March 11, 1952 M. L. NILSEN 2,589,203

REINFORCED SAIL

Filed Oct. 12, 1949 2 SHEETS—SHEET 1

Fig. 1

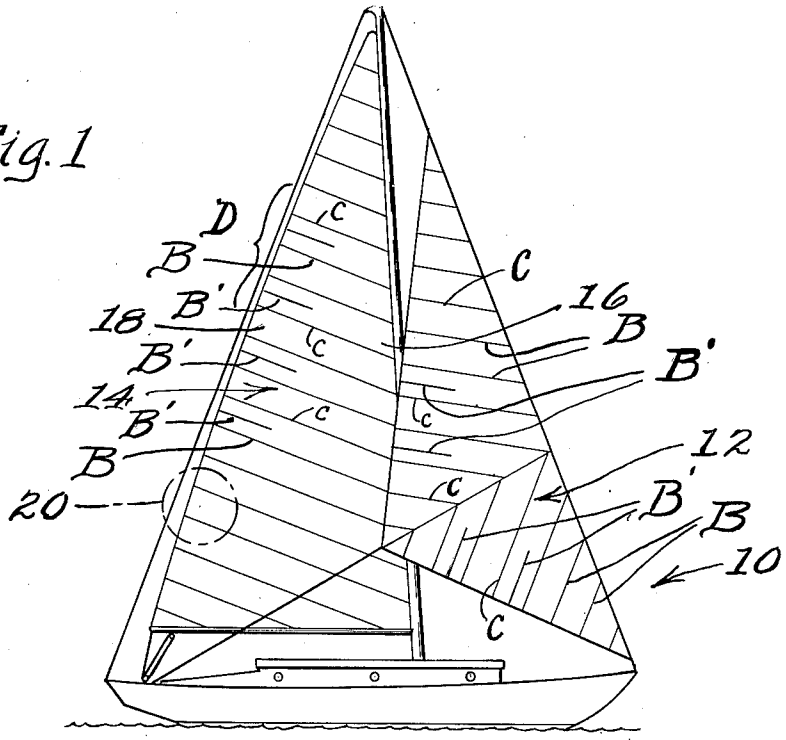


Fig. 2

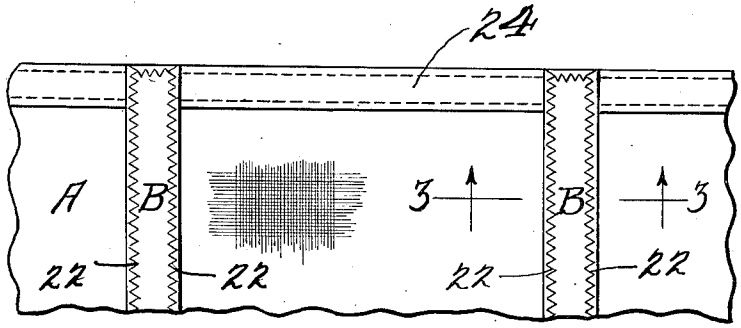


Fig. 3

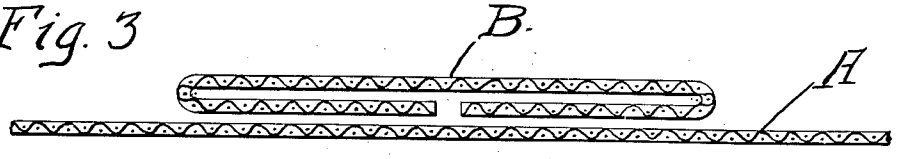
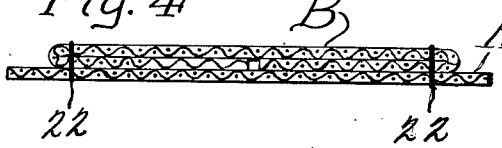


Fig. 4



INVENTOR.
Martin L. Nilsen
BY
Moore, Olson & Trexler
Attorneys

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Fig. 6.

