

Description

REPLACEABLE WEAR RUNNER

5 Technical Field

 This invention relates generally to replaceable wear runners for installation on the wearable part of a structure to protect such structure from engagement with abrasive material and the like.

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Background Art

 Loader, excavator, drag line buckets and shovels, truck and scraper beds, and similar structures of earth excavating and earth moving equipment are subject to wear from engagement with dirt, sand, rocks and other abrasive materials. It has been common practice to "tile" such structures with replaceable wear runners to protect the structure from wear due to contact with such abrasive materials.

15 Examples of prior wear runners are depicted in U.S. Patents 4,995,176 issued 26 February 1991 and 5,005,304 issued 9 April 1991 both to Terry L. Briscoe. Some type of mechanical lock is typically used to retain the replaceable cover of the wear

20 runner onto the mounting base. One type of mechanical lock that may be used is disclosed in U. S. Patent 5,088,214 issued 18 February 1992 to Larren F. Jones. Such lock, however, uses a rubber latch member, which may tear, fatigue or otherwise deteriorate in use.

25 Any such failure would permit the loss of the wear cover. It is also desirable for wear covers to be reversible and easily removable without the use of special tools to facilitate the ease of replacement, the moving around and/or reversal of the wear covers

30 in the field as needed to obtain the greatest wear life from such covers.

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5 The present invention is directed to
providing an easily replaceable wear runner without
the shortcomings of the prior attempts at securing the
wear cover to the mounting base.

10 Disclosure of the Invention

 In accordance with one aspect of the present
invention, there is provided replaceable wear runner
for installation on a structure to protect such
structure from engagement with abrasive material.
15 Such wear runner includes a mounting base, a
replaceable wear cover and apparatus for releasably
retaining the cover onto the base. The mounting base
is adapted to be secured to the structure and is
disposed along a longitudinal axis and has opposite
20 sides and at least two flanges. A respective one of
the flanges extends transversely from one of the
opposite sides of the base with each of the flanges
having an undercut latch surface formed thereon. The
replaceable wear cover is adapted to be received upon
25 the mounting base and has an outer face and at least
two inwardly extending feet. Each of the feet have a
mating latch surface thereon positionable to engage
the latch surface on a respective one of the flanges
of the base upon movement of the cover in one
30 longitudinal direction relative to the mounting base.
The apparatus for releasably retaining the cover onto
the base includes a generally arcuate retainer and a
generally arcuately shaped slot. The slot is
cooperatively formed between the cover and the base
35 and defines a first engagement surface provided on the
base, a second engagement surface provided on the
cover, and an opening through the outer face of the
cover to provide ingress and egress to the slot by the
retainer. The first engagement surface is oriented

5 normal to the longitudinal axis and faces in the one
direction relative thereto. The second engagement
surface is disposed in a spaced opposing relation to
the first engagement surface of the base. The
retainer has opposite sides with one side thereof
10 being positionable to engage the first engagement
surface and with its opposite side being positionable
to engage the second engagement surface such that the
cover is prevented from moving in a direction opposite
to the one longitudinal direction when the retainer is
15 disposed within the slot.

In accordance with another aspect of the
present invention, there is provided a replaceable
wear cover adapted for mounting onto a mounting base.
The mounting base is secured to a structure subjected
20 in use to abrasive materials. The wear cover includes
a generally rectangular body portion disposed along a
longitudinal axis. The body also has an inner face, a
planar outer face, and a pair of opposite
longitudinally extending side walls projecting toward
25 the mounting base. The wear cover also includes two
pairs of inwardly extending feet. One of each pair
are adjacent a respective one of the longitudinal side
walls. Each of the feet have an undercut latch
surface oriented normal to the longitudinal axis and
30 that face in one direction relative thereto. The wear
cover has a partially formed arcuate slot. The slot
has an arcuate inner periphery and a side formed in
the inner face of the body portion. The inner
periphery is generated by a radius located above the
35 outer face and parallel to the longitudinal axis. The
side defines an engagement surface facing in a
direction opposite to the one longitudinal direction.
The slot has an end thereof opening through the outer

5 face to provide ingress and egress to the slot from
the outer face side of the body portion.

