

Jan. 8, 1929.

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1,697,941

MULTIPLE TELEPHONY UPON ONE AND THE SAME ELECTROMAGNETIC WAVE

Filed Aug. 6, 1926

Fig. 1

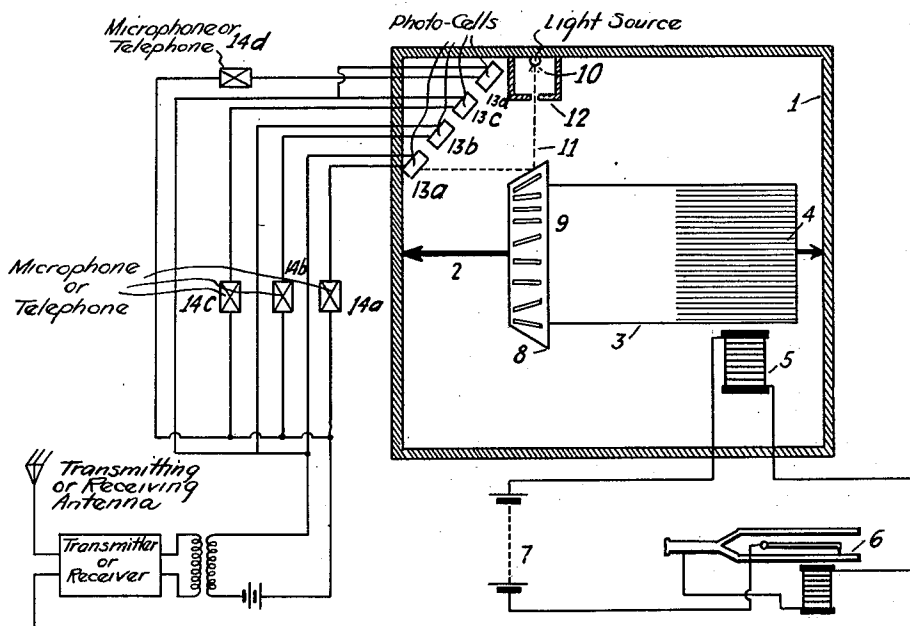
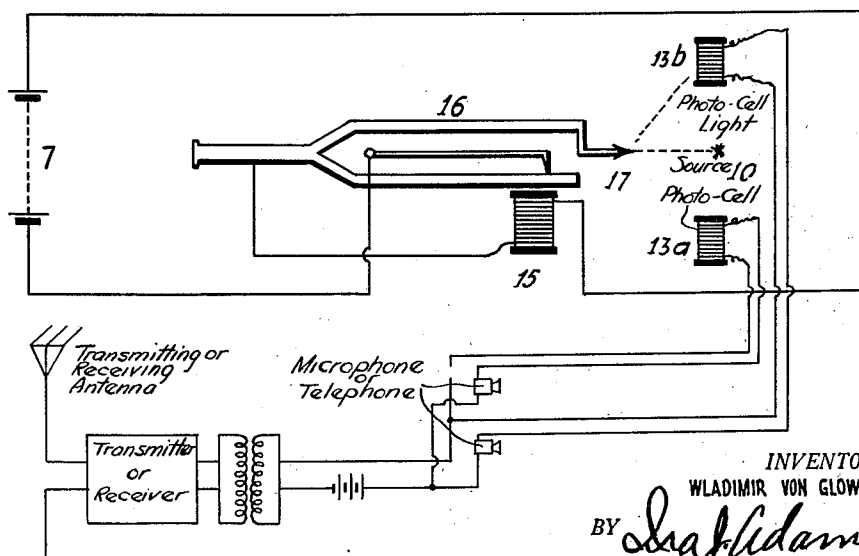


Fig. 2



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MULTIPLE TELEPHONY UPON ONE AND THE SAME ELECTROMAGNETIC WAVE.

Application filed August 6, 1926, Serial No. 127,588, and in Austria January 12, 1926.

