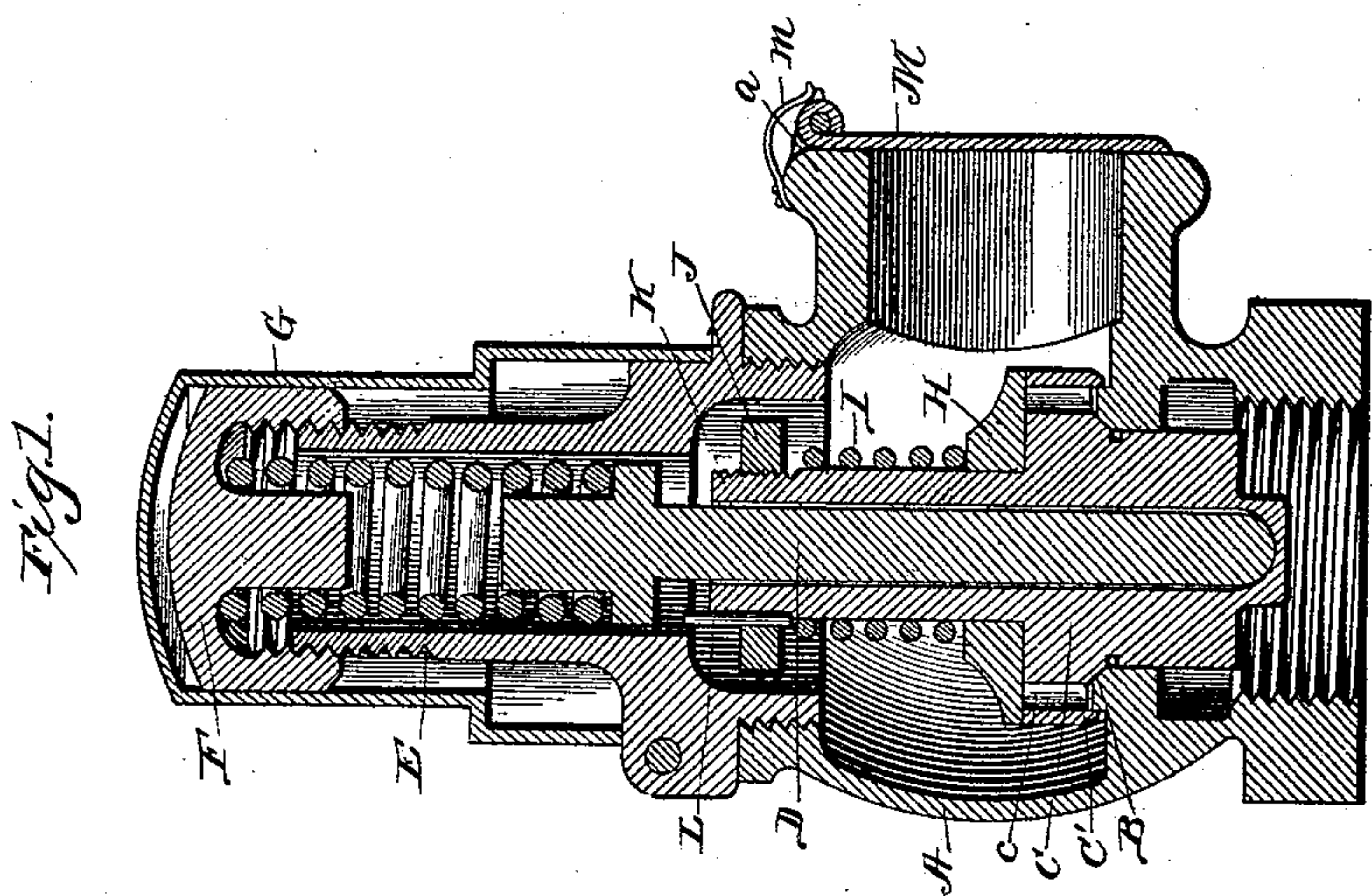
