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Bowers

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[54] **LINE GRIPPING DEVICE**

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[52] **U.S. Cl.** ..... **24/136 R**

[51] **Int. Cl.** **F16g 11/00**

[58] **Field of Search** ..... 24/136 B, 126 C, 24/263 SW, 263 A, 263 DM, 249 DP

[56] **References Cited**

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Primary Examiner—Paul R. Gilliam
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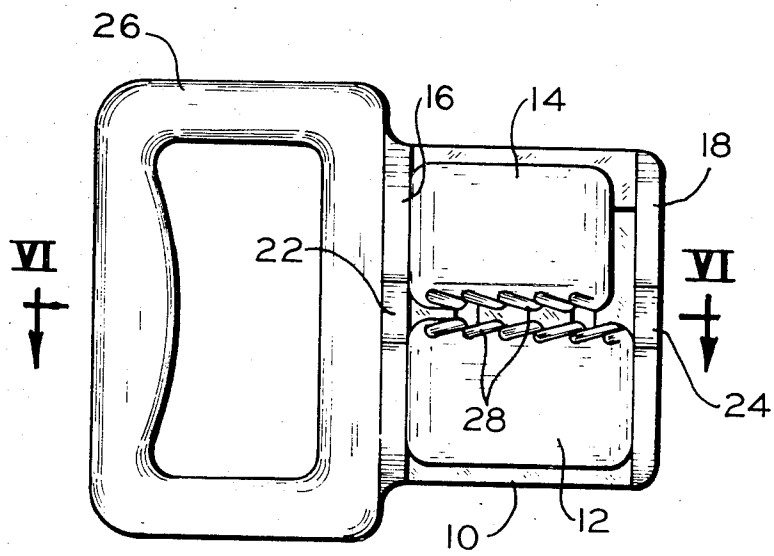
[57] **ABSTRACT**

This disclosure pertains to a line gripping device such as a rope puller, a wire puller, or a cleat. The line gripping device utilizes both the camming and the jamming action. More particularly, the disclosure illustrates a handle attached to a base with a first jaw member adjustably but firmly attached to the base. A second jaw member is mounted on the base adjacent the first jaw member with the gripping teeth of the jaw members spaced apart a sufficient distance to permit a rope to be inserted therebetween. The second jaw member is mounted for movement toward and away from the first jaw member by a cam-follower arrangement so that the first and second jaw members are constantly maintained in a parallel relationship. Accordingly, tension on a line placed between the jaws causes a camming operation to force the jaws together to grip the line while the angular relationship of the teeth causes the line to be jammed between the jaws. In another embodiment of the disclosure, the jaws are mounted on a base which is secured by screws to a deck of a vessel so as to form a combination jam-cam cleat.

