Dec. 6, 1955 E. W. TEMPLIN 2,725,785

FILM MARKING UNIT FOR SOUND PICTURE RECORDING SYSTEM

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FIG. 1

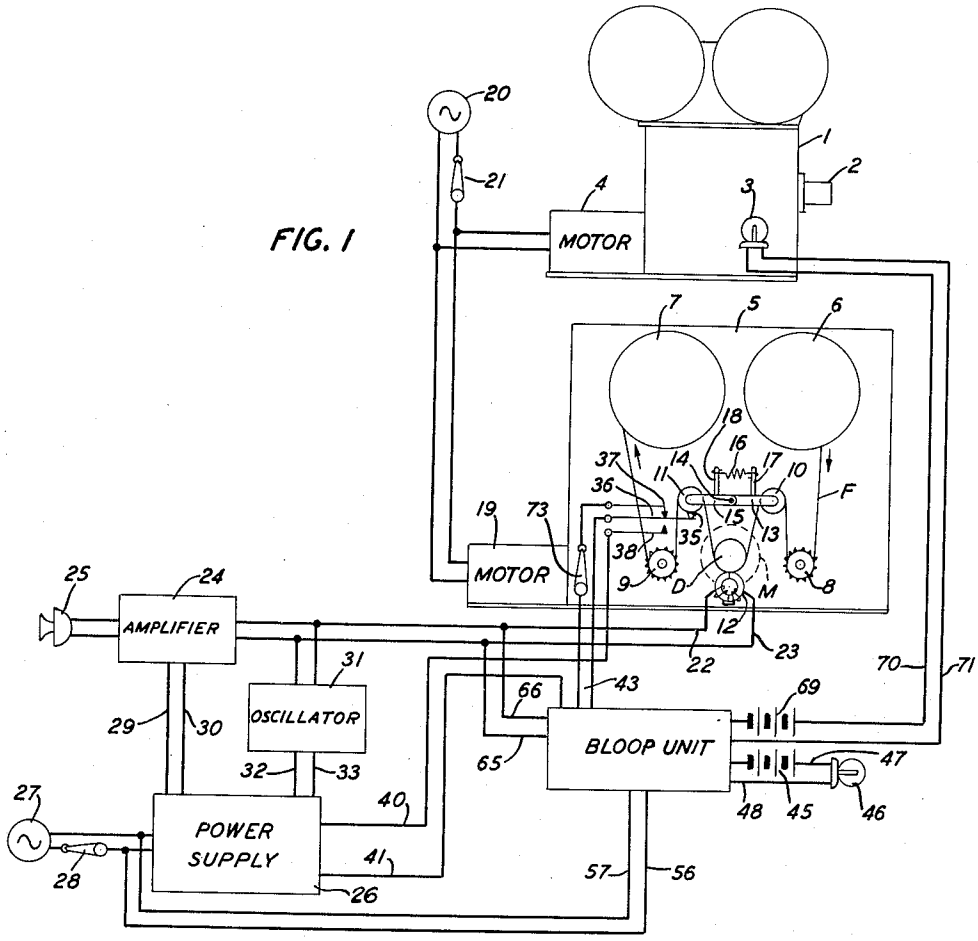
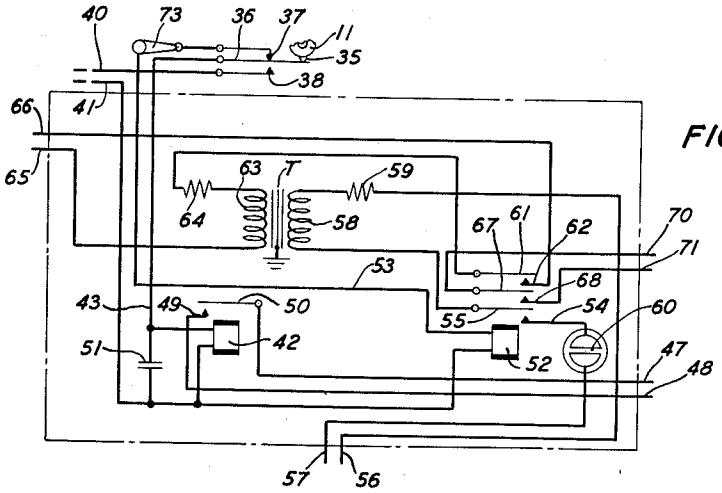


FIG. 2



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FILM MARKING UNIT FOR SOUND PICTURE RECORDING SYSTEM

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This invention relates to sound picture recording systems and particularly to improvements in apparatus employed to record synchronizing start marks on the separate picture and sound films.

