Automated Novelty Report

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1.1 Objective

The objective of the report is to perform a patentability search identifying the relevant art in the patent literature and non-patent literature as it relates to the invention.
The documents listed offer a basis for evaluation of the novelty of the invention.

Our Ref: 6401f700b5b4fe278cfe3385

Your Ref: NA

Search concluded on : 2023-03-01

Report generated on : 2023-03-03

1.2 Key Features

The broad key features are prepared based on the details of the invention and information provided by the client. The analysis of the references has been done based on one or more features overlapping with the key features of the invention to form a relevant prior art.

Key Features of the Invention Based on Information	
KF1	Window cleaning drone for buildings
KF2	Window Cleaning Drone is designed with a computer that controls up-and-down movements with the help of ropes and cables.
KF3	They also help move the drone to a different section of windows for cleaning them properly.
KF4	The propellers are used to push the device away from a building.
KF5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.

1.3 Summary

Based on the details of the invention, relevant patent citations are mapped. Further, ten other patent citations are also shortlisted. Only one patent per family is being mapped and other family members of the family are incorporated by reference. Summary of the citations is presented in the tables below. Clicking on the hyperlinks (Citation No. Column) will open the patent record in Xlpat with e.g. full text, family and legal data and the possibility to download the original document.

S.No.	Citation No.	Title	Publication Date
1	WO-2019172700-A1	Drone For Cleaning Window Glass Of High- rise Building	20190912
2	DE-102020121817-A1	Drone For Cleaning Window Surfaces, System For Cleaning Window Surfaces, Method For Cleaning Window Surfaces	20220224
3	KR-20210030105-A	Drone Fot Cleaning Windows Of Building	20210317
4	WO-2021034013-A1	Drone For Cleaning Outer Wall Of High-rise Building	20210225
5	WO-2018000736-A1	External Wall Cleaning Method Based On Unmanned Aerial Vehicle, And Unmanned Aerial Vehicle	20180104
6	US-20170340176-A1	Drone Cleaning Device	20171130
7	KR-20190056237-A	Cleaner For Outer Windows Drone	20190524
8	US-20170197713-A1	Aerial Drone Cleaning Device And Method Of Cleaning A Target Surface Therewith	20170713

1.4 Key Feature Analysis

The broad key features are prepared based on the details of the invention and information provided by the client. The analysis of the references has been done based on one or more features overlapping with the key features of the invention to form a relevant prior art.

Citation No.	KF1	KF2	KF3	KF4	KF5
WO-2019172700-A1	85.69%	65.67%	62.81%	71.28%	67.95%
DE-102020121817-A1	83.20%	74.95%	74.28%	53.77%	61.87%
KR-20210030105-A	82.69%	76.79%	77.24%	62.28%	61.87%
WO-2021034013-A1	79.75%	73.08%	75.91%	50.19%	73.83%
WO-2018000736-A1	75.50%	74.63%	76.28%	50.16%	61.84%
US-20170340176-A1	74.94%	69.73%	70.35%	46.05%	61.89%
KR-20190056237-A	77.35%	66.62%	61.46%	43.68%	54.04%
US-20170197713-A1	75.84%	67.30%	66.95%	48.77%	62.03%

02 Citations Details

The following citations are only for personal use.
The following citations are only for personal use. All the results are mapped based on the key features of the subject patent and as per the information provided by the client. The relevant texts of the patent citations are highlighted with colors to support the mapping based on the subject patent.

