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Patented Dec. 24, 1901.

H. BORCHARDT.
MEANS FOR LIGHTING GAS.

(Application filed Aug. 2, 1900.)

(No Model.)

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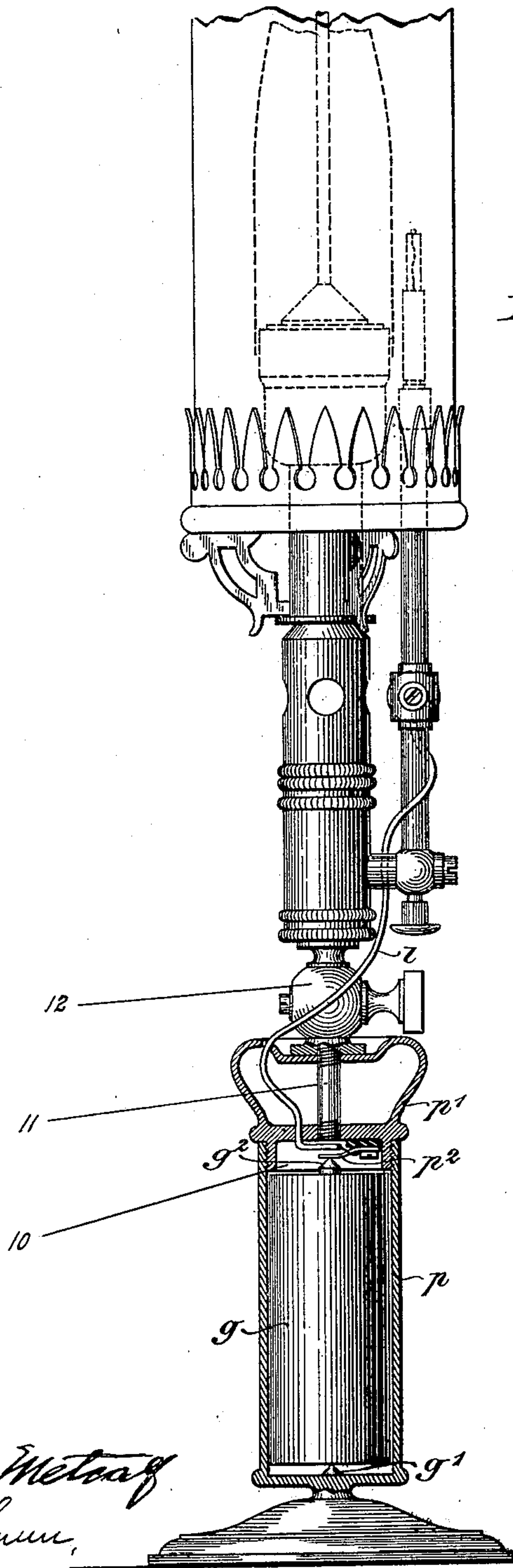


Fig. 1.

