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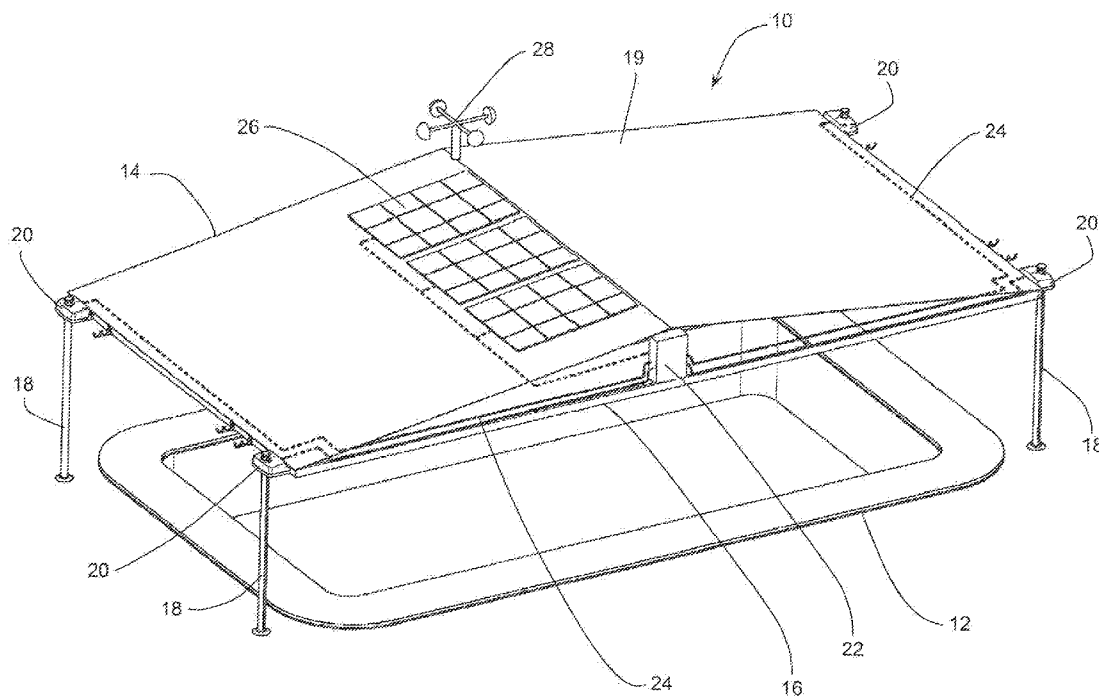
(19) **United States**(12) **Patent Application Publication**
GALEA(10) **Pub. No.: US 2014/0246063 A1**(43) **Pub. Date: Sep. 4, 2014**(54) **HEIGHT ADJUSTABLE SWIMMING POOL
COVER/CANOPY SYSTEM**(71) Applicant: **Atlantis Pool Covers Pty Limited,**
Penrith (AU)(72) Inventor: **Frank GALEA,** Kemps Creek (AU)(73) Assignee: **Atlantis Pool Covers Pty Limited,**
Penrith (AU)(21) Appl. No.: **14/157,232**(22) Filed: **Jan. 16, 2014**(30) **Foreign Application Priority Data**

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Feb. 22, 2013 (AU) 2013201035

Publication Classification(51) **Int. Cl.**
E04H 4/10 (2006.01)(52) **U.S. Cl.**CPC **E04H 4/108** (2013.01)USPC **135/121**(57) **ABSTRACT**

A canopy system for a swimming pool is provided. The system comprises a canopy frame sized so as to be capable of at least substantially covering the swimming pool. A number of vertical support posts are arranged around the swimming pool. The system further comprises a number of electric motors, each electric motor being arranged to drive an associated actuator arrangement engaging a corresponding one of the support posts. Each electric motor and associated actuator arrangement is attached to the canopy frame. A controller controls each of the motors to drive the associated actuator arrangement. The engagement of each associated actuator arrangement with each corresponding support post causes the canopy frame to be raised or lowered between a maximum and minimum height above ground level.



