

April 16, 1957

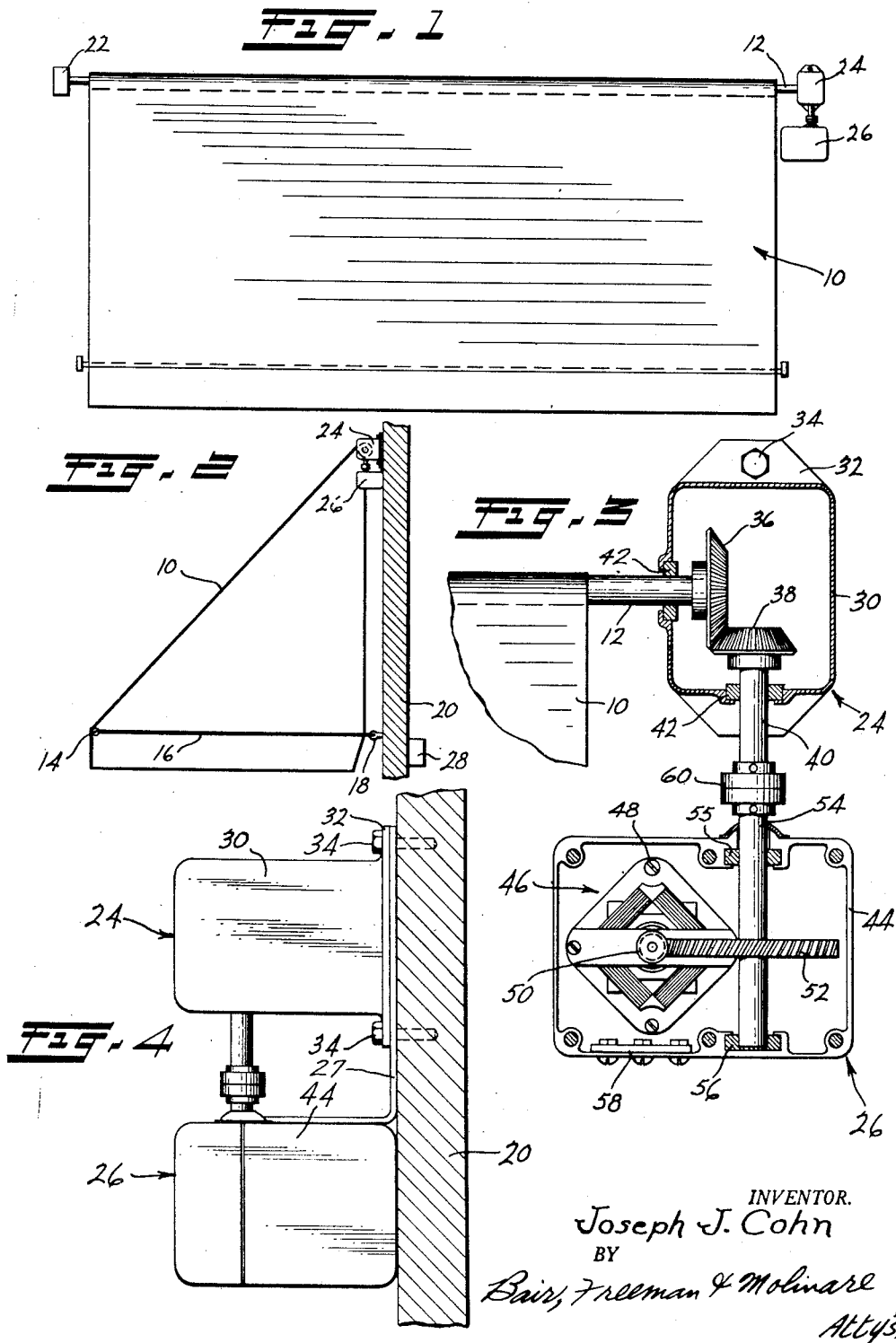
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2,789,263

