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W. F. ALDER

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TRANSFORMER CHOKED COIL AMPLIFIER CIRCUIT

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FIG. 2.

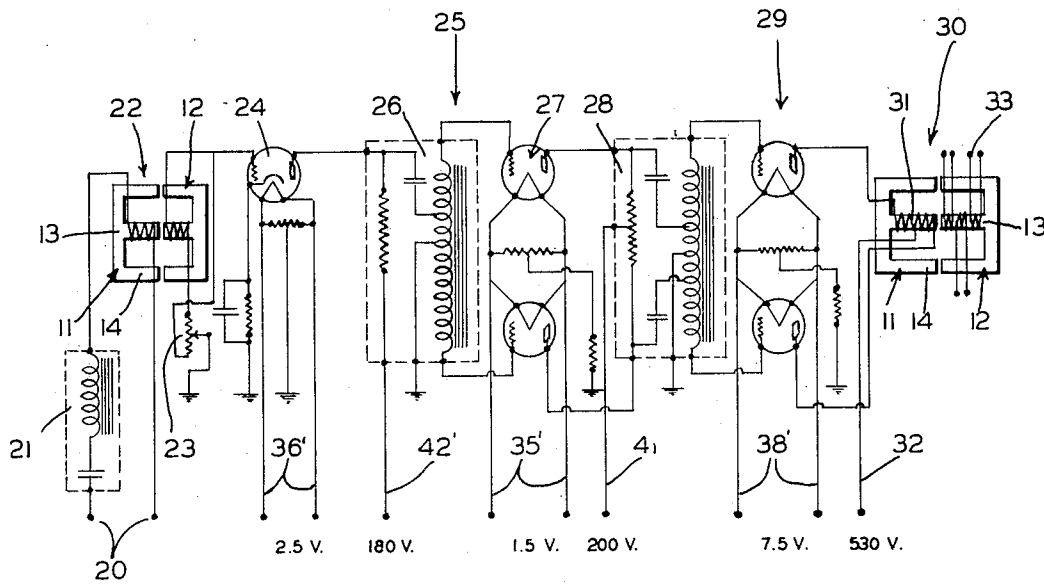


FIG. 3.

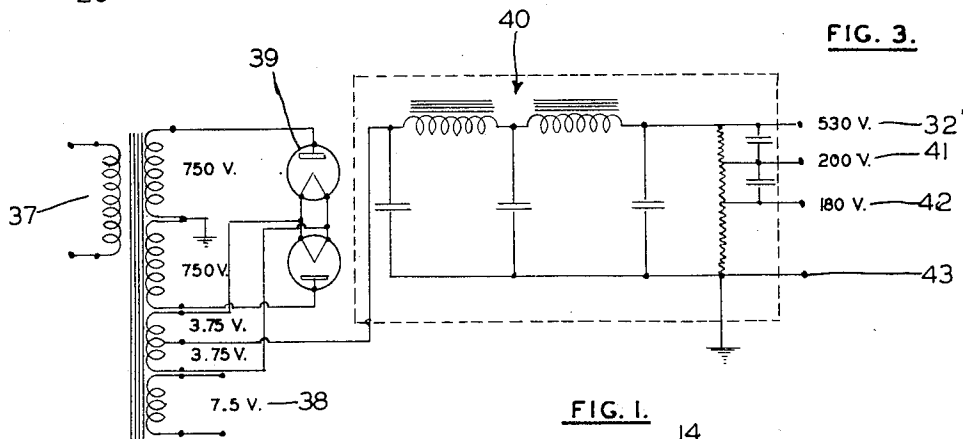
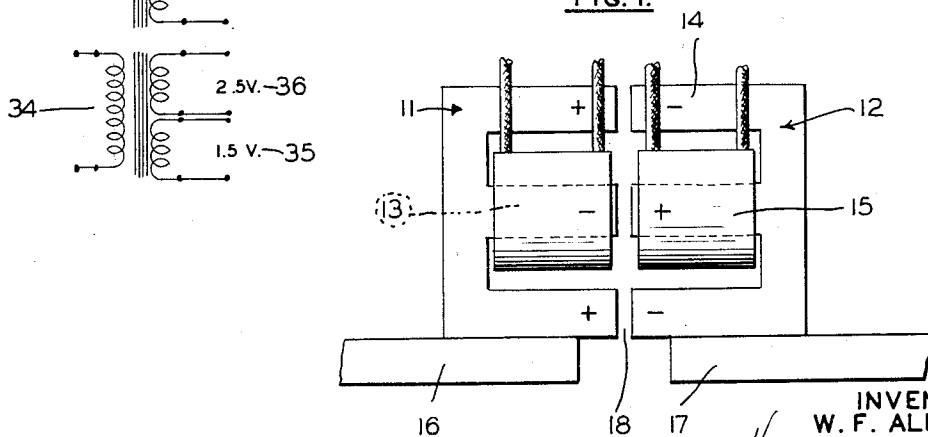


