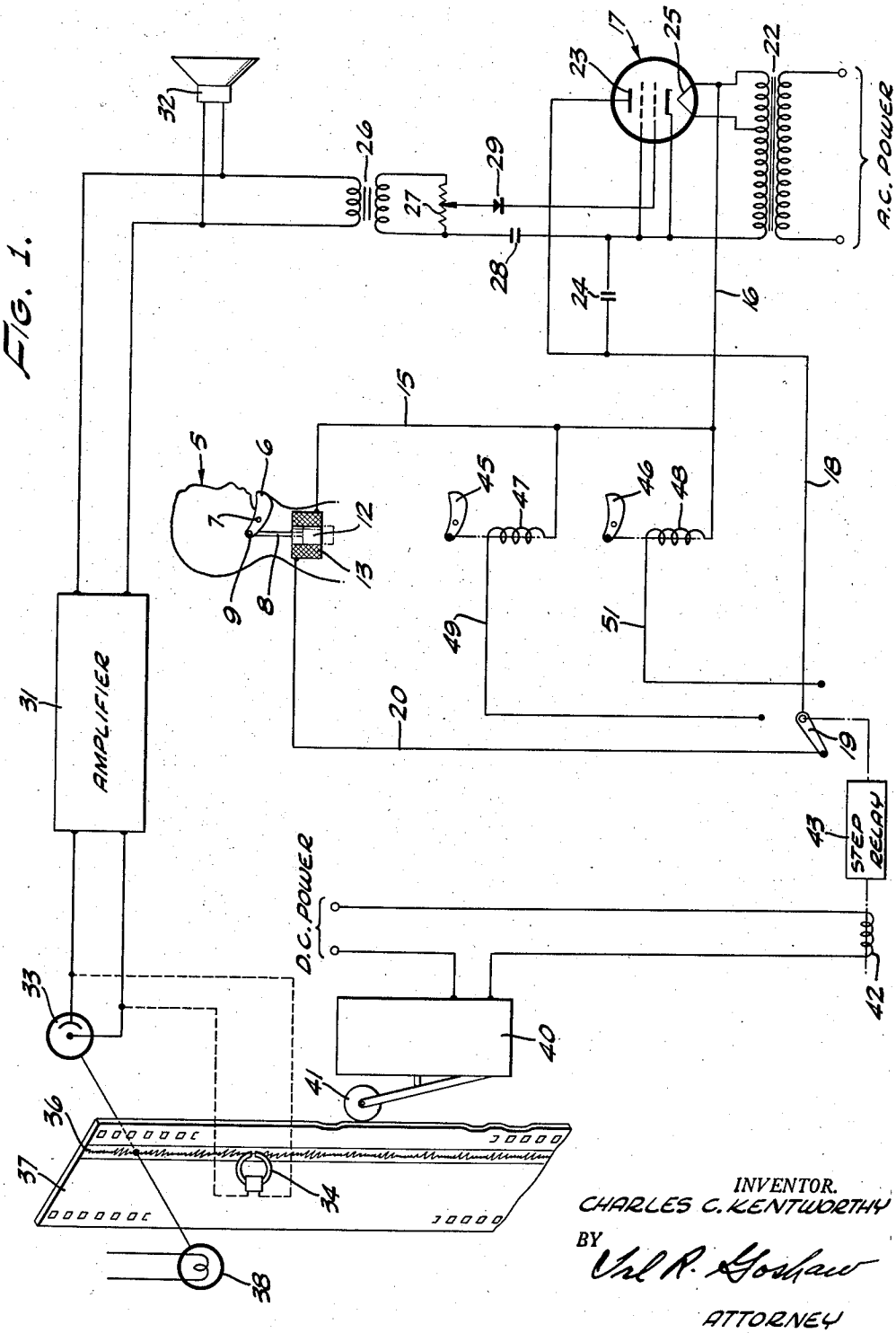
June 16, 1959 C. C. KENWORTHY 2,890,535

LIP ACTUATION OF DUMMIES BY ELECTRICAL SIGNALS

Filed May 2, 1955

3 Sheets-Sheet 1

FIG. 1.



