

(No Model.)

J. DESMOND.
SAFETY VALVE.

No. 358,148.

Patented Feb. 22, 1887.

Fig. 1

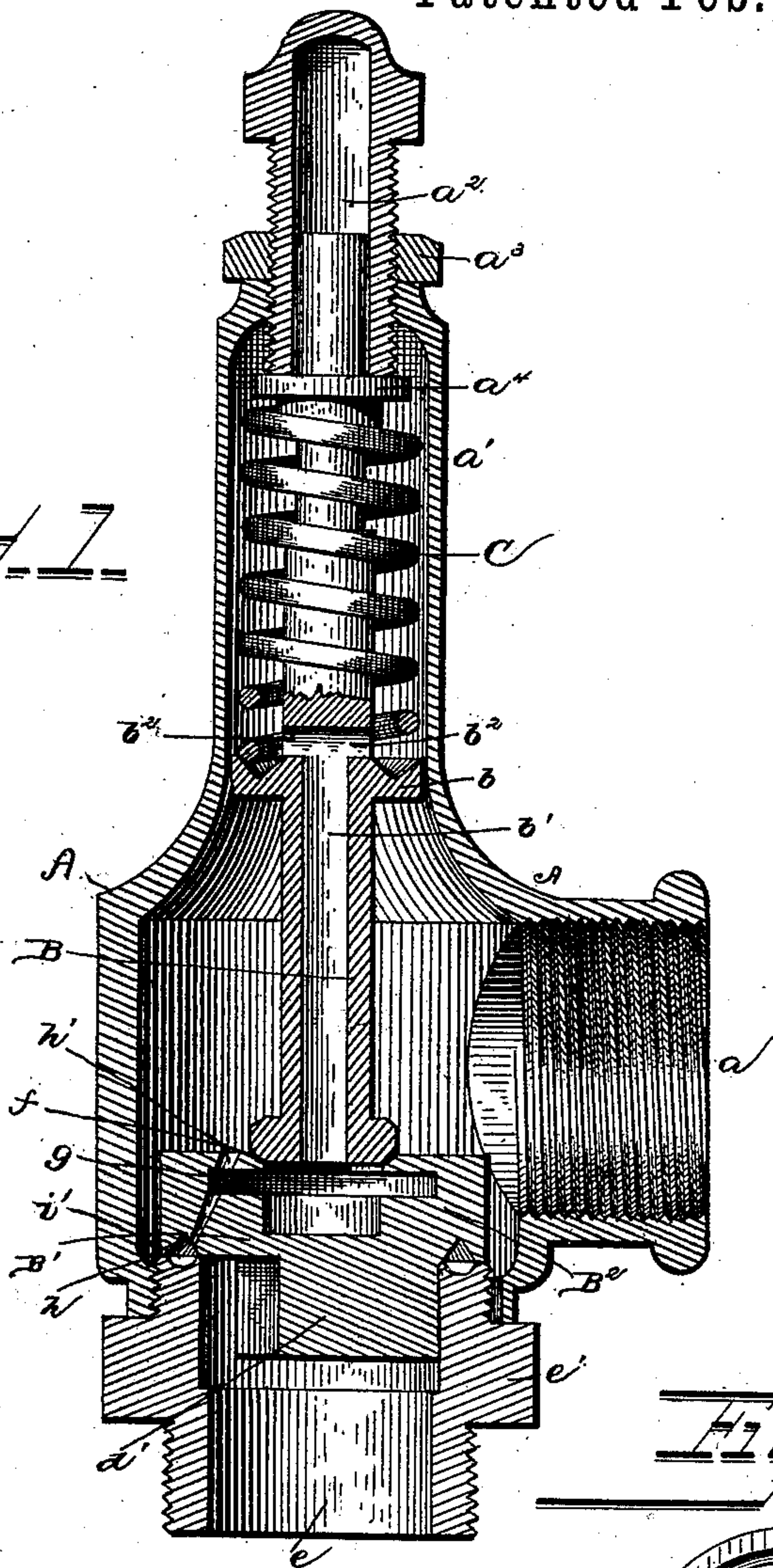


Fig. 2

