

(No Model.)

J. H. GLAUBER.
LIQUID SHUT-OFF.

No. 586,996.

Patented July 27, 1897.

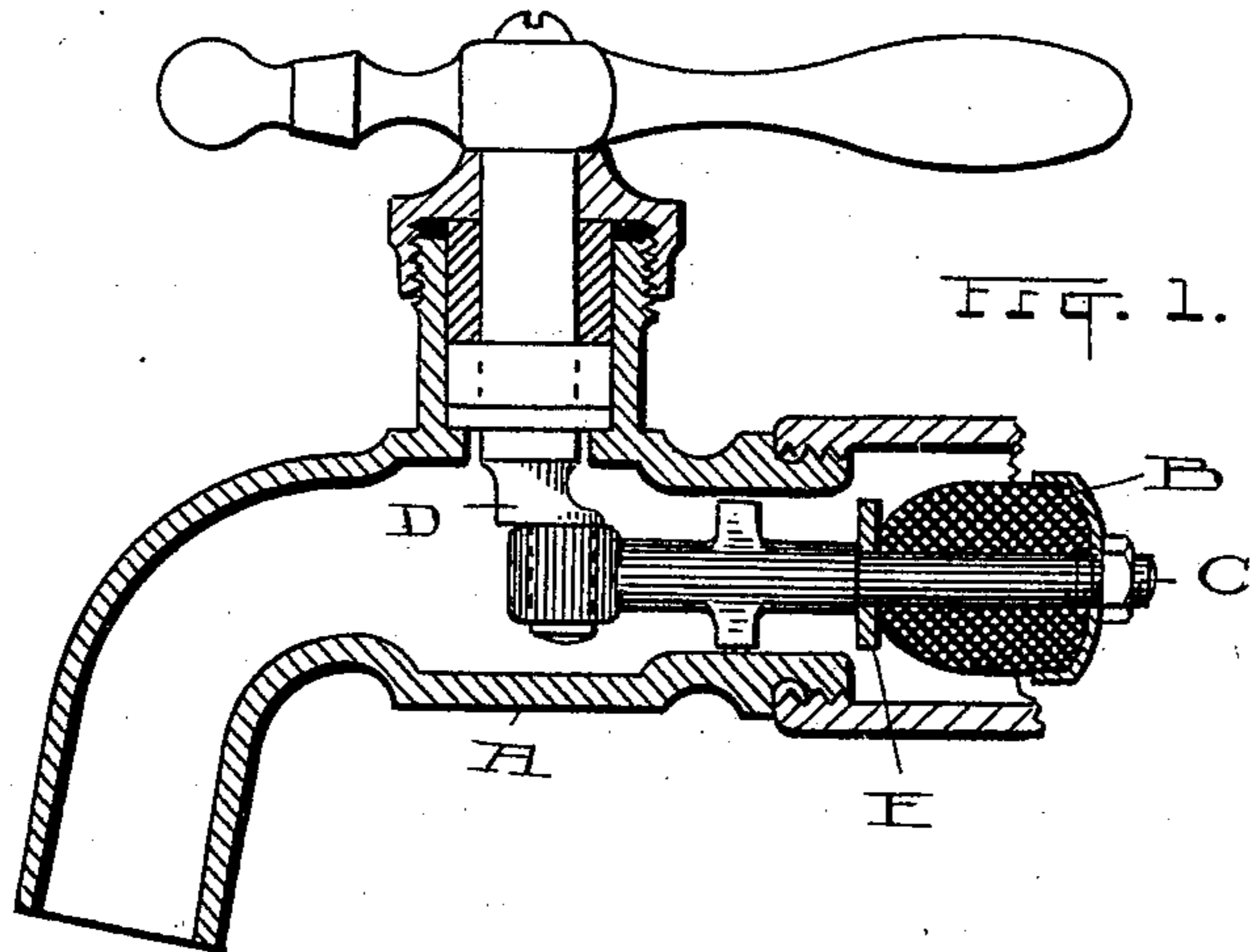


Fig. 1.