It is the object of this invention to provide a small, compact apparatus unit operable in a sound picture recording system to automatically produce synchronizing start marks on the separate sound and picture films immediately following the time the films reach proper recording speed.

A feature of the invention resides in the provision of circuit means producing only momentary operation of the marking devices to thereby produce a sharply defined and readily recognizable start mark on each of the films.

In early recording systems, electrical means were provided for simultaneously marking the separate films, the electrical means being operable by manual closure of a switch by the recordist when, in his opinion, the films were up to recording speed. In most instances this arrangement put an additional burden on the already busy recordist, which often resulted in delayed operation of the marking control switch with consequent wastage of film. In later systems, means are provided in the form of a motor-driven rotating cam which is adapted to close contacts in a circuit including the start marking units associated with the separate films. This motor-driven switch constitutes a comparatively expensive equipment unit and in addition, the time of operation of the marking devices is not necessarily coincident with the time the films attain proper recording speed but takes place following the passage of a predetermined time selected as normally sufficient to permit the films to attain proper recording speed. The duration of operation of the marking means in the first of the above-mentioned systems depends upon the length of time the switch is manually held closed, and in the second of these systems it depends on the design of the cam surface and the speed of its rotation. It has been found that in a system of this type it is not only desirable to have the film marking units operate immediately following proper film speed, but it is also desirable to produce only momentary operation of the marking devices so that there will be produced on the films a sharply defined and readily recognizable start mark.

In accordance with this invention, the marking devices associated with the separate films are simultaneously energized automatically by switching means operable in response to the position of the sound film when it reaches recording speed. The switching means is energized only momentarily by the discharge from a condenser which receives its charge by reason of its inclusion in a sound film speed indicator circuit, which circuit is closed by the sound film only during the period it is coming up to recording speed. Therefore, by means of this invention, the two separate films are simultaneously marked immediately upon reaching recording speed and the marking means is in operation only momentarily

to thereby produce a sharply defined, readily recognizable start mark on each film.

The invention will be more readily understood from the following description thereof when read in connection with the accompanying drawings in which:

Fig. 1 is a diagrammatic showing of a sound picture recording system incorporating the film marking unit in acordance with this invention; and

Fig. 2 is a schematic of the circuit of the control unit for the film marking devices in accordance with this invention.

Referring to Fig. 1, the sound picture recording system disclosed therein includes a picture camera 1 containing suitable film driving machanism (not shown) for feeding a photographic film past a recording lens 2 and past a film marking lamp 3 located within the housing. An electric motor 4 is provided for driving the film feeding unit of the camera 1.

Numeral 5 indicates the housing of a sound recording unit including feed reel 6, take-up reel 7 and film driving sprockets 8 and 9. The film F is drawn from the feed reel 6 by sprocket 8 and fed to freely rotatable roller 10. Sprocket 9 draws the film F from freely rotatable roller 11 and feeds it to take-up reel 7. Between rollers 10 and 11, the film F is drawn past a recording magnet 12, at which point the start mark and ensuing signals are magnetically recorded on this film. At the point the film is drawn past magnet 12, it engages and produces rotation of a supporting drum D to the shaft of which is attached a flywheel mass indicated at M, all in a manner well known in the art.

Rollers 10 and 11 are elements of a mechanical filter mechanism of a known type. Roller 10 is freely rotatable at one end of an arm 13, the other end of which is pivoted at 14. Roller 11 is mounted for free rotation at one end of arm 15 which is likewise pivoted at 14. A coil spring 16 is connected between studs 17 and 18 extending upward from arms 13 and 15, respectively. Spring 16 acts to urge rollers 10 and 11 upward against the film F on opposite sides of the recording magnet 12. Viscous damping of the movement of the arms is provided by a dashpot (not shown). The rollers 10 and 11 are shown in the position they assume during normal running of the film being fed at proper recording speed or at standstill. It can readily be seen, however, that during the starting period, the energy required from the film, acting as a belt, to bring the film drum and flywheel up to speed, will cause the roller 11 to be depressed and the roller 10 to be raised. This action will be continued until the film drum and flywheel are up to speed, at which time the rollers 10 and 11 will be in the position generally as shown in the drawing. An electric motor 19 is provided for driving the film transporting sprockets 8 and 9 and the take-up reel 7. The motors 4 and 19 are electrically connected to a single source of supply 20, through a starting switch 21 and are, therefore, driven in synchronism after they are up to synchronous speed. Any one of several synchronous motor drive systems well known in the art may be used.

