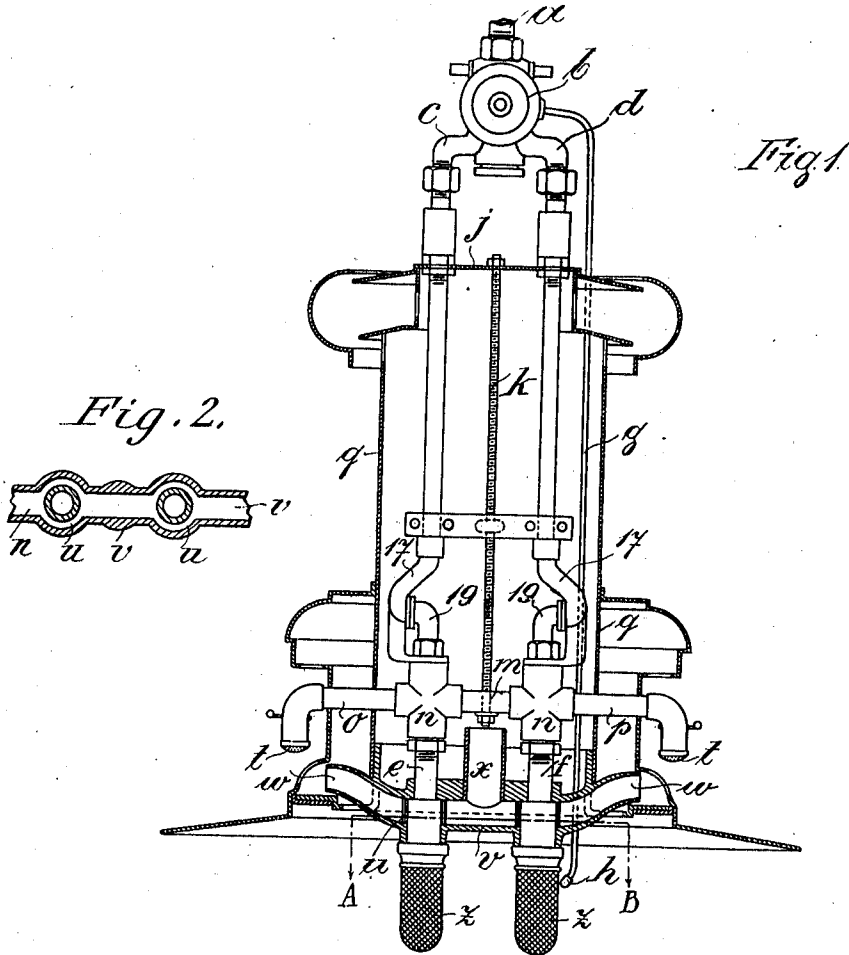


M. GRAETZ.
INCANDESCENT GAS LAMP.
APPLICATION FILED JAN. 6, 1908.

988,330.

Patented Apr. 4, 1911.

4 SHEETS—SHEET 1.



Witnesses:
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Paul Hinkelmann.

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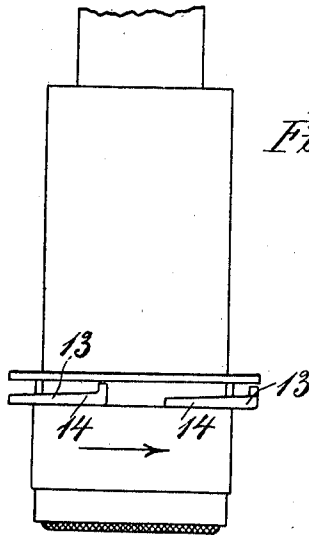


Fig. 3.