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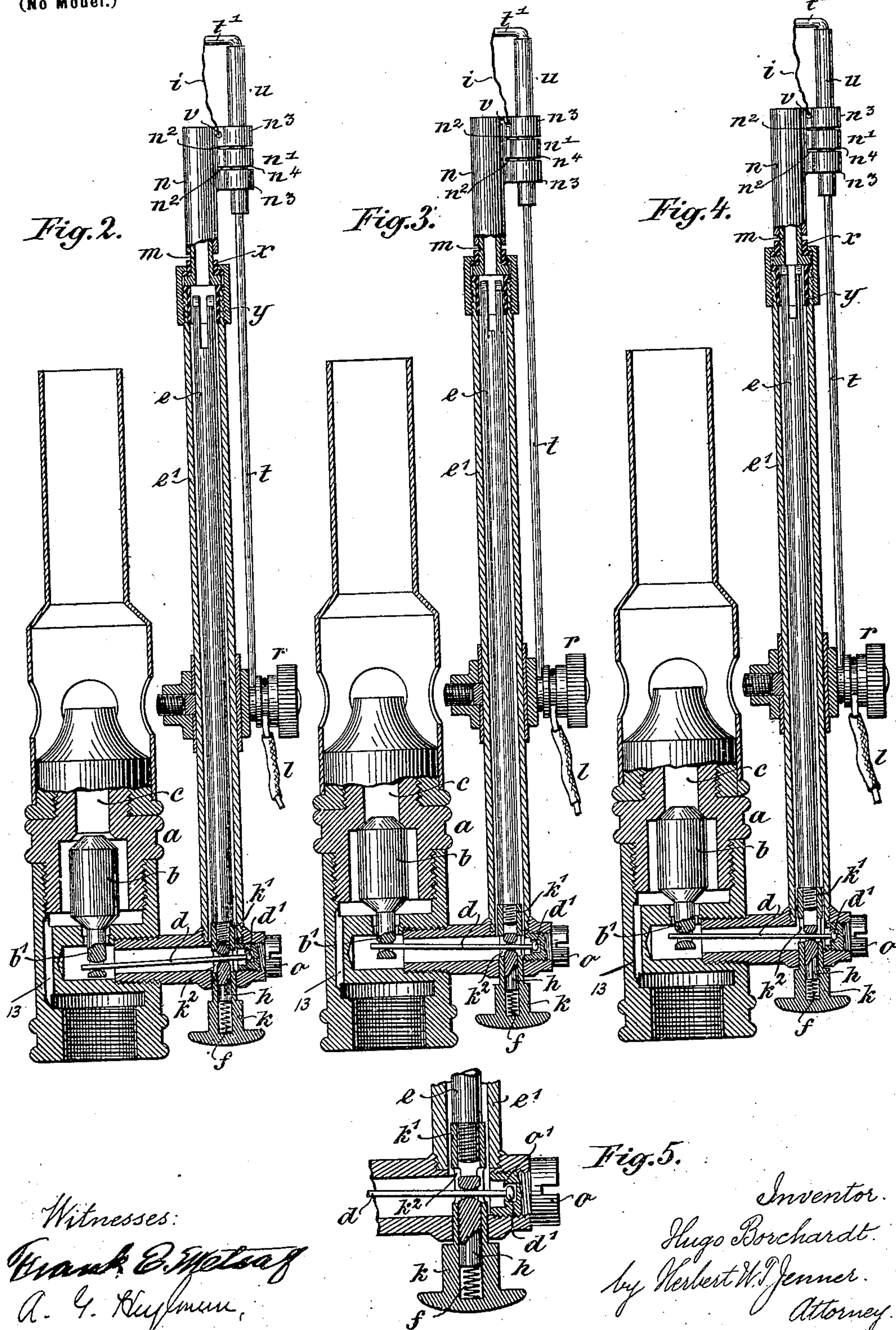
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