(57) Abrégé/Abstract:
An aerodynamic skirt adapted to be substantially longitudinally mounted on a trailer is provided, the resilient aerodynamic skirt comprising a skirt panel defining a forward portion and a rear portion, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height. A method of mounting an aerodynamic skirt on a trailer is also provided, the method comprising providing a skirt panel defining a forward portion and a rear portion the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height, positioning the forward portion toward a forward portion of the trailer and the rear portion toward a rear portion of the trailer, and securing the skirt panel to the trailer. A kit comprising a skirt panel defining a forward portion and a rear portion is equally provided, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being smaller than the rear height, and at least one strut adapted to secure the skirt panel to the trailer.
ABSTRACT

An aerodynamic skirt adapted to be substantially longitudinally mounted on a trailer is provided, the resilient aerodynamic skirt comprising a skirt panel defining a forward portion and a rear portion, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height. A method of mounting an aerodynamic skirt on a trailer is also provided, the method comprising providing a skirt panel defining a forward portion and a rear portion the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height, positioning the forward portion toward a forward portion of the trailer and the rear portion toward a rear portion of the trailer, and securing the skirt panel to the trailer. A kit comprising a skirt panel defining a forward portion and a rear portion is equally provided, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being smaller than the rear height; and at least one strut adapted to secure the skirt panel to the trailer.
AERODYNAMIC SKIRT SHAPE

FIELD OF THE INVENTION

This invention relates to aerodynamic trailer skirts, and also relates to a resilient skirt and attachment mechanism thereof.

BACKGROUND OF THE INVENTION

Road tractors are used to pull road trailers on roads to transport cargo. Aerodynamic apparatuses are installed on the road tractor and/or on the road trailer in order to reduce the aerodynamic air drag and improve fuel efficiency.

Trailer skirts made of rigid materials are installed on both sides of a road trailer to help manage the flow of air around and underneath the trailer. Brackets, also made of rigid material, are affixed to the trailer to secure the skirts positioned thereto. These skirts are secured to the bottom portion of the trailer, or on the sides of the trailer’s floor, to ensure proper positioning when the vehicle is moving.

People who are familiar with the trucking industry know that trailers are subject to hazardous road conditions. The skirts, because of their position under the trailer’s floor and their proximity with the road, are significantly vulnerable and might easily enter in contact with surrounding obstacles. The brackets holding the skirts, when put under significant stress, plastically bend and/or break to effect the skirts’ position in respect to the road trailer thus reducing the efficiency of the skirts. Moreover, the skirt itself might bend and/or break if they contact a foreign object. This also increases the operation cost and the maintenance time that is required.

The shape of the skirts, and their respective positions on the road trailer, have a significant effect on the aerodynamics efficiency of the road trailer.
Therefore, there exists a need in the art for an improved aerodynamic skirt assembly over the existing art. There is a need in the art for such a resilient skirt assembly that can be easily installed and economically manufactured.

SUMMARY OF THE INVENTION

It is one aspect of the present invention to alleviate one or more of the drawbacks of the background art by addressing one or more of the existing needs in the art.

Accordingly, one object of one or more embodiments of this invention provides an improved trailer skirt over the prior art.

An object of the invention provides a skirt assembly adapted to be installed on a road trailer to reduce the aerodynamic drag produced by the movement of the road trailer when pulled by a road tractor. The skirt assembly comprising a skirt panel sized and designed to channel air along the trailer. The skirt assembly, once installed on the road trailer, being substantially vertically disposed under the road trailer between the road trailer wheels and the trailer supports (and could even be extended in front of the trailer supports) with a curved shape defined from the front of the skirt panel to a distance of about between 1.5 meter to 3.5 meters.

One object of the invention provides a resilient skirt assembly that is adapted to bend when it contacts a foreign object and recovers its original position and shape thereafter.

One other object of the invention provides a resilient skirt assembly that can be easily installed and economically manufactured.

Another object of the invention provides a skirt panel adapted to be installed on a road trailer with a rear edge disposed next to the forwardmost road trailer rear wheel to keep a gap therebetween to a minimum. The skirt panel being adapted to forwardly extend next to the road trailer support
Another aspect of one or more embodiments of the invention provides a skirt assembly made of composite materials offering a significant range of elastic deformation.

Another aspect of one or more embodiments of the invention provides a resilient strut adapted to secure a skirt panel to a road trailer, the strut being made of a resilient material adapted to sustain significant deformation and adapted to resiliently regain its original position.

Another aspect of one or more embodiments of the invention provides strut supports made of non-metallic material.

One other aspect of one or more embodiments of the invention provides a trailer skirt that is sized and designed to allow a temporary deflection of, inter alia, a bottom portion of the skirt panel.

A further aspect of one or more embodiments of the invention provides a fastening system for easily securing the skirt panel to the trailer; the fastening system uses a limited number of parts to reduce the assembly time and the weight added to the trailer.

A further aspect of one or more embodiments of the invention provides a skirt assembly comprising a plurality of support angles adapted to secure the skirt panel to the road trailer.

According to a further aspect of one or more of these embodiments, support angles made of composite material is provided.

According to an aspect of the present invention provides a resilient strut shaped in one piece.

According to another aspect of the present invention is provided a resilient strut made of composite materials.

Another aspect of the present invention provides a resilient strut having a constant section.
A further aspect of one or more embodiments provides a resilient strut adapted to be connected to the skirt panel at an angle.

One additional aspect of the present invention provides an opening in the skirt panel adapted to allow access to a fuel tank located underneath the road trailer, the opening being adapted to be optionally provided with a door.

Another additional aspect of the present invention provides a skirt panel composed of a plurality of skirt panel modules, at least one panel module being adapted to be removed or pivoted about a hinged mechanism to allow access under the road trailer.

Another aspect of the present invention provides a substantially progressive curvature on the forward portion of the skirt panel.

One other aspect of the invention provides a method of installing a skirt assembly on a road trailer comprising installing fastening a portion of a skirt panel substantially on the edge of a road trailer floor and securing a forwardmost portion of the skirt panel at a predetermined position on the trailer to define the shape of the skirt panel.

Another aspect of the invention provides a radius on the skirt panel adapted to mate the shape of the road trailer wheel to reduce the air gap therebetween.

