Sept. 16, 1941. F. D. ARMSTRONG 2,256,008

SUPPORTING AND MANIPULATING CURTAINS AND THE LIKE

Filed Feb. 26, 1940 2 Sheets-Sheet 1

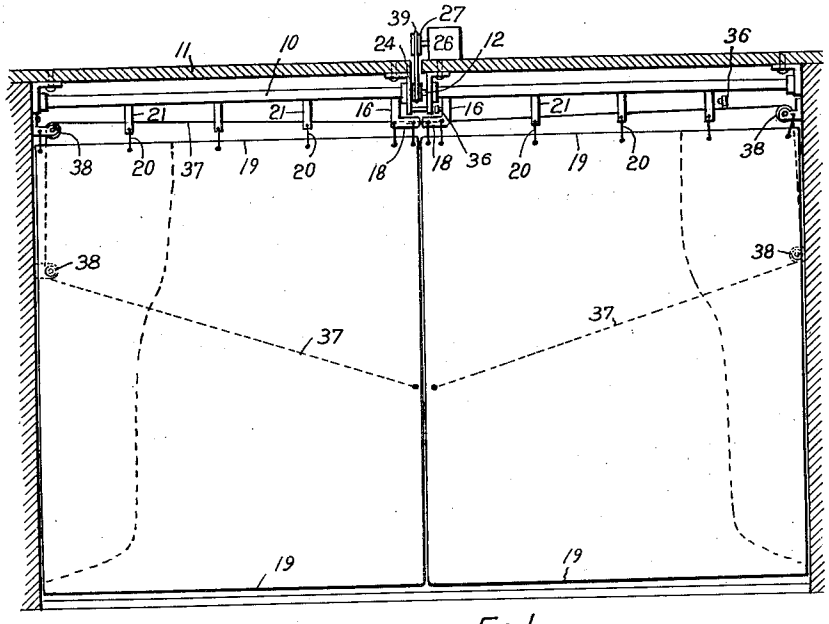


FIG. 1.

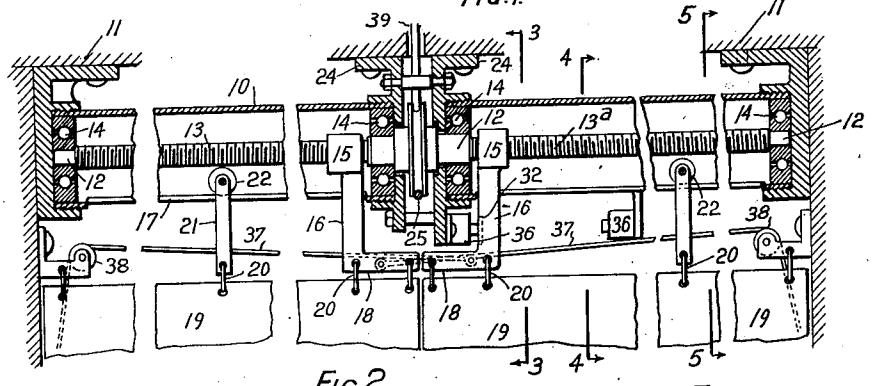


FIG. 2.

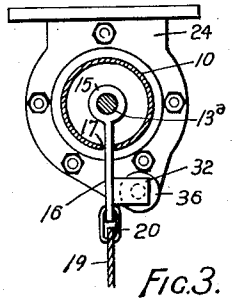


FIG. 3.

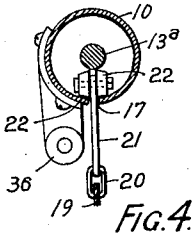


FIG. 4.

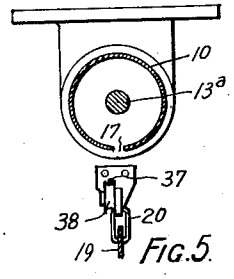


FIG. 5.

