F. W. MAGEE.

INVERTED ARC GAS LAMP.

APPLICATION FILED SEPT. 8, 1910.

1,007,713.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 1.

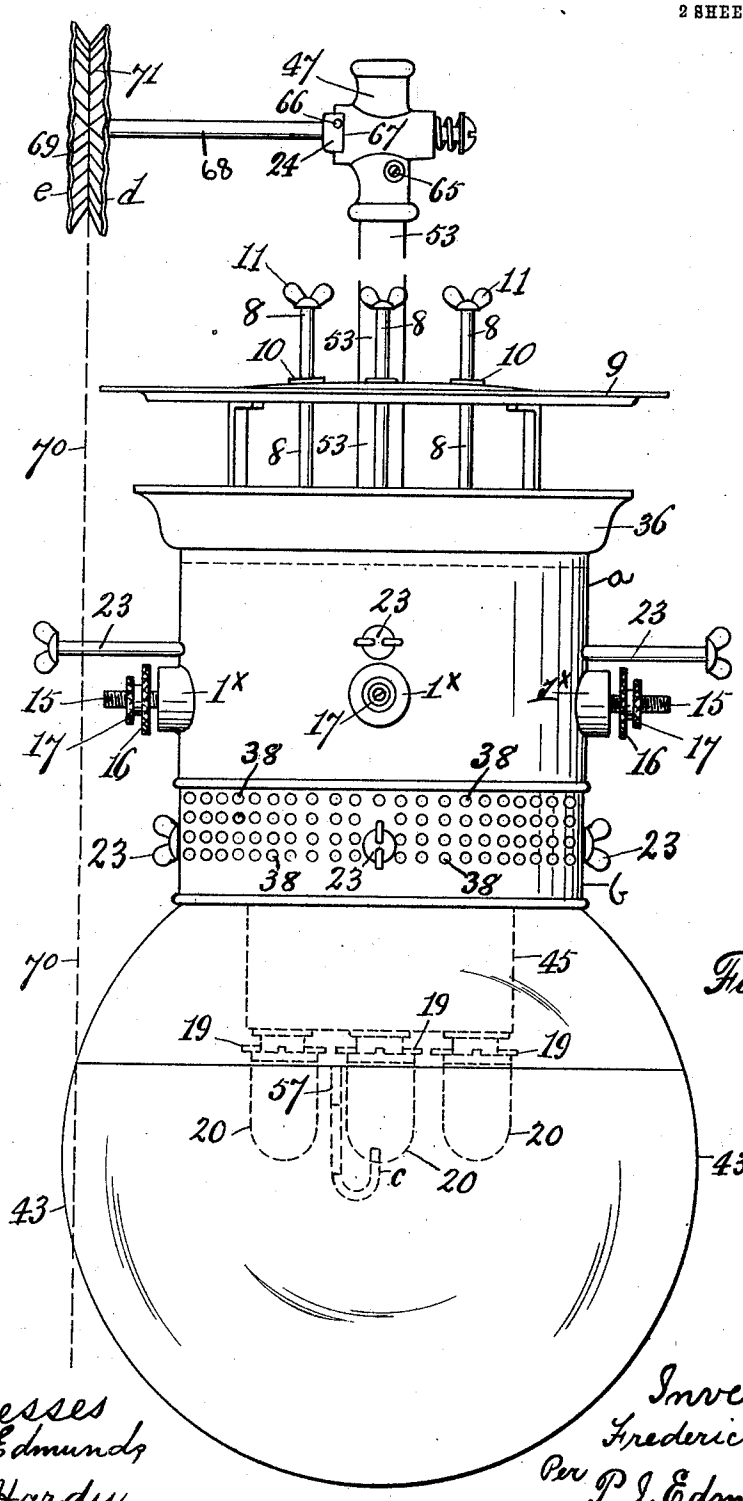

Fig. 1.

