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RELIABLE WINDSHIELD WIPER ASSEMBLY

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Abstract

An automatic windshield wiper assembly comprising: a modified wiper blade arm having multiple holes, configured like a manifold, to provide high pressure waterjet supply to the windshield; a wiper blade attached an angle to the wiper arm similar to exist in art; a servo/step motor connected to the assembly to lift the said wiper arm with wiper blade away from the windshield on initiation to render high pressure waterjet on the windshield to flush off the debris, rodents, sticky flies, dusts, etc. on the windshield; and to drop down the wiper blade in close contact with the windshield after the flushing completed; a water pump to supply high pressure water supply from the reservoir to the wind shield; a microcontroller, wherein the above said mechanism are controlled by the microcontroller provided as the part of the mechanism and the said microcontroller, water pump, are electrically connected to the vehicle.

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Title: RELIABLE WINDSHIELD WIPER ASSEMBLY

Sheet no.: 01

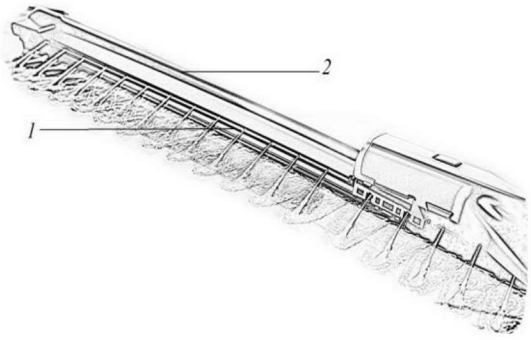

Fig 1

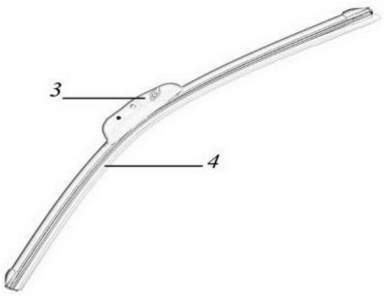

Fig 2

Vijayalakshmi. T (Patent Agent)

On behalf of the Applicant

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RELIABLE WINDSHIELD WIPER ASSEMBLY

TECHNICAL FIELD OF INVENTION:

The present invention generally relates to windshield wiper assembly used in any light, medium and heavy-duty vehicles and more particularly to a microcontroller enabled modified automatic wiper assembly having a detachable cleaning wiper blades and water spray wiper manifold to provide better cleaning of windshield during travels.

BACKGROUND OF THE INVENTION:

Wiper Scrapper is a normal elastomer material with sharp edges provided to wipe off or to clean the glassy surfaces accumulated with droplets of water or any foreign particulates sticking on it. These wipers are used in any household through industrial applications and leave a clean surface. We use hand operated wipers for kitchen, toilets, room cleaning aids, front office glasses, automobiles etc. Among all, the application of wiper is more important in automobiles as they wipe off the windshield which is the visual window for the operator who drives the vehicle to get clear view of things in front of his vehicle. The function of the wiper blade of the windshield is more important considering the variety of visibility limiting issues.

The use of wiper system in any automobile vehicle is considered as one of the key safety element and it is essential that this wiper should be healthy always that too for long journeys. But as it prone to different weathering conditions the wiper will be either covered with dust, foreign materials, sticky flies or insects, mud which may decrease the cleaning efficiency of the scrapper blade and may result in poor visibility. Sometimes the presence of small abrasive particles like sand, pollens may leave a scratch surface rending poor visibility for the vehicle operator. Also, the scrapper is

made of elastomer when subjected to high temperature and humidity, wind blow, rain etc. and it may degrade; become brittle providing hard scrapping surface resulting in poor cleaning performance. During such occasions it becomes mandate for the vehicle operators to do manual cleaning by getting off the vehicle and most of the time this brings lot of inconvenience to them and it is too risky on highways due to high traffics, results in fatal accident too.

