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1,988,505

LIGHT SENSITIVE TUBE

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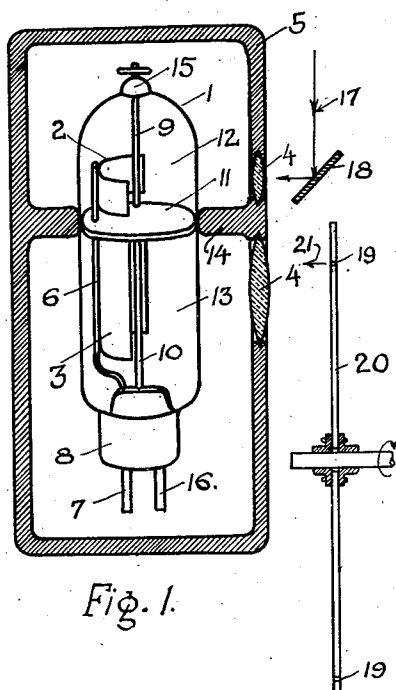


Fig. 1.

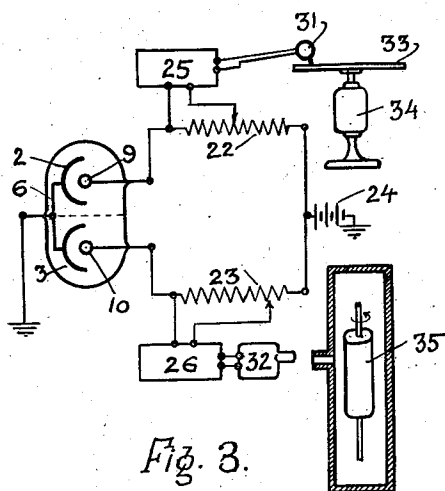


Fig. 3.

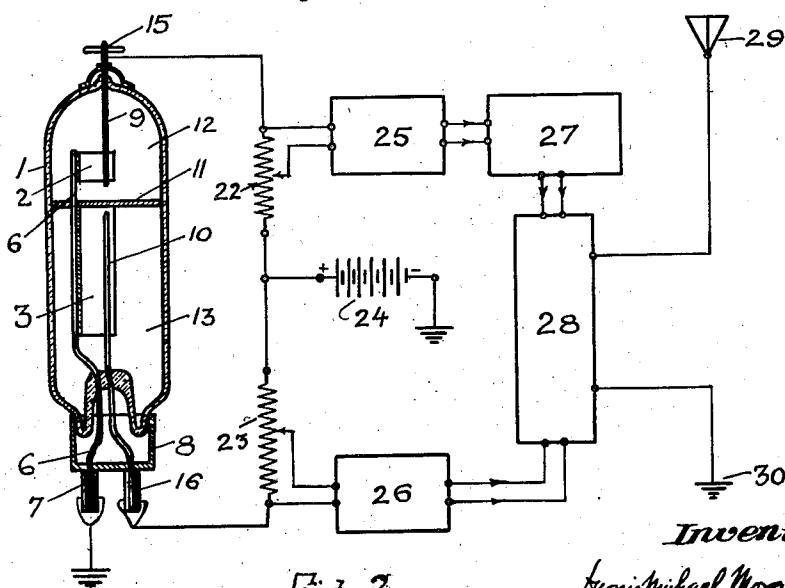


Fig. 2.

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LIGHT SENSITIVE TUBE

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2 Claims. (Cl. 250—27.5)

This invention relates to light sensitive tubes and especially to photo-electric tubes in which two or more light-sensitive photo-electron emitting metal or other surfaces (cathodes) are sensitized to incident light quanta by means of having distilled or otherwise applied a photo-electron emissive surface upon them; and which cathodes are joined together by a common conductor, but the electron emissions of which cathodes are collected by separate (two or more) anodes, so that two or more output circuits of the same light sensitive tube may be obtained independently from one another; and the objects of the improvement are, first, to simultaneously convert sound, light and other vibratory impulses into electrical signals, by means of light, and to transmit such signals in the same or independent wire or radio channels without losing the identity of the sound, light and other primary impulses; second, to simultaneously record such sound, light and other impulses, by means of recording instruments modulated by the amplified photo-electric signals upon discs, cylinders or other suitable record-holders and thus store them permanently for future uses.

We attain these objects by electrical mechanisms illustrated in the accompanying drawing, with reference to which the invention and its operation may be exemplified in the following, which, however, does not set any limitation to other forms or uses of the invention. Fig. 1 depicts a convenient exhibition of our single-unit light-sensitive tube in its double form, the tube itself being embodied in a light protective case and holder having two windows to accommodate focusing lens systems which transmit light impulses upon the light sensitive surfaces. Fig. 2 shows the connection of such a double-tube into intercombined electric signal amplifier circuits used for the purpose of simultaneous transmission through radio-channel of sound and television impulses. Fig. 3 exemplifies the use of such a double-tube in circuits simultaneously recording sound and light (telephotographic, television) or other impulses for the purpose of storing them in the form of permanent record.

