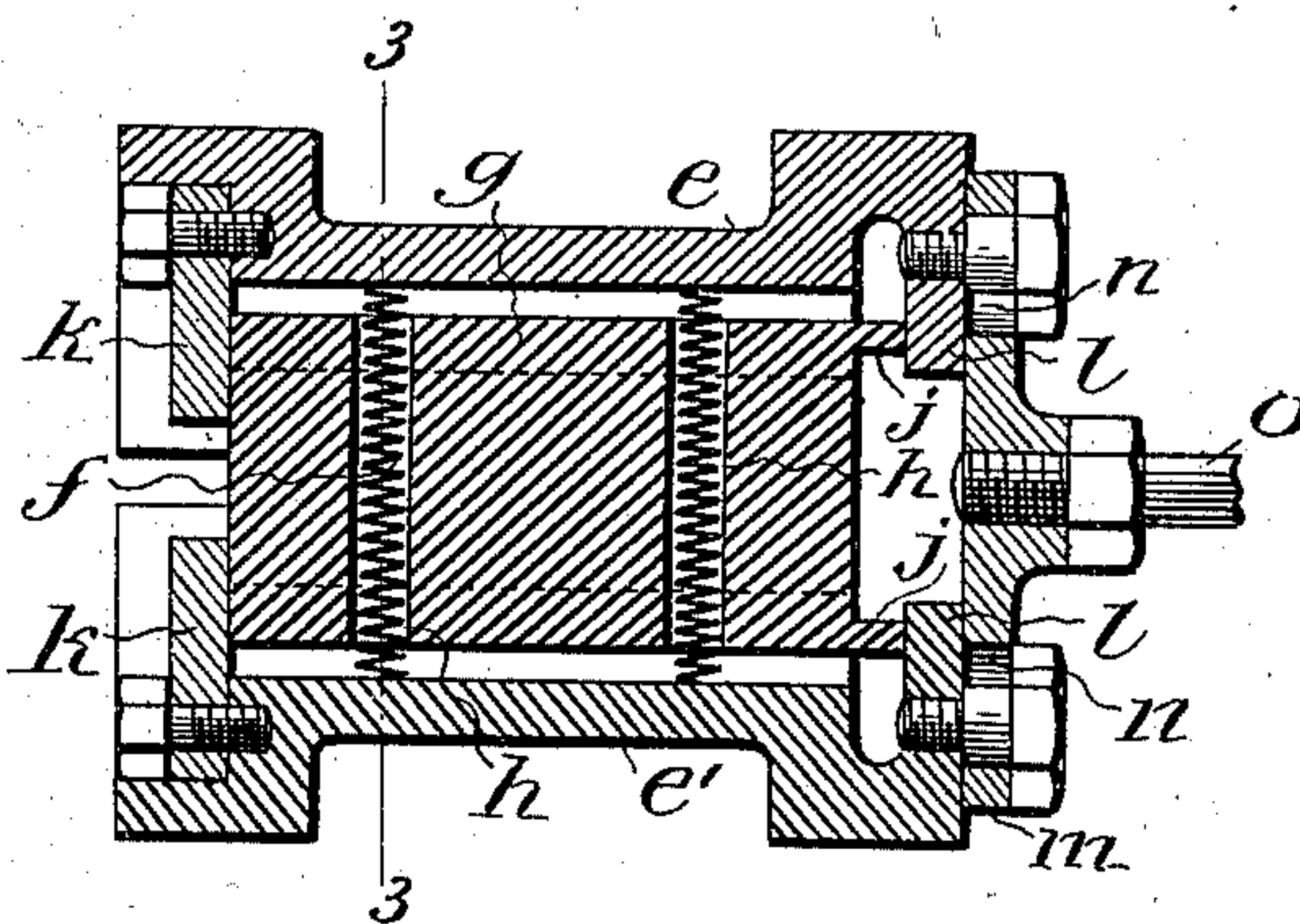
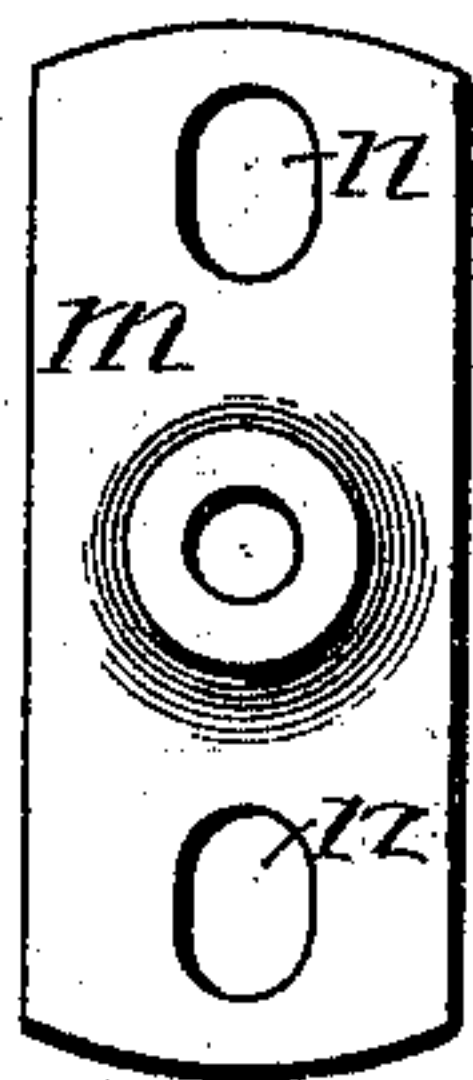


