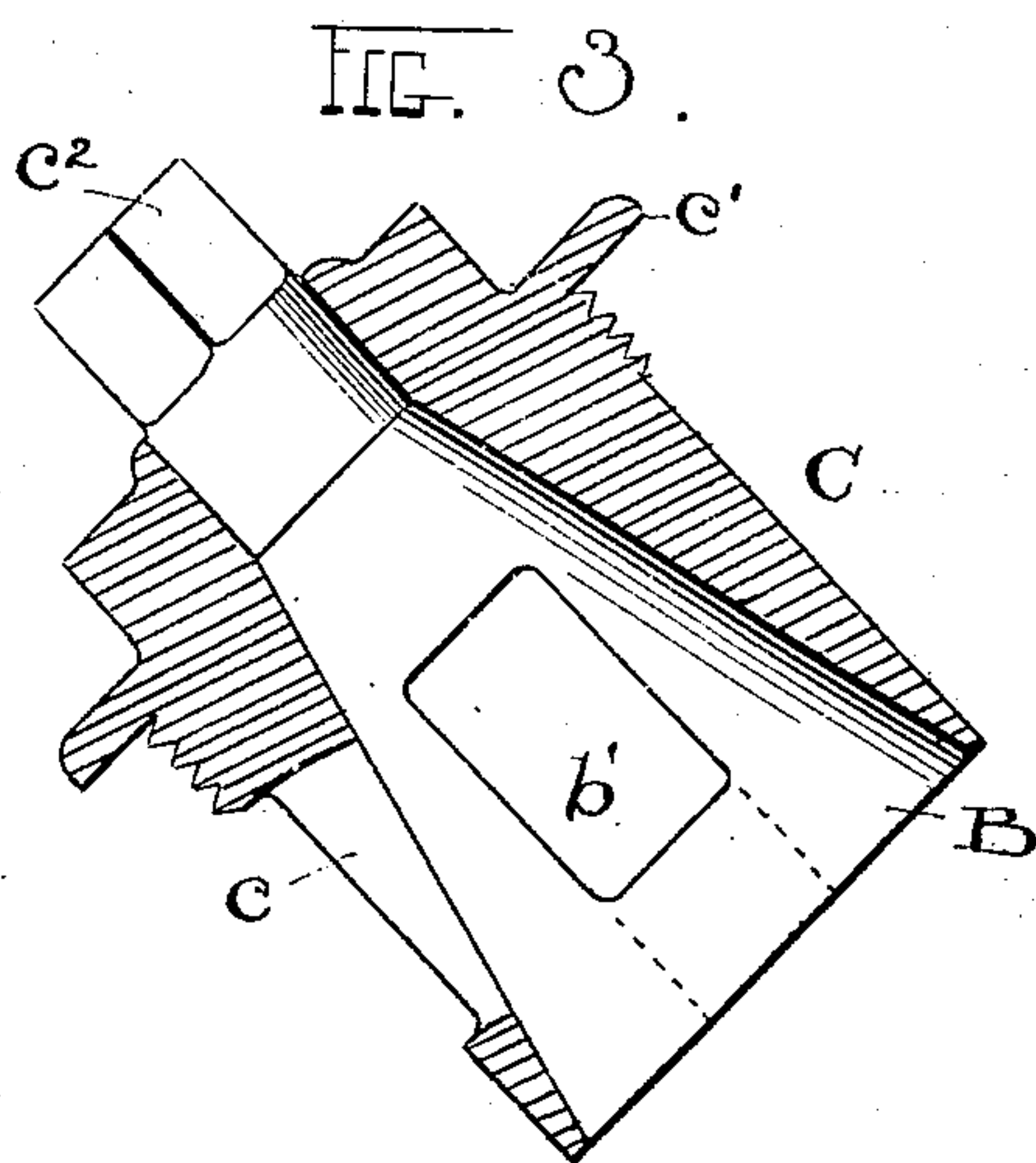