The present system of automobiles has wiper blades provided with a wiper arm fixed with an elastomeric wiper. The wiper arm is provided with pivot/radial movement by the motor. The spray nozzle on the bonnet of the vehicle sprays a jet of water or cleaning fluid stored in the reservoir to the wind shield before the wiper arm starts radial movement. The cleaning fluid or water provides necessary wet surface to clean the windshield by wiper scrapper blades.

Prior Arts:

The following are the earlier inventions related to the similar invention. U.S. Pat. No. 5,301,384 discloses a vehicular window cleaning apparatus having a wiper arm, wiper blade and drive means therefor in combination with a scrubber for intensifying the cleaning effort of the wiper blade. The scrubber is detachably connected to the wiper blade. An adjustment means is provided for rotating the wiper blade relative to the wiper arm for selectively and sequentially positioning the wiper blade and scrubber against an associated windshield.

U.S. Pat. No. 3,892,006 discloses a rotatable wiper, substantially cylindrical in shape and adaptable for mounting on a conventional oscillating windshield wiper arm, comprising a plurality of radially spaced, longitudinally extending blade-pairs of resilient material formed around a flexible, heated shaft member for wiping moisture and other visibility-limiting matter from a vehicle windshield. The wiper has an

electrical heating element located in the center of the wiper shaft and connected to an external power supply.

The Electronic wiper disclosed in CN207550151 includes a servo/step motor, reducing gear box, wiper arm and wiper blade, where the servo/step motor when powered, will rotate the gear box through the driving output shaft connecting to the servo/step motor. The reducing gear box output shaft is connected to the wiper which provide necessary oscillating motion to the wiper arm. The wiper blade attached to the wiper arm will provide the wiping action on the windshield encroaching it.

US 2020361417 discloses a disposable windshield wiper blade attachment which contains a chemical coated on the wiper blade that will provide the cleanising action in case of any foreign particles stick on the windshield. The chemical impregnated on the fabric, foam or other porous enclosure of synthetic or natural material will be attached to the end of the wiper blade for quick removal of debris.

JP2010047241 claims that the wiper blade having an angle θ with the windshield which will help to remove the smudge better than straight blade wiper.

US application 10343652 relates to a wiper device having the cleaning arrangement with one or more spray nozzle directly on the wiper arm and with fastening arrangement. Both the fastening and cleaning of the wiper is met by separate components.

US2014083455 discloses the wiper cleaning assembly wherein the wiper assembly has an abrasive portion including the rubber bristles and ridges; a thermal portion behind it for ice removal.

US Patent no 5007130 explains the wiper with twin elements on the either side of the

wind shield and are spaced apart in two or more offsetting parallel rows forming a zone where the left over from one side of the element shall be organized. Being offset area, the second arm shall remove the debris from this zone and there by provide a completely cleaner windshield.

US 2009064437 disclose an oscillating wiper mechanism which contains a rotating shaft fitting with detachable cleaning implements. This rotary mechanism is connected to the cleaning unit rendering both cleaning and brush implements supporting the wiper cleaning.

US 5774926 explains graduated windshield wiper cleaning elements, where the horizontal rows of raised dots or square of different size are included which provides rubbing action when applied to the external surface of the windshield. The dots or square graduated with the maximum size on bottom and minimum along the top edge of the element. It claims that the cleaning efficiency is improved due to the graduated sizes of the cleaning elements.

US patent no. 4934013 explains the wiper assembly with series of angularly positioned obstructions in the form of projects and depressions forming a bird track pattern. This obstruction forms a barricade over the wiper when it passes through the debris, dislodge them from the windshield and provide necessary cleaning action.

In another Journal article, Magic Vision control provided in Mercedes-Benz windshield wipers uses wiper with multiple holes and water is sprayed through this mobile windshield wiper attached to the wiper arm.

