

No. 714,162.

Patented Nov. 25, 1902.

L. F. DUCKER.
SAFETY GAS BURNER.
(Application filed June 18, 1902.)

(No Model.)

Fig. 1.

Fig. 2.

Fig. 3.

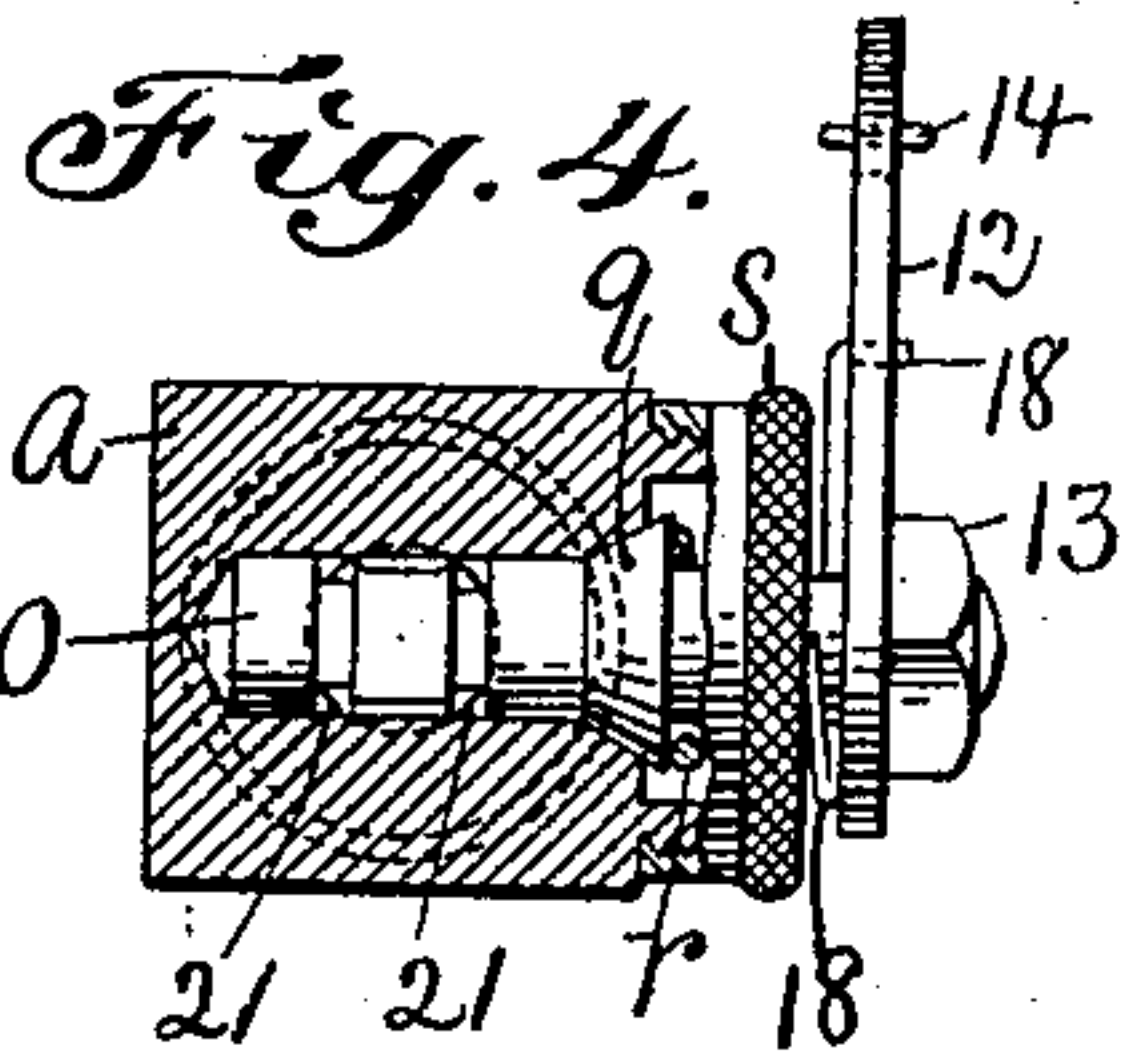
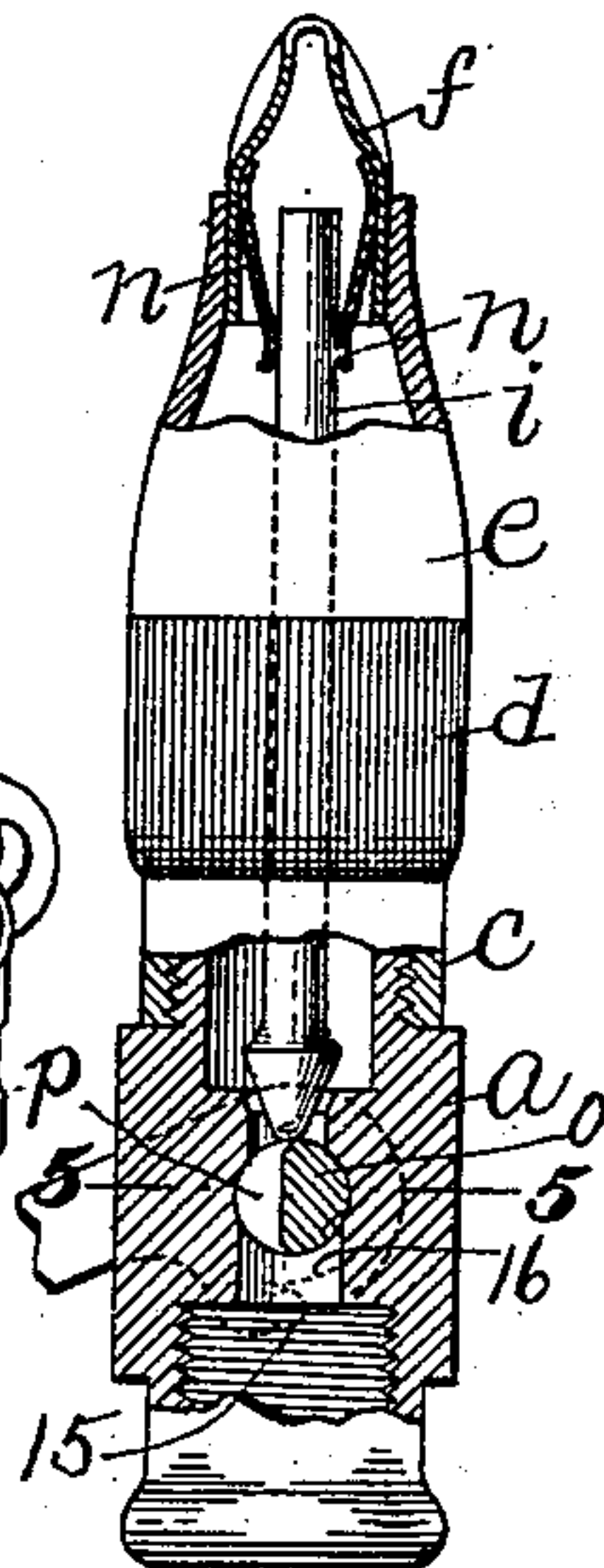
