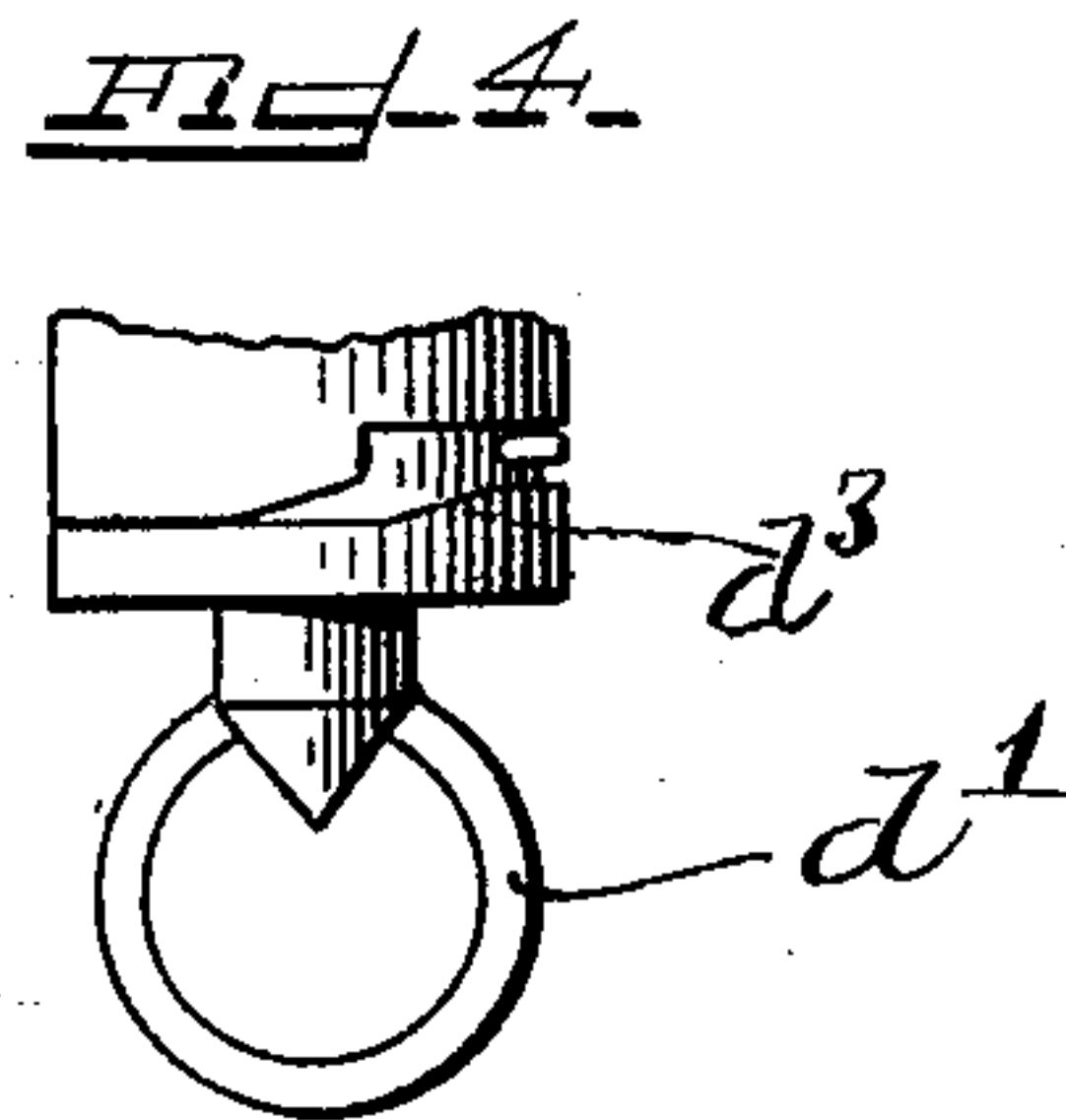
