

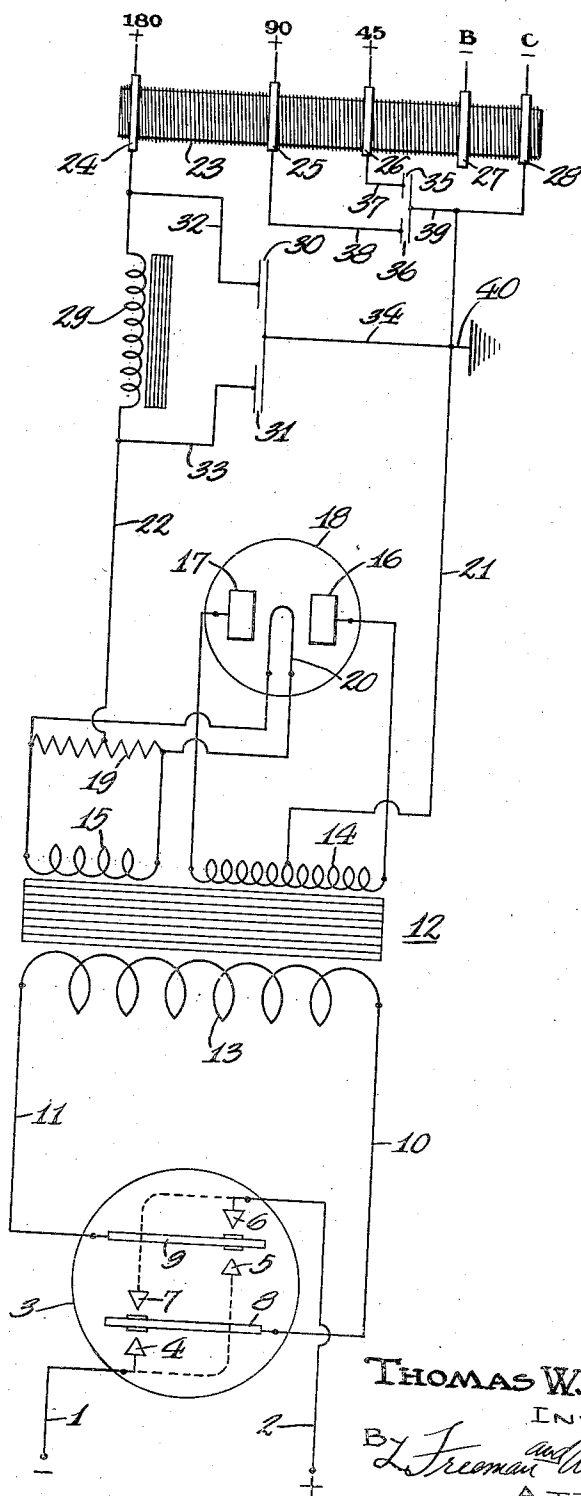
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SYSTEM OF ELECTRICAL DISTRIBUTION

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SYSTEM OF ELECTRICAL DISTRIBUTION

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This invention relates to systems of electrical distribution. More particularly it relates to the transformation of small direct current potentials to higher direct current potentials. One of the uses to which the invention may be put is for supplying the needed potentials to radio apparatus, and, more particularly, where a source of direct current of too small a potential for direct use is the only source available, as when radio apparatus is used on an automotive vehicle.

Accordingly, one of the objects of the invention is the provision of means whereby current from a direct current source may be converted to direct current at a higher potential, and more particularly where such higher potential is unidirectional and non-fluctuating.

Another object is the provision of means whereby the potential from a source of direct current is first converted into an alternating potential and then is reconverted to a non-fluctuating unidirectional potential.

A more specific object is the provision of means for converting an undulating unidirectional electromotive force into one which is non-undulating.

A further object is the provision of means for attaining the hereinbefore noted objects in an efficient and inexpensive manner. Other objects will appear as the description of the invention proceeds.

The novel features of my invention will appear from this specification and the accompanying drawing forming a part thereof and showing one embodiment of the invention, and all these novel features are intended to be pointed out in the claims.

The single figure of the drawing is a diagrammatic showing of a system of distribution embodying the invention.

