

Dec. 31, 1929

A. R. MITCHELL
AUTOMATIC SHADE ROLLER

1,741,871

Filed Nov. 9, 1926

2 Sheets-Sheet 1

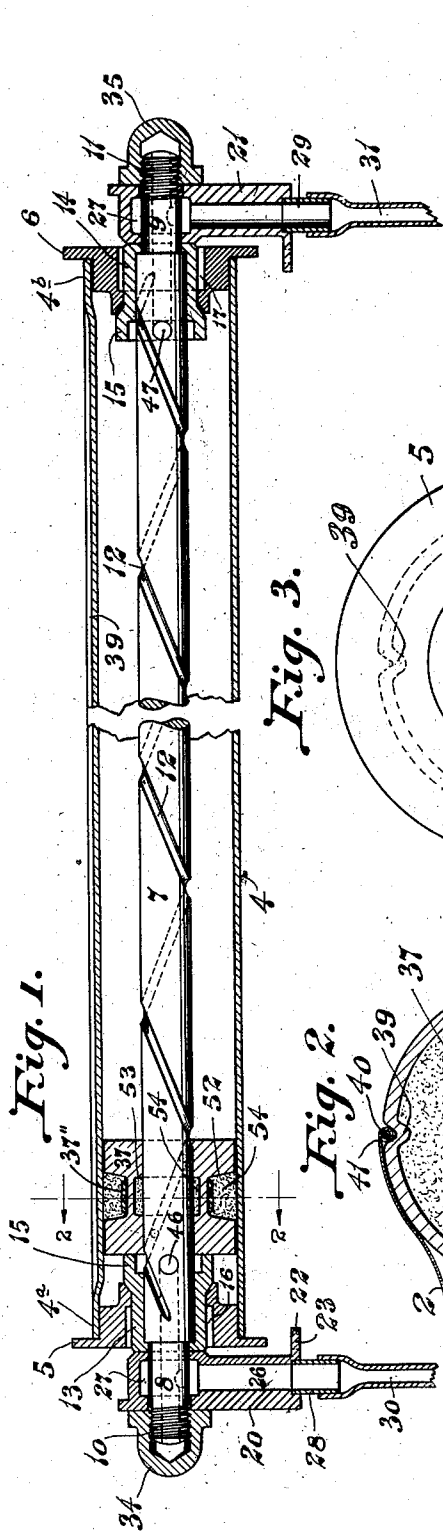


Fig. 1.