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3 Sheets-Sheet 2

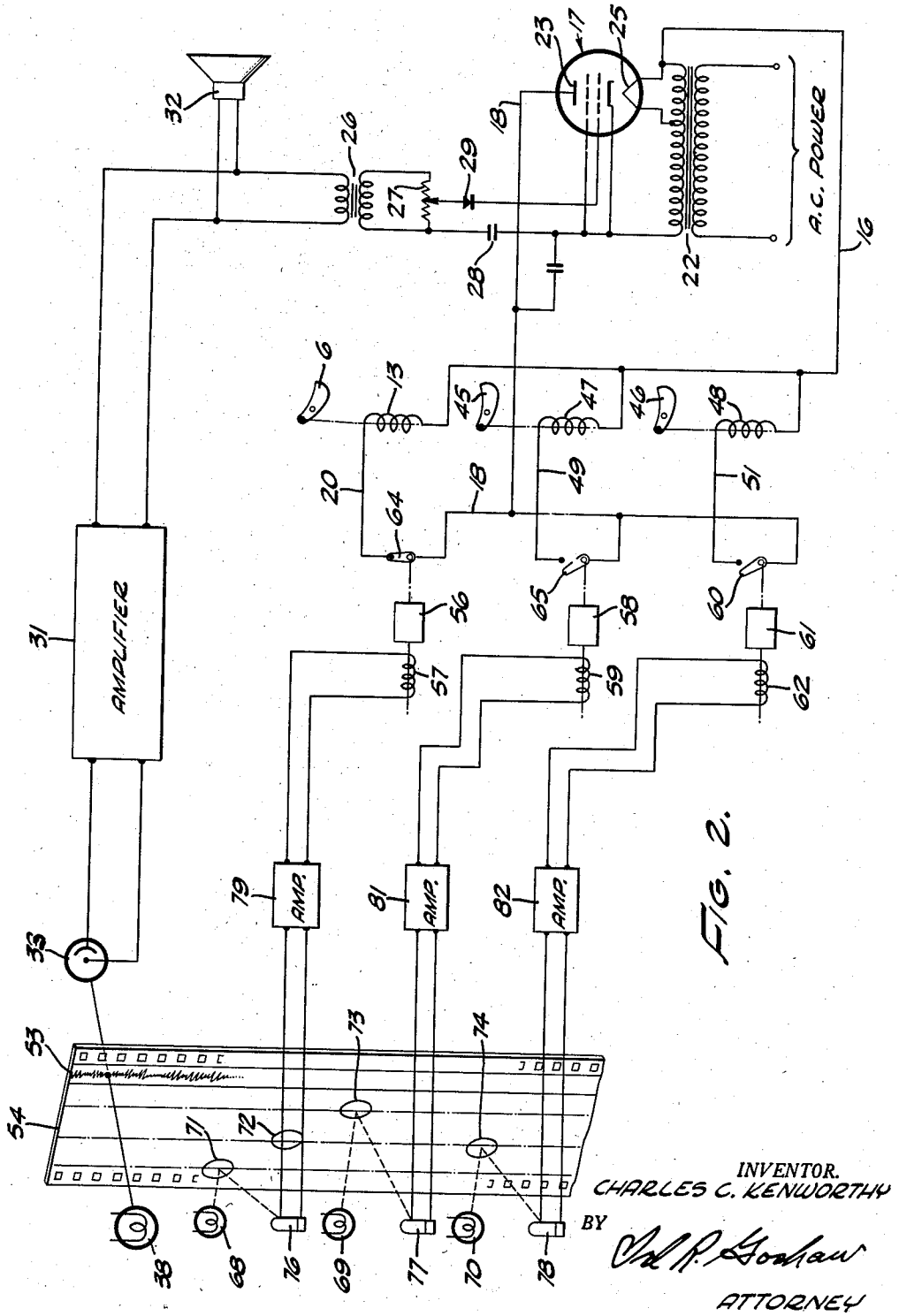


FIG. 2.