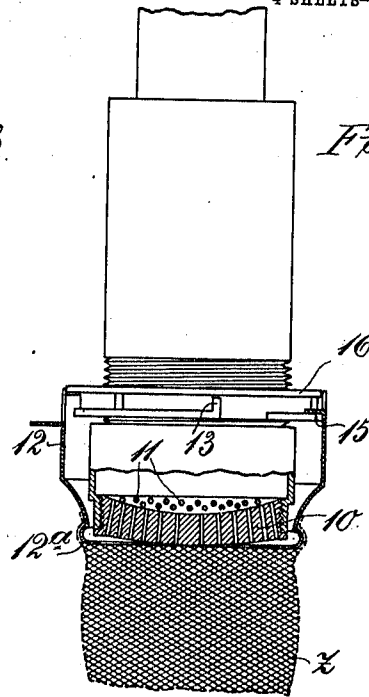


Fig. 4.

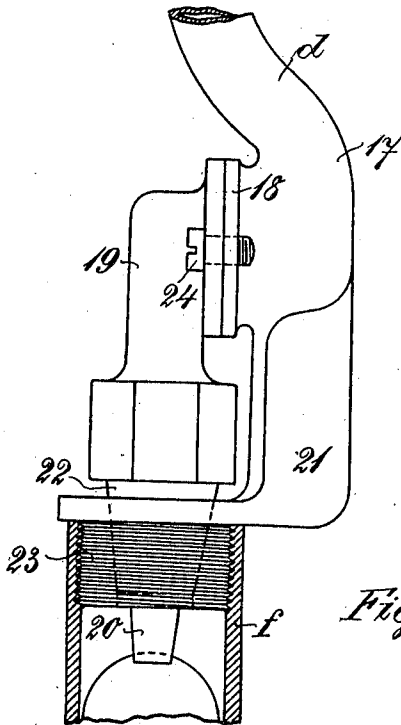


Fig. 6.

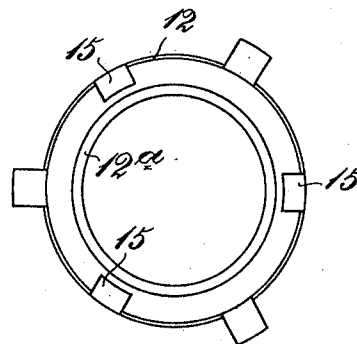


Fig. 5.

Witnesses:
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Paul Hindemann.

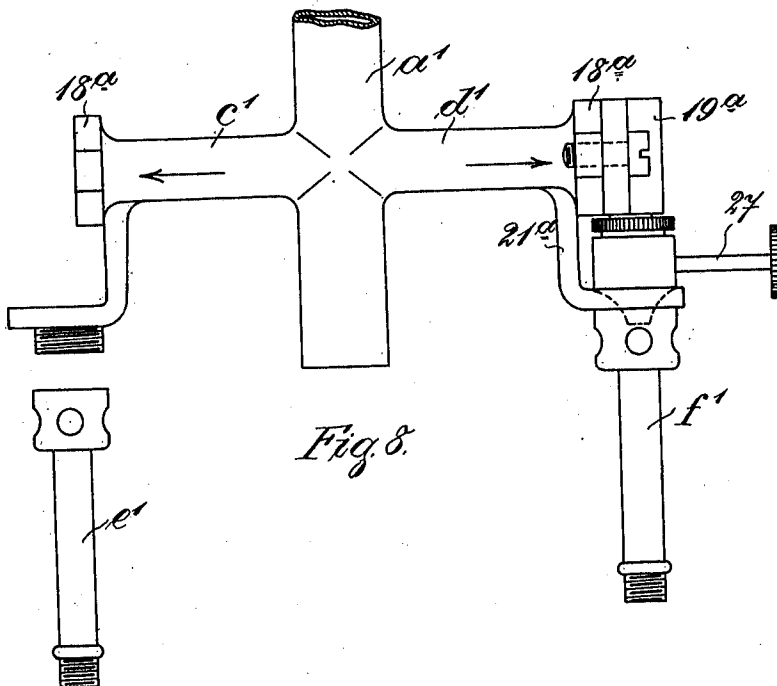
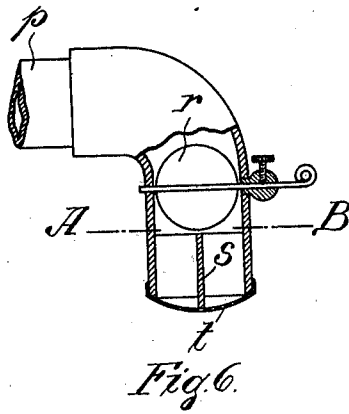
Inventor:
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M. GRAETZ.
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4 SHEETS—SHEET 3.