Witnesses
S. S. Edmunds
S. Hardy

Inventor
Frederick W. Magee
Per P. J. Edmunds
Attorney

F. W. MAGEE.

INVERTED ARC GAS LAMP.

APPLICATION FILED SEPT. 8, 1910.

1,007,713.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 2.

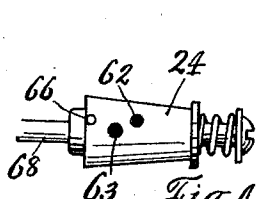

Fig. 4.

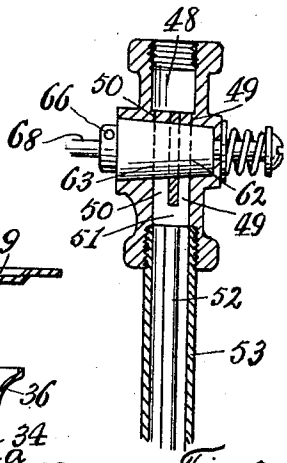

Fig. 3.

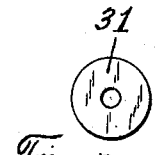

Fig. 5.

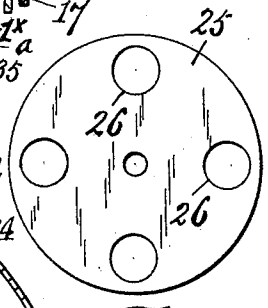

Fig. 6.

Fig. 2.

Witnesses
I. S. Edmunds
S. Hardy

Inventor
Frederick W. Magee
Per P. J. Edmunds
Attorney

UNITED STATES PATENT OFFICE.

FREDERICK W. MAGEE, OF LONDON, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO THOMAS W. BAKER, OF LONDON, CANADA.

INVERTED-ARC GAS-LAMP.

1,007,713. Specification of Letters Patent. **Patented Nov. 7, 1911.**

Application filed September 8, 1910. Serial No. 581,108.

To all whom it may concern:

Be it known that I, FREDERICK W. MAGEE, a subject of the King of Great Britain, and a resident of the city of London, in the county of Middlesex, in the Province of Ontario, Canada, have invented a new and useful Inverted-Arc Gas-Lamp, of which the following is a specification.

This invention relates to a device or lamp, employing a mantle, which is made luminous or glowing with heat, the radiant energy derived or produced from which acts on the eye to render objects visible.

It consists of the improved construction and novel combination of parts of the same as will be hereinafter first fully set forth and described and then pointed out in the claims, reference being had to the accompanying drawings forming part of this specification, wherein;

Figure 1 is a front view of an inverted arc gas lamp and attachments embodying my invention. In this view the chain is shown by a dotted line. Fig. 2 is a vertical sectional view of same. Fig. 3 is an enlarged detail sectional view of the upper part of Fig. 2, showing it at right angles to the view shown in Fig. 2. Fig. 4 is an enlarged detail side view of the valve plug. Fig. 5 is a detail plan view of the spreader plate. Fig. 6 is a detail plan view of the carrying plate.

In the accompanying drawings the numeral 1 indicates the body of the lamp, 2 a gas inlet opening therein, 3 gas branch passages in said body 1 which open into and communicate with the gas inlet opening 2, and 4 is a screw threaded plug which is inserted in each of the screw threaded ends of the branch passages 3, which screw plug may be screwed out to remove any accumulation or obstacle in said branch passage 3.

5 indicate main gas passages which are vertically located in and extend inwardly from outside of said body 1 and through the gas branch passage 3 and thereby communicate with the latter. In the outlet end of each of these main gas passages 5 is a disk 6, and said disk 6 is provided with an opening 7, and said disk 6 may be formed integral with or secured to said body 1 as preferred.

