Aug. 20, 1935. F. E. TWISS 2,011,599

CURTAIN STRUCTURE

Filed Feb. 6, 1934 2 Sheets-Sheet 1

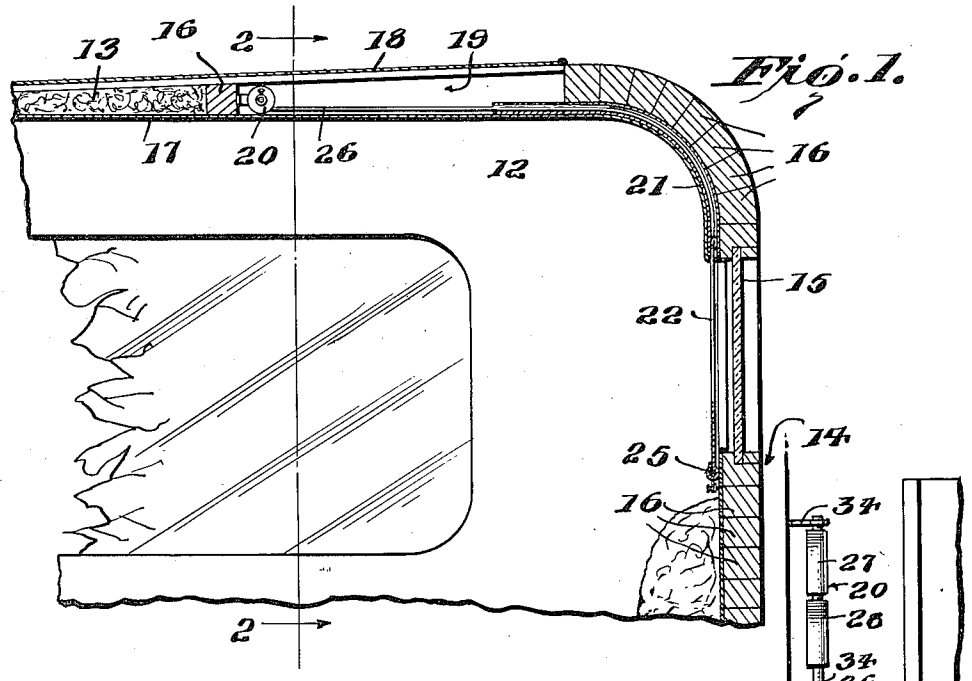
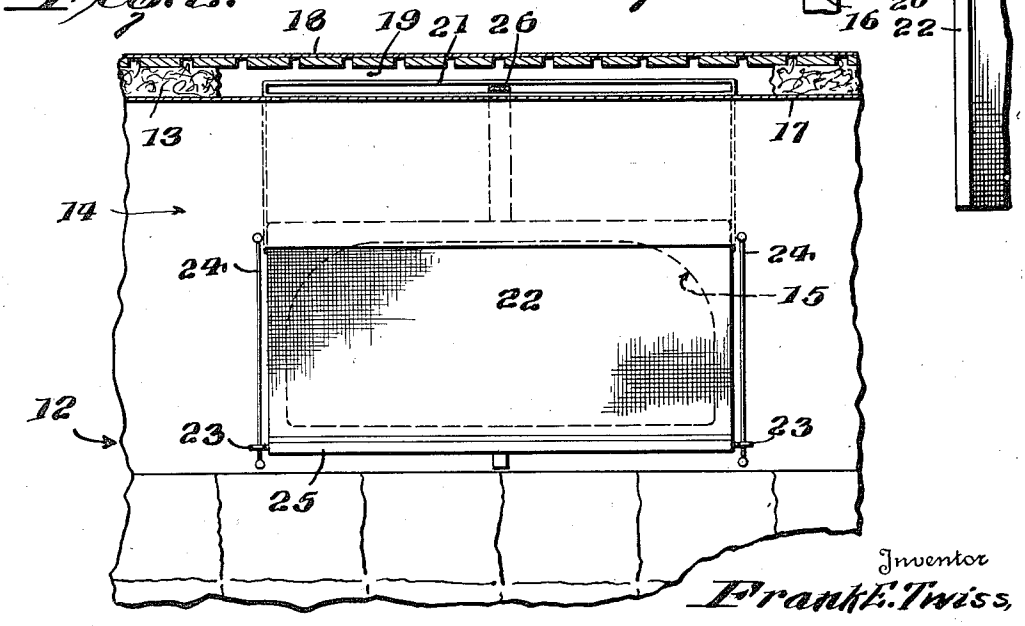


Fig. 1.

Fig. 3.

Fig. 2.