The subject matter of the present invention concerns an arrangement for multiple telephony or the like upon one and the same electromagnetic wave. The purpose aimed at is attained, according to the invention, by connecting the telephone apparatus, through light sensitive conductors subject to synchronous influence or control so that they are in regular alternation or sequence with one another.

In the drawing I have shown two of the many embodiments of my invention, in which

Fig. 1 shows a preferred form using a rotating drum provided with a reflecting means for directing the light beam; and

Fig. 2 shows a modified form of control which comprises a reflecting means operating with a tuning fork and periodic interrupter.

Referring first to the embodiment disclosed by Fig. 1 of the accompanying drawing, the arrangement is enclosed in an opaque box 1 in which, upon a revoluble shaft or spindle 2, a drum 3 made of some convenient material, preferably filled with a little mercury, is disposed. Upon this drum 3, at equal distances from one another, there are arranged very thin and narrow soft-iron rods 4. Immediately below the drum 3 is arranged a conveniently formed electromagnet 5 which conjointly with the tuning-fork interrupter 6 is inserted in the direct current source circuit 7. Upon the drum 3 is provided a reflecting surface 8 having a mirror-like polish, and into this surface 8 are cut reflecting notches 9 in close proximity to one another and being so cut that the angles of inclination thereof with reference to shaft 2 are successively different. 10 denotes a constant light source whose luminous beam or pencil 11 is allowed to fall through a slit in chamber 12 upon the polished reflecting surface 8, being there reflected according to the angle of incidence, in the direction of photo-electric cells 13^a, 13^b, 13^c, 13^d, if provided. Each of these photo-electric cells is inserted in the primary or the secondary circuit of the corresponding microphones (14^a, 14^b, 14^c, and 14^d). These microphones, finally, are connected in parallel with the transmitter equipment according to well-known methods, as, for example, in accordance with the arrangement disclosed in the drawings, wherein the separate microphones

or telephones (depending upon whether a transmitting or receiving station is represented) are connected each with a separate photo-cell and parallelly connected to a transmitting or receiving system of any desired or suitable character.

The receiving equipment is perfectly identical with the sending equipment, but in lieu of the microphones suitable telephone receivers are provided.

The method of operation of the arrangement shown in Fig. 1 is as follows:

After the tuning-fork interrupters of the sending and receiving stations have been carefully tuned to the same pitch, the drum 3 in the transmitter or receiver apparatus and the identically built drum in the receiving apparatus revolve at the very same rate of speed in clockwise direction. The pencil of light rays 11 then impinging vertically upon the reflecting surface 8 both in the transmitter as well as in the receiver is deflected in convenient manner by notches 9 towards the photo-electric or selenium cells 13^a, 13^b, 13^c, 13^d, mounted within box 1, whereby these are illuminated in rapid succession. On account of such synchronous illumination of the photo-electric cells at the sending and the receiving apparatus, on the one hand, the microphones 14^a, 14^b, 14^c, 14^d are connected transiently with the transmitter point, while the telephone receivers at the receiving end are similarly connected transiently, and successively, with the receiving point, the possibility for wireless communication between the telephone apparatus connected temporarily or momentarily being thus attained. Hence, according to the number of telephone apparatus provided, it is possible to carry on several conversations or the like upon one and the same electromagnetic wave simultaneously and without any trouble.

In Fig. 2 of the drawing is diagrammatically shown another form of construction of the above arrangement which, inserted in the transmitter and the receiver apparatus, permits multiple telephonic communication upon one and the same electromagnetic wave. In the circuit of a direct current source 7 is inserted a periodically operative interrupter 15. This interrupter 15 consists, in this scheme, of an electromagnet and a keeper constructed like a tuning fork 16, one end of which ter-

minates in a highly polished and conveniently formed point 17. 10 again denotes a light source the beam or pencil of which is caused to impinge perpendicularly upon the point 17, and which is alternately reflected towards the photo-electric cells or selenium cells 13^a—13^b according to the position or oscillation of the point 17. These photo-electric cells 13^a, 13^b are inserted in the circuits of the microphones coordinated thereto which are connected in parallel with the sending point. An identical arrangement is provided at the receiving end, with this difference that in lieu of the microphones, convenient telephone receivers are provided. The tuning forks of the sending and receiving stations are also tuned to the identical pitch, a fact which can be readily checked by comparing the pitch of the vibrating tuning forks.

