July 25, 1939. A. KATSCH 2,167,515

ELECTRONIC DISCHARGE TUBE

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Fig. 1

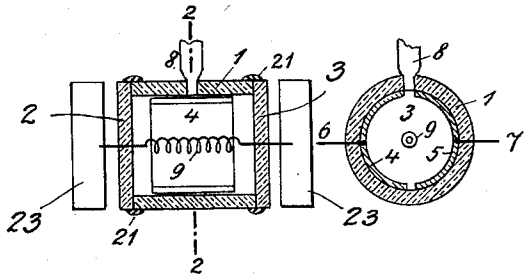


Fig. 2

Fig. 3

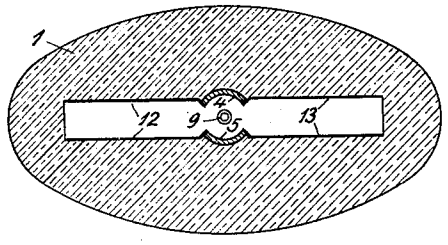
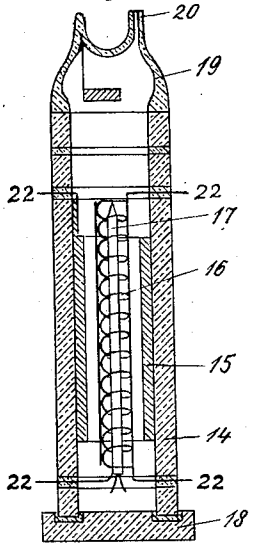


Fig. 4



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ELECTRONIC DISCHARGE TUBE

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2 Claims. (Cl. 250—27.5)

(Granted under the provisions of sec. 14, act of March 2, 1927; 357 O. G. 5)

For producing or receiving very high frequencies electron tubes of a very stable construction are necessary in order to avoid the electrodes oscillating in relation to each other and thus causing frequency variations. For the construction of such tubes ceramic materials are particularly suitable.

The invention has for its object to provide for a cheap manufacture of devices of this kind and consists in certain features of novelty which will appear from the following description and be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which some embodiments of the invention are illustrated by way of example. In this drawing,

Fig. 1 shows a longitudinal section of a split anode tube or so called Habann-tube as provided by the invention. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 is a cross-sectional view representing a second form of Habann tube. Fig. 4 shows a longitudinal section through a three-electrode tube adapted to be operated in brake field connection, for example.

The vacuum vessel illustrated in Figs. 1 and 2 consists of a tubular wall 1 made of a ceramic material. Wall 1 is at its two ends united with covers 2, 3 fastened thereto by molten glass 21, for instance. Instead of glass any other suitable means may be arranged to provide for vacuum-tightness. Within the vessel 1, 2, 3 electrodes 4, 5 are disposed which constitute the anode cylinder of the Habann tube. The electrodes 4, 5 may be for instance pieces of sheet copper placed onto wall 1 so as to be supported thereby. It is however particularly advantageous to employ a method by which such electrodes are produced on wall 1 so as to form a coating thereon. Methods of this kind are well known. In order to effect them, silver is melted onto the ceramic material so as to produce a coating thereon, and this silver coating is increased in thickness by electroplating or by a die-casting method. This arrangement has the advantage that the construction thus obtained is particularly stable and hence capable of resisting shocks. The electrodes 4, 5 are provided with leads 6, 7 inserted in the wall 1 in a manner to ensure the requisite vacuum-tightness. Wall 1 is fitted with a tubular extension 8 where a pump is connected in order to evacuate the vessel in a well known manner. Extension 8 may be of glass, for instance, united with the ceramic wall 1 by melting, and is sealed off after evacuation, as is well known with devices of this kind. The cathode 9 is supported by the covers 2, 3 and may consist of a helix of tungsten wire sealed into the covers 2, 3. The outer circuit is suitably joined to the ends of the heating filament. Also, a bar-shaped cathode may be used that consists of a ceramic bar provided with a metal coating.

In addition to the advantages before described the arrangement represented in Figs. 1 and 2 has the advantage of being very compact, whereby the magnet poles 23 which in a well known manner are associated with a Habann tube may be arranged in close proximity thereto. Furthermore, in the manufacture of such tubes the walls 1 may be obtained simply by cutting a ceramic tube in pieces of the length of such walls, whereby the manufacture will be cheaper than has been the case heretofore.

While the anode shown in Figs. 1 and 2 is made in two parts, as is the case also with Fig. 3, yet it is to be understood that the invention is in the same manner applicable also with Habann tubes whose anodes are made in more than two parts.

As shown in Fig. 3, Lecher wire systems formed of metal coatings 12, 13 may be connected to the anode parts 4, 5. This construction has proved to be suitable for the production of very steady oscillations. The high frequency energy is taken from the Lecher wire systems by galvanic contact or capacitively or inductively. This however is no feature of the invention and therefore is not illustrated.

The vacuum vessel of the three-electrode tube represented in Fig. 4 consists of a cylindrical or tubular wall 14, and two end portions or covers 18, 19. Cover 18 is disc-shaped, and cover 19 is a glass portion fitted with a tubular extension 20 where a pump can be connected in order to evacuate the vessel. The anode 15 is a metal cylinder arranged to contact with wall 14. The grid is designated 16 while the cathode is denoted by 17. The anode 15 may be a copper cylinder although it is particularly advantageous to produce the anode by producing a metal coating on the ceramic material, as before described. The leads

22 are arranged to extend merely through wall 14.

What is claimed is:

1. An electron tube comprising a vacuum vessel composed of a tubular body of ceramic material, each end surface of said tubular body lying in a single plane, flat discs of the same material fitted to the end surfaces of said tubular body and cemented thereto and closing both ends thereof, and a plurality of electrodes including an anode closely fitted to the tubular wall of said vessel.

2. An electron tube according to claim 1, the anode leads of which merely extend through the wall of said tubular body.

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