Fig. 5.
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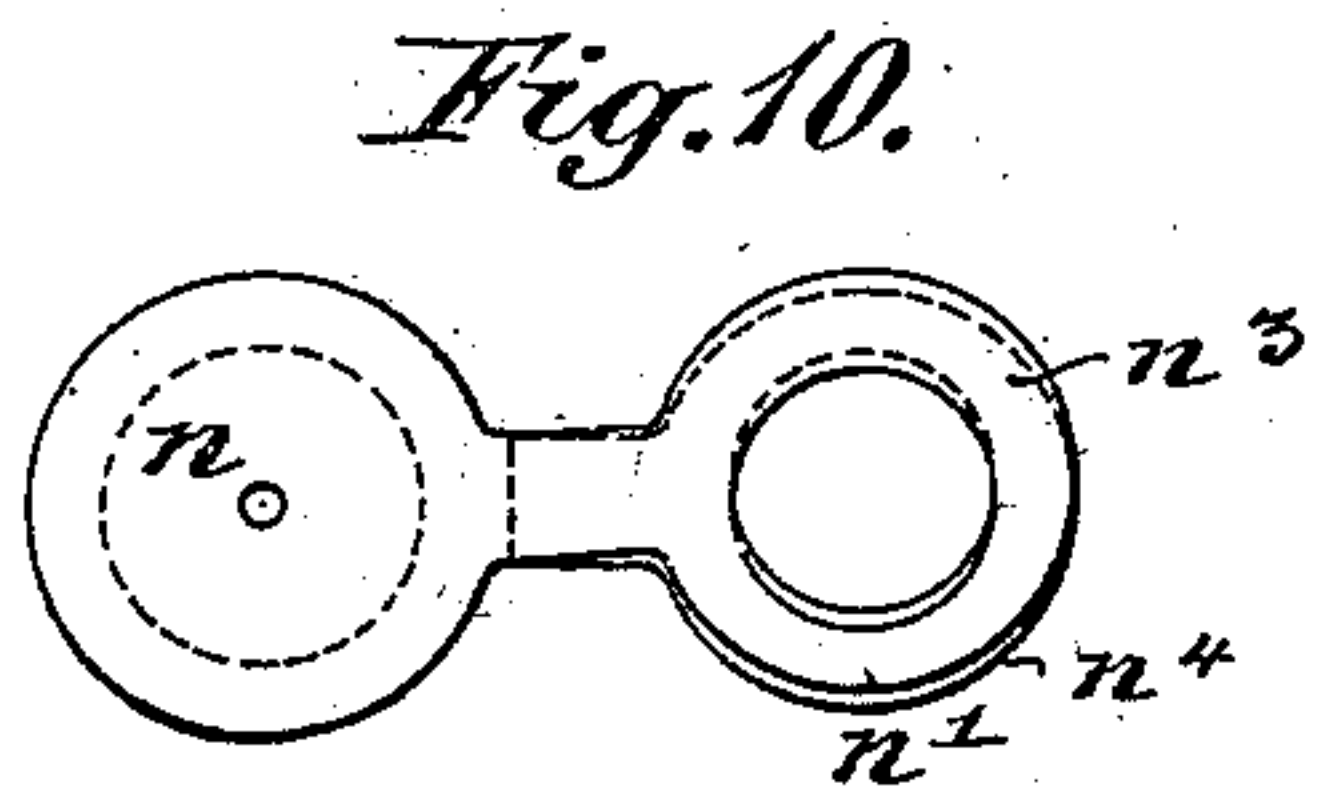
