

No. 749,381.

PATENTED JAN. 12, 1904.

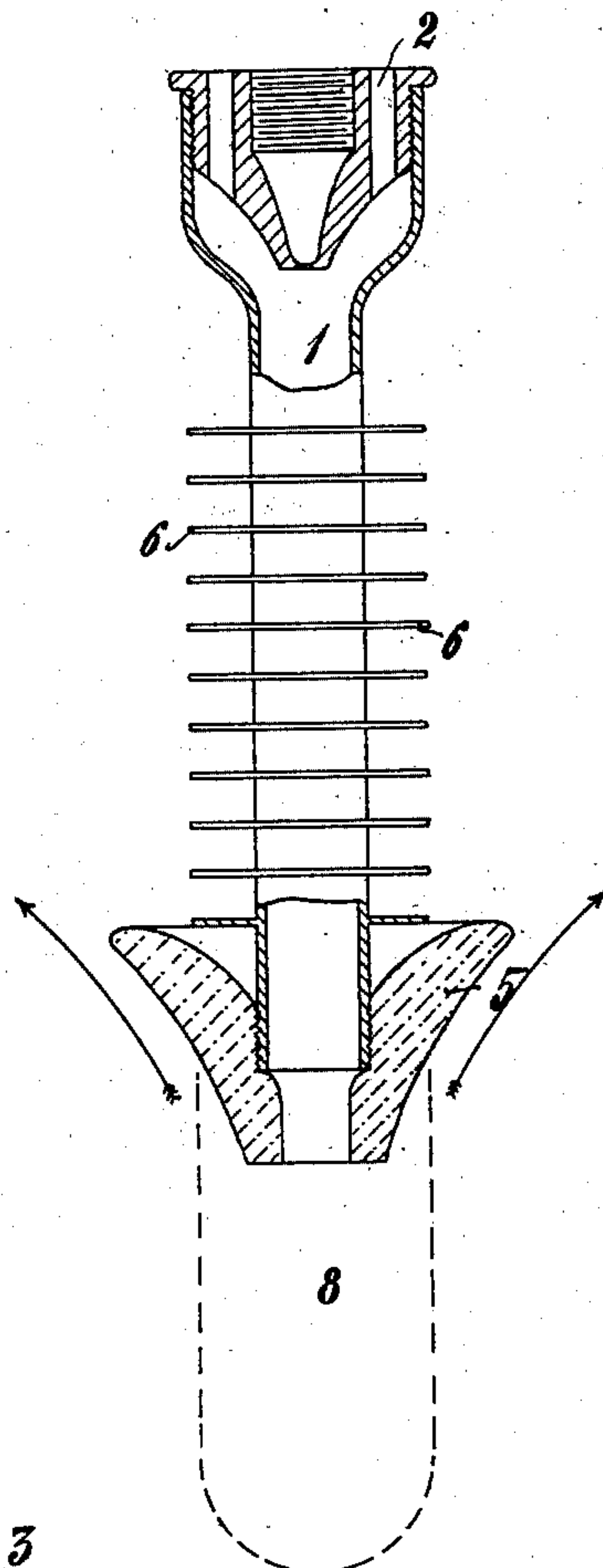
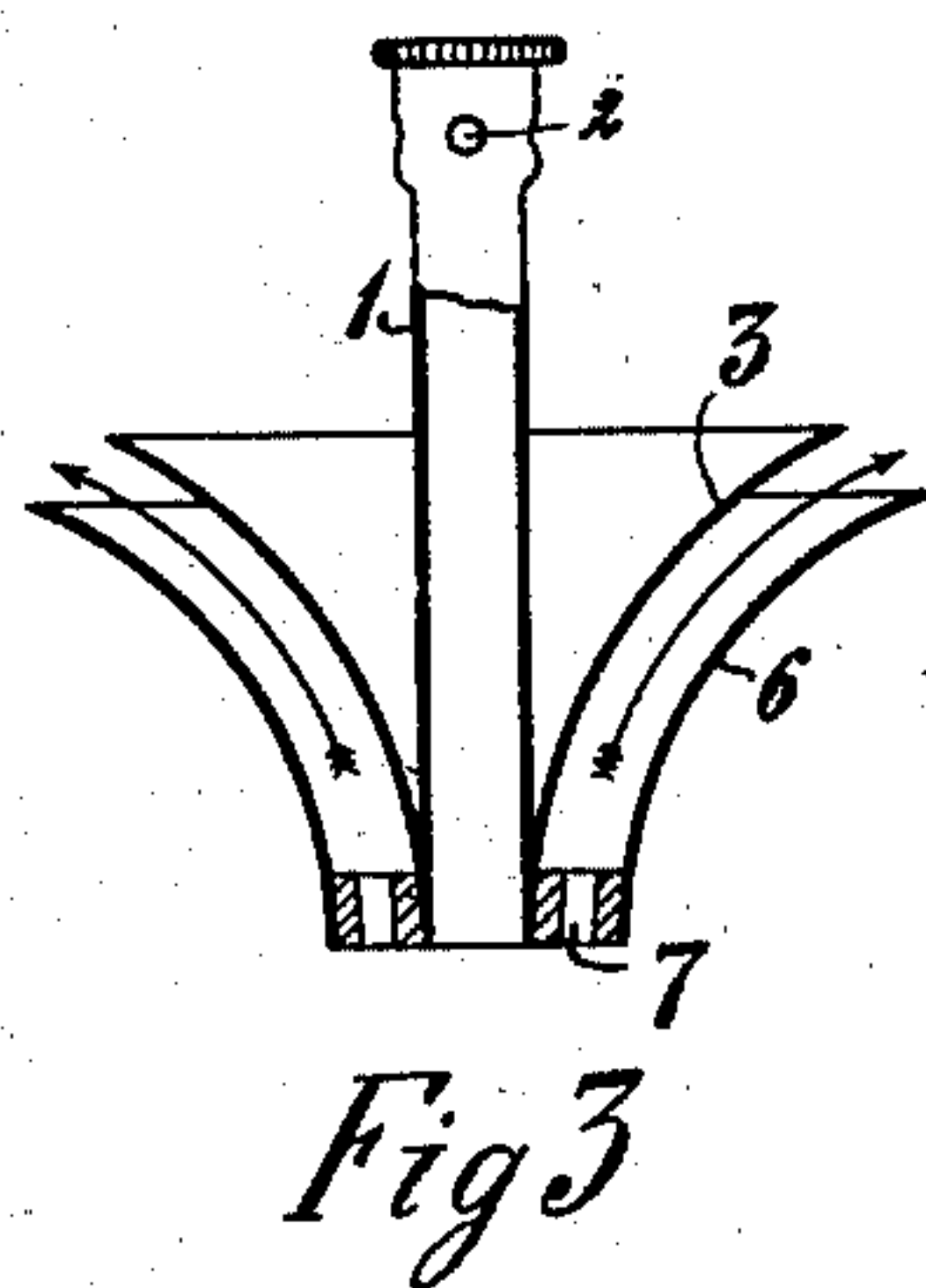
