June 23, 1931. E. F. ALLEN 1,810,890

ACTUATING APPARATUS FOR THEATER CURTAINS AND THE LIKE

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Fig. 1

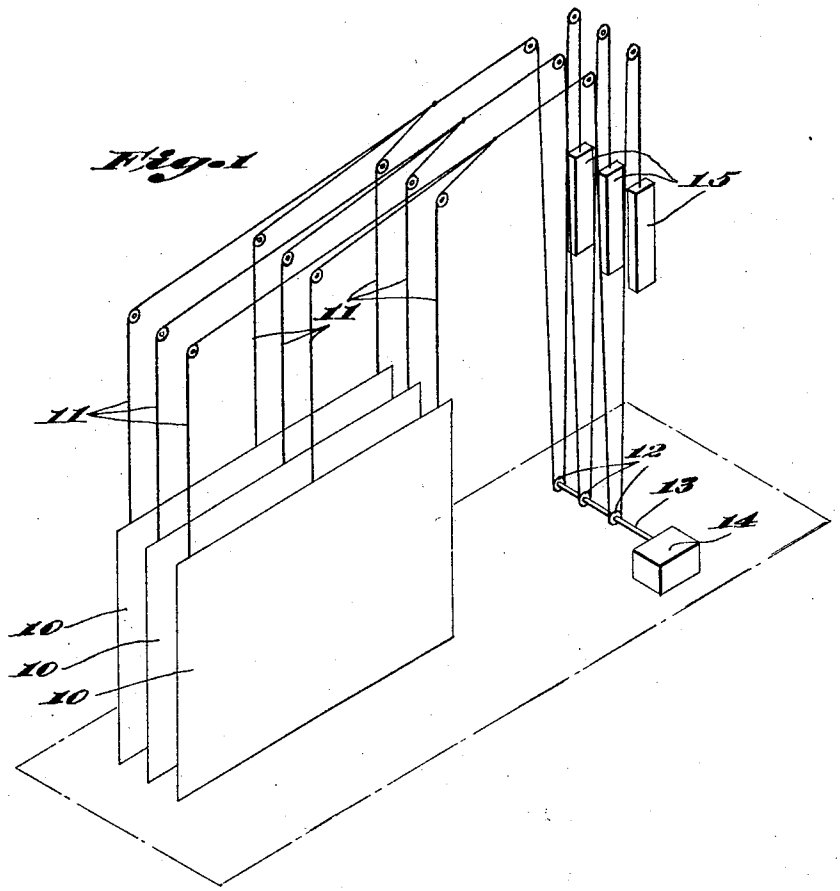
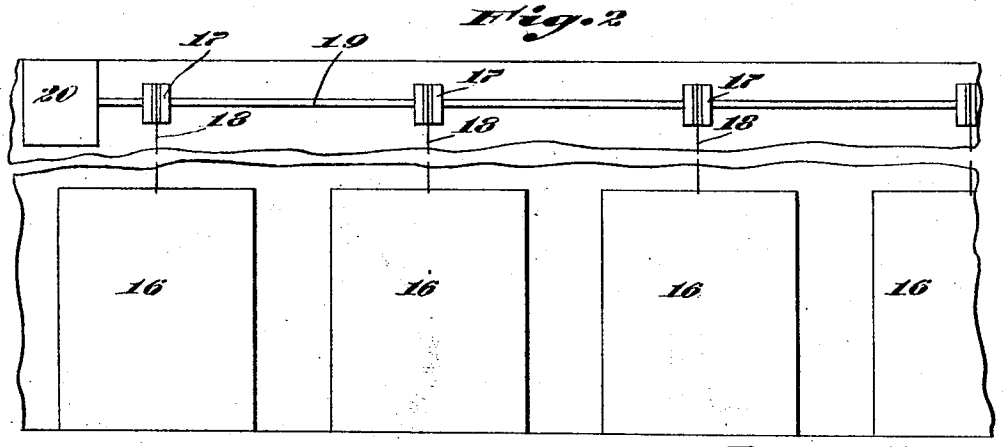


