Feb. 7, 1933. A. J. HIXON 1,896,623

SCREEN OR SHADE OPERATING MEANS

Filed March 25, 1931 6 Sheets-Sheet 1

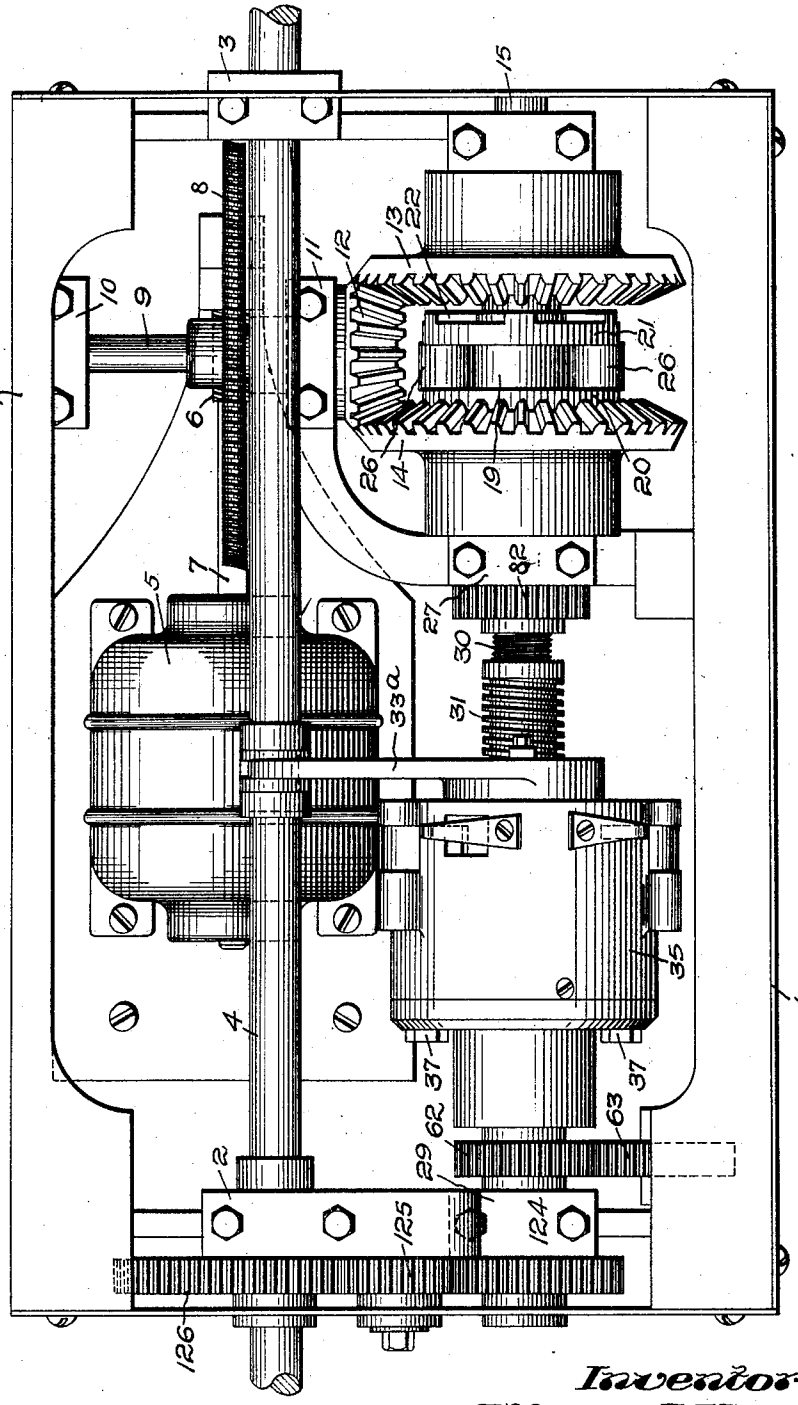


Fig. 1.

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SCREEN OR SHADE OPERATING MEANS

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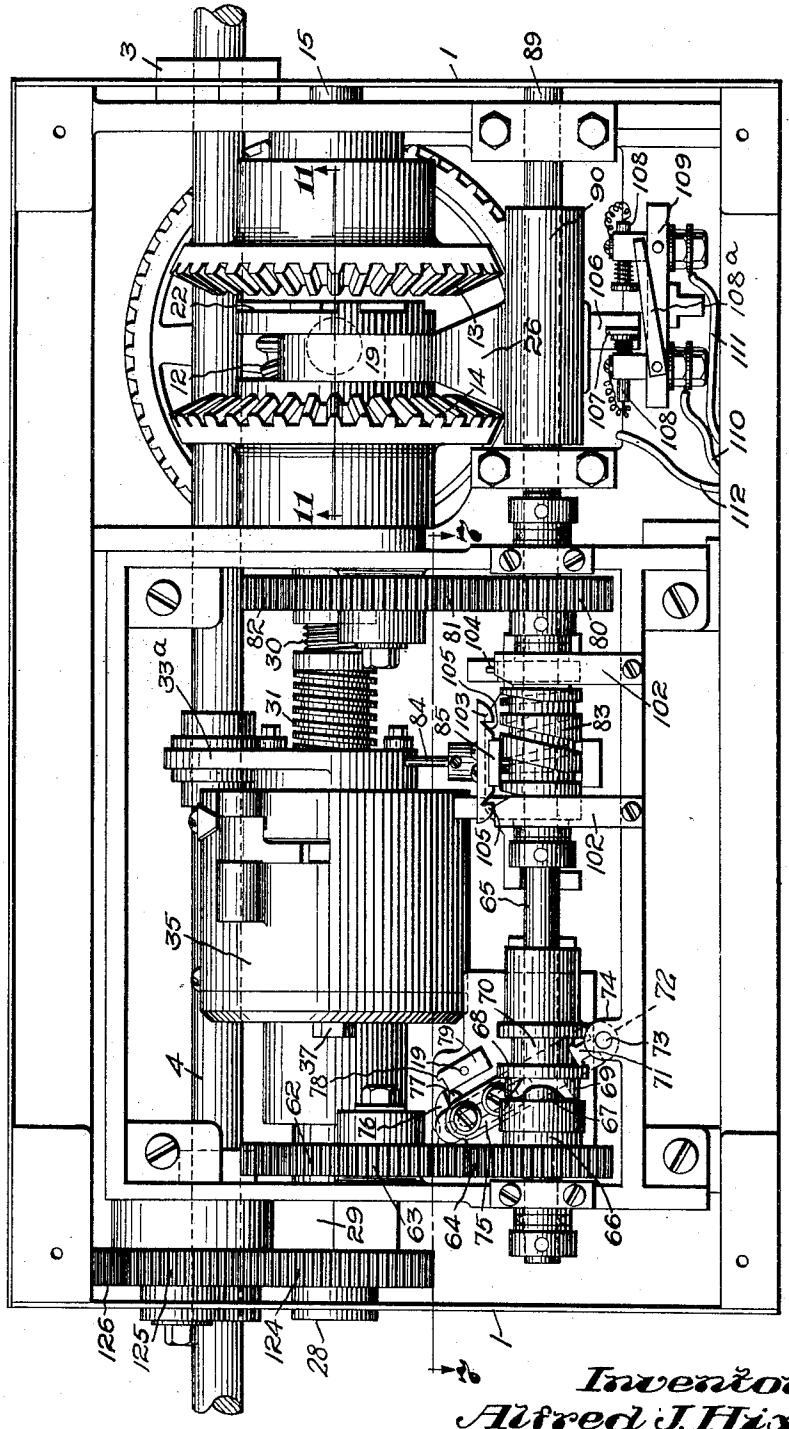


