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3 Sheets-Sheet 1



Ralph Gordon Fear.

May 11, 1937.

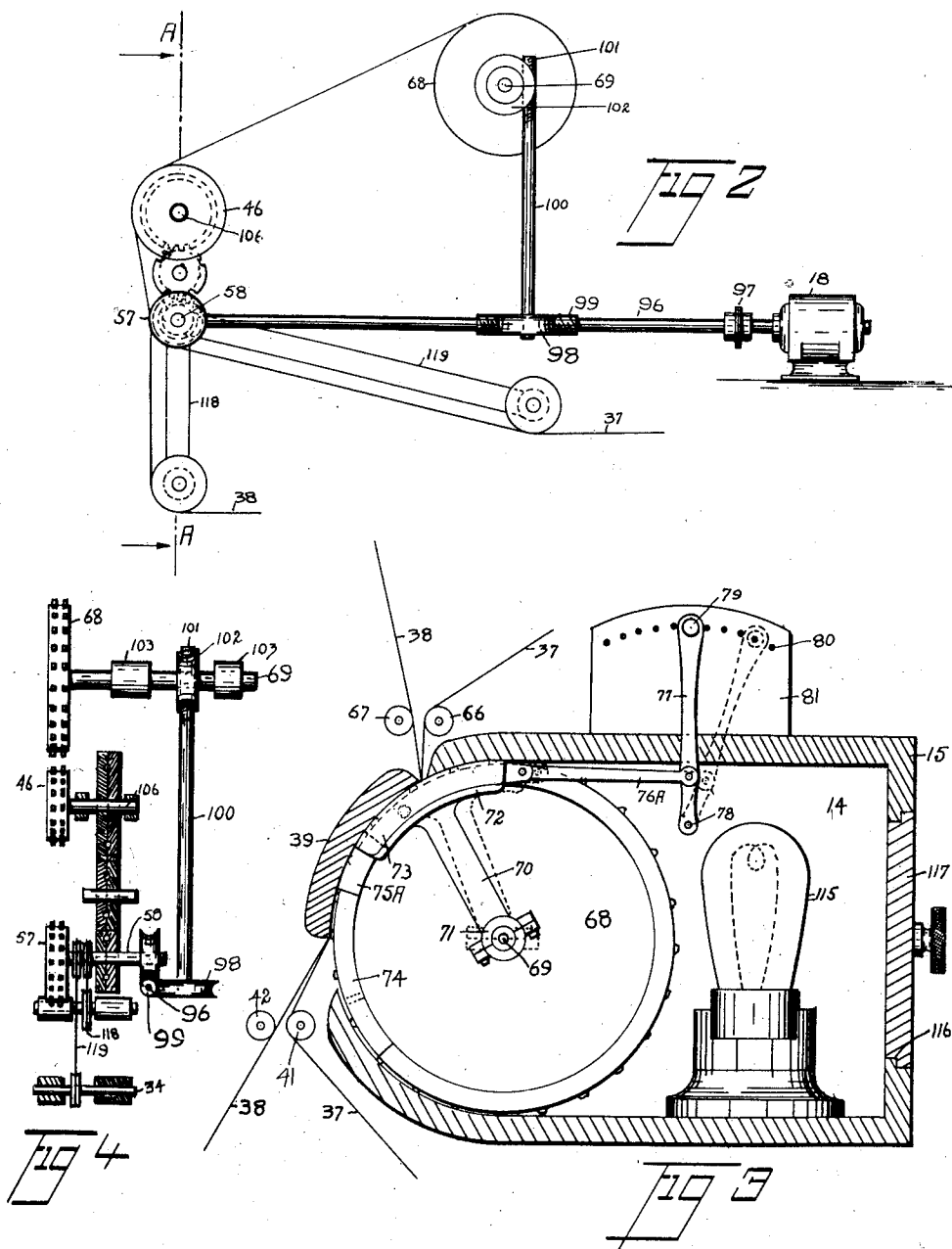
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COMBINED PRINTING AND RECORDING MACHINE

Filed Dec. 10, 1934

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INVENTOR.

