

Jan. 29, 1929.

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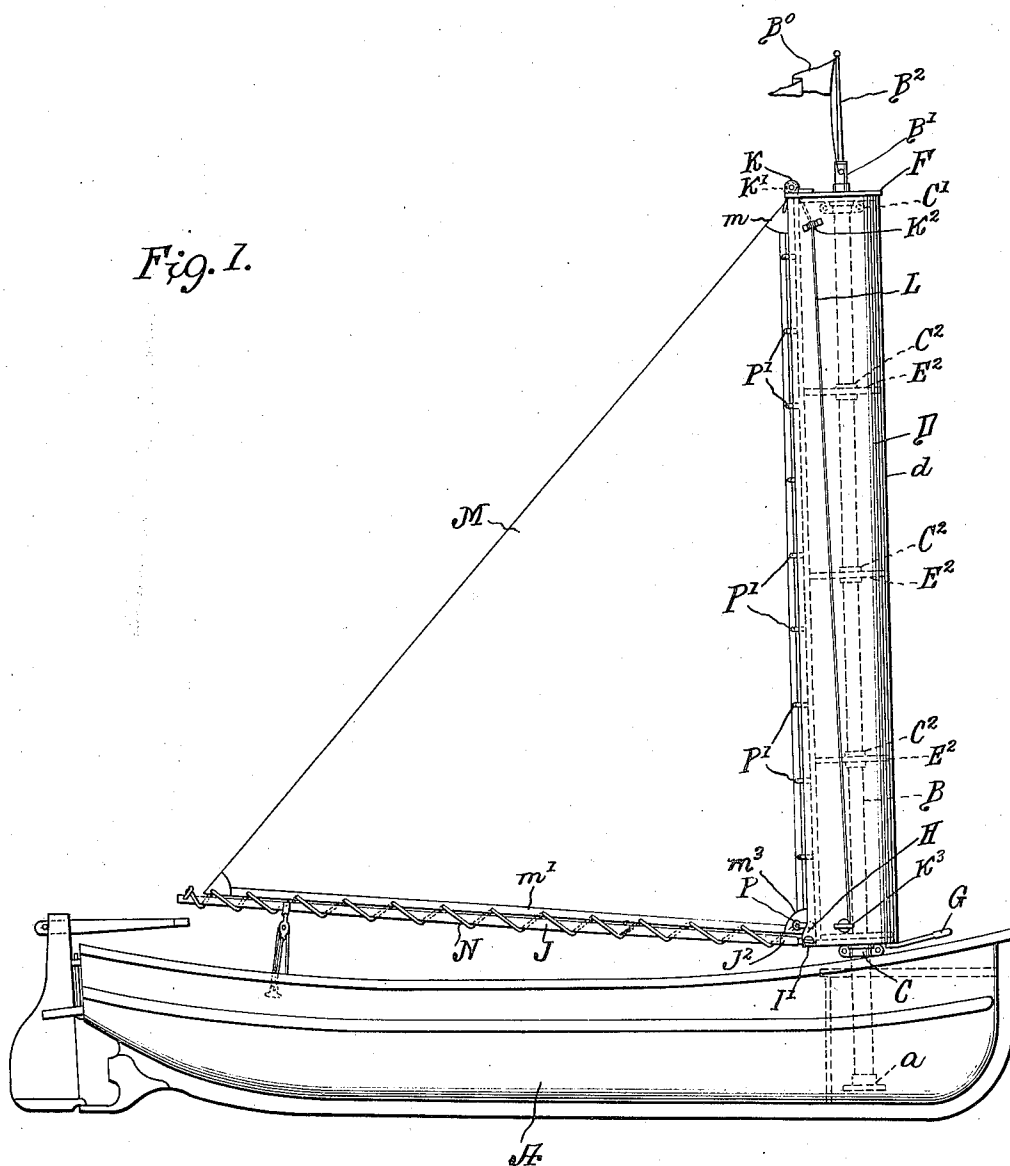
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STREAM LINE SAIL

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Fig. 1.



