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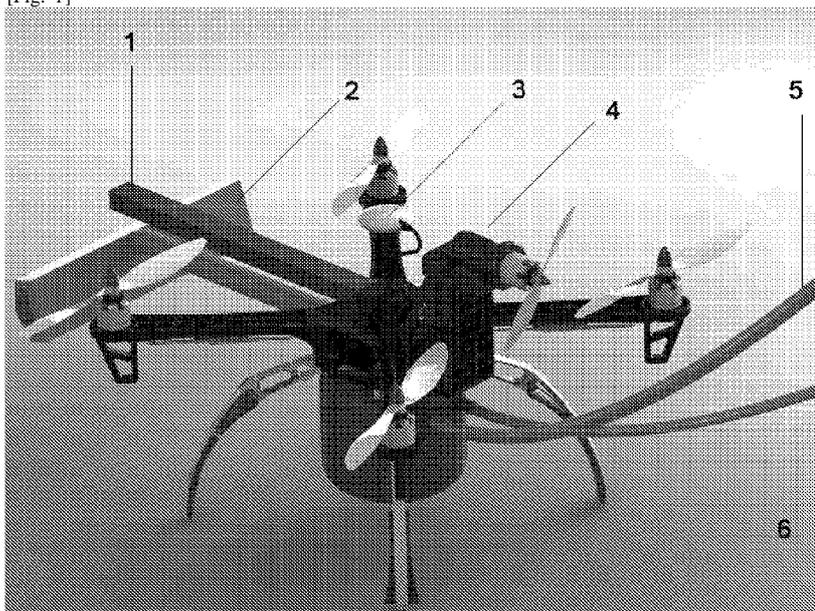
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(54) Title: SURFACE WASHING DRONE

[Fig. 1]



(57) Abstract: The surfaces and windows washing drone comprise a water hose connected to low volume reservoir; power cord connected to drone; a squeegee brush; an airscrew and engine in the opposite direction of the cleaning equipment; an air blower system for faster drying; a water pump; a distance sensor.



Description

Title of Invention: SURFACE WASHING DRONE

Technical Field

[0001] The subject matter described herein relates generally to a surface washing drone.

Background Art

[0002] Application Number: 15493050 - Application Date: 20.04.2017 - Publication Number: 20170305547 - Publication Date: 26.10.2017

[0003] Title: SURFACE WASHING DRONE

[0004] A surface washing drone with a modular cleaning head unit. The surface washing drone may also include a safety failover mechanism. The surface washing drone communicates and works together with other surface washing drones in a group.

Summary of Invention

[0005] This is a drone fully designed to obviate problems mentioned above, which can automatically keep the safe distance to the building, taking into account the size of the tower and skyscrapers and the size of windows to clean them. This invention not only does save time but also is cost-effective and safe.

[0006] In this drone, part of the required waters and inputs in drone is supplied by water pump from hoses connected to it. The main water reservoir was removed and the alternative low volume reservoir has been replaced. This reservoir is filled with water by that hose and upon running out of water it will immediately filled with by the water pump from the hoses.

[0007] This leads to less volume of water in the drone, in turn which makes it lighter. The volume of water inside the tank is always the same as washing a glass.

[0008] On the other hand, another wire is connected to the drone to supplies the required power. It also eliminates carrying battery in drone in turn makes drone lighter.

[0009] A cleaner blade is used to clean the windows so that after spraying the detergent cleaner blade cleans it and then the air blower embedded on our drone will dry remnant water. In case there is an urgent need to add external force to further blade pressure on the glass, the engine is mounted on the rear to add horizontally the lateral force that pushes the drove forward and makes cleaning and control easier.

[0010] Given removing detergent reservoir and power supplies from drone and transferring it to tower roof, this device can continue cleaning operations without stopping and as there is no need to climber and manpower has been removed, this operation can continue even day and night.

[0011] If skyscraper is too elevated, thanks to wires and cables, the cleaning can be performed in several steps. For example, after cleaning the top 10 floors of the

building, the power system is moved from the roof to lower 10 floors to clean them.

Technical Problem

[0012] To cleaning skyscrapers and towers windows is found to be one of the most costly and hazardous tasks and that's why such operations are usually performed once or twice a year. The cleaning method differs depending on the building, so that either climbers hanging on rope, or elevator connected to roof crane are used. On the other hand, to the best of our knowledge there are no robots and drones in the market to address this issue.

[0013] The existing drone samples to clean skyscrapers and towers windows have some drawbacks and limitations. These drones cannot clean windows for a long time due to battery heaviness and the lack of required water for a long time. At the same time in case much more water is carried by drone it is impossible for drone to take off. In case an external force is exerted to make more pressure on fins, existing drones cannot generate this force.