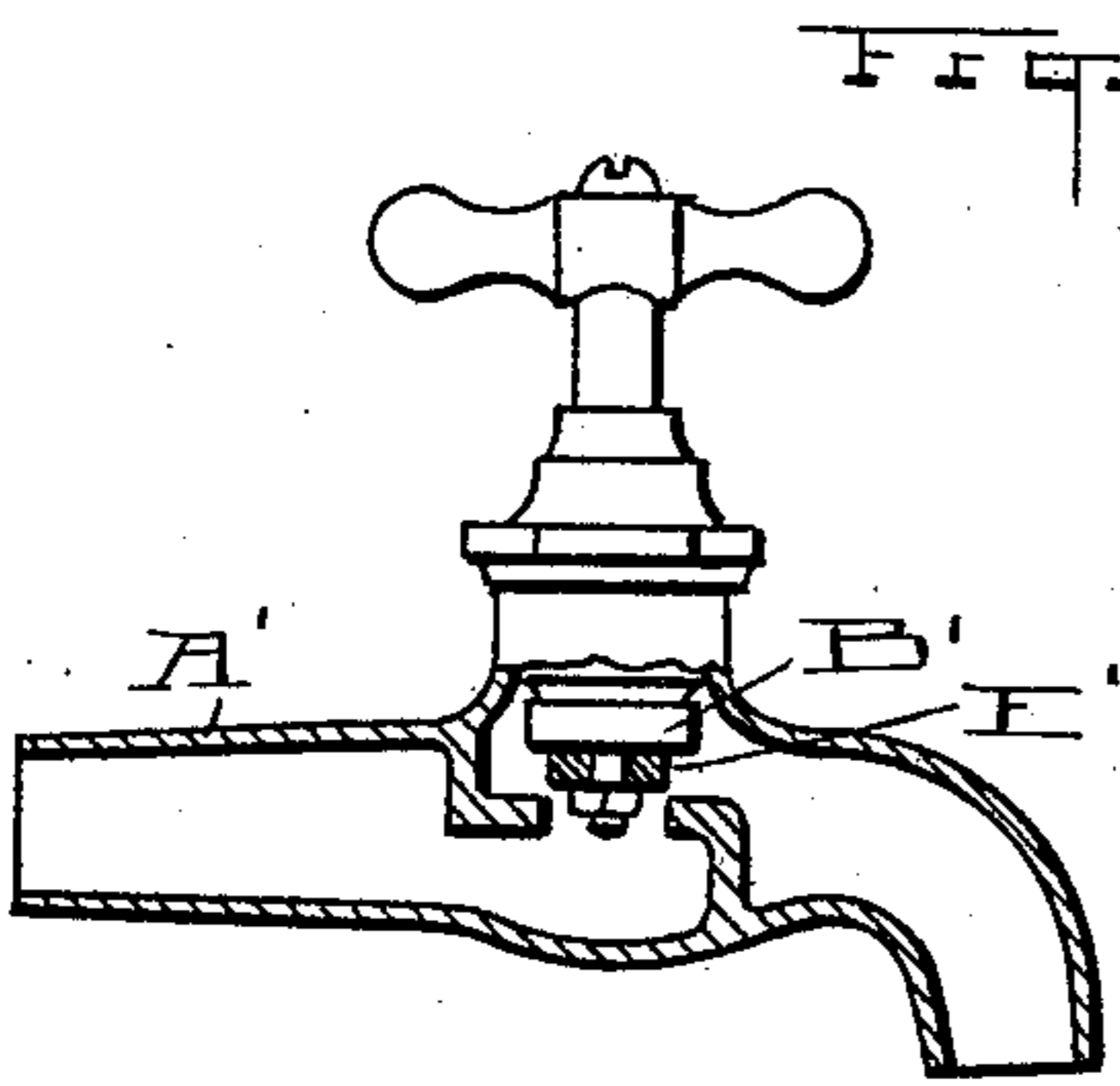


Fig. 2.