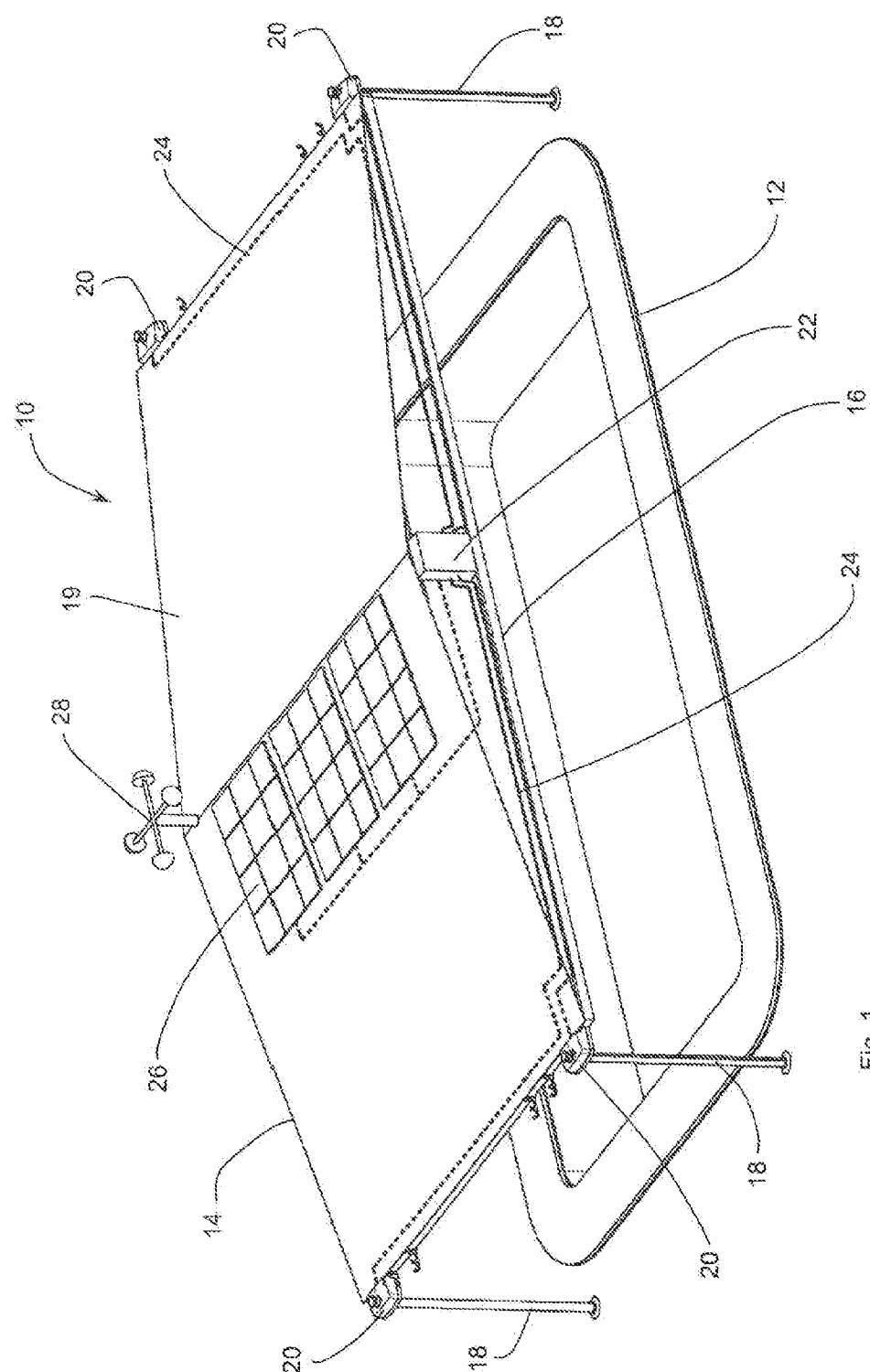


Fig. 1

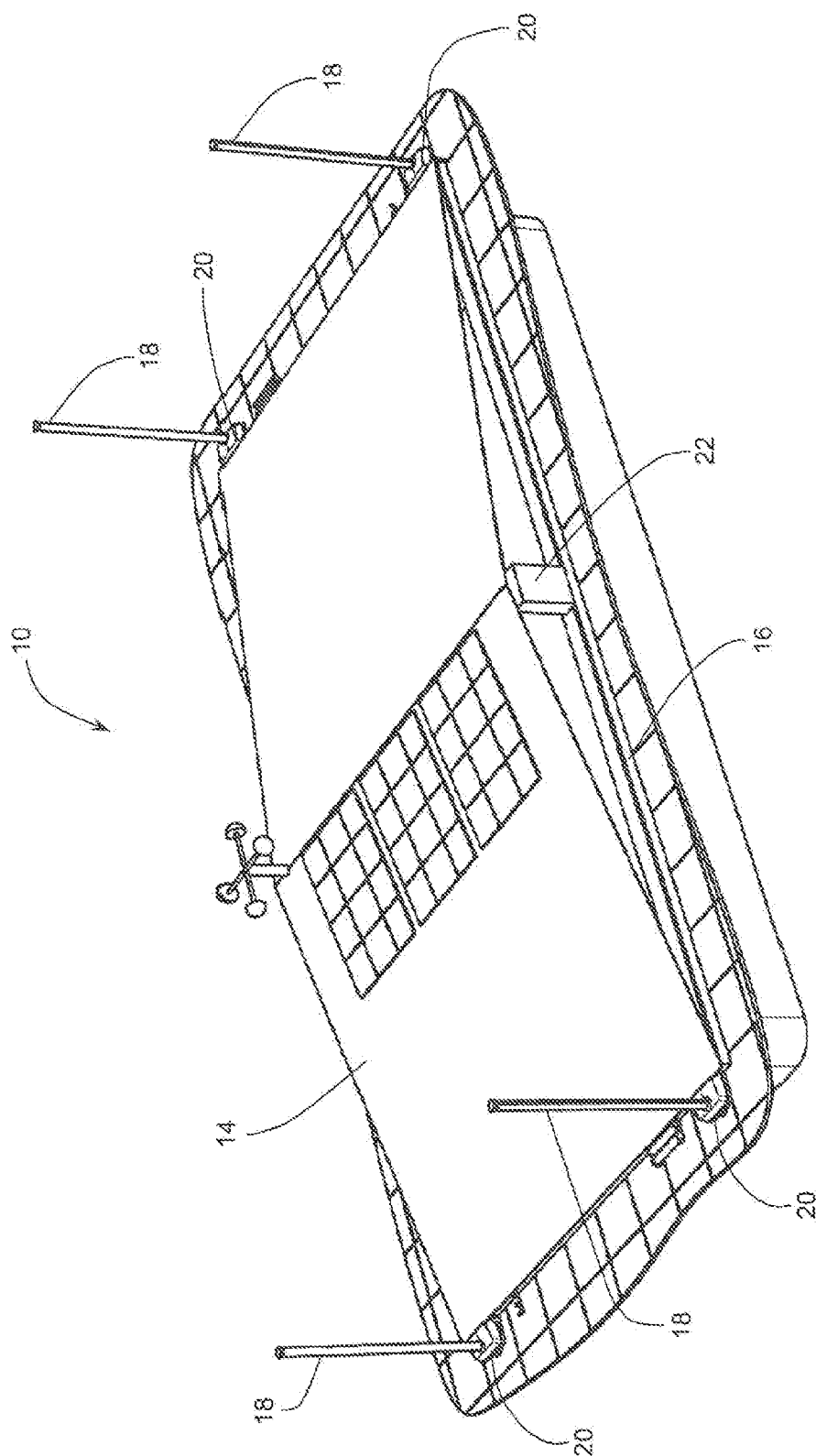


Fig. 2

