Sept. 6, 1966 T. S. HOLMES 3,270,494

SNAP-EYE

Filed March 30, 1964

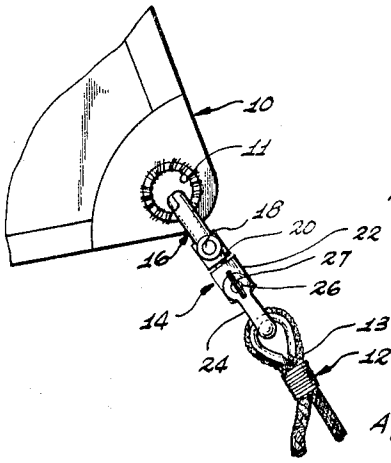


Fig. 1

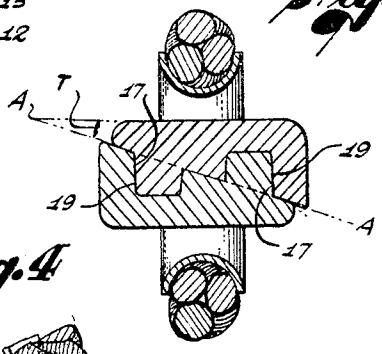


Fig. 3

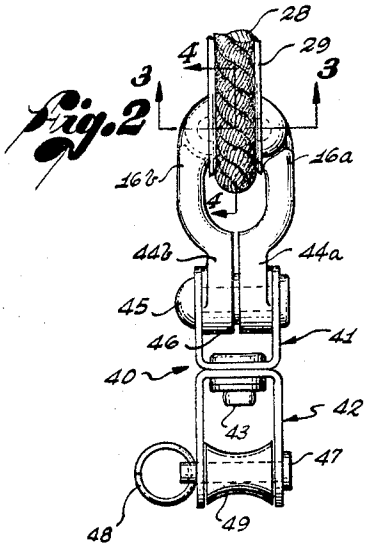


Fig. 2

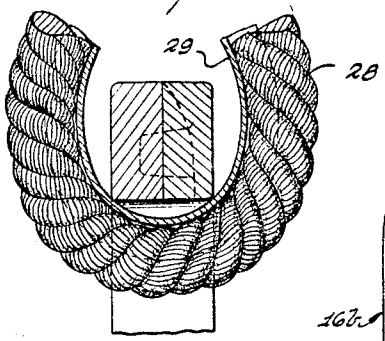


Fig. 4

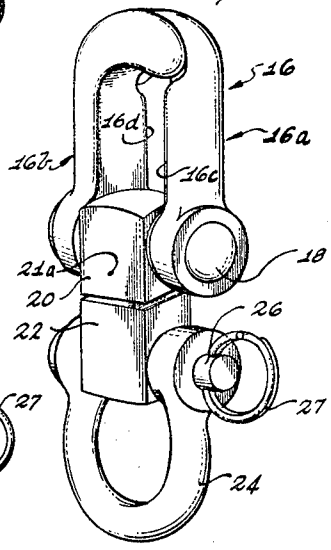


Fig. 7

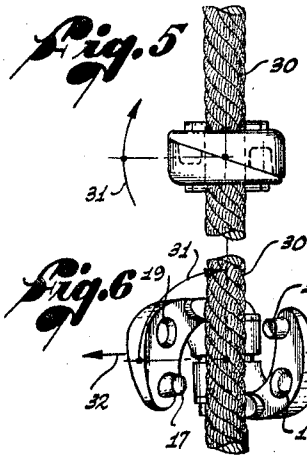


Fig. 5

Fig. 6

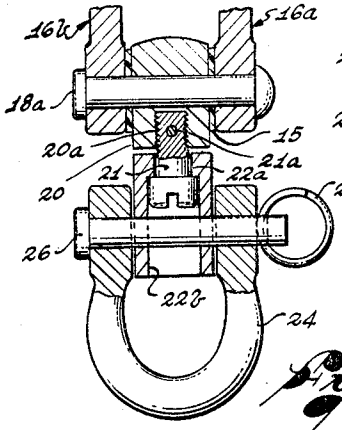


Fig. 8

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SNAP-EYE

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This invention relates generally to marine hardware and more particularly to quick-release snaps and shackles used on halyards, sheets, guys, lifts, and the like of small sailboats.

Shackles heretofore available for the purposes above listed have had the distinct disadvantage of not being readily engageable and disengageable particularly with one hand. The old sailor's adage "one hand for the ship and one for yourself" is particularly applicable in the handling of rigging in racing sailboats where sheets, guys, topping lifts and the like must be frequently changed during the course of a race. These operations must be performed quickly, positively and often with only one hand.

Another disadvantage of prior devices of this type is that they have usually included sliding bolts or catches that are relatively prone to damage or corrosion such as to cause them to jam and become virtually inoperable.

Still another disadvantage of prior snap shackles of the class described is that they are often designed with projecting bolts, handles, plungers or the like that increase the likelihood of the shackle fouling other lines or gear. Additionally, such structures are unsightly and detract from the shipshape appearance desired by yachtsmen.

