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FILM SYNCHRONIZING SYSTEM

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Fig. 1.

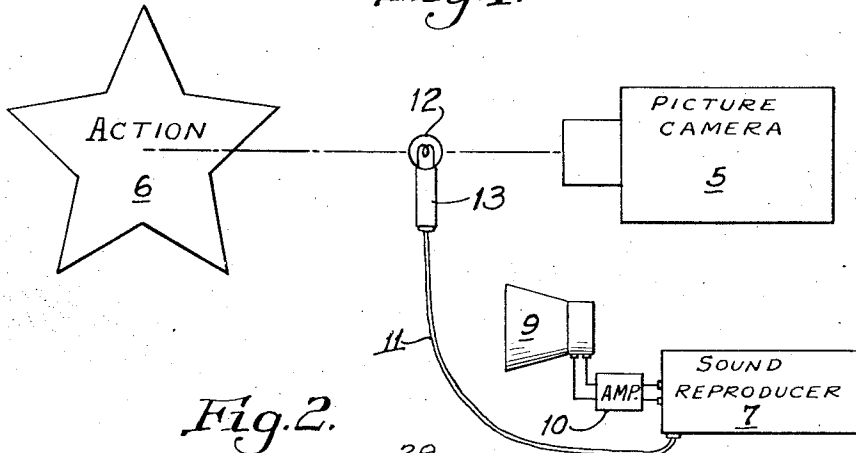


Fig. 2.

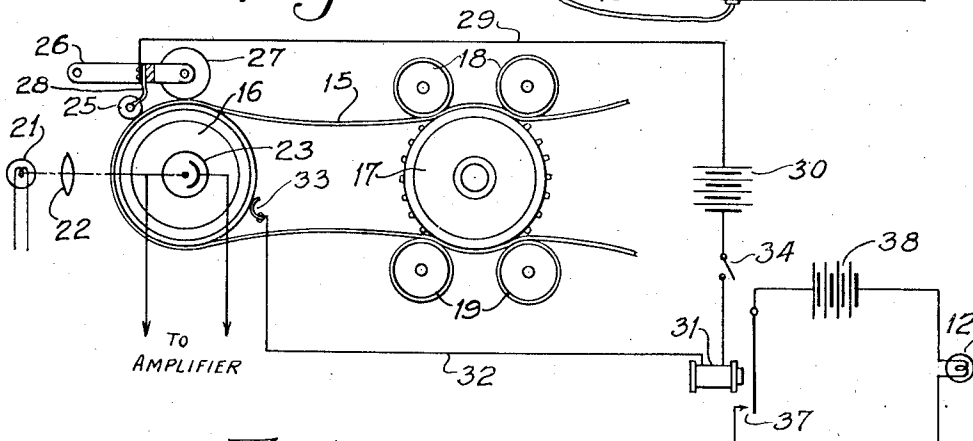


Fig. 3.

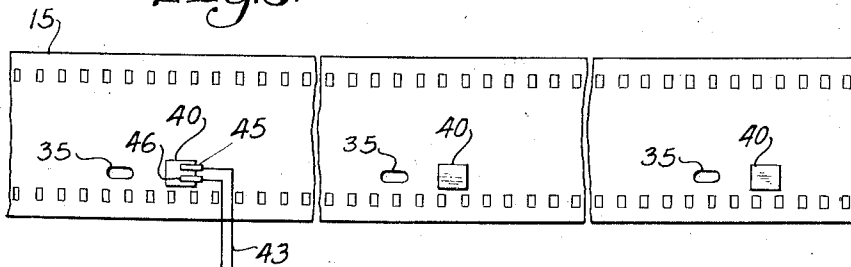
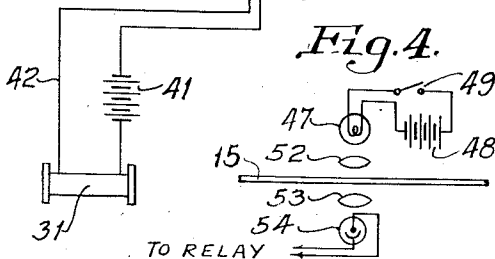


Fig. 4.



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FILM SYNCHRONIZING SYSTEM

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9 Claims. (Cl. 88—16.2)

This invention relates to motion picture apparatus and particularly to a method of and system for synchronizing separate picture and concomitant sound films.

In the art of producing motion picture sound films, the picture is usually recorded on a picture negative, and the sound is recorded on a separate sound negative. Generally these steps are performed simultaneously with the picture camera operating at the scene of action and the sound recorder operating at a distant point, the sound being transmitted to the recorder over the necessary transmission lines. After many sequences of respective picture and sound negatives are developed and prints made therefrom, they are edited by cutting and splicing together the various sequences. To aid in this procedure, synchronization marks are used at the beginning of each sequence. One system for so marking separate picture and sound films is disclosed and claimed in U. S. Patent 2,208,404, issued July 16, 1940, while the clapperstick method is well known in the art.

