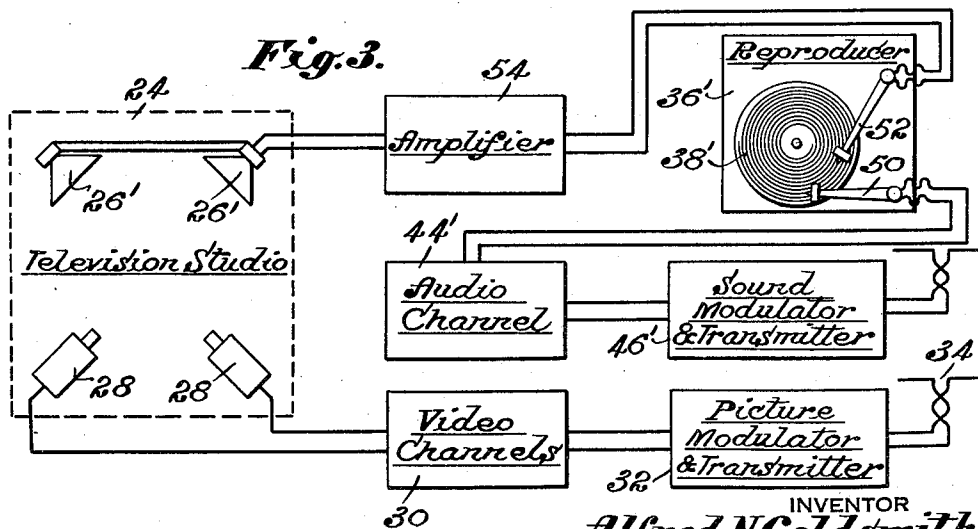
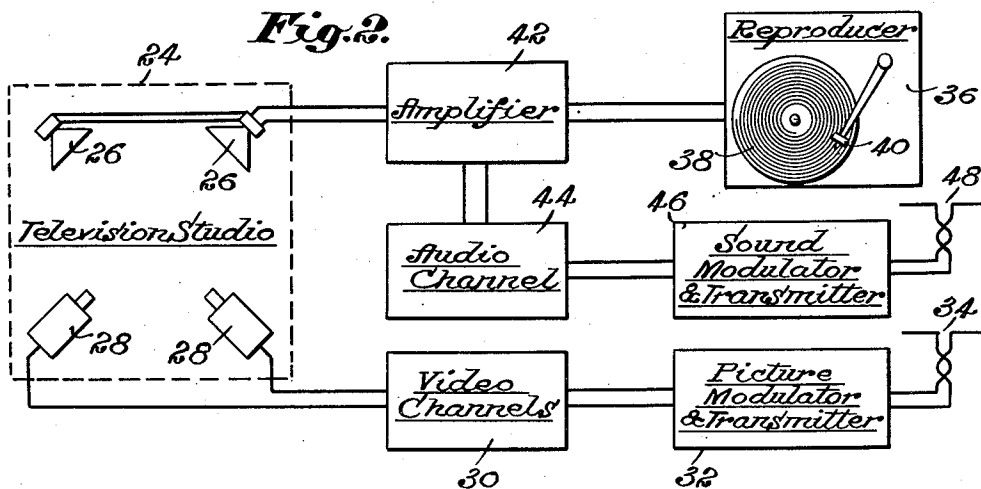
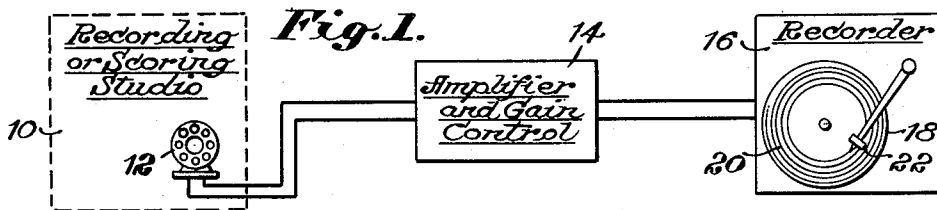


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TELEVISION TRANSMITTER

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## TELEVISION TRANSMITTER

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7 Claims. (Cl. 178—5.6)

This invention relates to an improvement in television transmitters and more particularly to a method and apparatus for use in transmitting television programs.

