DOMMARAJU. KRISHNA MOHAN RAJU

ABSTRACT

To protect the Bike rider & co-passenger from bad weather and to reduce the coefficient of wind friction of Bike, collapsible wind friction reduction attachments are designed in the earlier inventions. In the present invention a low cost operating mechanism is designed to open and close the collapsible wind friction reduction attachments of Bike. In this operating mechanism, the forward / backward movement of one Pneumatic/ Hydraulic cylinder causes the all side panels and rear panels to close / open. Thereby the no. of precision hydraulic/pneumatic cylinders requirement is reduced to one cylinder. Because of that the initial cost of the mechanism is reduced.

D. Krishna Mohan Raju

- DOMMARAJU. KRISHAN MOHAN RAJU

I CLAIM:

1) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike comprise of a planar collapsible gate type mechanism whose one end is pivoted at the front portion of fixed roof, and the remaining central pivots of mechanism are coupled to the both sides frames and rear sliding roof support frame depending on their movement during opening and closing operations, and racks fixed at the rear end of the roof on either side and pinions provided at the top of both side rear frame hinged pivots helps to rotate them during opening and closing of attachments.

2) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in claim-1, wherein the forward and backward movement of a planar collapsible gate type mechanism is achieved by using a one hydraulic/pneumatic cylinder whose one end is pivoted to the front roof frame and other end is pivoted to the second central pivot of the planar collapsible gate type mechanism.

3) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in claim-1, & 2, wherein the both right side and left side slidable frames of respective positions are coupled one to the other to move simultaneously for the required distance during the opening and closing of attachments automatically by pressing a button, which is under the control of driver.

D. Krishna Mohan Raju

DOMMARAJU. KRISHNA MOHAN RAJU

4) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in any of the proceeding claims wherein the slidable rear roof support frame top end is coupled to the second central pivot of plain collapsible gate type mechanism, to move backward and forward during opening and closing of attachments.

5) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in any of the proceeding claims wherein the either side of rear end frame is pivoted to the concern side rear side frame to achieve the required forward and backward motion during the opening and closing of attachments.

6) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in any of the proceeding claims wherein the either side of rear end frames are rotated to the required angle and direction, when it reaches to the rear end by engaging its pinion fixed to the hinged shaft with a rack fixed on the rear end of the roof depending on the opening and closing operation of the attachments.

7) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike as claimed in any of the proceeding claims wherein the guiding frames of slidable side frames and guiding frame of slidable rear end support frame provided on the fixed roof frame helps to move the attachments forward and backward perfectly.

8) A low cost operating mechanism to open and close the collapsible wind friction reduction attachments of bike substantially as herein described with reference to the accompanying drawings.

