No. 739,920. PATENTED SEPT. 29, 1903.

H. PAULING.

APPARATUS FOR TREATING GASES.

APPLICATION FILED APR. 2, 1902.

NO MODEL.

Fig. 1

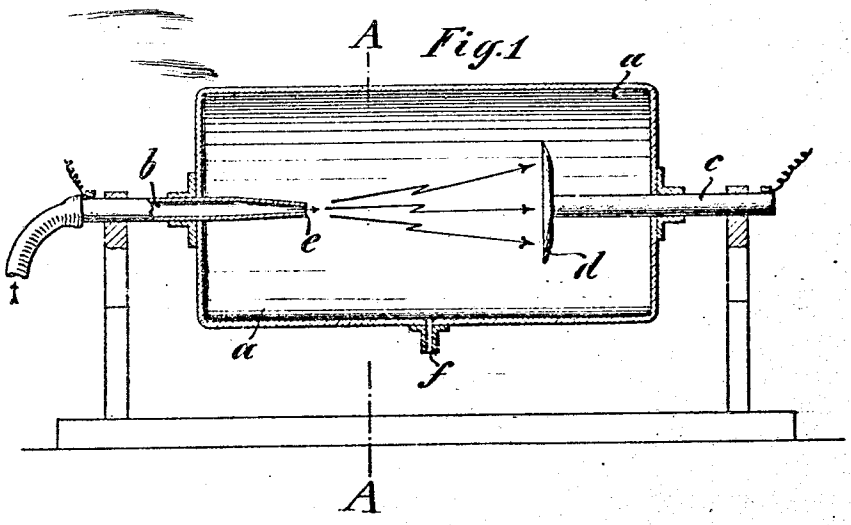


Fig. 2

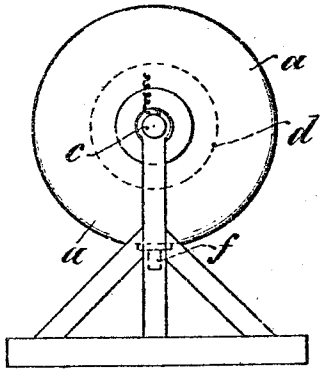


Fig. 3

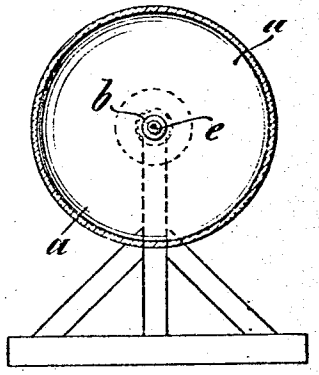
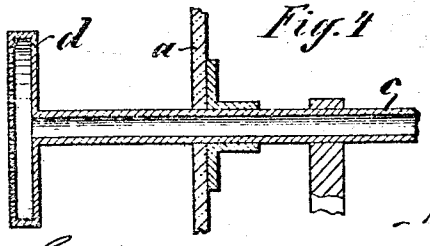


Fig. 4



Witnesses-

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No. 739,920. Patented September 29, 1903.

UNITED STATES PATENT OFFICE.

HARRY PAULING, OF BRANDAU, AUSTRIA-HUNGARY.

APPARATUS FOR TREATING GASES.

SPECIFICATION forming part of Letters Patent No. 739,920, dated September 29, 1903.

Application filed April 2, 1902. Serial No. 101,062. (No model.)

To all whom it may concern:

Be it known that I, HARRY PAULING, engineer of mines, a citizen of the Empire of Austria-Hungary, and a resident of Brandau, Bohemia, Austria-Hungary, (whose post-office address is House No. 200,) have invented certain new and useful Improvements in Apparatus for Treating Gases, &c., of which the following is a specification.

This invention relates to an improved apparatus for the treatment of gases, vapors, and the like by electric-spark discharges.

For certain purposes—for example, the ozonizing of oxygen for converting the nitrogen of the atmosphere into nitrous acid and the like—it is necessary to expose air, gases, gas mixtures, or mixtures of gas and air, or vapors of all kinds, and the like which may contain liquids in a finely-divided condition, separately or several, simultaneously to the effect of electric-spark discharges. The method hitherto in use consisted in producing the electric spark in a space or chamber filled with the particular gas or in a current of gas between two ordinary electrodes. It will be obvious that in this case the spark could only act upon a small quantity of gas at a time, and it is impossible to subject all parts of a given volume of gas uniformly to the action of the electric spark.

The apparatus forming the object of the present invention is based upon a process which enables the continuous treatment of gases and the like by means of spark discharges in such a manner that every particle of the gas is compelled to come into contact with the spark. The said process consists, essentially, in the fact that by a suitable form of the electrodes between which the spark is produced the sparking surface is a conical one and the gases are blown or sucked through this spark-cone. The apparatus suitable for this arrangement and forming the object of this invention is represented in Figures 1 to 4 of the annexed drawings.

Fig. 1 is a vertical section, Fig. 2 an end view, and Fig. 3 a cross-section on line *A*. *A* of Fig. 1. Fig. 4 shows a modification consisting of a tubular electrode terminating in a cup.

The novelty of this apparatus lies in the fact that the positive electrode is of pointed shape and the negative electrode has a disk shape, whereby the discharge-sparks are conical with the base directed toward the disk and its apex at the discharging point. The blowing in of the gases and the like to be treated is effected through this point in the direction of the spark-cone in such a manner that the greater part of the gas-current coincides with the spark-path. The outlet of the gases after the treatment is completed preferably takes place through openings in the disk electrode.

In the cylinder *a* the two electrodes *b* and *c* are axially inserted and connected with the poles of an induction-coil. These electrodes are tubular and suitably insulated from the cylinder. One of the electrodes, *b*, terminates in a nozzle *e*, while the other, *c*, carries a cup or plate *d* at its end opposite the nozzle, placing the induction-coil in circuit. The jumping of the spark takes place in the shape of a cone with its base directed toward the edge of the cup *d*, the apex of the cone being in the nozzle *e*. The gas or gas mixture to be treated is blown through the pipe *b* by means of a blower or from a gas-meter. The gases which have been subjected to the treatment are sucked out of the cylinder *a* by means of the second pipe *c* and passed on to be further dealt with. The electrode carrying the cup *d* can be open toward the second electrode *e* by a disk or cup, being provided with a number of fine holes, as shown in Fig. 4.

In the apparatus described above the gases, gas mixtures, or vapors can be subjected to the treatment in a more or less cooled or heated state and under normal, increased, or reduced pressure. They can also be saturated with finely-divided liquids, such as water.

The temperature of the gases or vapors to be treated in this apparatus, as well as their pressure, changes according to the nature of the gases or vapors and the nature of the products to be obtained.

Having now particularly described and ascertained the nature of my invention, I declare that what I claim is—

1. An apparatus for treating gases and the like by means of the electric spark, comprising two electrodes arranged in line, one of them formed by a tube ending in a nozzle,

the other one ending in a disk; the whole preferably inclosed in an insulating-casing, substantially as shown and described.

2. An apparatus for treating gases and the like by means of the electric spark, comprising two electrodes arranged in line, both being formed by tubes, one of them ending in a nozzle, the other one in a disk provided with perforations communicating with the hollow of said tube, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY PAULING.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.