

No. 696,074.

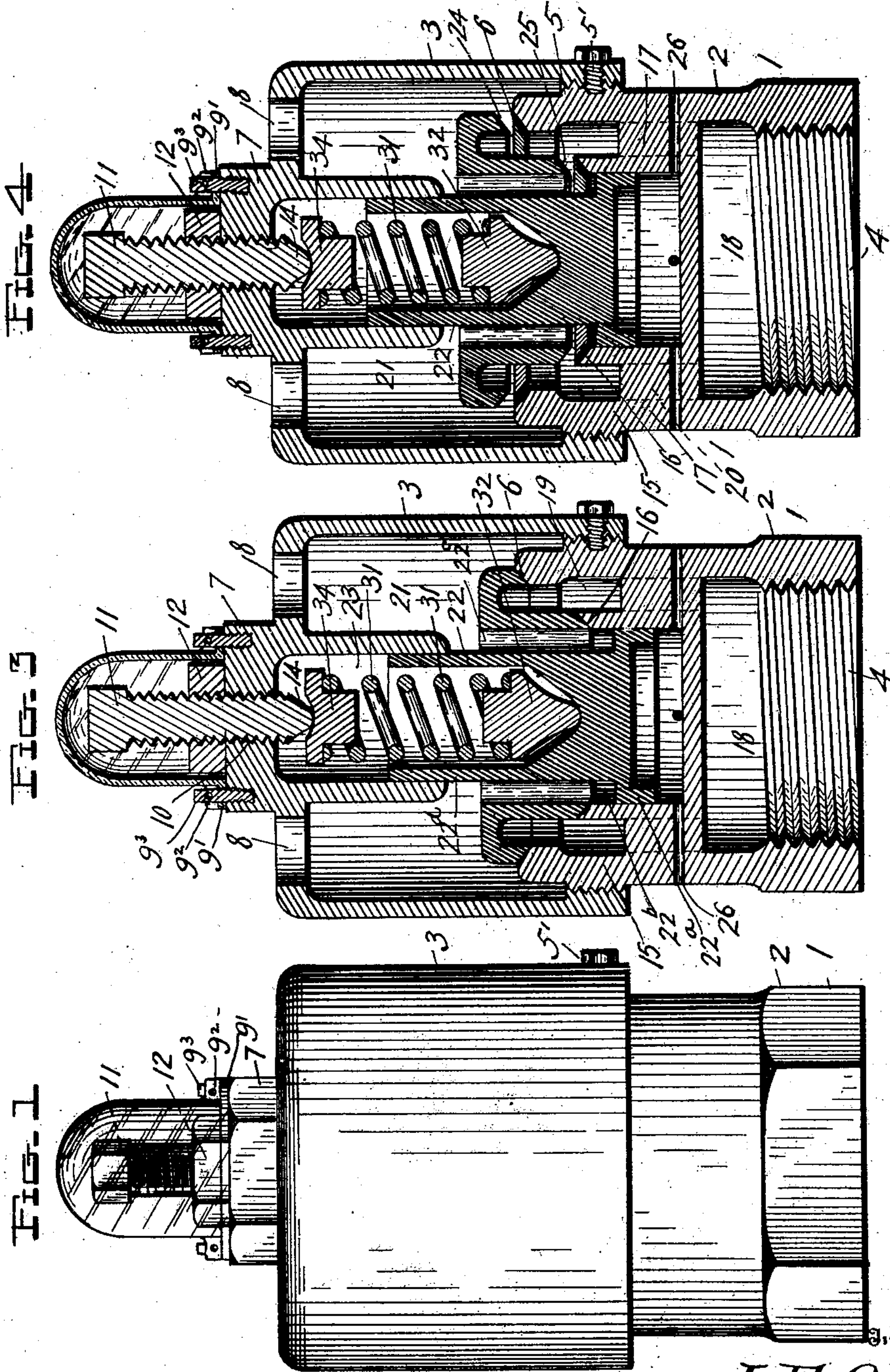
Patented Mar. 25, 1902.

