2 Sheets—Sheet 1.

E. L. HALL.

Locomotive Head-Light.

No. 209,041. Patented Oct. 15, 1878.

FIG. 1.

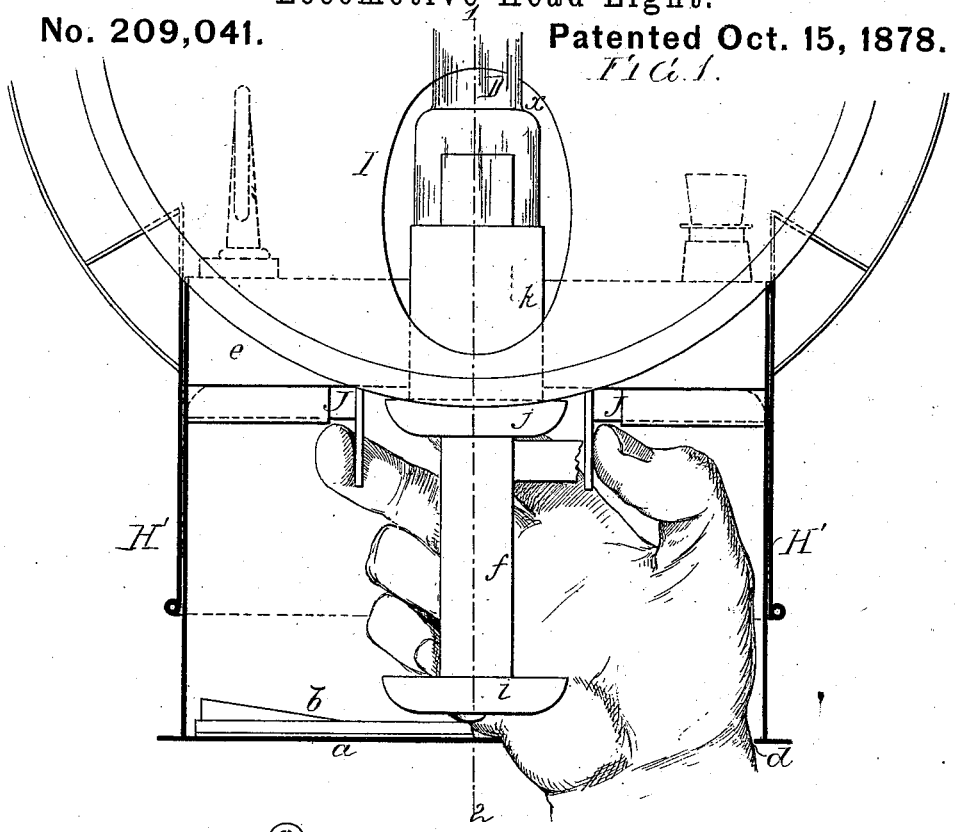
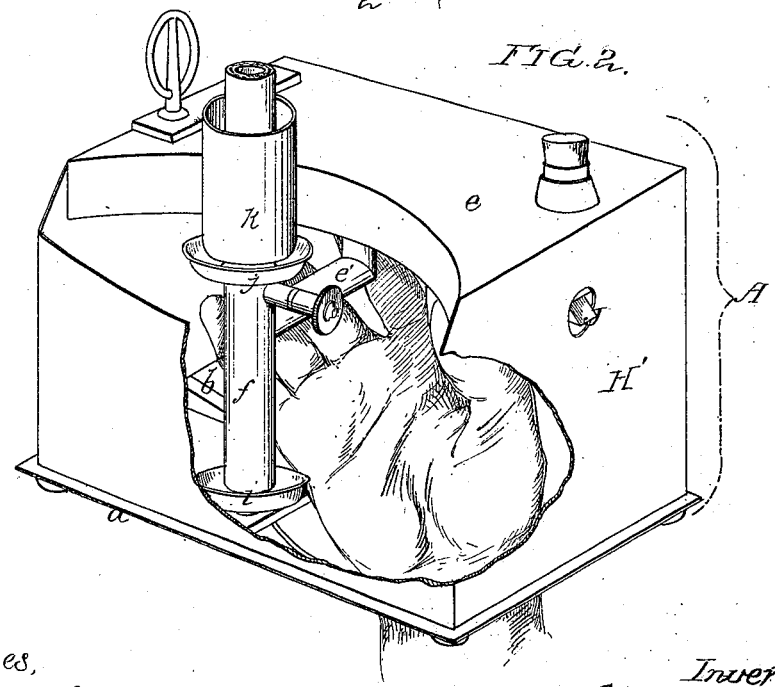


FIG. 2.