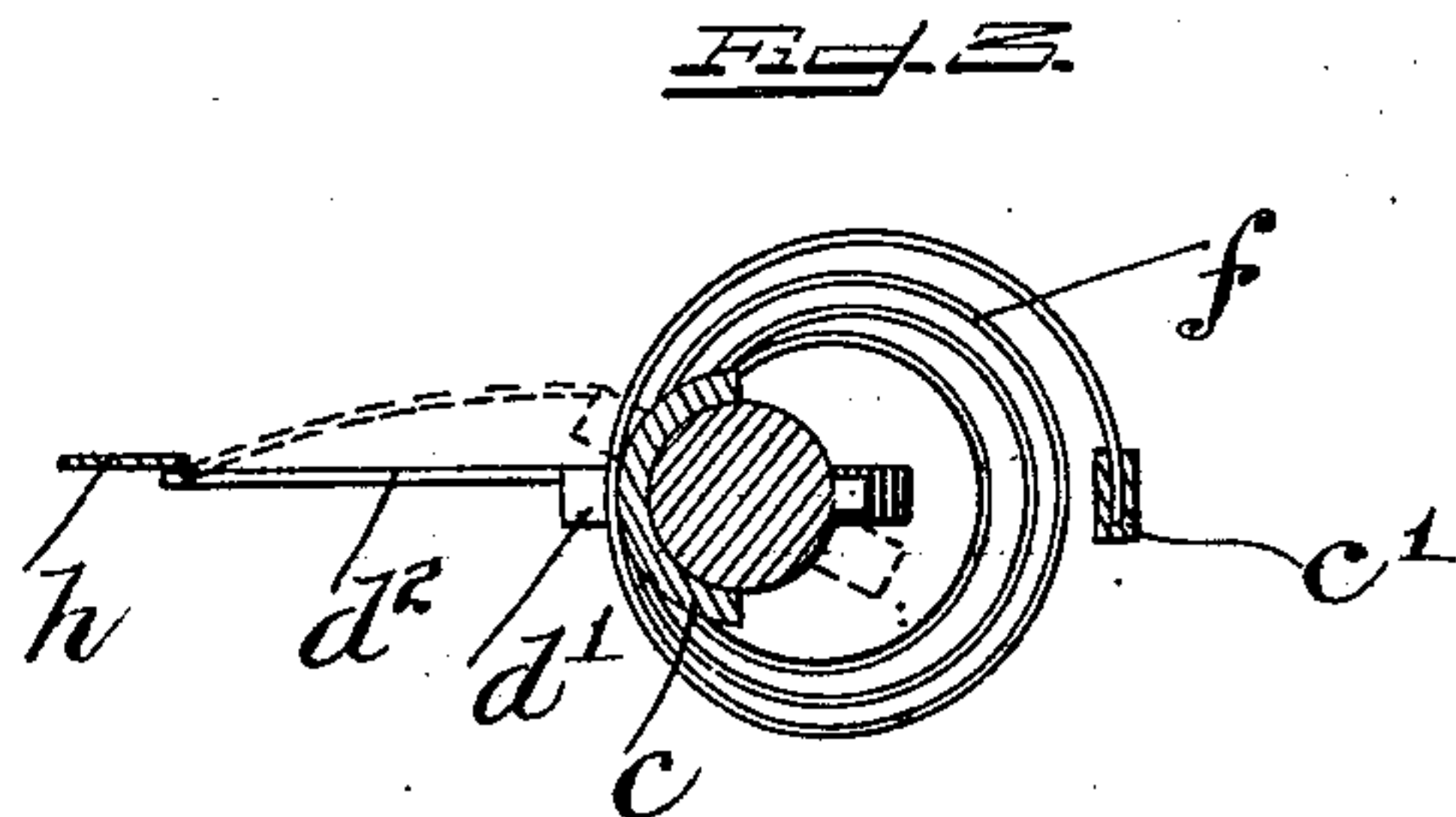
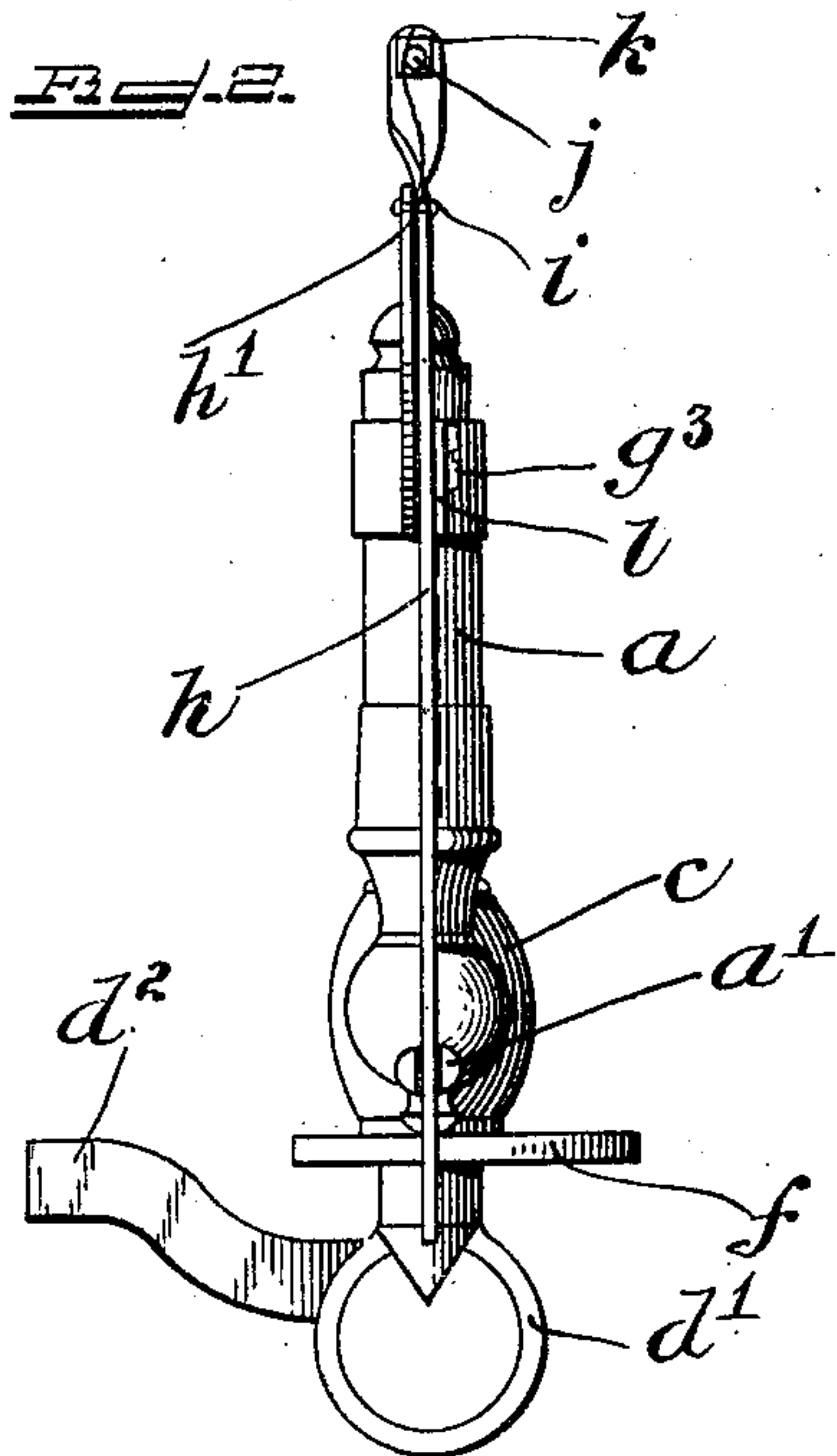
