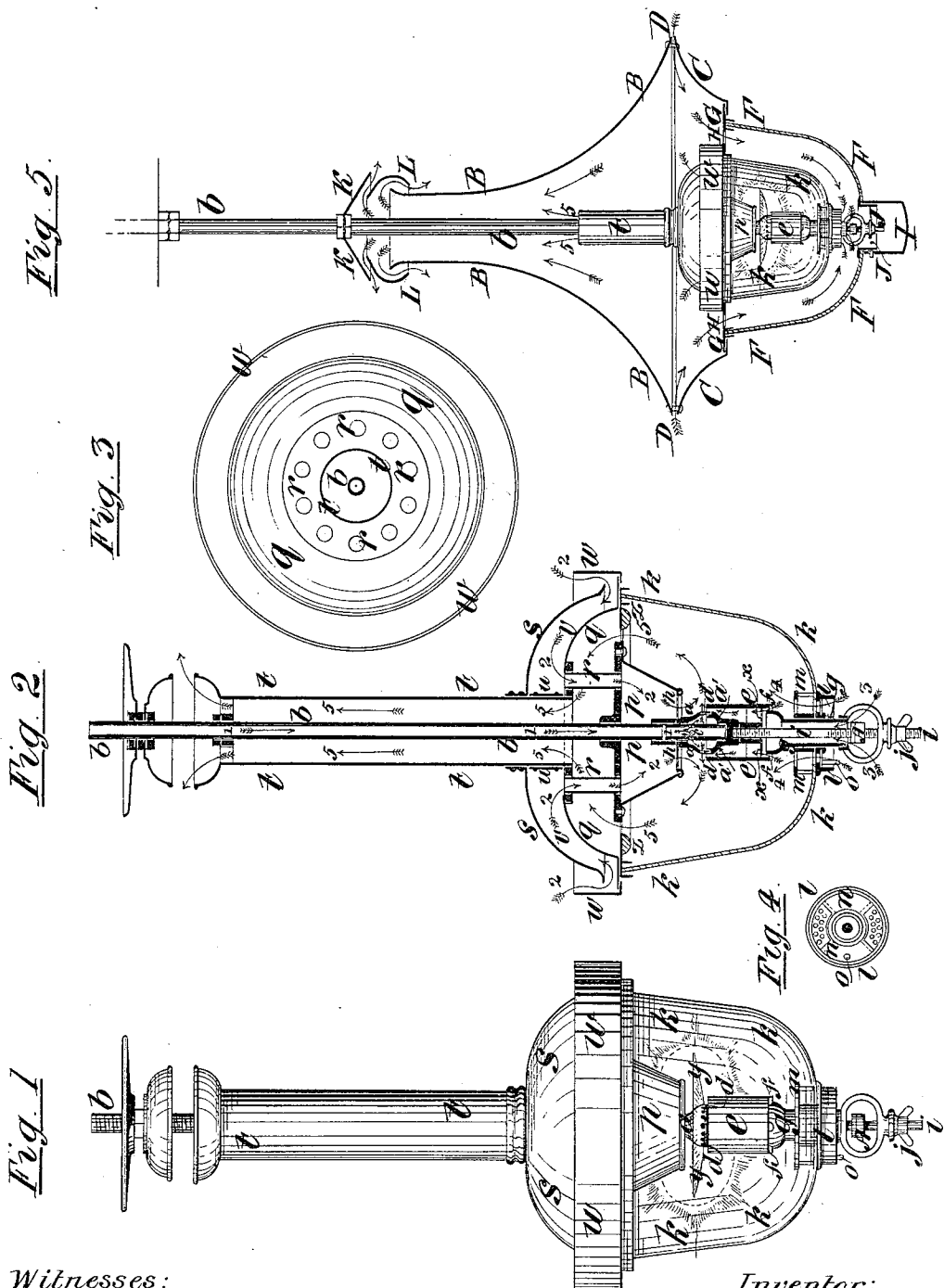


(No Model.)

H. FOURNESS. REGENERATIVE GAS LAMP.

No. 362,830.

Patented May 10, 1887.



Witnesses:
Alex. Barkoff,
David S. Williams.

Inventor:
Henry Fourness
by his Attorneys
Horsen and Sons

UNITED STATES PATENT OFFICE.

HENRY FOURNESS, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

REGENERATIVE GAS-LAMP.

SPECIFICATION forming part of Letters Patent No. 362,830, dated May 10, 1887.

