

S. EISENSTEIN.
 APPARATUS FOR STRENGTHENING ELECTRIC VIBRATIONS.
 APPLICATION FILED MAR. 27, 1908.

965,884.

Patented Aug. 2, 1910.

Fig. 1.

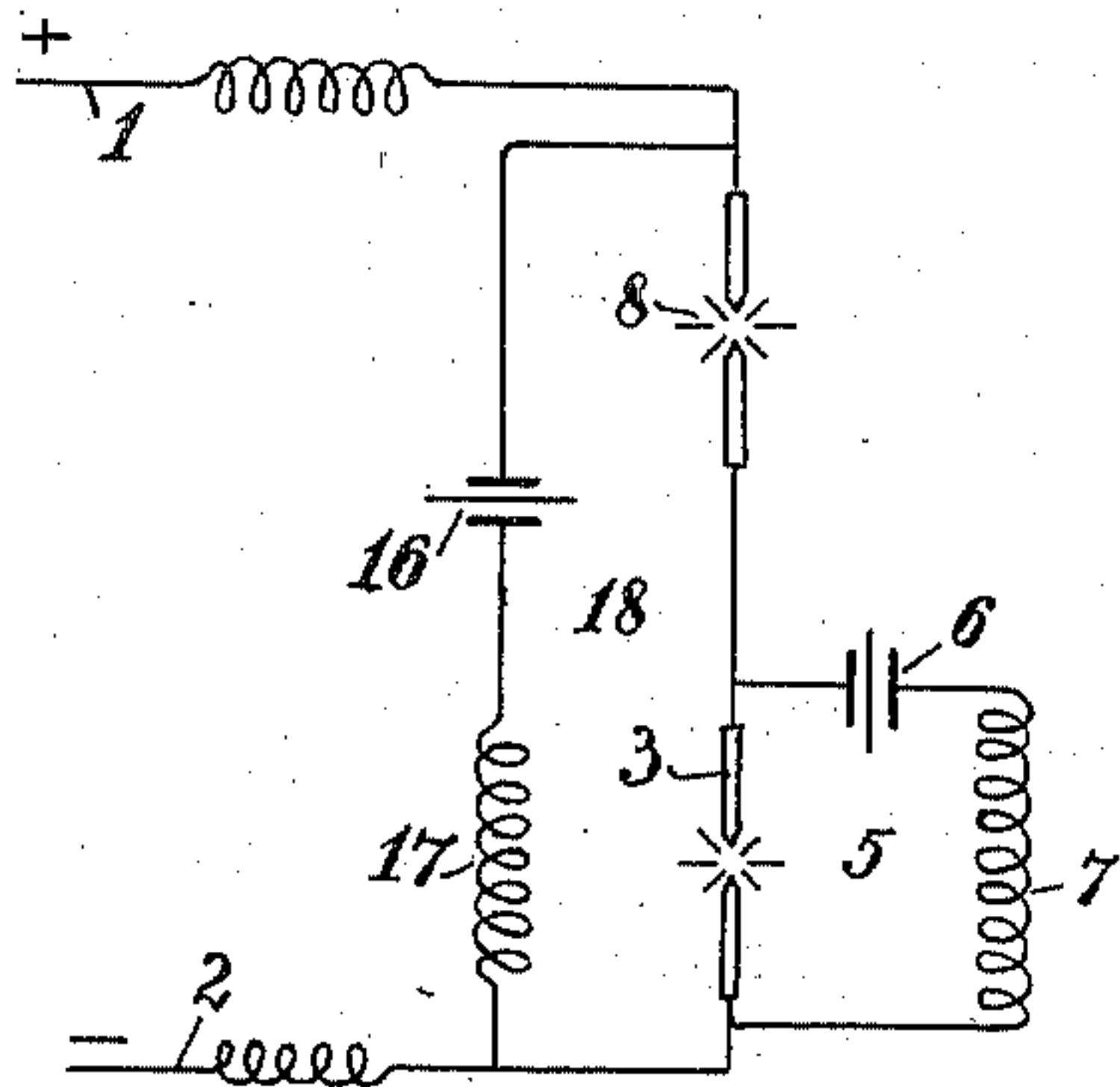


Fig. 2.