2.1 Details of Relevant Patent Citations

Reference 1: WO-2019172700-A1			
Publication No:	WO-2019172700-A1	Publication Date:	20190912
Application No:	KR-2019002699-W	Application Date:	20190308
Priority No:	NA10-2018-0028037	Priority Date:	20180309
Inventor(s)	LEE HAE GON | LEE, HAE GON | 이해곤 | LEE, HAE GON | 이해곤		
Family Member(s)	KR-101872664-B1 | WO-2019172700-A1		
Title	Drone For Cleaning Window Glass Of High-rise Building		
Abstract	The present invention relates to a drone for cleaning the window glass of a high-rise building and, more specifically, to a drone for cleaning the window glass of a high-rise building, comprising: a main body having a plurality of propellers for generating thrust for flight to a target point of a high-rise building; an adsorption unit arranged at one side of the lower part of the main body such that the main body comes into close contact with one surface of the window glass of the high-rise building; a cleaner module, which is arranged at the other side of the lower part of the main body so as to come into contact with one surface of the glass window; and a control unit including a sensor unit, which senses the approaching distance to the target point of the high-rise building, and controlling operations of the adsorption unit and the cleaner module when the main body is close to the target point of the high-rise building.		

S.No	Key Features	Identified Patent Number : WO-2019172700-A1
IN1	Window cleaning drone for buildings	Similarity Score - 85.69% drone for cleaning window glass of high-rise building
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 65.67% In addition, in the drone for high- rise glass- wiping according to the present invention, by using a spray nozzle connected to the receiving unit accommodated in the liquid form of the dust remover to spray on one side of the high-rise glass window can have an effect that can be cleaned clean. have.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 62.81% In addition, in the drone for high- rise glass- wiping according to the present invention, by using a spray nozzle connected to the receiving unit accommodated in the liquid form of the dust remover to spray on one side

Reference 1: WO-2019172700-A1		
		of the high-rise glass window can have an effect that can be cleaned clean. have.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 71.28% A main body provided with a plurality of propellers for generating thrust for flight to a target point of a high-rise building;
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 67.95% In addition, in the drone for high- rise glass- wiping according to the present invention, by using a spray nozzle connected to the receiving unit accommodated in the liquid form of the dust remover to spray on one side of the high-rise glass window can have an effect that can be cleaned clean. have.

Reference 2: DE-102020121817-A1

Publication No:	DE-102020121817-A1	Publication Date:	20220224
Application No:	DE-102020121817-A	Application Date:	20200820
Priority No:	NA102020121817	Priority Date:	20200820
Inventor(s)	MAYER MARCEL PHILIPP | Mayer, Marcel Philipp | Mayer | ALTHERR JANNICK DOMINIK HERBERT | ALTHERR, Jannick Dominik Herbert | Altherr		
Family Member(s)	DE-102020121817-A1		
Title	Drone For Cleaning Window Surfaces, System For Cleaning Window Surfaces, Method For Cleaning Window Surfaces		
Abstract	The invention relates to a flying drone (1) for cleaning window surfaces (2), the flying drone (1) having a plurality of thrust-generating components (3) for generating thrust forces in one thrust direction (S), at least one of the thrust-generating components (3) can be pivoted to control their respective thrust direction (S). The invention also relates to a system for cleaning window surfaces (2) and a method for cleaning window surfaces (2) using a flying drone (1).		

S.No	Key Features	Identified Patent Number : DE-102020121817-A1
IN1	Window cleaning drone for buildings	Similarity Score - 83.20% The invention relates to a flying drone for cleaning window surfaces, a system for cleaning window surfaces and a method for cleaning window surfaces using a flying drone.
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 74.95% The invention relates to a flying drone for cleaning window surfaces, a system for cleaning window surfaces and a method for cleaning window surfaces using a flying drone.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 74.28% The invention relates to a flying drone for cleaning window surfaces, a system for cleaning window surfaces and a method for cleaning window surfaces using a flying drone.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 53.77% According to a further preferred embodiment of the invention, it is provided that the system according to the invention is used to clean the window surface, with all flight drones of the system being operated using the method according to the invention, with the flight movements of the Flight drones are coordinated by the communications center.

Reference 2: DE-102020121817-A1		
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 61.87% The flying drone 1 is a flying drone 1 for cleaning window surfaces 2. For this purpose, it has a nozzle 6, from which a cleaning agent can be sprayed onto the window surface 2 to be cleaned. The cleaning agent is carried along by the flying drone 1 in a cleaning agent reservoir 9 which is in fluid communication with the nozzle 6 . A sensor 9.1 monitors the fill level of the cleaning agent reservoir 9 so that if the fill level is too low, a warning is issued to an operator or the flying drone 1 can be automatically navigated to a refill station.