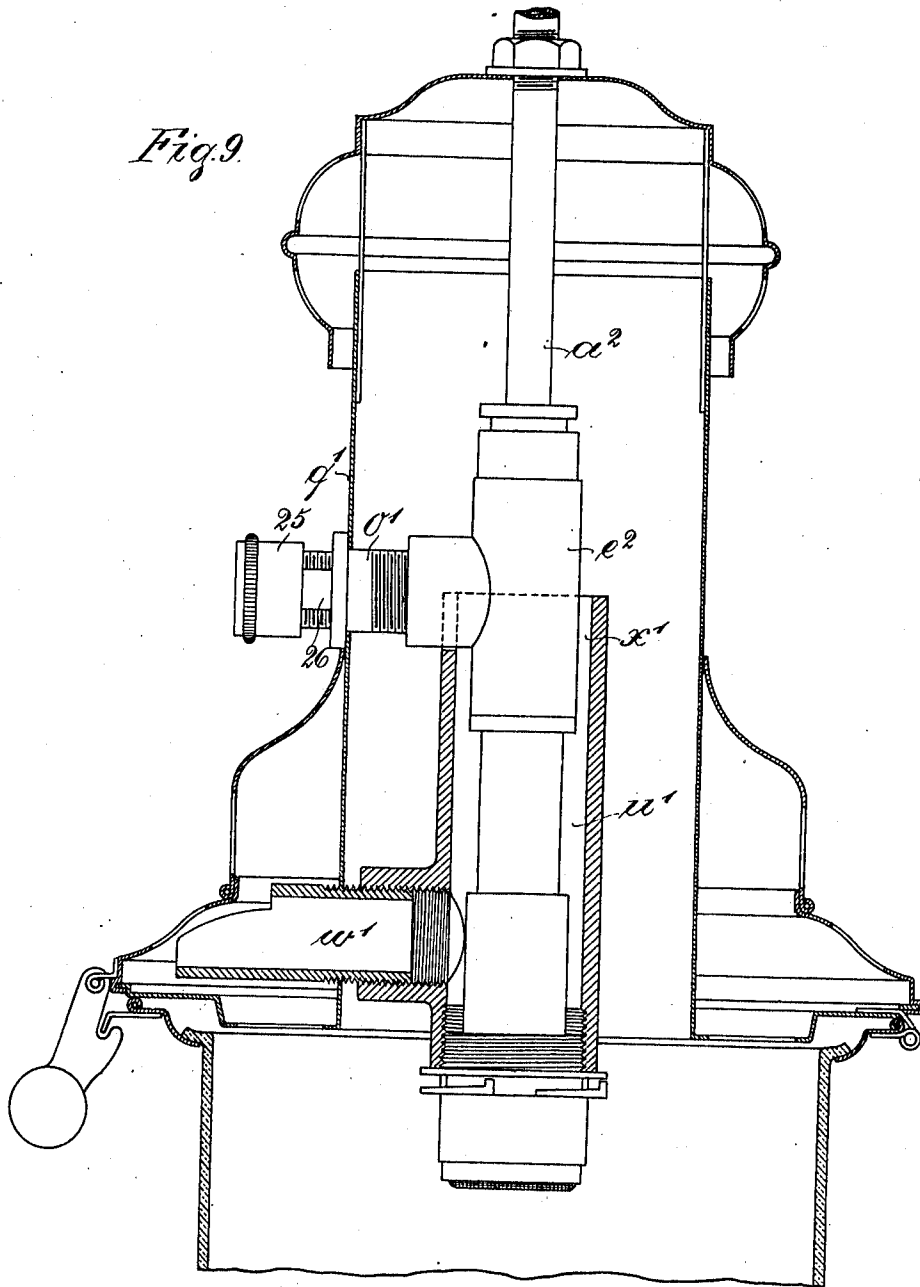
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APPLICATION FILED JAN. 8, 1908.

