June 27, 1950 H. K. SMELTZLY 2,512,976

MEANS FOR PRODUCING CONSTANT CURRENT FROM CONSTANT POTENTIAL

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Fig. 1

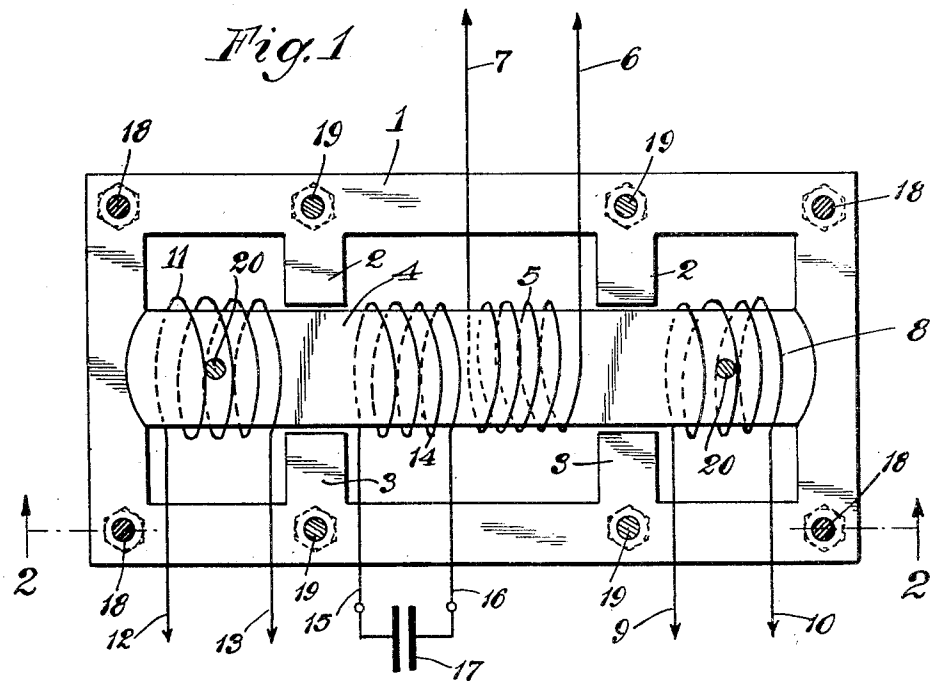
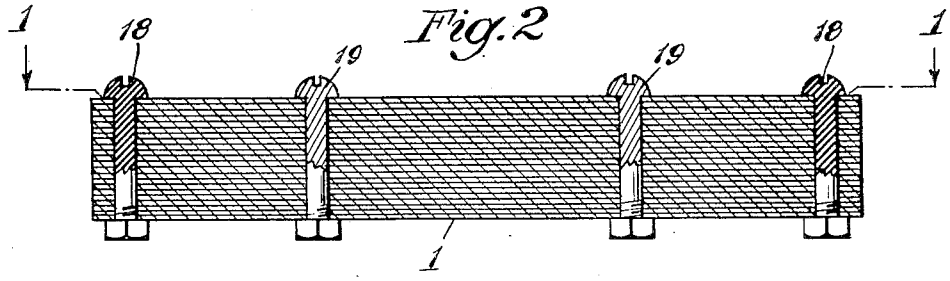


Fig. 2



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MEANS FOR PRODUCING CONSTANT CURRENT FROM CONSTANT POTENTIAL

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2 Claims. (Cl. 323—44)

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My invention relates to an improvement in means for producing constant current from constant potential, and has for one object to provide a transformer which brings this about without the use of separate reactor and transformer.

Another object of my invention is to provide a device wherein a single transformer may be adjusted conveniently and easily to take care of a wide range of voltage in a constant current circuit, and wherein it may be adjusted to take care of a wide range of current in a constant current circuit.

Another object is to provide a device of the class indicated, where some of the necessary holding parts are formed of a special material as a protection against excessive voltages.