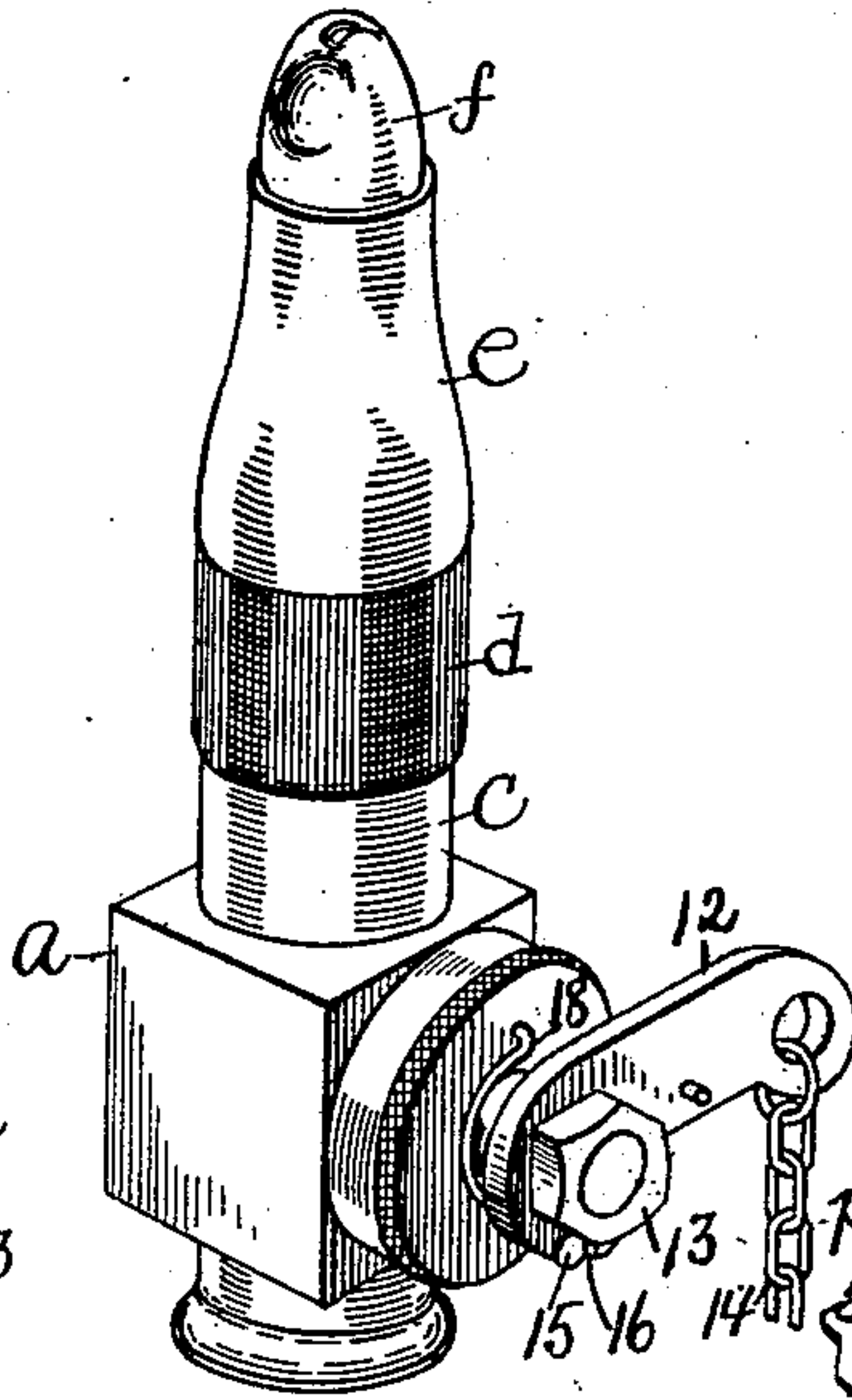
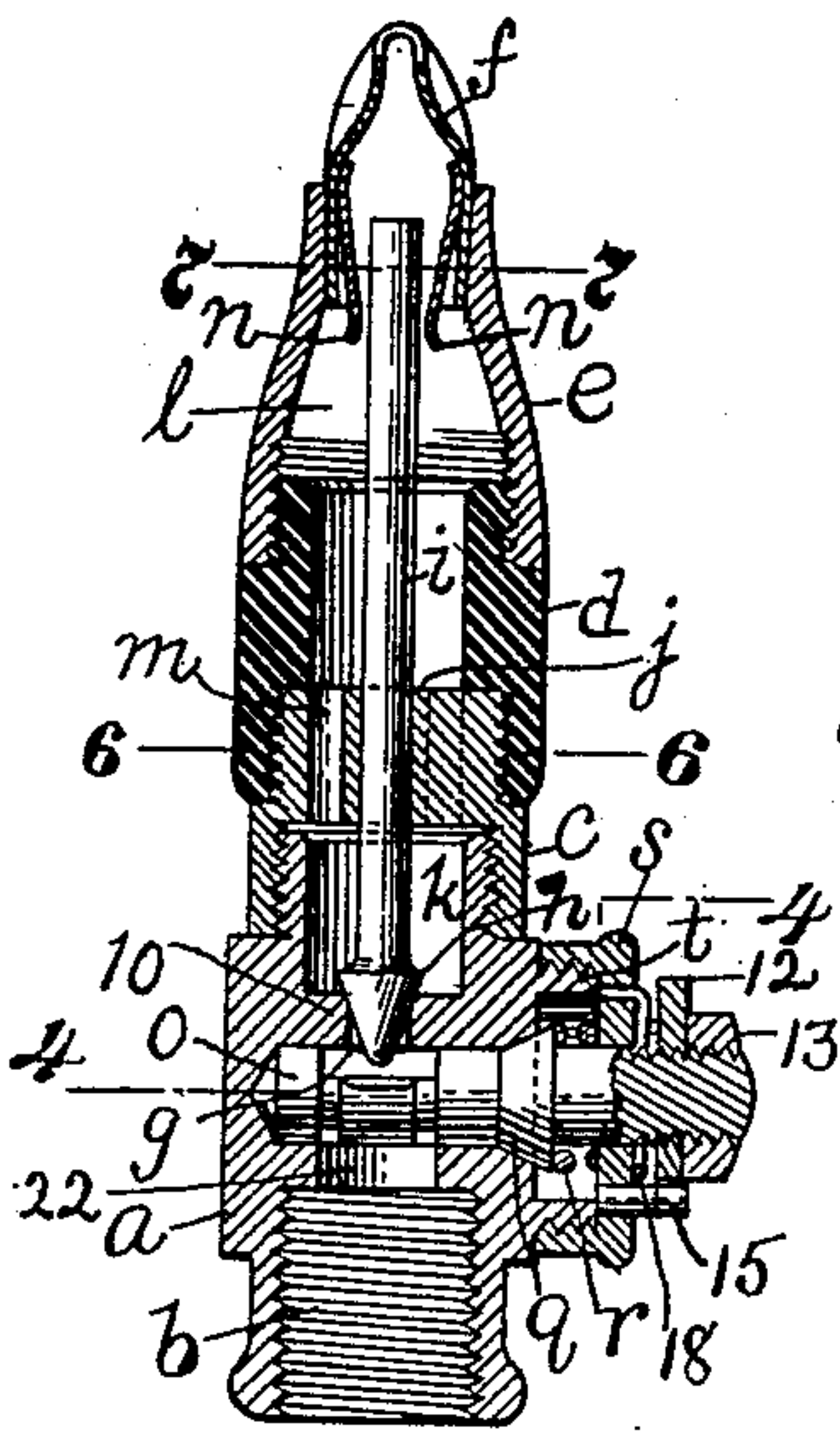