Fig. 2.

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SCREEN OR SHADE OPERATING MEANS

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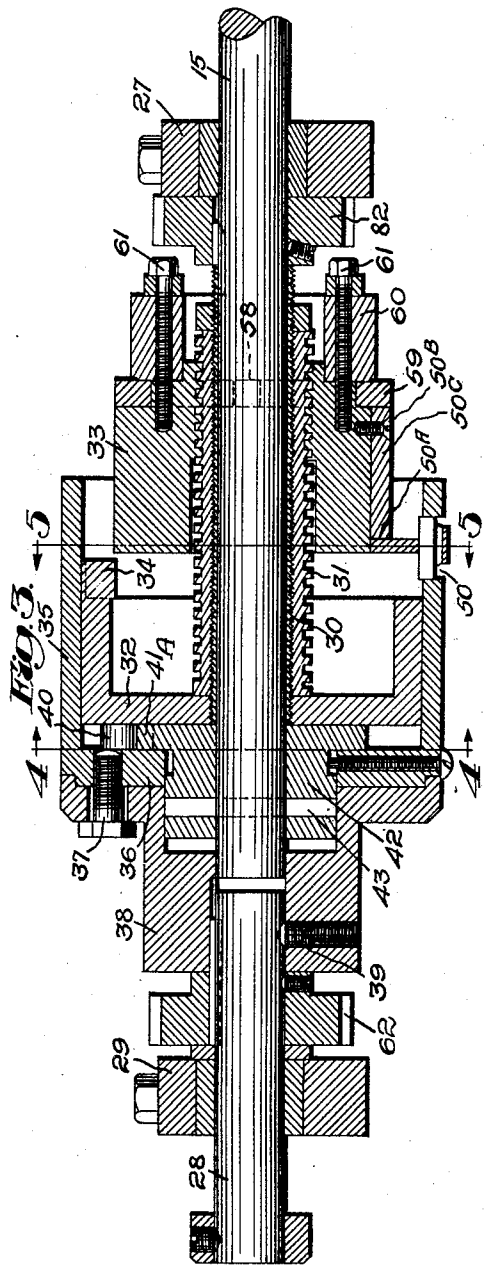


Fig. 5.

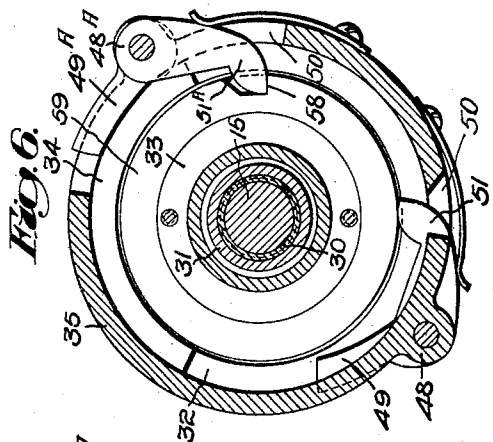


Fig. 6.

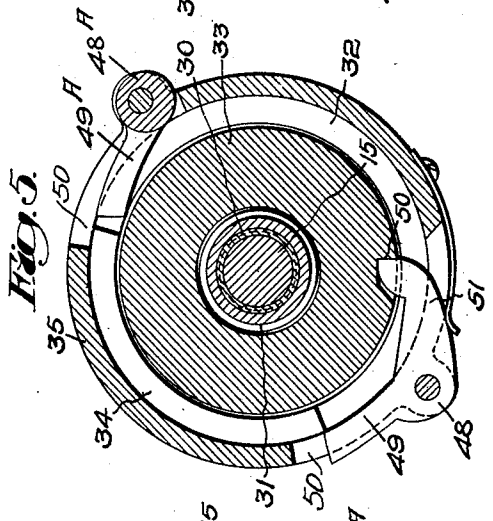


Fig. 5.

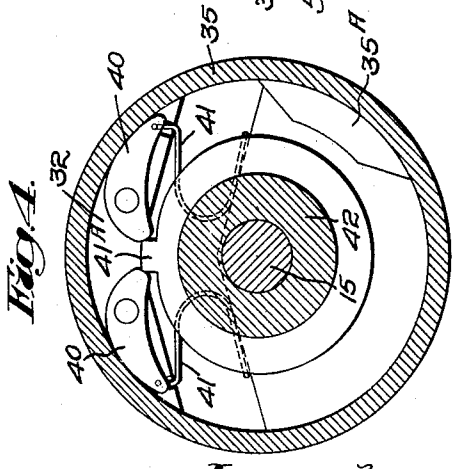


Fig. 4.