The presently used method for transmitting a television program includes transmitting from the television studio both the sight and sound of the program presentation which originate simultaneously in the studio and which are transmitted individually and in synchronized relationship on separate carrier frequencies. Since in television the images which are projected on the transmitting or carrier tube are transmitted substantially instantaneously, and since this is also the case for the sound picked up by the studio microphone, corrections of errors or omissions both as to the sound and as to the movement or appearance of actors, cannot be overcome. The pictures and sounds of the program must be transmitted as they occur and are then beyond correction or recall. Furthermore, a television program is ordinarily presented only once, and that presentation should preferably be as nearly perfect as is possible. Such technique as above described requires that the actors and actresses completely memorize the script both as to dialogue and action; and also it is necessary that the cast rehearse the television play or program a sufficient number of times so that they are sufficiently familiar with and confident concerning the required speech and movements as to obviate all possibilities of error at the time of actual transmission. Where several television plays are necessarily produced in the course of a relatively short time, for example a week, the memorizing of the parts alone places a considerable or even impossible burden on the cast used at the studio. In order to lessen the burden of memorizing a large number of parts and a plurality of different plays, a number of separate casts are frequently maintained which procedure of course is expensive and may be economically not feasible. There is therefore a marked need for some new method and equipment for avoiding these difficulties and limitations.

The present system of this application accordingly provides means whereby it is possible for the actors and actresses to record the aural, spoken, or musical part of the program prior to its actual transmission so that it is no longer necessary to commit the lines (or melody) to memory since the recording of the oral or vocal part of the program may be done while reading directly from the script. This, therefore, leaves only the particular movements of the actors and the vari-

ous entrances to be made in movements on the studio to be memorized, which is not nearly so difficult or lengthy, or costly as memorizing the complete lines of the play.

Further advantage of the present invention resides in the provision of means whereby the audio portion of the television program may be recorded prior to transmission, and may be used for transmission purposes simultaneously with the actual televising of the television program.

In exercising the present invention the sound which has been recorded is used directly to modulate the sound transmitter and no microphones or sound pick-up devices are, in fact, used in the television studio at any time during the presentation of the program.

During the time that the program is actually presented to the television-telephone broadcast audience, and after the cast has become sufficiently thoroughly familiar with their parts through action rehearsal and without the necessity of memorizing their lines, the record previously prepared of the spoken dialogue and/or accompanying music is used directly to modulate the sound transmitter. Simultaneously, the same audio frequencies from the record previously prepared are used to operate loudspeakers which are positioned at various points in the studio, these loudspeakers reproducing the output of the records of dialogue or music comprising the various active parts as previously recorded. The actors are then guided in their actions by the previously recorded sound which is reproduced on the loudspeakers, and thus their own dialogue or music is used for timing and guiding their action. The actors then go through their spoken or musical parts as during rehearsal in "dumb show," merely moving their lips in accordance with the sound emitted from the loudspeakers or, if they prefer, they may actually speak or sing in an ordinary tone of voice following of course the sound from the loudspeakers as closely as conveniently possible. Inasmuch as no microphones are in fact used in the television studio, the sounds from the loudspeakers, the aural renditions (if any) of the actors, and any extraneous noise are not objectionable.

Furthermore, for this same reason it is possible for a director to be actually present in the television studio and to communicate orally with or give directions to the actors directly as the case may demand. Any sounds present in the studio during the actually transmitted performance are not picked up nor transmitted to the television lookers.

Another advantage and purpose of the present invention resides in the fact that a different voice may be actually used for the audio portion of the program than the voice of the actor who in fact portrays the particular part. This is particularly advantageous since in many instances an actor or an actress may televise quite desirably and may be able to act effectively, and yet the speech of that person may not be entirely pleasant to hear or inherently suitable to the part to be played. In such instances a person with a more pleasant or appropriate voice may be used to make the audio recording, whereas the person with a more acceptable visual aspect may be used to portray the part from the standpoint of sight.

