

June 25, 1968

L. ROTH

3,389,738

WINDOW SHADE APPARATUS

Filed Feb. 23, 1967

2 Sheets-Sheet 1

FIG. 1

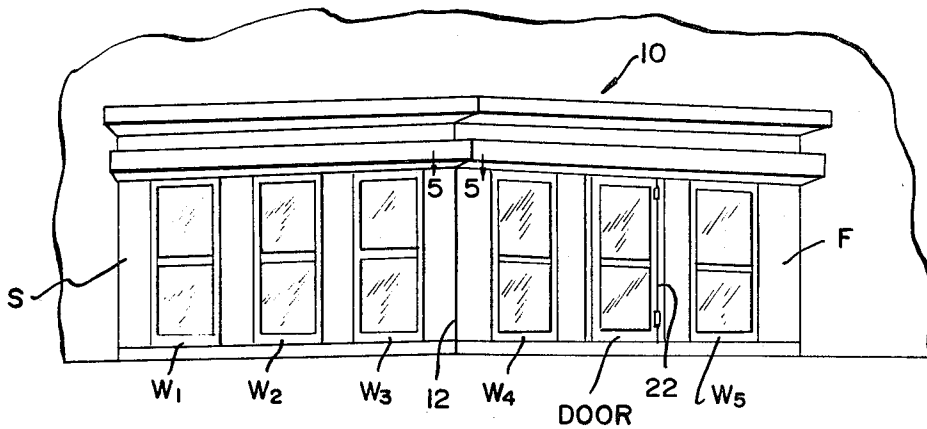


FIG. 2

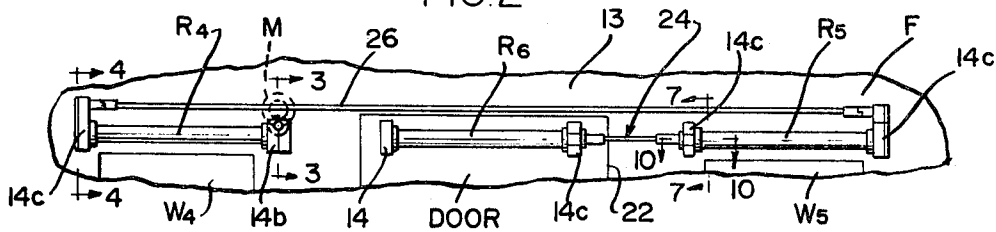


FIG. 6

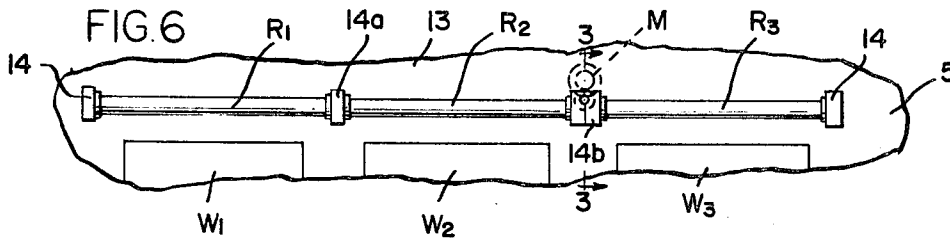


FIG. 4

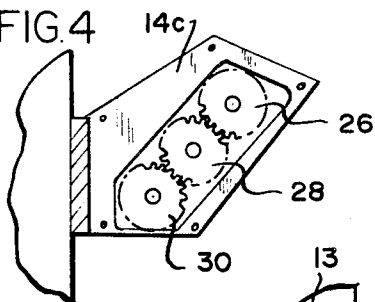


FIG. 3

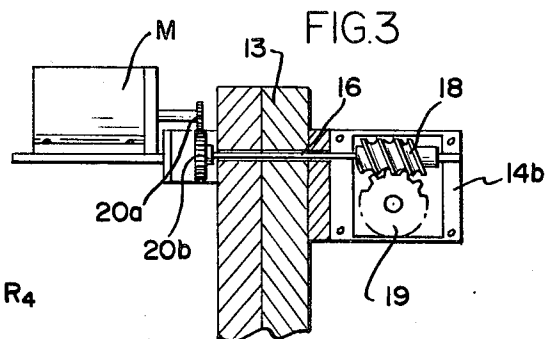
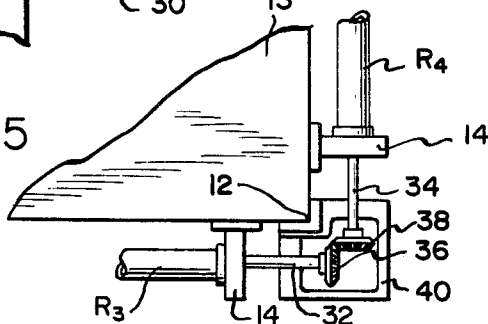