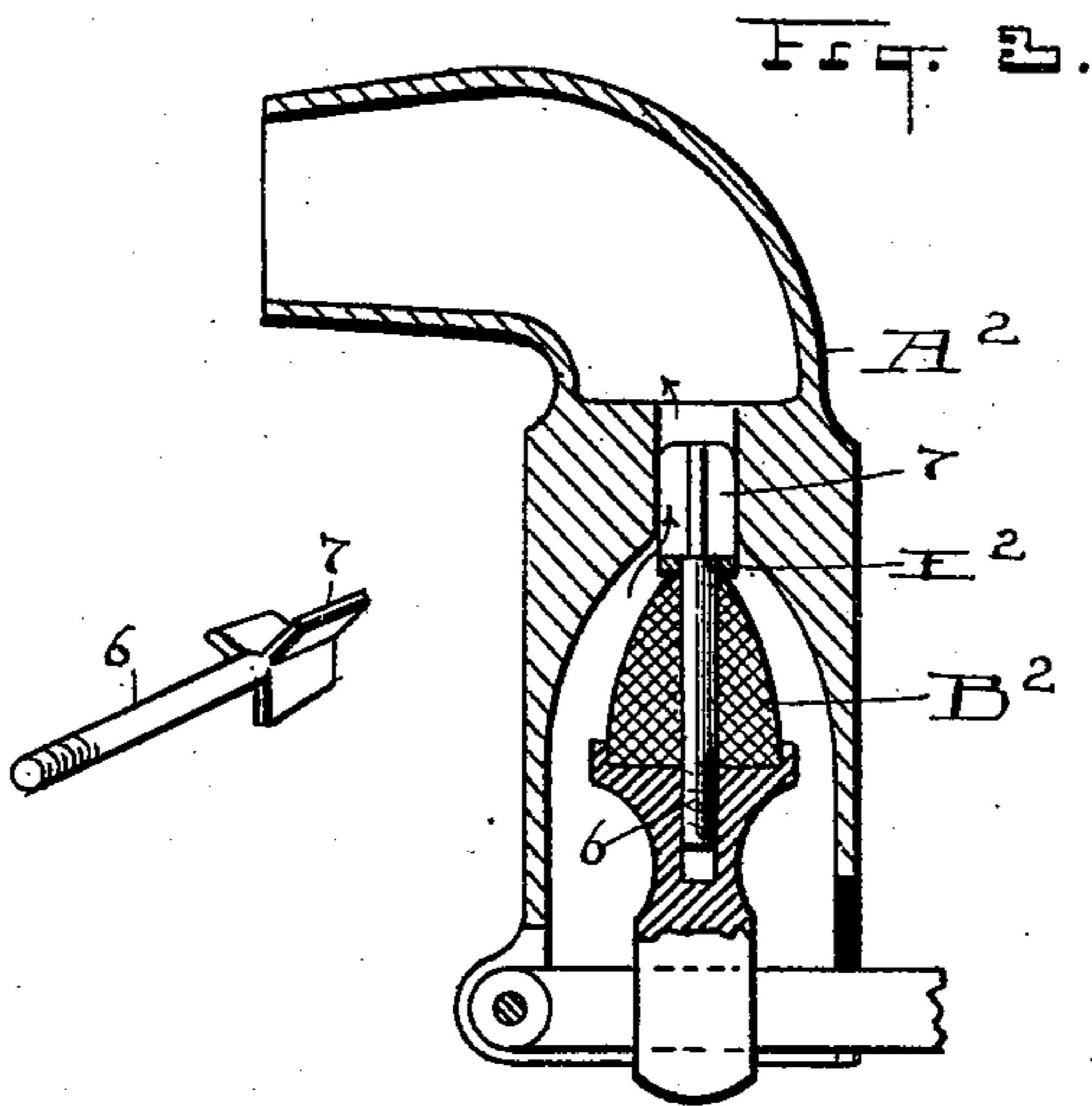


Fig. 3.