In Fig. 1 part 1 is an evacuated glass or quartz envelope in which some inert gas at low pressure may be encased. 2 and 3 are cathodes consisting of metallic half-cylinder or metallic surfaces of another convenient shape provided with potassium, sodium hydride, or cesium compound or other light sensitive coating which are actuated by light beams incident through windows 4 of the light shielding encasement 5. Cathodes 2

and 3 are interconnected by means of conductor 6, which ends, outside the tube, in connection prong 7, through tube base 8. The electronic emissions of 2 and 3 are collected by the wire-shaped metal anodes 9 and 10 respectively, which latter are kept at high potentials in comparison to their respective emitting surfaces 2 and 3. Part 11 is a non-transparent insulating material resting above surface 3, or otherwise secured in its position, and serves for the purpose of separating the two tube enclosures 12 and 13 from one another. No air tight separation is required, 11 only serves to prevent the collections of electrons in the upper and lower tubes respectively, which electrons are emitted in the lower and upper tube respectively. 11 also serves to prevent light penetration from the tube parts into one another. Shoulder 14 of encasement 5 prevents outside light reflections from the light beam serving into the other tube part. 15 and 16 are the electrode connections to anodes 9 and 10 respectively. Through window 4 a sound-modulated arc may throw its light beam 17 upon cathode 2 by means of reflecting mirror 18, while through the scanning holes 19 of a rotating television scanning disc or other scanning device 20 a light beam 21 may be focused through lens window 4 upon cathode 3.

With reference to Fig. 2, part 6 is at ground potential thus keeping the two interconnected cathodes 2 and 3 at the same potential level, while anodes 9 and 10 respectively are connected through coupling resistances 22 and 23 respectively to the positive terminal of a voltage supplying device 24 the negative terminal of which is grounded. In this manner the anodes are kept at a high potential with respect to the cathodes. The incident variable light beams 17 and 21, shown in Fig. 1, of a sound-modulated electric arc and of a scanning device controlled light source will cause variable photo-electronic emissions from cathodes 2 and 3, thus creating potential variations through output resistances 22 and 23 in their respective circuits 7, 2, 9, 15, 22 and 24, and 7, 3, 10, 16, 23 and 24 respectively. The potential variations of 22 and 23 respectively are then amplified through devices 25 and 26, and the sound modulated amplified output of 25 is superimposed, as modulating oscillations, upon a carrier wave generated in 27. Finally the output of 27 and 26, sound and television signals respectively, will be combined, that is superimposed upon one another in device 28 and transmitted, by antenna-ground circuit 29, 30, to any receiver station, where the sound-modulated carrier wave and the television modu-

lations will be filtered out from one another and will actuate independent receiving devices. Fig. 3 shows simultaneous recording arrangement of which the double light sensitive tube is the principal part. Using notations consistent with the previous figures the outputs of 25 and 26 respectively actuate the sound recording head 31 and the light valve 32 respectively. In this manner a wax sound record may be obtained on turntable 33, rotated by motor 34, and a photograph record of the light impulses may be obtained on a photographic film wrapped around rotating cylinder 35 which also has an axial transversal motion.

It is evident that the light recording device 32, 35 may be replaced by any other convenient recording methods. Thus e. g. the output of 26 may create flicker impulses upon a neon lamp or other light-emitting receiving device, which, further, may create light impressions (especially if it is a gas-tube of the crater type), through a scanning device, upon a continuously moving motion picture film, so that a motion picture record will be obtained instead of a simple photographic plate. The magnetic storing of the impulses in a wire is also possible. The television or other light impulses also may be recorded by a sound-recording device in a similar manner to that of device 31, 33, so that a sound record of television signals is obtained.

The usefulness of the new device is self-evident: the simultaneous transmission of sound

and light, or the simultaneous recording of the same is considerably facilitated by this device and sound and light communications are simultaneously carried out by independent channels or by a single radio or wire channel. The comparison recording of other than sound or light impulses through this device is also possible.

We claim:

1. A light sensitive unit comprising an opaque housing having light transparencies and an opaque partition therein having an opening, a photo-tube fitting in said opening and housing an insulating, opaque partition dividing said photo-tube into compartments, each of said compartments containing a photo cathode and an anode, said cathodes being conductively interconnected and said partitions being substantially in alignment.

2. A light sensitive unit comprising an opaque housing having light transparencies in the form of lens windows for focusing light beams upon cathodes, said housing having an opaque partition therein having an opening, a photo-tube fitting in said opening and housing an insulating, opaque partition dividing said photo-tube into compartments each containing a photo cathode and an anode, said cathodes being conductively interconnected and said partitions being substantially in alignment.

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