The motor drive for a patio umbrella is a motorized accessory for raising and lowering a patio umbrella. The motor drive for a patio umbrella has an electric motor contained within a housing mounted to the sliding hub, or to the pole, of a patio umbrella. A spool is fixed on the motor’s shaft, and a thin cord is taken up by, or unwound from, the spool as the motor is operated in forward or reverse directions. The cord is fastened to the patio umbrella so that, as the cord is taken up by the spool, the umbrella opens. As the cord unwinds from the spool, the umbrella closes. A control circuit operates the motor automatically in response to a photosensor or a remote control signal, or manually by a simple three-position switch.
FIG. 3A
FIG. 4
MOTOR DRIVE FOR A PATIO UMBRELLA

CROSS-REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to umbrellas and, more particularly, to a motor drive for a patio umbrella that can be installed on conventional, manually operated, patio-type umbrellas so that the umbrella may be opened and closed automatically.

[0004] 2. Description of the Related Art

[0005] Patio umbrellas color the landscape of countless places, urban and rural. From sidewalk cafes to beach resorts, alongside swimming pools, and on backyard patios, these umbrellas are used to provide a sun shade, protection from rain, and decoration.

[0006] A typical patio umbrella includes a canopy that is supported atop an umbrella pole by a number of staves, the staves being further supported by stave supports that, coupled to a sliding hub, are used to open and close the umbrella. When the umbrella is opened, the canopy is raised and stretched tight. When the umbrella is closed, the canopy is loosely gathered around the umbrella pole. It is a common practice to close umbrellas when they are not in use, to protect the umbrella from the elements of sun, rain, and wind as well as to relieve the tension of the opened canopy.

[0007] In a setting where many umbrellas are used, and particularly in a commercial setting such as an outdoor cafe or an outdoor resort, it can be a time consuming task to open the umbrellas at the start of the day and then close them again at the close of business. Additionally, in instances where umbrellas have remained closed for a long period of time, there is a possibility that insects, such as spiders or bees, or animals such as snakes, bats, birds, and other creatures might nest within the protective folds of the closed umbrella canopy. Opening a patio umbrella that has become home, for example, to nesting bats or a swarm of bees could be serious and dangerous.

[0008] It is therefore desirable to equip a patio umbrella with a device to open the umbrella automatically. Such an automatic opening device might be remotely controlled, controlled by a photo-sensor to open when the sun rises and close at night, or simply controlled by a switch. Various umbrellas that use an automatic or motor-driven mechanism to open the umbrella have been proposed.

[0009] U.S. Pat. No. 2,960,094, issued on Nov. 15, 1960 to S. Small, discloses a solar-actuated umbrella raising mechanism. Working with an umbrella that is raised by a hand-crank mechanism, the device includes an electric motor that is engaged, by a gear train to the hand crank. An electronic control circuit activates the electric motor.

[0010] U.S. Pat. No. 6,058,951, issued on May 9, 2000 to R. Wilson, discloses a remotely controlled and electrically operated umbrella. The umbrella uses a gear and chain drive system that, in turn, actuates a rod and bracket to open and close the spokes of the umbrella. An electric motor drives the gear and chain system.

[0011] U.S. Pat. No. 6,182,917, issued on Feb. 6, 2001 to J. Lai, discloses a motorized device for opening and closing longitudinally aligned with the umbrella pole. The motor is connected through a series of beveled gears to a hand crank that winds and unwinds a cord to raise and lower the umbrella.

[0012] None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed. Thus a motor drive for a patio umbrella solving the aforementioned problems is desired.

SUMMARY OF THE INVENTION

[0013] The motor drive for a patio umbrella provides a simple motorized mechanism that can be retrofitted to existing patio umbrellas to provide the umbrella with an automated, motorized means to open and close the umbrella. The motor drive for a patio umbrella comprises an electric motor, contained within a housing that is adapted for mounting to the operative sliding hub, or to the pole, of a patio umbrella. A spool is fixed on the motor's shaft, and a thin cord is taken up by, or unwound from, the spool as the motor is operated in forward or reverse directions.