It is a major object of the present invention to provide a quick release shackle which is readily attached to, and detached from an eye or line with the use of only one hand.

It is another object of the invention to provide a shackle of the class described for the interconnection of rigging parts which is symmetrical and streamlined so as to avoid snagging and fouling other lines, and to present a pleasing appearance.

A still further object of the invention is to provide a strong completely symmetrical shackle having two identically shaped parts relatively inexpensive to manufacture, and in which the tension and bending stresses are equally divided between the two principal parts of the shackle.

Yet another object of the invention is to provide a shackle of the class described in which attachment and detachment of the shackle requires a minimum of slack in the lines connected thereby, and in which tension in such lines tends to hold the shackle closed.

The foregoing and additional objects and advantages will appear from the following description of two presently preferred embodiments of the invention, such description being illustrated by attached drawings in which:

FIGURE 1 is an elevational fragmentary view of a shackle embodying the present invention as employed to attach a sheet to the clew of a sail;

FIGURE 2 is an elevational view of a slightly modified form of the shackle of my invention shown attached to an eye and thimble of a rigging line;

FIGURE 3 is an enlarged horizontal section taken on the line 3—3 in FIGURE 2;

FIGURE 4 is an enlarged vertical section taken on the line 4—4 in FIGURE 2;

FIGURES 5 and 6 are operational views showing the attachment and detachment of the shackle to the standing part of a line;

FIGURE 7 is an enlarged perspective view of the shackle shown in FIGURE 1; and

FIGURE 8 is an elevational section through the longitudinal axis of the device shown in FIGURE 7.

Referring now to the drawings, a presently preferred embodiment of the invention is illustrated in FIGURES

1, 7 and 8, attached to the clew cringle of a sail **10**, and will be seen to include a closable eye or snap shackle portion **16** secured through a swivel assembly **14** and a conventional shackle **24** to the eye **13** in a two-part jib sheet **12**.

The snap shackle **16** is comprised of two identical hook-shaped jaws **16***a* and **16***b* disposed in mating opposition to form a closed eye, each being pivotally secured to a hinge block **20** by a common hinge pin **18**. The pin **18** is secured in place by riveting, as indicated at **18***a* in FIGURE 8, or by other suitable means. A pair of washers of fiber or similar semiresilient material are inserted between the respective jaws **16***a* and **16***b* and the hinge block, so as to frictionally resist swinging movement about the pin **18**, thus to hold the jaws **16***a* and **16***b* in any relatively closed (see FIG. 5) or open (see FIG. 6) position to which they have been moved. The securing of the pin **18** is just tight enough to provide the light frictional resistance just described without preventing the manual swinging of the jaws to open and closed position.

As can be seen best in FIGURE 3, the jaws **16***a* and **16***b* are tappered in width toward their distal ends so as to meet at an obliquely disposed lapping or scarf joint line A—A (FIG. 3).

The taper angle of each of the jaws (indicated at T in FIG. 3) is relatively acute so that the abutting surfaces of the respective jaws extend entirely across the loop formed when the jaws are closed. Thus any member to which the shackle is attached is, when tension is applied, in pressure contact with *both* the jaws.

To strengthen the jaws they are each increased in vertical cross section adjacent the joint surface A—A as can be seen in FIGURE 7. Additional strength of the closed snap shackle formed by the jaws **16***a* and **16***b*, is provided in that each of the latter is formed with a stud **17** and a socket **19**, each adapted to receive the complementary stud or socket of the other jaw. The interfitting studs and sockets prevent relative slipping movement of the jaws **16***a* and **16***b* along the joint surface A—A when the shackle **16** is closed, and thus strengthen the closed loop by preventing the jaws from "unbending" and causing elongation of the shackle under tension stresses.

In FIGURE 4 the snap shackle **16** is shown secured to a conventional spliced eye **38** containing a conventional metal thimble **29**. The portions of the snap shackle shown in FIGURE 4 may be considered as illustrative of both forms of the invention shown and described herein since the portion shown in FIGURE 4 is the same in each form.

As can be seen most clearly in FIGURE 4, the cross-sectional shape of the shackle **16** viewed in a longitudinal plane through the joint surface A—A is rectangular so that the tension forces applied by a loop (e.g., the thimbled eye **28–29**) to which the shackle is attached, are applied at spaced points, i.e., the corners of the rectangle. The effect of the last described arrangement when used with a conventional attachment such as the eye **13** is to apply an inward closing force to the opposed jaws **16***a* and **16***b* as long as tension is applied between the shackle and element to which it is attached.

Although the snap shackle **16** provides a strong secure attachment as long as tension is applied, the shackle may be quickly and easily released once such tension is relaxed. Such operation is illustrated in FIGURES 5 and 6 wherein the shackle is shown attached and detached, respectively, from a line **30**, shown here as a shroud, stay or other straight line or member. Release of the snap shackle **16** is accomplished by rotating the entire assembly about its longitudinal axis, as indicated by the arrow **31** in FIGURES 5 and 6, which presses the longitudinal inner edges **16***c* and **16***d* (see FIG. 7) of the jaws against the line **30** and forces the jaws **16***a* and **16***b* away from each other as indicated by arrows **32** in FIGURE 6.