Now, the operation of this arrangement is as follows:

Due to the synchronous vibrations of the tuning forks 16 or the highly polished points 17 in the transmitter and the receiver, the pencil of light rays issuing from luminous source 10 is alternately deflected towards the selenium cells, 13^a, 13^b, whereby the corresponding microphones of the sending point and the telephone receivers of the receiving point are transiently interconnected by wireless. Thus, in this case, two conversations can be carried on simultaneously without mutual interference. Accurately speaking, the conversations simultaneously carried on are interrupted in rapid succession, with the evident result that fractions of the conversation are cut out; but, in the presence of a high speed of rotation of the drums, the ear is unable to notice the lack or loss of the missing fragments of the conversations.

In constructional respect a great number of modifications are conceivable. The above outlined idea could also be utilized in connection with other arrangements than the one hereinbefore referred to.

It will be readily understood that an arrangement very simple in constructional respect is dealt with, which not only allows of multiple telephony on one and the same electromagnetic wave, but which also precludes all chances of unauthorized listening in.

Having described my invention, I claim:

1. An arrangement for multiple telephony upon one and the same electro-magnetic wave comprising, a transmitting and a receiving station of like characteristics, a source of light rays at each of said stations, a distributor head for directing said light located at both said transmitting and said receiving stations, a plurality of photo-electric cells located at each of said transmitting and receiving stations, and means located at both said transmitting and said receiving station for synchronously subjecting corresponding

photo-electric cells at the transmitting and at the receiving stations to the light rays directed from said distributor head of light, whereby the said synchronous operation makes and breaks the signals between coordinated apparatus at the transmitting and the receiving stations simultaneously.

2. An arrangement for multiple telephony upon one and the same electro-magnetic wave comprising, a transmitting station and a receiving station of like characteristics, a plurality of photo-electric cells located at each of said transmitting station and receiving stations, a separate microphone connected with each photo electric cell at said transmitting station and a separate telephone receiver connected with each photo-cell at said receiving station, a source of light rays at each of said stations, a distributor head for directing said light rays positioned at each of said stations, means at each of said stations for synchronously rotating said distributor head at a speed above audibility for directing said light to corresponding photo-cells at said transmitting and said receiving stations, whereby the said reflected beams of light successively open and close a corresponding signal channel of conversation at each station at a speed above audibility.

3. An arrangement for multiple telephony upon one and the same electro-magnetic wave comprising, a light source directing a beam of light in a predetermined direction, a reflecting means for directing said light beam, a plurality of photo-electric cells for receiving the light beam reflected by said reflecting means, means for synchronously controlling said reflecting means so that the light beam may be successively directed from one cell to another at a predetermined rate of speed above the range of audibility, a microphone connected with each of said photo-electric cells, an energy transmitting system, and a connection for connecting each of said cells and associated microphone in parallel with said transmitting system, whereby one specific cell and its associated microphone is periodically and alternately connected with the transmitting system at a fixed rate of speed.

4. An arrangement for multiple telephony upon one and the same electro-magnetic wave comprising, a source of light, a distributor head for directing said light mounted within an opaque housing, said distributor head being rotatably supported within said housing interrupting means for controlling the rotation of said distributor head, a plurality of reflecting means in the path of the light rays mounted upon said distributor head, a plurality of photo-electric cells within said housing for alternately and successively receiving the light rays issuing from said light source as reflected by said reflecting means, a transmitting system, a microphone con-

nected with each of said photo-cells and said transmitting system for alternately and successively transferring sound impulses impressed thereon to said transmitting system during the period of time that each respective cell is subjected to the influence of said light ray.

5. An arrangement for multiple communication upon one and the same electro-magnetic wave which comprises, a plurality of channels for receiving sound waves and converting the same into electrical energy, light sensitive means for controlling the time of operation of sound channels, a light source and a light beam issuing therefrom, and a rotatable means revolving at a speed above audibility for periodically and successively changing the direction of said light beam and closing a circuit through one of said light sensitive means and one of said sound channels.