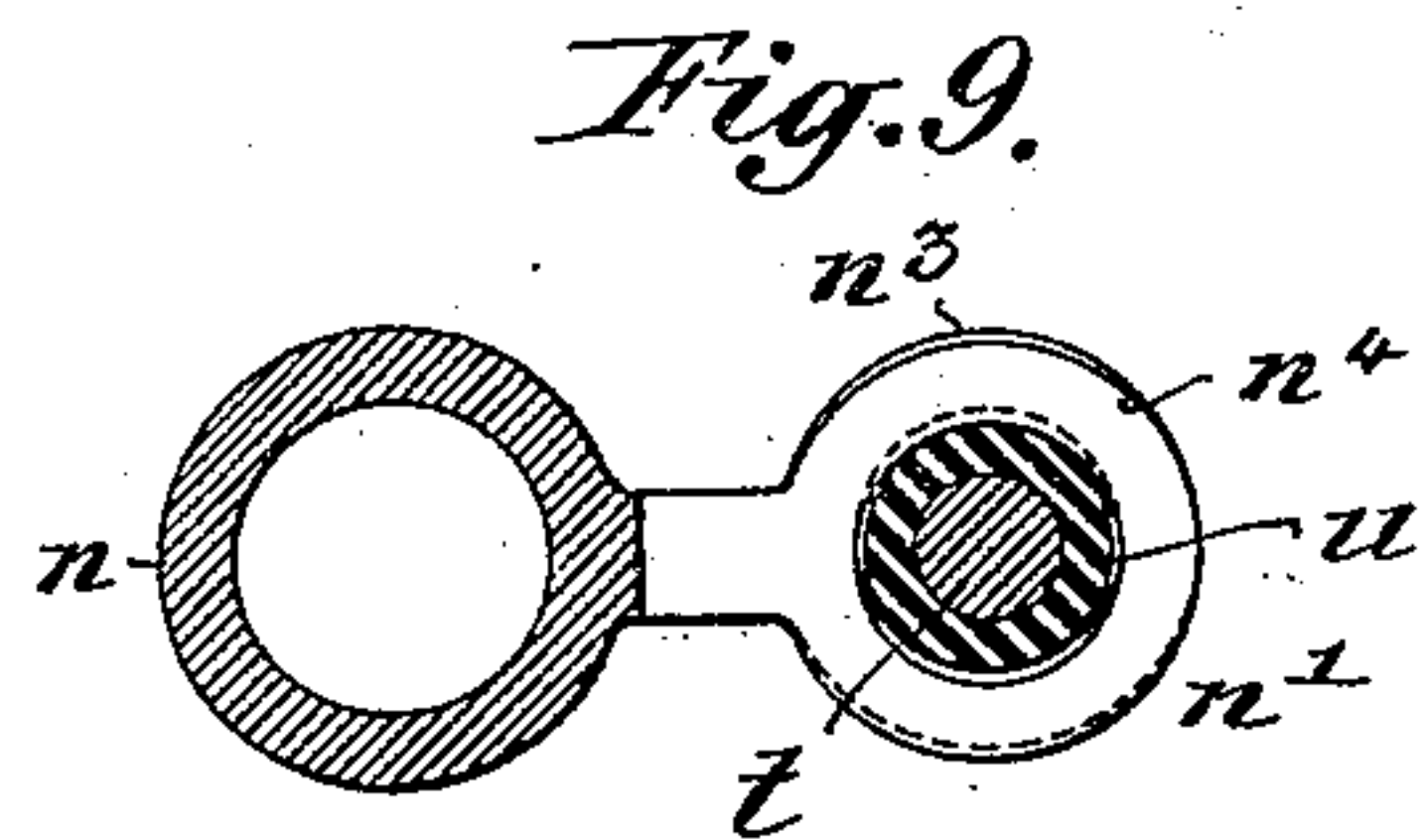
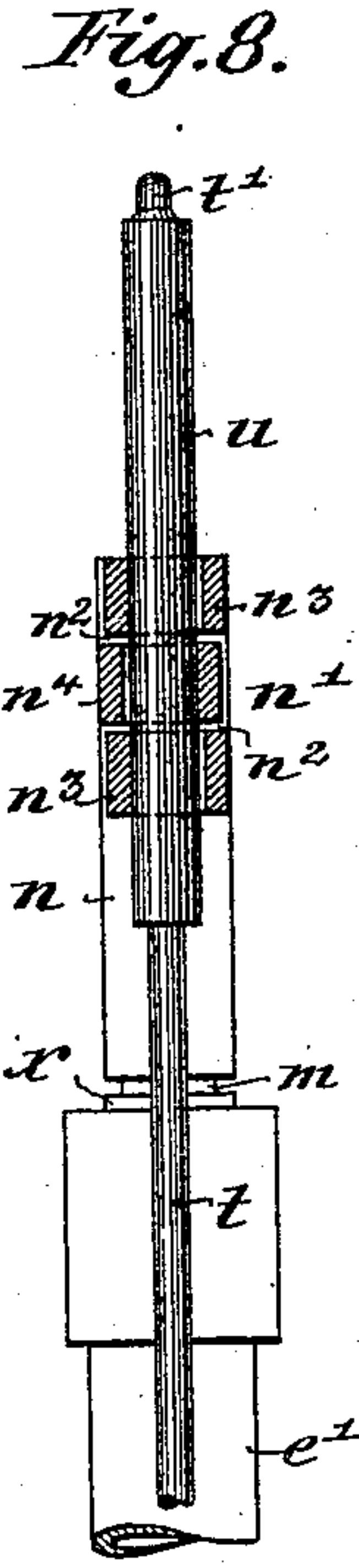
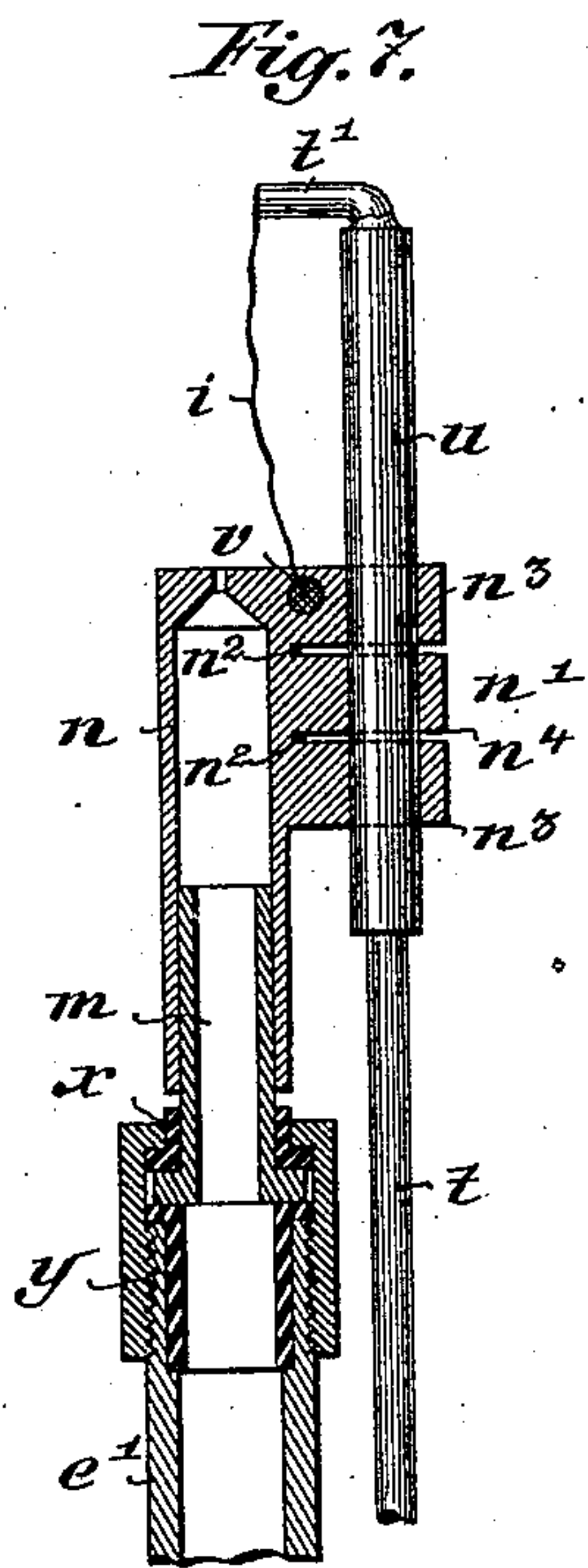
