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Inventor(s)	Dickerson; Tyler

Balance weight for vehicle wheel

Abstract

An improved adhesive-type weight system for use with vehicle wheels includes one weight or a series of weights arranged as a tape. Each weight is formed of a flexible thin iron plate material having a perimeter with opposing longitudinal ends and opposing lateral sides. The series of weights can be oriented end-to-end or side-to-side, and each weight includes two planar sections separated by a center raised section. The center section can be a peak, an arch, a step, or some other raised configuration. Additionally, it can be tapered from one side to another. On the underside of each weight is adhesive and a release paper, which can be continuous across a series of weights or separated and applied under each individual weight. Where weights are attached to adjacent weights in series, preferably a notch or cut extends along the connection to encourage easy separation.

Inventors:	Dickerson; Tyler (Scottsdale, AZ)
Applicant:	Dickerson; Tyler (Scottsdale, AZ)
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Primary Examiner: Bellinger; Jason R

Attorney, Agent or Firm: Whitley Legal Group, PC

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application claims the benefit of provisional U.S. Application 63/247,426 filed Sep. 23, 2021.

FIELD OF INVENTION

(1) This invention relates to balance weights for wheels. More particularly, this invention relates to an improved adhesive-type weight system for automobile wheels with features that improve application and removal of the weight from the wheel.

BACKGROUND

(2) Due in part to the way tires are manufactured, it is common for them to have an irregular distribution of weight. When installed on a vehicle, such weight imbalance causes tires to wear unevenly and chassis vibrations as the tires rotate, which in turn decreases the comfort for the vehicle passengers. If the vibration is too excessive or continuously generated for an extended period, the chassis also can become fatigued. As a result, cracks and gaps can occur between or

from various parts, which reduces their lifespan, impacts steering stability, and increases the risk of accidents.

(3) To address tire weight imbalance, balance weights can be installed at strategic points along a vehicle's wheel where unequal distribution of tire weight is canceled out to uniformly maintain distribution of tire weight. Weights typically are fixed to the rim of a wheel with a deformable clip or a self-adhesive. Because weights secured with clips cannot be applied to all vehicle wheels or require the use of special tools for installation, adhesive-type weights are increasingly popular.

(4) Adhesive-type weights typically comprise a weight body formed from a flexible iron plate material having a rectangular band structure. Adhesive is bonded to one side of the iron material, and a release paper covers the adhesive. The release paper protects the adhesive and is removed when the weight is to be bonded to a wheel. Several individual weights can be strung together along a strip of adhesive and release paper, or a singular extended weight can have several breaking points formed thereon. With both configurations, the adhesive-type weight can be customized by removing only the required amount of weight from the release paper and separating it from the remaining iron material. Because of how they are formed, adhesive-type weights can come in substantial lengths and are commonly referred to as tape weights.

(5) While adhesive-type weights are customizable and easy to apply to a vehicle once the vehicle's surface has been cleaned, they are difficult to remove when new weights need to be installed. Unfortunately, over time a tire can become imbalanced again or replaced, necessitating new adjustments. It would be desirable to provide an adhesive-type weight that is both easy to apply and easy to remove without compromising its ability to remain firmly affixed to the wheel for as long as it is needed. Moreover, it would be desirable to provide such an adhesive-type weight in a tape form that allows for customization.

SUMMARY OF THE INVENTION

(6) An improved adhesive-type weight system for use with vehicle wheels includes one or more weights arranged in series where each weight is formed of a flexible thin iron plate material having a substantially rectangular perimeter with opposing longitudinal ends and opposing lateral sides. Each weight is connected to or adjacent to additional weights along its ends, and each weight includes two planar sections separated by a center raised section. The center section can be a peak, an arch, a step, or some other raised configuration. Additionally, it can be tapered from one side to another. On the underside of each weight is adhesive and a release paper, which can be continuous across a series of weights or separated and applied under each individual weight. Where weights are attached to adjacent weights at their ends, preferably a notch or cut extends along the adjacent ends to encourage easy separation.

(7) To apply the weights, the desired number of weights is obtained, and the release paper removed. Then, the weights can be pressed on and bonded to a vehicle's wheel. Using the end of a flat-head screwdriver or a similar tool while tapping its handle with a mallet, force can be applied to the center section of one or more of the weights, which allows them to be quickly and easily removed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. 1 is a side view of the adhesive-type weight system according to the present invention as applied to a tire and wheel.

(2) FIG. 2 is a top view of the adhesive-type weight system where weights are arranged in series according to the present invention.