6. A system for establishing multiple communication upon one and the same electro-magnetic wave which includes, a transmitting station and a receiving station both of like characteristics, a plurality of microphone channels located at said transmitting station and a plurality of telephone channels located at said receiving station, photo-cells located at both said stations and associated with each microphone or telephone circuit, means located at each of said stations for alternately and successively subjecting said photo-cells to light impulses, whereby various microphone and telephone channels are placed in the circuit of said transmitting and receiving systems, and means located at each of said stations for synchronously controlling the operation of said means for directing light to said photo-cells, whereby corresponding sound channels are inserted in the transmitting and receiving systems at identically the same period of time.

7. A system for maintaining a plurality of separate communication upon one and the same electro-magnetic wave which includes, a transmitting station and a receiving station, each provided with a plurality of parallelly connected sound channels a source of light at each station for directing a beam in a predetermined path, light sensitive means associated with each of said sound channels for conducting the separate communications, means for alternately and successively establishing a connection between coordinated sound channels at said transmitting and receiving stations, said means including a light distributor for controlling said light beam and directing the same to corresponding light sensitive means, and means located at each of said stations for synchronizing said light distributor apparatus, whereby like channels of communication are utilized at like periods of time.

8. An arrangement for a multiple teleph-

ony upon one and the same electro-magnetic wave comprising, a transmitting and a receiving station each provided with a source of light, rotary reflecting means for directing said light, electro-magnetically controlled interrupting means for regulating said reflecting means, a plurality of photo-electric cells successively and periodically receiving the light from said source as reflected by said reflecting means, and telephonic means connected with each of said photo-electric cells for establishing a path of communication with a correspondingly coordinated telephone at the second point at said successively and periodically interrupted periods, said periods of interruption being above the range of audible reception, whereby interruption in the communication between said stations is unobservable to the ear and the accuracy of the transmitted and received message unaffected.

9. In a system for multiple communication upon one and the same electro-magnetic wave, a transmitting station provided with a plurality of parallelly connected sound conducting channels, a photo-cell associated with each of said separate sound channels, a light source, and means provided by a plurality of rotating mirrors for alternately and successively switching the light beams issuing from said source from one photo-cell to another in a fixed order at a speed above the range of audibility, whereby sound channels associated with said photo-cells are correspondingly connected with said transmitting system.

10. An arrangement for establishing multiple telephony or the like upon one and the same electro-magnetic wave which includes, a transmitting station, a plurality of sound pick-up devices parallelly connected with said transmitting station, a plurality of light sensitive photo-cells individually connected with each of said sound sensitive means, a light source and a rotary distributor head for successively directing the light rays issuing from said light source to separate photo-cells, whereby the photo cells function as circuit makers and breakers for continuously and successively establishing a communication with each of said separate sound pick-up devices.

11. In a system for multiple communication upon one and the same electro-magnetic wave, a source of light and a distributor head for controlling the direction of the issuing light beam, a plurality of photo-cells alternately and successively subjected to the influence of said light rays as directed from said distributor, a plurality of sound sensitive microphones individually connected with one of said photo-cells, and a transmitting station having each of said sound sensitive microphones parallelly connected thereto, whereby the said distributor head of light

alternately and successively establishes a plurality of separate communication channels with said transmitting apparatus.

12. In a system for multiple communication upon one and the same electro-magnetic wave, a transmitting system, a plurality of microphones connected in parallel therewith, a photo-cell associated with each of said mi-

crophones, a light source, and a distributor head for successively directing the light beam issuing from said source at a speed above audibility from one to another of said photo-cells, whereby said photo-cells function as circuit makers and breakers for each separate microphone channel.

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CERTIFICATE OF CORRECTION.

Patent No. 1,697,941.

Granted January 8, 1929, to

WLADIMIR von GLOWACKI.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 122, claim 4, between the syllable "ing" and the word "interrupting" insert a comma; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of December, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.