FIG. 5



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FIG. 7

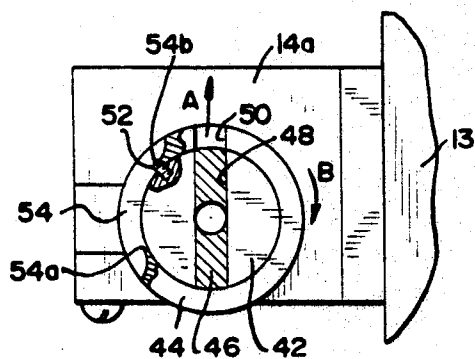


FIG. 8

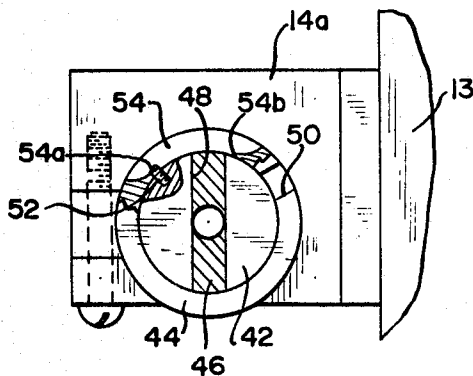


FIG. 9

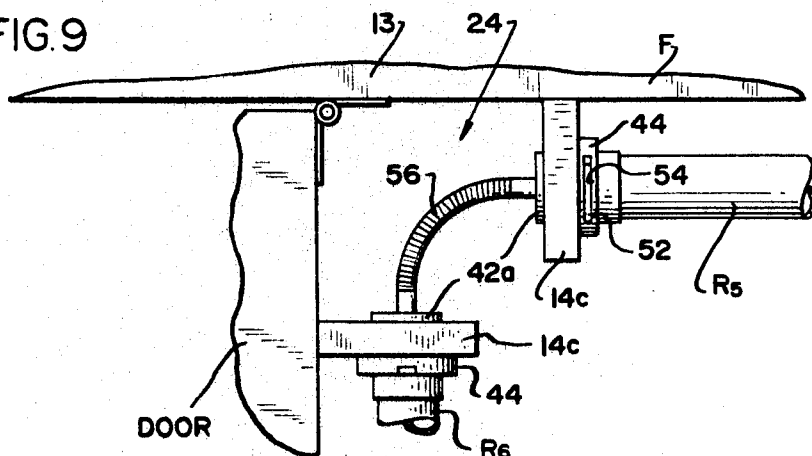
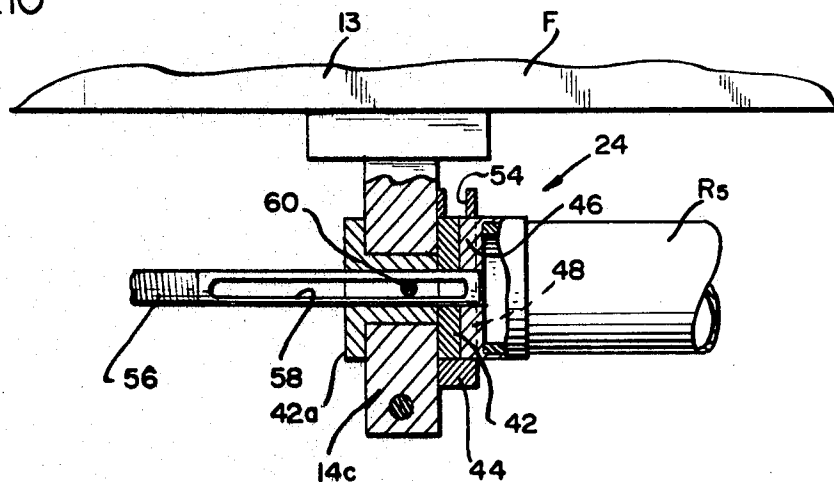


FIG. 10



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WINDOW SHADE APPARATUS

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3 Claims. (Cl. 160—120)