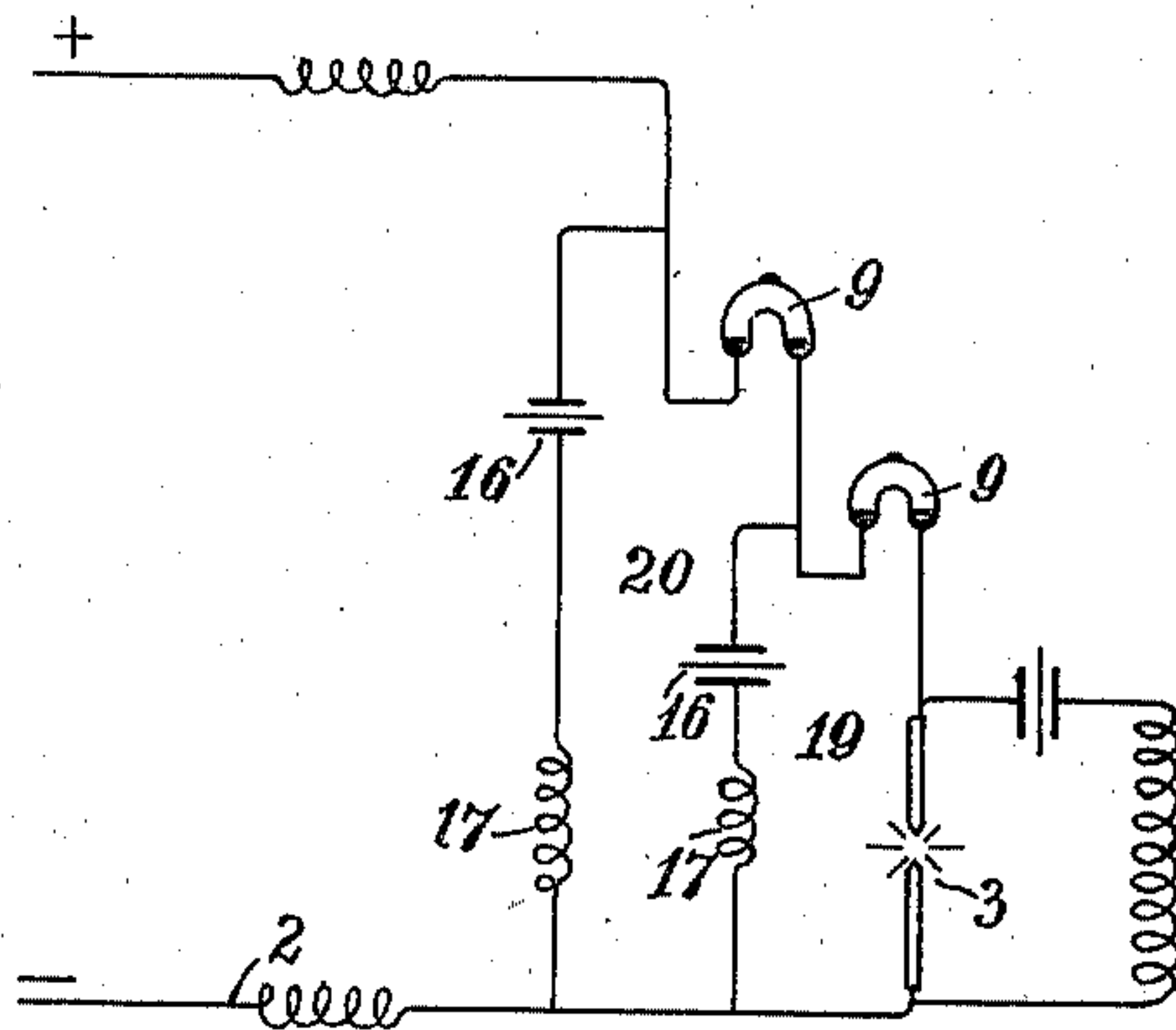