Witnesses,
Henry Howson Jr.
Harry Smith

Inventor
Edwin L. Hall
by his Attorneys
Howson and Howson

2 Sheets—Sheet 2.

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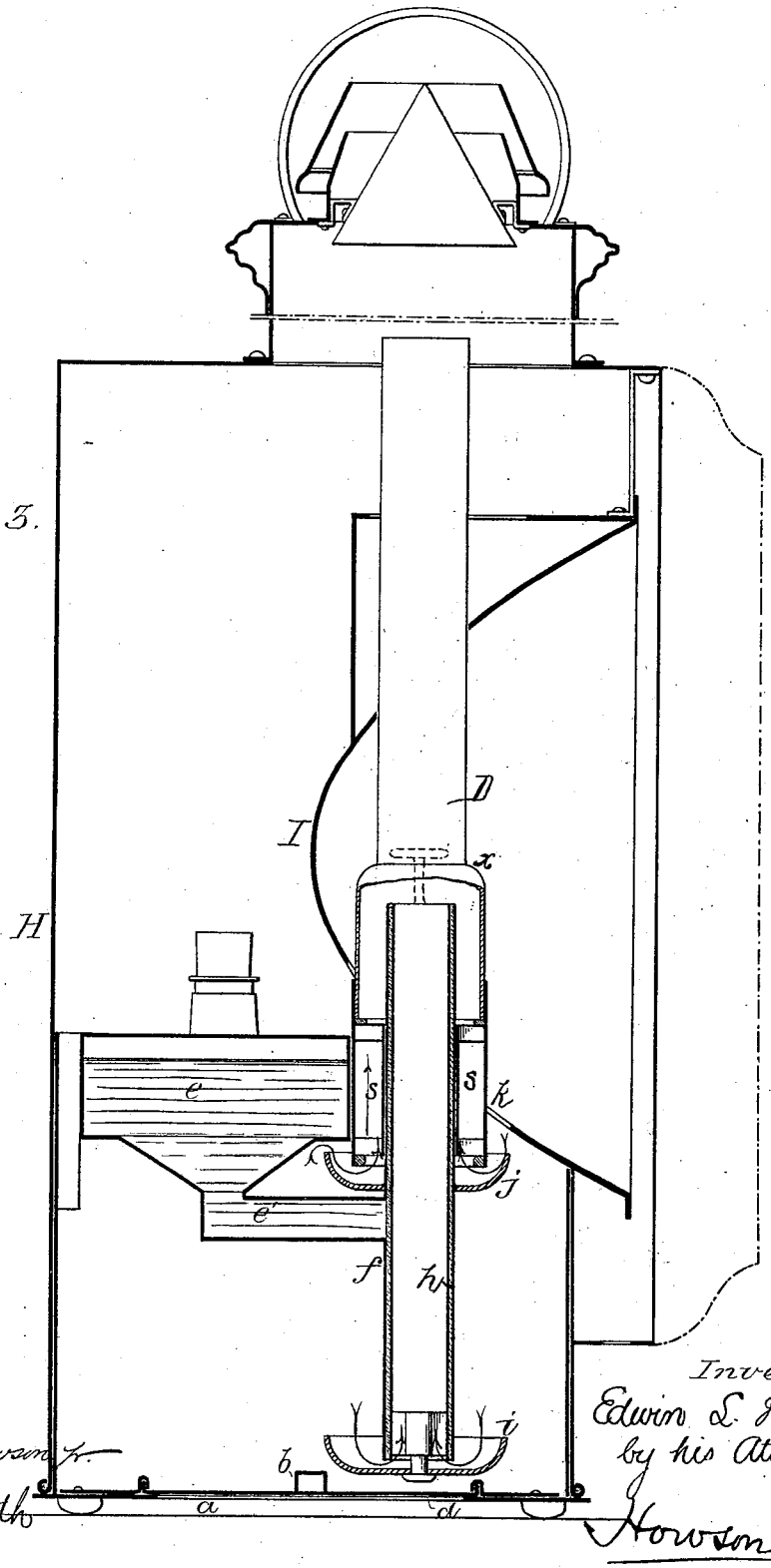
FIG. 3.