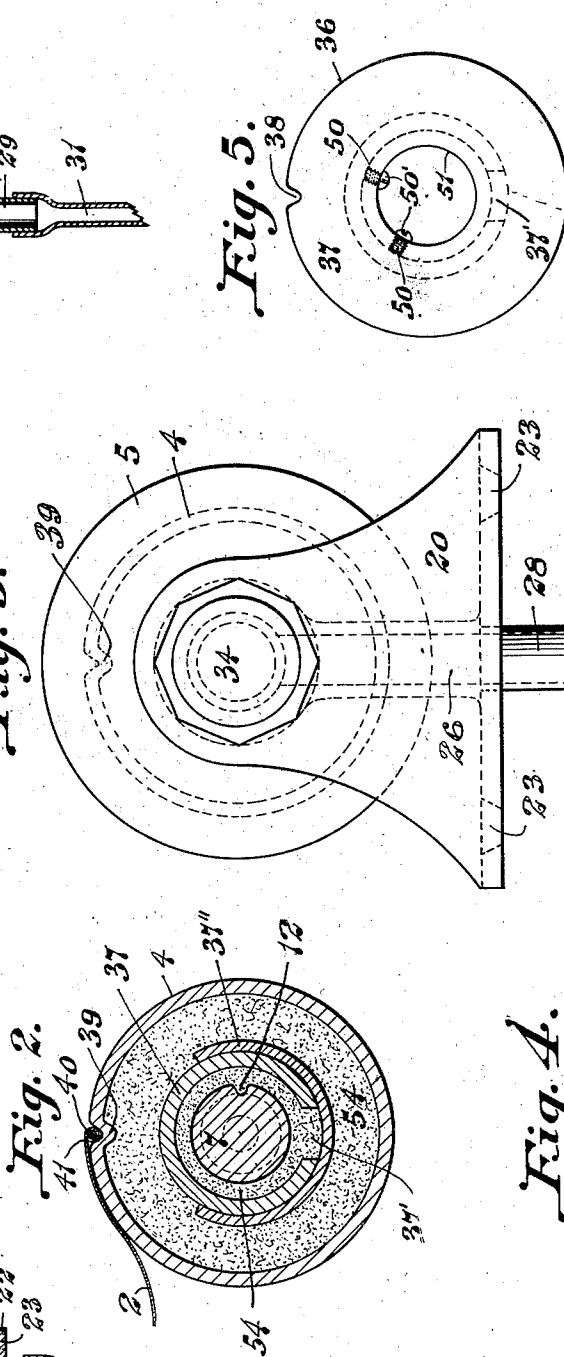


Fig. 2.

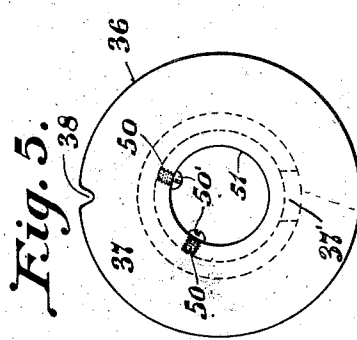


Fig. 3.

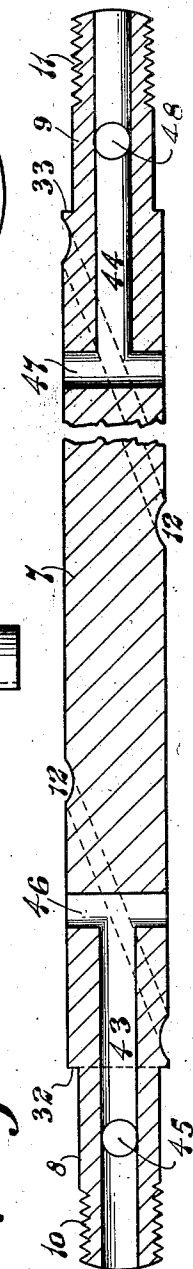


Fig. 4.