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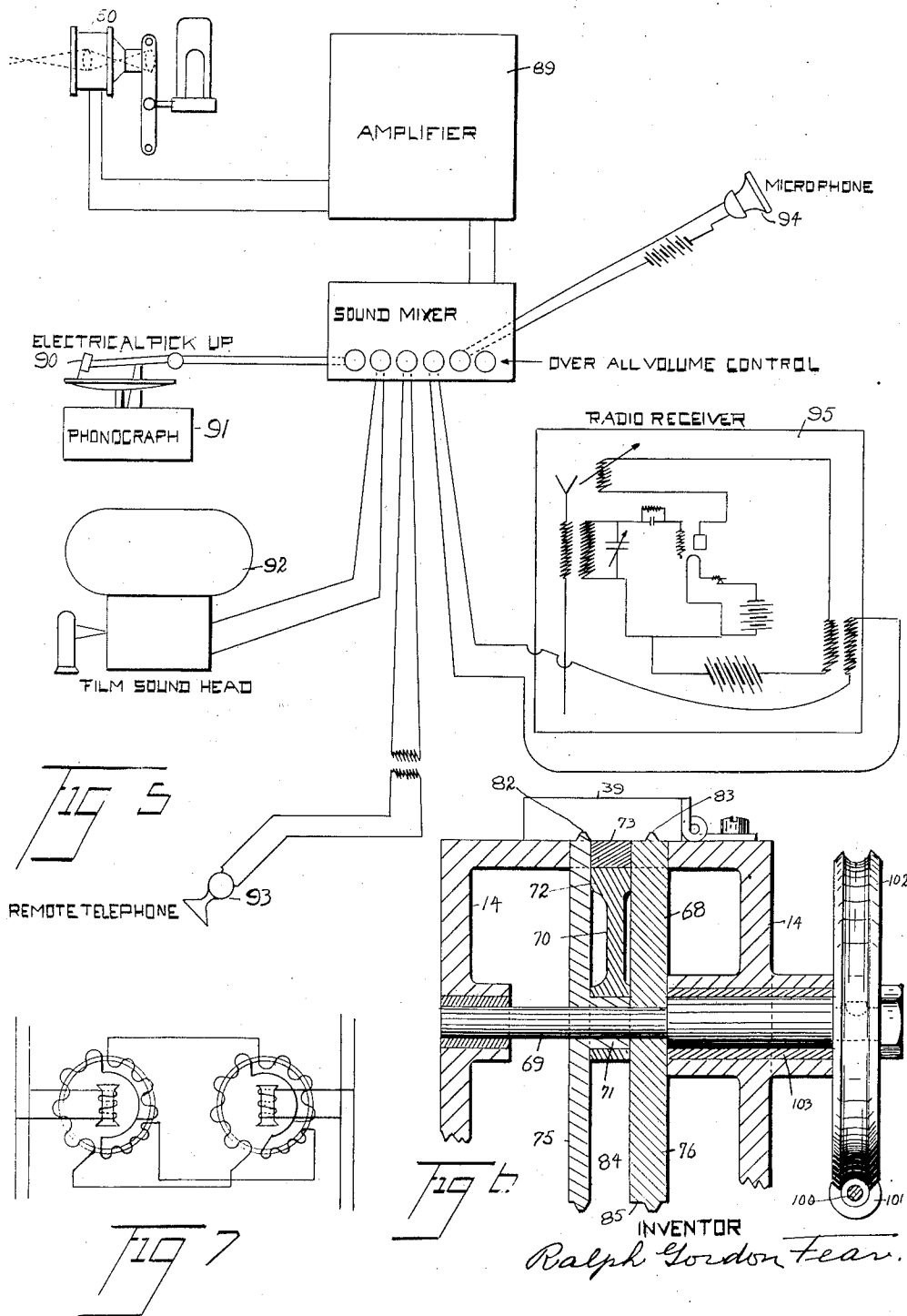
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,079,960

COMBINED PRINTING AND RECORDING
MACHINE

Ralph Gordon Fear, Los Angeles, Calif.

Application December 10, 1934, Serial No. 756,856

5 Claims. (Cl. 95—75)

My invention relates to film printers and recorders generally and more particularly to a film printing machine combined with a sound on film recording machine.

5 An object of the invention is to combine a film printing mechanism with a sound-on-film recording mechanisms for simultaneous operation from a single prime mover, the mechanisms being of a construction and arrangement that a final composite sound and picture positive print will be produced in but one printing operation from a single negative print.

10 Another object of the invention is to provide a single supporting structure for the said mechanisms and prime mover whereby the same are brought into a compact and readily accessible assembly on the supporting structure to facilitate maintenance and operation.

