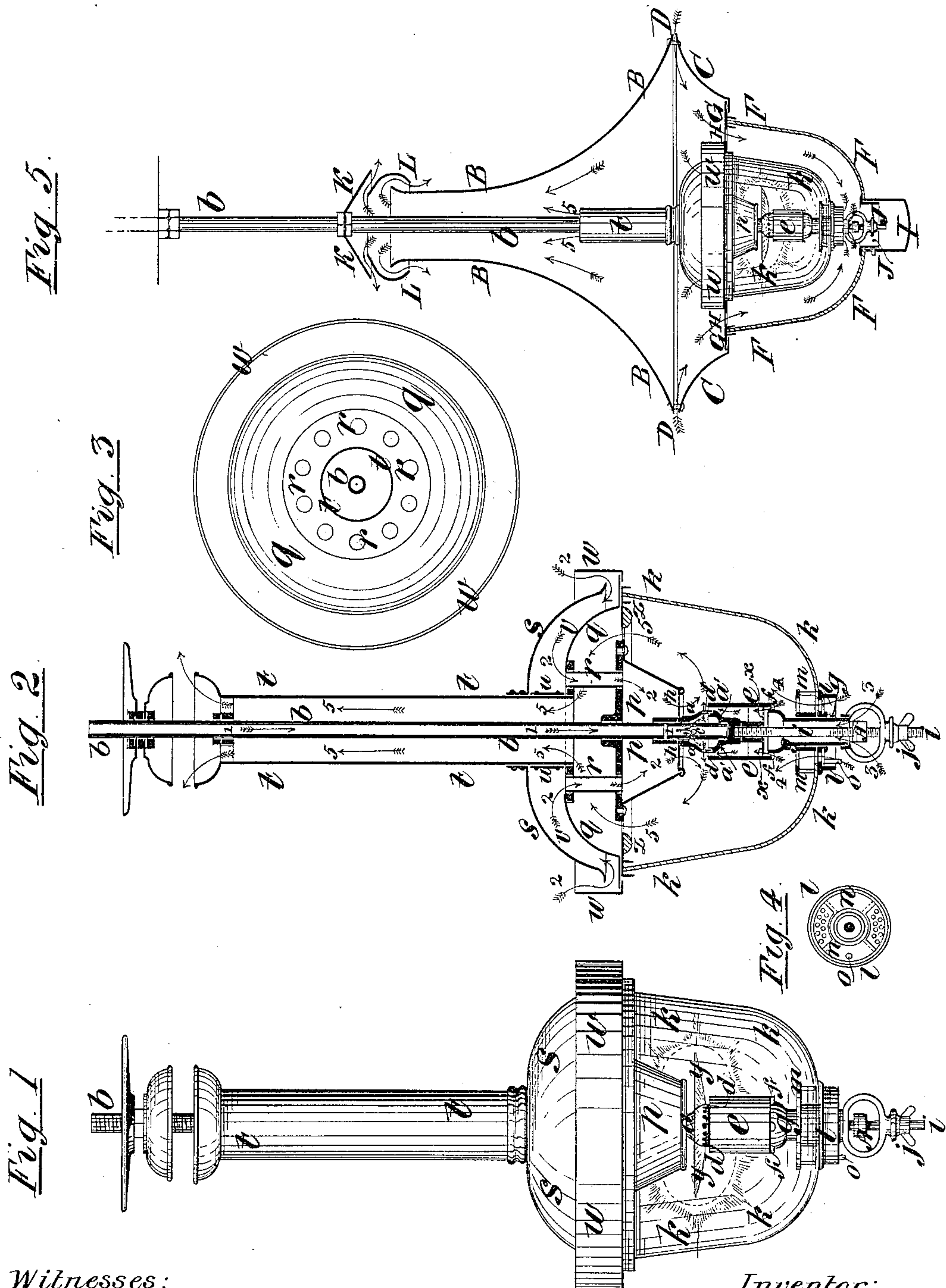


(No Model.)

H. FOURNESS.
REGENERATIVE GAS LAMP.

No. 362,830.

Patented May 10, 1887.



Witnesses:
Alex. Barkoff.
David S. Williams.

Inventor:
Henry Fourness
by his Attorneys
Howson 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. 207,228. (No model.) Patented in England June 16, 1885, No. 7,289; 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.

10 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.

15 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.

20 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
25 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
30 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
35 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 compos-
40 ing 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
45 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-
50 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
55 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 be-
60 tween 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*
65 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
70 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
75 burner.

The burner is surrounded, as shown, by a
75 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
80 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
85 allow of the introduction of a taper to light the gas.

The upper part of the lamp consists of a re-
generative chamber, *p*, which is situated just above the burner and is screwed or otherwise
90 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,
95 *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
100 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 *q*, 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.