Referring to the drawing, conductors 1 and 2 may be connected to a source of direct current (not shown). The conductors 1 and 2 are connected to any suitable means 3 for transforming the direct current supplied by the source into an alternating current. The means 3 is here shown as of mechanical form and comprises stationary contacts 4 and 5 connected to conductor 1 and stationary contacts 6 and 7 connected to conductor 2. The contacts 4 and 7 are disposed opposite each other and between them an armature 8 carrying contacts co-operable with the contacts 4 and 7 is adapted to vibrate. In a similar manner the contacts 5 and 6 are oppositely disposed and between them an armature 9 carrying contacts co-operable with the contacts 5 and 6 is adapted to vibrate. The armatures 8 and 9 may be vibrated

in any suitable manner by means not shown so that when armature 8 is in contact with contact 4 armature 9 will be in contact with the contact 6 and when armature 8 is in contact with contact 7 armature 9 will be in engagement with contact 5.

The armatures 8 and 9 are connected by conductors 10 and 11 respectively to the terminals of a primary winding 13 of a transformer 12. The transformer 12 is also provided with a secondary winding 14 and with a tertiary winding 15.

The secondary winding 14 has its terminals connected respectively to plates 16 and 17 of an electron discharge device 18. The number of turns in the secondary winding 14 is properly selected so that the alternating current potential across said secondary winding is higher than the direct current potential across the conductors 1 and 2 and is of a predetermined amount.

The tertiary winding 15 has its terminals connected respectively to a resistor 19, and the terminals of the resistor 19 are in turn connected to a filament 20 of the electron discharge device. The number of turns in the tertiary winding 15 is so selected that the voltage transformation ratio as between the primary 13 and the tertiary winding 15 is such that the electromotive force produced by the tertiary winding 15 is suitable for the proper operation of the filament 20.

A conductor 21 is connected to a neutral point on the secondary winding 14 and a conductor 22 is also here shown as connected to the neutral point of the resistor 19. The conductors 21 and 22 are connected to a resistor 23 as will more fully appear.

The resistor 23 is provided with a plurality of taps 24, 25, 26, 27 and 28, one or more or all of which may be adjustable along the resistor. The conductor 21 is shown as connected to the tap 28 and conductor 22 is shown connected through a reactor 29 to the tap 24.

As indicated on the drawing the tap 27 may be connected to the negative terminal of the "B" connections of radio apparatus while the terminals 26, 25, and 24 may be connected respectively to the 45, 90, and 180 volt terminals of the radio apparatus. If the radio apparatus utilizes negative biasing means, the terminal 28 may be connected to a so-called "C" terminal of the radio apparatus.

In order to smooth out any undulations which may exist in the potential across the conductors 21 and 22, means are provided for bucking out and filtering such undulations, of which means the reactor 29 hereinbefore referred to is a part.

To the end stated there is provided a condenser 31, one terminal of which is connected by a conductor 33 to the conductor 22 on the side of the reactor 29 connected to the electron discharge device. The other terminal of the condenser 31 is connected by a conductor 34 to the conductor 21. Another condenser 30 has one terminal connected by a conductor 32 to the connection between the reactor 29 and the tap 24. The other terminal of condenser 30 is also connected to conductor 34. In addition, a condenser 35 is provided having one terminal connected by a conductor 37 to the tap 26. Still another condenser 36 has one terminal connected by a conductor 38 to the tap 25. The other terminals of the condensers 35 and 36 are connected by a conductor 39 to the conductor 21.

The conductor 21 may be grounded as indicated at 40.

I have found that good results are obtained by using a reactor 29 having an inductance of 20 henries, while the condensers 30 and 31 may have a capacity of eight microfarads each and the condensers 35 and 36 may have a capacity of 250 milli-microfarads each, and the resistor 23 may have a resistance of 15,000 ohms. It is to be understood that while I have given these values as providing a satisfactory performance, I do not limit myself to such values.