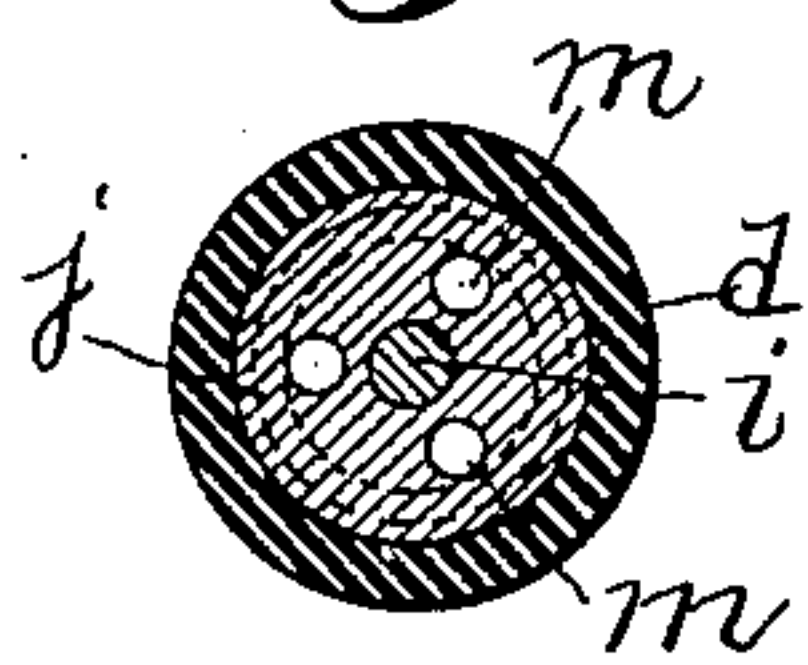
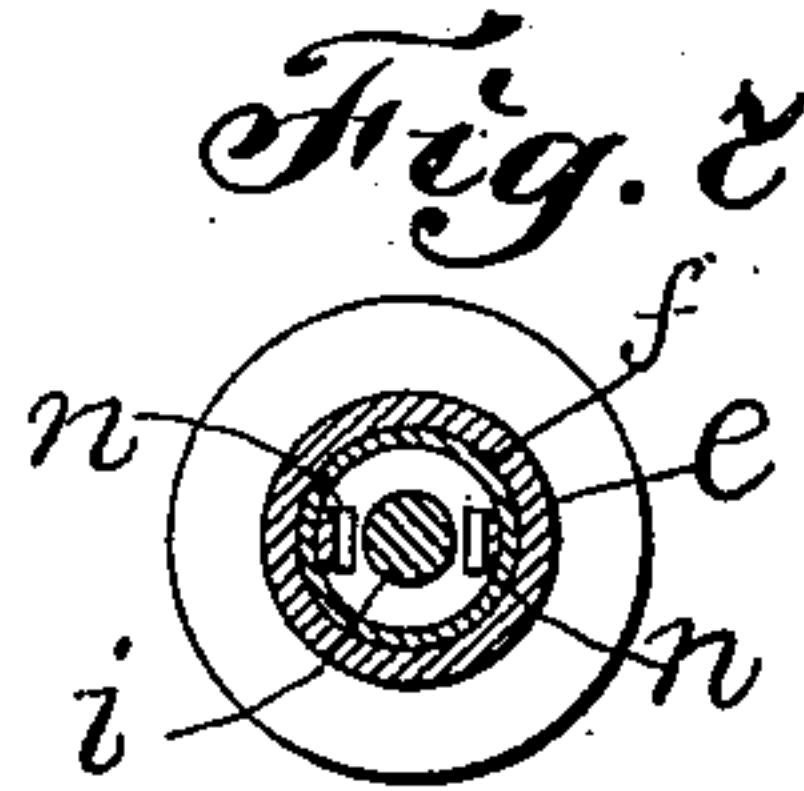
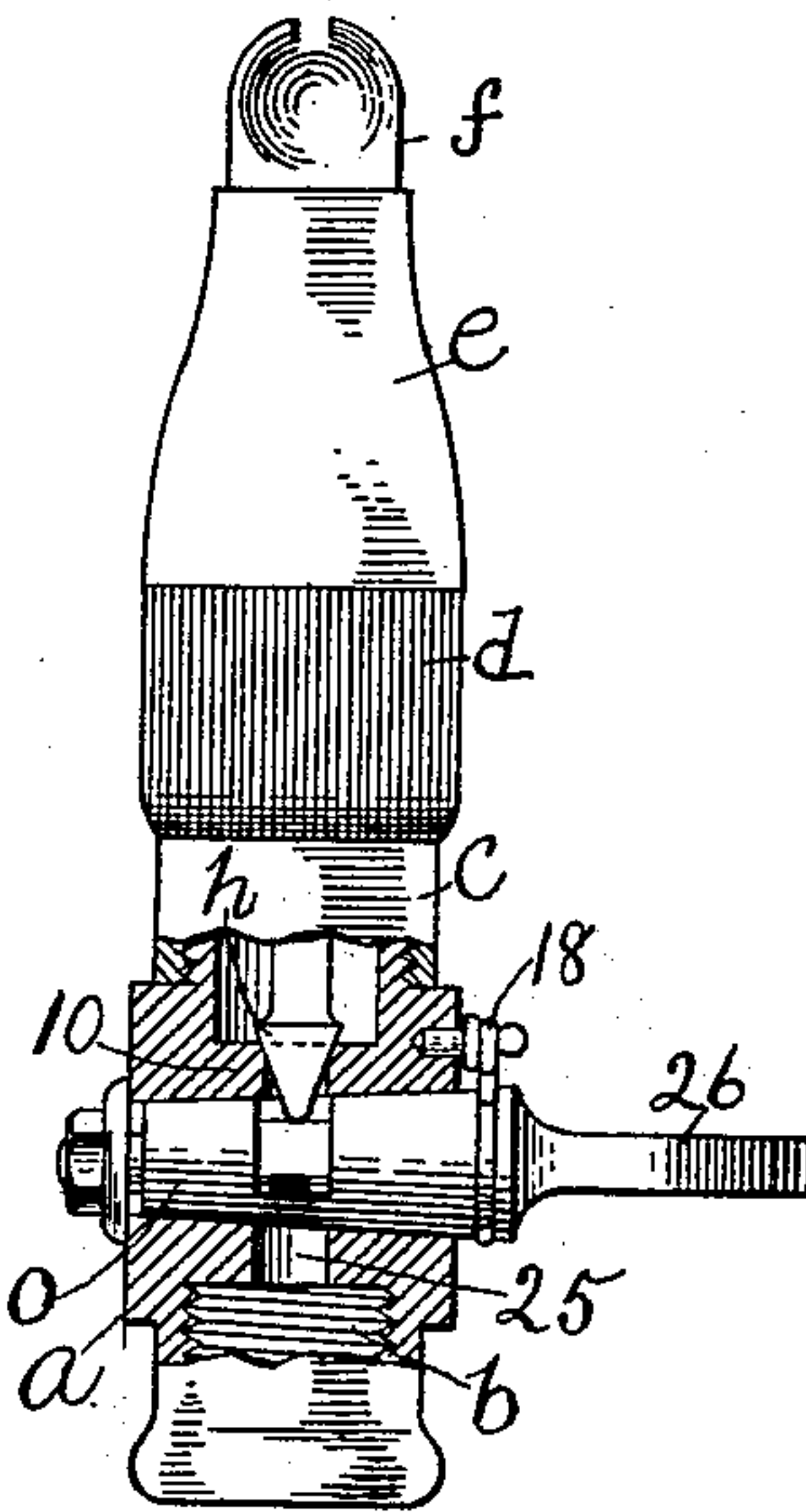