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SCREEN OR SHADE OPERATING MEANS

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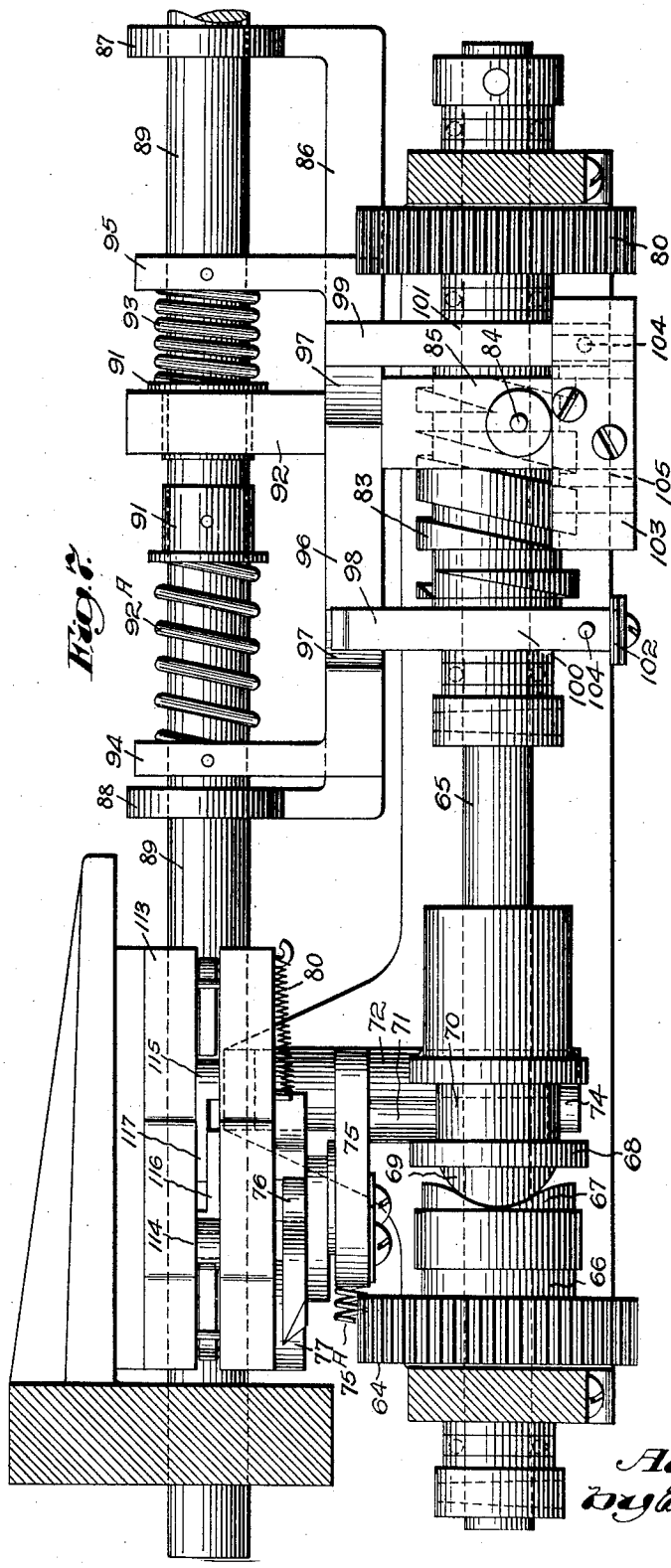


Fig. 7.

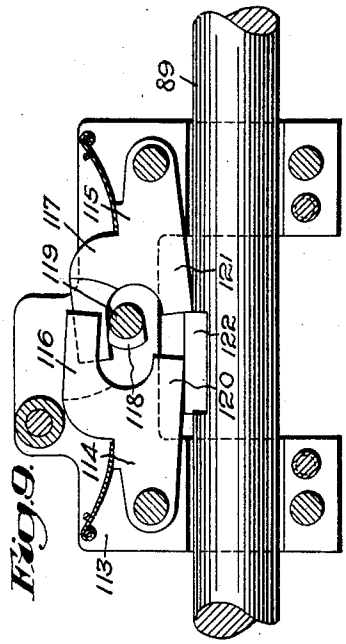


Fig. 9.

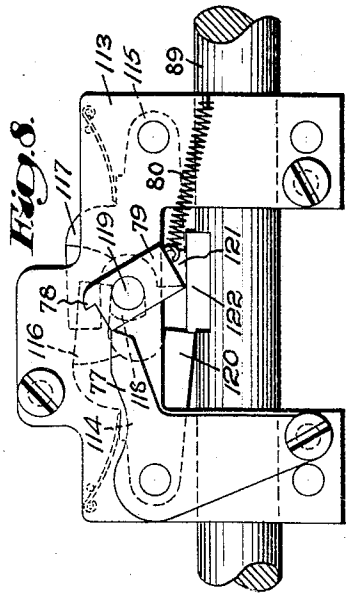


Fig. 8.

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SCREEN OR SHADE OPERATING MEANS

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Fig.12.

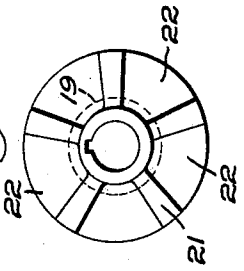


Fig.11.

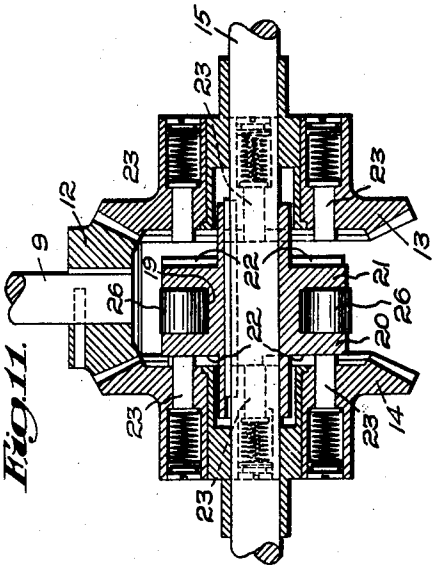


Fig.10.

