

March 29, 1966

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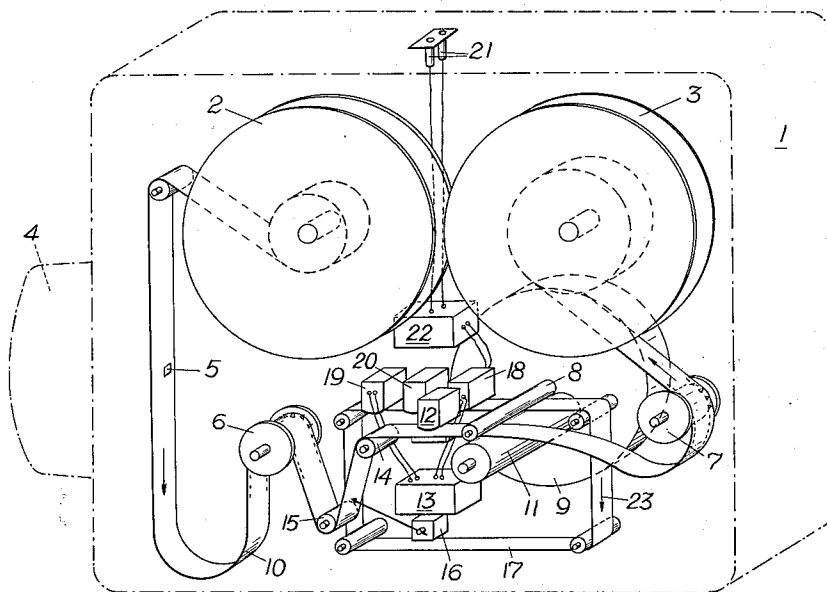
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ARRANGEMENT FOR THE RECORDING AND REPRODUCTION
RESPECTIVELY OF SOUND FILMS

Filed March 5, 1964

3 Sheets-Sheet 1

FIG. 1



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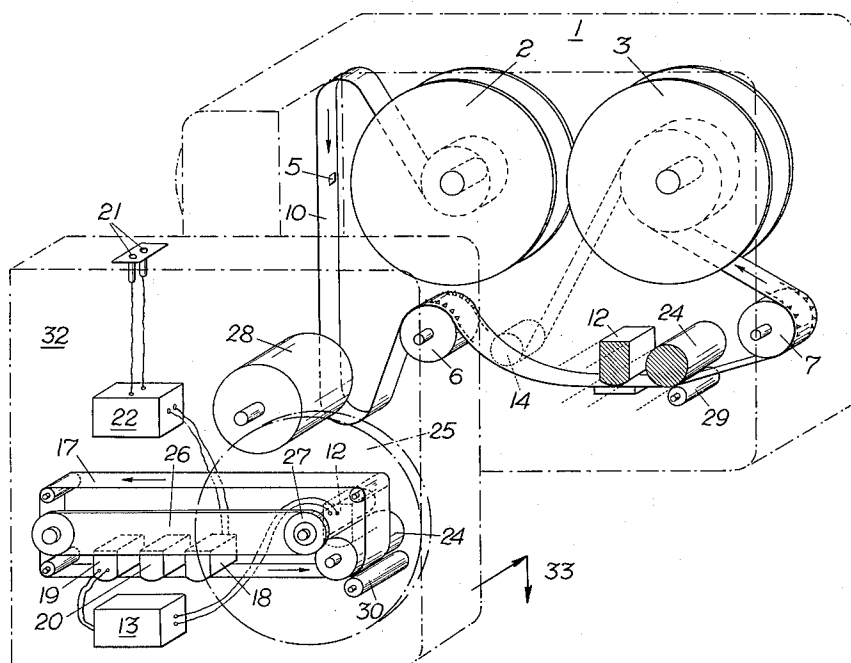
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Filed March 5, 1964