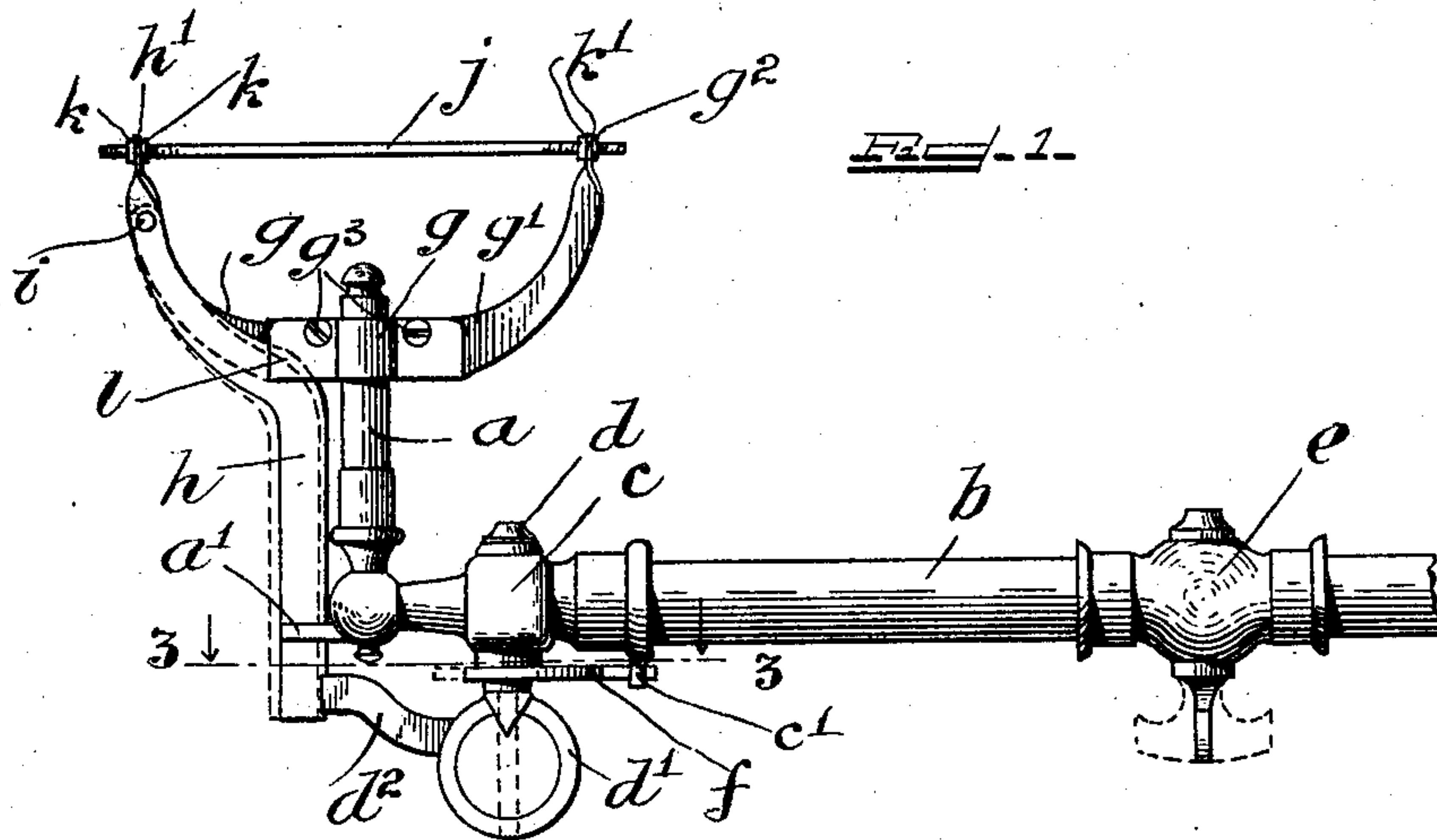


