Theater Engineering Conference

Lighting

Theater Dimmer*

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Summary—**The proper control of the intensity of the lighting in a theater is essential to the comfort and safety of the audience. The theater dimmer is the device which provides means of adjusting these intensities as required by the season of the year or the time of day. Of the various types of theater dimmers available, the autotransformer dimmer provides the most efficient and desirable unit for the small neighborhood theater. Units of large capacity are available, which will operate at high efficiency and low maintenance cost.**

THE THEATER DIMMER is usually associated with stage lighting. The production of a dramatic play or musical show requires a great variety of lighting instruments, each of which must be controlled in intensity by means of a theater dimmer. Thus the proper blending of colors and intensities produces the required balance of light and shade desired by the director. The neighborhood picture house is rarely equipped with a stage or any type of stage lighting. Therefore, it has been more or less assumed that the theater dimmer is unnecessary equipment.

The successful operation of a motion picture house depends first of all on the ability of the exhibitor to secure pictures which attract patrons to his theater. However, in order to maintain this patronage the exhibitor must provide features in his theater which promote the comfort and safety of his audience. With modern transportation facilities and the number of privately owned automobiles, people do not necessarily go to the nearest picture house if the same picture is playing in another house within a reasonable distance, and they know that they will be more comfortable and enjoy pleasanter surroundings in the more remote house. Therefore, to maintain his audience the manager installs the most comfortable seats that he can obtain, proper ventilation or air conditioning, and last but not least good lighting.

The problem of good lighting begins in the lobby and is carried all the way through the auditorium to the screen. Obviously, proper and

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adequate instruments and fixtures must be installed and correctly adjusted to give the desired distribution and balance of light. Next, the lighting in the house must be of the proper intensity to prevent eyestrain or discomfort when viewing the picture. The intensity of the lobby should be adjusted to eliminate any abrupt change from brilliant daylight to a dark interior. The transition from the outdoor intensity to the low level of picture lighting should be gradual and well balanced.

Adequate lighting in the corridors and ramps is essential to prevent those minor mishaps which can often be a considerable nuisance to the theater manager.

Adjustable Intensities Essential

The lighting intensities in these various locations should vary with the conditions such as the season of the year or the time of day or the type of outdoor weather. A warm, cheerfully illuminated lobby adds immeasurably to the pleasure and comfort of people entering the theater from the cold, rainy outdoors. On the other hand, a dim, cool light is refreshing when the weather outside is extremely hot and humid. The intensity of the picture lighting should vary with the picture being presented. High screen brilliancy should have a higher level of picture lighting than a low-intensity screen, otherwise the contrast may be objectionable and uncomfortable. It is only by the use of a theater dimmer that these adjustments in lighting intensities in the foyer, the corridors, and in the auditorium can be accomplished. The theater dimmer alone provides the means of accurately adjusting these intensities for any circumstances.

Types of Theater Dimmers

Three basic types of theater dimmers are available: the resistance, the autotransformer, and the reactance types.

The resistance-type dimmer, while the least expensive on initial installation, has the disadvantage that it must dissipate an appreciable amount of heat and consume a fair proportion of the wattage of the circuit when left in a dimmed position. Adequate ventilation must be provided to dissipate this heat and the loss of energy is expensive.

The reactance dimmer is the most expensive on initial installation, but it does operate at high efficiency and requires little or no maintenance. However, the cost for these installations is such that they are usually restricted to the very large presentation houses.