ABSTRACT OF THE DISCLOSURE

This invention relates to window shades and more particularly to a retractable window shade installation for simultaneously raising and lowering the shades of a plurality of windows arranged in a horizontal series such as in sun rooms or enclosures for patios, porches and the like. The windows and door each have a roller mounted by end brackets to the framework above each window and to the top of the door on the exterior of the room. A flexible shade is wound on each roller for raising and lowering in response to rotation of the roller. The invention relates principally to means for connecting the rollers of adjacent windows and the door roller for simultaneous rotation to simultaneously raise and lower all the shades of the installation. The structure includes a coupling connecting the rollers of the adjacent windows for simultaneous rotation and a universal means connecting the roller of the door to the roller of the window adjacent the hinged edge portion of the door for simultaneous rotation. A drive rod is rotatably mounted above the rollers out of the path of movement of the door and is connected by appropriate gears to the rollers of the extreme opposite windows of the series for simultaneous rotation. A motor is mounted on the interior of the room and has a drive shaft which extends through the room's framework in driving connection with one of the window rollers to rotate the same and thereby simultaneously rotate the remaining rollers of the windows and door to raise and lower all of the shades of the installation. One of the end brackets of one of the rollers comprises a gear box for receiving the drive shaft from the motor and to drivingly connect the same to the window roller supported by the bracket. The remaining end brackets of adjacent window rollers comprise coupling means with which the window rollers are readily disengageable such that each individual roller and the shade wound thereon may be removed for repair or replacement.

Background of the invention

Sun rooms or enclosed patios, porches and the like have become increasingly popular and normally include a horizontal series of windows with a door between two of the windows. Instead of employing glass windows, it has become popular to cover the window opening with transparent plastic sheeting material wound on a roller with the side edges of the sheeting received and guided in vertical grooves at the sides of the window framework. With most such installations heretofore available, it is necessary to have individual driving means for each window roller to raise and lower the plastic window shade. However, it is more desirable to simultaneously raise and lower the shades for the entire series of windows, and this is especially desirable when a sudden rain storm occurs to avoid damage to the interior of the room and furniture contained therein. Heretofore, the provision of such a common driving means has been quite elaborate and expensive and has merely added to the already relatively high cost of such installations. This is especially true when a door is disposed between two windows of the series because it is equally desirable to simultaneously raise and lower the shade covering the door window, but since the door breaks the driving chain between adjacent windows

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it has been difficult to provide a simple efficient structure. This invention is directed primarily to solving such problems and to providing a simple, inexpensive means for simultaneously raising and lowering not only the window shades of adjacent windows but the window shade of a door disposed between two of the windows of the series. The various couplings, driving links and universal connections disclosed herein all cooperate to provide a novel and useful window shade installation of the character described.

Summary of the invention

The principal object of this invention is to provide a new and improved retractable window shade installation.

Another object of this invention is to provide a retractable window shade installation of the character described for simultaneously raising and lowering the window shades of a plurality of windows arranged in a horizontal series.

A further object of this invention is to provide a retractable window shade installation of the character described including means for simultaneously raising and lowering the window shade of a door window along with the window shades disposed on each side of the door, the driving means being mounted out of the path of movement of the door, and including a universal means connecting the window shade roller of the door and the roller of an adjacent window to maintain a driving connection between said rollers notwithstanding the necessity of opening and closing the door.

Description of the drawings

FIG. 1 is a perspective view of a sun room, enclosed patio, porch or the like;

FIG. 2 is a partial elevational view on an enlarged scale of the front of the installation shown in FIG. 1 to illustrate the driving connections between the window shade rollers of the windows and the door;

FIG. 3 is a vertical sectional view taken generally along the line 3—3 of either FIG. 2 or FIG. 4;

FIG. 4 is a vertical sectional view taken generally along line 4—4 of FIG. 2;

FIG. 5 is a horizontal sectional view taken generally along the line 5—5 of FIG. 1;

FIG. 6 is an elevation view similar to that of FIG. 2 of the side of the installation shown in FIG. 1;

FIG. 7 is a vertical sectional view taken generally in the direction of line 7—7 of FIG. 2, showing the window roller coupling in a position to permit removal of the roller;

FIG. 8 is a vertical sectional view similar to that of FIG. 7 with the coupling in position preventing removal of the window roller;

FIG. 9 is a plan view on an enlarged scale of the universal connection between the window shade roller for the door and the adjacent window roller; and

FIG. 10 is a horizontal sectional view taken generally along the line 10—10 of FIG. 2 illustrating one end of the universal connection illustrated in FIG. 9.