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2 Sheets-Sheet 2

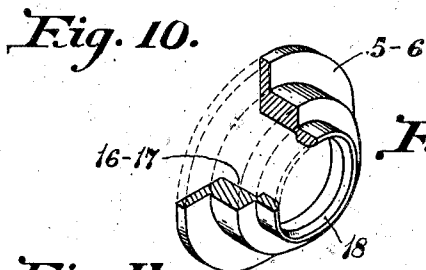
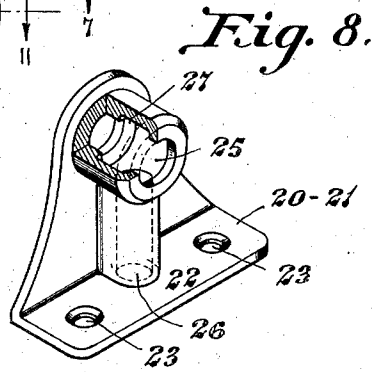
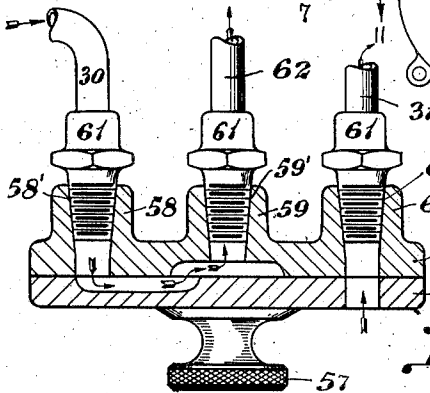
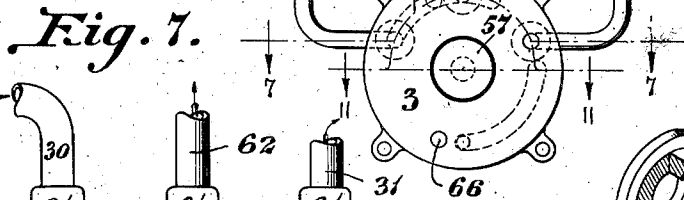
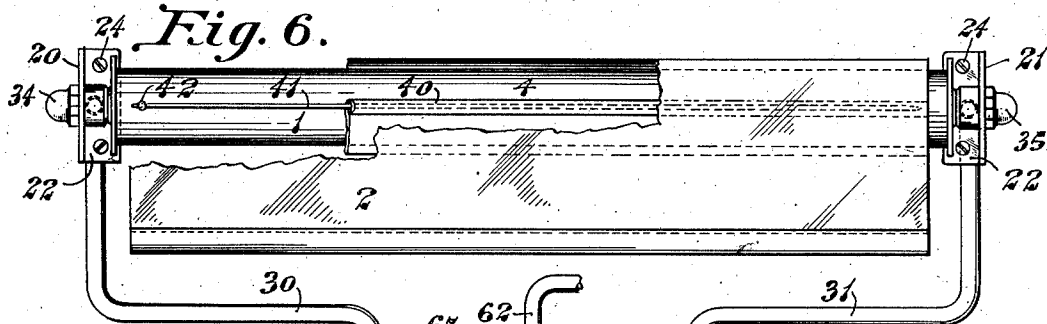
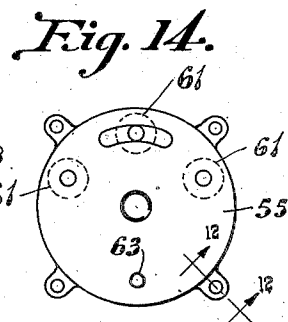
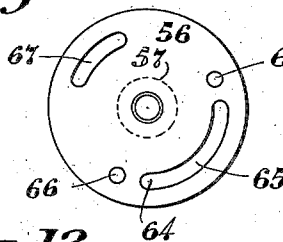
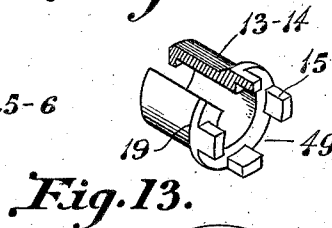
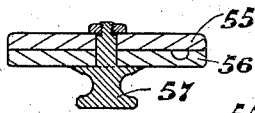


Fig. II.



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UNITED STATES PATENT OFFICE

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AUTOMATIC SHADE ROLLER

Application filed November 9, 1926. Serial No. 147,280.

My invention relates to automatic shade rollers for automobiles and more particularly to shade rollers wherein the rolling or winding of the shade upon the roller is effected by the use of suction from the intake manifold of an internal combustion engine, and which suction can be controlled from a suitable valve placed on the instrument board or like convenient place.

The objects of my invention are to provide an automatic shade roller for automobiles which will be simple, efficient, economical to manufacture and easily installed or made a permanent part of automobiles and like conveyances.

A further object of my invention is to provide a shade roller for automobiles which is operated by suction, piped from the intake manifold and which can be easily controlled from the operator's seat.

A still further object of my invention is to provide an automatic shade roller for automobiles operated by suction from the intake manifold of an internal combustion motor and means for controlling the raising and lowering of said shade to any desired adjusted position, and means for retaining said shade or curtain in said desired adjusted position.

The invention consists in providing an automatic shade roller for automobiles wherein the roller is rotatably mounted upon means supported by a fixed shaft, which shaft is rigidly supported to said automobile and provided with a grooved thread of great pitch, in which internal teeth of a plunger are engaged, said plunger adapted to thus rotate on the shaft, and means whereby said plunger is prevented from rotating within said roller but adapted to have a reciprocating movement therein.

