

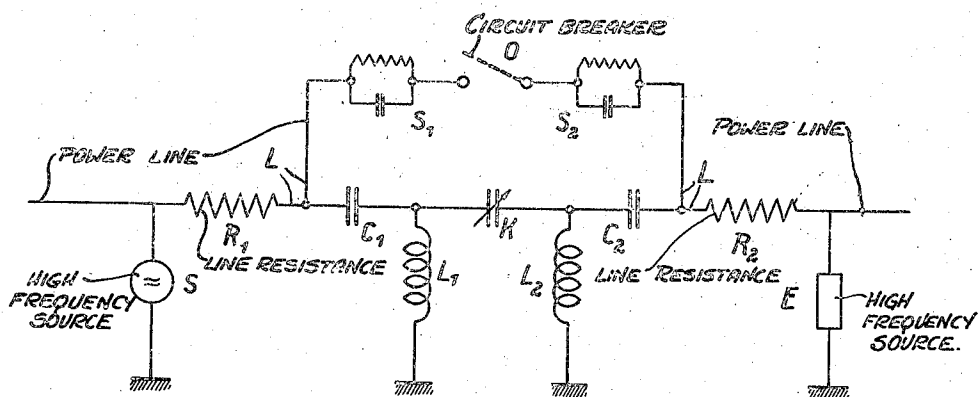
Dec. 27, 1938.

R. BARANOWSKY

2,141,286

COUPLING-ON OR BRIDGING IMPLEMENT

Filed Feb. 1, 1936



Inventor:
Raoul Baranowsky,
by Harry E. Dunham
His Attorney.

UNITED STATES PATENT OFFICE

2,141,286

COUPLING-ON OR BRIDGING IMPLEMENT

Raoul Baranowsky, Berlin-Treptow, Germany,
 assignor to General Electric Company, a cor-
 poration of New York

Application February 1, 1936, Serial No. 62,003
 In Germany February 2, 1935

7 Claims. (Cl. 177—352)

In high-frequency telephony across power lines it is frequently necessary to bridge disconnecting places present in said lines, for instance oil- or disconnecting switches, in a manner correspond-
 5 ing to the high frequency. For this purpose a coupling condenser is arranged in series with each end of the line, and there is connected to said condenser a coil for compensating the high-frequency reactance of the said condenser, the two
 10 coils serving simultaneously for coupling the two resonant circuits thus established.

That arrangement and combination of the parts stated suffers from the drawback that a change of the wave necessitates a change in the
 15 inductance of the coils, and as, as a rule, stationary coils are used for the purpose in view, it is necessary to change the position of the coils in order to change the tuning. Another drawback of said arrangement is that the coupling factor
 20 of such inductively coupled circuits is comparatively slight. Besides, every wave length requires a preceding computation of the coil inductance.

This invention presents a coupling or bridging implement which is free from the above-men-
 25 tioned drawbacks, the gist of the same residing therein that for the highest frequency to be transmitted two resonant circuits coupled and connected in parallel by a capacity are provided, said circuits being tuned to said frequency and
 30 coupled with one another in such a manner that the coupling means transmits a band of frequencies extending from the above-mentioned highest frequency to the lowest frequency occurring in the respective case. The arrangement according
 35 to the invention has thus the character of a multipart filter.

The invention is illustrated diagrammatically and by way of example on the accompanying drawing which shows a bridging arrangement for
 40 a high-frequency communication transmitting apparatus across a power-line that can be disconnected by an oil-switch.

In this example L denotes the power-line, O an oil-switch, S₁ a high-frequency stopper arranged
 45 before said switch, S₂ a stopper arranged behind the said switch, R₁ denotes the high frequency resistance of the line L on the portion up to the oil-switch, said resistance being assumed to be concentrated, and R₂ denotes the resistance be-
 50 hind the said switch. S denotes the high-frequency generator, and E is the high-frequency receiver, both (S and E) being adapted either for sound-transmission or for current-mark trans-
 55 mission or for both. C₁ is the coupling-con- denser, on which the high-frequency energy is

drawn from the line L before the stopper S₁. C₂ is the coupling condenser, on which the high-frequency energy is re-conducted to the line L behind the stopper S₂. L₁ is a coil for the compensation of the capacitive reactance of the coupling-condenser C₁. L₂ is just such a coil for the coupling-condenser C₂, and K denotes an adjust-
 5 able condenser.