The operation of the system in the illustrated embodiment is as follows: the conductors 1 and 2 being connected to a supply of direct current, the device 3 is set into operation and since this device acts to alternately supply the primary 13 with current flowing first in one direction and then in the other, an alternating flux is set up in the core of the transformer 12 which induces an alternating electromotive force in the windings 14 and 15 respectively. The filament 20 is heated and electrons are given off thereby in the well known manner. As a consequence and by reason of the illustrated connections of the conductors 21 and 22, the alternating electromotive force supplied by the secondary winding 14 is converted into, and delivered to the conductors 21 and 22, as a unidirectional electromotive force. This electromotive force may be somewhat undulating in character and it is therefore not delivered directly to the terminals 24 and 28, of the resistor 23. By reason of the filtering and by-passing action of the condensers 30, 31, 35 and 36 in conjunction with the choking action of reactor 29, the electromotive forces between the various taps on the resistor 23 is non-undulating.

It will be obvious to those skilled in the art that the embodiment of my invention herein shown and described may be variously changed, used, or modified, all without departing from the spirit of my invention or sacrificing the advantages thereof, and it therefore will be understood that the disclosure herein is illustrative only, that my invention embodies advantages and uses other than those particularly pointed out or suggested herein, and that my invention is not limited thereto.

I claim:

1. In a system of distribution, as for radio apparatus, adapted to be fed from a source of direct current: a step-up transformer having primary and secondary windings; means for in rapid succession alternately connecting the terminals of said primary winding to said source and then reversing said connections; means for rectify-

ing the alternating potential produced in said secondary winding; and said rectifying means including an electron discharge device having anodes, connected respectively to the terminals of said secondary winding, a cathode, and output conductors connected to said cathode and the mid-point of said secondary winding.

2. In combination: a transformer having primary and secondary windings; a pair of vibratory contacts; a pair of relatively stationary contacts disposed on opposite sides of one of said vibratory contacts; a second pair of relatively stationary contacts disposed on opposite sides of the other of said vibratory contacts; means for connecting said vibratory contacts and said relatively stationary contacts to said source of direct current and to said primary winding so that vibration of said vibratory contacts causes said source of direct current to be successively connected to said primary winding, disconnected therefrom, and connected thereto in the reverse direction, and disconnected therefrom; means for rectifying the alternating potential produced in said secondary winding, said rectifying means including output conductors one of which is connected to the mid-point of said secondary winding.

3. In a system, as for radio apparatus, adapted to be fed from a source of direct current: a step-up transformer having primary and secondary windings; a pair of vibratory contacts; a pair of relatively stationary contacts disposed on opposite sides of one of said vibratory contacts; a second pair of relatively stationary contacts disposed on opposite sides of the other of said vibratory contacts; means for connecting said vibratory contacts and said relatively stationary contacts to said source of direct current and to said primary winding so that vibration of said vibratory contacts causes said source of direct current to be successively connected to said primary winding, disconnected therefrom, and connected thereto in the reverse direction, and disconnected therefrom; means for rectifying the alternating potential produced in said secondary winding, said rectifying means including output conductors one of which is connected to the mid-point of said secondary winding.

4. In combination: a transformer having primary and secondary windings; a source of direct current; a pair of vibratory contacts; a pair of relatively stationary contacts disposed on opposite sides of one of said vibratory contacts; a second pair of relatively stationary contacts disposed on opposite sides of the other of said vibratory contacts; means for connecting said vibratory contacts and said relatively stationary contacts to said source of direct current and to said primary winding so that vibration of said vibratory contacts causes said source of direct current to be successively connected to said primary winding, disconnected therefrom, and connected thereto in the reverse direction, and disconnected therefrom; means for rectifying the alternating potential produced in said secondary winding; and said rectifying means including an electron discharge device having anodes connected respectively to the terminals of said secondary winding, a cathode, and output conductors connected to said cathode and the mid-point of said secondary winding.

5. In combination: a transformer having primary and secondary windings; means for in rapid succession alternately connecting the terminals of said primary winding to a source of

direct current and then reversing said connections; and means for rectifying the alternating potential produced in said secondary winding, said rectifying means including output conductors one of which is connected to the mid-point of said secondary winding.

5 6. In combination: a transformer having primary and secondary windings; means for in rapid succession alternately connecting the terminals
0 of said primary winding to a source of direct cur-

rent and then reversing said connections; and means for rectifying the alternating potential produced in said secondary winding; and said rectifying means including an electron discharge device having anodes connected respectively to the terminals of said secondary winding, a cathode, and output conductors connected to said cathode and the mid-point of said secondary winding.

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