8 is a valve the lower screw threaded end of which engages with the screw threaded upper inner face of each of the main gas passages 5, and extends beyond the gas branch passages 3, and this valve 8 is adapted to supply the quantity of gas required from said gas branch passage 3. By using a separate valve 8 in each main passage 5 the gas in said gas branch passages may be shut off more or less, so that one or more of the gas lights may be shut off altogether or used as required. These valves 8 extend upward through the shade 9 and plates 10 and are provided with a thumb nut 11 for easy adjustment of said valves 8 outside of and above said shade 9. Each of these main gas passages 5 communicates with an air passage 12 in said body 1, and in the outer end of each of said air passages 12 is a narrow bridge 13, provided with a screw threaded socket, 14.

15 indicates a screw which is rigidly secured in each of said sockets, 14, and is provided with a set nut 16 which is adjustable on said screw 15 to permit the quantity of air desired to pass into these air passages 12, and 17 is a jam nut which engages with each set nut 16 to hold the latter at the position on said screw 15 to which it may be adjusted.

18 indicate Bunsen tubes the top ends of which are secured to the body 1 and each of which opens into one of the air passages 12, and in these tubes 18 the proper amount of air and gas is mixed. To the lower ends of these Bunsen tubes 18, are secured the mouth pieces 19 which carry the mantles 20.

21 is a supplemental gas passage and 22 is a gas passage both formed in the body 1, and 23 is a valve in said body 1 which permits or prevents the gas from flowing from the main gas passage 5 through the gas passage 22 to the supplemental gas passage 21.

The valve 8 in the main gas passage 5 when opened regulates and permits the quantity of gas to flow into the gas passage 22, and the valve 23 is secured in the body

1 and is fitted to and engages with said gas passage 22 to permit or prevent the gas flowing from the main gas passage 5 through the gas passage 22 to the supplemental gas passage 21, out of which supplemental gas passage 21, the gas passes to the air passage 12.

24 is a tapered plug valve.

25 indicates a carrying plate provided with holes 26 through which the Bunsen tubes 18 project, and this carrying plate 25 rests on the upper rim edges of the mouth pieces 19.

27 indicates a screw provided with a thread 28, and with the nuts 29 and 30 which secure said screw to said carrying plate 25.

31 indicates a spreader plate resting on the head of said screw 27 between the latter and the nut 32, to hold said spreader plate level, and said screw 27 is adjusted by loosening said nuts 29 and 30, to permit said screw 27 as well as the spreader plate 31 to be adjusted to the proper height at which the gas will be readily and quickly lighted.

33 is a screw plug in the lower end of the body 1 opposite the gas inlet opening 2, which screw plug may be screwed out to remove any accumulation or obstacle which might obstruct the passage of the gas in the gas inlet passage 2 of the body 1.

34 is a canopy formed in two parts, *a*, and, *b*, the upper part, *a*, of which is mounted on the body 1, and the lower part, *b*, is secured to the part, *a*, by a bolt and nut 35; this canopy 34 permits the ends 1^x of the body 1, in which the air passages 12 are formed to project through it, as shown in Figs. 1 and 2.

36 is the annular top of the canopy provided with the flanges 37, and in said canopy near the lower end a series of holes 38 are formed, as shown in Fig. 1.

39 are the globe holders each of which extends through a perforation in one of the flanges 37 and is provided with an angular end 40, and with the screw threaded socket 41.

42 are winged bolts the screw threaded bolt portions of which extend through the side of the canopy 34 and into the screw threaded sockets 41 of the globe holders 39, so that by tightening these winged bolts 42 the globe 43 is firmly secured to the canopy 34.

x is a screw threaded thumb nut, one of which engages with each of the screw threaded upper ends of the globe holders 39 above the flanges 37, so that by turning these screw threaded thumb nuts, the globe holders 39 and angular ends 40 thereof are adjusted to the proper height to hold the globe 43.

44 is an annular ring on the inside of the canopy 34 the outer portion of which annular ring 44 rests against the upper part, *a*, of said canopy 34.