4 Claims, 7 Drawing Figures



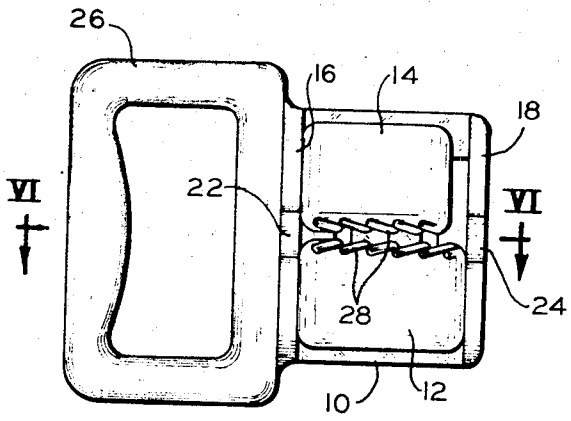


FIG. 1

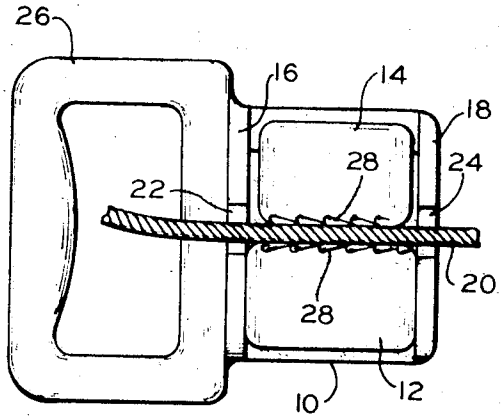


FIG. 2

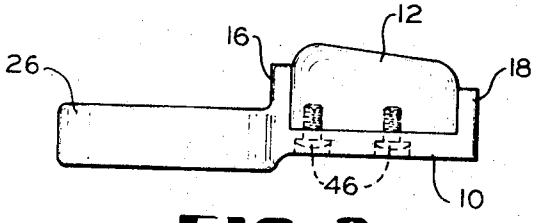


FIG. 3

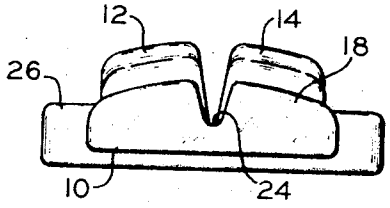


FIG. 4

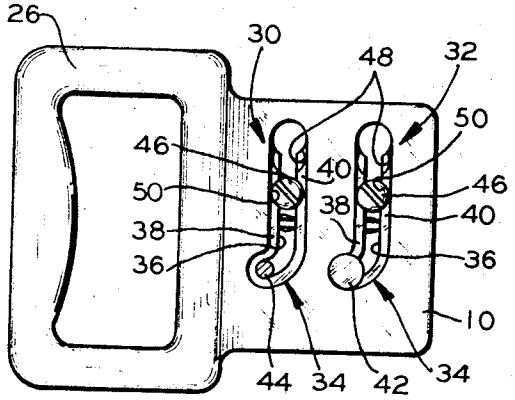


FIG. 5

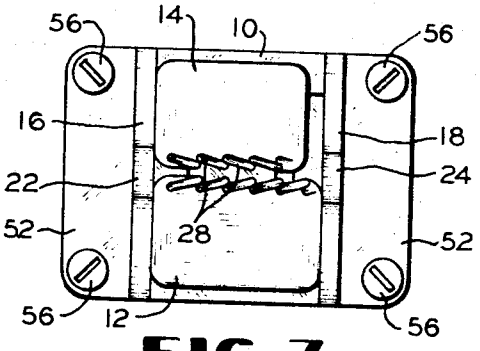


FIG. 7

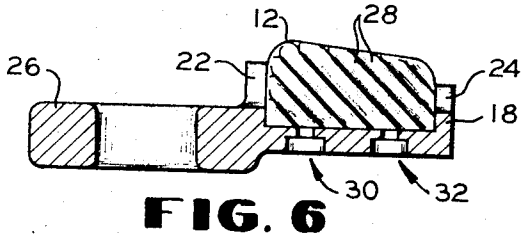


FIG. 6

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LINE GRIPPING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of this invention is line gripping devices such as a rope gripping device for marine use, a wire puller, or a deck cleat.

2. Description of the Prior Art

The prior art devices can be basically segregated into two groups. First, cam cleats or wire grippers such as P. B. Shea U.S. Pat. No. 2,836,870, issued June 3, 1968 and the J. G. Judd U.S. Pat. No. 1,520,716, ussued Dec. 30, 1924. In these devices, one or more eccentrically mounted wheels are provided with teeth and are rotated to cam a rope between the eccentrically mounted wheel and a stationary member or between two eccentrically mounted wheels. Second is the jam cleat such as that shown in U. S. Pat. No. 3,574,900. The jamming cleat utilizes a pair of walls shaped in cross-section in a V so that a rope pulled between the walls is jammed to the bottom of the V to hold the rope securely.

WIth the cam cleats and the wire grippers, merely point contact is established between the cams and a line so that extreme pressure is placed on the line to the extent that the line itself may be severed. On the other hand, the jamming cleats do not operate to hold and release the line easily and thus are not completely satisfactory.

SUMMARY OF THE INVENTION

It is an object of this invention to provide the best features of both the camming and the jamming cleats.

It is another object of this invention to provide parallel motion of one jaw member with respect to the other so as to establish full line contact between the jaws and the line.

A further object of this invention is to provide a line gripper or jam-cam cleat which is easily operable both to grip the line as well as release the same when tension is released.

Another object of this invention is to provide a simple structure with few parts which can withstand loads not heretofore possible.

