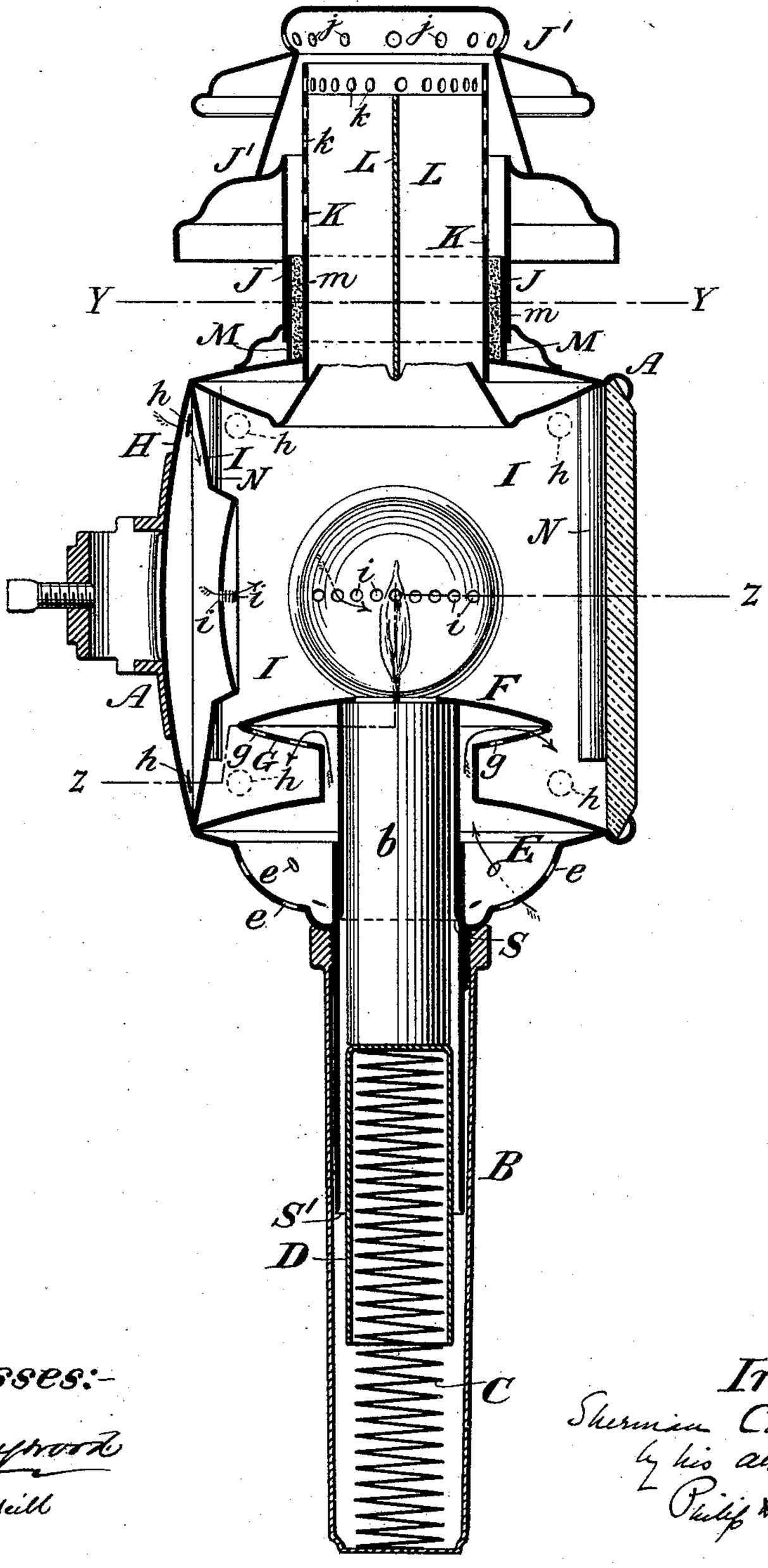
(No Model.) 2 Sheets—Sheet 1.

S. COOPER.

CARRIAGE LAMP.

No. 543,438. Patented July 23, 1895.

Fig. 1,



Witnesses:-

D. F. Hayward

Neil Maxwell

Inventor:-

Sherman Cooper

by his atty

Philip Hathaway

(No Model.) 2 Sheets—Sheet 2.

S. COOPER.

CARRIAGE LAMP.

No. 543,438. Patented July 23, 1895.