MOTOR CONTROL FOR AWNING APPARATUS

Filed Aug. 9, 1954

2 Sheets-Sheet 1



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FIG. 5

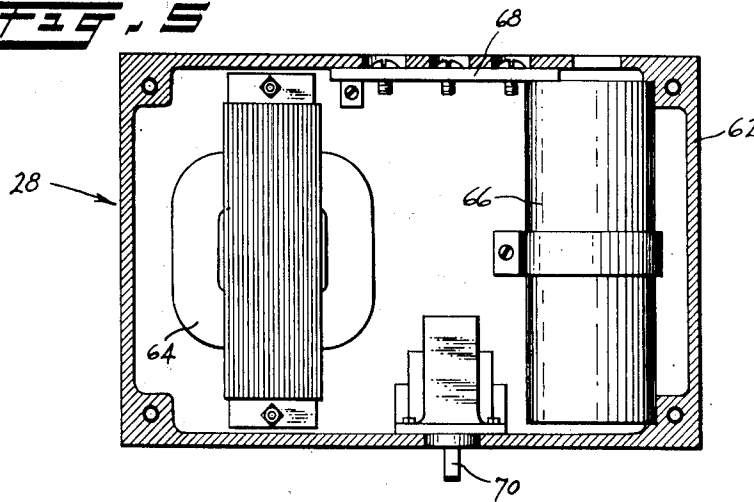


FIG. 6

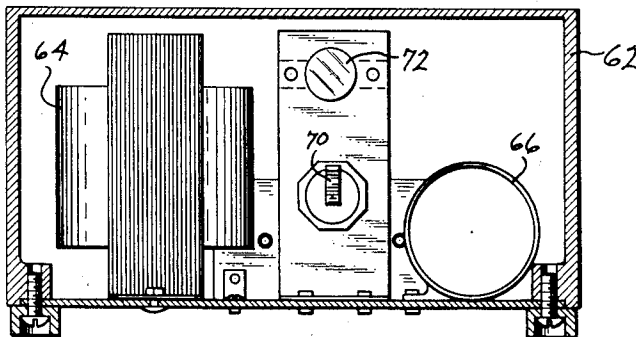
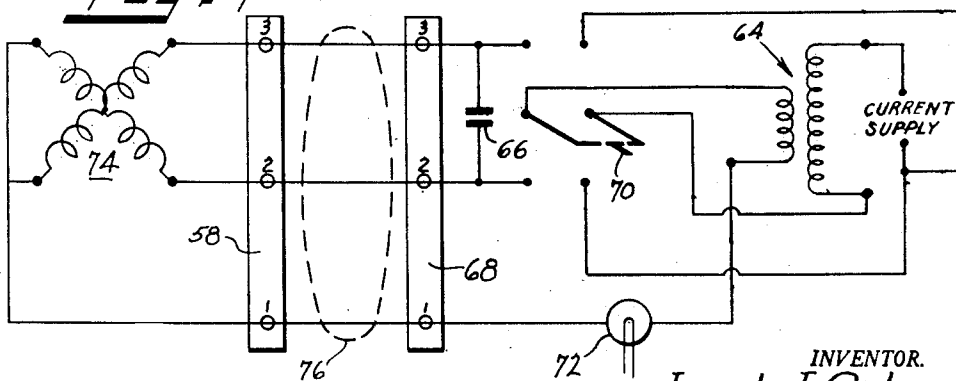


FIG. 7



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MOTOR CONTROL FOR AWNING APPARATUS

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1 Claim. (Cl. 318—207)

This invention relates generally to an awning apparatus, and more particularly to a novel electrically driven rotating device having remote control means for effecting elevating and lowering of an awning or the like.

I have illustrated my electrically driven rotating device in operative association with an awning apparatus of the type which ordinarily requires the operator to secure one end of an elongated, detachably removal crank or arm to a hook means which is suitably geared to one end of the awning roller. Such manually operated awning arrangements require the operator to actuate the elevating or lowering of the awning from a position outside the building or structure upon which the awning is mounted. Although power operated awnings have been employed to avoid the inefficiencies and inconveniences of manually operated awnings, such devices have been complex and costly, and not adapted to convenient attachment to existing manual installations.

It is a primary object of the present invention, therefore, to provide an electrically driven power device of simple design and construction which is adapted to be readily attached to and coordinated with a manually operated awning apparatus or the like, for effecting mechanical movement thereof in an automatic and controlled manner.

