R. SCOTT.

FLAMING ARC LAMP.

APPLICATION FILED JUNE 21, 1907.

975,165.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

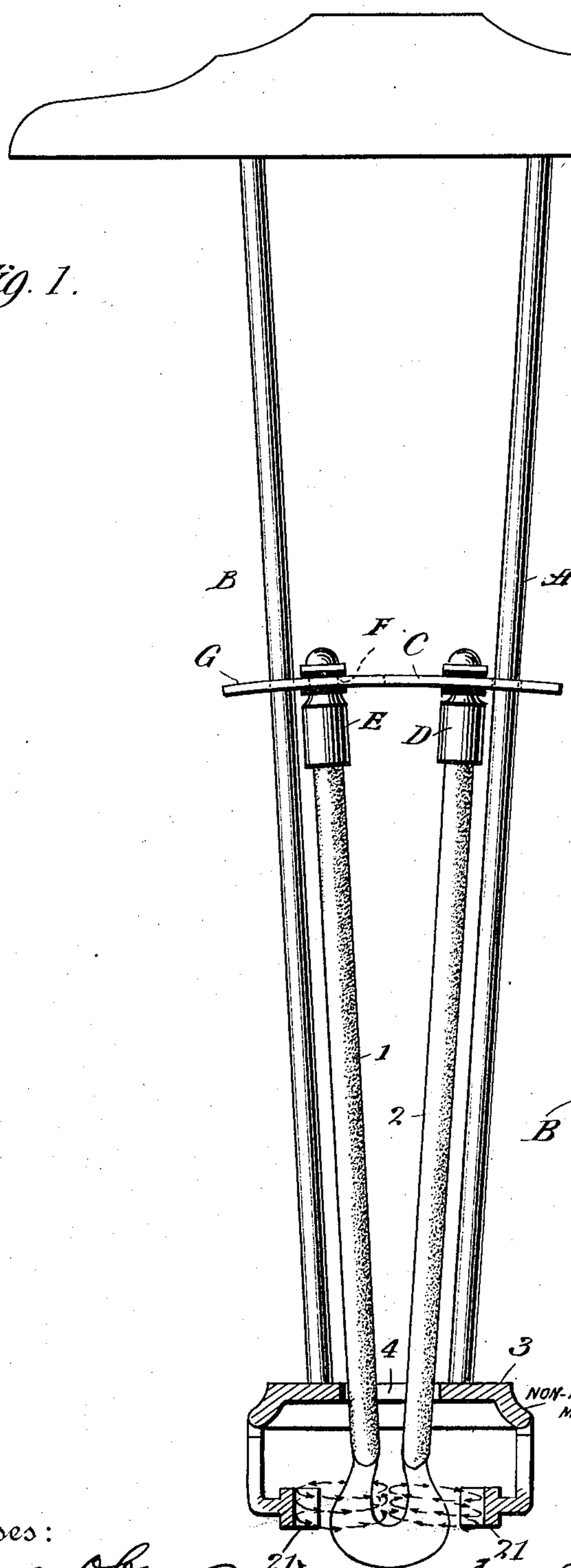
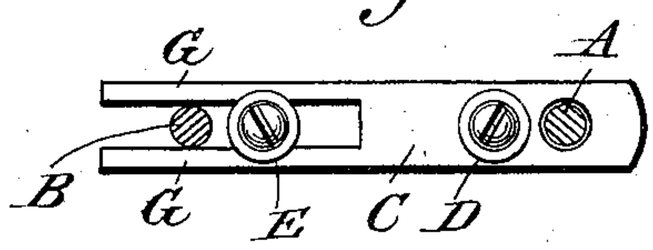


Fig. 1a.



Witnesses:

Frank S. Ober

Waldo M. Chapin

Inventor

Ralph Scott

By his Attorneys

Rosenbaum & Stickney

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2 SHEETS—SHEET 2.

Fig. 2.