The autotransformer dimmer, is a relatively new device and is the most desirable unit for the small neighborhood theater. This type

of dimmer is essentially a transformer having a variable output voltage from zero to full line voltage. Because of the transformer action, the output voltage is independent of the load connected to the dimmer. For instance, a single unit of 4000 watts capacity will control any load from 10 to 4000 watts. This feature alone is a distinct advantage as the theater manager may want to relamp the auditorium or the lobby with different sized lamps from time to time,

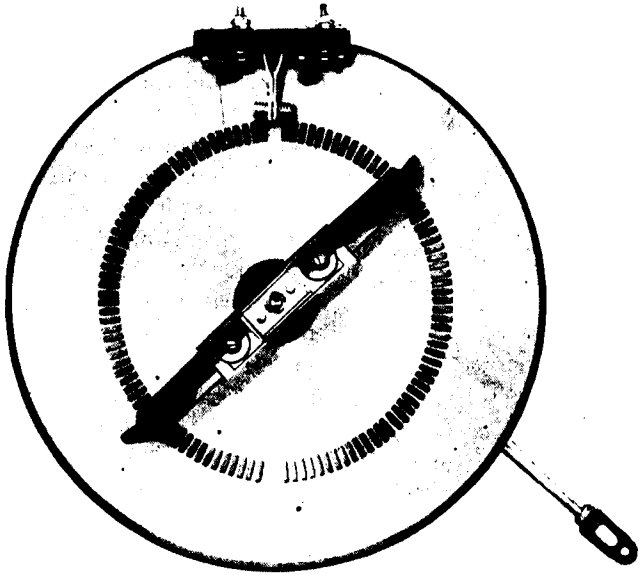

Fig. 1.—Resistance-type dimmer. Vitreous-enameled construction with 110 steps for flickerless dimming.

and the autotransformer dimmer will adequately control whatever load is connected, provided the maximum capacity is not exceeded.

The autotransformer dimmer operates at very high efficiency. Even with as low as 3 per cent of light output on the lighting circuit the efficiency is better than 90 per cent. This increased efficiency means that there is less energy dissipated in the form of heat and special provisions for ventilation are not required for this type of dimmer. Furthermore, the autotransformer dimmer is available in units of larger capacity. Single units of 8000 watts capacity are now being manufactured. Because of these larger capacity units less space is required for the dimmer equipment and fewer units must be operated to obtain the desired results.

PICTURE LIGHTING

It has been the practice in many theaters to provide a special circuit of low intensity for picture lighting. By the use of the new autotransformer dimmer, this circuit can be eliminated and the general auditorium lighting dimmed to the desired intensity. This at once provides means of varying the intensities in accordance with the change in the screen's brilliancy. The picture-lighting intensity must be adjusted so it does not disturb or distract, but should add to the comfort and ease of the audience. This dimmer permits the theater operator to provide the most comfortable lighting conditions for his audience at all times and in doing so he is operating his equipment at low cost.

Fig. 2.—Autrastat (autotransformer-type) dimmer. 8000-watt capacity, radial construction.

Cold-cathode lighting has become more and more popular for general auditorium lighting in the small neighborhood house and this, too, can be dimmed equally well with the autotransformer dimmer. Smooth, continuous dimming control is possible from full intensity to levels as low as 15 to 20 per cent of light output. Likewise, the new Slimline fluorescent lamps can be adjusted to the desired intensity to create a subtle atmosphere of restfulness and relaxation.

LOBBY AND FOYER LIGHTING

The rear of the auditorium should be illuminated at a slightly higher intensity so that the people can find aisles and seats readily. The lighting in the corridors and the lobby should be at higher intensities so that there is a gradual and continuous change in the level of intensity from the street to the auditorium. This will prevent an abrupt change of intensity that causes eyestrain or discomfort to the patrons on entering or leaving the theater. The addition of colored lighting circuits in the lobby allows the manager to tone the lighting in the lobby to fit the season or outdoor weather. The actual intensity of the lobby should vary from daylight to afternoon and evening.

INSTALLATION OF DIMMER EQUIPMENT

The space available for the installation of the dimmer will have some bearing on the type of assembly that finally is to be used. Dimmer controls for the lobby and corridor lighting would usually consist of one or two units which can be mounted on the wall above the lighting panel, in a closet, or other space adjacent to the lobby.

