

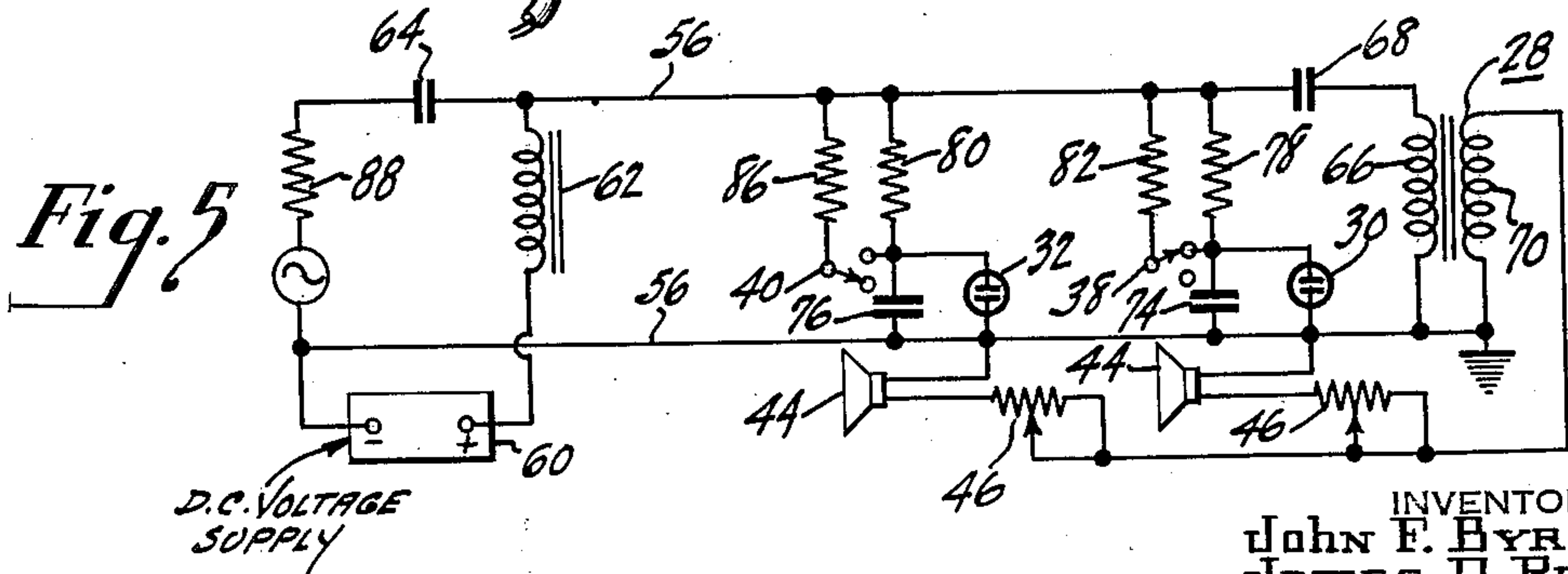
