Nov. 28, 1933. D. G. SHEARER 1,936,886

METHOD OF STUDIO TECHNIQUE

Filed Jan. 2, 1932

Fig. 1.

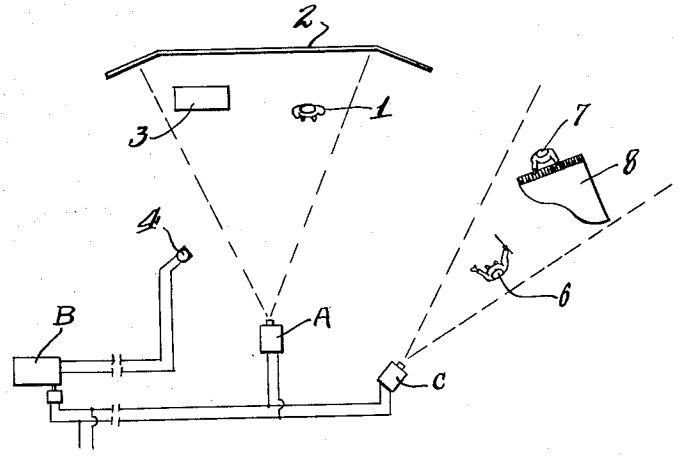
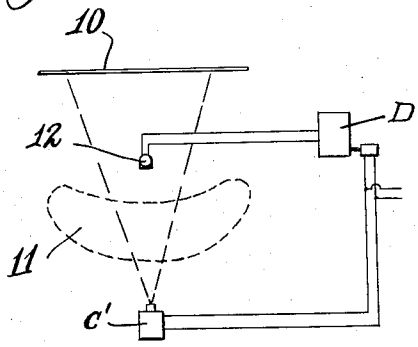


Fig. 2.



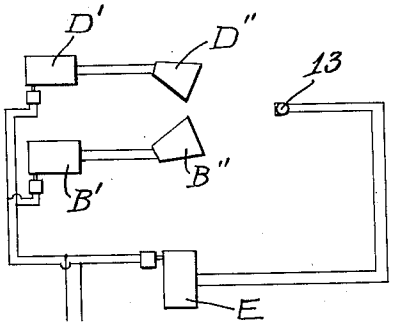


Fig. 3.

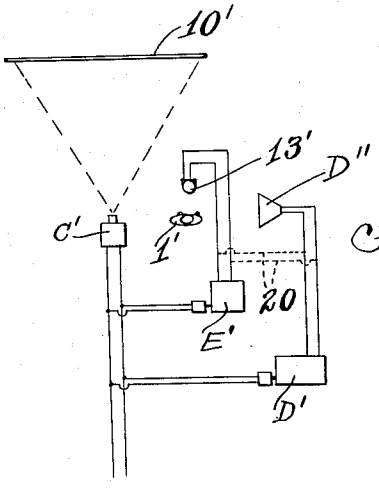


Fig. 4.

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METHOD OF STUDIO TECHNIQUE

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Application January 2, 1932. Serial No. 584,452

4 Claims. (Cl. 88—16.2)

This invention relates to an improved method of obtaining sound recordings of a voice with a musical accompaniment, and particularly relates to a method by means of which separate recordings of voices and of orchestra accompaniment may be combined so as to produce a single composite sound recording perfectly synchronized with a pictorial record of a sound source.

In order to insure perfect synchronization between a picture record and a sound record, the picture record and the sound recording should be simultaneously made. Numerous instances arise in the photography of photoplays where it is substantially impossible or extremely difficult to obtain a sound record and a pictorial record concurrently. For example, it is difficult, if not impossible at times, to take a picture record of an actor and simultaneously record the actor's voice and an orchestral accompaniment, particularly if the picture record must be limited to the picturization of the actor or singer and not include the orchestra. The difficulties arise from a number of causes. For example, the inability of the entire orchestra to get within the range of the microphones utilized in picking up the voice of the actor, or the inability of the entire orchestra to get close enough to the microphones and still keep out of the range of view of the camera taking the pictorial record of the actor or singer. Furthermore, it is difficult to properly modulate the voice and orchestra relatively to each other so as to produce a single combined record in which the orchestral accompaniment is sufficiently muted without distortion. Again, the structural limitations of the set or background being employed during the photography of the actor or singer and the acoustical limitations of the space in which said photography is being carried out, may be such as to render it impossible to permit an orchestra of say thirty pieces, to be within range of the microphones and to produce a sound record in which the various tones are not distorted.

