

(Model.)

C. JENKINS.
AUTOMATIC AIR VALVE.

No. 409,685.

Patented Aug. 27, 1889.

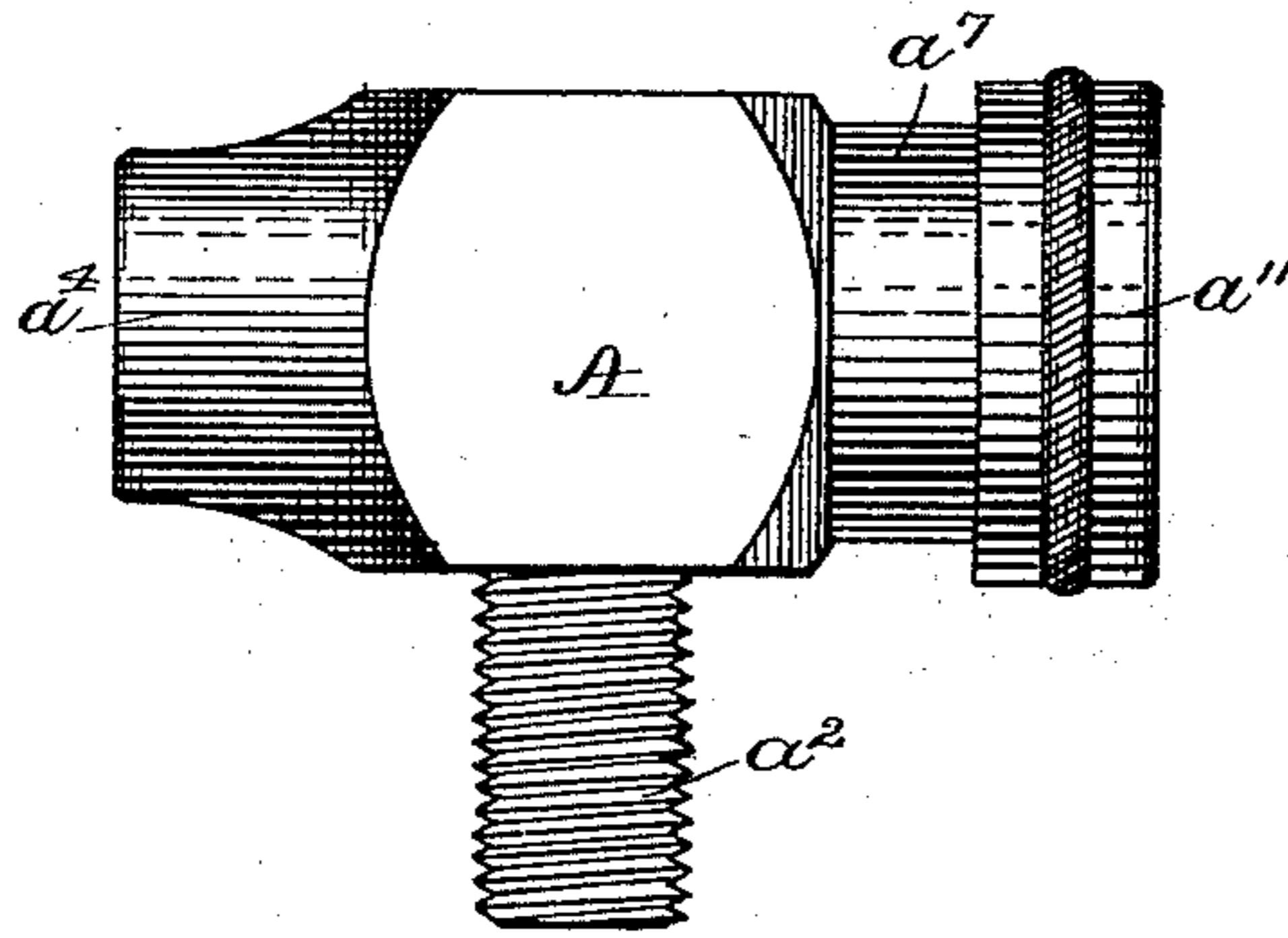


FIG. 1.

