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Inventor(s)	MORGAN; Justin Kane et al.

END OF TRAILER FAIRING WITH FLEXIBLE ATTACHMENT MEMBER

Abstract

A fairing includes a right end, a left end, a main portion extend therebetween, a support member, and a flexible attachment member. The main portion defines a fairing interior and includes a right end wall and a left end wall. The right end wall connects to the right end, and the left ed wall connects to the left end. The support member is within the fairing interior and extends between the right end wall and the left end wall. The flexible attachment member is threaded through a passage of the support member and is connected to and extends between the right end wall and the left end wall.

Inventors: **MORGAN; Justin Kane (Anderson, SC), SANZONE; Tara (Greenville, SC), ALKOD; Amarraj (Greenville, SC)**

Applicant: **Trailer Aerodynamics LLC** (Chicago, IL)

Family ID: **1000008475974**

Assignee: **Trailer Aerodynamics LLC (Chicago, IL)**

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATION(S) [0001] This disclosure claims the benefit of and priority to U.S. Provisional Patent Application No. 63/555,540, filed on Feb. 20, 2024, which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The subject matter of the present disclosure relates to an end of the trailer fairing that improves aerodynamic performance of the trailer. More particularly, the present disclosure involves a fairing that features a flexible attachment member that functions to retain a main portion of the trailer fairing to the trailer.

BACKGROUND

[0003] Trailers towed by trucks and similar apparatuses for transporting cargo can be large, unwieldy, and include geometries which invite inefficiencies during travel. One aspect of these inefficiencies concerns the aerodynamics of the trailer. In an effort to improve trailer aerodynamics, trailers have been built, supplemented, or retro-fitted with trailer skirts (or side skirts), devices affixed to the underside which limit air circulating in the empty space between the trailer's axles. By reducing the amount of airflow in this space, drag caused by turbulence is reduced and permits the trailer to be towed more efficiently, increasing the gas mileage and performance of the vehicle and its cargo. Other ways of improving aerodynamic performance of the trailer involves the provision of fairings to the end of the trailer. The fairings modify the airflow around or off of the end of the trailer to reduce drag. It is known to produce fairings that have a curved outer surface that extend from the leading edge of the fairing to the tailing edge of the fairing. These curved fairings change the airflow about the end of the trailer to reduce dragging force. These fairings may be mounted to the sides of the trailer, or to the top surface of the trailer at the back end of the trailer.

[0004] Trailer fairings on the market today may incorporate adhesive or tape as a primary mechanism of attachment to secure a front end of the fairing to the trailer. However, if the adhesive or tape fails, air may flow underneath the front end of the fairing, lifting a main portion of the fairing and causing the main portion to tear away from right and left ends of the fairing that are secured to the trailer.

SUMMARY

[0005] In some aspects, a fairing is configured to be mounted to a surface of a trailer. The fairing may include a first end, a second end, a main portion extending between the first end and the second end, and a support member. The main portion may define a fairing interior and may include a first end wall and a second end wall. The first end wall may be connected to the first end, and the second end wall may be connected to the second end. The support member may be integrally formed within the fairing interior and extend between the first end wall and the second end wall.

[0006] The support member may be a front support member, and the fairing may further include a rear support member integrally formed within the fairing interior and extending between the first end wall and the second end wall. The front support member and the rear support member may be connected with a plurality of brace members. The support member may include a first end and a second end. The first end may be integrally formed with the first end wall, and the second end may be integrally formed with the second end wall. The fairing may further include a first external bracket and a second external bracket. The fairing may be configured to be attached to the surface of the trailer such that the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface.

