

W. PEUKERT.
SPARK GAP APPARATUS.
APPLICATION FILED MAY 14, 1909.

955,101.

Patented Apr. 12, 1910.

Fig. 1

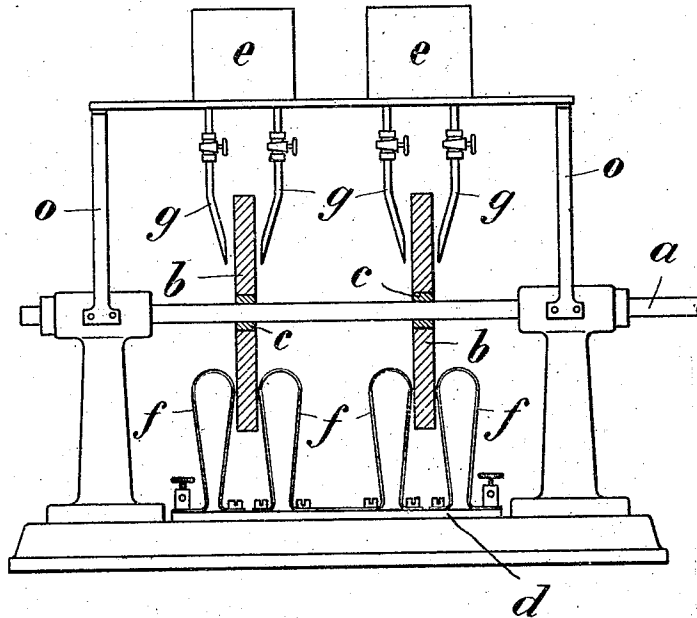
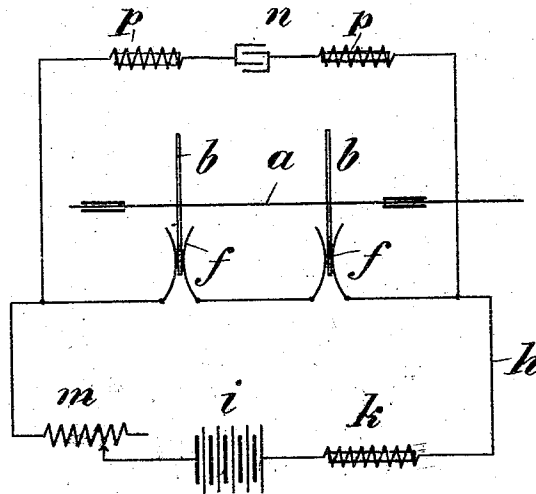


Fig. 2.



Witnesses.

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SPARK-GAP APPARATUS.

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To all whom it may concern.

Be it known that I, WILHELM PEUKERT, a subject of the German Emperor, and resident of Brunswick, Germany, have invented a certain new and useful Improvement in Spark-Gap Apparatus, of which the following is a specification.

The present invention relates to an apparatus for producing electrical oscillations of high frequency.

An imperfect contact between two conductors or terminals, which are separated by a thin layer or film of a bad conducting substance, such as oil, air, gas, steam, alcohol, glycerin, or the like has a resistance, which is subjected to alterations by electrical tension in such a way that for small tensions the resistance is extremely high, and when the tension increases the resistance decreases. This decrease will continue until finally the resistance attains a minimum, when the discharge takes place in the shape of a spark. The consequence of this peculiarity of an imperfect contact is that a discharge cannot take place permanently over the gap even if a properly chosen tension be applied over resistances and choking coils for loading a condenser-circuit provided with self-induction and arranged parallel to the sparking gap, nor is it possible until the condenser-potential has increased oscillatory to higher values to attain the igniting tension, characteristic to the gap, to pierce the di-electric layer. By the creation of the spark the condenser discharges oscillatory and quicker than the electric energy which is retarded by the choking coil, having a high self-induction, for as soon as the oscillation is discharged the contact is again in the state of insulation, the condenser is again loaded, and the operation repeated with a frequency dependent on the constants of the loading circuit.

When the spark starts repeatedly from the same spot, the gap may gradually become closed and form a perfect contact, as detached particles of metal will unite into a conducting bridge between the terminals. In order to reestablish the original state of the gap a manipulation is necessary, similar as is employed to decohere the coherer, to reestablish its normal condition. This manipulation may be the movement of one or both conductors or terminals relatively to one another or by giving motion to the badly

conducting substance or by making use simultaneously of both motions.

In the drawings accompanying and forming part of this application, Figure 1 is a side elevation partly in section of an apparatus constructed according to this invention and Fig. 2 is a diagrammatic view illustrating a mode of arranging this apparatus in an electric circuit.

The apparatus shown in Fig. 1 comprises a rotatable shaft *a* suitably journaled in any convenient manner and driven by an electric motor, not shown. On this shaft a series of disks *b* of a suitable metal are fixed by the aid of an insulating ring *c*, in such manner that the disks rotate in unison with the shaft *a*. A number of bands or strips *f* are attached to the base *d* next to the disks, but out of direct contact with the latter, contact being prevented by a layer of oil or the like. The oil is fed from pipes *g* arranged over each gap and leading from suitable oil reservoirs *e* on the frame *o*. The oil dropping down from the pipes *g* closes the gaps between the strips *f* and the disks *b* thus producing an imperfect conducting path.

As shown in Fig. 2 the springs are brought into a circuit *h*, in which there is a battery *i*, a choking coil *k* and a regulating resistance *m*, and in parallel to the strips *f* there is a shunt circuit made oscillatory by a capacity such as a condenser *n* and a self induction. By the action of the battery and the spark gap device the condenser is loaded, until it is discharged oscillatory through the spark gap. The disks *b* being rotated and the non-conducting film being continuously renewed the original state is constantly reestablished and a permanent activity of the spark gap is obtained, so that within the condenser circuit oscillations are obtained having a permanent constant energy. The physical properties of such a spark gap give the oscillations a very high damping. The number of periods of these oscillations depends on the values of the capacity of the self-induction and of the resistance in the oscillation circuit. The number of spark gaps, to which the oscillation circuit may be arranged parallel, may vary at will to produce any desired oscillatory energy. They may be arranged in series or parallel or combined series and parallel. In constructing or incasing the spark gap device provisions may be made in any desired manner to provide for

wear and tear, heating, regulation, and also for renewing the di-electric layer, for conducting the current and so on.

I claim:

- 5 1. A spark gap apparatus comprising an electric circuit, terminals in the circuit forming a gap and being arranged so close to one another that the gap only has an extremely small width, a thin layer of a di-electric
10 liquid between the terminals of the gap, means to produce a relative movement between the di-electrical substance and one of the terminals of the gap, and an oscillatory shunt circuit arranged parallel to the gap.
15 2. A spark gap apparatus comprising a stationary terminal, an extended vertical

metallic terminal in close proximity thereto, means for rotating the latter terminal and means to supply by gravity a di-electric liquid to the rotating terminal and gap. 20

3. A spark gap apparatus comprising a pair of stationary terminals, a vertical metallic disk in close proximity to said terminals, means to rotate the disk between the terminals, and means to supply by gravity a
25 di-electric liquid on each vertical face of the disk and the gaps formed between it and the terminals.

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Witnesses:

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