Recording magnet 12 is electrically connected by wires 22 and 23 to the output of an audio amplifier 24. A recording microphone 25 is electrically connected to the input of amplifier 24 and the signals received thereby are amplified and fed to the recording magnet 12. A power supply 26, electrically connected to a source of alternating voltage 27 through a switch 28, supplies the operating potentials for amplifier 24 through lines 29 and 30. An oscillator 31 receives its operating potentials from power supply 26 through wires 32 and 33. The high frequency output of oscillator 31 is fed to wires 22 and 23 to provide alternating-current bias for the magnetic recording system.

Arm 15 which supports roller 11 is provided with a downwardly extending projection 35 made of insulating material. A biased spring contact blade 36 extends into the path of permitted movement of roller 11. This blade 36 is biased to engage contact 37 in the absence of downward pressure thereon from projection 35 when the recorder is at rest or when the film is traveling uniformly at proper recording speed.

When the recording machine is started from standstill with the camera 1, the film loop between sprocket 9 and the film supporting drum at magnet 12 will be shortened, thus drawing roller 11 and projection 35 downwardly to move blade 36 into engagement with contact 38. This condition will exist until the film F stabilizes at its proper recording speed, at which time the blade 36 will break engagement with contact 38 and instantaneously engage contact 37.

Conductor 40 is connected from the positive 12-volt direct-current terminal of power supply 26 to the contact 38. Conductor 41 is connected from the negative 12-volt direct-current terminal of power supply 26 to one side of an electromagnet 42 (Fig. 2).

Referring now to Fig. 2, it is seen that the opposite side of the electromagnet 42 is connected by conductor 43 to the contact blade 36. Therefore, from the moment the recorder film drive and the synchronously driven picture film are started from standstill until immediately preceding the time the record film F has reached proper recording speed, electromagnet 42 will be energized from the 12-volt supply. When energized, electromagnet 42 operates to close contacts 49 and 50 which complete the circuit from a source of voltage 45 to a speed indicating lamp 46 through conductors 47 and 48. The lamp 46, therefore, indicates when it is lighted that the recorder is not up to proper operating speed.

During the starting period the 12-volt direct-current source which energizes electromagnet 42 also charges a 2000-microfarad condenser 51 connected across this electromagnet.

When the recorder reaches operating speed, the roller 10 permits the contact blade 36 to disengage from contact 38 (thus extinguishing lamp 46) and to engage contact 37. This places an electromagnet 52 across condenser 51 through leads 41, 53 and 43. The charge in condenser 51 is sufficient to energize electromagnet 52 and the switch contacts operated thereby for about one-quarter of a second. During this time the operations listed below take place.

Closure of contacts 54 and 55 connects a source of voltage (which in this case is 115 volts alternating current from source 27 transmitted through conductors 56 and 57) across the primary 58 of a transformer T, a resistor 59 and a neon lamp 60. An audible buzz signal is thus generated. The constants of this circuit are chosen so as to produce a large harmonic content such that the resulting buzz signal can readily be heard with headphones.

Closure of contacts 61 and 62 completes the circuit through the secondary 63 of transformer T, resistor 64 and the recording magnet 12 through conductors 65 and 66, and connecting conductors 22 and 23. The value of resistor 64 is made sufficiently large to prevent the loss of any appreciable amount of high frequency bias current while the buzz signal is being recorded on the sound track by magnet 12.

Closure of contacts 67 and 68 completes the circuit from a source of voltage 69 to film marking lamp 3 through conductors 70 and 71.

By means of the synchronous marking system in accordance with this invention, the photographic picture film and the magnetic sound film are simultaneously marked immediately upon reaching proper recording speed and the duration of operation of the electrically energized marking means is limited to the period of operation of electromagnet 52 under the influence of the discharge from condenser 51.

The sources of voltage 45 and 69 are shown as batteries for the sake of simplicity in the drawings. It will be understood, however, that suitable connections to leads 56 and 57 may readily be made from the circuits including lamps 3 and 46 and the battery source eliminated.