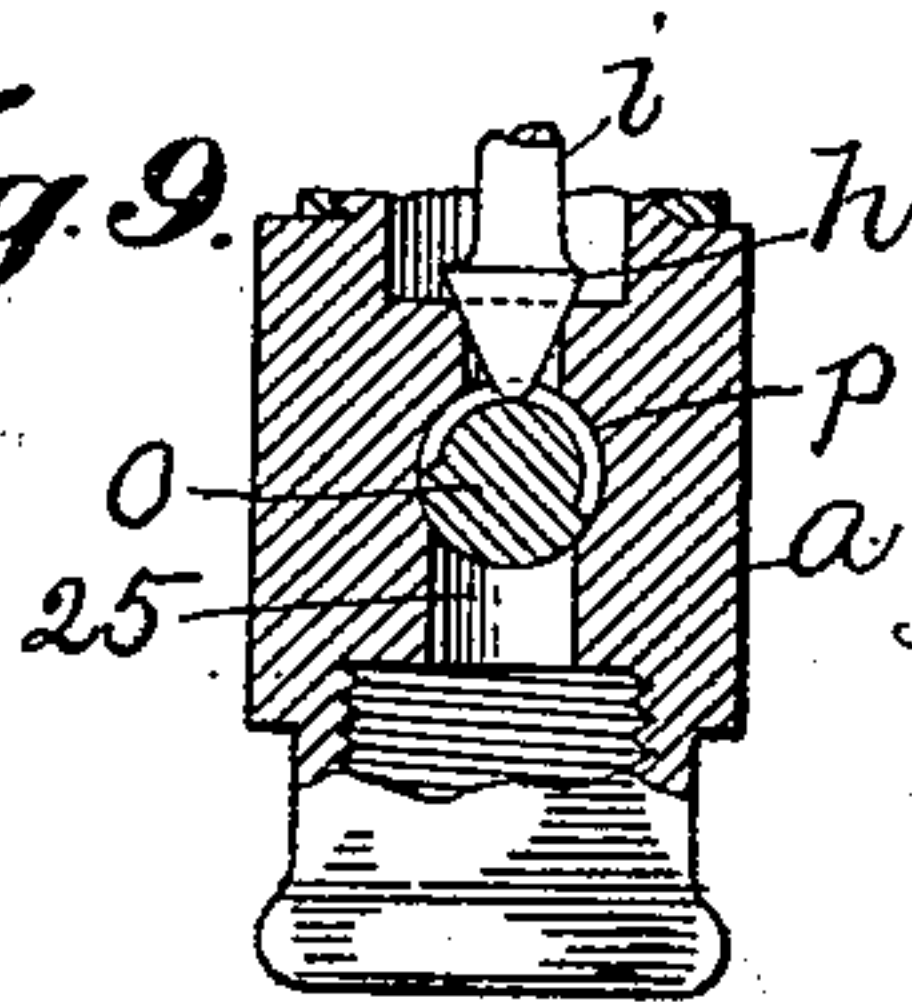
Fig. 8.