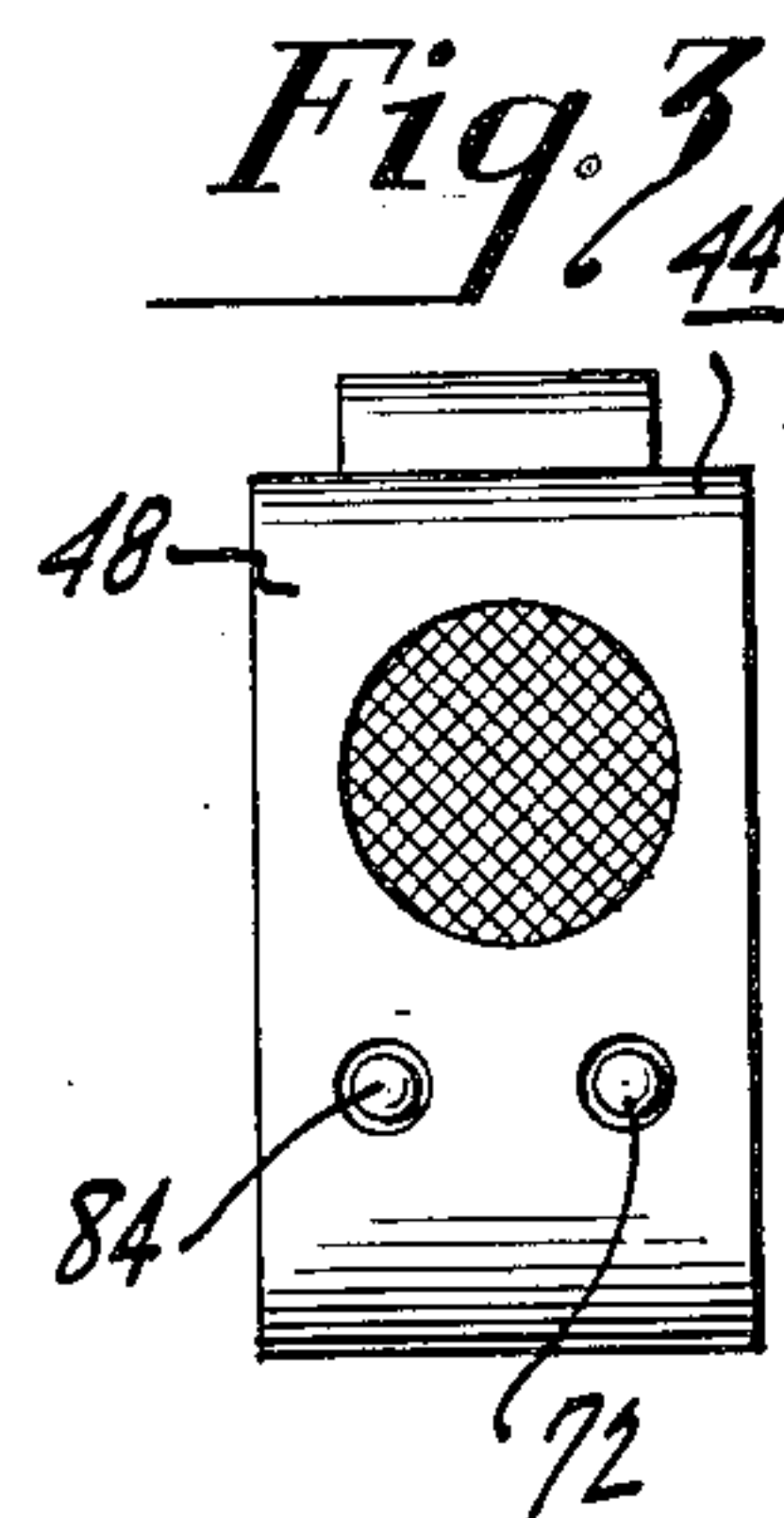
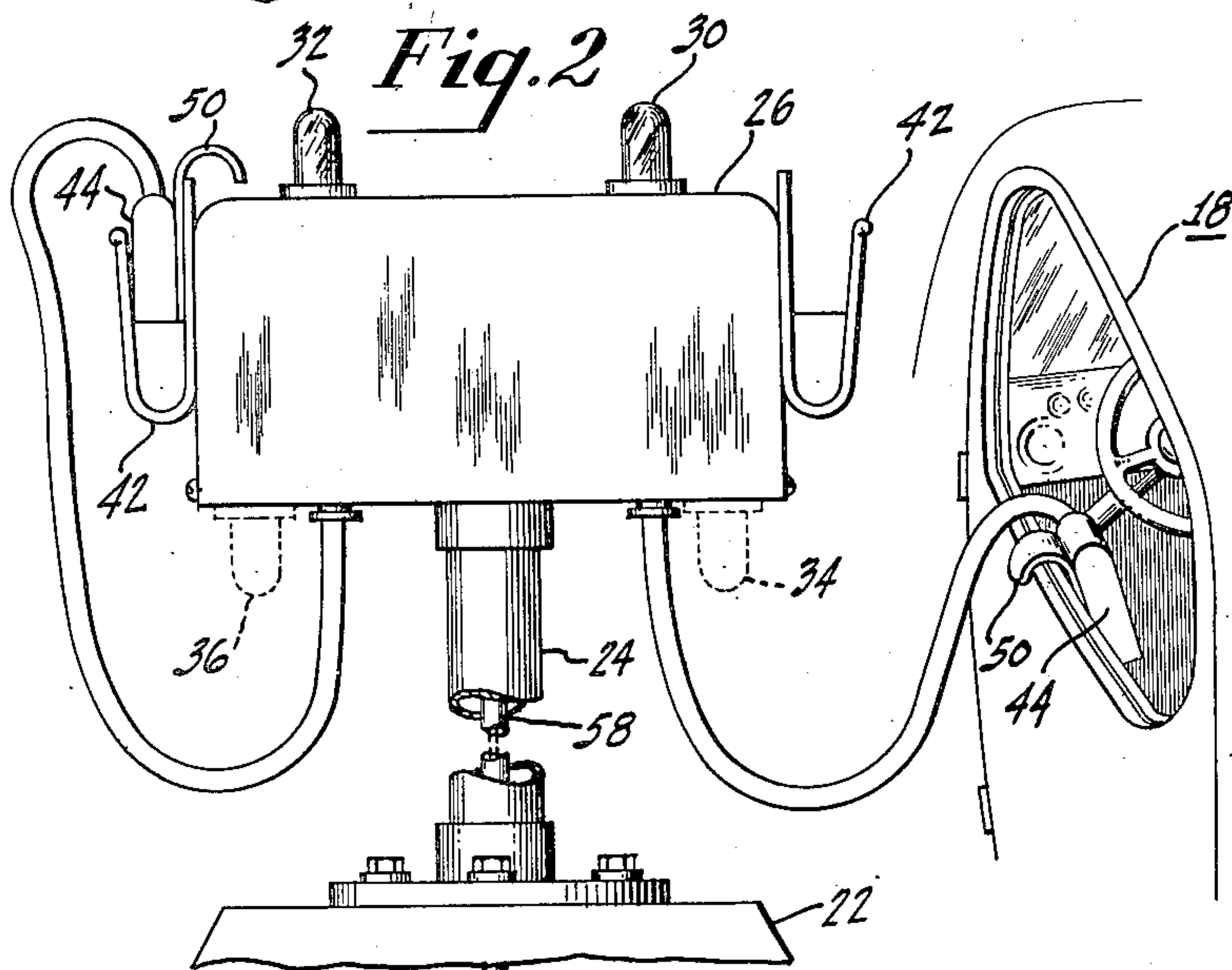