In addition to the difficulties enumerated hereinabove, in many instances it may be necessary to record the voice of the actor while certain other action is taking place, this additional action being included in the pictorial record being made of the actor. Many trials, rehearsals and retakes may be required. Even though the structural and acoustical conditions are such that an orchestra may be positioned within proper range of the microphones, still the cost is very material. Rehearsals and repeated photographing of the action may consume several days and the cost of maintaining an orchestra in attendance during the entire period of time often renders the resulting photoplay a commercial failure.

This invention is directed towards a method of producing single combined voice and sound records by which the difficulties mentioned hereinabove are obviated.

An object of the invention, for example, is to disclose and provide a method of producing a single combined voice and sound record from separately taken records, the resulting combined voice and sound record being perfectly synchronized with the pictorial record of the actor or singer who produced the voice record.

Another object of the invention is to disclose and provide a method of recording an orchestra so as to form an orchestral recording which is synchronized with a previously recorded voice.

A still further object of this invention is to disclose and provide a method of recording an orchestra so as to form an orchestral recording which is synchronized with a previously photographed pictorial record of action and a previously recorded voice record.

An object of this invention is to disclose and provide a method of producing simultaneously a pictorial record of an actor and a voice record and then subsequently producing an instrumental record adapted to be blended or combined with the voice record.

These and other objects, uses and advantages of this invention will become apparent to those skilled in the art from the following detailed description of one embodiment of the method.

In order to facilitate understanding of this invention, reference will be had to the appended diagrams, in which

Fig. 1 is a diagrammatic plan representation of the steps of producing a picture record of an actor and a concurrent voice record.

Fig. 2 diagrammatically represents in plan an arrangement of elements by means of which a sound record of an orchestra synchronized with a previously recorded voice, may be produced.

Fig. 3 diagrammatically illustrates one method by means of which separately recorded voice and instrumental records may be combined so as to form a single record.

Fig. 4 illustrates a modified arrangement of elements whereby a combined voice and music record may be produced.

It is to be understood that wherever the term "voice" is used herein, reference is not only made to a single human voice but may include a plurality of voices or sounds rendered by actors or

objects, either within or without the range of view of the camera recording pictorially the scene from which or near which such voices or sounds emanate. Furthermore, the term "voice" as used herein, may include incidental and substantially inconsequential musical accompaniment such as, for example, a single piano, cello or violin. By "instrumental" or "orchestral" recordings, reference will be made hereinafter to more complete musical recordings, that is, recordings produced by a plurality of instruments.

As shown in Fig. 1, it may be desirable to photograph an actor 1 in front of a suitable set or background 2, said set including an object 3. The pictorial record of the actor 1 may be obtained by a camera A operated electrically, as is well known in the art, and coupled or interlocked with a sound recording device B to which the voice currents are supplied by means of a microphone 4 positioned near the stage or background 2. Within visual observation of the actor 1 may be a musical director 6 and an accompanist 7 playing any desired instrument, such as the piano 8. A camera C may be so positioned as to photograph distinctly the musical director 6. Preferably, the camera C is mechanically or electrically interlocked with the camera A and sound recording device B.

