Feb. 23, 1926. 1,574,237

H. EDLER

APPARATUS FOR THE ELECTRICAL PURIFICATION OF GASES

Filed Feb. 9, 1925 2 Sheets-Sheet 1

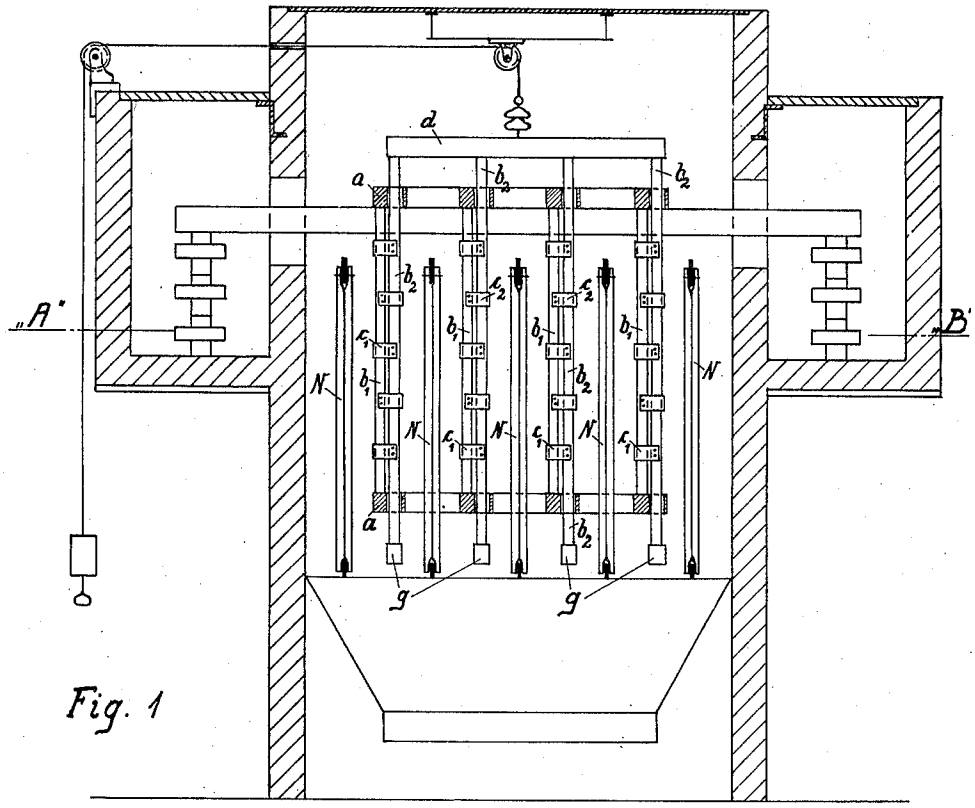


Fig. 1

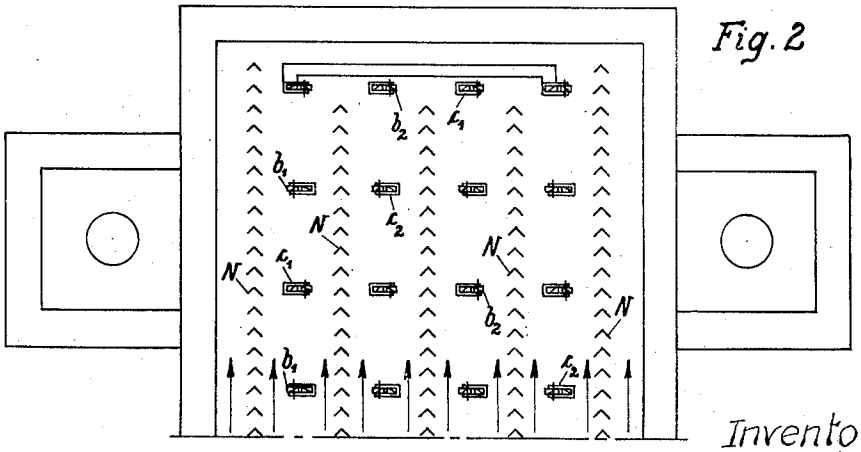


Fig. 2

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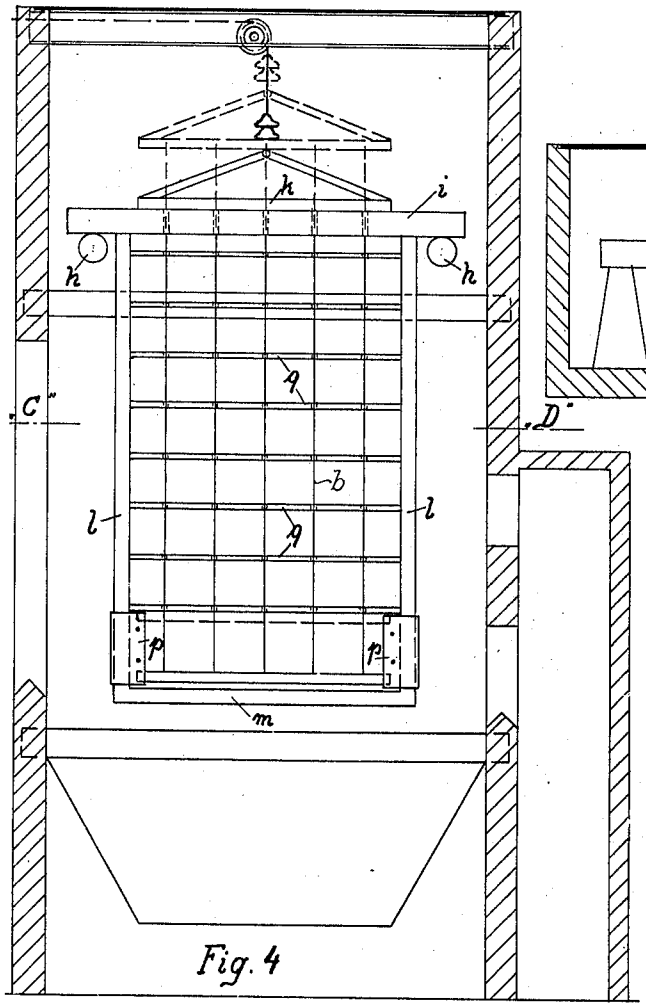


Fig. 4

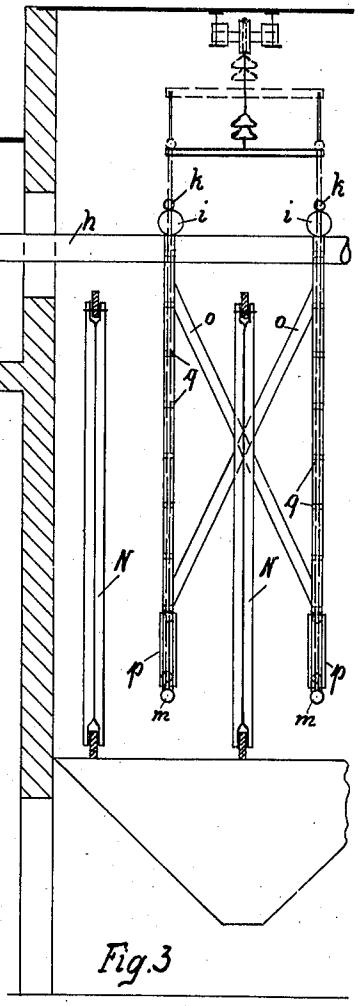


Fig. 3

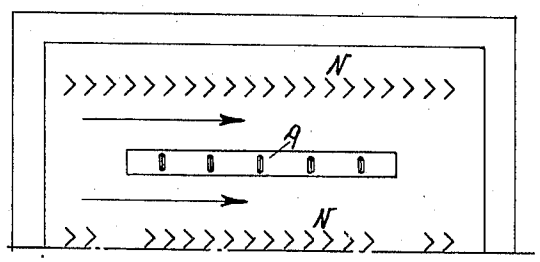


Fig. 5

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UNITED STATES PATENT OFFICE.

HANS EDLER, OF GELSENKIRCHEN, GERMANY.

APPARATUS FOR THE ELECTRICAL PURIFICATION OF GASES.

Application filed February 9, 1925. Serial No. 8,075.

To all whom it may concern:

Be it known that I, Dr. HANS EDLER, a German citizen, residing at Gelsenkirchen, Germany, have invented certain new and useful Improvements in Apparatus for the Electrical Purification of Gases (applications Nos. E. 29,029 and E. 29,725, filed in Germany on February 8, 1923, and August 3, 1923, respectively), of which the following is a specification.

The present invention relates to apparatus for purifying gases by the aid of electricity. The way in which the sparking electrodes are constructed in this apparatus is such as to bring about in the event of any recoil in the sparking coefficient, a durability and reliability of action which is superior to that of electrodes with a similar sparking action hitherto employed. Means are also described by the use of which a particularly stable and uniform mounting of the spark-electrodes is secured. The electrodes employed in the apparatus which form the subject matter of the invention have also the additional advantage that they can be efficiently cleaned in a simple manner. As collecting electrodes in this apparatus there may be conveniently employed bars of angular cross section which in comparison with the majority of arrangements of collecting electrodes hitherto employed, such as chains, plates, grids and the like, have the advantage that they retain the dust sufficiently firmly to prevent it being carried along by the rapidly moving gas, and yet permit the dust to fall off easily into the collecting chute.

The apparatus is illustrated by way of example in the accompanying drawings whereon:—

Figure 1 of the accompanying drawings shows the purifying apparatus in elevation, partly in section.

Figure 2 is a horizontal section through the apparatus on the line A—B, Figure 1.

Figure 3 is a side elevation, partly in section, of another constructional form of the apparatus, in which a special mode of attachment of the sparking electrodes is employed.

Figure 4 shows the same apparatus from the front partially in section.

Figure 5 is a horizontal section of Figure 4 on the line C—D, Figure 4.

