EXHIBIT 1007

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NORTH SAILS GROUP, LLC
Petitioner

v.

TEAM NEW ZEALAND LIMITED
Patent Owner

Declaration of Thomas A. Whidden in Support of Petition for Post-Grant Review of U.S. Patent No. 12,110,089

Declaration of Thomas A. Whidden in Support of Petition for Post-Grant Review of U.S. Patent No. 12,110,089

I, Thomas A. Whidden, hereby declare that:

1. I am presently employed by North Technology Group, LLC as Executive Chairman. I was President and later CEO during the years January 1, 1987-2023.

2. A copy of my Wikipedia page is attached in Exhibit 1008 (EX1008)

3. I graduated from Colby College in Waterville, Maine in 1970.

4. I began sailing competitively when I was 10 years old with some success in Blue Jays and Lightning class sailboats in Junior Championships on Long Island Sound.

5. I worked for a sailboat company named Alcort, maker of the Sunfish and Sailfish boats, as a regatta organizer, and later as a District Manager for New England and New York from 1970 to 1972.

6. While working at Alcort, I decided to try out for the 1972 Olympic games in the Finn Dinghy class. I made it to the final cut but was not the Olympic representative in that class.

7. The person I trained with leading up to the Olympics, Peter Conrad, and I decided to go into the sailmaking business as equal partners in September 1972. Together we bought a sailmaking company in Old Saybrook, Connecticut called Sobstad Sails.

8. I was a partner in Sobstad Sails with Peter Conrad from September 1972-

September 1986. As is usual in all startup companies, I performed virtually every job and discipline in sailmaking including cutting, sewing, handwork, repairs and recuts, design and engineering. I also sailed competitively in all boats from 14-80 feet during that time helping our clients to win regattas including National and World Championships. We turned the company into an internationally recognized sailmaking company with 45 locations serving Olympic sailors, Ocean Racing sailors, One Design sailors, Cruising sailors, and America's Cup sailors.

9. After seven years of performing well in my personal sailing career and providing leading edge sails to clients all around the world, I was asked to be Dennis Conner's America's Cup trial skipper for his 1980 America's Cup campaign. This was the start of my America's Cup Career, which spanned from 1979-2003, in which I sailed in eight America’s Cup Campaigns, and made it to the America's Cup Match itself in five of them. My jobs in those America’s Cup events were Sail Trimmer in 1980, Tactician in 1983, 1987, 1988, 1992, 1995, and 2000, and Strategist in 2003. In the years 1980-1986, I designed and engineered many of the sails we built at Sobstad Sails.

10. After winning the America's Cup in Australia in early 1987, I became the President of North Sails. North Sails was then just a sailmaking company with about $30 million in total revenue. I became the CEO and shareholder soon after we built

the company into the multi-product, multi-brand, multi-discipline company that it is today with a total revenue of $440 million across the group. Today, North Technology Group, LLC / North Sails Group, LLC is comprised of the three biggest names in sailmaking (North Sails, Doyle Sails, and Quantum Sails), the three biggest names in mast making (Southern Spars, Hall Spars, and Dynarig), a design services company (North Design Services), the largest standing rigging company (Future Fibers), an action sport company (North Actionsports Group) for windsurf sails, kites, wings and all boards and accessories that go with all water sports, and a sailing themed sportswear and action sports apparel company (North Sails Apparel S.p.A.). North Sails Group has also designed, consulted, engineered, and manufactured products for Boeing, NASA, The Space Shuttle, and Northrop Grumman, to name a few.

11. In my 60 years of sailing at the very pinnacle of the sport, and in my 52 years of leading sailmaking companies, I have written countless articles on sailing and sailmaking and making boats go faster through technology and technique. I also have co-authored three books, two that are on the Art and Science of Sails, and one on Championship Tactics (*The Art and Science of Sails*, Seapoint Books and Media, Brooklin, ME (2016); *The Art and Science of Sails: A Guide to Modern Materials, Construction, Aerodynamics, Upkeep, and Use*, St. Martin's Press, New York (1990);

and *Championship Tactics: How Anyone Can Sail Faster, Smarter, and Win Races*, St. Martin's Press, New York (1990)).

12. I have received the following honors and awards during my career:

- Inducted into the America's Cup Hall of Fame in 2004.
- Inducted into the Sailing Hall of Fame in 2017.
- Carl Nelson Award from Colby College in 1987 for Outstanding achievement in Athletics.
- University Club "Man of the Year" in 1987.
- Key To New York City in 1987.
- Zegna Award "A Life for Sailing" Award at the Trofeo Ermenegildo Zegna Regatta in Portofino, Italy in 2006 for devotion to a life and career in Sailing and for my work around sustainability of the sea.
- America and the Sea Award of by the Mystic Seaport Museum in Mystic, Connecticut in 2020.
- Distinguished Service Award by the National Maritime Historical Society in 2021.

13. I am presently the co-president of the Sailing Museum and National Sailing Hall of Fame in Newport, Rhode Island, the Vice President of Nantucket

Community Sailing in Nantucket, Massachusetts, and a recently retired trustee of the New York Yacht Club. I have created a foundation that provides scholarships for young people who would like to learn to sail and benefit from all the opportunities that it has afforded me in my life.

14. I am over the age of 18 and am competent to write this declaration. I have personal knowledge, or have developed knowledge, of the technologies discussed in this declaration based upon my education, training, or experience with the matters discussed herein.

15. I have read and understand US Patent No. 12,110,089 to Collie ("Collie′089") (EX1001).

16. I have carefully read through the Declaration of Daniel G. Neri (EX1003) (the "Neri Declaration") being submitted in this Action and agree with all of its content and conclusions, including, but not limited to, the definition of a POSITA, claim construction, tables, and opinions regarding anticipation of various claims of Collie′089 based on disclosures in the 2003 book *Maximum Sail Power: the Complete Guide to Sails, Sail Technology, and Performance*, by Brian Hancock, Nomad Press (2003) (also referred to in this Declaration as "*Maximum Sail Power*") (EX1017), the teachings of U.S. Patent No. 5,097,783 to Linville ("Linville") (EX1018), and of the obviousness of various claims of Collie′089 over the teachings of *Maximum Sail*

Power or Linville, supplemented by other secondary references set forth in the Neri Declaration.

17. I have also carefully read through the Declaration of Per Andersson (EX1005) (the "Anderson Declaration") being submitted in this Action and agree with all of its content and conclusions, and can verify that it and this declaration are based on the books and records kept in the ordinary course of business at North Sails.

18. My analysis and opinions expressed below are made from the perspective of a POSITA in the field of high-performance sail design at the time of the Collie provisional patent application (filed on December 17, 2020) and the subsequently filed PCT application (PCT/IB2021/061985, filed December 17, 2021) to which Collie′089 claims priority (see, e.g., the front page of Collie'089, EX1001, showing the priority applications and dates).

Anticipation.

19. I have been informed by attorneys for this proceeding that for a claim to be anticipated, a prior art disclosure must teach every element required by the claim under its broadest reasonable interpretation. I understand that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. I also understand that when a claim covers several structures, either generically or as alternatives, the claim is

deemed anticipated if any of the structures within the scope of the claim is known in the prior art.

20. I understand that, in some circumstances, a claim can be anticipated by a combination of a primary reference with one or more other references (sometimes referred to as evidentiary references) when the extra reference or references are cited to prove the primary reference contains an enabled disclosure, explain the meaning of a term used in the primary reference, or show that a characteristic not disclosed in the reference is inherent. I also understand that additional references may supplement the primary reference to accommodate situations in which the common knowledge of a POSITA is not recorded in the reference, that is, where technological facts are known to those in the field of the invention, but may not be known to judges.

Obviousness.

21. I understand that obviousness is analyzed from the perspective of a POSITA at the time of the alleged invention. I also understand that a POSITA is presumed to have been aware of all pertinent prior art at the time of the alleged invention.

22. I understand that an obviousness analysis involves comparing a claim to the prior art to determine whether the claimed invention as a whole would have been obvious to a POSITA in view of the prior art and in light of the common knowledge of

a POSITA in the field of the invention at the time the invention was made. I also understand that the invention may be deemed obvious when a POSITA would have reached the claimed invention through routine experimentation.

23. I understand that obviousness can be established by combining or modifying the disclosures of the prior art to achieve the claimed invention. It is also my understanding that where there is a reason to modify or combine the prior art to achieve the claimed invention, there must also be a reasonable expectation of success in so doing to render the claimed invention obvious. I understand that the reason to combine prior art references can come from a variety of sources, not just the prior art itself or the specific problem the patentee was trying to solve. I also understand that the references themselves need not provide a specific hint or suggestion of the alteration needed to arrive at the claimed invention; the analysis may include recourse to logic, judgment, common knowledge, and common sense available to a POSITA.

24. I also understand that when there is some recognized reason to solve a problem, and there are a finite number of identified, predictable solutions, a POSITA has good reason to pursue the known options within his or her technical grasp. If such an approach leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In such a circumstance, when a patent simply arranges old elements with each performing the same function it had been known to

perform and yields no more than one would expect from such an arrangement, the combination is obvious.