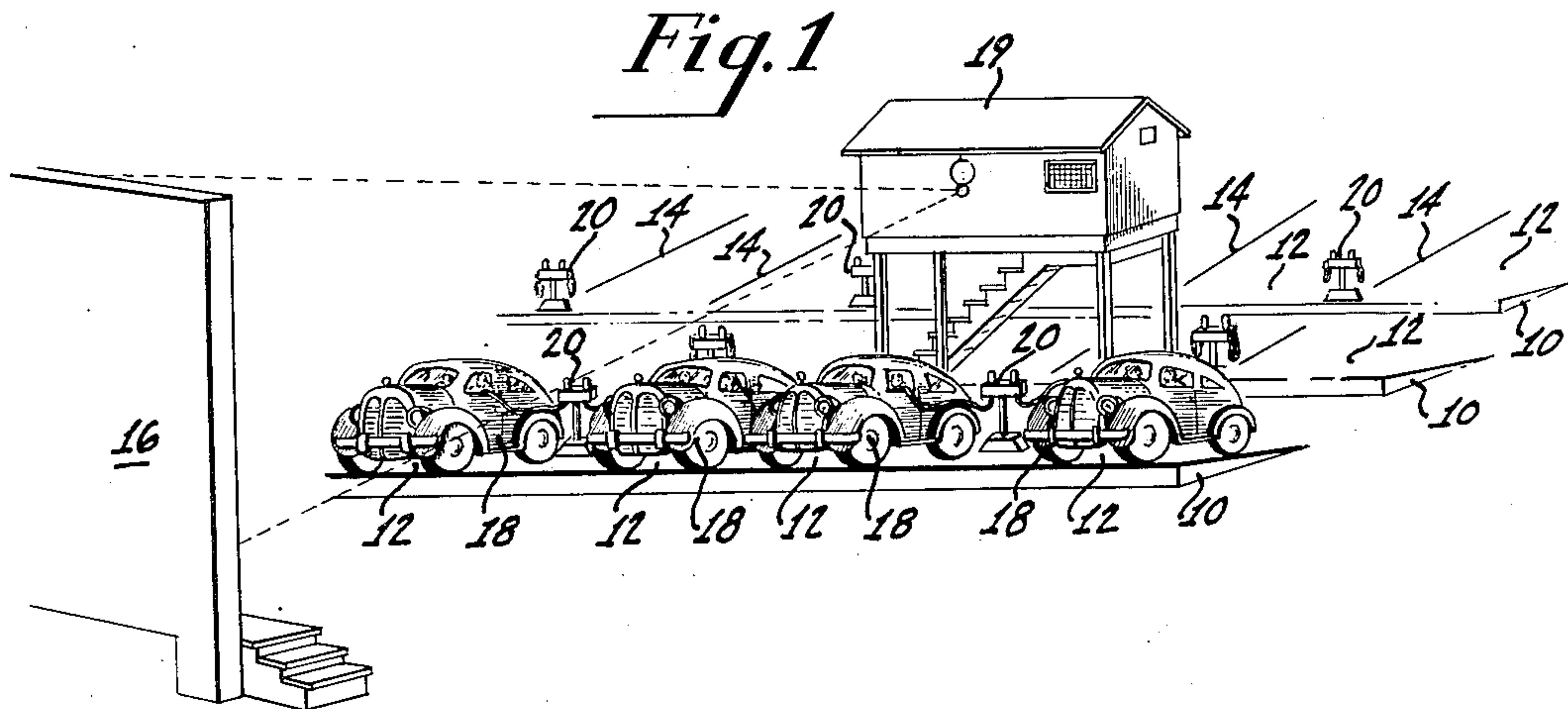
Feb. 24, 1953

