April 10, 1951 R. C. McCROREY 2,548,842

COUNTERBALANCING ATTACHMENT FOR WHEELS

Filed Aug. 23, 1949

FIG. 1.

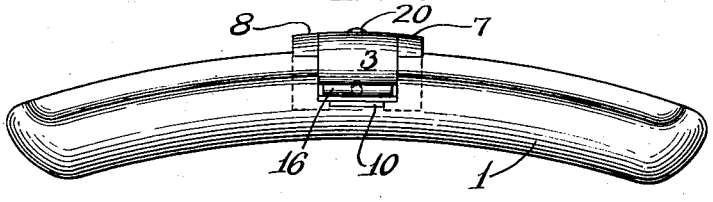


FIG. 4.

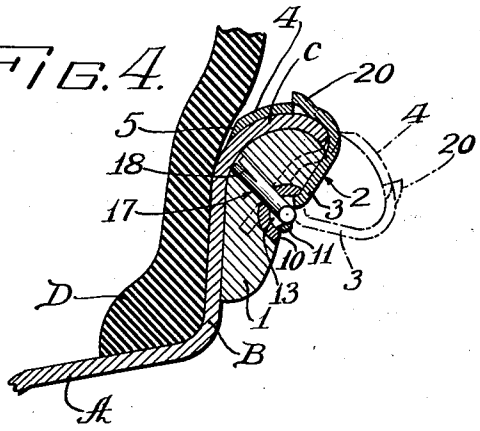


FIG. 3.

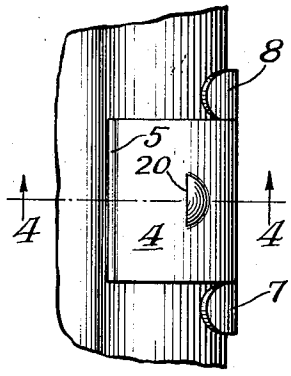


FIG. 5.

FIG. 2.

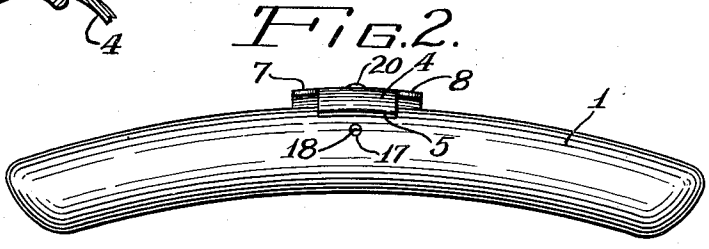


FIG. 7.

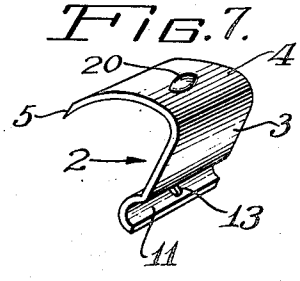


FIG. 6.

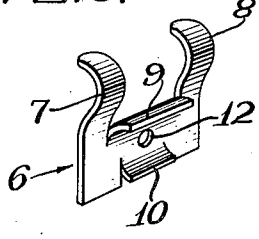
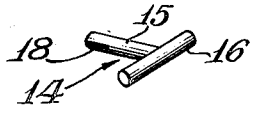


FIG. 8.



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UNITED STATES PATENT OFFICE

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COUNTERBALANCING ATTACHMENT FOR WHEELS

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Application August 23, 1949, Serial No. 111,805

12 Claims. (Cl. 301—5)

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Various types of counter balancing devices, adapted to be attached to the rims of rubber tired wheels, are at present in use. In all of these devices, as far as I am aware, the weight member has rigidly anchored thereto a spring clip that slips over the upper side of the rim flange, while the weight or body member is placed against the outer and partially overhanging side of the flange. These devices are reasonably satisfactory for use on older styles of rims that are provided with flanges which flare upwardly and outwardly in gentle curves. However, in more recent types of rims the flanges curve outwardly and then downwardly, their angular lengths being greater than is the case with older rims, and the radius of curvature being much shorter. Consequently, when one of the aforesaid older counter balancing devices is attached to one of these newer types of rims, the spring clips are stressed and distorted to a much greater extent than was ever intended or is at all desirable. This stressing may easily exceed the elastic limits of the spring clips, so that the clips are permanently damaged and will not effectively hold the weights in place.