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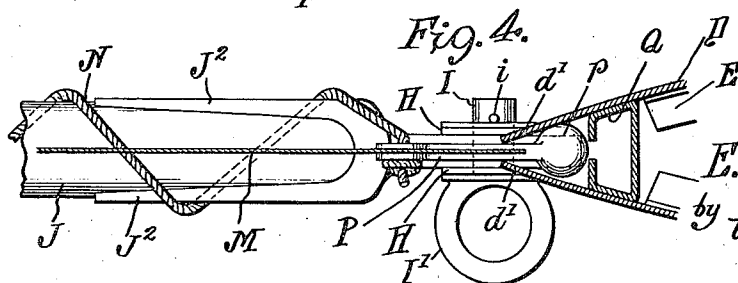
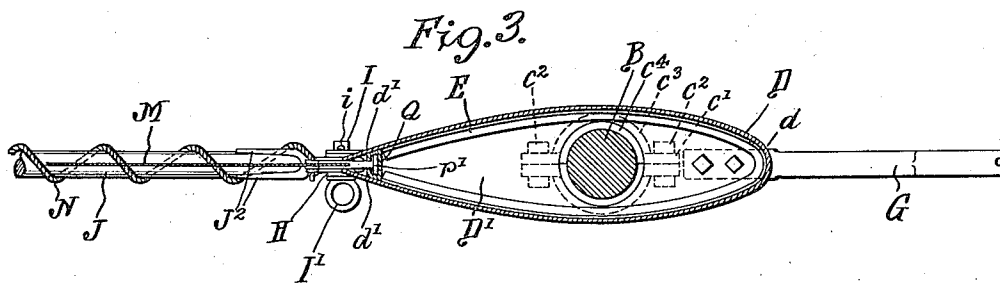
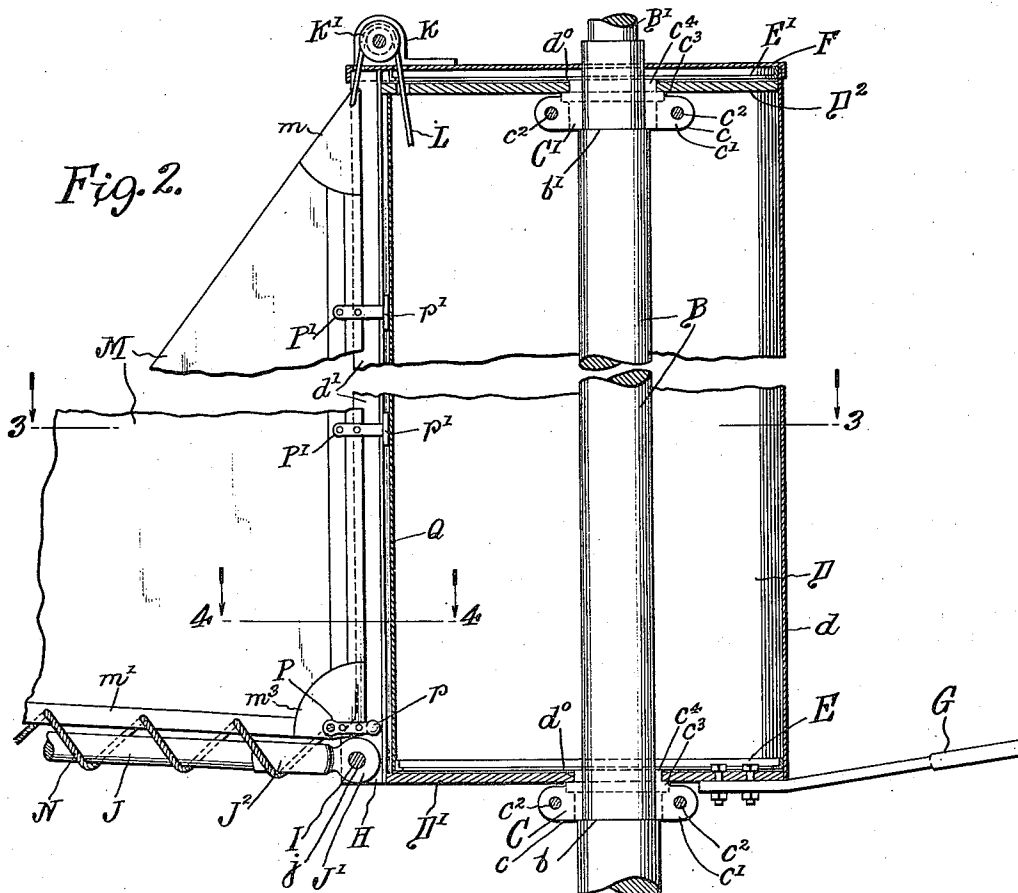
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STREAM LINE SAIL

Filed April 2, 1928

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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STREAM-LINE SAIL.

Application filed April 2, 1928. Serial No. 266,766.