R. E. STAPLES.  
 AUTOMATIC CUT-OFF COCK FOR GAS FIXTURES.  
 APPLICATION FILED APR. 29, 1908.

903,614.

Patented Nov. 10, 1908.



Attest:  
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 Notary

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 his Atty



# UNITED STATES PATENT OFFICE.

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## AUTOMATIC CUT-OFF COCK FOR GAS-FIXTURES.

No. 903,614.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed April 29, 1908. Serial No. 429,993.

*To all whom it may concern:*

Be it known that I, RALPH E. STAPLES, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Cut-Off Cocks for Gas-Fixtures, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to automatic cut-off cocks for gas fixtures, and more particularly to a type thereof wherein a spring actuated cock is held open through the expansion of a thermostatic controlling mechanism.

The main object of the invention is to provide a cut-off cock for gas fixtures wherein the heat from the flame will expand a thermostatic rod to automatically actuate a locking mechanism to hold the cock in the open position, and said rod, when it contracts, will release said mechanism, and said cock may be so turned and locked, while said locking mechanism is set, as to shut off the flow of gas to the burner, thus permitting the safety cock to be used as a full control cock, if desired.

A further object is to provide a device of this character, wherein the locking mechanism may be accurately set relative to the co-operating member carried by the cock through the adjustment of the length of the thermostatic rod, in a manner to time the locking or releasing of the cock to as short an interval as is practical.

