United States Patent [19]

Humlong

[11] **3,797,912**

[45] **Mar. 19, 1974**

[54] **CYCLE PEDAL WITH REFLECTOR AND METHOD OF MANUFACTURING SAME**

[75] Inventor: **Robert Frank Humlong,** Maysville, Ky.

[73] Assignee: **Wald Manufacturing Company, Incorporated,** Maysville, Ky.

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[21] Appl. No.: **270,018**

[52] **U.S. Cl.** **350/99,** 74/594.4, 350/97

[51] **Int. Cl.** **G02b 5/12**

[58] **Field of Search** 350/97, 99, 103, 105, 109; 74/594.4

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Primary Examiner—John K. Corbin
Assistant Examiner—Michael J. Tokar
Attorney, Agent, or Firm—J. Warren Kinney, Jr.

[57] **ABSTRACT**

A reflective cycle pedal is described wherein reflective elements are retained in the pedal frame without the use of additional retaining plates, rivets, screws, weldments, or adhesive material of any kind; the reflector elements are retained in the pedal framed by retaining means which are integral with the legs of the pedal frame.

21 Claims, 32 Drawing Figures

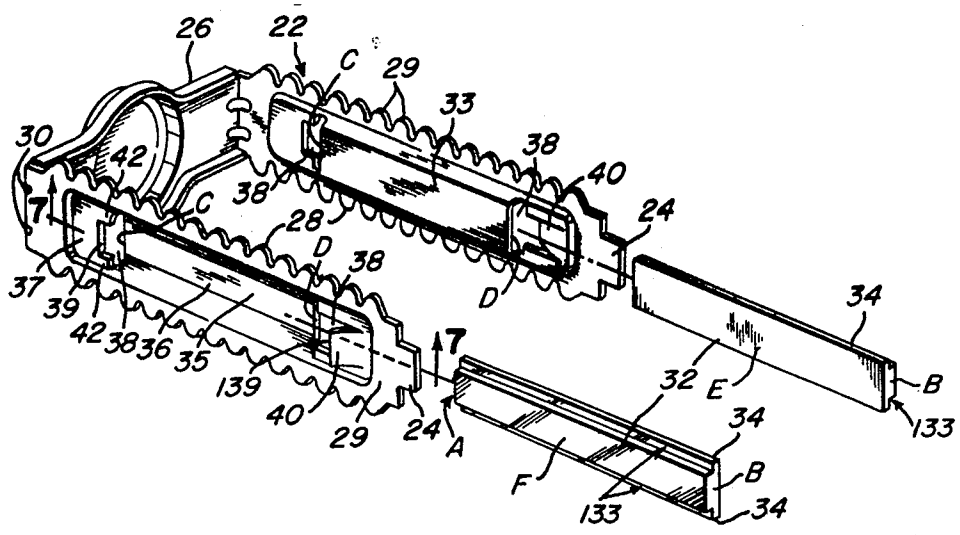
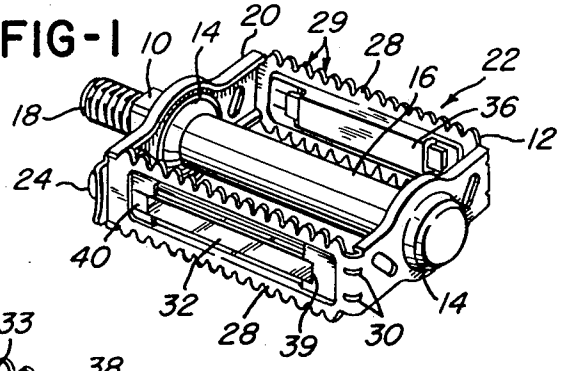


