

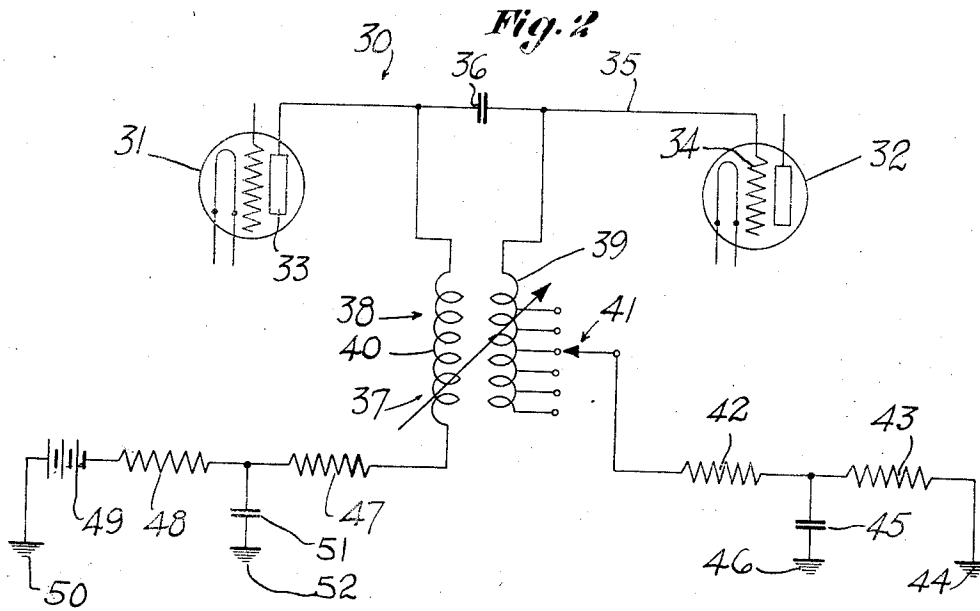
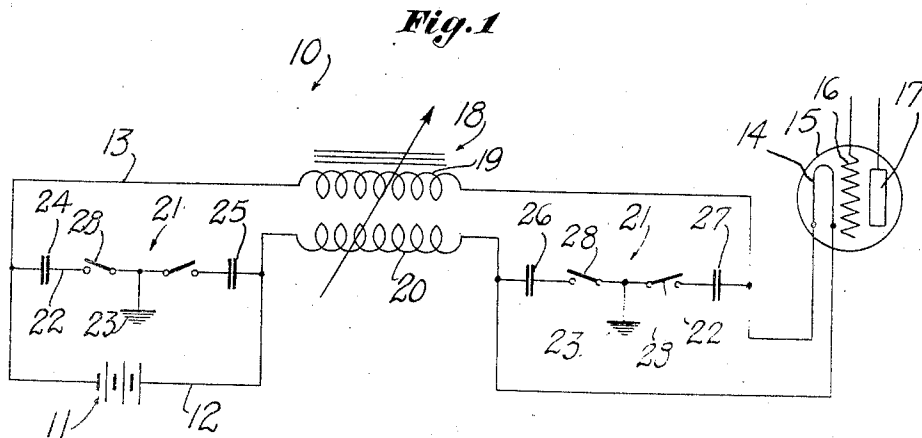
Jan. 12, 1943.

S. WHISK

2,307,979

TUNABLE SUPPRESSOR FOR FILAMENT FEEDBACK DISTURBANCES

Filed Oct. 6, 1941



INVENTOR.
Samuel Whisk
 BY
Paul Schumacher
 ATTORNEY.

UNITED STATES PATENT OFFICE

2,307,979

TUNABLE SUPPRESSOR FOR FILAMENT
FEEDBACK DISTURBANCES

Samuel Whisk, Brooklyn, N. Y., assigner of one-half to Morris Abrams and Morris Zippert, both of Brooklyn, N. Y., jointly

Application October 6, 1941, Serial No. 413,744

1 Claim. (Cl. 250—27)

This business relates to devices for suppressing disturbances that originate in the filament circuits of radio tubes.

One object of the invention is to provide an improved semituned power filter adapted for suppression of disturbances by the conjoint action of a choke coil and a condenser.

Another object of the invention is the provision of improved means for the superior suppression of all local disturbances at different frequencies, especially with respect to the filament circuit of a radio tube.

While chokes and condensers have been used for suppressing feed back in the power supply of radio receivers, I have discovered by long experimentation that some disturbances are nevertheless set up or fed back into the positive side or hot leg of the circuit; others are generated or fed back in the return or negative side of the circuit. Some of these disturbances are generated on the output side of the circuit; others on the input side.

One object of the invention is therefore to provide improved means to overcome these defects.

