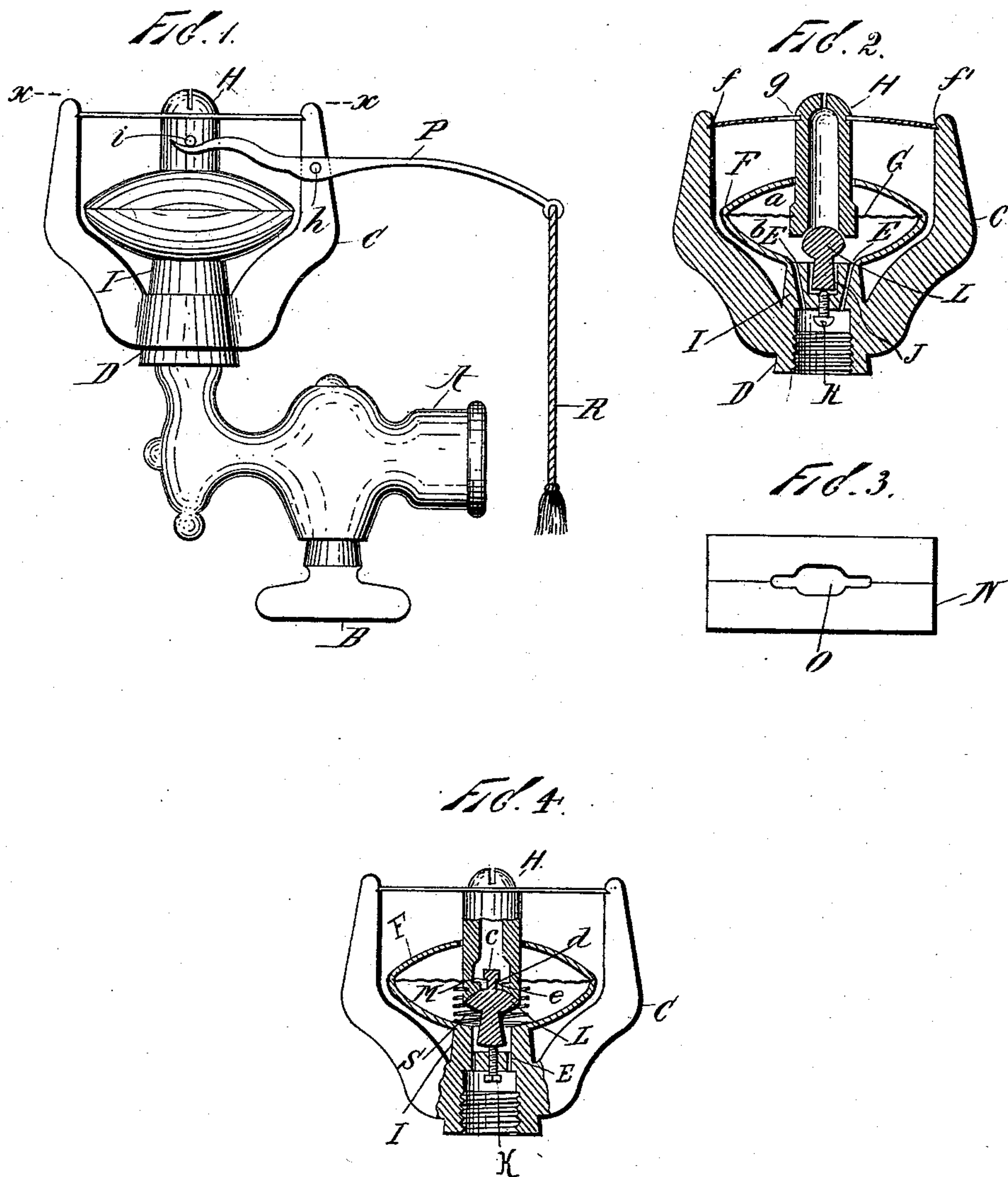


(No Model.)

A. KLEINFELDT.
GAS CUT-OFF DEVICE.

No. 522,600.

Patented July 10, 1894.