One another aspect of the invention provides a skirt panel extension adapted to selectively reduce the gap between the road trailer wheels and the skirt panel when the road trailer wheels, disposed on a moveable trailer buggy, are longitudinally moved about the road trailer to change the load distribution of the road trailer.

Another aspect of the present invention provides an aerodynamic skirt adapted to be mounted to a trailer, the aerodynamic skirt comprising a skirt panel defining a front portion and a rear portion, the front portion being adapted to be proximally mounted toward a center of the trailer, the rear portion being adapted to be substantially longitudinally mounted to the trailer.
One other aspect of the present invention provides a method of installing a skirt assembly on a trailer, the method comprising securing upper supports to the trailer, securing a skirt panel to the upper supports, and securing struts between the trailer and the skirt panel.

An aspect of the present invention provides a skirt assembly kit comprising a skirt panel adapted to be disposed on a trailer to route air about the road trailer, a plurality of upper supports adapted to secure the skirt panel to the road trailer and a plurality of struts adapted to secure the skirt panel to the road trailer.

One additional aspect of the invention provides an aerodynamic skirt adapted to be substantially longitudinally mounted on a trailer, the resilient aerodynamic skirt comprising a skirt panel defining a forward portion and a rear portion, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height.

Another aspect of the present invention provides a method of mounting an aerodynamic skirt on a trailer, the method comprising providing a skirt panel defining a forward portion and a rear portion the forward portion having a front height and the rear portion having a rear height, the forward height being shorter than the rear height, positioning the forward portion toward a forward portion of the trailer and the rear portion toward a rear portion of the trailer, and securing the skirt panel to the trailer.

A further aspect of the present invention provides a kit comprising a skirt panel defining a forward portion and a rear portion, the forward portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer, the forward portion having a front height and the rear portion having a rear height, the forward height being smaller than the rear height; and at least one strut adapted to secure the skirt panel to the trailer.
Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred 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.

Additional and/or alternative advantages and salient features of the invention will become apparent from the following detailed description, which, taken in conjunction with the annexed drawings, disclose preferred embodiments of the invention.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Referring now to the drawings which form a part of this original disclosure:

Figure 1 is a perspective view of a road tractor and a road trailer with a skirt assembly secured thereto;

Figure 2 is a left elevational view of the road tractor of Figure 1;

Figure 3 is a bottom plan view of the road tractor of Figure 1;

Figure 4 is a left-front perspective view of a portion of a floor section of the road trailer of Figure 1;

Figure 5 is a top plan view of a portion of the floor section of Figure 4;

Figure 6 is a right elevational section view of a portion of the road trailer and the skirt assembly of Figure 1;

Figure 7 is a rear elevational section view of a portion of the road trailer and the skirt assembly of Figure 1;
Figure 8 is a rear elevational view of a portion of the securing mechanism of the skirt to the road trailer’s floor;

Figure 9 is a section view of a portion of the road trailer’s floor with the securing mechanism attached thereto;

Figure 10 is a rear elevational section view of a portion of the skirt’s securing mechanism;

Figure 11 is a rear elevational section view of a portion of the skirt’s securing mechanism;

Figure 12 is a rear elevational section view of an alternate embodiment of a portion of the skirt’ securing assembly;

Figure 13 is a rear elevational section view of an alternate embodiment of a portion of the skirt’ securing assembly of Figure 12 when deflected;

Figure 14 is a perspective view of a road tractor and a road trailer with a skirt assembly secured thereto and a skirt panel module in the opened position; and

Figure 15 is a left-front perspective view of a portion of a floor section of the road trailer of Figure 14.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

A preferred embodiment of the present invention is described bellow with reference to the drawings.

Figures 1, 2 and 3 illustrate a road tractor 10 with a road trailer 20 attached thereto equipped with a pair of skirt assemblies 30, installed on each side of the road trailer 20, adapted to deflect and direct the airflow around the road trailer 20. Each skirt assembly 30 includes a skirt panel 32, adapted to be disposed on the side of the road trailer 20, and a plurality of securing members adapted to secure the skirt panel 32 to the road trailer 20. The securing members are not illustrated on Figures
1, 2 and 3 and will be discussed in more details later in this specification. Once
installed on the road trailer 20, the skirt assembly 30 helps channel the flow of air
around the road trailer 20 to reduce the air drag of the vehicle when the road trailer
20 moves on the road, pulled by the road tractor 10.

The skirt assembly 30 of the present embodiment is mostly located under the road
trailer 20, between the wheels 12 of the road tractor 10 and the wheels 26 of the
road trailer 20. The skirt panels 32 can alternatively extend forward up to the trailer
supports 14 of the road trailer, and be secured thereto, thus preventing complex
skirt panel 32 arrangements through the trailer supports 14. The skirt panels 32 are
substantially vertically positioned on each side of the road trailer 20 with a
clearance with the ground by illustratively about 15-25 centimeters (about 6 to 10
inches). The air management around the trailer 20 provided by the skirt assembly
30 reduces the air drag created by the road trailer 20 by directing the flow of air
around the road trailer 20. The flow of air would otherwise turbulently move around
and below the road trailer 20 to create substantial air drag. The airflow
management around the road trailer 20 provided by the skirt assembly 30 helps
maintain laminar airflow around the road trailer 20 that helps diminish fuel
consumption of the road tractor 10. The skirt assembly 30 also improves the safety
of the vehicle by providing a barrier that can significantly prevent foreign objects to
get under the road trailer 20.

The skirt panel 32 can also be used to display advertising thereon. Each skirt panel
32 provides additional display area in addition to the road trailer's wall 22.

As illustrated, the skirt panel 32 is shaped with an optional progressive height from
the forwardmost portion 34. The skirt panels 32 can alternatively also be installed
at an angle, in respect to the vertical, on the road trailer 20 to change the airflow
pattern around the road trailer 20 and more precisely adjust the aerodynamics to a
specific vehicle shape.

It can be appreciated from Figure 3 that each skirt panel 32 is installed directly on
the side of the road trailer 20 and, when seen from above, have a front portion 34
that progressively proximally leans toward the center 24 of the road trailer 20. The
recessed front portion 34 of the skirt panel 32 improves the collection of the
turbulent airflow generated by the road tractor 10 thus improving the aerodynamic
efficiency of the skirt assembly 30. Additional explanation about the shape of the
skirt panel 32 will be provided in further details below.