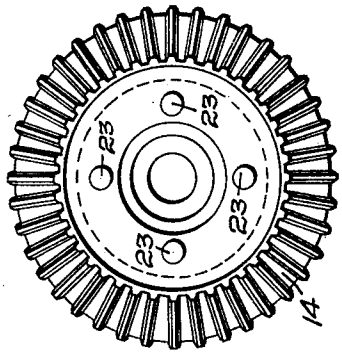
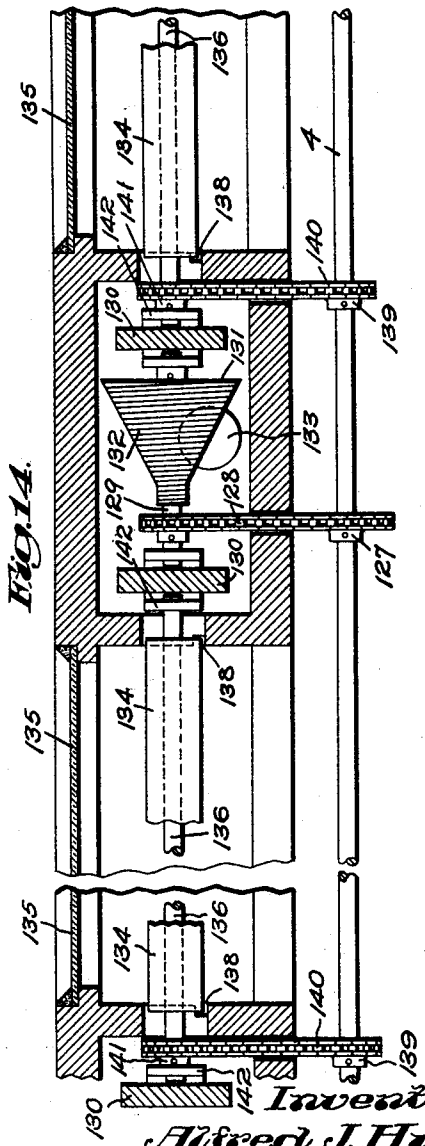


Fig.14.



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SCREEN OR SHADE OPERATING MEANS

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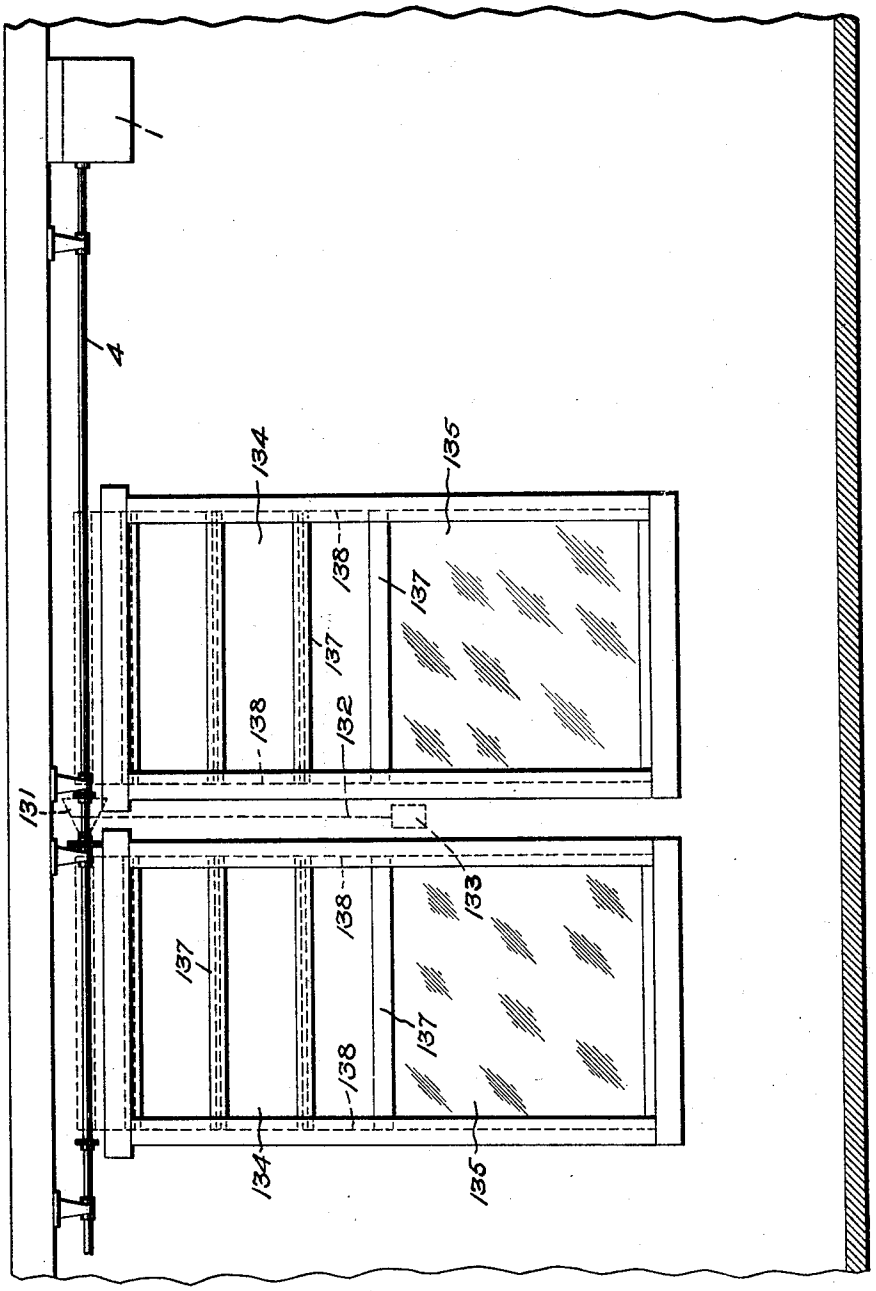


Fig. 13.

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UNITED STATES PATENT OFFICE

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SCREEN OR SHADE OPERATING MEANS

Application filed March 25, 1931. Serial No. 525,078.

This invention relates to screen or shade operating means broadly, and more specifically to a novel and improved means for lowering a plurality of shades simultaneously in a hall or the like, for excluding the light therefrom, and again raising the shades.

My invention is useful particularly for excluding the light temporarily from a lecture hall or the like to permit the showing of moving pictures or stereopticon slides and for quickly throwing into position, and the reverse, colored shades or screen for producing lighting effects in large auditoriums.

In the drawings of one embodiment of my invention selected for illustration and description herein,

Fig. 1 is a plan of the driving mechanism;

Fig. 2, a front elevation of the same;

Fig. 3, a vertical longitudinal section through the driving shaft and driving clutch;

Fig. 4, a vertical cross-section on the line 4—4, Fig. 3, from the left;

Fig. 5, a similar view on the line 5—5, from the right, with the clutch parts in locked relation but just previous to the unlocking thereof for reversal of drive;

Fig. 6, a similar view showing the clutch parts in locked relation just previous to unlocking thereof for second reversal of drive;

Fig. 7, a plan, on an enlarged scale, of part of the reversing gear clutch actuating mechanism on the line 7—7, Fig. 2, looking down;

Figs. 8 and 9, details on an enlarged scale of certain parts of the clutch-shipper-shaft locking mechanism;

Fig. 10, a face view of one of the reversing gears shown in Fig. 2;

Fig. 11, a horizontal section on the line 11—11, Fig. 2, looking down, through the driving pinion and reversing gears;

Fig. 12, a face view of the reversing clutch disk;

Fig. 13, an assembly view of the driving mechanism and shade operating mechanism; and

Fig. 14, a partial cross-sectional view through a conventional building wall showing an installation of curtains with the intermediate operating mechanical elements therefor.