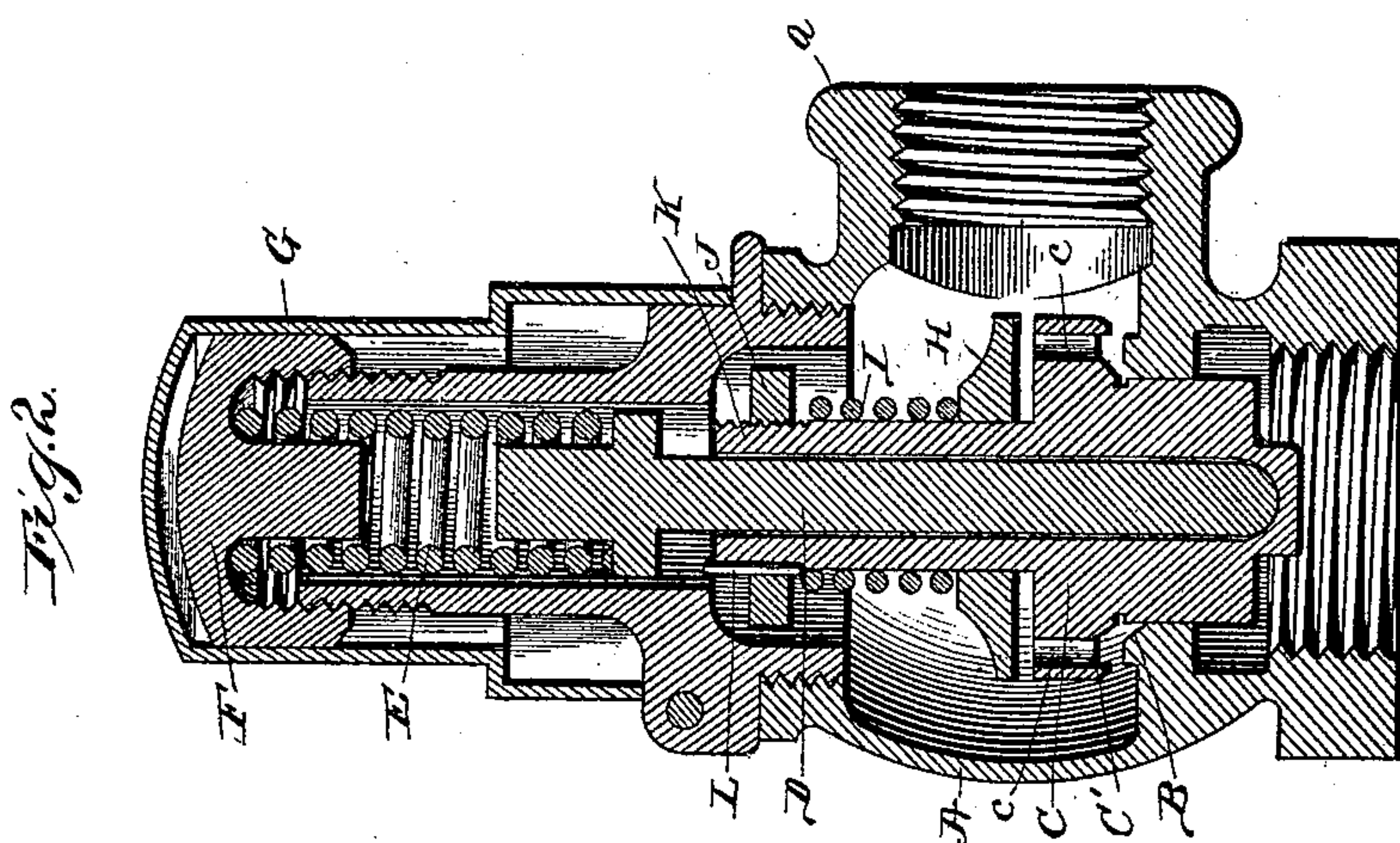
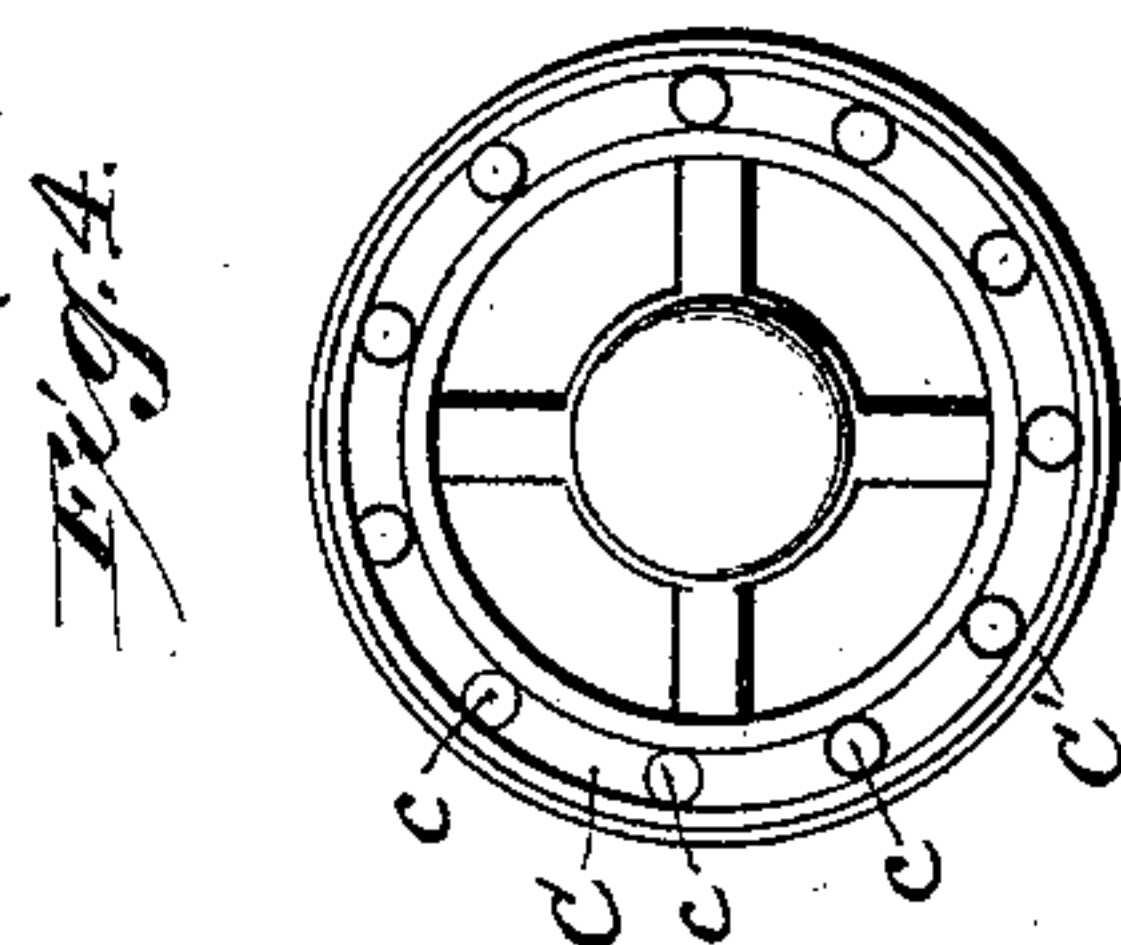