The object of the present invention is to produce a simple and novel construction that makes it possible to attach a counter balancing device to any wheel rim, particularly of the aforesaid newer types, without stressing any part to a degree that could cause the slightest damage.

In carrying out my invention I make use of a latch rather than a spring clip, the latch being hinged to the weight member and having a wing whose nose rides on top of the flange when the gate-like latch is swung up while the weight is nested underneath the curved flange. The wing is shaped to follow the contour of the top surface of the flange without being under heavy stress; the latching action being attained by causing the nose of the latch to ride uphill and then downhill as the latch wing moves across the flange into the latching position. Before the device can be unlatched, the nose must ride uphill again, something it will not do of its own accord in normal use.

Further objects of the present invention are to provide simple and novel means for effectively coupling the gate-like latch to the weight member, to insure a continuous, snug fit of the weight member against the rim side and the overhanging rim flange, and to make unlatching of the device simple and easy.

The various features of novelty whereby the present invention is characterized will hereinafter be pointed out with particularity in the

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claims, but, for a full understanding of the invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Figure 1 is a view of the outer or front side of a counter balancing device embodying my invention in a preferred form; Fig. 2 is a view of the inner or rear side of the device; Fig. 3 is a top plan view, on a larger scale, of the device applied to a wheel rim, only a fragment of each being shown; Fig. 4 is a section on line 4—4 of Fig. 3 showing, in addition, a fragment of a tire mounted on the rim, and the latch shown in broken lines in the open position; Fig. 5 is a section on the same plane as Fig. 4, showing only fragments of the rim and latch; Fig. 6 is a perspective view of the plate, before being cast into the weight member, to which the latch is hinged; Fig. 7 is a perspective view of the latch, before it is attached to the supporting plate; and Fig. 8 is a perspective view of a T-shaped rivet that holds the latch to the supporting plate.

In the drawings I have illustrated only a single preferred form of my new device and, for the sake of brevity, only this form will be described in detail although, obviously, the invention is not restricted to these details.

Referring to the drawing, A is a wheel rim having an almost vertical side web B which is curved upwardly and outwardly and then downwardly, at the top, to create a flange C in the form of an inverted trough. D is a side wall of a tire casing fitted into the rim, only a fragment being shown.

The counter balancing weight 1 is an elongated, thick member shaped to lie flat against the outer face of web element B of the rim and conform to the under surface of the flange C. Therefore, what may be termed the top of the weight is curved in two directions, circumferentially of the wheel and in the transverse direction. The weight is preferably about uniform in width so that, viewed from the side, it has an arcuate shape.

The weight is provided with a gate-like latch device 2, made of a resilient steel plate, cut and formed to provide a flat lower part 3, merging at the top into an inwardly extending wing 4; the wing being curved so that its under surface is complementary to the top surface of rim flange C, and terminating in a nose 5 at its free, inner end. The latch is hinged at its lower end to the weight member, midway between the ends of the latter, so as to swing about an axis at right angles to a radius of the wheel that bisects the weight mem-

ber after the latter is attached to the wheel rim.

When the weight member is made as a soft metal casting, which is usually the case, I prefer to cast into the same a steel plate 6 to which the latch is hinged; thus providing a better connection between the weight and latch than would be possible through hinging the latch directly to the weight member. In the arrangement shown, a large portion is cut away from the upper half of an originally flat plate to leave two strips or fingers 7 and 8 at the two ends, respectively, together with a partially severed lip 9 spanning the distance between the lower ends of the fingers. A somewhat shorter lip 10 is partially severed from the plate by cutting upwardly into the same through the lower edge. The fingers are bent laterally to form them into hooks that embrace the marginal portion of the rim flange to provide a partial support for the weight as soon as the latter is inserted beneath the flange. Lips 9 and 10 are bent laterally in the opposite direction from that in which the hooks face, to form an elongated semicylindrical bearing or seat.

The width of the plate from which the latch is made is only slightly less than the distance between hooked fingers 7 and 8, so that the latch may be moved into the space between these fingers. The marginal portion of the latch, along the lower edge, is deformed to create a semicylindrical bead 11, that protrudes from the inner side of the latch, beneath the wing portion. This bead constitutes a journal adapted to be seated in the semicylindrical bearing seat on plate 6; thereby permitting the latch to be placed in hinged relation to the plate, so that the wing portion can be swung in and out through the space between the fingers on plate 6.

