F. S. CHAPMAN.

MANUFACTURE OF VACUUM LIGHTNING ARRESTERS.

APPLICATION FILED NOV. 16, 1910.

1,024,555. Patented Apr. 30, 1912.

Fig. 1.

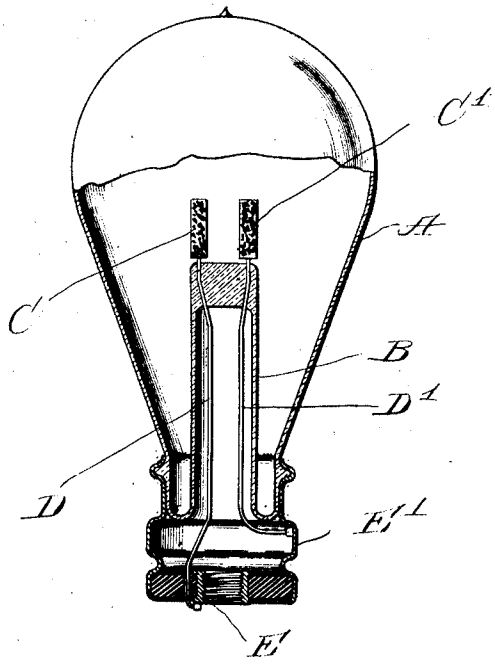
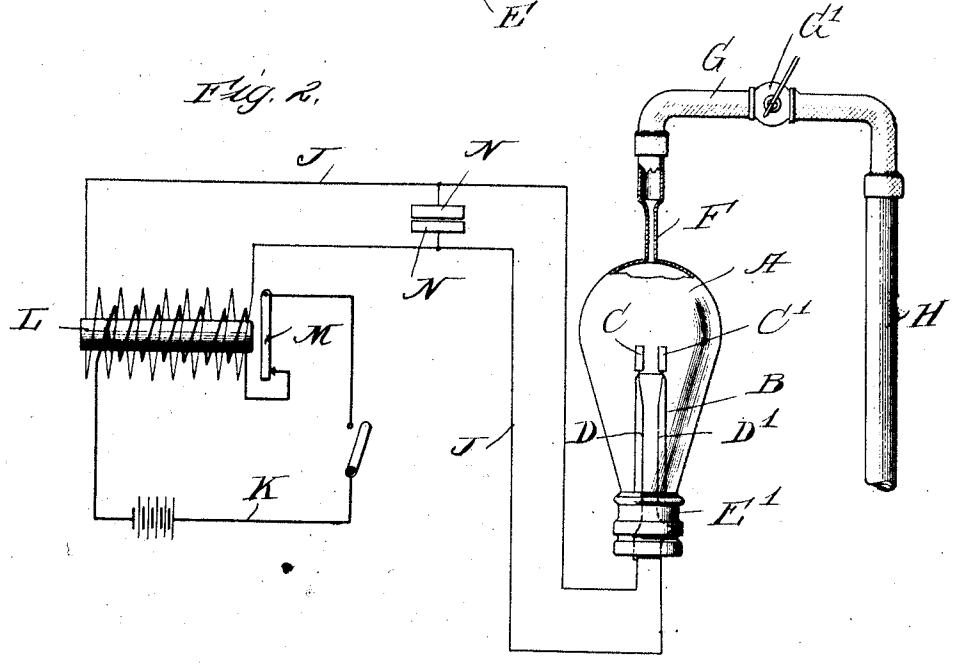


Fig. 2.



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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF VACUUM LIGHTNING-ARRESTERS.

1,024,555. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed November 16, 1910. Serial No. 592,665.

To all whom it may concern:

Be it known that I, FRANK S. CHAPMAN, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Manufacture of Vacuum Lightning-Arresters, of which the following is a specification.

My invention relates to the manufacture of devices such as vacuum lightning arresters involving an exhausted container in which it is desirable that the degree of vacuum in the exhausted container shall be substantially uniform and that such degree, preferably the degree of maximum conductivity, may be reliably, conveniently and economically produced and determined in the commercial manufacture of such devices.

My invention is illustrated in the accompanying drawings in which—

Figure 1, in sectional elevation, shows a completed vacuum arrester such as my improved process has in contemplation, and Fig. 2 shows diagrammatically a suitable apparatus for practising my process of producing a uniform, or, as I term it, a measured vacuum in the bulb or vacuum chamber.

Like characters of reference indicate like parts in the several figures of the drawings.

Referring first to Fig. 1, A represents a glass bulb closed at the bottom and provided with an inward projection B, on which are mounted the two carbon electrodes C, C′, connected severally by wires D, D′, which extend to the metal contact pieces E, E′ on the stem of the bulb.

It will be understood that I have shown and described simply a typical form of arrester, and that my invention is in no wise limited to these particulars of construction.

The wires D, D′ are sealed through the glass projection B by a method which does not concern the present invention. The air is thereupon exhausted from the bulb until the pressure of lowest electrical resistance, as above set forth, has been reached.

Preferably I follow in this regard the procedure which will now be outlined.

The bulb A is preferably formed with a small tube F at its upper end (Fig. 2) over which is fitted a rubber tube G, provided with the valve G′, this tube being connected with the exhaust pipe H of an exhaust pump (not shown). The wires D, D′ are connected with the secondary circuit J of a spark coil, the primary of which is indicated at K. L represents diagrammatically the core of the spark coil and M the interrupter. Two carbon blocks N, N are connected with the secondary circuit J and spaced one from the other.

For a lightning arrester of the dimensions shown in Fig. 1, I employ carbon blocks having surfaces one-quarter of an inch by one-half of an inch and space them apart one-eighth or one-sixteenth of an inch, or thereabout. The space between the blocks N, N is empirically determined for any given apparatus and any given sort of arrester, so as to determine the desired degree of exhaustion to be obtained. My practice has been to make this space between N, N about one two-hundredths of an inch.

With the pump and the spark coil in operation there will be at first a series of discharges across the space between the carbon blocks N, N. As the vacuum in the bulb A increases in intensity, the sparking between N, N will decrease and finally cease entirely, while there will be a glow between the electrodes C, C′. If the exhaustion is continued beyond this point, the sparking will recommence at the carbons N, N, showing that the electrical resistance between the electrodes C, C′ is increased by a further decrease of pressure in the vacuum chamber. The process of exhaustion should be discontinued after the sparking between the carbons N, N is stopped and before it recommences. This will give a pressure in the vacuum chamber which is substantially that above set forth. The bulb A is thereupon sealed in the familiar manner and wires J disconnected from the wires D, D′.

I claim:

1. The process of manufacturing articles of the class described which comprises establishing a spark gap in a container to be exhausted, and in multiple with a spark gap of definite and initially lower resistance than said first named spark gap, causing a current of a character to establish a spark across said last named gap to pass over the circuit so established, exhausting said container until the sparking at said gap ceases, then sealing said container without further substantial change of pressure therein.

2. The process of manufacturing a vacu-

um lightning arrester of the character herein described, which comprises connecting the electrodes in the vacuum chamber in multiple with a pair of electrodes in the air spaced apart so that said air gap has a resistance a trifle greater than the resistance between the electrodes in the vacuum chamber with the pressure therein at substantially the point of lowest electrical resistance, causing electrical discharges to be sent over said circuit of a character to spark across the air gap, exhausting the air from said vacuum chamber until the spark at the air gap ceases, stopping said exhausting process before the sparking at said gap recommences, and thereupon sealing said vacuum chamber.

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