Fig. 5.



Witnesses :
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UNITED STATES PATENT OFFICE.

WILLIAM G. SINNAMON, OF SYRACUSE, NEW YORK.

COLLAPSIBLE PISTON-VALVE.

SPECIFICATION forming part of Letters Patent No. 723,052, dated March 17, 1903.

Application filed November 15, 1902. Serial No. 131,559. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. SINNAMON, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Collapsible Piston-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in piston-valves for steam-engines, whereby they are made collapsible under sudden emergencies, as of water in the cylinder, where the relief-valves, if any, refuse to work, compelling some portion of the engine to give way unless otherwise safeguarded. In slow-running slide-valve engines the difficulty does not occur, as the valve will lift off from its seat and permit the water to escape by way of the steam-chest; but in high-speed engines the blow is too sudden for reliance on such a mode of relief, and with piston-valves, which are well adapted to high-speed engines, even this relief is impossible, since they are solid and constrained on all sides by a surrounding chest or casing. The frequent and costly repairs necessitated by this state of things renders some remedy in construction highly desirable, and this I have accomplished in the improvement about to be described.

In the drawings forming a part of this specification, Figure 1 is a side view of the bushing of a cylindrical valve-chest. Fig. 2 is a transverse section of the same on line 2 2 of Fig. 1. Fig. 3 is a transverse section of the piston on line 3 3 of Fig. 4. Fig. 4 is a longitudinal section of the piston on line 4 4 of Fig. 3. Fig. 5 is a front view of the yoke or pulling-plate of the piston-valve.

b is the bushing of a bored valve-chest, showing the necessary outlet and inlet passages or ports for steam. The bushing is entire at the points *c d* to cover the apertures in the collapsing piston.

e e' are the members of the collapsing piston separated longitudinally by a space sufficient to allow of the requisite play. These valve members, recessed externally in the usual manner to permit the passage of steam from port to port, are ordinarily held against

their seats by the steam-pressure in the valve-chest, and two or more light springs, which may be spiral springs *f f*, as shown, are provided to maintain them in position when there is no pressure in the valve-chest. The valves *e e'* are movably connected together by a tie-piece *g*, of I shape in section, with flanged or expanded heads playing in recesses *i i*, formed in the valve members *e e'*. Said tie-piece thus allows the said valve members to collapse on occasion, as from water in the cylinder, while preventing them from separating beyond the limit formed by the expanded heads occupying the recesses *i i*.