If, for example, the actor 1 is singing, the accompanist 7 may be sufficiently close to the set so as to permit the actor 1 to hear the accompanist and thus maintain true pitch. The musical director is so positioned that he can observe the singer 1, and the musical director during the singing by the actor 1 performs all of the motions which he would ordinarily perform in conducting a full orchestra accompanying such singer. As a result, the camera A produces a pictorial record of the actor during the act of singing; the recording instrument B concurrently produces a sound record of the voice (with what little incidental music which may enter the microphone 4 from the accompanist 7); the camera C produces a pictorial record of the musical conductor 6, this pictorial record being synchronized with the pictorial record produced by camera A and the voice record produced by device B.

Hereafter the pictorial record of the actor will be referred to as the record A, the voice record will be referred to as the record B, and the pictorial record of the musical conductor will be referred to as the record C.

After a suitable number of retakes have been made and the suitable voice record selected, the corresponding pictorial record C of the musical conductor is projected before a full orchestra (or any desired arrangement of musicians) and such orchestra renders an orchestral accompaniment, being directed during rendition of such accompaniment by the pictorial representation of the musical director.

As shown in Fig. 2, the pictorial record produced by the camera C may be projected at C' upon a screen 10 which is faced by or within full view of an orchestra, indicated by the dotted line 11. A recording device D provided with one or more suitable microphones 12 located properly with respect to the orchestra 11, is operated synchronously with the projection of the pictorial record C of the musical director by the projection machine C'. In other words, the director C' and the recording device D are either mechanically or electrically interlocked so as to operate in synchronism. The orchestra 11, by observing the projected image of the musical conductor 6 upon the screen 10, is properly and accurately directed during the rendition of the musical accompaniment and therefore the recording device D produces an orchestral record which is synchronous with the original voice record B, although said orchestral record is actually made at a different time.

It will be seen, therefore, that the musical director 6, or the pictorial record C of said musical director, forms the interlock between the original voice record B and the orchestral record D.

The separate voice and orchestral records B and D may then be combined in any suitable manner so as to form a single combined voice and musical record. The two records may be printed upon the same strip of film by double printing or double exposure methods, or preferably both records are reproduced concurrently and a new single combined record made. This latter step is diagrammatically illustrated in Fig. 3 wherein the voice record is reproduced at B' and the orchestral record D is reproduced at D', the two reproducing machines B' and D' being operated synchronously by mechanical or electrical interlock. Reproducing horns or units D'' and B'' placed in a room acoustically suitable are employed.

A recording device E is mechanically or electrically interlocked with the reproducing devices B' and D', such recording device E being electrically connected to suitable microphones 13 positioned in proper relation to the reproducing units B'' and D''. The reproducing units B' and D' may be provided with suitable modulating devices well known in the art (but not shown in the diagram) so that the relative volume, amplitude or intensity of reproduction of records B and D may be properly controlled and modulated. In this manner, the recording device E produces a single combined record of the voice and orchestra, said combined record being perfectly synchronized with the original pictorial representation A taken during the rendition of the original voice.

It will be thus seen that a single combined voice and orchestral record has been produced without the necessity of simultaneously recording the voice and the instrumental music during the photographing of the scene. In this manner, the necessity of maintaining a full orchestra in attendance during the rehearsals and various takes, has been obviated. A considerable amount of film is also saved. Furthermore, the relative volume of the voice and instrumental music may be regulated to a nicety during the final recording of the two separately produced records.

Instead of actually reproducing records B and D (of voice and music, respectively), so as to render them audible, and then collecting the sound as by a microphone in the creation of a combined record (as shown in Fig. 3), the two records B and D may merely be translated into electrical currents, such currents then combined, and the combined electrical currents sent directly into a recording unit.

Numerous modifications can be made in the procedure outlined hereinabove without departing from the spirit of the invention. For example, a voice record may have been made and it is now desirable to produce a musical or instrumental record synchronized with the voice record. The voice record may be reproduced and a musical director familiar with the music which it is desired to produce, may beat time or conduct an imaginary orchestra while listening to the voice record. While so conducting an imaginary orchestra, the musical director is photographed, the camera being interlocked with the reproduc-

ing unit so that the reproduction of the voice record and the motion picture film of the musical director are played and taken at substantially synchronous rates. The photographic record of the musical director may then at some subsequent time be projected upon a screen within view of an actual orchestra, in the manner illustrated in Fig. 2.

