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M. OSNOS

CIRCUIT ARRANGEMENT FOR HIGH FREQUENCY SYSTEMS WITH FREQUENCY AMPLIFICATION

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Fig. 1

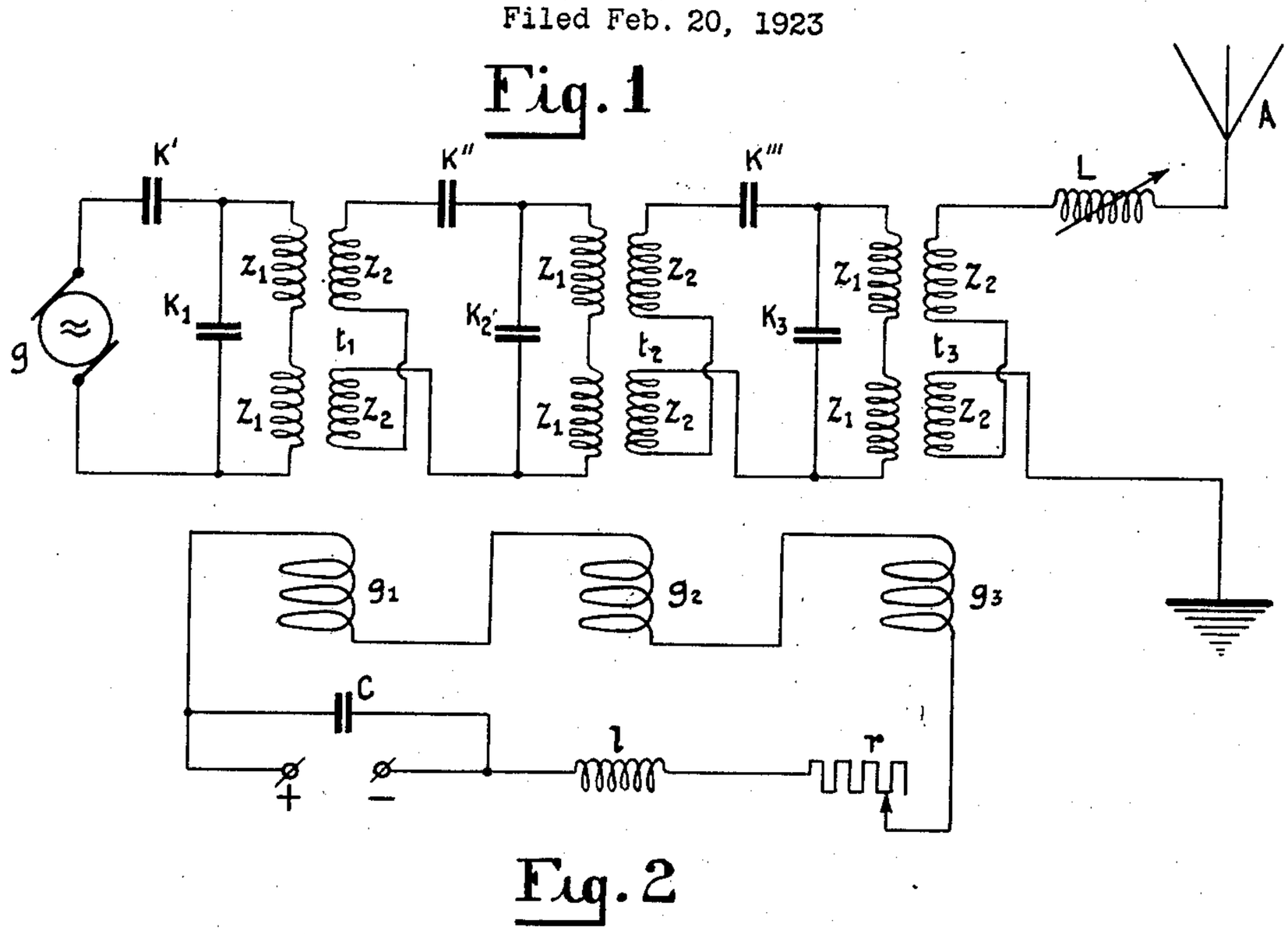


