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**Sailing glove**

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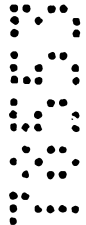
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(56) Related Art  
**US 5625900**  
**US 4497072**  
**US 5117509**

## SAILING GLOVE AND LINE COMBINATION

### Abstract of the Disclosure

A sailing glove and line combination in which the gripping surfaces of the glove are composed of a porous artificial leather fabric and the fabric is treated with a tackifying agent. The glove and line have an average static coefficient of friction of 0.65 to 0.75, to improve gripping power, and the tackifying agent improves the wear quality of the glove.



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COMPLETE SPECIFICATION

STANDARD PATENT

APPLICANT: HARKEN, INC.  
NUMBER:  
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Invention Title: SAILING GLOVE

The following statement is a full description of this invention,  
including the best method of performing it known to me:

## SAILING GLOVE AND LINE COMBINATION

### Background of the Invention

This invention relates a sailing glove for handling lines on sailing vessels.

Sailing gloves have been traditionally constructed of leather, with reinforcing pads on the palms and fingers. These gloves tend to become stiff after repeated wetting and drying. Thick, heavy leather is employed, since soft leather tends to wear out quickly.

More recently, artificial leather has been used as a component in sailing gloves. Artificial leather is typically composed of microfine polymer fibers such as nylon, with the fibers being interfelted by mechanical entanglement such as by needling, with the resultant nonwoven being impregnated with a cured polyurethane resin to bond the fibers together. These gloves have about the same gripping power and wear rate of natural leather but also have the added benefit of remaining soft after being wetted and dried.

Recent advances in sailing products have led to advances in technology relating to the lines or sheets which control the sails. For example, lines are made from high tensile polymer strands having low elongation, and allow for a smaller diameter line to be used. These lines also tend to have a slippery surface, making them difficult to grip and control.

Heretofore, sailing gloves have had only a single purpose, and that is to prevent chafing of the skin of the palm and fingers of the hand. The ability to

hold a line against an opposing force, such as the sheet of a sail, has been determined solely by the strength and endurance of the sailor. In many cases, sheets are held by hand, rather than cleated, to enable quick sail adjustments, and fatigue becomes an important factor especially in cold conditions.

### Summary of the Invention

In accordance with the present invention, the gripping surfaces of a sailing glove are provided with a high coefficient of friction relative to the sailing line. Specifically, the gripping surfaces are tackified to provide a coefficient of friction of from about 0.6 to about 0.9 relative to the line. Surprisingly, this has been found to increase the gripping power of the sailor and glove up to 50% over untreated gloves without affecting the ability to smoothly release and regrip the line.

The exposed palm and finger portions of the sailing glove are composed of porous artificial leather which has been treated or impregnated with a tackifying agent, such as a short chain polyurethane or tackifying resin. The material remains soft after repeated wet and dry cycles, and the wear properties are approximately the same as an untreated artificial leather.

### Brief Description of the Drawings

Figure 1 is a plan view of the sailing glove of the present invention, shown in connection with a section of line.

### Description of the Preferred Embodiments

Figure 1 illustrates the palm side of a sailing glove 10 in combination with a line 12 to be grasped when the glove is used. The forces on the line act generally in the direction indicated by the arrow 14, namely, perpendicular to or across the palm and fingers.

As used herein, the term "line" means a intertwined or braided and flexible rope-like structure composed of polymeric strands, such as polyester, aramid, polyamid or polyolefin polymers, sometimes having an outer textile cover. Lines on sailing craft are normally used to control the trim of sails or the rigging.

The palm 16, thumb 17, and inner finger portions 18 of the glove are lined with a thin layer of artificial leather 19 as shown, held to the fabric of the glove by stitching, such as that shown at 20, or by other type of bonding. As is typical of many sailing gloves, the ends of the finger portion of the glove may be cut away as shown at 22.

Artificial leather is a commercially available material sold under the trademark Amara. Preferably, porous types of artificial leather are employed. Such materials are made from a nonwoven substrate of short microfine nylon or other polymer fibers which are formed into a web by carding and cross lapping. The web is then needled with barbed needles at a high rate to entangle the fibers. The fabric is then impregnated with a polyurethane resin and the resin is coagulated. Various techniques are employed to provide a

porous surface, such as application of a solvent, as described in U.S. patent no. 5,156,900, incorporated herein by reference.

A tackifying resin or polymer is incorporated into the artificial leather. Flexible, elastomeric tackifying agents are preferred, such as short chain polyurethane, incorporated at a rate of five to twenty percent of the weight of the substrate. The agent may be dissolved in a solvent for this purpose. The actual amount of tackifying agent employed depends on the nature of the agent, with the only qualification being that the coefficient of friction between the material and the line 12 must fall within the ranges specified herein.

Both the static and dynamic coefficients can be determined by a simple test using the treated artificial leather from the glove and engaging the material on a support with the line 12. The preferred method is to mount a piece of the treated material on a drum, with the line 12 being looped over the supported material for approximately 180 degrees. The static coefficient of friction is calculated from the maximum force required to start the line moving against various amounts of weights or loads on the line. The dynamic coefficient of friction is calculated by measuring the amount of force required to move the line at a constant speed under increasing amounts of load. Both measurements can be made by inserting a load cell on one side of the drum and applying weight to the other side.

It has been found that the static coefficient of friction between the glove material and the line is critical and must be between 0.6 and 0.9 and the

average coefficient should be between about 0.65 and 0.75. The dynamic coefficient between the line and glove material should be in the order of 0.6 to 0.9 with the average in the order of between about 0.6 to 0.75. Within these parameters, the glove 10 will provide up to 50% improved gripping power on the line 12, while allowing the line to be easily released and regripped.