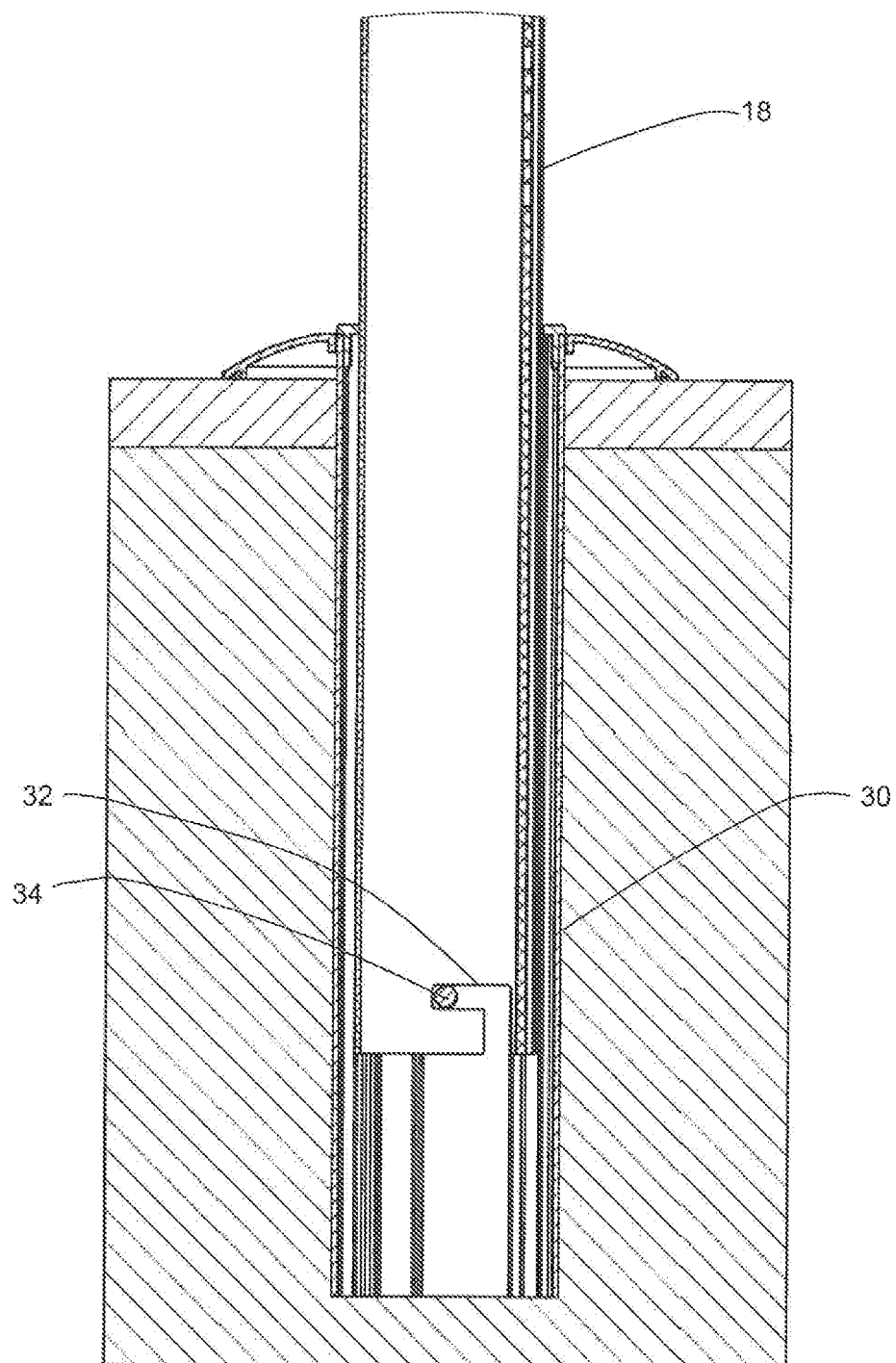


Fig. 3

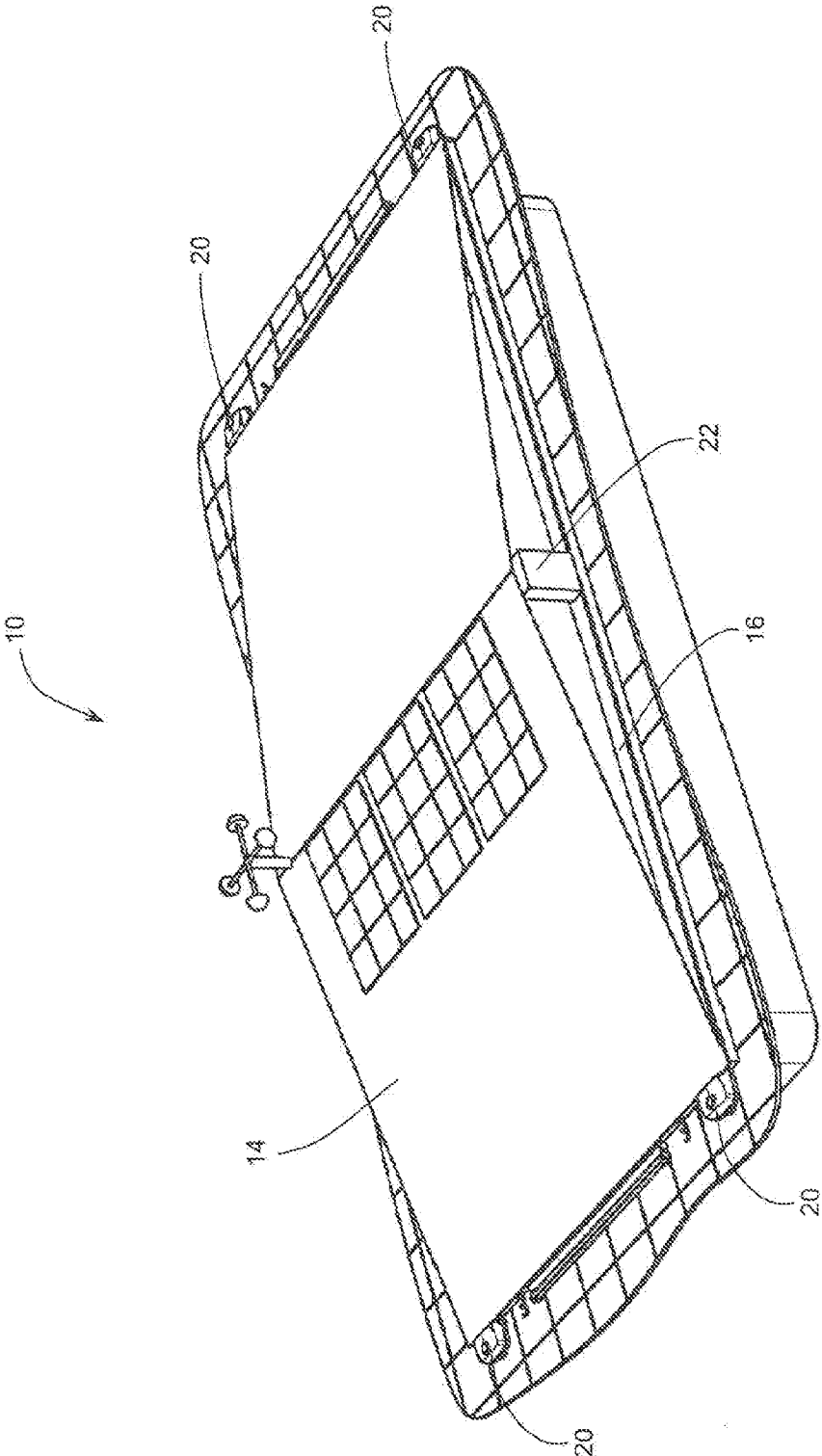


Fig. 4