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UNITED STATES PATENT OFFICE.

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GAS CUT-OFF DEVICE.

SPECIFICATION forming part of Letters Patent No. 522,600, dated July 10, 1894.

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To all whom it may concern:

Be it known that I, ARTHUR KLEINFELDT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas Cut-Off Devices, of which the following is a specification.

The object of my invention is to produce a device which will maintain the valve of a gas burner open so long as the gas is being consumed by ignition and which will automatically close the valve and cut off the supply of gas when the flame has been extinguished and the gas ceases to burn, so as to prevent the escape of unconsumed gas.

It not infrequently happens that after the gas has been lighted, burning through any of the usual burner tips, it becomes extinguished through accident as by being blown out instead of being turned off by means of the usual gas-cock, in which event the gas will escape through the burner-tip and pervade the atmosphere often occasioning serious damage and loss of life through explosion or asphyxiation, and there are devices now in use for the purpose of preventing the escape of gas under such circumstances, but all such devices are expensive, cumbersome, not easily applied to a gas-pipe or at any rate not of such construction as will enable them to be applied without addition to the gas-pipe of some sort or another, and not always to be relied upon. The device of my invention however can be applied to any gas-pipe and can be readily substituted for the gas-burner that may have been connected therewith, is light and compact, consisting of but few parts, inexpensive to manufacture, reliable, durable, absolutely automatic and not likely to get out of order or to become inoperative except when broken or after the lapse of a considerable length of time.

In the accompanying drawings, forming a part hereof, I have illustrated one construction of device which embodies my invention, the essential elements of my invention being more particularly set forth in the claims hereinafter following and forming a part of this specification.

In the drawings, Figure 1 represents a view in elevation of a section of a gas-pipe with a

device embodying my invention attached thereto. Fig. 2 is a vertical sectional view taken through lines $x-x$ of Fig. 1 and showing the position of the parts when the gas is flowing from the source of supply through the burner-tip and burning. Fig. 3 is a top or plan view of the expanding plate by which the valve is opened and closed; and Fig. 4 is a modification of the device shown in Figs. 1 and 2.

A represents a section of a gas-pipe leading from a source of supply and B a lever by which the valve inserted in said pipe, not shown, is opened and closed, whereby to allow the gas to flow therethrough and by which it can be wholly turned off.

C is a fork-shaped frame having a central annular portion D which is screw-threaded on its inside, as shown in Figs. 2 and 4 so as to engage with a corresponding screw-threaded portion at the end of the gas-pipe as will be readily understood; above the screw-threaded portion of the frame C is a solid portion I which has a series of ports or passages E so as to allow the passage therethrough of gas coming from the gas-pipe, and above this solid portion is located a circular or bulb-shaped chamber F connected with or forming part of the frame C and which chamber is divided into two compartments a b by a flexible partition or diaphragm G which preferably is of thin metal although it may be of any other suitable material. The chamber F and the partition G have a central opening therethrough to allow for the passage of the burner H and the inside edges and outside edges of the partition G are secured in grooves or slots or in any other suitable manner in the chamber F and burner H as will be seen in Figs. 2 and 4. The burner H is adapted to move easily through the opening in the chamber F, the opening therethrough providing a guide for the burner, but the partition G is attached to the chamber F and burner H in a perfectly gas-tight manner so that no gas will escape from the compartment b into the compartment a , whereby it would pervade the air, the partition or diaphragm G being made flexible and preferably a little larger than is required to accurately fit the space between the burner H and the inner surface of the

chamber F so as to allow it to give or spread as the burner H rises and falls in the manner to be presently explained.

The upper part or wall of the chamber F is provided as a protection to the diaphragm or flexible cover G and as a guide for the burner, but such upper part or wall of the chamber F may be dispensed with altogether if desired.

In the solid portion I of the frame C is milled out an opening J through the bottom of which is a screw-threaded hole into which is adapted to be screwed an adjusting screw K so as to engage with the under side of a metal plug L, the shank of which is inserted in the opening J but does not fill the same, sufficient space being allowed to enable the plug to be readily raised or lowered therein by means of the screwing in or out of the screw K; the upper end or head of the plug L is preferably made round and is also preferably ground and provides a seat for the lower end of the burner H which is also countersunk and rounded and also ground comprising a valve which is adapted to intimately fit and rest upon the head of the plug which as stated comprises a seat therefor.