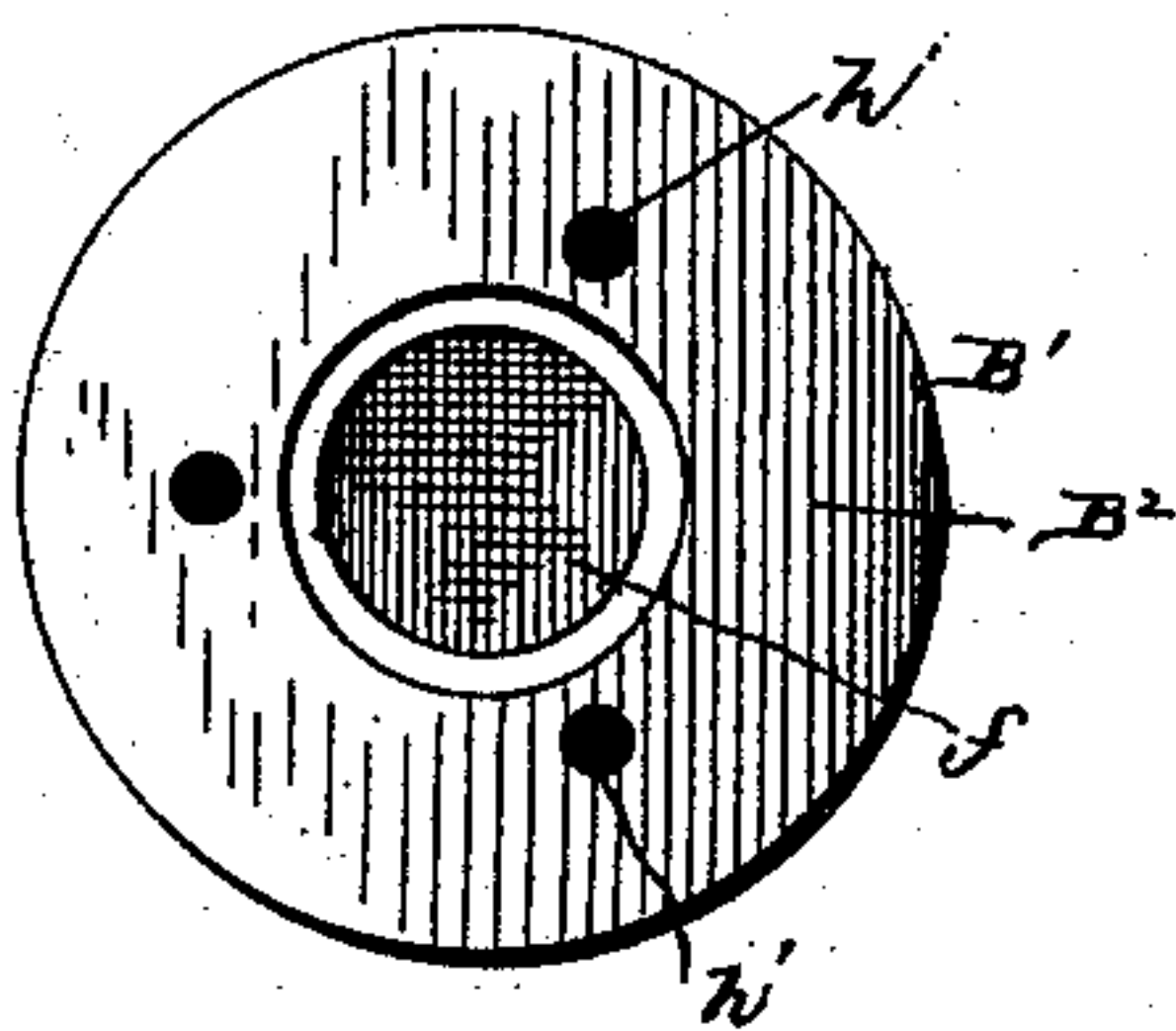
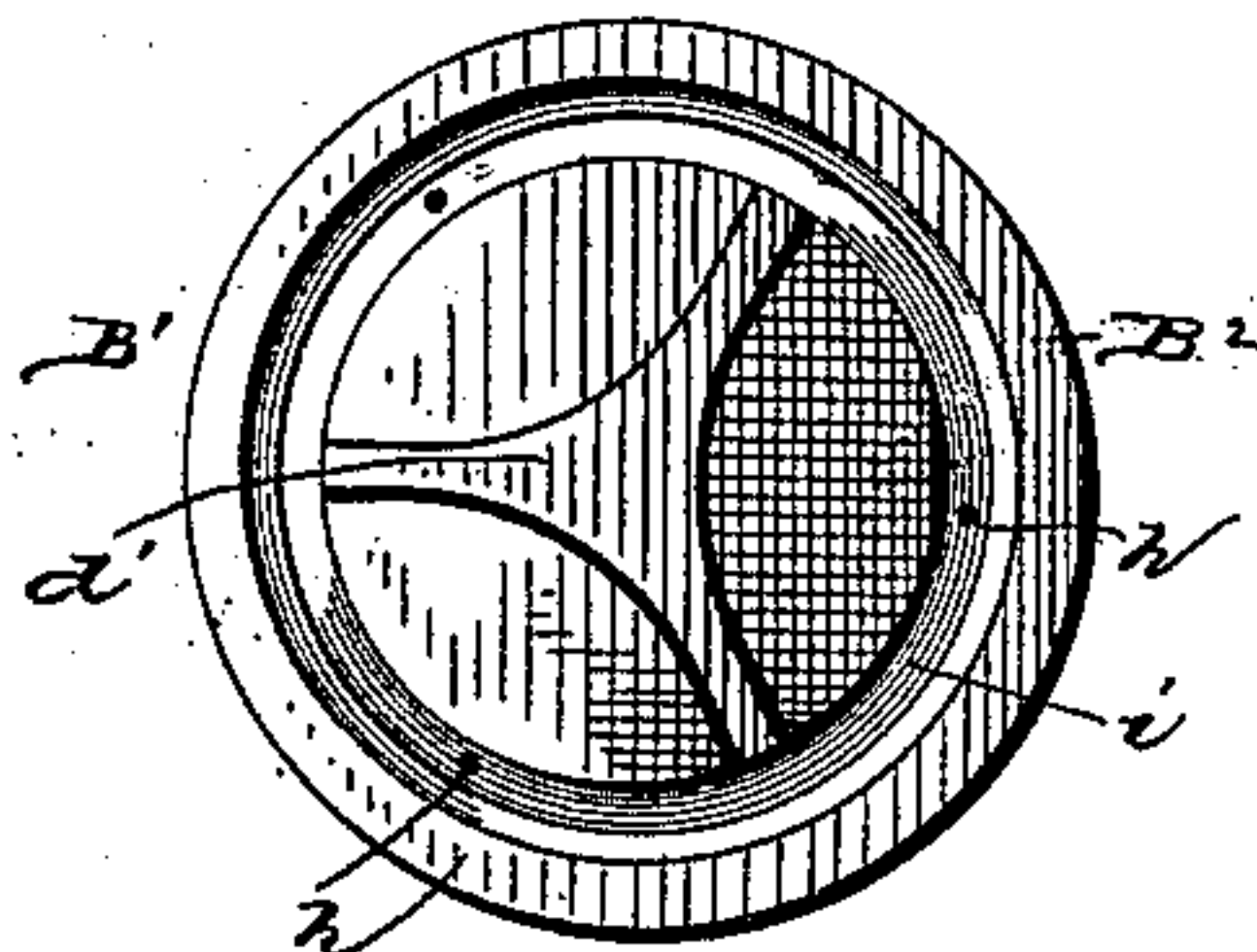


