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SOUND SYSTEM FOR OUTDOOR THEATERS

Filed Feb. 16, 1959

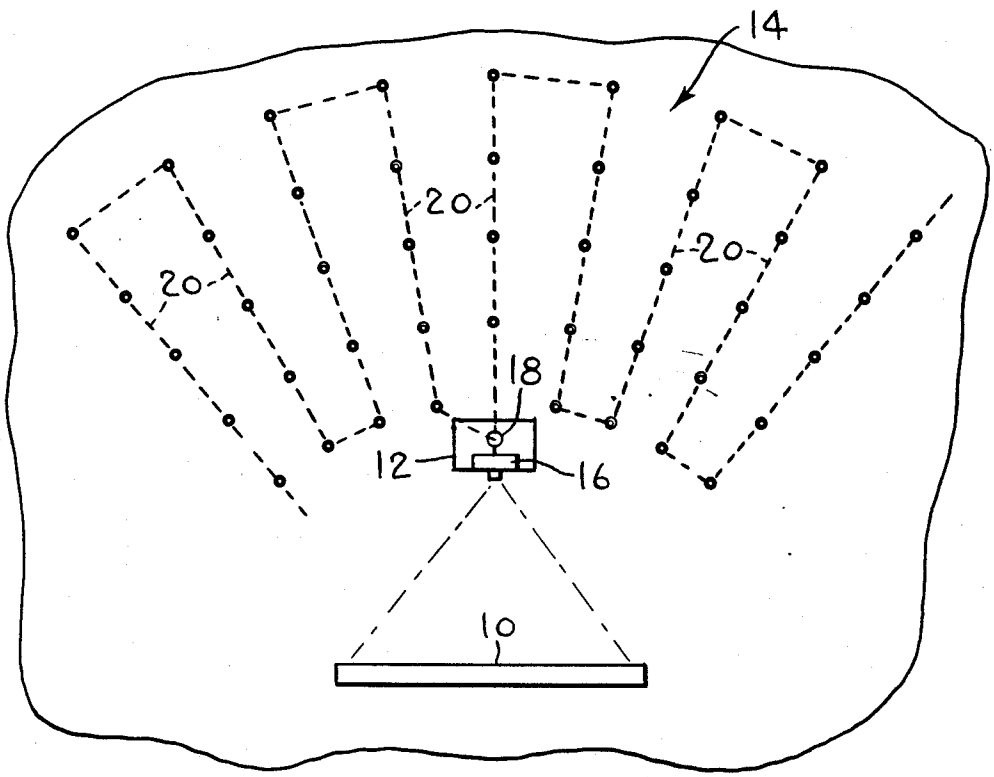


FIG. 1

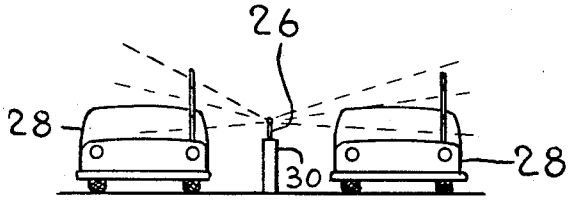


FIG. 2

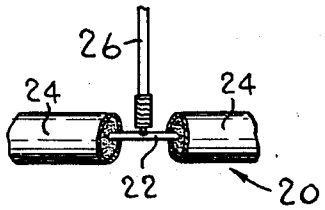


FIG. 5

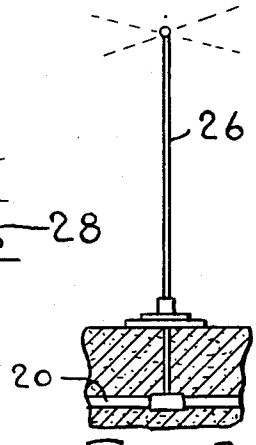


FIG. 3

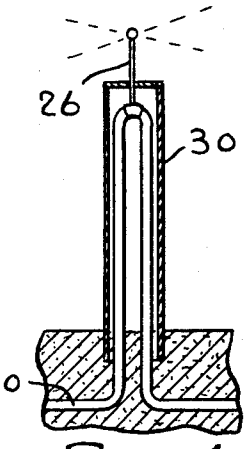


FIG. 4

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SOUND SYSTEM FOR OUTDOOR THEATERS

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This invention relates to apparatus for distributing sound to automobiles at outdoor theaters and more particularly to an improvement of the apparatus described and claimed in my co-pending application Serial No. 657,285, filed May 6, 1957, now U.S. Patent No. 2,979,-607.

The usual sound system employed in outdoor theaters utilizes small speakers which are notable primarily for the poor quality of sound produced and their high maintenance and replacement costs. In my co-pending application referred to above I disclose an improved sound system wherein the audio portion of the moving picture is transmitted as a radio signal on a frequency within the standard broadcast band for reception by the individual automobile radios of the theater patrons. Thus, the individual speakers and their attendant disadvantages are eliminated. There arises the problem, however, of controlling the radiation of the radio signal so as not to extend it beyond the immediate vicinity of the outdoor theater. The primary object of this invention, therefore, is to provide an improved outdoor theater sound system wherein the extent of radiation can be very closely controlled and limited.