Fig. 2



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Fig. 3

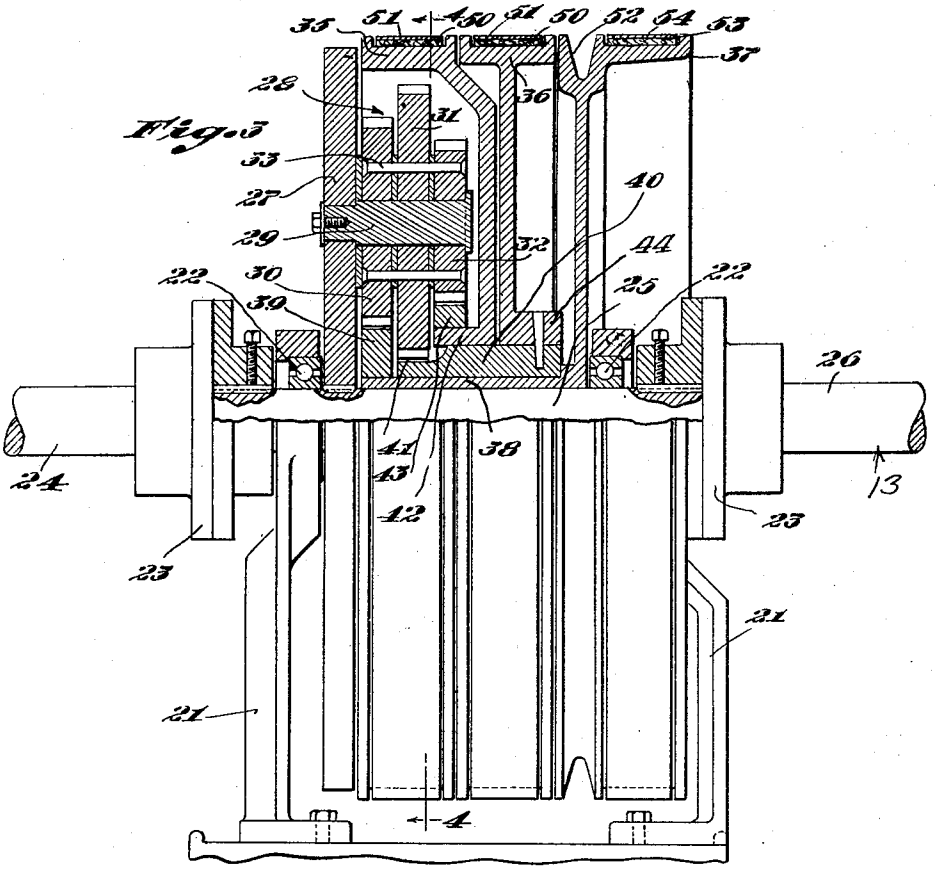
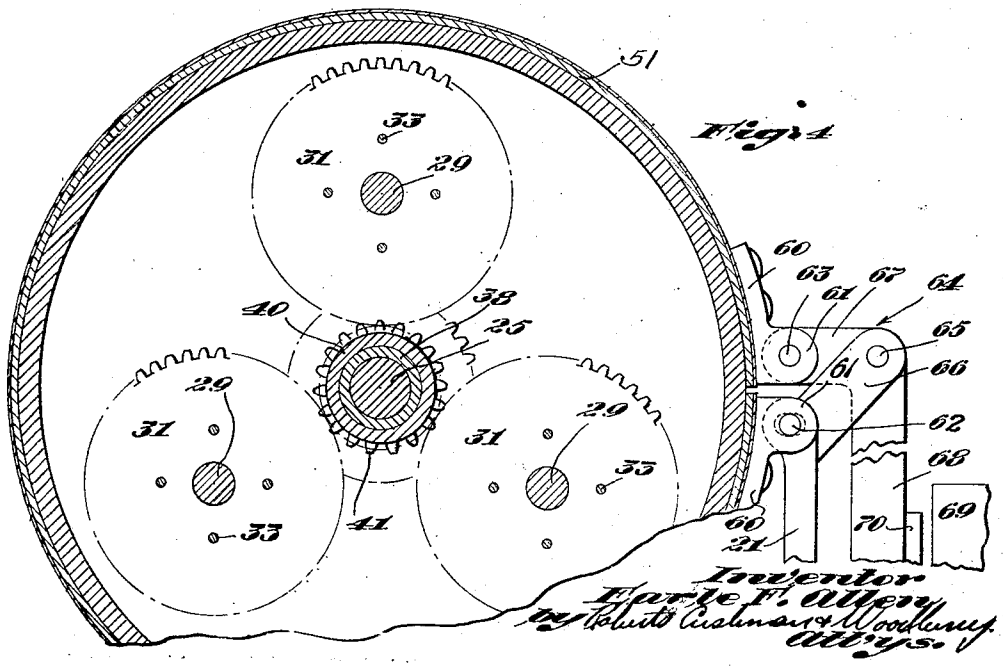