Referring first to Figs. 1 and 2, my novel shade and screen operating mechanism comprises a suitable, herein rectangular, frame or housing 1. In bearings 2, 3, on the ends of the housing, and near the top thereof is a curtain and shade operating shaft 4, shown broken away. Power is furnished by a suitable electric motor 5, which may be placed at the bottom of the housing and through a driving worm 6 on the shaft 7 thereof, which worm meshes with a worm gear 8 on the shaft 9 in suitable bearings 10, 11.

This shaft 9 carries a driving pinion 12 which meshes with reversing gears 13 and 14, according to the direction of the drive, and loose on the driving shaft 15. Between these gears shaft 15 carries a clutch reversing member keyed to the main shaft 15 but slidable thereon, and comprising a disk 19 having end faces 20, 21, see also Figs. 11, 12. Each face of the disk, Fig. 12, has formed in it a plurality of triangular recesses 22 which receive pins 23, Fig. 10, on the faces of the gears 13, 14 and by which the gears as part of the clutch mechanism are respectively locked to the clutch disk member 19 and the shaft 15 driven. This clutch is controlled as to position, by a forked shipper 26, Fig. 2, as will be described presently.

The main driving shaft 15, Fig. 1, is carried also by the bearing 27 near the clutch, but terminates, Fig. 3, within the driving clutch to be described, and axially in line with it is the auxiliary driving shaft 28 in bearing 29. Loose on the shaft 15, Fig. 3, is a threaded sleeve 30, fast on which is a worm 31 and a cup-shaped inner or driving clutch member 32, and to the worm is threaded a traveling clutch unlocking roll 33, Fig. 1, on an arm 33A, slidable on the shaft 4. The side wall of the member 32 has an overhanging or projecting portion 34 for driving the outer or auxiliary driving clutch member to be described.

Adjacent the inner clutch member 32, Fig. 3, is a second similarly shaped outer or auxiliary driving clutch member 35 secured, at its closed end 36, by screws 37 to a hub 38

which, in turn, is secured by screw 39 to the auxiliary driving shaft 28. For securing the member 32 to the shaft 15 and thus for driving the outer clutch member 35, the former is provided on its end wall with a plurality of pivoted pawls 40, see also Fig. 4, the long arms of which are normally forced outwardly by springs 41 on the member 32, thus causing the inner or shorter arms to normally engage on opposite sides a lug 41A on the outer edge of the hub 42 pinned to the shaft 15 by a pin 43.

The member 35, Fig. 5, is provided in slots 50 in its wall with a plurality of stopping pawls 48 and 48A each having one slightly curved arm 49 and 49A mounted and adapted to be engaged at its rear end when locking the clutch, by the overhanging portion 34 of the member 32, Figs. 3, 15, while the opposite arm 51 slightly offset is curved inwardly sharply and shaped to engage, under certain conditions, either the slot 50A in the outer edge of the member 33, Fig. 3, or a slot 58 in a ring 59, dotted lines, Fig. 3, according to the position of the member 33. The ring 59 is secured to the reduced end of the member 33, by a hub 60 secured by screws 61 extended through circumferential slots, not shown, in said hub 60, into the member 33.

The slot 50A may be created in any convenient manner in the outer wall of the member 33, but I prefer to do so by channeling the member and securing therein as by a screw 50B a strip or key 50C of a length that will leave at its inner end a slot to receive the arm 51 of the pawl 48.

In this way, the length of the key will automatically determine longitudinally the position of the slot which in turn determines the length of travel of the member 33 outward or to the right, Fig. 3, within the length of the member 35. In this manner the driving mechanism may be adjusted to raise and lower a curtain of any length within a given maximum or to provide a desired period of drive in one direction before reversal.

The auxiliary driving shaft 28 is provided with a train of gears for normally rotating a cam which, when stopped, functions with other elements to be described to throw the shipper for the reversing gears 13, 14. The train, Figs. 1, 2, 3, comprises gear 62 on the shaft 28, in mesh with a gear 63 on the end wall of the frame, in turn meshing with a gear 64, Fig. 2, loose on a shaft 65 in the frame upright wall, the shaft carrying adjacent the gear 64 a collar 66 with a gear reversing cam face 67 thereon. Opposite the cam collar 66 on the shaft 65 is a cooperating cam collar 68 keyed thereto, but slidable thereon, with a gear reversing cam face 69, to cooperate with the cam 67, being inoperative when the two cams rotate together, but, when one only rotates, then through connections to be described it reverses the gears 13, 14, and having an outer circumferential groove 70 which receives at one point a curved flange 71, Fig. 2 on the extended hub 72, dotted lines, pivoted by the pin 73 in upstanding ears 74, one only shown, on the bottom of the frame 1.

This hub carries an arm 75, Figs. 2, 7, having on its upper end a trip member, as a pivoted pawl 76, slidable on the top edge of a guide 77, Fig. 8, to engage a beak 78 on a pivoted block 79, normally maintained by a spring 80 in the position shown in Figs. 2, 8, and whereby, when the arm 75 is swung to the right from its present position shown, Fig. 2, and by means to be described, the pawl 76 will engage the beak 78 on the block 79 for releasing the shipper rod 89 to be referred to, preparatory to its being thrown, by means to be described, to reverse the direction of drive. The arm 75 is held normally in position shown in Fig. 2, by a spring 75A broken away, Fig. 7. Fast on the opposite end of the shaft 65, Figs. 2, 7, is a gear 80, meshing with a gear 81 on the frame 1 and, in turn, engaging a gear 82, Figs. 1, 2, 3, fast on the shaft 15, constituting the driving train of gears for actuating the shipper 26.

On the shaft 65, Figs. 2, 7, and between the collar 66 and gear 80, is fixed a worm 83 in which travels, as the worm revolves, a perpendicularly positioned pin 84 in the rear end of an arm 85 extended outwardly from the longitudinal shipper rod yoke bar 86 with inwardly extended shaft receiving arms 87, 88, by which it loosely rides on the shipper rod 89 in the frame 1, and which rod carries at its right hand end, Fig. 2, the hub 90 of the shipper 26. Inwardly, Fig. 7, from the bar 86 is extended a spring compressing arm 92 loosely encircling the rod 89, and the bore of the arm is sufficiently large to enable it to receive on opposite sides a thimble or collar 91 fast on the rod 89 and against which seats respectively one end each of springs 92A, 93 on the rod 89. The opposite ends of the springs seat against arms 94, 95, of the spring seating yoke 96, the arms being fast on the rod 89.