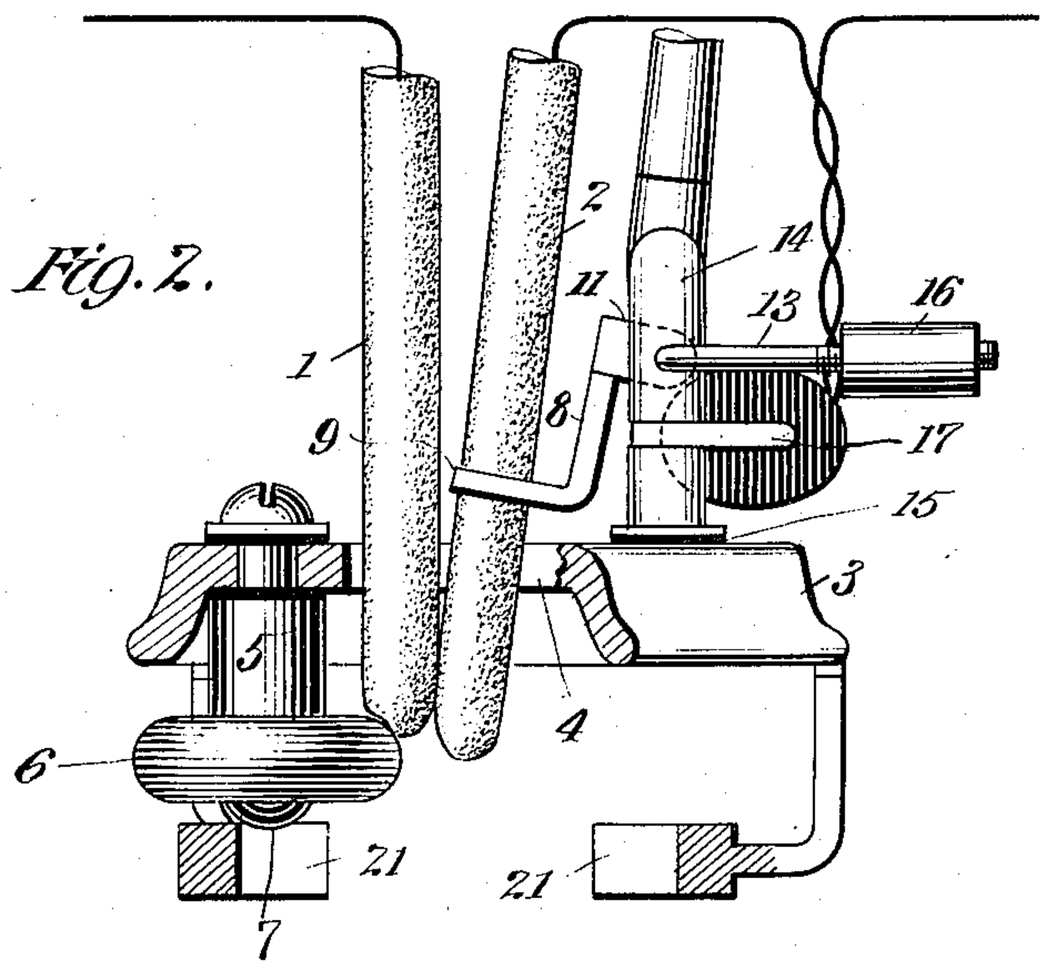


Fig. 3.