Figure 4 is a perspective image of the skirt assembly 30 installed on the left side of
a road trailer 20 from which is only illustrated a series of frame members 23
forming a portion of the road trailer floor frame 22. A series of angle supports 40
are secured to the trailer to secure the juxtaposed skirt panel 32 thereto. The angle
supports 40 could be omitted altogether and the skirt panel could alternatively be
attached directly to the road trailer 20 without deviating from the scope of the
present application. The rear portion 36 of the skirt panel 32 is preferably
positioned on the edge of the road trailer’s wall 28. It is also encompassed by the
present invention that the skirt panel 32 be installed a little in recess about the side
of the road trailer 20 to avoid winches, lights, toolbox or ladders located on the
side/edge of the road trailer 20. In contrast, it can be appreciated that the front
portion 34 of the skirt panel 32 is progressively positioned and secured toward the
center 24 of the road trailer 20. The skirt panel 32 is secured adjacent to the frame
22 with a series of angle supports 40 secured to both the frame members 23 and
the skirt panel 32. Lower, the skirt panel 32 is secured to the road trailer 20 with a
series of intervening resilient struts 42 also secured to both the frame members 23
and the skirt panel 32. Additional details about the angle supports 40 and the
resilient struts 42 are provided later in reference with Figure 7 through Figure 11.

Still referring to Figure 4, it can be appreciated that the upper series of holes 35
disposed on a top portion of the skirt panel 32 is used to fasten the skirt panel 32
to respective angle supports 40 that, themselves, are secured to frame members
23 of the road trailer 20. A number of connection points between the skirt panel 32
and the road trailer 20 are used to ensure the skirt panel 32 is well secured to the
road trailer 20 and will not vibrate or deflect (some deflection can be acceptable
under certain conditions) during operation. The series of holes 35 disposed on a
lower portion of the skirt panel 32 are adapted to fasten to an end of each resilient
strut 42. Similarly, the other end of the resilient strut 42 is connected to the frame
members 23 of the road trailer 20 via a fastener mechanism that will be discussed below in details.

A curved portion 38 is defined on the rear portion 36 of the skirt panel 32 and preferably corresponds to the exterior shape of the adjacent wheel 26 of the road trailer 20. In so doing, it is possible to install the skirt panel 32 close to the wheel 26 without risking any contact therebetween. The skirt panel 32 should be installed as close as possible to the road trailer wheels 26 to maximize its efficiency. It is preferable to leave a distance between the wheel 26 of the road trailer 20 and the skirt panel 32 to avoid any risk of interference therebetween.

The wheels 26 of a road trailer 20 are commonly adapted to be longitudinally adjustable to distribute the mass of the road trailer 20 in a desired fashion. The adjustment of the position of the axels of a road trailer 20 is desirable, for instance, when a heavy load is carried or during thaw and freeze periods. In this respect, and to avoid reinstalling the skirt panel 32 in various positions on the road trailer 20, it might be desirable to install the skirt panel 32 in respect with the forwardmost possible position of the axels of the road trailer 20. That would prevent to remove and reposition the skirt panel 32 when the trolley's 16 position is modified.

The road trailer wheels 26 are mounted on a road trailer buggy 16 adapted to move the wheels 26 along a portion of the road trailer's length to distribute the weight of the road trailer 20 in a desired fashion. The skirt assembly 30 is preferably permanently secured to the road trailer 20 taking in consideration the forwardmost position of the trailer buggy 16. The gap between the skirt panel 32 and the road trailer's wheels 26 is however increased when the trailer buggy 16 is move toward the rear of the road trailer 20 thus likely reducing the aerodynamic efficiency of the skirt assembly 30. The present invention provides a skirt panel extension module 33 adapted to reduce the gap between the skirt panel 32 and the road trailer's wheels 26 to prevent any aerodynamic efficiency reduction. The skirt panel extension modules 33 are secured to the road trailer in a similar fashion. The skirt panel extension module 33 can be provided in various lengths to fill gaps of various sizes. They can also be provided as skirt panel extension modules 33 kit. An
alternate embodiment provides a sliding skirt panel extension 33 that is
permanently secured to the road trailer 20 and extendable to the desired length
when the trailer buggy 16 is moved.

A skirt panel extension 33, illustrated on Figure 6, can alternatively be added
between the skirt panel 32 and the wheels 26 when the axles of the road trailer 20
are located in a rearward position leaving an increased distance therebetween to
improve the aerodynamic efficiency of the skirt assembly 30. A reasonable distance
between the skirt panel 32 and the wheels 26 could be between about 15
centimeters and about 30 centimeters although a shorter distance, or even a
superposition of the skirt panel 32 (or skirt panel module(s) 33) over the wheel 26,
can be achieved.

Figure 5 is a top elevational view of the road trailer frame 22. As mentioned above,
it can be appreciated from Figure 5 that the skirt panel 32 is disposed inwardly on
the forward portion of the road trailer 20 and is progressively located on the edge
of the road trailer’s wall 28 toward the rear end of the road trailer 20. A departure
angle support 60 and a cooperating forward angle support 64 are secured to the
road trailer to correctly locate the skirt panel 32 on the road trailer 20. The
departure angle support 60 and the forward angle support 64 are installed on the
trailer 20 prior to install the skirt panel 32. The rear portion 36 of the skirt panel 32
is secured to the road trailer 20 up to the departure angle support 60 and then the
skirt panel 32 is bent to reach the forward angle support 64 and secured thereto.
That bent locates the skirt panel 32 to the road trailer 20 and defines the shape of
the skirt panel 32 with the desired progressive proximal bent. The remaining angle
supports 62 and resilient struts 42 are installed thereafter to further secure the
assembly.

The rear portion 36 of the skirt panel 32 is intended to be secured to the road
trailer to leave only a minimum gap with the road trailer wheels 26 to improve the
aerodynamic efficiency of the skirt assembly 30. The skirt panel 32 extends to the
front of the road trailer 20 and defines a curve portion on its front portion 34. A
long skirt 32 appears to be more efficient than a shorter skirt panel 32 and should
therefore extend as far as possible to the front of the road trailer 20. However, for reasons of complexity, the front portion 34 of the skirt panel 32 is likely to stop at the trailer supports 14. It is nonetheless encompassed by the present invention that the skirt panel 32 alternatively extends in front of the trailer supports 14.

