

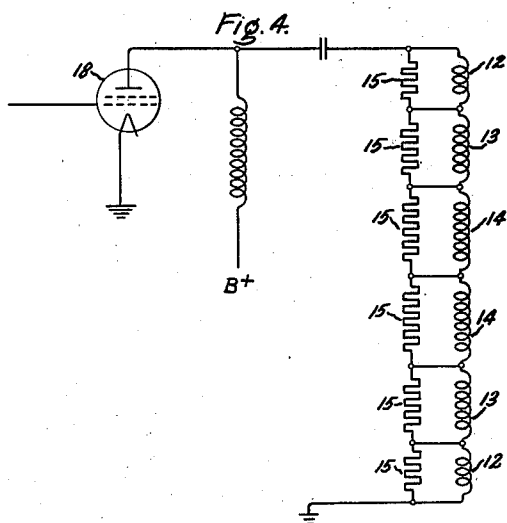
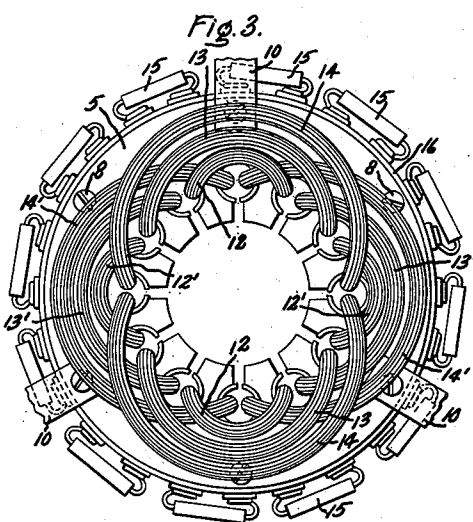
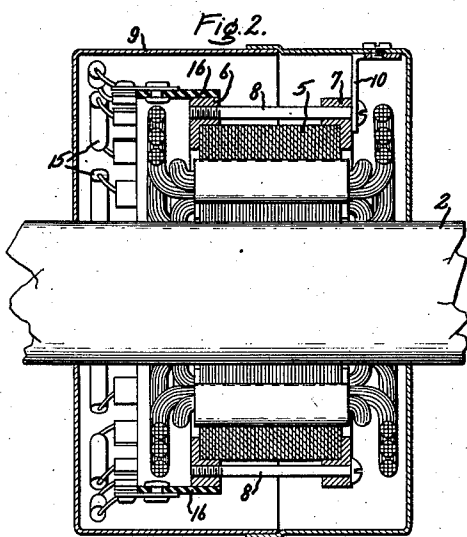
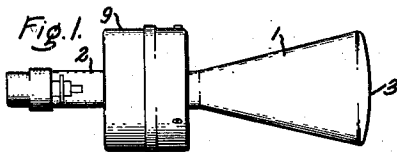
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MAGNETIC SWEEP COIL CIRCUIT

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MAGNETIC SWEEP COIL CIRCUIT

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3 Claims. (Cl. 250-157)

My invention relates to cathode ray tubes and particularly to such tubes which are provided with a winding for magnetically deflecting the cathode ray beam thereof.

Where such tubes are employed in television apparatus it is usual to supply the deflecting winding with a saw tooth wave for causing the beam to scan the end wall of the tube in the desired manner. The time required for the beam to return may be only one-tenth of the time for each forward sweep, hence the rate of change of the current in the deflection winding during the return of the beam is very high necessitating a relatively high voltage. This high voltage impulse together with the distributed capacity of the winding, particularly where the winding comprises a plurality of coils, gives rise to transient oscillations in the winding which by continuing during the next forward sweep of the beam seriously interfere with the scanning. It is the object of my invention to provide an improved cathode ray tube having means whereby the production of transient oscillations in its deflection winding is greatly reduced if not substantially eliminated.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 illustrates a cathode ray tube embodying my invention; Fig. 2 is a cross-section of the ray deflecting part of the tube shown in Fig. 1 drawn to a larger scale; Fig. 3 is an end view of the deflecting means shown by Fig. 2; and Fig. 4 is a circuit diagram.

The cathode ray tube illustrated by Fig. 1 comprises an evacuated envelope 1 which may be of the well-known form having a tubular portion 2 containing the beam emitting cathode together with the anode and focusing means and a conical part having the end wall 3 against which the cathode beam is directed. For causing the ray to move over the end wall of the tube, for example, to cause it to scan the end wall when the tube is used for television purposes, I provide the tube with two windings arranged to produce two magnetic fields extending transversely of the tubular portion and at right angles to each other. These windings are supported on the annular member 5 which is shown provided with slots for receiving the winding. The supporting member 5 may be magnetic or non-magnetic. I have chosen to illustrate the member 5 as comprising a laminated iron core which is clamped between the two rings 6 and 7 by means of the bolts 8. These bolts also

serve to support the enclosing casing 9 through the angle brackets 10.

Each of the windings comprises a plurality of separate sections or coils, the one winding comprising the two small coils 12, the two coils 13 of intermediate size, and the two large coils 14. Likewise the other winding comprises the small coils 12', the intermediate coils 13', and the large coils 14'. It will be noted that the coils of one winding produce a magnetic field extending vertically, as shown in Fig. 3, while the coils of the other winding produce a magnetic field extending horizontally. Each of the coils preferably has the same number of turns; however, the coils of different size will differ in resistance and in inductance.

In accordance with my invention I provide each section or coil with an individual damping resistor, the several resistors being represented by 15. These resistors conveniently are supported from the clamping ring 6 by means of the insulating ring 16, the ends of the resistors being suitably connected across the coils with which they are associated. The circuit arrangement of the coils 12, 13, and 14 forming the winding producing the horizontal sweep of the cathode beam together with the damping resistors 15 connected across the coils is represented by Fig. 4. The resistances of the several resistors are proportional to the inductances of the coils which they bridge. The total inductance of the coils forming the winding may, for example, be 0.1 henry and the total resistance of the damping resistors may, for example, be 11,500 ohms. Fig. 4 shows one winding comprising the several coils connected in series and constituting the output circuit of the electron discharge amplifier 18 whose input circuit may be supplied with a suitable wave for inducing the desired scanning movement of the cathode beam.

With the damping arrangement which I have devised, I have found that transient oscillations in the various parts of the winding are greatly reduced if not entirely eliminated whereas, when a single resistor is bridged across the entire winding, transient oscillations are sometimes set up in various coils of the winding which, while not appearing at the ends of the winding, nevertheless are present in some of the separate coils with the result that they greatly interfere with the smooth scanning movement of the beam.

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

1. A cathode ray tube having beam deflecting means comprising a winding adjacent the tube in-

cluding a plurality of separate cooperating coils having different inductances and an individual damping resistor connected in shunt with each of said coils, the resistances of the resistors being substantially proportional to the inductances of the coils which they shunt.

2. A cathode ray tube having beam deflecting means comprising an annular supporting structure on the tube, a plurality of cooperating coils of various sizes supported thereby and an individual resistor connected across each of said coils for damping transient oscillations therein, the resistance of each resistor being substantially proportional to the inductance of the coil which it shunts.

3. A cathode ray tube having beam deflecting means comprising an annular slotted member surrounding said tube and a winding thereon, said winding comprising a plurality of separate coils of different sizes each having substantially the same number of turns and engaging in different slots whereby they differ in resistance and inductance and a separate resistor connected in shunt with each coil, the resistance of each resistor being substantially proportional to the inductance of the coil which it shunts.

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