Witnesses,
Henry Howson Jr.
Harry Smith

Inventor,
Edwin L. Hall
by his Attorneys
Howson and Sons

UNITED STATES PATENT OFFICE.

EDWIN L. HALL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN LOCOMOTIVE HEAD-LIGHTS.

Specification forming part of Letters Patent No. **209,041**, dated October 15, 1878; application filed September 30, 1878.

To all whom it may concern:

Be it known that I, EDWIN L. HALL, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Locomotive Head-Lights, of which the following is a specification:

The main object of my invention is to so construct a locomotive head-light and the lamp connected therewith that the full power of the reflector may be obtained, and that the lamp, with its reservoir, burner, and chimney, may be removed from below without disturbing the reflector or the glazed door which protects the same.

In the accompanying drawing, Figure 1, Sheet 1, is a front view, partly in section, of my improved head-light, showing the manner of removing the detachable portion of the same; Fig. 2, a perspective view of the said detachable portion as it appears when removed from the body of the head-light; and Fig. 3, Sheet 2, a vertical section of the head-light on the line 1 2, Fig. 1.

The detachable portion of the head-light (shown in Fig. 2) consists of a quadrangular box, A, preferably made of tinned plates. In the bottom *a* of this box is an opening, *d*, large enough to admit the hand, as shown in the drawing, and this opening may be closed by a sliding door, *b*, after the hand has been withdrawn. In the upper portion of the box is formed the oil-reservoir *e*, which communicates, through a passage, *e'*, with the wick-tube *f*, the latter containing an ordinary tubular wick, *h*, the wick-tube having at the lower end a cup, *i*, which is secured in such a manner as to permit the free passage into and through the said tube of the air admitted to the box. There is the usual device common to other lamps for raising and lowering the wick, as shown in Fig. 2.

A cup, *j*, is secured to the wick-tube, and to the latter is fitted a tubular casing, *k*, which extends below the upper edge of the cup *j*, but is free from contact with the latter, so that air admitted to the interior of the box A may pass freely upward and through the space *s* and chimney D, the base of which fits into the tubular casing *k* and rests on a ledge, *m*, formed within the same. This chimney is of the same character as that of the well-known student-lamp—that is to say, it is contracted at the point *x*, immediately above the top of the wick-tube *f*, so as to deflect the air-currents against the flame.

I may remark here that it has hitherto been deemed necessary to use a disk or button (shown by dotted lines in Fig. 3) above the top of the wick in the lamp of a head-light, so as to insure a spreading and brilliant flame. The necessary position of the flame in respect to the reflector was such that the button always occupied the focal point of the said reflector—that is, the point from which rays of light must emanate in order to be reflected horizontally. This consequently detracted from the reflective power. Indeed at least one-third of the entire surface of the reflector was neutralized by the presence of this button.

One of the objects of my invention has been to dispense with this button, so as to entirely cover with flame the focal point of the reflector, and this object I attain by the use of the chimney D, of the character shown and described, in combination with the annular casing *k*, which extends upward a short distance through an opening in the reflector and downward into the detachable box A. I have found by actual tests that by causing the air from the box for supporting combustion to pass through the annular space within this casing the flame will burn with great steadiness and brilliancy, without the aid of the objectionable button, and hence that the reflecting-surface is fully utilized. The brilliancy of the flame is due to the perfect combustion insured by the volumes of highly heated air which pass up through the annular space *s* between the wick-tube *f* and the casing *k*, and are caused to impinge upon the flame by the shoulder *x*, formed by contracting the chimney D.