J. E. OSMER.
SAFETY VALVE.

(Application filed Sept. 30, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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FIG. 2

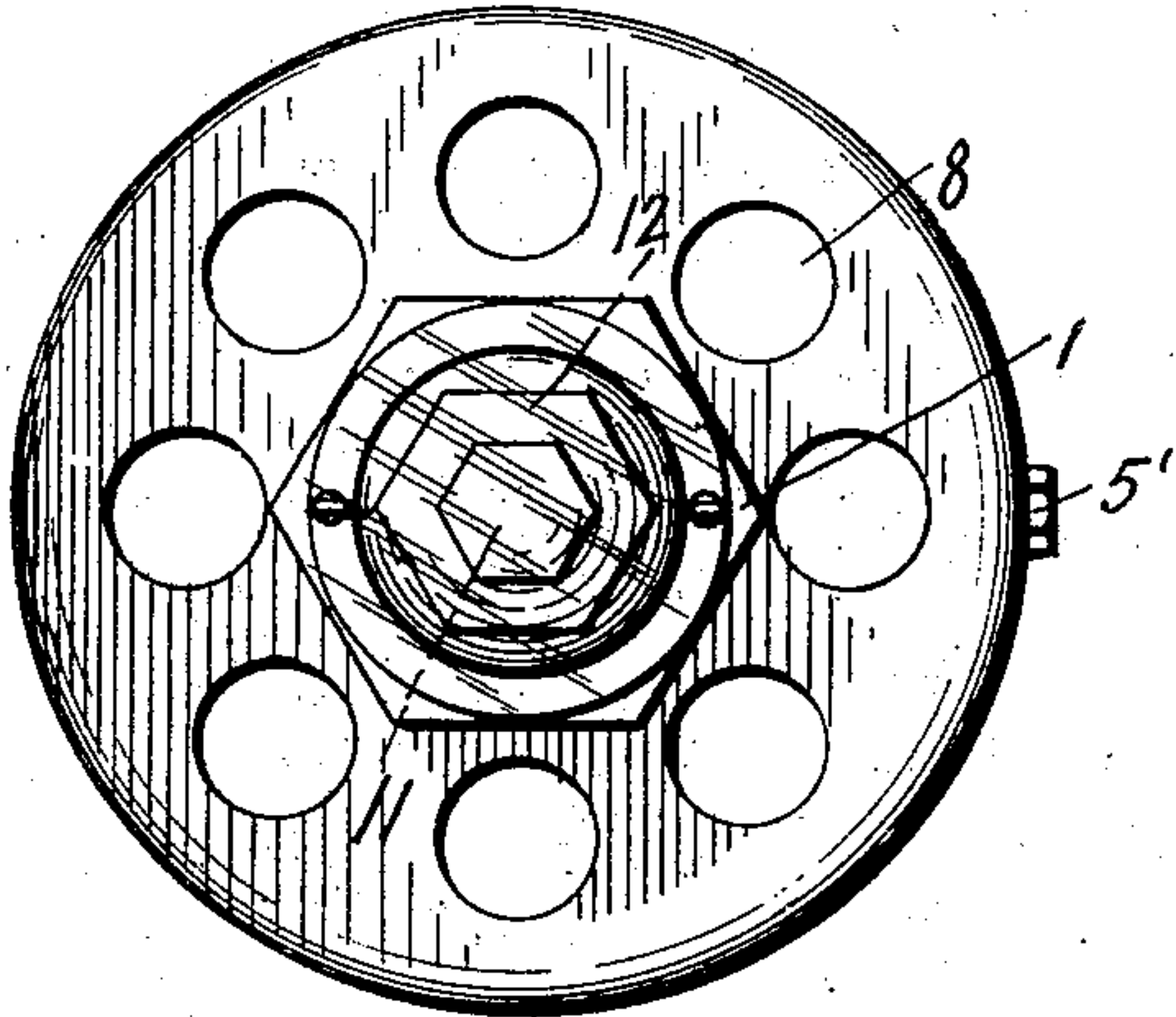


FIG. 5

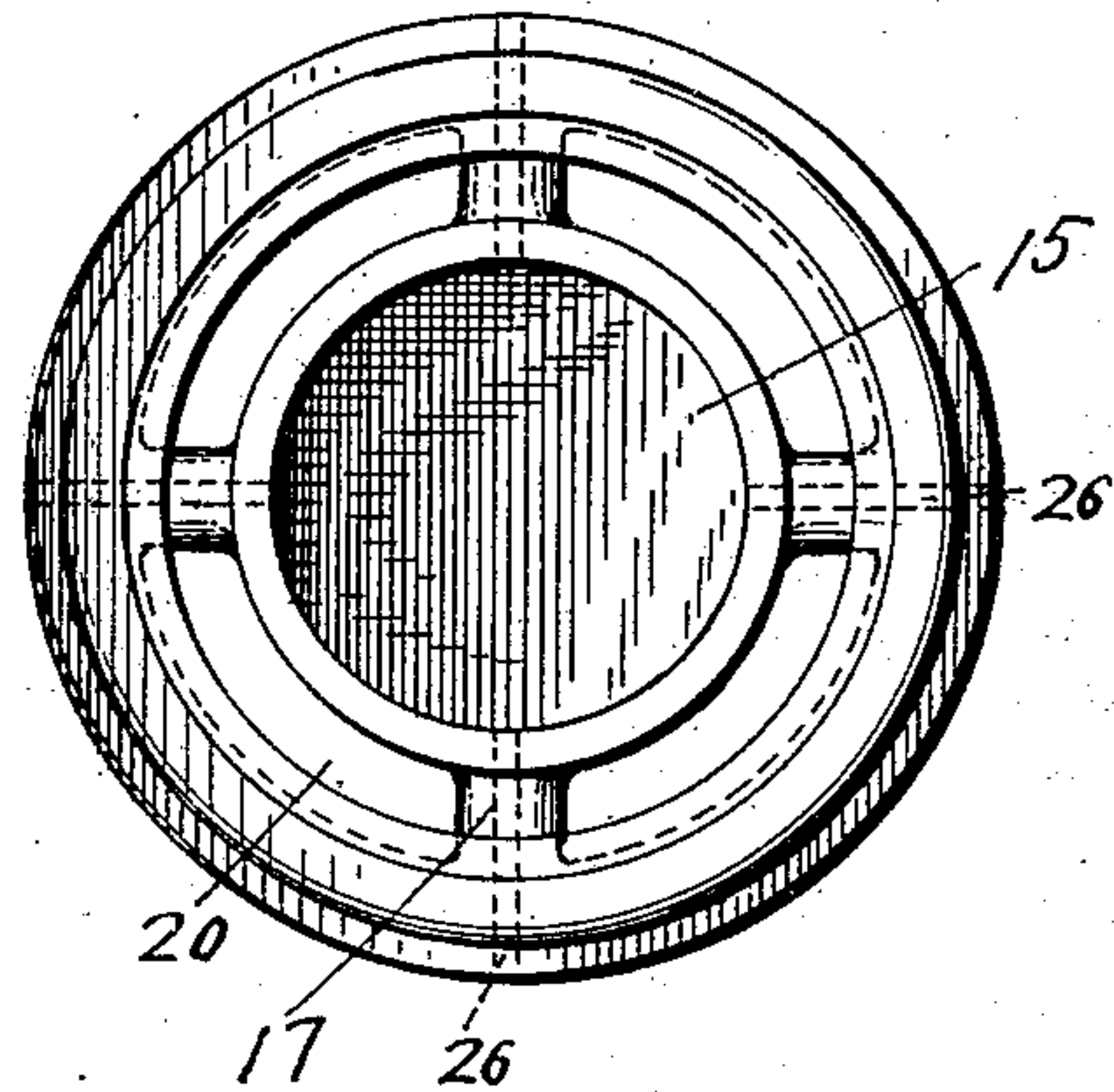