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CURTAIN STRUCTURE

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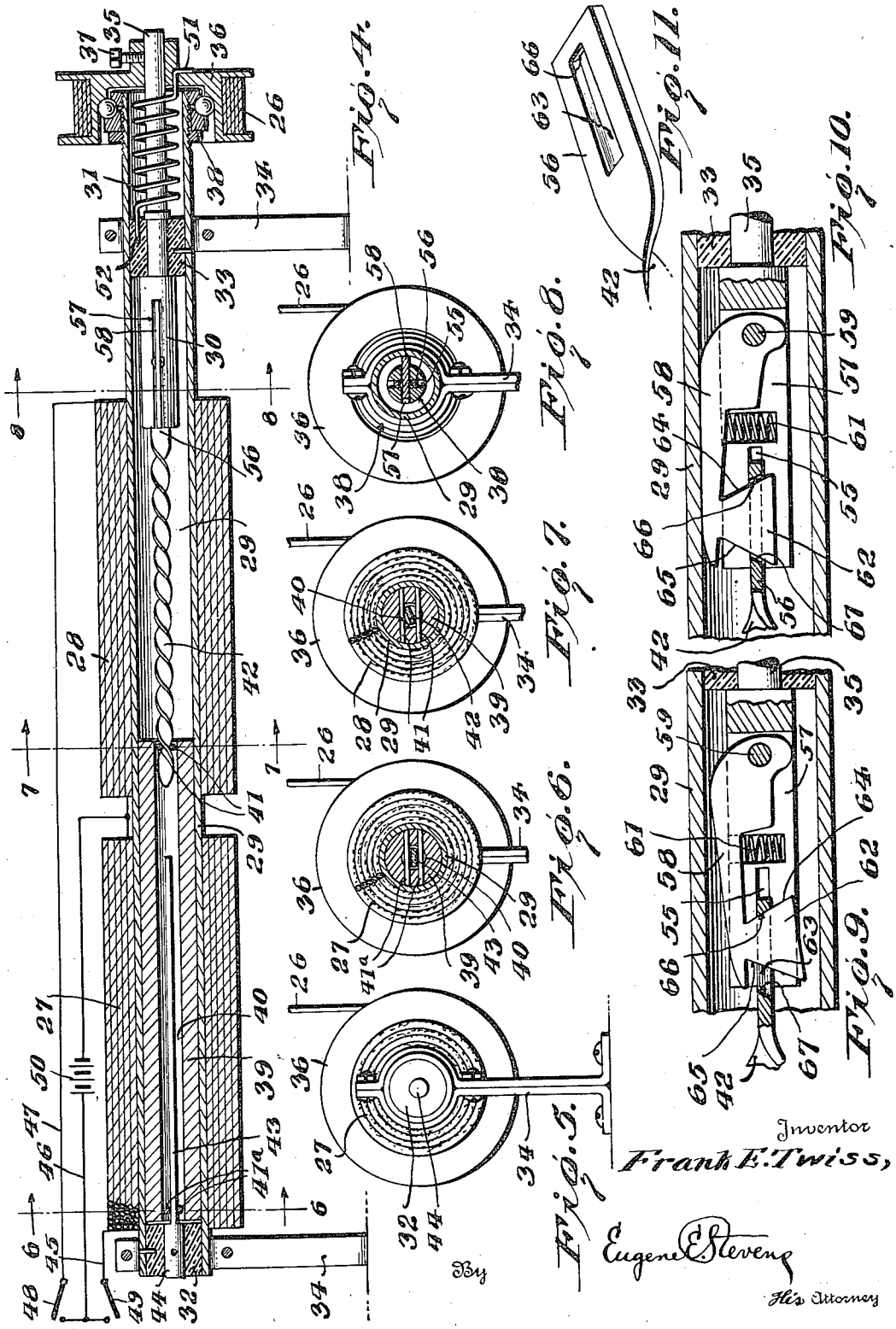

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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CURTAIN STRUCTURE

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Application February 6, 1934, Serial No. 710,017

7 Claims. (Cl. 156—28)

My invention relates to improvements in shutter actuators, with particular reference to such as are used as curtains for the windows of closed automobiles.

One of the principal objects of the invention provides a device in which the usual curtain roller is eliminated and the operating mechanism for raising and lowering the curtain is concealed from view within the automobile structure.

Another object of the invention is the provision of means whereby the curtain, in its raised position, is concealed from view within the automobile structure.

A further object of the invention is to provide mechanism whereby a stabilizing or counterbalancing means is employed for balancing the weight of the curtain so as to lighten the load upon the source of power.

A still further object of the invention is to provide brake means for initially resisting the raising and lowering of the curtain, there preferably being a lost motion connection between the elements of the curtain actuating mechanism so that the same will not be working against the load of the weight of the curtain while overcoming the brake means.

Other objects and advantages will be apparent from the following description, appended claims and annexed drawings.

Referring to the drawings wherein like numerals designate like parts throughout;

Figure 1 is a sectional view through the rear portion of an automobile body showing my invention partly in section, applied thereto in relation to the rear window, the curtain being in the lowered position.