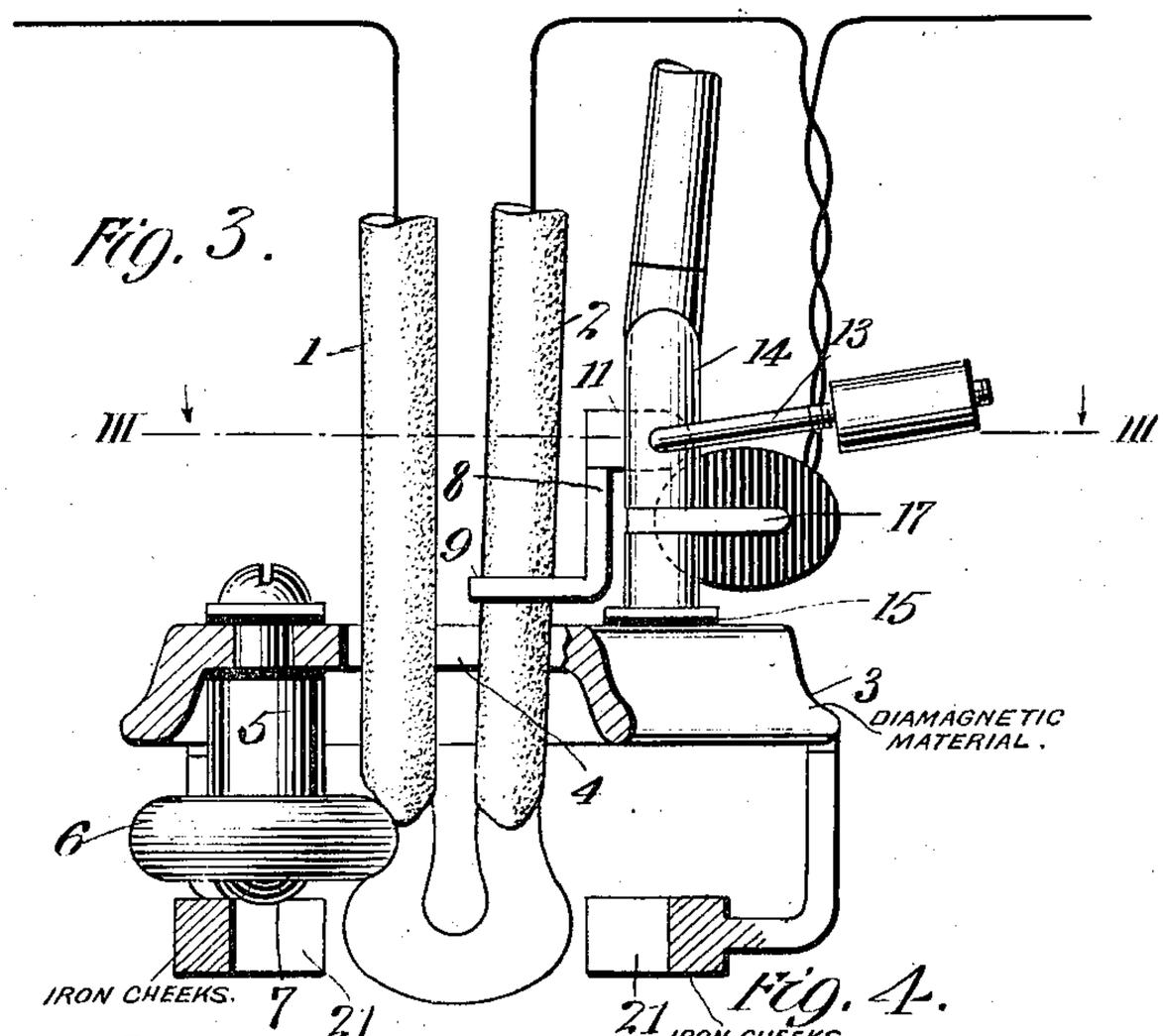
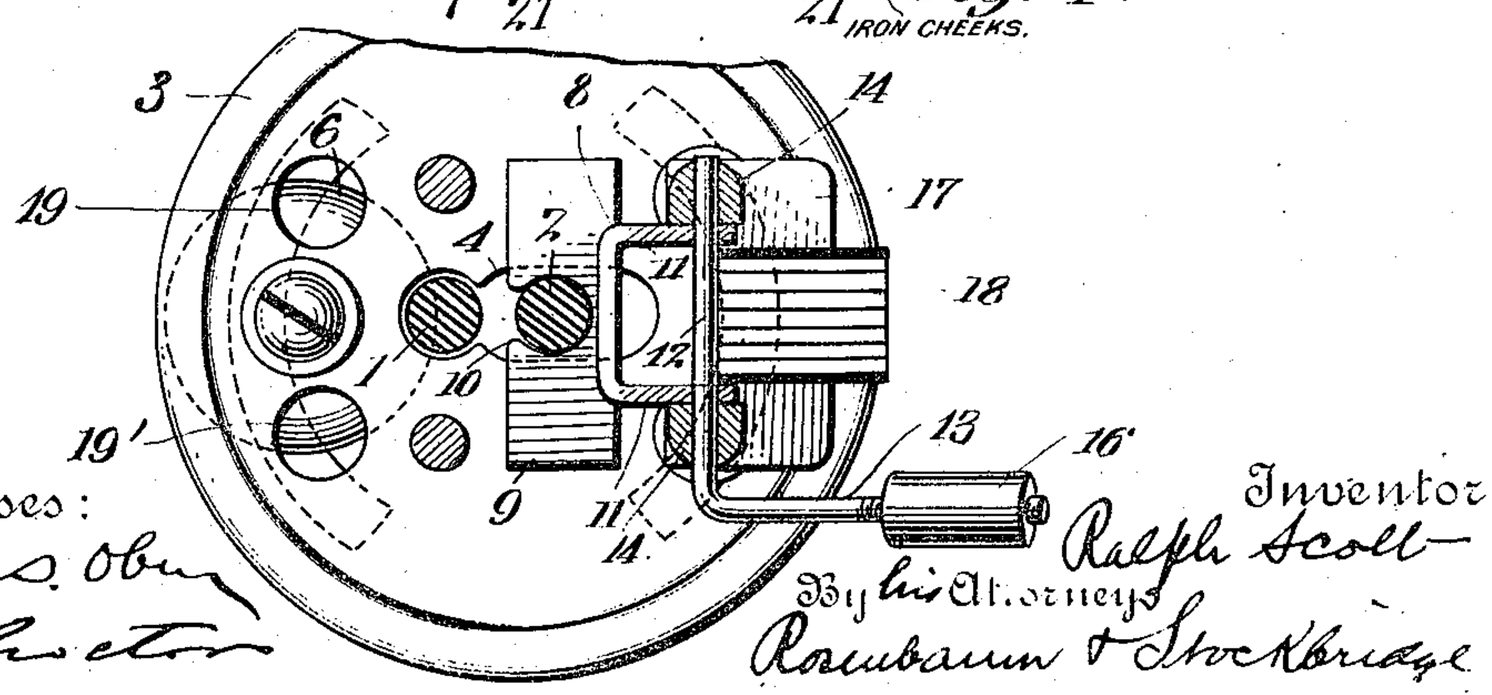