FIG. 6

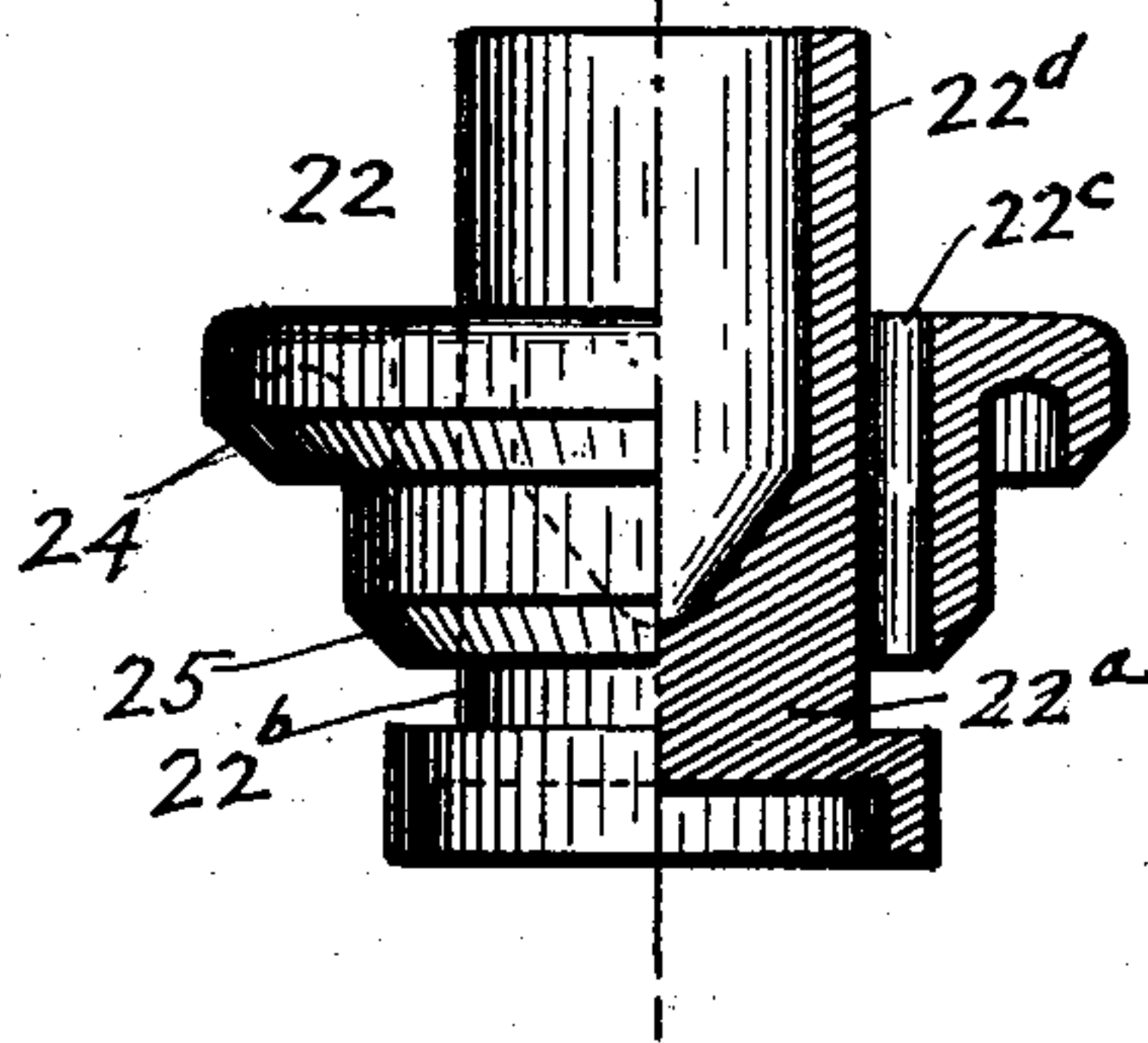
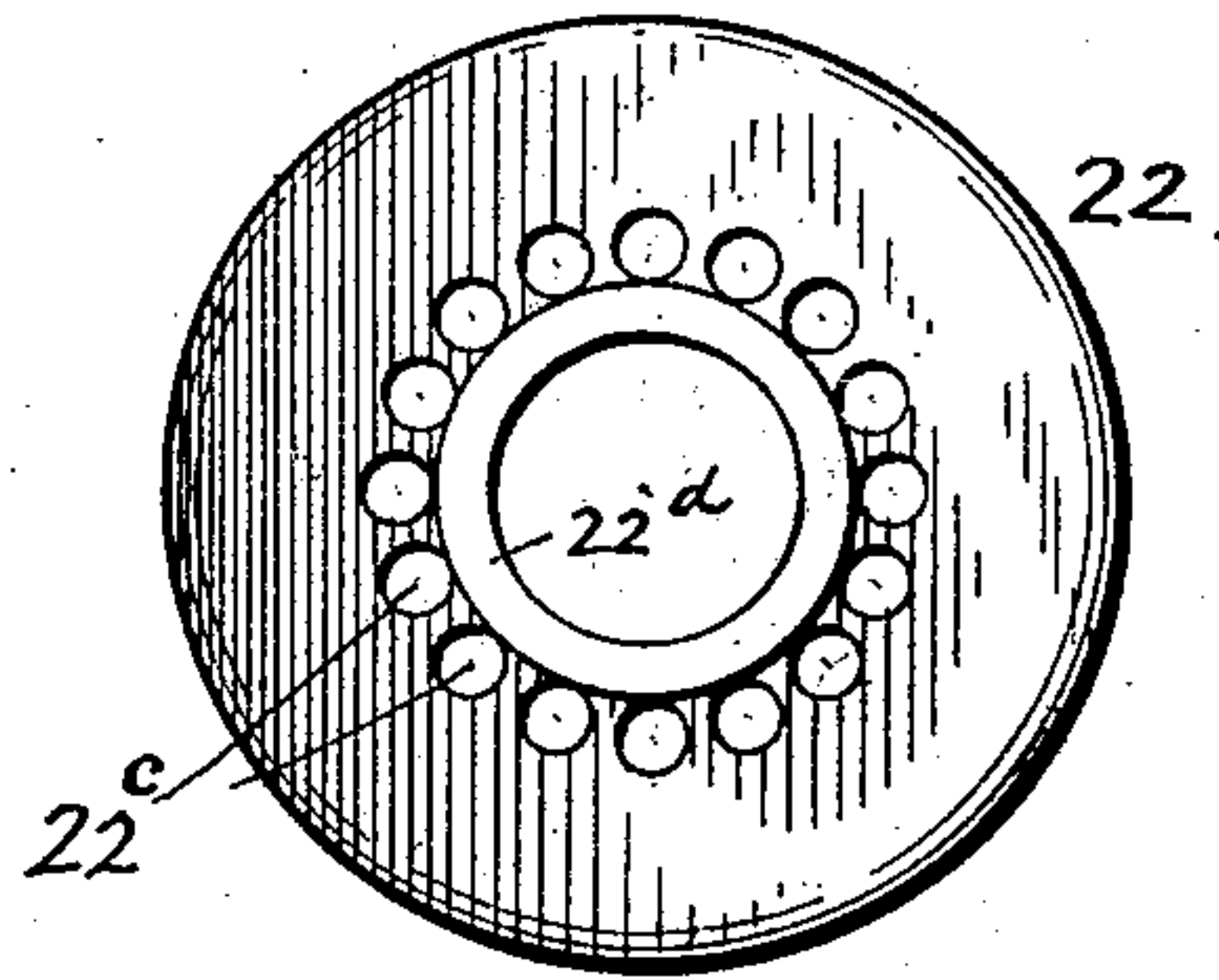