The invention further consists in the construction, combination, location and arrangement of parts, as will be hereinafter more fully explained and pointed out in the claims.

In the drawings:

Fig. 1 is a longitudinal vertical section of my improved shade roller, showing the construction of the several parts, the grooved shaft appearing in elevation and the tubes

leading to the suction control valve broken away;

Fig. 2 is an enlarged vertical cross-section taken on a plane corresponding to line 2—2 of Fig. 1;

Fig. 3 is an enlarged end elevation of Fig. 1;

Fig. 4 is an enlarged longitudinal vertical section of the grooved shaft;

Fig. 5 is an enlarged end elevation of the reciprocating plunger;

Fig. 6 is a diagrammatic view showing the roller, roller brackets, shade suction control valve, and tubes leading from said valve to said roller, parts being broken away;

Fig. 7 is a horizontal cross-section taken on a plane corresponding to line 7—7 of Fig. 6;

Fig. 8 is an isometric view of one of the roller brackets partly shown in section;

Fig. 9 is an isometric view of one of the journals, partly shown in section;

Fig. 10 is an isometric view of one end of the roller, partly shown in section;

Fig. 11 is a horizontal cross-section of the suction control valve taken on a plane corresponding to line 11—11 of Fig. 6;

Fig. 12 is a cross-section taken on line 12—12 of Fig. 14;

Fig. 13 is an inside elevational view of the suction valve cover; and

Fig. 14 is a similar view of the valve body.

In the embodiment of my invention as illustrated and which shows a preferred construction, I provide an automatic shade-roller for automobiles which comprises roller 1, shade 2 and suction-control-valve 3.

The roller 1 in detail comprises cylinder 4 which is preferably made of metal tubing. End pieces 5 and 6, respectively, tightly fit within the ends 4^a and 4^b of said cylinder (see Fig. 1). Shaft 7 has its ends 8 and 9 reduced in diameter and provided with threads 10 and 11, respectively. Said shaft 7 is also provided in its outer periphery and throughout its length with a helical grooved thread 12 of great pitch, as clearly shown in Figs. 1 and 4.

Journals 13 and 14, respectively, are adapted to snugly fit over the ends 8 and 9 of shaft 7 and are provided with extended lugs or

stops 15 on their inner ends, as clearly shown in Fig. 9, for purposes more fully explained hereinafter, under operation.

Holes 16 and 17, respectively, centrally located in ends 5 and 6 are reduced in diameter at their inner ends and terminate in beveled edge 18, as clearly shown in Figs. 1 and 10. Journals 13 and 14, respectively, are enlarged in diameter at their inner ends to form beveled surfaces 19, said beveled surface 19 engaging beveled edge 18 of ends 5 and 6, respectively as explained later on.

The roller brackets 20 and 21, respectively, comprise base 22 provided with holes 23 for receiving screws or bolts 24 (Fig. 6). The outer ends of said brackets are each provided with hole 25 with which hole 26 connects. Most of the inner portion of hole 25 is cut away to form recess 27, as clearly shown in Figs. 1 and 8. Short sleeves 28 and 29, respectively, are received by holes 26 of roller brackets 20 and 21, which sleeves connect tubes 30 and 31 with said brackets and suction control valve 3.

Shaft 7 having its ends 8 and 9 reduced in diameter forms shoulders 32 and 33. Nuts 34 and 35, respectively, are received by threads 10 and 11 of reduced ends 8 and 9 of shaft 7 (see sectional view, Fig. 1).

The outer periphery 36 of piston 37 is of a size just sufficient to slidably fit within cylinder 4, and is provided with groove 38, as clearly shown in Fig. 5. Said groove 38 is provided in piston 37 to slidably receive elongated bead or rib 39 formed in cylinder 4, as clearly shown in Figs. 1 and 2.

As the cylinder 4 is preferably made of metal tubing and the shade 2 of cloth or similar material, I fasten the inner hemmed end 40 of said shade to said cylinder 4 by passing wire rod 41 through said hemmed end, which rod lays within elongated grooved bead 39, as clearly shown in the sectional view, Fig. 2.