[0007] In other aspects, a fairing may be configured to be mounted to a surface of a trailer. The fairing may include a first end, a second end, a main portion extending therebetween, and a flexible attachment member. The main portion may define a fairing interior and include a first end wall and a second end wall. The first end wall may be connected to the first end, and the second end wall may be connected to the second end. The flexible attachment member may be within the fairing interior and may be connected to and extend between the first end wall and the second end wall.
[0008] The flexible attachment member may be connected to the first end wall via a first attachment bracket, and may be connected to the second end wall via a second attachment bracket. The fairing may further include a first external bracket and a second external bracket. The first external bracket may be attached to the first end wall of the fairing such that the first end wall is between the first external bracket and the first attachment bracket. The second external bracket may be attached to the second end wall of the fairing such that the second end wall is between the second external bracket and the second attachment bracket. The fairing may be configured to be attached to the surface of the trailer such that the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface. The flexible attachment member may include a first loop that loops around the first attachment bracket and a second loop that loops around the second attachment bracket. The first attachment bracket may include a first cavity that retains a first end of the attachment member. The second attachment bracket may include a second cavity that retains a second end of the attachment member. The flexible attachment member may be a strap, a cable, a wire, or a rope. The fairing may further include a first external bracket and a second external bracket. The fairing may be configured to be attached to the surface such that the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface.
[0009] In other aspects, a fairing may be configured to be mounted to a surface of a trailer. The fairing may include a right end, a left end, a main portion extending therebetween, a support member, and a flexible attachment member. The main portion may define a fairing interior and include a right end wall and a left end wall. The right end wall may be connected to the right end, and the left end wall may be connected to the left end. The support member may be within the fairing interior and extend between the right end wall and the left end wall. The flexible attachment member may be threaded through a passage of the support member and may be connected to and extend between the right end wall and the left end wall.
[0010] The support member may include a right opening and a left opening, and the passage extends therebetween. The flexible attachment member may include a first end that extends from the right opening to connected to the right end wall, and a left end that extends from the left opening to connect to the left end wall. The fairing may further include a right attachment bracket and a left attachment bracket. The right attachment bracket may connect a first end of the flexible attachment member to the right end wall, and the left attachment bracket may connect a second end of the flexible attachment member to the left end wall. The first end of the flexible attachment member may include a first loop that loops around the right attachment bracket. The second end of the flexible attachment member may include a second loop that loops around the left attachment bracket. The first end of the flexible attachment member may be retained in a right cavity within the right attachment bracket, and the second end of the flexible attachment member may be retained in a left cavity within the left attachment bracket. The support member may be a front support member integrally formed within the fairing interior. The fairing may further include a rear support member integrally formed within the fairing interior. The support member may include a right end that is integrally formed within the right end wall, and a second end that is integrally formed with the left end wall.
[0011] In other aspects, an apparatus for a trailer may include a top fairing body, a right external bracket, a left external bracket, a right attachment bracket, a left attachment bracket, and a flexible

attachment member. The top fairing body may have an upper surface and a lower surface. The top fairing body may be mounted to a top surface of the trailer. The trailer may have a longitudinal direction, a lateral direction, and a vertical direction. The top fairing body may be located closer to the back of the trailer than to the front of the trailer in the longitudinal direction. The right external bracket and the left external bracket may be attached to the trailer. The right attachment bracket may be attached to the right external bracket. The left attachment bracket may be attached to the left external bracket. The flexible attachment member may extend from the right attachment bracket to the left attachment bracket.

[0012] The top fairing body may have a right end that engages the right external bracket. The right attachment bracket may engage the right end such that the right end is located between the right attachment bracket and the right external bracket. The right attachment bracket may not engage the right external bracket. The top fairing body may have a left end that engages the left external bracket. The left attachment bracket may engage the left end such that the left end is located between the left attachment bracket and the left external bracket. The apparatus may further include a right external bracket bolt and a left external bracket bolt. The right external bracket bolt may extend through the right external bracket and the right end to attach the right external bracket to the trailer. The left external bracket bolt may extend through the left external bracket and the left end to attach the left external bracket to the trailer. The apparatus may further include a right attachment bolt and a left attachment bolt. The right attachment bolt may extend through the right external bracket and the right end to attach the right attachment bracket to the right external bracket. The left attachment bolt may extend through the left external bracket and the left end to attach the left attachment bracket to the left external bracket.

[0013] The flexible attachment member may be a strap. The strap may be a nylon strap. The strap may be a textile strap. The strap may be a steel strap. The strap may be a leather strap. The flexible attachment member may be a steel cable. The flexible attachment member may be a wire. The flexible attachment member may be a rope. The flexible attachment member may not be under tension. The flexible attachment member may sag. A first end of the flexible attachment member may loop around the right attachment bracket. A second end of the flexible attachment member may loop around the left attachment bracket. The flexible attachment member may be located between the top fairing body and the top surface of the trailer such that the flexible attachment member is not visible from a person standing on ground next to the trailer.