Application filed July 6, 1886. Serial No. 207,222. (No model.) Patented in England June 16, 1885, No. 7,389; in France January 9, 1886, No. 173,439, and in Belgium January 11, 1886, No. 71,578.

To all whom it may concern:

Be it known that I, HENRY FOURNESS, residing at Manchester, county of Lancaster, England, and a subject of the Queen of Great Britain and Ireland, have invented certain Improvements in Regenerative Gas-Lamps, (for which I obtained a patent in Great Britain, No. 7,289, dated June 16, 1885,) of which the following is a specification.

This invention relates to regenerative gas-lamps in which the gas to be consumed, and also the air supplied to the flame, are heated in the lamp itself.

In my improved lamp the gas issues through a burner having horizontal openings, the resulting disk-shaped flame being fed with heated air from above and beneath. I provide means for regulating the supply of air from beneath.

In the accompanying drawings, Figure 1 is an elevation of the improved lamp. Fig. 2 is a vertical section. Fig. 3 is a plan view of the top of the lamp, the upper shield being removed to show the circle of tubes through which air enters to the upper regenerative chamber. Fig. 4 is a view of a slide at the bottom of the lamp, which can be moved round to admit a lighted taper. Fig. 5 is a view of the lamp surrounded by a wind-guard, such as is necessary when the lamp is in an exposed situation.

The gas to be consumed is supplied to the burner *a* through the central pipe, *b*, as indicated by the arrows marked 1 in Fig. 2. The said burner is composed of two bell-shaped halves, *a* and *a'*, which are turned both internally and externally and are screwed tightly together upon the lower end of the threaded gas-supply pipe *b*, the two halves thus composing a chamber, into which gas is admitted from the pipe *b* through the apertures *c*, as shown by the course of the arrows marked 1. It is important that the said apertures *c* should be in about the relative position shown, as I have found that when these apertures are brought too nearly opposite to the horizontal openings *d* in the upper half, *a*, of the burner the flame is apt to be irregular in shape. By isolating the apertures *c* in the manner shown the gas-pressure is diffused and equalized in the chamber before issuing from the horizontal open-

ings *d*. The lower part of the burner is surrounded by a tube, *e*, the upper edge of which is just beneath the burner-openings *d*, while the lower edge rests upon pins *f*, which project from the cup-shaped upper end of another tube, *g*, which projects through the bottom of the lamp and is open to the atmosphere, as shown.

It will be observed that at the junction between the upper tube, *e*, and the lower tube, *g*, an annular space exists for the passage of air, as indicated by the arrows, and also that a similar annular space for a similar purpose is left between the upper part of the tube *e* and the burner. A wire-gauze partition, *x*, is placed within the tube *e*. The tube *e* is screwed on the stem *i*, and the said stem *i* screws into the bottom of the lower half, *a'*, of the burner. The lower tube, *g*, is held in position against the upper tube, *e*, by a wing-nut, *j*, which screws upon the lower end of the stem *i*, so that the respective tubes are held securely in their proper positions relatively to the burner.

The burner is surrounded, as shown, by a glass globe or shield, *k*, which is held at the foot between the outer ring, *l*, and the inner nut, *m*. The outer ring, *l*, is shown separately in plan at Fig. 4. It has two spaces covered by a revolving shutter or slide, *n*, the remainder being perforated, as shown, for the admission of air. The slide *n* can be moved round by the catch *o*, so as to uncover the spaces and allow of the introduction of a taper to light the gas.

The upper part of the lamp consists of a regenerative chamber, *p*, which is situated just above the burner and is screwed or otherwise attached to the gas-supply pipe *b*. The upper part of the chamber *p* is connected to the curved top *q* of the lamp by a circle of air-tubes, *r*, as shown in the plan view, Fig. 3, and above the said curved top *q* is a similarly-curved shield, *s*, which slips over the chimney *t* and is sustained a certain distance apart from the curved top by means of a thimble, *u*, so as to leave an annular space, *v*, for the passage of air, as indicated. The annular opening at the outer lip of the shield is protected by an upright rim or wall, *w*, which prevents the entrance of disturbing gusts of air. The air enters between

the shield *s* and the top *g*, as shown by the arrows marked 2, and flows through the tubes *r* into the chamber *p*, from whence it is discharged through a wire-gauze or other perforated or porous partition, *h*, so as to impinge upon the upper side of the disk-shaped flame *y*.