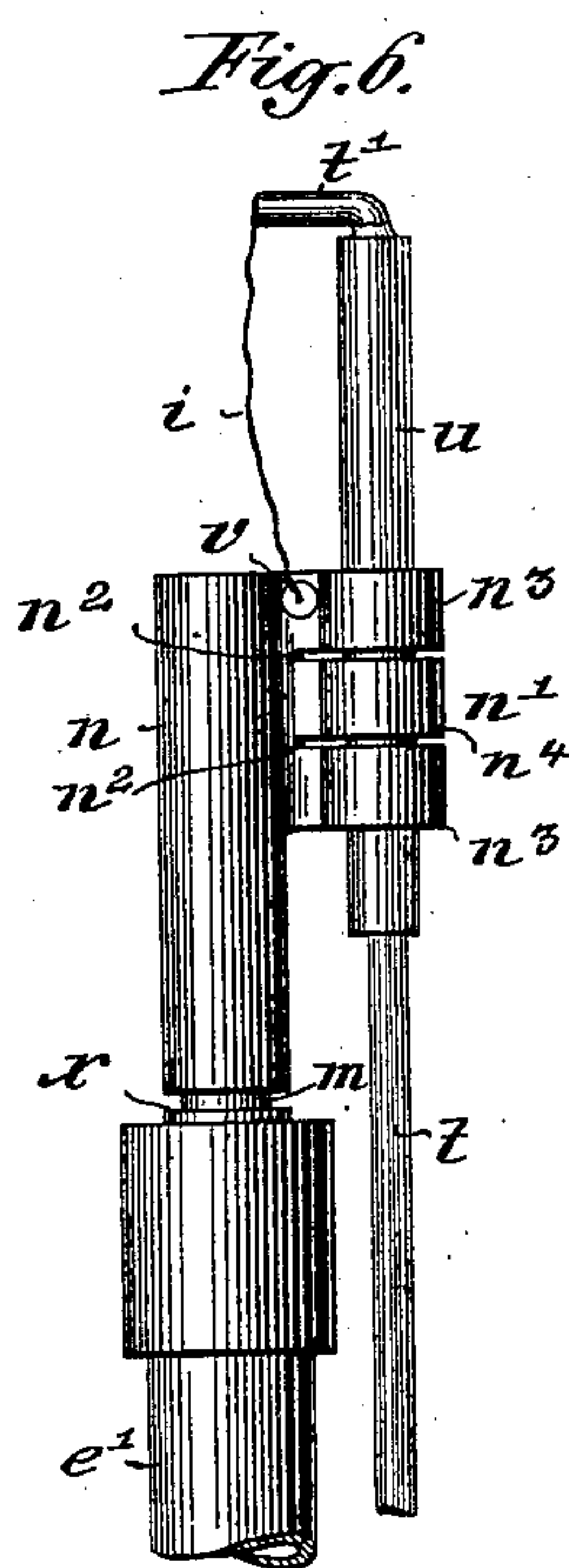
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(Application filed Aug. 2, 1900.)