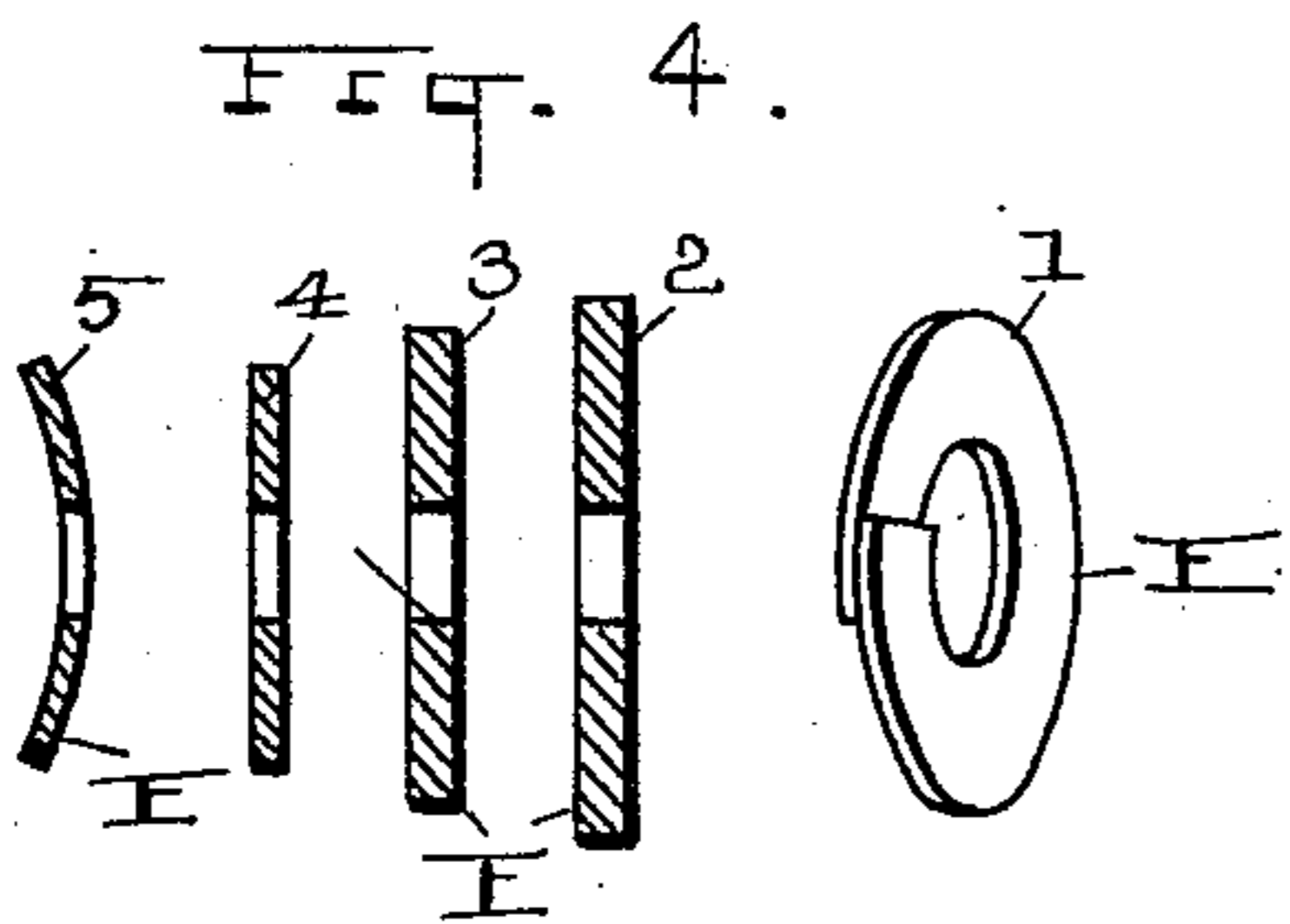


Fig. 4.