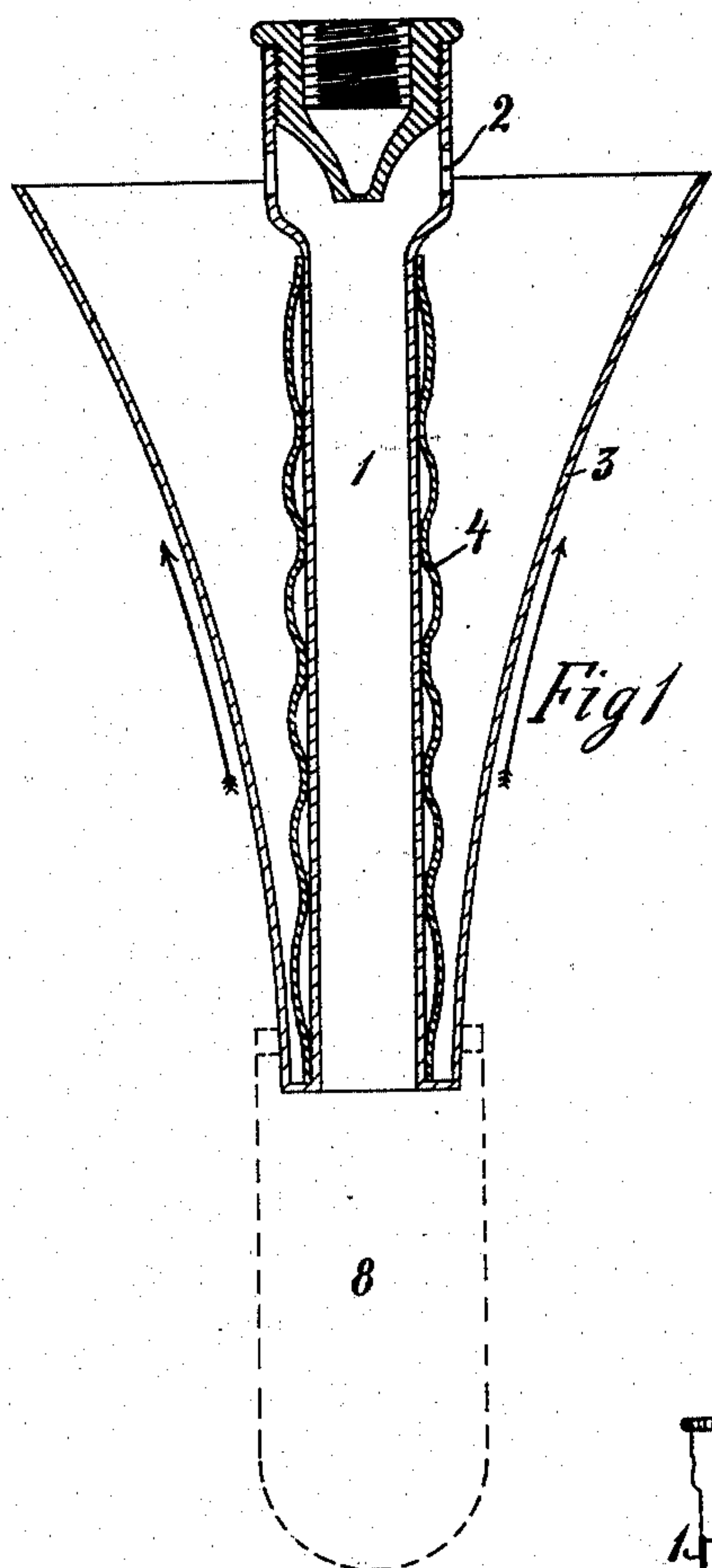
H. W. HELLMANN.