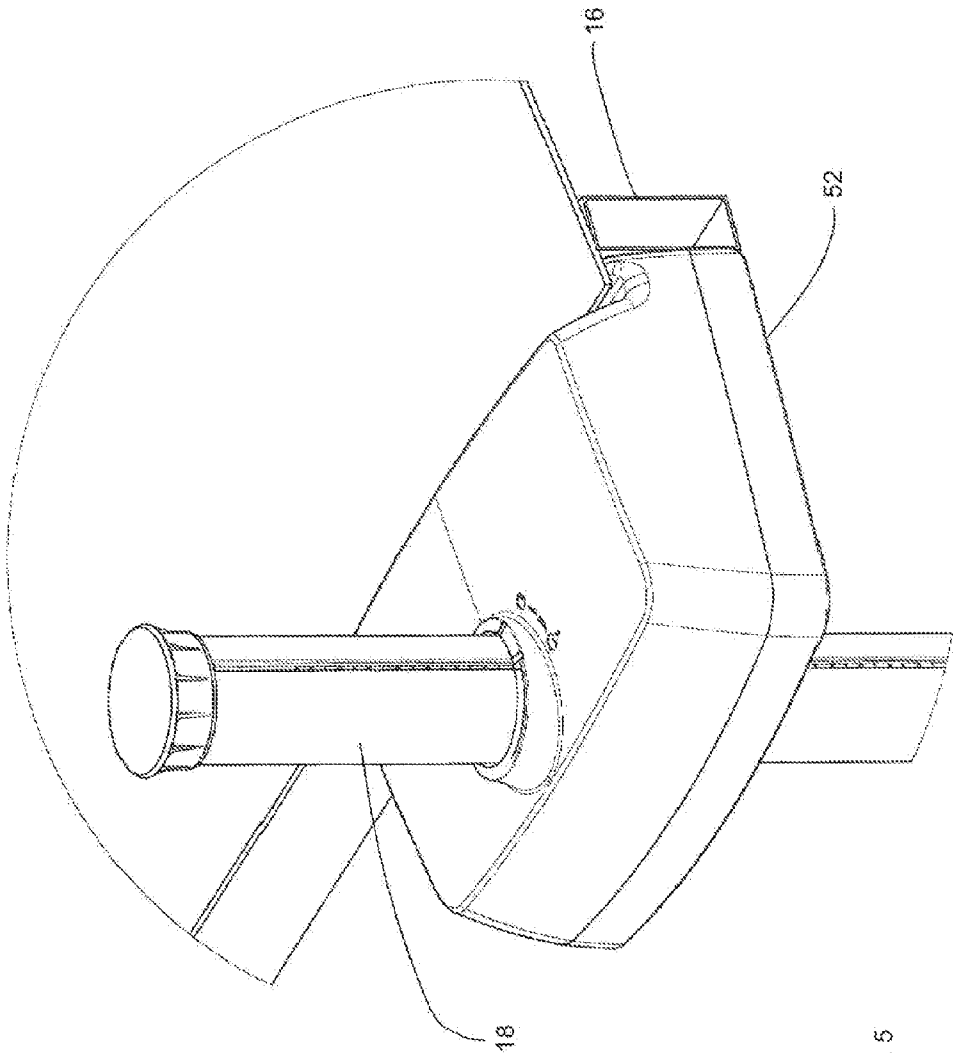
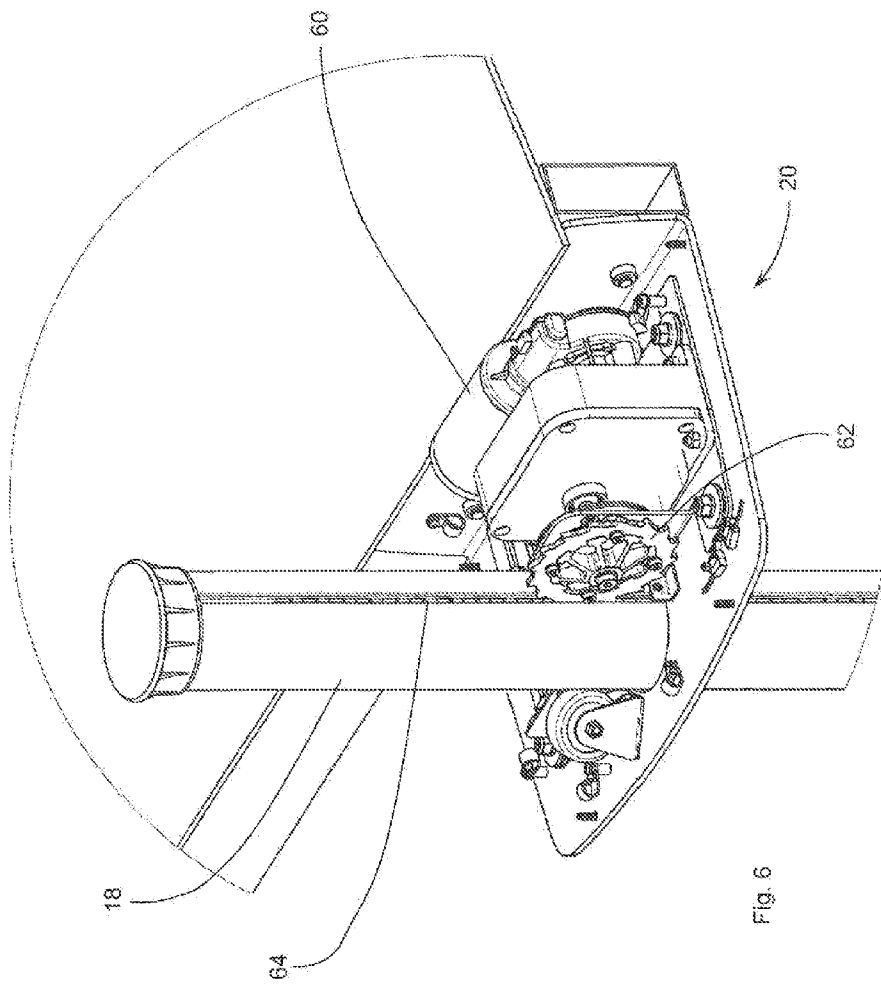
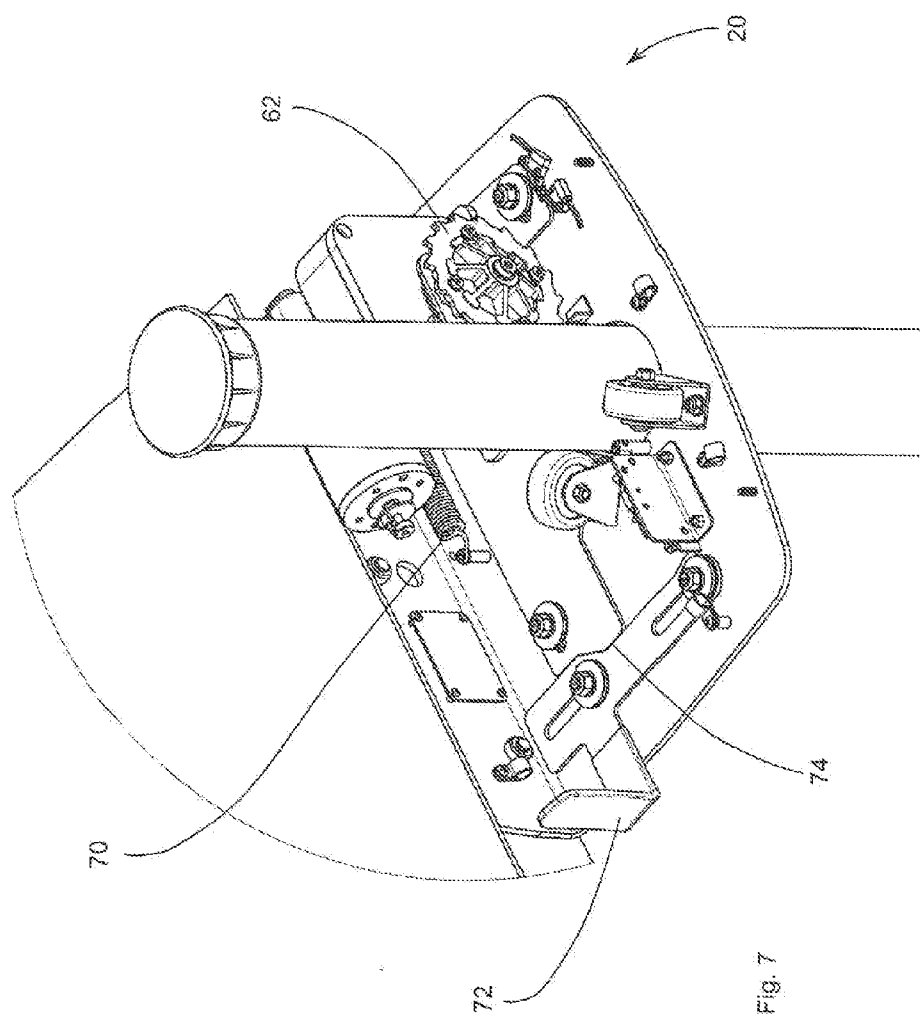