ATTEST
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LIQUID SHUT-OFF.

SPECIFICATION forming part of Letters Patent No. 586,996, dated July 27, 1897.

Application filed December 2, 1896. Serial No. 614,181. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. GLAUBER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Liquid Shut-Offs; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in liquid shut-offs, such as cocks, faucets, valves, and the like used in water-service.

It is well known that generally in dwellings and buildings where water is supplied under pressure there is a constant tendency to what is known as "hammering" or "pounding" in the pipes. In some places this is more noticeable than in others, but it is liable to occur anywhere if the pressure is sufficient, and especially if the water be turned off suddenly. I am of course aware that I am not the first person who has attempted to remedy this very disagreeable effect, and I also know that various devices and mechanism having this purpose in view have been made and patented, but I am not aware that any existing patent is based on the right remedial theory or that any inventor has before disclosed a construction which wholly overcomes the trouble. I have myself discovered that a very slight departure from my theory and construction will totally defeat the remedy, and the invention therefore calls for exactness of construction and detail to make it effective.

To this end the invention consists in a primary closing-valve having a certain function and effect before the main valve is seated, all substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of what is known as a "bib" cock or faucet embodying my invention, and Fig. 2 is a sectional elevation of another form of bib-cock in which the invention appears. Fig. 3 is a sectional elevation of a float-valve mechanism for water-closet tanks to which the invention is adapted. Fig. 4 shows a series of graduated disks which constitute the primary valve in the foregoing views.

Referring now to Fig. 1, A represents the

barrel of the faucet, and B the main valve, supported on the stem or spindle C, supported on the crank-shaft D, all of which is a common construction. The valve B presumably is of rubber or its equivalent, and it is adapted to be drawn into the end of barrel A and to be seated therein and cut off the flow of water through the faucet. As shown, the valve is open its full distance.

Now, if the valve B were used alone, as it generally is, there would be inevitable pounding or hammering in the pipes under usual conditions. The barrel and valve shown are old and well known and their association with hammering in the pipes is equally common. Hence the primary valve E, which in this instance has the form of a disk, is placed on the valve-spindle C in advance of valve B. This disk requires to be carefully adapted to the barrel A, so as to practically close the fluid-passage through the same and yet leave a very slight passage for the fluid round about its edge. This passage has to be carefully ascertained, so that it will allow a mere film or very thin sheet of water to pass and not a volume or heavy flow. If the latter occurs the pipe will inevitably pound when the main valve shuts off the flow altogether. It is the sudden shutting off of the water that produces the hammering, but to prevent this more than a gradual closing of the passage is needed. For example, the use of a conical valve with its point in advance will not accomplish the desired result. Other expedients besides conical valves have been tried and failed, and evidently for the reason that they did not comprehend the principle by which alone the result can be controlled. This principle necessitates the sudden, not gradual, closing of the fluid-passage to a practically shut-off condition and with only enough escape to relieve the present tension or pressure induced by such sudden action. If the pressure in the pipes be high, as usual, a very slight sheet of water will relieve the strain. This then closes the body of water off, and then the main valve can come safely and quietly to the remainder of the task and close off the sheet or film of water so escaping and the work is done and all noise is absolutely avoided.