BUNSEN BURNER FOR INCANDESCENT GAS LAMPS WITH MANTLE
HANGING DOWNWARD.

APPLICATION FILED NOV. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

Rebecca Herzog
Oskar Wendt

Inventor:

Heinrich Wilhelm Hellmann

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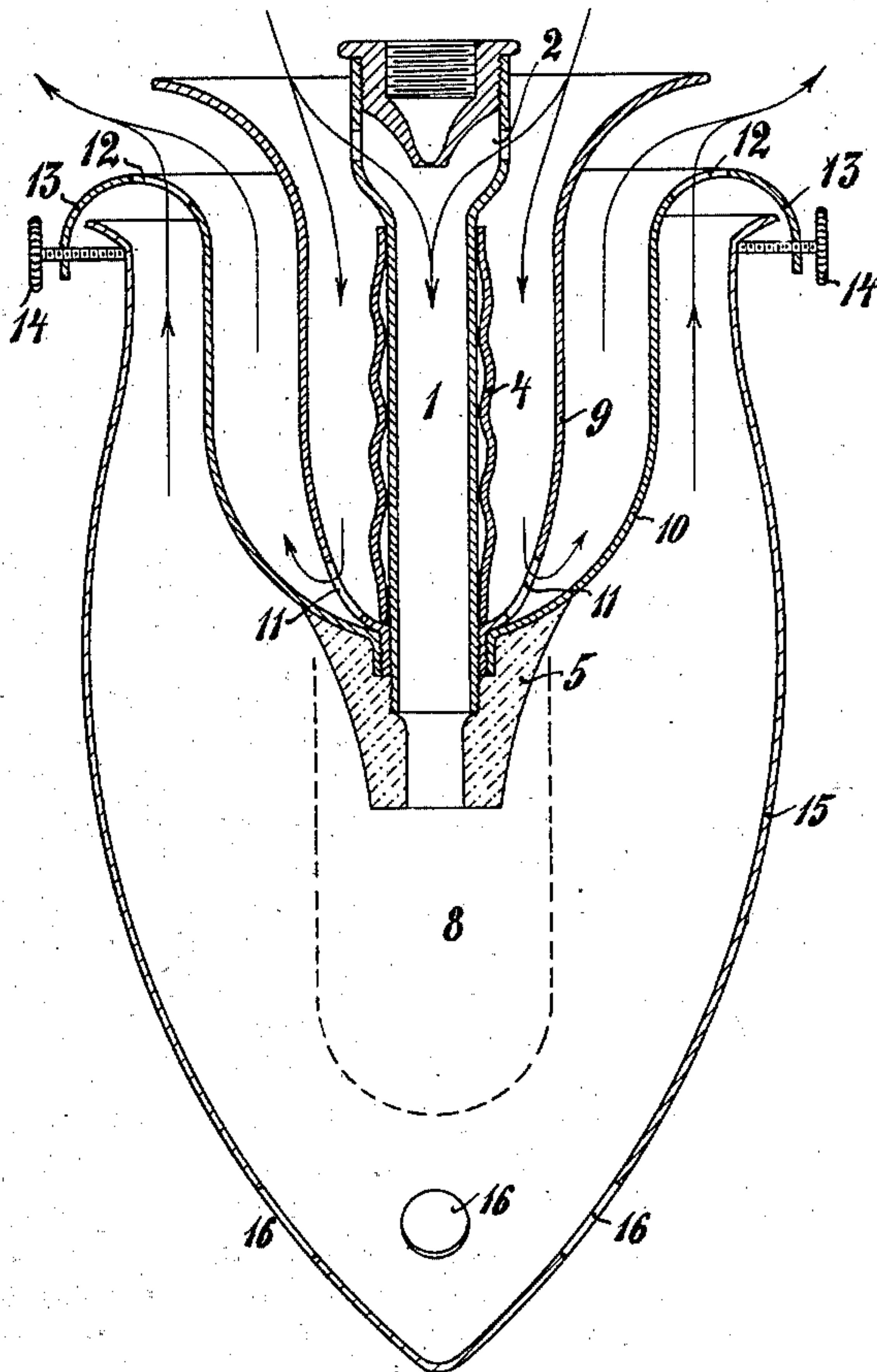


Fig 4

Witnesses:

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UNITED STATES PATENT OFFICE.

HEINRICH WILHELM HELLMANN, OF BERLIN, GERMANY.

BUNSEN BURNER FOR INCANDESCENT GAS-LAMPS WITH MANTLE HANGING DOWNWARD.

SPECIFICATION forming part of Letters Patent No. 749,381, dated January 12, 1904.

Application filed November 14, 1902. Serial No. 131,374. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH WILHELM HELLMANN, engineer, a citizen of Germany, and a resident of Berlin, Germany, (whose post-office address is Zinzendorfstrasse 7, Berlin N. W., Germany,) have invented certain new and useful Improvements in Bunsen Burners for Incandescent Gas-Lamps with Mantles Hanging Downward, of which the following is a specification.

This invention has reference to improvements in incandescent gas-lamps with downwardly-directed or depending light-emitting mantle or incandescent body, and it is particularly intended to devise means whereby the entire surface of the mixing-tube may be protected against the ascending hot gases of combustion and also against the heat radiated by the gas-burner.

My invention is distinguished from the inverted Bunsen burners as heretofore employed in connection with incandescent gas-lamps by the combination with a straight mixing or burner tube which consists of a good conductor of heat, the entrance-ports for the admission of gas and air being provided in the upper part of the mixing-tube. I have found it preferable to employ as a material for the mixer and for the burner-tube of downwardly-burning incandescent gas-lamps a good conductor of heat in place of a non-conducting medium, provision being made, however, to prevent the hot gases of combustion and the radiated heat from ascending and passing in contact with the mixing-tube, inasmuch as a good conductor of heat will be better adapted to radiate the heat and as it will therefore admit of a more effective cooling by air than a non-conductor, which may be regarded as a means for storing the heat. In order to arrive at a more effective cooling action of the mixing and burner tube, I provide means to increase the heat-radiating surface of the same, or I may provide a sleeve or mantle surrounding the mixing-tube at a small distance from the mixing-tube, so as to produce an insulating non-conducting layer of air. In a modification of my invention the mixing-tube is surrounded with two sleeves of this kind and within which a current of air is free

to circulate for the purpose of cooling the mixing-tube, the said air-current being induced by the air heated by the burner and which ascends along the outer sleeve.