FIG-1



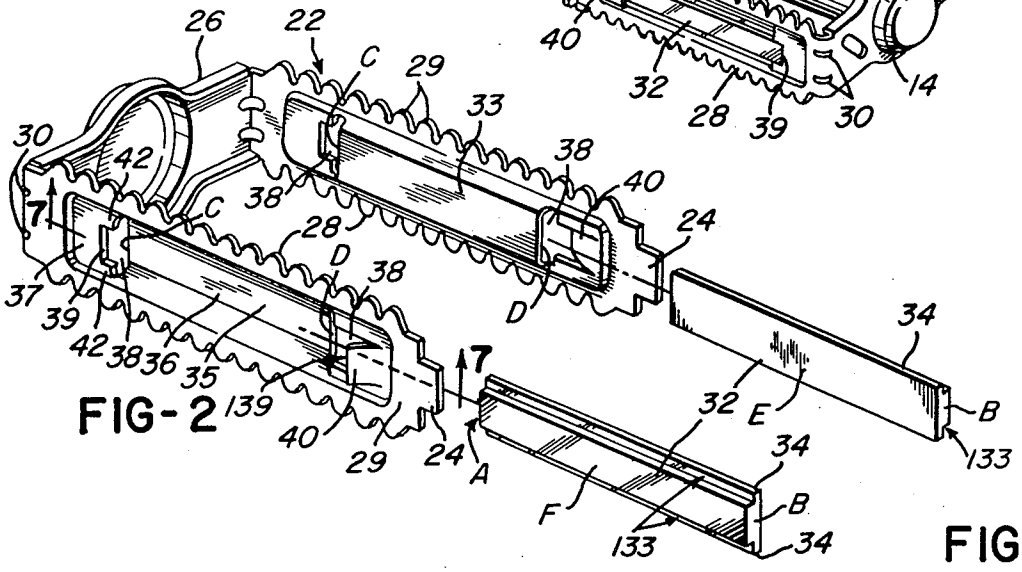


FIG-2

FIG-3

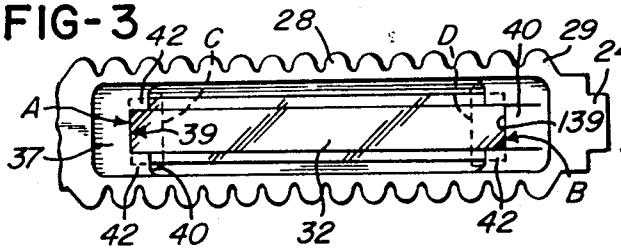


FIG-4

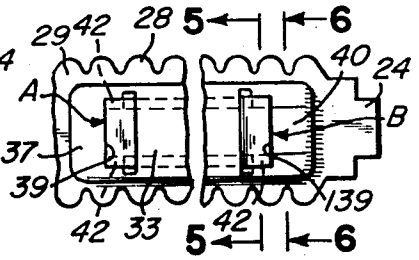


FIG-5

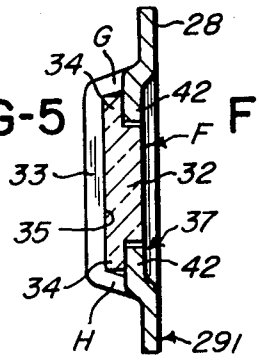


FIG-6

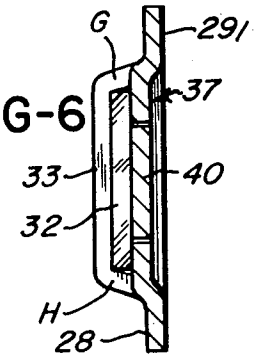


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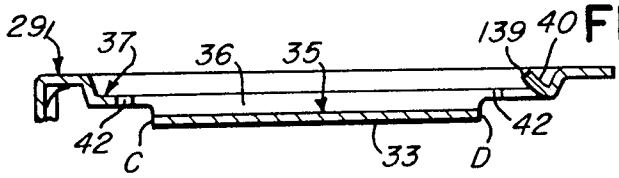


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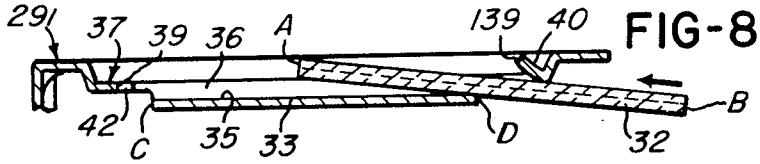


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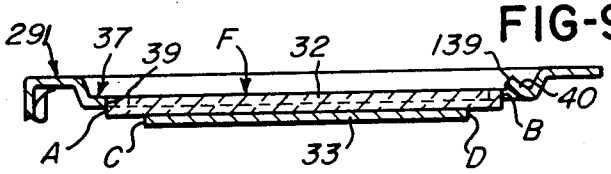


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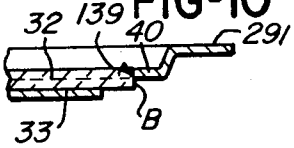


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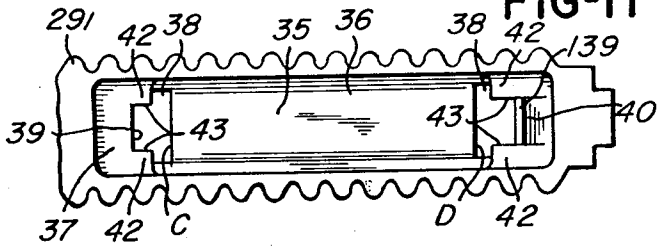


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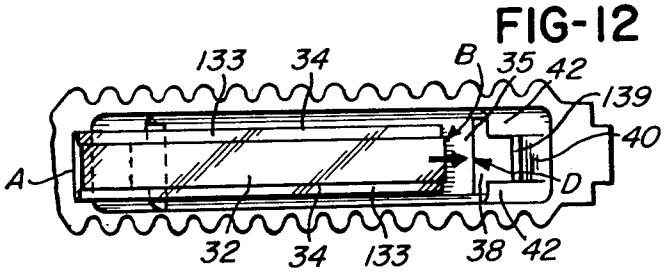