My invention relates to improvements in stream line attachments to be pivotally attached to masts and to be connected to sails of the fore and aft type, so that the resistance of the mast to the wind in sailing to the windward will be materially decreased.

A number of years ago, it was noted that by applying a sharp pointed cap to the nose of an ogival headed projectile, the range of the projectile might be greatly increased due to the lessening of the resistance of the air, and a similar result has been accomplished by applying stream line shields to smoke stacks or masts of marine vessels and to the struts or other heavier parts of aircraft.

In sail boats moving to windward, the ordinary round mast presents considerable head resistance to the wind and causes eddy currents around the mast which impair the efficiency of sail and affect the air currents on the leading edge of the sail.

This action of the mast proper is often increased and accentuated by rings or other arrangements for attaching the sail to the mast, with the result that there is quite a material loss of efficiency in a sail boat beating to windward.

These objections are in a large measure obviated by the advantages contained in the construction hereinafter more fully described.

My invention will be more clearly understood after reference to the accompanying drawings, in which like parts are indicated by similar reference symbols throughout the several views, and in which,

Figure 1 shows an elevation of a sail boat carrying a leg of mutton sail and with the mast provided with the improved revoluble stream line attachment.

Figure 2 is a sectional elevation on a larger scale, showing parts of the mast and the stream line attachment, and illustrating the mode of attaching the sail thereto.

Figure 3 shows a section along the line 3—3 of Figure 2, and looking down, this section being on the same scale as that shown in Figure 2.

Figure 4 shows a section along the line 4—4 of Figure 2, the parts being shown on a larger scale than in the preceding figures.

A represents the hull of a sail-boat which may be of any suitable or preferred shape or construction. For convenience of illustration, I have shown a catboat with a single mast and sail, but obviously the number of masts may be increased and the size and shape

of the sail may be varied so long as a fore and aft said is used. B represents a mast circular in cross-section which may be of wood and solid, or of metal and hollow, as preferred. The base of this mast B is securely held in a suitable step *a* carried by the hull of the boat.

The mast above the deck of the boat is provided with an annular shoulder *b* shown in Figure 2, and towards the top of the mast another annular shoulder *b'* is provided. On these two annular shoulders, the supporting collars C and C' are held on which the stream line casing is supported, which will be hereinafter described.

These two collars C and C' preferably consist of two separable members *c* provided with lugs *c'*, and these members are clamped firmly to the mast by bolts *c''*. Each collar is provided with a bearing flange *c'''*, and with the journal bearing *c''''*. The stream line casing D has a top and bottom crossed by the partitions D' and D'', which are perforated as at *d*^o to permit the passage therethrough of the journal bearing *c''''* of the collars C and C', and thus the stream line casing is supported on these collars. While I have shown ordinary bearings, obviously ball bearings or other suitable bearings could be used upon which to mount the rotary casing. This casing is preferably of a stream line form as shown in Figure 3, and the front end is rounded slightly as at *d'*, the rear end being bifurcated as at *d''*. Suitable braces E and E' are provided at the top and bottom of the casing as shown in Figure 2, and intermediate braces, such as E² shown in dotted lines in Figure 1, may also be provided.

These braces are preferably in the form of angle irons in cross section as shown in Figures 2 and 4 and are secured in any convenient way to the interior of the casing as by welding, riveting or otherwise.

The intermediate braces E² may bear on collars C², as indicated in dotted lines in Figure 1, if desired, and thus a series of supports for the rotary frame are provided against lateral pressure. The upper end of the rotary frame may be closed by a cap F if desired, and above this cap, the mast may be reduced in diameter as at B', see Figure 1, and may terminate in the flag staff B² carrying a flag or pennant B³. For convenience in rotating the pivoted frame when desired, I provide a hand lever G, as shown in Figures 1, 2 and 3.

Where a boom is used, I may provide the

rear lower edge of the casing with reinforced brackets H, as shown in detail in Figure 4, and through which brackets the pin I passes. This pin may be provided with a suitable handle I' in the form of a ring for convenience in assembling, and it may be held in place by the lock pin i. The pin I passes through the eye j of the swivel bearing J' which has the yoked arms J² engaging the boom J, as shown in detail in Figures 2 and 4. Attached to the upper part of the rotary casing, I provide the bracket K in which the pulley K' is journaled, over which passes the halyards L for hoisting the sail. These halyards may consist of a rope or wire cable which is secured to the head m of the sail M, and passing over the pulleys K' and K² is secured to the cleat K³ near the bottom of the casing, as shown in Figure 1.