It is well understood that the use of a T-connected resonant circuit will result in a transformation of constant potential to constant current, but when such a circuit, as is well known in the art, is used, the apparatus becomes prohibitively expensive because of the use of separate reactors and transformers.

My invention is illustrated diagrammatically in the accompanying drawing, wherein:

Figure 1 is a diagrammatic plan view; and

Figure 2 is a longitudinal section taken at line 2—2 of Figure 1.

Like parts are indicated by like characters in the specification and drawing.

1 is a transformer core generally of the ring type and having intermediate its ends a plurality of pairs of shunt projections 2, 3. An air gap is defined between each of the pairs of shunt projections. 4 is a core member, bar-like in shape and positioned between and out of contact with the shunt projections 2, 3. It is in contact with and supported by the ends of the ring of the transformer core 1. Air gaps as shown in Figure 1 are provided between it and the shunt projections. The core 1 and the bar 4 are preferably made of a plurality of laminations of ferrous metal.

5 is a primary coil positioned about the bar 4. It is provided with leads 6 and 7. 8 is a secondary coil positioned about the bar 4 and having leads 9 and 10 extending to lamps or other members to be energized by current transmitted from the device.

11 is a secondary coil positioned by the bar 4 and provided with leads 12 and 13 which also extend to lamps or other members to be energized by current from the device.

14 is a tertiary coil positioned about the core 4

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and provided with leads 15 and 16 which are connected to a capacitor 17.

To protect against excessive voltage across the leads 9 and 10, and across the leads 12 and 13, the core adjacent its two ends is secured together by nonmagnetic rivets or other attaching means 18. These rivets may be formed of nonferrous metal or plastic or insulation, so long as the material is nonmagnetic. The use of the members 18 holds the flux to a minimum, because the saturation of those parts of the core associated with the secondary coils 8 and 11 limits the voltage across the leads 9 and 10 and across the leads 12 and 13. This is due to the fact that when the secondary portions of the core are saturated, the flux short-circuits across the air gaps between the pairs of extensions 2 and 3 and the adjacent portions of the member 4. The purpose of the capacitor or condenser 10 is to make the exciting current leading in exactly the same way in which the condenser would work in a T-connected resonant circuit.

If desired, the laminations of the member 1 may be additionally secured together by rivets or bolts 19 which will normally be of ferrous or other magnetic metal or alloy. Similarly, the laminations of the member 4 may be secured together by rivets, bolts or other fastening means 20 which may be of any desired material and will normally be of steel or other ferrous or magnetic material.

I claim:

1. Means for producing constant current from constant potential, which includes a ring-type transformer core, pairs of extensions formed as parts of the core and extending toward each other, a core member positioned between the ends of and out of contact with said extensions, the extensions and the last-mentioned core member defining air gaps, a portion of the core being formed of a plurality of members, and securing means for securing said members together, said securing means being formed of nonmagnetic material, a primary winding and a tertiary winding being associated with the same part of the core, the non-magnetic securing means reducing the magnetically effective cross-section of the core at points outside the shunt magnetic circuit, the secondary coils being disposed outside the shunt circuit and in the saturable part of the core.

2. Means for producing constant current from constant potential, which includes a ring-type transformer core, pairs of extensions formed as parts of the core and extending toward each other, a core member positioned between the ends of and

out of contact with said extensions, the extensions and the last-mentioned core member defining air gaps, a portion of the core being formed of a plurality of members, and securing means for securing said members together, said securing means being formed of nonmagnetic material, a primary winding and a tertiary winding being associated with the same part of the core, and a capacitor in series with both ends of the tertiary winding the tertiary winding and the capacitor being in closed circuit out of electric connection with the primary and secondary coils, the nonmagnetic securing means reducing the magnetically effective cross-section of the core at points outside the shunt magnetic circuit, the secondary

coils being disposed outside the shunt circuit and in the saturable part of the core.

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