It is another object of this invention to provide a novel remote control unit for regulating the movement of awnings, shades, jalousies, or the like, by means of an electrically driven power device.

It is a further object to provide novel automatic power means for effecting controlled movement of an awning apparatus or the like, including a high torque, reversible capacitor type electric motor.

It is still another object to provide a novel remote control unit for the mechanical drive unit of a power actuated awning apparatus, including a step-down transformer providing low operating voltage and power line isolation for the drive unit.

It is still a further object to provide a remote control unit of the aforesaid type, including novel signal light means arranged in the control circuit so as to be automatically energized at the end of travel or movement of the awning apparatus.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my awning apparatus whereby the objects contemplated are obtained as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing, wherein:

Figure 1 is a front elevation of an awning having the electrically driven rotating mechanism of the present invention;

Figure 2 is a diagrammatic side elevational view, partly in cross-section through the supporting wall, showing the awning apparatus illustrated in Figure 1;

Figure 3 is a fragmentary detail view, on an enlarged scale, showing the mechanical operating mechanism of my awning rotating apparatus;

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Figure 4 is a fragmentary detail view, on an enlarged scale, showing the manner in which my awning rotating apparatus is mounted on the supporting wall;

Figure 5 is a top plan view, partly in cross section, showing the interior details of the control unit for my awning apparatus;

Figure 6 is a front elevational view, broken away and in cross-section, of the control unit shown in Figure 5; and

Figure 7 is a electric wiring diagram of the control circuit for my awning apparatus.

Referring now more particularly to the drawing, I have shown in Figure 1 a conventional awning 10 having a movably mounted frame including a roller 12, a weight bar 14 and a position bar 16 pivotally secured as at 18 to a supporting wall 20. One end of the roller 12 is journaled in a bearing box 22 which is rigidly secured to the supporting wall 20. The outer end of the roller 12 is journaled in a combined bearing and reduction gear box 24, which is also rigidly secured to the supporting wall 20.

Although I have shown a movable awning construction of the conventional roller and gear box type for the purpose of illustrating my invention in operatively installed relation, it will be understood that my power drive and control units may be adapted for use with other types of awning installations and the like. For example, the output of my rotating drive mechanism may be utilized to rotate a pulley for drawing cord-pulls or winding ropes. Also, suitable gearing may be employed for operatively connecting my rotating drive mechanism to the axes of rotation of jalousies or slats for effecting rotation of pivotal movement thereof.

In the form illustrated, the awning roller 12 is power driven by an awning rotor unit 26 which is operatively connected to the gear box 24 and secured to the wall 20. The rotor unit 26 is electrically driven, and may be manually actuated and regulated from a remotely positioned control unit 28. As illustrated in Figure 2, the control unit 28 may be mounted on the interior side of the supporting wall 20. It will be understood that the control may be positioned or mounted at any convenient location remote from the rotor unit 26 and awning 10.

The bearing and reduction gear box 24 comprises a housing or casing 30 having mounting flanges 32 extending outwardly therefrom. Mounting bolts 34 cooperate with the mounting flanges 32 to effect attachment to the supporting wall 20. The shaft end of the roller 12 extends through a side wall of the housing 30 and terminates in a roller bevel gear 36. An upper drive shaft 40 extends through the bottom wall of the housing 30 and terminates in a drive bevel gear 38. Bearing means 42 are provided for rotatably supporting the shaft end of the roller 12 and the shaft 40. The size of the bevel gears 36 and 38 may be suitably selected to obtain any desired gear ratio for effecting rotation of the awning roller 12 at a desired predetermined speed.

The awning rotor unit 26 comprises a housing or casing 44. Preferably, the housing 44 is of weather-tight die cast construction. An electric motor 46 is rigidly mounted to a side wall of the housing 44 by means of bolts 48. The shaft of the motor terminates in a worm gear 50 which meshes with a large wheel gear 52 carried by a drive shaft 54, rotatably supported in upper and lower bearings 55 and 56. An electric terminal panel 58 is provided for attaching suitable electrical wiring. The upper drive shaft 40 of the gear box 24 and the lower drive shaft 54 of the awning rotor unit 26 are fixedly connected by means of a flexible coupling member 60.