Attachment of the snap shackle **16** is just the reverse of the detaching operation described above. The open jaws **16***a* and **16***b* are placed over the member to which the snap shackle is to be attached and the entire assembly is rotated in the direction opposite to that indicated by the arrow **31** and at the same time the jaws are pressed together to contact and engage the studs and sockets along the joint surface A—A.

In order to prevent unintended release of the snap shackle **16** during momentary slackening in the tension in the line which it secures (e.g., sheet **12**), a swivel assembly is preferably included in assemblies wherein torsional forces are likely to occur, such as those due to twisting and untwisting of conventional rope lines during variations in the tension therein.

The swivel assembly of the form of the invention shown in FIGURE 1 is shown in more detail in FIGURE 8. Here it is seen that the hinge block **20** which carries the jaws **16***a* and **16***b* is in turn pivotally secured to a bored and counterbored pivot block **22** by a longitudinally disposed cap screw **21** received in a threaded bore **20***a* in the block **20**. The clearance of the bore and counterbore **22***a* and **22***b* in the pivot block **22** is such that the block **22** may rotate freely about the screw **21**. The screw **21** is locked in place in the hinge block **20** by any suitable means such as a small pin **21***a*.

Semi-permanent attachment of line to the snap shackle assembly is made by a conventional shackle **24** secured to the swivel block by a transverse shackle pin **26** retained by a spring wire ring **27**.

The alternate form of the invention illustrated in FIGURE 2 is designed for use in relatively light rigging, such as that used in small racing sailboats. In the alternate form, a swivel assembly **40** is employed which comprises a pair of bail-like sheet metal members **41** and **42**, positioned back-to-back and pivotally secured together by a longitudinally disposed rivet **43**. The degree of upset of the rivet **43** is such that the members **41** and **42** are free to rotate about the axis of the rivet.

In the alternate form of the invention (FIG. 2), the jaws **16***a* and **16***b* are formed at their proximal ends with aligned, transversely bored shanks **44***a* and **44***b* which are received between the arms of the bail-like member **41**. A hinge attachment between the jaws **16** and the member **41** is provided by a rivet **45** positioned in the bores in the shank **44** and which is just tight enough to permit the relative hinging movement of the jaws **16**. A single fiber washer **46** between the shanks **44***a* and **44***b* provides the desired frictional resistance to the opening and closing of the jaws **16** as previously described.

Conventional means comprising a cross pin **47**, retainer **48** and thimble **49** are provided for semi-permanent securing of the shackle to a line.

Operation of the alternate form shown in FIGURE 2 is precisely the same as that described with respect to the first form.

While the devices shown and described herein are fully capable of achieving the objects and providing the advantages hereinbefore stated, it will be appreciated that they are illustrative only. Therefore, I do not mean to be limited to the specific forms of the invention shown and described above but rather to the scope of the appended claims.

I claim:

1. A snap shackle comprising in combination:

a pair of hook-shaped jaws disposed in side-by-side relation in a common plane facing in opposite directions and with abutting surfaces of distal portions normally in overlapping mutual contact to form a closed loop, said distal portions being tapered toward the distal ends thereof so that said abutting surfaces form a joint surface oblique and at an acute angle to said common plane;

interfitting projections and recesses formed in said surfaces of said jaws to prevent relative motion of said jaws along said joint surface;

hinge bearings formed in said jaws adjacent the proximal ends thereof, said bearings being aligned on a transverse axis in said common plane;

a hinge pin received in said bearings to permit relative swinging movement of said jaws by manual manipulation to separate said contacting surfaces, open said loop, and permit attachment or detachment of said shackle;

and means secured to said hinge pin for attaching said shackle to a line.

2. The construction of claim **1** further characterized in that said last-named means includes a swivel adapted and disposed to permit relatively free rotation of said shackle about the longitudinal axis of a line to which it is attached.

3. The construction of claim **1** further characterized by having friction means interposed between said jaws adjacent said hinge bearings to yieldably resist said relative swinging movement and yieldably retain said jaws in either open or closed position.

4. A snap shackle comprising in combination:

a pair of hook-shaped jaws disposed in side-by-side relation in a common plane facing in opposite directions and with abutting surfaces of distal portions normally in overlapping mutual contact to form a closed loop, said distal portions being tapered toward the distal ends thereof so that said abutting surfaces form a joint surface oblique and at an acute angle to said common plane, said jaws having at a point substantially midway along said joint surface, a substantially rectangular cross section in a plane transverse to said common plane whereby tension forces applied by an eye member to which said shackle is attached by interlinking said jaws therewith are applied at spaced points in said respective jaws applying an inward closing force thereto;

interfitting projections and recesses formed in said surfaces of said jaws to prevent relative motion of said jaws along said joint surface;

hinge bearings formed in said jaws adjacent the proximal ends thereof, said bearings being aligned on a transverse axis in said common plane;

a hinge pin received in said bearings to permit relative swinging movement of said jaws by manual manipulation to separate said contacting surfaces, open said loop, and permit attachment or detachment of said shackle;

and means secured to said shackle adjacent said hinge means for attaching said shackle to a line.

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