988,330.

Patented Apr. 4, 1911.
4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

MAX GRAETZ, OF BERLIN, GERMANY.

INCANDESCENT GAS-LAMP.

988,330.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed January 6, 1908. Serial No. 409,491.

To all whom it may concern:

Be it known that I, MAX GRAETZ, a subject of the King of Prussia, German Emperor, and resident of 92/93 Elsenstrasse, Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Incandescent Gas-Lamps, of which the following is an exact specification.

10 This invention relates to inverted incandescent gas lamps working with pressure gas and its object is to effect various improvements in lamps of this type.

15 The novel features of the present invention are hereinafter pointed out in the claims and they relate particularly to the gas-tight arrangement of the mantle and burner tube combined with an arrangement for spreading the flame so as to cause it to play on all parts of the mantle which in such lamps, as is known, is made of considerable size.

20 The invention also deals with the cooling of the burner tubes so that a current of fresh atmospheric air is always caused to pass upwardly and around the burner tube.

25 Other improvements in construction will be more readily understood from the following description of the two modifications of the present invention illustrated in the accompanying drawings.

30 In these drawings Figure 1 is a sectional elevation through a multiple burner pressure gas lamp according to the present invention, Fig. 2 is a separate plan view of the base plate in which the burner tubes are fixed, Fig. 3 is an enlarged detail of the burner tube, Fig. 4 is also an enlarged detail view partly in section showing a slightly modified form of burner tube, Fig. 5 is a plan view of the mantle carrier, Fig. 6 is a detail view showing the air inlet to the burner mixing tube and the method of controlling the same, Fig. 6^a is a section on the line A—B of Fig. 6, Fig. 7 is a detail view showing the detachable nozzle arrangement according to this invention, Fig. 8 shows a slightly modified form of detachable nozzle arrangement for a two burner lamp, Fig. 9 is a sectional view showing a single burner inverted incandescent lamp for working with pressure gas according to the present invention.

50 According to the form of the invention shown in Fig. 1 gas under high pressure is

fed through a pipe *a* to an automatic lighting and extinguishing device *b*. From the lighting and extinguishing device *b* there lead the branch pipes *c* and *d* to the burner tubes *e* and *f* and supply pipes *g* to the pilot burners *h* for igniting. To the branch pipes *c* and *d* there is fixed a plate *j* which carries a screw *k* by which the lower part of the lamp is supported. The screw *k* engages a preferably solid cross piece *m* which is screwed into the four-way joint pieces *n*. The vertical limbs of these joint pieces form parts of the burner tubes *e* and *f* while the horizontal limbs form parts of the air supply pipes to the burner tubes. These air supply pipes *o* and *p* project horizontally from the burner tubes *e* and *f* respectively and pass through the side wall of the chimney *q*, which they serve to support into the atmosphere. Outside the chimney the air tubes *o* and *p* are bent downward (see also Fig. 6). In this downwardly bent part there is arranged a butterfly controlling valve *r* and cross ribs *s* while the end of the downwardly bent part is covered by a wire netting or dust sieve *t*. It will be seen that air is fed separately to the burner tubes as there is no through going connection from the pipe *o* to the pipe *p*. This enables perfect adjustment of the separate burner flames while I have found that, by bending the air supply pipe downwardly and providing ribs in the downwardly projecting part, a much steadier and better flow of air to the burner tube is secured.