As seen in Figure 4, a mounting bracket 27 may be secured to the top wall of the housing 44 and attached by means of the mounting bolts 34, together with the flanges 32 of the gear box 24, to the supporting wall 20.

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Since the rotor unit 26 is secured to the gear box 24 by means of the coupling 60, it is not necessary for reasons of support alone to positively mount the unit 26 to the wall 20 by means of the bracket 27. In order to preclude rotation of the unit 26 relative to the gear box 24, and effectively transmit the rotary power of the motor 46 to the awning roller 12, the bracket 27 is necessary. As an alternative simplified manner of mounting, the housing 44 may be merely provided at each side of the casing 44 with outwardly extending arm elements adapted to engage the wall 20 in the manner of an out-rigger and thereby prevent rotation of the unit 26 in either direction of motor rotation.

The control unit 28 comprises a housing or casing 62, preferably having a metal base or bottom wall and a plastic cover unit. A transformer 64 is rigidly secured to the bottom wall of the housing 62. A capacitor 66 is also rigidly secured to and supported by the bottom wall. A terminal panel 68 is provided at the rear side wall of the housing 62 for attachment of suitable electrical wiring. A manual switch 70 is provided in outwardly extending relation on a front panel of the housing 62. A signal lamp 72 is also provided in a readily visible position on the front panel of the housing 62.

Referring now to Figure 7 of the drawing I have illustrated diagrammatically the electric control circuit for my awning apparatus. The field coils of the motor 46 are shown generally at 74. The terminal panels 58 and 68 of the awning rotor unit 26 and the control unit 28, respectively, are each indicated as having three terminal connections numbered 1, 2 and 3 for purposes of illustration. A conductor cable is indicated by dotted lines at 76 to represent the conventional insulated sheath surrounding a bundle of conductor wires interconnecting the pairs of terminals 1, 2 and 3. The conductor cable 76, in a typical installation, will have its three conductor wires each secured at its one end to the terminals 1, 2 and 3 of the terminal panel 58 of the awning rotor unit 26, at the exterior side of the mounting wall 20. A suitable opening extending through the wall 20 will permit the cable 76 to be extended therethrough so that the three conductor wires may each be secured at its other end to the terminals 1, 2 and 3 of the terminal panel 68 of the control unit 28, at the interior side of the mounting wall 20 or at any convenient remote location.

The manual switch 70 is of the momentary contact, double-pole, double-throw type, as diagrammatically represented in Figure 7. The transformer 64, capacitor 66, signal light 72, and a suitable supply of alternating current are also indicated in Figure 7 in a diagrammatic manner.

The operation of my awning apparatus is as follows. The momentary contact switch 70 is normally centered in conventional manner by suitable spring biasing means to a neutral or open position. Assuming that it is desirable to elevate the awning, the switch 70 may be manually thrown and held by the operator in an up position, as shown in Figure 6. It will be apparent from Figure 7 that a closing of the switch 70 to an up position will serve to complete a power circuit from one side of the step-down windings of the transformer 64 by a first line of current flow through the capacitor 66 and terminals 2—2 to one of the coils of the motor field, by a second line of current flow around the capacitor 66 and through the terminals 3—3 to the other coil of the motor field, and from the other side of the step-down windings through the signal light 72 and terminals 1—1 to both of the coils of the motor field. At the same time, a current supply circuit through the high voltage windings of the transformer 64, thereby providing power to the step-down windings thereof, will be completed.

In a typical installation, the step-down transformer 64 will supply a voltage of about 30 volts to the motor circuit. In this manner, a relatively low operating volt-

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age is employed, thereby providing power line isolation for the mechanical drive unit.

By means of the capacitor 66 in circuit with the motor 46, I provide a capacitor-type motor having a starting torque which is considerably greater than the usual split-phase motor of the same rating. The direction of rotation of the motor 74 is readily reversed by throwing the switch 70 to one position or the other. It will be apparent that the capacitor 66 will be in series with one or the other of the coils of the motor 46, depending on the direction in which the switch 70 is thrown to complete the motor circuit. In this way, the capacitor 66 may be employed to effect a phase difference between the coils of the motor, and the direction of current lead will be dependent upon the particular coil with which the capacitor 66 is in series. The motor is thereby rotated in a desired direction and readily reversed by closing the switch 70 in a corresponding direction.