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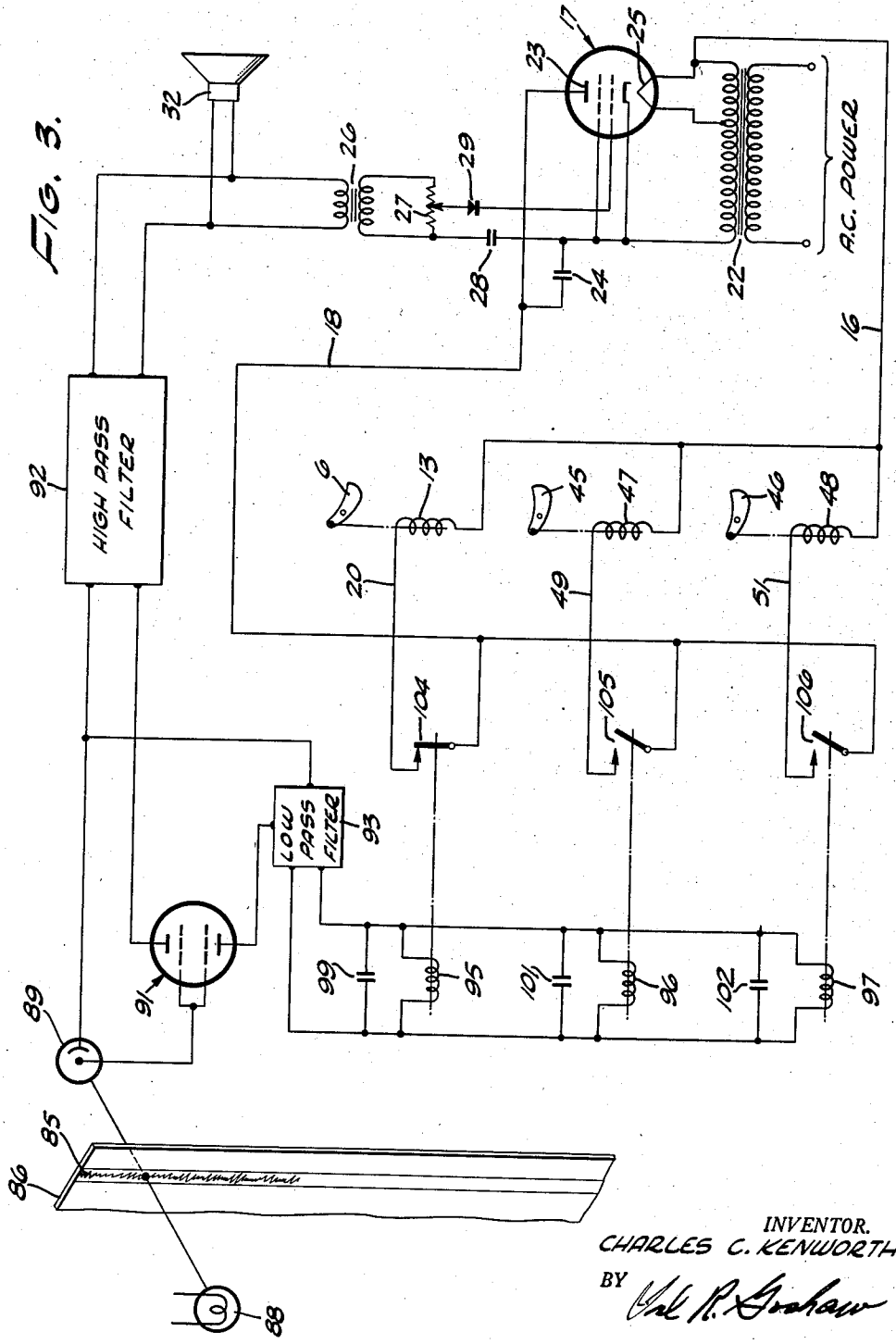
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FIG. 3.



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2,890,535

LIP ACTUATION OF DUMMIES BY ELECTRICAL SIGNALS

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Application May 2, 1955, Serial No. 505,354

1 Claim. (Cl. 40—28.3)

This invention relates to the actuation of the lip or lips of dolls, dummies, puppets, and the like, in synchronism with signals, such as voice or music, which have been translated into electrical currents.