The above prior art has configurational complexities for the purpose of cleaning the windshield and does not address the following drawbacks:

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1. When water is sprayed on the windshield from the external nozzle, it flushes all the foreign particles, sand, debris, dust, flies, rodents etc. and accumulates on top of the wiper scrapper blade at the bottom of the windshield. Hence the movement of wiper arm will spread these dusts, sand, water mixed foreign particles again on the windshield itself leaving a dirty surface and it may cause scratch on the windshield glass leading to reduced lifetime.

2. The modified spray nozzle with twin nozzle helps to cover 120° of the wind shield area, still limit the spray area of the windshield and visibility of the complete 180° of the wind shield. Incase of any damage of the nozzle or nozzle angle change, it may not provide enough water for cleaning on demand. This is somehow overcome in the Magic vision control of Mercedes Benz where water is sprayed by the inbuilt wiper manifold which moves along with the wiper arm.

3. The water spray pressure at the first instance does not remove the debris; the cleaning is achieved by water spray to wet the surface and wiping action of the wiper. This may result in reduced life of the wiper assembly as it may damage the sharp edge of the wiper blade.

Present invention helps to overcome the above said drawbacks and provide a reliable wind shield cleaning mechanism with better cleaning mechanism.

The present invention aims at providing a windshield wiper assembly with reduced configurational complexities and capable of efficiently cleaning a variety of visibility limiting matter from the windshield of the vehicle. The purpose of the present invention is to overcome the deficiencies in the prior art and provide a microcontroller based automatic cleaning wiper for convenient use.

The objective of the invention is to provide an improved automatic microcontroller based windshield wiper for cleaning containing a servo/step motor, modified wiper

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blade having manifold, high pressure pump, wiper blade, microcontroller in combined action provides a windshield wiping providing an effective cleaning and longer life of blade/windshield.

Another object of the invention to provide working of the modified automatic shield for providing cleansing windshield.

SUMMARY OF THE INVENTION:

The present invention explains an automatic windshield wiper assembly comprising a modified wiper blade arm, wiper blade, water pump, servo/step motor, microcontroller as the part of the assembly. The modified wiper blade arm is configured to have multiple holes and made like a manifold to distribute the high-pressure water supplied by the water pump which supplied water from the reservoir to the wiper arm manifold. The water pump pressurize water to 120 psig is used in this mechanism as water when supplied at 100 psig on the windshield top shall flush away all the debris without much wiping and drains freely to the bonnet. The water is distributed evenly at uniform pressure like a jet through the wiper holes when the wiper arm is moved along the windshield. This high-pressure water flushes away the debris, rodents, sticky flies, dusts etc. and drains to the bonnets without accumulating it on the top of the wind shield assembly as the entire assembly get lifted off the wind shield by the servo/step motor. The wiper blade is attached to the wiper arm at an angle of 20-25^{o} to provide better wiping action once the entire assembly is rested on the windshield by the servo/step motor. A micro controller is used to control the entire steps of the action of the wind shield wiper assembly. The water pump and servo/step motor, microcontroller is powered by the battery of the vehicle.

Another embodiment of the invention explains the process of wind shield cleaning that includes the following steps:

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Initiation of the wiper cleaning, will energize the microcontroller, the first step of the process is the raise of the wiper assembly using the servo/step motor off the windshield, water pump gets energized and pushes water from the reservoir to the wiper manifold assembly; water is sprayed through the manifold wiper holes at high pressure with the oscillatory motion of the wiper assembly; windshield gets cleaned off by flushing action of the high pressure water removing all the debris, sands, dusts, rodents, sticky flies, foreign particles adhering to the wind shield and are drained to the bottom of the bonnet drains; on completion of the flushing action, the servo/step motor drops the wiper assembly on the wind shield and in parallel the water pump will gets deenergized and stops supply of water to the manifold. The wiper blade moves along the wiper blade arm to wipe off the excess water or debris on top of the wind shield. On completion of the said wiping and cleaning action, the wiper assembly is held at halt position and microcontroller get deenergized. This wind shield assembly can be used in any of the vehicle wind shield, or any household or industrial wind shield applications. The vehicle wind shield application includes the use of this wind shield wiper assembly in light duty or medium duty or heavy-duty vehicles.

