F. C. FISK.

PROCESS FOR THE MANUFACTURE OF SPARK PLUGS.

APPLICATION FILED JUNE 20, 1919.

1,333,401. Patented Mar. 9, 1920.

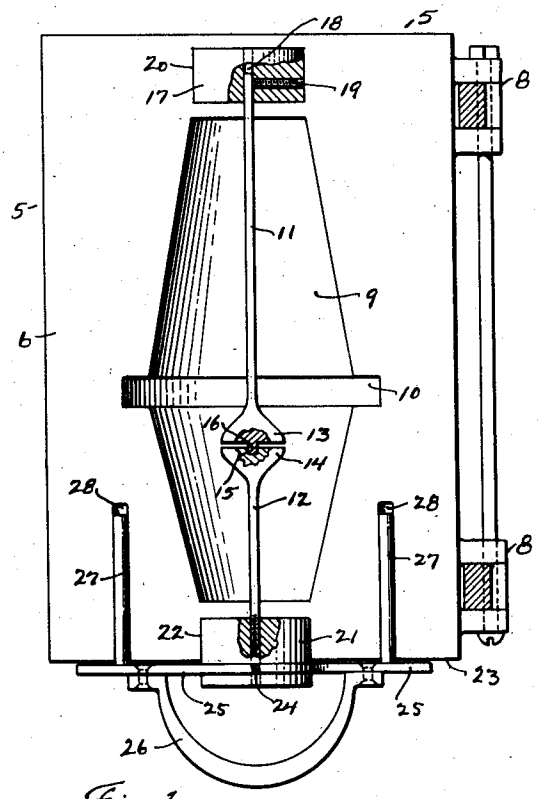


Fig. 1.

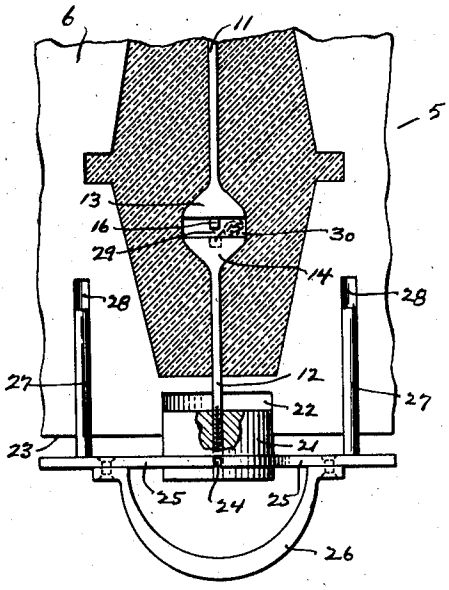


Fig. 3.

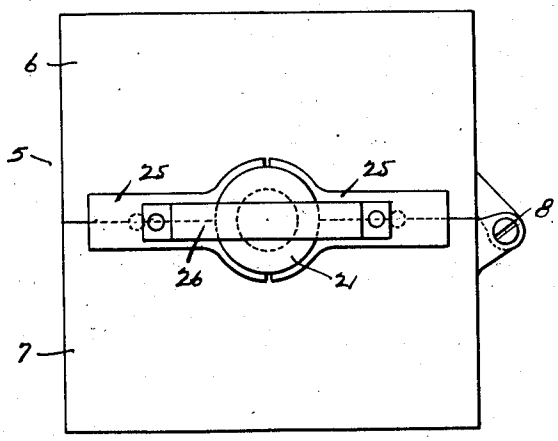


Fig. 2.

INVENTOR

Frederick C. Fisk

BY

J. W. McEllis

ATTORNEY

UNITED STATES PATENT OFFICE.

FREDERICK C. FISK, OF WILLIAMSVILLE, NEW YORK.

PROCESS FOR THE MANUFACTURE OF SPARK-PLUGS.

1,333,401. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed June 20, 1919. Serial No. 305,682.

To all whom it may concern:

Be it known that I, FREDERICK C. FISK, a citizen of the United States of America, residing in the town of Williamsville, county of Erie, and State of New York, have invented certain new and useful Improvements in Processes for the Manufacture of Spark-Plugs, of which the following is a full, clear, and exact description.

My invention relates generally to the manufacture of spark plugs, and more particularly to the insulator and electrodes of the type in which an auxiliary spark gap is provided.

As is well known, spark plugs having auxiliary spark gaps, have the insulator made of glass or other transparent material and in this insulator the auxiliary gap is provided. It is very desirable that this auxiliary spark gap be formed in a space having a vacuum. Under the present methods of manufacturing it is practically impossible to provide a vacuum in the space surrounding this auxiliary spark gap. It is also difficult to prevent the insulating material from flowing in between the points of the electrodes of the plug.

The principal object of my invention has been to provide a process for the manufacture of spark plug insulators having an auxiliary spark gap in which it shall be possible to separate the electrodes any desired distance without danger of the insulating material flowing in between the points, and one in which it shall be possible to produce a substantially perfect vacuum in this space between the electrodes.

Another object has been to provide a process in which spark plug insulators, having an auxiliary spark gap may be easily, quickly, and cheaply made.