Fig. 5





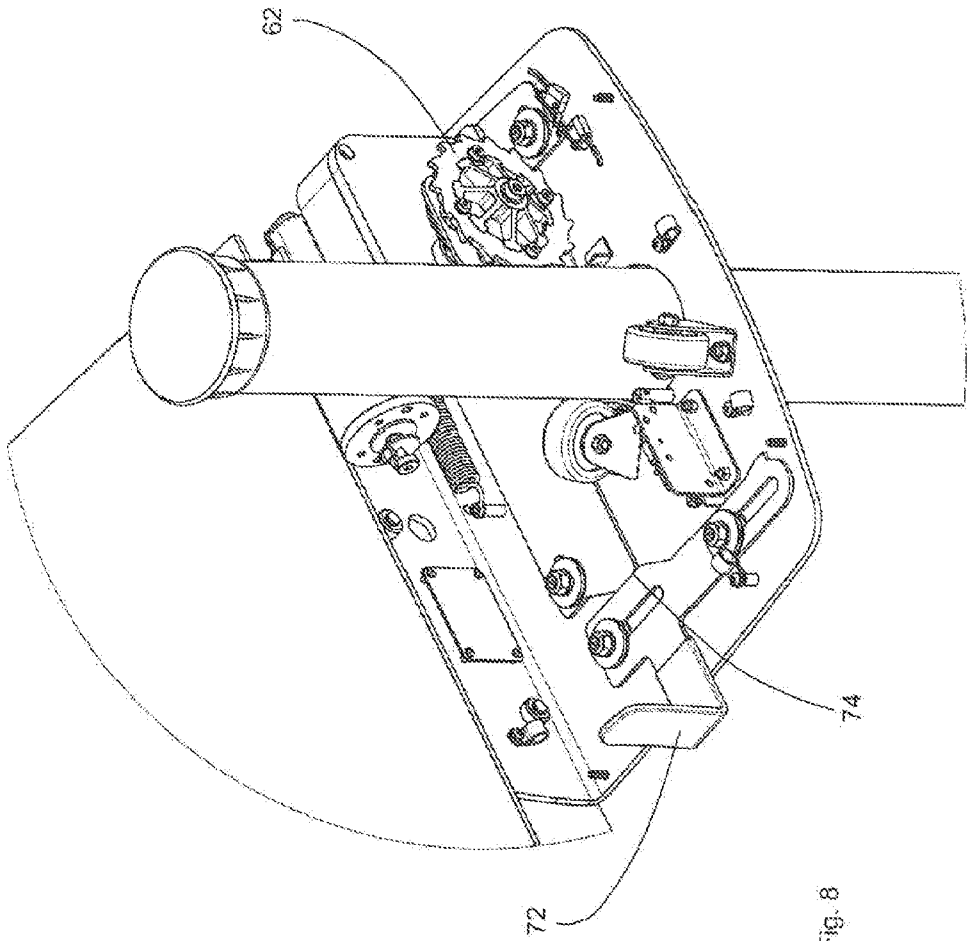
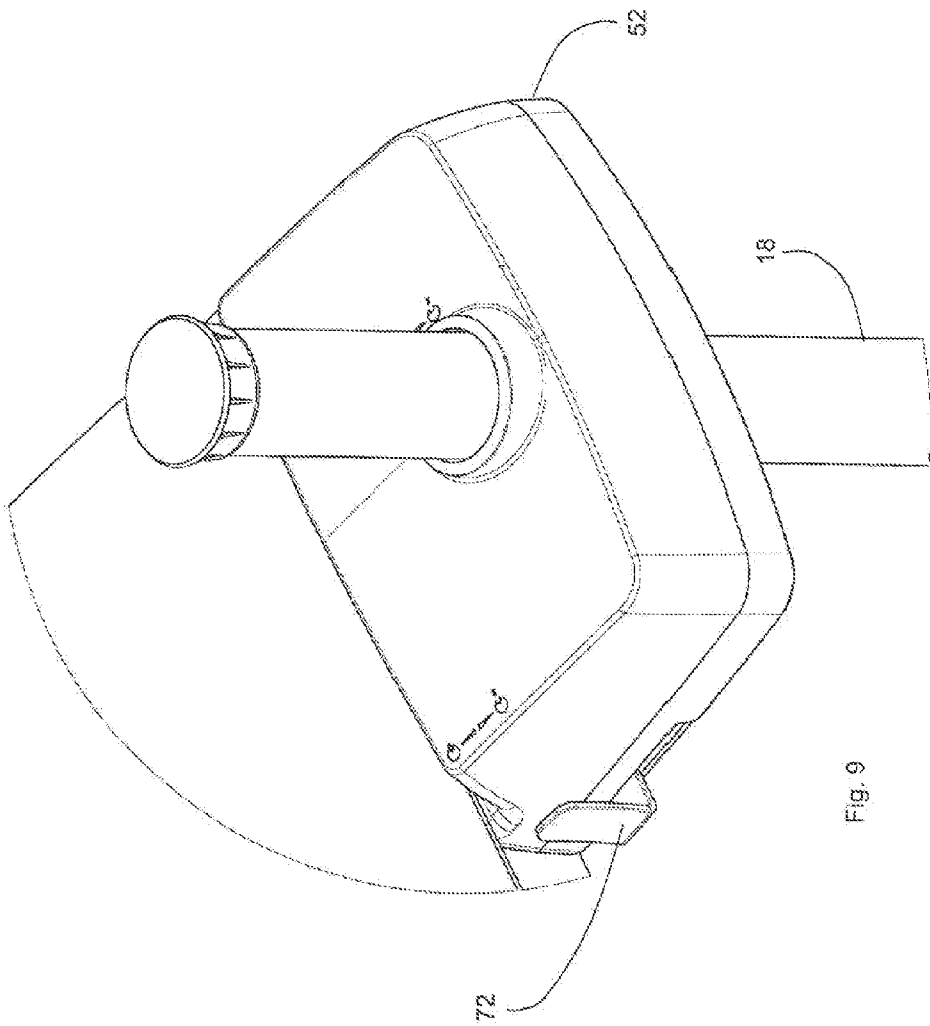