The high-frequency produced by the generator S passes across the coupling condenser C₁, the
 10 coils L₁ and L₂ or the tunable condenser K respectively, and the coupling condenser C₂ to the receiver E.

It appears from the drawing that the entire arrangement and combination of the parts, across
 15 which the high-frequency passes, can be comprehended as a system of two oscillatory circuits connected up in parallel and coupled with one another across the condenser K, the capacity of
 20 which can be adjusted. The one of said circuits comprises the generator S, the resistance R₁, the coupling condenser C₁ and the inductance L₁ in combination with the wire connecting said mem-
 25 bers with one another, and the earth forming the return path. The other oscillatory circuit comprises the high-frequency receiver E, the wave resistance R₂, the coupling condenser C₂ and the inductance L₂ in combination with the wire connecting these members with one another, and
 30 the earth constituting the return path.

Supposing that the two oscillatory circuits are tuned to the highest frequency to be transmitted, then by appropriate adjustment of the tunable
 35 condenser K the coupling means in accordance with the present invention transmits the band of frequencies extending from the aforementioned highest frequency to the lowest frequency to be transmitted. That adjustment can obviously be
 40 carried out in the simplest way and presents the advantage that it can be effected at any time and especially also at an open line without an exchange of any parts and without any change of
 45 the coil adjustment. Therefore the entire high-frequency system receives by the coupling as described a band-characteristic, the breadth of
 50 which can be varied in a simple manner.

I claim:

1. The combination, in a system for coupling two power lines together for carrier currents hav-
 50 ing frequencies spaced apart by a desired range of frequencies, of a pair of oscillatory circuits tuned to one of said frequencies, one of said oscillatory circuits comprising the impedance of one of said power lines and the other oscillatory
 55 circuit comprising the impedance of the other of

said power lines, and a reactance element to couple said oscillatory circuits and to resonate with the reactance of said oscillatory circuits at a frequency spaced from said one frequency by said desired range.

2. The combination, in a system for coupling two power lines together for carrier currents having frequencies spaced apart by a desired range of frequencies, of a pair of oscillatory circuits tuned to one of said frequencies, one of said oscillatory circuits comprising the impedance of one of said power lines and a branch across said line and the other of said oscillatory circuits comprising the impedance of the other of said lines and a branch across said other line, and a reactance element connected between said branches to couple said oscillatory circuits and to resonate with the reactance of said oscillatory circuits at a frequency spaced from said one frequency by said desired range.

3. The combination, in a system for coupling two power lines together for carrier currents having frequencies spaced apart by a desired range, of a band-pass network comprising two oscillatory circuits tuned to the same frequency, each of said oscillatory circuits including a respective one of said power lines, and a reactance element to couple said oscillatory circuits, and to resonate with said oscillatory circuits at a different frequency, said frequencies being spaced apart by said range.

4. In a system for coupling two power lines together for carrier currents having frequencies spaced apart by a desired range, a band-pass network having low attenuation for all currents in said range comprising a series connection across each line, each series connection comprising inductance and a condenser, and a reactance connected between said series connections.

5. In a system for coupling two power lines together for carrier currents having frequencies spaced apart by a desired range, a band-pass network for said carrier currents comprising three

condensers connected in series between said power lines, and a pair of inductances, each inductance being connected between ground and a respective point on opposite sides of the intermediate of said condensers.

6. The combination, in a network for transmission of a band of frequencies from a current source to a load, of a pair of oscillatory circuits, one of said circuits comprising an inductance and a condenser connected in series across said source and proportioned to resonate with the impedance of said source at a frequency at one extremity of the frequency range to be transmitted, the other of said circuits comprising an inductance and a condenser connected in series across said load and proportioned to resonate with the impedance of said load at said frequency, and a reactance to connect together said oscillatory circuits and to resonate with the reactance of said circuits at a frequency at the opposite extremity of said range whereby said network offers low impedance to currents supplied to said one of said oscillatory circuits having any frequency within said range.

7. In a system for coupling a source of currents having frequencies extending over a wide range to a load, the combination of a pair of impedances, one of said impedances comprising an inductance and a condenser connected in series across said source and proportioned to resonate with the impedance of said source at a frequency at one extremity of said range, the other impedance comprising an inductance and a capacity connected in series across said load and proportioned to resonate with the impedance of said load at a frequency at said one extremity of said range, and a reactance connected between said impedances and proportioned relative to said impedances to form therewith a circuit resonant at a frequency at the opposite extremity of said range.

RAOUL BARANOWSKY.