Fig. 5.

Fig. 6.



Witnesses: *Fig. 9.*
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UNITED STATES PATENT OFFICE.

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SAFETY GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 714,162, dated November 25, 1902.

Application filed June 18, 1902. Serial No. 112,121. (No model.)

To all whom it may concern:

Be it known that I, LOUIS F. DUCKER, a subject of the German Emperor, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Safety Gas-Burners, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to an automatic cut-off for gas-burners, and has for its object to provide a simple, inexpensive, and efficient device for the purpose specified. For this purpose I employ a valve located within the burner and provided with a valve-stem which is adapted to be engaged by a thermostat to hold the valve open when the gas is lighted. The valve is normally disengaged by the thermostat and is positively opened by a device also located within the burner. The device referred to may and preferably will be a rotatable cam, which is adapted to be turned to lift the valve from its seat and which is automatically removed from engagement with the valve if the hand of the operator is removed before the gas is lighted, thus enabling the valve to be automatically closed in case the gas is not lighted. The burner is provided with an insulated section, by means of which the heat is confined to the tip of the burner, and the action of the thermostat is thereby quickened. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a perspective view of a gas-burner embodying this invention; Fig. 2, a vertical section of the burner shown in Fig. 1; Fig. 3, a partial section and elevation of the burner shown in Fig. 1, the section being at right angles to the section on which Fig. 2 is taken; Fig. 4, a section on the line 4 4, Fig. 2; Fig. 5, a section on the line 5 5, Fig. 3; Fig. 6, a section on the line 6 6, Fig. 2; Fig. 7, a section on the line 7 7, Fig. 2; and Figs. 8 and 9, modifications to be referred to.

The gas-burner herein shown as embodying this invention comprises, essentially, a fitting *a*, provided with a screw-threaded socket *b*, a metal section *c*, screwed onto the fitting *a*, a section *d*, of insulating material, and a tip-receiving section *e*, which receives

the tip *f* of any usual or suitable construction.

