the other. In this way an induction balance was produced and a quiet circuit secured for telephonic purposes. This method was patented in England in November, 1877, and during the whole winter of 1877–8 I was engaged in London upon experiments relating to the subject.

In the course of these researches I made frequent use of flat spirals of insulated wire, like those employed by the late Prof. Henry[1] in his experiments upon induction.

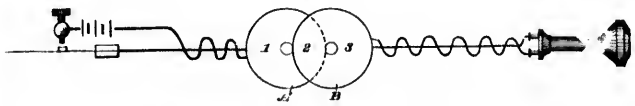
My method was to pass a rapidly interrupted voltaic current through one flat spiral while I examined its field of induction by means of another flat spiral connected with a telephone. The currents induced in the latter coil produced a musical tone from the telephone.

At every point in the field of induction it was found that by turning the plane of the exploring coil a position of silence could be obtained, and another of maximum sound, the two positions making a right angle with one another.

It was also noticed that when a position of silence was established a piece of metal brought within the field of induction caused the telephone to sound. This effect was most marked when the two flat spirals were in close proximity, and were arranged with their planes parallel, as shown in Fig. 1.

When a silver coin, such as a half-crown or florin, was passed across the face of the two coils, the silence of the telephone was broken three times. The instrument emitted a musical tone when the metallic disk passed the points marked 1, 2, and

Fig. 1.



3 in the illustration, but the loudest effect was produced when the coin crossed the area marked "2," where the two coils overlapped.

After my return to America I embodied these and other results in a paper "*Upon New Methods of Exploring the Field*

[1] Silliman's Journal, xxviii, 329; xxxviii, 209; xli, 117.