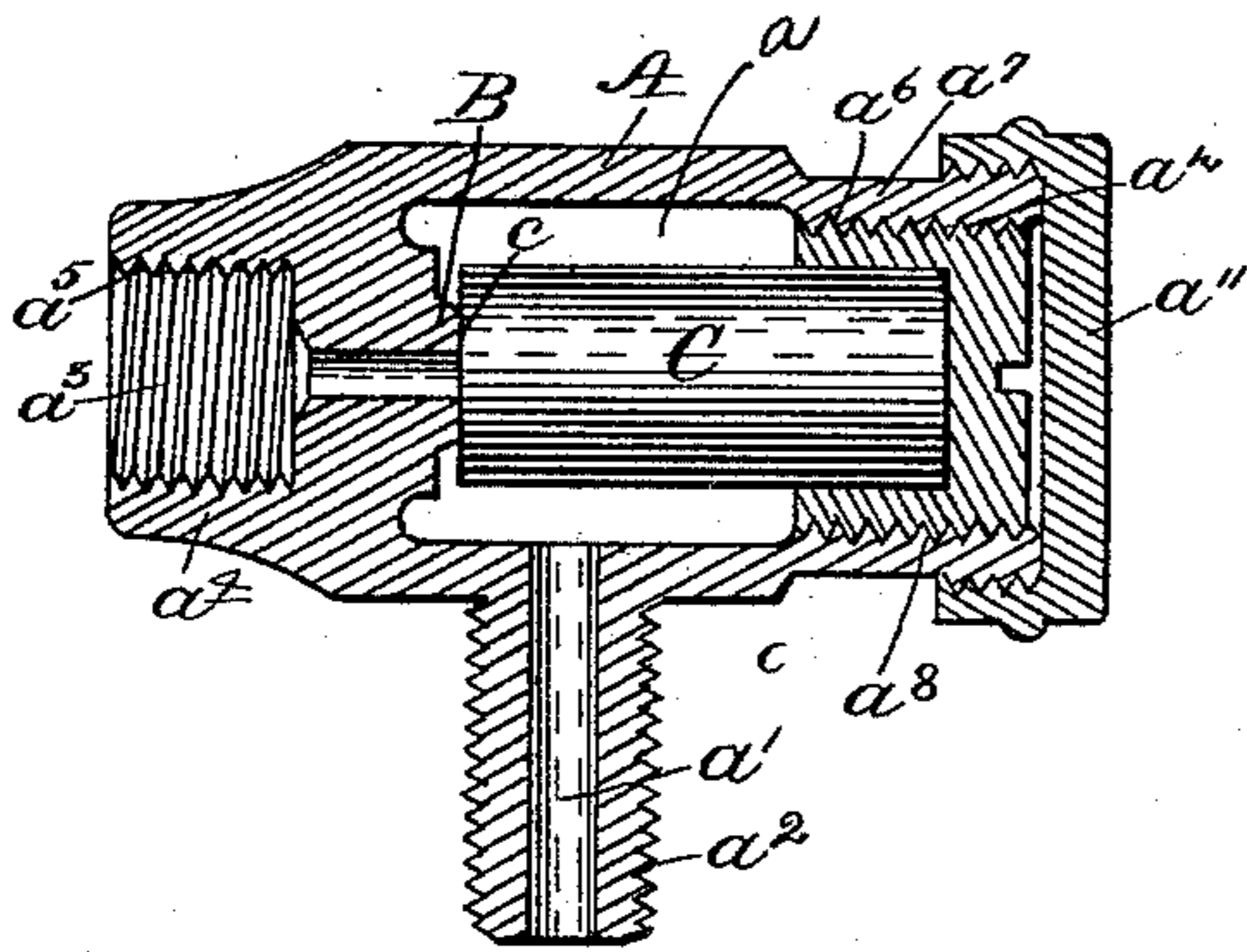


FIG. 2.