Advantageous Effects of Invention

[0014] 1) Eliminating need to agreement in order to supply the required energy and water in drone

[0015] 2) Much more effective and efficient cleaning

[0016] 3) The possibility for automatic control and use of the drone

Brief Description of Drawings

Fig.1

[0017] [fig.1] Over view of the drone

Fig.2

[0018] [fig.2] Distance sensor of the drone

Description of Embodiments

[0019] 1) blower- after washing the window and cleaned it with squeegee, the blower will make the rest of the water dry.

[0020] 2) Squeegee- it has a motor behind it for two style cleaning situations, one that makes it ups and downs movement for heavy cleaning and without the motor for regular cleaning.

[0021] 3) Antenna- communicating with the central control panel and GPS.

[0022] 4) Backup motor- provide extra power for back and forward movement and extra force for pushing the squeegee for heavy duty cleaning mode or stabilize the drone in the windy situations.

[0023] 5) Hose- it is connecting the main tanker to onboard tanker and filling up the onboard tanker. It could be water or window cleaning liquid etc. The goal of having this hose is removing the heavy load from the drone.

[0024] 6) Power cable- providing the power of the drone. The goal is to remove the heavy loads of the battery.

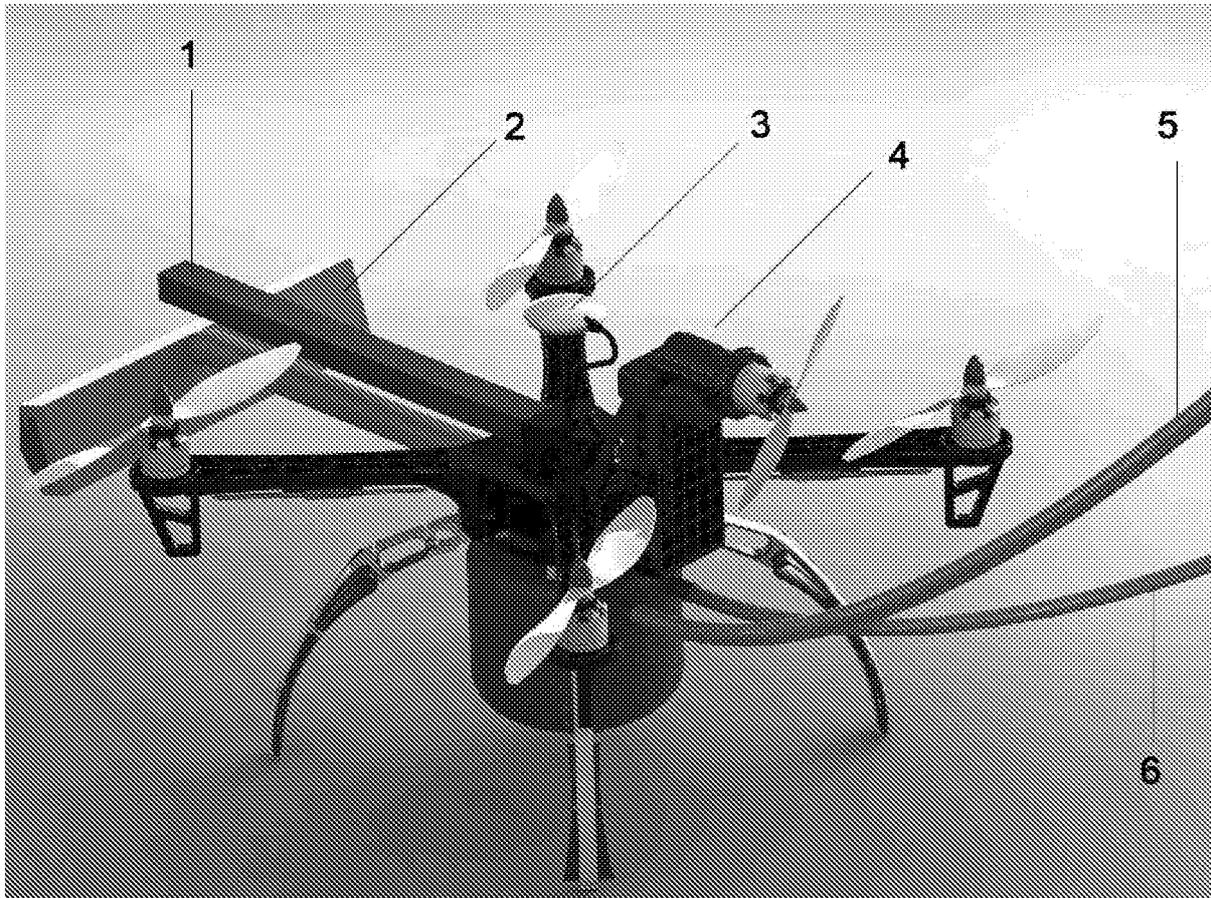
Industrial Applicability

[0025] This drone is applied to clean up tower and skyscrapers windows that are difficult to access. Currently, such buildings are cleaned by climbers and workers, which is a very time consuming and dangerous task.