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a top plan view of my invention, a portion of the curtain and coacting parts being eliminated.

Figure 4 is a longitudinal sectional view of the curtain actuating mechanism.

Figure 5 is an end elevation thereof.

Figures 6, 7 and 8 are sectional views taken on the lines 6—6, 7—7, and 8—8, respectively of Figure 4.

Figure 9 is a detail longitudinal sectional view showing the brake mechanism in inoperative or contracted position.

Figure 10 is a similar view as illustrated in Figure 9, the brake mechanism in this instance being shown in operative or expanded position and,

Figure 11 is a detail perspective view of an end portion of the spiral rotating element or strip showing the slot therein for actuating the brake shoe.

A typical automobile body 12 having top and rear walls 13 and 14 respectively, is provided with the usual rear window 15 located in the rear wall 16. The top and rear walls are provided with reinforcing spacing members 16 over which is attached upholstering material 17. The roof or top 18 is spaced from the upholstering 17 and forms a space 19 therebetween. Within this space 19, I attach my curtain actuating mechanism 20 to one of the reinforcing members 16. Other members 16, at the junction of the top and rear walls receive an arcuate metal envelope or guide member 21 for receiving the curtain 22 when it is in its raised position.

As shown in Figures 1 and 2, the curtain is of a sufficient length and width as to completely cover the rear window in its lowered position and is provided with the usual guide eyes 23 through which pass guide cords 24 for guiding and aligning the curtain during movement.

The lower end of the curtain is provided with a heavy bar or weight 25 which serves to normally urge the curtain in a downward direction. A connecting strap 26 of any suitable material connects the top of the curtain to the actuating mechanism 20, the strap passing through and operating within the envelope or guide member 21.

The curtain actuating mechanism comprises a pair of solenoid magnets including coils 27 and 28 wound upon a suitable brass tube 29, one end of which is extended a sufficient distance to encompass a brake 30 and counterbalancing mechanism 31. One end of the tube is closed by a plug 32 and the other end by a bearing 33, at which points supports 34 embrace the tube for securing the entire mechanism to any suitable spacing member 16 hereinbefore set forth. Of course supports 34 can be located at different points than indicated.

The bearing 33 has journaled therethrough a shaft 35, one end of which terminates in and forms part of the brake mechanism 30. The other end extends beyond the tube and has secured to it a pulley 36 by means of a set screw 37. Suitable roller bearings mechanism 38 is interposed between the pulley 36 and tube 29 for rendering efficient rotation of the pulley relative to the tube.

Slidably mounted within the tube 29 is a core 39 common to both solenoid coils 27, 28 and having a central bore 40. Each end of the core

is provided with a set of dowel pins 41 and 41a for a purpose hereinafter set forth.

Connected to and forming part of the brake mechanism 30 is a spiral rotating element or strip 42, the free end of which (Figure 4) is passed within one end of the bore 40 and between the dowel pins 41. The dowel pins 41 being spaced from each other a sufficient distance to receive between them the strip 42. The dowel pins 41a, at the other end of the core, are so positioned as to receive between them a flat strip 43 which is fixed to the plug 32 as at 44, thus, while allowing longitudinal movement of the core 39, preventing any rotating movement. It will be noted that the core is of a greater length than either of the coils and this arrangement and construction of the coils, tube and core form a pair of solenoids, the resultant operation of which will be hereinafter described. Suitable lead wires 45, 46 and 47 are connected thereto and have switches 48 and 49 for controlling a source of power 50 for operating the solenoids.

The counterbalance mechanism 31 takes up the slack both in the strap 26 and curtain 22 when the same is in the lowered position. This frequently occurs when the bar 25 on the lower end of the curtain is prevented, for any reason, from further downward movement. The mechanism 31 is comprised of a coil spring which surrounds the shaft 35 having its outer end 51 secured to the pulley 36 and its inner end 52 secured to the bearing 33. The degree of compensation may be changed or varied by adjusting the pulley 36 on the shaft 35 through the medium of the set screw 37. Any adjustment of the pulley relative to the shaft will of course increase or decrease, as the case may be, the tension of the coil spring. Thus, it will be readily understood, that during the lowering operation of the curtain, the spring is being compressed about the shaft 35 and upon the stopping of the rotation of the shaft, the spring reacts to rotate the shaft and pulley in a reverse direction to compensate for the distance provided by the play or lost motion between the relative cooperating parts or members.