Detailed description of the invention

Referring to the drawings in greater detail, the invention is illustrated herein as installed on a sun room or enclosed patio, porch or the like, two sides of which are illustrated in FIG. 1. F refers to the front of the room and S denotes the side of the room. The room has a plurality of windows W1 through W5 arranged in a horizontal series in the framework 13 of the room and the structure of this invention is designed to simultaneously raise and lower the window shade rollers (hereinafter described) of the series of windows. As will be more fully set forth below, the device may operate only the rollers of the windows in a single wall or may extend around corner 12

of the room and yet simultaneously rotate all the window shade rollers of the room. An important feature of the invention is to permit simultaneous rotation of the rollers of each window notwithstanding the disposition of a door (FIG. 1) between two of the windows of the series. In fact, as will be hereinafter described, a window shade roller may be disposed at the top of the door for simultaneous rotation with the rollers of the windows in the series.

Referring to FIG. 4, each window W1 through W3 of the side wall S of the room has a roller R1 through R3, respectively, which is mounted by end brackets 14 to the framework above the respective window on the exterior of the room. Each roller is designed to have a window shade wound thereon for raising and lowering in response to rotation of the roller. As will be more fully described later, the bracket between adjacent windows (for instance bracket 14a between rollers R1 and R2 in FIG. 6) comprises a readily disengageable coupling to connect adjacent rollers for simultaneous rotation and permit removal of the rollers for repair or replacement.

As best illustrated in FIG. 3, a motor M is mounted on the framework 13 on the interior of the room and comprises the drive means for rotating the rollers. A drive shaft 16 extends through the framework 13 for connecting the motor to the rollers to drive the rollers. Referring to FIGS. 3 and 6, bracket 14b, between rollers R2 and R3, comprises a gear box for receiving one end of the drive shaft 16. A similar bracket is shown in FIG. 2 at the right end of roller R4. A worm gear 18 is fixed to the drive shaft 16 within bracket 14b for rotating the rollers R2 and R3 through a gear 19 which is coupled to the rollers. The drive shaft 16 is rotated by motor M through gears 20a and 20b. This driving means is seen in FIG. 6 as mounted on the side wall S such that the motor M simultaneously rotates rollers R1, R2 and R3 to simultaneously raise and lower the shades for windows W1, W2 and W3.

It is usually desirable to have a door in one wall of the room as is best seen in the front wall F of FIG. 1. However, the door breaks the driving chain between adjacent rollers when using the basic structure as shown in FIG. 6 and a modification is required. As best seen in FIGS. 1 and 2, the door is hinged along one vertical edge 22 adjacent window W5 and the respective roller R5. The door is provided with a roller R6 adjacent the top of the door approximately the same height as rollers R4 and R5 of adjacent windows. A universal means generally designated 24 connects roller R6 at the top of the door with the roller R5 of window W5 adjacent the hinged edge 22 of the door. The universal means is best illustrated in FIGS. 9 and 10 and will hereinafter be described in more detail. The universal means connects the rollers R5 and R6 for simultaneous rotation notwithstanding the opening and closing of the door. A drive rod 26 is rotatably mounted on the framework 13 above the rollers out of the path of movement of the door. The drive rod 26 is operatively connected to the rollers R4 and R5 of the extreme opposite windows W4 and W5, respectively through gear means disposed in end brackets 14c which are shown in detail in FIG. 4. The end brackets 14c comprise a gear box for housing gears 26, 28 and 30 (FIG. 4). Gear 26 is secured to the ends of drive rod 26 and operates through a spacer gear 28 for rotating a gear 30 which is coupled to the end rollers R4 and R5. The spacer gear 28 is provided to space the drive rod 26 sufficiently above the top of the door to be out of the path of movement of the door. The spacer gear may be eliminated and the gears 26 and 30 enlarged but such would require unduly large end brackets 14c housing the gears and aesthetically detract from the installation. The roller R4 is provided with a bracket 14b at its right hand end in FIG. 2 which is similar to the bracket 14b in FIG. 6 and comprises a gear box for receiving one end of a drive shaft from a motor M on the interior of the room opposite the roller R4. The structure of the motor and the means for

connecting the same to the roller R4 is identical to the structure shown in FIG. 3 as described above.

The operation of that portion of the installation shown in FIG. 2 mounted on the front wall F is as follows. The motor M, through a drive shaft extending through the wall into gear box bracket 14b rotates roller R4. Roller R4 is connected to drive rod 26 through the gear means illustrated in FIG. 4 which in turn is operably connected at its other end, through similar gear means, to roller R5. Roller R5 is operably connected by universal means 24 to roller R6 of the door. Thus, all of the rollers mounted on the front wall, including the door roller R6, are simultaneously rotated by means of a single motor notwithstanding the necessity of opening and closing the door. Obviously, additional windows may be disposed in the series and operated as the windows of the side wall S, as illustrated in FIG. 6.