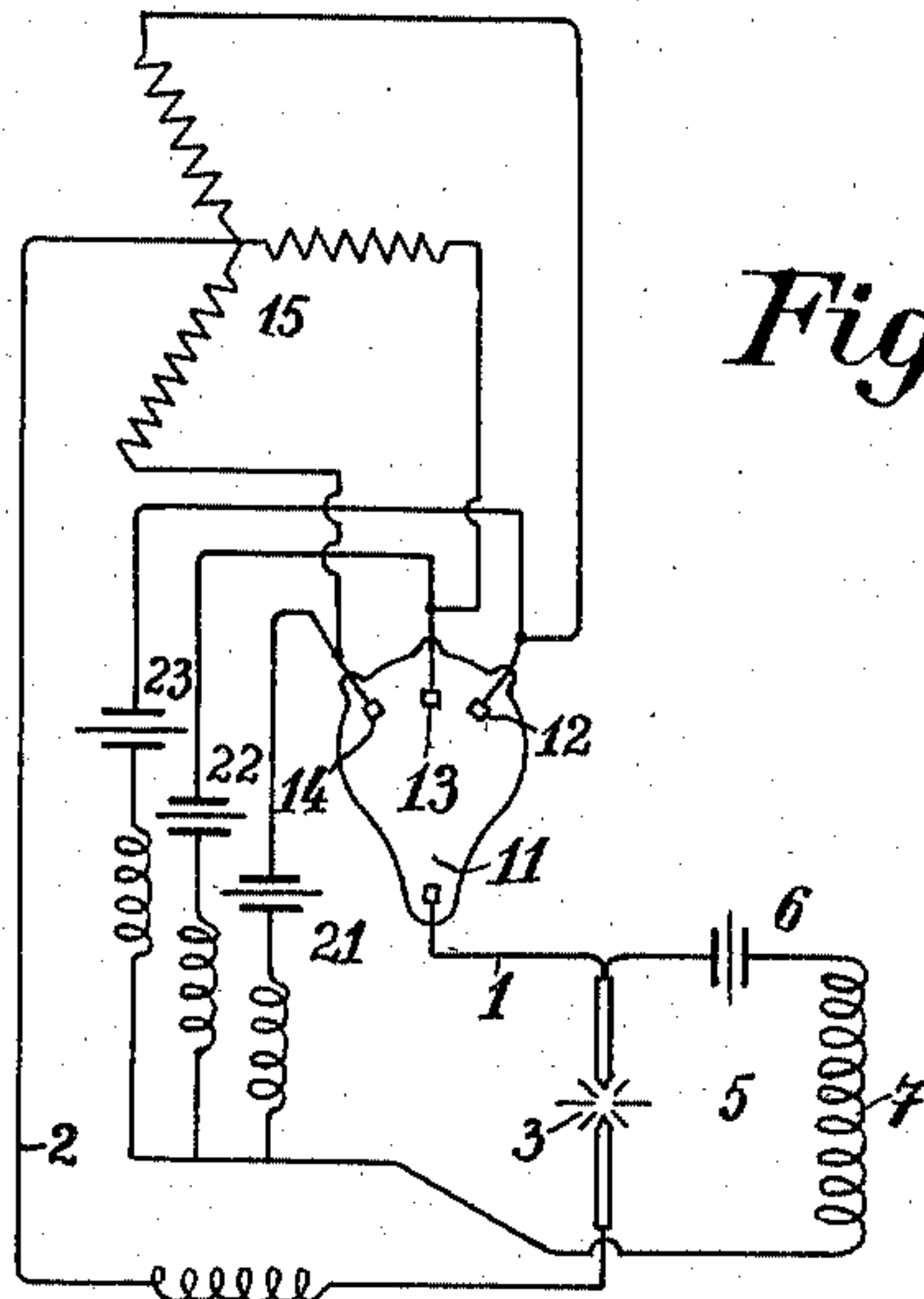