45 is a sleeve which surrounds the Bunsen tubes 18 and said sleeve 45 is provided with an external annular flange 46 which is supported on said annular ring 44.

47 is a valve body adapted to be connected to the supply pipe not shown, which valve body is provided with a main gas passage 48, and leading from this main gas passage 48 are the branch passages 49 and 50, which connect with the chamber 51 formed in the valve body 47, and 52 is an inner pipe secured in the outer pipe 53 which latter is connected at one end to said valve body 47 and at the other end is screwed or otherwise secured to the body 1, opposite the gas inlet opening 2. Between the outer face of the inner pipe 52 and the inner face of the outer pipe 53 packing plates 54 are secured to prevent the gas from entering said outer pipe 53, and this forms a chamber 55 in and at the lower end of the outer pipe 53 and below the pipe 52. In this valve body 47 the first supplemental branch passage 56 is formed, which extends from the main gas passage 48 to and opens into the pilot pipe 57 provided with a curved end, *c*.

58 is a second supplemental branch passage which extends through the body 47 to and opens into and communicates with the passage 56 and thereby to the pilot pipe 57, and these first and second supplemental branch passages 56 and 58 are provided with the valve screws 59 and 60, respectively, which regulate the amount of gas passing to the pilot pipe 57.

24 is a tapered plug valve which is inserted in a suitable valve opening 61 in the body 47. In this tapered valve plug 24 transverse passages 62 and 63 are formed, which may be positioned opposite to and communicating with said branch passages 49 and 50.

When the valve screw 59 is open the gas passes through the main passages 48 and 56 and communicates with the pilot pipe 57, and is conducted by the latter to the end, *c*, where it is lighted.

The passage 62 in the tapered valve plug 24 communicates with the pilot pipe 57 by means of the radial passages 64 and 58, and at the same time this passage 62 by means of the passage 49 communicates with the chamber 51 and the latter with the pipe 52. This passage 62 thus feeds the pilot pipe 57 and Bunsen tubes 18, so that when the pilot pipe 57 is lighted at the end of the curved part, *c*, it comes in contact with the spreader plate 31 which distributes said pilot light to light the mantles. At the same time that said tapered valve plug 24 is gradually turned and shuts off the passage 62 from the passage 49, the passage 63 is gradually turned opposite the passage 50, formed at a different point or place on said valve plug, and this shuts off the gas from the gas passages 62 and 49 and turns on sufficient gas through

the passages 63 and 50 to make the mantles incandescent.

65 is a valve screw in the body 47 which may be adjusted in the branch passage 49 to reduce this passage 49 to light the mantles with the least possible amount of gas.

The tapered valve plug 24 is provided with a stop 66 which works in a groove 67 in the body 47 so that in turning the gas off or on this lamp to light the mantles, this stop 66 abuts against an end of the groove 67, to prevent it from being further turned.

The shaft 68 is secured to the tapered plug valve 24, and to this shaft 68 the corrugated pulley 69 is rigidly secured, and a chain 70 extends thereover. By giving this pulley 69 the proper corrugations 71, when too great or too sudden a strain is applied to this chain 70 and the stop 66 comes to the end of the groove 67, the chain slips and rides thereover, otherwise the result would be when the stop on the tapered plug engaged with the end of the groove in the valve body 47 the jarring or vibration of the lamp would break the mantles, but when this pulley 69 is turned properly the tapered valve plug 24 is operated to readily and easily turn off or on the gas as desired. This corrugated pulley 69 is formed in two corrugated sections, *d*, *e*, riveted or otherwise secured together.

