CURTAIN CONTROL MECHANISM

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The invention relates to mechanism for controlling or effecting the opening and closing of curtains such as are used in theaters and has for its general object the provision of a novel power operated device for this purpose and which will at the same time automatically control the house lights, the arrangement being such that as the curtains are moved to open position the house lights will be gradually dimmed, this being particularly advantageous in motion picture theaters though of course not limited to such.

An important object of the invention is to provide a mechanism of this character in which the entire control is effected by movement of a single switch, thereby reducing the number of necessary parts and greatly increasing the ease of operation.

Another object is to provide a device of this character having means permitting slippage in the transmission so as to avoid danger of damaging any of the parts after the parts have moved to the predetermined desired limit.

Still another object is to provide a device of this character having a very positive drive so that the operation will be assured.

A more specific object is to provide a novel supporting means upon which the curtains travel, the construction being such as to eliminate any possibility of undesired sag in the curtains themselves.

An additional object is to provide an apparatus of this character which will be simple and inexpensive to make, easy to install and adjust, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the details of construction and arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of the complete device.

Figure 2 is a detail section taken along the main drive shaft.

Figure 3 is a similar view through the transmission for controlling the lights.

Figure 4 is a diagram of the electrical circuits, and

Figure 5 is a detail view of the light dimming resistance device.

Referring more particularly to the drawings the numerals 10 and 11 designate a pair of curtains of any ordinary or preferred construction and of the type used in front of the stage or screen in a theater. These curtains are shown as suspended by means of suitable loops 12 from a pair of horizontally disposed parallel bars or rods 13 and 14 which are mounted in brackets 15 and 16. Of course the curtain 10 slides on the rod 13 in overlapping relation to the curtain 11 which slides on the rod 14. The brackets 15 limit the separating movement of the curtains while the brackets 16 act as stops for maintaining them in overlapping relation when closed.

At one side of the pair of curtains there is provided a pulley 17 mounted in a bracket 18, and at the other side are two pulleys 19 and 20 mounted in a similar bracket 21. For moving the curtains there is provided a rope or cable 22 which is trained over the pulleys 19 and 20 and about the pulley 17. Opening and closing of the curtains is effected by pulling upon this rope in one direction or the other by means of the mechanism to be described.

The power device for operating the curtains is represented as comprising a support 23 which may be a casting and which includes bearing portions 24 and 25 and a housing 26. Journelled 29 through the bearing portions is a shaft 27 upon which is mounted a worm wheel 28 located within the confines of the casing or housing 29 and meshing with a worm 29 on the shaft 30 of an electric motor 31 which is mounted in any convenient manner upon the support 23. Fixed upon the shaft 27 for rotation therewith is a small sprocket 32, and loose upon the shaft is a larger sprocket 33 which is intended at times to rotate with the shaft and at other times to slip with respect thereto, as will be explained.

This drive mechanism further includes a specially constructed clutch comprising a collar 34 splined at 35 onto the shaft 27 and carrying a friction member 36 bearing against a similar friction member 37 mounted on a ring 38 secured to the sprocket 33. A coil spring 39 surrounds the shaft 27 and bears against the collar 34 for the purpose of urging it toward the sprocket. The other end of the spring abuts against a collar 40 which rotates with the shaft 27 but which is also slidable thereon. The particular connection is represented as consisting of a pin 41 which passes through the hub of the collar and through a transverse slot 42 in the shaft 27. From this slot to the adjacent end the shaft is formed with a bore 43 into which extends a screw 44 which is threaded into the outer end of the shaft and which is equipped with a head 45 by means of which it may be turned for the purpose of adjusting the tension of the spring 39 and consequently the degree of frictional engagement between the friction faces 36 and 37, it being clear that by rotating the operating head 45 in a clockwise direction the engagement of the end of the screw 44 with the pin 41 will move the collar 40 toward the sprocket 33 and increase the pressure exerted by the spring. Rotation of the head 45 in the opposite direction will of course reduce the fric-
tional engagement so that the clutch can slip more readily.