In an embodiment of the invention adapted to fit a standard 16.1 meters (53 feet) road trailer 20 the forward end of the departure angle support 60 is located at a distance $d_1$ from the forward end of the skirt panel 32. A forward angle support 64 is secured to the frame at a distance $d_2$ from the side edge of the road trailer 20. Distance $d_1$ is about between 1.5 meter and 3 meters, preferably about between 2 meters and 2.5 meters and most preferably about between 2.1 meters and 2.4 meters. Distance $d_2$ is about between 0.20 meter and 0.40 meter, preferably about between 0.25 meter and 0.35 meter and most preferably about 0.27 meter and 0.32 meters. More precisely, distance $d_1$ is preferably about 2.29 meters and distance $d_2$ is preferably about 0.31 meter in a preferred embodiment. Corresponding angle supports 40 and resilient struts 42 are installed to further secure the skirt panel 32 at the desired position.

A left side elevational view schematically illustrating, on Figure 6, the overall size of the skirt panel 32. Length $d_3$ of the skirt panel 32 is about between 5 meters and 9 meters, preferably about between 6 meters and 8 meters and most preferably about between 6.5 meters and 7.5 meters. The height $d_4$ of the skirt panel 32 is about between 0.5 meter and 1 meter, preferably about between 0.6 meter and 0.9 meter and most preferably about between 0.7 meter and 0.8 meter. And the forwardmost height $d_5$ of the skirt panel 32 is about between 0.3 meter and 0.7 meter, preferably about between 0.4 meter and 0.6 meter and most preferably about between 0.45 meter and 0.5 meter. More precisely, distance $d_4$ is preferably about 0.76 meter and distance $d_5$ is preferably about 0.48 meter in a preferred embodiment.

Alternate embodiments providing a skirt assembly sized and designed to fit road trailers of different lengths can be inferred from the dimensions discussed above.
For instance, a skirt assembly can be designed to fit a 14.6 meters (48 feet) road trailer 20 or any other road trailer 20 sizes and lengths.

As further illustrated on Figure 6, the skirt panel 32 is provided with a series of holes 35 used to connect the skirt panel 32 to the road trailer 20. The series of holes 35 disposed on the upper portion of the skirt panel 32 is used to connect the skirt panel 32 to the frame 22 of the trailer 20 whereas, in a similar fashion, the series of holes 35 disposed on the bottom portion of the skirt panel 32 is used to connect the skirt panel 32 to the skirt connecting portion 48 of the resilient strut 42. The resilient strut 42 is connected to the frame member 23 of the trailer via the trailer connecting portion 46 of the resilient strut 42. The skirt connecting portion 48 and the trailer connecting portion 46 of the resilient strut 42. The skirt connecting portion 48 and the trailer connecting portion 46 are provided with respective series of holes 35 to receive fasteners therein. The holes 35 can be factory pre-drilled or can be drilled during installation to ensure desired customization. Rivets or bolts are placed in the holes 35 to secure the skirt panel 32 to the trailer frame 22 or the support assembly. Other appropriate fastening mechanism variations well known in the art are encompassed by the present disclosure and can be used without departing from the scope of the invention.

An opening 70 is defined in the skirt panel 32 to allow access to an optional fuel tank disposed on the road trailer 20 to fuel an onboard generator or freezer. Such a fuel tank is commonly disposed under the floor 22 of the road trailer 20 and is most likely hidden by the skirt assembly 30. The opening is sized, designed and located on the skirt panel 32 to allow access to the fuel tank. A door (not illustrated) can optionally be added to close the opening 70.

Turning now to Figure 7 where is illustrated a plurality of resilient struts 42 and angles support 40 assembly secured between the frame 22 and the skirt panel 32. The rear elevational view shows that the front portion 34 of the skirt panel 32 is proximally recessed from the left lateral side of the trailer 20 by, illustratively, about 30 centimeters. It can also be appreciated that the skirt panel 32 is held to the road trailer frame 22 via the series of angled support 40 on its upper portion. The lower portion of the skirt panel 32 is connected to the trailer connecting portion 46 of the resilient strut.
42 at an angle $\alpha_1$, which is an angle of about 45° in the present illustrative
embodiment and could be different without departing from the present description.

In one embodiment, the resilient strut 42 has a rectangular section and is made of
composite material. Recommended multilayer composite material, or reinforced
thermoplastic manufactured by Transtex Composites Inc is used in the present
embodiment. The composite material forming the resilient struts 42 of the
illustrative example is shaped in a rectangular section to allow the resilient strut 42
to bend when the skirt panel 32 is pushed toward the center of the road trailer 20
(proximally) when, for instance, contacting an obstacle or having a force applied
thereon. The resilient strut 42 bends, allowing a significant displacement of the
bottom portion of the skirt panel 32, is adapted to retrieve its original position when
the force is removed from the skirt panel 32. The resilient strut 42 is preferably
made of a one-piece material where both ends are slightly angled 44 to evenly
contact the skirt panel 32 and the road trailer frame member 23. In so doing, no
additional intervening parts are required between the resilient strut 42 and both the
skirt panel 32 and the road trailer frame member 23.

The resilient struts 42 of the present embodiment is about 4 millimeters thick and
can reach a radius of 20 centimeters without going into plastic deformation or
breaking. Generally, the thinner the resilient strut 42 is, the shorter will be its
maximum radius of curvature. A lateral proximal displacement of about 60
centimeters of the bottom portion of the skirt panel 32 is possible. The lower
portion of the skirt panel 32 can even reach, under certain circumstances, a
position parallel with the trailer 20 floor. The skirt assembly 30 and the skirt panel
32 will recover their original positions when the force causing the bending is
removed. Further, the bending of the resilient struts 42 provides energy absorption
in case of impact from another vehicle for example. It can be noted that a distal
displacement of the skirt panel 32 is possible. A distal displacement of the skirt
panel 32 will occur when a properly directed force is applied to the skirt panel 32 to
bend the skirt panel 32.
Figures 8 and 9 depict with more details the connection mechanism between the resilient struts 42 and the trailer frame members 23. One of the resilient strut 42 ends is juxtaposed on the lower surface of the road trailer frame 22. A set of holes, identified with holes axes 54, are used to fasten two clamps 4, one on each side of the frame 23, to secure the resilient strut 42 to the road trailer frame 22. The clamps 50 are illustratively made of a shaped stainless steel plate material to prevent corrosion.