The operation is as follows: As soon as the gas is turned on, it passes to and through the main gas passage 48 and the first supplemental branch passage 56 to the pilot pipe 57, and the latter is lighted at the curved end, *c*. When lighted the valve screw 59 is adjusted inward or outward in the body 47 to regulate the size of the flame at the curved end, *c*, of the pilot pipe 57. One side of the chain 70 is then pulled downward which turns the pulley 69, shaft 68, and the tapered valve plug 24, in which the passages 62 and 63 are formed, and this turns the tapered valve plug 24 until the gas passage 62 therein is opposite or in line with the gas passage 49 in the valve body 47. When the gas passage 62 is so adjusted, the supplemental gas passage 64 in plug 24, communicates through the passage 58 with the pilot pipe 57, and the latter then conducts the amount of gas that is required at the curved end, *c*, of the pilot tube 57, to strike against the spreader plate 31 where the flame from this gas is distributed to the mantles 20, by said spreader plate 31. The valve screw 60, is also adjusted inward or outward in the valve body 47 according to the size or the amount of gas that is required at the spreader plate 31 to light the mantles 20. At the same time that the gas passes from the passage 62 through passage 58 to the tube 57, the gas from this passage 62 also passes down through the gas passage 49, chamber 51 and pipe 52 through the body 1 and Bunsen tubes 18 to the mantles 20, where this gas is lighted by coming in contact with the flame from the spreader plate 3. The valve screw 65 in the passage 49 regulates the amount of gas passing to the mantles 20 so that only sufficient gas will be permitted to pass through passage 49 to said mantles to just light the latter and to do this gradually. By further operating the chain 70, the passage 62 in the tapered valve plug 24 is gradually closed and the passage 63 therein is gradually opened, this permits the gas to pass through the opening 50 and connections to the mantles 20 in sufficient volume to make these mantles 20 fully incandescent. As the passage 62 is closed the gas is shut off from the horizontal passage 64 in the tapered valve plug 24 and the passage 58 in the valve body 47, this shuts off the gas in the passages 62 and 58 from the pilot pipe 57 and also shuts off the extra gas that is required at the spreader plate 31 to light the mantles 20. When this lamp is burning, the main gas outlets 5 are governed by the valves 8 to admit from twelve to fifteen feet of gas per hour to impart thereto a full candle power. The object of permitting the gas to pass through the gas passage 22, from the main gas passage 5 to the supplemental gas passage 21, is for the purpose of regulating the velocity or the speed and flow of the gas through the opening 7 in the disk 6.

There is only one speed at which the gas of a standard richness will thoroughly incorporate and mix with the air, and prevent a back flash, and the sizes of the main gas passage 5, and the opening 7 in the disk 6 is adapted to gas of the lowest pressure and standard richness at which it can be commercially used and successfully burned. And using this as a basis, a single hole in the disk 6 is absolutely necessary to burn gas of this low pressure and standard richness. In this case the device is designed to operate from gas of a low pressure to that of a high pressure, with standard richness, and the gas is always at the proper pressure when passing from the opening 7 in the disk 6 into the Bunsen tubes or mixing chambers 18 irrespective of the pressure in the main inlet opening 2. By adjusting the valve 23 in the gas passage 22 from over the supplemental gas passage 21 the velocity of the gas through the opening 7 is reduced because a greater amount of gas passes into the supplemental gas passage 21 consequently the pressure of the gas in the main gas passage 5, and at the opening 7 is reduced. Again, by adjusting the valve 23 in the gas passage 2 toward the main gas passage and over the supplemental gas passage 21 the velocity of the gas through the opening 7 is increased because a less amount of gas passes into the supplemental gas passage 21 consequently

the pressure of the gas in the main gas passage 5 and on the opening 7 is increased. When the valves 8 and 23 are once set they remain so, unless the pressure or nature of the gas changes. From this it will be seen that with this device the gas is taken at the lowest pressure that it will draw in sufficient air to thoroughly incorporate and mix with said air in said mixing chamber or Bunsen tube, and any gas of a higher pressure is reduced, or the velocity or speed and flow of said gas is reduced by means of said valve 23 and gas passage 22, and this prevents any back flash or other noise when lighting or turning out. By using the inner pipe 52 in the outer pipe 53, the gas passing down said inner pipe 52 is prevented from being decomposed or rarefied by the intense heat of the gas at the mantles 20, which heat is expended on said outer pipe 53 and the air between said outer and inner pipes. In the case of the globe holder 39 extending through the flange 37 of the annular top 36, the winged nut, x, engaging with the screw threaded end of the top of the globe holder 39 not only holds the globe 43 but by means of the angular end 41 of said globe holder any side of the globe may be adjusted as desired.