I have shown the sail M triangular, but obviously other forms may be adopted. The bottom edge m' of the sail is secured to the boom J in any convenient way as by the lacing N. The leading edge of the sail is connected to the rotary casing in such a way that the head of the sail may be raised or lowered, as desired. Various arrangements may be provided for so connecting the sail to the mast casing, and I have shown one method of accomplishing this, which will now be described.

P represents a guide, the rear end of which is attached to the sail, and the front edge terminates in a ball guide p, which is held between the ends d' of the curved plate D in rear of the channel way Q, see Figure 4.

This lower guide P is attached to the forward clew m³ of the sail, as shown in Figure 2. Above the guide P, I provide a series of other guides P', each having a T head p' engaging in the channel guide Q, see Figures 3 and 4. While I have shown ordinary T guides traveling in a channel guide way, obviously anti-friction bearings may be used if desired, but for small sails, such bearings will be unnecessary, as it will be entirely practicable to hoist the sail by pulling down on the halyards, and omitting any anti-friction arrangement.

Assuming the sail to be hoisted, and the parts to be in the position shown in Figure 1, in reaching to windward, the mast casing will form a continuation of the sail, and which will project not only to the rear of but also in front of the mast; and the stream line shape of the casing will not only very materially decrease the head or wind resistance, but will also eliminate any eddy currents around the mast and the sail, and will increase the efficiency of the sail as a motive power. The herein described construction also provides the location of the center of pressure on the sail closer to the mast than with other forms of sail now generally in use, with resulting advantages.

Furthermore, the sail, comprising in part the mast casing referred to, is very readily shifted in tacking or going about. Again the herein described arrangement provides a sail which may be very readily reefed, or part of which may be housed to meet increasing wind velocities, and in which the sail may be quickly restored to the initial condition. The invention primarily is intended to provide a mast attachment adapted for use in fore and aft sails, and in which the attachment comprises an important part of the sail itself, and obviously this attachment may be used with fore and aft sails of various shapes and I do not mean to limit this to the particular form of sail shown in the drawings.

It will be obvious that various changes might be made in the construction, combination and arrangement of parts, which could be used without departing from the spirit of my invention, and I do not mean to limit the invention to such details except as particularly pointed out in the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In a sail boat the combination with a mast of a casing revolubly mounted on said mast, the casing having its outer surface of stream line cross section, rounded in front and tapering to the rear, with an open vertical slot to the rear, a channel guide mounted in front of said slot, a fore and aft sail, means for slidably attaching the leading edge of said sail to said channel guide and means for hoisting or lowering the head of said sail.

2. In a sail boat the combination with a mast of a casing revolubly mounted on said mast, the casing having its outer surface of stream line cross section, rounded in front and tapering to the rear, with an open vertical slot to the rear, a channel guide mounted in front of said slot, a fore and aft sail, means for slidably attaching the leading edge of said sail to said channel guide, a boom pivotally connected to said casing, means for connecting the foot of said sail to said boom, and means for hoisting or lowering the head of said sail.

3. In a sail boat the combination with a mast of a casing revolubly mounted in said mast, the casing having its outer surface of stream line cross section, rounded in front and projecting in front of said mast and tapering to the rear of said mast, with a substantially vertical channel guide provided at its rear, a fore and aft sail, means for slidably attaching the leading edge of said sail to said channel guide and means for hoisting or lowering the head of said sail.

4. In a sail boat the combination with a mast of a casing revolubly mounted on said mast, the casing having its outer surface of stream line cross section, rounded in front

and projecting in front of said mast, and tapering to the rear of said mast, with a substantially vertical channel guide provided at its rear, a fore and aft sail, means for slidably
5 attaching the leading edge of said sail to said channel guide, a boom pivotally connected to said casing, means for connecting the foot of said sail to said boom, and means for hoisting or lowering the head of said sail.
10 5. A sail comprising a casing adapted to be revolubly mounted on a mast, the casing having its outer surface of stream line cross section, rounded in front and tapering to the rear, with an open vertical slot to the rear, a
15 channel guide mounted in front of said slot.

and a fore and aft sheet of textile fabric with means for slidably attaching the leading edge of said sheet to said channel guide.

6. A sail comprising a casing adapted to be revolubly mounted on a mast, the casing having its outer surface of stream line cross section, rounded in front and tapering to the rear, with an open vertical slot to the rear, a channel guide mounted in front of said slot, and a fore and aft sheet of textile fabric with
20 means for slidably attaching the leading edge of said sheet to said channel guide, and means for hoisting or lowering the head of said sail.
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