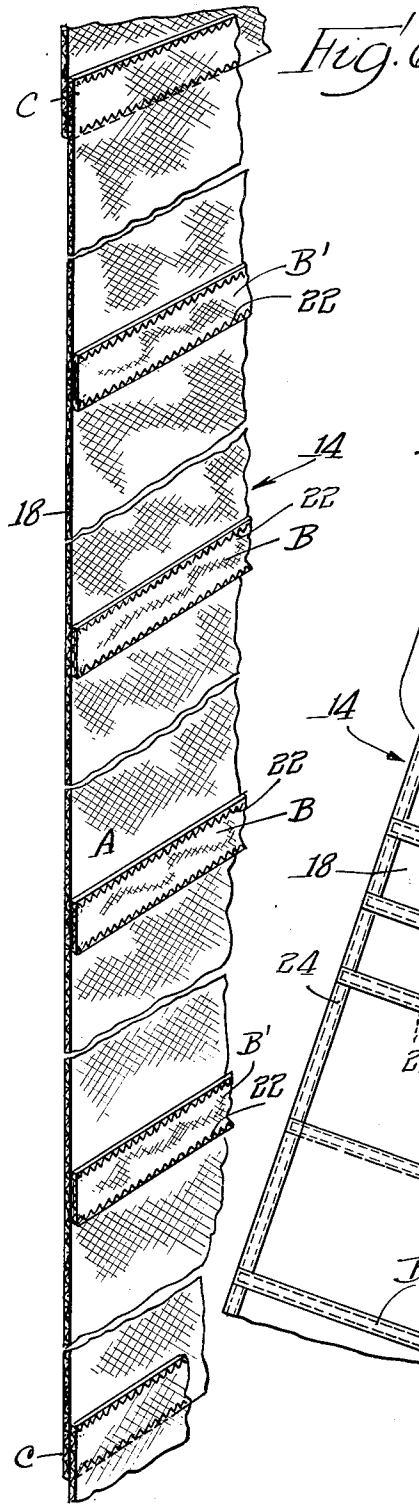
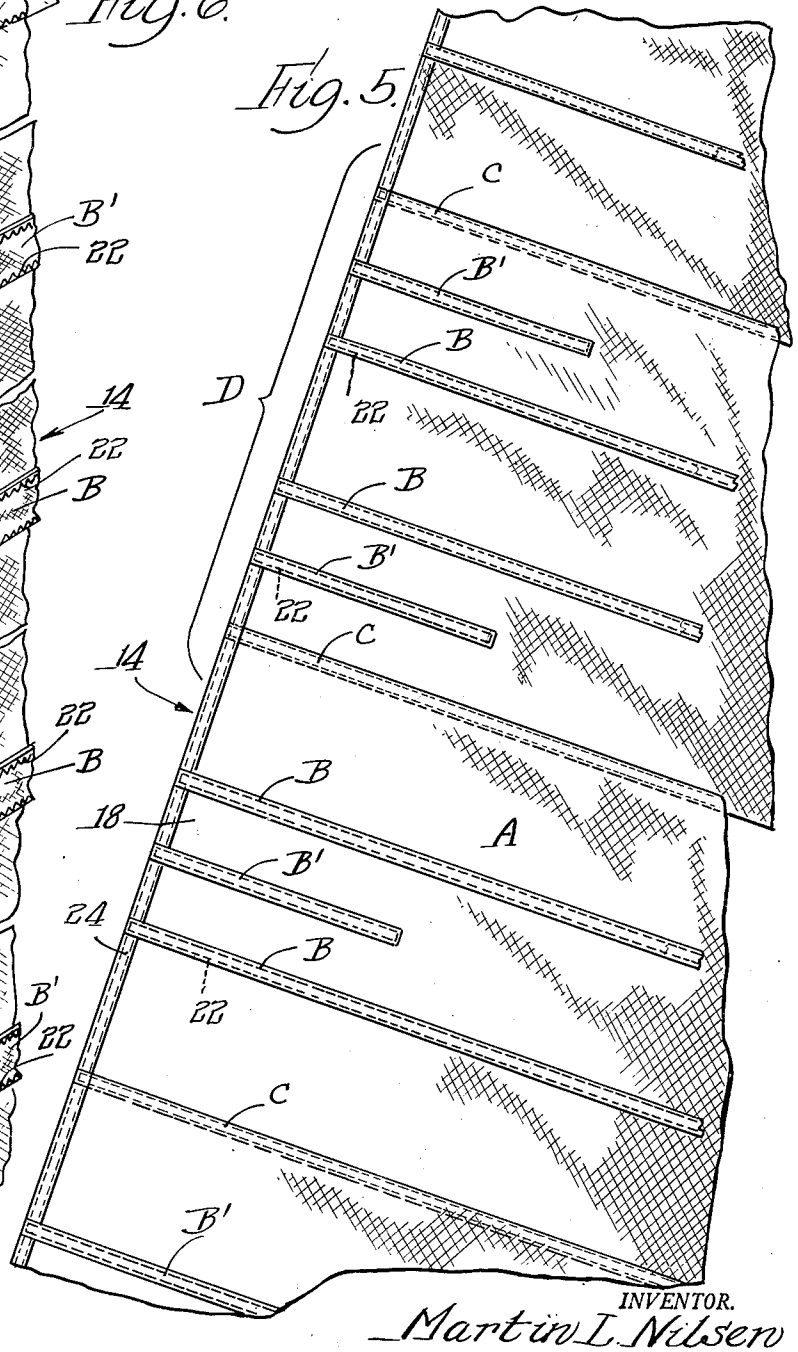