The upper end of the burner H is cut through so as to provide an opening for the passage of the gas therethrough and which is to be ignited at that point, the upper end of the burner constituting the usual burner tip in the construction shown in the drawings, although a separate burner-tip may be inserted therein if desired.

In the position of the parts shown in Fig. 2 there is a free passage for the gas from the gas-pipe to the burner-tip, its course being as follows:—from the gas-pipe through the opening in the part D, through the ports E, through the space between the head of the plug L and the lower end of the burner, up the burner and out the burner-tip where it is to be ignited.

In order to adjust and regulate the flow of the gas from the compartment *b* of the chamber F into the burner-tip, the screw K is operated so as to lower or raise the plug L whereby the space between the head of the plug and the lower end of the burner will be correspondingly regulated or increased or decreased; and to provide for a further regulation of the flow I may surmount the head of the plug L with the metal piece M shown in Fig. 4 which consists of the head-portion *c* and neck *d*, the head *c* being adapted to almost fill the central opening *e* of the lower end of the burner tip as it is constructed in Fig. 4, as will be presently explained.

Between the forks of the frame C is located a plate, bar or rod of expansible metal N which may be made of one or two parts, two parts being shown in the drawings (see Fig. 3) and they are each cut away so that when placed together there will be a central opening O therethrough; this plate or these plates are securely held in position between the

forks and the frame C, their ends being held in grooves *ff'* in the upper ends of the forks as shown in Fig. 2, and this plate or these plates are preferably located below the point of the burner H from which the gas passes and are held in an annular groove *g* in the burner H, the burner passing through the opening O therein.

For the purpose of opening the valve in the first instance so as to enable a free passage through the burner tip I provide a lever P pivoted at *h* on one fork of the frame C, one end of the lever being adapted to engage with a key or projection *i* on the burner, and to the other end is attached a cord and tassel R so that when the cord is pulled down the end of the lever to which it is attached will be lowered and the other end raised thereby raising the burner so as to remove its lower end from the head of the plug L and allow the free passage of gas therethrough as before explained, it being of course understood that the lever B has been turned so as to open the valve at that point and permit the passage of gas from a source of supply. After the gas has been ignited the lever P is released and falls to its normal position, the valve H being maintained raised by the plate N in the manner now to be explained.

After the valve H has been raised, the gas can then be ignited whereupon the burner H will become hot communicating its heat to the expansible metal piece N, which will thereby expand but as its ends are securely held, and as the expansion is not great enough to force apart the forks of the frame C, the plate N will belly upward or curve out as shown in Fig. 2; and as will of course be understood a very slight tendency to expansion longitudinally when resisted in that direction will cause a comparatively great curvature in the plate. So long as the gas is ignited and burning the burner will be held raised, and as soon as the flame goes out for any reason or another the plate N will become cool and contract and force down the burner H in a very short space of time, almost immediately, so that its lower end will again rest firmly and tightly to its seat on top of the plug L.

As before stated when the burner H rises the partition or diaphragm G also rises in the center and when the burner lowers again the diaphragm or partition G is restored to its normal position; and the feature of using this flexible preferably metallic and gas-tight partition or diaphragm is that I am enabled thereby to avoid the use of a stuffing-box at that point which would add friction and which would require greater power to overcome and a greater degree of expansion in the plate N in order to do so and raise the burner. By my device the expansion in the plate will be sufficient to keep the burner H raised from off its seat even though the quantity of gas is reduced to a minimum by almost wholly closing the main valve operated by the lever B; and in order to facilitate the up-

ward movement of the burner H I may provide a light spiral spring S, the tension of which is upward. It is held in position in the compartment *b* of the chamber F surrounding the plug L and the lower portion of the burner H, the ends of the spring being secured in the burner H and in the wall of the compartment F as shown in Fig. 4, the spring being compressed when the burner falls by the contraction of the plate N, and as the tension of the spring S is upward as stated the upward movement of the burner will be assisted thereby being in part raised by the spring and chiefly by the expansion of the plate N; or the spring S can be used entirely for the purpose of raising the burner H when the plate N expands and the lowering of the plate N being accomplished by the contraction of the plate as before explained, in which case there need be but one shoulder on the burner-tip instead of having a groove, as shown in Fig. 4.