Further aspect of the invention is the use of the said wind shield wiper assembly in all type of vehicles, industrial and household application. More specifically it is used in light duty, medium duty and heavy-duty vehicles.

Other aspects, features and advantages of the present invention will become apparent from the following detailed description. It should be understood, however, that the detailed description and the specific examples, while indicating specific embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF DRAWINGS:

Figure. 1 illustrates wiper blade and spraying mechanism.

Figure. 2 shows the complete view of the wiper assembly.

Figure. 3 illustrates a block diagram of the process involved in the wiper mechanism.

DETAILED DESCRIPTION:

A description of embodiments of the present invention will now be given with reference to the Figures. It is expected that the present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.

Referring to Figure 1, wiper blade arm (2) is filled with water which is evenly spread through the spraying holes provided in the wiper blade manifold (1) . The wiper blade arm is provided with a manifold to provide multiple holes through out the entire length of the wiper arm to provide even distributed and pressurized flow to the wind.

Referring to Figure 2, it shows the wiper blade which shows the wiper blade connector (3) to the wiper arm (2) and the wiper blades are provided with normal wiper blades (4) which are placed at an angle to the wind shield to provide better wiping action so that the blade will be in close contact and will strip off the excess water from the windshield.

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Figure 3 shows the different steps involved in the process of wiper assembly wiping action.

Summarizing the present invention, an automatic windshield wiper assembly comprising: a modified wiper blade arm having multiple holes, configured like a manifold, to provide high pressure water jet supply to the windshield; a wiper blade attached an angle to the wiper arm similar to exist in art; a servo/step motor connected to the assembly to lift the said wiper arm with wiper blade away from the windshield on initiation to render high pressure waterjet on the windshield to flush off the debris, rodents, sticky flies, dusts, etc. on the windshield; and to drop down the wiper blade in close contact with the windshield after the flushing completed; a water pump to supply high pressure water supply from the reservoir to the wind shield; a microcontroller, wherein the above said mechanism are controlled by the microcontroller provided as the part of the mechanism and the said microcontroller, water pump, are electrically connected to the vehicle.

The Automatic windshield assembly, wherein the wiper arm housing comprising Multiple holes having a manifold to distribute the water at uniform pressure throughout the wind shield; extending the complete coverage area of the wiper arm movement and provide high flush water on the debris to get flush off the wind shield and ger flooded into the bonnet drain without sticking to the wiper arm as it is levied away from the windshield. The pressure of the manifold is in the order of 80-120 psig; more specifically 100 psig and water pressure provided by a water pump connected with the water reservoir.

The wiper blade fitted to the modified wiper arm assembly, at an angle of 20-25^{o} to provide better wiping action. The entire process of the windshield assembly is controlled by a Microcontroller.