Fig. 4



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Patented June 23, 1931

1,810,890

UNITED STATES PATENT OFFICE

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ACTUATING APPARATUS FOR THEATER CURTAINS AND THE LIKE

Application filed April 2, 1929. Serial No. 351,842.

This invention relates to actuating apparatus for theater curtains or similar articles, more particularly to gear driving mechanism for raising or lowering theater curtains, drops, or fire-screens, doors, swings, hatches, covers and the like, and is an improvement upon the apparatus set forth in my Patent No. 1,651,985, dated December 6, 1927.

The primary object of the invention is to provide means for simultaneously raising or lowering a plurality of articles which means may consist of an apparatus including a shaft which is rotated at all times in one direction and an article-actuating unit carried by the shaft whereby the articles are raised or lowered without any change in direction of rotation of the shaft, the apparatus acting if desired to raise one article while lowering another.

Other objects of the invention reside in the details of the elements employed as will appear from a consideration of the following specification taken in connection with the drawings which form a part thereof and in which:

Fig. 1 is a pespective view illustrating more or less diagrammatically the application of this invention to theater curtains, drops, fire-screens and the like;

Fig. 2 is an elevational view illustrating the application of this invention to the operation of doors, swings, hatches, covers, and the like;

Fig. 3 is a view in elevation, partly in section, of one type of actuating unit by which a single such article may be raised or lowered; and

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 3.

In Fig. 1 of the drawings the reference numeral 10 is employed to indicate a plurality of articles here shown as curtains, drops, fire-screens, etc., to which are suitably connected a plurality of cables 11 which are actuated by units 12 mounted upon and driven by a shaft 13 which is rotated in one direction by a motor 14. Each cable 11 is attached at one end to the article passed over a unit 12 and provided at the other end with a suitable counterbalance weight 15.

In Fig. 2 the reference numeral 16 is employed to designate a plurality of doors, windows, hatches, covers, or the like, which may be actuated by units 17 through cables 18. The units 17 function in substantially the same way as do the units 12 and are mounted upon and driven by a shaft 19 which is rotated in one direction by a suitable motor 20.

Figs. 3 and 4 show in detail the control unit 12 which comprises a pair of uprights 21 provided with anti-friction bearings 22 in which the shaft 13 rotates freely. The shaft 13 is here shown as made up of a plurality of sections united by couplings 23. In Figs. 3 and 4 are illustrated in part sections 24, 25 and 26, the section 25 being directly supported by the bearings 22 of the uprights 21. Keyed to the section 25 of the shaft 13 between the uprights 25 is a disc 27 upon which is mounted a suitable form of planetary gearing 28. The gearing 28 comprises stud shafts 29 whch are carried by and project from one face of the disc and gears 30, 31 and 32 suitably united by pins 33 or similar means so that they may rotate as a unit about the stud shafts 29. Supported by the section 25 of the shaft 13 are drums 35 and 36 and a sheave 37 to which the rotation of the shafts is transmitted by the gearing 28.

