Sept. 27, 1960 H. NEUFISCHER 2,954,534

ARRANGEMENT FOR SECURING IN POSITION ONE OR MORE HELICES IN TRAVELING WAVE TUBES

Filed Aug. 22, 1956

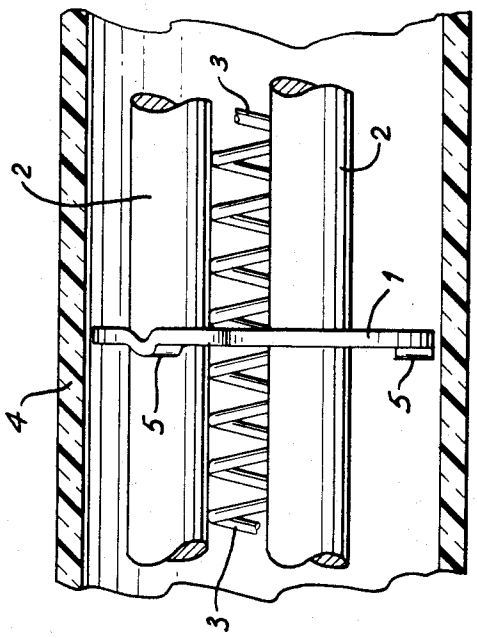


FIG. 2

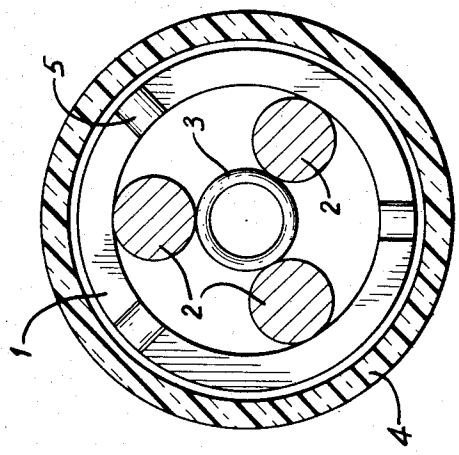


FIG. 1

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ARRANGEMENT FOR SECURING IN POSITION ONE OR MORE HELICES IN TRAVELING WAVE TUBES

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3 Claims. (Cl. 333—31)

The holding in position of the helices in traveling wave tubes is in most cases effected between three dielectric holding bars or in a glass pipe which, at the same time, forms part of the vacuum tube. High requirements are demanded from the helices with respect to the slight sag or dip and the uniformity of the pitch. It is, therefore, necessary, that the helices are firmly fixed over their entire lengths between the holding bars or inside a glass pipe without any clearance. In order to achieve this, in some embodiments the helices are sealed to the holding bars or to the glass pipe respectively.

The drawbacks of such a method are: complicated manufacture, substantial dielectric losses and the danger that during the heating or glowing of the helices the glass may be cracked.

In another type of embodiment the holding bars are pressed against the helices with the aid of elastical holding clips or clamps, at spaced intervals along the rods. Due to the fact that these clips or clamps are arranged inside the tubes, they have to be made of a non-magnetic material that also does not lose its elasticity on account of the occurring temperatures. Furthermore, they have to be dimensioned in such a way that the helical field is not disturbed by them and that they are easy to manufacture and install, generally by making them as small as possible.

According to the invention, therefore, it is proposed to slip a flat disc of a suitable material, e.g. molybdenum, tungsten, etc., loosely over the three holding bars and the helix, and with the aid of a simple tool at the desired points there are provided one or more crimps or beads radially of the discs. In reducing the circumference these crimps also reduce the diameter of the disc so that the ring disc will now elastically embrace the holding bars. The chosen form of the ring disc, unlike other shapes or forms, such as bands of sheetmetal strip, has the advantage of small space requirement, thus hardly disturbing the helical field. Since the pressure of the disc is edgewise, the disc may be made of very thin material. In

this way the supporting surface of the disc on the bars will become very small, which likewise contributed to keeping the disturbances of the helical field at a low level. Finally, the described holding clip or clamp can be manufactured very easily and, consequently, inexpensively by punching or stamping.

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a transverse sectional view through a traveling helix assembly illustrating the invention and;

Fig. 2 is a fragmentary longitudinal section of the assembly of Fig. 1.

In the accompanying drawing there is given an example of embodiment of the invention. The three holding bars 2, surrounding the helix 3 are encircled by the flat ring disc 1 with the crimps or beads 5. A ceramic tube 4 which may be coated with a damping layer, surrounds the whole arrangement outside the ring disc.

What is claimed is:

1. A helix mounting assembly for traveling wave tubes comprising a helical coil, a plurality of holding rods circumferentially positioned around said coil and means for holding said rods pressed against said helix comprising a substantially flat, thin and circular non-integral ring disc around said rods, said disc being of relatively rigid non-magnetic material which retains its elasticity at high temperatures and having a crimp extending substantially radially of said disc to provide relatively rigid resilient pressure against said rods but without any substantial change in the circular periphery of the disc.

2. An assembly according to claim 1, wherein said non-magnetic material is molybdenum.

3. An assembly according to claim 1, wherein said non-magnetic material is tungsten.

References Cited in the file of this patent

UNITED STATES PATENTS

931,706	Stevens	Aug. 17, 1909
1,379,476	Parr	May 24, 1921
1,705,895	Blair	Mar. 19, 1929
1,885,168	Affel	Nov. 1, 1932
2,147,354	Scholtes	Feb. 14, 1939
2,611,102	Bohlke	Sept. 16, 1952
2,720,609	Bruck et al.	Oct. 11, 1955
2,790,926	Morton	Apr. 30, 1957

FOREIGN PATENTS

710,847	Great Britain	June 16, 1954