3 Sheets-Sheet 2

FIG. 2



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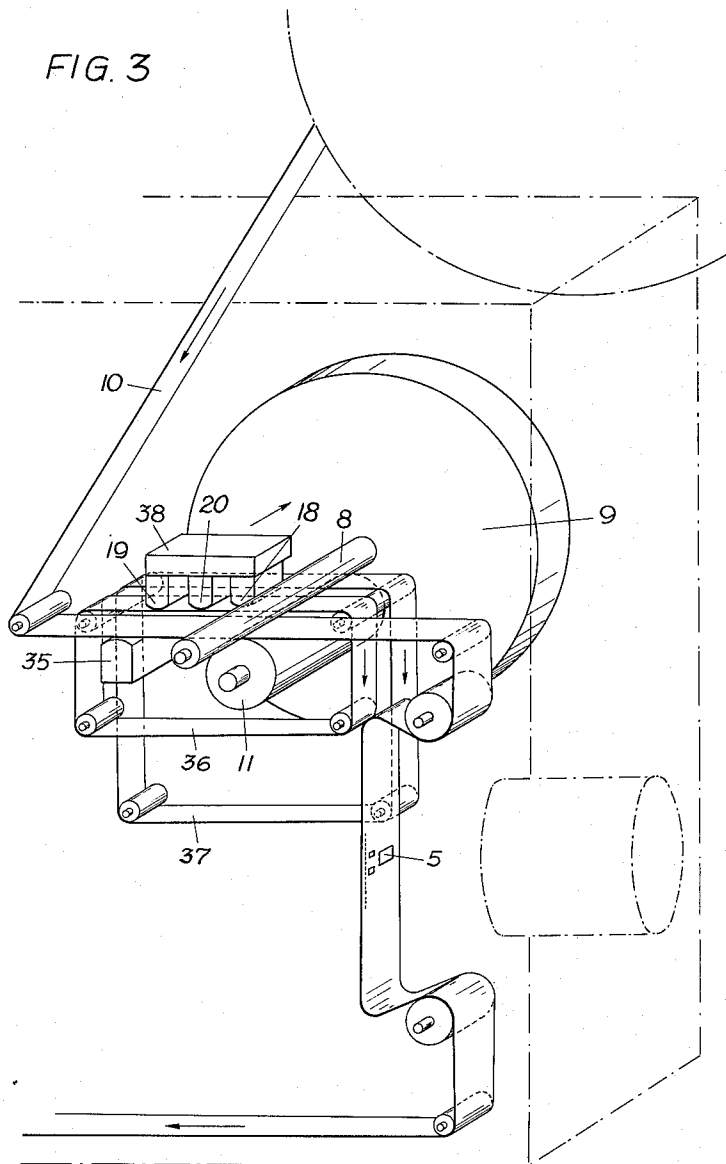
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Filed March 5, 1964

3 Sheets-Sheet 3



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3,243,250

ARRANGEMENT FOR THE RECORDING AND RE-PRODUCTION RESPECTIVELY OF SOUND FILMS

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Filed Mar. 5, 1964, Ser. No. 349,703

Claims priority, application Austria, Mar. 14, 1963,

A 2,040/63

11 Claims. (Cl. 352—29)

The present invention relates to an arrangement for the recording and reproduction, respectively, of sound films wherein the image-sound recordings are provided on a common carrier and the film is intermittently driven within the range of the film gate. In the circuit of the recording and/or reproduction heads a magnetic storage device is provided, the reproduction head for the sound track on the film being arranged before the film gate, the recording head after the film gate, and the storage time is preferably equal to the running period of the film between the film gate and the sound head and in reverse direction respectively, so that the image-sound recordings corresponding to each other are recorded directly side by side.

Methods for the treatment of sound films have already been described in which in an interphase the image and the sound are recorded side by side. These suggestions start from a sound-film, recorded with a normal sound-recording camera, the sound-film having the image and the sound displaced according to the standard. Before cutting, the sound recording is scanned in a special device and after having been amplified it is recorded adjacent to the associated image (after having erased the original recording) over a suitably displaced sound head. After the film editing the film runs through the device in a reverse direction and thus the original image-sound displacement is remade. These methods have considerable disadvantages. Firstly it is pointed to the fact that, owing to the relatively low film running speed, the low flexibility of the film material and the small width of the track, the quality of the sound which may be achieved is modest, compared with the quality of the sound obtained with recordings on a tape. As a result of the repeated rerecording of the sound on the same relatively unfavourable sound carrier, an extremely heavy reduction of the quality of the recording has to be accepted. Mainly with 8-mm. films having a film running speed of 6.1 cm./sec. and a sound track being directly beside the perforation and having an effective width of about 0.5 mm., an unbearable loss of quality will occur.

With these methods it is also necessary to rerecord the entire sound recording twice for every film cutting. If the film is damaged, the sound recording has to be displaced according to the corresponding distance of image and sound and after having performed the necessary treatment the sound recording has to be recopied. Mainly in amateur practice an occasionally damaging of the film must be taken into consideration, owing to the incorrect handling of the devices. It is also possible that the film breaks or film welds come undone. For these cases the above mentioned methods are not suited, because the restoration of the film is extremely difficult, and the quality of the sound of the entire film is essentially deteriorated.

It is, therefore, an object of the present invention to provide an arrangement for the recording and reproduction, respectively, of sound films, wherein the storage devices are used within the camera and/or projector, so that a displacement of the sound recording is not necessary during the editing of the film. This leads to difficulties in that the sound of the end of a first scene is only recorded on the film upon the beginning of the next

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scene which sometimes may be recorded at a later time.