In many cases it may be desirable to use the recorder 5 to record sounds independently of the taking of pictures. In such cases the film marking means may not be needed but the speed indicating lamp 46 will be desirable. A switch 73 is provided which, when opened, will disable the film marking circuit without disabling the speed indicator circuit.

While Fig. 1 discloses two sources of electrical supply 20 and 27 and their associated switches 21 and 28, it will be understood that a single source of voltage supply and a single switch may be employed.

The invention is disclosed herein as applied to a sound picture system employing a photographic picture film and a magnetic sound film. It will be understood that the invention is applicable to a sound picture system employing a photographic picture film and a photographic sound film. The conductors 65 and 66 can be readily connected to a suitable marking lamp disposed adjacent a photographic sound film in a recorder adapted for photographic film recording.

What is claimed is:

1. In a sound picture recording system, a motion picture camera having means for driving a photographic film, a synchronously driven sound recorder incorporating means producing uniform forward movement of a sound recording film, electrically energized marking means associated with each of said films; a first circuit including each of said marking means and a normally open magnetically operated switch, a second circuit including a source of voltage, a condenser and a switch for connecting said condenser to said source of voltage, said switch being operated to closure by said sound recording film during the period of acceleration thereof from standstill up to recording speed; and a second switch operated by said sound recording film when it reaches recording speed to disconnect the said condenser from said second circuit and to connect it across the terminals of the operating winding of said magnetically operated switch in said first circuit, thereby to simultaneously energize the marking means associated with each of said films.

2. In combination, a motion picture camera including means for driving a photographic film, a synchronously driven sound recorder including means for driving a magnetic film, a light exposure marking device associated with said photographic film, a magnetic marking device associated with said magnetic film, said marking devices being simultaneously energized by the closure of a magnetically operated switch; means operable under the control of one of said films for energizing said magnetically operated switch, said means comprising a first circuit including a source of voltage, a condenser and a switch for connecting said condenser to said source of voltage, said switch being operable to closure by one of said films during the period of acceleration thereof from standstill up to recording speed; and a second circuit including the operating winding of said magnetically operated switch and a switch operable to closure by said one film upon reaching recording speed, said last-named switch operable when closed to disconnect said condenser from said first circuit and connect it across the terminals of said operating winding, thereby to simultaneously energize both said marking means.

3. In a sound picture recording system, a motion picture camera having means for driving a photographic film, a synchronously driven sound recorder having means for driving a magnetic sound recording film, an electrically energized light exposure unit associated with said photographic film, a recording magnet associated with said

magnetic film; a first circuit including said recording magnet, a switch, a source of voltage connectable to said recording magnet by closure of said switch and circuit elements producing an audible signal current to be recorded on said magnetic sound film by said recording magnet; a second circuit including said light exposure unit, a switch and a source of voltage connectable to said light exposure unit by closure of said switch; an electromagnet common to both said switches for producing simultaneous closure thereof; a third circuit including a source of voltage, a condenser and a switch for connecting said source of voltage to said condenser, said switch being operated to closed position by said sound recording film during the period of acceleration thereof from standstill up to recording speed; and means operated by said sound recording film when it reaches recording speed to disconnect said condenser from said circuit and to connect it across said electromagnet, thereby to electrically energize said light exposure unit simultaneously with energization of said recording magnet by said signal current.

4. The combination in a sound picture recording system having synchronously driven picture and sound films, electrically energized marking means associated with each of said films and a circuit including a source of voltage, an electrically operated switch and each of said marking means, of means for controlling the simultaneous energization of both said marking means comprising a switch blade and a pair of contacts, said switch blade being operated by said sound film during the period of acceleration thereof from standstill up to recording speed to engage the first of said pair of contacts and operated by said sound film during the running period thereof at recording speed to engage the second of said pair of contacts; a first circuit including a source of voltage, a condenser, said switch blade and the first of said pair of contacts; a second circuit including said switch blade, the second of said pair of contacts and said electrically operated switch associated with said marking means; said switch blade being movable under the control of said sound film from engagement with the first of said pair of contacts into engagement with the second of said pair of contacts to disconnect said condenser from said first circuit and to connect it across the terminals of the electrically operated switch associated with said marking means, whereby the marking means associated with each of said films are energized simultaneously.

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