When the wire rod 41 is thus passed through the hemmed or looped end 40 of shade 2 and placed within elongated groove of bead or rib 39, I securely fasten the rod and cylinder together as by placing a drop or two of solder 42 at each end of the said rod.

The ends of shaft 7 are provided with longitudinally extending holes 43 and 44 and transverse holes 45, 46, 47 and 48, respectively. Said holes 45 and 48 are located adjacent recesses 27 in roller brackets 20 and 21, respectively, and connect with holes 43 and 44. Holes 46 and 47 are located adjacent recesses 49, respectively, formed in journals 13—14 by lugs 15 and also connect with holes 43 and 44, respectively.

Roundheaded screws 50, screwed into central openings 51 of piston 37, form the teeth which engage or operate within helical grooved thread 12 of shaft 7.

Piston 37 is also provided with packing recess 52 on its outer periphery and packing

recess 53 in its central opening 51, as clearly shown in Figs. 1 and 2. Said recesses 52 and 53, respectively, are filled with suitable packing material 54 which prevents the leakage of air past piston 37 within cylinder 4 and past central opening 51 in said piston.

The suction-control-valve 3, shown, is not claimed, as any three-way valve may be substituted in its place, but for the purpose of describing the operation of the automatic shade roller, I have shown a preferred construction wherein the valve comprises body 55, rotary cover 56 and hand operating knob 57. Bosses 58, 59 and 60, respectively, formed integral with the back of body 55 are provided with threaded openings 58', 59' and 60', respectively, which openings receive unions 61. Unions 61 connect one end of tubes 30, 31 and 62, respectively, with suction-control valve 3. The other end of tubes 30 and 31 are connected with short sleeves 28 and 29, respectively (see Fig. 1) and the other end of tube 62 is connected to the intake manifold of an internal combustion motor (not shown).

Operation.—The operation of my invention is as follows:

Assume that roller 1 has been installed in an automobile, as by screws 24 passing through holes 23 in roller brackets 20 and 21, respectively; that suction-control-valve 3 is suitably located near the driver's seat; that tube 62 is properly attached to the intake manifold; that shade 2 is rolled upon cylinder 4; that piston 37 is positioned in end 4^a of cylinder 4; and that suction-control-valve 3 is in the position shown in Figs. 6 and 7.

Should it then be desired to lower the shade 2, grasp hand knob 57 of suction-control-valve 3 and turn in a clockwise direction thereby turning rotary cover 56 in a like direction until end 64 of slot 65 engages or comes into contact with pin 63 located in body 55 of said valve 3. This movement of said cover 56 severs the connection between tubes 30 and 62 and disconnects tube 31 from the atmosphere gained through hole 66 in said cover 56. When rotary cover 56 is thus turned so that end 64 of slot 65 limits against pin 63, port 67 connects tube 62 with tube 31 and hole 68 connects tube 30 with the atmosphere.

With the valve turned in the position just described, suction from the intake manifold will draw through tube 62, port 67, tube 31, sleeve 29, hole 26, recess 27 in bracket 21, transverse hole 48, longitudinally extending hole 44 and transverse hole 47, respectively, in shaft 7, thereby permitting the atmospheric pressure to force piston 37 towards end 4^b until it is stopped by lugs 15 of bearing 14. As the piston 37 is thus forced towards end 4^b of cylinder 4, it is caused to rotate as by heads 50' of screws 50 operating within helical groove 12 of shaft 7. The

rotary movement of piston 37, in turn, imparts rotary movement to cylinder 4, as by bead or rib 39 of said cylinder engaging groove 38 of said piston, thereby lowering or unrolling shade 2.

As the suction from the intake manifold reduces the atmospheric pressure on the side of piston 37 towards end 4^b of cylinder 4, air is permitted to enter said cylinder 4 on the opposite side of said piston 37 through hole 66, tube 30, sleeve 28, hole 26 and recess 27 in roller bracket 20, and transverse hole 45, longitudinally extending hole 43 and transverse hole 46, respectively, of shaft 7, thereby moving said piston toward end 4^b.