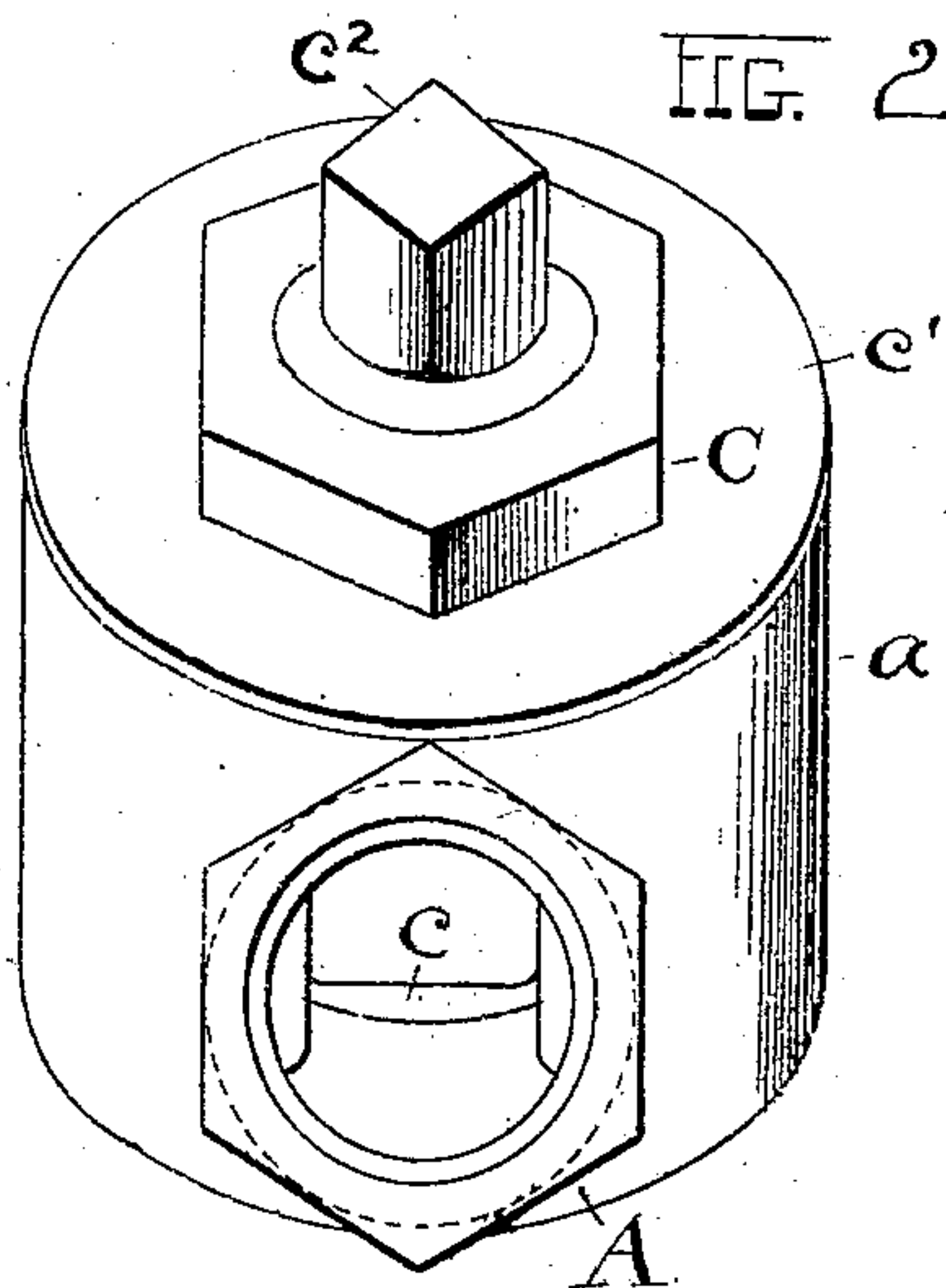