3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

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MEANS FOR LIGHTING GAS.

SPECIFICATION forming part of Letters Patent No. 689,378, dated December 24, 1901.

Application filed August 2, 1900. Serial No. 25,658. (No model.)

To all whom it may concern:

Be it known that I, HUGO BORCHARDT, engineer, a subject of the King of Prussia, German Emperor, residing at Berlin, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Means for Lighting Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a gas-lighter comprising means for igniting an auxiliary jet or flame by the aid of electricity, wherein the ignition of the latter is effected by means of a kindling or face wire first subjected to preparatory heating by electricity and afterward heated to the proper igniting temperature by the gas-current flowing toward it. Now in order to insure equable ignition neither attended with detonation nor apt injuriously to affect the mantle it is necessary to cause the secondary or pilot jet to be ignited before sending gas through the main-jet pipe. In other words, the main-jet gas-supply has to be cut off during the process of ignition of the pilot-jet and not to be reopened until after the pilot-flame has been kindled. According to the present invention this object is attained by means of an arrangement whereby the first stage of operation of the part which serves to make electrical contact prior to the closing of the circuit required for the ignition of the pilot-jet has the effect of cutting off the main-jet gas-supply, while in the next or final stage of operation of such part contact is made and the pilot-flame is kindled. Then the moment the spring contact-piece is released and allowed to return to its initial position it will as it does so once more automatically turn on the main-jet supply, when the ignition of the gas as it issues from the burner will take place unaccompanied by any detonation. Hence in this gas-lighter by a single action of the hand contact is made and at the same time the gas-current is directed to the main jet or the pilot-jet as required, and thus reliable and accurately-timed ignition is secured.

The invention also relates to a special method of securing the support of the ignit-

ing body or fuse, such support being retained in its sleeve by means of the lateral resilience of part of such sleeve. This mode of attachment admits of the ready fitting and removal of the fuse or its support without the necessity of resorting to special means for fastening the same.

The accompanying drawings represent a gas-lighter provided with means for the electric ignition of the pilot-jet constructed according to the present invention and special means for securing the carrier of the igniting body or fuse.

Figure 1 is a sectional elevation showing the general arrangement of the device fitted to a portable lamp. Fig. 2 is a sectional elevation showing the kindling device in the inoperative state, all parts being in the initial position. Fig. 3 is a sectional elevation showing the parts in the position they occupy after the main-jet gas-supply has been cut off, but before the circuit required to effect the ignition of the pilot-jet has been closed. Fig. 4 is a sectional elevation representing the parts in the terminal or "contact" position, wherein while the cut-off of the main-jet gas-supply is maintained the electrical contact is made; and Fig. 5 is an enlarged detail view of some of the parts occupying the same positions as those shown in Fig. 4. Fig. 6 is an elevation of the pilot-jet burner and means for securing the carrier of the igniting body or fuse. Fig. 7 is a longitudinal section, Fig. 8 a side elevation, Fig. 9 a horizontal section, and Fig. 10 a plan of the same.