I shall describe the nature of my invention by the aid of the accompanying drawings, which illustrate modified forms of construction of the same.

In the drawings, Figure 1 shows an inverted Bunsen burner for gas incandescent lamps, the protecting-sleeve 3 being shown in longitudinal section. Fig. 2 is another modification of my invention in combination with a burner-head 5 of imperfectly heat-conducting material, which is shown in section. Fig. 3 is a longitudinal section through an inverted Bunsen burner, being a modification of the construction shown in Fig. 1. Fig. 4 is a longitudinal section through a downwardly-burning incandescent gas-lamp provided with double cooling walls or sleeves 9 10 and protecting globe or bulb 15.

In the construction of burner illustrated in Fig. 1 of the drawings the mixing or burner tube 1 of the inverted Bunsen burner consists of a good conductor of heat—of metal, for instance—and it is provided with a protecting-tube 4 of undulated shape, so as to present an increased heat-radiated surface. The mixing and burner tube is surrounded by a sleeve 3, directly attached to the lower end of the mixing-tube 1 and gradually enlarged toward its upper end. Thus an air-column is created around the mixing and burner tube, whereby excessive heating of the burner is prevented. At the same time the heat radiated by the incandescent cap or hood 8, which is suspended in any suitable manner from the burner-opening, as well as the heated outside air, are carried off along the sleeve 3. The air-admission openings 2 of the Bunsen burner are provided in the upper enlarged part of the mixing-tube near to the gas-admission opening.

In the modified construction shown in Fig. 2 of the drawings the increase of radiating-surface of the mixing-tube 1 is produced by means of disks 6, which surround the mixing and burner tube. The said disks may also be replaced by any other suitable means. To the lower end of the metal mixing-tube 1 a

burner-tip 5, of non-conducting material, is attached by screw-threads or the like, said tip in its upper part being of larger diameter than the mixing-tube and being thereby adapted to prevent the entire surface of the mixing-tube from coming into direct contact with the ascending hot gases and with the radiated heat. In this construction the air-admission ports 2 are axially arranged with relation to the gas-admission passage, as an illustration of an arrangement of parts which will be found advantageous for some purposes. The incandescent mantle or cap 8 may be supported, suspended, or clamped to the nozzle 5. I may employ any suitable means for attaching or suspending the mantle from the nozzle or burner-tip, such means forming no part of my present invention.

The modified form of construction shown in Fig. 3 is distinguished from the construction shown in Fig. 1 by the sleeve 3 being surrounded at a certain distance by a second sleeve 6, along which the hot gases are allowed to pass, passages, small tubes, or the like being provided in the lower part of the space remaining between the sleeves 3 and 6, the said passages 7 communicating with the outside air and being laterally extended with preference. They are intended to provide for the renewal of the air contained between the sleeves 3 and 6, whereby the cooling effect is increased.

Fig. 4 is an illustration of a model of a downwardly-extending incandescent gas-lamp in longitudinal section and in which all the different parts shown in the other modified forms of construction are all combined into one construction. In Fig. 4 the metal mixing and burner tube of the inverted Bunsen burner is marked 1, the gas and air admission openings 2 being provided in the upper enlarged part of the mixing-tube. A protecting-tube 4 of corrugated or undulated shape surrounds the mixing and burner tube for the greater part of its length, so as to present a great cooling-surface. A burner-tip 5 of non-conducting or refractory material and of upwardly-enlarged conical shape is interchangeably attached by screw-threads or otherwise to the mouth of the burner. The said burner-tip is snugly fitting with its broader base upon the outer one of the two protecting-sleeves 9 and 10, which are fixed to the lower end of the mixing-tube 1 and surround the same at a certain distance from each other. Communicating passages 11 are provided in the lower part of the inner sleeve 9. The exterior sleeve 10 is provided with an outwardly-turned rim 13, in which are secured the clamping-screws 14 for the suspension of the transparent protecting-bulb 15. In the lower part of the said protecting-bulb I provide openings 16, which serve for the admission of fresh air to the mouth of the burner and to the incandescent mantle or cap 8. When the lamp is burning,