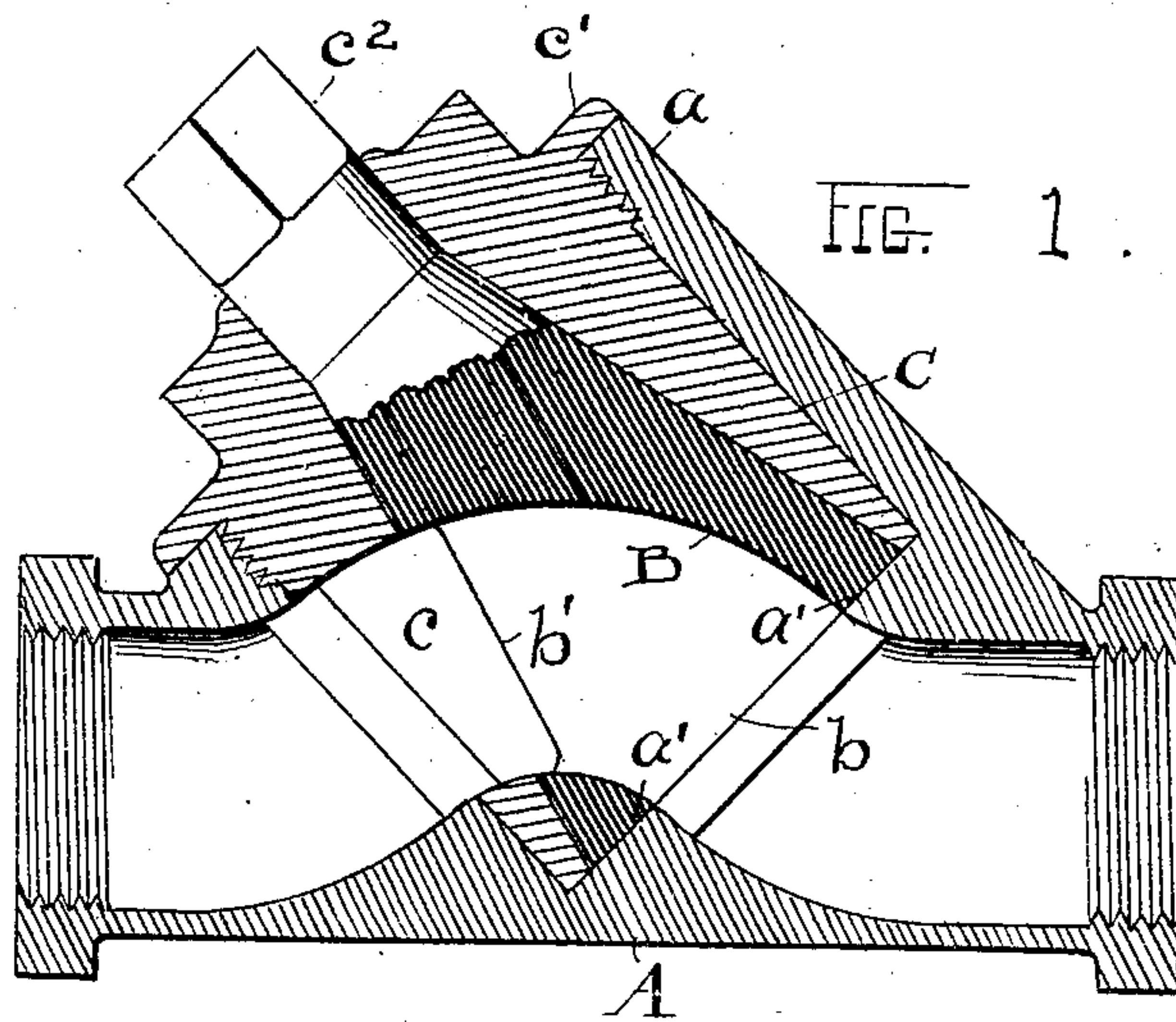