[0014] The apparatus may further include a double sided tape that engages the lower surface of the top fairing body and that engages the top surface of the trailer. The double sided tape may function to retain the top fairing body to the trailer. The flexible attachment member may be a secondary mechanism of attachment of the top fairing body to the trailer. The top fairing body may have a support member that provides structural rigidity to the top fairing body. The flexible attachment member may be located between the support member and the upper surface of the top fairing body in the vertical direction. The top fairing body may not extend may not extend rearward of a back end of the trailer in the longitudinal direction. The top fairing body may not have any moving parts during use of the trailer.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0015] FIG. **1** is a side view of a truck hauling a trailer with a fairing located at the rearward end of the trailer at the top of the trailer.

[0016] FIG. **2** is a top view of FIG. **1**.

[0017] FIG. **3** is a close-up side view of the front attachment of the fairing to the top of the trailer.

[0018] FIG. **4** is a perspective view of the bottom of the fairing in an assembled condition.

[0019] FIG. **5** is an exploded perspective view of the fairing of FIG. **4**.
[0020] FIG. **6** is a cross-sectional view taken along line **6-6** of FIG. **1**.
[0021] FIG. **7** is a close-up perspective view of the right end of the fairing with the flexible attachment strap in position.
[0022] FIG. **8** is a close-up perspective view of the right end of the fairing with the flexible attachment strap and right attachment bracket in exploded view from the top fairing body.
[0023] FIG. **9** is a cross-sectional view taken along the same line as that described above with respect to FIG. **6**, but with an alternate arrangement of the flexible attachment member.
[0024] The use of identical or similar reference numerals in different figures denotes identical or similar features.
[0025] Before any exemplary configurations of the disclosure are explained in detail, it is to be understood that the disclosure is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the accompanying drawings. The disclosure is capable of other configurations and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting.
DETAILED DESCRIPTION
[0026] Reference will now be made in detail to embodiments of this disclosure, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of this disclosure, and not meant as a limitation. For example, features illustrated or described as part of one embodiment can be used with another embodiment to yield still a third embodiment. It is intended that the present disclosure include these and other modifications and variations.
[0027] The present disclosure provides for a top fairing **14** that improves aerodynamic performance of the trailer **12** to reduce drag on the trailer **12** when a truck **10** is transporting the trailer **12**. The top fairing **14** includes a top fairing body **24** having a right end **44** (i.e., a first end), a left end **46** (i.e., a second end), and a main portion **25** extending therebetween. The main portion **25** defines a fairing interior **27** and includes a right end wall **74** (i.e., a first end wall), which is connected to the right end **44**, and a left end wall **78** (i.e., a second end wall), which is connected to the left end **46**. The top fairing **14** is attached to the top surface **16** of the trailer **12** and features a flexible attachment member **42** within the fairing interior **27** that functions to retain the main portion **25** of the top fairing **14** to the trailer **12** via connection to the right end **44** and the left end **46** of the top fairing **14**. The flexible attachment member **42** could be a nylon strap, a textile strap, a leather strap, a steel strap, a wire, a rope, a steel cable, or other type of member. Right and left external brackets **34**, **36** (i.e., first and second eternal brackets) rigidly attach the right and left ends **44**, **46** of the top fairing body **24** to the trailer **12**, and first and second ends **56**, **58** of the flexible attachment member **42** are respectively attached to these brackets **34**, **36** via a pair of attachment brackets **38**, **40**. The flexible attachment member **42** could be contained within the fairing interior **27** of the top fairing body **24** and not be visible from the outside of the top fairing **14**, such as by a person standing on the ground next to the trailer **12**.
[0028] FIGS. **1** and **2** illustrate a truck **10** transporting a trailer **12** that features the top fairing **14** in accordance with one exemplary embodiment. The truck **10** and trailer **12** combination extends in a longitudinal direction **18** of the trailer **12** which is the general direction of travel as the truck **10** pulls the trailer **12** forward. The top fairing **14** directs airflow around the back **30** of the trailer **12** so that drag on the trailer **12** during travel is reduced. The geometric design of the top fairing **14** includes features that result in this reduction of drag. The trailer **12** has a front **32** and a back **30** in relation to the longitudinal direction **18**, and the top fairing **14** is located closer to the back **30** than to the front **32** in the longitudinal direction **18**. The trailer **12** has a back end **64** which is the back terminal end of the trailer **12** and is the point of the trailer **12** farthest rearward in the longitudinal direction **18**. The top fairing **14** does not extend rearward of the back end **64** in the longitudinal direction **18**, although the top fairing **14** could extend to the back end **64** or could be located

