

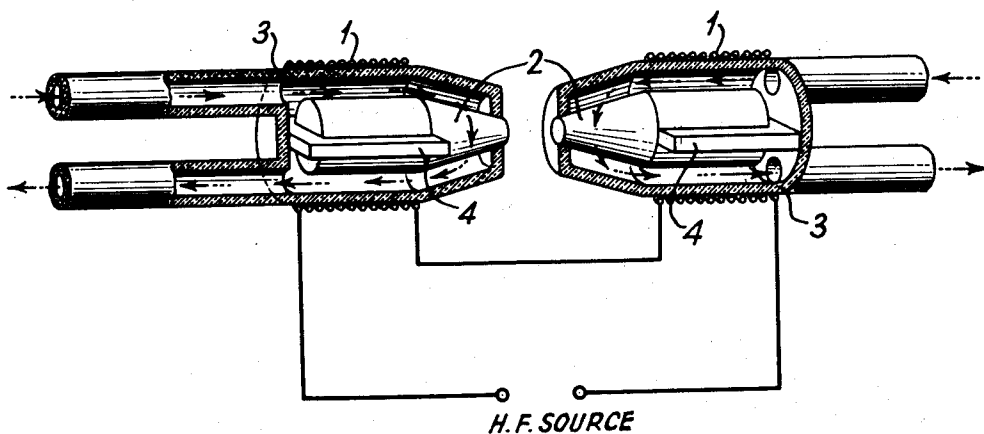
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RADIO TUBE MANUFACTURE

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RADIO TUBE MANUFACTURE

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2 Claims. (Cl. 219-47)

This invention relates to means for heating metal parts in vacuum or radio tubes by means of high frequency eddy currents.

It is usual to arrange the discharge tube whose metal parts are to be heated, in a coil through which high frequency current is passed, or place flat coils on one or both sides of the tube. This method entails difficulties where it is desired to subject certain metal parts to more heat than adjacent parts. If the parts to be heated are near lead-in seals for example, it is often difficult to sufficiently localize the inductive field as to prevent damage to the seals. The field of the usual coils has such a spreading action that all parts of same size throughout the tube are heated the same amount.

In accordance with this invention, means are provided to concentrate the high frequency field to such a degree that only the parts desired will be heated, while the parts which are to remain unheated are situated outside the said field although only a short distance removed from the heated parts. The improved heating means consist of ferrous magnetic cores, such as iron cores, between the ends of which the concentrated high frequency field is formed. In order that at the ordinary high frequencies all of the magnetic line of force extends through the core, it is preferable that the core be of finely divided particles of iron.

In order to avoid an excessive heating of the iron core at the high power required, it is advisable to cool the cores with cooling fluid.

An example of construction of the improved heating means of this invention is shown in the drawing. Two coils connected to a high frequency source may be connected for instance in series. They are wound about the iron cores 2 which are surrounded by a cooling cylinder 3. This cooling cylinder has a separation wall 4 by which it is divided into two halves so that the cooling liquid arrives at the one half and leaves at the other half. The cooling cylinder proper

should consist of insulating material so that no eddy currents can be induced therein.

The cores or pole pieces 2 are of powdered material of high magnetic permeability to reduce high frequency losses and heating within the cores, and are each preferably molded or machined into solid cylinders with a tapered end to concentrate the high frequency magnetic field between the adjacent tapered ends of the cores. The high frequency source to which coils 1 are connected may be any oscillator capable of generating current of the frequency usually employed for high frequency heating in the manufacture of radio tubes. Frequencies between 300 and 750 kilocycles are usually employed in heating the metal parts of radio tubes during exhaust.

I claim:

1. A device for heating selected metal parts of a radio tube by high frequency induction comprising two cylindrical metal cores of high magnetic permeability, the cores being tapered at their ends and adapted to be placed with the small ends of the cores on opposite sides of the selected metal pieces to be heated, a tubular jacket of insulating material coaxial with each core and sealed liquid-tight to the core at the small end, turns of a coil coaxial with and surrounding each core wound on the outer surface of each of the jackets, and a high frequency source connected to said coils.

2. Means for concentrating the magnetic field of a high frequency heating device, comprising two cylindrical cores of powdered metal of high magnetic permeability, the ends of the cores being spaced and adapted to be placed on opposite sides of the metal pieces to be heated, a tubular jacket of insulating material for cooling fluid surrounding each core and joined fluid-tight to the ends of the cores, a high frequency source, and a wire coil wound on each jacket connected to said source.

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