90 In order to cool the burner tubes and prevent back firing these tubes are surrounded at their lower end with jackets *u* cast in one with the base plate *v* which is fixed to the end of the chimney *q*. Also cast in one with the base plate *v* there are conduits *w* leading from the jackets *u* to the atmosphere. The jackets *u* all communicate with the upwardly projecting outlet *x* which opens into the chimney. It will be seen that with this arrangement there are two factors contributing to the promotion of a good circulation of air through the air jackets *u* viz. the hot air passes upward as the cooler air is led to the lower part of the jacket and the outlet of hot air is above the cool air inlet and secondly the open outlet for the hot air projects into the chimney so that the circulation of air through the air jacket is assisted by the suction action of the waste or

burned gases passing upward through the chimney.

At the end of the burner tubes as can be seen in Fig. 4 there is arranged a spreader plate 10 which is preferably formed with an outward convexity and may be made of any suitable material for instance steatite. In this spreader plate there are provided a number of outwardly and downwardly inclined passages 11 which direct the air and gas mixture passing from the burner tube to play on all parts of the mantle evenly. This is of great importance in pressure gas lamps as the mantles z are in such lamps of considerable size and without some distributing means on the end of the burner tube the heating of the mantle surface is apt to be uneven. Further in order to prevent the burning gas and air escaping without coming in contact with the mantle at all I provide a mantle carrier 12 preferably in the form of a cylindrical plate as shown which mantle carrier is held gas tight on the end of the burner tube around the spreader plate 10. For this purpose in Fig. 3 the outside of the burner tube is provided with a bayonet joint 13 having its upper surfaces 14 inclined. With this bayonet joint there engage the projecting lips 15 on the mantle carrier. At its bottom side the mantle carrier 12 is tapered inward and provided with a flange 12^a adapted to be brought tightly against the end of the burner tube when the carrier is properly fixed to the bayonet joint connection on the end of the burner tube.

Instead of providing tapered surfaces 14 on the bayonet joint the bayonet joint connection may as shown in Fig. 4 be carried by a screwed ring 16 engaging the end of the burner tube. By screwing the ring on to the burner tube the mantle carrier is tightened against the end of the burner tube and around the spreader plate.

In incandescent gas lamps it is desirable to arrange the nozzles removable for the purpose of inspection and cleaning and I have shown a very convenient arrangement of removable nozzle by which the burner tube and the supply pipes need not be removed. Further the nozzle forms no part of the suspending arrangement of the lamp. This detachable nozzle is illustrated in enlarged detail in Fig. 7. The end of the supply pipe d is bent around at 17 and a vertical flange 18 is formed on this end. To the flange 18 there is bolted a knee piece 19 the vertical leg of which carries the nozzle 20. Cast in one with the pipe d there is an angle bracket 21 having a conically bored opening therein in which the conical external part 22 of the vertical leg of the knee piece fits gas-tight. On the underside of the angle bracket there is formed a boss 23 which receives the burner tube f —i. e. the part of the burner tube f which is formed by the ver-

tical limb of the four way piece n in Fig. 1. It will be seen that with this arrangement when the pins 24 are extracted the knee piece 19 may be raised out of the conical opening in the angle bracket and the nozzle 20 cleaned or inspected without disturbing the remaining lamp parts. Of course it will be understood that the usual admission door is provided in the chimney to enable this removal. The remainder of the construction of the lamp forms no part of this invention and is not further described. As can be seen from the drawings the remaining construction is of ordinary form.