The steadiness of the flame is much enhanced by the use of the cups *i* and *j*. Without these cups the movement of the head-light due to the jolting of the engine would cause currents in opposite directions within the casing, and thereby cause an uneven flame. Thus on the upward movement of the head-light there would be a downward current through the chimney, and on the downward movement of the head-light an upward current of air around and within the wick-tube.

In my improved burner, however, the cups *i* and *j* will, on the upward movement, cause such volumes of air to enter the lower ends of the wick-tube *f* and casing *k* as to counteract the effect of any draft of air down the chimney, while the open lower ends of the wick-tube *f* and annular casing *k* are so protected by said cups *i* and *j* that forcible upward currents within and around the wick-tube, on the downward movement of the head-light, are effectually prevented.

The removable box A carries the reservoir, wick-tube, and all appertaining to the lamp, but not the reflector I, which is attached to the exterior casing H of the head-light.

Heretofore it has been usual in head-lights to mount the lamp and reflector upon a sliding platform which, was introduced into or removed from the interior of the casing of the head-light either through an opening in the side of said casing or in front. This plan is objectionable for several reasons. The structure comprising the slide, lamp, and reflector is generally very heavy, frequently weighing as much as forty or fifty pounds, so that it cannot be conveniently handled by one man, especially as the head-light generally occupies such an elevated position as to be beyond the reach of a person standing upon the ground, thus necessitating the use of a stool or other more or less precarious support in order to gain access to the head-light. Further than this, the reflector, which is the most expensive part of the head-light, is always in danger of being damaged while being conveyed to and fro, or while the attendant is engaged in filling the reservoir or trimming the wick of the lamp. The soiling or scratching of the reflector during the latter operation is a result which is very frequent.

In my improved head-light the reflector is, as before mentioned, permanently secured within the casing H, and there is an extension H′ at the base of the latter, this extension being open at the bottom and of such a form that the box A will fit snugly in it, but so as to be easily removed.

The box is held in its place by two spring-latches, J J, adapted to guides within the box below the reservoir, the points of the latches fitting in orifices in the exterior casing.

When the box A, with its lamp and chimney, has to be withdrawn from the main casing of the head-light, the slide *b* on the bottom of the casing is moved back so as to expose the opening *d*, through which the hand can be inserted, as shown, and can seize the projections at the inner ends of the latches, which are drawn toward each other, thereby releasing the box, which can now be withdrawn by lowering it without disturbing the reflector and without the necessity of first opening a door in the casing of the head-light.

The manner of reintroducing the box into its place will be understood without explanation.

It will be evident that by the above means all the objections which result from the removal of the reflector from the casing are overcome, while the weight of the lamp without the reflector is such that it can be handled without inconvenience.

The removal of the lamp through the bottom of the casing instead of through the side or front of the same is also an advantage, as it is thus brought within more convenient reach of a person standing upon the ground or beside the engine.

I claim as my invention—

1. The combination, in a head-light, of the reflector I, the buttonless wick-tube *f*, the casing *k*, and the chimney D, all arranged in respect to each other and to the air-chamber within the head-light, substantially as set forth.

2. The combination, in a head-light, of the wick-tube *f*, the shield *k*, and cup *j*, as set forth.

3. The combination of the extension H′ of the exterior casing of a head-light, the said extension being open at the bottom, with a detachable box, adapted to the said extension and carrying the lamp, all substantially as described.

4. The combination, in a head-light, of the casing H, the reflector I secured therein, and a lamp arranged to be introduced into and removed from the casing from below, as specified.

5. The within-described detachable box A, having an opening, *d*, in its base, a slide, *b*, adapted to the opening, and spring-retaining latches J, constructed for manipulation by a hand introduced into the said opening, all being combined substantially as set forth.

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

EDWIN L. HALL.

Witnesses:

HARRY A. CRAWFORD,

HARRY SMITH.