Fig. 2

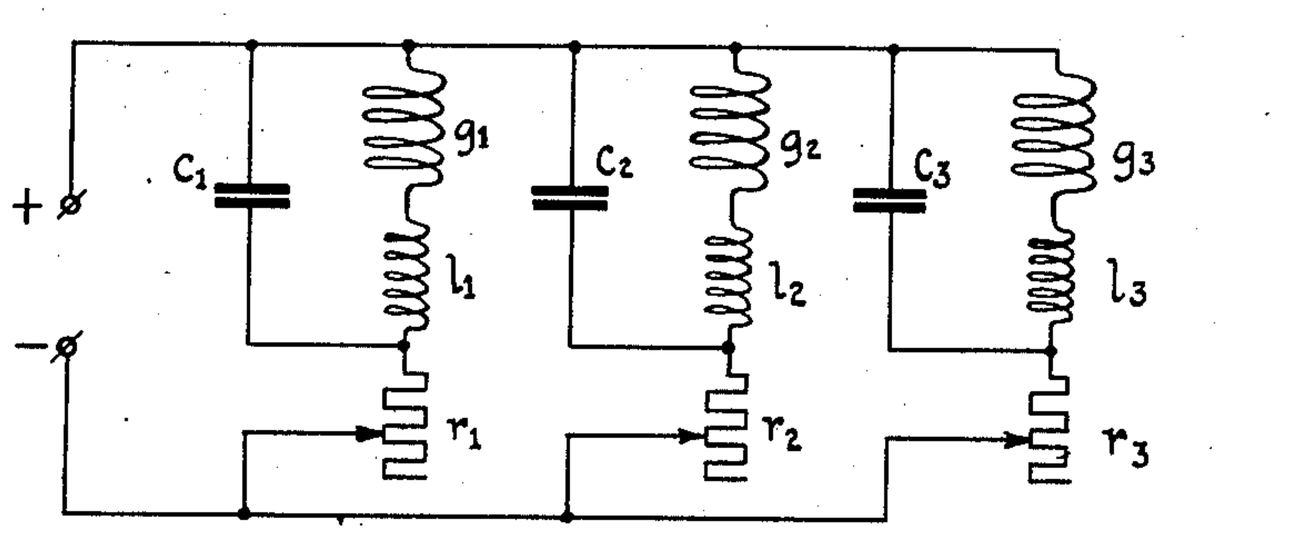
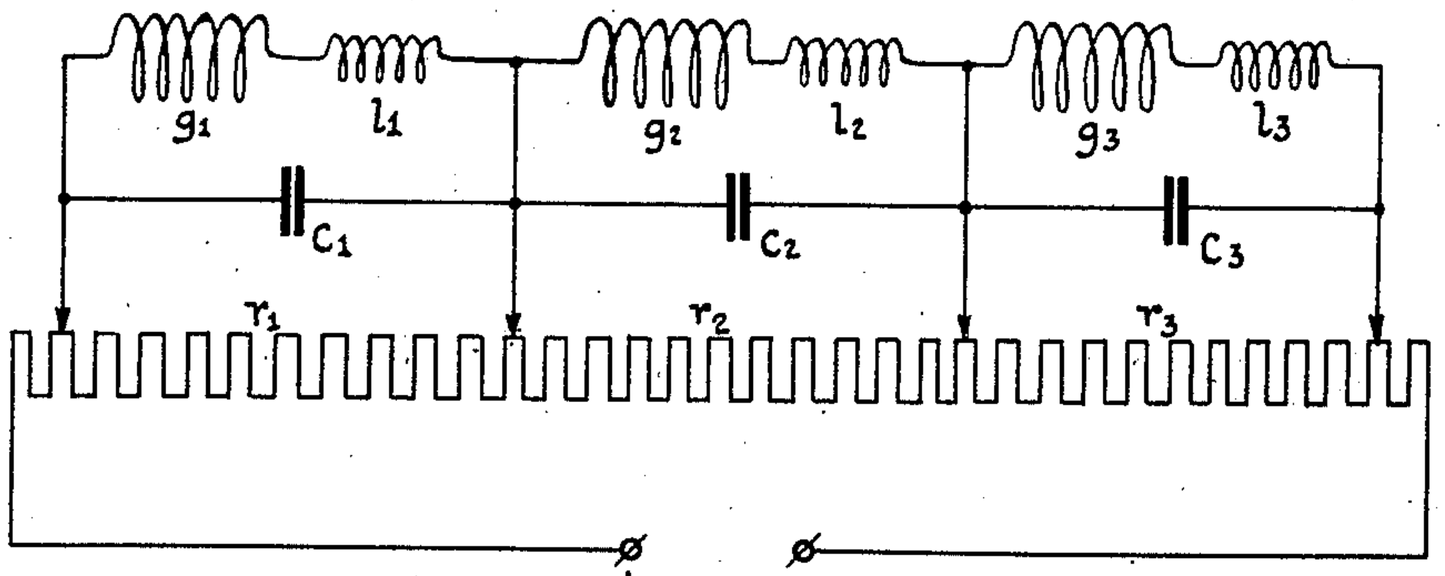


Fig. 3



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CIRCUIT ARRANGEMENT FOR HIGH-FREQUENCY SYSTEMS WITH FREQUENCY AMPLIFICATION.