completely forward of the back end **64** in the longitudinal direction **18**. In some instances the top fairing **14** could in fact extend rearward of the back end **64** in the longitudinal direction **18**. The top fairing **14** is located at the back **30** of the trailer **12** to effect the flow of air at the back **30** of the trailer **12** and behind the trailer **12** during travel. Additional fairings can be employed at the bottom **66** of the trailer **12** or in other locations on the trailer **12** as desired. For example, side fairings could be placed onto the right and left side surfaces **68**, **70** of the trailer **12** at the back **30**. The top fairing **14** may extend all the way across the top surface **16** in the lateral direction **20** of the trailer **12** so as to be located at both the right and left side surfaces **68**, **70**. Alternatively, the top fairing **14** may be spaced inboard from one or both of the side surfaces **68**, **70**. The top fairing body **24** has an upper surface **26** over which air flows as the trailer **12** moves, and the shape of the upper surface **26** is designed to allow for the air to flow over it in a manner that reduces aerodynamic drag on the trailer **12**.

[0029] FIG. **3** is a side view of the top fairing **14** and shows the front end **72** of the top fairing **14** in the longitudinal direction **18**. The top fairing **14** is attached to the top surface **16** of the trailer **12** via double sided tape **60** that is attached to the top surface **16** and to a lower surface **28** of the top fairing body **24**. The double sided tape **60** functions as the primary mechanism of attachment of the main portion **25** of the top fairing **14** to the trailer **12**. The double sided tape **60** may extend along a majority of the length of the top fairing **14** in the lateral direction **20**. Although the primary mechanism of attachment of the main portion **25** of the top fairing **14** is described as being made through double sided tape **60**, other primary mechanisms of attachment are possible such as screws, clamps, single sided tape, adhesives, or mechanical fasteners. Should the primary mechanism of attachment fail, a secondary mechanism of attachment can be provided that functions to retain the main portion **25** of the top fairing **14** to the trailer **12** either in the same position or in a similar position as would be the case when the primary mechanism of attachment was functioning. This secondary mechanism of attachment can be made with the flexible attachment member **42**. However, it is to be understood that the flexible attachment member **42** could be the primary and/or only mechanism of attachment of the main portion **25** of the top fairing **14** to the trailer **12** in other embodiments.

[0030] FIG. **4** is a bottom perspective view of the top fairing **14** in accordance with one exemplary embodiment. The top fairing body **24** may be made of a single component or any number of components. The top fairing body **24** has a front support member **62** that extends across the majority of the length of the top fairing body **24** in the lateral direction **20**. In some implementations, the top fairing body **24** may further include a rear support member **88** that extends across the majority of the length of the top fairing body **24** in the lateral direction **20**. The front support member **62** and the rear support member **88**, which are integrally formed within the fairing interior **27** via thermoforming, thus forming a one-piece, monolithic top fairing body **24**, add strength to the top fairing body **24**, and nine additional features, in the form of a plurality of brace members **94**, as shown in FIG. **4**, that connect the front support member **62** and the rear support member **88**, likewise add strength to the top fairing body **24**. The front support member **62** may include a portion of the lower surface **28** of the top fairing body **24** and include a right end **80** (i.e., a first end) and a left end **82** (i.e., a second end). To strengthen the main portion **25** of the top fairing body **24** and minimize potential of the main portion **25** tearing away from the right end **44** and/or the left end **46** of the top fairing body **24**, the right end **80** of the front support member **62** may be integrally formed with (e.g., via thermoforming) the right end wall **74** of the main portion **25**, and the left end **82** of the front support member **62** may be integrally formed (e.g., via thermoforming) with the left end wall **78** of the main portion **25**. The rear support member **88** may include a portion of the lower surface **28** of the top fairing body and include a right end **90** and a left end **92**. To strengthen the main portion **25** of the top fairing body **24** and minimize potential of the main portion **25** tearing away from the right end **44** and/or the left end **46** of the top fairing body **24**, the right end **90** of the rear support member **88** may be integrally formed (e.g., via

thermoforming) with the right end wall **74** of the main portion **25**, and the left end **92** of the rear support member **88** may be integrally formed (e.g., via thermoforming) with the left end wall **78** of the main portion **25**.