the heat produced by radiation from the incandescent mantle 8 ascends with the hot air along the burner-tip 5 and along the outer protecting-sleeve 10 and escapes through the openings 12 in the rim 13. This causes the air contained between the protecting-sleeves 9 and 10 to become heated and to ascend, a rarefaction of the air being produced in the lower part of the air-space. This results in a current of cool air being induced from the inner space of the sleeve and through the communicating passages 11. A continuous circulation of air will thus be set up around the mixing-tube and through the protecting-sleeves in the direction indicated by the arrows, which in turn will result in a very efficient cooling of the mixing and of the burner tube. At the same time a part of the fresh and cool air entering into the interior of the sleeve 9 passes with increased velocity through the air-admission openings 2 into the interior of the mixing-tube 1, and by this means a very efficient cooling of the interior of the mixing-tube and a very thorough mixing of the gas with air is produced by the device.

As regards the tip or burner-head, it is manufactured from a material which is both a non-conductor or an imperfect conductor of heat and having refractory properties. This property is an essential feature of my lamp, inasmuch as I thereby avoid the otherwise ready destruction of the mixing-tube, which is made up of metal. It is also of importance that the heat-resisting burner-head can be easily detached from the mixing-tube and that it may be replaced by another whenever necessary, whereby the life of the lamp is obviously increased. Of such non-conducting and heat-resisting material I may mention magnesia, soapstone, and the like. According to my invention the burner-tip is at least for some part of its length of larger diameter than the burner-tube, so that the heat is prevented from passing vertically upward along the mixing and burner tube, and the excessive heating of these parts is thereby avoided. It is obvious that the burner tip or head may be interchanged at any time without interfering with the operation of the other parts of the lamp and without injury to the lamp.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In an incandescent gas-lamp in combination, an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said straight mixing-tube and isolating means of a larger diameter than the burner-tube on and descending from the lower end of the said burner-tube and surrounding said burner-tube, all combined to protect the entire cooling-surface of the mixing and burner tube from the upwardly-ascending hot gases of combustion and from the heat radiation of the burner.

2. An incandescent gas-lamp, comprising the combination with an inverted Bunsen burner of a mixing and burner tube of metal, gas-inlets and air-inlets in the upper part of the said straight mixing-tube, a protecting-sleeve surrounding the entire mixing-tube and closed at the lower part, a burner-tip of non-conducting, fireproof material, substantially as described.

3. An incandescent gas-lamp, comprising the combination with an inverted Bunsen burner of a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said straight mixing-tube, a protecting-sleeve surrounding the mixing-tube, a burner-tip at the base of said protecting-sleeve, a second sleeve surrounding the first one, air-inlets in the lower part of the lamp between the two sleeves.

4. In an incandescent gas-lamp the combination with an inverted Bunsen burner and a mixing and burner tube of metal, of gas-inlets and air-inlets in the upper part of the said straight mixing-tube, another tube surrounding the mixing and burner tube of a large radiating-surface, an incandescent mantle below the end of the burner and a burner-tip of fireproof material, substantially as described.

5. In an incandescent gas-lamp, a depending incandescent mantle or cap, an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets, in the upper part of the said straight mixing-tube, isolating means at and ascending from the lower end of the said burner-tube and having a larger diameter than the burner-tube, means to increase the heat-radiating surface of the burner-tube and an incandescent mantle or cap below the end of the burner-tube, substantially as described.

6. An incandescent gas-lamp comprising the combination with an inverted Bunsen burner and a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said straight mixing-tube, a protecting-sleeve surrounding the mixing-tube, a burner-tip of isolating and heat-resisting material at the base of said protecting-sleeve, another tube at a certain distance from the mixing and burner tube and surrounding the same, means to increase the heat-radiating surface of said outer tube and an incandescent cap or mantle below the burner-tip, substantially as described.

7. An incandescent gas-lamp, comprising in combination an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of said straight mixing-tube, means to increase the heat-radiating surface of said mixing and burner tube, a protecting-sleeve surrounding the mixing-tube at a certain distance from the same, and an incandescent mantle or cap below the mouth of the burner, substantially as described.

