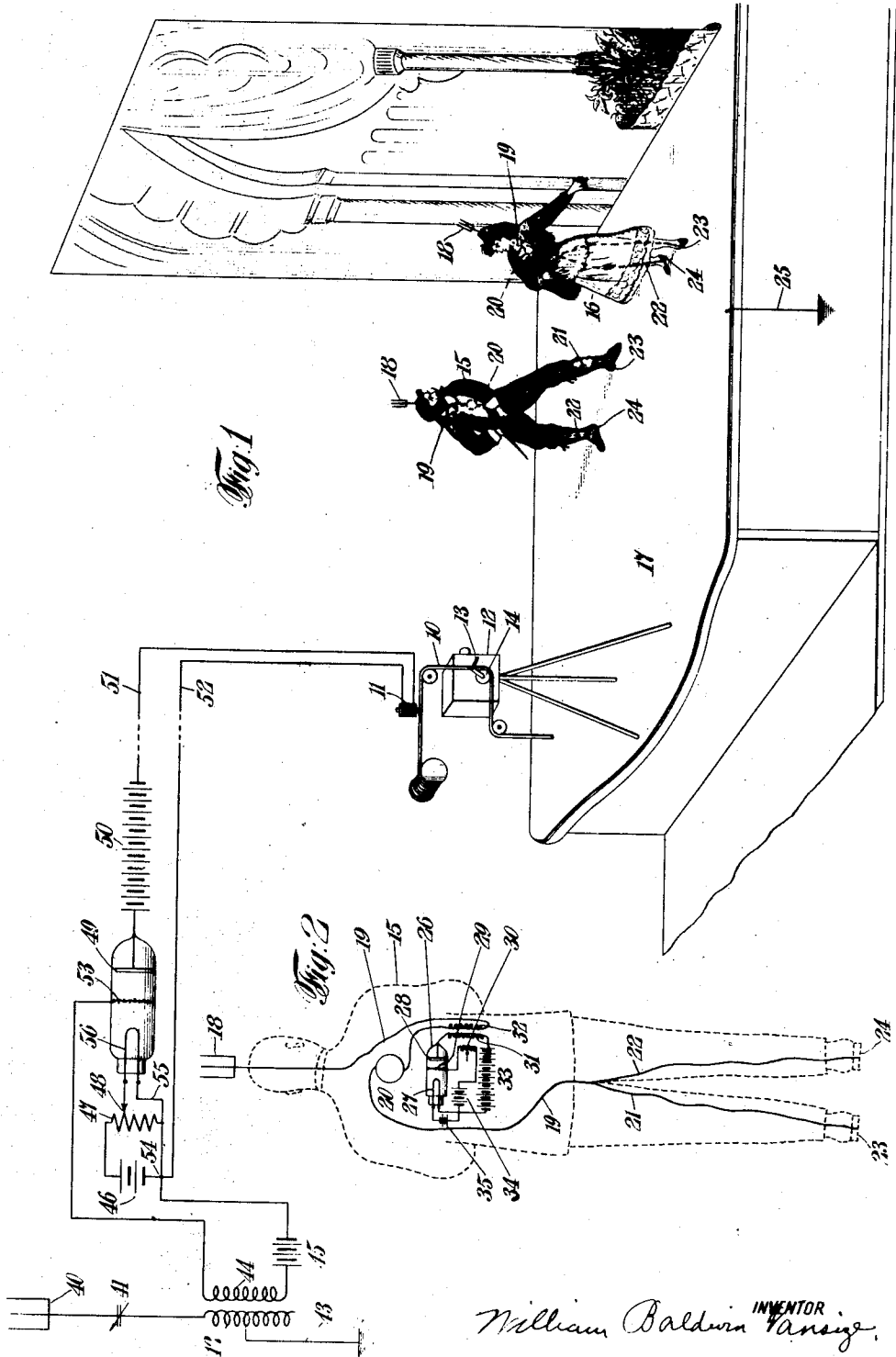


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 RECORDING CORRELATED LIGHT AND SOUND EFFECTS.
 APPLICATION FILED SEPT. 24, 1915.

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Patented Mar. 20, 1917.



UNITED STATES PATENT OFFICE.