(3) FIG. 3 is a top perspective view of a preferred embodiment of an individual weight according to the present invention.

(4) FIG. 4 is a bottom perspective view of the preferred embodiment of an individual weight the

present invention.

(5) FIG. 5 is a side view of the preferred embodiment of the adhesive-type weight of the present invention.

(6) FIG. 6 is a top view of a series of weights according to an alternate embodiment of the adhesive-type weight system of the present invention.

(7) FIG. 7 is a bottom view of the embodiment of the adhesive-type weight system of the present invention shown in FIG. 6.

(8) FIG. 8 is a top view of a series of weights according to a second alternate embodiment of the adhesive-type weight system of the present invention.

(9) FIG. 9 is an illustration of alternate configurations for the center section of each individual weight.

(10) FIG. 10 is an illustration of a tapered configuration for the center section of each individual weight.

(11) FIG. 11 is a top view of a series of weight according to a third alternate embodiment of the adhesive-type weight system of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

(12) An improved adhesive-type weight system **100** for use with wheels **20** and tires **10** includes one or more weights **110** arranged in series as shown in FIGS. 1-2. Each weight **110** is formed of a flexible thin iron plate material preferably having a substantially rectangular perimeter with opposing first and second longitudinal ends **130a**, **130b** and first and second opposing lateral sides **132a**, **132b**. Preferably, first longitudinal end **130a** is substantially parallel to second longitudinal end **130b**, and first lateral side **132a** is substantially parallel to second lateral side **132b**. Alternatively, each weight may have a perimeter that is non-rectangular such that one or both of longitudinal ends **130a**, **130b** are not parallel to one another and lateral sides **132a**, **132b** are not parallel to one another. Although iron is preferred, weight **110** can be formed of a flexible lead, zinc, zinc, or metal alloy, all of which falls within the scope of this invention. Preferably, weight **110** is connected to additional weights **110** along its ends **130a** and **130b** or arranged in a series with additional weights **110** sitting adjacent to one another along its ends **130a** and **130b**.

Alternatively, weight **110** may be a singular weight **110** for application to wheel **20** as shown in FIGS. 3 and 4, or the series of weights **110** may be arranged along their sides **132a** and **132b** as shown in FIG. 8. Preferably, each weight **110** is about 0.25 ounces but smaller or larger weights can also be configured according to the present invention.

(13) Each weight **110** includes a first planar section **112**, a second planar section **114**, and a raised center section **116** disposed between the first planar section **112** and second planar section **114**, as shown in the Figures. The proximal end of first planar section **112** is the first longitudinal end **130a** of the overall weight **110**, and the distal end **130c** of first planar section connects to center section **116**. The proximal end of second planar section **114** is the second longitudinal end **130b** of the overall weight **110**, and the distal end **130d** of second planar section connects to center section **116**. Preferably section **112** is integrally connected to center section **116** along the distal end **130c** of first planar section **112**. Likewise, preferably section **114** is integrally connected to center section **116** along the distal end **130d** of the second planar section. Also preferably, center section **116** forms a peak **116a** as shown in FIGS. 1-8 and 10. Alternatively, center section **116** can be an arch, a step, or another configuration as long as it creates an open space below it relative to first and second planar sections **112** and **114**. FIG. 9 illustrates some examples of alternate configurations for center section **116** of each weight **110**. The peak, arch, step, or other raised configuration of center section **116** preferably uniformly extends from first lateral side **132a** to second lateral side **132b**. Alternatively, the peak, arch, step, or other raised configuration of center section **116** can taper from one height to another across weight **110** as shown in FIG. 10.

(14) For each weight **110**, one or more adhesive units **120** connects or preferably covers at least the lower surfaces **112a** and **114a** of planar sections **112** and **114**. Adhesive units **120** allow each

individual weight **110** to attach to a wheel of a vehicle. More preferably, when weights **110** are not attached to the wheel of a vehicle, release paper **140** covers the adhesive units **120** to protect the adhesive units **120**. Release paper **140** is removed immediately prior to bonding the weight **110** or series of weights **110** to the wheel. Adhesive units **120** can be a series of separate adhesive units **120** that are individually bonded to the underside or lower surfaces **112a**, **114a** of each planar section **112** and **114** of weight **110** as shown in FIG. 3 or a continuous sheet of adhesive that supports a series of weights **110** as shown in FIG. 5. Preferably, no adhesive unit **120** directly contacts the underside of center section **116** where it is raised as is shown in the Figures. Alternatively, it can be applied to the underside or lower surfaces of the entire weight **110** including to the lower surface (not labeled) of center section **116**. Release paper **140** can be a series of individual release papers applied to individual weights **110** or a continuous release paper **140** applied to a series of weights **110**.

