Feb. 14, 1939. K. SCHLESINGER 2,147,553

HIGH-FREQUENCY TRANSFORMER

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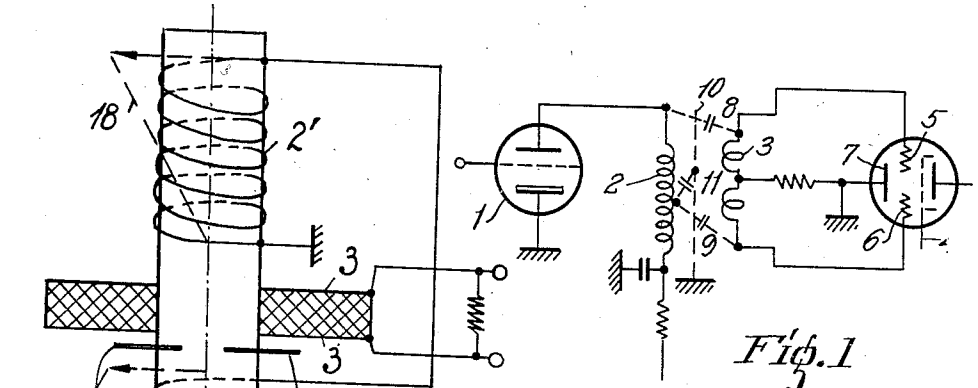


Fig. 3

Fig. 1

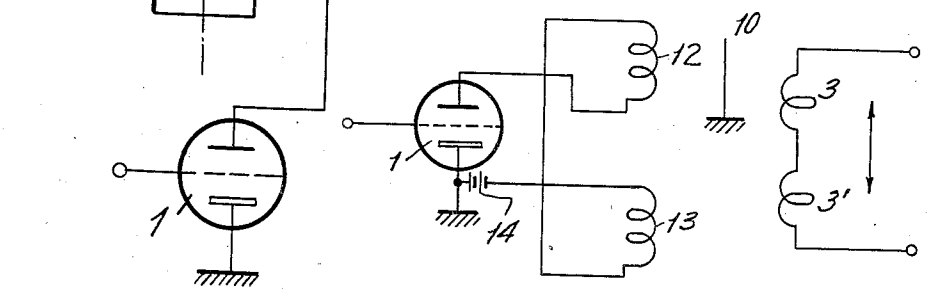


Fig. 2

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HIGH-FREQUENCY TRANSFORMER

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4 Claims. (Cl. 178—44)

In the high-frequency art the production of a purely inductive coupling between two coils represents a frequent problem. The elimination of a capacitative coupling between windings is somewhat difficult. The problem is rendered particularly difficult if push-pull operation is desired in the secondary circuit and the potentials of the secondary terminals require to be exactly equal and opposite in phase with regard to earth.

The subject matter of the invention is constituted by constructions of high-frequency transformers, which completely fulfil the requirements imposed, and which will be described in connection with the accompanying drawing, in which exemplary embodiments are illustrated. The conditions, which the invention is exceeding from, are explained in conjunction with the connection diagram shown in Fig. 1 of a rectifier stage for television receivers.

Fig. 2 shows an embodiment for the remedy of the capacitative coupling.

In Fig. 3 an exemplary embodiment is illustrated using cylindrical coils for the one and a disc winding for the other coil group.

In conjunction with Fig. 1, the primary coil 2 of a H. F. transformer is excited by an amplifier tube 1, whilst the secondary coil 3, which preferably consists of two winding sections spaced apart, and disposed over the primary 2. The receiving rectifier 4 requires oppositely phase voltages on the two grids 5 and 6 in relation to the cathode 7, which is connected with earth. This is prevented by capacities 8 or 9, which result in the grid potentials not being exactly in phase opposition.

If a screening means 10 is placed between the whole length of the coils, which in the manner known per se requires to be protected by means of a longitudinal slot against the occurrence of eddy currents, the following disturbing effects occur:

1. The capacitative load of both coils and accordingly the inertia of the arrangement in relation to the highest modulation frequencies is increased.

2. There is developed on account of the presence of a part capacity 11 between primary coil and screen a very short-wave resonance point for the primary coil, which particularly in the case of low-tuned transformers may coincide with the carrier wave and considerably interfere with the image. According to the invention, the space between the screen 10 and the coil 2 is increased until this interference resonance has been shifted to a sufficient extent into the short wave zone.