Instead of having the musical director listen to a reproduction of the voice record during the photographing of the musical director, the musical director may either visually observe pictures of the actor or singer which it will be desired to subsequently supplement with a musical score, or he may merely listen to a metronome properly adjusted so as to beat a tempo suitable for use in the picture record.

By photographing the musical director, his personal interpretation of tonal values, shadings and nuances of the music are recorded and rendered available for transmission to the musicians, whereas such delicacy and artistry can not be utilized or preserved for subsequent use in any of the other mechanical methods tried heretofore in somewhat analogous situations. By photographing the musical director while he is listening to a previously recorded sound record (of voice or music alone or in combination), a pictorial record embodying all of these advantages, for subsequent use, is prepared.

As shown in Fig. 4, the combined voice and sound record of the new or foreign version may be obtained by projecting the image of the musical conductor upon a screen 10' by means of a projector C', this projected image being observed by the actor 1' who renders a suitable voice version. The actor 1' may not only observe the projected image of the musical director upon the screen 10', but may at the same time listen to a previously prepared musical record or score prepared in any suitable manner, or preferably as above described, said musical record being reproduced by a reproducing device D' operatively connected with a reproducing horn D''. The actor's voice as well as the sounds from the horn D'' may be picked up by a microphone 13' and conveyed to a recording machine E'. The projector C', reproducing unit D' and the recording machine E' are operated in unison as by synchronous motors. By permitting the actor 1' to observe the projected image of the musical director upon the screen 10', such musical director may direct the singer 1' through those portions of the play which are free from musical accompaniment. For example, if the actor 1' is merely to declaim or hum and it is desired that such declamation, recitation or humming be perfectly synchronized with the original film, this system will insure perfect synchronization as the musical director will then direct the actor 1' and maintain him in the proper tempo.

If desired, the reproducing horn D'' may be eliminated and the musical record be transformed by the device D' into an oscillatory electrical current which may then be passed by suitable lines 20 directly into the microphone line or recording device E'.

Those skilled in the art will appreciate that these and other numerous changes and modifications can be made in the mode of procedure without departing from the spirit of the invention.

All such changes and modifications as come within the scope of the appended claims are embraced thereby.

I claim:

1. In a method of making a single sound record of voice and orchestra from separate recordings of voice and of orchestra, the steps of making a voice record without orchestra accompaniment while simultaneously making a picture record, synchronized with said voice record, of a musical director, then projecting the picture record of the musical director and making a sound record of instrumental music rendered by musicians observing the projected picture record of said musical director, and then combining the voice record with the record of instrumental music to form a single combined voice and music record.

2. In a method of making sound recordings of voice and instrumental music, the steps of making a voice record while synchronously making a picture record of a musical director, then projecting the picture record of the musical director and making a sound record of instrumental music rendered by musicians observing the projected picture record of said musical director, and then combining the voice record with the record of instrumental music to form a single combined voice and music record.

3. In a method of making sound recordings of voice and instrumental music, the steps of making a voice record while synchronously making a picture record of a musical conductor, projecting the picture record of the musical director and separately making a sound record of instrumental music rendered by musicians observing the projected picture record of said musical director, said separately made sound record being synchronized with said separately made voice record, and then combining the voice record with the record of instrumental music to form a single combined voice and music record.

4. In a method of making a single combined sound record of voice and instrumental music, the steps of making a voice record of an actor while simultaneously making a picture record of the actor and a synchronous record of a musical director, then projecting the picture record of the musical director and making a sound record of instrumental music rendered by musicians observing the projected picture record of said musical director, and then combining the voice record with the record of instrumental music to form a single combined voice and music record synchronized with the picture record of the actor.

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