It will be noticed as another feature of this

invention that the primary valve E is supported on spindle C in advance of valve B, and being separate from the spindle C can be removed and substituted. This construction and arrangement has several material advantages, because it enables me to adapt the valve to faucets of different sizes and kinds, and it also enables me to place the primary valve on faucets now in use, so that old faucets can be equipped with them and made as good as new ones so far as hammering is concerned. The preferred form of disk valve is shown at 1, Fig. 4, and 2, 3, 4, and 5 in said figure show valves of different sizes. These valves may be of graduated size or they may be severed and overlapped, as shown in the spiral form, No. 1, Fig. 4, and thus be adapted to be expanded or contracted according to the needs of each particular faucet. These disks need be nothing more than a piece of stiff sheet metal, or they may be made heavier, if preferred. No. 5, Fig. 4, shows a concavo-convex disk which expands by being flattened. Any one of these forms or any equivalent thereof may be used in connection with Figs. 1, 2, and 3.

In Fig. 2 precisely the same principle of construction is present as in Fig. 1. Here the barrel A' and main valve B' likewise appear in a familiar form of faucet, and the primary valve-disk E' is removably fixed on the valve-stem after the valve B' and is separately attachable and detachable.

In Fig. 3 the valve-casing A² is for water-tank connection, and a so-called "float-valve" B² is employed. This valve is of a substantially pineapple shape, but without disk E² is as liable to promote hammering in the pipes as the valves seen in Figs. 1 and 2. Here again the disk E² is a separate piece adapted to be fixed on old valve mechanism as well as new and serving to quiet valve B² in either case.

Still other forms of shut-off constructions could be shown to which my improved primary valve is adaptable to prevent hammering, but these will suffice. So, also, might there be modification of the construction of the primary valve itself and still keep it within the spirit of the invention, and it may be made of metal or any other suitable material. In any and all cases of course the primary valve must be only slightly smaller than the fluid-passage and adapted to enter said passage in advance of the valve proper. To the eye the primary valve might apparently be as wide as the passage and yet leave plenty of room about its edge to allow such escape of water as to make it serve its purpose—that is to say, the fit of the valve in the casing may be so close about its edge as to appear close-fitting at all points and yet leave sufficient passage to take off the reaction in

the pipes and prevent the hammering noise. Hence it is true that the water-passage is to all appearance practically closed by the primary valve, and the invention is limited to a construction which has this effect, whatever the construction of the primary valve itself, and whether it be altogether alone or constitute a part of the valve itself or other member removably supported on the spindle.

The valve-stem 6 in Fig. 3 has guide-wings 7, as of course is common in this art, and the primary or initial closing valve-disk E² is placed on said stem in advance of valve B². In all cases a greater movement of the main valve is required than before to get a free flow of water, because now the primary valve controls the flow, whereas before the main valve controlled it, and the primary valve must be withdrawn from the water-passage before a full flow of water is possible.

I use the term "primary valve" in the sense that it goes before the main valve and is relied on to do the primary work in closing and opening the water-passage, while the "main valve" is relied on to perform its usual function.

The disks or washers 1 2 3 4 5 might be plain uncut parts, if preferred, and may have any desired thickness and be made of any desired material.

What I claim as new, and desire to secure by Letters Patent, is—

1. The casing provided with a fluid-passage and valve-seat, said passage being of the same cross-section at all points beyond said seat, in combination with a valve-stem, a main valve and a substantially disk-shaped primary valve on said stem of a size to practically close the liquid-passage in advance of the main valve, said primary valve constructed to conform around its entire periphery to the wall of the said water-passage and to close the same evenly all around, substantially as described.

2. The casing having a single valve-seat, the valve-spindle and the main valve for said seat and a separate substantially disk-shaped primary valve supported movably on said spindle before the main valve and constructed to enter and substantially close the said fluid-passage, substantially as described.

3. The casing, a main valve therein and an expansible substantially disk-shaped primary valve supported in advance of the main valve and separately attachable and detachable, substantially as described.

Witness my hand to the foregoing specification this 15th day of November, 1896.

JOSEPH H. GLAUBER.

Witnesses:

H. T. FISHER,
H. E. MUDRA.