The use of a solenoid which is energized with actuating currents to move an armature connected to the lips of a doll or dummy, together with a relay interposed between the current source and the solenoid is well known. United States Patents Nos. 2,247,329 and 2,270,142, show such systems, while United States Patent No. 2,700,250, shows a somewhat different construction for the same purpose. These systems are all directed to certain types of electrical circuits and mechanisms for controlling a single puppet.

The present invention is directed to a system which permits a sound record on a photographic or magnetic film to control one or more dummies, selecting the proper dummy and accurately moving its lip or lips in synchronism with the recorded dialogue or music. Any one or more of a number of dummies may be controlled simultaneously, the sound film or track itself doing the selecting. Also, a circuit is provided which not only obtains syllabilization of words but stabilization of operation at all times.

The principal object of the invention, therefore, is to facilitate the actuation of the lips of dummies to simulate speech or music.

Another object of the invention is to provide an improved method of and system for the synchronization between currents representing voice signals and the lips of a dummy.

A further object of the invention is to provide an improved system of controlling the selection of one or more dummies from a group of dummies and actuating the lips of the selected dummy or dummies from a single sound track.

The novel features which are believed to be characteristic of this invention, both as to the manner of its organization and the mode of its operation, will be better understood from the following description, when read in conjunction with the accompanying drawings, in which:

Fig. 1 is a diagrammatic drawing of one system embodying the invention;

Fig. 2 is a diagrammatic drawing of another system embodying the invention; and

Fig. 3 is a diagrammatic drawing of a third modification of the invention.

Referring now to the drawings wherein the same numerals identify the same elements, and particularly to Fig. 1, a dolly, dummy, or puppet head 5 is shown having a movable lower lip or jaw 6 pivoted at 7 and connected to a rod or wire 8 at 9. The rod 8 is connected to an armature 12 of a solenoid 13, energization of the solenoid moving the lip 6 in synchronism with voice currents. Energy is impressed on the solenoid 13 over conductor 15, conductor 16, thyratron tube 17, conductor 18, swinger 19, and conductor 20. The thyratron

17 is connected to an A.C. power source over transformer 22 which energizes its filament 25 and anode 23 over condenser 24.

The input to the thyratron is over a matching transformer 26, amplitude adjusting resistor 27, condenser 28, and rectifier 29, the latter improving operation by stabilizing the circuit. The primary of transformer 26 is connected to the output of an amplifier 31 across which is bridged a speaker 32 in which the voice currents are translated into sound waves. The input of amplifier 31 is connected to a photoelectric cell 33 or to a magnetic reproduce head 34. This permits a sound track 36 on a perforated film 37 to be either photographic or magnetic. If the track is photographic, an exciter lamp 38 is used with cell 33. The film 37 is notched along one edge, adjacent which is a microswitch 40 having a roller 41 adapted to be moved into and out of the notches to make and break an electrical contact in series with a D.C. power supply and a coil 42 of a relay 43.

In addition to the puppet head 5, two other heads are illustrated solely by their lower lips 45 and 46 and their actuating solenoids 47 and 48, respectively. Lips 45 and 46 are actuated when the thyratron 17 is connected to solenoids 47 and 48 over respective conductors 49 and 51 when the swinger 19 is connected thereto. This system permits the automatic selection of the puppet to be actuated and actuates the selected puppet as now will be described.

The sound track 36 has three different voices recorded thereon and at the beginning and end of each voice sequence, the film is notched with either one or two notches. One notch will move the swinger 19 a distance of one contact, and two notches will move the swinger a distance of two contacts. Thus, the thyratron 17 can be switched to any one head as the sound track is being reproduced by speaker 32 and the lip of the head is moved according to the voice currents as rectified and triggered by rectifier 29 and thyratron 17, respectively. If desired, the swinger 19 may be manually manipulated to select any head to be activated.