Fig. 2,

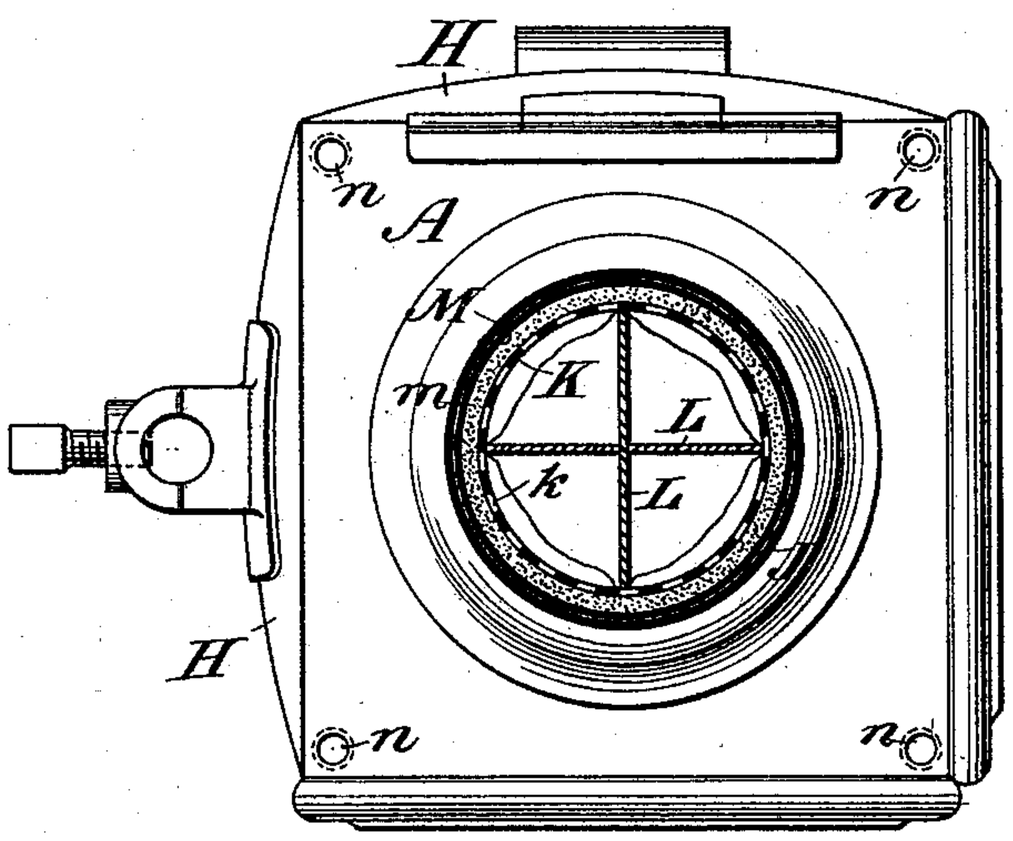
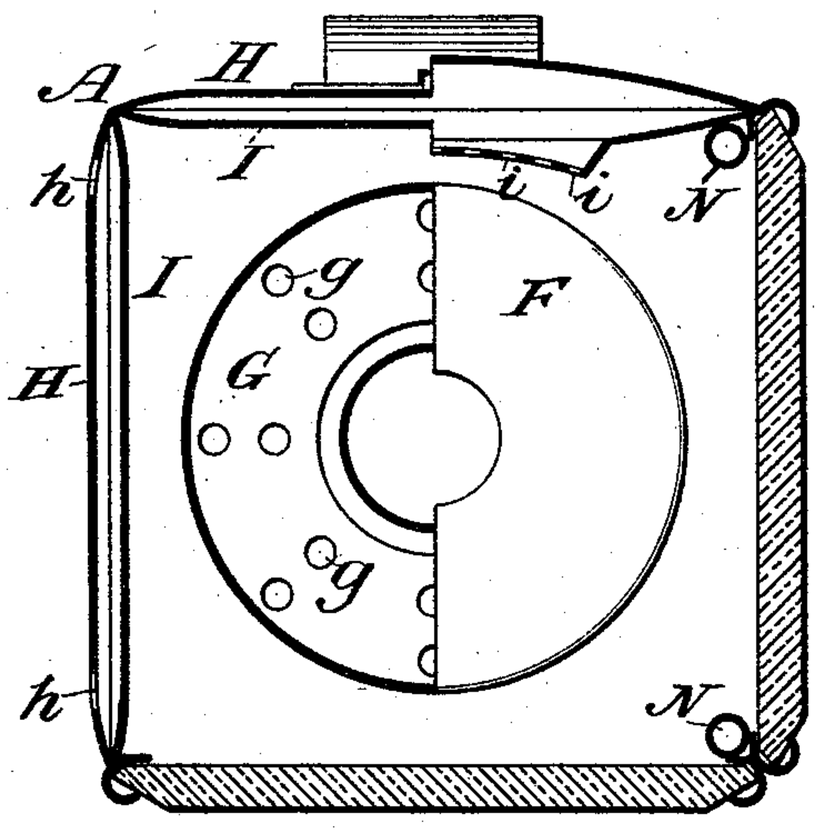


Fig. 3,



Witnesses:-

D. F. Hayward

Neil MacNeill

Inventor:-

Sherman Cooper

by his atty

Philip Hathaway

UNITED STATES PATENT OFFICE.

