Aug. 15, 1950 H. M. CRANKSHAW 2,519,230

MAST AND SPAR OF YACHTS AND OTHER CRAFT

Filed April 19, 1946

Fig. 1.

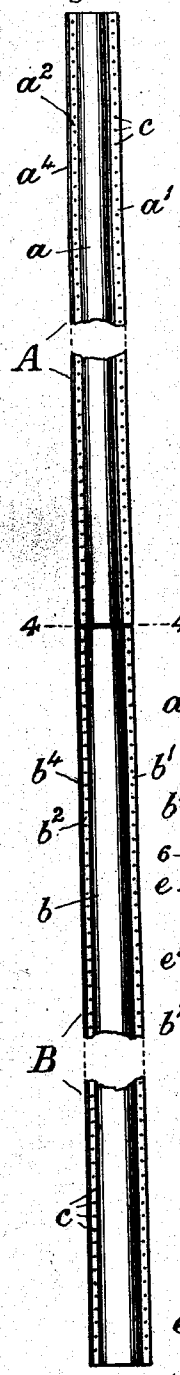


Fig. 2.

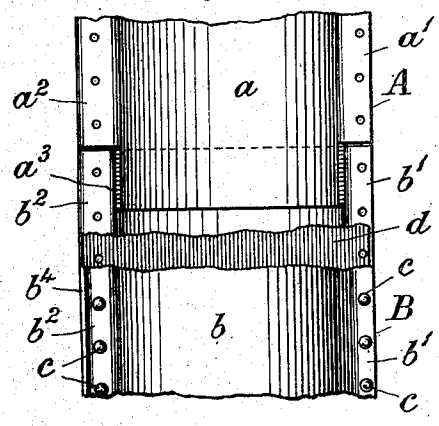


Fig. 3.

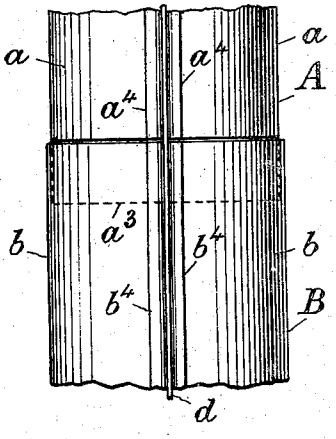


Fig. 4.

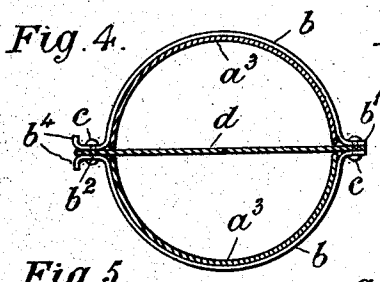


Fig. 7.

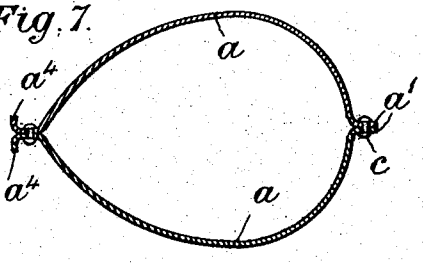


Fig. 5.

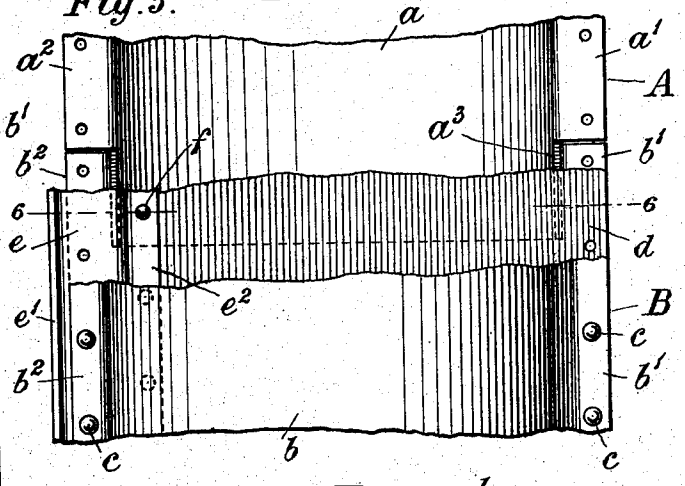
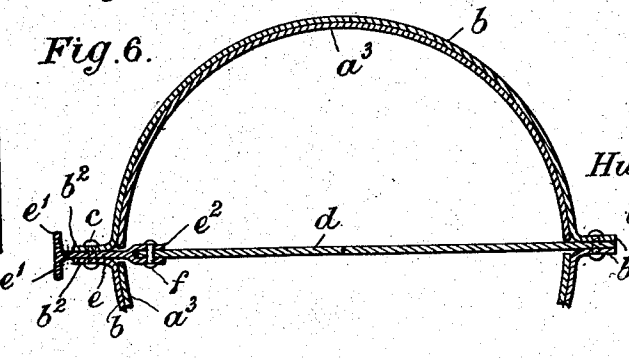


Fig. 6.