Reference 3: KR-20210030105-A

Publication No:	KR-20210030105-A	Publication Date:	20210317
Application No:	KR-20190111641-A	Application Date:	20190909
Priority No:	NA20190111641	Priority Date:	20190909
Inventor(s)	LEE HAE GON | LEE, HAE GON | 이해곤 | 이해곤		
Family Member(s)	KR-20210030105-A		
Title	Drone Fot Cleaning Windows Of Building		
Abstract	Disclosed is a drone for cleaning glass windows of a high-rise building. According to the present invention, the drone includes: a body including a plurality of propellers generating thrust for flight to a target spot of a high- rise building; an adsorption apparatus placed on one side of an upper part of the body such that the body comes in tight contact with a glass window of the high-rise building; a cleaner module placed on one side of the body to come in contact with one side of the glass window; a control part controlling the operation of the adsorption part and the cleaning module when the body is adjacent to the target spot of the high-rise building, by including a sensor part sensing a distance by which the body approaches the target spot of the high-rise building; and an attachment support apparatus stably supporting the body to the glass window such that the movement of the body is minimized when the body comes in tight contact with the glass window of the high-rise building. Therefore, the present invention is capable of cleaning a glass window while conveniently moving a drone.		

S.No	Key Features	Identified Patent Number : KR-20210030105-A
IN1	Window cleaning drone for buildings	Similarity Score - 82.69% drone fot cleaning windows of building
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 76.79% The present invention relates to a drone for cleaning windows of a high-rise building, and more specifically, to a drone for cleaning windows of a high-rise building that allows cleaning of the windows while moving up and down while maintaining a close contact with the windows.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 77.24% The present invention relates to a drone for cleaning windows of a high-rise building, and more specifically, to a drone for cleaning windows of a high-rise building that allows cleaning of the windows while moving up and down while maintaining a close contact with the windows.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 62.28% That is, four propellers 110 face each other radially on the outside of the main body 100, but this is only an example, and may be provided in a large number, such as five or six.

Reference 3: KR-20210030105-A		
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 61.87% The present invention relates to a drone for cleaning windows of a high-rise building, and more specifically, to a drone for cleaning windows of a high-rise building that allows cleaning of the windows while moving up and down while maintaining a close contact with the windows.

Reference 4: WO-2021034013-A1

Publication No:	WO-2021034013-A1	Publication Date:	20210225
Application No:	KR-2020010770-W	Application Date:	20200813
Priority No:	NA10-2019-0100950	Priority Date:	20190819
Inventor(s)	LEE GILL DO | LEE, Gill Do | 이길도 | LEE, Gill Do | 이길도		
Family Member(s)	KR-102039603-B1 | WO-2021034013-A1 | US-20220267002-A1		
Title	Drone For Cleaning Outer Wall Of High-rise Building		
Abstract	The present invention relates to a drone for cleaning an outer wall of a high-rise building and, more specifically, to a drone configured to float and move in the air, the drone comprising: a drone main body; and a floating transfer unit for floating and moving the drone main body in the air, wherein the drone main body has a camera unit provided to photograph the exterior of a building, has driving wheels on one surface thereof to be guided to the exterior of the building, further has a buffer angle member to cushion an impact with the building, and further has a washing nozzle unit which sprays water onto and washes the exterior of the building. Accordingly, by cleaning the exterior or a window of a skyscraper using the drone configured to float and move in the air, there are the effects of reducing the costs of cleaning a skyscraper, simplifying a cleaning operation, preventing human accidents due to falls, and reducing cleaning time.		