The yoke 96, Figs. 2, 7, slides longitudinally on the bar 86 and has a cam face 97 near each end upon which downwardly bear fingers 98, 99 inwardly extended from hubs 100, 101, fast on the shaft 65 and adjacent opposite ends of the worm 83. The fingers 98, 99 are maintained firmly bearing down upon the cam faces of the member 96 by leaf springs 102 upwardly extended on the frame 1, Fig. 2.

On the outer end of the arm 85, and at right angles thereto is a plate 103, the lower face of which is beveled upward toward each end, Fig. 2, to enable the ends to ride over the tops of pins 104 on hubs 100 and 101 so that one pin will enter a slot 105 in the plate 103 at

each end of the travel of the plate on the worm, to lock the arm 85 in position until it is thrown by means therefor to be described.

The hub 90 of the shipper 26, Fig. 2, carries a downwardly extended post 106 provided with a laterally extended contact 107, which engages, according to its position, one of two pair of contacts 108, in the motor circuit, and thus establishes a circuit through either line 110, 111 by a suitable three way switch, not shown, in a power line to a dynamo, not shown, which is also connected by line 112 with the motor 5.

The shipper rod 89, Fig. 7, already described, is moved longitudinally to throw the shipper 26 by the following mechanism. In the small inverted U-shaped housing 113, Figs. 7, 8, 9, on the frame 1, and near the left hand end, are pivoted horizontally yoke shaped dogs 114, 115, the upper yoke ends 116, 117 of which overlap longitudinally, and both of which overlie a segmental disk 118 fast on a stud shaft 119 while the lower yoke arms 120, 121 are shorter and are adapted each to engage at times one end of an elongated boss 122 on the rod 89. The block 79, Fig. 8, is mounted upon the stud shaft 119, and by the spring 80 already described secured thereto and to the housing 1 the block is kept in normally the position shown in Fig. 8.

When the pawl 76 already referred to is caused to engage, by means to be described, the beak 78 on block 79, and thus lift the cam 118 beneath the arms 116, 117, it will cause whichever arm 120 or 121 is engaging the end of lug 122 on the rod 89 to release the same and the spring 92A or 93, whichever has been compressed by the travel of the member 86, will throw the rod longitudinally with the shipper 26, and thus throw the clutch gear reversing disk 19 to the opposite gear member, and throw the switch movable contact 107 to the opposite contacts 108. The auxiliary driving shaft 28, Fig. 2, carries on its end a gear 124 in mesh with a gear 125 on the frame 1, which gear in turn meshes with a gear 126 on the operating shaft 4 which may run longitudinally as far as necessary to provide facilities for operating as many curtains as may be required, Fig. 13.

Opposite each window, Figs. 13, 14, the shaft 4 is provided with suitable means as a sprocket wheel 127 and chain 128 by means of which power is carried to a short shaft 129, on supports 130 either within the wall or inside the room on a false wall as may be most practical, carrying a progressively effective shaft screen and shade load compensating means, as for instance a cone roller pulley 131 over which runs a cord 132 carrying a weight 133 sufficient to substantially counterbalance the weight of the shaft and window shade 134 or a plurality of shades. The cord will roll upon the cone in proportion to the distance the curtain is lowered and of course its counterbalancing effect is increased as the cord is projected outwardly from the shaft by the increasing diameter of the pulley, and its full effect is had when the curtain is drawn down to the bottom of the window. The shade may be of any suitable material secured to a springless roller 136, preferably having secured to it guiding and stiffening bars 137, which travel in a groove 138 in the window frame to maintain the shade in close relation to the window and thoroughly exclude the light. The shaft 4 also is provided at convenient points as near the ends of each curtain roller 136 with take-off sprockets 139, over which runs a sprocket chain 140 to a cooperating sprocket 141 on the end of the roller 136 mounted on the upright 130 by means of bearings 142, by which the curtains are raised and lowered.

The method of operation is as follows: If the clutch disk 19 is engaging a gear 14, as shown in Fig. 1, and the mechanism has been operated until the clutch opener 33 has traveled inwardly or to the left, Figs. 1 and 2, until it has nearly reached its extreme point of travel, the pin 84 on the arm 85 will have traveled the length of the worm 83 and the cam 69 will be rotated under the drive of the gears 80, 81, 82, as shown in Fig. 2. The cam 67 will have been rotated in unison with the cam 69, by the gears 62, 63 and 64. The spring 92A, Fig. 7, will have been compressed under the influence of the travel to the left, of the arm 92, just the reverse of its position in Fig. 7.

During this time the inner clutch member 32, Fig. 3, has been locked to the hub 42 by the pawls 40, Fig. 4, and therefore to the shaft 15, and the outer clutch member 35 has been driven by the overhanging edge 34 against the then inwardly positioned end 49 of the pawl 48 held in that position by its beak 51 riding upon the outer face of the member 33, see Fig. 5. This will continue until the beak 51 drops into the slot 50A, stopping the rotation of the shaft 28. The brief continued rotation of the shaft 15 and hub 42 thereon causes the driving pawl 40 on the member 32 to ride upon one face of the cam 35A on the end of the member 35, raising the long arm of the pawl 40 and freeing it from its contact with the lug 41A on the hub 42 and stopping the rotation of the member 32 and therefore also of the clutch opener 33. The stopping of rotation of the shaft 28 stops also the rotation of the gears 124, 125, 126 and the rotation of the gear shift cam 67. The brief continued rotation of the shaft 15 after unlocking of the clutch member 33 and before the stopping of the shaft through gears 80, 81, 82, causes brief rotation of the worm 83, shaft 65 and cam 69. As the gear reversing cam 67 has ceased to

rotate and is now fixed, the cooperating cam 69 slides on its shaft 65 by means of its key thereon and rides upon the cam 67, turning arm 72 on its pin 73, throwing the upper end of the finger 75 to the right, against the action of a spring 75A thereon which normally holds the arm to the left, Fig. 1, causing the pawl 76 to rock the beak 78 and block 79 on the pin 119, thereby raising the segmental disk 118 and lifting the arms 116, 117, and yokes 120, 121, permitting the spring 92A to throw the shipper rod 89 and yoke 96 to the right, the raised arm 98 on the cam face 97 of the member 96 dropping the pin 104 on the hub 100 from the slot 105 in the plate 103, and throwing the shipper 26 which operates the switch 109 to stop the motor.