No. 862,741.

PATENTED AUG. 6, 1907.

H. KIEREN.  
BLOW-OFF VALVE.  
APPLICATION FILED DEC. 19, 1904.



ATTEST.

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ATTY



# UNITED STATES PATENT OFFICE.

HENRY KIEREN, OF CRYSTAL FALLS, MICHIGAN, ASSIGNOR OF ONE-HALF TO FRED H. MILLER, OF CRYSTAL FALLS, MICHIGAN.

## BLOW-OFF VALVE.

No. 862,741.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed December 19, 1904. Serial No. 237,461.

*To all whom it may concern:*

Be it known that I, HENRY KIEREN, a citizen of the United States, residing at Crystal Falls, in the county of Iron and State of Michigan, have invented certain  
5 new and useful Improvements in Blow-Off Valves; and do 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.

10 My invention consists in an improvement in blow-off valves for steam boilers, the same being constructed and adapted to operate substantially as herein shown and described.

In the accompanying drawings Figure 1 is a longitudinal sectional elevation of the invention. Fig. 2 is  
15 an end view looking in from the left of Fig. 1, and Fig. 3 is a central sectional elevation of the shell and showing the plug in full lines therein at right angles to Fig. 2.

Referring to the drawing, the letter A designates the  
20 body of the valve, which is composed of a one piece structure arranged at its ends for screw-threaded or other coupling-engagement with the line of pipe in which it is to be introduced and provided with a reversely curved passage extending longitudinally and  
25 of substantially uniform diameter throughout but highest at the middle of the body as best seen in the longitudinal sectional view.

The body A is provided with a boss *a* at an inclination to its longitudinal axis and threaded about the  
30 top only and the body is also formed with an annular shoulder or seat *a'* which surrounds the passage through the body and the bottom portion of which is as shown in the longitudinal sectional view formed in the thickened portion of the body wall at the middle  
35 thereof, said thickened portion being constituted by the curved character of the passage.

The valve or plug B is tapered from its lower end towards its upper end where it is provided with a smooth cylindrical stem and a projecting polygonal  
40 shank *c*<sup>2</sup> for engagement of a suitable tool to turn the plug. The plug is provided with a passage the inlet end of which is in the bottom *b* of the plug while the outlet end extends through its side as at *b'*, said passage being curved as shown and making said passage  
45 through the plug diagonal to the axis thereof.

C designates a renewable seat or shell for the plug, said shell being provided with a side opening designed to register with the passage through the body of the valve and intended to establish communication be-  
50 tween said passage and the passage in the plug. The shell C has a flange *c'* about its top overlapping the upper edge of the boss *a* and resting thereon. As best seen in Fig. 1, the plug B is seated within the shell C and the latter is screwed into the boss *a* until its bot-  
55 tom edge and the bottom of the plug rests snugly on

the annular seat or shoulder *a'*. It is to be noted that both the bottom of the plug and the bottom of the shell rest on said shoulder and that the said shoulder forms in the bottom wall of the body, a recess substantially  
60 V-shaped in cross section the two angularly disposed walls of which are both oblique to the longitudinal axis of the body and are formed in the thickened wall thereof which produces the upward curve of the pas-  
65 sage through the body. Hence this recess does not weaken the body to any appreciable extent. It is also to be noted that the plug B is devoid of washers and adjusting nuts and that it is so disposed with re-  
70 spect to the inlet opening of the body or coupling that the force of steam and water will always tend to keep it tight in its joint.

Now, in order to more clearly apprehend the nature and need of this invention, it will be understood that it is intended for use chiefly in connection with steam boilers having under drain pipes with one or more  
75 valves therein. In steam boilers the heat of the fire converting the water into steam causes the water in the boiler, by reason of the cooler water coming in and the hot water going out in the form of steam, to form a continual circulation, and as the hot water is con-  
80 verted into steam it is divested of sediment or other impurities that may have been carried by it in a fluid or suspended state, which, by force of gravitation are deposited in the lower portion of the boiler in the form  
85 of scale, mud or other solid according to the chemical composition of the same. The scale or sediment thus deposited obstructs the free passage of the heat from the fires through the iron plate of the boiler to the water  
90 and thus there is caused a corresponding loss of heat and steam is not formed as rapidly as would otherwise occur. Now, in order to minimize the loss of heat on  
95 this account a suitable pipe is connected to the lower part of the boiler which extends or runs outside the boiler room and a valve or combination of valves is placed in this pipe. At intervals of time, and in com-  
100 mon practice once daily, the valve or valves are opened and the water in the lower portion of the boiler containing the sediment or deposits is drawn off, the same being blown out by the pressure of the steam in the upper portion of the boiler. The scale or sedimentary  
105 accumulations if not thus blown out would settle and harden, and by preventing the cooling effect of the water would cause the lower sheets of the boiler to be burned out. The seatings in ordinary blow-off valves controlling this line of escape for the hot water are  
110 brought into contact with hard flinty substances in the water, which are forced in between the side of the plug and its seating or bearing, or are forced against the plug and there incrustated, so that when the plug is opened or closed these flinty particles are ground in between these seatings and in a short time destroy