The gas-lighter shown in the accompanying drawings has arranged within the body *a* of the burner a valve *b*, which controls the access of gas to the perforation or orifice *c* of such burner. Over the burner *n* of the igniting or pilot jet a thin platinum wire *i* is placed in such a position laterally as to be out of reach of the incandescent heat of the main jet. This wire is electrically connected with the conducting-wire *l* of a conveniently-arranged source of electricity, (a cell or the like,) the connection being effected through the medium of a conducting-wire *t*, which is connected to the binding-post or terminal *r* of the wire *l*. The lower end of the platinum wire is electrically connected to the tube

or sleeve *n* of the burner. This battery is electrically connected with the body of the lamp and also consequently with the igniting-burner, and a contact is placed in a convenient position.

The apparatus for making contact and directing the gas-supply to the main jet or to the pilot-jet, as required, is according to the present invention constructed as follows:

For circuit-closing purposes there is provided within the side tube *e'* a vertically-movable contact-rod *e*, the upper end of which terminates in contact edges which to close the circuit come into contact with the lower end of the sleeve *m*, which supports the burner *n* and is properly insulated from the tube *e'* by means of inserted sheaths or casings *x* and *y*. The lower end of the contact-rod *e* is screwed into the sleeve *k'*, attached to a knob or head *k*, within the interior of which is a cylindrical pin *h*, subjected to the pressure of a spring *f*. The contact-rod *e*, together with the sleeve *k'*, is in direct mechanical connection with the valve *b* through the lever *d*. The ball-shaped end *d'* of such lever *d* rests in a correspondingly-shaped bearing or seat *o'*, formed in the screw-plug *o*, while the lever passes through a rounded aperture in the cylindrical pin *h* and through the slots *k²* in the sides of the sleeve *k'* and engages with the lower end or pin *b'* of the body *b* of the valve, which latter is also provided with a rounded passage through which the end of the lever *d* passes. By operating the contact-rod by pressing the knob *k* the first effect produced (without varying the position of the cylindrical pin *h* in the sleeve *k'* of the said knob) is to move the lever *d* so that the valve *b* rises to its closed position, as illustrated in Fig. 3. In this position the upper end of the contact-rod is still at a certain distance from the end of the sleeve *m*, so that as yet no circuit is formed. Then as the contact-rod continues to be moved upward the spring *f* is compressed and the sleeve of the knob moved upon the now stationary cylindrical piece *h* and contact is made by the contact edges of the rod *e* meeting the end of the sleeve *m*, Figs. 4 and 5. The pilot-jet now becomes ignited by the platinum wire, which has been rendered incandescent by the joint action of the heat initially imparted thereto by the electrical current and the chemical action of the issuing gas. Upon the knob being released the contact-rod returns to its initial position under the pressure of the spring *f*, the lever *d* is moved back, and the valve *b* is once more brought to its original or "open" position. This change in the position of the valve takes place almost instantaneously with the release of the knob *k*, so that immediately after the ignition of the pilot-jet gas is also admitted to the main jet or burner. The ball-joint or knee-joint-like arrangement whereby the lever *d* is supported in its end socket *o'* in the cylindrical pin *h*

and in the terminal pin or journal of the valve *b* greatly facilitates the working of such lever.

Gas is admitted to chamber 10 in the lower part of the lamp by any approved connections, and the gas passes upward through a pipe 11, regulating-valve 12, and a passage 13 to the chamber of the double-acting valve *b*.

Referring to Figs. 6 to 10, the tube or sleeve *n'*, which holds the support or carrier of the igniting body or fuse, forms a portion or lateral extension of the pilot-jet burner *n*. This sleeve is provided with two incisions *n²* across its longitudinal axis and reaching nearly to the hollow interior of the jet-burner *n*, so that the said sleeve is thus divided into three parts or sections—viz., two outer sections *n³* and one intermediate section *n⁴*. The intermediate or central section *n⁴* is bent somewhat to one side in relation to the two outer sections *n³*, so that when the fuse-carrier is inserted in its place the resilience resulting from the said central section being laterally out of alinement with the other two serves to retain such carrier in position by spring action, this arrangement being specially illustrated in Fig. 8.

The method of assembling the parts is preferably as follows: After the cuts *n²* have been made, say, by means of a saw the central portion *n⁴* is slightly bent outward from the axial line. Then the fuse-carrier is inserted into the bore of the sleeve, to facilitate which insertion the central resilient portion which has been bent out of alinement, as stated, is temporarily pressed inward again as far as may be necessary to enable the said carrier or support to be passed through the sleeve. On being thereupon released the portion *n⁴* will spring sidewise, thereby, as before explained, securely locking the fuse-carrier within the bore of the sleeve by a jamming or compressing action. For the purpose of exchanging carriers the said central part is simply again pressed inward, when the carrier may be readily removed from the sleeve.