25. Finally, I understand that Patent Examiners at the U.S. Patent and Trademark Office ("PTO") rely upon certain exemplary rationales in reviewing patent applications to understand whether the subject matter of the claims is obvious. I understand that the following is the list of exemplary rationales relied upon by patent examiners at the PTO: (i) combining prior art elements according to known methods to yield predictable results; (ii) simple substitution of one known element for another to obtain predictable results; (iii) use of a known technique to improve similar devices (methods, or products) in the same way; (iv) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (v) "obvious to try"—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (vi) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Anticipation of Claims 1-3, 10, 11, 13-16, and 23 of Collie′089.

26. At least claims 1-3, 10, 11, 13-16, and 23 of Collie′089 are anticipated by prior art set forth in Table 4 of this Declaration, either alone or in combination with

evidentiary references to show certain elements are common knowledge to a POSITA.

Obviousness of Claims 13, 14, and 15 of Collie′089.

27. In the alternative, as discussed below with reference to the Neri Declaration (EX1003), at least claims 13-15 of Collie′089 are obvious over the teachings of *Maximum Sail Power* (EX1017) or Linville (EX1018) as discussed in detail in EX1003, and Tables 1 and 2 of EX1003, in view of the prior art set discussed below and in Table 4 of this Declaration.

28. Claim 13 of Collie′089 depends on claim 1, and specifies that the sail includes a third region having an elasticity less than other regions of the sail, and that this third region extends along at least a portion of a margin of the luff region between the luff region and the remainder of the sail. This concept has been known since at least the 1980's as discussed below and is nothing more than applying a known technique to improve a known device (in this case a high performance sail) to yield predictable results.

29. Working with Peter Conrad during the 1980's, we at Sobstad Sailmakers developed sails that had a stiffer region between the luff and the leech, such that the sail could flatten in higher winds for improved up-wind performance. This idea later evolved into a design having what is often called a "catenary band" between the luff and the leech, which is of a stiffer material than the materials used in the luff or the

leech. This catenary band is what Collie′089 refers to as a "third region that has an elasticity that is less than other regions of the sail" which extends "along at least a portion of a margin of the luff region between the luff region and the remainder of the sail." As discussed below, this old concept has been exploited in racing sail design by numerous sail designers besides myself over many years.

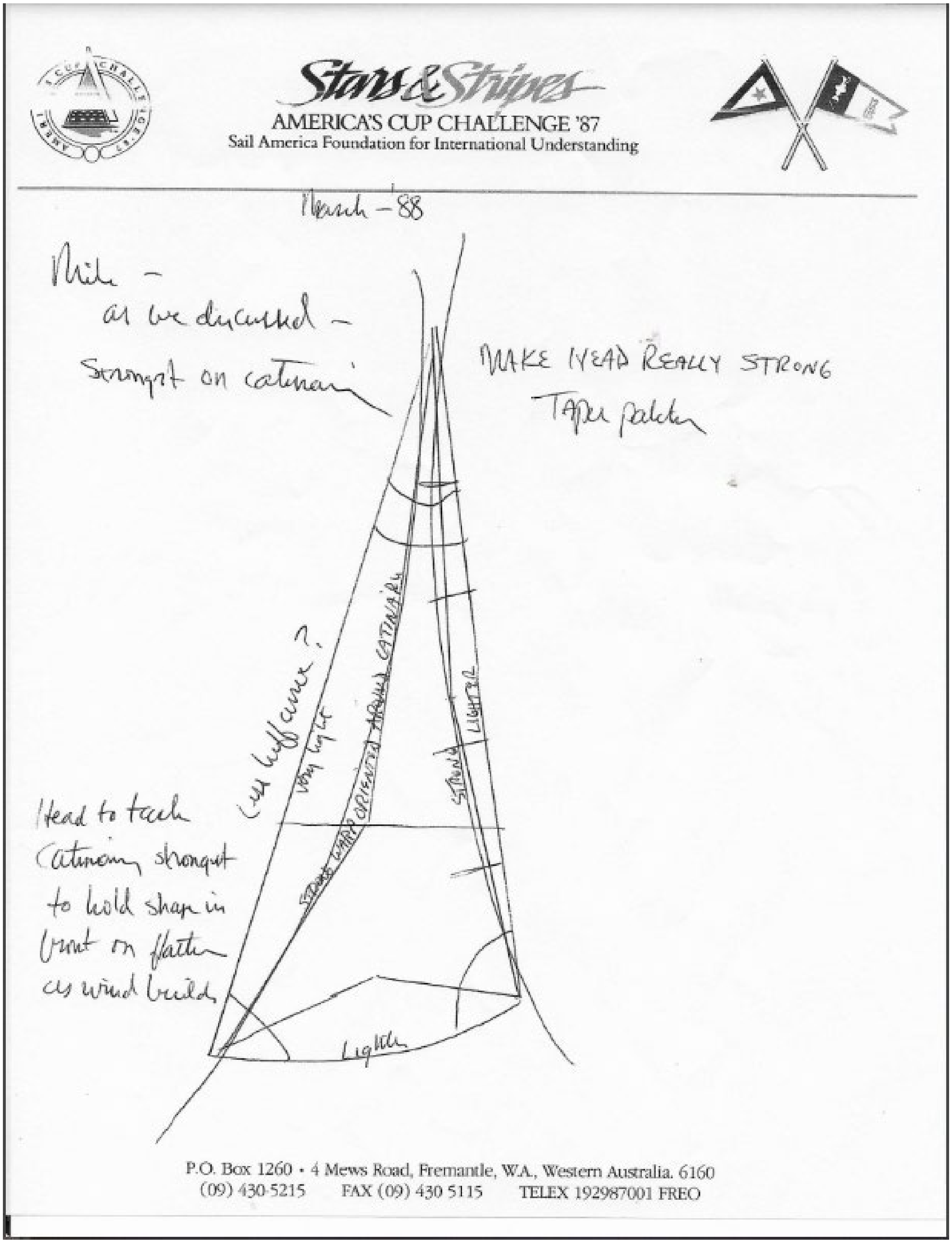
30. In the early to mid '80's, at Sobstad Sails, a man named John Stanton came to our business and discussed his concept for sail designs built around catenaries from clew to head, head to tack and tack to clew. Catenaries are lines of force (also referred to as "load lines") exerted by the wind on a sail. His idea was that you could flatten sails as the wind increased by aligning yarns with these catenaries and later by changing stretch characteristics and load carrying ability throughout the sails with materials of various strength.

31. Mike Schreiber, the sail designer for the *Stars and Stripes '88*, and I met with Dennis Conner, then two-time America's Cup winner, in mid-spring of 1988 in San Diego, California, and discussed a perceived issue we were having with our sails for a "soft sail" version of his *Stars and Stripes '88* catamaran for the America's Cup. Test runs were being conducted in San Diego, where winds were generally pretty light, and we were looking for ways to get the 60' catamaran to fly a hull (i.e., lift up on one hull) earlier in the wind range. Dennis also expressed frustration with the

strength of the jibs as we had a few breakages near the head patch. Mike Schreiber and I discussed options after Dennis left. We decided that if we could make the sails deeper to give more power in the lower wind ranges then we could fly a hull more easily. The only problem was that the sail or sails would be too deep once we were flying a hull, because the apparent wind speed would increase dramatically.

32. Racing sails, such as those used in the America's Cup race, need to operate over a range of wind conditions and directions, and the shape of the sail must be adjustable in response to the wind conditions, because racing is not just a question of speed, but the speed in the direction of the next marker in the racecourse. Sail shape can be used to optimize speed in a given direction and given wind conditions. This means that racing boats need sails that are more specialized, adjustable in shape and depth, and thus more expensive, than sails used for "weekend" or leisure sailing (see e.g., *Maximum Sail Power*, EX1017, Chapters 11, 12, and 15).