[0031] The right end **44** and the left end **46** of the top fairing body **24**, which are positioned on opposite ends of the top fairing body **24** in the lateral direction **20**, each have a series of slots **96**, **98** that are sequential to one another in the longitudinal direction **18**. The flexible attachment member **42** is present in the top fairing **14** and is for the most part hidden from view by the front support member **62**. In particular, the flexible attachment member **42** is threaded through a passage **87** within the front support member **62**. The first and second ends **56**, **58** of the flexible attachment member **42** respectively extend through right and left openings **84**, **86** of the passage **87** and are visible in FIG. **4** while the rest of the flexible attachment member **42** is contained within the passage **87** of the front support member **62** such that the lower surface **28** at the front support member **62** is between the flexible attachment member **42** and the top surface **16** of the trailer **12** when the top fairing **14** is attached.

[0032] FIG. **5** is the view of the top fairing **14** of FIG. **4** but with the right external bracket **34** and the left external bracket **36** in exploded view. The flexible attachment member **42** in this embodiment is a strap that may not be under tension. Instead, the flexible attachment member **42** may have some amount of sag in it in that it bows at some point along its length in the lateral direction **20**. This sag is opposite to what the flexible attachment member **42** would look like if it were in tension and pulled tight from the first end **56** to the second end **58**. As such, embodiments of the top fairing **14** exist in which the flexible attachment member **42** has some amount of slack. The right and left external brackets **34**, **36** may not be part of the top fairing body **24** but may be separate components. The illustrated exemplary brackets **34**, **36** have a general L-shape cross-section and feature slots **104**, **112** and apertures **106**, **114**. In particular, the right external bracket **34** includes panels **108**, **110** that form the general L-shape cross-section. The panel **108** includes the slots **104**, and the panel **110** includes the apertures **106**. Likewise, the left external bracket **36** includes panels **116**, **118** that form the general L-shape cross-section. The panel **116** includes the slots **112**, and the panel **118** includes the apertures **114**. Right and left attachment bolts **52**, **54** are present and are shown. The right attachment bolts **52** extend through the apertures **106** of the right external bracket **34** and apertures **76** of the right end wall **74** to attach the right external bracket **34** to the right end **44**. The left attachment bolts **54** extend through the apertures **114** in the left external bracket **36** and apertures (not shown) in the left end wall **78** to attach the left external bracket **36** to the left end **46**. Although two right attachment bolts **52** and two left attachment bolts **54** are present, there may be only a single right attachment bolt **52** and a single left attachment bolt **54** in other embodiments. In yet other configurations, any number of left and right attachment bolts **54**, **52** can be present in the apparatus.

[0033] FIG. **6** is a cross-sectional view that shows a left side **100** of the top fairing **14** as attached to the trailer **12**. The left end **46** engages the top surface **16**, and the left external bracket **36** is located on and engages the left end **46**. The left and right ends **46**, **44** can be integrally formed (e.g., via thermoforming) with the top fairing body **24**, the front support member **62**, and the rear support member **88** so that they are all a single piece, monolithic component. However, in some implementations, the left and right ends **46**, **44**, the front support member **62**, and/or the rear support member **88** may be different components that are attached to one another in other embodiments. The slots **98**, **112** of the left end **46** and the left external bracket **36** are aligned with one another, and a left external bracket bolt **50** extends through these aligned slots **98**, **112** so as to extend through the left end **46** and the left external bracket **36**. Tightening of the left external bracket bolt **50** causes the left external bracket **36** and the left end **46** to be attached to the trailer **12**. The left end **46** is located between the left external bracket **36** and the top surface **16**. Although a single left external bracket bolt **50** is shown, any number of left external bracket bolts **50** can be used in other embodiments to effect this attachment. Although not shown in FIG. **6**, a similar right

external bracket **34** is attached to the trailer **12** via one or more right external bracket bolts **48** extending through the slots **96** of the right external bracket **34** and the slots **104** of the right end **44** to cause the right external bracket **34** and the right end **44** to be attached to the trailer **12**. The right end **44** is located between the right external bracket **34** and the top surface **16**. The left and right external bracket bolts **50**, **48** may thus cause the left and right ends **46**, **44** of the top fairing body **24** to be retained onto the top surface **16**.