J. F. BYRD ET AL  
ILLUMINATION AND SIGNALING SYSTEM  
FOR DRIVE-IN THEATERS

2,629,780

Filed March 31, 1949

2 SHEETS—SHEET 1



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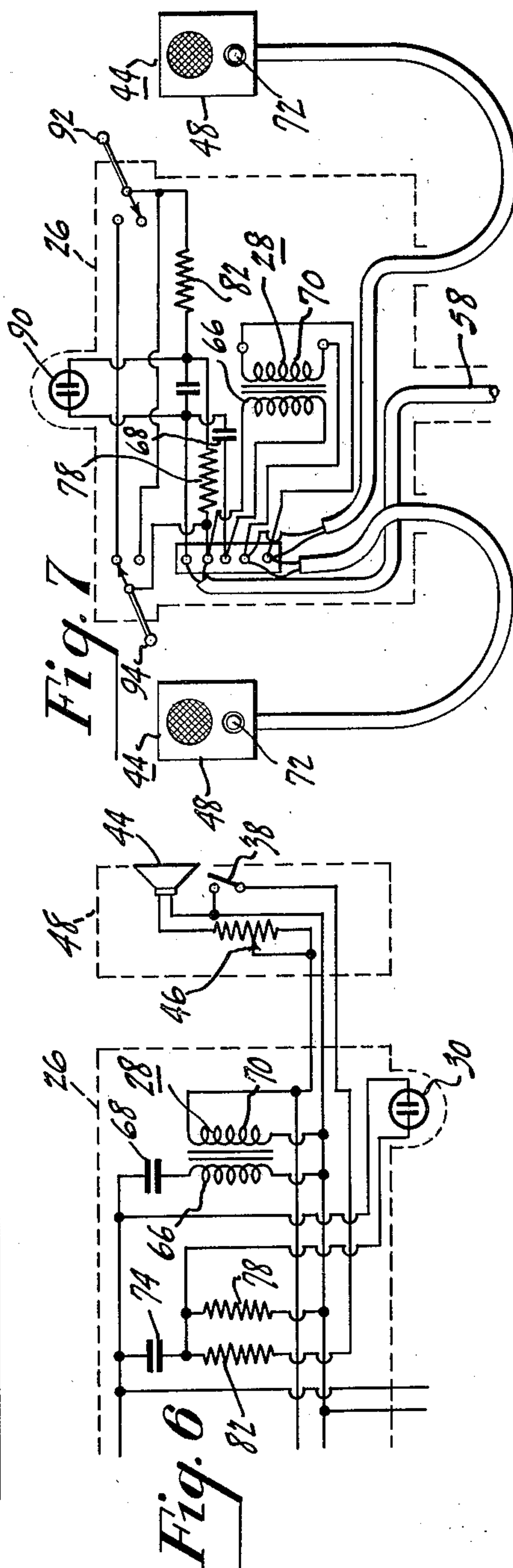
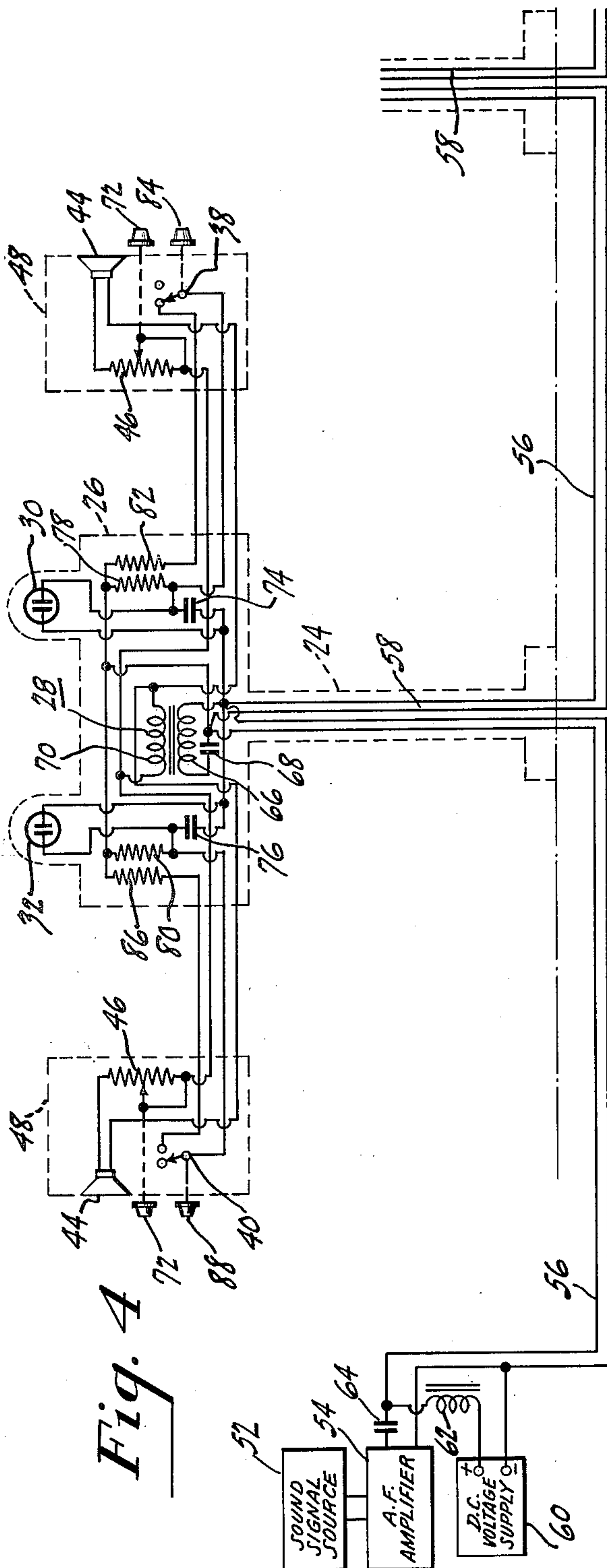
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2 SHEETS—SHEET 2



