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[54] **CAM CLEAT**

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[52] **U.S. Cl.** **114/218**

[51] **Int. Cl.** **B63b 21/04**

[58] **Field of Search**... 114/218, 199; 24/134 CP, 114/134 P

[56] **References Cited**

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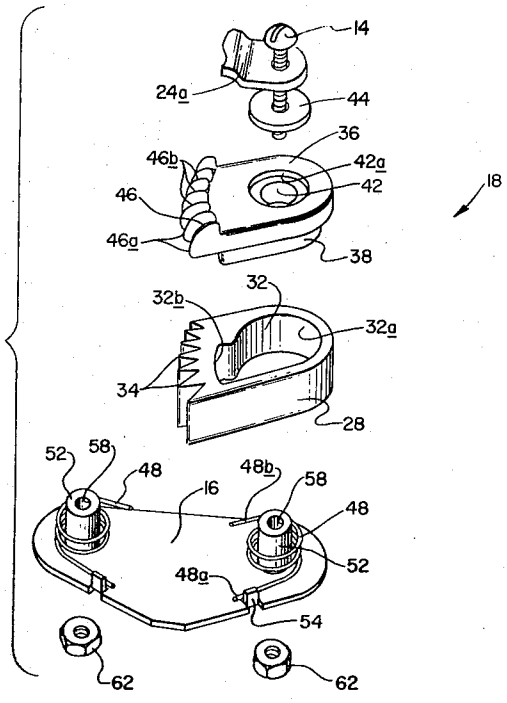
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Attorney, Agent, or Firm—Cesari and McKenna

[57] **ABSTRACT**

A cam cleat for retaining a sheet on a sailboat has cams in the form of toothed shells which provide the main working surfaces of the cams. A rigid plastic insert is fitted into each shell. Each insert is formed with specially shaped entry teeth which enable the sheet to wedge between the cams and open them to receive the sheet when the sheet is moving in a preferred direction.