Dated this 27th day of February, 2015

D. Krishna Mohan Raju

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APPLICANT

D. Krishna Mohan Raju

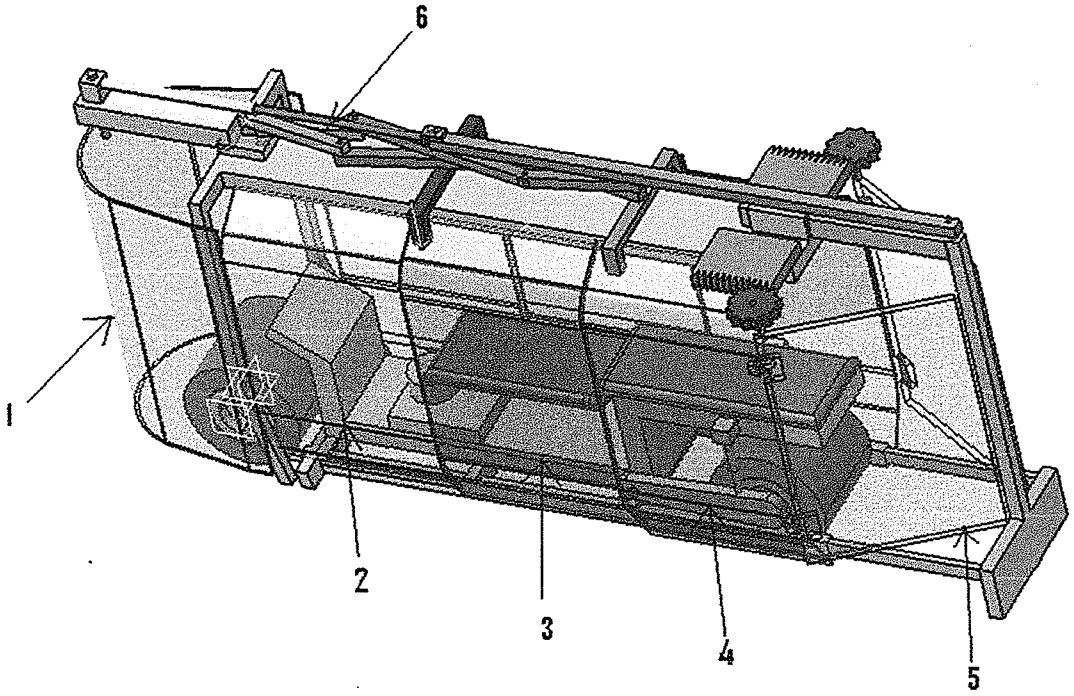

Fig.3. Conceptual Bike collapsible wind friction reduction attachments operating mechanism.

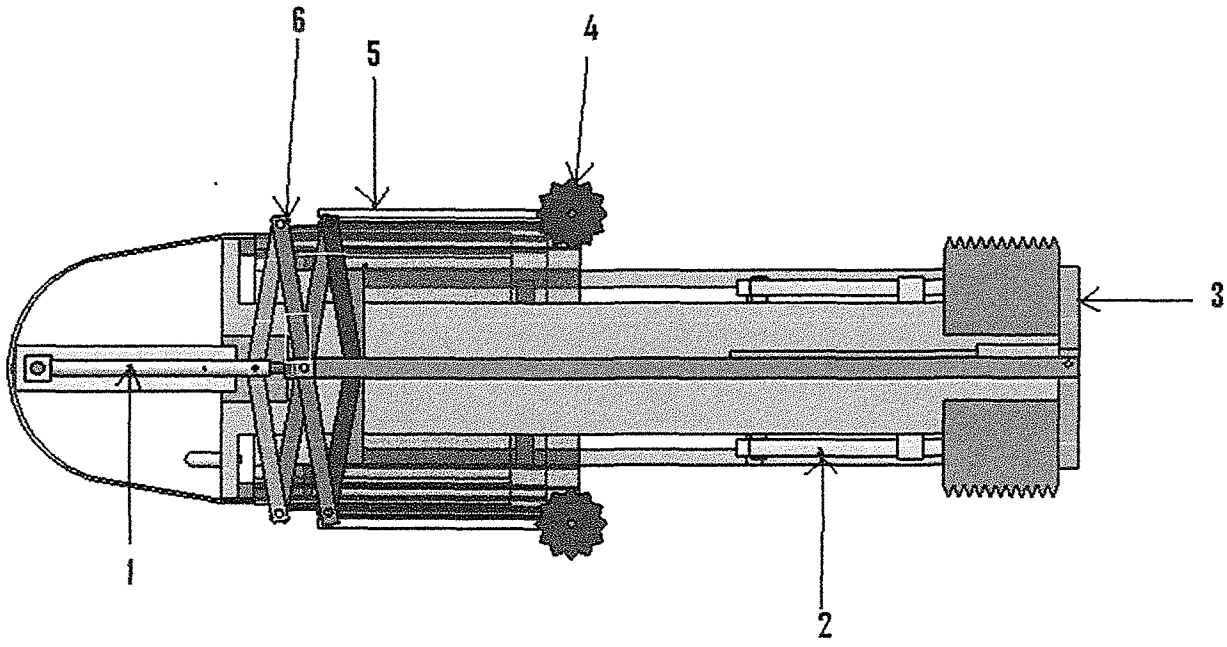

Fig.4. Top view of Bike collapsible wind friction reduction attachments operating mechanism in closed condition.