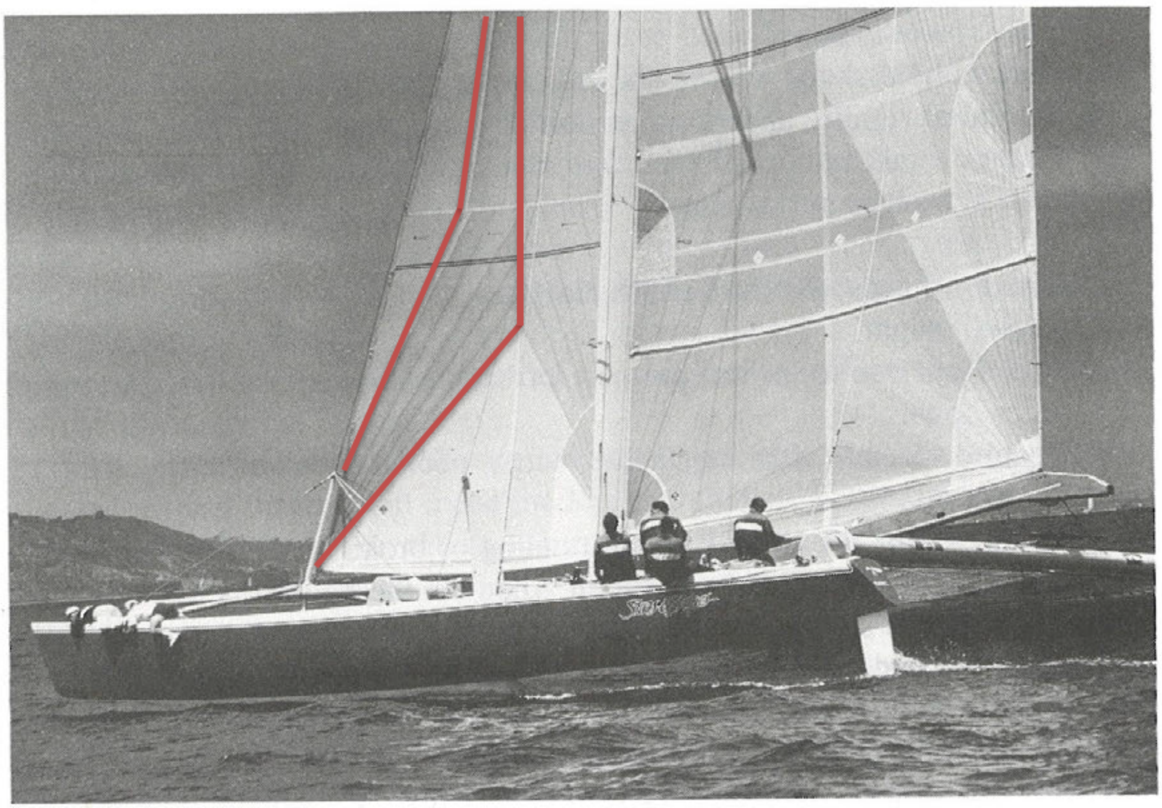
33. Remembering what we had done at Sobstad Sails and the many sails that were built to the catenary concept, particularly with the advent of warp oriented sailcloth materials of different modulus, I made a drawing for Mike Schreiber that was the genesis of some sails that we built at North Sails and sold to Dennis Conner for the *Stars and Stripes '88* catamaran. That drawing is attached as EX1025, and is dated March, 1988. EX1025:


Stars & Stripes
AMERICA'S CUP CHALLENGE '87
Sail America Foundation for International Understanding
March – 88
Mike –
as we discussed –
Strongest on catenary
MAKE HEAD REALLY STRONG
Taper patch
use luff curve?
very light
STRONG WARP ORIENTED AROUND CATENARY
STRONG
LIGHTER
Head to tack
Catenary strongest
to hold shape in
front on flatten
as wind builds
Lighter
P.O. Box 1260 • 4 Mews Road, Fremantle, W.A., Western Australia. 6160
(09) 430-5215 FAX (09) 430 5115 TELEX 192987001 FREO

34. A sail embodying the design shown in Exhibit EX1025 was made and sold by North Sails in 1988 to test the catenary band running from the tack toward the head (what Collie′089 calls the "third region" between the luff region and the remainder of the sail) on a boat being considered for the America's Cup race that year. I was personally involved with and remember this sail. The sketch is addressed by me to Mike Scheiber: "Mike – as we discussed-Strongest on the catenary."

35. As can be seen in EX1025, the catenary band is labeled "STRONG WARP ORIENTED AROUND CATENARY", while the leech on the right side of the sail is labeled "lighter", and the luff region on the left side of the sail is labeled "very light". Thus, the catenary band is the least elastic (strongest) area of the sail, while the leech region is more elastic (lighter) than the catenary band, and the luff region is the most elastic (lightest) area of the sail. This sail design, with a combination of three regions, is the same as set out in Collie′089 and claimed in claims 13 through 15. The purpose for the catenary band is stated on the lower left side of the drawing in EX1025: "Head to tack Catenary strongest to hold shape in front or flatten as wind builds." This is the same logic expressed in Collie′089 (see e.g., EX1001, col. 5, ll. 44-47: "This provides for a sail that is effective to power up or power down the sail in response to the wind speed or heading of the yacht relative to the wind direction." See also Collie'089, col. 5, ll. 48-59, and col. 11, ll. 46-50).

36. The first sail we built and sold based on this concept was the headsail (jib) shown on page 225 of my book *Art and Science of Sails* published in 1990 (EX1010), shown below with the catenary (third region) labeled in red.



A full-battened main is seen on the catamaran Stars & Stripes '88—*the one with the soft rig rather than the wing (see photograph on page 124). While go-fast catamaran sailors and then boardsailors were the first recreational sailors to use full-battened mainsails, Chinese junks have had them for at least a century. They are now popular on cruising boats and some racers.* (Courtesy of North Sails, Inc.)

37. In the jib shown on the left in the photo from page 225 of EX1010, the luff is along the left (forward) side, the leech is to the right, and the stronger "catenary

band" (illustrated here between two added red lines) is the darkest region aft of the luff, running from the tack (lower left of the sail) at an angle away from the luff in the lower part of the sail, and then continuing toward the head (not shown) roughly parallel to the luff about half way up the sail, consistent with my sketch in EX1025, shown above. A POSITA looking at the photograph on page 225 of EX1010 would recognize the light and dark regions as having the elasticity characteristics I have described above.

38. We built another jib in this fashion, and at least one mainsail of similar concept for *Stars and Stripes '88*. My recollection of the jib in the picture from page 225 of EX1010 is that it was a laminate sail made up of the following materials: the luff region was the lightest Kevlar material that we could find, 200 denier yarns woven with a lower denier per inch count than the leech and 1 mil of polyester film; the middle section was the strongest single ply Kevlar we could find, 1000 denier yarns with 2 mil of polyester film, and the leech area was comprised of a 400 denier Kevlar yarn material woven with a higher denier per inch count than the luff with 2 mil of polyester film. Because denier can also relate to the stiffness of the material, the leech region (what Collie′089 generally calls the "remainder of the sail") is at least two times as stiff as the luff region (400 denier yarns in the leech and 200 denier yarns in the luff). The middle section (what Collie′089 calls the "third region") was the

stiffest material, and was at least 5 times stiffer than the luff (1000 denier yarns in the catenary versus 200 denier yarns in the luff). The foot area (the white triangular area at the bottom of the sail) was a light polyester taffeta with 2 mil of polyester film. The yarns in the luff region and the remainder of the sail generally run from tack to head (luff region and catenary band) or from clew to head (leech region), so the difference in stiffness between the remainder of the sail and the luff region is generally in the direction of the luff. This particular sail worked just as expected, as the harder we pulled on the halyard and cunningham, and the harder we sheeted the sail, the flatter it got.

39. Thus, the *Stars and Stripes '88* jibs and mainsail sold by North Sails in 1988 anticipate at least claims 1-3, 10, 11, 13, 14, and 23 of Collie′089 as the sail includes all of the elements of these claims, as discussed below.

40. Regarding claim 1 and claim 23, mainsails and jibs such as those designed, prepared, and sold in 1988 for *Stars and Stripes '88* all have a head, a tack, a luff, a luff region that is more elastic than the remainder of the sail, as described above, a luff region that comprises a first material (i.e., the 200 denier yarns and 1 mil polyester film, as described in paragraph 39, above), a remainder the of the sail that comprises at least a second material (i.e., the catenary band with 1000 denier yarns a 2 mil polyester film, the leech region with 400 denier yarns and 2 mil polyester film,

and the foot region. In addition, the second material is 2-20 (or 2- 25 in claim 23) times stiffer than the first material. Furthermore, the stiffness referred to in paragraph 38, above, is in the direction of the luff, as in claim 23.

41. Claim 2 specifies that the sail of claim 1 is a mainsail. The *Stars and Stripes '88* sails meet this limitation because one of the sails discussed above in paragraphs 36-39 was a mainsail.

42. Claim 3 specifies that the sails of claim 1 is a headsail. The *Stars and Stripes '88* sails meet this limitation because some of the sails discussed above in paragraphs 36-39, were headsails (jibs).

43. Claim 10 specifies that the first material of the sail of claim 1 extends at least 50 to 90% of the distance between the head and the tack of the sail. As described above in paragraphs 33-39, and as shown, e.g., in the photograph from EX1010 discussed in paragraphs 36 and 37, the first material (luff region on the left of the jib in the photograph in paragraphs 36 and 37) extends essentially the full length from tack (lower left) to head (top), which meets the limitation of at least 50-90%.

44. Claim 11 specifies that the first material (i.e., the luff region) extends up to about 10 to 50% the width of the sail of claim 1. As shown in the photograph from EX1010 discussed in paragraphs 36 and 37, above, the first material extends approximately between about 20% to 33% of the distance between the luff and the

leech at its widest point about halfway up the sail from the foot toward the head, which falls within the 10 to 50% range of claim 11.

45. Claim 13 specifies that the sail of claim 1 includes a third region that has less elasticity (i.e., is stiffer) than other regions of the sail, the third region extending at least a portion of a margin of the luff region between the luff region and the remainder of the sail. As discussed above in paragraphs 33-39, the catenary band of the sails sold for *Stars and Stripes '88*, is the stiffer "third region", which is situated along the margin of the luff between the luff region and the foot and leech regions, or "remainder" of the sail.