Brief Description of the Drawings

10 Fig. 1 is a fragmentary diagrammatic
perspective representation of a bucket on which wear
runners embodying the features of the present
invention are employed;

15 Fig. 2 is an exploded perspective view of
one of the wear runners depicted in Fig. 1 and
illustrating the principle components of such wear
runner;

Fig. 3 is a plan view of the mounting base
of the wear runner depicted in Fig. 2;

20 Fig. 4 is a plan view of the wear cover of
the wear runner depicted in Fig. 2, with a portion
broken away to show the retaining apparatus of the
present invention;

25 Fig. 5 is a cross-sectional view taken
generally along line 5-5 of Fig. 4 to illustrate the
retaining apparatus;

Fig. 6 is a cross-sectional view taken
generally along line 6-6 of Fig. 4 to illustrate the
preferred arrangement for mounting the wear cover to
the mounting base;

30 Fig. 7 is a cross-sectional view taken
generally along line 7-7 of Fig. 4 to better show the
retaining apparatus of the present invention;

Fig. 8 is an enlarged plan view of the
spring catch employed by the retaining apparatus;

35 Fig. 9 is an enlarged front view of the
retainer of the retaining apparatus; and

Fig. 10 is a cross-sectional view similar to
Fig. 6, but illustrating the corner wear runner
depicted in Fig. 1.

5 Best Mode for Carrying Out the Invention

Referring more particularly to the drawings, replaceable wear runners embodying the principles of the present invention are depicted at 10 and 11 in Fig. 1 and are adapted for installation on a structure to protect the structure from engagement with abrasive materials. One such structure is a large bucket 12 as illustrated in Fig. 1 for a loader, excavator front shovel or similar earthmoving machine or the like (not shown). However, wear runners 10 and 11 may be used on a number of earthworking structures requiring protection from abrasive materials, such as large truck beds, scraper bodies, bulldozer blades and the like and the present invention is not intended to be limited to use on buckets, but is intended to be applicable to any such structure where protection from abrasive materials is desired.

As more clearly seen in Fig. 2, replaceable wear runner 10 includes a mounting base 14, a replaceable wear cover 16 and apparatus 18 for releasable retaining the cover 16 onto the mounting base 14.

As shown in Fig. 3, the mounting base 14 has a plate-like body 20 disposed along a longitudinal axis 22 and having opposite sides 24, 26 and at least two flanges 28, 30. A respective one of the flanges extend transversely from one of the opposite sides of the base. Preferably, the mounting base is provided with a pair of flanges (the two additional rearward flanges being numbered 32, 34 on each of the opposite sides). Each of the flanges 28, 30 and 32, 34 are provided with an undercut latch surface 36 for purposes to be hereinafter described. The mounting base 14 may be secured to the structure 12 by means of welding. To this end, one or more weld holes, such as

5 those shown at 38, may be provided in the body 20, as well as beveled edges, shown at 40 in Fig. 6, for use as weld edges for welding purposes.

The body 20 also includes a first end 42 and second end 44 (Fig.3). A pair of transversely
10 extending upright flanges 46 and 48 are also provided on the body portion 20, with the flange 46 being adjacent the first end 42 and the upright flange 48 being adjacent the second end 44.

Referring more particularly to Fig. 6, the
15 wear cover 16 includes at least two inwardly extending feet on opposite sides thereof, one of which is shown at 52, to mate with the side flanges 28,30 on the base 14. However, the wear cover 16 is preferably provided with a pair of feet on each side thereof, one of the
20 second pair of feet being shown at 54. Each of the feet 52,54 are provided with a mating latch surface 56 thereon which are positionable to engage the latch surfaces 36 on a respective one of the flanges 28,30,32,34 of the base 14 upon movement of the cover
25 16 in one longitudinal direction, indicated by arrow 58, relative to the mounting base.

As shown in Figs. 4 and 6, the wear cover 16 has a generally rectangular body portion 60 disposed along the longitudinal axis as indicated at 22 and has
30 an inner face 62, a planar outer face 64 and a pair of opposite longitudinally extending sidewalls 66,68 (Fig. 5) projecting from the inner face 62 of the body portion 60 toward the mounting base 14. Each of the pair of inwardly extending feet 52,54 are disposed
35 adjacent of respective one of the longitudinal sidewalls 66,68. The undercut latch surfaces 56 on each of the feet 52,54 are oriented normal to the longitudinal axis 22 and face in the direction of the arrow 58 shown in Fig. 6.