FIG. 7



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UNITED STATES PATENT OFFICE.

JOHN E. OSMER, OF CLINTON, IOWA.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 696,074, dated March 25, 1902.

Application filed September 30, 1901. Serial No. 77,041. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. OSMER, a citizen of the United States, residing at Clinton, in the county of Clinton and State of Iowa, have invented certain new and useful Improvements in Safety-Valves; and I do 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.

The invention relates to improvements in safety-valves for steam-boilers, and has for its object to improve the construction of the valve shown and described in my Patent No. 666,109 and to provide a safety pop-valve which shall be simple of construction, durable in use, comparatively inexpensive of production, balanced in an effective manner to secure the requisite degree of sensitiveness without chattering, and adapted to relieve the excess pressure on the boiler quickly without the loud and prolonged noise produced by safety-valves of ordinary construction.

With these and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, which will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved safety-valve. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical longitudinal sectional view showing the parts of the valve in their normal or closed position. Fig. 4 is a similar view showing the valves open to equalize the pressure and exhaust all excess steam. Fig. 5 is a top plan view of the cylindrical valve-casing and dash-pot. Fig. 6 is a side elevation, partly in section, of the valved plunger; and Fig. 7 is a top plan view of the same.

Referring to the drawings, 1 represents the cylindrical valve-casing, comprising a base or main section 2 and a dome or cap section 3, said base-section being formed or provided at its lower end with an internally-threaded extension 4 for connection with a steam-escape pipe leading from the boiler and at its upper end with an annular shoulder or enlargement 5, formed with a valve-seat 6 and external threads to receive the threads of the lower end of said dome-section 3, whereby

the sections are coupled together. Set-screws 5' are employed for locking the sections 2 and 3 after they have been screwed together. The dome-section is provided with a hexagonal head 7 for the application of a wrench thereto in applying or removing it, an annular series of escape-ports 8, opening to the atmosphere, and a central screw-threaded opening 10, in which works an adjusting-screw 11, held in fixed position by a lock-nut 12. The lock-nut and adjusting-screw are inclosed within a shield 9, preferably made of glass and provided with a base-flange 9', through which project lugs 9², extending upwardly from a head formed integral with the dome. These lugs are provided with apertures engaged by locking-seals 9³, thus making it impossible for one to tamper with the screw without affording evidence of the fact by the removal of the seal or the breakage of the shield. The screw is provided with a rectangular head, to which a wrench may be applied for adjusting it, and with a tapered or hemispherical head 14, designed for a purpose hereinafter set forth.

The base-section 2 has arranged therein and preferably formed integral therewith a dash-pot 15, provided at its upper end with a valve-seat 16. This dash-pot, in connection with webs 17, divides the interior of the base-section into a lower steam-chamber 18 and an upper balancing-chamber 19, said chambers being in communication through ports or passages 20, formed by the spaces between said webs.

The interior of the dome-section 3 forms an equalizing-chamber 21, through which the excess steam passes before exhausting to the atmosphere. Mounted to slide vertically in the casing is a valved piston 22, having a solid head 22^a, an annular recess 22^b, valves 24 and 25 of different areas to engage, respectively, the valve-seats 6 and 16, vertically-disposed ports 22^c, leading upwardly from the annular recess 22^b, and a tubular stem 22^d, which projects upwardly into and is adapted to slide within an annular guide 23, projecting downwardly from the top of the dome. 26 denotes vent-openings leading from the dash-pot through the webs and side of the section 2 of the casing and prevent the formation of a vacuum in the upward movement of the piston and permit of the slow escape or expul-

sion of air in the downward movement of the piston as well as allowing the escape of such water of condensation as may pass from the annular recess 22^b past the head of the piston into the dash-pot. The valves 24 and 25 are normally held closed against their seats 6 and 16 by a coil or spiral pressure spring 31, bearing at its lower end against a conical head 32, resting against the base of the tubular extension 22. The upper end of the spring bears against the flange-cap 34, which is engaged by the screw 11. The spring serves as a common tension device to hold the valves 24 and 25 seated.

Briefly stated, the operation of the valve is as follows: In the normal position of the parts when the steam in the boiler and the chamber 19 is at or below safe pressure, as shown in Fig. 3, when the pressure in the balancing-chamber 19 is sufficient to overcome the tension of the spring the piston, with its valves 24 and 25, rises, thereby bringing the chamber 19 into communication with the equalizing-chamber 21. A portion of the steam now passes from the chamber 19 past the valve 24 and its seat and the remaining portion passes the valve 25 and its seat 16 into the groove or recess 22^b and thence up through the ports 22^c into the chamber 21, whence it escapes through the apertures 8 into the atmosphere. Upon the diminution of the pressure within the chambers 18 and 19 the valves and piston under the pressure of the spring will be forced downward. To prevent the too sudden seating of the valves, which invariably causes a hammer or chatter, was the object of the provision of a dash-pot, which effectually obviates the above objectionable features.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In a safety-valve for steam-boilers, the combination with the valve-casing provided with concentric valve-seats of different radii and with a dash-pot, a balancing-chamber and an equalizing-chamber, of a spring-controlled piston to coöperate with said dash-pot, said piston being provided with valves of different radii to engage said valve-seats and provided with ports which, when the valves are unseated, afford auxiliary communication between the balancing and equalizing chambers, whereby the steam is admitted directly and indirectly from the balancing-chamber into the equalizing-chamber, substantially as set forth.

2. In a safety-valve for steam-boilers, the combination with the valve-casing provided with concentric valve-seats of different radii, one located above the other, and with a dash-pot having vent-openings, a balancing-chamber and an equalizing-chamber, of a spring-controlled piston to coöperate with said dash-pot, said piston being provided with valves of different radii and located in different planes to engage said valve-seats, with an annular groove or recess and with ports leading from said annular groove or recess to and communicating with the equalizing-chamber, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN E. OSMER.

Witnesses:

ALEX. SPALDING,
P. T. LILLIS.