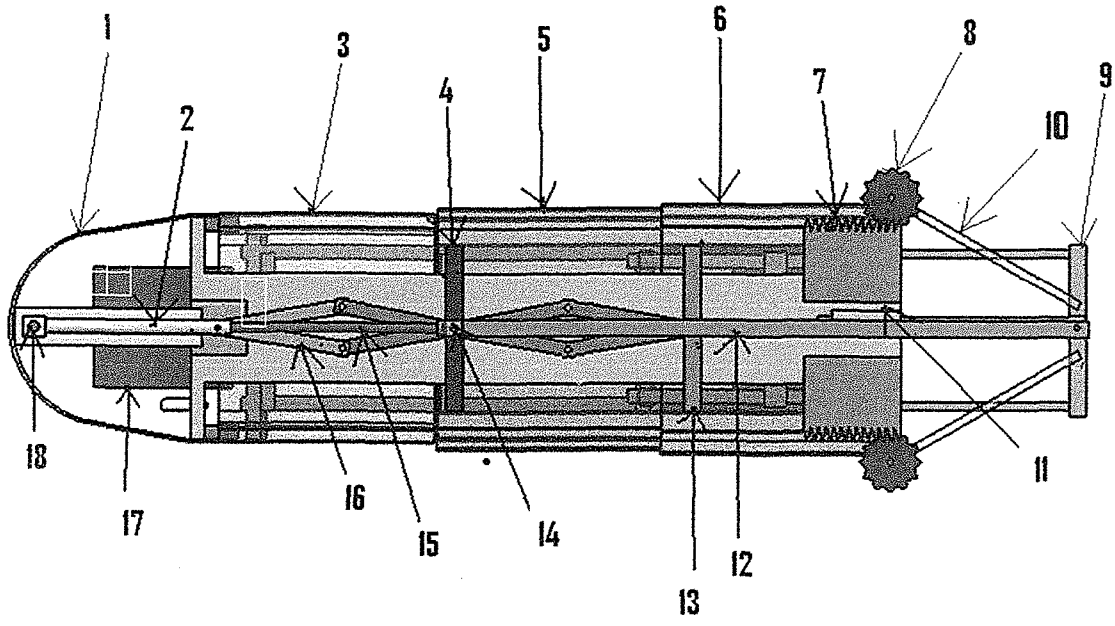

Fig.5.Top view of Bike collapsible wind friction reduction attachments operating mechanism in open condition.

DOMMARAJU KRISHNA MOHAN RAJU

LOW COST OPERATING MECHANISM TO OPEN AND CLOSE THE COLLAPSIBLE WIND FRICTION REDUCTION ATTACHMENTS OF BIKE

ABSTRACT

To protect the Bike rider & co-passenger from bad weather and to reduce the coefficient of wind friction of Bike, collapsible wind friction reduction attachments are designed in the earlier inventions. In the present invention a low cost operating mechanism is designed to open and close the collapsible wind friction reduction attachments of Bike. In this operating mechanism, the forward / backward movement of one Pneumatic/ Hydraulic cylinder causes the all side panels and rear panels to close / open. Thereby the no. of precision hydraulic/pneumatic cylinders requirement is reduced to one cylinder. Because of that the initial cost of the mechanism is reduced.

INTRODUCTION

In general the Bikes are designed to travel at low speed, and to travel short distances. In the present world certain Bikes are designed to travel at high speed around 100 to 120 KMPH, by increasing the engine capacity, thereby the mileage of high end Bikes are reduced to around 25 KMPL. The Bikes designed to travel at low speed are giving mileage around 70KMPL. To improve the mileage and speed of Bike, one option is to reduce the coefficient of wind friction by providing the collapsible wind friction reduction attachments [1]. Nowadays the fuel prices are increasing day by day with increased demand for petrol and the fossil fuel resources are also depleting day by day. The increased fuel consumption is increasing atmospheric pollution also in the world. In case of conventional Bikes the coefficient of wind friction is around 0.9 which can be reduced to 0.15 to 0.3 with the help of collapsible wind friction reduction attachments provision at the front and rear portions of Bike. The effect of collapsible wind friction reduction attachments on the mileage of vehicle is estimated and found that the mileage can be doubled at around 100 KMPH and speed of Bike also can be increased to around 140KMPH [2]. The collapsible wind friction reduction attachments designed for Bike consists of 4 side elements and 2 rear elements. To open and close these attachments in sequence it is necessary to provide no. of hydraulic cylinders / pneumatic cylinders and a logical circuit consisting of valves and relays. As

D. Krishna Mohan Raju

Page No. 3

attachments. The rear panels are hinged to the 3rd stage side panels and the rotation of rear panels is achieved by using rack and pinion mechanism.