The invention comprises a first jaw member having a gripping means adapted to cooperate with the gripping means on a second jaw member. Means is provided for mounting the second jaw member for movement toward and away from the first jaw member while maintaining the jaw members in a parallel relationship so that a line between the jaw members is gripped the full length of the jaw members.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the line gripping device embodying this invention with the jaws in their fully separated position;

FIG. 2 is a plan view similar to FIG. 1 with the rope positioned between the jaws with the jaws positioned in their closed relationship;

FIG. 3 is a side elevation view of the line gripping device shown in FIG. 1 with the jaw adjusting screws shown in phantom;

FIG. 4 is an end elevation view of the line gripping device shown in FIG. 1;

FIG. 5 is a bottom view of the line gripping device shown in FIG. 1 with the head of one of the cam followers cut away;

FIG. 6 is a cross-sectional view taken along lines 6—6 of FIG. 1; and

FIG. 7 is a plan view of another embodiment of this invention showing the concept as a deck cleat.

DESCRIPTION OF THE PREFERRED EMBODIMENT

First Embodiment (FIGS. 1–6)

Referring more particularly to the drawings, the invention comprises three basic parts; a mounting base **10**, a first jaw member **12**, and a second jaw member **14**. The base member **10** is of generally rectangular configuration and has a pair of upstanding end walls **16** and **18**. The end walls **16** and **18** have V-shaped slots **22** and **24** which act as guides for a line cable or rope **20** as best illustrated in FIG. **2**.

Formed integral with the mounting base member **10** is a handle **26**. The handle **26** is conventional in nature with an opening through which the fingers may be placed.

The jaw members **12** and **14** are each of generally rectangular configuration with the jaw member **12** having a length substantially equal to the distance between the end walls **16** and **18** of the base member **10**. On the other hand, the second jaw member **14** has a length somewhat smaller than the distance between the end walls **16** and **18** so that the second jaw member **14** can move into engagement either with the end wall **16** or the end wall **18**. The inner faces of the jaw members **12** and **14** are spaced relative to each other and slope toward each other so as to form a V which, as viewed in FIG. **4**, has a separation slightly smaller than the V-slots **22** and **24** provided in the end walls **16** and **18** of the base member.

Means is disposed on the inner faces of the jaw members **12** and **14** for gripping the line or cable adapted to be positioned therebetween. More particularly, a series of ridges and grooves **28** are provided on the inner faces of jaw members **12** and **14** and extend the entire length thereof. As best shown in FIG. **6**, the grooves slope from the upper lefthand corner of the jaw member **14** to the lower righthand corner thereof at an angle to the base of approximately **45** degrees. The ridges and the grooves on the jaw member **12** are similarly sloped so as to be in alignment with the ridges and grooves on the second jaw member **14**.

To mount the jaw members **12** and **14** to the mounting base member **10**, a pair of parallel slots **30** and **32**, as best seen in FIG. **5**, are provided on the under surface of the mounting base **10**. The slots **30** and **32** are similar in configuration and each have a head portion and extend parallel to the end walls **16** and **18** for the greater portion of the width of the base member **10** and terminate in a camming curve tail portion **34**. Recessed within each of the slots **30** and **32** is a second slot **36** formed by shoulders **38** and **40**. The shoulders **38** and **40** extend substantially the full width of the slots **30** and **32** but terminate at the head portion thereof. Accordingly, the heads **42** (only one shown in FIG. **5**) of cam followers **44** which extend downwardly from the bottom of the jaw member **14**, may be inserted in the head portion of the slots **30** and **32** and slipped along the slots toward the tail portion thereof. As is apparent in FIGS. **5** and **6**, the neck of the cam followers **44** are ac-

commodated within the second slot **36** formed by the shoulder **38** and **40** with the head portion **42** of the cam follower resting on the shoulders so as to be retained within the slots **30** and **32**

As a next step, the heads of the pair of screws **46** projecting downwardly from beneath the first jaw member **12** are inserted in the head portion of the slots **30** and **32** and likewise slid along the slots to their desired location with the necks of the screws being accommodated within the second or recessed slot. To fix the position of the first jaw member in its desired location on the base **10**, a pair of circular seats **48** and **50** are provided on the shoulders **38** and **40** in each of the slots **30** and **32.** When the screw heads **46** are positioned in the desired location, such as in seats **50**, the screws are then tightened to fixedly secure the first jaw member **12** in its desired location on the base.