In Fig. 8 a slightly modified arrangement of the supply pipes is indicated and the method of arranging the detachable nozzles according to this invention applied thereto. In this form the gas supply pipe a' is carried downward and the branch pipes c' and d' are at their horizontal open ends provided with flanges 18^a to which knee pieces 19^a are fixed. The lower part of the knee pieces 19^a is arranged separately and may be screwed down on to the conical opening in the horizontal arm of the angle bracket 21^a which is cast or suitably fixed to the branch pipes c' and d' . As described with reference to Fig. 7 the underside of the bracket 21^a is provided with a screwed boss which carries the burner tube. An adjusting screw 27 is shown for adjusting the opening of the nozzle and the ordinary Bunsen burner tubes e' and f' are illustrated as fixed to the screwed boss on the angle bracket.

In Fig. 9 the invention is illustrated as applied to a single burner lamp. The gas supply pipe a^2 passes downward through the chimney q' to the burner tube e^2 . From the burner tube e^2 there leads a horizontal pipe o' through the wall of the chimney q' and opens to the atmosphere for the purpose of conducting fresh atmospheric air to mix with the gas issuing from the gas supply pipe a^2 . The opening of the air supply pipe o' is controlled by means of a cap 25 adapted to cover more or less of the side slots 26 on the pipe o' as required. Extending over the burner tube there is a jacket u' which is fed with cool atmospheric air at its lower end by means of a conduit w' while its upper end is extended to form an outlet x' opening into the chimney. The same combined suction and natural draft action is obtained in this construction as described with reference to Fig. 1. The lower end of the burner tube is provided with a spreader and mantle carrier as described with reference to Figs. 3 and 5. The remaining construction of the lamp is of ordinary form and need not be further described, all the parts of the lamp being supported from the gas pipe a^2 . The lamp shown in Fig. 9 is of considerably lighter construction than the lamp shown in Fig. 1 and both are provided with glass globes

closed at the bottom. They are particularly suitable for use in outdoor lighting for streets and shops. Further any convenient number of burners may be employed and I have only illustrated my improvements as applied to a single and a double burner lamp by way of illustration.

I claim:—

1. In an incandescent gas lamp for pressure gas in combination, a burner tube, air and gas conduits leading thereto a spreading plate at the outlet end of said tube having passages therein inclined outwardly and downwardly, bayonet joint parts at the end of said tube, and a mantle carrier in the form of a closed cylindrical body engaging said bayonet joint and having an inwardly projecting flange on its lower end adapted to be brought gas tight against the end of the burner.

2. In an incandescent gas lamp in combination, a burner tube, air and gas conduits leading thereto, a spreading plate on the outlet end of said tube having passages therein inclined outwardly and downwardly, a screwed ring engaging said burner tube externally near its outlet end, bayonet joint parts carried by said screwed ring, a mantle carrier in the form of a closed metal cylinder engaging with the bayonet joint on said ring and having a flange on its lower end adapted to bear against the end of the burner tube.

3. In combination in an inverted incandescent gas lamp for pressure gas, a chimney for the burned gases, a burner tube arranged vertically within said chimney, air and gas supply pipes leading to said burner tube and means for cooling said burner tube comprising a jacket surrounding the burner tube near its lower end, a connection leading from the atmosphere to the lower end of said jacket and an outlet from said jacket opening upward into the chimney.

4. In combination in an inverted incandescent gas lamp for pressure gas, a chimney for the waste gases, a plurality of burner tubes arranged vertically within said chimney, air and gas supply pipes leading to said burner tubes and means for cooling said burner tubes comprising jackets surrounding said burner tubes at their lower ends, connections leading from the atmosphere to said jackets and an outlet pipe common to all said jackets and opening upward into the chimney.

5. In combination in an inverted incandescent gas lamp for pressure gas, a chimney for the waste gases a plurality of burner tubes arranged vertically within said chimney, a base plate to which said tubes are fixed air and gas supply pipes leading to said burner tubes, means for cooling said burner tubes comprising jackets formed in the base plate and surrounding said burner

tubes at their lower ends, connections also formed in said base plate and leading from the atmosphere to said jackets and an outlet pipe common to all said jackets, said outlet pipe being fixed to the base plate and opening upward into the chimney.