Description of Low cost Operating Mechanism to Close and Open the Collapsible Wind Friction Reduction Attachments:

Fig.3.shows 3D view of the Bike with low cost operating mechanism to open and close the collapsible wind friction reduction attachments. Fig.4. shows the top view of Bike with low cost operating mechanism in closed condition. Fig.5. shows the top view of Bike with low cost operating mechanism in open condition. In the wind friction reduction attachments provided to the Bike, the front portion, roof and 1st stage side panels are fixed in position. The supports are provided at front and rear positions to the fixed roof attachment. The rear side supporting frame is a slidable support frame to avoid the increase in length of vehicle in the closed condition of attachments. The 2nd stage side panels and 3rd stage side panels and rear side panels are slidable panels. The either side of 2nd stage and 3rd stage side panels are coupled one to the other by a frame, so that the 2nd stage two side panels and 3rd stage two side panels can move independently. The two rear side panels are hinged to the rear edge of 3rd stage side panels, so that the movement of 3rd stage side panels moves the rear side panels. To move the side panels guide ways are provided on roof frame and on the bottom frame fixed to the Bike. A pinion is fixed at the top end of hinged pivot shaft of both rear side panels and on the roof frame on either side rack is fixed to rotate the rear side panels while moving to the rear end position.

The hydraulic cylinder / pneumatic cylinder fixed end is pivoted to the roof frame at the front end. The piston rod front end is pivoted to the planar toggle mechanism central second pivot, so that the piston rod forward / rearward movement opens and closes the planar toggle mechanism. The planar toggle mechanism central first pivot is fixed to the roof frame front portion. The planar toggle mechanism central second pivot is coupled to the second stage side panels coupling frame and also to the rear slidable roof support frame with the help of extension rod. The toggle mechanism central third pivot is coupled to the third stage side panels coupling frame. The rear slidable support frame consists of three guiding rods i.e. one on top end and two at the bottom end. The guiding frame of top guiding rod is provided on the middle of roof frame rear end and the guiding frames of two bottom guiding rods are provided on either side of bottom frame of Bike.

D. Krishna Mohan Raju
page NO. 6

OPERATION OF COLLAPSIBLE WIND FRICTION REDUCTION ATTACHMENTS:

In the proposed operating mechanism to open and close the collapsible wind friction reduction attachments, a hydraulic / pneumatic circuit is used. Once the open button is pressed the double acting hydraulic / pneumatic cylinder piston rod extended for the predetermined length, thereby the toggle mechanism expand to the predetermined distance. Once the toggle mechanism expands, the 2nd stage central pivot coupled with 2nd stage side panels moves rearward to the required position, and the 3rd stage central pivot coupled with 3rd stage side panels also moves to the rear most position. The rear panels hinged to the 3rd stage side panels also moves to the rear most position. While moving the rear panels to the rear most position, the pinion fixed to the hinged pivot shaft rotates to the required angle by engaging with the rack. The rotation of the hinged pivot shaft causes the rear panels to achieve the required position at the rear portion of the Bike.

Once the close button is pressed, the double acting hydraulic / pneumatic cylinder piston rod is retracted, thereby the toggle mechanism is collapsed. Once the toggle mechanism collapses, the 2nd stage central pivot coupled with 2nd stage side panels moves forward to the required position, and the 3rd stage central pivot coupled with 3rd stage side panels also moves forward to the required position. The rear panels hinged to the 3rd stage side panels also moves forward along with 3rd stage side panels. While moving the rear panels to the forward position, the pinion fixed to the hinged pivot shaft rotates to the required angle by engaging with the rack. The rotation of the hinged pivot shaft causes the rear panels to achieve the required position at the front portion of the Bike along with 3rd stage side panels.

ADVANTAGES OF THE PROPOSED OPERATING MECHANISM:

1. The proposed mechanism uses only one Hydraulic/ Pneumatic cylinder for moving the both side panels, rear panels and rear roof support frame of the Bike, instead of a separate cylinder for each panel.
2. The use of only one cylinder to open and close the panels makes the control circuit simple.

D. Krishna Mohan Raju

page NO. 7

3. The usage of toggle mechanism and rack and pinion mechanism along with pneumatic cylinder reduces the cost of operating mechanism compared to the usage of separate cylinder for each panel. At the same time the toggle mechanism elements can be made of sheet metal or plastic, as the load on those elements is less. Thereby the cost of mechanism will be reduced drastically.

DISADVANTAGES OF THE PROPOSED OPERATING MECHANISM:

1. The proposed mechanism is having no. of link elements which are required to be designed and manufactured for better reliability and durability.