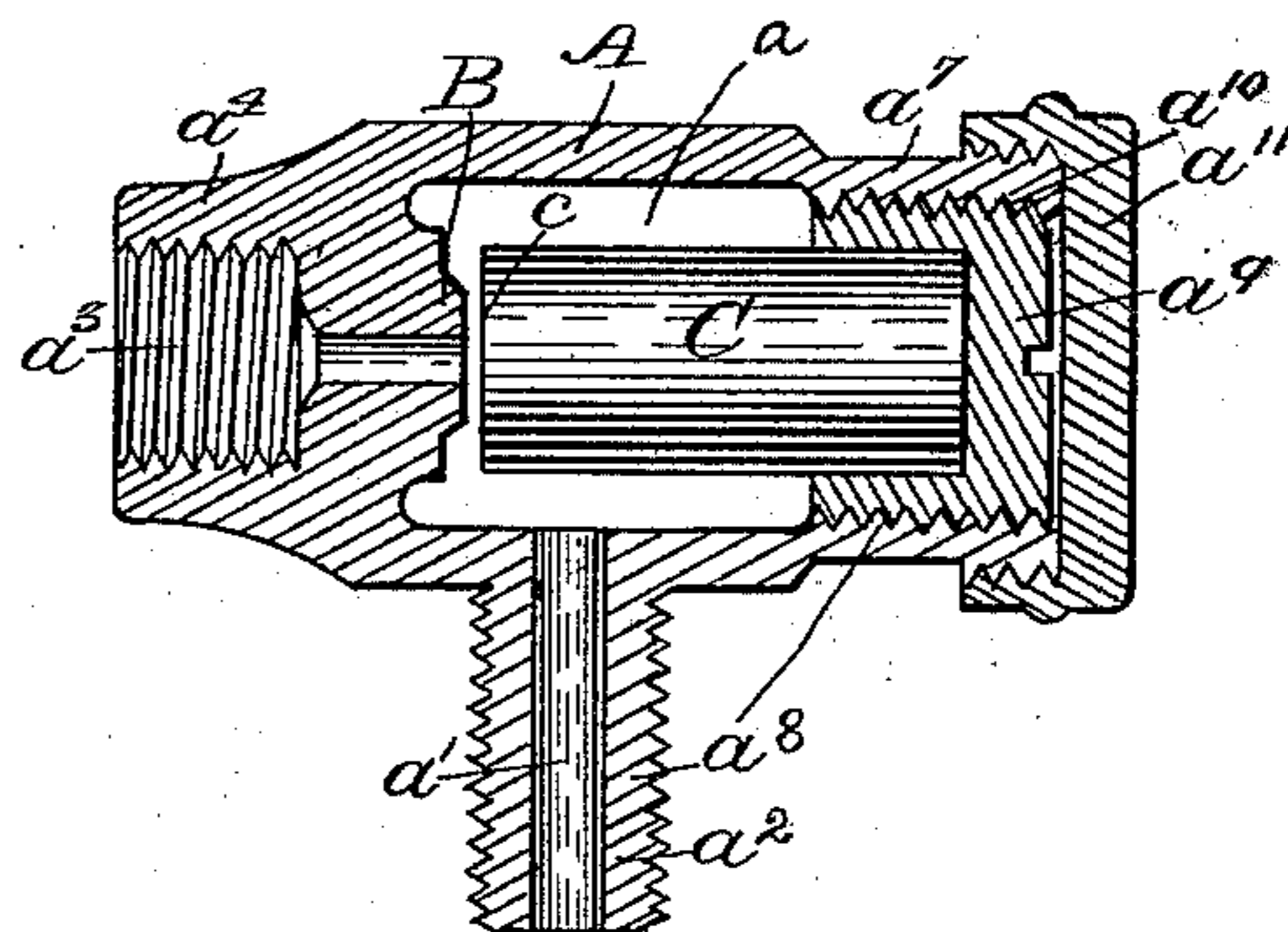


FIG. 3.