5 Claims, 2 Drawing Figures



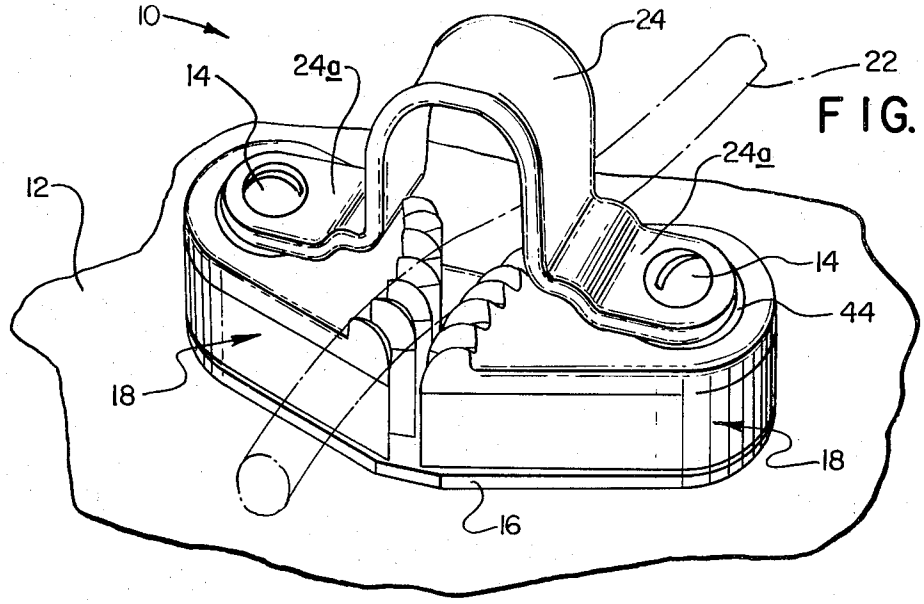

10
14
24a
24
22
12
24a
14
44
18
18
16

FIG. 1

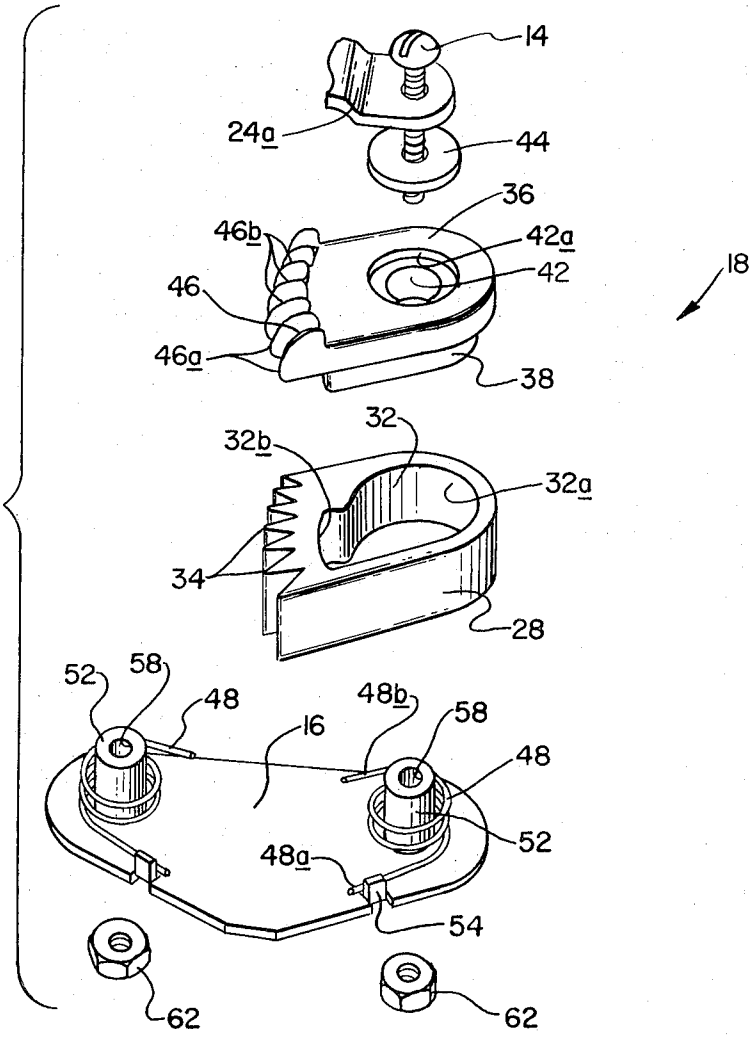

14
24a
44
36
46b
42a
42
18
46
46a
38
32
32b
32a
34
28
52
58
48
48b
16
58
48
52
48a
54
62
62

FIG. 2

CAM CLEAT

BACKGROUND OF THE INVENTION

This invention relates to boating fixtures. It relates more particularly to a cam cleat for securely retaining a line, the cleat also having a quick release capability.

Cleats of this type are used to a great extent to retain the sheet on a sailboat while cruising to relieve the sailor of the necessity of constantly holding the line. Basically, the cleat prevents the sheet from paying out in response to additional tension on the boom, yet permits it to be drawn in by the sailor in the event that the sail slackens when the wind shifts. Most cleats of this type also permit the sheet to be yanked up out of the cleat for quick release in the event that becomes necessary.

Until now, fixtures of this type have been quite expensive to manufacture. This is because the cleat components, particularly the cams, have been constructed of stainless steel in order to withstand corrosion due primarily to salt water. Stainless steel is an expensive material to begin with. Furthermore, it is very difficult to machine. While the portions of the teeth which jam against the sheet to retain it are more or less regular, the teeth portions near the tops of the cams are specially shaped so that when the sheet is drawn down against the cleat and is moving in the preferred direction, the sheet will gradually spread the cams apart and be received between them. Consequently, in the case of conventional cleats, the formation of the specially shaped teeth has involved a time-consuming and costly machining operation.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a cam cleat which is less expensive than those presently available.