D. Krishna Mohan Raju

page NO. 8

the no. of precision elements increased in the earlier proposed collapsible attachments operating mechanism, the initial cost of the attachments to the Bike is increased. To simplify the operating mechanism of the collapsible attachments and to reduce the initial cost of the attachments to Bike, an innovative mechanism is proposed in the present invention.

Background:

The figures 1,2 shows the 3D model of the Conceptual Bike / Bike with collapsible wind friction reduction attachments covering front, rear, sides and top portions in the open and closed conditions of attachments. The earlier inventions of collapsible attachments to conventional Bike or conceptual Bike is not disclosed the simple operating mechanism for opening and closing of attachments. In the present invention a simple low cost operating mechanism is designed to open and close the collapsible attachments of Conceptual Bike /Bike.

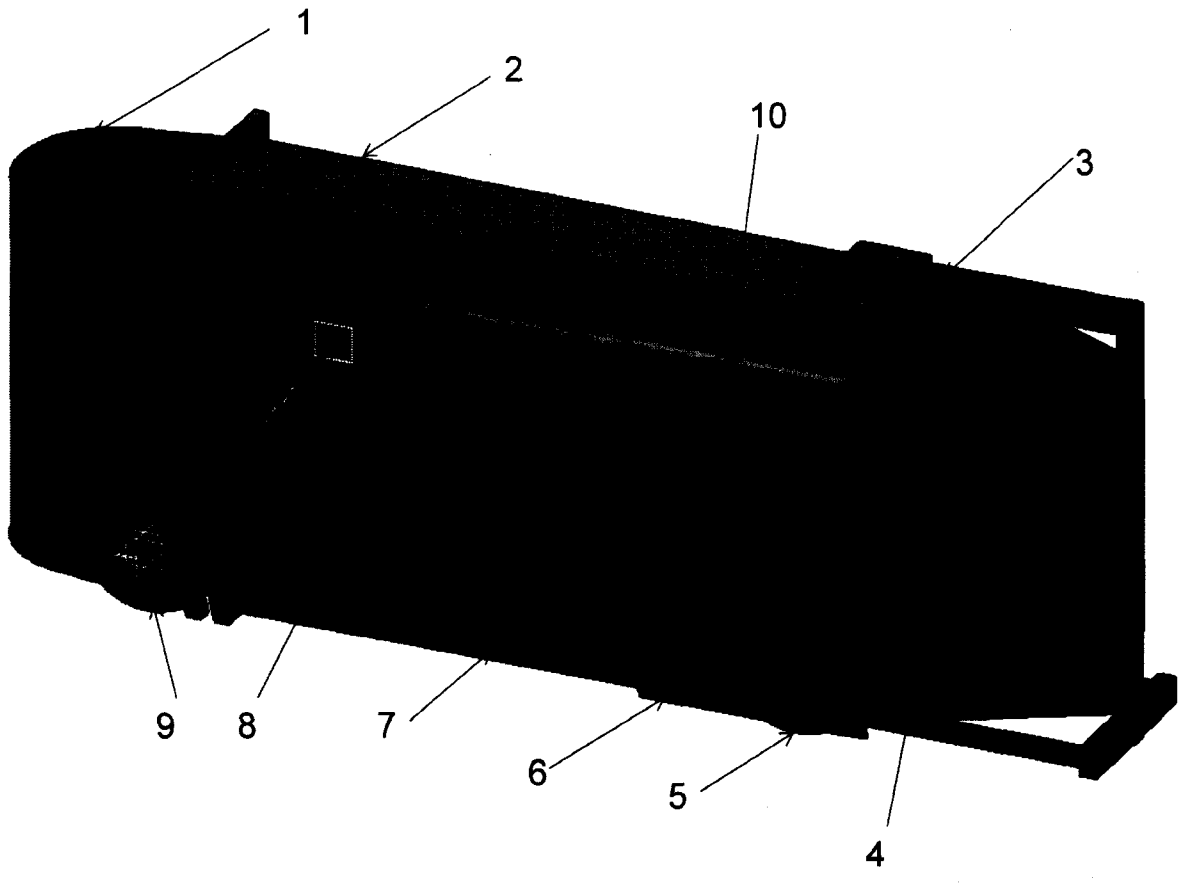

Fig.1. 3D Model of Big Bike for Family with Attachments in open condition

D. Krishna Mohan Raju
page No. 4

Parts of Fig.1.1.Fixed wind friction reduction attachments provided at the front side, 2.Fixed roof supported from the bottom frame, 3. Slidable rear support frame, 4.Pivoted rear portion wind friction reduction attachments provided at the third sliding side door. 5. Big width Rear wheel, 6.Third Sliding side wind friction reduction attachments, 7.Second sliding side wind friction reduction attachments, 8. First sliding side wind friction reduction attachments, 9.Big width Front Wheel, 10.Long seat of Bike.