46. Claim 14 specifies that the third region of claim 13 extends from the head to the tack. As discussed above in paragraphs 33-39, this catenary band or "third region" of the *Stars and Stripes '88* sails extends from the head to the tack.

47. Claim 15 specifies that the "third region" of claim 13 comprises carbon. By the time the Collie′089 application was filed, carbon was commonly used to stiffen sailcloth. See, e.g., *Maximum Sail Power*, EX1017. Page 23 of *Maximum Sail Power*, in regard to carbon fiber, states: "When used in sails carbon fibers are combined with more durable fibers like Kevlar … The result is a measure of durability, without a sacrifice in modulus." Also in *Maximum Sail Power*, on p. 20, the photo caption states: "Some fabrics are made from a blend of fibers such as Kevlar and carbon in

order to maximize benefits of each." A POSITA would consider using carbon in combination with the Kevlar of the catenary band or "third region" of the sails sold for *Stars and Stipes '88* discussed in paragraphs 33-39, above, as an obvious design choice to achieve a measure of durability, without a sacrifice in modulus (EX1017, p. 23), in order to maximize benefits of each (EX1017, pg. 20).

48. Mike Schreiber was the sail designer for the *Stars and Stripes '88* sails and was employed by North Sails in San Diego, CA. Twenty years later, in 2009, Mike Schreiber was working with Patrick Masuay, the North Sails Switzerland sail designer assigned to the Swiss America's Cup team, Alinghi, in their defense of the America's Cup against the challenger Oracle team. Alinghi designed a 100' catamaran that had similar challenges to *Stars and Stripes '88*. They needed deep sails to get the windward hull to lift clear of the water and then much flatter sails to reduce drag once accelerated on one hull. The headsails for Alinghi were composite sails, made using North Sails 3DL manufacturing processes, and were sold to Alinghi in 2009 and 2010, as discussed below.

49. These Alinghi sails were composite sails made with Kevlar and carbon yarns deposed onto Mylar film. Composite sails presented the sail designers with much greater flexibility in how they distributed the materials and allowed them to achieve much smoother transitions from the areas of high elasticity to low elasticity.

As discussed in detail below, the Alinghi sails exhibited the attributes described in many of the Collie′089 claims: the luff area was more elastic than the remainder of the sail; the material in the luff area displayed a gradient of decreasing elasticity moving from the luff to where it merges with the so-called "third region" or catenary band material; and the third region, at the boundary of the first material and the remainder of the sail, was heavier and stiffer than the remainder of the sail. Consequently, as discussed below, the Alinghi sails anticipate at least claims 1, 2 and 13-15 of Collie′089.

50. The photo of the Alinghi boat, below, was published by the New York Times in a 2010 in the article entitled "America's Cup Rivals Race With The Wind In Their Wings" (EX1020), and shows that the headsail (a jib) on the left side of the photograph has a relatively higher density of material in the third region (central portion) of the sail compared to the rest of the sail. The sail is very light in the luff region (the left most portion of the jib), is darker/denser in the leech area of remainder of the sail (right side of the jib), and is darkest/densest in the region between the luff and the remainder of the sail. Note that yarn density in a composite sail, such as those sold to Alinghi, is directly related to measures of stiffness, elasticity, and modulus, as would be recognized by a POSITA.

51. A close look at the photo from EX1020 shows darker areas of the sail where there is a greater concentration or density of yarns. More yarn concentration is directly related to lower elasticity (i.e., higher stiffness). An annotated version of the same photo is provided below, with red lines outlining the densest catenary third region, corresponding to the area "third region" in Collie′089 claims 13-15. The area forward to the left of the red lines, the luff region or first material has the lightest coloring, indicating the least yarn density, and thus the greatest elasticity and lowest stiffness. The area aft (behind) of third region, to the right of the red lines, is the leech area or second material of the remainder of the sail, which is darker, or denser, than the luff area on the left edge of the sail, indicating a higher yarn density and accordingly higher stiffness.

52. The lead sail designer, Patrick Masuay, related these comments in an email about the distribution of the structural material: "The luff structure that you see there was never meant to be with highest density near luff, but rather inside (20-35% max density from luff). The goal is clearly to have the max luff density at the same spot as the max rounded shape of the headsail, in order to flatten this part (so to flatten the whole global volume), as well as move the draft (slightly) forward, as well as keeping the luff very light. This is mostly aiming the 2/3rd up more than the lower part, but still we want to play like this globally."

53. EX1028 provides images of another jib sail of the same general design as the one described above, for the same Alinghi catamaran, sold to Alinghi in 2009 (see EX1026 and EX1027). The purchase order is found in EX1026 (Order No.

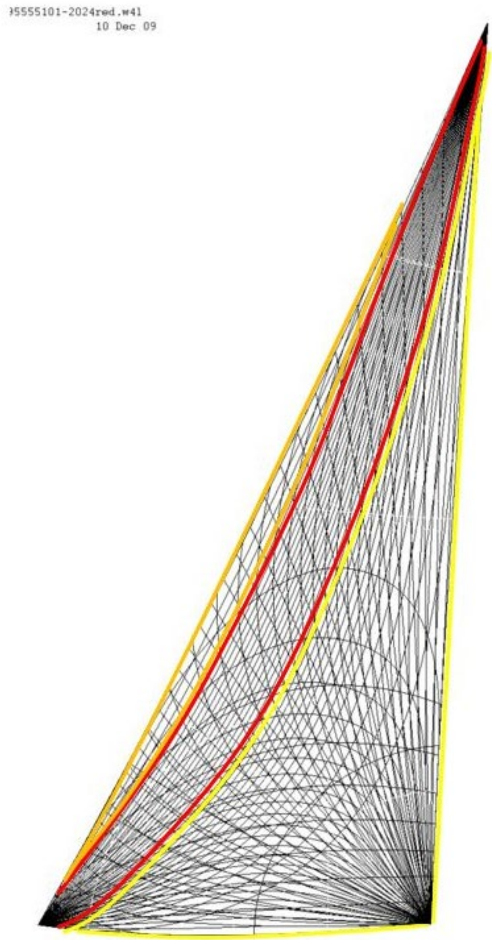
95555101), and a redacted version of the invoice is found in EX1027 (redacted to remove bank information and pricing), and is dated December 13, 2009. This much larger headsail is intended to be used in lighter wind ranges than the sail shown in EX1020. A photo of this sail, from EX1028, is sourced from the designer's testing records and was sold by North Sails Switzerland on December 13, 2009. Below is the sail image from EX1028, annotated to include red lines around the densest "third region" area of the sail:

54. Another image of the same sail (EX1029), made during testing by the Alinghi team, is shown below, annotated with red lines around the third region, showing that the stiffest region between the luff region and remainder of the sail

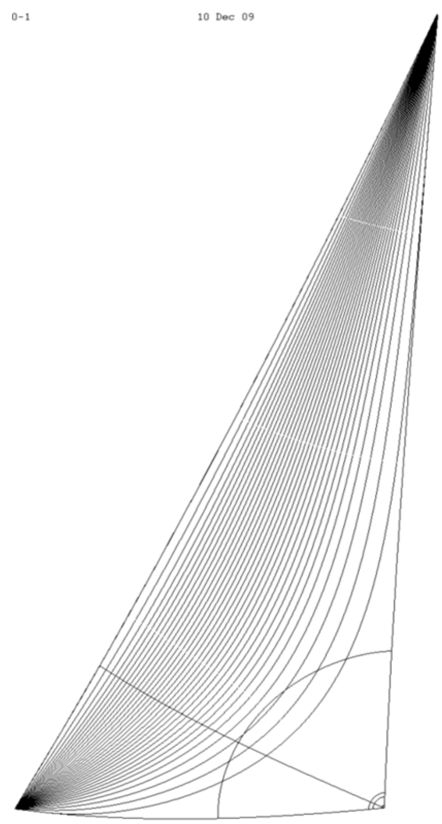
continues substantially from tack to head:

55. The next image, from EX1030, is taken from the sail design file used to create the sail of EX1026 through EX1029. It shows all of the yarn passes that make up the complete structure for the sail as curved lines. Note that each line in the image

represents 4 passes of a comb containing 13 yarns (52 yarns represented by each line) with some combination of carbon and aramid yarns intermixed among the 13 positions. The image has been annotated to add outlines of the different regions of the sale. The area bounded by the orange lines corresponds to the "first material" or '"luff region" of Collie′089 (on the left side of the image), which runs about 80% to 90% of the distance from tack to head. The area bounded by the yellow lines corresponds to the "second material of the "remainder of the sail" of Collie′089. The area bounded by the red lines corresponds to the "third material" or "third region" of Collie′089 claims 13-15. This sail meets all of the limitations of claim 1 and 23, because as discussed in more detail below in paragraphs 56 through 59, this sail, like all headsails, has a head, a tack, and a luff. In addition, this sail comprises a luff region that is more elastic than the remainder of the sails, and the remainder of the sail is at least 2 to 2.3 times stiffer than the luff region (or the luff region is at least 2 to 2.3 times more elastic than the remainder of the sail) in the direction of the luff.

