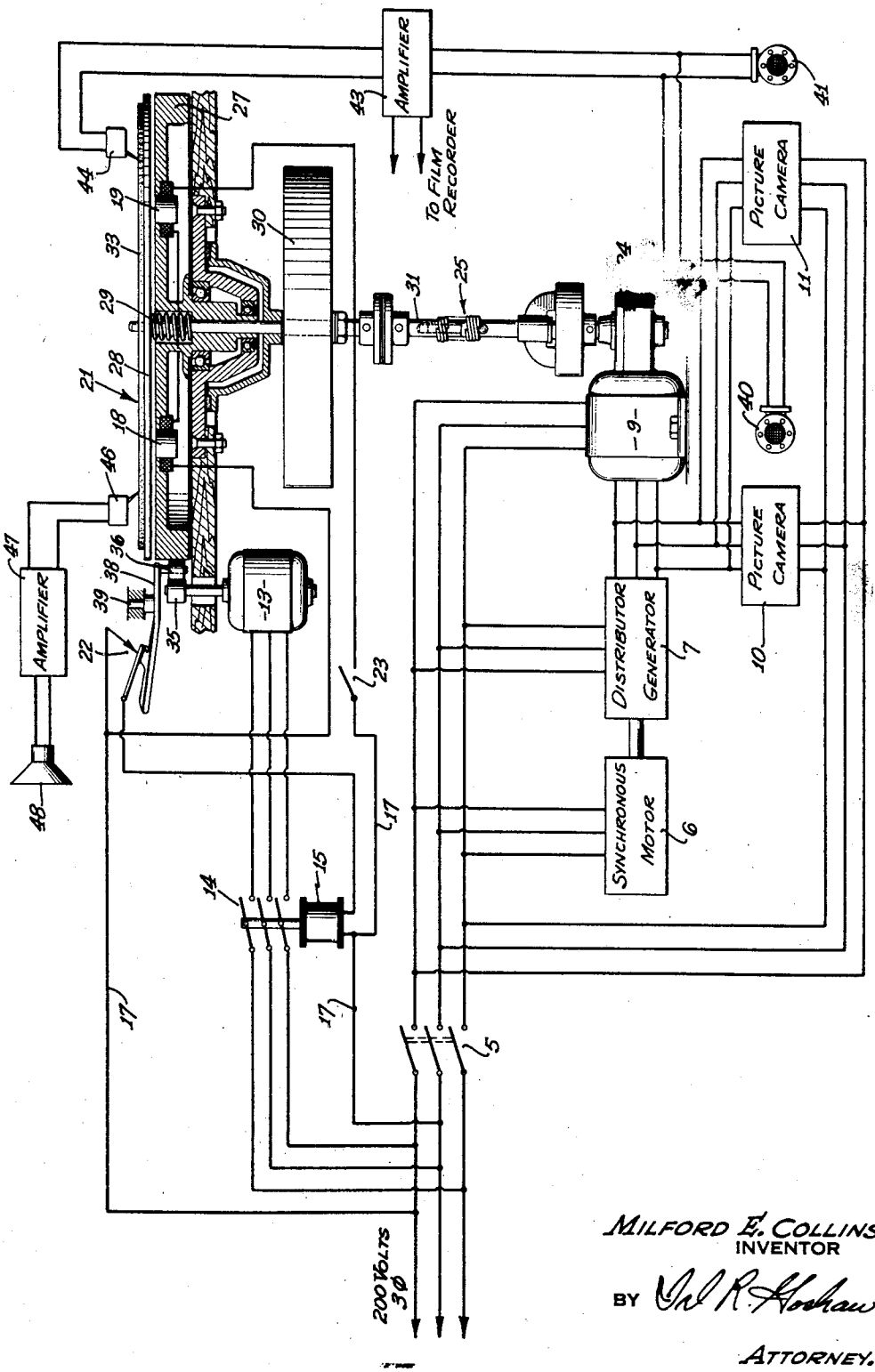
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REHEARSAL SYSTEM FOR SOUND MOTION PICTURES

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## REHEARSAL SYSTEM FOR SOUND MOTION PICTURES

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This invention relates to sound motion picture apparatus and particularly to systems used during the production of the various sequences which constitute a completed sound picture.

It is well known that in the production of motion pictures, each sequence is rehearsed before the final take is made. The purpose of a rehearsal is to obtain the proper action for recording on the picture film and, since the advent of sound, the proper dialogue or other sound effects which are to accompany the picture. The actors of any particular scene generally move about the scene during the speaking of their lines, while the source of the sound shifts from actor to actor. In the recording of this dialogue, it is necessary for the microphone operator to follow the sound source with the microphone in order to satisfactorily record the sound. In addition to this and other technical problems involved, there is the dramatic side of recording which relates to the wording and enunciation of the dialogue. Also, extraneous sounds may become recorded which are not noticed during the taking of the scene. To check on these various factors, it is frequently desirable to have a sound recording system which will permit the immediate reproduction of the recorded sound after a rehearsal or after a final take to determine whether or not the pickup was satisfactory for the scene.