It will be observed that the air-tubes *r* stand directly in the path of the hot gases and products of combustion, whose direction of escape to the chimney *t* is indicated by the arrows marked 5. The tubes thereby abstract a considerable portion of the heat from the said products and transfer it to the air flowing through them, as described. The outer circumference of the chamber *p* is polished, plated, painted, enameled, or otherwise treated, so as to act as a reflector. An additional reflecting-ring, *z*, is also sustained at the upper part of the lamp. When the lamp is in operation, the gas is heated in its passage down the pipe *b* (which is encircled by the chimney) and becomes ignited on issuing from the horizontal openings in the burner, so as to form the disk-shaped flame *y*. (Shown in Fig. 1.) The products of combustion escaping in the direction of the arrows marked 5 impinge upon the tubes *r* and heat the air flowing through the tubes, as shown by the arrows 2. The air is further heated in the chamber *p* and issues through the wire-gauze *h* to impinge upon the upper side of the flame. The air to the lower side of the flame enters the lamp partly through the perforations in the ring *l*, as shown by the arrows 4, and partly through the tube *g*, as shown by the arrows 3. The air which enters the tube *g* is heated within the said tube, and also within the tube *e*, from whence it issues to the flame through the annular space between the tube *e* and the burner. Part of the air entering through the ring *l* proceeds toward the outer edge of the flame, which it sustains and brightens, while part of the same air-supply enters the tube *e* through the annular space at the junction between the two tubes *e* and *g*, all as shown by the arrows. The air entering through the perforations in the ring *l* is warmed by the heat contained within the glass globe or shield *k*. To regulate the air entering the tube *g*, I provide a stop, *A*, which is screwed upon the stem *i*, and which can be approached toward or withdrawn from the opening at the bottom of the tube *g*, so as to increase or diminish the supply of air at will.

Fig. 5 is a sectional view of the wind-guard I employ to protect the lamp when used in an exposed situation. The said wind-guard consists mainly, as shown, of an upper inclined or curved portion, *B*, and an under similarly inclined or curved portion, *C*, which approach each other at an angle toward the point *D*, but do not touch, so that a narrow annular conical opening is left between the upper and lower partitions, through which air is admitted to the interior of the casing. The bottom *G* of the

casing has an orifice large enough to admit the glass globe or shield *k* of the lamp, and presents a ledge, upon which the rim *w* of the lamp finds support. A second outer glass shield, *F*, is secured to the bottom *G* of the casing, so as entirely to inclose the lamp. Openings *H* are formed in the bottom *G*, so as to allow the air to pass, as indicated by the arrows, from the interior of the wind-guard into the space between the glass shields *F* and *k* to the bottom of the lamp for supplying the under side of the flame, as hereinbefore described. The regenerative chamber *p* of the lamp is supplied with air from the interior of the wind-guard, as shown by the arrows. The top of the wind-guard is formed with inclined and curved baffle-caps *K L*, as shown, which prevent downdrafts, while not interfering with the escape of the products of combustion, which are indicated by the arrows marked 5. The bottom of the glass shield *F* of the wind-guard is fitted with a cap, *I*, which is secured by a bayonet-joint or snapping arrangement to the projecting sleeve *J*. The cap *I* can be readily removed, when desired, for lighting the lamp, and for other purposes.

I claim as my invention—

1. The combination of the inclosing-globe and burner of a regenerative gas-lamp, the said burner having an annular row of openings, *d*, with a tube, *e*, around the lower part of the burner, and a tube, *g*, supporting the said tube *e* and extending to the outside of the globe, substantially as set forth.

2. The combination of the burner and inclosing-globe of a regenerative gas-lamp, with a tube, *g*, extending through the bottom of the globe to supply air to the flame, a stem, *i*, passing through the tube, and an adjustable stop, *A*, thereon to regulate the supply of air, all substantially as described.

3. The combination of a regenerative gas-lamp having an inclosing-globe, with a wind-guard for the said lamp, consisting of the curved shields *B C*, leaving an intermediate air-space, a bottom, *G*, having air-openings, and a glass shield, *F*, all substantially as described.

4. The combination of a regenerative gas-lamp having a burner and inclosing-globe, with a wind-guard for said lamp, consisting of the curved shields *B C*, leaving an intermediate air-space, baffle-plates *K L* at the top, a bottom plate, *G*, having air-openings, a glass globe, *F*, and cap *I*, all substantially as specified.

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

HENRY FOURNESS.

Witnesses:

DAVID FULTON,
EDWARD L. DUTTON.