20 With these and other objects of equal importance in view, the invention resides in the certain new and useful combination, construction and arrangement of mechanisms and parts as will be hereinafter more fully described, set forth in the appended claims, and illustrated in the accompanying drawings in which:—

25 Figure 1 is a side elevation showing a practical embodiment of my invention;

Figure 2 is an elevation of the driving mechanism per se;

30 Figure 3 is a vertical longitudinal section through the printer head, showing the housed parts in elevation;

Figure 4 is a vertical section taken on the line 4—4 of Figure 2;

35 Figure 5 is a diagrammatical view showing various sound sources interconnected to produce a composite sound record;

Figure 6 is an enlarged sectional view thru the printer sprocket mechanism; and

40 Figure 7 is a diagrammatical view showing how the driving motor of the instant invention may be electrically interlocked with the driving motors of other mechanism for the purpose of synchronizing sound and picture printing.

45 Referring to the drawings in which like characters of reference denote corresponding parts wherever they occur throughout the several views.

Referring to Figure 1; the numeral 1 indicates a film roll which is journaled upon shaft 2 and adapted to rotate thereon, being held in place by rod 3 which is arranged upon supporting shaft 4 so that it may be swung to one side for the purpose of placing film upon the shaft 2. A back plate 5 is mounted upon a bracket 6 which also carries a second film roll 7 journaled upon the shaft 8 and adapted to rotate thereon. Retaining rod 9 mounted upon supporting rod 10 holds the film on the shaft 8, the back plate 11 preventing the film from working out of position as it rotates.

The supporting T 12 is affixed to a vertical rod 13 which is rigidly secured to the printer housing 14. The printer housing 14 has a light proof lamp housing 15 cast integrally therewith. A lever 16 is adapted to be rotated so as to change an exposure aperture with the printer. The printer supporting pedestal 17 supports a motor 18 mounted upon a bracket 19 attached to the pedestal at 20. A second bracket 21 cast integrally with the pedestal supports the sound recorder 22 which has a door 23 having locking means 105 adapted to close and exclude light from the interior of the recorder. A film take up roller 24 is supported by the bracket 25 which is secured to the bottom of the recorder case 22. A swinging rod 26 mounted and supported by a bracket 27 prevents the film from falling off of take up spindle 28 which is adapted to be driven by a belt 118 or any other conventional means.

Another bracket 29 is attached to the pedestal 20 at 30 and held thereon by screws 31 and 32. A film take up reel 33 is mounted upon rotatable shaft 34 and held in place by a swinging arm 35 which is supported by rod 36 mounted upon said bracket 29.

The film roll 7 is a developed picture negative placed and rolled so that the emulsion side thereof is away from the light as it unrolls. This film indicated by the numeral 37 is adapted to contact the unexposed positive film 38 which is pulled down from the film roll 1 by the printer mechanism. Film 38 has its emulsion side facing film 37 so that an emulsion to emulsion contact is made by the two films as they pass thru the printer mechanism, the two films, 37 and 38 pass between the guide rollers 66 and 67 and under contact shoe 39 onto printing sprocket 68 which is mounted upon and driven by shaft 69 at which time they are exposed to a printing light and separate at 40 as they emerge from under the shoe 39 as will be clearly understood by referring to Figures 1 and 3.

The negative film 37 passes between guide rollers 41 and 42 and is taken up by the spindle 33 upon the shaft 34 forming roll 43. The spindle 33 is adapted to be driven by a belt 119 or any other conventional means.

The positive film 38 is led into the recorder 22, after passing between guide rollers 41 and 42 and between rollers 44 and 45 secured to the recorder housing, and then onto the large heavy sprocket 46 mounted on shaft 106 where it is held by the film engaging rollers 47 and 48 which are pivotally connected to the rocking or eccentric frame 107 having a finger piece 108 for operating the frame to disengage the rollers 47 and 48 from the sprocket wheel 46 to readily thread the film 38.

The film 38 is exposed at 49 to a varying light source, such as a light valve 50 which has an optical shutter 51 for focusing light that passes thru

shutter 52 which may be actuated by electrical impulses furnished by any conventional sound conversion system. The lamp 53 may burn at a fixed intensity and the optical system 54 may be arranged to focus such light upon the shutter 52. The shutter 52 opening and closing in accordance with the electrical currents that are used to actuate it.

The positive film 38 having passed recording point 49 follows the sprocket 46 and passes under the sprocket film engaging rollers 55 and 56 which are pivotally connected to the rocking or eccentric frame 109 having a finger piece 110 for operating the frame to disengage the rollers 55 and 56 from the sprocket wheel 46 to readily thread the film 38, and then away from sprocket 46 onto sprocket 57 which is mounted upon rotatable shaft 58. A loop 59 is formed by the sprocket film engaging rollers 60 and 61 which are pivotally connected to the rocking or eccentric frame 111 having a finger piece 112 for operating the frame to disengage the rollers 60 and 61 from the sprocket wheel 57 to readily thread the film. After passing under roller 61 the film passes between film guide rollers 62 and 63 secured to the bottom portion of the recorder housing, and is taken up by the revolving take up spindle 28 forming roll 64.