8. In an incandescent gas-lamp in combination with a downwardly-directed incandescent mantle, an inverted Bunsen burner, a mixing and burner tube of metal, gas-inlets and air-inlets in the upper part of said straight mixing-tube, a burner-tip of heat-resisting and non-conducting material on and ascending from the lower part of the said burner-tube, the said burner-tip having a larger diameter than the burner-tube.

9. In an incandescent gas-lamp in combination with a downwardly-directed incandescent mantle, an inverted Bunsen burner, a straight mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said mixing-tube, a metal tube providing a large radiating-surface, a burner-tip of heat-resisting and imperfectly-conducting material on and ascending from the lowest part of the said burner-tube, having a larger diameter than the said burner-tube, substantially as and for the purpose described.

10. An incandescent gas-lamp comprising the combination with an inverted Bunsen burner of a straight mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said straight mixing-tube, a protecting-sleeve surrounding the mixing-tube, a burner-tip of imperfectly heat-conducting material and ascending from the lowest part of the said burner-tube and the upper part of which is of a larger diameter than the burner-tube and an incandescent mantle supported on said burner-tip.

11. In an incandescent gas-lamp, an incandescent mantle extending downward, an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said mixing-tube, a double sleeve surrounding the mixing and burner tube, the walls of the said double sleeve being arranged at a distance from each other, air-inlets in the upper part of the said double sleeve, communicating passages between the two walls of the double sleeve and arranged in the lower part of the inner sleeve, a burner-tip of isolating and fireproof material, substantially as described.

12. In an incandescent gas-lamp, an inverted Bunsen burner, a mixing and burner tube of metal, gas-inlets and air-inlets in the upper part of the said mixing-tube, a double sleeve surrounding the mixing and burner tube at a certain distance from the same and from each other and ascending from the mouth of the burner, a fireproof burner-tip at the end of the burner, inlets in the upper part of the said sleeves, communicating passages in the lower part of the inner sleeve, a metal tube providing a large radiating-surface, substantially as described.

13. In a gas-light incandescent lamp, in combination, an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part

of the said mixing-tube, a double protecting-sleeve surrounding the mixing and burner tube and ascending from the mouth of the burner, inlets in the upper part of the walls of said
 5 double sleeve, communicating passages between the said walls of the protecting-sleeve and arranged in the lower part of the interior sleeve, a burner-tip of imperfectly heat-conducting, heat-resisting material on and ascending
 10 ing from the lowest part of the said burner-tube and extending up the outer wall of the said double protecting-sleeve and an incandescent mantle or cap round and below the burner-tip, substantially as described.

15 14. In a gas-light incandescent lamp, an inverted Bunsen burner, a mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said mixing-tube, a double sleeve surrounding the
 20 mixing and burner tube at a distance from the same, a burner-tip at the base of the said double-sleeve inlets in the upper part of the said double sleeve, communicating passages between the inner spaces of the walls of the
 25 sleeve and provided in the lower part of the inner sleeve, a metal tube providing a large radiating-surface, the burner-tip of imperfectly heat-conducting, heat-resisting material being arranged at the lower part of the
 30 said burner-tube and extending up to the exterior wall of the double protecting-sleeve, an

incandescent mantle below the burner-tip and partially surrounding the same, substantially as described.

15. In a gas-light incandescent lamp, in combination an inverted mixing and burner tube of heat-conducting material, gas-inlets and air-inlets in the upper part of the said mixing-tube, a double protecting-sleeve surrounding the mixing and burner tube at a distance from
 40 the same, inlets in the upper part of the said protecting-sleeves, communicating passages between the inner spaces of the said protecting-sleeves and in the lower part of the inner protecting-sleeve, a burner-tip of heat isolat-
 45 ing and resisting material at the base of the said double protecting-sleeve and extending from the lowest part of the said burner-tube to the outer wall of the double protecting-sleeve, a downwardly-curved rim at the upper
 50 end of the said exterior protecting-sleeve, screws in the said rim and a transparent protecting-bulb adapted to be supported by the said screws, an incandescent mantle or cap on the burner-tip and projecting downward, sub-
 55 stantially as and for the purpose set forth.

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

HEINRICH WILHELM HELLMANN.

Witnesses:

OSKAR ARENDT,
 HENRY HASPER.