As sparking elements flat bands b^1 and b^2 (see Figures 1 and 2) are employed, being so arranged that their sharp edges point towards the collecting electrodes. Experiments have shown that bands placed in this way have a most excellent sparking action and are of practically unlimited durability. The electrodes b^1 are rigidly attached to the frame a, while the electrodes b^2 are passed at the top and bottom through the openings in this frame so that they can be drawn upwards by the aid of a rod d. A weight g holds the band b^2 taut and draws it downwards when d is released. Yokes or stirrups c' and c^2 act as scrapers (see also Figure 2), and are alternately attached to b^1 and b^2 viz: c^1 to b^2 and c^2 to b^1. When d is drawn up b^2 will be moved upwards. The yokes or stirrups c^1 attached to b^2 sweep over the edge of b^1 while the yokes or stirrups c^2 attached to b^1 clean the edge of b^2.

The durability of the electrodes is practically unlimited as the bands are not subjected to any change of shape by being bent, etc. and furthermore the electrodes can be easily interchanged by drawing them out at the top.

As collecting electrodes I use in this apparatus bars N of angular cross section, angle irons being illustrated. The gas flows in the direction indicated by the arrows. The deposition of the dust takes place on the open side of the angle next to the current of gas. By this arrangement any carrying away of the dust from the place where it has deposited is impossible. If any dust should be deposited on the back of the angle, removal of it would result in the particles carried off being caught by the succeeding angle. By this means losses, through dust being carried away, cannot occur. On the other hand the removal of the dust which has accumulated in the interior of the angle by vibration, scraping or even by letting it fall off is not impeded in any way, as the surfaces to be cleaned are perfectly smooth and are protected against the action of the current of gas.

In Figures 3 and 4 is shown a special mode of attachment and cleaning of the sparking electrodes by the aid of which it is possible to prevent the occurrence of vibrations which may be produced partly by electrical action and partly by the mechanical force of the current of gas. The occurrence of such vibrations is particularly disadvantageous because the distance between the sparking electrodes and the collecting elec-

trodes is thereby changed and this leads to sparking across. This disadvantage is avoided in the arrangement shown in Figure 3 by connecting the sparking electrodes at their lower ends to parts of the rigid frame in a suitable manner. On the main girders *h* rest the cross bar *i* which acts as supports for the member *k* from which the sparking electrodes are suspended. To the cross bar *i* are attached rods *l* connected to each other by transverse rods *m*. Rigidity of the whole frame is secured by the diagonal stretchers *o*. To the transverse rods *m* are secured the stop rods *p*, between which the sparking electrodes *b* are guided in their upward or downward movements. With this arrangement there is therefore no rigid connection between the frame and the ends of the electrodes. On the contrary they can undergo expansion by heat and contraction without hindrance. The movement of the electrodes towards each other is however so limited that the distance between them will vary within such slight limits that the risk of sparking across will be avoided.

Instead of the method of cleaning illustrated by Figure 1 the method illustrated by Figure 4 may be employed. In this case special transverse connections *q* are rigidly attached to the rods *l* in the plane of the sparking bands. The sparking electrodes are adjustable as a whole vertically relatively to the frame and the transverse connections *q*. The transverse connections, which may be constructed in the form of tubes, bars, chains or the like, are provided with holes or slots, through which the bands may be drawn. In Figure 5 is shown the position of the sparking electrodes with relation to the collecting electrodes in the apparatus shown at Figs. 3 and 4.

The distance of the transverse connections from each other may be made greater or smaller according to the nature of the precipitate and corresponds approximately to the length by which the rod *k* carrying the bands projects when in its highest position above the transverse connection of the frame. Cleaning is carried out by alternately raising and lowering the system of electrodes and at the same time and in consequence drawing the bands through the holes in the transverse connections and scraping them. The movement of the rods carrying the electrodes may be produced by hand or mechanically.

What I claim and desire to secure by Letters Patent of the United States is:—

1. An apparatus for the electrical purification of gases, comprising bars of angular shape in cross section serving as collecting electrodes, and sparking electrodes consisting of flat bands arranged with their narrow edges facing towards the collecting electrodes.

2. An apparatus according to claim 1, in which the angularly shaped bars are arranged vertically to the current of gas in two or more rows one behind the other.

3. An apparatus according to claim 1, in which the collecting electrodes have their open sides arranged to meet the current of gas.

4. An apparatus for the electrical purification of gases, comprising collecting electrodes, sparking electrodes consisting of flat bands, and means for cleaning the sparking electrodes comprising members arranged to traverse the edges of the bands.

5. An apparatus according to claim 4 in which each sparking electrode is divided into two separate flat bands which are movable longitudinally, lie in one plane and have their narrow edges turned towards each other, and a series of shaped scrapers applied to each of the bands in such a way that those attached to one band alternate with those applied to the other band, so that when a band is moved mutual scraping of the bands takes place.

6. An apparatus according to claim 4, comprising transverse connections which are stretched between the side walls of the electrode frame and means for moving the sparking electrodes in such a way that the impurities adhering thereto are detached therefrom.

7. An apparatus according to claim 4, comprising means for preventing oscillation of the sparking electrodes comprising a transverse rod, stop bars mounted on said rod, and rigid lower connecting bars which hang between every two stop bars.

HANS EDLER.