6. In combination in an inverted incandescent gas lamp working with pressure gas, a chimney for the waste gases, a plurality of burner tubes within said chimney, gas supply pipes leading to said burner tubes, a separate air pipe leading through said chimney from the atmosphere to each of said burner tubes and means external to the chimney on each of said air pipes for controlling the opening of said pipes.

7. In combination in an inverted incandescent lamp working with pressure gas, a chimney for the waste gases, a plurality of burner tubes within said chimney, gas supply pipes leading to said burner tubes, a separate air pipe leading horizontally from each of said burner tubes through the chimney and then bent downwardly and means in each of said downwardly bent parts for controlling the opening of said air pipes.

8. In combination in an inverted incandescent lamp working with pressure gas, a chimney for the waste gases, a plurality of burner tubes within said chimney, gas supply pipes leading to said burner tubes, separate air pipes leading horizontally from said burner tubes through the chimney to the atmosphere and then bent downward, baffling ribs within said downwardly bent parts and controlling devices within said downwardly bent parts.

9. In combination in an inverted incandescent lamp working with pressure gas, a chimney for the waste gases, a plurality of burner tubes within said chimney, gas supply pipes leading to said burner tubes, separate air pipes leading horizontally from said burner tubes through the chimney to the atmosphere and then bent downward, baffling ribs within said downwardly bent parts, controlling devices within said downwardly bent parts and dust sieves over the downwardly opening ends of said air pipes.

10. In combination in an inverted incandescent gas lamp, a gas supply pipe, a vertically arranged flange on the end of said supply pipe, a knee piece bolted to said vertically arranged flange, a nozzle on said knee piece, said nozzle projecting vertically downward and a burner tube into which said nozzle projects in a gas tight manner.

11. In combination in an inverted incandescent gas lamp, a gas supply pipe, a vertically arranged flange on said pipe, an angle bracket on said pipe, a knee piece fixed to said vertically arranged flange and having a conical end fitting gas tightly in a conical opening in the angle bracket, a nozzle on the downwardly projecting leg of said

knee piece and a burner tube carried by said bracket and into which the nozzle projects, substantially as described.

12. An inverted incandescent lamp for
5 working with pressure gas comprising in
combination, a gas supply pipe, a chimney
frame supported from said supply pipe, a
burner tube within said chimney with which
said supply pipe communicates, an air sup-
10 ply pipe leading from the atmosphere to said
burner tube, a cooling jacket surrounding
said burner tube, a connection from said
jacket to the atmosphere, an upwardly open-
ing outlet from said jacket to the chimney,
15 a spreading plate having outwardly and
downwardly inclined openings therein at the
bottom end of said burner tube, a mantle
carrier in the form of a cylindrical plate gas
tightly bearing on the end of said burner
20 tube and a mantle on said carrier.

13. An inverted incandescent lamp work-
ing with pressure gas comprising in combi-
nation, a gas supply pipe, a chimney frame
supported from said supply pipe, a plurality
25 of burner tubes within said chimney and

with which said gas supply pipe communi-
cates, a separate air supply pipe leading
from the atmosphere to each of said burner
tubes, means for controlling the opening of
said air supply pipes, a cooling jacket sur- 30
rounding each of the burner tubes, a pipe
leading from the atmosphere to each of said
jackets, a common outlet pipe for said jack-
ets opening upward into the chimney, a
spreading plate at the lower end of each of 35
said burner tubes, said spreading plate hav-
ing downwardly and outwardly inclined
openings therein, a mantle carrier on the end
of each of said burner tubes and fitting gas
tightly on said burner tubes around said 40
spreader plates and a mantle fixed to each
of said mantle carriers, substantially as de-
scribed.

In witness whereof I have hereunto set my
hand in the presence of two witnesses.

MAX GRAETZ.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.