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SUPPORTING AND MANIPULATING CURTAINS AND THE LIKE

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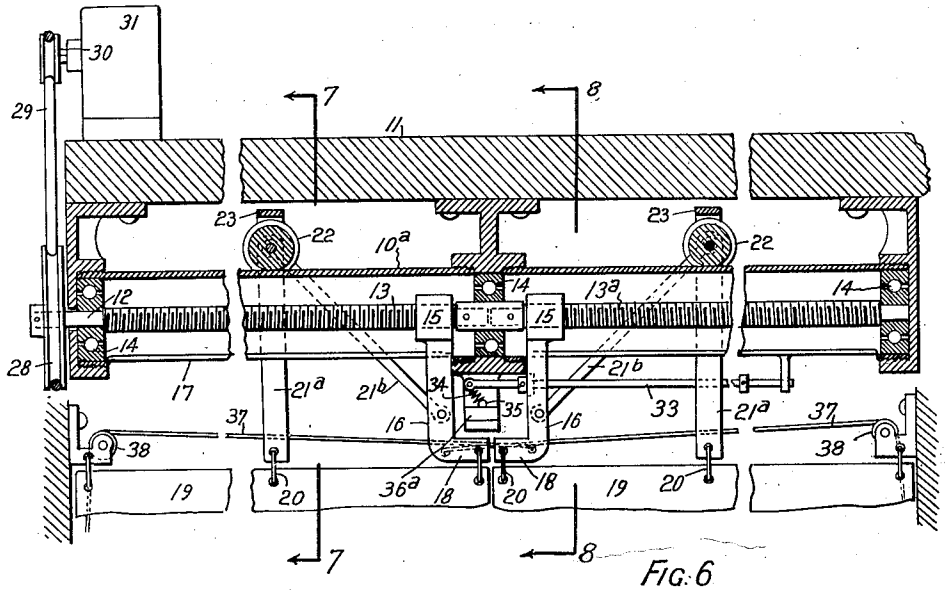


FIG. 6

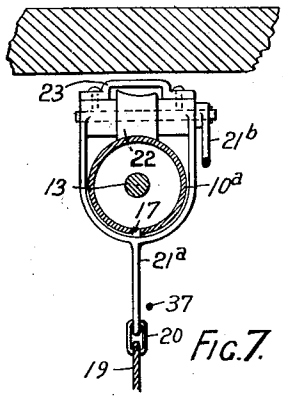


FIG. 7.

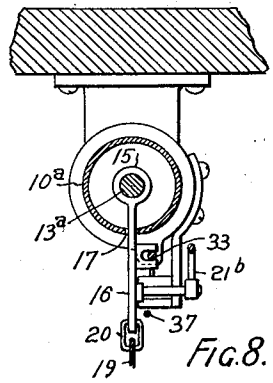


FIG. 8.

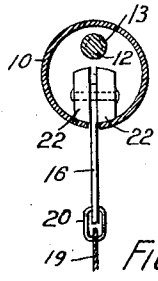


FIG. 9.

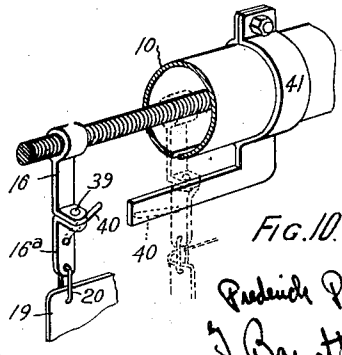


FIG. 10.

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UNITED STATES PATENT OFFICE

2,256,008

SUPPORTING AND MANIPULATING CURTAINS AND THE LIKE

Fredrick Donald Armstrong, Brighton-le-Sands, near Sydney, Australia

Application February 26, 1940, Serial No. 320,956
In Australia June 7, 1939

5 Claims. (Cl. 156—46)

This invention relates to improvements in supporting and manipulating curtains and similar hanging drapings and blinds and has particular application in the supporting and manipulation of stage curtains employed in amusement theatres.