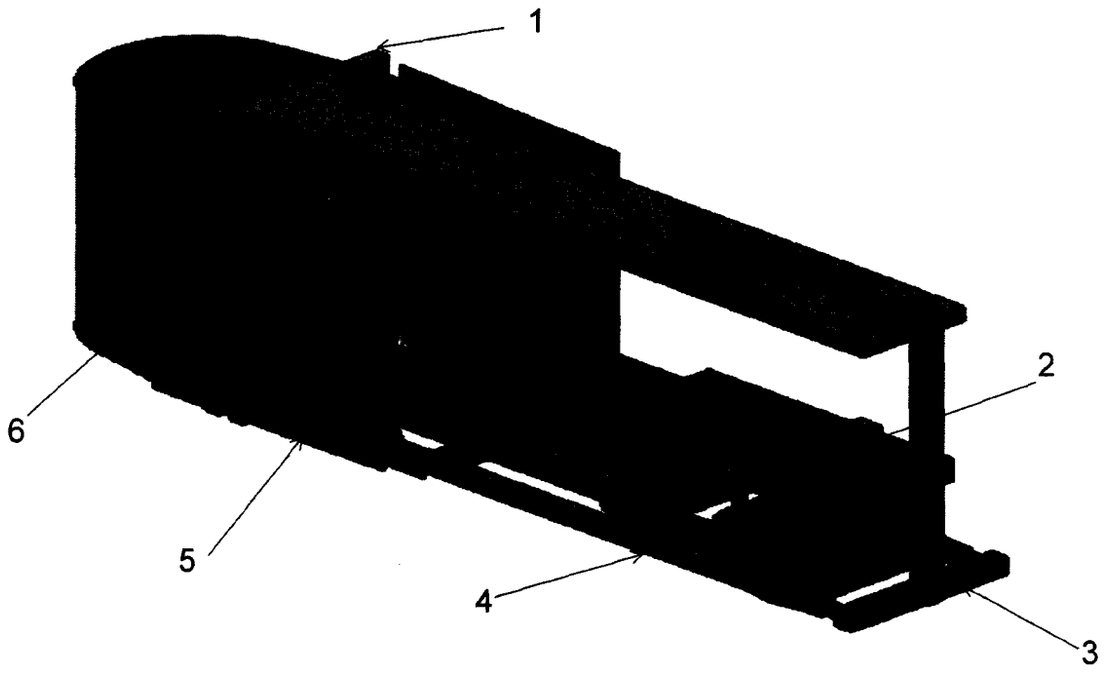

Fig. 2. 3D Model of Big Bike with Wind Friction reduction attachments in closed condition.

Parts of Fig.2.1.Vertical supports of Roof, 2.Long seat, 3. Slidable rear support frame, 4.Bottom sliding doors support frame. 5. Three sliding doors in collapsed condition, 6. Front fixed wind friction reduction attachments.

Working Principle of Low Cost Collapsible Wind Friction Reduction Attachments Operating Mechanism:

In the proposed operating mechanism the forward / rearward movement of one piston rod opens / closes all the side and rear panels of the attachments by using planar toggle mechanism. The 2nd stage and 3rd stage side panels' move telescopically while opening and closing of the