Artificial leather gloves without a tackifying agent generally have a static coefficient of friction with the line of less than 0.5 and an average dynamic coefficient of less than 0.4.

A variety of other types of materials have been tested, including a number of fabrics having rough surfaces. All other materials proved to be unsatisfactory either because of low gripping power or excessive wear.

Despite the higher coefficient of friction afforded by the present glove, the surfaces of the glove in contact with the line exhibit a high wear rate, which is approximately the same as the same untreated artificial leather glove having a lower coefficient of friction with the line. The wear rate from a line can be evaluated by running a line under load back and forth across a 180°expanse of material supported on a stationary drum. Without wishing to be bound by any theory, it is believed that the tackifying resin may serve to protect and reduce wear on the fabric substrate of the artificial leather.

What Is Claimed Is:

1. A sailing line and glove combination including a sailing line, a glove adapted to grip said line, said glove including artificial leather gripping surfaces, and a tackifying agent in said gripping surfaces, said gripping surfaces and said line having an average static coefficient of friction of between about 0.65 and 0.75.

2. The sailing line and glove combination of Claim 1 wherein said gripping surfaces and said line have a dynamic coefficient of friction of between about 0.6 to 0.75.

3. The combination of claim 1 wherein said artificial leather includes a nonwoven porous substrate.

4. The combination of claim 3 wherein said tackifying agent is a polyurethane resin.

5. A sailing line and glove combination, said combination including a line having an outer surface of polymer strands, and a glove adapted to grip said line, said glove including surfaces for gripping said line, said surfaces including a porous substrate of nonwoven fibers, and a polyurethane tackifying resin impregnated into said porous substrate, said surfaces and said line having a static coefficient of friction between 0.6 and 0.9.

6. A sailing line and glove combination substantially as herein described with reference to the Figure.

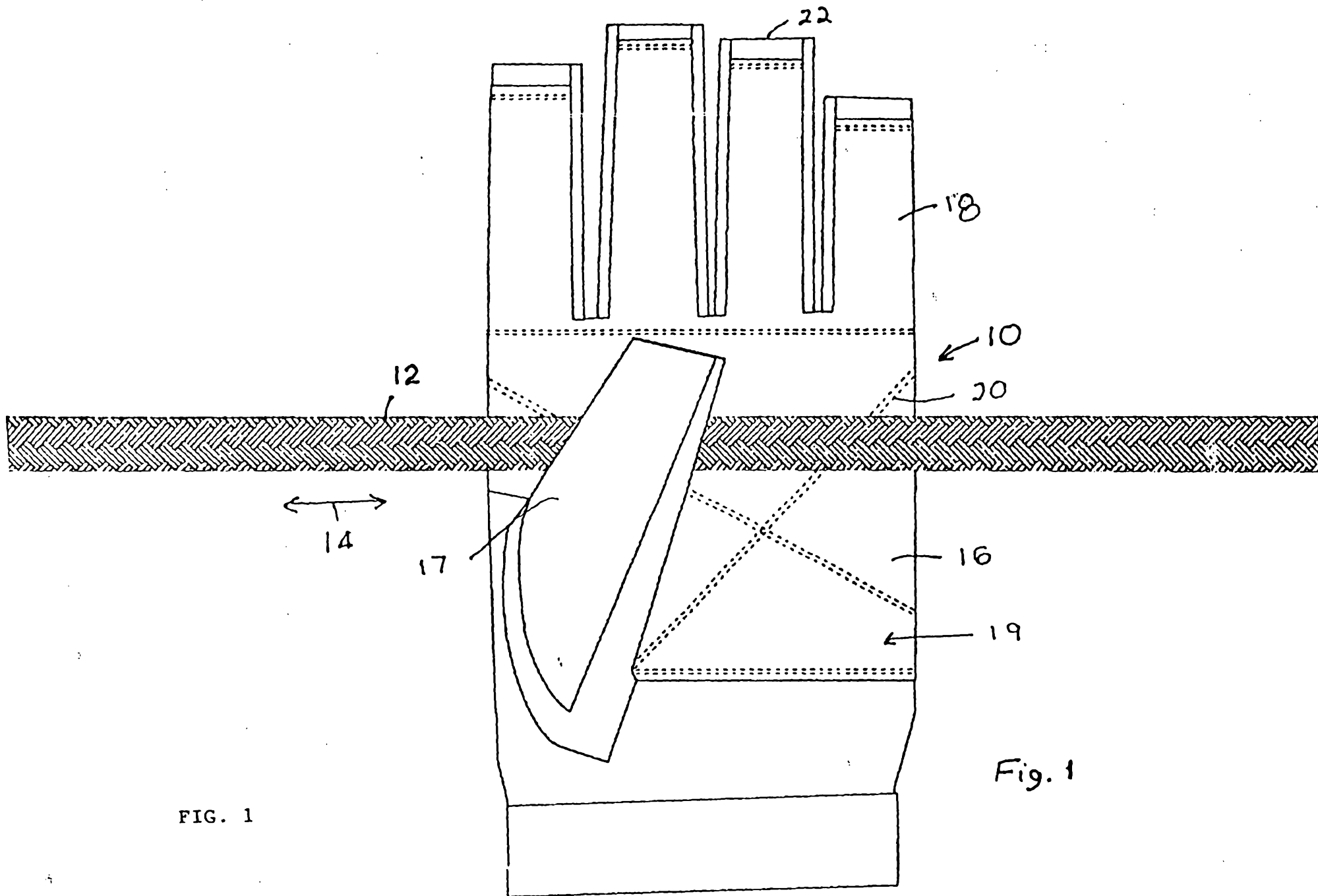


FIG. 1

Fig. 1