The fitting *a* is provided with a partition-wall 10 intermediate the gas inlet and outlet of the burner and having a port or passage *g*, with which coöperates a valve *h*, located above said partition-wall, and having a stem or rod *i* extended up through a suitable hole in the guide-plate, disk, or wall *j*, forming part of the section *c*. The guide-wall *j* separates the burner into two chambers *k l*, which are in communication with each other through ports or passages *m*. (See Fig. 6.) The valve-rod *i* extends up into the chamber *l* and has coöperating with it one or more thermostats *n*, herein shown as two in number and each made in the form of a strip having one end suitably fastened to the burner-tip *f* and its other end extended to near the valve-stem.

The thermostatic strip *n* is preferably normally disengaged from the valve stem or rod, but is adapted to be engaged therewith when the strip is expanded by the heat conducted to it from the flame by the burner-tip. The valve *h* in the embodiment herein shown projects through the port or opening *g* when in its closed position and is adapted to be positively lifted from its seat by a device which is operated by the person wishing to light the gas. This device may be of various constructions, and in the present instance I have shown two forms, one in Fig. 2 and the other in Fig. 8. I prefer to use the form shown in Fig. 2. The valve-lifting device shown in Fig. 2 consists of a rotatable shaft or spindle *o*, extended transversely of the fitting *a* below the port *g* and cut away or reduced in diameter substantially in line with the valve to form a recess *p*, (see Fig. 3,) into which the end of the valve may extend when in its closed position. (Shown in Fig. 2.) The rear wall of the recess *p* is inclined or rounded at one or both ends, (see Fig. 3,) so as to practically form a cam, which acts to lift the valve into the position shown in Fig. 3 when the shaft *o* is turned in the act of lighting the gas.

The shaft or spindle *o*, as shown in Fig. 2, is provided near its outer end with a conical enlargement or flange *q*, which coöperates with a conical seat in the fitting to form a

gas-tight joint. The conical flange or enlargement *q* is held to its seat by a spiral spring *r*, which bears against the conical flange *q*, and a cap *s*, screwed upon a threaded boss *t*, projecting from the side of the fitting. The shaft or spindle *o* may be rotated in any suitable manner, and, as shown in Figs. 1 and 2, the shaft has a threaded portion extended through the cap *s*, upon which is mounted an arm 12, fastened on the threaded portion of the shaft by a nut 13. The arm 12 may have attached to its outer end a drop-chain 14, such as now commonly employed on gas-fixtures. The rotation of the shaft *o* is limited, as shown by a stud or pin 15 on the cap *s*, which extends into a slot 16 (see Figs. 1 and 3) in the arm 12, the said stud engaging one wall of the slot 16 when the shaft is turned in one direction to open the valve and the other end of the slot when the shaft is turned in the opposite direction to permit the valve to be closed. The shaft *o* may be turned in the reverse direction referred to by a light spring 18, having one end fastened to the cap *s* and the other end to the arm 12.

The operation of the cut-off mechanism (shown in Figs. 1 to 7, inclusive) may be briefly described as follows: In the normal position of the cut-off mechanism shown in Fig. 2 the valve *h* is closed, thereby shutting off the flow of gas to the tip *f*. If, now, it is desired to light the gas, the operator draws down upon the chain 14, which turns the shaft *o* from the position shown in Fig. 2 to that shown in Fig. 3, during which movement the cam-shaped portion of the shaft lifts the valve *h* off from its seat and into the position shown in Fig. 3, thus allowing the gas to flow into the valve-chamber *k*, from which it passes through the ports or openings *m* into the chamber *l*, from which it flows out through the tip *f*. If the gas is ignited, the heat from the flame is communicated substantially in an instant to the thermostats *n*, which are brought into engagement with the valve-stem, as represented in Fig. 3, and engage the said stem with sufficient force to hold the valve in its elevated position after the shaft *o* has been withdrawn from engagement with the valve, which takes place when the operator releases the chain 14, whereupon the spring 18 turns the shaft *o* back into its normal position, (shown in Fig. 2,) in which position the shaft *o* does not interfere with the flow of gas to the burner-tip, as it is not designed in the construction shown in Figs. 2 and 3 to have the functions of a valve, and for this purpose the shaft is provided, as represented in Figs. 2, 4, and 5, with annular grooves 21; but, if desired, the chamber 22 in the fitting may be enlarged, so as to permit of the passage of the gas around the shaft at all times. If for any reason the gas-flame should be extinguished, the thermostats contract and release the valve-stem, thereby permitting the valve to drop by gravity to its seat, and thus automatically cut off the sup-