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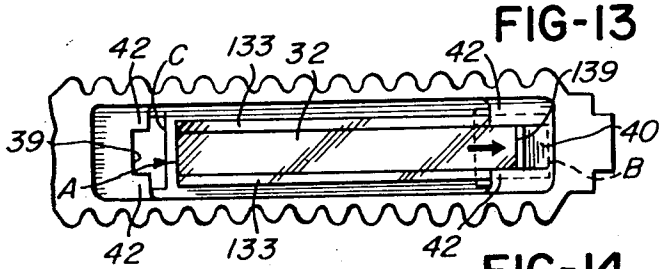


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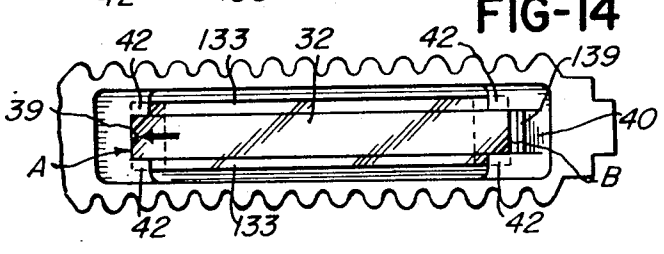
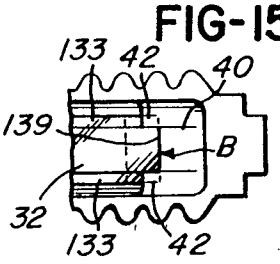


FIG-15



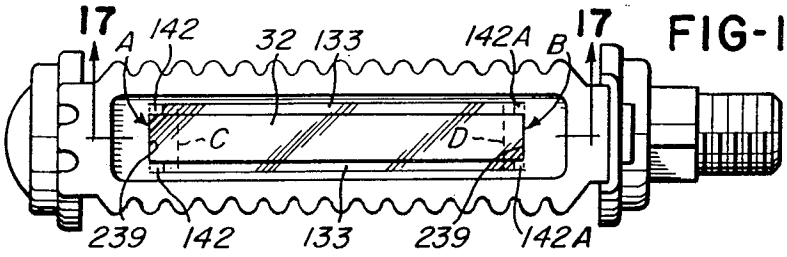


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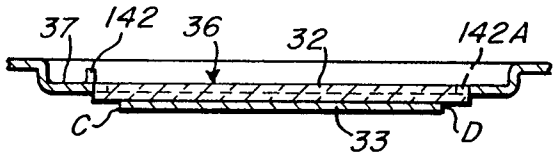


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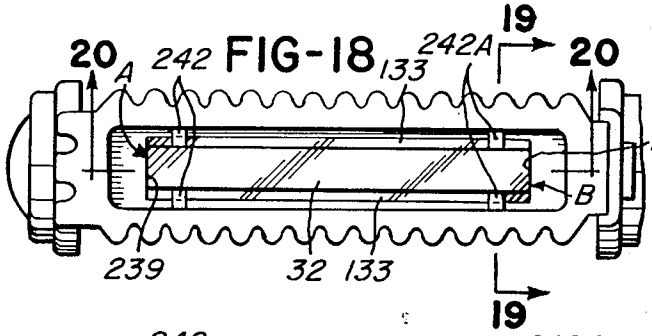


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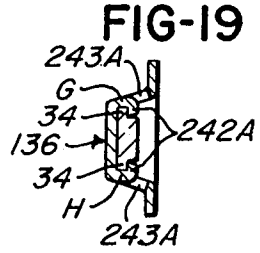


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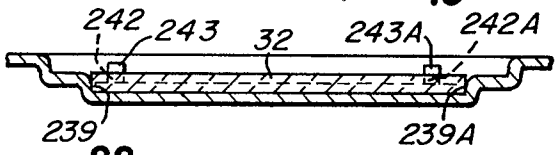


FIG-20

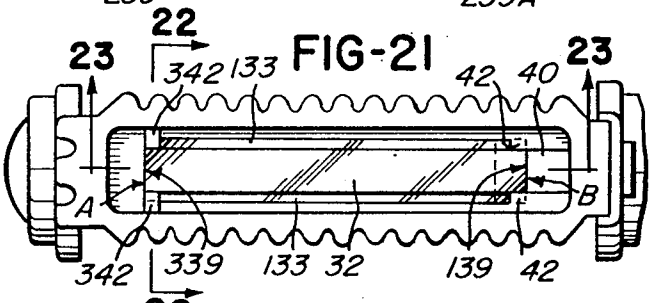


FIG-21

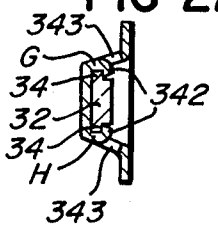


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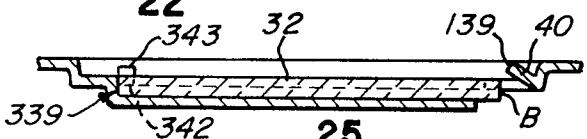