D. Krishna Mohan Raju
page NO.5

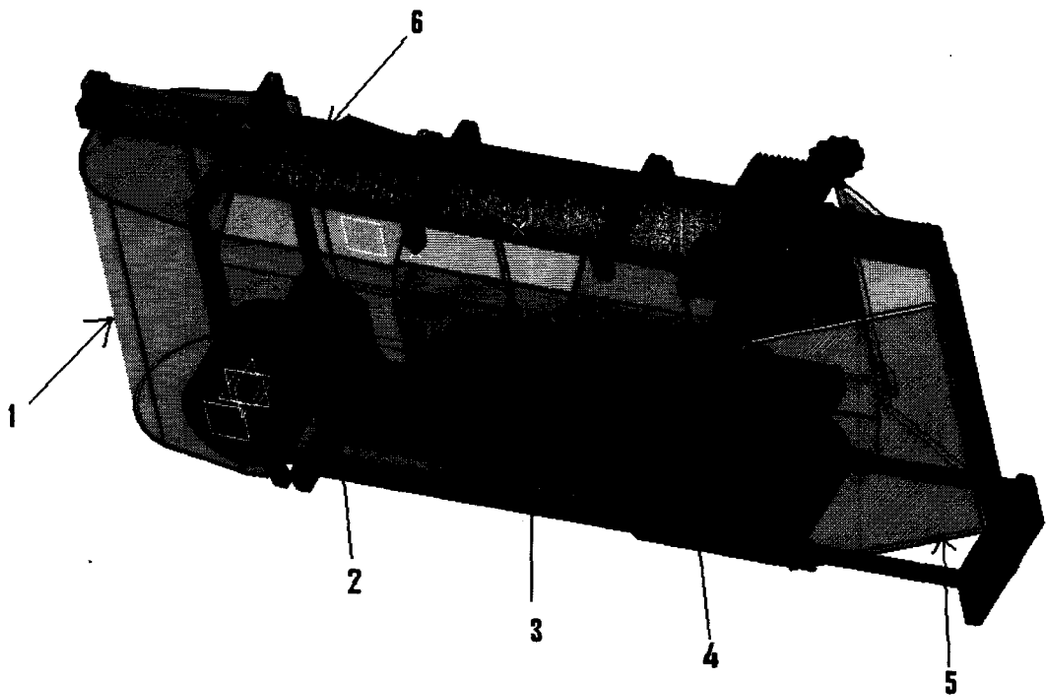

Fig.3. Conceptual Bike collapsible wind friction reduction attachments operating mechanism.

1. Fixed front attachments, 2. Fixed first stage side attachments, 3. Slidable second stage side attachments, 4. Slidable third stage side attachments, 5. Slidable rear attachments hinged to third stage side attachments.6. Toggle mechanism to close and open the collapsible wind friction reduction attachments.

D. Krishna Mohan Raju
page No. 9

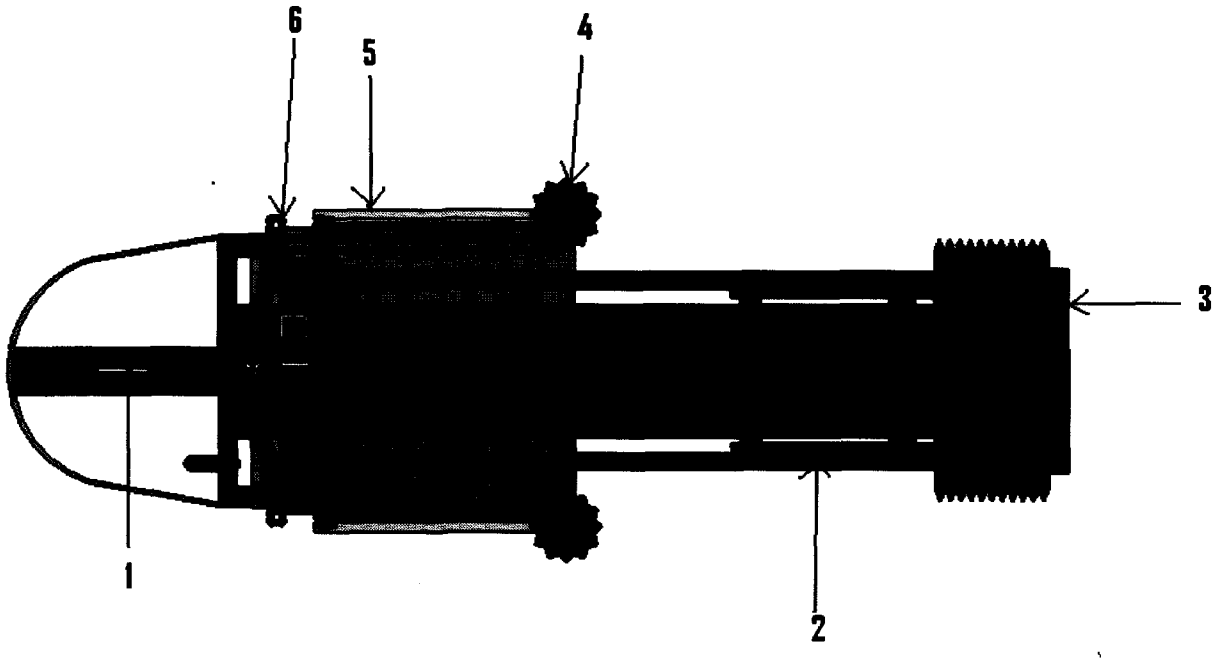

Fig.4. Top view of Bike collapsible wind friction reduction attachments operating mechanism in closed condition.