Another object of the invention is to provide a cam cleat which is rugged and reliable and has a relatively long, useful life.

Other objects will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the invention will be indicated in the claims.

In general, the cleat has two opposed toothed cams which are rotatively mounted on a base plate and biased toward one another by an internal spring arrangement. A line pulled down between the cam teeth and moved in a direction opposite the spring bias opens the cams to admit the line between them. However, the toothed cams jam against and grip the line when it tends to move in the opposite direction.

Each cam is comprised of an open-ended, stainless steel shell. The shell is machined with a set of straight-edged teeth which bite into the line to prevent it from paying out when the line is in the cleat.

Each cam also includes a special impact-resistant plastic insert which fits down into the top of the shell. The insert has a set of splayed teeth whose edges curve down and become contiguous with the teeth on that shell. Each cam is rotatively mounted on a base plate pedestal which projects up through the shell into an opening in the plastic insert, the pivot being a screw

turned down through the insert opening into the pedestal. A coil spring inside each shell is wound up between the base plate and that shell so that the two toothed cams are biased toward one another.

When the cleat is closed, the shell teeth engage. However, the insert teeth curve apart from one another creating a gap so that they can readily receive a line drawn down between them. The insert teeth are so arranged that they readily engage the sheet as it is drawn down and in the direction opposite the spring bias so that the line gradually spreads the cams apart and wedges down between them. Now any movement of the line in the opposite direction is opposed by the strong, stainless steel shell teeth which firmly bite into the line.

During entry of the line into the cleat, no appreciable stresses or abrasive forces are imposed on the insert teeth. Consequently, even though they are made of plastic, they do not suffer appreciable wear or chipping. On the other hand, the major working surfaces of the cleat which do encounter considerable stress and may be damaged by corrosion are well able to withstand these effects because they are made of stainless steel.

Thus, the subject cam cleat is rugged and reliable in use, yet it is less expensive to make than conventional cleats of this type. This is because it uses considerably less stainless steel. Further as to its stainless steel shells, the requisite teeth being straight and regular can be formed by a relatively straightforward machining operation. On the other hand, the inserts which have the specially shaped entry teeth are formed easily using conventional molding techniques.

BRIEF DESCRIPTION OF THE DRAWING

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view of a cam cleat embodying the principles of this invention; and

FIG. 2 is an exploded perspective view on a larger scale showing the elements of the cam cleat in greater detail.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to FIG. 1, of the drawing, the subject cam cleat shown generally at **10** is bedded down in a sturdy structural component of the boat indicated at **12** by means of screws **14.**

The cleat is comprised of a base plate **16** which supports a pair of opposed toothed cams **18.** Both cams are rotatively secured to plate **16** by means of the screws **14** so that they oppose one another.

Cleat **10** retains a line **22** between cams **18** so that the line can be pulled in, i.e. downwards in FIG. **1,** but cannot move in the opposite direction. However, the sheet can be pulled out from between the cams (i.e. out of the plane of the drawing) in the event that quick release of the line becomes necessary for one reason or another.

In a preferred embodiment, a U-shaped bracket **24** is provided which is secured to the tops of the cams by the screws **14** extending down through the bracket ears **24***a*. Thus, the line can slide through the bracket when

it is not retained by the cleat; yet, if its end is knotted, it cannot escape the reach of the sailor.

Referring now to FIG. **2**, cams **28** are mirror images of one another so, for purposes of this description, we will describe only the right-hand cam in detail. It is comprised of a generally elliptical open-ended shell **28** made of stainless steel or other comparable strong, corrosion-resistant material. An opening **32** through the shell has a major portion **32***a* which is substantially cylindrical. A leg **32***b* branches off from opening portion **32***a* in a direction generally parallel to the long axis of the shell. The outside wall of the shell adjacent leg **32***b* is machined so that it is softly curved and has a set of transverse straight, regular, wedge-shaped teeth **34.** These are the teeth which retain the line **22** when the cleat is in use.