S.No	Key Features	Identified Patent Number : WO-2021034013-A1
IN1	Window cleaning drone for buildings	Similarity Score - 79.75% drone for cleaning outer wall of high-rise building
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 73.08% Drone for cleaning the outer wall of a high-rise building, characterized in that consisting of a safety wire connecting the connecting rings and the lifting motor.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 75.91% The drone body is further provided with a moving cleaning means to transfer the driving cleaning unit,
IN4	The propellers are used to push the device away from a building.	Similarity Score - 50.19% The drone body is provided with driving wheels on one side to guide the exterior of the building,
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 73.83% The drone body is further provided with a driving washing unit to clean the outer surface of the building where water is sprayed through the washing nozzle unit,

Reference 5: WO-2018000736-A1

Publication No:	WO-2018000736-A1	Publication Date:	20180104
Application No:	CN-2016109146-W	Application Date:	20161209
Priority No:	NA201610488504.1	Priority Date:	20160628

Inventor(s)	LIU JUN | LIU, JUN | 刘均 | LIU, JUN | 刘均 | LIU XIN | LIU, XIN | 刘新 | LIU, XIN | 刘新 | SONG CHAOZHONG | SONG, Chaozhong | 宋朝忠 | SONG, Chaozhong | 宋朝忠 | OUYANG ZHANGPENG | OUYANG, Zhangpeng | 欧阳张鹏 | OUYANG, Zhangpeng | 欧阳张鹏
Family Member(s)	CN-106114857-A | WO-2018000736-A1
Title	External Wall Cleaning Method Based On Unmanned Aerial Vehicle, And Unmanned Aerial Vehicle
Abstract	Disclosed is an external wall cleaning method based on an unmanned aerial vehicle. When receiving an instruction to clean an external wall of a building, an unmanned aerial vehicle flies to a specified position of the building to be cleaned; determines a cleaning area corresponding to the specified position on the external wall of the building to be cleaned, and acquires environmental information of the cleaning area; and controls a cleaning device of the unmanned aerial vehicle so that same cleans the cleaning area according to the environmental information. Further disclosed is an unmanned aerial vehicle, comprising a flight module (10), an acquisition module (20) and a cleaning control module (30). The unmanned aerial vehicle and the cleaning method realize the purpose of efficiently cleaning an external wall of a building.

S.No	Key Features	Identified Patent Number : WO-2018000736-A1
IN1	Window cleaning drone for buildings	Similarity Score - 75.50% When the drone receives an instruction to clean the exterior wall of the building, it flies to the designated location of the building to be cleaned;
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 74.63% Preferably, the cleaning device that controls the cleaning device of the drone according to the environmental information to clean the cleaning area comprises:
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 76.28% The cleaning device of the drone is controlled to clean the cleaning area according to the environmental information.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 50.16% To achieve the above object, an unmanned aerial vehicle based external wall cleaning method provided by the present invention includes the following steps:
IN5	After the water is sprayed from the drone	Similarity Score - 61.84%

Reference 5: WO-2018000736-A1		
	microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	The cleaning device of the drone is controlled to clean the cleaning area according to the environmental information.

Reference 6: US-20170340176-A1

Publication No:	US-20170340176-A1	Publication Date:	20171130
Application No:	US-201715400966-A	Application Date:	20170107
Priority No:	NA105116779	Priority Date:	20160527
Inventor(s)	LIAO CHIA-HUNG | LIAO CHIA-HUNG | LIAO		
Family Member(s)	US-20170340176-A1 | TW-201740870-A		
Title	Drone Cleaning Device		
Abstract	A drone cleaning device for a building exterior comprises a main frame, a plurality of branch shafts set to the main frame, a plurality of power elements respectively set to the branch shafts, a plurality of adjustable supports set to the main frame, a plurality of rotatable elements respectively set to the adjustable supports and are configured to rotate relative to the adjustable supports, and a plurality of cleaning elements respectively set to the rotatable elements.		