As far as I am aware curtains have, hitherto, been manipulated manually for drawing and withdrawing and, in general, the present invention relates to the provision of means associated with curtain supports which will enable such curtains to be automatically drawn and withdrawn as desired. In an adaptation of the invention the apparatus described may be manipulated manually instead of automatically.

In the drawings, which illustrate appropriate forms of the invention, as applied to stage curtains,

Figure 1 is an elevation of the curtain with its appurtenances,

Figure 2 is an enlarged longitudinal section of the supporting and manipulating means,

Figures 3, 4 and 5 are sectional elevations on lines 3—3, 4—4 and 5—5 respectively of Figure 2,

Figure 6 is a similar view to that of Figure 1 but showing another form of construction,

Figures 7 and 8 are sectional elevations on lines 7—7 and 8—8 respectively of Figure 6,

Figure 9 is a sectional elevation showing a modified detail of construction, and

Figure 10 is a fragmentary detail showing an alternative form of curtain suspension.

Referring to the drawings, 10 (Figure 1) of 10*a* (Figures 6, 7 and 8) is a tubular member suitably supported as by a frame 11 or otherwise according to known practice. 12 is a rod or spindle having screw-threads 13 and 13*a* upon opposite sides of the centre thereof, one of the said screw-threads being right-handed and the other screw-thread being left-handed. 14 are ball races supporting the rod or spindle 12. Nuts 15 ride upon each respective screw-thread 13 and 13*a* of spindle 12. 16 are lugs depending from nuts 15. 17 are slotted portions on the undersides of tube 10 (or 10*a*) disposed in the path of travel of lugs 16. 18 are brackets carried by lugs 16 to support curtains 19. 20 are supporting rings for curtains 19. 22 are rollers and 21 are supporting units attached to rollers 22 and supporting curtain rings 20. Supporting units 21 may take the form of U-brackets 21*a* (as shown in Figures 5, 6 and 7) or otherwise (as shown in Figures 1, 2 and 4). 21*b* (Figures 6, 7 and 8 is a link connecting lug 16 with the first roller 22. 23 (Figures 6 and 7) are horizontally disposed straps about rollers 22. 24 (Figure 1) is a spacer casting housing driving gear 25, for the spindle 12, and 26 represents a prime mover such as an electric motor; 27 is a drive pulley and 39 is a belt. 28 (Figure 6) is a pulley, 29 is an endless belt, 30 is a drive pulley and 31 is a motor. 36 (Figures 1, 2, 3 and 4) is a switch in circuit with the motor 26 and 36a (Figures 6 and 8) is a switch in circuit with electric motor 31. 32 (Figures 1, 2 and 3) is a projection on lug 16 adapted to operate switch 36; 33 (Figures 6 and 8) is a trip rod capable of operation through the travel of lug 16 to influence spring 34 to operate switch arm 35 of switch 36*a*. 37 are cords attached to lugs 16 and to curtains 19 and 38 are sheaves about which cords 37 pass.

Figure 9 shows a modified construction wherein the spindle 12 is offset from the centre of the tubular member 10 and placed towards the crest thereof. This allows an increased space for rollers 22 thus enabling rollers of larger size to be employed and also enabling the rollers to be given, to some degree, a curvature conforming to that of the tubular member 10. Figure 10 shows an alternative form of supporting lug 16 wherein the lower portion 16*a* of the lug is suspended by a swivel 39 and carries a trigger or projection 40. 41 is an adjustable bracket mounted upon tube 10 and having an extended side. The extended side of the bracket acts as a trip for the trigger 40 and causes folding of the curtain. The position at which folding is desired is determined by the setting of the bracket 41 on the tube 10.