A further remedy is provided in Fig. 2. The primary coil of the transformer is divided into two halves 12 and 13 with the same direction of winding. These are connected, as shown, and fed at the centre by the amplifier tube 1. It is then merely necessary to place a screening ring 10 over the upper of the two coils, and connect the same with earth, so that on the one hand the capacitative load is decreased, and the occurrence of a short-wave resonance point will be more and more avoided the shorter the screening ring 10 is made. The secondary coil 3, as before, is composed of two spatially separated sections 3 and 3' and, if these are moved in the direction of the arrow, adjustment of the counter-cadence potentials is effected. Any capacity coupling is overcome by the short screen 10. According to the invention, this adjustment is also possible if the secondary coil is not composed of two separated sections, but is narrowly wound as coil of small length. It is then also possible for instance to reduce the length of the screening means still further, and thus to diminish the capacitative coupling to the primary coil and its inclination to produce the stated resonance point. Preferably the two winding sections 12 and 13 of the primary coil are then disposed in very close spatial relation.

The capacitative loads and couplings may be made even less when employing disc coils than in the case of the stated transformer constructions with cylindrical coils, and they are particularly low when employing in accordance with the invention a cylindrical winding for the one and a disc winding for the other coil group.

This is explained by Fig. 3 which relates to a transformer free of capacitative influence, in which a screening means is employed.

In Fig. 3 an amplifier tube 1 again supplies the primary coil of the transformer, which in accordance with the invention is divided into two halves 2 and 2'. The distribution of the potential along the primary winding is shown by broken lines 17 and 18. The secondary coil 3 is constructed as a flat coil, and accordingly has only a small capacity coupling with the ends of the primary windings. Since the end of the upper cylindrical primary coil 2' nearest the flat coil is earthed in accordance with the connection, merely a negligible influence on 3 can emanate from this point. On the other hand capacitative coupling will occur between the inner end of the winding 2 and 3. To eliminate this coupling a

screen 10' is interposed and connected with earth. In the arrangement according to the invention the distance between 10' and the adjacent windings may be made comparatively large (approximately 3 mm.), and the detrimental capacity coupling to earth very small, as by the arrangement of the primary coils 2 and 2' on either side of the secondary coil 3 the primary field is made homogeneous to such extent that a detrimental recession of the inductive coupling is not to be feared even with relatively large linear expanse of the transformer.

I claim:

1. A high-frequency coupling network more particularly for the use in circuits for television purposes comprising a transformer having a primary and a secondary winding and screening means for preventing the capacitative coupling-effect in order to have a purely inductive coupling-effect between the primary and secondary, said primary being divided into two winding sections, said sections being wound separately and adjacent on the same axis, the inner end of each one in the middle of said primary being the input terminal and the output terminal respectively for the operating oscillations, the opposite ends of which being connected to one another so that said two halves of the primary are traversed by the current in the same direction, said secondary consisting of two spatially separated windings being connected in series and wound in the same direction and being adjustable in its situation in relation to the primary, said screening means being arranged as an earthed partial screen in form of an earthed ring over one of the halves of the primary.

2. A high-frequency coupling network more particularly for the use in circuits for television purposes, comprising a transformer having a primary and a secondary winding and screening means for preventing the capacitative coupling effect in order to have a purely inductive coupling-effect between the two windings, said primary having two separate winding-halves arranged separately on a cylinder, the inner end of one half of said primary (i. e., the end towards the middle of the cylinder) being connected to earth, the corresponding opposite end being connected to the inner end of the other half of said primary and the opposite end of the latter forming the input terminal, said secondary being constructed as a flat coil being arranged to be shiftable between the two halves of said primary, said screening means being arranged between the flat coil and the one half not earthed of the primary in form of an earthed ring.

3. A high frequency coupling network more particularly for the use in circuits for television purposes comprising a transformer having a primary and a secondary winding and screening means for preventing the capacitative coupling effect in order to have a purely inductive coupling effect between the primary and secondary, said primary being divided into two winding-sections, said sections being wound separately and adjacent on the same axis and connected in series as to produce the same direction of magnetic flux, one of the two inner adjacent terminals of said winding sections being connected to earth and the section not earthed being screened from the secondary by said screeninhg means which is grounded, to reduce capacity coupling.

4. A high frequency coupling network more particularly for the use in circuits for television purposes comprising a transformer having a primary and a secondary winding and screening means for preventing the capacitative coupling effect in order to have a purely inductive coupling effect between the primary and secondary, said primary being divided into two winding-sections, said sections being wound separately and adjacent on the same axis and connected in series as to produce the same direction of magnetic flux, one of the two inner adjacent terminals of said winding sections being connected to earth and the section not earthed being screened from the secondary by said screening means which is grounded to reduce the capacity coupling, said secondary being constructed as a flat coil being arranged to be shiftable between the winding sections of said primary.

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