Fig. 8



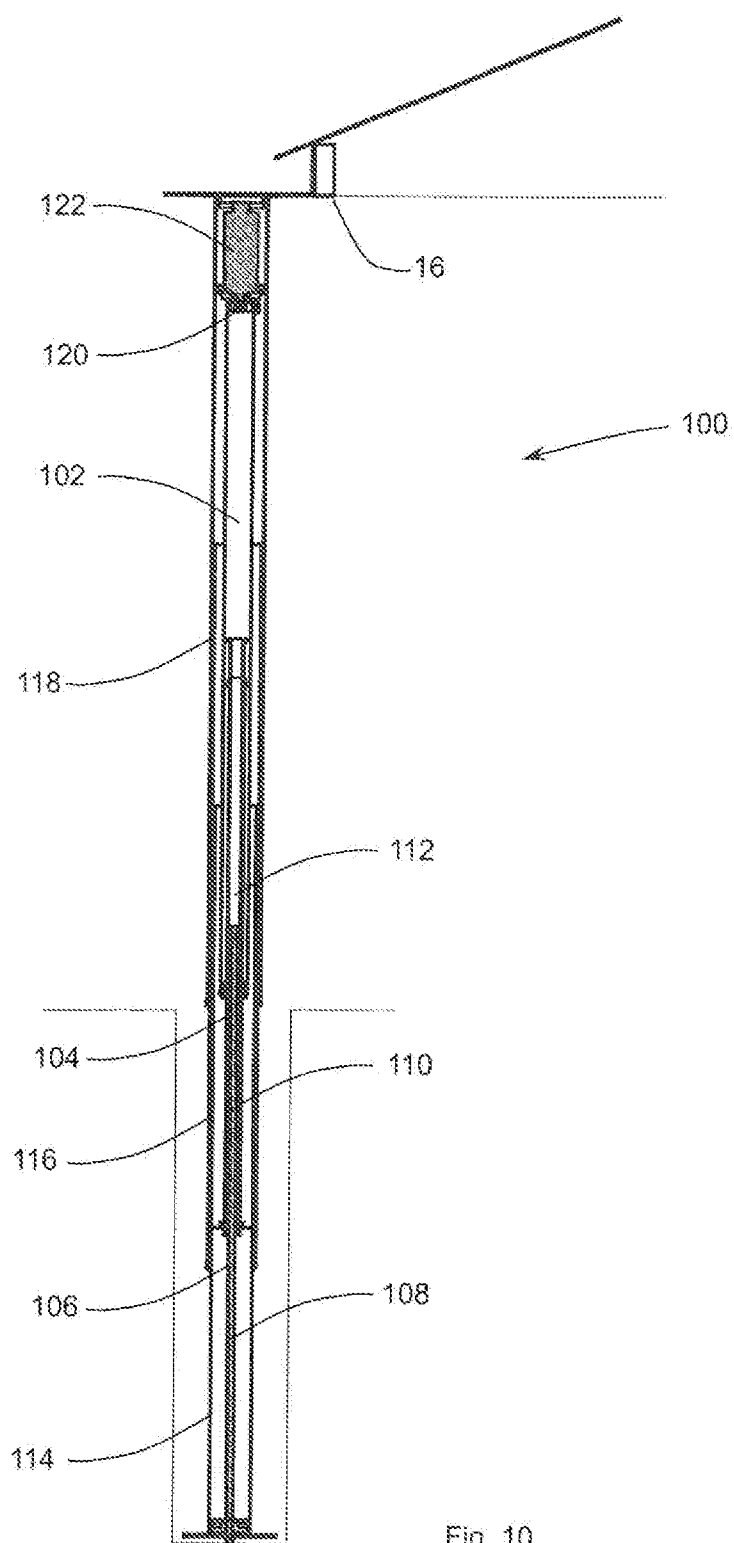


Fig. 10

HEIGHT ADJUSTABLE SWIMMING POOL COVER/CANOPY SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Australian Provisional Application No. 2013900156 filed Jan. 18, 2013, entitled "HEIGHT ADJUSTABLE CANOPY SYSTEM," and to Australian Application No. 2013201035 filed Feb. 22, 2013, entitled "HEIGHT ADJUSTABLE CANOPY SYSTEM," which claimed priority to AU 2013900156, the disclosures of which are incorporated fully by reference.

TECHNICAL FIELD

[0002] The present invention relates to canopies which can be used to cover or shelter a swimming pool.

BACKGROUND OF THE INVENTION

[0003] Pool covers are required for outdoor swimming pools for a number of purposes when the pool is not in use. A pool cover is ideally required to cover the surface area of the pool to act as a barrier to prevent the ingress of debris, such as leaves, entering the pool in order to maintain the pool in a clean state. Furthermore, the cover acts to hinder or reduce the effects of water evaporation so as to maintain a reasonable volume of water within the pool.

[0004] Typical pool covers are formed of flat sheet material which extends across the surface of the pool. However, over time, debris falling on the cover tends to weigh down on the cover, causing the cover to bow under the weight. This bowing can cause the edges of the cover to expose the perimeters of the pool and negate the cover's effectiveness. Similarly, the bowing can cause the accumulated debris to gather in the centre of the cover which is not easily removed without removing the entire cover from the pool.