A still further object is to provide a device of this character employing a spring returned cock and thermostatically controlled locking means whereby the heat from the flame will normally hold the cock open, with a locking mechanism having a sufficiently strong tension to resist the action of the spring acting on said cock while being capable of yielding sufficiently to permit the release of the cock under positive pressure to avoid damage to the locking mechanism in case one unfamiliar with the device should attempt to shut off the flow of gas by turning said cock backward when the locking mechanism is set. And a still further object is to provide a device of this character which will be simple in construction, wherein the

various parts will be so constructed and arranged as to be strong and not readily disarranged, wherein the device may be readily applied relative to any burner and which will be neat and compact and inexpensive to produce.

The invention consists, primarily, in the combination in a device of this character, of a gas fixture including a burner and a pipe line leading thereto, a gas cock in said line having a rotary plug, a spring normally acting on said plug to close said cock, coöperating locking means on said plug and its casing, whereby said plug may be locked by turning it beyond the open position against the tension of said spring, a thermostatic rod, means supporting said rod above said burner, and within the zone of heat of the flame therefrom, an oscillatory locking lever actuated by said rod, and means carried by said plug adapted to engage said lever to lock said plug in the open position, and in such other novel features of construction and combination of parts as are hereinafter set forth and described and more particularly pointed out in the claims hereto appended.

Referring to the drawings:—Figure 1 is a side elevation of a gas fixture embodying my invention. Fig. 2 is an end view thereof; and Fig. 3 is a section on the line 3—3 of Fig. 1 looking downwardly; and Fig. 4 is an enlarged view of the lower casing of the cock and of the rotary plug thereof, illustrating the arrangement of friction surfaces for holding the plug in the closed position against the tension of the spring acting thereon.

Like letters refer to like parts throughout the several views.

In the accompanying drawings, I have shown a gas fixture of a conventional type, which includes a burner *a*, and a pipe-line *b*, leading thereto from any desired source of supply. Arranged in said pipe-line is a gas cock *c*, composed of an ordinary casing having mounted therein a rotary plug *d* controlling the flow of gas to the burner *a*. I also arrange in this pipe-line a supplemental cock *e*, of any desired type, the function of which is to regulate the volume of gas flowing through the pipe *b* to the valve casing *c*



and burner *a*, the cock *c* being an automatic cut-off cock and the cock *e*, as stated, being a regulating cock. I employ the cock *e* in conjunction with the cock *c*, in order that the size of the flame may be controlled.

The plug *d* is made as loose a fit in the casing of the cock *c* as is permissible with the formation of a gas-tight joint therebetween, as this plug is a rotary plug and is designed to be actuated for the purpose of automatically closing the cock to cut off the flow of gas by means of a torsion spring and the resistance within the casing must, therefore, be limited as much as possible. Acting upon the plug *d*, so as to normally close the cock *c*, is a torsion spring *f*, one end of which is secured to said plug, and the other end of which is secured to the fitting of the said cock *c*. The spring is thus seated close to the valve casing, and between it and the actuating handle *d'* of the plug *d*, thus being in a position where it will not interfere with the free actuation of the said plug and permit of a compact arrangement of the cut-off mechanism. The exact location of this spring is immaterial to the invention, it being merely necessary that any suitable spring acting on said plug to normally close said cock, and which will be tensioned by the opening of the cock, be used.

Mounted upon the burner *a*, adjacent to the tip thereof, is a bracket having upwardly projecting arms *g*, *g'*, disposed upon opposite sides of said burner and distanced therefrom sufficiently to afford the desired quantity of metal in a thermostatic rod, to be hereinafter referred to. This bracket is secured to the burner *a* by means of a split collar *g<sup>3</sup>*, closed by the screws *g<sup>4</sup>*, thus permitting the application of the bracket to burners of different dimensions. This bracket and the plug *d* carry cooperating locking members actuated through a thermostatic rod, whereby the said plug may be locked through the expansion of said rod by the heat from the flame of the burner. These locking members comprise a tongue *d<sup>2</sup>*, carried by some part of the plug *d*, preferably the handle *d'* and an oscillating lever *h* pivotally mounted on one arm of said bracket, as *g*, adjacent to one end of said lever, thus causing a considerable quantity of movement of the long arm of said lever relative to the movement of the short arm thereof, under the influence of said rod.

To relieve the bracket from side strains due to the action of the spring *f*, I provide a slotted guide *a'* on the burner *a*, or on the fixture immediately below same, which, while permitting a free oscillation of the lever *h*, will take up any side strains thereon. The pivot *i*, uniting the lever *h* to the arm *g*, may be of any desired form,—an ordinary pivot or scissors screw being used.

