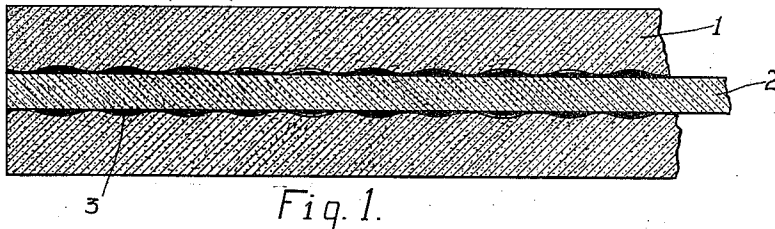
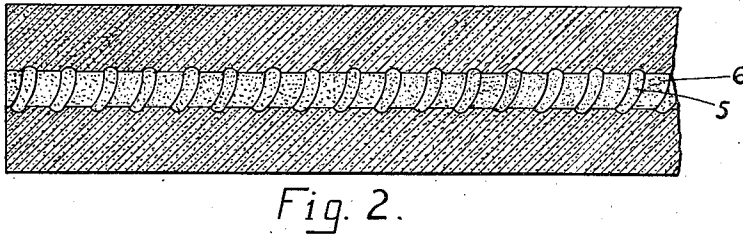
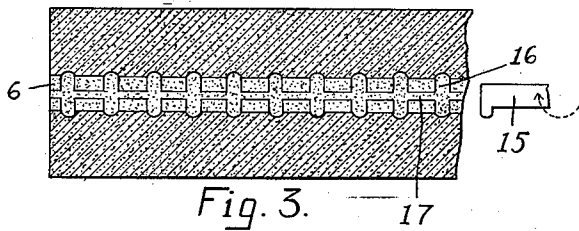
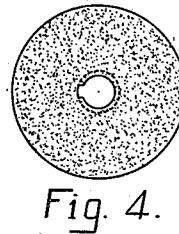
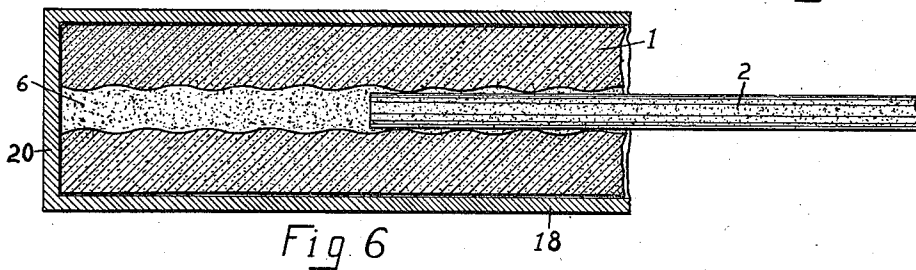
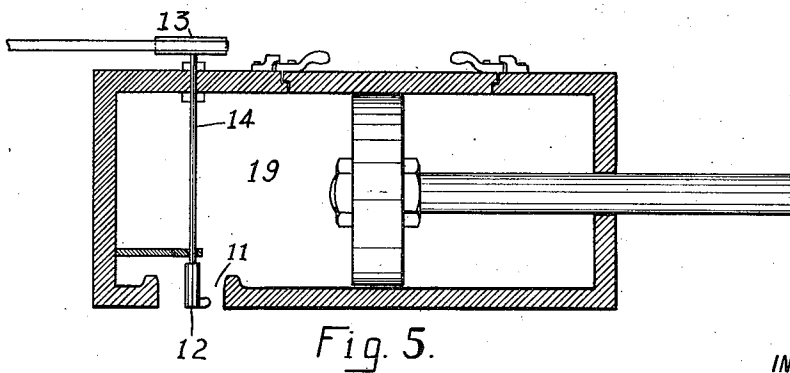


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ELECTRODE FOR SEARCHLIGHTS AND METHOD OF MAKING THE SAME.
APPLICATION FILED JULY 15, 1916.

1,342,398.

Patented June 1, 1920.