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RECORDING CORRELATED LIGHT AND SOUND EFFECTS.

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Specification of Letters Patent.

Patented Mar. 20, 1917.

Original application filed June 29, 1915, Serial No. 36,938. Divided and this application filed September 24, 1915. Serial No. 52,353.

To all whom it may concern:

Be it known that I, WILLIAM B. VANSIZE, a citizen of the United States, residing in Brooklyn, in the city of New York, county of Kings, State of New York, have invented certain new and useful Improvements in Recording Correlated Light and Sound Effects, of which the following is a specification.

This application is a division of my application Serial No. 36,938, filed June 29, 1915.

This invention relates to recording light and sound effects which are correlated in time and significance, and the object of the invention is to record, in moving-picture form, as on a film, photographically, certain moving objects or individuals, and at the same time record on a sound-record medium any intelligible sounds, whether purely vocal or purely musical, or both, due to said objects. This is done by placing on each moving object independent means for transmitting sound through the natural medium, or Hertzian waves, thus making each object absolutely independent of circuit connections or contacts, with respect to fixed points or circuits. The apparatus employed includes telephonic wireless transmitting and recording devices, and the means employed for recording the sound is preferably a wire of hardened magnetic metal, like steel, of small diameter; this wire is magnetized by the free pole of an electro-magnet, the coil of which magnet is subjected to electro-magnetic waves transmitted through the natural medium; by natural medium is meant the ether surrounding the earth, which Hertz demonstrated to be a natural medium subject to electro-magnetic influences, and it is here intended to include all the various means by which wireless signaling is and has been accomplished. To produce these electro-magnetic waves, each object photographed, and emitting sounds, is equipped with a portable telephonic wireless transmitting apparatus. By this it is meant to include a generator of high frequency oscillations, and a means for inflecting the oscillations with variations due to sound waves, like a telephone transmitter of the microphone species. It is preferable to employ, as a part of this apparatus, a vacuum valve adapted for transmitting high frequency oscillations; this valve, in addition to the usual hot element and

cold element, preferably has a third element adapted to form the terminal of a circuit and influence or control the electrical condition of the space between the two said elements; this may be like a grid, located within the vacuum between the hot element and the cold element; also there is a battery having an electro-motive force of about one hundred volts, each cell is of diminutive form and light weight, of the Planté or Faure type, and fifty such cells, arranged in series, should supply about one hundred volts; these cells are connected between the hot element and the cold element; the telephone transmitter is included in or associated with the radiating circuit and supported upon the chest of the object or individual. There is a battery for heating the filament in the vacuum, and when this battery is adjusted to produce a certain degree of heat and the battery and the circuit connecting the hot and cold element is tuned and so adjusted as to cause the valve to oscillate, the variation of voice waves or sound waves due to the microphone transmitter will inflect the resulting oscillatory discharge, and as these oscillations are radiated, there results a corresponding wave motion in the ether, as well known. The recording magnet for the sound recorder is connected in circuit with a vacuum detector or valve, as above described, adjusted for the reception and detection of oscillations, and the valve is associated with the receiving antenna. The antenna at the transmitting station or object, if used, is, preferably, in the form of a wire of practically invisible dimensions and color, and projects a foot or two above the object. The lower end of this antenna terminates in contacts and these contacts are adapted to engage a sheet-metal floor or capacity. These contacts are preferably placed in the soles of the shoes of the individual. The picture record and the sound-record medium or wire are advanced at a predetermined rate, and the two records are made simultaneously, in the identical correlation in which they occur. The sound-record medium or wire is coiled upon a spool and may be, in length, coextensive with the picture film.

In the arrangement of apparatus for recording the sounds due to the several different objects or actors, in order to make effective use of Hertzian oscillations, a re-

ceiving and repeating station is preferably located from one-quarter to one-half wave length from the transmitter, that is, say, outside the inclosure or hall and from 1200 to 2000 feet distant from the transmitters; the transmitted sound variations are there received, at this station, by a valve detector, such as has been described. A wire circuit, preferably a complete metallic circuit, is extended back to the point where the sound record, in close proximity to the picture record, is to be made. The valve detector is preferably connected as a form or species of repeater or relay between this last-named circuit and the radio receiving circuit. This separated station is used so as to provide for changes in position and movement by the moving object, the extent of movement, ordinarily, of the object being but a small part of the entire distance separating the object from the receiving station. If this provision were not made, re-tuning or re-adjustment of the apparatus carried by the object or individual, as said object moves about, would be necessary at frequent intervals.