A loop 65 is formed between rollers 42, 44 and 45 to prevent the printing sprocket from affecting the film entering the recorder.

An arm 70 is adapted to be pivotally supported upon the central hub 71 of the sprocket 68. The arm 70 has an arcual flange 72 formed at its periphery and carries hardened steel film guiding shoe 73 mounted thereon as clearly shown in Figures 3 and 6.

A film exposure aperture forming shoe 74 is rigidly fastened to the printer case and arranged to fit snugly between the flanges 75 and 76 of the printer sprocket 68 to prevent light from escaping from the printer case. The arm 70 may be moved radially to open or close an aperture 75A between the fixed shoe 74 and the movable shoe 73 by a link 76A connected to lever 77 pivoted at 78 and having a latching handle 79 arranged to engage convenient holes 80 in a quadrant 81 mounted on the printer housing 14.

The contact shoe 39 having grooves 82 and 83, shown in Figure 6, so as to prevent the teeth of sprocket wheel 68 from interfering with the contact shoe and to allow the shoe to press the film into a sliding contact with the film guiding shoes 73 and 74.

The annular space 84 between the flanges 75 and 76 of the sprocket 68 is arranged so that one side of the sprocket flange has an inwardly extending flange 85 that is the proper width of a sound track and prevents the printing light from fogging the sensitive film where the sound is to be recorded.

An incandescent lamp 115 which may be inserted thru the door opening 116 in the printer housing 14 and closed by the swinging door 117 furnishes light to expose the positive film passing thru the printer.

The light valve 50 may be actuated by an amplifier 89 as shown in Figure 5, which may amplify varying electrical currents that may be furnished by an electrical pick up 90 of a phonograph 91, or by a film sound head 92 or by a remote telephone 93 or by a microphone 94, or by electrical current picked up by a radio and con-

verted into electrical currents of audio frequency as indicated by 95 shown also in Figure 5.

The motor 18 drives shaft 96 thru a flexible coupling 97. A helical gear 98 drives gear 99 which is rigidly mounted upon vertical shaft 100 and which has a worm 101 mounted thereon. Worm 101 drives the printer sprocket 68 by means of worm gear 102 which is keyed to shaft 69 journaled in bearing 103 in printer housing 14 of the printer.

Many other modifications and changes in details will readily occur to those skilled in the art without departing from the spirit and scope of my invention as defined in the claims, and I therefore desire to have the foregoing description and drawings used in connection therewith regarded in the illustrative sense rather than in a limiting sense.

What I claim is:—

1. In a machine of the class described, a vertical support, a film printing mechanism at the upper end of said support, a sound-on-film recording mechanism carried by and at one side of said support below said film printing mechanism, a second support rising from the upper end of the first named support, film rolls carried by said second support, a prime mover carried by and at the opposite side of said support, a drive shaft journaled in said support and connecting the said prime mover directly to the film feed mechanism of the said sound recording mechanism, and a second shaft geared to said second named shaft at one side of said support to transmit power from the prime mover to the film feed mechanism of the said printing mechanism.

2. A film picture printing machine, comprising a light-proof housing having a light exposure aperture, a film contact shoe overlying the said aperture, a driven shaft within said housing, a film feed sprocket on said shaft, a movable film guiding shoe, an arm mounted for angular movements on said driven shaft and carrying said film guiding shoe at its free end, a lever pivoted within said housing and projecting exteriorly thereof, a link connecting said lever with said film guiding shoe, and a latch carried by said lever and selectively cooperative with a series of keepers mounted on the wall of the housing.

3. The machine as set forth in claim 1, wherein a flexible coupling is interposed between the said prime mover and the said drive connections thereof for the said film feed mechanism of the printing and sound recording mechanisms.

4. In an apparatus of the class described, a sound-on-film machine comprising a casing, a light source exteriorly of said casing, a light valve including an optical system mounted in one wall of said casing in line with said light source, a control shutter for said light valve, a sprocket within said casing for feeding a positive film past the exposure point of said light valve, a second sprocket within said casing for drawing the said film from the first named sprocket, guide means cooperative with said sprockets and cooperative with said film to maintain a loop therein between the sprockets, a take-up for said film exteriorly of said casing, and means for operating said sprockets and take-up.

5. The machine as set forth in claim 4, wherein the said shutter is operated by and correspondingly with electrical impulses from an amplifying unit of a usual sound conversion system.

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