While of course the quantity of gas which it is desired to pass through the burner may be regulated primarily by the lever B and the valve operated thereby, yet it is preferable that the main valve be allowed to remain fully opened and the regulation accomplished by means of the screw K, the operation of which has been before explained and by the head *d* which surmounts the plug L and by means of which as the burner H rises it will move up over the head *d* thereby making narrower the passage in the lower end of the burner by partially filling that opening, this of course being made possible when the screw K has been operated and has adjusted the position of the plug L so as to allow the head *d* to enter the central opening through the burner at that point after a slight rise of the burner H, it being understood that if the screw K is screwed in so as to raise the plug as far as it will go, the rise of the burner H would not be sufficient to enable the head *d* to enter the central opening therethrough.

I do not limit my invention to the particular construction of device shown and described nor to the particular construction, size, or relative arrangement of the separate parts which comprise the device hereinbefore described and shown in the drawings as embodying my invention; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a gas pipe leading from a source of supply, of a gas chamber connected therewith inclosed in a gas tight manner by a flexible cover, a gas burner connected with said flexible cover in a gas tight manner and leading into said gas chamber and constituting a valve in co-operation with a seat therefor, and an expansible metallic plate engaging with said gas burner and arranged in proximity to the frame of said burner so as to be expanded by the heat of the flame.

2. The combination of a gas-pipe leading

from a source of supply, of a gas chamber connected therewith, a gas-burner leading from said gas-chamber and a metal rod or plate adapted to curve by expansion through the heat of the gas flame so as to raise said burner to allow the passage of gas there-through and to contract when the flame goes out to lower said burner to shut off the supply of gas.

3. The combination with a gas-pipe leading from a source of supply, of a gas chamber connected therewith, inclosed in a gas-tight manner by a flexible cover, a gas-burner connected with said flexible cover in a gas-tight manner and also connected with said gas-chamber and a metal rod or plate adapted to engage with said burner and tube and to expand through the heat of the flame so as to allow the passage of gas from said gas-chamber into said burner and to contract when the flame goes out so as to shut off the gas.

4. The combination with a gas pipe leading from a source of supply, of a chamber connected therewith divided into two compartments by a flexible partition or diaphragm, the gas-pipe being connected with the lower compartment, a gas-burner which passes through the upper compartment of said chamber and through said diaphragm, which is also connected with said burner in a gas-tight manner and a metal rod or plate adapted to engage with said burner and tube and to expand through the heat of the flame so as to allow the passage of gas from said gas-chamber into said burner, and to contract when the flame goes out so as to shut off the gas.

5. The combination with a gas-pipe leading from a source of supply, of a gas-chamber connected therewith inclosed in a gas-tight manner by a flexible cover, a gas-burner connected with said flexible cover in a gas-tight manner and passing therethrough into said gas-chamber and a metal rod or plate adapted to engage with said burner and tube and to expand through the heat of the flame so as to raise said gas-burner, and with it the flexible cover of the gas chamber to allow the passage of gas therethrough and to contract when the flame goes out to lower the said burner to shut off the supply of gas.

6. The combination with a gas-pipe leading from a source of supply of a gas-chamber connected therewith inclosed in a gas-tight manner by a flexible metallic cover, a gas-burner connected with said flexible metallic cover in a gas-tight manner and passing therethrough into said gas-chamber and a metal rod or plate adapted to engage with said burner and tube and to expand through the heat of the flame so as to raise said gas burner and with it the flexible metallic cover of the gas-chamber to allow the passage of gas therethrough and to contract when the flame goes out to lower the said burner to shut off the supply of gas.