[0014] The motor drive for a patio umbrella is installed on an umbrella by mounting the housing to the umbrella’s sliding hub. An end of the cord is affixed near the top of the umbrella so that, as the motor operates to take up the cord on the spool, the motor drive for a patio umbrella, and consequently the sliding hub, is hoisted upward, thus opening the umbrella.

[0015] The motor may be operated by a simple toggle switch, capable of powering the motor in forward and reverse directions. Alternatively, the motor may be controlled by a controller that includes a remote control receiver, a photosensor, or other means for activating the motor in response to varied stimuli. The controller may be configured so that several umbrellas, each operated by a motor drive for a patio umbrella, are opened and closed in response to the same stimulus. For example, each remote control receiver can be tuned to respond to the same remote control transmitter and command so that the several umbrellas at an outdoor cafe may be opened and closed by a single command.

[0016] Accordingly, it is a principal object of the invention to provide a motor drive for a patio umbrella that can be attached to a patio umbrella.

[0017] It is another object of the invention to provide a motor drive for a patio umbrella that can be attached to a patio umbrella to automatically open and close the umbrella.

[0018] It is a further object of the invention to provide a motor drive for a patio umbrella that can be attached to a patio umbrella to automatically open and close the umbrella in response to an external stimulus.

[0019] Still another object of the invention is to provide a motor drive for a patio umbrella that can be attached to a patio umbrella to automatically open and close the umbrella in response to a remote control signal.
It is an object of the invention to provide improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a side view of a motor drive for a patio umbrella according to the present invention, mounted on an umbrella in an open position.

FIG. 1B is a side view of a motor drive for a patio umbrella according to the present invention, mounted on an umbrella in a partially closed position.

FIG. 2 is a perspective view of a conventional patio umbrella of the prior art.

FIG. 3A is a section view drawn along line 3A-3A of FIG. 1A, showing a first embodiment of the motor drive for a patio umbrella.

FIG. 3B is a section view drawn along line 3A-3A of FIG. 1A, showing a second embodiment of the motor drive for a patio umbrella.

FIG. 4 is a section view drawn along line 3A-3A of FIG. 1A, showing the embodiment of FIG. 3A including reducing gears disposed between the motor and spool.

FIG. 5 is a side view of a motor drive for a patio umbrella according to the present invention, mounted in an alternative position on an umbrella in an opened position.

FIG. 6 is a block diagram of the electrical components of a motor drive for a patio umbrella according to the present invention.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a motor drive for a patio umbrella, designated generally as 10 in the drawings. The motor drive for a patio umbrella 10 provides a mechanism that can be installed on a conventional patio umbrella to provide the umbrella with an automated opening and closing function.

A typical patio umbrella 50 is shown in FIG. 2. The typical patio umbrella 50 comprises a canopy 52 that is supported by a number of staves 54. The staves 54 are pivotally joined to the top end of a pole 60 and can be raised and lowered. Raising the staves 54 opens and spreads the canopy 52, while lowering the staves 54 closes the canopy 52. Staves 54 are supported by stave supports 56 pivotally attached thereto, which are in turn pivotally mounted to a hub 58 that is configured to slide along the pole 60. Thus, sliding the hub 58 upward raises the stave supports 56 and the staves 54, causing the canopy 52 to open. Conversely, sliding the hub 58 downward causes the canopy 52 to close. The hub 58 of a conventional umbrella 50 typically has a locking mechanism to maintain the canopy in the open position.

Turning now to FIGS. 1A and 1B, a motor drive for a patio umbrella 10 is shown installed on the hub 58 of a patio umbrella. The motor drive for a patio umbrella 10 includes an electric motor 26, contained within a housing 20. Shaft 28 extends from the motor 26. A spool 30 is disposed on the end of the shaft 28. A length of cord 32 is attached to the spool 30. The cord 32 is taken up by spool 30 as the motor 20 is operated in a forward direction. As the motor 20 is operated in a reverse direction, the cord 32 is unwound from the spool 30. An end of the cord 32 is affixed at or near the top of the pole 60 by a fastener 34.

