

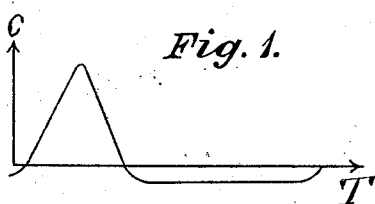
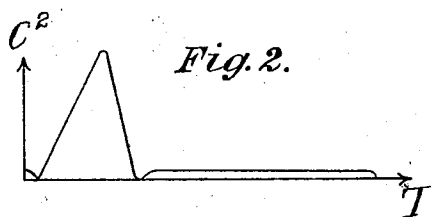
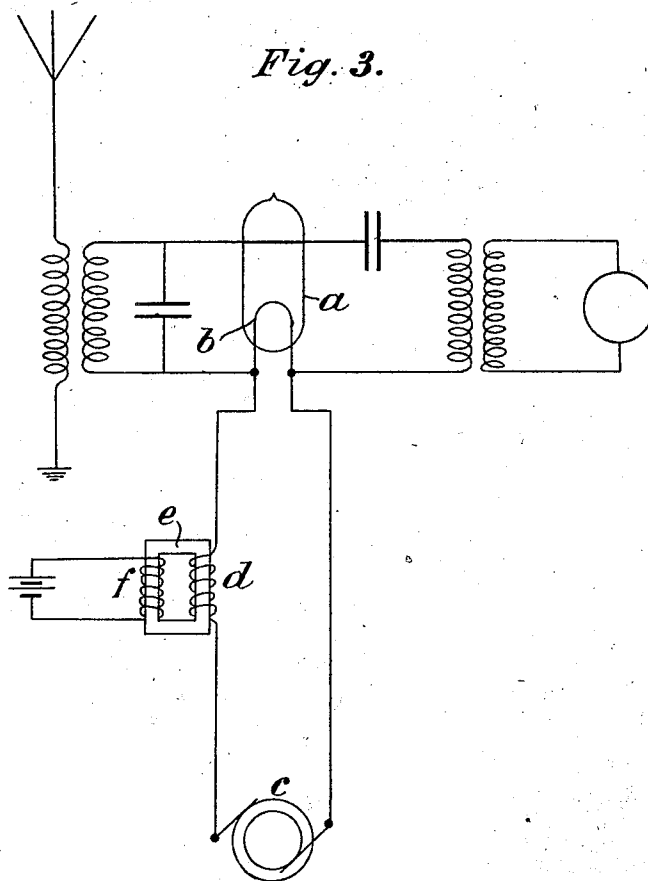
June 17, 1924.

1,497,948

I. SHOENBERG

THERMIONIC DEVICE

Filed April 9, 1918



*Irae Shoenberg by
Sheffield & Butts
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UNITED STATES PATENT OFFICE.

ISAAC SHOENBERG, OF LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
RADIO CORPORATION OF AMERICA, A CORPORATION OF DELAWARE.

THERMIONIC DEVICE.

Application filed April 9, 1918. Serial No. 227,443.

To all whom it may concern:

Be it known that I, ISAAC SHOENBERG, a Russian subject, residing at Marconi House, Strand, London W. C. 2, England, have invented new and useful Improvements in Thermionic Devices, of which the following is a specification.

It is well known that if an alternating current be made to pass through a choking coil with a closed iron core saturated to a certain degree by a direct current winding, the shape of the alternating current wave gets distorted in the following manner:—

The amplitude of one half of the wave is much larger than that of the other, and the half with the larger amplitude is of shorter duration than the other.

Referring to the drawings:

Figure 1 represents the form of the current curve distorted in the said manner;

Figure 2 represents the form of the temperature curve of the filament of a thermionic device subjected to a current of the form shown in Figure 1.

Figure 3 is a diagrammatic representation of one application of my invention.

A curve of this form is shown in Figure 1 of the accompanying drawing, the horizontal axis, T, representing time and the vertical axis, C, current.

According to this invention a current is used with a wave of this form for heating the filament of a thermionic device; the temperature of the filament, provided its diameter is suitably chosen, will then be proportional to the square of the current. The functional relation between time and temperature under ideal conditions is shown in Figure 2 where the abscissæ are proportional to the time intervals, and the ordinates to the square of the current.

In practice, however, owing to thermal inertia (insufficient radiation) the temperature of the filament will lag behind the current: still the general character of the curve will remain very much as shown in Figure 2.

It follows from the above that the discharge of electrons from the filament will be intermittent. This property can be utilized in various ways in the practice of wireless telegraphy. As an example the reception of continuous waves may be mentioned.

Figure 3 is a diagram showing the application of this invention to the reception of

continuous current wireless signals. *a* is a Fleming valve the filament *b* of which is heated by a current from an alternator *c* in the circuit of which is included a choking coil *d* on a closed iron core *e* saturated by a direct current winding *f*.

What I claim is:—

1. The combination with high frequency signalling circuits of a thermionic device cooperating therewith and means for heating the source of electrons of said device to produce intermittent electron emission, said means comprising means for producing a current having alternate portions of greater amplitude than the intervening portions and having the duration of the portions of lesser amplitude at least equal to the duration of the portions of greater amplitude.

2. The combination with high frequency signalling circuits of a thermionic device cooperating therewith and means for heating the source of electrons of said device to produce intermittent electron emission, said means comprising means for producing a current having alternate alternations of greater amplitude than the intervening alternations and having the duration of the alternations of lesser amplitude at least equal to the duration of the alternations of greater amplitude.

3. The combination with high frequency signalling circuits of a thermionic device cooperating therewith and means for heating the source of electrons of said device to produce intermittent electron emission, said means comprising means for producing a current having alternate half cycles of greater amplitude and less duration than the intervening half cycles.

4. The combination with high frequency signalling circuits of a thermionic device cooperating therewith and means for heating the source of electrons of said device to produce intermittent electron emission, said means comprising means for producing an alternating current of such characteristics that the temperature of said filament is rapidly varied above and below its vertical electron-emitting temperature and that the period of low temperature is greater than the period of high temperature.

5. The combination with high frequency signalling circuits of a thermionic device cooperating therewith and means for heating the source of electrons of said device to pro-

duce intermittent electron emission, said means comprising a source of alternating current, a closed core choking coil and a source of direct current for substantially saturating said core.

6. The method of signalling with high frequency currents utilizing a thermionic element having a source of electrons which consists in impressing the signalling currents on said thermionic element and heat-

ing said source of electrons of said thermionic element by means of alternating current, having alternate half cycles of greater amplitude and less duration than the intervening half cycles.

In testimony that I claim the foregoing as my invention, I have signed my name this 19th day of March, 1918.

ISAAC SHOENBERG.