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The retaining apparatus 18 includes a generally arcuate retainer 70 and a generally arcuately shaped slot 72. The slot 72 is cooperatively formed between the cover 16 and the mounting base 14 and defines a first engagement surface 74 which is provided on the mounting base 14 and a second engagement surface 76 which is provided on the wear cover 16. A first opening 78 is provided through the outer face 64 of the cover 16 to provide ingress and egress to the slot 72 by the retainer 70. The first engagement surface 74 in the base 14 is oriented normal to the longitudinal axis 22 and faces in one longitudinal direction relative thereto, that direction being in the direction of the arrow 58 shown in Fig.6. The second engagement surface 76 in the cover 16 is disposed in a predetermined spaced opposing relation to the first engagement surface 74. The arcuate retainer 70 has opposite sides 80,82 with the first side 80 being positionable to engage the first engagement surface 74 and with the second side 82 being positionable to engage the second engagement surface 76 such that the cover 16 is prevented from moving in a direction opposite to the longitudinal direction of arrow 58 when the retainer 70 is disposed within the arcuate slot 72.

In particular, the cooperatively formed slot 72 includes an inner periphery 84 and an outer periphery 86. At least a portion of each of the peripheries 84, 86 may each be generated by a radius, the centers 88 of which coincide when the cover 16 is mounted upon the base 14. The coincident centers are preferably located above and parallel to the longitudinal axis 22 of the base. The retainer 70 has an inner periphery 90 and an outer periphery 92 which

5 are generated by radii having a common center and which are sized to permit free passage of the retainer into the slot 72.

The cover 16 is also preferably provided with a second opening 96 which is located in registry with the end of the slot 72 which is opposite the end of the slot in registry with the first opening 78. The second opening 96 is adapted to permit access to the retainer 70 for removal purposes. In such regard, a common tool such as a flat bar or screw driver (not shown) may be inserted through the second opening to engage the adjacent end of the retainer 70. By applying a force to such tool, the retainer 70 can be forced out of the slot 72 through the first opening 78.

20 In addition, the wear cover 16 is also made symmetrical end for end in order to enable the cover to be reversible. In this regard, the cover 14 is provided with another first opening 78', another second opening 96' and another relief 112', as shown in Fig. 2, opposing mating latch surfaces 56', as shown in Fig. 6, and the features of the slot 72, such as a corresponding second engagement surface similar to 76 and an inner periphery similar to 84 (both of which are not shown).

30 The retaining apparatus 18 also includes a spring catch 98 adapted to engage the retainer 70 to releasably maintain the retainer in place. In particular, the spring catch 98 includes a leaf spring 100 having a first end portion 102 held by the mounting base 14 in a suitable groove and a second end portion 104 which is provided with a transversely extending leg 106. The leg 106 is adapted to be received within an aperture 108 provided in the retainer 70.

5 The second end portion 104 of the leaf
spring 100 is preferably provided with a loop portion
110 while the wear cover 16 is provided with a relief
112. Relief 112 is disposed in registry with the loop
portion so as to provide access to the loop portion
10 110 with a screw driver or similar tool (not shown),
such tool can be used to apply a force to the leaf
spring in order to release the leg 106 of the leaf
spring 100 from the aperture 108 in the retainer 70 so
that the retainer 70 can be removed from slot 72.

15 The wear runner 11, shown in Figs. 1 and 10
differs from wear runner 10 only in its use of a
corner wear cover 114. Cover 114 includes an end
extension 116 having a corner leg 118 of sufficient
length to extend around and protect a corner edge 120
20 of the bucket. Wear runner 11 uses the same mounting
base 14 and retaining apparatus 18 as wear runner 10.

Industrial Applicability

25 The replaceable wear runners 10 are adapted
to protect the wearable portions of a structure, such
as bucket 12, from engagement with abrasive material.
With a plurality of mounting bases 14 welded at
suitable locations on the bucket 12, the replaceable
wear covers 16 are quickly and easily attached to a
30 respective mounting of the bases 14. Attachment is
effected by placing the wear cover 16 over the
mounting base 14 with the feet 52,54 slightly forward
of the transversely extending flanges 28,30,32 and 34.
Then the cover 16 may be slid in the direction of
35 arrow 58 to seat the mating latch surfaces 56 on the
feet 52,54 with the latch surfaces 36 on the flanges
28,30,32 and 34. Once this is accomplished, the
arcuate retainer 70 may be inserted into the arcuate
slot 72 to a position where the leg 106 of the leaf

5 spring 100 may be engaged into the aperture 108 of the
retainer. With the retainer 70 in place and secured
by the leaf spring, the cover cannot be dislodged from
the mounting base, even when substantial forces or
large impact loads are exerted on the cover. However,
10 when desired, the cover can be easily and quickly
removed with the use of readily available hand tools,
such as a screw driver, and with very little effort.
To remove the cover, the leg 106 of the leaf spring
100 is easily pried from the aperture 108 and the
15 retainer 70 is pushed out of the slot 72. Once the
retainer 70 is removed, the cover 16 may be slid
forward slightly and lifted off mounting base 14. The
removed cover 16 may be simply turned end for end and
remounted, replaced with a new one or switched with a
20 cover from another location. This allows one to even
out non-uniform wear patterns on the covers and to
maximize their useful wear lives.