As the motor 20 is operated in the forward direction, and the cord 32 taken up by spool 30, the motor drive for a patio umbrella 10 is lifted, along with the umbrella hub 58, upward along the pole 60, raising the stave supports 56 and the staves 54 to bring the umbrella into an open position as shown in FIG. 1A. As the motor is operated in a reverse direction, and the cord 32 is unwound from the spool 30, the umbrella is allowed to close as shown in FIG. 1B.

Turning now to FIG. 3A, a first embodiment of the motor drive for a patio umbrella 10 is shown in greater detail. The housing 20 is comprised of a first half 22 and a second half 24. A means for mounting the housing 20 to the umbrella 10 comprises a semi-circular recess 64 formed in each of the housing halves 22, 24 so that the halves 22, 24 may be joined together around a portion of the umbrella 10.

As illustrated in FIG. 3A, the housing 20 is mounted to the umbrella hub 58 by joining the halves 22, 24 together, the hub 58 being clamped snugly between the halves 22, 24. The motor 26 is disposed within the first half 22, while batteries 48 are disposed in the second half 24. Shaft 28 extends from the motor 26, extending to the outside of the first half 22 of the housing 20. Spool 30 is disposed on the end of the shaft 28, with a length of cord 32 attached to the spool 30.

In a second embodiment shown in FIG. 3B, a single or unitary housing 20 contains both the motor 26 and the batteries 48. A means for mounting the unitary housing 20 to the umbrella 10 comprises a semi-circular recess 64 formed in the side of the housing 20, and a semi-circular clamping member 62 used to clamp the housing 20 about a part of the umbrella 10. As illustrated in FIG. 3B, the unitary housing 20 is mounted to the umbrella hub 58.

In either embodiment, a series of reduction gears may be included, installed within the housing 20 or contained within the motor 26 itself, to increase the torque available to open the umbrella. Referring to FIG. 4, the embodiment of FIG. 3A is illustrated with reduction gears 29 and 129. Gear 29 is disposed on the motor shaft 28. Gear 129 drives a separate shaft 128 that, in turn, drives the spool 30. It can be recognized that additional reduction gearing configurations may be employed, including worm or crown gear configurations, or additional reducing gears.

An alternative installation of the motor drive for a patio umbrella 10 is shown in FIG. 5. The motor drive for a patio umbrella 10 is mounted near the top of the umbrella pole 60, and cord fastener 34 fastens the cord 32 to the lower hub 58.

It can be recognized that, in addition to the embodiments illustrated, the components of a motor drive for a patio umbrella 10 could be housed within the hub 58 of a patio umbrella itself, making the motor drive for a patio umbrella 10 an integral part of the patio umbrella rather than an aftermarket accessory.
Turning now to FIG. 6, the motor drive for a patio umbrella 10 is controlled by a control circuit 40 connected to the motor 26. The control circuit 40 may range from simple wiring to a switch 46 to an electronic circuit incorporating a remote control receiver 42, a photosensor 44, and other devices or sensors to automate and simplify the control of one or more patio umbrellas equipped with the motor drive for a patio umbrella 10.

The switch 46, such as a simple three-position switch, allows the motor 26 to be operated in its forward or reverse directions or turned off. This allows an umbrella to be manually operated. The switch 46 may be mounted on the housing 20, or remotely mounted on the umbrella pole 60 or elsewhere.

A photosensor 44, such as a photodiode or phototransistor or the like, may be connected to the control circuit 40 to allow the motor drive for a patio umbrella 10 to automatically open and close an umbrella according to daylight, open during the day and closed at night. The control circuit 40 responds to a signal from the photosensor 44 to operate the motor.

A remote control receiver 42 may be connected to the control circuit 40 to allow the motor drive for a patio umbrella 10 to be remotely controlled by a remote control transmitter. The control circuit 40 responds to a signal from the remote control receiver 42 to operate the motor. Additionally, where many patio umbrellas are used, each may be equipped with a motor drive for a patio umbrella 10 having a remote control receiver 42 tuned to respond to the same remote control transmitter, thereby simplifying the task of opening many umbrellas at once.