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## UNITED STATES PATENT OFFICE

2,629,780

ILLUMINATION AND SIGNALING SYSTEM  
FOR DRIVE-IN THEATERSJohn F. Byrd, Ashland, and James D. Phyfe,  
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Application March 31, 1949, Serial No. 84,703

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This invention relates to illumination and signalling systems, and more particularly to a novel illumination of signalling systems for arenas, amphitheatres, and the like, such as the so-called open-air "Drive-In" theatres.

Theatres of this type, for the exhibition of motion pictures, generally comprise a series of arcuate ramps divided into parking stallways arranged to face an elevated screen at a central point which may be the focal point of the ramps. The ramps are so inclined with respect to the screen that, when automobiles are parked thereon, the occupants thereof can view the screen through the windshields. Such a theatre is shown, for example, in U. S. Patent No. 1,909,537 granted to R. M. Hollingshead, Jr.

For the exhibition of talking motion pictures, a sound distributing system is, of course, necessary to go with the action portrayed on the screen. Various forms of loudspeaker arrangements have been suggested heretofore, among which is an arrangement of loudspeakers behind the screen; mounting individual speakers at each stallway to face the radiators of cars parked therein; and mounting portable loudspeakers between stallways so that the patrons can lift the loudspeakers into the cars. One such system is described and claimed in a patent to James D. Phyfe (Patent No. 2,469,986, issued May 10, 1949), and entitled "Sound Distributing System."

Since "Drive-In" theatres function for the most part at night, any illumination other than that from the performance serves to divert the attention of the audience and detract considerably from the enjoyment of the performance. However, for the maintenance of safety and for the guidance of the cars, some illumination at the parking stalls to which the cars are driven and in which they are parked during the performance must be maintained. Furthermore, in order to prevent cars from colliding with the supporting members upon which loudspeakers are mounted, these supporting members should also be illuminated.

For the convenience of the patrons of the drive-in theatre, refreshments are sold by concessionaires to be partaken during the performance. Heretofore, to obtain these refreshments, either the patron would leave his car to go to the refreshment stand or the concessionaire would carry the refreshments about the area of the theatre calling out his wares. Either system is a nuisance to the parties involved. Signalling by the patron to the concessionaire by flicking his

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bright lights off and on is an annoyance to other patrons.

The wiring required for the installation of an illumination system and a signalling device at each automobile stall in a "drive-in" theatre is expensive and has been a deterrent in their installation. A preferred system is one in which the functions of signalling and illumination are combined and which, as far as possible, utilizes the existing wiring in the theatre.

It is therefore an object of our invention to provide an illumination signalling system for open air theatres and the like.

It is another object of our invention to provide an inexpensive illumination and signalling system for open air theatres and the like.

It is a further object of our invention to provide a combined illumination and signalling system which may have general utility.

It is still a further object of our invention to provide an illumination and signalling system which requires a minimum of additional wiring.

We achieve these and other objects in accordance with our invention by mounting at least one glow lamp at every sound reproducing station and a control switch on each speaker housing. Power to the lamps is supplied through the existing sound distributing system but this power does not interfere with audio signals in the sound distribution system. The control switch will either cause the lamp to glow continuously or to flicker at a predetermined rate, thus constituting a signal.

The novel features of our invention, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description of several illustrative embodiments thereof when read in connection with the accompanying drawings in which:

Figure 1 is a fragmentary, perspective view of an outdoor theatre provided with an illuminating signalling system at sound reproducing stations in accordance with our invention,

Figure 2 is an enlarged, detailed view showing a sound reproducing station and the manner in which illumination and signalling lamps may be mounted thereon,

Figure 3 is a front elevation of a loudspeaker housing showing the location of the signalling switch thereon,

Figure 4 is a schematic diagram of one embodiment of our invention in combination with a sound distributing system,



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Figure 5 is a schematic diagram of a second embodiment of our invention in combination with a sound distributing system,

Figure 6 is a schematic diagram of a third embodiment of our invention in which three wires are connected to the speaker housing, and

Figure 7 is a schematic diagram of a fourth embodiment of our invention in which one lamp is controlled at a sound reproducing station by either of two switches.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout, there is shown, in Figure 1, an outdoor theatre provided with a plurality of parking ramps 10 each divided into a plurality of adjacent stallways 12 by suitable boundaries, such as markers 14. The ramps 10 may be inclined upwardly toward a screen 16 so that occupants in automobiles 18 parked in the stallways 12 will have a clear view of the screen 16 through their respective windshields. Moving pictures or the like are projected into the screen 16 from a projection booth 19 in well known manner.