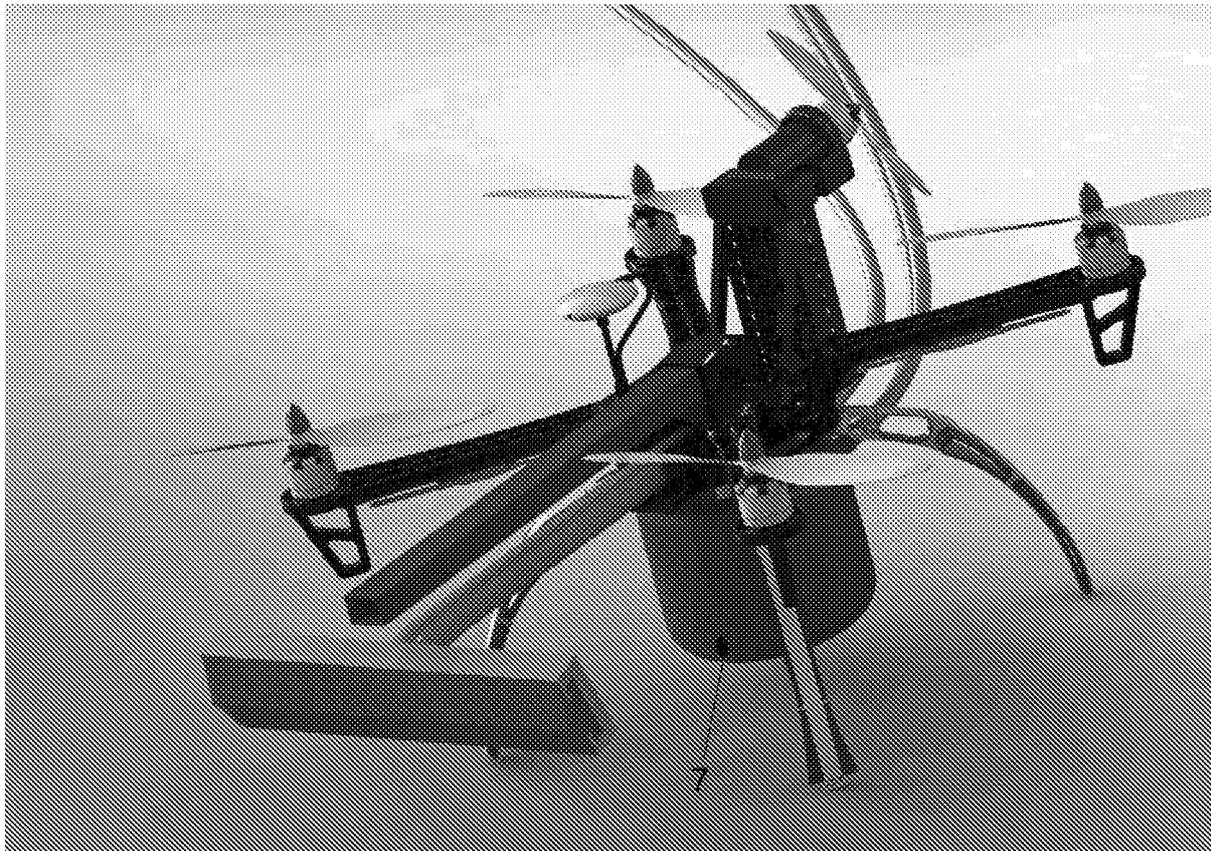
Claims

- [Claim 1] Surfaces and windows washing DRONE by connecting electrical wire and water hose which consists of the following components: A) Water hose connected to DRONE reservoir; B) Power cord connected to DRONE; C) An airscrew and engine in the opposite direction of the DRONE system; D) Air blower system; E) Water pump; F) Distance sensor.
- [Claim 2] The DRONES required water is supplied by a reservoir that is at a higher level than DRONE and connected to the DRONE with a hose.
- [Claim 3] The power required by DRONE is supplied by the wiring connected to the city power supply.
- [Claim 4] An airscrew and engine are installed in the opposite direction to the DRONE washing system to bring the pressure to the surface for better washing.
- [Claim 5] The air blower system will dry faster the washed windows.
- [Claim 6] The distance sensor avoids the DRONE collision with objects.
- [Claim 7] Water volume inside the reservoir is always as much as the washing of a glass by a pump and a hose.

[Fig. 1]



[Fig. 2]



INTERNATIONAL SEARCH REPORT

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According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) TotalPatentOne		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR101818195 B1 (KIM Jong Yul) 12 January 2018 (12.01.2018) Para [0023], [0027]-[0028], [0030], [0052]-[0053], Figure 1-2, 6-7	1-7
Y	WO2016028736 A1 (ELWHA LLC) 25 February 2016 (25.02.2016) Para [0023], Figure 1	1-7
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		EP 3183170 A1	28-06-2017
		US 20160052026 A1	25-02-2016