The present invention is directed to such a system wherein the sound may be immediately reproduced for checking the manipulations of the microphone, the speaking voices of the actors, and the quality of the sound system. The invention thus avoids the making of many retakes days later and after the particular set has been disturbed. Such a recording cannot be made on photographic film, which requires time to develop. The invention utilizes disc recording apparatus which is synchronized with the picture cameras, the records being reproduced separately from the operation of the recording apparatus.

The principal object of the invention, therefore, is to facilitate the production of sound motion pictures.

Another object of the invention is to record sound in synchronism with a motion picture sequence, the sound record being adaptable for immediate reproduction.

A further object of the invention is to record a sound sequence for a motion picture scene which may be independently reproduced.

A further object of the invention is to provide a combined sound recording and picture system wherein the sound may be immediately reproduced independently of the recording and picture-taking apparatus or later reproduced in synchronism with the projection of the picture.

Although the novel features which are believed to be characteristic of this invention will be pointed out with particularity in the appended claims, 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 the single figure is a diagrammatic arrangement of a sound picture recording and reproducing system embodying the invention.

Referring to the drawing, a source of power is connected through a main three-phase switch 5 to a synchronous motor 6 and to the stators of a distributor-generator 7, a Selsyn motor 9, and the Selsyn motors of picture cameras 10 and 11. One or more cameras may be used in accordance with standard practice. The rotors of the distributor-generator 7, motor 9, and the motors of cameras 10 and 11 are interconnected for synchronous operation. The synchronous motor 6 drives the distributor-generator 7, which maintains the three motors in synchronism. Also connected to the power source is a synchronous or induction motor 13 connected through a magnetic switch 14 operated by a solenoid 15. Connected across one phase of the power supply over conductors 17 are the solenoid 15 and electromagnets 18 and 19 of the turntable 21. The solenoid 15 is under control of a manually operated switch 22, while the energization of the solenoids 18 and 19 is controlled by switch 23.

The motor 9 through a gearbox 24 and an overrunning clutch 25, such as shown in U. S. Patent 2,106,718, drives the turntable 21 comprising a heavy plate 27 and a thin steel disc 28 held away from the plate 27 by a spring 29. A flywheel 30 is mounted on a drive shaft 31 to maintain uniform speed of the plate 27. The magnets 18 and 19 are mounted in the plate 27 and, when energized, will pull the thin disc 28 into contact with the plate 27. Thus, when the plate 27 is up to speed, energization of the magnets will substantially instantaneously start a record 33 attached to the disc 28 at the proper reproducing speed. When the magnets 18 and 19 are de-energized, the spring 29 will release the disc 28 from the plate 27 and it may be braked in any convenient manner to stop substantially instantaneously.

As mentioned above, the motor 9 drives the plate 27 through the gearbox 24 and overrunning clutch 25. The plate is also adapted to be rotated by means of motor 13 driving through a friction roller 35 on the end of the motor shaft, and an intermediate friction roller 36 adapted to be brought into contact with the friction roller 35 and the rim of the plate 27. The friction roller 36 is mounted on an arm 38 pivoted at 39, and when the friction roller is rotated about the pivot 39, will be positioned so as to drive the turntable. Simultaneously with the movement of the arm 38, switch 22 is closed—that is, closure of the switch is accomplished when the arm 38 is in a position to connect the friction roller 35 to the plate 27. When the friction roller 36 is in an inoperative position, the switch 22 will be opened. Closure of the switch 22 energizes the solenoid 15, which closes switch 14 to energize the driving motor 13. When the turntable 21 is operated by the motor 13, the overrunning clutch 25 permits operation thereof without the transmission of energy to the gearbox 24.

Positioned adjacent the cameras 10 and 11 are microphones 40 and 41, respectively, which are connected through an amplifier 43 to a disc cutter unit 44. Thus, simultaneously with the taking of a picture by either one or both of cameras 10 and 11, the concomitant sound is recorded on the record 33. Also shown in reproducing position is a pickup element 46 connected to an amplifier 47 and a loudspeaker 48 for reproduction of sound from the record 33. Conductors are shown from the amplifier 43 which go to the usual type of film recorder for recording the sound from microphones 40 and 41 on film for the final take.

Operation of the above system is as follows. To start a rehearsal or a take, the synchronous motor 6 is energized along with motors 9, 10 and 11 by the closure of the switch 5. The energization of motor 9 will rotate the plate 27 in synchronism with the operation of the cameras. When the scene is ready to be shot and recorded, an operator may close the switch 23 to start the record rotating with the plate 27. Recording of the sound accompanying the picture scene is thus accomplished. When the scene is finished, switch 5 is opened.