For the purpose of distributing sound related to the action portrayed on the screen uniformly throughout the entire theatre, at alternate boundaries 14 are provided suitable sound reproducing stations 20 each having a pair of loudspeakers in association with the adjacent two stallways. Each sound reproducing station 20 comprises a concrete or other suitable base 22 from which rises a tubular supporting standard 24 supporting a junction box 26 within which are usually housed the loudspeaker coupling transformer 28 together with a terminal strip upon which are mounted the required network components in a manner well known in the art.

At the top of the junction box 26 and at its opposite ends adjacent the stallways 12 are mounted two glow lamps 30, 32. By glow lamp is meant that type of lamp which is suitable for use as a component of a relaxation oscillator network and which radiates sufficient illumination to be utilizable for purposes of illumination. Neon or argon filled lamps are common examples of glow lamps which may be used. The glow lamps 30, 32 if desired, may be mounted on the underside of the junction box 26 as shown by the lamps 34, 36 drawn in dashed lines. This casts more of the light downward on the stall. These glow lamps serve either as illumination or as a signalling device, either condition being selected by the control switches 38, 40.

Secured to the junction box 26, at the opposite ends thereof and alongside the adjacent stallways, are a pair of wire baskets or other suitable receptacles 42 each of which removably receives a loudspeaker 44. The loudspeakers are preferably of the electrodynamic type and include a volume control 46 and one control switch on the front panel of the loudspeaker housing 48. Each loudspeaker housing 48 is also provided with a mounting bracket 50 by means of which the loudspeaker may be mounted on the window frame of an automobile 18 with the loudspeaker 44 inside the car, as shown to the right of Fig. 2. The junction box 26 is of such a length that it extends into fairly close proximity with the automobiles properly parked in the adjacent stallways, so that the occupants of the cars can easily reach the loudspeakers by merely extending their arms out of the windows. Similarly, the loudspeakers may be replaced in their receptacles 42 from within the car through the open window thereof.

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Figure 3 shows a loudspeaker 44 enclosed in a loudspeaker housing 48 of the weather protective type with suitable openings so that the sound from the loudspeaker can be heard. Mounted in the housing 48 are a volume control for the loudspeaker and a control switch for the illumination and glow lamp controlled from the exterior of the housing by a volume control knob 72 and a control switch knob 84.

Figure 4 shows a schematic diagram of a sound distributing system in combination with my invention, wherein the wires of the sound distributing system are utilized for power distribution to an illumination and signalling system. A sound signal source 52 such as a microphone or recording, supplies audio signals to an audio frequency amplifier 54 which amplifies these signals and impresses them on a transmission line 56. The transmission line 56 runs underground and supplies a feeder cable 58 at each sound reproducing station. The feeder cable 58 extends through the tubular standard 24 (shown in dashed lines in Fig. 4), into junction box 26 (also shown in dashed lines in Fig. 4). A direct current voltage supply 60 is also connected to the transmission line 56 through an audio frequency choke 62. The choke 62 is used for the purpose of substantially blocking the audio frequency signals from the direct current source 60. A condenser 64 is used to substantially block direct current from the audio frequency amplifier 54. Therefore by means of the transmission line 56 a direct current voltage and an audio frequency voltage are simultaneously made available at every sound distributing station junction box 26. Feeder cable 58 inside the junction box 26 connects to the primary 66 of loudspeaker coupling transformer 28 through a condenser 68. The condenser 68 besides blocking the direct current from the primary 66, is selected to have a value such that it, together with the primary 66, form a high pass filter having a cut-off frequency at 70 cycles.

Each loudspeaker 44 is connected through its respective volume control 46, in parallel with the secondary 70 of transformer 28. The respective volume controls 46, are varied by turning the respective knobs 72 located on the outside of the respective loudspeaker housings 48 (here drawn in dashed lines).

The glow lamps 30, 32 are respectively connected in parallel with the condensers 74, 76. A resistor 78 is connected in series with the condenser 74 and the glow lamp 30. Another resistor 80 is also connected in series with condenser 76 and glow lamp 32. These series parallel combinations are both connected across the feeder cable 24 from which they receive a direct current voltage. Each of the series parallel combinations will readily be recognized as a relaxation oscillator network in which the glow lamp will flash at a rate determined by the time constants of the series resistor and parallel condenser. The time constants of the combination of the resistor 78 and the condenser 74, as well as the combination of the resistor 80 and the condenser 76, are chosen to be somewhat lower than 70 cycles per second whereby the oscillations will not pass by the primary 64 of the loudspeaker matching transformer 28 in view of the high pass filter made by the primary 64 and the condenser 68. A resistor 82 is connected in series with the control switch 38 and this series combination is connected in parallel with the resistor 78. The control switch 38 is located in the loudspeaker housing 48 and is controlled by the



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knob 34 on the loudspeaker housing 48. Closing the switch 38 places the resistor 82 in parallel with the resistor 78.