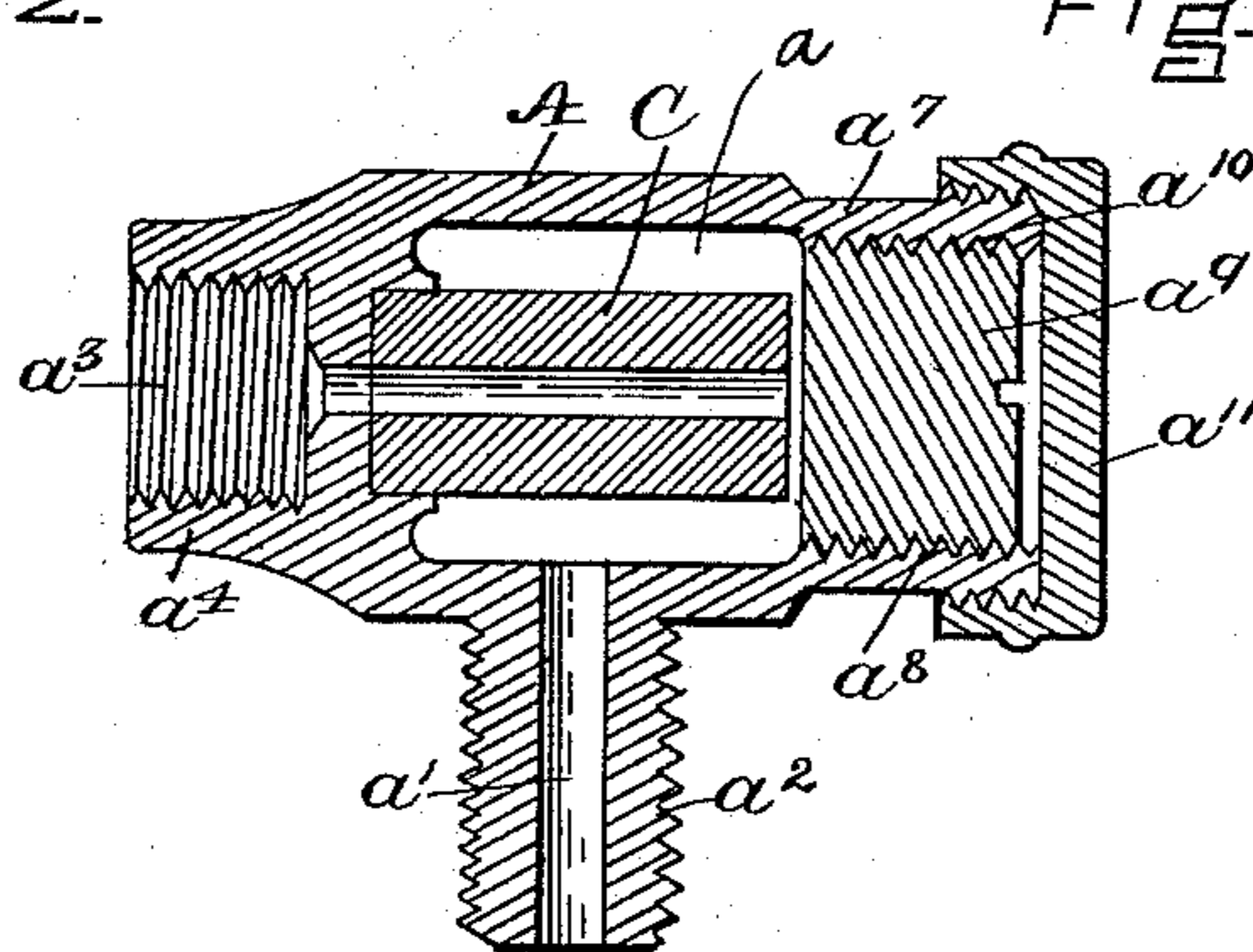


FIG. 4.

WITNESSES.

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AUTOMATIC AIR-VALVE.

SPECIFICATION forming part of Letters Patent No. 409,685, dated August 27, 1889.

Application filed November 15, 1887. Serial No. 255,185. (Model.)

To all whom it may concern:

Be it known that I, CHARLES JENKINS, a citizen of the United States, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Automatic Air-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to an automatic air-valve particularly adapted for use upon steam-radiators and adapted to be operated by variation in the temperature.

In the drawings, Figure 1 is an elevation of the valve. Fig. 2 is a central section thereof, representing the valve as closed. Fig. 3 is a central section representing it as open. Fig. 4 is a central longitudinal section representing a slightly different form of construction.