the perfect fit necessary to prevent leakage. This grinding out of the seatings of the plugs or valves occurs very quickly at times, owing to the fact that various kinds of packing are used to increase the tightness of the fit between the surfaces of the seating on the plug and its seat or bearing. In some instances the said packing is used in pieces, which, taken together, are smaller than the circumference of the seatings of the plug, thus leaving spaces to become filled with such hard flinty substances that will be ground into and ruin the seatings. This, when it occurs, necessitates the shutting down of the boiler until the valves can be replaced and involves loss of valuable time besides incurring expense. In some instances a gate valve is used in a line of pipe between the boiler and the plug valve to insure safety and lessen the injurious effects of the scale upon the said valve, but this has been found objectionable for various reasons. Taken all together the seatings of the ordinary plug blow-off valves now in use are so exposed to the direct contact with hot water carrying hard flinty impurities which is forced against them by a high pressure of steam that the valves are, as a rule, soon rendered inoperative or ruined, and this works material loss by leakage of hot water from the boiler or from stoppage while repairs are in progress as above mentioned, and which often occurs at times when service of the boiler is of the utmost importance. Sometimes such imperfect valves are continued in use when they are in bad order, thereby causing danger to property and person through liability to total collapse of the valve and loss of control of the boiler. In the construction of plug blow-off valves as herein shown all this difficulty and danger is avoided and the plug or valve is held securely and continuously upon its seat by pressure from the boiler whether the valve be open or closed. When open, the hot water with its impurities is forced out through the smooth slightly curved passage without any opportunity for the sediment or scale to lodge or deposit in any crevice, hole, space or pocket in any portion of the valve body, cap or plug to harden, clog, and make trouble at some future time because there is no place in the present construction for such lodgments.

Again, the plug and containing cap or seat being accurately fitted by grinding the plug in its seat the natural effect of further use only tends to perfect the seating, thus assuring effective work through long usage instead of lessening utility. A material advantage in this respect is afforded in having an individual seat for a particular plug which, should renewal at any time be necessary, can be procured before going to the job and made to replace the old ones without the necessity of removing the body of the valve from the line of pipe,

thus actually renewing the valve. The long bearing above the passage through the plug forms a seat of such length and there is such large seating surface continuously around the plug that leakage is entirely prevented, and this advantage contributes to the economical operation of the boiler and obviates serious delays for repairs along this line. Furthermore the seating thus being kept free from abrasive substances and the angle of the taper being large, the operation of the valve is exceptionally easy, which is in decided contrast with the common forms of blow-off valves now in use and which require excessive power to open and close them.

As herein shown this valve is complete in its three parts and operates without the aid of stuffing box, packing, nuts, washers, threaded stem, or any loose part depending upon the uncertain workings of a combination of other parts. When the valve is closed, the outlet opening in the plug is opposite a portion of the renewable seating at a point above the level of the top of the pipe leading away from the boiler. Thus the sediment or other matter in the water would by force of gravitation drop away from the exposed seating and not attach itself or be incrustated thereon.

What I claim is:—

A blow off valve for steam boilers, consisting of a body having a reversely curved passage lengthwise thereof and of substantially uniform diameter throughout and highest at the middle of the body and provided with a boss extending at an inclination to the longitudinal axis of the body, the body being formed with an annular seat, the lower portion of which is at the highest point of the curved passage on the lowermost side thereof and extending at an oblique angle to the longitudinal axis of the body, a shell arranged for adjustable engagement in said boss with its lower edge resting on said seat and provided with a side opening registering with the passage through the body and a tapered plug fitting in said shell with its bottom edge designed to rest upon said annular seat within the lower edge of the shell, said plug being provided with a curved and obliquely extending opening extending from its bottom out of one side and adapted to register with the reversely curved passage in the body and with the side opening of the shell, the bottom end of said opening in the plug being located adjacent the inner end of the passage through the body, being also of a diameter equal to the diameter of said passage and concentric to it and always open to it and in complete coincidence therewith, the said opening through the plug also being of substantially uniform diameter throughout its length, and said plug being held to its seating by pressure through the source of supply as the sole means for holding the plug to its seat.

In testimony whereof I sign this specification in the presence of two witnesses.

HENRY KIERNEN.

Witnesses:

CHAS. M. ROGERS,  
FRED H. MILLER.