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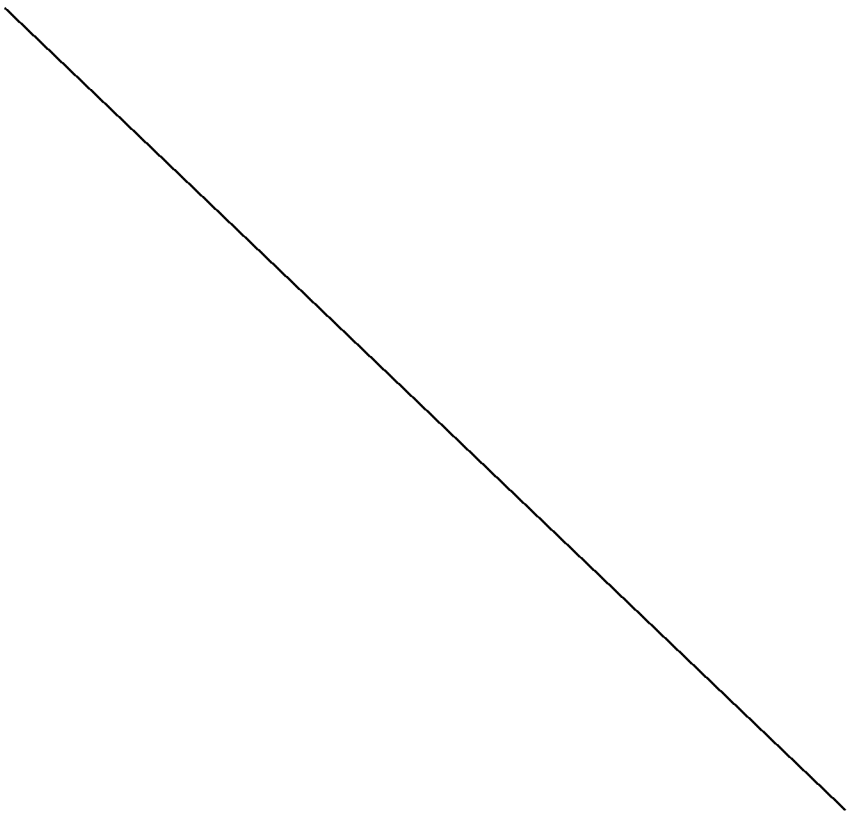
The Automatic windshield assembly process includes; initiation of wiper cleaning; powering of the microcontroller; the servo/step motor raises the whole wiper assembly apart from the wind shield; water pump will push water from reservoir to the wiper arm manifold; wiper assembly moves along the windshield providing the oscillatory motion as well as flushing of water at high pressure; windshield get cleans off due to the high pressure water flushing; servo/step motor drops the assembly on the windshield; water pump gets powered off; wiper arm with blade moves on the windshield to wipe off the excess water and debris; wiper arm assembly comes to halt position, microcontroller is deenergized. The process is used in the windshield wipers of light duty, medium duty or heavy-duty vehicles.



EDITORIAL NOTE

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There are 2 pages of claims only.

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CLAIMS

We claim:

1. An automatic windshield wiper assembly comprising: a modified wiper blade arm having multiple holes, configured like a manifold, to provide high pressure water jet supply to the windshield; a wiper blade attached an angle to the wiper arm similar to exist in art; a servo/step motor connected to the assembly to lift the said wiper arm with wiper blade away from the windshield on initiation to render high pressure waterjet on the windshield to flush off the debris, rodents, sticky flies, dusts, etc. on the windshield; and to drop down the wiper blade in close contact with the windshield after the flushing completed; a water pump to supply high pressure water supply from the reservoir to the wind shield; a microcontroller, wherein the above said mechanism are controlled by the microcontroller provided as the part of the mechanism and the said microcontroller, water pump, are electrically connected to the vehicle.

2. The Automatic windshield assembly as claimed in claim 1, wherein the wiper arm housing comprising Multiple holes having a manifold to distribute the water at uniform pressure throughout the wind shield; extending the complete coverage area of the wiper arm movement and provide high flush water on the debris to get flush off the wind shield and ger flooded into the bonnet drain without sticking to the wiper arm as it is levied away from the windshield.

3. The Automatic windshield assembly as claimed in claim 2, wherein the pressure of the manifold is in the order of 80-120 psig; more specifically 100 psig and water pressure provided by a water pump connected with the water reservoir.

4. The Automatic windshield assembly as claimed in claim 1, wherein the wiper blade fitted to the modified wiper arm assembly, at an angle of 20-25° to provide better wiping action.

5. The Automatic windshield assembly as claimed in claim 1, wherein the entire process of the windshield assembly is controlled by a Microcontroller.

6. The Automatic windshield assembly process includes; initiation of wiper cleaning; powering of the microcontroller; the servo/step motor raises the whole wiper assembly apart from the wind shield; water pump will push water from reservoir to the wiper arm manifold; wiper assembly moves along the windshield providing the oscillatory motion as well as flushing of water at high pressure; windshield get cleans off due to the high pressure water flushing; servo/step motor drops the assembly on the windshield; water pump gets powered off; wiper arm with blade moves on the windshield to wipe off the excess water and debris; wiper arm assembly comes to halt position, microcontroller is deenergized.