Figure 10 illustrates the connection between the resilient strut 42 and the skirt panel 32. The end of the resilient strut 42 is positioned to the surface of the skirt panel 32 and secured thereto. Any types of fasteners 56 can be used to fasten both parts together. Rivets are preferably used although a bolt could also fit into the holes 54 performed in the skirt panel 32 and the resilient strut 42, and illustrated with hole axes 54 to secure the assembly. Glue or resin could alternatively be applied between the resilient strut 42 and the skirt panel 32 to secure the resilient strut 42 and the skirt panel 32 together and is also encompassed by the present invention.

Figure 11 shows the assembly between the upper portion of the skirt panel 32 and one of the angled supports 40. The angle support 40 is disposed next to the edge of the road trailer 20 to position the exterior surface of the skirt panel 32 significantly co-planar with the lateral wall of the road trailer 20. Again, any types of fasteners can be used to fasten both parts together. Rivets are preferably used but a bolt could also fit into the holes 54 in the skirt panel 32 and the angled support 40 to secure the assembly. Here again, glue or resin could alternatively be applied between the angle support 40 and the skirt panel 32 to permanently secure the angle support 40 and the skirt panel 32 together.

Figure 12 and Figure 13 illustrate an alternate embodiment where the resilient strut 42 is fixed to the trailer frame 22 and the skirt panel 32 differently. Instead of installing the resilient strut 42 with both ends slightly angled to mate with the skirt panel 32, both ends of the resilient strut 42 are further angled to contact the skirt panel 32 from the opposite side. This alternate layout assembly reduces the stress
on the resilient strut 42, when the skirt panel 32 is deflected, for instance, under a
force F, by expending the radius of curvature of the resilient strut 42 throughout the
resilient strut 42 ergo significantly reducing local stress points in the resilient strut 42.

In another unillustrated embodiment, the section of the resilient strut 42 has a shape
adapted to increase its stiffness. A "U" or a "C" shaped resilient strut 42 can be
manufactured. Alternatively, an embossed portion on a planar shaped resilient strut 42
can also be manufactured. Preferably the selected shape should prevent dirt and road
debris to keep stuck on the resilient strut 42. The shape can also be uneven along the
length of the resilient strut 42 to provide an uneven flex to the resilient strut 42.

As would be appreciated by those skilled in the art, in view of the present
specification, the nature of the material used to build the skirt panel 32 and the
resilient strut 42 can vary. These materials are also contemplated to fall within the
scope of the invention if they lead to the flexibility and resilience required to build a
resilient skirt assembly 30.

Turning now to Figure 14 and Figure 15, illustrating the road tractor 10 and the
road trailer 20. In this embodiment the skirt panel 32 is constructed with a plurality
of skirt panel modules 80. A pivotable skirt panel module 86 is adapted to be
pivoted about hinges 84 to give access under the road trailer 20. A support member
82 is also provided to maintain the pivoted skirt panel module 86 in its opened
position. The support member 82 being composed of a suspension means and a
damper means.

While the invention has been described in connection with what is presently
considered to be the most practical and preferred embodiments, it is to be
understood that the invention is not to be limited to the disclosed embodiments and
elements, but, to the contrary, is intended to cover various modifications,
combinations of features, equivalent arrangements, and equivalent elements
included within the scope of the appended claims. Furthermore, the dimensions of
features of various components that may appear on the drawings are not meant to
be limiting, and the size of the components therein can vary from the...
size that may be portrayed in the figures herein. Thus, it is intended that the
present invention covers the modifications and variations of the invention, provided
they come within the scope of the appended claims and their equivalents.
In the Claims:

1. An aerodynamic skirt assembly adapted to be substantially longitudinally mounted to a trailer, the aerodynamic skirt assembly comprising:

   a skirt panel including a front portion and a rear portion, the front portion being adapted to be substantially vertically mounted toward a forward portion of the trailer and the rear portion being adapted to be substantially vertically mounted toward a rear portion of the trailer in an aerodynamic configuration, the front portion having a front height and the rear portion having a rear height, the front height being shorter than the rear height, the skirt panel being adapted to move away from the aerodynamic configuration when contacting an object and to recover its aerodynamic configuration thereafter,

   the skirt panel being resiliently secured to the trailer with a plurality of resilient struts, the resilient strut comprising

   an intermediate portion;

   a trailer connecting portion at a first end thereof; and

   a skirt connecting portion at a second end thereof,

   the resilient strut being adapted to sustain an elastic deformation when a load is applied thereon when the skirt panel moves away from the aerodynamic configuration and to self-recover its original shape when the load is removed.

2. The aerodynamic skirt assembly of claim 1, wherein the front height progressively increases toward the rear portion.

3. The aerodynamic skirt assembly of any one of claims 1 to 2, wherein the front height linearly increases toward the rear portion.

4. The aerodynamic skirt assembly of any one of claims 1 to 3, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.
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5. The aerodynamic skirt assembly of any one of claims 1 to 4, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.

6. The aerodynamic skirt assembly of any one of claims 1 to 5, wherein the front height is shorter than the length of a trailer support.

7. The aerodynamic skirt assembly of any one of claims 1 to 6, wherein the front portion defines a substantially vertical edge.

8. The aerodynamic skirt assembly of claim 7, wherein a lower portion of the substantially vertical edge ends with a radius.

9. The aerodynamic assembly skirt of any one of claims 1 to 8, wherein the front portion is adapted to secure a skirt connecting portion thereon.

10. The aerodynamic assembly skirt of any one of claims 1 to 9, wherein the front portion is laterally proximally positioned in respect with the rear portion.

11. The aerodynamic assembly skirt of any one of claims 1 to 10, wherein the skirt panel includes a curved portion between the front portion and the rear portion.

12. The aerodynamic assembly skirt of claim 11, wherein the skirt panel is substantially planar before installation on the trailer.