In operation, the line gripping device is grasped by the handle **26** and a rope, line or cable **20** is disposed between the first and second jaw members **12** and **14** as well as in the V-slot guides **22** and **24** in the end walls **16** and **18.** Tension on the cable **20** causes the teeth formed by the ridges and grooves **28** in the jaw members **12** and **14** to grasp the cable. Such tension causes the cam followers **44** to automatically move along the camming curve tail portion **34** of slots **30** and **32** to effect movement of the second jaw member **14** towards the end wall **18** and, at the same time, towards the first jaw member **12.** It should be noted that, due to the parallel relationship of the slots **30** and **32,** the faces of the jaw members **12** and **14** are maintained in a parallel relationship so that the cable **20** is grasped along the entire longitudinal length of the jaw members **12** and **14** to firmly grip the cable in a non-cutting manner. Furthermore, the ridges and grooves **28** provided on the faces of the jaw members **12** and **14** cooperate with the convolutions on the cable **20** and, due to the angularity of the ridges and grooves, force the cable towards the bottom of the V formed by the positioning of the first and second jaw member with respect to each other providing a jamming effect.

Upon release of the tension on cable **20,** the jaw member **14** is free to move back towards the end wall **16** and away from the jaw member **12** through movement of the cam followers **44** around the camming curve tail portion to the end thereof as shown in FIG. **5.** Thus, the gripping device may be moved entirely away from the cable or merely slid along the cable to firmly establish another gripping operation for pulling the cable.

Should the cable or rope to be gripped by the line gripping device vary substantially in size from that shown, it is merely necessary to loosen the screws **46** and move them along the second slot **36** from circular seat **50** to circular seat **48.** This has the effect of moving the first jaw member **12** from one fixed position relative to the base and to the second jaw member to another fixed position upon retightening of the screws **46.** Thus, it is apparent that the V groove established by the positioning of the first and second jaw members may be varied as desired.

Second Embodiment (FIG. 7)

Referring now to the second embodiment of the invention which is shown in FIG. **7,** like reference numerals have been used to designate parts similar to those shown in the first embodiment of the invention. Accordingly, a first jaw member **12** is provided on a base member **10** with end walls **16** and **18** having V-shaped slots **22** and **24** to guide the position of the rope or cable. A second jaw member **14** is adapted for movement relative to the first jaw member in a parallel relationship similar to the first embodiment. However, instead of the handle **26** as shown in the first embodiment, a pair of mounting extensions **52** and **54** project outwardly from the end walls **16** and **18** and are provided with apertures to receive screws **56** (four in this instance). Accordingly, the base member **10** may be secured through the mounting extensions **52** and **54** to a deck or other similar structure by the screws **56.** A rope or cable may then be positioned between the jaws **12** and **14** and tension upon the same will cause a gripping of the rope through the camming and jamming effect previously described. Thus it is apparent that this invention has ready application as a cleat.

While only two embodiments of this invention have been shown and described it is apparent that there may be many changes in structure and operation without departing from the scope of this invention as defined by the appended claims.

What is claimed is:

1. A line gripping device comprising: (a) a base member, (b) a first jaw member fixedly mounted to said base member and having an angularly disposed face with alternate ridges and grooves disposed at an angle on said face, (c) a second jaw member disposed on said base in juxtaposed relation to said first jaw member and having an angularly disposed face with alternate ridges and grooves disposed at an angle on said face, (d) said faces of said first and second jaw members being spaced apart to form a generally V-shaped opening into which a line to be gripped may be easily guided, (e) said base member and said second jaw member having a pair of cooperating cam follower-cam slots thereon with said cam slots being parallel to each other and having angular paths whereby said second jaw member is mounted on said base for free movement toward and away from said first jaw members in a parallel relationship, (f) said alternate ridges and grooves causing said second jaw member to automatically move toward said first jaw member when tension is applied to a line between the jaws and causing automatic movement away from said first jaw member upon relaxation of tension to release said line, (g) said V-shaped slot permitting easy ingress and egress of said line while tension on the line tends to force the line to the bottom of the V to increase the grip on the line, said cam slots extending generally perpendicular to said faces of said first and second jaw members and having a portion of their path varying from the perpendicular.

2. A line gripping device according to claim **1** wherein said cam slots are recessed within said base member and accommodate the mounting means for said first jaw member to secure said first jaw member in a selected position in said cam slots to adjust the initial spacing between said first and second jaw members.

3. A line gripping device according to claim **1** wherein said base member is provided with end walls between which said first and second jaw members are mounted and wherein said end walls are provided with guide means to facilitate positioning of the line between said jaw members.

4. A line gripping device according to claim **3** wherein a handle is secured to said base member adjacent one of said end walls to facilitate moving said line gripping device into and out of contact with a line.

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