The value of the resistor 82 is chosen sufficiently low so that the time constant of the R-C circuit of the relaxation oscillator is reduced below the point of oscillation whereby the glow lamp 30 will remain illuminated and will not flicker. Switch 38 can therefore be operated to change glow lamp 30 to either a substantially steady state condition or to a flickering condition. A resistor 86 and the switch 40 controlled by the knob 38 are similarly connected in series with each other and in parallel with the resistor 80. The value of the resistor 86, as is the value of the resistor 82, is chosen so that operation of the switch 46 from open to close will cause the glow lamp 32 to pass from a flickering condition to a steady state condition. The value of the resistors 82, 86, while chosen to be low enough to effectively halt the oscillations of their respective circuits are still selected high enough to protect the glow lamps 30, 32 from a burn out due to a high direct voltage being applied across their terminals.

The control switches 38, 40, are normally closed whereby the glow lamps 30, 32 radiate a substantially steady illumination. The concessionaire will usually post an observer on some point of vantage in the theatre from which he can see the entire field. Any patron who operates a control switch to the open condition causes the glow lamp associated with his parking stall to flicker. The observer reports the location of the flickering glow lamp to the concessionaire who can then readily serve that patron, without any others being disturbed or inconvenienced.

The wiring system shown in Fig. 5 is similar to that described for Fig. 4, but is a simplified modification in that one side of the transmission line 56 and of the loudspeaker coupling transformer 28 is grounded. The audio signal source 52 has its characteristic impedance represented by resistor 88. The other components are similarly numbered and function the same as is described in Figure 4.

Figure 6 shows the connections required when it is desired to run only a three wire cable between the junction box and the loudspeaker housing. The apparatus shown in Figure 6 functions in the same manner as was above described for Figure 4. One wire is eliminated by connecting in common one side of the primary 66 and the secondary 70 of the loudspeaker transformer 28 and by using the common lead as the connection between switch 38 and resistor 82.

Figure 7 shows a single glow lamp 90 controlled by two control switches. The control switches 92, 94 are mounted on either end of the junction box 26 (drawn in dashed lines) adjacent each of the parking stalls. The switches 92, 94 are connected in parallel with each other and in series with resistor 78, so that when either switch is opened glow lamp 90 is caused to flicker. The switches 92, 94 if desired may be mounted on the loudspeaker housing as shown in Figure 4, instead of on the junction box as shown in Fig. 7.

We have herein shown and described a lighting and signalling system which uses the existing distribution wires of a sound distributing system and operates independently of the audio signals in the sound distribution system. Another modification of our system is to connect the control switch so that upon closing it shorts out a sufficient portion of the relaxation oscillator circuit to effec-

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tively halt oscillations. Also the switch may be placed in series with the condenser so that, upon closing, the condenser will be in parallel with the glow lamp which then commences to flicker.

Although some modifications of our invention have been shown, it will be apparent to those skilled in the art that many other variations and embodiments thereof are possible. We therefore desire that the foregoing shall be taken merely as illustrative and not in a limiting sense.

What we claim is:

1. In a combined sound distributing and signalling and illumination system for an outdoor theater, the combination of transmission lines to distribute sound signals to sound reproducing stations, each of said sound reproducing stations comprising a junction box and a pair of loudspeakers mounted on said junction box for ready removal therefrom, each of said loudspeakers having a protective housing, a pair of glow lamps mounted on said junction box, and a control switch mounted on each of said loudspeaker housings, said switches being electrically coupled to said glow lamps to control their illumination for signalling, means to impress direct current electrical energy to illuminate said glow lamps upon said transmission lines, and means to isolate the glow lamp illuminating energy from said loudspeakers.

2. In a combined sound distributing and signalling and illumination system for an outdoor theater, the combination of a sound signal source, and transmission lines to distribute sound signals from said source to sound reproducing stations, each of said sound reproducing stations comprising a junction box and a pair of loudspeakers mounted on said junction box for ready removal therefrom, a glow lamp mounted on said junction box, and at least one control switch mounted on said junction box, said switch being electrically coupled to said glow lamp to control said glow lamp illumination for signalling; means to impress direct current electrical energy to illuminate said glow lamp upon said transmission lines, and means to isolate the glow lamp illuminating energy from said sound signal source and said loudspeakers.

3. The combination with a sound distributing system for an outdoor theater having a sound signal source and transmission lines to distribute sound signals from said source to sound reproducing stations, of means to impress direct current energy upon said transmission lines, means to isolate said sound signal source from direct current energy and illumination and signalling means at each of said sound reproducing stations comprising a relaxation oscillator network including a glow lamp and a resistor connected in series with said glow lamp, said resistor and said glow lamp being connected across said transmission lines, and a control switch coupled in parallel with said resistor to be operable to determine the rate of oscillation of said relaxation oscillator network.

4. In a sound distributing system for an outdoor theater, a sound reproducing station comprising a junction box, a pair of loudspeakers mounted on said junction box for ready removal therefrom, a relaxation oscillator network including a glow lamp and a frequency of oscillation determining element connected to said lamp, said glow lamp being mounted on said junction box, means to apply direct current exciting energy to said network, and at least one control switch electrically coupled with



said frequency determining element to be operable to determine the rate of oscillation of said relaxation oscillator network, said control switch being mounted on said junction box.