During the time that these changes have taken place in the mechanism, the shaft 4 has rotated to unroll or lower the shades, the spring 93 has been compressed, and as the machine is stopped, the outer and inner clutch members 35, 32 and clutch opener 33, Fig. 3, worm pin 84, Fig. 7, and dog 122, block 79 and yoke arms 117, 116, 121, 120, Fig. 9, are in the positions shown in these figures.

When the shades are to be rolled up or raised, the control switch, not shown, is thrown to close either circuit 110, 111, as the case may be, through the switch 109 to the motor 5 and the motor is started. The rotation of motor causes the rotation of the hub 42 and the lug 41A becomes locked between the pawls 40 thus rotating the member 32. The overhang portion 34 of this member engages the rear end 49 of the pawl 48 which was thrust inwardly when the forward end was raised from the slot 50 by the stopping of the member 35, see Fig. 6, and thus starts reverse rotation of the member 35 and shaft 28. Simultaneously the rotation of the worm 31 causes the member 33 to travel to the left, Fig. 3, and the gears 124, 125, 126 again operate the cam 67. The gears 80, 81 and 82 rotate the shaft 65 and worm 83 and feed the pin 84 to the left, Fig. 7, to compress the spring 92A. When the clutch opener reaches nearly the end of its travel, forward end 51A of the pawl 48A, Fig. 6, drops into the slot 58 and stops the rotation of member 35 and shaft 28, and curtain operating shaft 4 driven therefrom. This also stops rotation of gears 124, 125, 126 and cam 67.

Motor 5 continues to rotate the hub 42 until one of the pawls 40 rides upon the cam 35A releasing it from contact with lug 41, and permitting the member 32 to stop. By this time the spring 92A has been compressed and rotation of the shaft 65 causes the cam 69 to ride upon the face of the cam 67. The cam 69 slides upon its shaft and rocks arm 75 on the pin 73, swinging the pawl 76 to the right to engage beak 78 on the block 79.

The block turns its shaft 119, lifting the yoke arms 116, 117 by the segmental disk 118, thus lifting the arm 121 from in front of the lug 22 and permitting the compressed spring 92A to throw the shaft again to the right, Fig. 7, with the shipper 26 and clutch disk 19, as before.

When the rod 89 was thrust to the right it carried with it the yoke 96, the cam face 97 raising the inner end of the arm 98, dropping the outer end with pin 104 thereon from the slot 105 so that the plate 103 and arm 85 can slide to the right, Fig. 7, preparatory to its travel to the extreme left to compress the spring 93 upon further operation of the machine.

Obviously while the driving mechanism is particularly designed for operating the curtain shaft, nevertheless the former may be used for any other purpose for which it is adapted.

By closing switch 108A to connect the two pairs of contacts 108, continuous reversal of motion may be had without manual switching at the end of travel of the member 33 each way, thus providing convenient means for demonstration of the mechanism, or uninterrupted cycle of motion if and when desired.

In most uses of driving and reversing mechanism it is important that the travel of the driven element and reversal of motion shall be definitely determined.

For instance in the present case it is very important that all the shades for the windows be unrolled to the same degree that is necessary to properly darken all windows.

Where the stopping and reversing mechanism is actuated or controlled by the driven member in cooperation with some associated member, usually a fixed member, particularly where there are a number of driven members in series to be stopped, any delay of the stop mechanism is apt to affect the several driven members unequally. And if reversal of direction of motion is effected before the driven member stops, the driven member usually coasts a short distance before it actually stops and sometimes even kicks back a little.

By my novel construction, stopping of the driven member is effected by disconnecting the main and auxiliary driving member in the driving means unit or assembly, with the result that the driven member stops instantly and with no back kick.

The time of the disconnection of the elements is fixed positively, not by the arrival of the driven element at some point but by the arrival of the driving elements at some definite point in their operation. As the latter elements are driven by a constant speed motor, the disconnection is always made at a fixed time and the main driving mechanism is reversed by cooperation with the non-mov-

ing driven or auxiliary part of the driving mechanism.

This invention is not limited to the particular embodiment thereof described and illustrated.

I claim:

1. A shade or screen raising and lowering mechanism comprising a shade operating shaft, a shade compensating weight therefor, a cone pulley supporting the weight, said shaft adapted to simultaneously operate a plurality of shade rollers; and driving means therefor comprising a motor, a reversible driving shaft, and an auxiliary driving shaft both driven from said motor, and a clutch on the driving and auxiliary shafts, and reversing means for the shafts.

2. A flexible screen and shade raising and lowering mechanism comprising a shade operating shaft, a shade weight compensating means therefor, said shaft adapted to operate a plurality of shade rollers; and driving means therefor comprising a motor, a reversible driving shaft and an auxiliary driving shaft both driven from said motor, and a clutch on the driving and auxiliary shafts, and reversing means for the shafts operative at a selective predetermined time.

3. Driving and reversing mechanism for shades, screens and the like, comprising reversing gears, a clutch member and a shipper therefor; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member thereon; and reversing means for the gears comprising a shipper rod, means to actuate it and the shipper; and means including a cam shaft, cams thereon, and gears driving the cams, and means controlled by the driving clutch for unlocking the rod, to permit it to throw the shipper.

4. Driving and reversing mechanism for shades, screens and the like, comprising reversing gears, clutch members therefor and a shipper; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member thereon; and reversing means for the gears comprising a shipper rod, locking means therefor, means to actuate the rod and the shipper; and means including a cam shaft, cams thereon, and gears controlled by the driving clutch and driving the cams for unequal periods, to unlock the rod to permit it to throw the shipper.

5. Driving and reversing mechanism effecting interrupted cycle operation, comprising reversing gears, a clutch member therefor and a shipper; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member thereon; reversing means for the gears comprising a shipper rod, locking dogs therefor, means adjustable on and fast to the shipper rod to throw the rod and shipper; and means including a cam shaft with cams, and gears controlled by the driving clutch as to operation, acting to position the rod actuating means and for driving the cams to an unequal extent, to unlock the rod, and permit the rod and shipper throwing means to throw it and the shipper.