It is thus another object of the present invention to provide an arrangement for the recording and reproduction, respectively, of sound films, wherein arrangements are provided for a simultaneous start and arresting of the sound carrier of the storage device and the film being in the range of the sound heads, and wherein the sound carrier of the storage device and the film are synchronously driven.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIGURES 1 and 2 are perspective schematic side views of two embodiments of sound-recording cameras; and

FIGURE 3 is a perspective schematic sound-film projector.

In the drawings all parts which are not necessary for a clear understanding of the invention have been omitted. In particular the arrangements for an intermittent driving of the film, the driving means for the take-up reel and the image-forming system with the diaphragm and the shutter have not been represented. In the figures, similar parts have been marked with the same reference characters.

Referring now to the drawings, and in particular to FIG. 1, the arrangement comprises a camera 1 for sub-standard film, which contains a film supply reel 2 and a film take-up reel 3. It includes an objective 4, and a film gate 5 of the camera. Between the film gate 5 and the take-up reel 3 two sprockets 6 and 7 are provided which sprockets embrace the sound recording arrangement of the camera 1. This sound-recording arrangement consists of a sound shaft 8 driven at a constant angular frequency by a driving motor (not shown). On this sound shaft 8 a flywheel 9 is arranged for the stabilizing of the film running speed. The film 10 is pressed onto the sound shaft 8 by means of a pressing roller 11. The sound-recording on the sound track of the film 10 is effected with the assistance of a sound head 12 which is energized by an amplifier 13. Between a film-guide bolt 14 and the sprocket 6 the film 10 is forming a loop which is scanned by a feeler roller 15. This feeler roller 15 adjusts a regulator 16 symbolically indicated in the drawing, which acts on the driving motor (not shown). A magnetic storage device is arranged in the input circuit of the amplifier 13. This magnetic storage device has an endless tape loop 17 against which a recording head 18, a reproduction head 19 and an erase head 20 are resting. The drive of the tape loop is effected by the sound roller 8 and the pressing roller 11. The low-frequency signals delivered by a microphone (not shown) are transmitted to the camera over the input plug 21 and amplified in the amplifier 22. In the output circuit of the amplifier a recording head 18 is provided by which the signals are recorded on the tape revolving in the direction of the arrow 23. The length of the tape loop between recording head 18 and reproduction head 19 is equal to the length of the film loop between the film gate 5 and the sound head 12, so that the signal transmitted over the reproduction head 19 and the amplifier 13 to the sound head 12 is recorded adjacent to the corresponding image. The recording on the tape loop 17 is erased by the erase head 20 which is energized by a high frequency oscillator (not shown).

FIG. 1 shows the camera in its operating position. In the rest position the pressing roller 11 is lifted off the sound roller 8 by which the driving connection of the film and the tape is disconnected. Before the start of the recording the driving motor of the sound roller 8 is switched on. Then, by operating the releaser of the cam-

era, the driving motor of the image recording part is switched on and the film 10 and the tape 17 are pressed against the sound roller 8 by the pressing roller 11, which sound roller 8 is revolving at a constant angular speed. The sound recording is effected in the above described manner. When the driving motor of the image recording part is arrested the roller 11 is lifted off the sound roller 8 at the same time and the film 10 and the tape 17 are simultaneously arrested. By the simultaneous arresting of both carriers 10 and 17, it is ensured that the sound recording of the end preceding scene, which is stored on the tape loop 17, adjoins the signals recorded on the sound track of the film 10 without any interruption when the next scene is recorded.

While in the above described embodiment the magnetic storage device forms an integral part of the camera, the magnetic storage device with the entire amplifying arrangement and the sound head is detachably connected according to FIG. 2 to the camera. In contrast to the arrangement shown in FIG. 1 the common sound shaft 24 of the magnetic tape storage and the sound-film head of the film driving means is not rigidly coupled to the flywheel 25. This sound shaft 24 is rather rotatably mounted on a swingable lever 26. In the position of the lever 26 as shown in FIG. 2, the flywheel 25 is coupled over a friction wheel 27 to the sound shaft 24. In the other position of the lever 26, the driving connection with the sound shaft is disconnected. In this position the flywheel 25 is driven by the motor 28. The film 10 and the tape 17 are pressed onto the sound roller 24 by the pressing rollers 29 and 30, respectively. The storage device is arranged together with its two amplifiers, the sound roller 24, the recording head 12 and further film guides (not shown) in a portion of the lid 32 which closes the spool room of the camera. When putting on the lid 32 the same is moved in the direction of the arrow 33, and the film 10 is pressed against the pressing roller 29 mounted on the camera, by the sound shaft 24 which is arranged on the lid. At the same time the sound head 12 is applied to the film. When the camera is put into its taking position, the motor 28 is connected to a power source (not shown) which is arranged in the camera housing 1. The lever 26 is in the upper end-position, so that the flywheel 25 is driven at a speed corresponding to the film running speed. By operating the releaser of the camera the driving means of the image recording part is released in known manner and at the same time the lever 26 is moved downwards. Thus the flywheel 25 is uncoupled from the motor 28 and the driving connection to the sound shaft 24 is established. The flywheel 25 is towed by the film 10 during the recording proceedings, so that the film running speed is defined by the speed of the driving motor of the image recording part. The common sound roller 24 ensures an absolute synchronous running of the film loop and of the tape loop, also during the start and the running out of the camera.