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MAST AND SPAR OF YACHTS AND OTHER CRAFT

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In Great Britain June 26, 1945

1 Claim. (Cl. 114—90)

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My invention is concerned with improvements in or relating to the masts and spars of yachts and other craft provided with sail, the said improvements having for their object to simplify and economise the manufacture of the said masts and spars and further to provide masts and spars which while being of ample strength are considerably lighter in weight than the masts and spars of equivalent length as ordinarily constructed.

My invention resides in a mast or spar characterised in that it is constructed from or incorporates a plurality of symmetrical and complementary parts or sections of a semi-tubular or channel-like formation which may be fabricated by rolling or pressing operations from plates or sheets of stainless steel or any suitable light metallic alloy or a plastic substance having the tensile strength and other properties requisite for withstanding the stresses to which such masts and spars are subjected in use, each semi-tubular or channel-like part or section being formed along its respective longitudinal edges with an outwardly directed flange-like part, the corresponding flange-like parts on the complementary sections being, when the sections are assembled to constitute the mast or spar, secured together by rivetting or by a welding operation.

In the application of the invention to masts the connected flange-like parts are disposed on the fore and aft sides of the mast when erected and along the after flanges of the semi-tubular or channel-like sections a runner or track is provided for the rings and tackle associated with the luff of the sail for its seizing and raising or lowering on the mast.

Where the mast or spar is of moderate length, say up to 30 feet, two only of the said semi-tubular or channel-like and complementary parts may be employed in its construction, but where the mast or spar exceeds 30 feet in length, or even if desired where it is of less length than 30 feet, it may be constructed from a plurality of tubular sections each constituted by a pair of the said flanged semi-tubular or channel-like complementary parts, the tubular sections requisite for obtaining the desired length in the mast or spar being assembled and connected end to end in axial alignment.

The complementary semi-tubular or channel-like parts may be so shaped in cross section as to produce a mast or spar having a circular or substantially circular figure in cross section and tapering from a maximum diameter at one end to a minimum diameter at its other end, that is

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to say, in the case of a mast from the head to the heel or foot thereof; or the taper formation of the said channel-like parts may be such that the mast or spar has a maximum diameter at or about the middle part thereof and tapers towards its respective ends.

Or instead of the cross sectional shape of the semi-tubular or channel-like complementary parts being such as to provide a mast of circular figure in cross section the cross sectional shape of the complementary part may be such as to provide a mast of other cross sectional shape.

A continuous plate, or a plurality of plates arranged end to end, may be interposed between the complementary semi-tubular or channel-like parts, the said plate or plates being disposed diametrically across the interior and extending preferably from head to heel, or end to end of the mast or spar and serving to give increased rigidity and strength to the structure.

My invention will be further and more particularly described with reference to the accompanying drawings as applied to the construction of a mast and wherein two tubular sections are comprised in the mast structure.

Figure 1 represents the mast in elevation, viewed from the starboard side, considerable portions thereof being broken away intermediate the top and heel, in consequence of the limitations imposed on the length of the sheet prescribed for the drawings.

Figure 2 is a similar view of a fragmentary portion of the mast with parts thereof hereinafter more particularly referred to, broken away.

Figure 3 is an after side elevation of a fragmentary portion of the said mast.

Figure 4 is a sectional plan on the plane indicated by the dotted line 4—4, Figure 1.

Figure 5 is a similar view to Figure 2 illustrating a further mast construction hereinafter more particularly described.

Figure 6 is a sectional plan on the plane indicated by the dotted line 6—6, Figure 5, the lower portion of the said Figure 6 being broken away.

Figure 7 illustrates a modification in the cross sectional shape of the semi-tubular or channel-like parts employed in the construction of masts or spars in accordance with my invention.

In the said drawings the two tubular sections comprised in the mast are denoted, in the elevational views, by the references A and B, the reference A denoting the upper and the reference B the lower section respectively of the structure.

Each of these tubular sections is constituted by two symmetrical and complementary chan-

nel-like parts marked in the respective sections with the references *a*, *a* and *b*, *b*, the said complementary parts being formed on their respective side edges with an outwardly directed flange, the flanges on the section A being denoted by the references a^1, a^2 and those on the section B by the references b^1, b^2.

These flanges may, as shown, be provided with perforations for the passage therethrough of rivets *c* whereby the two channel-like parts comprised in each section are secured to each other to form the tubular sections.

Alternatively, where the masts are, as is preferable, formed from metal, the securing of the two channel-like parts together may be effected by welding them at the flanged portions a^1, a^2, b^1, b^2, thereof.

The sections A, B taper gradually from their lower to their upper ends, the lower end of the section A being of a diameter proper to take and fit into the upper end of the section B and being adapted for this engagement by the cutting away of the lower end portions of its flanges a^1, a^2 so as thereby to leave an unflanged semi-tubular extension a^3 on each channel-like part *a*, these extensions a^3 when located in the upper end of the section B, being fixed therein by welding or riveting.