13. The aerodynamic assembly skirt of any one of claims 1 to 12, wherein the skirt panel includes composite material.

14. The aerodynamic assembly skirt of any one of claims 1 to 13, wherein the skirt panel is made of a single part.

15. The aerodynamic assembly skirt of any one of claims 1 to 14, wherein the skirt panel includes an opening therein allowing access therethrough.
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16. A trailer comprising:

a frame having longitudinal sides, and a resilient aerodynamic skirt assembly adapted to
be mounted on the frame, said skirt assembly including:

a pair of resilient skirts, one for each longitudinal side of the trailer; and

an attachment mechanism to connect each said resilient skirt to the trailer,

wherein:

each said resilient skirt includes at least one skirt panel including a composite material
that is elastically deformable, such that each said skirt panel may, in use, sustain temporary
deformation or stress as a result of encountering an object without breaking, and thereafter
recover its original position and shape when unloaded,

said attachment mechanism includes a plurality of resilient struts of composite material
for each said resilient skirt, and a fastening system to attach (1) each said resilient strut to the
trailer and the respective resilient skirt, and (2) each resilient skirt to the trailer,

each said resilient strut has a first end directly connected to the respective skirt panel
and a second end configured for connection to an I-beam of the trailer,

each said resilient skirt includes an angled portion provided to a top portion of the skirt
panel, a horizontal portion of each said angled portion being adapted to be secured to an I-beam
of the trailer via the fastening system,

the fastening system includes a set of rivets to directly connect the first end of the
resilient strut to the respective skirt panel, and the fastening system further includes a first set of
bolts to connect the second end of the resilient strut to the I-beam of the trailer, and a second set
of bolts to connect the horizontal portion of the angled portion to the I-beam of the frame,

each resilient strut has a rectangular cross section with longer sides running substantially
parallel to the skirt panels and shorter sides running substantially perpendicular to the longer sides, wherein each said resilient strut may bend or flex when the respective part of the respective skirt panel is pushed towards a center of the trailer when encountering an object, and thereafter regain its original position when unloaded,

each said resilient strut has a first configuration when unloaded, and a second configuration that is curved when under load,

said first end of each said strut is angled to evenly contact the respective skirt panel, the second end of the strut being angled to evenly contact the trailer, said first end being substantially in a vertical plane when unloaded, said second end being in a substantially horizontal plane, and

each said skirt panel includes a rearward portion and a forward portion, the rearward portions of the skirt panels being generally parallel to one another when attached to the trailer and the forward portions of the skirt panels being configured to converge towards one another when attached to the trailer, wherein an air passage is provided between the pair of resilient skirts in use and wherein the forward portion has a front height and the rearward portion has a rear height when mounted to the trailer, the front height being shorter than the rear height.

17. The trailer of claim 16, wherein the front height progressively increases toward the rear portion.

18. The trailer of any one of claims 16 to 17, wherein the front height linearly increases toward the rear portion.

19. The trailer of any one of claims 16 to 18, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.

20. The trailer of any one of claims 16 to 19, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.
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21. The trailer of any one of claims 16 to 20, wherein the front height is shorter than the length of a trailer support.

22. The trailer of any one of claims 16 to 21, wherein the front portion defines a substantially vertical edge.

23. The trailer of claim 22, wherein a lower portion of the substantially vertical edge ends with a radius.

24. The trailer of any one of claims 16 to 23, wherein the front portion is adapted to secure a skirt connecting portion thereon.

25. The trailer of any one of claims 16 to 24, wherein the front portion is laterally proximally disposed in respect with the rear portion.

26. The trailer of any one of claims 16 to 25, wherein the skirt panel includes a curved portion between the front portion and the rear portion.

27. The trailer of claim 26, wherein the skirt panel is substantially planar before installation on the trailer.

28. The trailer of any one of claims 16 to 27, wherein the skirt panel includes composite material.

29. The trailer of any one of claims 16 to 28, wherein the skirt panel is made of a single part.

30. The trailer of any one of claims 16 to 29, wherein the skirt panel includes an opening therein allowing access therethrough.

31. An aerodynamic skirt assembly kit adapted to be substantially longitudinally mounted to a trailer, the aerodynamic skirt assembly kit comprising:

    a skirt panel including a front portion and a rear portion, the front portion being adapted to be substantially vertically mounted toward a forward portion of the trailer and the rear portion
being adapted to be substantially vertically mounted toward a rear portion of the trailer in an aerodynamic configuration, the front portion having a front height and the rear portion having a rear height when mounted to the trailer, the front height being shorter than the rear height, the skirt panel being adapted to move away from the aerodynamic configuration when contacting a foreign object and to self-recover its aerodynamic configuration thereafter,

the skirt panel being adapted to be resiliently secured to the trailer with a plurality of resilient struts, the resilient strut being adapted to sustain an elastic deformation when a load is applied thereon when the skirt panel moves away from the aerodynamic configuration and self-recovers the aerodynamic configuration when the load is removed.

32. The aerodynamic skirt assembly kit of claim 31, wherein the front height progressively increases toward the rear portion.

33. The aerodynamic skirt assembly kit of any one of claims 31 to 32, wherein the front height progressively increases toward the rear portion.

34. The aerodynamic skirt assembly kit of any one of claims 31 to 33, wherein the front height linearly increases toward the rear portion.

35. The aerodynamic skirt assembly kit of any one of claims 31 to 34, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.

36. The aerodynamic skirt assembly kit of any one of claims 31 to 35, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.

37. The aerodynamic skirt assembly kit of any one of claims 31 to 36, wherein the front height is shorter than the length of a trailer support.

38. The aerodynamic skirt assembly kit of any one of claims 31 to 37, wherein the front portion defines a substantially vertical edge.
39. The aerodynamic skirt assembly kit of claim 38, wherein a lower portion of the substantially vertical edge ends with a radius.

40. The aerodynamic assembly skirt kit of any one of claims 31 to 39, wherein the front portion is adapted to secure a skirt connecting portion thereon.

41. The aerodynamic assembly skirt kit of any one of claims 31 to 40, wherein the front portion is laterally proximally disposed in respect with the rear portion.

42. The aerodynamic assembly skirt kit of any one of claims 31 to 41, wherein the skirt panel includes a curved portion between the front portion and the rear portion.