[0005] It is a primary object of the present invention to provide a multi-purpose swimming pool canopy system which can be employed as a useful pool cover.

SUMMARY OF THE INVENTION

[0006] According to a first aspect of the present invention there is provided a swimming pool canopy system, the system comprising:

[0007] a canopy frame sized so as to be capable of at least substantially covering the swimming pool;

[0008] a number of vertical support posts arranged around the swimming pool, wherein the base of each vertical support post is securely arranged in a respective subterranean cavity surrounding said swimming pool;

[0009] a number of electric motors, each electric motor arranged to drive an associated actuator arrangement engaging a corresponding one of said support posts, wherein each electric motor and associated actuator arrangement is attached to said canopy frame; and

[0010] a controller which controls each of said motors to drive the associated actuator arrangement, whereby the engagement of each associated actuator arrangement with each corresponding support post, causes the canopy frame to be raised or lowered between a maximum and minimum height above ground level.

[0011] The system according to the first aspect advantageously provides a fairly self-contained system which, aside

from meeting the previously stated objective, facilitates ease of installation even when retrofitted to an existing swimming pool structure.

[0012] According to a further aspect of the present invention there is provided a swimming pool canopy system, the system comprising:

[0013] a canopy frame sized so as to be capable of at least substantially covering the swimming pool;

[0014] a number of vertical support posts arranged around the swimming pool, wherein the base of each vertical support post is securely arranged within a respective subterranean cavity surrounding said swimming pool;

[0015] a number of electric motors, each electric motor arranged to drive an associated actuator arrangement engaging a corresponding one of said support posts; and

[0016] a controller which controls each of said motors to drive the associated actuator arrangement, whereby the engagement of each associated actuator arrangement with each corresponding support post, causes the canopy frame to be raised or lowered between a maximum and minimum height above ground level;

[0017] wherein the system comprises a self-contained electrical power supply and electrical power circuitry, thereby removing any need to provide any connection to an external power source.

[0018] The system according to the second aspect provides advantages in being electrically self-contained. Consequently, in respect of installation, excavation to provide mains power supply is avoided and simplifies retrofitting to existing swimming pool structures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Preferred embodiments of the invention will now be described with reference to the accompanying drawings, in which:

[0020] FIG. 1 shows a preferred embodiment of a canopy system in a raised position;

[0021] FIG. 2 shows the system of FIG. 1 in a lowered position;

[0022] FIG. 3 is a cross-section view of the ground engaging portion of the support post of the system of FIG. 1;

[0023] FIG. 4 shows the system of FIG. 1 in a lowered position and having the support posts removed;

[0024] FIG. 5 shows a motor assembly housing of the system of FIG. 1;

[0025] FIG. 6 shows the motor assembly within the housing of FIG. 5

[0026] FIG. 7 shows the motor assembly of FIG. 6 in a normally biased post engaging position;

[0027] FIG. 8 shows the motor assembly of FIG. 6 in a disengaged position;

[0028] FIG. 9 shows the motor assembly housing of FIG. 5;

[0029] FIG. 10 shows an alternative embodiment for a post structure.

DETAILED DESCRIPTION OF THE INVENTION

[0030] The present invention will be principally described with reference to particular illustrative examples. It will be understood that the principles of the present invention may be implemented using variations of features on the particular implementations illustrated and described.

[0031] In the context of the following description, a canopy system 10 is described which can be raised and lowered in

height about an underlying swimming pool structure 12. In the fully raised height (see FIG. 1), the canopy 14 acts as a shelter or sunshade for the pool 12 and does not hinder access to the pool 12. In the fully lowered position (see FIG. 2), the canopy 14 acts as a cover for the pool 12 and does prevent access to the pool 12.

[0032] A common feature of the following preferred embodiments is a canopy frame 16 formed of rigid interconnected members. The frame 16 can be formed of stainless steel, aluminium or other weather-durable materials. The frame 16 could have a pitched-roof structure, as illustrated, or conceivably be a flat platform. The frame 16 comprises cover material 18 which could be a variety of materials, comprising a canvass sheet material, PVC panels, or (especially in the case of a platform concept) wooden panels capable of providing a sturdy surface.

[0033] Referring to FIG. 1 there is shown a canopy system 10 in conjunction with a swimming pool 12. The system 10 comprises four vertical support posts 18 positioned around the pool 12 and typically adjacent the corners of the pool 12. The canopy frame 16 engages and is attached to the vertical support posts 18 by motor assemblies 20.

[0034] In FIG. 1, the canopy frame 16 is shown at the maximum height, at the top of the vertical posts 18, where the canopy 14 acts as a shelter or sunshade for the pool 12 and does not hinder access to the pool. Typically the maximum height for the posts 18 is above average head height, for example 2.1 m above ground surface.

[0035] The system 10 comprises a control box 22 affixed to the canopy frame 16. The control box 22 houses a power supply, typically a rechargeable battery, for powering the motor assemblies 20, and comprises a processor for sending and receiving control signals to/from the motors 20. Cables 24 for providing data and power between the controller 22 and the motors 20 is self-contained within the canopy system 10. Hence, in the case of installing the system 10, no external power supply is required, which simplifies the installation and means the need for additional cabling for mains supply, which would require disruptive excavation, is removed.

[0036] As shown, the canopy 14 could be provided with solar panels 26 which can recharge the rechargeable battery.

[0037] In FIG. 2, the canopy frame 16 is shown in its fully lowered position, being at ground surface, whereby the pool surface is covered by the canopy frame 16.

[0038] In this first embodiment, the posts 18 can be made removable when the canopy frame 16 is at the fully lowered position. As shown in FIG. 3, each post 18 is positioned within a subterranean excavated hole 30, of approximately 0.3 m. The post 18 comprises a bayonet-type fitting 32 to mate with a protrusion 34 within the hole 30. When the canopy 14 is in the fully lowered position, as will be described in more detail, the post 18 can be removed in accordance with the bayonet-type fitting 32 and replaced by a shorter member with a similar bayonet-type fitting (see FIG. 4), thereby retaining the canopy frame 16 in place but removing the unnecessary protrusion of the elongated posts 18, as seen in FIG. 2, when the canopy 14 is in the fully lowered position.

[0039] Each motor assembly 20 is enclosed in a motor housing 52, which is attached to the canopy frame 16, see FIG. 5.

[0040] The motor 60 is a DC motor. The motor 60 shown can be between 100-130 W, having a worm drive and two-stage gear box with a gear ratio of 300:1. The motor 60 drives an actuator in the form of a cogged wheel 62. The cogged

wheel 62 engages a slot 64 arranged along the height of the vertical support post 18. The slot 64 comprises a track with evenly spaced holes, in which the teeth of the cogged wheel 62 engage, see FIG. 6

[0041] As will be appreciated, controlling the direction of the motor 60 causes the cogged wheel 62 to turn and the engagement of the teeth with the track in the post 18 causes the canopy frame 16 to raise or lower, depending upon the direction in which the motor 60 is driven.