The journal 11 may be held in its bearing in any suitable way. In the arrangement shown, plate 6 contains a round hole 12 at the center of the seat or bearing, while the bead or journal portion of the latch contains a hole 13 that registers with hole 12 when the plate and latch are assembled. Hole 13 is elongated in the vertical direction. A rivet or the like, extending through both holes and fixed relatively to plate 6, while loose in the elongated hole, will serve to maintain the connection between that plate and the latch, while allowing the latch to swing up and down. In the arrangement shown, there is a rivet 14 in the form of a T, the stem 15 passing through both holes and the cross member 16 fitting in the trough of the bead on the latch.

In manufacturing the device, plate 6 is cast into the weight member, the latter being formed with a passage 17 in registration with hole 12, extending through the same from front to rear. What may be termed the body portion of the device has now been completed, and the latch may be added and the rivet inserted; the stem of the rivet extending into or through passage 17. The stem of the rivet is split, lengthwise, at its free end, 18 indicating the location and extent thereof. After the three separate pieces have thus been assembled, the divided end of the rivet proper is spread by means of any suitable wedging or expanding device; thereby effectively securing the latch to the weight member.

When applying my improved device to a wheel rim, the weight member is set under the overhanging flange and against the side wall of the rim, with the hooked fingers loosely embracing the rim edge and not interfering with the proper seating of said member; the latch being at this time in its down, idle position, as shown in broken lines in Fig. 4. The latch is then swung up into the position shown in full lines in Fig. 4, for the first time bringing into play any spring action. When the latch is up, the wing section thereof preferably fits snugly against the curved upper face of the rim flange and is stressed sufficiently to form with the weight member an effective spring clamp.

In order to make the grip of the device still more secure, I prefer that, in order to unlatch, the latch must be stressed beyond what may be regarded as being the necessary holding stress. To this end I so proportion the parts that the nose of the latch in effect rides over a bulge in moving across the top of the flange, the stress increasing during the first part of such movement and thereafter gradually decreasing. Then, because the latch wing cannot simply slide off the flange, but must be further stressed before it can come free, the danger of accidental unlatching due to vibration, for example, is eliminated. One advantageous result of this construction is that no reliance need be placed on the tire casing for holding the device in place.

The variation in the degree of stressing of the latch is shown diagrammatically in Fig. 5, where broken line 19 indicates the path that would be taken by the nose of the latch in moving between the two positions illustrated in Fig. 4 without change in the stress. The upper surface of the flange, however, gradually rises above this line and then slopes down, placing a hill or hump in the path of the nose whenever it moves from either of such extreme positions to the other.

In order to permit unlatching to be accomplished easily, the metal of the latch wing is struck up to form a lug 20 to provide a square shoulder spaced apart from and facing the tire casing. One need only press outward against this shoulder to force the latch off the rim flange.

So far as the compound curvature of the weight member and the lug by means of which the latch may be drawn into release position are concerned, the present application is a continuation of my prior application entitled Spring Clips for Wheel Balancing Weights, Ser. No. 705,758, filed October 25, 1946, now abandoned.

I claim:

1. A wheel balancing device for attachment to rims provided with flanges that curve outwardly and downwardly comprising a weight member shaped to fit underneath such a flange, and a resilient latch hinged at its lower end to the outer side and at a considerable distance below the top of the said weight member for free swinging movements and shaped to snap over the top of said flange when the latch is swung up and pressed inwardly while the weight member is in place under said flange; the latch being the sole fastening means between the weight member and the rim to which the latter is attached.

2. A wheel balancing device for attachment to rims provided with flanges that curve outwardly and downwardly, comprising a weight member shaped to fit underneath such a flange, and a resilient latch hinged at its lower end to the outer side of said weight member, at about the longitudinal center of the latter for free swinging movements, and having a wing shaped to ride over the top of and grip said flange when the latch is swung up and pressed inwardly while the weight member is in place under said flange.