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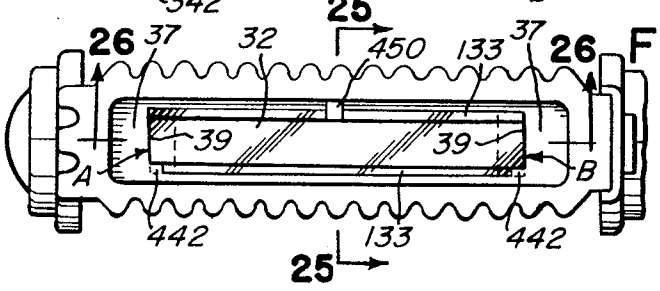


FIG-24

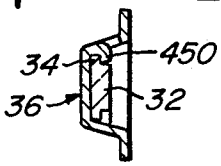


FIG-25

FIG-26

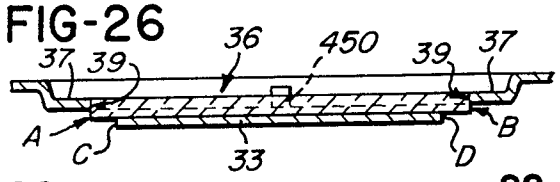


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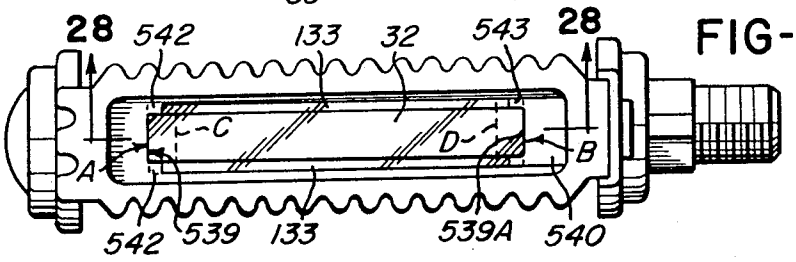


FIG-28

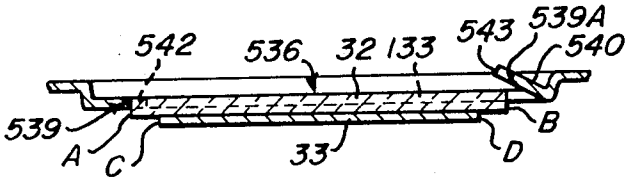


FIG-29

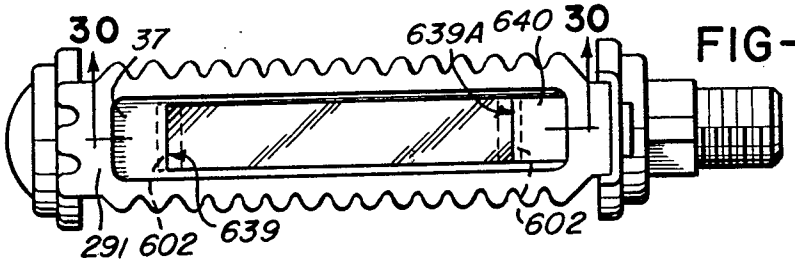


FIG-30

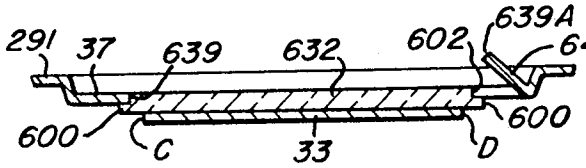


FIG-31

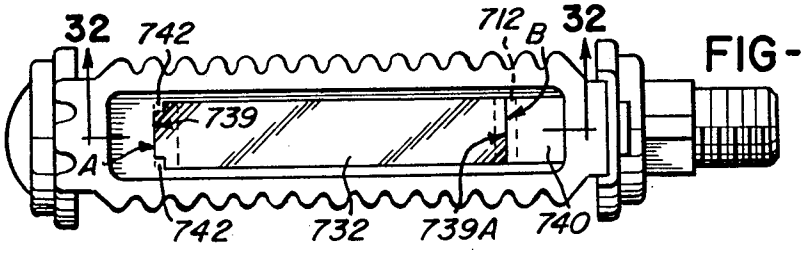
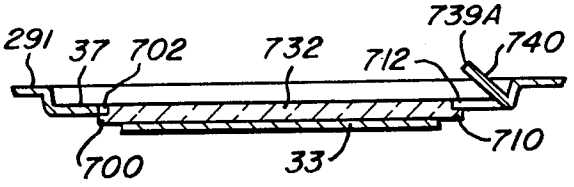


FIG-32



CYCLE PEDAL WITH REFLECTOR AND METHOD OF MANUFACTURING SAME

BACKGROUND OF THE INVENTION

The invention relates generally to cycle pedals having reflectors mounted thereto.