As the spindle 12 is rotated the nuts 15, riding on oppositely turned screw-threads on the respective ends of the said spindle 12, will advance towards the centre of the tube 10 (or 10*a*) or retire towards the respective ends thereof according to the direction of rotation of the said spindle 12. The nuts 15, when advancing towards the ends of the containing tube, will abut each first roller 22 and cause it to move towards the tube end whereby each roller 22 will, in turn, abut the succeeding roller so that, as the nuts 15 retire, the rollers 22 will correspondingly retire (Figure 1). Since the curtains 19 are supported, through lug 16 and bracket 18 and curtain rings 20, from the nuts 15 and rollers 22 respectively, they will withdraw as the nuts retire. In the form of the invention as shown in Figure 6, the rollers 22 are flanged and ride outside the tube 10*a*. In this case each forward roller is actuated by its corresponding nut 15 by means of a link 21*b* attached thereto and to

the lug 16 of the nut; where the rollers are flanged there is a possibility of fouling and this is obviated by providing each such roller with a strap as 23. When the nuts 15 advance towards the centre of the containing tube they will draw the curtains together. The containing tube 10 (or 10a) is slotted on the underside, as at 17, in order to enable the lugs 16 and, as shown in Figure 1, the supports 21 to move relatively thereto. The tubes, as herein referred to, may be supported in any suitable manner in accordance with known practice; in Figures 1 and 6 there is shown a supporting frame 11 but it will be readily apparent that other means of support may be employed; for example, the ends of the spindle 12 may be accommodated in bearings.

When the construction shown in Figure 10 is employed the curtain end will rotate on the swivel 39 causing the trigger 40 to impinge against the bracket 41 and wrap about it whereby the curtain will be given a vertical roll as it is withdrawn.

Any suitable method for causing the spindle 12 to rotate may be employed and a variety of known means are available for this purpose; for example a spacer casting 24 (Figure 1) may be disposed centrally of the tube 10 said spacer casting housing appropriate driving gear 25 attached to spindle 12 and driven by an electric motor 26 through a drive pulley 27 and belting 39. Again (Figure 6) a pulley 28 may be carried on one end of the spindle 12, outside the tube 10a, the said pulley being driven through belting 29 from a drive pulley 30 by a motor 31. Suitable known means may be employed to control the operation of the motor for stopping, starting or reversing and switches therefor may be conveniently located as, for example, in the projection operator's box in a motion picture theatre. Such means may be caused to operate during the opening or closing of the curtains; for example a switch, as 36, may be so arranged that it is actuated to cut out the motor through the movement of one of the nuts 15 when the latter reaches the limit of its travel in the opening or closing of the curtains and, in this case, a lug 16 may be equipped with a trip mechanism, such as lug 32, adapted to operate a switch 36 when the nut 15 reaches a required position; again, a trip rod 33 (Figures 6 and 8) may be adapted to be mechanically actuated during the travel of a lug 16 to influence a spring 34 adapted to operate an arm 35 on a switch 36a.

In an adaptation of the invention cords 37 are attached to lugs 16, taken about suitable sheaves 38 and attached to the inside edges (at suitable locations) of opposite curtains (Figure 1) so that, as the nuts 15 move backwards, tension is placed upon the curtains, where fastened to the cords 37, and the curtains are thereby draped as they are withdrawn (see dotted lines, Figure 1).

It will be obvious that alternatives for and mechanical equivalents of the apparatus herein described and illustrated may be employed for the purposes of this invention. For example, the rollers 22 may be substituted by slippers or by telescopic tubes. Again the tube, as 10 (or 10a), may be curved in form and not necessarily limited to a linear form. In this case a coiled spring may replace the rod 12 and the pitch of the spring may be used for the travel of the moving nut, the latter running inside the spring; or, instead of a coiled spring, a flexed casing may be employed and the moving nut will travel thereon in the manner hereinbefore set out.

Although the invention has been herein described with reference to curtains, it will be apparent that it may also be adapted to the manipulation of blinds, as for example, verandah blinds. In an appropriate form of the invention, as applied to, say, verandah blinds, the blinds are supported at top and bottom, between short cords. A slotted tube may be provided at the bottom and rollers, as hereinbefore described, located in said slotted tube, the said rollers being attached to the bottom blind cords. The rollers, moving in the slotted tube, will facilitate the drawing of such blinds; alternatively, slotted tubes, carrying rollers, may be disposed at top and bottom of the blind and the supporting cords, at both top and bottom, carried on the said rollers. The blind cords are spring loaded or otherwise carried by adjustable tensioning devices in order to provide for variations in blind length caused by shrinkage or other means.