3. A wheel balancing device for attachment to

rims provided with flanges that curve outwardly and downwardly, comprising a weight member shaped to fit underneath such a flange, a resilient latch hinged at its lower end to the outer side of said weight member and having a wing shaped to snap over the top of said flange when the latch is swung up and pressed inwardly while the weight member is in place under said flange, said wing having a shoulder rising therefrom in position to face a tire on the rim when the latch is in latching position.

4. A wheel balancing device for attachment to rims provided with flanges that curve outwardly and downwardly, comprising a weight member shaped to fit snugly underneath such a flange, and a latch of resilient material hinged at its lower end to the outer side of the weight member and provided with an inwardly extending wing, adapted to overlie such a flange, said wing terminating in a nose adapted to ride on top of the flange when the latch is swung up while the weight member is in place underneath the flange; and the weight member being so curved transversely on the upper side that the latter is farther from the hinge axis at the middle than at the inner and outer sides, whereby nose rides uphill to stress the latch, and then downhill to relieve some of the stress, during the movement of the latch into latching position.

5. A wheel balancing device for attachment to a rim provided with a flange that curves outwardly, comprising a weight member shaped to fit underneath such flange, a resilient latch hinged at its lower end to the outer side of the said member and having a wing to overlie the flange beneath which said member is positioned, and a shoulder projecting outwardly from said wing at a point that is remote from a tire on the rim when the latch is in latching position.

6. A wheel balancing device for attachment to rims provided with flanges that curve outwardly and downwardly, comprising an elongated weight member shaped to fit the curvature of such a flange, both transversely and circumferentially, when placed underneath and in contact with the same, a resilient latch hinged at one end to the outer side of said weight member and provided with a wing that fits the top of the flange when the latch is swung up, the combined inner surfaces of the main portion of the latch and the wing being similar in contour to that part of the flange surface upon which the wing is to lie and that part of the outer face of the weight member between the hinge and the top of said member, except that there is sufficient difference in size to cause the latch to grip the flange tightly when the latch is swung up and the wing forced across the flange.

7. A wheel balancing device for attachment to a rim provided with a flange that curves outwardly comprising a weight member shaped to fit underneath such flange, a resilient latch hinged at its lower end to the outer side of the said member and having a wing to overlie the flange after said member is positioned beneath the latter and hook elements on said member in position to embrace the edge of the flange when the weight is in place and to lie adjacent to the side edges of the wing, when the latch is swung into latching position.

8. A wheel balancing device for attachment to rims provided with flanges that curve outwardly, comprising a weight member in the form of a soft metal casting shaped to fit underneath such a flange, a plate cast into said member, a resilient latch, said plate and said latch having thereon cooperating bearing elements to form a hinge joint to permit the latch to be swung up over a rim flange underneath which the weight member lies, and said plate having at the top fingers in position to lie beside the long edges of the latch when the latter is up.

9. A wheel balancing device for attachment to rims provided with flanges that curve outwardly, comprising a weight member in the form of a soft metal casting shaped to fit underneath such a flange, a plate cast into said member, a resilient latch, said plate and said latch having thereon cooperating bearing elements to form a hinge joint to permit the latch to be swung up over a rim flange underneath which the weight member lies, and hook-like fingers formed on the upper end of said plate and projecting above the weight member on opposite sides of the latch to embrace the margin of the rim flange.

10. A wheel balancing device for attachment on a rim provided with a flange that curves outwardly, comprising a weight member in the form of a soft metal casting, shaped to fit under such a flange, a plate cast into said member and having a trough-shaped bearing exposed on the outer side of the latter, a resilient latch having along its lower edge a bead fitting rotatably in said bearing and having at its upper end a wing adapted to overlie the rim flange to hold the weight member in place.

11. A wheel balancing device for attachment to a rim provided with a flange that curves outwardly, comprising a weight member in the form of a soft metal casting shaped to fit under such a flange, a plate cast into said member and having a trough-shaped bearing exposed on the outer side of the latter, a resilient latch having along its lower edge a trough-shaped bead fitting rotatably in said bearing and having at its upper end a wing adapted to overlie the rim flange to hold the weight member in place, a fastening element passing through the bead and into the bearing, and the opening in the bead through which the fastening passes being in the form of a slot to allow the latch to swing up and down.

12. A device as set forth in claim 11, wherein the fastening element is a rivet having a head in the form of a shaft fitting in the trough of the bead on the latch.

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