S.No	Key Features	Identified Patent Number : US-20170340176-A1
IN1	Window cleaning drone for buildings	Similarity Score - 74.94% drone cleaning device
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 69.73% 9. The drone cleaning device of claim 1, wherein the cleaning element comprises a cleaning part and a liquid storage connected to the cleaning part.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 70.35% 9. The drone cleaning device of claim 1, wherein the cleaning element comprises a cleaning part and a liquid storage connected to the cleaning part.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 46.05% The drone cleaning device 100 further comprises a flight controlling system 70 assembled onto the main frame 10. In this embodiment, the flight controlling system 70 is located onto the adjustable support 40 away from the main frame 10. In other embodiment, the flight controlling system 70 may be located into the main frame 10 or other parts.
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 61.89% 9. The drone cleaning device of claim 1, wherein the cleaning element comprises a cleaning part and a liquid storage connected to the cleaning part.

Reference 7: KR-20190056237-A

Publication No:	KR-20190056237-A	Publication Date:	20190524
Application No:	KR-20170153441-A	Application Date:	20171116
Priority No:	NA20170153441	Priority Date:	20171116
Inventor(s)	SONG GWANG HYUK | SONG, GWANG HYUK | 송광혁 | 송광혁		
Family Member(s)	KR-20190056237-A		
Title	Cleaner For Outer Windows Drone		
Abstract	The present invention relates to a drone wherein a drone for cleaning an outer wall window is intended to prevent a dangerous situation that people wipe an outer wall while being roped, and allow the drone to wipe an outer wall window with a wider width in a ′Z′ letter shape and an outer wall window with a longer height in an ′N′ letter shape. More specifically, the drone comprises: a detachable rag capable of wiping an outer wall of a building; an obstacle avoiding sensor for preventing a collision with the wall; and, a hole for inserting a detergent which is used for wiping the outer wall window, wherein the obstacle avoiding sensor is provided at an edge of the drone, the hole for inserting a detergent is provided at the center thereof, and a function for the detachable rag is provided at both sides thereof. Accordingly, the present invention has effects of preventing the dangerous situation that people wipe the outer wall while being roped and allowing the drone to wipe the window with a wider width in a ′Z′ letter shape and the window with a longer height in an ′N′ letter shape.		

S.No	Key Features	Identified Patent Number : KR-20190056237-A
IN1	Window cleaning drone for buildings	Similarity Score - 77.35% cleaner for outer windows drone
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 66.62% The present invention relates to a drone wherein a drone for cleaning an outer wall window is intended to prevent a dangerous situation that people wipe an outer wall while being roped, and allow the drone to wipe an outer wall window with a wider width in a ′Z′ letter shape and an outer wall window with a longer height in an ′N′ letter shape. More specifically, the drone comprises: a detachable rag capable of wiping an outer wall of a building; an obstacle avoiding sensor for preventing a collision with the wall; and, a hole for inserting a detergent which is used for wiping the outer wall window, wherein the obstacle avoiding sensor is provided at an edge of the drone, the hole for inserting a detergent is provided at the center thereof, and a function for the detachable rag is provided at both sides thereof. Accordingly, the present invention has effects of preventing the dangerous situation that people wipe the outer wall while being roped and allowing the drone to wipe the window with a wider width in a ′Z′ letter shape and the window with a longer height in an ′N′ letter