6. Driving and reversing mechanism for interrupted cycle operation comprising reversing gears, a clutch member therefor and a shipper; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member thereon; reversing means for the gears comprising a shipper rod, locking means therefor including a plurality of dogs and lifting arms thereon; springs on and movable with the rod to throw the rod and shipper, and means including a cam shaft with cams in operative relation to the dog lifting arms, and gears controlled as to time by the driving clutch, to compress the rod throwing springs alternately and in opposite directions, while the rod is locked and to drive the cams through unequal periods to cause them to cooperate and unlock the rod and permit the rod to be thrown.

7. Driving and reversing mechanism for interrupted cycle operation comprising reversing gears, a clutch member therefor and a shipper; a driving shaft carrying loosely thereon a driving clutch member, an auxiliary driving shaft and driving clutch member thereon, reversing means for the gears comprising a shipper rod, a yoke bar therefor, locking dogs therefor, a spring seating yoke bar on the rod, movable on the rod yoke bar, springs therein to throw the rod and shipper; and means, including a dog lifting block, and arms on the dogs to lock and unlock the rod; and means including a cam shaft with cams in operative relation to the block, a worm on the cam shaft, a spring compressor operated by the worm, and gears controlled as to time of operation by the driving clutch to operate the cams and spring compressor, the gears operative for unequal periods to cause the cams to cooperate and release the rod locking dogs and permit the spring to throw the rod and shipper.

8. Driving and reversing mechanism for interrupted cycle operation comprising reversing gears, a clutch member therefor and a shipper; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member fast thereon; reversing means for the gears comprising a shipper rod, locking dogs therefor, springs fast on the rod to throw the rod and shipper, and including a dog lifting block, and arms on the dogs; and including a cam shaft with cams thereon and a pivoted arm actuated thereby in operative relation to the block to lock and unlock the rod; and a worm on the cam shaft, a spring compressor

with a stud traveling in the worm and feeding the compressor in each direction, and a lock for the compressor for locking the rod under compression at each end of its travel; and gears effective with the auxiliary shaft for driving one cam; and gears effective with the main driving shaft for driving a second cam and spring compressor to cause the cams to cooperate and release the rod locking dogs and permit the spring to throw the rod and shipper.

9. Driving and reversing mechanism for interrupted cycle operation comprising reversing gears, a clutch member and a shipper therefor; a driving shaft carrying a driving clutch member; an auxiliary driving shaft and driving clutch member thereon; and a movable clutch unlocking member; reversing means for the gears comprising a shipper rod, locking dogs therefor, springs to throw the rod and shipper; and including a dog lifting block, and arms on the dogs to lock and unlock the rod; and means including a cam shaft with cams, in operative relation to the block to actuate the same, and a worm on the cam shaft and a spring compressor operated by the worm, and gears operated from the auxiliary shaft to operate one cam, and gears operated from the driving shaft to operate a second cam and a spring compressor, to release the rod locking dogs and permit the spring to throw the rod and shipper.

10. Driving and reversing mechanism comprising reversing gears, a clutch member and a shipper therefor; a driving shaft carrying a hub, a driving inner clutch member loose on the shaft and lockable to the hub, a driving auxiliary shaft with a driving outer clutch member fast on the shaft, self-acting means for locking the inner and outer clutch members and a traveling clutch unlocking member operated by the inner clutch member.

11. Driving and reversing mechanism comprising reversing gears, a clutch member and a shipper therefor; a driving shaft carrying a hub fast thereon, a driving inner clutch member loose on the shaft and pawls on the inner clutch member engaging said hub; and a worm on the shaft and fast to the inner clutch member with a clutch unlocking member on the worm constructed to travel in the driving clutch member to unlock the clutch members.

12. Driving and reversing mechanism comprising reversing gears, a clutch member and a shipper therefor; a driving shaft carrying a hub fast thereon, a driving inner clutch member loose on the shaft with self-acting pawls thereon to lock it to the hub, and having an overhanging quadrant-like edge; a driving outer clutch member fast on the shaft constructed to be engaged by the quadrant edge and lock the clutch, a worm on the shaft and fast with the inner clutch member with a cylindrical clutch unlocking member on the worm constructed to travel toward and to engage the outer clutch member to unlock the clutch.

13. A shade and screen raising and lowering mechanism comprising an operating shaft, progressively effective shaft and load compensating means therefor, said shaft adapted to operate a plurality of shade rollers; and driving means for said shaft comprising a motor, a reversible driving shaft, and an auxiliary driving shaft both driven from said motor, and a clutch on the driving and auxiliary shafts and reversing means for the shaft.

14. A shade and screen raising and lowering mechanism comprising a shade carrying and operating shaft, said shaft adapted to receive a shade thereon, a progressively effective shaft and load compensating means therefor, and a driving shaft, and means to drive the shade carrying shaft therefrom, and means to stop said shafts when moving in either direction at a predetermined time.

15. A successively operative driving and reversing mechanism for interrupted cycle operation, comprising reversing gears, a clutch member therefor and a shipper; a driving shaft carrying a driving clutch member, an auxiliary driving shaft and driving clutch member thereon; reversing means for the gears comprising a shipper rod, locking dogs therefor, means to throw the rod and shipper; means including a cam shaft with cams and gears controlled by the driving clutch as to operation, for positioning the rod actuating means and for driving the cams to an unequal extent to unlock the rod, and permit the means to throw it and the shipper; and a motor for driving the same with a switch in the motor circuit.

16. Driving and reversing mechanism comprising a driving shaft with a clutch member loose thereon; an auxiliary driving shaft with a clutch member fast thereon to lock the shaft to the first-mentioned shaft; a clutch unlocking member loose on the first shaft and in telescoping and travelling relation to the clutch members; a reversible clutch for the driving shaft, and clutch operating means including a shipper and rod therefor, a camshaft with cams thereon in operative relation for operating the shipper rod; and a train of gears from the auxiliary shaft for operating one cam and a train of gears from the driving shaft for operating the second cam and throwing the shipper rod; and a plurality of shade carrying rolls at selected locations operated by the driving and driven mechanism automatically to roll and unroll to a predetermined degree the shades thereon.

In testimony whereof, I have signed my name to this specification.

ALFRED J. HIXON.

CERTIFICATE OF CORRECTION.

Patent No. 1,896,623. February 7, 1933.

ALFRED J. HIXON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, line 44, claim 4, before "clutch" insert the article "a", and for "members" read "member"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of May, A. D. 1933.

M. J. Moore.
Acting Commissioner of Patents.

(Seal)