Sept. 19, 1944. E. MAY 2,358,411

SOUND FILM DEVICE

Filed April 23, 1941 2 Sheets-Sheet 1

FIG. 1

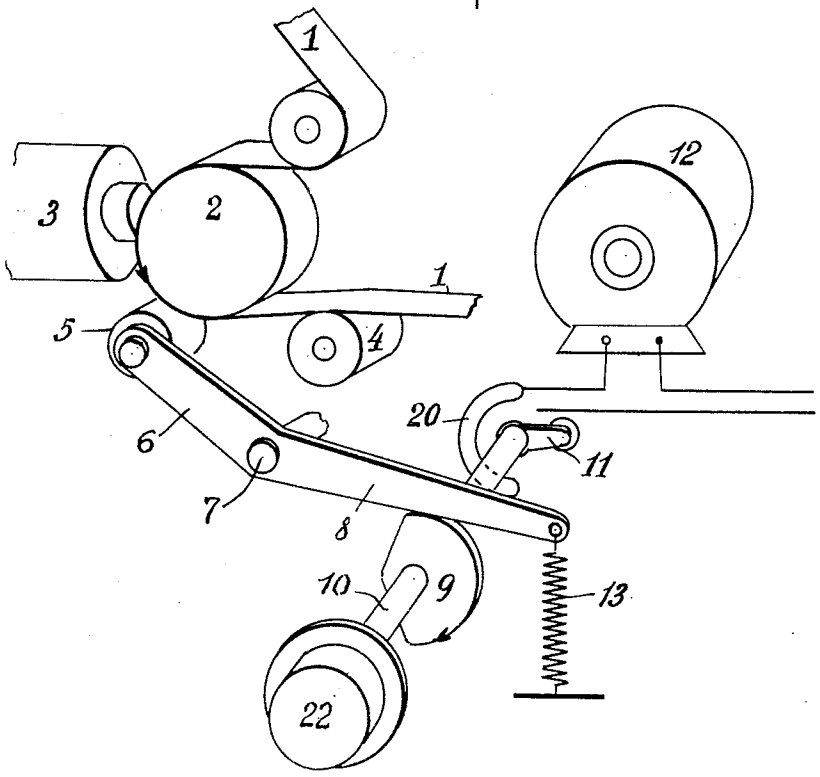



FIG. 2

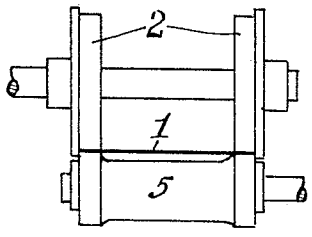
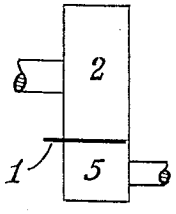



FIG. 3




INVENTOR.

ERWIN MAY

BY

Joan E. G. Konigsberg

Atty.

Sept. 19, 1944. E. MAY 2,358,411

SOUND FILM DEVICE

Filed April 23, 1941 2 Sheets-Sheet 2

FIG. 4

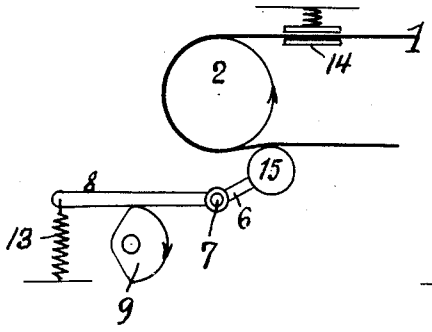



FIG. 5

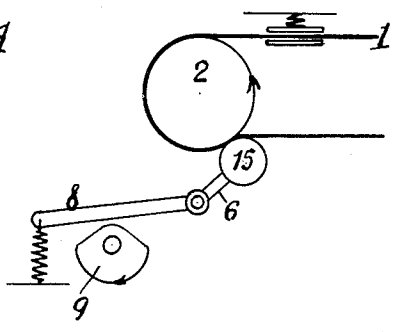



FIG. 6

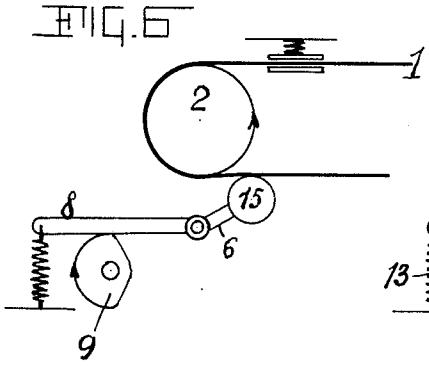



FIG. 7

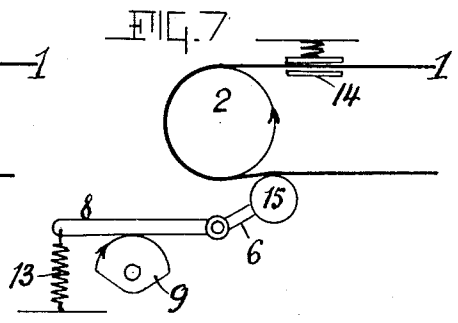
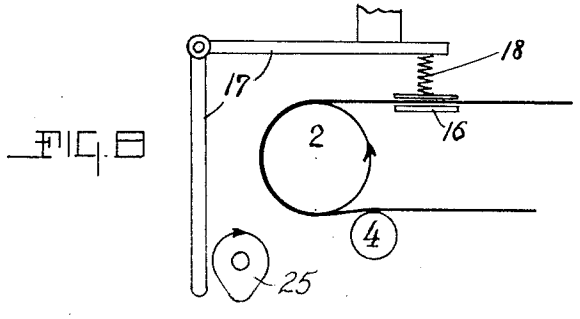



FIG. 8




INVENTOR.