Reflectors have long been recognized as a desirable, if not essential, feature for bicycles and other vehicles particularly when said vehicles are operated during the hours of darkness.

There have been various approaches to the provision of cycle pedals having reflectors which, while they all generally serve the primary function of providing a safety feature, have various shortcomings, to wit the liklihood that the reflectors will be damaged, loosened or lost, and the expense of securing reflectors to the pedal frames.

Loss or damage to cycle pedal reflectors may result from many causes, such as the abuse of which such pedals are normally subjected in use. While there are some pedals which incorporate reflector elements which are highly resistant to loss or damage, the expense of producing such pedals have negated their wide spread usage due to high competitive market conditions. The conventional means of mounting reflectors particularly on "rat trap" pedals, which are of an open frame construction, have utilized rivets, screws, weldments, adhesive material and/or additional retaining plates to fasten the reflectors to the pedal frame.

SUMMARY OF THE INVENTION

The present invention is directed to an improved pedal for cycles or the like having reflectors secured to and permanently secured in the legs of the pedal frame in a simple and effective manner without requiring the use of additional retaining plates, rivets, screws, weldments or adhesive material thereby materially reducing the cost of manufacturing of a reflective pedal of the type wherein the reflectors cannot become accidentally or unintentionally dislodged from the pedal frame.

An object of the invention is to provide a cycle pedal having the aforesaid characteristic wherein the reflector is effectively protected from loss and/or damage.

A further object of the invention is to provide an unique method of securing reflectors to a pedal frame for achieving the aforesaid objects.

A pedal embodying the teachings of the present invention incorporates a reflector which is mounted directly on, in or to the legs of a pedal frame by means which are integral with the frame and which engage the rear surface, opposite end portions and limited portions of the outer surface of the reflector, as well as portions of the top and bottom surface thereof. Other features of the invention include the utilization of a relatively rigid reflector, preferably having lips projecting from its side edges for engagement with integrally formed portions of the legs of the pedal frame. An elongated recess is provided in the legs of the pedal frame to bodily receive and afford protection for the reflector associated therewith. The pedal frame is in the form of a U-shaped member wherein the legs of the U-shaped member have reflector elements mounted therein.

The method aspects of the invention relate to the provision of forming the legs of the frame member with integral abutment portions for so retaining a reflector element with at least one abutment portion or bendable tab initially deflected outwardly so that a reflector may be assembled and engaged with other retaining portions of the frame member after which the initially deflected portion is returned to its original position to abuttingly engage an end of the reflector and thereby provide the last of the integral retaining portions to thus positively mount the reflector to the frame member.

Each leg of the frame member is formed with an elongate, reflector receptive recess wherein openings are provided in the legs at opposite ends of the recess. Each of the aforesaid integral abutment portions are disposed outwardly beyond the opposite ends of the recess, between and adjacent pairs of locking tangs which overlie edge portions of a reflector housed within the recess. The final relationship of the abutting portions, recess and locking tangs of the legs of the frame member with the reflector are such that the reflector is securely anchored directly to the pedal frame without the use of extraneous means, such as, additional retaining plates, screws, rivets, weldments or adhesive material.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a "rat trap" cycle pedal embodying the present invention.

FIG. 2 is an exploded, perspective view, on an enlarged scale, of the components incorporated in the pedal as seen from the other end of FIG. 1.

FIG. 3 is a fragmentary, side view of the pedal components of FIG. 2 after assembly.

FIG. 4 is a view of the pedal components as seen from the opposite side of FIG. 3 with portions thereof broken away.

FIG. 5 is a sectional view taken on line 5—5 of FIG. 4.

FIG. 6 is a sectional view taken on line 6—6 of FIG. 4.

FIG. 7 is a sectional view taken on line 7—7 of FIG. 2.

FIGS. 8, 9, and 10 are views similar to FIG. 7 illustrating sequential steps in the assembly of a reflector with the leg of a pedal frame.

FIG. 11 is an elevational view of the side of the pedal frame leg in the foreground of FIG. 2.

FIGS. 12, 13, 14, and 15 are similar to FIG. 11 illustrating sequential steps in a modified mode of assembly of a reflector with a leg of a pedal frame.

FIG. 16 illustrates a first modification of the invention.

FIG. 17 is a section taken on line 17—17 of FIG. 16.

FIG. 18 illustrates a second modification of the invention.

FIG. 19 is a section taken on line 19—19 of FIG. 18.

FIG. 20 is a section taken on line 20—20 of FIG. 18.

FIG. 21 is a third modification of the invention.

FIG. 22 is a section taken on line 22—22 of FIG. 21.

FIG. 23 is a section taken on line 23—23 of FIG. 21.

FIG. 24 is a fourth modification of the invention.

FIG. 25 is a section taken on line 25—25 of FIG. 24.

FIG. 26 is a section taken on line 26—26 of FIG. 24.