In the use of such a system it is obviously desirable that the lip movements of the actors reasonably coincide with and be synchronized with the actual audio portion of the program, and particularly when close-up full-face views of the speaking actors are shown. Since the actors have not memorized their lines, a certain amount of prompting would of course be necessary; and if they were to follow the sound emitted from the loudspeakers with a certain inherent physiological or psychological lag, the movements of their lips might be later than the actual sound by a small amount. It is therefore another purpose of the present invention to incorporate means whereby, wherever necessary, the sound reproduced in the television studio will precede the sound transmitted on the television channel by a small amount (e. g., of the order of a fraction of a second to one or two seconds) in order that the actors may actually permit a small amount of time to elapse between the audio portion of the program which they hear from the loudspeakers in the television studio actuated from the record previously prepared and the "dumb show" or movements of their lips, and any related action.

Another advantage of the present invention resides in the fact that increased naturalness and emphasis may be given to the audio portion of the program since the actors, at the time the recording is made, can concentrate fully upon such emphasis inasmuch as they do not have to be simultaneously occupied with remembering positions on the television set or their accompanying actions.

Another advantage of the present invention is the elimination of actual microphones in the television studio. This reduces the number of personnel who must be present during the actual performance, avoids limitations in the placement of pick-up microphones, and gives the television cameramen greater scope since they do not have to consider the unpleasant possibility of accidentally including the microphone in the pick-up picture.

Also it is well known that a superior pick-up for speech or music can be secured if the microphone is placed in the best possible relationship to the actors or other sources of sound from the acoustic aspect exclusively during the prerecording process, and without any consideration of pictorial limitations or requirements nor yet of the movement of the actors which may be required in the actual television performance.

It is further advantageous in the present invention to be able to record any desired number of renditions of the aural parts of the actors, and to select from the thus available recordings that one which most nearly perfectly represents

the dramatic and musical requirements of the various parts. Every television program presentation addressed to the radio audience thus becomes, so far as its aural aspects are concerned, the best performance which can be produced by orally qualified persons, under conditions free from strain or the hampering necessity for carrying out the accompanying correct action in costume, and as a result of repeated attempts to make a perfect record by reading the parts before the microphone.

Various other advantages and purposes of the present invention will become more apparent to those skilled in the art from the following specification, particularly when considered in conjunction with the drawing wherein:

Fig. 1 shows schematically the recording apparatus,

Fig. 2 shows one form of a transmitting apparatus, and

Fig. 3 shows a modified form of a transmitting apparatus.

Referring now to the drawing and particularly to Fig. 1 thereof, a recording or scoring studio is shown schematically at 10 which includes a sound responsive device or microphone 12. The output from the microphone is supplied to an amplifier and gain control device 14 and after the signals have been sufficiently amplified they are supplied to a recorder, one possible form of which is shown schematically at 16 which naturally includes a turntable 18 for supporting a recording disc 20 and an arm carrying a recording head 22.

After the actors have become sufficiently familiar with the script to give proper emphasis and correct timing to the dialogue when read, the actors who are to supply the sound portion of the program assemble in studio 10 and read the script into the microphone 12. A recording of the sound program is then made on the recording disc 20. The recording disc may be of any preferred form such as, for example, an acetate disc, or a wax disc; or it may be replaced by any equivalent sound recording medium such as a light sensitive film or a Poulsen or magnetic wire recording apparatus of the telegraphophone type. The particular manner in which the audio program is recorded is not vital.

In Fig. 2 is shown a television studio 24 which includes one or more loudspeakers 26 not visible to the television cameras or the broadcast lookers, and one or more television cameras 28. The television cameras 28 are connected to the video amplifying channels 30 and after proper and usual corrections have been made in the video signals and synchronizing signals have been added, the video signals are then used to modulate a picture transmitter 32 so that the picture program may be transmitted by the antenna 34.