Referring now to Fig. 2, the same thyratron 17 with its transformers 22 and 26 are shown along with loud speaker 32, amplifier 31, photocell 33, and exciter lamp 38. It is to be understood that the photographic sound track 53 on film 54 could also be magnetic as in Fig. 1. Three heads are represented by the lips or jaws 6, 45, and 46, and solenoids at 13, 47, and 48, respectively, as in Fig. 1. In this modification, a relay 56 with its coil 57 is used to control the connection of solenoid 13 to thyratron 17, a relay 58 with its coil 59 is used to control the connection of the thyratron 17 to solenoid 47 and relay 61 with its coil 62 is used to connect the thyratron 17 to solenoid 48. The relays 56, 58, and 61 close switches 64, 65, and 66, respectively, when momentarily energized and open them when next momentarily energized.

The energy pulse for the relays may be obtained in several suitable ways, the one shown in Fig. 2 being lamps 68, 69, and 70, the light from which is reflected by light reflective paint or patches such as shown at 71, 72, 73, and 74, to respective photocells 76, 77, and 78. The pulses are amplified in respective amplifiers 79, 81, and 82. To select a head to be actuated, a patch is placed at the beginning of a sound sequence for that head at a certain transverse position on film 54 to actuate the relay and close its switch controlling that head. At the end of the sound sequence for that head, another patch is placed at the same transverse position on the film, this patch disconnecting the head from the thyratron by opening the switch. Since each set of lamps

and cells are effective for patches at different positions transversely of film **54**, each of switches **64**, **65**, and **66** are independently controlled. Furthermore, this modification lends itself to permitting any one or more of the lips to be actuated simultaneously since all switches may be closed over the same period of time the sound is being reproduced at **32**. Thus, group singing of the heads may be simulated.

Referring now to Fig. 3, again the thyratron and speaker circuits are the same as in Figs. 1 and 2. Also, the same heads and solenoids are shown. In this system, all selection controls are embodied in the sound track **85** of a narrow film **86** which could be an 8 mm. photographic film or a ¼ inch magnetic non-perforated tape. As shown, the film is photographic with its exciter lamp **88** and photocell **89** connected to an amplifier **91** which feeds a high-pass filter **92** connected to speaker **32** and transformer **26** and to a low-pass filter **93**. The output of filter **93** is connected to relays **95**, **96**, and **97**, each of which is tuned by the inductance of its winding and respective shunting condensers **99**, **101**, and **102**, to a different acceptance frequency. The relays may be the momentary type as shown in Fig. 2 or of the simple holding type whereby to maintain their respective contacts **104**, **105**, and **106** closed, they are energized with a constant tone.

This modification functions by the use of three control tones such as 30, 40, and 50 c.p.s., each tone energizing a respective relay **95**, **96**, and **97**. That is, a tone is recorded at the beginning and end of a sequence, this tone passing filter **93** but not filter **92** to close one of the contacts **104**, **105**, or **106**, provided the relays are of the momentary type. If not of this type, the tone may be only at the beginning of a sequence and maintained throughout the sequence to hold the desired contact closed. This system also permits one or more lips of one or more heads to be actuated from a narrow film not suitable to carry reflective light patches or to be notched.

The above system, therefore, permits manual or automatic selection of one or more heads from among several and to thus provide dialogue and group voices as desired for dolls, dummies, puppets or animals. Furthermore, although only three heads have been used for illustration, it is to be understood that any number of heads can be added and controlled in the same manner. Furthermore, the actuating of the lips may be through the manipulative strings or wires of a puppet. The particular rectifier-thyratron circuit illustrated is especially effective to permit perfect syllabilization of words from voice signals. Although the invention has been illustrated in connection with film sound records of the photographic and magnetic types, it is to be understood that other types of signal sources may be used, such as phonograph records of the disc type or microphones.

I claim:

In a system for actuating the lips of one or more of a plurality of dummies one at a time or in any combination the improvement comprising means for generating electric signal currents representing the voices of said dummies transducer means for reproducing said signal currents as sound waves, an individual solenoid for the movable lip of each dummy, other means responsive to said signal generating means for energizing said solenoids, selecting means including a filter associated with said signal generating means for selecting the solenoid or solenoids to be operated, said selecting means also including frequency responsive relay means and switch means connecting the solenoid or solenoids to said other means, said other means including a thyratron and a series connected rectifier combination to provide stabilization and syllabilization of the lip or lips of said dummies in accordance with the amplitude of said signal currents and the connection made by said selecting means.

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