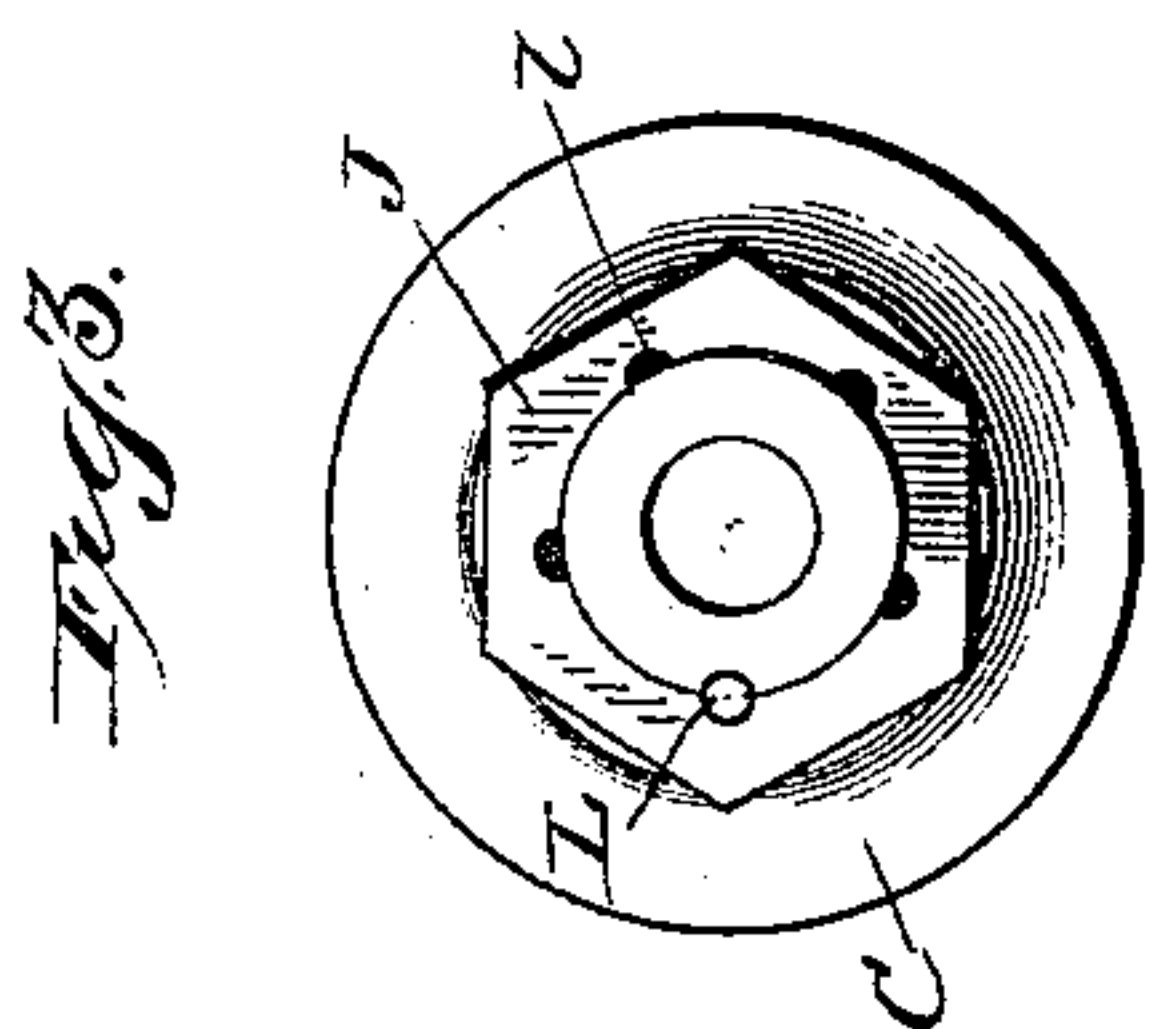