Other alternatives will become apparent from the foregoing description and the accompanying drawings.

Having thus described and ascertained by said invention and the manner in which it is to be performed I declare that what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for supporting and manipulating curtains comprising, in combination, a tube slotted on the underside, a rod supported longitudinally within said tube, said rod located off-centre of the tube and towards the upper surface thereof, right and left-handed screw threads upon the respective ends of said rod, means to rotate the rod, nuts adapted to ride upon the respective screw threads aforesaid and complementarily arranged, lugs depending from said nuts and extending through the tube slot, rollers carried within the tube and beyond each of the nuts aforesaid, said rollers riding on the tube bottom about the slotted parts thereof and in line with the nuts and lugs aforesaid, a dependent unit extending from each said roller and extending through the tube slot said dependent unit mounted for free movement on the rollers, and curtain supporting means attached to the lugs and roller dependent units aforesaid.

2. Apparatus for supporting and manipulating curtains comprising, in combination, a tube slotted on the underside, a rod supported longitudinally within said tube, right and left-handed screw threads upon the respective ends of said rod, means to rotate the rod, nuts adapted to ride upon the respective screw threads aforesaid and complementarily arranged, lugs depending from said nuts and extending through the tube slots, rollers running upon the top of the tube and disposed on either side of the centre thereof, a link attached to each lug aforesaid beyond the tube and to each first roller whereby each first roller is moved as each said lug moves, brackets attached to each roller and extending below the tube, and curtain supporting means attached to the lugs and brackets aforesaid.

3. Apparatus for supporting and manipulating curtains comprising, in combination, a tube slotted on the underside, a rod supported longitudinally within said tube, right and left-handed screw threads upon the respective ends of said rod, means to rotate the rod, nuts adapted to ride upon the respective screw threads aforesaid complementarily arranged, lugs depending from said nuts and extending through the tube slots, a swivel jointed appendage depending from each lug, a projection upon each appendage, a fixed member placed in the path travelled by said pro-

jection when its associated nut moves towards the tube end said fixed member causing the projection to be turned as it passes by, rollers borne by the tube said rollers extending beyond each of the nuts aforesaid and adapted to be moved when the nuts move on the screw threaded rod and curtain supporting means attached to each swivel jointed appendage and to the rollers aforesaid.

4. Apparatus for supporting and manipulating curtains comprising, in combination, a tube slotted on the underside, a rod supported longitudinally within said tube, right and left-handed screw threads upon the respective ends of said rod, an electric motor set up to drive said rod for rotation in either direction, nuts adapted to ride upon the respective screw threads aforesaid and complementarily arranged, lugs depending from said nuts and extending through the tube slots, a trip switch set up for operation by the travel of said lugs to stop the electric motor at a prearranged position, rollers borne by the tube, said rollers extending beyond each of the nuts aforesaid and curtain supporting means attached to each of the lugs and the rollers aforesaid.

5. Apparatus for supporting and manipulating curtains comprising, in combination, tubular elements arranged linearly on either side of a spacer casting, each said tubular element slotted on the underside, a rod supported longitudinally within each said tubular element and journalled in the spacer casting, right and left-handed screw threads upon the respective ends of said rod, means to rotate the rod, nuts arranged to ride upon the respective screw threads aforesaid and complementarily arranged, lugs depending from the nuts aforesaid, said lugs extending through the tube slots and projected inwards to approach each other below the spacer casting, rollers borne by each tubular element, said rollers extending beyond each of the nuts aforesaid and curtain supporting means attached to the lugs and rollers aforesaid.

FREDRICK DONALD ARMSTRONG.