As a safeguard against damage to the at-

tachment by persons not familiar with its mode of operation, I make either or both of the cooperating locking members *h*, *d<sup>2</sup>* flexible, taking care, however, that the tension of said member be greater than that ever exerted by the spring *f*, so that to secure the flexing of either of said members necessary to permit one to pass the other, greater power must be applied than that exerted by the said spring.

The bracket, including the arm *g*, *g'* thereof, is preferably made of sheet metal. One end of the arm *g'*, as *g<sup>2</sup>* is twisted at right angles to the remainder of the arm, thus affording sufficient compressive strength to the arm *g'* while affording a holding surface of considerable area at right angles to the angle of projection of the thermostatic rod *j*, carried by said arm, and the short arm *h'* of the lever *h*, which is turned in a similar manner to that of the end *g<sup>2</sup>* and parallel therewith.

The ends of the rod *j* are screw-threaded, and adjustably mounted in the end *g<sup>2</sup>* of the arm *g'*, and to the short arm *h'* of the lever *h*, by means of take-up and lock-nuts *k* and *k'* at the opposite ends thereof, which nuts are disposed on opposite sides of said arms, respectively. Any other desired take-up mechanism may be employed, it being merely necessary that some means be provided for regulating the length of the thermostatic rod for the purpose of properly seating the lever *h* and securing the desired amount of expansion and contraction of said rod for the purpose of actuating said lever and the locking mechanism, of which it forms a part.

I so form one part of the split collar *g<sup>3</sup>* as to space it away from the arm *g* of the bracket to leave clearance between the two parts of the said collar *g<sup>3</sup>* and to accommodate the long arm of the lever *h* forming an upper guideway in which said arm may reciprocate. This point is indicated at *l*. The long arm of the said lever *h* is projected toward the burner *a*, and then downwardly parallel therewith for the purpose of compactness of structure, and making the tongue *d<sup>2</sup>* as short as possible. This arrangement, however, may be varied through the positioning of the cock *c*, although, as shown in the drawings, the construction described is compact and not conspicuous.

In order to permit the use of the cock *c* for the purpose of entirely cutting off the flow of gas to the burner *a*, independently of the automatic cut-off mechanism, I provide abutting friction surfaces upon the casing of the cock *c* and on the rotary plug *d*, consisting of a cam surface *d<sup>3</sup>* on said plug, which will, when said plug has been turned 180 degrees, engage the casing of the cock *c* and bind firmly against same. This arrangement may be used with perfect safety, as, in



case the abutting friction surfaces should, through wear, permit the plug  $d$  to escape the spring  $f$  would merely automatically close same by a turn of 180 degrees to the other closed position.

The operation of the herein described device is substantially as follows: The cock  $e$  is first opened to the full extent to permit the flow of gas through the pipe  $b$  to the cock  $c$ . This cock, when it is desired to light the gas, is turned substantially 90 degrees, allowing a full flow of gas to the burner  $a$ . Said burner is ignited in the usual manner. As the flame impinges upon the thermostatic rod  $j$ , said rod will immediately begin to expand and force the short arm of the lever  $h$  outwardly about the pivot  $i$  and forcing the long arm of said lever forwardly of the tongue  $d^2$ , the term "forwardly" relating to the direction of action of the spring  $f$ . The limit of expansion is reached within two seconds, at which time the plug  $d$  may be released. Thereupon, the spring  $f$  will turn said plug to an extent to cause the tongue  $d^2$  to engage the lower end of the long arm of the lever  $h$ , thus automatically locking the cock in the open position. If the flame be too high, the volume of the flow of gas may be regulated through the supplemental cock  $e$ . The tension of the spring  $f$ , being less than that of the arm  $h$  or the tongue  $d^2$ , it will not exert sufficient pressure to force the tongue  $d^2$  past the arm  $h$ . If, however, a person should attempt to shut off the flow of gas by turning the plug  $d$  manually, the tongue  $d^2$ , or the end of the arm  $h$ , would flex before sufficient power had been applied to break either of these members and permit the plug to be turned independently of the locking mechanism. The guides  $l$  and  $a'$  not only serve to guide the oscillatory movement of the lever  $h$ , but will also take up the strains from the spring  $f$ , and incidental to the manual operation of the plug, above referred to.