An important feature of the roller construction is that end pieces 5 and 6 rotatably mounted upon bearings 13 and 14, respectively, are provided with beveled edges 18, which edges alternately engage beveled surfaces 19 of said journals 13 and 14, according to the direction of travel of piston 37. For example, should piston 37 be traveling towards end 4^b of cylinder 4, the beveled edge 18 of end 6 will be automatically forced against beveled surface 19 of journal 14, thereby preventing any loss of the reduced atmospheric pressure within cylinder 4. In packing the piston 37 the inner packing recess 52 is packed first with packing material 54 inserted through opening 37' in said piston 37 and then retained therein by retaining ring 37'', as shown in Figs. 1, 2 and 5, and then the outer packing recess 53 is packed before the piston is inserted within cylinder 4.

An advantage of my invention is that any adjustment of the shade may be made by the operation of suction-control valve 3. That is, the shade may be partly unrolled, unrolled its full length, or rerolled as desired.

Another advantage of my invention is that the shade cannot be operated by hand, owing to the great pitch of helical groove thread 12 in shaft 7.

It will be understood that certain changes and modifications can be made without departing from the scope or spirit of the invention as defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A shade roller of the class described comprising a shaft provided in its outer periphery with a helical grooved thread, brackets for supporting said shaft, journals positioned near the ends of said shaft, a hollow roller rotatably mounted upon said journals, a piston on said shaft, teeth on said piston adapted to be received by said grooved thread whereby said piston is given a rotary motion when moved longitudinally upon said shaft by suction producing means, a rib on the inner periphery of said hollow roller, and a groove in the outer periphery of said piston adapted to receive said rib whereby the ro-

tary motion of said piston is imparted to said roller, for the purposes specified.

2. A shade roller comprising a fixed shaft provided in its outer periphery with a helical grooved thread of great pitch, a pair of hollow brackets for supporting said shaft, journals fixedly mounted near the ends of said shaft, a hollow cylindrical roller rotatably mounted upon said journals, a piston on said shaft and within said cylinder, teeth on said piston adapted to fit within said helical grooved thread of said shaft whereby said piston is given a rotary motion when moved longitudinally upon said shaft by suction producing means, a rib formed on the inner periphery of said hollow roller and extending longitudinally thereof, and a groove in the outer periphery of said piston adapted to engage said rib whereby the rotary motion of said piston is imparted to said roller, for the purposes specified.

3. A shade roller of the character described comprising, in combination, a shaft having a helical grooved thread in its outer periphery, a pair of hollow brackets, journals mounted on said shaft, a hollow roller mounted upon said journals, a piston mounted upon said shaft, means on said piston adapted to engage said helical grooved thread, a rib on the inner periphery of said hollow roller, a groove in the outer periphery of said piston adapted to receive said rib, and a conduit connected to said hollow brackets and to suction producing means whereby said piston is moved longitudinally within said roller and rotated about said shaft which rotary movement of said piston is, in turn, imparted to said roller by said rib, substantially as set forth and for the purposes specified.

4. A shade roller of the character described comprising, in combination, a shaft supplied with a helical grooved thread of great pitch in its outer periphery, a pair of hollow brackets for supporting said shaft, journals mounted upon said shaft, a hollow roller rotatably mounted upon said journals, a piston mounted upon said shaft and within said roller, means on said piston adapted to permanently engage said helical grooved thread, an elongated rib on the inner periphery of said hollow roller, a groove on the outer periphery of said piston adapted to receive said rib, conduits connected to said hollow brackets and to suction producing means whereby said piston is caused to move longitudinally within said roller and rotated about said shaft due to said rib and groove, which rotary movement of said piston is, in turn, imparted to said roller, and means for reversing the direction of travel of said piston when desired, substantially as set forth and for the purposes specified.

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