Fig. 4.



Witnesses:
Frank S. Oberg
Chas. E. Foster

Inventor
Ralph Scott
By his Attorneys
Rowbaum & Stockbridge

UNITED STATES PATENT OFFICE.

RALPH SCOTT, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SCOTT ELECTRICAL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

FLAMING-ARC LAMP.

975,165. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed June 21, 1907. Serial No. 380,006.

To all whom it may concern:

Be it known that I, RALPH SCOTT, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Flaming-Arc Lamps, of which the following is a full, clear, and exact description.

My invention relates to arc lamps, and more particularly to the so-called "Bremer" or flaming arc lamp in which metallized carbons are used, and in which the arc takes the form of a comparatively long and very luminous flame.

The electric arc when produced between plain carbon electrodes is not luminous, and the most efficient results are obtained when the carbons are not widely separated. On the other hand, with metallized carbons the arc is very luminous, and the best results are obtained with an arc four or five times as long as with plain carbons. Moreover the stability of a long arc between metallized carbons is very much greater than that between plain carbons. For these various reasons flaming arc light mechanism should be capable of producing a normal arc about five-eighths of an inch long in ordinary operation. By the Bremer, Carbone, Baker, and other devices, this is done by having downwardly convergent electrodes separated by about one-fourth of an inch at the points and a magnetic field to blow the arc downward from the points and lengthen it to the required extent. This is particularly advantageous, in that it positions the arc most efficiently for the purpose of ordinary illumination, and also causes the electrodes to burn away evenly.

On account of the long arc, and the sensitiveness thereof to air currents, etc., considerable difficulty is found in keeping the arc steady and uniform in its normal position. By the present invention I have illustrated an arrangement including several features by which this difficulty is overcome and the arc controlled and made steady in its position.

In accordance with the present invention, the arc is also regulated, that is to say, kept at a substantially constant illuminating value.

The invention also includes various other features which will more fully appear in connection with the following description and the appended claim.

In the drawings: Figure 1 is a side view showing the general principles of construction and action of a flaming arc lamp embodying my invention; for the sake of clearness, a number of details of the construction are omitted in this figure; Fig. 1[A] is a detail view of the means for mechanically connecting the electrodes whereby they feed together; Fig. 2 is a detail view of the lower ends of the electrodes of the same, and showing all of the features of the construction which were omitted in Fig. 1; Fig. 3 is a similar view showing the arc in normal operation; Fig. 4 is a section on the line III—III of Fig. 2 looking in the direction of the arrows.

Referring to the drawings in which like parts are designated by the same reference sign, 1 and 2 denote electrodes which may be of metallized carbon supported so as to slide downward toward one another at a convergent angle. The mechanism for this purpose may be of any desired sort. In Fig. 1, I have shown rods A and B, of which A serves to guide a carrier C having a socket D fixed thereto but insulated therefrom. E indicates an additional socket having an insulating bushing F which is embraced by arms G rigidly projecting from the carrier C. This construction permits the electrodes to fall freely by gravity unless specially prevented, and insures an equal downward feed or movement thereof under all circumstances. 3 denotes a cup or plate of non-magnetic material having a slot 4 therein through which the electrodes extend to a point slightly below its lower surface.