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ELECTRODE FOR SEARCHLIGHTS AND METHOD OF MAKING THE SAME.

1,342,398.

Specification of Letters Patent.

Patented June 1, 1920.

Application filed July 15, 1916. Serial No. 109,564.

To all whom it may concern:

Be it known that I, ELMER A. SPERRY, a citizen of the United States, residing at 1505 Albermarle road, Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electrodes for Searchlights and Methods of Making the Same, of which the following is a specification.

This invention relates to improvements in carbon electrodes for arc lights, relating especially to cored flaming arc carbons, and it has for its object a number of substantial improvements in these carbons, whereby, among other objects, the steadiness and reliability of the light are improved.

The invention consists in providing means whereby the core and shell or the complete cored electrode may be baked simultaneously, but is not necessarily limited to this particular detail. In the finished product, however, the core is not only firmly located in the shell by having rigid contact, but this contact or contact substance is rendered porous or of such a character that gas may be passed longitudinally of the electrode, preferably between the core and the shell.

In cored arc light electrodes for the modern high intensity searchlights, difficulty has been experienced in keeping the core in place. Owing to the high current density employed and the difficulty in securing intimate contact between the core and the shell it frequently happens that arcing takes place between and within the shell and core causing gases to be formed therein which blow out a piece of the core. This generally renders it necessary to shut down the light, as the protruding core will touch the other electrode and form a short circuit between the two. I, therefore, propose to provide means not only to lock the shell and core firmly together, but to permit the escape of any gas that may be formed therebetween.

In attaining these objects, I may employ various means either separately or conjointly. Prominent among these is to provide in the hole within the shell irregularities at different points axially. These may consist of undulations. They may be spiral or of any configuration, but it is preferable that they should eventually progress axially,

aiding in the egress of any gas or volatile matter evolved under conditions of the intense heating of the electrode at or in the vicinity of the arc, and also being valuable in aiding the same phenomena during the baking or curing of the carbon prior to its use.

Referring to the drawings, which show some forms of my invention,

Figure 1 is a longitudinal section of a finished carbon made according to my invention.

Fig. 2 is a corresponding section of a modified form of shell.

Fig. 3 shows another modification.

Fig. 4 is a cross section thereof.

Fig. 5 is a diagrammatic sectional view of the container used during the extruding process.

Fig. 6 is a section of a form that may be employed during the process of uniting the shell and core.

According to this invention, the first step in manufacturing the shell 1 and the core 2 are performed in the usual manner by separately extruding or squirting the carbonaceous material while in a pasty or plastic state. Such an apparatus is illustrated in Fig. 5, in which 19 is a container for the carbonaceous mass, 11 a hole therein through which the mass is extruded and 12 a plug to form the axial bore 6 of the shell.

Preferably I incorporate in the core not only the usual carbonaceous material with an agglutinous binder, and flaming arc salts, but also a sufficient amount of tar or other spongy substance to be exuded during the subsequent curing and baking processes for forming a porous layer or binder 3 between the core and the shell. The shell may also be provided with volatile salts, if desired.

The undulations 5 in the bore 6 of the shell may be formed during the squirting process by making the plug 12 of irregular shape and slowly revolving it. A pulley 13 is shown as mounted on the shaft 14 of plug 12 to represent any means for imparting a rotary motion thereto. I do not limit myself to this method of manufacture, however, as the undulations may be formed by imparting lateral movement to the plug, or they may be formed after the squirting process by running a roughening or cutting

tool 15 into the bore, forming incisions therein. Still another method is to apply pressure to the shell at predetermined points, while the shell is plastic. Also, as above stated, the undulations may be of any configuration, but preferably progress axially. In Fig. 1, they are shown as waves, while in Fig. 2 they appear as of spiral configuration. In Fig. 3, spaced annular depressions, 16 are formed, preferably connected by an axial groove 17. After the bore is properly formed; it may be lubricated by a liquid containing volatile matter such as "dead oil" or thin tar. After the shell has been cured by being allowed to stand or by drying at a moderate temperature of from 100 to 200° C., the shell and core are ready to be united.