Should it be desirable to simultaneously raise and lower the window shades of the side wall and the front wall by a single drive means, one of the motors illustrated in FIGS. 2 and 6 and shown in detail in FIG. 5 may be eliminated and the rollers R3 and R4 of the windows W3 and W4, respectively, adjacent the corner 12 of the room may be connected for simultaneous rotation by a means illustrated in FIG. 5. Each of the rollers R3 and R4 is coupled to an extension rod 32 and 34, respectively, for rotation therewith. The extension rods 32 and 34 are operatively connected for simultaneous rotation by bevel gears 36 and 38, respectively. The bevel gears may be enclosed within a housing 40 secured to the framework 13 at the corner 12 on the exterior of the room.

Referring to FIGS. 7 and 8, each of the brackets 14 and 14a seen in FIGS. 2 and 6 comprises a coupling for readily disengageably mounting the rollers to the framework walls of the room and, as with bracket 14a in FIG. 6, couple one roller R1 with the adjacent roller R2. The coupling includes a coupling shaft 42 rotatably supported by the bracket 14a and includes cylindrical roller connecting rings 44 encircling and retaining the ends of the rollers therein. Each roller has a rib or tongue 46 shown in section in FIGS. 7 and 8 disposed on at least one end of the roller and which is received in a complementary groove 48 in the end wall of the coupling shaft 42. The roller connecting ring 44 has a slot 50 which may be selectively aligned with the rib 46 and slot 48 to permit the roller to be disengaged from the coupling by moving the rib 46 through the slot 50 in the direction of arrow A in FIG. 7. In order to hold the roller in driving connection with the coupling shaft 42, the cylindrical retaining ring 44 is rotated in the direction of arrow B, FIG. 7, such that the slot 50 is out of alignment with the rib 46 and groove 48 as best illustrated in FIG. 8. In this position, the retaining ring 44 blocks movement of tongue 46 out of slot 48. Rotation of the retaining ring 44 is limited by a stop pin 52 extending outwardly from the coupling shaft 42 into an arcuate slot 54. The ends 54a, 54b of the slot 54 form stop means for abutting the stop pin 52 and define the disengaging, FIG. 7, and holding, FIG. 8, positions of the retaining ring 44.

FIGS. 9 and 10 show in detail the universal means connecting the door roller R6 with the adjacent window roller R5 and includes a flexible universal shaft 56 slidably connected to coupling shafts 42a mounted by brackets 14d to each of the front wall F and the door. The coupling shafts 42a are disengageably coupled to the rollers R5 and R6 by coupling means described above and shown in FIGS. 7 and 8. The universal shaft 56 has elongated slots 58, FIG. 10, in its opposite ends through which pins 60 extend. The pin 60 at the right end of universal shaft 56 is fixed to the coupling shaft 42a and imparts rotary motion from roller R5 to the universal shaft 56 by bearing against the walls of the slot 58. A similar structure connects the left end of the universal shaft 56 to the door roller R6. The slots 58 provide a lost motion connection to permit the universal shaft to move in relation to the brackets 14c

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and rollers R5 and R6 as the universal shaft 56 flexes on opening and closing movement of the door.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom as some modifications will be obvious to those skilled in the art.

I claim:

1. In a retractable window shade installation comprising a plurality of windows arranged in a horizontal series in a framework with a door hinged along one vertical edge thereof and located between two of said windows, said windows and door each having a roller mounted by end brackets to the framework above the respective window and adjacent the top of said door, and a flexible shade wound on each of said rollers for raising and lowering in response to rotation of the rollers: means connecting the rollers of adjacent windows for simultaneous rotation; universal means connecting the roller of said door to the roller of the window adjacent the hinged edge portion of the door for simultaneous rotation; said connecting means comprising a drive rod rotatably mounted on said framework above said rollers out of the path of movement of said door gear, means operatively connecting said drive rod to at least one window roller on opposite sides of said door for simultaneous rotation, and a drive means for rotating one of said window rollers and thereby simultaneously rotating the remaining rollers of said windows

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and door to simultaneously raise and lower all the shades of said installation.

2. The retractable window shade installation of claim 1 wherein one of the end brackets of each of said window rollers on opposite sides of said door to which said drive rod is operatively connected includes a gear box for receiving the ends of said drive rod, and gear means within each of said gear boxes connecting said drive rod with said rollers.

3. The retractable window shade installation of claim 2 wherein said gear means includes a first gear connected to the roller, a second gear connected to the drive rod, and a spacer gear operatively connecting said first and second gear to space said drive rod out of the path of movement of said door.

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