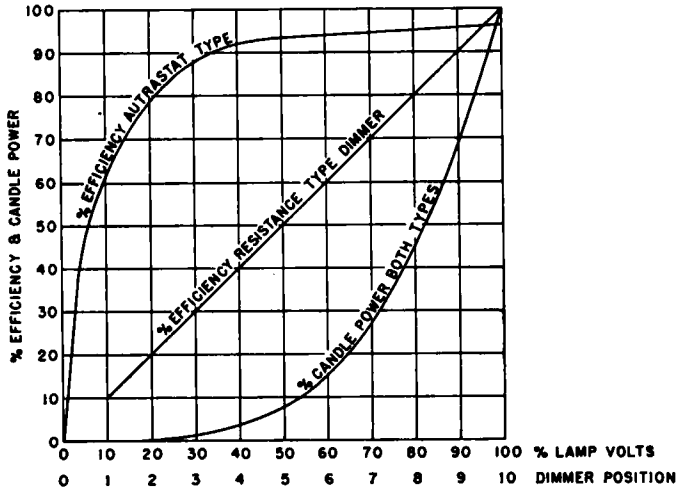

Fig. 3—Comparative efficiencies of Autrastat and resistance dimmers.

To eliminate the necessity of additional help simply for the purpose of operating the dimmers, it has been found desirable to install the dimmer controls for the auditorium where they can be conveniently operated either by the projectionist, the head usher, or the manager.

The least expensive installation obviously is the individually, manually operated dimmer unit. Where a number of these dimmers are located in the same place, they can be assembled edgewise to the wall on which they are mounted and occupy a reasonably small area. Usually the most convenient location for this equipment is the motor-generator room adjacent to the projection booth. However, the operator is obliged to go to that room in order to operate the dimmers.

By the use of an interlocking construction it is possible to mount the dimmers in a space directly above the projection booth and by means of extension rods through the ceiling locate the operating handles within the booth. In this manner the projectionist is able to adjust the intensity of the auditorium lighting without leaving his station.

REMOTE-CONTROLLED EQUIPMENT

Where space is not available to locate the dimmer equipment conveniently for manual operation, remote-controlled motor-operated dimmer equipment is available. With momentary contact push-button stations for operation this assembly can be placed in any convenient spot where the wiring installation will be a minimum.

Motor-operated dimmer equipment has other advantages. First of all, control stations can be located at several points so that the dimmer may be operated by both the projectionist and the chief usher or the theater manager from his office. Furthermore, the dimmer equipment can be made semiautomatic.

By semiautomatic we mean that a definite program of intensities can be set up beforehand so that the projectionist or operator automatically can secure the desired intensity by pushing one of a series of buttons. For instance, buttons would be provided for full bright, blackout, picture lighting, and perhaps one or two other intermediate intensities. By momentarily pushing any of these buttons, the dimmers automatically will move to the desired position. Still another system of control provides a dial for selecting the desired intensity to which the dimmers will move automatically whenever the control switch is closed. These automatic controls eliminate errors in judgment by the operator as the same intensity which has been selected as proper for the particular condition can be secured immediately by the motor-operated dimmer equipment.

ELECTRONIC-CONTROLLED REACTANCE DIMMERS

In installations where refinement of control is of particular importance, the reactance-type dimmer with electronic control provides the highest refinement. Here again the heavy dimmers and auxiliary equipment are located in any desired space where the wiring connections are reduced to a minimum. Control stations may be located in two or more places so that different individuals may operate the dimmer equipment. Furthermore, it is possible to preset intensities in advance and secure semiautomatic control of the lighting by push-button control. Miniature dimming controls having graduated dials are usually provided so that the intensity can be adjusted accurately by the operator.

Regardless of the type of dimmer involved there is definitely a place for the theater dimmer in the neighborhood motion picture house. It is only by accurately adjusting the various intensities of lighting in the lobby, clear through to the picture screen, can the theater manager provide the most comfortable and pleasing lighting conditions for his patrons and thus induce their return to his theater.