Associated with the television transmitter is a sound reproducer 36 which includes a turntable 38 and a pick-up arm 40 for converting the previously prepared recording into electrical energy variations. The audio output signal from the reproducer 36 is supplied to an amplifier 42 for increasing the method of the voltage variations of this amplifier as to outputs. One of the outputs is supplied to the speakers 26 in the television studio whereas the other output is supplied to the audio amplifying channel 44. After suitable amplification, audio signals from the audio channel 44 are then used to modulate a sound transmitter 46 in order that the sound portion of the program may be transmitted from the antenna 48. It will be specifically noticed

that no sound responsive device or microphone is used in the television studio and the sound signals which are actually used in modulating the sound transmitter are taken directly from amplifiers supplied with energy from the reproducer 36.

After the actors have rehearsed the television play and have become sufficiently familiar with their actions on the set, the actual broadcast may then be presented from the television studio 24. During the time of the presentation of the television program, sound from the speakers 26 acts as a guide or control to the lip movements (and accompanies action) of the actors so that on the screen of a television receiver it will appear that the actors are actually speaking or singing the audio portion of the program being simultaneously heard with the action. At the time the actors are portraying their parts, the television cameras pick up the associated action and the sight portion of the television program is transmitted through the transmitter 32 on the air to the radio audience.

The speakers 26 are provided in the television studio in order to assist in directing proper movements of the actors at the time the program is broadcast and to afford sufficient cueing to permit them to perform the proper "dumb show" movements of their lips. Through the use of such a system it is therefore possible for a television program to be presented even though the actors have not actually committed their parts and lines to memory. Furthermore, as pointed out above, it is possible for one person to take the audio part of the program whereas another person may act the moving or sight portion of the program. In such a system the reproduction of the sound recording at the television receiver occurs simultaneously with the actual transmission of the television portion of the program and no film record of the movements or sight portion of the program is prepared.

As pointed out above, it may be desirable in some instances to have the audio portion of the program as reproduced by the loudspeakers in the television studio slightly precede the audio signals which are transmitted from the transmitter 46. An exemplary system for accomplishing this is shown in Fig. 3 which corresponds in most respects to the transmitter shown in Fig. 2. Fig. 3 differs from Fig. 2, however, in that the reproducer 36' includes a turntable 38' and two sound pick-ups 50 and 52. The sound pick-up 52 is connected to the amplifier 54 which supplies energy to the speakers 26' whereas the pick-up 50 is connected to the audio channel 44' which supplies energy to the sound modulator and transmitter 46'. In operating the system shown in Fig. 3 the pick-up arm 52 which supplies audio signals to the speakers 26 is positioned a fraction of a groove or one or more grooves ahead of the pick-up 50 so that the sound signals which are reproduced in the television studio actually precede the sound signals which are transmitted over the air by a predetermined short interval. This will give the actors sufficient advanced cueing, as desired, to permit more accurate synchronizing of lip movements and action, in the one hand, with the actually transmitted sound signals on the other hand.

If the recording is made on a light responsive film the same advance in sound signals may be produced by using two light responsive reproducers positioned a given distance longitudinally along the film record. Likewise, if a Poulsen

magnetic wire recorder of the telegraphone type is used, two pick-up devices may be employed spaced a predetermined distance along the recorder wire.

Through the use of the system shown in Fig. 3, therefore, it is possible to reproduce the previously prepared recorded sound signals in a television sound studio at a predetermined interval in advance of the transmission of the sound signals over the air. By a little practice the actors can become accustomed to a conveniently predetermined time lag of movements of the lips, as well as action of the actors themselves; or motions of various objects on the set can be properly synchronized with the sound as transmitted.

Various alterations and modifications may be made in the present invention without departing from the spirit and scope thereof by those skilled in the art and it is desirable that any and all such modifications and alterations be considered within the purview of the present invention except as limited by the hereinafter appended claims.

I claim:

1. In a television system, the method which comprises recording the audible portion of a sight-sound program, converting the recording into electrical energy representative of the recorded sound at a time subsequent to the recording, scanning a scene of action to produce electrical energy signals representative of the sight portion of the program, converting a first portion of the electrical energy produced to represent the sound into audible energy at the scene of action, controlling the energization of a transmission channel by a second portion of the electrical energy produced from the sound recording, and simultaneously controlling the energization of a transmission channel by the electrical energy representative of the sight portion of the program to provide concomitant related sight and sound transmission.