The accompanying drawings illustrate the invention.

Figure 1 shows apparatus employed in recording the movement and vocalization of two objects or individuals on a stage. Fig. 2 shows, in dotted outline and detail, the transmitting apparatus carried by each individual.

In Fig. 1 the movements and utterances of two objects or individuals, 15 and 16, are shown on a stage; this stage has a metal or conducting surface or floor, 17, connected to earth as shown at 25. Each object, 15, 16, may be provided with a wire or antenna, 18, projecting slightly above the head. This is formed of small-gage wire and given a color which will not photograph effectively, the object being to avoid its representation in the picture; the antenna, 18, is connected in the circuit, 19, containing an inductance, 32, utilized as the secondary of an induction coil in series with a microphone or current-varying telephone transmitter, 20, carried on the chest of the individual, so that chest vibrations are effective to control the telephonic transmission by transmitter 20. The wire 19 is bifurcated and continued in two divisions, 21 and 22, to contacts, 23 and 24, placed in the bottom of the shoe of the individual, so as to make contact with the metal floor, 17. In addition to the circuits described, there is carried by the individual a vacuum valve, 26, having a hot element, 27, and a cold element, 28, with an intermediate grid, 29; the hot element 27 is heated by a small dry battery, 35. A battery, 33, of, say, fifty secondary elements of small size and weight, preferably one or two ounces per cell, is connected in circuit between the cold element 28 and the hot element 27. In

this circuit is an inductance, 31, employed as the primary of an induction coil, and inductively associated with the secondary, 32. The third or grid element, 29, is in circuit with six cells of battery, 34, connected to the hot element, and including an inductance, 30, inductively associated with the coil, 31. The inductance 30 is adjustable and, when properly adjusted, the local circuits described, including the valve, constitute a generator of high-frequency oscillations. On the stage, I have shown a tripod supporting a camera, with a crank handle, 13; this crank 13, when rotated clockwise, advances the transparent film of sensitized surface upon which the photographic record is made, as is well known. The camera is shown at 12. The sound-record medium is a tape of steel or a steel wire, like piano-string wire, shown at 10. A supply of this wire is carried on a spool and passes around a series of pulleys, including a grooved pulley, 14, on shaft with crank 13, so that when the film is advanced by turning the crank 13 the sound-record medium 10 is advanced with it or in predetermined relation, as may be determined by varying the size of the pulley on the shaft of crank 13. A magnet having a small pole-piece is shown at 11; this is in the circuit 51, 52, with battery 50, terminating in the hot and cold elements 49 and 56 of a vacuum valve. At a point from one-quarter to one-half wave length distant from the stage 17 there is erected any well-known form of wireless antenna, 40; included in its circuit is an adjustable condenser, 41, an inductance, 42, of adjustable character, and a ground connection, 43. Inductance 42 is employed as the primary of an inductorium, the secondary of which, in inductance form, is shown at 44, in circuit with a battery, 45, in a circuit one terminal of which is connected to the grid, 53; the other terminal is connected to the hot element 56 at 54, 55. The battery for heating the element 56 is shown at 46, and a variable resistance, 47, with an adjustable contact, 48, provides for adjusting the heating capacity of the battery and the heat of the filament 56. It is to be noted that the sounds emitted by the objects 15 and 16 are telephonically transmitted, by means of the microphone-transmitter 20, and the high-frequency generator carried upon the person, as shown in Fig. 2, by radio-signals or Hertzian waves, to the antenna 40, and are repeated back to the valve and the metallic circuit 51, 52, to the sound-recording magnet 11, where the sounds are recorded on the wire 10, while a visible record is photographically made upon the film of the camera 12 in correlated order.

All batteries shown in connection with the vacuum valves are to be adjustable as regards electro-motive force.

It is intended to include in the term "natural medium" used in the claims, the space separating the transmitting and recording station only and Hertzian waves and any magnetic or electro-magnetic waves, or influence of an intangible nature, operating through said space, and where wire or material of a conducting nature does not form a complete circuit.