FIG. 27 is a fifth modification of the invention.
FIG. 28 is a section taken on line 28—28 of FIG. 27.

FIG. 29 is a sixth modification of the invention.
FIG. 30 is a section taken on line 30—30 of FIG. 29.

FIG. 31 is a seventh modification of the invention.
FIG. 32 is a section taken on line 32—32 of FIG. 31.

DESCRIPTION OF PREFERRED EMBODIMENT

FIG. 1 illustrates a "rat trap" of cycle pedal which includes an axle 10 which supports bearings (not illustrated) at opposite ends of a rectangularly shaped pedal frame denoted generally by the numeral 12. The location of the bearings are indicated at 14, at opposite ends of a frame tube 16 through which axle 10 extends.

Axle 10 projects from one end of the frame, terminating in a threaded stud 18 which permits it to be attached to the crank of a drive sprocket (not illustrated) of a bicycle or the like.

The pedal frame is a composite structure which includes an end plate 20 and a U-shaped member 22 forming the sides and opposite ends of the frame. The sides of the frame are defined by legs 28, each of which terminate in tangs 24 which are inserted through openings in end plate 20 and thereafter staked to secure the elements in the assembled relation illustrated in FIG. 1. Each of the legs 28 are interconnected at one end by an integrally formed end member 26. In the preferred embodiment of the invention reinforcing ribs 30 are provided at the juncture of legs 28 with end plate 26. The outermost side edges of the legs may be scalloped as at 29, to provide a good friction surface for engagement with the shoes of a cyclist.

Elongate reflectors 32 are associated with and permanently secured to legs 28 by retaining means formed integral with each leg.

In one embodiment of the invention, each of the legs 28 are provided with an elongate, open-ended reflector-receptive recess 36. As best illustrated in FIGS. 2, 5, and 7, the depth of recess 36 as determined by surface 35 of the bottom wall 33 thereof is disposed below and relative to end surfaces 37 beyond the ends of the recess, wherein the depth of recess 36 is such that the outer surface F of the reflector will be substantially flush with surface 37. Surface 37 is located in a plane which is offset inwardly of or below plane in which the outer peripheral surface 291 of each leg is disposed.

As best illustrated in FIG. 11, an opening 38 is provided at each end of the recess 36 wherein the openings are defined by ends C and D of the recessed portion and by an abutment portion or retaining surface 39 and 139 and a pair of retainer lips 42 located in the plane of leg surface 37.

Abutment members or portions 39 and 139 are located between adjacent side edges 43 of each pair of retainer lips 42. Abutment 139 comprises the free outer end of a tongue or tab 40 struck from leg surface 37 whereby to be initially deflected outwardly as in FIGS. 2 and 7–9 to facilitate the introduction of a reflector strip 32 endwise into recess 36; beneath tongue 40, for advancing end A of the reflector toward and into abutting relationship with abutment 39, and with the end corners of the opposite sides of the reflector located beneath each pair of retainer lips 42.

The side edges of the reflector are provided with lips 34 which, as best illustrated in FIG. 2, are disposed along rear surface E of the reflector thereby providing an elongate notch or track 133 in and along the sides of the outer surface F of the reflector. Each pair of retainer lips 42 are adapted to receive or overlie the notch or track portions 133 of a reflector adjacent its opposite ends.

Thereafter, tongue 40 is bent downwardly as in FIGS. 3, and 10, and returned to its original position in the plane of surface 37 whereby its end abutment portion 139 will engage end B of the reflector for thereby positively securing the reflector to the leg against accidental or unintentional disengagement therefrom.

Alternatively reflector 32 of FIG. 2, may be expeditiously associated with recess 36, as illustrated in FIGS. 12–15 wherein the reflector is introduced into the recess and end B of the reflector is initially advanced over surface 35 of bottom wall 33 toward the outwardly deflected tongue 40 and the pair of retainer lips 42 immediately adjacent said tongue, until such time as end A of the reflector has cleared the retainer lips 42 adjacent abutment member 39, as in FIG. 13, at which time rear surface E of the reflector will engage surface 35 of the recess.

Thereafter, the reflector is shifted to the left (as illustrated in FIG. 14) for disposing end A in abutment with abutment portion 39 and with retainer lips 42 disposed in the ends of side track or notch 133 for thereby overlying portions of the outer surface of the reflector. Tongue 40 is then bent downwardly and returned to its original position in the plane of surface 37 whereby its end surface 139 will abut end B of the reflector, FIG. 15, for thereby positively securing the reflector to the frame leg against accidental or unintentional disengagement therefrom.

In each of the foregoing examples, it will be noted that the opposite side edges of the reflector are received between the elongate side walls G and H of the recess, note FIGS. 5 and 6, whereby all portions of the reflector including outer surface F thereof are disposed inwardly of outer peripheral surface 291 of each leg 28.