(No Model.)

J. T. HAYDEN.
SAFETY VALVE.

No. 451,210.

Patented Apr. 28, 1891.



Witnesses:

M^{rs} M. Rheem.
G. H. Kerdeman

Inventor:

James T. Hayden
By Raymond & Veder
Atty's.

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UNITED STATES PATENT OFFICE.

JAMES T. HAYDEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CRANE COMPANY, OF ILLINOIS.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 451,210, dated April 28, 1891.

Application filed January 31, 1891. Serial No. 379,764. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. HAYDEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety-Valves, of which the following is a specification.

The object of my invention is to provide an ample area or opening for the escape of steam when the valve is open and to insure the prompt and certain closure of the valve when the steam-pressure has been sufficiently relieved, and to make the valve sufficiently sensitive to confine the fluctuations of steam-pressure to a comparatively small range.

In the operation of safety-valves there are two conflicting conditions to fulfill, one condition being that the escaping steam shall so act upon the safety-valve when lifting as to insure a wide opening, so that the steam may escape as rapidly as it is generated within the boiler. The other condition is that the lifting force of the steam shall not be so great as to prevent the seating of the valve when the pressure of steam within the boiler has been reduced to the desired working pressure. In the present invention I have provided for the fulfillment of these two conditions by the use of an auxiliary disk or valve combined with the main valve in a manner which will hereinafter be described.

The further object of my invention is to provide a valve-exit for the steam from the casing, so that the parts within the casing may be protected from dirt and consequent derangement.