It frequently occurs, however, in the production of sound motion picture films, that the sound film record is made prior to the taking of the accompanying picture sequence, such a procedure being known as pre-scoring. In the case of a song sequence, the singer is located in a special acoustically treated recording stage and the song is recorded under optimum recording conditions. During the recording, the singer can give his undivided attention to the rendition of the song.

After the sound record so recorded has been developed, one of the prints is reproduced on the particular set or scene of action wherein the actor is supposed to render the selection in accordance with the story script. As he is being photographed, he sings in step with the sound record reproduced on the set during the photographing. At this time, the singer directs his attention to his acting and gestures without worrying about his position with respect to a microphone or other sound recording equipment. The picture film made under these conditions must, of course, be synchronized with the previously made sound record.

When motor interlock drive systems are employed, synchronization marks can be applied at definite points on the sound record and picture negative while stationary, but after the machines have been locked up. However, when straight synchronous motors are used, the respective film drives do not bring the films up to synchronous speed in step and thus other methods of providing

synchronization marks are used. One of these methods is to again record all or at least the beginning of the song, the picture negative and sound negative being provided with synchronizing marks by a system such as mentioned above. This intermediate recording produces a cue record. This, of course, requires the use of another sound recording unit, which uses additional film and time of the sound recording operators.

The present invention is directed to a pre-scoring system which completely eliminates the sound recording step and the production of the cue track record and permits the direct combining of the picture print and the sound print as soon as the picture is developed.

The principal object of the invention, therefore, is to facilitate the synchronous marking of sound and picture films.

Another object of the invention is to facilitate the synchronous marking of a picture negative made subsequent to the concomitant sound negative.

A further object of the invention is to produce synchronization marks on a picture negative under control of a sound record film.

A further object of the invention is to synchronize a previously made sound record with a subsequently made picture film adapted to be combined in a final sound picture film.

Although the novel features which are believed to be characteristic of this invention are pointed out with particularity in the claims appended herewith, the manner of its organization and the mode of its operation will be better understood by referring to the following description read in conjunction with the accompanying drawing forming a part thereof, in which

Figure 1 is a diagrammatic view of a motion picture film apparatus embodying the invention;

Figure 2 is a diagrammatic and schematic drawing of one system embodying the invention;

Figure 3 is a fragmentary view of a modified sound film for use in the invention; and

Figure 4 is a detailed view of another method of obtaining control impulses for a sound record.

Referring now to Fig. 1, a picture camera 5 is adapted to photograph a scene of action represented by a star 6. A sound reproducer 7 is shown for reproducing a previously made sound track, the sound being projected onto the scene of action by a loudspeaker 8 after amplification by an amplifier 10. Connected to the sound reproducer by a flexible cable 11 is a portable lamp 12 which may be manually positioned by a handle

13, the lamp being placed in front of the camera 5 after the camera and reproducer are running at synchronous speed.

Referring now to Fig. 2, one type of sound reproducer is shown in which a sound film 15 is fed to a sound drum 16 from one side of a sprocket 17 having pad rollers 18 associated therewith. The film is taken from the drum 16 by the other side of the sprocket 17 having pad rollers 19 associated therewith. Light from a source 21 is projected by a lens 22 in a narrow beam to the sound track area of the film, the emergent light being impressed upon a photoelectric cell 23 connected to the input of the usual sound amplifier.

The elements just described are those essential to the reproduction of sound. However, in addition to these elements, there has been provided an impulse producing system comprising a spring-mounted roller 25 normally contacting the film and mounted upon a bracket 26 carrying a normal film pressure roller 27. The roller 25 is electrically connected through its mounting spring 28 over a conductor 29 to a potential source such as a battery 30, the circuit including a switch 32 and relay 31, connected over conductor 34 to a brush 33 contacting the drum 16. Thus, with switch 34 closed and the roller 25 contacting the drum 16, the above-traced circuit will be completed, and the relay 31 energized.

The roller 25 will be brought into contact with drum 16 at times when holes punched in the film 15, as shown in Fig. 3 at 35, or notches cut in the film, pass under the roller 25. The energization of the relay 31 closes a contact 37 in a circuit including a potential source 38 and the lamp 12. With this arrangement, the lamp 12 will be energized whenever one of the holes 35 passes under the roller 25 and this roller is permitted to contact the drum 16. The holes may be elongated to provide a predetermined period of energization of the lamp 12, although the proper voltage will rapidly bring the lamp to its full brilliancy while its thermal inertia will provide light after the contact 37 is broken. Thus, with the lamp 12 in front of the camera, the negative film in the picture camera will be fogged at predetermined points along the negative, these points corresponding to the position of the holes 35 in the sound film.

Referring now to Fig. 3, another method of energizing lamp 12 is shown, this modification employing small tinfoil patches 40, glued or otherwise attached to the film 15, the tinfoil completing a lamp control circuit for the relay 31 through a potential source 41, over conductors 42 and 43, through the spring contact brushes 45 and 46. The use of tinfoil patches does not require mutilation of the film.