(15) Where weights **110** are arranged in a series, they may be separate and distinct weight that abut or are adjacent to other weights or they may be at least partially attached or connected where they abut one another. If partially attached, preferably a score, notch, or cut extends along the union to define the connection point and allow a user to easily disconnect one weight **110** from another. FIG. 6 illustrates a configuration of weights **110** in series, arranged in an end-to-end manner, where the weights sit adjacent to each without being attached. FIG. 5 illustrates a configuration of weights **110** in series, arranged in an end-to-end manner, where the weights are connected with a notch or partial cut extends along and defines adjacent ends **130a**, **130b**. As shown, when weights are arranged end-to-end, the first longitudinal end **130a** of one weight preferably abuts the second longitudinal end **130b** of an adjacent weight, especially when the individual weights **110** have a substantially rectangular perimeter. Should the weights have a non-rectangular perimeter, they may be arranged differently. For example, a series of weights with a triangular or isosceles trapezoidal perimeter may be arranged so that the first longitudinal end **130a** of a first weight abuts the first longitudinal end of a second weight, the second longitudinal end of a second weight abuts the second longitudinal end of a third weight, and the first longitudinal end of the third weight abuts the first longitudinal end of a fourth weight. FIG. 11 illustrates such an arrangement.

(16) To use weights **110**, a technician removes the release paper and then applies as many weights **110** as needed to balance the tire. When weights **110** must be removed, a technician places the end of a tool, such as the end of a flat-head screwdriver, under the center section **116** of one of weights **110**. Using a rubber mallet, the technician can tap on handle of the screwdriver to apply force under the center section **110**. This overcomes the strong adhesive bond between weight **110** and wheel **20** and encourages the weight **110** to lift off the wheel surface. The technician can quickly and simply move the screwdriver and mallet to the next center section **116** and continue releasing individual weights. Because each weight **110** has a raised center section **116**, they can be quickly and easily removed, which improves a technician's efficiency.

(17) While there has been illustrated and described what is at present considered to be the preferred embodiment of the present invention, it will be understood by those skilled in the art that various changes and modifications may be made and equivalents may be substituted for elements thereof without departing from the true scope of the invention disclosed, but that the invention will include all embodiments falling within the scope of the claims.

Claims

1. A balance weight for a vehicle wheel comprising: a) a first longitudinal end; b) a second longitudinal end opposite the first end; c) a first lateral side extending from the first longitudinal end to the second longitudinal end; d) a second lateral side extending from the first longitudinal end to the second longitudinal end; and e) a flexible body disposed between the first longitudinal end and second longitudinal end, the flexible body comprising: i) a first planar section comprising a

proximal end and a distal end, wherein the first longitudinal end of the weight comprises the distal end of the first planar section; ii) a second planar section comprising a proximal end and a distal end, wherein the second longitudinal end of the weight comprises the distal end of the second planar section; iii) a non-planar center section disposed between the proximal end of the first planar section and the proximal end of the second planar section, wherein the center section further comprises a peak extending from the first lateral side of the balance weight to the second lateral side of the balance weight, the first planar section is integrally connected to the center section at the proximal end of the first planar section, and the second planar section is integrally connected to the center section at the proximal end of the second planar section; and iv) an adhesive unit disposed along a lower surface of the first planar section and a lower surface of the second planar section.

2. The balance weight of claim 1 further comprising a release paper removably attached to the adhesive unit.

3. The balance weight of claim 1 wherein the peak is uniform and disposed substantially parallel to the first longitudinal end of the balance weight and to the second longitudinal end of the balance weight.

4. The balance weight of claim 3 wherein the peak is equidistant from the first longitudinal end of the balance weight and the second longitudinal end of the balance weight.

5. The balance weight of claim 1 wherein the height of the peak tapers from the first lateral side of the balance weight to the second lateral side of the balance weight.