[0034] The flexible attachment member **42** is a strap that is looped to form a loop **126** at the first end **56** and is likewise looped to form a loop **128** at the second end **58** which is shown in FIG. **6**. The left attachment bracket **40** (i.e., second attachment bracket) is positioned so that it extends through the loop **128** of the second end **58**. A pair of left attachment bolts **54** extend through the apertures **114** in the left external bracket **36**, the apertures (not shown) in the left end wall **78**, and apertures **124** in the left attachment bracket **40**. Tightening of the left attachment bolts **54** causes the left attachment bracket **40** to be attached to the left external bracket **36** and for the left end **46** to again be attached to the left external bracket **36**. The second end **58** of the flexible attachment member **42** is thus indirectly attached to the left external bracket **36**. Tightening of the left attachment bolts **54** causes the second end **58** of the flexible attachment member **42** to be secured by being squeezed between the left attachment bracket **40** and the left end wall **78** so that the flexible attachment member **42** is restrained against forward or rearward movement in the longitudinal direction **18**.

[0035] The opposite side of the top fairing **14** is arranged in a similar manner. The first end **56**, which is formed into the loop **126**, is located between the right attachment bracket **38** (i.e., first attachment bracket) and the right end **44** and is secured via the right attachment bolts **52**. The right attachment bolts **52** extend through the apertures **120** of the right attachment bracket **38**, the apertures **76** of the right end wall **74**, and the apertures **106** of the right external bracket **34**, and in this regard the first end **56** of the flexible attachment member **42** is indirectly attached to the right external bracket **34**. The right components of the top fairing **14** can all be arranged in a similar manner to the left components as previously discussed and a repeat of this information is not necessary. The loops **126**, **128** at the first end **56** and second end **58** are made by sewing, mechanical fasteners, integral formation, or other mechanisms. The flexible attachment member **42** extends from the first and second ends **56**, **58** and since each end **56**, **58** is indirectly attached to the external brackets **34**, **36**, in the design the flexible attachment member **42** is attached to the trailer **12** by way of the external brackets **34**, **36**.

[0036] FIGS. **7** and **8** show the right end **102** of the top fairing **14** in an assembled view and an exploded view, respectively. The illustrated exemplary top fairing body **24** is a single piece component such that the left and right ends **44**, **46** are all formed as a single piece with the front support member **62**, the rear support member **88**, and the rest of the top fairing body **24**. In other configurations the top fairing body **24** may be formed from multiple pieces. In FIG. **8**, the right external bracket **34** is shown removed from the right end **44** and a pair of right attachment bolts **52** are likewise removed. Although two right attachment bolts **52** are used to secure the right external bracket **34**, the right end **44**, and the right attachment bracket **38**, any number of right attachment bolts **52** could be used in other embodiments. FIG. **8** shows the flexible attachment member **42** in an exploded position, and FIG. **7** shows the flexible attachment member **42** within the front support member **62** as would be the case when assembled during use of the top fairing **14**. The first end **56** of the flexible attachment member **42** extends from the right opening **84** of the passage **87** of the front support member **62** and is thus not within the front support member **62**. However, the length of the flexible attachment member **42** between the first and second ends **56**, **58** is within the passage **87** of the front support member **62**. If the primary attachment mechanism of the top fairing **14** were to fail, the main portion **25** of top fairing body **24** would be retained onto the trailer **12** because the flexible attachment member **42** is attached to the external brackets **34**, **36** and is within the front support member **62**. The portions of the top fairing body **24** that are between the flexible

attachment member **42** and the top surface **16** in the vertical direction **22** are caught by the flexible attachment member **42** to cause the entire top fairing body **24** to be retained to the trailer **12**. The portions of the top fairing body **24** that are forward and rearward of the flexible attachment member **42** in the longitudinal direction **18** will engage the flexible attachment member **42** to likewise cause the top fairing body **24** to be retained to the trailer **12**. In other words, because the flexible attachment member **42** is threaded through the passage **87** of the front support member **62**, which is a component of the main portion **25**, the flexible attachment member **42** is configured to limit vertical displacement of the main portion **25** and thus prevent the main portion **25** from tearing away from the right and left ends **44**, **46** in the event that the double sided tape **60** fails.