Then again, I have discovered that the reduction of disturbances while maintaining the desired current did not occur with uniform efficiency especially where different frequencies were involved.

It is therefore another object of the invention to provide improved means for avoiding this difficulty.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claim, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing:

Figure 1 is a diagrammatic view of an apparatus embodying the invention.

Fig. 2 is a similar view showing a modification of the invention.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different con-

structions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawing, 10 denotes a device embodying the invention. The same may include any source 11 of direct current, connected by a circuit 12, 13 to the filament 14 of a radio tube 15, which may comprise the conventional grid and plate 16, 17 respectively. Disposed in the circuit 12, 13 between the power source and the output or tube 15 is a variable transformer 18, comprising inductance coils 19 and 20. Differently stated, the circuit 12, 13 comprises a choke coil 19, the same being arranged to constitute one of the elements of transformer 18. Desirably the coils 19, 20 are wound in like direction.

In order to overcome varying disturbances in the power circuit 12, 13, at varying frequencies, while maintaining the energy of the desired current, I provide means cooperating with the choke or transformer coils or both for grounding the same through capacities at different ends of the transformer coils as may be required. Thus I provide a like unit 21 at each end of the transformer in parallel therewith. For example, a lead 22 is connected across the circuit 12, 13, this lead being centrally grounded at 23. At each side of the ground connection is disposed a condenser, so that for the two units 21, there are provided condensers 24, 25, 26 and 27, all of which may be of like capacitance. By means of switches 28 a connection to ground through capacitance may be made by closing any one or more of the switches 28 in any desired combination.

The device 10 utilizes the various capacitances and the variability of the transformer for eliminating disturbances at different high frequencies. By selective setting of the transformer and of the switches 28, the desired signal current is obtained free of extraneous frequencies. By the provision of a plurality of units 21, the control as above indicated is exercised not only for suppressing the feed back in the power supply of radio receivers, but also disturbances generated or fed back in the return or negative side of the circuit. All such disturbances will be eliminated whether generated on the output or on the input side of the circuit. The device 10 has been found particularly effective where the same is located relatively close to the generators or ignition coils of airplanes and of comparatively small boats.

By this invention, the need for expensive shielding is eliminated, with saving in metal, labor and with increased compactness. When

applied in quantity production, the saving involved is very great.

It will be noted that the principle of the device 10 is also applicable in alternating current circuits for a like purpose, and will serve to minimize 60 cycle modulation disturbances.

In Fig. 2 is shown a modification of the invention including a device 30, but the advantages thereof are best realized when the same is operatively disposed between the second radio frequency detector and the first audio frequency stage; this device 30 like that at 10 serves to eliminate disturbances in the power circuit and reduces undesired frequencies while permitting maintenance of desired current strength.

Accordingly there are shown the second detector tube 31 and the tube 32 for the first audio stage, the plate 33 of the former being connected to the grid 34 of the latter by a circuit 35 having therein a condenser 36. Connected to the lead 35 is a circuit 37 which comprises the condenser 36 and also a variable transformer 38. The latter may include coils 39, 40, of which the former may be variably tapped as indicated at 41 to ground, as by means of series resistances 42, 43, grounded at 44. Intermediate of these resistances is connected a condenser 45 which is grounded at 46. Desirably the coil 40 may constitute the primary, and it is connected to resistances 47, 48 which are in series with a source of power 49 that is grounded at 50. Intermediate of the resistances 47, 48 is connected a condenser 51 grounded at 52. The condensers 36, 45 and 51 may be of like capacitance, the same being chosen according to the power in the circuit 35 as will be apparent to any one skilled in the art.

Efficient operation is obtained by the combined

effects of the variable tapping at 41 and change of angle of a transformer coil to thus vary the phase; this result is rendered possible by the favorable conditions created by the balanced grounding through capacity resistances 42, 43 and 47, 48.

In the interpretation of the invention as claimed, the term resistive means may include condensers such as those in the devices 10 and 30.

I claim:

10 An apparatus including a circuit having a portion for connection to the filament of a radio tube, a source of current for the filament in said circuit, a choke coil in one line of the circuit, an inductance in the other line of the circuit, 15 said choke coil and inductance coil constituting a variable transformer located between the current source and the circuit portion for the filament, the circuit having shunt branches one of which interconnects said lines at one end of the transformer and the other of which interconnects 20 said lines at the other end of the transformer, each branch having individual like control means, each of the latter including a plurality of condensers, a ground connection therebetween, a 25 switch for each condenser located between its condenser and the ground connection, whereby either or both condensers can be connected to said ground connection or disconnected therefrom at will, and either or both control means 30 being operative at will, both branches and their control means being located between the current source and the circuit portion that is connectible to the filament, whereby filament feedback disturbances are suppressed by tuning said apparatus. 35

SAMUEL WHISK.