Referring now more particularly to Figs. 2, 3 and 4 of the drawings, I have illustrated the details of a practical arc striking, maintaining and regulating mechanism. In order to have the illustration of the theoretical principles more clear, these details have been omitted from Fig. 1. 6 denotes

a stop or button fixed beneath the cup 3 in the path of one of the electrodes 1, so as to limit the downward movement of this electrode, and thereby also the other electrode 2 which is connected therewith by the arms G. A convenient form of button 6 is that illustrated and made circular in form and centrally pivoted at 7 to a stud 5 which projects downwardly from the cup 3. This permits the button to be rotated on its axis and act in the same way as a stop at whatever angular position it occupies. In this way undue wear or oxidation at any particular point on its periphery is prevented. One of the electrodes 2 passes through a pivoted part 8, conveniently stamped of sheet metal in the form of an angle plate, the lower ear or extension 9 of which is slotted at 10, to receive the electrode. 11 indicates inwardly projecting ears from this plate which are fixed on a spindle 12, having an arm 13. This spindle is shown journaled in the bearings 14, which project upward from the base 3, but are insulated therefrom by the bushings 15. 16 denotes a weight threaded at the extremity of the arm 13, so as to be adjustable thereon, and 17 indicates a magnet conveniently stamped of sheet metal and having a winding 18. This magnet is also secured to the base 3 by the parts 14, and has its poles presented to the part 8, which therefore constitutes an armature. When the lamp is not in use, the armature 8 presses the electrode 2 into contact with the electrode 1, under the influence of the counterweight 16. The relation of the parts under these circumstances is shown in Fig. 2. When the current is turned on, the striking magnet 17 is energized in the usual way, which need not be particularly described, so that the armature 8 is attracted and the electrodes separated into the relation shown in Fig. 3.

In addition to the above features of construction, there is an additional one which pertains to the provision of holes of predetermined form, size and location in the cup or plate 3. 19, 19′, (Fig. 4) illustrate holes or openings of this sort. It will be observed that these openings are located to one side of the arc, but symmetrical with respect to the central plane of the current flow therein. These holes 19, 19′, are on the side of the arc corresponding to the electrode 1 which has no movement. (It will be noted that the electrode 2 moves through a comparatively large part of the slot 4 in the cup 3). The purpose of these openings 19, 19′, is to produce an air draft exactly compensating for the air draft which takes place through the large part of the slot 4, through which electrode 2 extends. By compensating for the air draft in this way, the effect on the arc is balanced so that the position of the arc between the electrodes is made symmetrical, and above all, undue oxidation of one electrode by unequal air currents is prevented.

I will now consider the theoretical principles of the magnetic action by which the arc is maintained and regulated. The arc itself has a field tending to deflect it downward. This occurs since the electrodes and the arc all constitute conductors carrying a current and the field produced thereby tends to repel the conductors from one another and therefore the arc is repelled downward. This action is feeble, because the divergent form which the conductors assume with respect to one another is not as efficient to repel the arc downward as if they were parallel. By reason principally of the proximity of iron parts 21 and also by the equalizing drafts, and also, in less measure, by reason of the stray field from the striking magnet 15, a tendency is produced to crowd the field due to the electrodes downward, the arc being correspondingly impelled downwardly, disposing it in the best position for normal operation. It is evident that if the length of the arc increases, the current diminishes, and the field is correspondingly decreased so that the arc is shortened. The converse of this occurs when the arc is required to be lengthened, so that it is constantly regulated and controlled. It will be seen from this figure that the arc streams almost directly downward from the points of the electrodes, as is desirable, but thereafter flares outward into a curved form. This action is assisted by the curved iron cheeks or bars 21 supported in the plane of the arc at such points as to coöperate with its magnetic field to deflect it outward. The lines of force of the magnetic field of the arc in this action are clearly shown in Fig. 1.

In conclusion, the description of my arc lamp may be summed up as follows: First, the electrodes are fed properly by being connected together, and having one rest against a stop or button; second, the arc is struck by a striking magnet operating on one electrode which passes through a slot in the economizer plate or cup; third, the unequal washing of the electrodes by air currents which would ensue from the said slot in such economizer or cup is prevented by compensating vents 19, 19′; fourth, the arc is properly formed and maintained in a proper predetermined shape or form by its own field, the action of which is assisted by having iron or paramagnetic cheeks or bars adjacent to the arc in a position to draw it out and expand it in proper directions.

By the use of these various features, and principles, a single flaming arc may be efficiently produced and maintained between a

single pair of downwardly converging electrodes.

What I claim, is:—

In a flaming arc lamp, a pair of downwardly convergent electrodes, a cup through which said electrodes project, and arcuate iron cheeks or bars having slender depending standards connected to said cup and presenting their concave faces toward one another in a direction in the plane of the electrodes and below the lower extremities thereof.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

RALPH SCOTT.

Witnesses:

WALDO M. CHAPIN,

JAMES D'ANTONIO.