A split ring, not shown, may if desired be introduced into the lower end of the upper section A, the said split ring which serves to reinforce the mast structure at this junction of the tubular sections A, B, fitting against the inner periphery of the parts a^3 and being fixed thereto by riveting or welding.

The mast is erected with the flanges a^1, b^1 and a^2, b^2 disposed respectively on the fore and aft presented sides thereof.

The flanges a^2, b^2 on the aft presented side, as shown in Figs. 2 and 4, are made somewhat wider than the flanges a^1, b^1 on the fore side, and the said after side flange on each semi-tubular or channel-like section is curved or bent laterally outwards from the vertical longitudinal plane containing the axis of the mast, the said outwardly turned parts, marked a^4, b^4 on the respective sections *a*, *b*, co-acting to provide integral with the mast the runner or track for the rings and tackle associated with the luff of the sail for its seizing and raising and lowering on the mast.

A plate *d* is interposed between the symmetrical and complementary channel-like sections for the purpose of giving rigidity to the mast structure, the said plate being disposed in the middle longitudinal plane of the mast, its fore and aft edges, as shown in Figs. 2 and 4, being located between the fore and aft flanges respectively of the channel-like sections and being secured therebetween in the rivetting or welding operation employed for effecting the connecting together of the complementary channel-like sections embodied in the mast structure.

The reinforcing plate *d* may, if the length of the mast is not too great as to render it inconvenient or impracticable, be a continuous plate extending from the heel to the top of the mast or through any desired portion of the length of the mast, but when the length of the mast is such as to render the employment of a single or continuous plate inconvenient or impracticable a plurality of plates arranged end to end may be employed in the structure of the mast.

As shown in Figs. 5 and 6, the runner or track provided on the after side of the mast for the purpose specified, is formed as an integral part of

the mast by the incorporation in the mast structure of a bar *e* of metal or a suitable plastic substance, the said bar which may conveniently be formed by an extrusion process, being located between the flanges a^2, b^2 on the aft presented edges of the complementary channel-like section and fixed thereto by rivets *c* as shown, or otherwise fixed thereto.

The said bar *e* is provided on each face thereof which is external to the tubular body of the mast, and is presented aft, with a laterally directed part or flange e^1 the said flanges giving to the bar at this longitudinal side thereof a T-section in formation to afford the runner or track on the mast.

The bar *e* may be continuous or it may be in sections of suitable length according to the height of the mast to be constructed, and, as shown in Figs. 5 and 6, the mast structure incorporates a diametrically disposed reinforcing plate *d*, which may also be continuous or in sections as aforesaid, the inner or forwardly presented edge of the bar *e*, or its sections, as the case may be, being formed with a part e^2 of channel-like formation and wherein the after edge of the diametrical plate *d*, or plate sections, is located and fixed by rivets *f*, or otherwise fixed therein.

By this construction the flanges provided at the respective sides of the complementary channel-like sections for effecting their attachment to each other can be of the same width at both sides thus facilitating the production of the said sections by rolling operations. Further, this construction permits the ready provision of a runner or track of the dimensions required for any size of mast and considerably enhances the rigidity of the mast structure.

Instead of the cross sectional shape of the complementary semi-tubular or channel-like sections embodied in the mast structure being such as to provide a mast of circular figure in cross section their cross sectional shape may be such that the tubular mast formed thereby will have a pear or egg-like shape in cross section, such for example as is illustrated in Figure 7, the narrow part taking a streamline form, and further the said sections may be so tapered in the direction of their length that the mast will be of greatest cross sectional dimensions at a part thereof intermediate its respective ends.

The application of the invention to the construction of spars differs in no essential respect from its application to masts as hereinbefore described.

By the improved construction of masts and spars described not only is their manufacture considerably simplified and economised but their use considerably reduces top weight thus lowering the centre of gravity and increasing the stability of the vessels in which they are provided and further in the case of racing craft they allow the use of a longer mast than with masts of ordinary construction, thus increasing sail area and giving more speed.

I claim:

A tubular mast for sailing craft, comprising two symmetrical and complementary semi-tubular sections formed along their longitudinal edges with outwardly directed flanges, the flanges on each section being secured to the flanges on the other section, oppositely directed runners extending along the flanges at one side of the mast and providing a track for the travel of luff rings and tackle of a sail, said track being constituted by a bar-like member located and fixed between the

flanges of said sections, a portion of said bar being external to the tubular mast and having flanges at its opposite sides and having a substantially T-shaped cross section which provides said track, and said bar-like member having an inner longitudinal edge within the mast formed with a groove, and a reinforcing plate disposed diametrically of said sections and secured between flanges thereof and having an edge within the mast fixed in the groove of said bar-like member.

HUGH M. CRANKSHAW.

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