6. A balance weight for a vehicle wheel comprising: a) a first longitudinal end; b) a second longitudinal end opposite the first end; c) a first lateral side extending from the first longitudinal end to the second longitudinal end; d) a second lateral side extending from the first longitudinal end to the second longitudinal end; and e) a flexible body disposed between the first longitudinal end and second longitudinal end, the flexible body comprising: i) a first planar section comprising a proximal end and a distal end, wherein the first longitudinal end of the weight comprises the distal end of the first planar section; ii) a second planar section comprising a proximal end and a distal end, wherein the second longitudinal end of the weight comprises the distal end of the second planar section; iii) a non-planar center section disposed between the proximal end of the first planar section and the proximal end of the second planar section, wherein the center section further comprises a step extending from the first lateral side of the balance weight to the second lateral side of the balance weight, the first planar section is integrally connected to the center section at the proximal end of the first planar section, and the second planar section is integrally connected to the center section at the proximal end of the second planar section; and iv) an adhesive unit disposed along a lower surface of the first planar section and a lower surface of the second planar section.

7. A balance weight for a vehicle wheel comprising: a) a first longitudinal end; b) a second longitudinal end opposite the first end; c) a first lateral side extending from the first longitudinal end to the second longitudinal end; d) a second lateral side extending from the first longitudinal end to the second longitudinal end; and e) a flexible body disposed between the first longitudinal end and second longitudinal end, the flexible body comprising: i) a first planar section comprising a proximal end and a distal end, wherein the first longitudinal end of the weight comprises the distal end of the first planar section; ii) a second planar section comprising a proximal end and a distal end, wherein the second longitudinal end of the weight comprises the distal end of the second planar section; iii) a non-planar center section disposed between the proximal end of the first planar section and the proximal end of the second planar section, wherein the center section further comprises an arch extending from the first lateral side of the balance weight to the second lateral side of the balance weight, the first planar section is integrally connected to the center section at the proximal end of the first planar section, and the second planar section is integrally connected to the center section at the proximal end of the second planar section; and iv) an adhesive unit disposed along a lower surface of the first planar section and a lower surface of the second planar section.

8. A balance weight tape system for use with a vehicle wheel, the tape comprising a plurality of

balance weights arranged in sequence, wherein each balance weight comprises: a) a first longitudinal end; b) a second longitudinal end opposite the first longitudinal end; and c) a flexible body disposed between the first longitudinal end and second longitudinal end, the flexible body comprising: i) a first planar section comprising a proximal end and a distal end, wherein the first longitudinal end of the weight comprises the distal end of the first planar section; ii) a second planar section comprising a proximal end and a distal end, wherein the second longitudinal end of the weight comprises the distal end of the second planar section; iii) a non-planar center section disposed between the proximal end of the first planar section and the proximal end of the second planar section, wherein, for each balance weight, the first planar section is integrally connected to the center section of the balance weight at the proximal end of the first planar section and the second planar section is integrally connected to the center section at the proximal end of the second planar section; and iv) an adhesive unit disposed along a lower surface of the first planar section and a lower surface of the second planar section, wherein the balance weights are arranged in series such that a first longitudinal end of one balance weight abuts the second longitudinal end of an adjacent balance weight.

9. The tape system of claim 8 further comprising a release paper removably attached to the adhesive units of the balance weights arranged in series.

10. The tape system of claim 8 wherein, for each balance weight, the center section comprises a peak.

11. The tape system of claim 8 wherein, for each balance weight, the center section comprises a step.

12. The tape system of claim 8 wherein, for each balance weight, the center section comprises an arch.

13. The tape system of claim 8 wherein the balance weights are arranged in series such that a first longitudinal end of one balance weight is removably connected to the second longitudinal end of an adjacent balance weight.

14. A balance weight tape system for use with a vehicle wheel, the tape comprising a plurality of balance weights arranged in sequence, wherein each balance weight comprises: a) a first longitudinal end; b) a second longitudinal end opposite the first longitudinal end; c) a first lateral side extending from the first longitudinal end to the second longitudinal end; d) a second lateral side opposite the first lateral side and extending from the first longitudinal end to the second longitudinal end; and e) a flexible body disposed between the first longitudinal end and the second longitudinal end, the flexible body comprising: i) a first planar section comprising a proximal end and a distal end, wherein the first longitudinal end of the balance weight comprises the distal end of the first planar section; ii) a second planar section comprising a proximal end and a distal end, wherein the second longitudinal end of the weight comprises the distal end of the second planar section; iii) a non-planar center section disposed between the proximal end of the first planar section and the proximal end of the second planar section, wherein the first planar section is integrally connected to the center section of the balance weight at the proximal end of the first planar section and the second planar section is integrally connected to the center section at the proximal end of the second planar section; and iv) an adhesive unit disposed along a lower surface of the first planar section and a lower surface of the second planar section; wherein the balance weights are arranged in series such that a first lateral side of one balance weight is removably connected to the second lateral side of an adjacent balance weight.
