CHAPTER VI.

METHODS OF PRODUCING OSCILLATORY CURRENTS IN AN AERIAL.

1.

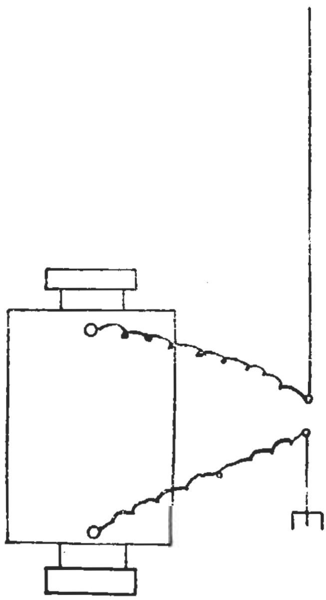

FIG. 33.

The first method of obtaining oscillatory currents in an aerial is known as "Plain."

Here the secondary of the transformer or Rhumkorf coil is joined direct to a spark-gap. One side of this spark-gap is joined to earth, and the other to the aerial. This is tantamount to joining the secondary to two sides of a Leyden jar separated by a spark-gap. The discharge, provided everything is correct, is oscillatory, and consequently waves are radiated into space.

2. The great disadvantage of this system is the necessity of high insulation. Should the aerial in Fig. 33 be earthed, or nearer to an earthed object than the length of the spark-gap, no spark at the gap can be obtained. Consequently in wet weather great difficulties are often encountered.

Although the insulation has to be better for plain than for other systems, plain has the advantage of instantly informing the operator when it is bad.

3. Another disadvantage of the plain system is the liability of severe shock to anyone touching the aerial above the spark-gap. In such a case it will be seen that the person is short-circuiting the secondary of a transformer or Rhumkorf coil.

The shock, even when only $\frac{1}{4}$ k.w. power is being used, is severe, and even dangerous. But it must be remembered that it is probably no more dangerous to a man aloft than a shock from an "Oscillator" system. An electric shock of any sort, unexpected, is sure to disturb a man's balance owing to involuntary contraction of his muscles. The bad shock obtainable from "Plain" has the good effect of engendering respect for the aerial among those not responsible for the wireless telegraphy. This is a distinct advantage.

4. The wave-length sent out by plain aerial is the natural wave-length of the aerial.

5. The wave itself is greatly damped owing to the large resistance in the spark-gap. It is for this reason that plain is often referred to, especially in America, as the "Whipcrack" method. Fig. 34 gives an idea of the "shape" of the wave, ordinates being E.M.F. and abscissæ time.

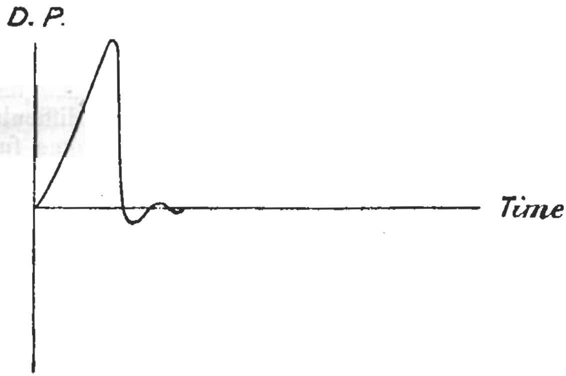

FIG. 34.

9. Adding a capacity to the aerial has another effect. The aerial is no longer only separated from the earth by the spark-gap. There is a Leyden jar as well. Consequently, should anyone touch the aerial, he does not now short-circuit the secondary of the transformer. The alternating current can still go on charging and discharging the condenser. Consequently, he now acts simply as an additional capacity to earth, and is charged and discharged. The shock is not nearly so unpleasant.

Also, with a capacity above the spark gap, the insulation need not be so good, though a fault in the insulation does not intimate its existence as before.

10. When the insulation is good, and all is going well with plain, the spark should be a bright white colour tinged with blue, and give a noisy crackling sound. When the insulation is bad, the spark gets furry and blue in colour, and straggles up and down. When the aerial is earthed, there will be no spark at all, unless there is a condenser in series with the aerial. The appearance of a good spark is perfectly unmistakable.

11. When, to obtain a long wave, inductance has been placed in the foot of the aerial, it is found more difficult to get a good healthy spark. There is bound to be some furriness. This, however, does not appear to render the wave ineffective.