In the drawings accompanying this application, I have shown, for illustrative purposes, one form of apparatus by which my process may be carried out, it being obvious that apparatuses other than that shown may be used with equal efficiency.

In the drawings:

Figure 1 is a front elevation of a portion of the apparatus, and shows one-half of the molding flask.

Fig. 2 is a bottom view of the complete apparatus.

Fig. 3 is a fragmentary elevation, of the parts of the apparatus in different positions, and shows a molded insulator in section.

In spark plug insulators of the kind above referred to, glass is usually used as the insulating material, because of its transparency and ease of molding. In the drawings 5 represents a molding flask having parts 6 and 7. This flask is, of course, provided with the usual pouring opening, well understood in the art and not shown in the drawings for clearness of illustration. The parts 6 and 7 of the flask are hinged together at 8 in the usual manner. In Fig. 1 an inner face view of the part 6 of the flask is shown. The parts 6 and 7 of the flask are provided with the matrix 9, which is preferably tapered at each end and provided with the recess 10 for the usual annular flange on the insulator.

11 and 12 are the electrodes of the spark plug insulator. These electrodes are preferably provided with enlarged heads 13 and 14, which are arranged adjacent each other within the matrix before the insulating material is poured into the mold. The head 14 is preferably provided with a recess 15, for the reception of a stud 16, carried by the head 13. The engagement of this stud and recess keep the heads 13 and 14 in alinement while the insulating material is being poured. So as to centralize and hold the outer ends of electrodes 11 and 12 I provide suitable means for this purpose which are carried by the flask. Thus, a clutch disk 17 holds the electrode 11 and has a central aperture 18 for the reception of the electrode. A set screw 19, or other convenient means, is carried by the disk 17, for locking the end of the electrode within the disk. The disk is set into an annular recess 20 formed in the parts 6 and 7 of the flask whereby it is held against axial movement. The electrode 12, which is preferably the upper electrode of the spark plug and, therefore, screw-threaded to receive the nut of the spark plug, is screwed into a disk 21. This disk is movable axially and is mounted within an annular opening 22 formed in the parts 6 and 7 of the flask and at the end face which is opposite to the end of the flask having the disk 17. The disk 21 extends beyond the end 23, of the flask and is provided in its extended end with an annular recess 24. Engaging with this recess are prefer-

ably two oppositely arranged fingers 25 which are held together by means of a handle 26. Guide rods 27 are carried by the fingers 25 and are slidably disposed within suitable recesses 28 formed in the parts 6 and 7 of the flask. It will be clear that when the handle 26 is moved away from the flask, the disk 21 will be carried with it, and the electrode 12 will, therefore, be separated from the other electrode 11.

When the apparatus herein described is to be used in connection with the manufacture of spark insulators of the type described, the electrodes 11 and 12 are fastened in the disks 17 and 21, respectively, and the parts of the apparatus are placed in the positions shown in Fig. 1. The glass or other insulating material is now poured into the matrix 9 through the suitably provided opening and the matrix filled with the insulating material. It is obvious that both the parts of the flask and the electrodes are previously heated before the insulating material is poured therein. While the glass is still plastic, the handle 26 is operated to withdraw the disk 21, which will separate the heads 13 and 14 of the electrodes 11 and 12, respectively, and provide a spark gap 29 within a space 30. As the space 30 is formed after the molding material has been poured within the matrix, it will contain no air and a substantially perfect vacuum will exist.

Having thus described my invention what I claim is:

1. The process of manufacturing spark plug insulators, which consists in supporting the electrodes within a matrix, flowing insulating material within the matrix and around the electrodes, and then separating the electrodes, while the material is still plastic, whereby a spark gap is provided in a space having a substantial vacuum.

2. The process of manufacturing spark plug insulators, which consists in supporting the electrodes within a matrix, flowing molten glass within the matrix and around the electrodes, and then separating the electrodes, while the glass is still plastic, whereby a spark gap is provided in a space having a substantial vacuum.

3. The process of manufacturing spark plug insulators, which consists in heating the electrodes, supporting the electrodes within a heated matrix, flowing molten glass within the matrix and around the electrodes and then separating the electrodes, while the glass is still plastic, whereby a spark gap is provided in a space having a substantial vacuum.

4. The process of manufacturing spark plug insulators, which consists in supporting the inner ends of the electrodes adjacent each other, then placing the electrodes within a matrix, then flowing insulating material within the matrix and around the electrodes, and then separating the electrodes, whereby a spark gap is provided in a space having a substantial vacuum.

5. The process of manufacturing spark plug insulators, which consists in supporting the inner ends of the electrodes adjacent each other, then supporting the outer ends of the electrodes within a matrix so that they may be moved relative to each other, then flowing insulating material within the matrix and around the electrodes, and then separating the electrodes, while the material is still plastic, whereby a spark gap is provided in a space having a substantial vacuum.

6. The process of manufacturing spark plug insulators, which consists in placing the inner ends of the electrodes in engagement with each other, then supporting the electrodes within a matrix, then flowing molten glass within the matrix and around the electrodes, and then separating the electrodes while the glass is still plastic, whereby a spark gap is provided in a space having a substantial vacuum.

In testimony whereof I have hereunto signed my name.

FREDERICK C. FISK.