ERWIN MAY

BY

Ivan E. G. Konigsberg

Atty

Patented Sept. 19, 1944

2,358,411

# UNITED STATES PATENT OFFICE

2,358,411

## SOUND FILM DEVICE

Erwin May, Wetzlar, Germany; vested in the Alien Property Custodian

Application April 23, 1941, Serial No. 389,857
In Germany April 4, 1940

1 Claim. (Cl. 271—2.3)

This invention relates to improvements in sound film devices in which the sound film track is photographed upon the film while the latter runs over a smooth film drum which is driven by friction by the film after the drum has been started by a starting motor which latter is cut out when the drum has reached operating speed. For the purpose of smooth and even operation the drum is made relatively heavy. Hence before the drum reaches operating speed there is a slip between the film and the drum. This slipping motion is very objectionable because it results in very poor tone production or one must provide for a starting silent period. This objection becomes more marked if the production for any reason is interrupted and must be started again. Various means have been proposed to overcome this trouble. For instance, it has been proposed to provide a friction roller to be pressed against the film and the drum, such roller to be governed in its operations by the film itself. Such an arrangement however, required in turn a good deal of complicated releasing and compensating mechanism which in many instances could not be included in a practical arrangement. Other devices have been proposed but none of them have proven satisfactory.

The object of this invention is to provide means for causing increased friction between the film and the drum at the very start of the drum starting motor, the increased friction to be released as soon as the drum is running at operating speed. To this end the friction means is timed to synchronize with the operation of the motor starting rheostat or starting switch. As soon as the motor circuit is closed the friction is applied. As the starting switch is operated to cut out the starting resistance in the circuit the friction means is released. In the accompanying drawings illustrating the invention.

Fig. 1 is a diagrammatic perspective illustration of a mechanism embodying the invention with certain parts omitted.

Figs. 2 and 3 show different types of film drums.

Figs. 4, 5, 6 and 7 illustrate diagrammatically the several steps in the operation of the mechanism.

Fig. 8 illustrates diagrammatically a film braking device for retarding the film to prevent slip on the drum.

In the drawings the film 1 runs around the film drum 2 past the optical sound track producing device 3. The drum 2 is a smooth drum to be driven by friction by the film 1 hence slip occurs before the drum has reached operating speed corresponding to the moving speed of the film. A guide roller 4 may be provided to guide the film. A friction roller 5 is carried by a rocking lever 6—8 which is pivoted at 7. The lever is kept in engagement with a cam 9 upon a shaft 10 by means of a spring 13. The shaft 10 also carries a switch arm 11 which contacts with and moves over a switch sector 20 in a usual manner to open and close the circuit for the drum starting motor 12. The latter is in known manner drivingly connected to the drum 2 to start the latter. Such connection being well known is not shown. The shaft 10 has an operating knob 22. The arrangement in Figs. 1 and 8 include a separate film guide roller 4. In the other figures this roller is omitted, there being a friction roller 15 carried by the lever 6—8 which serves both for friction purposes as well as a guide roller.

For the purpose of describing the invention the cam 9 is shown as having four distinct positions ninety degrees apart. Fig. 4 shows the mechanism at rest the same as Fig. 1, the parts being reversed to bring the roller 15 in position to serve as a roller for guiding the film after it leaves the drum 2. In Figs. 1 and 4 the friction is off and the motor circuit is open. When the apparatus is to be operated the operator rotates the shaft 10 clockwise as indicated to close the motor circuit and disengage the cam 9 from the lever 6—8. The spring 13 then immediately moves the roller 15 into frictional engagement with the film and the drum 2 to apply additional friction between these elements at the start of operations. This is shown in Fig. 5. Hence no slip occurs. The clockwise movement of the shaft 10 is then continued in the usual manner to cut out the starting resistance in the circuit and as this is done the cam 9 is again moved into engagement with the lever 6—8 to release the roller 15 from its friction position. This is shown in Fig. 6 where the motor is still running. Further movement of the shaft 10, from the position in Fig. 6 to that of Fig. 7, opens the motor circuit. The motor stops and the roller 15 is maintained in off position. The drum 2 has now reached operating speed. The closing of the starting motor circuit starts the motor and the drum and simultaneously therewith the friction is applied. As the motor increases its speed and the drum gains momentum the friction is released. The position of the cam 9 upon the shaft 10 is synchronized with the position of the switch arm 11 so that when the switch is first closed the friction is applied.

The apparatus in Figs. 4 to 7 may include a film retarding brake 14 which functions to retard the film at the start of the operations and serves as an additional means to prevent slip. In Fig. 8 a similar brake 16 is positively operated by a bell crank 17 which is under the control of a cam 25 on the shaft 19. As soon as the drum has reached operating speed the brake is released and functions as a normal film speed controlling means.

Fig. 2 shows a film drum 2 which is wide enough to accommodate a film 1 on which the sound track is between the edges of the film and the drum may therefore consist of guiding disks as shown. The friction roller 5 is accordingly also of disk formation. Fig. 3 shows a solid drum to accommodate a film having the sound track at one edge thereof.

I claim:

In a device of the character described, a smooth film guiding drum to be normally frictionally rotated by a film passing around the drum including a starting motor for said drum, a mechanism for momentarily applying additional friction between the film and the drum when the motor starts to drive the latter, said mechanism comprising a normally open switch for controlling the motor circuit, friction means adapted to be moved into and out of frictional engagement with said film and drum, operating members connected to said switch and to said friction means, and means for actuating said operating members to simultaneously close said switch to start the motor and move said friction means momentarily into frictional engagement with said film and drum and thereafter move said friction means out of said frictional engagement.

ERWIN MAY.