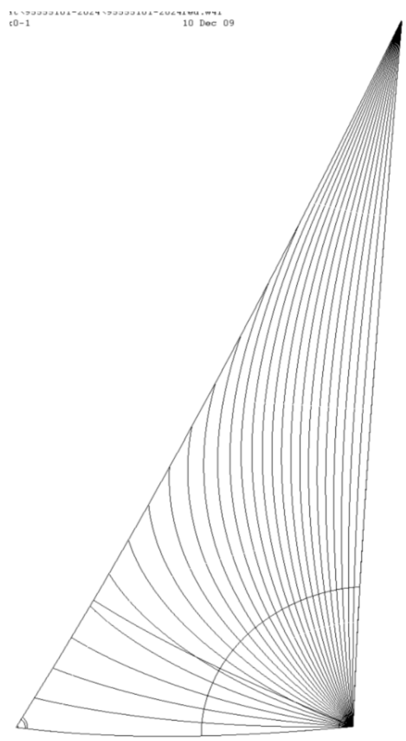


56. This next image from EX1030 shows the yarn passes for just the luff group. It shows a gradient of yarn density, with a lower density of yarns along the luff increasing to the highest density of yarns in the area of the 3rd material (the middle of the sail), with a gradient of density that increases in the direction from luff toward the leech as in claim 16 of Collie′089.



57. An image from EX1030 of one of the two leech groups of the sail is shown below. The yarns represented by the lines in the image (52 yarns per line) originate at the clew (lower right corner) and fan to the head and to the luff. Where the yarns cover the leech region on the right side of the image, they are essentially parallel to the luff through the middle of the sail. Where the lines cover the luff region they are at angles greater than 15 degrees to the luff (as in claim 21 of Collie′089), and as such, do not significantly contribute to the luff modulus or stiffness. The second leech group (not shown) is made of straight passes fanning out from the clew and doubling the denier-per-inch (DPI) yarn density in the lower half of the second

material in the remainder of the sail.



58. While there is no established or known method for determining the exact boundaries of these regions of a composite sail or for calculating the "average elasticity" (or stiffness or modulus) of a composite sail, it is possible to determine the total denier per ince (DPI) of the sail across a single girth by counting the number of passes of yarn across the various portions of the sail girth, knowing the the denier of the yarns. The table below, prepared by Richard Bowen, a member of the North Sails design staff, based on the design records in EX1030, shows the DPI measured along the middle girth of this sail (a line connecting the mid point of the luff edge to the

midpoint of the leech edge).

Region of sail	First Material		Third Material				Second Material					
Distance from Luff edge (mtrs)	0.6	1.2	3	4	5	6	7	8	9	10	11	12
Luff group	11000	13,500	19,700	21,500	21,600	20,500	19,000	17,500	16,250	15,000	11,500	9,000
Leech groups	0	0	7,300	7700	8250	8600	8850	9200	9650	10100	11500	12900
total DPI	11000	13500	27000	29200	29850	29100	27850	26700	25900	25100	23000	21900
Average	12250		28787.5				25075					

59. As is evident from the table above reproduced from EX1030, there is a gradient from 11000 DPI to 13500 DPI in the luff region (first material). The "second material", which extends to the leech of the sail, has an average DPI of 25075 along the same girth of the sail, which more than double the average DPI of the first material (12250 DPI), while the "third material" in the middle of the sail has the highest average DPI along this same girth (28787.5 DPI). Thus, the remainder of the sail comprises a "second material" that is at least twice as stiff as the luff region "first material" as required by claims 1 and 23 of Collie'089. The stiffness direction referred to here is in the luff direction, as in claim 23

60. With regard to claim 3 of Collie'089, the sail sold to Alinghi in 2009 is a headsail (see paragraph 53 above).

61. As demonstrated by EX1030, the "third region" along the border of the luff region and the remainder of the sail is stiffer than both the first material and the second material, just as required by claims 13 through 15 of Collie′089.

62. With regard to claim 14, the third region extends from the head (top) to the tack (lower left) (see paragraph 55 above).

63. With regard to claim 15, the third material region of the Alinghi sails is a composite of Kevlar and carbon (see paragraph 55 above).

64. With regard to claim 16, the first material has a gradient of reducing elasticity in the direction from luff toward the leech (see paragraph 59 above). In particular, the table above paragraph 59 shows that the yarn density (in DPI) in the luff region nearest the luff is 11,000 DPI, while the DPI of the next adjacent portion of the luff region in the direction of the leech is 13,500, which represents a gradient of reducing elasticity, since elasticity is inversely proportional to DPI for yarns of the same type. While the records do not explicitly show the modulus of the threads, it is common knowledge of a POSITA that the modulus of an area of a sailcloth increases with increasing fiber DPI for fibers of the same type (as in the Alinghi sails), thus, the 2009 sail sold to Alinghi by North Sails also meets the alternative requirement of claim 16 that the gradient is based on Young's Modulus. It is also common knowledge that the failure strain will roughly inversely depend on DPI of the sailcloth when the fibers are of the same type, as in the 2009 Alinghi sails, therefore also meeting the alternative requirement of claim 16 that the gradient is based on failure strain.

65. Thus, the Alinghi sails, including the sails from EX1028 through EX1030, discussed above, anticipate at least claims 1, 3, 13-16, and 23 of Collie′089, as the sails include all of the elements of these claims either alone or in combination with common knowledge of a POSITA. See also Table 4 attached at the end of this Declaration, which sets out the forgoing information in tabular form.

66. Additional art is also available for the stiffer "third region" of claims 13-15 of Collie'089. My former partner Peter Conrad has the 1991 U.S. Patent No. 5,038,700 (EX1023), which discloses another sail with a stronger catenary band between a relatively elastic luff, and a stiffer leech. Figure 4 of Conrad (EX1023) shows a sail design with threads 16 aligned from tack to head and from clew to head along catenary load lines , which provide strength to the sail along the catenary lines of force experienced by the sail in use (see also EX1023, col. 3, ll. 22-25; and col. 4, ll. 46-50). As POSITA would understand, the density of threads is directly proportional to the stiffness of the sail in a given region. FIG. 4 of Conrad is provided below, along with an annotated version of FIG. 4 in which the stiffer catenary band or "third material" is the region between the two red lines.

FIG. 4

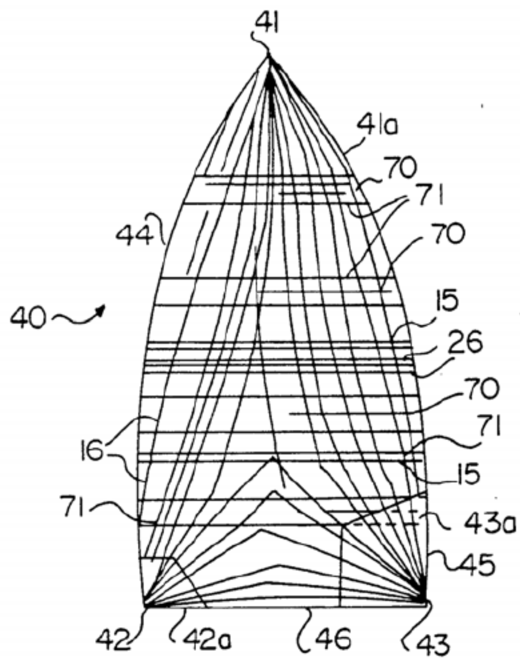
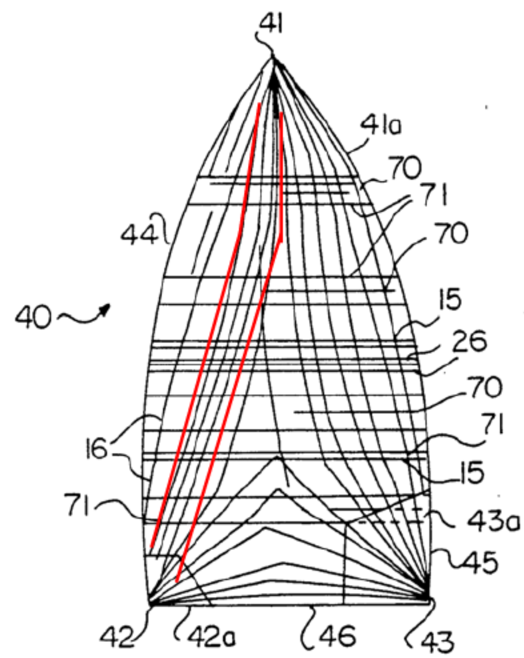


FIG. 4



67. In annotated FIG. 4 (on the right), a dense group of catenary threads 16 is evident in the middle of the sail between the luff 44 and leech 45, and red lines are drawn around this stiffest region of the sail for easier reference and identification. The luff region to the left of the left-most red line includes a single illustrated thread line, while the remainder of the sail, to the right of the right-most red line includes a number of thread lines 16 that are spaced further apart than the threads in the region between the red lines. As a POSITA would understand, the sail in FIG. 4 of Conrad is stiffest in the red-bounded region that is between the border of the luff region and the remainder of the sail, as this is where the highest thread density is found. Thus,

Conrad teaches the same "third region" material as in claims 13 through 15 of Collie′089. In addition, Conrads discloses that the treads of the of the sail run as catenaries from head to tack, from head to clew, and from tack to clew (see EX1023, col. 7, l. 15-26). A POSITA would have been motivated to include the stiffer third region of the Conrad patent in other prior art sails, e.g., the sails described the 2003 textbook *Maximum Sail Power*, EX1017, or the 1992 U.S. Patent No. 5,097,783 to Linville (EX1018), described in the Declaration of Daniel G. Neri (EX1003), for the same reasons as described above for the *Stars and Stripes '88*, Alinghi, and related sails discussed in this Declaration.