ply of gas to the burner-tip. The action of gravity upon the valve may, if desired, be assisted by a spring in a manner well understood; but I prefer to rely on gravity alone, as by so doing the action of the cut-off mechanism is rendered more sensitive, inasmuch as lighter and more sensitive thermostats may be used, as they have only to overcome the action of gravity upon the valve and its stem. It is to be observed that in the apparatus herein shown accidents due to the operator failing to light the gas after it has been turned on and the chain has been released are avoided, for by reference to Fig. 3 it will be seen that as soon as the chain 14 is released the spring 18 turns the shaft *o* back into its normal position, (shown in Fig. 2,) thereby bringing the recess *p* into line with the valve and permitting the latter to drop to its seat. By means of the section *d*, of insulating or non-heat-conducting material, forming part of the burner and interposed between the burner-tip and the valve-fitting *a* the sensitiveness of the mechanism is increased, as the heat is confined to the vicinity of the thermostat and is removed from the valve and its lifting device, thereby not only rendering the thermostat quicker acting, but also preventing warping, binding, or other injurious action of the heat upon the valve and its lifting device.

In Fig. 2 I have shown two thermostats; but I do not desire to limit my invention in this respect, as one or more may be used, and when one is used it coöperates with the valve-stem to move the same out of line with the opening in the guide-wall *j*, through which it passes, and thereby acts as a clutch to bind the same in said opening.

In Fig. 2 the lifting device for the valve is shown as a shaft, which has the sole function of a lifting device; but, if desired, the lifting device may be made so as to have the function of a valve, which latter construction is represented in Figs. 8 and 9.

Referring to Figs. 8 and 9, the lifting device *o* is shown as a plug-valve, having a groove which extends partially around the valve and forms a recess *p* for the reception of the end of the valve *h* when the latter is in its closed position. The plug-valve coöperates with a gas-inlet port 25 in the valve-fitting *a* and normally closes the said port when the plug-valve is in position to permit the automatic valve *h* to be closed, as represented in Figs. 8 and 9. The plug-valve, as shown, is provided with the usual handle or key 26 and is automatically turned back toward its closed position a sufficient distance to permit the valve to be seated, when the key 26 is released by the operator by the spring 18.

I claim—

1. The combination with a gas-burner having within it a gas port or opening, of a valve coöperating with said port or opening and arranged to be closed by gravity, a stem or rod attached to said valve, a device for lifting

said valve from its seat to uncover said port or opening, a thermostat to retain the said valve in its open position when the gas is lighted, and means for automatically moving
5 said lifting device into position to permit the valve to be seated, substantially as and for the purpose specified.

2. The combination with a gas-burner provided with a gas-inlet and with a gas-outlet, a
10 partition-wall in said burner intermediate said gas inlet and outlet, and provided with a port or opening, a valve arranged within the burner between said partition-wall and said
15 gas-outlet and cooperating with said port or opening to close the same, a stem or rod attached to said valve and extended toward said gas-outlet, means for moving said valve toward said gas-outlet to uncover said port or
20 opening, and a thermostat within the burner to engage said valve-stem and retain the valve in its open position when the gas is lighted, substantially as described.

3. The combination with a gas-burner provided with a gas-inlet and with a gas-outlet, a
25 partition-wall within said burner having a port, a valve cooperating with said port and arranged to be seated by gravity, a valve stem or rod attached to said valve, means for lifting said valve from its seat, and a thermostat
30 within the burner adapted to engage the side of the valve-stem to hold the valve in its elevated position when the gas is ignited, substantially as described.

4. The combination with a gas-burner consisting of a metallic fitting provided with a
35 gas-port, a metallic tip, and an interposed section of insulating material, of a valve cooperating with said port and provided with a valve-stem, a guide for said valve-stem, means
40 for opening said valve, and a thermostat within the tip for engaging the said valve-stem

and retaining said valve open when the gas is lighted, substantially as described.

5. The combination with a gas-burner having a fitting provided with a gas-inlet and
45 with a partition-wall having a port or opening, a valve located above said partition and cooperating with said port, a stem or rod attached to said valve and extending toward
50 the gas-outlet for said burner, means for opening said valve, and a thermostat for engaging the side of the said valve-stem within the burner to retain the valve open when the gas is lighted, substantially as described.

6. The combination with a gas-burner having
55 within it a gas port or opening, of a valve cooperating with said port and normally closed by gravity, a stem or rod attached to said valve, means for positively opening said valve against the action of gravity, and a
60 thermostat to engage said valve-stem and retain the valve open against the action of gravity when the gas is lighted, substantially as and for the purpose specified.

7. The combination with a gas-burner having
65 within it a gas port or opening, of a valve projecting through said port or opening and normally closing the same, means for engaging the projecting end of said valve to lift
70 the same from its seat, a stem or rod attached to said valve, and a thermostat to engage said valve-stem and retain the valve in its lifted position when the gas is lighted, substantially as described.

In testimony whereof I have signed my
75 name to this specification in the presence of two subscribing witnesses.

LOUIS F. DUCKER.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.