In my improved arrangement the audio portion of the moving picture is transmitted as a radio signal by a shielded non-radiating type cable to the individual parking stalls of the outdoor theater. The cable is run underground and because of its construction will not itself act as an antenna to transmit the radio signal into the surrounding area. At each stall or between adjacent stalls a small antenna is attached to the inner conductor of the cable through the cable shield to radiate a signal in a small area for reception only by cars parked in the stalls immediately adjacent the small antennas. Such an arrangement provides good reception when the car is parked in the stall but radiation will not extend beyond the immediate vicinity (10 to 12 feet) of the antenna. Thus, any undesirable radiation of the signal which could be received by cars on the highway passing the theater, for example, or by radios in homes on neighboring properties is eliminated.

Other objects and advantages will be pointed out in, or be apparent from the specification and claims, as will obvious modifications of the two embodiments shown in the drawings, in which:

FIG. 1 is a partially schematic lay-out of an outdoor theater with a sound distributing system embodying my invention;

FIG. 2 is a partially schematic view of a pair of adjacent parking stalls served by a single antenna mounted between them;

FIGS. 3 and 4 show antenna arrangements for a new installation and an existing theater, respectively; and

FIG. 5 is a fragmentary view with parts broken away showing how the individual antennas are connected to the shielded cable.

Referring now to the drawings, FIG. 1 is a lay-out of a typical outdoor theater having a screen **10** on which the picture is projected from projection house **12** for viewing by the theater patrons in automobiles parked in a parking area **14**. The audio signal from the sound projector **16** ie fed into a transmitter **18** which converts the audio signal to a radio frequency signal in the standard broadcast band. The frequency will be selected so that there will be no interference from any broadcasting

stations operating in the particular locality of the outdoor theater.

The radio signal is transmitted to the parking area of the theater by means of a shielded non-radiating type cable **20** shown in dotted lines in FIG. 1. Cable **20** in its simplest form (FIG. 5) includes a conductor **22** for carrying the radio signal and a hollow shield **24** to prevent radiation of the signal from the conductor. Cables suitable for this purpose are known generally as coaxial transmission line cables. There are a number of such cables available commercially which could be used. One such cable which provides good results is identified by the standard designation RG62U. This RG62U cable has a characteristic impedance of 93 ohms and is constructed from a solid copper conductor enclosed in a braided shield of bare copper which in turn is covered with a vinyl plastic jacket. The solid copper conductor is insulated from the shield by semi-solid polyethylene plastic.

The lay-out of cable **20** in the parking area of the outdoor theater can be made in any suitable way depending on the particular arrangement of the parking stalls in the theater, the only object being to run the cable throughout the entire parking area of the theater. The cable is preferably run underground and, as shown in FIG. 2, it is laid out so that a small aerial **26** can be connected to it at points between each pair of adjacent stalls.

Antennas **26** may be made from any suitable material such as chrome-plated steel or copper for example. They are attached to conductor **22** of the cable (FIG. 5) and must be insulated from cable shield **24** as shown.

It has been found that by making the individual antennas **26** of a proper length (2 to 6 inches) the area of radiation can be confined to about ten or twelve feet from each antenna. The reception by radios in cars **28** parked within such area is good and clear but when the car moves out of the area the signal disappears. This arrangement, therefore, eliminates any problem of the radio signal being picked up by automobile radios outside the theater area or by radios in neighboring homes, for example.

In existing theaters utilizing individual speakers for sound distribution the speakers are usually mounted on a post located between a pair of adjacent stalls, each post having two speakers mounted on it. In such existing arrangements the coaxial cable can be extended up inside the mounting post **30** as shown in FIG. 4 and antenna **26** connected to it as shown. In new installations such a post is not necessary and an arrangement, such as shown in FIG. 3, can be used. Here aerial **26** is merely connected to the underground cable and positioned to extend a short distance above the ground for transmission of the signal in the immediate vicinity thereof.

Although two embodiments of the present invention have been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In an outdoor theater sound system, means including a motion picture projector for producing an audio signal, a transmitter to convert said signal to a radio frequency signal within the standard broadcast range, a shielded non-radiating cable connected to said transmitter and extending to the parking and viewing area of said outdoor theater, and a plurality of antennas connected to said shielded cable for radiating said radio signal only in the immediate vicinity of said antennas for reception by radios in automobiles parked in the immediate vicinity of said antennas.

2. An outdoor theater sound system according to claim

1 in which there is a single antenna for each two adjacent parking stalls in said outdoor theater, said antennas located between each pair of adjacent stalls.

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