If it is now desired to listen to determine whether or not the sound is satisfactory, the arm 38 is rotated, bringing the friction roller 36 into operating position between the friction roller 35 and plate 27, simultaneously closing the switch 22, which energizes solenoid 15, closing switch 14, and energizing motor 13. The record 33 will thus be rotated independently of the motor 9, the sound being reproduced over elements 46, 47 and 48. This reproduction is solely for the purpose of obtaining an idea of the dramatic effects of the lines accompanying the scene and to check on the sound recording operators as to whether or not the positioning of the microphone and the operation of other sound equipment was satisfactory. The motor 13, therefore, may be any type of motor capable of providing a satisfactorily uniform reproducing speed.

Should it be desired to subsequently reproduce the sound in synchronism with the picture after the picture film has been developed and before a film recording has been made, this may be obtained by driving the plate 27 by motor 9 in synchronism with the picture projector and then operating switch 23 manually or from the film projector at a previously determined synchronizing point. The closing of the switch 23 will immediately start and rotate the record 33 at the synchronous speed of the plate 27, which corresponds to the Selsyn motor-driven projector.

There is thus provided a flexible sound recording system in association with motion picture cameras or projectors whereby the sound may be recorded and reproduced synchronously with the picture, or the sound may be reproduced independently of the picture during the taking of the particular sequence, such a system preventing many retakes which have been found necessary a day or so after the actual taking of the scene. It is realized, of course, that a disc record of the sound may be made simultaneously with the take recording on film to provide a check on the sound as produced during the take.

What I claim as my invention is:

1. Sound motion picture apparatus comprising a motion picture camera, a sound record medium, means for recording on said medium the sound accompanying said picture, means for driving said picture camera and said sound record medium in synchronism, additional means for driving said record medium independently of said first driving means said synchronous driving means being automatically disconnected from said record medium when said additional driving means drives said record medium, and means for mechanically connecting and disconnecting said additional driving means to and from said record and electrically energizing and de-energizing said additional driving means, said connecting and energizing being accomplished simultaneously.

2. Sound motion picture apparatus in accordance with claim 1 in which said mechanical connecting means includes a movable roller and means for moving said roller into connecting position, said moving means being adapted to control the electrical energization of said additional driving means.

3. Sound motion picture apparatus comprising a motion picture camera, a motor for said camera, a rotatable plate, a second motor for rotating said plate, means for simultaneously energizing said motors for advancing film in said camera and rotating said plate in synchronism, an over running clutch intermediate said plate motor and said plate, a third motor, means for interconnecting said third motor to said plate for rotating said plate, the starting of said third motor automatically disconnecting said plate from said second motor through said overrunning clutch, and means for connecting a record medium to said plate to rotate said record in synchronism with said camera.

4. Sound motion picture apparatus comprising a motion picture camera, a motor for said camera, a rotatable plate, a second motor for rotating said plate, means for simultaneously energizing said motors for advancing film in said camera and rotating said plate in synchronism, an overrunning clutch intermediate said plate motor and said plate, a third motor, means for interconnecting said third motor to said plate for rotating said plate, the starting of said third motor automatically disconnecting said plate from said second motor through said overrunning clutch, and remote control electromagnetic means for connecting a record medium to said plate to rotate said record medium in synchronism with said camera.

5. Sound motion picture apparatus comprising a motion picture camera, a motor for said

camera, a rotatable plate, a second motor for rotating said plate, means for simultaneously energizing said motors for advancing film in said camera and rotating said plate in synchronism, an overrunning clutch intermediate said plate motor and said plate, a third motor, means for interconnecting said third motor to said plate for rotating said plate, the starting of said third motor automatically disconnecting said plate from said second motor through said overrunning clutch, and common means for mechanically interconnecting said third motor to said plate and simultaneously controlling the electrical energization of said third motor.

6. Sound motion picture apparatus comprising a plurality of sound record mediums, a picture camera, means for synchronously driving said camera and said plurality of record mediums, means for independently driving one of said record mediums, means for automatically disconnecting said synchronous driving means from said record medium when driven independently, and means for mechanically connecting said independent driving means to said record medium and electrically energizing said independent driving means simultaneously.

7. Sound motion picture apparatus in accordance with claim 6 in which electromagnetic means are provided for connecting and disconnecting said independently driven record medium to said synchronous driving means.

8. Sound motion picture apparatus comprising a motion picture camera, a motor for said camera, a rotatable plate, a second motor for rotating said plate, means for simultaneously energizing said motors for advancing film in said camera and rotating said plate in synchronism, a third motor for rotating said plate, a power source for all of said motors, means for disconnecting said plate from said second motor when said plate is rotated by said third motor, and means for mechanically interconnecting said third motor to said plate and electrically interconnecting said third motor to said power source.

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