For best results, I prefer to heat the shell to a fairly high temperature and to have the core warm enough to render it plastic, prior to uniting them. A convenient means for accomplishing this result is to extrude the core from the mold directly into the shell. The shell may be incased by tubing 18 at the time of receiving the core to prevent its bursting and also to provide an abutment or stop 20 against which the core may be pressed. The core is forced within the shell until it strikes the said abutment. Pressure may then be continued to be applied thereto to expand it within the shell so as to partially fill the undulations in the bore. The core is then cured within the shell by gentle heat, during which the exudations from the core or from the core and shell leave a spongy mass of carbonaceous material between the core and the shell, which serves to at least partially fill the undulations and lock the core and shell together.

The electrodes are then ready for the baking process, during which it is gradually raised to a very high temperature. They are preferably heated in a ventilated chamber of porous material in contact with the walls thereof to prevent deformation. The electrodes are also shielded from oxidation and their ends vented to permit the escape of the volatile matter exuded therefrom. During this process, a further exudation of tarry matter takes place, all of which, including the spongy binder between the core and shell, is evaporated, leaving a porous binder 3 between the core and shell. Such a binder not only unites the core and shell firmly, but also permits the escape of any gas that may be formed during the burning of the arc, between the core and shell. This last feature is of especial importance in high intensity arc lights employing from 150 to 200 amperes, as frequently arcing takes place in this type of light between and within the shell and core, forming gas which, if not allowed

to escape will blow out a piece of the core, as explained above.

Having described my invention, what I claim and desire to secure by Letters Patent is:—

1. A carbonaceous electrode comprising a shell provided with an axial aperture having an undulatory surface, a core within said aperture, and means for uniting the core and shell.

2. A carbonaceous electrode comprising a shell provided with an axial aperture having an undulatory surface, a core within said aperture, and means for interlocking said core with said undulations.

3. A carbonaceous electrode comprising a shell provided with an axial aperture, a core of a composition different from that of said shell within said aperture and means for permitting the axial escape of gas formed within the electrode.

4. A carbonaceous electrode comprising a shell provided with an axial aperture having radial depressions, a core within said aperture, and a binder between said core and shell.

5. A carbonaceous electrode comprising a shell provided with an axial aperture, a core within said aperture, and a porous layer located between the core and the shell.

6. A carbonaceous electrode comprising a shell provided with an axial aperture having an undulatory surface, a core within said aperture, and means for causing said core to interlock with but only partially fill said undulations.

7. The process of manufacturing arc light electrodes which consists in molding the shell with an axial bore provided with undulations, molding the core, fitting in the core, and causing the core to interlock with the undulations.

8. The process of manufacturing arc light electrodes which consists in molding the shell with an axial bore provided with undulations, molding the core, then while in a plastic state, expanding the core within the bore and baking the shell and core together.

9. The process of manufacturing arc light electrodes which consists in molding the shell with an axial bore making a core containing carbon depositing volatile material for rendering said core plastic, introducing such core within the shell while in its plastic state, and subjecting said core and shell to heat.

10. The process of manufacturing arc light electrodes which consists in molding a shell with an axial bore having radial depressions, directly extruding into such bore from its mold a carbonaceous core while in its plastic state.

11. The process of manufacturing arc

light electrodes which consists in providing the shell with an axial bore having radial depressions, and directly extruding into such bore a carbonaceous core, while in a hot and plastic state.

12. The process of manufacturing arc light electrodes, which consists in molding the shell with an axial bore, making a core containing carbon producing volatile material for rendering said core plastic and extruding said core directly, while at an elevated temperature into the shell in the

plastic state, and subjecting said core and said shell to heat.

13. The process of manufacturing arc light electrodes which consists in molding a shell with an axial bore, directly extruding into such bore from its mold a carbonaceous core while in its plastic state and then expanding the core within the shell.

In testimony whereof I have affixed my signature.

ELMER A. SPERRY.