2. The method of controlling the energization of a television signal transmission channel by related sight-sound signals which comprises the steps of producing a recording of the audible portion of the sight-sound program prior to the origination of the sight portion of the program transmitted, subsequently converting the recording into electrical energy representative of the recorded sound, scanning a scene of action of the related sight portion of the program to produce electrical energy representative thereof, converting a first portion of the electrical energy representative of the sound into audible signals substantially at the scanned scene of action, concomitantly controlling a signal transmission channel by a second portion of the electrical energy representative of the sound and by the electrical energy representative of the sight portions of the program, and establishing a predetermined timed relationship between the control of the transmission channel by the electrical energy representative of the sound and the conversion of the electrical energy representative of the sound into audible signals at the scanned scene of action.

3. A system for controlling the energization of a television signal transmission channel by related sight-sound signals which comprises means for producing a recording of the audible portion of the sight-sound program prior to the origination of the sight portion of the program transmitted, means for subsequently converting

the recording into electrical energy representative of the recorded sound, a television scanning camera for scanning a scene of action of the related sight portion of the program to produce electrical energy representative thereof, sound reproducing apparatus for converting a first portion of the electrical energy representative of the sound into audible signals substantially at the scanned scene of action, means for concomitantly controlling a signal transmission channel by a second portion of the electrical energy produced to represent the sound and by the electrical energy produced to represent the sight portions of the program, and a signal delay means for establishing a predetermined timed relationship between the control of the transmission channel by the electrical energy representative of the sound and the conversion of the said electrical energy into audible signals at the scanned scene of action by the sound reproducing apparatus.

4. The method of transmitting a television program wherein both the visual and the related sound portions are simultaneously transmitted which comprises the steps of recording, prior to the actual transmission of the program, the sound part of the program, reproducing the recorded sound part of the program in the studio during the actual transmission of the program to guide the movements or actions of the actors in portraying the visual or action part of the program before a television camera, producing visual or picture signals at the camera representative of the visual or action part of the program, transmitting the produced visual or picture signals, utilizing the recorded sound portion of the program to directly supply the associated sound signals for transmission, simultaneously transmitting the sound signals derived directly from the sound record, and delaying the transmitted sound signals by a predetermined small amount with respect to the sound reproduced in the studio.

5. The method of transmitting a television program wherein both the visual and the related sound portions are simultaneously transmitted which comprises the steps of recording the sound part of the program prior to the actual transmission thereof, reproducing the recorded sound in the television transmitting studio during the actual transmission of the program to cue the actors in portraying the visual part of the program before a television camera, producing visual or pic-

ture signals at the camera in the studio, transmitting the produced visual or picture signals, utilizing the recorded sound record to directly supply the associated sound signals, simultaneously transmitting the sound signals derived directly from the previously recorded sound, and delaying the transmitted sound signals by a predetermined small amount with respect to the sound reproduced in the television transmitting studio.

6. A television transmitting system wherein both the picture and the related sound signals are transmitted simultaneously comprising means for recording the sound part of the program prior to transmission, means including a sound reproducing device for reproducing the recorded sound portion of the program in the television studio at the time of the program presentation to guide the movements or actions of the actors in portraying the visual part of the program, a television camera in the studio for producing picture signals, means for transmitting the produced picture signals, means for producing the related sound signals directly from the previously recorded sound, means for delaying the production of the related sound signals developed from the recording for transmission with the picture with respect to the reproduction of the recording in the television studio, and means for transmitting the related sound signals simultaneously with the transmission of the picture signals.

7. A television transmitting system wherein both the picture and the related sound signals are transmitted simultaneously comprising means for recording the sound part of the program, means including a sound reproducing device for reproducing the previously recorded sound portion of the program in the television studio at the time of its presentation to guide the movements or actions of the actors in portraying the visual part of the program, a television camera in the studio for producing picture signals, means for transmitting the produced picture signals, means for producing the related sound signals directly from the previously prepared recording, means for transmitting the produced related sound signals simultaneously with the transmission of the picture signals, and means for advancing the reproduction of the sound in the television studio by a predetermined small amount of time with respect to the produced related sound signals for transmission.

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