The sheave 37 includes a sleeve 38 which surrounds the shaft section 25 but permits free rotation of the shaft and which terminates in the plane of the gears 30. Upon the end of the sleeve 38 is suitably fixed a gear 39 with which the gears 30 mesh. The drum 36 is provided with a sleeve 40 which surrounds the sleeve 38 but which is unsecured thereto. The sleeve 40 terminates in the plane of the gears 31 and its inner end is recessed and provided with a plurality of integral gear teeth 41 with which the teeth on the gears 31 mesh (see Fig. 4). The drum 35 includes a sleeve 42 which terminates in the plane of the gears 32 and to the end of which is secured a gear 43 which meshes with these gears. While the sleeve 38 and 42 are shown as integral parts of the sheave 37 and drum 35 respectively and the sleeve 40 as a separate element secured to the hub 44 of the drum 36, and while the gears 39 and 43

are shown as separate elements and the gear 41 as formed by teeth integral with the sleeve 40, the invention is not in any way limited to such details of construction.

The drums 35 and 36 each have at their periphery an annular recess 50 which receives a brake band 51. The sheave 37 includes an annular groove 52 which receives the cable 11 of the embodiment shown in Fig. 1, or the cable 17 shown in Fig. 2 and an annular recess 53 which receives a brake band 54. Each of the bands 51 or 54 may be operated in any desired manner to engage and hold the drum with which it cooperates, against motion. One form of such mechanism is shown in Fig. 4, wherein the ends of the brake band 51 are provided with plates 60 which include apertured lugs 61, through one of which is passed a shaft 62 which is supported in the uprights 21 to prevent any movement of rotation of the band with the drum. Pivotally mounted on a pin 63 in the other post 61 is a right-angle lever 64 which is fulcrumed on a shaft 65 carried by brackets 66 extending outwardly from the uprights 21. The lever 64 thus comprises a short arm 67 which is pivotally attached to the pin 63 in the post 61 and a long arm 68 which, as here shown, terminates adjacent a solenoid 69 being provided with an armature 70 which is electrically acted upon by the solenoid 69.

The operation of the unit may be briefly described as follows: When the article actuated by the unit is in the proper position the brake band 54 is actuated to hold the sheave 37 against movement as the disc 27 rotates. Consequently the gears 30 which mesh with the gear 30 will cause the assemblies comprising the gears 30, 31 and 32 to rotate on the shaft 29 as the disc 27 rotates. When it is desired, however, to raise the article actuated by the unit which we may assume will be done by rotating the sheave 37 in the same direction as the shaft 13, the band 54 is released and the band 51 controlling the drum 36 is tightened. Thus the gear 39 and its sleeve 38 will be free to rotate while sleeve 40 and the gear 41 will be held stationary so that the gear assemblies will rotate on the shafts as the disc 27 revolves, due to the meshing of the gears 31 and 41. This rotation of the gear 31 will, in the well known manner, cause the gear 30 to act upon the gear 39 and rotate the sheave 37 in the same direction as the shaft. If it is desired to rotate the sheave 37 in the direction opposite that of the shaft 13, which motion we may consider as that lowering of articles controlled thereby, the band 51 on the drum 36 is released, and the band 51 on the drum 35 is tightened thus holding the drum against rotation. The gear 43 is carried on the sleeve 42 of the drum 35 and meshes with the gear 32 which is held stationary and will cause the gear assemblies to rotate on the shafts 29 as the disc 27 is rotated. This rotation of the gear assemblies will cause the gears 30 acting through the gear 39 and sleeve 38 to rotate the sheave 37 in the direction opposite to that of the shaft 13 and will lower the article.