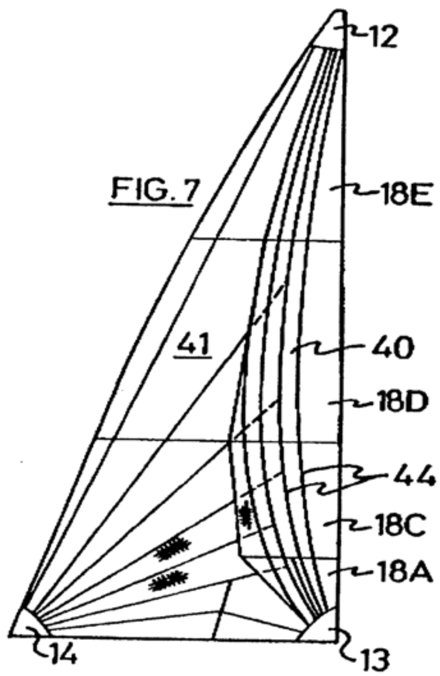
68. Yet another example of a sail design with a strong catenary band or "third region" between the luff and the remainder of the sail is found in European Patent Publication No. 0271215 A1 to Smale, which was published in 1988 (EX1031). Smale discloses, at col. 1, ll. 51-55: "It is an object of this invention to provide improved fore and aft sails, capable of varying their cross-sectional shape in response to varying wind conditions, or which will at least provide sail makers with a useful choice." This is consistent with a stated purpose of Collie′089 (see EX1001, col. 5, ll. 42-45). Smale also discloses at col. 3, ll. 13-18: "The invention in its simplest form radiates straight lines of directional stability from the clew towards the aft edge of the fore portion of the sail. Thus, the aft edge of this fore portion can become the collector

for the majority of the stresses at the clew." The aft edge of the fore portion of a sail is the border between the luff region and the remainder of the sail in the terminology of Collie′089.

69. Furthermore, col. 3, ll. 50-57 of Smale states: "Any length of sail material will have a certain elongation at a specific loading. Thus, the objective becomes one of transmitting the loads at the clew to the aft edge of the fore portion consistent with maintaining the ability of the leech of the sail to react dynamically to changing wind conditions and thus varying its cross-sectional shape in the chosen manner." A POSITA would recognize that this is exactly what Collie′089 does with the stiff, so-called "third region" running along the border between the luff and the remainder of the sail. Making this region of the sail stiffer than the luff region and the aft (leech) portion of the sail directs forces from tack to head and keeps the shape of the sail from being too deep in high wind conditions. This is the same function and advantage as described for the *Stars and Stripes '88* jib sail discussed above in paragraphs 33-47.

70. Col. 6, ll. 7-13 of Smale states: "Figure 5 shows a mainsail in accordance with this invention having a fore portion 40 and an aft portion 41. The aft portion is similarly formed from a series of panels to provide lines of directional stability radiating outwardly from the clew to at least a central region of the aft edge 42 of the fore portion 40." Col. 6, ll. 16-20 goes on to state "Figure 7 shows a similar mainsail

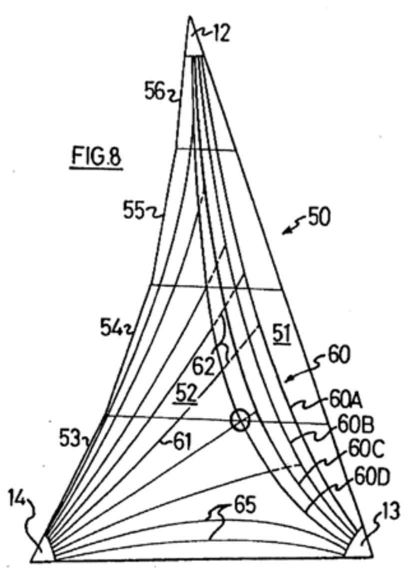
[i.e., similar to FIG. 5] with the addition of strips of reinforcing material 44 superimposed on the surface of the fore portion 40 of the sail which is itself made up of substantially triangular panels 18A-18E." FIG. 7 of Smale is shown below.



71. The strips of reinforcing material (44) in FIG. 7 are tapes that provide reinforcements for that region of the sail adjacent to the luff region formed from panels 18A-E. A POSITA would recognize that this reinforced region would be stiffer than both the luff region and the remainder of the sail (41 in FIG. 7). The purpose of the tapes is to help control the shape of the sail in varying wind conditions (e.g., per col. 1, ll. 51-55 referred to above) and is just another variant on the catenary band in

my design for the *Stars and Stripes '88* jib discussed above in paragraphs 33-47.

72. Col. 6, ll. 27-36 of Smale states: "Figure 8 shows a headsail 50 having a fore portion 51 and an aft portion 52. This sail can be formed from a single large panel, or more conveniently a series of panels 53 54 55 56, in which the orientation of the thread lines of the panels is not as important as the orientation of the lines of directional stability of a series of strips of material, e.g., tapes 60, 61, superimposed on the surface of the material." FIG. 8 of Smale is reproduced below.



73. Just as in FIG. 7, the tapes 60A-D in FIG. 8 of Smale reinforce and stiffen the region of the sail just aft of the luff region, making the taped region the stiffest part of the sail excluding reinforcements at the head, tack and clew which are always highly reinforced to prevent tearing at these major stress points.

74. As noted above, claim 13 of Collie′089 depends on claim 1, and further specifies that the sail includes a third region having an elasticity less than other regions of the sail, and that this third region extends along at least a portion of a margin of the luff region between the luff region and the remainder of the sail. As set forth in the Declaration of Daniel G. Neri (EX1003), claim 1 is anticipated by at least two different references: the 2003 textbook *Maximum Sail Power* (EX1017), and the 1992 patent to Linville (EX1018), discussed above. Claim 13 is at least obvious over any of these two references in view of the catenary band prior art represented discussed above in paragraphs 33-73 of this Declaration, all of which disclose this stiffer band of a "third material" at a border between the luff region and the remainder of the sail. A POSITA would have been motivated to combine the anticipating references of EX1017 and/or EX1018 with the catenary band prior art in order to control the shape of the sail in varying wind conditions such as disclosed by Smale.

75. A POSITA would be particularly motivated to use such a catenary band because *Maximum Sail Power* (EX1017) at p. 54 points out that "the art of aligning yarn along specific load catenaries has become a sophisticated process, far more complicated than in the early days…" Page 66 of *Maximum Sail Power* discusses how North Sails used its 3DL process to make sail catenaries with load bearing yarns or fibers. See also pages 87-88 of *Maximum Sail Power*.

76. Claim 14 depends on claim 13, and specifies that the third region extends from the head to the tack of the sail. The catenary "third regions" of my *Stars and Stripes '88* design (EX1010, EX1020, and EX1025), of the Alinghi sails sold in 2009 (EX1026 to EX1030), of Conrad (EX1023) from 1991, and of Smale (EX1031) from 1992, all extend from the head to the tack of their respective sails. Thus, claim 14 is obvious over any of *Maximum Sail Power* (EX1017) and Linville (EX1018) discussed in the Declaration of Daniel G. Neri (EX1003) in view of any or all of my *Stars and Stripes '88* design (EX1010, EX1020, and EX1025), the Alinghi sails sold in 2009 (EX1026 to EX1030), Conrad (EX1023), and Smale (EX1031), all of which disclose this stiffer band of a "third material" extending from head to tack. As with claim 13, a POSITA would be motivated to use such a winning design because it increases the size of the catenary.

77. Claim 15 depends on claim 13 and specifies that the third region comprises carbon. As discussed above, the Alinghi and related sails of EX1026 through EX1030, were composite sails comprising Kevlar and carbon fibers between sheets of polyester film made by the 3DL process. Thus, claim 15 is obvious over any of *Maximum Sail Power* (EX1017) or Linville (EX1018) as primary references in view of the 2009 Alinghi sails of EX1026 through EX1030 disclosing a catenary band comprising carbon. Alternatively, claim 15 is obvious over *Maximum Sail Power*

(EX1017) in view of Conrad (EX1023) or Smale (EX1031). A POSITA would have been motivated to combine the teachings of the primary references with EX1026 through EX1030, Conrad (EX1023) or Smale (1031) for the reasons set forth in *Maximum Sail Power* (EX1017), p. 23, i.e., that carbon has a high modulus , and when combined with Kevlar or other aramids, provides "a measure of durability, without a sacrifice in modulus."