 The corner wear cover 11 is mounted and
removed in the same manner as wear cover 10.

25 Other aspects, objects and advantages of the
present invention can be obtained for a study of the
drawings, the disclosure and the appended claims.

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Claims

1. A replaceable wear runner for installation on a structure to protect such structure from engagement with abrasive material comprising:

10 a mounting base adapted to be secured to said structure, said base being disposed along a longitudinal axis and having opposite sides and a flange, said flange having an undercut latch surface formed thereon;

15 a replaceable wear cover adapted to be received upon said mounting base and having an outer face and an inwardly extending foot, said foot having a mating latch surface thereon positionable to engage the latch surface on said flange of said base upon
20 movement of said cover in one longitudinal direction relative to said mounting base; and

apparatus for releasably retaining said cover onto said base, said retaining apparatus including a generally arcuate retainer and a generally
25 arcuately shaped slot, said slot being cooperatively formed between said cover and said base and defining a first engagement surface provided on said base, a second engagement surface provided on said cover, and an opening through the outer face of said cover to
30 provide ingress and egress to said slot by said retainer, said first engagement surface being oriented normal to said longitudinal axis and facing in said one direction relative thereto, and said second engagement surface being disposed in a spaced opposing
35 relation to said first engagement surface of said base, and said retainer having opposite sides with one side thereof being positionable to engage said first engagement surface and with its opposite side being positionable to engage the second engagement surface



5 such that said cover is prevented from moving in a
direction opposite to said one longitudinal direction
when the retainer is disposed within said slot, said
slot including an inner periphery and an outer
periphery, each periphery being generated by radii
10 having a common center located above and parallel to
the longitudinal axis of said base, and said retainer
having an inner periphery and an outer periphery
generated by radii having a common center and sized to
permit free passage of said retainer into said slot.

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2. The wear runner of claim 1 wherein said
retaining apparatus includes:

a spring catch adapted to engage said
retainer to releasably maintain said retainer in
20 place.

3. The wear runner of claim 2 wherein said
retainer has an aperture and said spring catch
includes a leaf spring, said leaf spring having a
25 first end portion held by said mounting base and a
second end portion with a transversely extending leg
adapted to be received within said aperture of said
retainer.

30 4. The wear runner of claim 3 wherein said
second end portion of said leaf spring is provided
with a loop portion and said wear cover is provided
with a relief in registry with said loop portion so as
to provide access thereto in order to release the leg
35 of said spring from the aperture in said retainer.

5. The wear runner of claim 4 wherein said
mounting base has opposite sides and includes a pair
of flanges on each of said opposite sides, each flange



5 having an undercut latch surface thereon, and said
wear cover has a mating latch surface for each of said
latch surfaces on said flanges.

6. The wear runner of claim 5 wherein said
10 slot has opposite ends and said opening through the
outer face of said cover is located at one of said
ends and said cover has a second opening located at
the other end of said slot, said second opening being
adapted to permit access to said retainer for removal
15 purposes.

7. A replaceable wear cover adapted for
mounting onto a mounting base, said mounting base
being secured to a structure subjected in use to
20 abrasive materials, comprising:

 a generally rectangular body portion
disposed along a longitudinal axis and having an inner
face, a planar outer face, a pair of opposite
longitudinally extending side walls projecting toward
25 said mounting base;

 two pairs of inwardly extending feet, one of
each pair being adjacent a respective one of the
longitudinal side walls, each of said feet having a
latch surface oriented normal to said longitudinal
30 axis and facing in one direction relative thereto; and

 a partially formed arcuate slot for
receiving an arcuate retainer, said slot having an
arcuate inner periphery and a side formed in the inner
face of said body portion, said inner periphery being
35 generated by a radius having a center located above
the outer face and parallel to the longitudinal axis
and said side defining an engagement surface facing in
a direction opposing said one direction, said slot
having an end thereof opening through said outer face



5 to provide ingress and egress to said slot through the
outer face of said body portion and said slot being
adapted to receive said arcuate retainer by the
circular movement of said retainer through said
opening generally about said center of the radius of
10 said inner periphery.