In FIGS. 16 and 17 the numerals 239 denote abutment portions which correspond to portion 39 of FIGS. 2–14, it being noted that tongue 40 has been omitted. The numerals 142 and 142A denote pairs of retainer lips or tab which are integral with and each of which are initially disposed in upstanding relationship with surface 37, as clearly illustrated at the left end of FIG. 17 for thereby providing unobstructed access to the reflector-receptive recess 36. After reflector 32 has been inserted into the recess the retainer lips 142 and 142A are bent forwardly into the plane of surface 37 whereby to be received in notch or track portions 133 and overlie the end adjacent portions of side lips 34 of the reflector. Ends A and B of the reflector are disposed in abutting relationship with abutment portions 239 whereby the reflector is permanently secured to the frame leg.

In FIGS. 18, 19 and 20, the reflector 32 is secured within recess 136 by means of pairs of retainer lips or tab 242 and 242A integral with and struck from side walls G and H of the recess and spaced inwardly from ends 239 and 239A of the recess. The retainer lips are initially disposed in upstanding relationship whereby to permit unobstructed access of the reflector-receptive

recess. After reflector 32 has been seated within the recess the retainer lips 242 and 242A are bent downwardly to be received within notch or track portions 133 and overlie the side lips 34 of the reflector. The numerals 243 and 243A denote openings in the side walls G and H of the pedal leg as the result of the retainer legs 242 and 242A being struck therefrom.

The construction illustrated in FIGS. 21, 22 and 23 differs from that illustrated in FIGS. 2–15 primarily in that a pair of retainer lips 342 are struck from the side walls G and H at one end of the reflector-receptive recess leaving openings 343 therein. The notch or track portions 133 are received beneath lips 342 and 42, said tongue or tab 40 being bent downwardly from its initially outwardly deflected or raised position of FIG. 23 for disposing the abutment portion 139 a tongue 40 in engagement with end B of the reflector with end A of the reflector abutting against end 339 of the recess.

In FIGS. 24, 25, and 26 reflector 32 is secured in recess 36 by means of retainer lips 442 provided in the plane of surface 37 at opposite ends of one side of the recess. After lip 34 along one side of the reflector has been inserted sidewise beneath retainer lips 442 a retainer lip or tab 450, initially struck from the opposite side wall of the recess and extending at substantial right angles with peripheral surface 37 is bent downwardly for engaging the lip 34 along the other side of the reflector. Ends A and B of the reflector abut portions 39 of the abutment in the plane of surface 37.

In FIGS. 27 and 28 the numeral 540 indicates a tongue or tab having a central portion which terminates in an abutment portion 539A and which includes a pair of retainer lips 543 on opposite ends of portion 539A and which project forwardly of said portion. The tongue is formed integral with the leg, being initially raised as indicated in FIG. 28. An abutment portion 539 is provided in spaced relationship with end C of the recess 536, and a pair of retainer lips 542 are disposed at opposite ends of and projecting forwardly from edge 539. The reflector is secured to the frame leg by initially introducing end A beneath retainer lips 542 which lips overlie the notch or track portions 133 of the reflector sides. Thereafter tongue 540 is bent downwardly for disposing abutment portion 539A in engagement with end B of the reflector while the retainer lips 543 are simultaneously lowered to engage and be seated in notch or track portions adjacent end B for thereby securely anchoring the reflector in the recess.

In FIGS. 29 and 30 flanges 600 are provided along the opposite ends of the reflector 632 for providing end notches 602. One end flange is received beneath abutment portion 639 with the notch engaging the end of portion 639, as clearly illustrated in FIG. 30. Thereafter tongue or tab 640 is bent downwardly from its raised position of FIG. 30 for disposing the end 639A thereof in notch 602, as in FIG. 29 for thereby securely anchoring the reflector in the recess and against bottom wall 33 thereof.

In FIGS. 31 and 32 one end of the reflector 732 is notched as at 700 for providing a pair of end notches receivable under corner retainer lips 742 with end A of the reflector engaging abutment portion 739. The other end of the reflector is flanged as at 710 for providing a transverse end notch 712 which is engaged by the end adjacent portion of tongue or tab 740 when said tongue has been bent downwardly from its initially elevated position of FIG. 32 and the lowered position of FIG. 31.

With particular reference to FIG. 2, the other drawings wherein tongue or tab 40, of FIG. 2, has been illustrated in an initial deflected raised position relative to an end of the reflector-receptive recess, it should be understood that the invention contemplates an initial deflected lowered position out of alignment with the end of a reflector housed within recess 36. Such an initially lowered tongue or tab is bent upwardly into the desired abutting relationship with an end of the reflector, as in FIGS. 3 and 10 for precluding endwise movement of a reflector in the recess.

What is claimed is:

1. A reflective "rat trap" cycle pedal comprising a pedal frame including a pair of substantially parallel, spaced apart leg members, each leg member having an integral, elongate, reflector-receptive recess means formed therein, elongate reflector means in said recess means, and integral, bendable reflector retaining tab means on each leg member at said recess means, said bendable tab means bent inwardly against an adjacent peripheral portion of said reflector means permanently fixing said reflector means in said recess means.