5. In a sound distributing system for an outdoor theater, a sound reproducing station comprising a junction box, a pair of loudspeakers mounted on said junction box for ready removal therefrom, at least one relaxation oscillator network including a glow lamp and a resistor connected in series with said glow lamp, said glow lamp being mounted on said junction box, means to apply direct current exciting energy to said network, and a pair of control switches, said switches being respectively mounted to be removable with each of said loudspeakers, each of said switches being coupled in parallel with said resistor to be operable to determine the rate of oscillation of said relaxation oscillator network.

6. The combination with an outdoor theater, sound distribution system having a sound signal source, a plurality of sound reproducing stations, and transmission lines connecting said sound signal source to said sound reproducing stations, of means for illumination and signalling at each of said stations comprising at least one glow lamp, means to impress direct current energy upon said transmission lines to illuminate said glow lamp, a resistor and a condenser connected in series combination, said series combination being coupled across the transmission line connected to said station, said glow lamp being connected across said condenser whereby a relaxation oscillator is formed and said glow lamp flickers at a rate determined by the time constants of said series combination, and switch means to decrease the time constant of said series combination to a value at which the glow lamp will have substantially steady illumination.

7. The combination with an outdoor theater sound distributing system having a sound signal source and transmission lines distributing said sound signals to sound reproducing stations, of means to impress direct current energy upon said transmission lines, means to isolate direct current energy from said sound signal source, and an illumination and signalling system at each of said stations comprising a glow lamp, a first resistor and a condenser in series combination, said series combination being connected across said transmission lines at said station, said glow lamp being connected in parallel with said condenser whereby said glow lamp and said series combination form a relaxation oscillator, said first resistor and condenser values being selected to cause said glow lamp to oscillate at a visible rate, a second resistor having a resistance value which is low compared to said first resistor value, and a switch connected in series with said second resistor, said series connected switch and second resistor being connected in parallel with said first resistor, whereby closing said switch causes said glow lamp to have a substantially steady illumination and opening said switch causes said glow lamp to flicker at a rate determined by the time constant of said first resistor and condenser.

8. The combination with an outdoor theater sound distributing system having an audio signal source and transmission lines distributing said audio signals to loudspeaker coupling transformers and loudspeakers connected thereto located at sound reproducing stations, of an illumination and signalling system at each of said stations comprising a glow lamp, a first re-

sistor and a condenser in series combination, said series combination being connected across said transformer primary, said glow lamp being connected across said condenser whereby said glow lamp and series combination form a relaxation oscillator, said first resistor and condenser values being selected to cause said glow lamp to oscillate at a visible rate, a blocking condenser between said transformer primary and said series combination, a second resistor having a resistance value which is low when compared to said first resistance value, and a switch connected in series with said second resistor, said series connected switch and second resistor being connected in parallel with said first resistor whereby closing said switch causes said glow lamp to have a substantially steady illumination and opening said switch causes said glow lamp to have a flickering illumination determined by the time constant of said first resistor and condenser.

9. The system recited in claim 8 wherein the value of said blocking condenser is selected so that in combination with said output transformer primary a high pass filter is provided having a frequency cut-off at approximately 70 cycles.

10. A signaling system for use in a drive-in theater wherein a pair of conductors are provided for distributing audio signals from an amplifier to loud speakers distributed throughout the theater comprising in combination a source of direct current power, means for connecting said direct current power source to said conductors including audio chokes for preventing the flow of audio signals from said amplifier through said conductors to said source of direct current power, direct current blocking condenser means for blocking the flow of direct current from said source to said speakers, light means distributed throughout said theater, and means for connecting said light means to said conductors.

11. In a drive-in theater, amplifier means for audio signals, a plurality of speakers, a two-wire distributing system for connecting said speakers to said amplifier means, a concession signal light adjacent each of said speakers, a source of direct current power, means for connecting said source of direct current power to said two-wire distributing system including audio choke means for preventing the flow of audio signals from said two-wire distributing system to said power source, direct current blocking condenser means in said two-wire distributing system for preventing the flow of direct current from said power source to said amplifier means, direct current operated signal means, and means for connecting said signal means to said two-wire distributing system.

12. In a drive-in theater, an amplifier for audio signals, a plurality of loud speaker stations, each of which comprises a transformer having a primary coil and a secondary coil, circuit means for connecting said primary coil to the output circuit of said power amplifier, a plurality of speakers, means for connecting at least one of said speakers to each of said secondary coils, a source of direct current power, means for connecting said direct current power to said output circuit at a given point including audio choke coils for preventing the flow of audio signals from said amplifier to said power source, blocking condenser means in said output circuit between said amplifier and said given point for



preventing the flow of direct current from said power source to said amplifier, blocking condensers in said output circuit at each of said speaker stations for blocking the flow of direct current from said power source to said transformers, a plurality of lights at said speaker stations, circuit means for connecting said light to said output circuit in parallel with one another at a point ahead of said last-named blocking condensers, and switch means in series with one of said lights for controlling the flow of current to said one light.

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JAMES D. PHYFE.

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