43. The aerodynamic assembly skirt kit of claim 42, wherein the skirt panel is substantially planar before installation on the trailer.

44. The aerodynamic assembly skirt kit of any one of claims 31 to 43, wherein the skirt panel includes composite material.

45. The aerodynamic assembly skirt kit of any one of claims 31 to 44, wherein the skirt panel is made of a single part.

46. The aerodynamic assembly skirt kit of any one of claims 31 to 45, wherein the skirt panel includes an opening therein allowing access therethrough.

47. A means to reduce air drag adapted to be substantially longitudinally mounted to a trailer, the means to reduce air drag comprising:

- a means to deflect air including a front portion and a rear portion, the front portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer in an aerodynamic configuration, the front portion having a front height and the rear portion having a rear height, the front height being shorter than the rear height, the means to deflect air being adapted to move away from the aerodynamic configuration when contacting an object and to recover its aerodynamic configuration thereafter,
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the means to deflect air being resiliently secured to the trailer with a plurality of resilient support means,

at least some of the resilient support means being adapted to sustain an elastic deformation when a load is applied thereon when the means to deflect air moves away from the aerodynamic configuration and adapted to self-recover their original shape when the load is removed.

48. The means to reduce air drag of claim 47, wherein the front height progressively increases toward the rear portion.

49. The means to reduce air drag of any one of claims 47 to 48, wherein the front height linearly increases toward the rear portion.

50. The means to reduce air drag of any one of claims 47 to 49, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.

51. The means to reduce air drag of any one of claims 47 to 50, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.

52. The means to reduce air drag of any one of claims 47 to 51, wherein the front height is shorter than the length of a trailer support.

53. The means to reduce air drag of any one of claims 47 to 52, wherein the front portion defines a substantially vertical edge.

54. The means to reduce air drag of claim 53, wherein a lower portion of the substantially vertical edge ends with a radius.

55. The means to reduce air drag of any one of claims 47 to 54, wherein the front portion is adapted to secure a skirt-connecting portion thereon.
56. The means to reduce air drag of any one of claims 47 to 55, wherein the front portion is laterally proximally disposed in respect with the rear portion.

57. The means to reduce air drag of any one of claims 47 to 56, wherein the means to deflect air includes a curved portion between the front portion and the rear portion.

58. The means to reduce air drag of claim 57, wherein the means to deflect air is substantially planar before installation on the trailer.

59. The means to reduce air drag of any one of claims 47 to 58, wherein the means to deflect air includes composite material.

60. The means to reduce air drag of any one of claims 47 to 59, wherein the means to deflect air is made of a single part.

61. The means to reduce air drag of any one of claims 47 to 60, wherein the means to deflect air includes an opening therein allowing access therethrough.

62. A trailer comprising:

a frame having longitudinal sides, and a means to reduce air drag adapted to be mounted on the frame, said means to reduce air drag including:

a pair of resilient means to deflect air, one for each longitudinal side of the trailer; and

an attachment mechanism to connect each said resilient means to deflect air to the trailer,

wherein:

each said resilient means to deflect air includes a composite material that is elastically deformable, such that each said means to deflect air may, in use, sustain temporary deformation or stress as a result of encountering an object without breaking, and thereafter recover its original position and shape when unloaded.
said attachment mechanism includes a plurality of resilient support means of composite material for each said means to deflect air, and a fastening system to attach (1) each said resilient support means to the trailer and the respective means to deflect air, and (2) each resilient means to deflect air to the trailer,

...each said resilient support means has a first end directly connected to the respective means to deflect air and a second end configured for connection to an l-beam of the trailer,

...each said resilient support means includes an angled portion provided to a top portion of the skirt panel, a horizontal portion of each said angled portion being adapted to be secured to an l-beam of the trailer via the fastening system,

...the fastening system includes a set of rivets to directly connect the first end of the resilient support means to the respective means to deflect air, and the fastening system further includes a first set of bolts to connect the second end of the resilient support means to the l-beam of the trailer, and a second set of bolts to connect the horizontal portion of the angled portion to the l-beam of the frame,

...each resilient support means has a rectangular cross section with longer sides running substantially parallel to the means to deflect air and shorter sides running substantially perpendicular to the longer sides, wherein each said resilient support means may bend or flex when the respective part of the respective means to deflect air is pushed towards a center of the trailer when encountering an object, and thereafter regain its original position when unloaded,

...each said resilient support means has a first configuration when unloaded, and a second configuration that is curved when under load,

...said first end of each said support means is angled to evenly contact the respective means to deflect air, the second end of the support means being angled to evenly contact the
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trailer, said first end being substantially in a vertical plane when unloaded, said second end being in a substantially horizontal plane, and

each said means to deflect air includes a rearward portion and a forward portion, the rearward portions of the means to deflect air being generally parallel to one another when attached to the trailer and the forward portions of the means to deflect air being configured to converge towards one another when attached to the trailer, wherein an air passage is provided between the pair of means to deflect air in use and wherein the forward portion has a front height and the rearward portion has a rear height when mounted to the trailer, the front height being shorter than the rear height.

63. The road trailer of claim 62, wherein the front height progressively increases toward the rear portion.

64. The road trailer of any one of claims 62 to 63, wherein the front height linearly increases toward the rear portion.

65. The road trailer of any one of claims 62 to 64, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.

66. The road trailer of any one of claims 62 to 65, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.

67. The road trailer of any one of claims 62 to 66, wherein the front height is shorter than the length of a trailer support.

68. The road trailer of any one of claims 62 to 67, wherein the front portion defines a substantially vertical edge.

69. The road trailer of claim 68, wherein a lower portion of the substantially vertical edge ends with a radius.
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70. The road trailer of any one of claims 62 to 69, wherein the front portion is adapted to secure a skirt connecting portion thereon.

71. The road trailer of any one of claims 62 to 70, wherein the front portion is laterally proximally disposed in respect with the rear portion.

72. The road trailer of any one of claims 62 to 71, wherein the means to deflect air includes a curved portion between the front portion and the rear portion.

73. The road trailer of claim 72, wherein the means to deflect air is substantially planar before installation on the trailer.