FIG. 1.



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TRANSFORMER CHOKED COIL AMPLIFIER
CIRCUITWilliam F. Alder, Los Angeles, Calif., assignor
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2 Claims. (Cl. 179—171)

My invention pertains to an amplifier actuated by two separate choke circuits with no direct connection between the input and output members.

An object of my invention is to employ choke electrical circuits which are associated to form a variable magnetic coupling and in which there is no core subjected to magnetic action common to the input and output circuits. And in this connection a further object of my invention is placing the cores whereby there is an inductive coupling between the choke coils of the input and output circuits.

A further object of my invention is an apparatus and method of amplifying, particularly suitable for audio-frequency currents, in which a pair of choke coils are magnetically and inductively coupled with no physical contact. And in this connection a more detailed object of my invention is in the employment of two distinct and separate choke coils, each in a separate circuit, but in which the metal cores of each of the chokes are out of physical contact one with the other, but which may be adjustably spaced in close juxtaposition.

A further object of my invention is utilizing two distinct and separate choke coils arranged in the manner above described, one of which coils is connected to a suitable electrical pickup, such as electrical waves for sound reproducing and the other side of the coupling forms the input of an amplifier circuit, the output of which to suitable instruments such as loud speakers, is by means of choked inductive and magnetic couplings having no direct physical contact.

A particular object of my invention is forming a choked magnetic and inductive coupling, each element of which has a metal core arranged in the shape of the letter E and with a winding on the center leg or branch of the E. The ends of the branches of the two E's are placed close together, but adjustably mounted to vary the distance between the cores. When the coil on one of the cores is energized by an alternating or fluctuating current, a similar current is produced in the coil on the other core.

In constructing my invention, I employ cores of magnetic material, preferably made E-shaped, having the winding on the central leg or branch of the E. This forms one pole and the upper and lower branches or legs of the E, form the other or opposite pole. These two separate E-shaped choke coils are placed close together, with the ends of the branches slightly spaced apart, and this spacing being variable. I also illustrate my invention in connection with a suitable ampli-

fying circuit, but it is to be understood that many other types of amplifying or other circuits may be utilized in connection with my type of coupling.

My invention is illustrated in the accompanying drawing, in which,

Figure 1 is a side elevation of a coupling made in accordance with my invention;

Fig. 2 is an electrical diagram showing a hookup with my couplings at the input and output ends of an amplifying circuit;

Fig. 3 is an electrical diagram illustrating a suitable manner of obtaining a source of power for the circuit of Fig. 2.

In the accompanying drawing, I show two distinct choke coils 11 and 12, each E-shaped, having a central leg or core 13 with lower and upper legs or branches 14. On the central leg 13 there is an electrical winding 15. One of these windings may be connected to a sound circuit, and the other to sound reproducing units, there being suitable amplification devices in each of the circuits.