SHERMAN COOPER, OF WESTFIELD, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE COOPER LAMP COMPANY, OF SAME PLACE.

CARRIAGE-LAMP.

SPECIFICATION forming part of Letters Patent No. 543,438, dated July 23, 1895.

Application filed March 14, 1894. Serial No. 503,602. (No model.) Patented in England March 8, 1893, No. 5,037.

To all whom it may concern:

Be it known that I, SHERMAN COOPER, a citizen of the United States, and a resident of Westfield, in the county of Union and State of New Jersey, have invented new and useful Improvements in Lamps, of which the following is a specification.

My invention relates to lamps, and particularly to that class of lamps which are used in carriages and other vehicles, (patented in Great Britain March 8, 1893, No. 5,037,) the chief object of said invention being to provide improved means for a properly-distributed admission of air to the lamp and for the escape of the carbonic-acid gas and the other products of combustion. This object is accomplished by and my invention consists in certain novel features of construction and combination of parts described and shown in the following specification and accompanying drawings, in which similar letters indicate corresponding parts in each figure.

Figure 1 is a longitudinal section of my lamp. Fig. 2 is a cross-section on the line *y y*. Fig. 3 is a cross-section on the broken line Z Z.

In the above figures, A is the lamp-case; B, the candle-tube; *b*, the candle; C, the spiral spring; D, a guard protecting the upper part of such spring; E, a chamber under the floor for the lamp, and provided with holes *e e* for the admission of air into the chamber.

F is a disk-shaped guard or deflector affixed to and surrounding the top of the candle-tube and having its upper surface convex.

G is a corresponding disk placed in an inverted position affixed to the floor of the lamp, and provided with holes *g g* for the passage of air into the chamber formed by the juxtaposition of the disks F and G and for the exit of such air into the lamp.

H H are the external casings of the metal sides of the lamp. I I are the internal casings of such metal sides and act as reflectors.

h h are holes in the corners of the external casings H H for the admission of air into the space between the external casings H H and the internal casings I I, and *i i* are fine holes or perforations in such internal casings, placed so as to be out of alignment with the holes *h h* in the external casings H H, and placed preferably in the center of the internal casings or reflectors I I for distributing and admitting such air to the lamp.

J is an outer chimney or chimney-casing carrying the usual ornamental top or covering J′, and provided with holes *j j* in its circumference for the admission of air and the escape of the heated and lighter products of combustion.

K is an inner chimney, constructed of finely-perforated metal or of wire-gauze, and provided with one or more metal vertical partitions or baffle-plates L L, the lower ends of such partitions being arranged above the flame of the lamp, and their upper ends extending very nearly to the top of the outer chimney or chimney-casing J.

k k are perforations in the circumference of the chimney.

M is a socket or casing for the reception of the lamp-chimney K, the space between M and K being filled with plaster-of-paris or other cement *m*.

In operating a lamp constructed in the manner shown in the above drawings, the supply of air necessary for combustion is obtained partly through the chimney K, partly through the holes *e e* in the chamber E, and partly through the holes *h h* and *i i* in the metal sides or casings of the lamp.

In some cases, as in bicycle-lamps, where the internal area of the lamp is small and it is found desirable to increase the supply of air, I add the corner-tubes N N, communicating with the holes *n n;* but such tubes are not absolutely essential to the proper working of my invention.

By constructing a lamp in the manner above described the following advantages are secured:

(*a.*) The exit of the smoke and other products of combustion is not affected or hindered by the motion of the carriage or by gusts of wind, as is frequently the case in carriage-lamps of the ordinary construction.

(*b.*) A full supply of air necessary for combustion is obtained.

(*c.*) No air can impinge directly on the flame, so as to disturb its steady action.

(*d.*) The air admitted into the lamp is passed over heated surfaces and consequently reaches the flame at a high temperature.

These advantages are obtained in the following ways: By constructing the chimney K with one or more vertical partitions or baffle-plates L L, (but preferably with two partitions,) separate currents are established when the lamp is lighted, viz: a downcast current of heavier or cold air and an upcast current of smoke and other lighter products of combustion, and no interference between these currents can take place, as commonly happens in an ordinary carriage-lamp when in rapid motion or in a high wind, the effect of such interference being to cause imperfect combustion and a dull and smoky flame.