74. The road trailer of any one of claims 62 to 73, wherein the means to deflect air includes composite material.

75. The road trailer of any one of claims 62 to 74, wherein the means to deflect air is made of a single part.

76. The road trailer of any one of claims 62 to 75, wherein the means to deflect air includes an opening therein allowing access therethrough.

77. An air drag reducing kit adapted to be substantially longitudinally mounted to a trailer, the air drag reducing kit comprising:

   a pair of means to deflect air including a front portion and a rear portion, the front portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer in an aerodynamic configuration, the front portion having a front height and the rear portion having a rear height when mounted to the trailer, the front height being shorter than the rear height, the means to deflect air being adapted to move away from the aerodynamic configuration when contacting a foreign object and to self-recover its aerodynamic configuration thereafter,

   the means to deflect air being adapted to be resiliently secured to the trailer with a plurality of resilient support means, the resilient support means being adapted to sustain an
elastische Verformung, wenn eine Last aufgebracht wird, die Methode, die über die Luft bewegt wird, nach der aerodynamischen Konfiguration und sich wieder erholt, ohne aerodynamische Konfiguration, wenn die Last entfernt wird.

78. Der Luftwiderstand verringergendes Komponente 77, wobei die vordere Höhe schrittweise abnimmt, bis zum hinteren Teil.

79. Der Luftwiderstand verringergendes Komponente 77 bis 78, wobei die vordere Höhe schrittweise abnimmt, bis zum hinteren Teil.

80. Der Luftwiderstand verringergendes Komponente 77 bis 79, wobei die vordere Höhe linear abnimmt, bis zum hinteren Teil.

81. Der Luftwiderstand verringergendes Komponente 77 bis 80, wobei die vordere Höhe den hinteren Teil bei einer Entfernung von mehr als der Halbe von einer Horizontalen Distanz zwischen der vorderen Teil und dem hinteren Teil erreicht.

82. Der Luftwiderstand verringergendes Komponente 77 bis 81, wobei die vordere Höhe den hinteren Teil bei einer Entfernung von mehr als der Drittel einer Horizontalen Distanz zwischen der vorderen Teil und dem hinteren Teil erreicht.

83. Der Luftwiderstand verringergendes Komponente 77 bis 82, wobei die vordere Höhe kürzer ist als die Länge der Laststange.

84. Der Luftwiderstand verringergendes Komponente 77 bis 83, wobei die vorderen Teil definiert als eine fast vertikale Kante.

85. Der Luftwiderstand verringergendes Komponente 84, wobei eine untere Teil der fast vertikalen Kante enden mit einem Radius.

86. Der Luftwiderstand verringergendes Komponente 77 bis 85, wobei die vorderen Teil angepasst ist, um eine Leine an dem hinteren Teil anbinden.

87. Der Luftwiderstand verringergendes Komponente 77 bis 86, wobei die vorderen Teil lateral proximale angebracht in Bezug auf den hinteren Teil.
88. The aerodynamic assembly skirt kit of any one of claims 77 to 87, wherein the means to deflect air includes a curved portion between the front portion and the rear portion.

89. The air drag reducing kit of claim 88, wherein the skirt panel is substantially planar before installation on the trailer.

90. The air drag reducing kit of any one of claims 77 to 89, wherein the means to deflect air includes composite material.

91. The air drag reducing kit of any one of claims 77 to 90, wherein the means to deflect air is made of a single part.

92. The air drag reducing kit of any one of claims 77 to 91, wherein the means to deflect air includes an opening therein allowing access therethrough.

93. An aerodynamic skirt assembly adapted to be substantially longitudinally mounted to a trailer to reduce air drag thereof when the trailer is moving, the aerodynamic skirt assembly comprising:

   a skirt member including a front portion and a rear portion, the front portion being adapted to be mounted toward a forward portion of the trailer and the rear portion being adapted to be mounted toward a rear portion of the trailer in an aerodynamic configuration, the front portion having a front height and the rear portion having a rear height, the front height being shorter than the rear height, the skirt member being adapted to move away from the aerodynamic configuration when contacting an object and to self-recover its aerodynamic configuration thereafter,

   the skirt member being resiliently operatively maintained to the trailer in the aerodynamic configuration with a plurality of resilient members adapted to temporarily buckle, or bend, when the skirt member moves away from the aerodynamic configuration and to self-recover their original shape when the skirt panel self-recovers its aerodynamic configuration.

94. The aerodynamic skirt assembly of claim 93, wherein the front height progressively increases toward the rear portion.
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95. The aerodynamic skirt assembly of any one of claims 93 to 94, wherein the front height linearly increases toward the rear portion.

96. The aerodynamic skirt assembly of any one of claims 93 to 95, wherein the front height reaches the rear height at a distance less than half of a horizontal distance between the front portion and the rear portion.

97. The aerodynamic skirt assembly of any one of claims 93 to 96, wherein the front height reaches the rear height at a distance less than a third of a horizontal distance between the front portion and the rear portion.

98. The aerodynamic skirt assembly of any one of claims 93 to 97, wherein the front height is shorter than the length of a trailer support.

99. The aerodynamic skirt assembly of any one of claims 93 to 98, wherein the front portion defines a substantially vertical edge.

100. The aerodynamic skirt assembly of claim 99, wherein a lower portion of the substantially vertical edge ends with a radius.

101. The aerodynamic assembly skirt of any one of claims 93 to 100, wherein the front portion is adapted to secure a resilient member thereon.

102. The aerodynamic assembly skirt of any one of claims 93 to 101, wherein the front portion is laterally proximally positioned in respect with the rear portion.

103. The aerodynamic assembly skirt of any one of claims 93 to 102, wherein the skirt member includes a curved portion between the front portion and the rear portion.

104. The aerodynamic assembly skirt of claim 103, wherein the skirt member is substantially planar before installation on the trailer.

105. The aerodynamic assembly skirt of any one of claims 93 to 104, wherein the skirt member includes composite material.
106. The aerodynamic assembly skirt of any one of claims 93 to 105, wherein the skirt member is made of a single part.

107. The aerodynamic assembly skirt of any one of claims 93 to 106, wherein the skirt member includes an opening therein allowing access therethrough.

108. The aerodynamic assembly skirt of any one of claims 93 to 107, wherein the skirt member is substantially vertically mounted to the trailer in the aerodynamic configuration.