The cores are preferably mounted on a suitable stand, one being on a stand illustrated at 16 and the other at 17; these stands being spaced apart by a gap 18. The ends of the cores are preferably adjusted with a thin sheet of paper or the like, between the abutting ends of the cores, to provide a small air gap when this sheet of paper is removed. It is obvious that the cores may be adjusted to secure the desired spacing and thereby increase or decrease this air gap without physical contact of the metal cores of the two chokes. This construction gives two distinct and separate choke coils, each having its own circuit and in which the magnetic cores are so placed that they form magnetic circuits. The core having the windings thereon, will be of one polarity and the upper and lower cores will be of the opposite polarity. The coils themselves have an inductive relation forming an inductive circuit between the two coils. With this construction one of the coils may be connected to a circuit linked with a talking circuit or other circuit having a modulated current. The other coil may be connected to electrical sound reproducing units with suitable amplification.

Referring to Fig. 2, the electric input or pickup is indicated by the numeral 20, this having a filter 21 therein, of the type known as a scratch filter. This circuit leads to a choke inductive coupling designated generally by the numeral 22, which is of the same character as that illustrated in Fig. 1. The coil on the second element of the choke inductive and magnetic coupling has

a connection through a volume control 23 on one side of the circuit; the other side of the circuit is indicated as being connected through an amplifier tube 24, thence through an input push and pull type of unit designated generally by the numeral 25 having the usual transformer unit 26, a pair of amplifying tubes 27 and a variable resistance 28. The current so amplified is passed through a second push and pull type of amplifier 29, the output of which is taken to an output choked magnetic and inductive output coupling 30. In this it will be noted that the winding 31 on one of the E-shaped elements has connections to the plates of two tubes of the push pull set 29.

Connected to the same winding there is a lead 32 to a direct current positive high voltage. The complementary unit of the output coupling 30 has a winding with a plurality of taps 33, these being adapted to be connected to a plurality of loud speakers or the like, where the circuit is used for a special reproducing circuit.

In Fig. 3 I illustrate a suitable power source for connection in the circuit of Fig. 2. A supply line transformer 34 is illustrated as producing a voltage 35 of 1.5 volts and a second voltage 36 of 2.5 volts, which are connected to the respective leads indicated in Fig. 2. These have the complementary connections 35' and 36' of Fig. 2. There is also a line supply 37 having a transformer with an output connection 38 of 7.5 volts having a connection 38' indicated in Fig. 2. This circuit is indicated as having high voltage rectifiers 39 and a combination filter and choke unit designated generally by the numeral 40. From such unit there is a voltage output indicated as 32' connecting to the positive voltage 32 of Fig. 2, indicated at 530 volts. The positive output 41 has a connection 41' in the circuit of Fig. 2, this being indicated as 200 volts. The positive output 42 is connected at 42' of Fig. 2 and is indicated as 180 volts. A negative output 43 is a ground connection.

The above circuit is merely illustrative of a suitable manner of connecting the choke coils

which have no direct physical contact one with the other but have a magnetic and an inductive coupling and as above mentioned this coupling may be varied by spacing the cores with a thin sheet of paper between the opposing core ends and then withdrawing such paper, or may be suitably adjusted in any other desirable manner.

It is to be understood that the details of the invention as herein disclosed, are subject to alteration within the spirit or scope of the appended claims.

I claim:

1. In an electrical circuit, an input coupling having a pair of choke coils, each having a metal core with a winding thereon, the cores being in juxtaposed position but out of physical contact, one of the windings being connected to a pickup circuit, means to amplify the current from the other winding, an output coupling having a pair of choke coils, each with a metal core with a winding thereon, the said latter cores being juxtaposed but out of physical contact.

2. In an electrical circuit, an input coupling having a pair of choke coils, each arranged with a metal core having a leg with a winding thereon and one or more legs without windings, the said windings being separate, means to position the said cores with the legs having the windings juxtaposed and those without the winding juxtaposed, one of the windings being connected to a pickup circuit, an amplifying circuit connected to the other winding, an output coupling having a pair of choke coils, each having a metal core with a leg with a winding and one or more legs without a winding, the legs with the windings being juxtaposed and those without the windings being juxtaposed, the windings on one of the legs being connected to the amplifier circuit, and means to make an electrical connection to the other winding on the output coupling all of the juxtaposed legs being out of physical contact.

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