Each cam **18** includes an insert **36** molded of a suitable strong impact-resistant plastic such as nylon. Insert **36** has a depending boss **38** which is comparable in size and shape to opening **32** in shell **28** so that the boss can be press-fit into opening **32.** Insert **36** is formed with a through opening **42** which is concentric with opening portion **32a** when the insert is in place within the shell. Further, the opening is counter-bored at **42***a* to accommodate a washer **44.**

Still referring to FIG. **2,** the end of insert **36** which is directly above teeth **34** is formed with teeth **46,** the number of such teeth being equal to the number of teeth in shell **28.** The lower portions **46***a* of teeth **46** are more or less the same shape as teeth **34.** However, the upper portions **46***b* of those teeth are rounded. Furthermore, their shape or pitch is such that they present somewhat smooth rounded surfaces to the line **22** when the line is being drawn in.

During assembly of the cleat, a coil spring **48** is engaged over a pedestal **52** secured to plate **16.** The lower end **48***a* of the spring is retained by a small tab **54** projecting up from the plate. The shell **28** with its insert **36** is then engaged over the pedestal **52** so that the upper end of the spring **48***b* engages against the wall of opening **32.** Next, the washer **44** is placed in counter-bore **42***a* and the screw **14** is passed down through a passage **58** in pedestal **52** and plate **16.** Then, a nut **62** is turned down onto screw **14** below the plate to secure the cam to the plate.

A similar spring **48,** pedestal **52,** tab **54,** screw **14,** washer **44** and nut **62** are provided on the opposite side of plate **16** to retain the other cam **18.**

When both cams are in place as shown in FIG. **1,** they are free to pivot in opposition to the bias provided by springs **48** (i.e. downward in the figure) so that their teeth spread apart to accommodate line **22.** Since the teeth **46** on insert **36** are specially shaped to present smooth, relatively even surfces to the line moving in this direction, there is no undue wear or abrasion of that member, yet the line is able to wedge down between the two sets of teeth **46** so as to gradually open the cams and situate itself between them. During this entry process, there are no unusually high stresses applied to the inserts **36** either. On the other hand, once the line **22** is in place between the cams **18,** any movement of the line in the opposite direction causes the cam shells **28** to jam together and chock the line.

While the cleat construction described above results in a considerable reduction in manufacturing cost as compared to prior cleats of this type, the fitting is quite rugged. Yet, since its main working surfaces which receive the most abuse are constructed of stainless steel, or other comparable strong, corrosion-resistant material, the cleat has a long, useful life.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described.

I claim:

1. A cam cleat comprising

A. a base,

B. a pair of opposed cams pivotally mounted on the base, each said cam being composed of

1. an open-ended shell made of a corrosion-resistant material, the opposed faces of the shells having sets of straight teeth, and

2. an insert made of a hard, impact-resistant material positioned in each shell, each insert having teeth corresponding in number to those on the associated shell, the lower portions of the insert teeth being straight and contiguous with the corresponding shell teeth and the upper portions of the insert teeth being rounded,

C. means for pivotally mounting the cams in spaced-apart relation on the base, and

D. means for biasing the two cams toward one another so that their shell teeth oppose one another.

2. The cam cleat defined in claim **1** wherein the insert teeth are formed to present a toothed gap to a line moving between the two sets of insert teeth in a direction opposite the spring bias direction so that the line tends to wedge between the insert teeth and thereby open the cams to receive the line.

3. The cam cleat defined in claim **1** wherein the mounting means include

A. a pair of spaced-apart pedestals

1. affixed to the base,

2. projecting up through a shell, and

3. being rotatively received in the corresponding insert, and

B. means for rotatably securing each cam to the corresponding pedestal.

4. The cam cleat defined in claim **3** wherein the biasing means include a coil spring

A. engaged around each pedestal inside the corresponding cam shell, and

B. reacting between the base and the cam to swing the cam about its pivot toward the other cam.

5. The cam cleat defined in claim **1** wherein each shell is made of stainless steel and each insert is made of nylon.

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