Application filed February 20, 1923, Serial No. 620,220, and in Germany February 22, 1922.

The present invention relates to a circuit arrangement for improving the operating range and for increasing the output of high frequency systems with frequency amplification in two or more stages by means of fixed frequency transformers having superimposed magnetization with superimposed current, e. g. direct current.

In the drawing,

Fig. 1 is a diagrammatic representation of the circuit arrangement of a high frequency system with frequency amplification and of well known form and having means for magnetizing the high frequency transformers by superimposed direct current;

Fig. 2 is a diagrammatic representation of a circuit arrangement, in accordance with the invention, for superimposing direct current on the high frequency transformers, the magnetizing coils of the individual transformers being arranged in parallel; and

Fig. 3 is a diagrammatic representation of a circuit arrangement for superimposing direct current upon the high frequency transformers in which the magnetizing coils of the transformers are arranged in series.

In Fig. 1 g is the high frequency current source, and t_1, t_2 and t_3 are three frequency transformers of a well-known type, for example, Joly transformers, with primary windings Z_1 and differentially wound secondary windings Z_2. g_1, g_2 and g_3 are direct current energizing windings of the frequency transformers and are wound in the same direction as the secondary windings of the transformers. The elements r and l, respectively, are a variable ohmic resistance and a choke coil, C is a condenser for protecting the direct current source which is applied to the terminals marked plus and minus, A is the antenna, and L the antenna extension coil. K′. K″ and K‴ are tuning condensers, and K_1, K_2, K_3 are condensers which are connected in parallel with the frequency transformers for the purpose of discharging the wattless currents of the system. Heretofore, when they have been fed from a common source it has been customary to connect in series with each other the direct windings g_1, g_2, and g_3 of the frequency transformers. I have found, however, that this circuit arrangement has material drawbacks. This may be explained as follows:

In order to obtain the best operating conditions, the direct current energization of a frequency transformer must be properly adjusted. This adjustment is dependent on the absolute value of the transformer, as well as on the ratio between its primary and secondary windings, and, furthermore, on the value of the condenser that is connected in parallel with the transformer. Because of the fact that such values are different in different stage transformers, the simultaneous adjustment of all the direct current energizations by means of a common element r, Fig. 1, will not have the best result for the whole system, because, if the direct current energization of a single transformer is most favorably adjusted for its operation, this will not hold good for the other transformers.

In accordance with the present invention, the direct current windings of multi-stage transformers fed from a common source of potential, are regulated independently of each other. In the circuit arrangements represented in Figs. 2 and 3, the windings g_1, g_2, and g_3 connected with a common source of potential may each be separately controlled by means of individual regulators r_1, r_2, and r_3.

The choke coils 1_1, 1_2 and 1_3 serve for the purpose of choking off the alternating currents induced in the direct current windings and may be separated from the direct current windings as shown. Preferably, however, the choke coils are combined with the direct current windings if the latter are provided in the well-known manner so that, in addition to both iron cores of the associated transformer, each turn surrounds also an additional mass of iron which operates as a choker. The condensers C_1, C_2 and C_3 are provided as a protection for over-tensions and may be connected in parallel with each winding g_1, g_2 or g_3 and associated choke coil 1_1, 1_2 or 1_3.

Instead of connecting the windings g_1, g_2 and g_3 in parallel, they may be connected in series, a suitable potential distributor r_1, r_2 r_3, see Fig. 3, being provided for the purpose of insuring that each of the direct current windings may be adjusted independently of the others.

Having described my invention what I claim is:—

1. In combination, a source of energy, a

potential distributor connected across said source, load circuits in series with each other and in parallel with the potential distributor, each load circuit comprising a load and a choke coil, taps extending from the ends of the load circuits to said distributor, whereby the current from said source thru said circuits may be separately adjusted, and condensers connected across said load circuits.

2. A frequency multiplier circuit comprising a source of energy of fundamental frequency, a plurality of saturable iron core frequency multipliers arranged in cascade for successive frequency multiplication, a utilization circuit for the frequency multiplied energy, a plurality of saturating windings, including choke coils, for the frequency multipliers, a source of direct saturating current, a potential distributor connected across said source, means connecting the saturating windings in series with each other and in parallel with the potential distributor, taps extending from the ends of the saturating windings to said distributor, whereby the current from the direct saturating current source through said circuits may be separately adjusted, and condensers connected across said saturating windings.

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