7. The process as claimed in claim 6 is used in the windshield wipers of light duty, medium duty or heavy-duty vehicles.

Dated this the 03rd day of August 2021.

Vijayalakshmi.T (Patent Agent)

On behalf of the Applicant

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Applicant: M. KUMARASAMY COLLEGE OF ENGINEERING Total no. of Sheets:02

Title: RELIABLE WINDSHIELD WIPER ASSEMBLY Sheet no.: 01

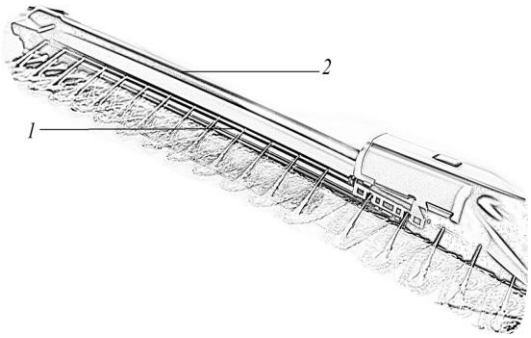

Fig 1

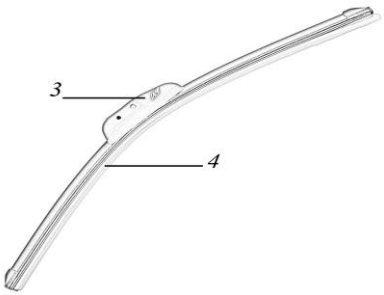

Fig 2

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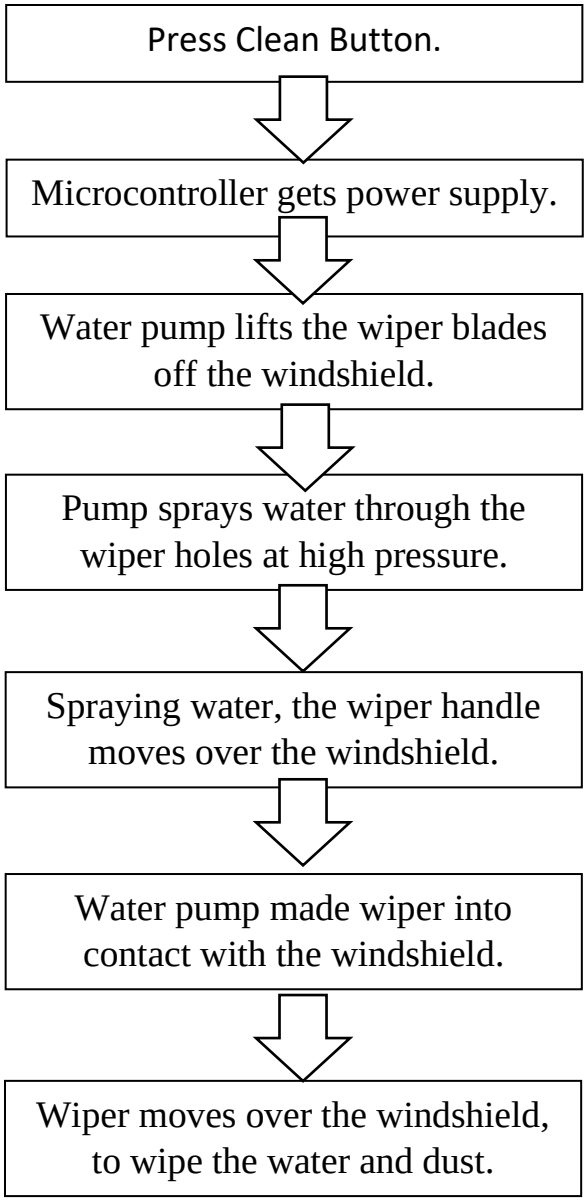

Fig 3

Vijayalakshmi. T (Patent Agent)

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