An advantage of the arrangement of the entire sound aggregate in the detachable portion of the lid of the camera resides in the fact that the sound aggregate can also be used for the reproduction, and that the construction of the camera is greatly facilitated because it is not necessary to provide the sound part in the camera.

Referring now again to the drawing, and in particular to FIG. 3, a sound film projector is disclosed. In contrast to the arrangement of the recording heads 12 of the cameras the reproduction head 35 of the projector has to be arranged before the film gate. The construction of the projection part corresponds substantially to that shown in FIG. 1, but does not have a special driving means for the sound roller 8, so that a synchronous regulator for the driving motor of the projection part may be eliminated.

In order to enable a reproduction of films on which the sound is dislocated relative to the associated image of a certain number of images in correspondence with the

standard, the storage device is adapted to be changed with respect to its storage time. To this aim the magnetic storage device has two tape loops 36 and 37. The storage time of the loop 36 is equal to the running period of the film between the reproduction head 35 and the image gate 5. The storage time of the loop 37 is increased relative to the first mentioned loop of the timely standardized displacement of sound and image. For the reproduction of the films having the mentioned sound and image dislocation the entire sound-head carrier 38 is moved at right angle to the direction of the tape, so that the sound heads 18 to 20 are situated in front of the loop 37. In an analogous manner an increase of the storage time could be effected by the displacement of one of the two sound heads 18 and 19 in the longitudinal direction of the film or by the prolongation of an adjustable loop which is arranged between the two sound heads. A change of the storage time finally would be possible by the variation of the tape running speed.

The present invention is not restricted to the above described embodiments. Thus e.g. a magnetic storage device having a magnetic drum or a disk made of a magnetizable material may be used instead of a magnetic storage device with a tape loop. It is important however that the storage device has a wide sound track which ensures a high sound quality of the storage recording, so that a deterioration of the recording on the film, caused by the sound storing is avoided. In order to meet the highest requirements in quality, it may also be desirable to choose a higher speed of the sound carrier of the storage device than the film running speed. If the distance between the film gate 5 and the sound head 12 of the camera corresponds to the mentioned displacement of the image and the sound, the camera may be used for making standard films when the storage device is overbridged.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A sound recording and reproducing apparatus, comprising

a magnetic storage device having a recording means and a reproducing means, and a carrier for carrying sound recordings recorded and reproduced by said means,

a film gate,

means for intermittently driving a sound film adapted to carry images passing by said film gate,

a sound head connected to said reproducing means, positioned adjacent said film, and at a distance from said gate,

means for simultaneously starting and stopping said carrier and said film,

said recording means recording sound on said carrier while a portion of said film is passing by the gate, the running time of said carrier between said recording and reproducing means being equal to the running time of said portion of film within the distance between said film gate and said sound head.

2. The apparatus, as set forth in claim 1, which includes

a common sound shaft driving said film and said sound carrier of said magnetic storage device, and a flywheel coupled to said sound shaft.

3. The apparatus, as set forth in claim 2, which includes

a driving motor coupled to said common sound shaft, a regulator regulating the synchronous running of said driving motor of recording and reproducing means, respectively, and said first mentioned driving means.

4. The apparatus, as set forth in claim 3, which includes

means for alternately coupling said flywheel to said

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driving motor and to said sound shaft, respectively, and

means for rendering automatically operative said coupling means upon starting the drive of said image recording and reproducing means, respectively.

5. The apparatus, as set forth in claim 1, which includes

means for adjusting said storage time for the recording and reproduction, respectively, for said films, and the latter have a distance of sound to image different from zero.

6. The apparatus, as set forth in claim 5, which includes

means for changing the speed of said sound carrier and of said storage device.

7. The apparatus, as set forth in claim 5, wherein said sound carrier comprises a film, and

said storage device comprises a plurality of sound carriers of different lengths, and

means for driving said sound carriers synchronously and for acting together alternately with said sound heads of said storage device.

8. The apparatus, as set forth in claim 5, which includes

means for changing the distance between said recording head and said reproduction head.

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9. The apparatus, as set forth in claim 1, which includes

means for detachably mounting said magnetic storage device.

10. The apparatus, as set forth in claim 9, which includes

guide means for said film, and

said magnetic storage device includes said sound head and said guide means for said film.

11. The apparatus, as set forth in claim 1, which includes

a camera housing having a removable lid closing said housing, and

said magnetic storage device is disposed in said lid.

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