Fig. 3



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN DESMOND, OF DETROIT, MICHIGAN, ASSIGNOR TO THE PENBERTHY INJECTOR COMPANY, OF SAME PLACE.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 358,148, dated February 22, 1887.

Application filed June 2, 1886. Serial No. 203,889. (No model.)

To all whom it may concern:

Be it known that I, JOHN DESMOND, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Safety - Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention pertains to improvements in steam-valves; and it consists in the detailed construction of the component parts, substantially as hereinafter set forth, and pointed out in the claims.

15 In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of my improved steam-valve. Fig. 2 is a plan view of the valve proper, and Fig. 3 is an inverted view of the same.

20 In the embodiment of my invention I employ a shell or casing, A, having the exhaust-outlet *a* in one side, and its upper end formed with a tubular extension, *a'*, the function of which will presently appear.

25 B is the valve-stem, which extends out through the tubular extension *a'* of the casing or shell A, and into a small tubular guide, *a''*, and around which stem is arranged a spring, C, which is inclosed by said extension, its one end resting upon a shoulder or flange, *b*, of said stem, and its other end resting against the upper end of said extension, thus holding the valve under spring tension or pressure. The small tubular guide *a''* is provided on its outer surface with a screw-thread which corresponds with a female screw-thread formed in the upper end of the tubular extension *a'* of the casing. The valve-stem extends up into the hollow tubular guide *a''*, and said guide is provided on its screw-threaded portion with an adjusting-nut, *a'''*, for regulating the tension of the spring C around the valve-stem, according to the amount of steam-pressure designed to be retained in the boiler. The inner end of the tubular guide *a''* presses against a flanged washer, *a''''*, fitted on and around the valve-stem, its flanged portion extending within said spring to more securely hold the same in position thereon. The valve-stem is provided with a small passage or aperture, *b'*, extending

from its lower end to a point immediately above the piston on said valve-stem, at which point it branches off into two opposite lateral passages or slots, *b'' b''*, the purpose of which will appear farther on.

55 B' is the valve, which consists of a disk-like casting, B², from the bottom of which depends a spider, *d'*, to hold and guide it centrally within a nozzle, *e*, screwed into the lower end of the shell or casing A. Said nozzle is connected by a screw-thread at one end to the casting or shell A, and also having a screw-thread at its other end for connection with the boiler, in practice, while intermediately of its screw-thread or ends it is provided with a pentagonal or other angular shoulder or flange, *e'*, to permit of the ready application thereto of a wrench for turning or screwing the same in place. The valve casting or disk B² is provided with an aperture, *f*, in its upper side, upon which is seated the lower enlarged end of the valve-stem B, the latter being independent or separate of the valve. Between its upper opened end and a cylindric chamber below said end the valve-casting is provided with an annular or circular chamber, *g*, with which communicates a series of small apertures, *h*, in the said casting, that have communication with steam or boiler pipe nozzle *e*, as presently described. A corresponding series of larger apertures, *h'*, opens from said annular chamber *g* through the upper end of said casting into the shell or casing A.

85 In the under side of the valve, near its circumference, is formed a circular reduction or recess, *i'*, into which the lower apertures, *h*, open.

The operation is as follows: The adjusting-nut on the tubular guide is regulated according to the amount of pressure desired to be retained in the steam-boiler, and when an excess of steam is in the boiler, or more than is desired, the excess steam pressing against the under side of the valve will force said valve from its seat, permitting the steam to pass through the small apertures *h* into the circular chamber *g*, and immediately upon the passage of the steam through the larger apertures *h'* a vacuum is at once formed in the chamber in the valve, over the aperture of which the valve- 100

stem is held by the action of its spring. The vacuum thus formed in the chamber of the valve will, by reason of the passage in the lower portion of the cylindric stem and the apertures formed immediately above the piston on said stem, cause the said stem to rise as against the action of its spring. Immediately on lifting to its full height the valve looses the vacuum thus formed, and can then fall freely to its seat as soon as the steam-pressure has been sufficiently reduced in the boiler. The reseating of the valve-stem is caused partly by the steam against the piston on the valve-stem, assisted by the spring acting on said piston of the valve-stem.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the casing and the nozzle having in one end an annular recess, of the valve having apertures, and an annular or circular chamber in its center, and the spring-pressed valve-stem having a central passage or aperture and two opposite lateral passages or slots, substantially as shown and described.

2. The combination, with the shell or casing and the nozzle connected thereto, of the spring-pressed valve, together with its yielding stem, said valve having a central opening, and apertures in its lower edge or face communicating with the interior of the valve, substantially as and for the purpose set forth.

3. The combination, with the casing, the nozzle connected thereto, and the valve having the central annular or circular chamber, and apertured, of the spring-pressed valve-stem having a shoulder or flange serving as a piston, the tubular guide screw-threaded on its outer surface, and the adjusting-nut, arranged substantially as shown, and for the purpose described.

4. The combination, with the shell or casing and the nozzle connected thereto and having in its one end an annular recess, of the valve having in its face an annular recess, and having a series of apertures both in its lower and upper surfaces, and the spring-pressed valve-stem seated upon the valve, substantially as and for the purpose specified.

5. The combination, with the casing, the nozzle connected thereto, and the valve having the central annular or circular chamber, of the spring-pressed valve-stem and the shoulder or flange serving as a piston, said stem having a central passage and two opposite lateral passages or slots immediately above said shoulder or flange, as shown and described.

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

JOHN DESMOND.

Witnesses:

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