As indicated in the disclosures in Figs. 1 and 2 of the drawings, it is applicant's purpose to employ a plurality of such units upon a suitable shaft, each unit raising, lowering or holding stationary a single article due to the operation of the mechanism as herein described. Since the units 12 are independently controlled it will, of course, be possible to raise one article at the same time that another article is lowered, an operation which could not be performed by the apparatus shown in my earlier patent.

I claim:

1. Actuating apparatus for raising, lowering or holding in position theater curtains or like articles comprising a power driven rotary shaft, a plurality of units carried by the shaft and including means normally free from turning therewith, connections from each said unit to the article to be actuated and means operable upon each said unit for holding the normally free means of the unit against rotation upon said shaft whereby the article is stationary and for causing the same to be rotated by the shaft either in the same or the opposite direction as the shaft rotates in one direction whereby the article is raised or lowered at the will of the operator.

2. Actuating apparatus for raising, lowering or holding in position theater curtains or like articles comprising a power driven rotary shaft, a plurality of units carried by the shaft and including means normally free from turning therewith, connections from each said unit to the article to be actuated and means operable upon each said unit for holding the normally free means of the unit against rotation upon said shaft whereby the article is stationary and for causing the same to be rotated by the shaft either in the same or the opposite direction as the shaft rotates in one direction whereby the article is raised or lowered at the will of the operator, each unit and the means operable therewith being independent of each other so that one article may be raised while another article is lowered.

3. Actuating apparatus for raising, lowering or holding stationary theater curtains or like articles comprising a power driven rotary shaft, a plurality of units on said shaft, one unit for each article to be actuated, connections from each article to its unit and means cooperable with each unit for holding said article stationary and for causing said shaft to act through the unit while rotating in one direction to raise or lower the article at the will of the operator.

4. Actuating apparatus for raising, lowering or holding stationary theater curtains or like articles comprising a power driven rotary shaft, a plurality of units on said shaft, one unit for each article to be actuated, each unit including a sheave, connections from each article to the sheave of each unit, and means cooperable with each unit for holding the sheave thereof stationary and for causing said shaft to rotate said sheave in the direction of rotation of the shaft or in the opposite direction thereby raising or lowering the article at the will of the operator.

5. Actuating apparatus for raising, lowering or holding stationary theater curtains or like articles comprising a power driven rotary shaft, a plurality of units on said shaft, one unit for each article to be actuated, each unit comprising a disc fixed to rotate with the shaft, gearing carried by said disc, two brake drums and a sheave including a brake drum, said brake drums and sheave being carried by said shaft but normally not driven thereby, and connections from each article to the sheave of its unit.

6. Actuating apparatus for raising, lowering or holding stationary theater curtains or like articles comprising a power driven rotary shaft, a plurality of units on said shaft, one unit for each article to be actuated, each unit comprising a disc fixed to rotate with the shaft, gearing carried by said disc, two brake drums and a sheave including a brake drum, said brake drums and sheave being carried by said shaft but normally not driven thereby, connections from each article to the sheave of its unit and means cooperable at the will of the operator with said unit for actively connecting said sheave with said disc through said gearing whereby said sheave is rotated by said shaft in the direction of its rotation or in the opposite direction.

7. Actuating apparatus for raising, lowering or holding stationary theater curtains or like articles comprising a power driven rotary shaft, a plurality of units on said shaft, one unit for each article to be actuated, each unit including a sheave provided with a sleeve surrounding said shaft and normally free from rotation therewith and means for transmitting rotative impulses from the shaft to the sheave, connections from each article to the sheave of its unit and means for causing said unit means to transmit rotative impulses from the shaft to the sleeve whereby the sheave rotates with the shaft either in the same or the opposite direction at the will of the operator.

Signed by me at Boston, Massachusetts this first day of April 1929.

EARLE F. ALLEN.