Fig. 5.



INVENTOR.
Martin L. Nilsen
BY
Moore, Olson & Treplin
Attys.

Patented Mar. 11, 1952

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REINFORCED SAIL

Martin L. Nilsen, Chicago, Ill.

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3 Claims. (Cl. 114—103)

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This invention relates generally to sail constructions and more particularly to a false seam structure which may extend partially or completely across the body of the sail.

In the manufacture of sails it has heretofore been common practice to employ fabric sections of a given width whose selvedges are secured in overlapping relation. Before these selvedges can be secured in overlapping relation it has been common practice to first provide false seams at spaced intervals by folding the fabric upon itself and then sewing or stitching these folded portions. Such folded over or tuck type false seams are employed to retain the flatness of the sail particularly when the sail is under severe strain. An ordinary piece of sail fabric when subjected to tension has a tendency to become wavy or undulated unless the aforesaid false seams are employed. In view of the fact that these false seams partake of the nature of a tuck or fold they must of necessity extend completely across the fabric sheet. That is to say, the tuck or fold cannot extend only part way because to do so would introduce unevenness in the sail surface. Also, it is not uncommon, as a result of severe tension stresses to which sails are commonly subjected, for these folded type false seams to loosen because under tension stresses the oppositely disposed folded edges have a tendency to pull away from the main body of the sail.

The leech of a sail, namely the trailing edge thereof, often requires more reinforcing than the luff or forward portion of the sail. However, present methods of producing false seams, as referred to above, preclude the possibility of incorporating false seams which extend only partially across the sail. It is an important object of the present invention to provide a false seam structure for a sail which may extend only part way across the sail, thereby enabling the application of additional relatively short false seams in the sail area subjected to the greatest tension stresses such as the leech area of the sail.

Heretofore it has also been necessary to form the folded or tuck type false seams in the sail cloth before the selvedges of the sail material are secured in overlapping relation and before the sail is cut to proper shape. The present invention contemplates a sail structure in which the overlapping connected selvedges as well as the cutting and shaping of the sail may be accomplished before the false seams are incorporated. To this end the invention contemplates a false seam structure in the form of fabric strips applicable to the sail after it has been cut and shaped to the

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desired design, thereby precluding the necessity of folding or tucking the sail fabric.