[0037] FIG. **9** is an alternate embodiment of the top fairing **14** as attached to the trailer **12** and as shown in cross-sectional view along the same cross-sectional line as that shown in FIG. **6**. The top fairing **14** differs in that the flexible attachment member **42** is not a strap and does not have loops at its first end **56** and second end **58**. Instead, the flexible attachment member **42** is a steel cable, rope or wire. The flexible attachment member **42** may have some degree of sag or slack in it, and may not be pulled completely into a state of tension between the right and left attachment brackets **38** and **40**. The left attachment bracket **40** can define a cavity **122** into which the second end **58** is located and is of a size that is too small for the second end **58** to be pulled from an opening of the left attachment bracket **40** that leads into the cavity. The second end **58** can thus be retained by the left attachment bracket **40** and attached to the left external bracket **36**. The first end **56** may be configured with the right attachment bracket **38** in a similar manner such that the first end **56** has a size that prevents it from leaving the opening (not shown) of the right attachment bracket **38** that extends into the cavity (not shown) of the right attachment bracket **38**. It is to be understood that the mechanisms of attaching the first and second ends **56**, **58** to the right and left attachment brackets **38**, **40** are varied in possibility and that others besides those disclosed are possible.

[0038] The flexible attachment member **42** can provide a secondary mechanism of securement of the main portion **25** of the top fairing **14** to the trailer **12** should the primary mechanism of attachment, such as the double sided tape **60** attachment, fail. In this regard, the flexible attachment member **42** will still retain the main portion **25** of the top fairing **14** to the trailer **12** even if main portion **25** of the top fairing **14** becomes detached from the double sided tape **60**. Alternatively, the flexible attachment member **42** can be provided as the primary mechanism of attachment of the main portion **25** of the top fairing **14** to the trailer **12** in some embodiments, and in these embodiments a secondary mechanism of attachment is not present. The arrangement of the flexible attachment member **42** contemplates right and left external brackets **34**, **36** that are rigidly attached to the trailer **12**, with the flexible attachment member **42** in turn attached to these external brackets **34**, **36** with the top fairing body **24** captured by the flexible attachment member **42** through its geometry and retained to the top surface **16**.

[0039] The flexible attachment member **42** can be a metallic component, or can be a non-metallic component. The flexible attachment member **42** is flexible in that it can bend or sag along its length in the lateral direction **20** as positioned in the top fairing **14**. The placement of the top fairing body **24** onto the top surface **16** with the flexible attachment member **42** within the space defined by the top fairing body **24** and the top surface **16** (e.g., the fairing interior **27**) causes the flexible attachment member **42** to be contained within and not visible by an observer on the ground next to the trailer **12**. In this regard, the ends **56**, **58** of the flexible attachment member **42** are contained within the fairing interior **27** and are not visible from outside of the top fairing body **24** and do not directly engage the external brackets **34**, **36**. Placement of the flexible attachment member **42** within the top fairing body **24** reduces exposure of the flexible attachment member **42** to environmental damage since it is shielded from the elements. The flexible attachment member **42** generally does not add appreciable structural integrity to the top fairing **14** and generally does not function appreciably to support or stiffen the top fairing **14**. Instead, portions of the top fairing body **24** such as the front support member **62**, the rear support member **88**, and the plurality of

brace members **94** are designed to provide structural integrity to the top fairing **14** and stiffen and support this assembly.

[0040] While the present subject matter has been described in detail with respect to specific embodiments and methods thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing may readily produce alterations to, variations of, and equivalents to such embodiments. Accordingly, the scope of the present disclosure is by way of example rather than by way of limitation, and the subject disclosure does not preclude inclusion of such modifications, variations and/or additions to the present subject matter as would be apparent.

[0041] As uses herein, “a,” “an,” and a “set” are intended to include one or more items, and may be used interchangeably with “one or more.” Further, as used herein, the article “the” is intended to include one or more items referenced in connection with the article “the” and may be used interchangeably with “the one or more.” Further, the phrase “based on” is intended to mean “based, at least in part, on” unless explicitly stated otherwise. Also, as used herein, the term “or” is intended to be inclusive when used in a series and may be used interchangeably with “and/or,” unless explicitly stated otherwise (e.g., if used in combination with “either” or “only one of”). Further, spatially relative terms, such as “below,” “lower,” “above,” “upper,” and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. The spatially relative terms are intended to encompass different orientations of the apparatus, device, and/or element in use or operation in addition to the orientation depicted in the figures. The apparatus may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein may likewise be interpreted accordingly.