In the accompanying drawings, Figure 1 is a vertical section of a valve constructed in accordance with my invention. Fig. 2 is a similar section showing the valve open. Fig. 3 is a plan view of the valve proper separated from its casing. Fig. 4 is an inverted plan of the same.

In the drawings, A is the valve-casing, which, so far as the first part of my invention is concerned, may be of any well-known form. It is, as shown herein, however, closed except upon one side, where an exit *a*, to which the escape-pipe may be screwed, is provided, as shown in Fig. 2, while in Fig. 1 the exit is provided with a flap or valve, hereinafter more

minutely described, which makes the casing tight when not open for the escaping steam.

Within the casing is provided a valve-seat B, of the ordinary form, to which is fitted a valve C. Said valve C is held to its seat by a spindle D, upon which rests a spring E. The tension of spring E is adjusted by the screw-cap F, attached to the upper part of the valve-body, and an outer casing or shield G, which is fitted over the screw-cap F and the upper portion of the valve-casing, shelters the parts and is customarily locked in place, so that unauthorized tampering with the adjustment of the valve is prevented.

The devices for retaining and housing the valve just described are not claimed to be novel, and, so far as my present invention is concerned, may be modified indefinitely without departing from my invention, which relates especially to the portions hereinafter described.

The valve C is provided with an extended face outside of the beveled bearing portion of the valve-seat B, and the outer edge of this extended face is bounded by a depending lip C', which, when the valve is closed, slightly overlaps the valve-seat. From this extended face a series of perforations *c* extend to the upper face of the valve C, as shown in Figs. 1, 2, and 4. Resting upon said upper face of main valve C is an imperforate auxiliary valve H, for which the main valve forms a seat. Said auxiliary valve H is so fitted upon the main valve C as to close the perforations *c* when it is down. It is held in contact with the valve C by a spring I, which spring is compressed by a nut J upon the upper portion of the spindle K, forming a part of or attached to the main valve C. Said nut J is held, when adjusted, by a pin L, which is dropped into the opening formed by a notch cut into the spindle K, and one of the series of notches *l* cut into the nut J, which is brought to coincide with the first-named notch.

The operation of the valve C and its auxiliary valve H is obvious from the foregoing description and a comparison of Figs. 1 and 2. When the steam-pressure rises beyond the point to which the valve is set, the latter is raised and the escaping steam, entering the

orifices *c*, raises the auxiliary valve *H*, there being thus provided an additional outlet for the escape of the steam. The use of the auxiliary valve is found to insure the prompt
5 closure of the main valve upon a slight fall of the steam-pressure, whether the valve be set for a high or a low pressure, thus adapting a single valve to use under a widely-varying working pressure, if desired. The resist-
10 ance of the valve to closure is diminished by the rise of the auxiliary disk, and there is available a greater force for opening the valve than subsequently exists to prevent its closure. Its speedy and complete closure thus ensues
15 after a comparatively small reduction of the steam-pressure.

In Fig. 1 a clack-valve *M* is shown hinged to one side of the exit of the valve-case. It is held in contact with the valve-case by a
20 light spring *m*, which allows the valve to open under a very small pressure, but keeps the valve *M* snugly closed when the safety-valve is closed.

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

1. The combination, in a safety-valve, of a perforated main valve and an imperforate auxiliary valve seated upon the main valve,
30 substantially as described.

2. The combination, in a safety-valve, of a main valve having an extended surface beyond the portion in contact with the valve-seat and a lip surrounding said extended surface and overlapping the raised portion of
35 the valve-seat, said main valve having perforations extending from the extended surface to the upper side of the valve, and an imperforate auxiliary valve seated upon said main valve, substantially as described. 40

3. The combination, in a safety-valve, of a valve-casing having its escape-orifice beyond the safety-valve proper provided with a valve which closes the valve-case tightly when the
45 main valve is not in operation, substantially as described.

4. The combination, in a safety-valve, of a main valve having an extended surface beyond the portion which makes contact with the valve-seat, and having perforations from
50 said extended surface to the top of the valve, and an imperforate auxiliary valve adapted to close said orifices and to be raised by the escaping steam when the main valve is lifted, substantially as described.

JAMES T. HAYDEN.

Witnesses:

IRWIN VEEDER,
TODD MASON.