It will be apparent that as the motor rotates the worm gear 50 will drive the wheel gear 52 and thereby effect rotation of the lower and upper shafts 54 and 40. This serves to effect rotation of the drive bevel gear 38, and in turn the roller bevel gear 36. In this manner, the roller shaft 12 is rotated. The direction of rotation of the roller shaft 12, and therefore the elevating or lowering of the awning 10, will be determined by the direction of rotation of the rotor shaft of the motor. This in turn is controlled in the manner described by switch 70.

Assuming that the switch 70 has been held by the operator in an "up" position for a sufficient time to permit the mechanical drive mechanism to effect full elevation of the awning 10, the various gear and shaft elements of the awning rotor unit 26 and gear box 24 will lock in a limiting position because of the inability of the awning roller 12 to be rotated further. When the rotor of the motor 46 is thus locked, there will be a substantially increased current drain by the motor. The signal light 72 is selected so that such increased current flow through the motor circuit will be sufficient to energize the bulb and effect a lighting thereof. Lighting of the signal light 72 in this manner serves to indicate to the operator that the awning has been fully elevated. It will be apparent that full lowering of the awning will similarly operate to effect energizing of the signal light 72.

The provision of a signal light in the control circuit of my awning apparatus, in the novel manner disclosed, provides an automatic and immediately responsive signal means for indicating the full limiting positions of the awning. In this manner, the operator may manually regulate the positioning of the awning from a remote location with immediate knowledge of the arrival of the awning at a limiting position of full lowering or full elevation.

It will be apparent from the circuit diagram of Figure 7 that the switch sections of my double-pole, double-throw switch are gauged so as to supply power to the system only when the switch has been thrown to one of its closed positions. It is an important feature that the switch 70 be of the momentary contact type so that the system is operative only while the switch is positively held closed by the operator. If released or left unattended, the circuit will be immediately opened. In this manner, there is a power drain only so long as the switch is manually held in a closed position to effect actuation of the awning rotor unit.

Changes may be made in the construction and arrangement of the parts of my awning apparatus without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical improvements which may be reasonably included within their scope.

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What I claim as new and desire to obtain by Letters Patent of the United States is:

An automatic power system for operating an awning or the like comprising a rotor unit, a control unit remotely located relative to said rotor unit for operating said rotor unit at a position distant therefrom, said rotor unit including an electric motor having a pair of windings and a shaft adapted to effect rotational output drive, conductor means electrically connecting said rotor unit to said control unit, said conductor means comprising a first conductor connected to one end of one of said pair of windings, a second conductor connected to one end of the other of said pair of windings, and a third conductor connected to the other ends of each of said pair of windings, including a capacitor having a pair of terminals connected across said first and second conductors, a transformer having primary and secondary windings for providing power line isolation for said rotor unit relative to said control unit, a motor reversing switch having a first pair of contacts, a second pair of contacts, separate from said first pair of contacts and a pair of mechanically coupled switch blades having two circuit closing positions, means connecting one contact of each pair of contacts to a different terminal of said capacitor, means connecting the other contact of each pair of contacts to a first terminal adapted to be connected to a supply of electric current, means connecting a second terminal adapted to be connected to a supply of electric current to one end of said primary winding, means connecting the other end of said primary winding to one of said switch blades, means for connecting the other of said

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switch blades to one end of said secondary winding, means connecting the other end of said secondary winding to said third conductor, means normally biasing said switch in a circuit opening position, said switch when closed in one position serving to selectively connect said capacitor in series with one of the windings of said motor and when closed in the second position serving to selectively connect said capacitor in series with the other of the windings of said motor, to thereby energize said motor and effect rotation thereof under high torque in a controlled direction, said means connecting said end of said secondary winding to said third conductor including a signal lamp adapted to be energized upon operation of the motor to provide at the control unit a continuous indication of motor operation and further adapted when said motor is locked in position by mechanical opposition to the rotational output drive thereof to respond to the increase in the current flow through said third conductor to glow with increased intensity to indicate the stalled condition of said motor.

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