Claims

1. A fairing that is configured to be mounted to a surface of a trailer, the fairing comprising: a first end; a second end; a main portion extending between the first end and the second end and defining a fairing interior, the main portion comprising: a first end wall connected to the first end, and a second end wall connected to the second end; and a support member integrally formed within the fairing interior and extending between the first end wall and the second end wall.

2. The fairing of claim 1, wherein the support member is a front support member; and the fairing further comprises: a rear support member integrally formed within the fairing interior and extending between the first end wall and the second end wall.

3. The fairing of claim 2, wherein the front support member and the rear support member are connected with a plurality of brace members.

4. The fairing of claim 1, wherein the support member includes: a first end that is integrally formed with the first end wall, and a second end that is integrally formed with the second end wall.

5. The fairing of claim 1, wherein the main portion defines a front end of the fairing that is connected to double-sided tape for attachment to the surface of the trailer.

6. The fairing of claim 1, further comprising: a first external bracket; and a second external bracket; wherein the fairing is configured to be attached to the surface of the trailer such that: the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface.

7. A fairing that is configured to be mounted to a surface of a trailer, the fairing comprising: a first end; a second end; a main portion extending between the first end and the second end and defining a fairing interior, the main portion comprising: a first end wall connected to the first end, and a second end wall connected to the second end; and a flexible attachment member within the fairing interior and connected to and extending between the first end wall and the second end wall.

8. The fairing of claim 7, wherein the flexible attachment member is connected to the first end wall via a first attachment bracket; and wherein the flexible attachment member is connected to the

second end wall via a second attachment bracket.
9. The fairing of claim 8, further comprising: a first external bracket attached to the first end wall of the fairing such that the first end wall is between the first external bracket and the first attachment bracket; and a second external bracket attached to the second end wall of the fairing such that the second end wall is between the second external bracket and the second attachment bracket; wherein the fairing is configured to be attached to the surface of the trailer such that: the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface.
10. The fairing of claim 8, wherein the flexible attachment member includes: a first loop that loops around the first attachment bracket; and a second loop that loops around the second attachment bracket.
11. The fairing of claim 8, wherein the first attachment bracket includes a first cavity that retains a first end of the attachment member; and wherein the second attachment bracket includes a second cavity that retains a second end of the attachment member.
12. The fairing of claim 7, wherein the flexible attachment member is at least one of a strap, a cable, a wire, or a rope.
13. The fairing of claim 7, further comprising: a first external bracket; and a second external bracket; wherein the fairing is configured to be attached to the surface such that: the first end of the fairing is between the first external bracket and the surface, and the second end of the fairing is between the second external bracket and the surface.
14. A fairing that is configured to be mounted to a surface of a trailer, the fairing comprising: a right end; a left end; a main portion extending between the right end and the left end and defining a fairing interior, the main portion comprising: a right end wall connected to the right end, and a left end wall connected to the left end; a support member within the fairing interior and extending between the right end wall and the left end wall; and a flexible attachment member threaded through a passage of the support member and connected to and extending between the right end wall and the left end wall.
15. The fairing of claim 14, wherein the support member includes a right opening and a left opening, and the passage extends therebetween; and wherein the flexible attachment member includes: a first end that extends from the right opening to connect to the right end wall, and a left end that extends from the left opening to connect to the left end wall.
16. The fairing of claim 14, further comprising: a right attachment bracket that connects a first end of the flexible attachment member to the right end wall; and a left attachment bracket that connects a second end of the flexible attachment member to the left end wall.
17. The fairing of claim 16, wherein the first end of the flexible attachment member includes a first loop that loops around the right attachment bracket; and wherein the second end of the flexible attachment member includes a second loop that loops around the left attachment bracket.
18. The fairing of claim 16, wherein the first end of the flexible attachment member is retained in a right cavity within the right attachment bracket; and wherein the second end of the flexible attachment member is retained in a second cavity within the left attachment bracket.
19. The fairing of claim 14, wherein the support member is a front support member integrally formed within the fairing interior; and wherein the fairing further includes a rear support member integrally formed within the fairing interior.
20. The fairing of claim 14, wherein the support member includes: a right end that is integrally formed with the right end wall; and a second end that is integrally formed with the left end wall.