It will be readily seen that from whichever quarter a gust of air may strike the chimney of my lamp, one-half of such chimney will be protected from any downdraft and the ascending current of smoke and hot air will rise without any impediment. The effective action of the inner chimney K is still further secured by the fine perforations in its circumference. By providing this chimney with these perforations all sudden, accidental, or varying pressure in the chimney is avoided and the whirling action of the ascending current common to carriage-lamps and causing flickering and unsteadiness of flame and smoking is altogether obviated.

The use of the inner perforated chimney K, provided with the partitions or baffle-plates L L and protected from the cold external air by the outer chimney or chimney-casing J, has the further advantage that the cool or descending current of air will become heated by contact with the baffle-plates, thereby causing more perfect combustion and checking the cooling of the carbonic-acid gas and diminishing its tendency, as in ordinary carriage-lamps, to fall, owing to such rapid cooling, and to lie on the floor of the lamp, thereby at times submerging the wick and so extinguishing the flame. It will also be seen that the air entering through the holes *e e* in the chamber E must be deflected by the deflecting-disks F and G and cannot impinge directly on the flame. The air entering the holes *e e* passes into the space or chamber between the disks F and G, where it becomes heated and passes into the lamp in a heated state through the holes *g g*. The holes *e e*, being placed around the circumference of the chamber E in a horizontal position, discharge an important function in securing a forced draft of air through the disks F and G, especially when the lamp is in rapid motion, and in consequence conduce largely to obtaining complete combustion and a consequent brilliant flame. In carriage-lamps of ordinary construction having only air-holes placed vertically in the floor of the lamp, it frequently happens that the lateral pressure of the air or wind overcomes the upward draft through such holes and imperfect combustion results. No such defective action can take place with air-holes arranged horizontally round the circumference of the chamber E and connecting with the disks F and G in manner shown in my lamp. The lower disk G can, if desired, be dispensed with and the air be admitted through holes placed directly under the upper disks F, but the combination of the two disks is preferable. In the same way the air entering through the holes *h h* in the external metal casings H H becomes heated by contact with the internal metal casings I I, and after being so heated passes into the lamp through the fine distributing-holes *i i* placed opposite the flame. By placing the holes *h h* in the corners of the external casings H H and the fine distributing holes *i i* in or near the center of the inner casings or reflectors I I the air in its passage from the holes *h h* to the distributing-holes *i i* is so deflected and broken up that no gust of external air can strike directly on the flame and so cause unsteadiness or flickering.

The tubes N N deliver air in the corners of the lamps by a downward distribution, which prevents the air so distributed impinging directly on the flame and so disturbing its steady action.

Another feature in my new and improved lamp is the spring-guard D. In carriage-lamps of the ordinary construction it frequently happens that the spiral spring C catches or jams against the shoulders S S′, which shoulders or projections are formed by the junction of the different parts of the candle-tube B, and sometimes buckles against the side of the candle-tube. When this takes place the candle is prevented from feeding up properly and remains stationary, so that the candle burns down into the candle-tube and the flame is consequently obscured. To obviate this inconvenience, I place over the upper end of the spiral spring C a loose spring-guard D, having its top rounded off as shown, so as to prevent it catching against the shoulders S S′. Such guard should be of a length at least equal to that of the upper section of the candle-tube, so that under no circumstances can it be possible for the unguarded portion of the spring *c* to touch either of the shoulders S S′. I construct the spiral spring C of a diameter, as shown in the drawings, considerably less than the diameter of the candle-tube, with a spring so constructed and guarded by the loose spring-guard D of the length indicated that all possibility of the spiral spring C catching or jamming or buckling against the side of the candle-tube and so failing to feed up the candle is especially prevented.

Having thus described my invention and the manner in which the same is to be carried out, what I claim, and desire to secure by Letters Patent, is—

1. In a lamp the inner perforated metal chimney K. provided with one or more vertical partitions or baffle plates, the lower ends of such partitions being arranged above the flame of the lamp in combination with the outer chimney J. provided with perforations in its circumference in the manner and for the purposes therein specified.

2. In a lamp, the perforated convex and concave deflecting disks F. and G. placed around the upper end of the candle tube and arranged to form by their juxtaposition a heating chamber for the air passing into the lamp through the perforations in such disks in combination with the horizontal air-holes *e. e.* placed round the circumference of the chamber E. in the manner shown and for the purposes specified.

3. In a lamp, the combination with a sectional candle tube B. of the candle spring C. made of a less diameter than the tube B. as described, and the loose or removable guard or thimble D constructed as shown with the upper end rounded or chamfered, and having a length not less than the upper section of the candle tube for the purposes shown and in the manner specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 3d day of March, 1894.

SHERMAN COOPER.

Witnesses:
CHAS. E. HATHAWAY,
L. M. WHITAKER.