More specifically, the invention contemplates an extremely simple, economical and easily applicable reinforcing strip of any desired length which gives the appearance of a seam and yet enables the sail cloth to retain its original tensile strength, at the same time contributing the desired reinforcement to any selected area of the sail.

The present invention is particularly concerned with the provision of an improved sail of the fore and aft type, wherein means in the form of relatively narrow fabric reinforcing strips are employed to facilitate the maintenance of an aerodynamically advantageous sail body contour.

The foregoing and other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawing wherein:

Figure 1 is a side elevational view of a sailing vessel equipped with sails which are reinforced in accordance with the teachings of the present invention;

Figure 2 is an enlarged fragmentary elevational view of that portion of the mainsail of Figure 1 included within the dot and dash circle;

Figure 3 is a detailed, fragmentary, transverse, sectional view taken substantially along the line 3—3 of Figure 2 disclosing the reinforcing strip and associated body of the sail in separated relation for the purpose of more clearly illustrating the structural details thereof;

Figure 4 is a sectional view similar to Figure 3 disclosing the reinforcing strip and sail body sewed or stitched together;

Figure 5 is an enlarged view of the leech and mainsail to more clearly illustrate the manner in which the strips are stitched to complementary sail sections and the manner in which said sections are secured in overlapping relation; and

Figure 6 is an enlarged fragmentary perspective sectional view of that portion of the sail included within the bracket D of Figure 5.

Referring now to the drawing more in detail, wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that Figure 1 discloses a sailing vessel designated generally by the numeral 10 equipped with a jib 12 and a mainsail 14 which are constructed in accordance with the teachings of the present invention. The mainsail 14 includes a forward margin 16 known as the luff and an after margin 18 commonly known as the leech. The present invention is concerned pri-

marily with a novel and practical reinforced sail construction.

In order more clearly to illustrate the reinforced sail structure contemplated hereby, Figure 2 discloses an enlarged fragmentary elevational view of that portion of the leech area of the mainsail 14 which is included within the dot and dash circle 20 of Figure 1. The main body of the sail fabric is indicated by the letter A and reinforcing strips by the letter B. The reinforcing strips B consist of a strip of suitable sail fabric whose opposite edges are folded under as shown clearly in Figures 3 and 4. After these opposite margins of the strip have been so folded they may be stitched at 22 so as to firmly secure the strips B to the mainsail body A. Note that the outer extremities of the strips B are also stitched so as to provide a closed end. The margin of the leech 18 is usually folded over as at 24, Figure 2, to provide a strong finished edge in this vicinity. The dotted lines extending along the folded over portion 24 indicate stitchings.

From the foregoing it will be apparent that the reinforcing strips B may be of any desired length or width depending upon the requirements incident to its use. In Figure 1 the strips B of the mainsail 14 extend completely across the sail body. Experience has shown that the portion of the sail subjected to the most severe stresses in use is the leech area 18. Hence it may be desirable to apply additional relatively short reinforcing strips B' as clearly illustrated in Figure 1. In view of the fact that the main body of the sail cloth is not at any time subjected to folding or tucking, but only to the application of a fabric strip, the original tensile strength of the sail cloth is maintained intact.

Obviously the invention is applicable to sails generally. Thus in Figure 1 the jib 12 is provided with a series of reinforcing strips B some of which extend from the leech to the luff and other shorter reinforcing strips B' extending only a portion of the distance toward the luff.

Sails are conventionally fabricated by marginally connecting the selvaged edges of sail cloth which is available in various widths. It is not uncommon for a complete sail body to be made up of several widths of sail cloth, the selvage edges of which are stitched together. In the drawings as previously mentioned, the strips B and the shorter strips B' are stitched to a section or width of sail cloth. The opposite margins of this section designated by the letter C are stitched together in the conventional manner, as more clearly illustrated in the enlarged views of Figures 5 and 6. These marginal connections consist of a simple overlapping of the selvaged edges of the adjacent margins of the sail section. The present invention contemplates distributing the strips B or B', and in some instances both, in substantial parallelism with the overlapped margins of the sail sections intermediate the connected margins of one or more of said sections. Each of the strips is stitched to, and in flatwise flush engagement with, a complementary sail section. By this arrangement of strips, the tendency for the sail to become undulated when subjected to wind action is reduced to a minimum. In other words, the arrangement of the strips is such as to facilitate the maintenance of an aerodynamically advantageous sail body contour. The strips are relatively narrow and, in fact, conform substantially in width to the width of the overlap of the marginally connected sections.