Another method of energizing the lamp 12 is by the use of the system shown in Fig. 4, wherein a light source 47 is energized from an energy source 48 under control of a switch 49. The light from the lamp 47 is projected through the film 15 by means of lenses 52 and 53 to a photoelectric cell 54. The output from the cell 54 may be transmitted to the relay 31 for control of the energizing circuit for the lamp 12. The system shown in Fig. 4 may operate in two ways, one of which is by having the picture portion of the film 15 opaque and punching holes therein to allow the cell 54 to be energized when the holes pass between the lamp 47 and the lens 53. and the other, by having the picture portion of the film 15 transparent and placing

opaque patches on the film to remove the light at the proper points.

Thus, in Figs. 2, 3 and 4, there are shown three methods of obtaining impulses from the sound record film to produce energization of the lamp 12. The holes or notches in the film or metallic patches 40 are spaced approximately eight frames apart, and the exposure period made approximately $\frac{1}{2}$ of a second by the length of the holes and patches. Therefore, when the lamp 12 is held in front of the camera, as shown in Fig. 1, and the camera shutter is operating at the normal speed of exposing the film at twenty-four frames per second, then regardless of the start, or the difference in acceleration between the sound film and picture negative, each successive light impulse will reach the picture negative. Although for any one sequence only the first part or leader of the sound film is modified to provide the "sync" marks on the picture negative, in the case of a reel or for "insert" starts, the sound film may be similarly modified at various intervals. The lamp 12 is shown in Fig. 1 in portable form for universal use, but it is to be understood that the fog lamp mounted within certain cameras, as disclosed in the above-mentioned patent, may also be used when connected up to amplifier 10.

In operating the system, therefore, it is only necessary to bring the picture camera and sound reproducer up to speed and then at the beginning of the "take" the lamp 12 is held in front of the picture camera. As the sound film or its leader advances, the lamp 12 is periodically energized to fog the picture negative and produce sync marks thereon corresponding in position to the holes or patches on the sound film. After the picture negative has been developed, the fog marks produced by the lamp 12 may be lined up with the holes or patches on the sound film. Thus, the usual auxiliary cue track film is eliminated and much time is saved in synchronizing picture negatives with pre-scored sound records.

What I claim as my invention is:

1. In combination, a motion picture camera having a negative film therein, a sound record reproducer having a sound record film therein, means for driving said camera and reproducer for advancing said films at the same speed, a portable light source, means for energizing said light source, and means under control of said sound record for operating said energizing means to light impress said negative film in said camera at predetermined intervals when said light source is moved in front of said camera.

2. A combination in accordance with claim 1 in which said last-mentioned means comprises means on said sound record film, for closing an electrical circuit, an electrical circuit adapted to be closed, said circuit including said light source, and said means for energizing said light source.

3. A combination in accordance with claim 1 in which said last-mentioned means comprises a plurality of spaced current transmission elements on said sound film for closing an electrical circuit, an electrical circuit adapted to be closed, said circuit including said light source and said light source energizing means, and means adapted to close said circuit upon contact with said current transmission elements.

4. A combination in accordance with claim 1 in which said last-mentioned means comprises an electrical circuit, including said light source and said light source energizing means, and means adapted to close said circuit and energize said light

source by the passing of notches or holes in said sound film past a predetermined point.

5. A synchronizing system comprising a picture camera adapted to intermittently advance a negative film therethrough for exposure to a picture scene, sound film reproducing means for reproducing sound to accompany said scene, a lamp, the light from which is adapted to fog said picture negative when said lamp is positioned between said camera and said scene, an electrical circuit for said fogging lamp, and means on said sound film for controlling the energization of said fogging lamp.

6. A synchronizing system in accordance with claim 5 in which said circuit controlling means on said sound film are so positioned as to fog said picture negative regardless of the running position of said sound film with respect to the intermittent exposing time intervals of said picture negative.

7. In combination, a negative film, means for advancing said film at a definite speed, a sound record film, means for advancing said sound record film at the same speed as said negative film, a source of light, means for energizing said source of light at periodic intervals, said negative film being fogged by said source of light only

when said source of light is moved in front of said negative, and means for controlling said energizing means by said sound record film.

8. A combination in accordance with claim 7 in which said negative film is adapted to be exposed periodically to a picture scene, and said sound film has electrical conducting sections thereon for controlling said energizing means.

9. The method of producing synchronizing marks on a picture negative during the photographing of a scene thereon, said marks to correspond to predetermined synchronizing marks on a sound record reproduced simultaneously with said photographing comprising advancing said picture negative and simultaneously advancing said sound record at the same speed at separated positions, reproducing said sound record while periodically exposing said picture negative to a picture scene, generating a light beam at periodic intervals, and moving said light beam between said scene and said picture negative during a portion of the time said scene is being photographed, said periods of generation of said light beam corresponding to the periods of exposure of said picture negative to said scene.

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