The braking mechanism 30 comprises an enlarged portion of the shaft 35 and is slotted as at 55 to receive the end 56 of the spiral strip 42. Another slot 57 is positioned at right angles to the slot 55 and receives the brake shoe 58 which is held therein by means of a pivot 59. A bore or opening contains a coil spring 61, the upper end of which seats against the shoe 58 and normally urges the upper face of the shoe in contact with the inner surface of the tube 29 which is appropriately formed to insure positive engagement. The shoe is provided with an extended portion 62 positioned within a slot or opening 62 formed in the end 56 of the strip 42, and is provided with inclined surfaces 64 and 65 which are adapted to engage cam surfaces 66 and 67 formed on opposite walls of the slot or opening 63.

In operation, the curtain being in the lowered position (the relative position of the parts being shown in Figures 4 to 8, inclusive) the switch 48 is operated to close the circuit between the wires 46, 47 and source of power 50. This action energizes the coil 28 which serves to move or pull the core 39 in a direction toward the brake mechanism. The longitudinal movement of the core, which is prevented from rotating by the dowels 41a and strip 43, causes the spiral strip 42 to be rotated due to the pressure exerted by the dowel pins 41, carried by the core, on the convolutions of the spiral strip. This rotation of the spiral strip imparts a rotary movement to the shaft 35 which is connected to the spiral strip 42 through the medium of the brake mechanism. The pulley 36, being secured to the shaft, is likewise rotated. The web or strap 26 from the curtain 22 is connected to the pulley and as a result of the rotation of the pulley the curtain is raised into the envelope 21. The bar or weight 25 in this operation abuts the bottom of envelope 21 to limit extent of raising. However, it will be noted that before starting the operation, the brake mechanism is in the position shown in Figure 10, thus serving to prevent relative movement between the shaft and housing. Upon the starting of the raising operation, the movement of the core through the dowel pins 41a imparts a lateral thrust to the strip 42. This thrust action permits of the strip 42 to advance within the slot 55 in a manner, that, the cam surface 67 contacts and acts upon the inclined face 65 of the extended portion 62 of the shoe 58 and forces the shoe away from the inner surface of the tube, thus, releasing the brake and permitting free rotation of the associated parts. In the lowering of the shade, the reverse action takes place, the core exerting a pull upon the spiral strip and as a consequence, the cam surface 66 formed in the slot 63 acts on the face 64 of the extended portion and forces the shoe out of engagement with the tube, as clearly shown in Figure 9. While the curtain is being lowered, the spring of the compensating mechanism is being compressed. The termination of the rotation of the pulley and shaft at the end of the lowering operation permits of the spring to react and take up the slack and lost motion in the parts as hereto described. The switch 48 is of course operated to break the circuit and stop the actuating mechanism when the curtain has reached the desired level.

The parts are so constructed, that upon closing the switch 49 a circuit between the wires 45 and 46 is completed thus energizing the coil 27 to move the core in the opposite direction, thereby, imparting a reverse movement to all the parts and lowering the curtain until the core 39 abuts plug 32 to limit the extent of lowering movement.

It is to be distinctly understood that various changes and modifications may be had in the construction and arrangement of the various parts without departing from the spirit of the invention or scope of the appended claims.

Having thus set forth and described my invention, I claim:

1. In a curtain operating construction, a curtain, remote control mechanism for operating said curtain and embracing a solenoid, a shaft operated by said solenoid and providing a pulley, a brake for said shaft, a compensating device operable by said pulley, means connecting said mechanism to said curtain and means connected to said mechanism for operating the same.

2. A window curtain operating construction comprising a curtain, electrically operated mechanisms for raising said curtain embracing a solenoid and including a shaft, a pulley secured to said shaft and resiliently connected to said curtain and a brake for said shaft, means for operating said mechanism from a remote point and a device for concealing said curtain in raised position.

3. In a reeling apparatus, a solenoid having an axially movable core, a driven shaft, a winding drum fixedly attached to said shaft, and cooperative means on said core and shaft whereby to

rotate the shaft upon linear movement of the core.

4. Shutter operating apparatus comprising in combination, a driving member, means for causing linear reciprocation of said member, a rotatively driven member operable by said driving member, a drum carried by said driven member, a shutter, and flexible cable means attached to said drum and shutter.

5. Shutter actuating mechanism comprising in combination, a shutter arranged for movement in opposite directions, a drum, flexible cable means connecting said shutter and drum, a solenoid having an element supporting said drum in freely rotatable relation, an axially movable core in said solenoid, means for rotating said drum by and upon movement of said core whereby to operate the shutter by winding and unwinding the cable means on the drum, and distant control means for actuating the solenoid.

6. In an automobile curtain operating construction, a curtain, means incorporated in the rear wall and top of the car body for guiding and concealing said curtain coincident with and after one of its operations, rotatable means in said top for operating the curtain, and means connecting said curtain with said rotatable means.

7. In an automobile curtain construction, a flat sliding curtain, means connected to said curtain for raising and lowering the same, a curved envelope-like guide and housing means for keeping the curtain in a substantially flat condition at all times, and means including said last named means and a part of said curtain for limiting movement of the curtain in one direction.

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