Fig. 3.



WITNESSES:

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APPARATUS FOR STRENGTHENING ELECTRIC VIBRATIONS.

965,884.

Specification of Letters Patent.

Patented Aug. 2, 1910.

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To all whom it may concern:

Be it known that I, SIMON EISENSTEIN, a subject of the Czar of Russia, residing in Kief, in said Empire of Russia, have invented new and useful Improvements in Apparatus for Strengthening Electric Vibrations, of which the following is a specification.

It is known that a voltaic arc or an incandescent path of gas produces vibrations (Duddell's connection) in a shunt which is provided with a capacity and self induction, when certain conditions are fulfilled. The conditions must be such that the strength of current in the voltaic arc itself constantly fluctuates with the same frequency owing to the vibrations produced in the shunt circuit and the best oscillatory effect takes place when the fluctuations of the strength of the current have very large amplitudes, and indeed it is advisable to select the conditions in such a manner that these fluctuations are so great that the strength of the current falls to its minimum value and the voltaic arc is almost extinguished. These fluctuations in the strength of the current of the feed circuit are produced by selecting voltaic arcs or gas paths in which the diminution of the current produced by the oscillations in the shunt circuit causes an augmentation of the resistance in the voltaic arc. Such voltaic arcs may be formed between homogeneous carbons for example. The alteration in the resistance may be strengthened artificially by producing the voltaic arc under pressure in an atmosphere of hydrogen between cooled electrodes, in ventilated media, &c. It has also been proposed to obtain the same effect by single voltaic arcs connected in series with the capacity and self induction mounted in parallel with them. This latter method of connection presents the defect that the resistance of these voltaic arcs connected in series is somewhat considerable so that the damping of the vibration system is seriously affected. Accordingly the amplitudes of the vibrations produced in such a manner can never attain the maximum value which would actually be expected.

Figure 1 is a diagrammatic view of one embodiment of my invention, showing a voltaic arc in series with the arc of the Duddell connections. Fig. 2 is a similar view of another form of the invention, showing vapor sparking paths in place of the voltaic arc, and showing a plurality of vibration

circuits, and Fig. 3 shows the invention arranged for connection with a three-phase current.

Experiments have demonstrated that it is possible and advisable to influence by means of additional circuits the current fluctuations conducted to the vibration generator by the feed current. These additional circuits are, however, arranged in such a manner that they do not exert any direct influence upon the actual vibration generator which is connected with the aerial conductor over the vibration circuit. In order however that no difficulties may be caused as regards the tuning it may be advantageous to select the frequencies of these auxiliary vibration circuits in such a manner that they have either the same frequency as the main vibration circuit or that the ratio of the frequencies corresponds to the overtones.

Fig. 1 illustrates an embodiment of this invention with the addition of an auxiliary vibration circuit. 1 and 2 represent the feed conductors of the vibration generator 3. 5 is the vibration circuit comprising the capacity and self-induction 7, a variable resistance, such for example as a voltaic arc 8, being inserted in the feed conductor.

A vibration circuit 18 comprising a capacity 16 and self-induction 17 is arranged between the two feed conductors; this circuit as already stated, merely influences the current fluctuations of the feed current but exerts no influence upon the actual vibration generator 3. The frequency of the vibration circuit 18 may be equal to that of the vibration circuit 5. The frequencies may also however, stand in the relationship of the overtones one to the other so that no difficulties arise in tuning. Similarly a number of such auxiliary vibration circuits may be provided as shown in Fig. 2. Here two vapor sparking paths 9 are first of all inserted in front of a vibration generator 3 and two vibration circuits 19 and 20 are provided between the feed conductors, each of them being provided with a capacity and self-induction 17. In other respects the connections will be obvious from the foregoing. Obviously here the mercury vapor lamp or a Wehnelt valve tube may be employed not only as a variable resistance to be inserted in front but also as a rectifier of an alternating current and in this case also the auxiliary vibration circuits may be provided. This construction is illustrated in

Fig. 3 and will be understood without further description from what has already been stated. In view of the fact that three-phase current is here used, three auxiliary vibration circuits 21, 22, and 23 are provided.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The herein described arrangement for increasing the vibrations of Duddell connections comprising the combination with said connections of means placed in the circuit in series with the arc of the Duddell connections for automatically increasing the resistance of said circuit as the current in said circuit decreases, and an auxiliary vibratory circuit shunted around said means and said arc.

2. The herein described arrangement for increasing the vibrations of Duddell connections comprising the combination with said connections of a variable resistance placed in series with the arc of the Duddell connections and adapted to automatically increase in resistance as the current passing through said arc decreases, and an auxiliary vibratory circuit shunted around said resistance and said arc and comprising a capacity and

an inductance placed in series with each other, the frequency of the auxiliary circuit corresponding with that of the main circuit.

3. The herein described arrangement for increasing the vibrations of Duddell connections comprising the combination with said connections of a variable resistance placed in the circuit in series with the arc of the Duddell connections and adapted to automatically increase in resistance as the current in said circuit decreases, and an auxiliary vibratory circuit shunted around said resistance and said arc and consisting of self-induction and a capacity placed in series with each other in such a manner that they reinforce the current fluctuation without exerting any influence on the vibration of the generator, the frequency of the shunting auxiliary circuit being in harmony with the frequency of the main vibration circuit.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

SIMON EISENSTEIN.

Witnesses:

PETER ZRAZEWSKI,
H. A. LOVIAGUINE.