2. A pedal, as called for in claim 1, wherein said elongate reflector receptive recess means comprises a bottom wall and a pair of laterally spaced side walls.

3. A pedal as called for in claim 2, wherein at least one reflector retaining lip is on each said leg member at said recess and said lips have a reflector engaging surface disposed in spaced relationship with the plane of the bottom wall of said recess.

4. A pedal as called for in claim 2, wherein each leg member includes abutment means which engage opposite ends of a reflector housed within said recess.

5. A pedal as called for in claim 4, wherein said abutment means is disposed in spaced relationship with the plane of the bottom wall of said recess and in alignment with an end of a reflector housed within the said recess.

6. A pedal as called for in claim 4, wherein said abutment means are disposed in the plane of the reflector retaining tab means and reflector retaining lip.

7. A pedal as called for in claim 4, wherein at least one of said abutment means comprises said tab means and is defined by the outer, terminal end of a tongue struck from a frame leg adjacent an end of said elongate recess.

8. A pedal as called for in claim 7, wherein said tongue is initially deflected whereby to provide access of a reflector to said recess.

9. A pedal as called for in claim 3, wherein pairs of retaining lips are on each leg member and said pairs of lips engage outer peripheral portions of the reflector adjacent the ends thereof.

10. A pedal as called for in claim 1, wherein the reflector is elongate and has lips projecting from its side edges which define elongate notches in and along the outer side surfaces thereof, and wherein the reflector retaining tab means engage and are seated within said notches.

11. A pedal as called for in claim 2, wherein the reflector is housed within said recess with its rear surface in contacting relationship with the bottom wall of the recess.

12. A pedal as called for in claim 2, wherein the recess is open ended and has a depth greater than the

thickness of the reflector so as to locate the outer surface of a reflector received therein in a plane below the peripheral portions of the leg member adjacent said recess.

13. A pedal as called for in claim 2, wherein the recess is open ended, and wherein the reflector retaining tab means are located beyond an end of the recess, spaced outwardly from the bottom wall thereof and in engagement with the end adjacent portions of the outer surface of the reflector.

14. A pedal as called for in claim 13, wherein the ends of the reflector terminate beyond the ends of said recess and beneath said retaining means.

15. A pedal as called for in claim 13, wherein the ends of the reflector engage abutment means integral with the leg member.

16. A pedal as called for in claim 3, wherein the outer surface of the reflector includes lips projecting from its side edge and wherein the reflector engaging surface of the retaining lip is spaced from the bottom wall of the recess a distance approximating the thickness of said lips on said reflector.

17. A method of manufacturing a reflective "rat trap" cycle pedal, comprising forming a pedal frame with a pair of spaced apart, substantially parallel leg members, forming integral, reflector-receptive recess means in said leg members, forming integral, reflector retaining, bendable tab means on said leg members at said recess means, inserting a reflector into said recess means, engaging and supporting the bottom, sides and at least one end of the reflector, and deforming said bendable tab means into engagement with an adjacent peripheral portion of said reflector to permanently secure the reflector in the recess means.

18. A method as in claim 17, including the steps of forming integral lips on said frame projecting into said recess, forming an opening through said frame leg members communicating with said recess, inserting said reflector through said opening from the rear of said leg member and at an angle to the leg member and into the recess, tilting the reflector into engagement with the leg member, and then bending said tab means into engagement with the reflector to retain the reflector in the recess.

19. A method as in claim 18, including the steps of forming said recess with a depth approximating the thickness of the reflector, forming said opening at one end of the recess, forming another opening through the frame at the other end of the recess, and forming the integral retaining portions as a consequence of forming the openings.

20. A method as in claim 17, including the steps of forming an opening through said frame leg members in opposite ends of said recess and as a consequence thereof forming integral lips projecting inwardly into said recess at opposite ends thereof, inserting said reflector endwise into said recess from the front of said leg member and beneath said lips at one end of the recess, and then sliding the reflector toward the other end of the recess and beneath the lips thereat.

21. A method, as in claim 19, wherein

the reflector has an essentially uniform cross section,

the forming step includes forming the recess with a depth spacing it from the opposed inner face of the leg member a distance approximating the thickness of said lips and forming said openings in the non-recessed portions of the member with pairs of retaining lips which extend inwardly of the outer ends of said openings in spaced apart relation approximating the width of the outer surface of said reflector and further forming the deflected retaining portion as an outwardly deflected tongue struck from said member as an extension of the outer end of said one opening,

and the positioning step further includes shifting said reflector along said recess, after it has been advanced into engagement therewith, to engage one end of the reflector with the retaining means at said other opening and bring its adjacent lip portions beneath the ledges thereat, and

the deforming step includes bending the tongue into abutting relation with the other end of the reflector.

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