In the construction of pilot-jet fuse here shown the rod *t* forms the conductor, and its upper bent end *t'* has connected thereto the platinum wire *i*, which acts as a fuse. The upper part of such rod *t* is inclosed in a porcelain insulating-tube *u*, the tube and rod being inseparably welded together by the aid of borax, the entire combination forming that which is above referred to as the "fuse-carrier." The lower end of the igniting-wire *i* is secured to the body *n* of the jet-burner, or, more correctly speaking, to the portion *n³* of the sleeve, by means of a lead seal *v*; and it may furthermore be mentioned that the jet-burner is mounted upon the sleeve *m*, which, by means of insulating-sheaths *x* *y*, is secured from contact with the tube *e'*, within which the contact-rod *e* is adjustably arranged.

The cell which supplies current for the initial electric heating is preferably located

within the lower part or pedestal of the lamp, as illustrated in Fig. 1, which is a view of the complete arrangement. The cell in this case is of cylindrical shape and is inclosed within a suitably-constructed casing *p*, arranged above the foot or base of the lamp and below the gas-pipe coupling-tube, so that it forms a pedestal or stand for the lamp. On the cover *p'* of this casing, which may be removably attached to the latter in any suitable manner—say by screwing, as shown—there is provided a resilient tongue *p²*, to which the conductor *l* is attached and which when touched by a contact-point *g²*, forming part of the cell *g*, serves to establish electrical connection with the latter, such tongue being, of course, insulated from the cover of the casing, and consequently from the casing itself. The other pole of the cell (its first pole being constituted by the contact-point *g²*) is electrically connected with the lamp-body and also, therefore, with the contact-rod *e*, the cell standing with its bottom upon the contact-point *g'*. Hence it will be seen that if the cell should happen to be exhausted, which is very rare, seeing the small amount of current that is used, it might readily be removed and replaced by a fresh cell.

By the several arrangements above described the proper ignition of the pilot-jet is secured, and by such means a gas-lighting device is provided which meets all practical requirements as regards accurately-timed operation, facility, and simplicity.

What I claim is—

1. In a gas-lighting device, the combination, with a main burner, a pilot-burner, and a double-acting valve which admits gas to the pilot-burner only when raised to close the gas-inlet of the main burner; of an electric igniter for the pilot-burner, a slidable push-piece which operates the electric igniter, and a yieldable connection between the said push-piece and the double-acting valve whereby the said valve is raised to its full extent by a movement of the push-piece and the igniter is op-

erated by the continued movement of the said push-piece in the same direction, substantially as set forth.

2. In a gas-lighting device, the combination, with a main burner, a pilot-burner, and a double-acting valve which admits gas to the pilot-burner only when raised to close the gas-inlet of the main burner; of an electric igniter for the pilot-burner, a slidable push-piece which completes the circuit through the said igniter when raised, a pivoted lever for opening the said valve, and a spring-supported pin carried by the said push-piece and operating the said lever when the push-piece is partially raised, substantially as set forth.

3. In a gas-lighting device, the combination, with a main burner, a pilot-burner, and a double-acting valve which admits gas to the pilot-burner only when raised to close the gas-inlet of the main burner; of a plug supported from the body of the said valve, a lever having a ball at one end which is pivoted in the said plug, said lever projecting through a hole in the said valve-stem, an electric igniter for the said pilot-burner, a slidable push-piece which completes the circuit through the said igniter when raised and which is provided with a slot for the said lever to work in, and a spring-supported pin slidable longitudinally in the said push-piece and provided with a hole having rounded edges which engages with the said lever, substantially as set forth.

4. In a lighting device, the combination, with a burner provided with perforated lugs upon one side of it, one of the said lugs being resilient and sprung out of line with the others, of an insulated carrier clamped in the perforations of the said lugs, and a platinum filament supported between the burner and the carrier, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HUGO BORCHARDT.

Witnesses:

HENRY HASPER,

WOLDEMAR HAUPT.