[0042] The motor assembly 22 is spring biased by a spring 70 so that the cogged wheel 62 is maintained in engagement with the post's track. A lever arrangement 72, in contact with the motor assembly 22 with abutting angled portions 74, allows the motor assembly 22 to be moved against the spring bias and cause the cogged wheel 62 to be manually disengaged from the post's track (see FIG. 8), when the canopy 14 is at the lowest position, thereby allowing the post 18 to be removed and replaced, as mentioned before.

[0043] In an alternative embodiment, the vertical posts 100 could be arranged as a number of telescopic members. Hence the raising and lowering of the canopy frame 16 is caused by the telescopic arrangement of the posts 100. Referring to FIG. 10, each post 100 is formed by a number of parts 102, 104, 106 having inter-engaging screw-threaded surfaces 108, 110, 112. Each part 102, 104, 106 having an associated housing 114, 116, 118 which can nest inside each other when the post 100 is at the lowest position. The top part 102 is arranged to engage an actuator member 120 attached to the motor 122. Thereby, when the motor 122 is driven, the upper member 102 is caused to rotate, which in turn causes the other members 104, 106 to rotate and expand or contract the telescopic arrangement. In this embodiment, the bottom portion 106 is subterranean and may require an excavation hole of approx. 1500 mm depth.

[0044] The system 10 can be designed to comprise a variety of additional features to improve safety aspects. As shown, the system 10 can comprise an anemometer 28 so that wind conditions can be monitored. The controller 22 can be programmed so that, when the anemometer 28 detects a wind condition in excess of a predetermined safe threshold, the controller 22 causes the motors 20 to drive the canopy frame 16 to the minimum height.

[0045] While the speed in which the motors 20 can raise or lower the canopy frame 16 is open to design choice, for safety reasons, it is preferred that, for at least during lowering, the speed is fairly slow and could take about a minute to go from full height to ground height.

[0046] In ideal embodiments, the controller 22 can respond to signals from a wireless remote control unit. In this regard, however, it may be prudent if, when lowering, that the control be manually entered adjacent the system 10 and, preferably, on the control box 22 itself. In this way, a user can be able to visually inspect the pool 12 to ensure that the pool 12 is clear of any persons before the canopy 14 is at its lowest height and fully covers the pool 12. In other words, ensuring that no-one is trapped under the lowered cover 14. In this regard, the controller 22 may be programmed so that, when remotely controlled, it lowers only to a select height (for example, 0.6 m above minimum height) and requires a manual entry on the control box 22 itself before lowering all the way to minimum height.

[0047] A further safety feature may be the detection of objects in the path of the lowering canopy frame 16. In this regard, each motor assembly 20 may be designed to detect

progress of movement. In the case of any motor assembly **20** detecting movement being hindered, the controller **22** can stop all motors **20**. Ideally, in this circumstance, the controller **22** would direct that all motors **20** reverse direction (for example by 0.2 m) and then stop, to allow any obstacles blocking the lowering of the canopy frame **16** to be removed. [0048] A further feature may be the automatic lowering of the canopy frame **16** upon detecting that the pool **12** is not in use for a period of time. In this regard, the controller may be in communication with sensors associated with the pool, for example motion sensors and heat sensors, which can detect the presence of persons in the pool.

1-27. (canceled)

28. A swimming pool canopy system, said system including:

- a canopy frame sized so as to be capable of at least substantially covering said swimming pool;
- a number of vertical support posts arranged around said swimming pool, wherein the base of each vertical support post is securely arranged in a respective subterranean cavity surrounding said swimming pool;
- a number of electric motors, each electric motor arranged to drive an associated actuator arrangement engaging a corresponding one of said support posts, wherein each electric motor and associated actuator arrangement is attached to said canopy frame; and
- a controller which controls each of said motors to drive the associated actuator arrangement, whereby the engagement of each associated actuator arrangement with each corresponding support post, causes the canopy frame to be raised or lowered between a maximum and minimum height above ground level.

29. The canopy system of claim **28**, wherein, said system includes a self-contained electrical power supply and electrical power circuitry, thereby removing any need to provide any connection to an external power source.

30. The canopy system of claim **29**, wherein said self-contained power supply is a rechargeable battery.

31. The canopy system of claim **30**, wherein said canopy system further includes solar panels which provide recharging power for said rechargeable battery.

32. A swimming pool canopy system, said system including:

- a canopy frame sized so as to be capable of at least substantially covering said swimming pool;
- a number of vertical support posts arranged around said swimming pool, wherein the base of each vertical support post is securely arranged within a respective subterranean cavity surrounding said swimming pool;

a number of electric motors, each electric motor arranged to drive an associated actuator arrangement engaging a corresponding one of said support posts; and

a controller which controls each of said motors to drive the associated actuator arrangement, whereby the engagement of each associated actuator arrangement with each corresponding support post, causes the canopy frame to be raised or lowered between a maximum and minimum height above ground level;

wherein the system includes a self-contained electrical power supply and

electrical power circuitry, thereby removing any need to provide any connection to an external power source.

33. The canopy system of claim **32**, wherein said cogged wheel is arranged to be normally biased into engagement with said vertical track and said cogged wheel is capable of being moved against said bias to disengage from said vertical track.

34. The canopy system of claim **33**, wherein said cogged wheel is arranged to be normally biased into engagement with said vertical track and said cogged wheel is capable of being moved against said bias to disengage from said vertical track.

35. The canopy system of claim **34**, wherein each support post is capable of being removed when the associated cogged wheel is disengaged.

36. The canopy system of claim **35**, wherein said support post includes a bayonet arrangement arranged to mate with an associated protrusion within the associated subterranean cavity which allows said post to be removed.

37. The canopy system of claim **28**, wherein each support post has a telescopic structure which allows said post to extend and retract, thereby raising or lowering said canopy frame, wherein said actuator arrangement is a portion at the top of the post which directly engages the associated motor.

38. The canopy system of claim **37**, wherein each support post is formed of a plurality of members with inter-engaging screw-threaded surfaces.

39. The canopy system of claim **28**, wherein said controller is programmed to cause said canopy frame to lower upon the detection of certain conditions.

40. The canopy system of claim **39**, wherein a certain condition includes excessive wind conditions as measured by an anemometer incorporated in said system.

41. The canopy system of claim **38**, wherein a certain condition comprises detection of non-usage of the swimming pool.

42. The canopy system of claim **28**, wherein said canopy frame provides a pitched roof structure.

43. The canopy system of claim **41**, wherein said canopy frame provides a level platform structure.

* * * * *