Oct. 28, 1941. C. L. RICHARDS ET AL 2,260,725

ELECTRON BEAM DEFLECTION APPARATUS

Filed July 6, 1939

Fig. 1

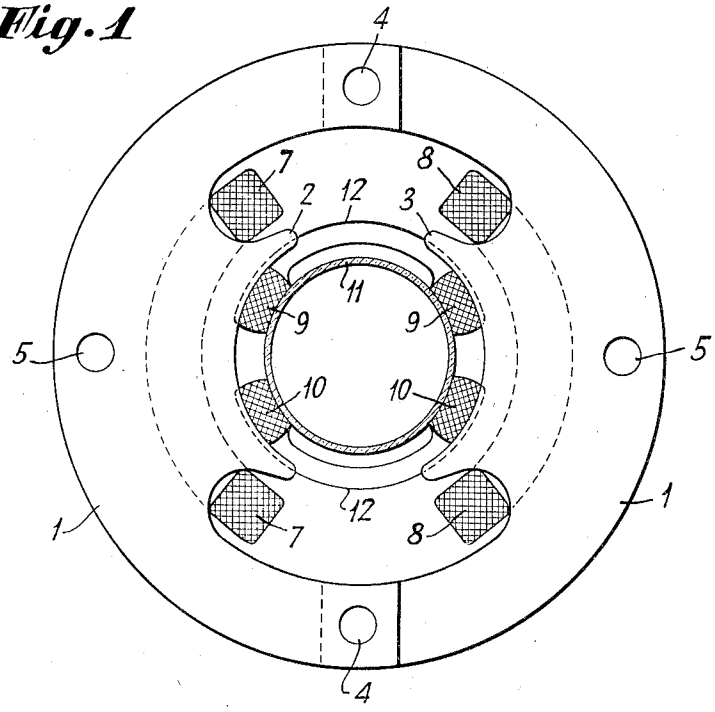
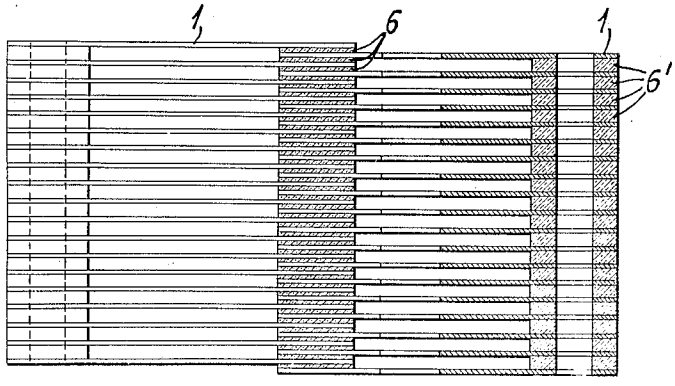


Fig. 2



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ELECTRON BEAM DEFLECTION APPARATUS

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2 Claims. (Cl. 250—157)

The invention relates to a device comprising a cathode ray tube with magnetic deflection of the cathode ray.

In these devices, the deflection of the cathode ray is effected with the aid of a magnetic field which is perpendicular both to the cathode ray and to the direction of the deflection. This magnetic field is generated with the aid of a set of coils which is usually arranged outside the cathode ray tube and which consists of two diametrically located coils. In order to ensure that during the deflection the cathode ray moves in a plane, the lines of force of the magnetic field must be parallel to one another and be perpendicular to the plane in which the deflection is to take place. This leads to coil constructions wherein only a small proportion of the magnetic field is utilized for the deflection of the cathode ray while the total magnetic field, which is much larger, determines the self-inductance of the set of coils and thus the size of the final amplifying tubes for the deflecting current.

In order to be enabled to utilize a larger portion of the magnetic field for the deflection of the cathode ray and thus to reduce the deflecting current and furthermore in order to produce more easily a homogeneous magnetic field, it has previously been proposed to utilize magnetic material for the core of the deflecting coils. This has the drawback that at the comparatively high frequencies more particularly the iron losses greatly increase.

According to the invention, this drawback is avoided by leading the magnetic field for the deflection in at least one direction outside the cathode ray tube through an iron yoke built up from spaced laminations, the relative spacings between the laminations being at least of the same order of magnitude as the thickness of the laminations.

In a television receiver comprising a cathode ray tube with magnetic deflection of the cathode ray, it is advisable to lead at least the magnetic field for the deflection in a direction perpendicular to the scanning lines through an iron yoke built up from spaced laminations.

The invention will be explained more fully with reference to the accompanying drawing which represents, by way of example, one form of construction of the deflecting coils of a television receiver.

Fig. 1 is a front elevation of the core built up from spaced laminations and

Fig. 2 is a cross-sectional view through the said core.

The core is built up from a plurality of semi-circular laminations **1** provided with pole shoes **2** and **3** of particular shape and with a number of holes **4** and **5** which serve for centering and mounting.

The laminations, which are made from transformer sheet metal, for example, with a thickness of 0.5 mm. are alternately stacked up in the manner shown in Fig. 2 while between each two laminations there is provided insulating material **6** having a thickness of 0.5 mm. in practice. Owing to the fact that at the ends the laminations overlap one another, the spacing between the laminations overlap one another, the spacing between the laminations is usually at the point of the pole shoes three times the thickness of a lamination in practice. The insulating material **6'** which is present at the circumference of the laminations near the holes **5** has therefore a thickness of 1.5 mms. in practice. On the pole shoes **2** there are provided the two deflecting coils **7** and **8** which are provided to deflect a cathode ray beam to reconstruct an optical image and the coils are taken of such size that they can just be slid over the pole shoes. Then, as is shown in the drawing by dotted lines, they are bent back to such an extent that they exactly fix in the gap between the pole shoes and the yoke.

The coils **9** and **10** for line deflection are interposed between the glass wall **11** of the cathode ray tube and the inside of the pole shoes.

The coil heads **12** of the line deflection coils **9** and **10** are bent upwards and bear on the terminal laminations of the core. With the aid of the sets of coils mounted in this manner it is possible to generate at the point of the cathode ray beam two homogeneous magnetic fields which are perpendicular to one another. The lines of force of the magnetic field generated by the picture deflection coils extend through the pole shoes and the yoke of the iron core, the homogeneity of this field being promoted by the presence of the pole shoes. The magnetic field generated by the line deflection coils extends, on the contrary, substantially through the air due to the heavy eddy-currents generated by this field in the iron of the core.

What is claimed is:

1. In deflection apparatus for cathode ray beams a core member formed of sets of magnetizable laminations, each of said sets being interleaved with the laminations of the other sets, the members of each set being alternately positioned between the members of the opposing set for a short distance along the length thereof, and coil means embraced by said interleaved sets of laminations for developing an electro-magnetic flux in said core.

2. Apparatus in accordance with claim 1, wherein each of the laminations of each set comprises a semi-circular member.

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