If the throw of the lever  $h$  is too great to insure prompt action, or too short to secure the desired engagement of the long arm thereof and the tongue  $d^2$ , the length of the thermostatic rod  $j$  may be regulated by releasing the nuts  $k$ ,  $k'$ , and taking up or letting out said rod between the arm  $g'$  of the bracket and the short arm of the lever  $h$ , said lever being moved to accommodate itself to this adjustment. In case the gas should be accidentally put out, the cooling of the rod  $j$  would contract it sufficiently to reverse the movement of the lever  $h$ , thus forcing the lower end thereof outwardly and away from the path of the tongue  $d^2$ . Thereupon, the spring  $f$  would instantly close the cock  $c$  and cut off the flow of gas. If it be desired to turn out the gas, the plug  $d$  may be turned another 90 degrees until the cam surface  $d^3$  thereon engages with the cas-

ing of said cock, locking the plug in this position, temporarily, at least, until the rod  $j$  has cooled sufficiently to remove the lever from the path of the tongue  $d^2$ , as above described.

I am aware that it is old in this art to automatically cut off the flow of gas by means of a thermostatic rod within the burner jet, and I do not intend to claim such broadly. I believe, however, that the structure herein described possesses certain advantages over the prior art in points affecting its practical utility. It is apparent, however, that the exact arrangement of parts and the specific details of their construction, as shown in the drawings, are not so essential to the invention as not to permit a variation thereof without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters-Patent, is:—

1. In an automatic cut-off cock for gas fixtures, the combination with a gas fixture including a burner, a pipe-line leading thereto and a gas cock in said line having a rotary plug, of a spring acting on said plug to normally close said cock, coöperating locking means on said plug and its casing, whereby said plug may be locked by turning it beyond the open position against the tension of said spring, a thermostatic rod, means supporting said rod above said burner, and within the zone of heat of the flame therefrom, an oscillatory locking lever actuated by said rod, and means carried by said plug adapted to engage said lever to lock said plug in the open position.

2. In an automatic cut-off cock for gas fixtures, the combination with a gas fixture including a burner, a pipe-line leading thereto, and a gas-cock in said line having a rotary plug, of a spring acting on said plug to normally close said cock, coöperating friction surfaces on said plug and its casing, whereby said plug may be locked by turning it beyond the open position against the tension of said spring, a thermostatic rod, means supporting said rod above said burner, and within the zone of heat of the flame therefrom, an oscillatory locking lever actuated by said rod, and means carried by said plug adapted to engage said lever to lock said plug in the open position.

3. In an automatic cut-off cock for gas fixtures, the combination with a gas fixture including a burner, a pipe-line leading thereto, and a gas cock in said line having a rotary plug, of a spring acting on said plug to normally close said cock, a bracket adapted to be attached to the burner, coöperating locking members carried by said bracket and said plug, whereby said plug may be locked against rotation by said spring, one of said members being flexible, whereby it may be



sprung to permit the other member to pass, the tension of said flexible member being greater than said spring, and a thermostatic rod mounted in one of said members and said bracket, whereby the expansion or contraction of said rod will set or release said members.

4. In an automatic cut-off cock for gas fixtures, the combination with a gas fixture including a burner, a pipe-line leading there- 10 to and a gas cock in said line having a rotary plug, of a spring acting on said plug to normally close said cock, a bracket adapted to be attached to the burner, an oscillatory 15 lever mounted in one arm of said bracket, a thermostatic rod having its opposite ends attached to said lever and the other arm of said bracket and a flexible tongue carried by said plug adapted to engage said lever when 20 said rod is expanded by the heat from the flame from said burner, said tongue having a greater tension than said spring.

5. In an automatic cut-off cock for gas

fixtures, the combination with a gas fixture including a burner, a pipe-line leading there- 52 to and a gas cock in said line having a rotary plug, and a supplemental cock for controlling the flow of gas to said first mentioned cock, of a spring acting on said plug, to normally close said cock, a bracket adapted 30 to be attached to the burner, an oscillatory lever mounted in one arm of said bracket, a thermostatic rod having its opposite ends attached to said lever and the other arm of said bracket, means whereby the length of 35 said rod between said bracket arm and said lever arm may be regulated, and a locking member adapted to cooperate with said lever carried by said plug.

In witness whereof, I have hereunto affixed 40 my signature this sixteenth day of April, 1908, in the presence of two witnesses.

RALPH E. STAPLES.

Witnesses:

N. L. FROTHINGHAM,  
A. A. ASHMAN.