As previously mentioned, the present invention

is particularly applicable to sails of the fore and aft type disclosed in the drawings. In each of the disclosed sails, the upper portions are conventionally known as the head and the lower portions adjacent the bottom margin are commonly referred to as the foot. The lower right corner of each sail is known as the tack and the opposite corner as the clew. As previously mentioned the forward margin of each sail is defined as the luff and the after margin as the leech. In the claims which follow these sails are defined by the above nomenclature commonly used by those skilled in the art of sailing.

It will be apparent from the foregoing description that the present invention provides a new and improved seam construction which will overcome many of the disadvantages heretofore experienced. Not only does the present invention provide a simple and inexpensive method of manufacture, but it also serves to reduce to a minimum waste material. Thus it is possible for the first time to reinforce sail cloth without folding and without tucking. In other words, the entire sail may be laid out to shape and size from the unfolded sheet material, and the reinforcing strips subsequently applied where needed. In certain sail constructions it is not necessary to extend the reinforcing seams completely across the sail body as previously pointed out. Heretofore in using the folded or tuck type false seam construction the entire width of the sail cloth was formed with a fold even though reinforcing was only necessary over a limited extent of the sail. In other words, the present invention limits the use of the total square footage of sail cloth to an unfolded sheet of fabric of the desired size and shape. Hence the amount of cloth used in fabricating the sail is held to an absolute minimum and yet strengthening thereof by the use of seams may be limited to those areas where reinforcement is necessary. It is of course essential that the reinforcing strips be secured as by stitching along the entire margin thereof both along the sides and the ends in order to present the most efficient reinforcement structure.

The present invention contemplates a sail structure in which the main body portion of the sail may be formed from a single sheet or section of fabric or a number of sections stitched together along their selvages. In other words, these sections forming the main body of the sail are substantially uniform in thickness before the reinforcing strips are applied, thus retaining the normal tensile strength of the sail body. As previously pointed out, this arrangement presents a sail structure of improved practical construction.

While for purposes of illustration certain specific sail structures have been disclosed, it will be apparent that other applications and modifications may be made without departing from the spirit and scope of the appended claims.

The invention is hereby claimed as follows:

1. A sail of the fore and aft type having a head, a tack, a clew, a leech, a luff, and a foot, said sail consisting of a plurality of smooth surfaced elongated sections of fabric of uniform thickness stitched together along overlapping elongated selvedged margins, said sections in the aggregate presenting a completely shaped sail body, relatively narrow fabric strips stitched to and lying in flush, intimate, flatwise relation against the sail body intermediate certain of said overlapping margins with the opposed longi-

tudinal margins of each fabric strip folded under a substantial amount to afford reinforcement, each strip positioned in substantial parallelism with said margins and extending substantially throughout the length of the complementary smooth surfaced fabric sail section to which it is stitched, the flatwise, intimate association of the undersurface of each strip with the adjacent smooth surface of its juxtaposed sail section and the aforesaid disposition thereof with respect to the sail body providing both reinforcement and a sail surface free of localized deformations when said sail body is under wind action.

2. A sail of the fore and aft type as set forth in claim 1, wherein additional like fabric strips of shorter length and parallel disposition are secured in flatwise, intimate, flush association with said sail sections and extend from the leech margin of the sail body toward the luff thereof for only a portion of the total length of said sail section.

3. A sail of the fore and aft type as set forth in claim 1, wherein the longitudinal edges of said folded-under margins of the strips are juxtapositioned.

MARTIN L. NILSEN.

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