1.Pneumatic cylinder pivoted at front end frame, 2. Rear slidable support frame bottom slidable elements, 3. Rear slidable support frame, 4. Pinions provided on top of rear attachments hinged shaft to rotate the rear attachments by engaging with rack, 5.Rear attachments hinged to slidable third stage support frame, 6. Toggle mechanism to operate the collapsible wind friction reduction attachments.

D. Krishna Mohan Raju

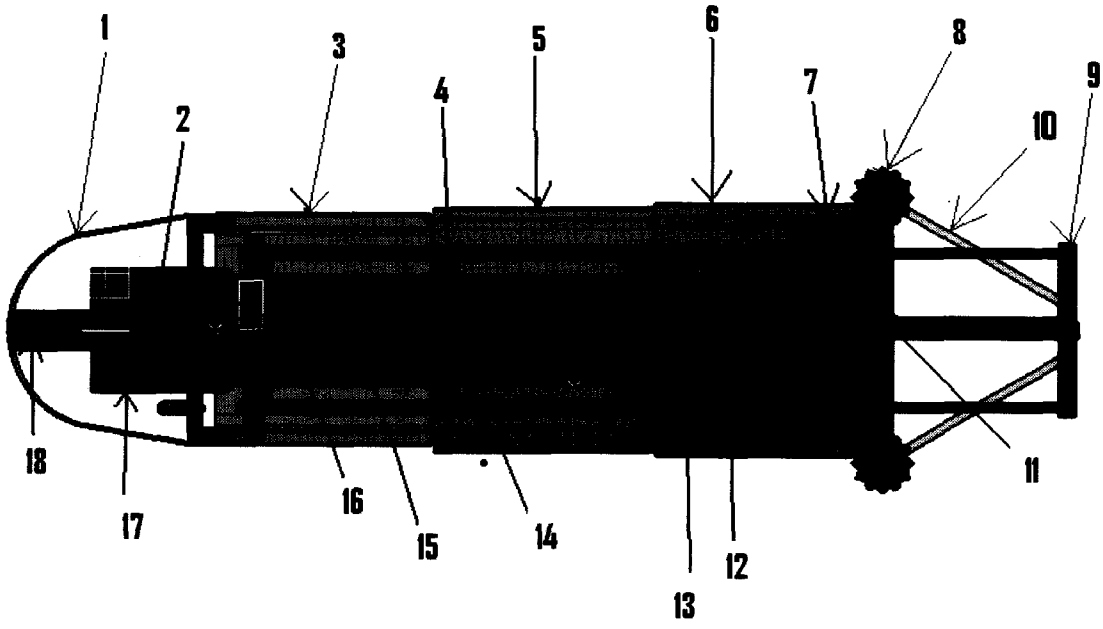

Fig.5.Top view of Bike collapsible wind friction reduction attachments operating mechanism in open condition.

1. Fixed Front attachment of Bike, 2. Pneumatic/Hydraulic cylinder, 3.Fixed first stage side frames, 4. Coupling frame of second stage slidable frames, 5.Second stage slidable frames, 6.Third stage slidable frames, 7. Rack fixed on the roof of bike to rotate the rear end attachments, 8. Pinion placed on the top of rear end hinged shaft, 9. Rear end slidable support frame, 10. Rear end collapsible attachments, 11. Guiding hole provided on the roof of Bike to guide the rear end slidable support frame, 12. Link rod connecting the second central pivot and rear end slidable support frame, 13. Coupling frame of third stage slidable frames, 14. Pivot pin connecting the coupling frame of second stage slidable frames and toggle mechanism second central pivot,15. Pneumatic/Hydraulic cylinder Piston rod connected to the second central pivot of toggle mechanism, 16. Toggle mechanism link elements, 17. Supporting frame to pivot the fixed end of Pneumatic/Hydraulic cylinder, 18. Fixed Pivot of Pneumatic/Hydraulic cylinder.

D. Krishna Mohan Raju
page No. 11