Referring to the drawings, A is the body of the valve. It has the valve-chamber *a*, which has three openings—first, the inlet *a'* in the screw-teat *a²*; second, the outlet *a³*, formed in the nozzle *a⁴*, which has an interior screw-thread *a⁵*, and a large hole *a⁶*, formed in the neck *a⁷*, which has an interior screw-thread *a⁸*, which receives the screw-plug *a⁹*, and an exterior screw *a¹⁰*, to hold the cap *a¹¹*.

About the outlet-passage *a³* in the valve-chamber *a* is a raised valve-seat B, and between this valve-seat and the screw-plug *a⁹* is a valve C. This valve is represented in Figs. 2 and 3 as attached to the screw-plug by fitting a recess therein, and it is also represented as being quite long. It is therefore a valve and stem combined. The entire device is therefore an air-valve or steam-trap of the sort familiarly known as a "rod-trap," in which the opening and closing of the valve are brought about by a difference in the modulus of expansion at a given steam-temperature between the valve-stem and the shell of the valve to which the valve-seat is attached. It is essential for this purpose that the valve-stem should be comparatively inflexible and refractory at the temperature to which it is exposed; and in order to make the whole structure as small as possible it is desirable that there should be a considerable difference between the modulus of expansion

of the valve-stem at a given temperature and that of the shell of the valve to which the valve-seat is attached. Various compounds have been hitherto used for what is known as "compression-packing" or "elastic steam-packing," not including in this term the kinds of packing known as "pure packing," "plain packing," and "fibrous or mixed packing," but only such as are generically described as crude, burned, refractory, vulcanized-rubber compounds, carrying forty per cent. or more of refractory mineral matter. Such compounds, whether they contain a proportion of sulphur suitable for making what is called a "soft-rubber" compound or a higher percentage of sulphur—such as is used for making vulcanite—if they contain refractory mineral matter in the above-described proportions, are suitable for this use, whatever the chemical constitution of the refractory mineral matter may be. I, however, prefer for this purpose, as I believe it has a higher modulus of expansion under thermotic influences, the compound described in Letters Patent No. 232,974, for elastic packing, the preferred composition of which, as described in said patent, being twenty to fifty-five per cent of diatomaceous silica or infusorial earth, thirty-five to fifty per cent. of rubber, and five to twenty per cent of sulphur, this elastic packing, for the purposes of use with this air-valve, preferably containing forty per cent. or more of refractory mineral substance.

In use the packing is set by the screw-plug so that its seating surface *c* comes in contact with the raised seat B when the packing is expanded by heat, or, in other words, when steam, hot water, or hot air, or other heated medium enters the valve-chamber *a* and causes the valve to be elongated by the heat imparted to it, and upon the cooling of the valve and its body or case the packing is contracted and becomes enough shorter in length to remove its seat surface from contact with the valve-seat B, so that an opening is provided for the escape of cooled air or any other medium which it is desired shall be permitted to escape through the valve before the valve is actuated by the application of heat.

In Fig. 4 I have shown a different form of valve, the valve being tubular in form, instead of solid, and having a hole in continua-

tion of the hole a^3 . It is fastened to the diaphragm, tightly fitting the hole or recess formed therein, and it is elongated and shortened by variation in temperature thereof in relation to this diaphragm. This causes its end next the adjusting plug or screw to become one seat of the valve and the surface of the adjusting plug or screw the other seat of the valve.

It will be observed that this construction of valve is very compact and cheap; also, that the valve is set by bringing the adjusting screw or plug against it to close it when it is lengthened by heat, so that upon its contraction it operates to automatically open the valve, and this insures its automatic action by variation in temperature after the packing has been once set.

I would say, also, that the invention can be applied to any valve-trap or similar device subject to change in temperature and having

a passage which it is desired to open and close.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

An improved automatic air-valve for steam-radiators, &c., of the class known as "rod-traps," in which the expansion valve-stem controlled by steam heat is composed of the crude, burned, refractory, elastic compound containing forty per cent. or more of refractory mineral substance in conjunction with vulcanizable gum, and known to commerce as "compression-packing," for facing steam-valve seats and joints, substantially as and for the purpose described.

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Witnesses:

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