h h are perforations in the tie-piece to contain the springs *f f*. The tie-piece has two feet or projections *j j*, which rest on lugs *l l*, formed on the valve members *e e'*, and removable clamp-pieces *k k* are provided at the other extremity of the piston to prevent the tie-piece *g* from coming out, while permitting free play to the valve-pieces *e e'*.

m is a yoke or pulling-plate removably secured to the valve members of the piston by bolts or other suitable means passing through elongated apertures or slots *n n* in the said yoke, which permit the valves to collapse. The valve-rod *o* is centrally secured to the yoke *m*. It is obvious that if but one of the valve members is collapsible the result is the same in a degree.

It is not indispensable that the valve-chest be cylindrical. If the chest is bored, which is the simplest construction mechanically, the valve members *e e'* constitute a cylinder when fully expanded to fit the chest; but if the chest has plane surfaces the valve members of course should be plane accordingly.

To insure a steam-tight and perfectly-balanced valve, the following method of construction is preferably adopted: The two valve sections or members *e e'* are immovably secured on a tie-piece which is four one-thousandths of an inch smaller in dimensions between the flanges *s s* than the standard tie-piece with which the valves are designed to work. The piston is then placed in the lathe and accurately turned or planed to fit the valve-chest. The standard tie-piece is then substituted for the temporary one, which allows the valve to expand four one-thousandths of an inch within the valve-chest,

5 permitting the valve and valve-seat to wear
 smooth and remove the tool-marks in both.
 When after a few days' wear the valve mem-
 bers and seat have thus become surfaced to-
 10 gether, there will be neither appreciable fric-
 tion nor leakage, and the valve will remain
 tight indefinitely. To take up the wear, it is
 only necessary to remove the clamp-pieces
k k and pull out the tie-piece, when a few
 15 strokes of a file along the inner edges of the
 flanges *s s* will remove sufficient stock to per-
 mit the valves to expand enough to compen-
 sate for the accomplished wear.

The advantages possessed by this valve
 15 over the piston-valves in common use are
 that it collapses and relieves the cylinder of
 any charge of water, thus making relief-
 valves an auxiliary instead of a necessity.
 It is steam-tight and will remain so for a long
 20 time. On account of the absence of rings
 the ports will not be gouged out. Leakage
 may be taken up without removing the valve
 from the chest or disturbing adjustments.
 As but two bridges are used, it will not wire-
 25 draw the steam. It is practically frictionless
 and perfectly balanced at all times. The tie-
 piece should be so proportioned that the wear
 on the face of the valves is compensated as
 nearly as possible by the wear on the inner
 30 edges of the flanges *s s*, so that the necessity
 for letting out the valve to prevent leakage
 is a rare occurrence.

I claim and desire to secure by Letters Pat-
 ent—

1. A piston-valve formed of diametrically 35
 collapsible halves, and means for restraining
 said halves from expanding beyond a fixed
 diametral limit, substantially as specified.

2. A piston-valve formed in two collapsible
 halves with an interposed tie-piece to limit 40
 their outward range of movement to the nor-
 mal diameter of the piston, substantially as
 specified.

3. A piston-valve formed in two collapsible
 portions, an interposed tie-piece to limit their 45
 degree of separation to the normal diameter
 of the piston, while permitting their approxi-
 mation, and a pulling-plate to which the said
 collapsible portions are movably attached,
 substantially as specified. 50

4. In a piston-valve, a piston having mov-
 able valve members of semicylindrical con-
 tour suitably recessed externally, normally
 separated by a suitable interval, internal re-
 cesses *i i* in said valve members, and a tie- 55
 piece with expanded heads playing in said
 recesses *i i*, whereby the valve members are
 restrained from expansion beyond the diam-
 etral limit of the piston while allowed to col-
 lapse to permit the discharge of any abnor- 60
 mal liquid present in the steam-cylinder, sub-
 stantially as specified.

In testimony whereof I affix my signature
 in presence of two witnesses.

WILLIAM G. SINNAMON.

Witnesses:

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 N. J. LINDENMEYER.