Reference 7: KR-20190056237-A

		shape.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 61.46% The present invention relates to a drone wherein a drone for cleaning an outer wall window is intended to prevent a dangerous situation that people wipe an outer wall while being roped, and allow the drone to wipe an outer wall window with a wider width in a ′Z′ letter shape and an outer wall window with a longer height in an ′N′ letter shape. More specifically, the drone comprises: a detachable rag capable of wiping an outer wall of a building; an obstacle avoiding sensor for preventing a collision with the wall; and, a hole for inserting a detergent which is used for wiping the outer wall window, wherein the obstacle avoiding sensor is provided at an edge of the drone, the hole for inserting a detergent is provided at the center thereof, and a function for the detachable rag is provided at both sides thereof. Accordingly, the present invention has effects of preventing the dangerous situation that people wipe the outer wall while being roped and allowing the drone to wipe the window with a wider width in a ′Z′ letter shape and the window with a longer height in an ′N′ letter shape.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 43.68% Accordingly, the present invention has been made to solve the problems that the conventional drones can not be used in various places
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 54.04% The present invention relates to a drone wherein a drone for cleaning an outer wall window is intended to prevent a dangerous situation that people wipe an outer wall while being roped, and allow the drone to wipe an outer wall window with a wider width in a ′Z′ letter shape and an outer wall window with a longer height in an ′N′ letter shape. More specifically, the drone comprises: a detachable rag capable of wiping an outer wall of a building; an obstacle avoiding sensor for preventing a collision with the wall; and, a hole for inserting a detergent which is used for wiping the outer wall window, wherein the obstacle avoiding sensor is provided at an edge of the drone, the hole for inserting a detergent is provided at the center thereof, and a function for the detachable rag is provided at both sides thereof. Accordingly, the present invention has effects of preventing the dangerous situation that people wipe the outer wall while being roped and allowing the drone to wipe the window with a wider width in a ′Z′ letter shape and the window with a longer height in an ′N′ letter

Reference 7: KR-20190056237-A		
		shape.

Reference 8: US-20170197713-A1

Publication No:	US-20170197713-A1	Publication Date:	20170713
Application No:	US-201614992195-A	Application Date:	20160111
Priority No:	NA201614992195	Priority Date:	20160111
Inventor(s)	BORMAN MICHELLE LYNN | BORMAN MICHELLE LYNN | Borman | BRADBURY GLENN ALLEN | BRADBURY GLENN ALLEN | Bradbury | CHANG SU YON | CHANG SU YON | Chang | HUSTON LARRY L | HUSTON LARRY L. | Huston		
Family Member(s)	US-20170197713- A1 | WO-2017123431- A1 | US-9963230- B2 | CN-108463153- A | EP-3402380-A1 | EP-3402380-B1		
Title	Aerial Drone Cleaning Device And Method Of Cleaning A Target Surface Therewith		
Abstract	A drone which can be piloted by a user. The drone has at least one or both of a depending head and an outwardly extending elongate handle. A cleaning sheet may be removably disposed on the head, to clean a target surface, such as a floor or countertop. A duster may be removably disposed on the handle, to clean a target surface, such as an elevated surface or clean personal items.		

S.No	Key Features	Identified Patent Number : US-20170197713-A1
IN1	Window cleaning drone for buildings	Similarity Score - 75.84% aerial drone cleaning device and method of cleaning a target surface therewith
IN2	Window Cleaning Drone is designed with a computer that controls up- and- down movements with the help of ropes and cables.	Similarity Score - 67.30% A drone which can be piloted by a user. The drone has at least one or both of a depending head and an outwardly extending elongate handle. A cleaning sheet may be removably disposed on the head, to clean a target surface, such as a floor or countertop. A duster may be removably disposed on the handle, to clean a target surface, such as an elevated surface or clean personal items.
IN3	They also help move the drone to a different section of windows for cleaning them properly.	Similarity Score - 66.95% A drone which can be piloted by a user. The drone has at least one or both of a depending head and an outwardly extending elongate handle. A cleaning sheet may be removably disposed on the head, to clean a target surface, such as a floor or countertop. A duster may be removably disposed on the handle, to clean a target surface, such as an elevated surface or clean personal items.
IN4	The propellers are used to push the device away from a building.	Similarity Score - 48.77% The rotary wing (12) may define a plane. Components of the drone (10) may be referenced to this plane. For example, a head (20) for removably receiving a cleaning

Reference 8: US-20170197713-A1		
		sheet (22) may be disposed below this plane, while a handle (30) for removably receiving a duster (32) may be disposed below, coplanar with, parallel to or above this plane.
IN5	After the water is sprayed from the drone microfiber scrubbers clean the windows while an attached squeegee is used to remove excess water.	Similarity Score - 62.03% After cleaning the drone (10) is piloted so that it returns to the user. The user then removes the soiled cleaning sheet (22) and replaces it as desired, and/or replenishes cleaning fluid in the reservoir (24).