The control circuit 40 may include a programmable timer so that the motor drive for a patio umbrella 10 can be opened and closed on a programmable, timed basis.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

We claim:

1. A motor drive for a patio umbrella, comprising:
   a housing, the housing having formed therein means for mounting the housing to a sliding hub on a patio umbrella;
   a motor disposed in said housing, the motor having a shaft;
   a spool driven by said shaft;
   a length of cord connected to said spool; and
   fastening means for fastening said cord to a fixed position on said patio umbrella;

   whereby said motor is operable to take up said cord on said spool, thereby causing said umbrella to open, or to unwind said cord from said spool, thereby causing said umbrella to close.

2. The motor drive for a patio umbrella according to claim 1, further comprising a control circuit electrically connected to said motor, the motor being operable by said control circuit.

3. The motor drive for a patio umbrella according to claim 2, wherein said control circuit comprises a switch, said motor being operable by said switch.

4. The motor drive for a patio umbrella according to claim 2, wherein said control circuit comprises a photosensor, said motor being operable in response to daylight.

5. The motor drive for a patio umbrella according to claim 2, wherein said control circuit comprises a remote control receiver, said motor being operable in response to a signal received from a remote control transmitter.

6. The motor drive for a patio umbrella according to claim 2, wherein said control circuit comprises a programmable timer.

7. The motor drive for a patio umbrella according to claim 1, further comprising a reduction gear train disposed between said motor and said spool.

8. The motor drive for a patio umbrella according to claim 1, further comprising a source of electric power electrically connected to said motor.

9. A motor drive for a patio umbrella, comprising:
   a housing, the housing having formed therein means for mounting the housing to a fixed position on a patio umbrella;
   a motor disposed in said housing, the motor having a shaft;
   a spool driven by said shaft;
   a length of cord connected to said spool; and
   fastening means for fastening said cord to a sliding hub on said patio umbrella;

   whereby said motor is operable to take up said cord on said spool, thereby causing said umbrella to open, or to unwind said cord from said spool, thereby causing said umbrella to close.

10. The motor drive for a patio umbrella according to claim 9, further comprising a control circuit electrically connected to said motor, the motor being operable by said control circuit.

11. The motor drive for a patio umbrella according to claim 10, wherein said control circuit comprises a switch, said motor being operable by said switch.

12. The motor drive for a patio umbrella according to claim 10, wherein said control circuit comprises a photosensor, said motor being operable in response to daylight.

13. The motor drive for a patio umbrella according to claim 10, wherein said control circuit comprises a remote control receiver, said motor being operable in response to a signal received from a remote control transmitter.

14. The motor drive for a patio umbrella according to claim 10, wherein said control circuit comprises a programmable timer.

15. The motor drive for a patio umbrella according to claim 9, further comprising a reduction gear train disposed between said motor and said spool.

16. The motor drive for a patio umbrella according to claim 5, further comprising a source of electric power electrically connected to said motor.
17. A motor drive for a patio umbrella, comprising:
a motor having a shaft;
a spool driven by said shaft;
a length of cord having a first end connected to said spool
and having a second end; and
means for attaching said motor to a first position on a
patio umbrella, the second end of said cord being
attached to a second position on said patio umbrella
such that operating said motor to take up said cord on
said spool causes the patio umbrella to open, and
operating said motor to unwind said cord from said
spool causes the patio umbrella to close.

18. The motor drive for a patio umbrella according to
claim 17, further comprising a control circuit electrically
connected to said motor, the motor being operated by said
control circuit.

19. The motor drive for a patio umbrella according to
claim 18, wherein said control circuit comprises a switch,
whereby said motor is operable by said switch.

20. The motor drive for a patio umbrella according to
claim 18, wherein said control circuit comprises a remote
control receiver, said motor being operable in response to a
signal received from a remote control transmitter.

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