In this device the body 1 is cast or otherwise formed in one piece thereby reducing the number of parts and consequent joints which permits the escape of gas, this reduces the cost of construction of said body 1.

An inverted arc gas lamp constructed as described provides one that is strong, durable and inexpensive to manufacture and one that will be efficient in practical use.

Having thus described my invention, I claim:

1. In a device of the class described, a body of a lamp, a gas inlet opening into said body, gas branch passages communicating with and extending from said gas inlet opening, a main gas passage extending from and communicating with each of said gas branch passages, a disk in the outlet end of each of said main gas passages, an opening in each of said disks, a supplemental gas passage, and a gas passage extending from and communicating with said main and said supplemental gas passages, in combination with air passages with which said main and said supplemental gas passages communicate, and means for regulating the amount of gas passing through said main and said supplemental gas passages, and for regulating the amount of air passing through said air passages in the body of said lamp.

2. In a device of the class described, a body of a lamp, a gas inlet opening into said body, gas branch passages communicating with and extending from said gas inlet opening, a main gas passage extending from and communicating with each of said gas branch passages, a disk in the outlet end of each of said main gas passages, an opening in each of said disks, a supplemental gas passage, a gas passage extending from and communicating with said main and said supplemental gas passages, and valves for regulating the amount of gas passing through said main and said supplemental gas passages, in combination with air passages with which said main and said supplemental gas passages communicate, a bridge in each of said air passages, a screw secured in each bridge, and a set nut and jam nut on each screw for regulating the amount of air passing through said air passages in the body of said lamp.

3. In a device of the class described, a plurality of burner tubes, mantles positioned upon the ends of said tubes, a carrying plate spaced above said mantles, means for supporting the plate, a pilot tube terminating between said mantles, a screw projecting through said plate, and a head provided thereon, turn nuts positioned at either side of said plate, a spreader plate positioned between said tube ends and above the end of the pilot tube and resting against the head of said screw, and a securing nut positioned upon said screw above said spreader plate and adapted to engage the same.

4. In a device of the class described, a valve body, a main gas passage and a tapered opening formed in said valve body, a tapered valve plug fitted to said tapered opening, a passage formed through said tapered valve plug, a passage in said valve body communicating with said passage formed through said tapered valve plug, a chamber in said valve body communicating with said passage in said valve body, an outer pipe secured to said valve body, an inner pipe in said outer pipe, and a chamber below said inner pipe and in said outer pipe, in combination with a main lamp body, Bunsen tubes opening into said main lamp body, mouth pieces on said Bunsen tubes and mantles on said mouth pieces.

5. In a device of the class described, a valve body, a lamp body, a gas pipe communicating between said bodies, Bunsen tubes depending from said lamp body, mantles secured to the lower ends of said tubes, a valve plug fitted to said valve body, a shaft extending from said plug, in combination with a pulley provided with corrugations and secured to said shaft, and a chain passing over the corrugations of said pulley to prevent the breakage or other injury to said mantles.

6. In a device of the class described, a canopy, an upper annular ring on said canopy, flanges on said upper annular ring provided with openings, and a globe, in combination with a globe holder provided

with an angular end which engages with said globe, and the other end of said globe holder extending through the openings in said flanges, a winged nut on each of said globe holders above said flanges, and an adjusting bolt extending through said canopy and globe holder.

In testimony whereof, I have signed in the presence of the two undersigned witnesses.

FREDERICK W. MAGEE.

Witnesses:
P. J. EDMUNDS,
S. HARDY.