What I claim is:

1. The combination of a photographic recorder, including a moving record medium, a phonographic record medium moving with said record medium, means for phonographically recording sound waves, including an electromagnet, a telephone transmitter located on an animate moving object, and means whereby said transmitter controls said electro-magnet, including the natural medium in the space separating the transmitting and recording points, and circuit connections for said magnet.

2. The combination, in a correlated photographic and phonographic recorder, of two characteristic record mediums moving in predetermined relation, a recording magnet for the phonographic recorder, forming part of a wireless receiving apparatus, and a wireless transmitting apparatus controlled by and moving with the moving object photographed.

3. The combination, in a correlated photographic and phonographic recorder, of two characteristic record mediums moving in predetermined relation, a recording magnet for the phonographic recorder, forming part of a wireless receiving apparatus, and a series of independent, wireless sound-wave transmitting devices, carried by a series of independently moving objects, respectively.

4. Apparatus for recording photographically and phonographically correlated optical and audible effects, due to a moving object, consisting of the combination of a moving photographic record medium, a lens therefor, a moving phonographic record medium, means for advancing said mediums in predetermined relation, means for recording sounds, including an electro-magnet, a telephone transmitter carried by the moving object photographed, and means whereby said transmitter controls said magnet through the natural medium in the space separating the transmitting and recording points or stations.

5. In apparatus for recording correlated, optical and audible effects due to a plurality of independently moving objects, the combination of a moving-picture record medium, a lens therefor, a moving sound-record medium, a recording magnet therefor, means for moving said record mediums in predetermined relation, a plurality of independent telephone transmitters, one car-

ried by each moving object photographed, and means including the natural medium in the space separating the transmitting and recording points or stations whereby said transmitters jointly and severally control said magnet.

6. In apparatus for recording correlated light and sound effects due to a moving object, the combination of record mediums, one for each species of record, means for advancing said record mediums, a photographic recording apparatus, a sound-recording device, a sound-transmitting apparatus carried by the object operating through the natural medium in the space separating the transmitting and recording points or stations, a repeater located at a station at least one-quarter wave length distant from said recording device, and a local circuit containing a sound-recording magnet located at the recording device.

7. In recording apparatus for correlated light and sound effects, the combination of a photographic record medium, a sound record medium, means for advancing both records, a magnet for recording sound waves, a wireless telephone transmitting apparatus carried by an animate, moving object, a wireless receiving device at a separated point and means whereby said transmitter controls said magnet.

8. In a recording apparatus for correlated light and sound effects, the combination of a photographic record medium, a sound record medium, means for advancing both record mediums, means for recording sound waves, wireless telephone transmitting apparatus carried by an animate, moving object, and a wireless receiving device to control the sound recording means.

9. The combination of photographic recording apparatus, including a moving picture record medium, a moving, independent sound record medium, means for advancing said mediums in predetermined relation and a sound recording device, with wireless telephonic transmitting apparatus carried by an animate, moving object, the movements and sounds due to which object are to be recorded.

10. The combination of a record medium for light effects, a record medium for sound effects, means for recording upon said mediums, simultaneously, light and sound effects due to a moving, animate object, a wireless detector adapted to control the sound record and a wireless sound-transmitting apparatus carried by said object.

11. The combination, with recording apparatus for correlated light and sound variations, of wireless sound-transmitting apparatus carried by an animate, moving object and a wireless detector adapted to control the sound-recording apparatus.

12. In recording apparatus for correlated

light and sound effects, the combination of a
moving, photographic recording apparatus,
a moving sound recording apparatus, means
for advancing both record mediums in pre-
5 determined relation, wireless telephonic
transmitting apparatus carried by an ani-
mate, moving object, the movements and
sounds due to which are to be recorded, a
wireless receiving device at a separated
10 point, and means whereby said transmitting

apparatus controls said receiving device
and said receiving device controls said sound
recording apparatus.

In testimony whereof I have signed my
name in the presence of two subscribing wit- 15
nesses.

WILLIAM BALDWIN VANSIZE.

Witnesses:

JOHN C. SANDERS,

J. ANDREW WHITE.