2.2 Details of Relevant Non-Patent Citations

Note: Below are the list of non-patent citations.

S.No.	Title	Date	Source
1	A Window Cleaning Drone | Drone Below	Nov 23, 2018	Dronebelow
2	Window Cleaning – Atlanta Drone Cleaning	NA	Atlantadronecleaning
3	Are Window Cleaning Drones The Future? - Dean's Window Cleaning	Mar 14, 2019	Deanswindowcleaning
4	Are Drones The Future Of Commercial Window Cleaning?	Dec 13, 2021	Intercleanshow
5	The Advantages Of Drone Technology In Window Cleaning: A Look Into The Future - Latest In Tech	NA	Latestintech
6	Window Cleaning Drone For Sale Factory Sale, Save 51%.	NA	Toques-blanches-lyonnaises
7	This Drone Is Cleaning Windows 1,100 Feet Above The Ground, So Humans Don't Have To	Dec 1, 2018	Sea mashable
8	De-risking A Dangerous Job: How A Window Washing Startup Is Raising The Bar (and Hose) With Drones	Mar 15, 2022	Startlandnews
9	Lucid Offers Exterior Building Cleaning Drone For Rent	Nov 2, 2022	Thedronegirl
10	Windowcleaning - Ktv Working Drone	NA	Ktvworkingdrone

2.3 List of Other Shortlisted Citations

Note: Below list of citations are not mapped in detail since they are broadly related to the domain of invention. These citations are provided for reference as they can be useful.

S.No.	Citation No.	Title	Family Member(s)
1	KR-20210017866-A	Drone For Cleaning Windows	KR-20210017866-A
2	NL-2012975-B1	System And Method For Placing A Load On A Non-horizontal Surface At A Location That Is Difficult To Reach And With Which Drone Can Be Used.	NL-2012975-B1
3	KR-102198788-B1	Dron For Cleaning	KR-102198788-B1
4	US-10618652-B2	Surface Washing Drone	US-20170305547-A1 | WO-2017184898-A1 | US-10618652-B2
5	KR-102099187-B1	Indoor Cleaning Drone System And Operating Method	KR-102099187-B1
6	KR-20190139432-A	Apparatus For Cleaning Exterior Wall Of Building Using Drone	KR-20190139432-A | KR-102214414-B1
7	CN-115158664-A	Unmanned Aerial Vehicle Cleaning Structure And Using Method	CN-115158664-A
8	WO-2020082393-A1	Cleaning Method And System Based On Unmanned Aerial Vehicle	GB-201821278-D0 | DE-202019102399-U1 | CN-110769728-A | EP-3643608-A1 | WO-2020082393-A1 | GB-2578489-A | JP-2021509591-A | JP-2021509591-A5 | US-20210196093-A1
9	CN-207436825-U	A Kind Of Drone Version Window	CN-207436825-U
10	US-20200237168-A1	Drone Cleaning Apparatus And Method For Elevated Structures And Ceilings	US-20200237168-A1

03 Assignee

KOREA IND TECH INSTITUTE

VALEO SYSTEMES D ESSUYAGE

STATE GRID

COBALT ROBOTICS

IBM

LG ELECTRONICS

SHENZHEN YANBEN BRAND DESIGN

WORKING DRONES

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Dr. Nirmal S. Basi has a PhD in Biochemistry and is an entrepreneur, inventor, as well being a registered patent agent for the United States Patent and Trademark Office (USPTO).

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Jitin Talwar, Founder

Experienced Patent Attorney, globally recognized entrepreneur and technology leader led early adoption of AI/ML and Deep Learning that led to founding of multiple start-ups including XLSCOUT.

He is Leading the use of Artificial Intelligence for Innovation, Machine Learning for Ideation and Blockchain in Innovation management.

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