7. The combination with a gas-pipe leading from a source of supply, of a gas-chamber con-

5 nected therewith, a gas-burner leading from
said gas-chamber and a metal rod or plate
adapted to engage with said burner and tube
and to curve by expansion through the heat
of the gas flame so as to raise said burner and
allow the passage of gas therethrough and to
contract when the flame goes out to lower said
burner to shut off the supply of gas and means
for regulating the flow of gas into the gas-
chamber.

8. The combination with a gas-pipe leading
from the source of supply, of a gas chamber
connected therewith, a gas burner leading
from said gas chamber and a metal rod, plate
or bar arranged below the point of ignition
and constructed to engage directly with said
gas burner and adapted to curve by expansion
through the heat of the gas flame so as
to allow the passage of gas from said gas
chamber into said gas burner, and to contract
when the flame goes out so as to shut off the
gas, and means to regulate the supply of gas
from the gas chamber into the gas burner.

9. The combination with a gas-pipe leading
from a source of supply of a valve inserted
therein and a metal rod or plate or bar which
is placed at right angles to the burner, said
burner engaging therewith and passing there-
through, and a rigid frame holding the ends of
said rod, plate or bar, said rod being adapted
to curve by expansion through the heat of the
flame so as to operate said valve to open the
gas-pipe and restore itself to its original posi-
tion by contraction when the flame goes out
and operate said valve to close said gas-pipe.

10. The combination with a gas-pipe lead-
ing from a source of supply, of a gas cham-
ber connected therewith, a gas-burner lead-
ing from said gas-chamber and a metal rod or
plate adapted to curve by expansion through
the heat of the gas flame so as to allow the
passage of gas from said gas-chamber into
said gas-burner and to contract when the
flame goes out so as to shut off the gas, means
to regulate the supply of gas from the gas-
pipe into the gas-chamber and means to regu-
late the flow of gas from the gas-chamber into
the gas-burner.

11. The combination with a gas-pipe, lead-
ing from a source of supply, of a gas-cham-
ber connected therewith provided with a flexi-
ble cover, a gas-burner leading from said gas-
chamber and connected with said flexible
cover and a device adapted to engage with

said gas burner and tube to be operated by ex-
pansion through the heat of the gas flame so
as to allow the passage of gas from said gas-
chamber into said gas-burner and to be oper-
ated by contraction when the flame goes out
so as to shut off the gas.

12. The combination with a gas-pipe lead-
ing from a source of supply, of a gas-burner
connected therewith and a seat for said gas
burner so constructed that the movement of
said gas burner opens and closes the gas sup-
ply to said burner, and a device adapted to
engage with said gas burner and to operate
by expansion through the heat of the gas
flame so as to move said burner to allow the
passage of gas therethrough and to operate
by contraction when the flame goes out so
as to move said burner to shut off the supply
of gas.

13. The combination with a gas-pipe, of a
device consisting of the fork-frame C having
a central opening therethrough, plug L, cham-
ber F having compartments *a b* therein, dia-
phragm G, burner H and metal piece N all
arranged and adapted to operate substantially
as set forth.

14. The combination with a gas-pipe of the
fork-frame C having central opening there-
through, plug L, adjusting screw K, chamber
F, having compartments *a b* therein, dia-
phragm G, burner H and metal piece N all
arranged and adapted to operate substantially
as set forth.

15. The combination with a gas-pipe of the
fork-frame C having central opening there-
through, plug L having head *c* thereon, spring
S, adjusting screw K, chamber F, having com-
partments *a b* therein, diaphragm G, burner
H and metal piece N all arranged and adapted
to operate substantially as set forth.

16. The combination with a gas-pipe of a
device consisting of the fork-frame C having
central opening therethrough, plug L, cham-
ber F having compartments *a b* therein, dia-
phragm G, burner H, metal piece N and lever
P all arranged and adapted to operate sub-
stantially as set forth.

This specification signed and witnessed this
6th day of March, A. D. 1893.

ARTHUR KLEINFELDT.

In presence of—
E. M. TAYLOR,
M. GIBSON.