Trained about the sprocket 33 is a chain 46 whose ends are engaged with the ends of the above mentioned rope or cable 22, stop balls 47 being provided at the junctures. By this construction it will be seen that when the motor 31 is operated and the sprocket 33 rotated the curtains 30 and 31 will be moved together or apart depending upon the direction in which the motor is operating. For controlling the motor there is provided a control box 48 containing a double throw switch 49 of any ordinary or preferred type and connected with the field 60 and armature 51 of the motor in such manner that when the switch is at one limit of its movement the motor will run in one direction whereas the motor will be reversed when the switch is moved in the other direction. The connections are shown in the diagram, Figure 4, and as such switches are old and well known it is not believed that elaboration of description is needed. The control box is also represented as containing a pair of pilot lights 52 and 53 which may be of contrasting colors so as to indicate the direction of rotation of the motor and also to indicate whether or not the motor is in neutral or cut off position, both of the pilot lights being out at such a time.

A very important feature of the invention resides in the provision of means for automatically dimming and brightening the house lights in accordance with movement of the curtains. To accomplish this I provide a suitable support 54 in which is journaled a shaft 65 carrying an arm 66 which is connected with a contact arm 67 movable over a series of contacts 68 tapped off at spaced points in the length of a resistance coil 59 mounted in an appropriate casing 60 likewise mounted on the support 54.

Rotatable on the shaft 55 is a sprocket 51 about which is trained a chain 46 in turn trained about the small sprocket 32 on the shaft 27 of the main drive. The same type of slippage permitting clutch is provided in association with the sprocket 51 and is represented as including a friction member 63 on the sprocket engaging with a similar friction member or race on a collar 64 keyed to the shaft 55. The sprocket is slidable on the shaft and is urged toward the collar 65 by a spring 58 which abuts against a collar 67 slidable on the shaft and engaged by an adjusting screw 68 which is threaded into the hollow end of the shaft as clearly shown in Figure 3. By turning the screw 58 in or out the pressure exerted by the spring 58 can be controlled so as to permit the clutch to slip upon the occurrence of a certain predetermined degree of torsion.

In the operation, it will be seen that assuming that the curtains are closed as shown in Figure 1 and it is desired to open them the operator must throw the switch 49 wherein the motor will start and by virtue of the friction clutch consisting of the parts 33 to 42 the sprocket 33 will be driven, thereby moving the chain 46 and pulling upon the rope 22, which, having its ends connected with the curtains, will result in drawing them away from the curtains and into the curtains whereupon virtue of the friction clutch connection consisting of the parts 61 to 68 the shaft 55 will be rotated, the arm 56 moving the contact arm 61 over the series of contacts 58 and thereby cutting more and more resistance into the circuit of the house lights so that the lights will be gradually dimmed as the curtains are opened. When it is desired to close the curtains the reverse action is performed as the result of throwing the switch in the other direction.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a very simply constructed mechanism which may be operated from any desired point depending upon where the control switch is located. This device is bound to be of great advantage in that the curtains are adequately supported and therefore cannot sag. Moreover the feature of the automatic dimming and brightening of the house lights in accordance with the curtain positions is a distinct advantage particularly in motion picture theaters. It is believed from the foregoing that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

While I have described the preferred embodiment of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. A mechanism for opening and closing theater curtains, comprising means for slidably supporting the curtains to overlap in closed position, a shaft, a motor operated transmission for driving the shaft, friction means permitting slippage in the transmission, means driven by the shaft and connected with the curtains for sliding them in opposite directions to open position and to overlapped closed position, and means for adjusting the friction means.

2. A mechanism for opening and closing slidably suspended theater curtains, comprising means for supporting the curtains to overlap in closed position, a motor, a transmission mechanism driven by the motor and including a shaft, a sprocket rotatable on the shaft, a friction clutch for locking the sprocket to the shaft, means for adjusting the friction of the clutch, a chain trained over the sprocket, and a flexible member connected with the ends of the chain and operatively connected with the curtain supporting means to slide the curtains oppositely to each other to open position and to overlapped closed position.

3. A mechanism for opening and closing slabably suspended theater curtains, comprising means for supporting the curtains to overlap in closed position, a motor, a shaft driven by the motor, a sprocket rotatable on the shaft, a friction clutch for locking the sprocket to the shaft, means for adjusting the friction of the clutch, a chain trained over the sprocket, a flexible member connecting the rods or rails for the flexible member, and means connecting the flexible member with the curtains for moving them in opposite directions to open position and to overlapped closed position.

TRAVIS W. BICKEL.