78. Table 4 is attached to this Declaration after my signature below, which describes where the various limitations of the Collie'089 claims are found in the prior art discussed herein in tabular form.

I, THOMAS A. WHIDDEN, the undersigned declarant, further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18, United States Code.

Dated: July 1 , 2025

Thomas A. Whidden

Thomas A. Whidden

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
[*bracketed numbers and letters next to claim limitations are added for reference purposes]	**Primary References:** **MSP:** 2003 Textbook *Maximum Sail Power* (**EX1017**) **Linville**: 1992 U.S. Pat. No. 5,097,783 to Linville (EX1018) **Secondary References:** **Stars & Stripes I:** 1988 sketch of catenary-banded sail design for 1988 America's Cup winner *Stars and Stripes '88* catamaran (**EX1025**). **Stars & Stripes II**: photo of catenary-banded sail used on soft-rigged version of the 1988 America's Cup winner *Stars and Stripes '88* catamaran using Whidden Sketch design (p. 225 from **EX1010**) **Alinghi:** Headsail Sold to Swiss America's Cup team Alinghi in 2009. See 2010 NY Times Article Discussing Team Alinghi's America's Cup entry **(EX1020)**; purchase order for sail sold in 2009 **(EX1026)**, sales invoice for sail sold in 2009 **(EX1027)**, images of the Alinghi sail **(EX1028 and EX1029)** and excerpts of sail design records for the Alinghi sail **(EX1030).**

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
	Conrad: US 5,038,700, Novel Sail Construction and Sails Made Accordingly (**1991**) (**EX1023**) **Smale**: European Patent Application Publication No. 0217215 A1, Fore and Aft Sails (**1988**) (**EX1031**)
Claim 1	**MSP (EX1017) and Linville (EX1018)**
A sail comprising a head, a tack, a luff extending between the head and the tack; and a luff region extending along the luff; wherein the luff region has a higher degree of elasticity compared to a remainder of the sail, wherein the luff region of the sail includes a first material and a remainder of the sail includes at least a second material, wherein the first material and the second material are different, and wherein an average stiffness of the second material is in a range of 2-20 times higher than an average stiffness of the first material.	As set forth in Table 1 of the Declaration of Daniel G. Neri (**EX1003**): Claim 1 is anticipated by *Maximum Sail Power* (**MSP**) by Brian Hancock, Nomad Press (2003) (**EX1017**) see also par. 63 to 68 of **EX1003**. As set forth in Table 2 f the Declaration of Daniel G. Neri (**EX1003**): Claim 1 is anticipated by or in the alternative obvious over **Linville:** US 5,097,783, Reinforced Sailcloth (1992) (**EX1018**), See also par. 106 to 111 of **EX1003**.
Claim 1 (itemized)	**Prior art:** **Stars & Stripes I:** 1988 sketch of catenary-banded sail design for 1988 America's Cup winner *Stars and Stripes ’88* catamaran (**EX1025**).

TABLE 4

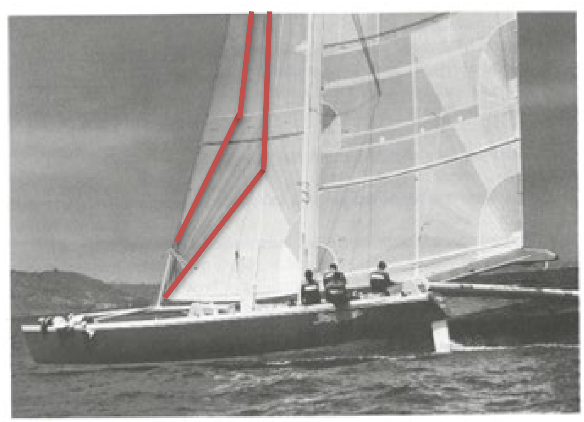
Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
	Stars & Stripes II: photo of catenary-banded sail used on soft-rigged version of the 1988 America's Cup winner *Stars and Stripes '88* catamaran using Whidden Sketch design (p. 225 from **EX1010**) **Alinghi:** Headsail Sold to Swiss America's Cup team Alinghi in 2009 **(EX101020, and EX1026 through EX1030)**
[1.A] A sail comprising [1.B] a head, [1.C] a tack, [1.D] a luff extending between the head and the tack; [1.E] and a luff region extending along the luff;	**Stars & Stripes II**:  The above photograph of the America's Cup boat *Stars and Stripes '88* from p. 225 of **EX1010**, illustrates a sail according to claim 1 made and sold by North Sails in 1988. The photograph shows a sail having a tack, a luff, and a luff region extending along the luff. The head of the sail is not visible in the photo. The sail primarily was made from laminate panels of Kevlar yarns disposed

TABLE 4

<table>
<tr><th>Claim of Collie U.S. Pat. No. 12,110,089</th><th>Citations to Prior Art</th></tr>
<tr><td></td><td>between Mylar sheets, with the exception of the roughly triangular foot area, which was made from a polyester taffeta between 1 mil Mylar sheets, as explained in par. 38 of this Declaration.

Alinghi:

See EX1020 New Your Times article about the 2010 America’s Cup race from which the photograph above was obtained.

Note that all sails have a head, a tack, a luff, and a luff region extending along the luff.</td></tr>
<tr><td>[1.F] wherein the luff region has a higher degree of elasticity compared to a remainder of the sail,</td><td rowspan="2">Stars & Stripes II: As explained in par. 34 to 38 of this Declaration:

The luff region of Stars and Stripes ’88 (the first material) was made from the</td></tr>
<tr><td>[1.G] wherein the luff region of the sail includes a first material</td></tr>
</table>

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
[1.H] and a remainder of the sail includes at least a second material, [1.I] wherein the first material and the second material are different, and	lightest available Kevlar material (200 denier Kevlar yarns with 1 mil Mylar sheets), and was, on average, more elastic than the remainder of the sail. The leach area of the sail, on the right of the illustrated jib was made with heavier 400 denier Kevlar yarns woven with a higher denier per inch (DPI) than the luff region. The middle region of the sail, between the luff region and the leech area on the right) was made with 1000 denier Kevlar yarns between 2 mil Mylar sheets. The materials of the leech area and of the middle "third region" both qualify as a "second material" in the remainder of the sail, that is different than then "first material' in the luff region. **Alinghi**: As explained in par. 55 of this Declaration, the orange-bordered region on the left side of the image below from the design records in **EX1030** is the luff region, running along the luff (left edge) of the illustrated headsail, and the remainder of the sail includes the red and yellow-bordered regions. The material of the luff region has a lower density of yarns than the remainder of the sail, and thus comprises a different material from the remainder of the sail.

TABLE 4

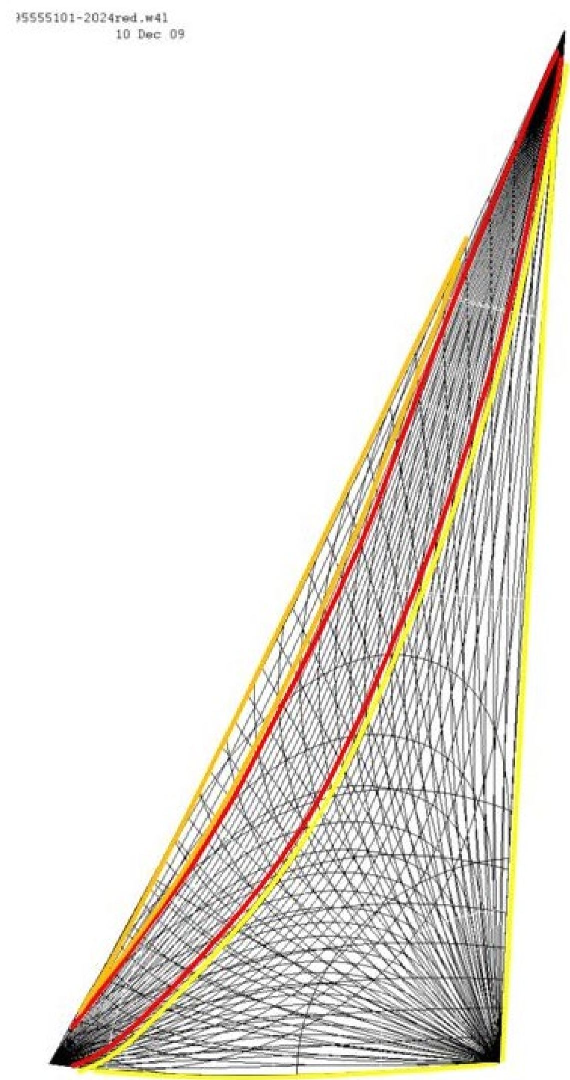
Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
	
[1.J] wherein an average stiffness of the second material is in a range of 2-	**Stars & Stripes II**: As explained in par. 40 of this Declaration:

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
20 times higher than an average stiffness of the first material.	The stiffness of the second material of *Stars and Stripes '88* was 2-5 times higher than the stiffness of the first material based on the denier of the yarns that were used in the respective areas: luff: 200 denier, leech: 400 denier, third region: 1000 denier. **Alinghi**: As explained in par. 50, 58, and 59 of this Declaration, the yarn density in a given region of a sail is directly proportional to the stiffness of that region. The *average* stiffness of the luff and remainder of the sail cannot be determined, but a yarn density across a given girth of a sail can be determined from the design files for the sail. In the case of the Alinghi sail, the yarn density in denier per inch (DPI) was calculated across a girth spanning the middle of the sale from luff to leech (par. 58 and 59) as graphically illustrated in the table following par. 58 of this Declaration. The average DPI of the luff region (the "first material") was 12250 DPI, while the average DPI for the remining portions of the sail were 25025 for the material nearer the leech (the "second material") and 28787.5 for the material in the middle of the sail (the so-called "third region" or "third material"). Thus, the second and third materials making up the

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
	reminder of the sail are 2 to 2.35 times stiffer than the luff region material.
Claim 2	**The above for claim 1 and:**
[2.A] The sail of claim 1, wherein the sail is a mainsail.	**Stars & Stripes II**: As explained in par. 38 of this Declaration: At least one of the *Stars and Stripes '88* sails sold by North sails in 1988 was a mainsail.
Claim 3	**The above for claim 1 and:**
[3.A] The sail of claim 1, wherein the sail is a headsail.	**Stars & Stripes II**: As explained in par. 38 of this Declaration: More than one of the *Stars and Stripes '88* sails sold by North Sails in 1988 was a jib, i.e., a headsail **Alinghi**: As explained in par. 50 to 55 of this Declaration, the sail sold to Team Alinghi in 2009 was a headsail.
Claim 10	**The above for claim 1 and:**
[10.A] The sail of claim 1, wherein the first material extends at least 50% to about 95% of a distance between the head and tack of the sail.	**Stars & Stripes II**: As can be seen in the photo from EX1010 above in the section on claim 1 and explained in par. 37 of this Declaration, the first material of the luff region (the panel on the left of the jib) extends most of the way between the head and the tack. **Alinghi**: As explained in par. 55 of this Declaration, the luff region of the sail

TABLE 4

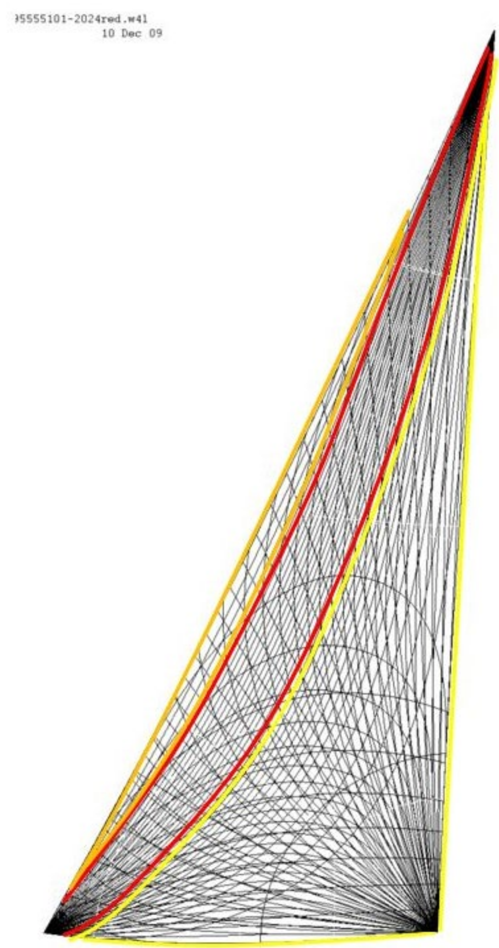
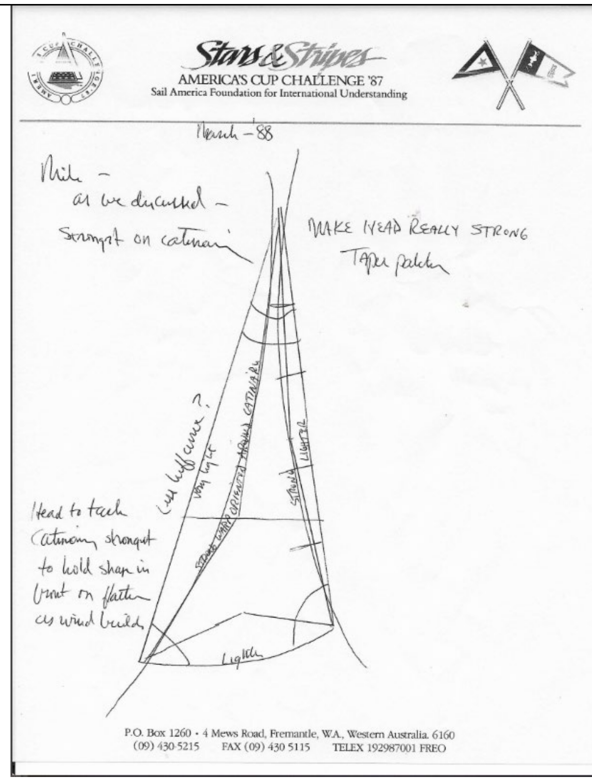
Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
	runs approximately 80 -90% of the distance from tack to head, which meets the at least 50-95% limitation, as is evident from the annotated image below in which the luff region (first material) is outlined in orange on the left side of the sail image. 

TABLE 4

Claim of Collie U.S. Pat. No. 12,110,089	**Citations to Prior Art**
Claim 11	**The above for claim 1 and:**
[11.A] The sail of claim 1, wherein the first material extends up to about 10% to about 50% of a width of the sail towards a leech of the sail.	**Stars & Stripes II**: As explained in par. 44 of this Declaration: As can be seen in the photo from page 225 of EX1010 above, in the section relating to claim 1, the first material extends about 20% to 33% of the width of the sail.
Claim 13	**The above for claim 1 and:**
[13.A] The sail of claim 1, wherein the sail includes a third region having an elasticity less than other regions of the sail,	**EX1025:** A sketch and description of sail with strong catenary band between a stretchy luff and a stiff leech used for sails of the 1988 America's Cup winner *Stars and Stripes '88* made by Thomas A. Whidden in March 1988:

TABLE 4

<table>
<tr><th>Claim of Collie U.S. Pat. No. 12,110,089</th><th>Citations to Prior Art</th></tr>
<tr><td></td><td>


The sketch is dated March-88 at the top, and is oriented with the luff on the left, and leech on the right.
The sketch is addressed: “Mike – as we discussed-Strongest on the catenary.”
The catenary band running up the middle of the sail is labeled: “STRONG WARP ORIENTED AROUND CATENARY“, while the leech on the right is labeled “lighter” and the luff region on the left is labeled “very light”
</td></tr>
</table>

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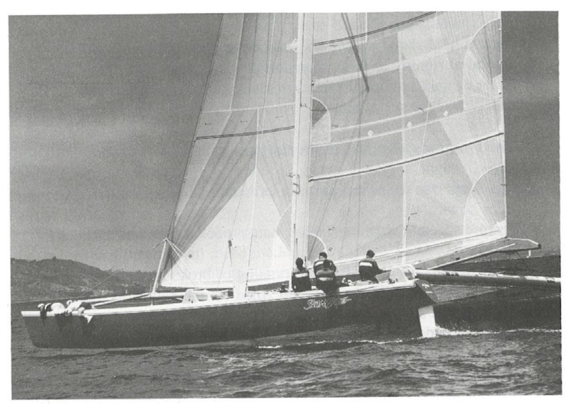
	Next to the lower left side of the sail is the statement "Head to tack Catenary strongest to hold shape in front or flatten as wind builds" **EX1010** includes the following photo which shows the jib on the left, which shows the Stars and Stripes '88 jib following the design on of the sketch in **EX1025** on the soft-rigged version of Stars and Stripes, a soft rig mainsail instead of the wing mainsail ultimately used in the 1988 America's Cup boat.  **EX1020:** New York Times article about the 2010 America's Cup includes a photo of the Swiss Team Alinghi boat with a sail a sail prepared for and sold to Team Alinghi by North Sails Group, LLC. An annotated version of the photo is included below with red lines around the stiffest area of the jib at the front of the

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	boat (left side of the photo). The stiffest region of the sail, between the red lines, runs from the tack toward the head adjacent to the luff area of the sail (on left). **Alingi (EX1020, and EX1026 through EX1030):**  The sail in the photo is a composite sail designed using the North 3Di process, and was sold to Alinghi on December 13, 2020 as shown in **EX1027** (see a par. 53 of this Declaration). The design records for the sail, designed by North Sails designer Patrick Masuay, provide thread layouts for the sail sold to Team Alinghi (see excerpts from the design records in **EX1030**; and par. 55-59 of this Declaration). An annotated version of the composite thread layout showing the tread patterns form all of the layers superimposed, is shown below with yellow lines around the stiffest

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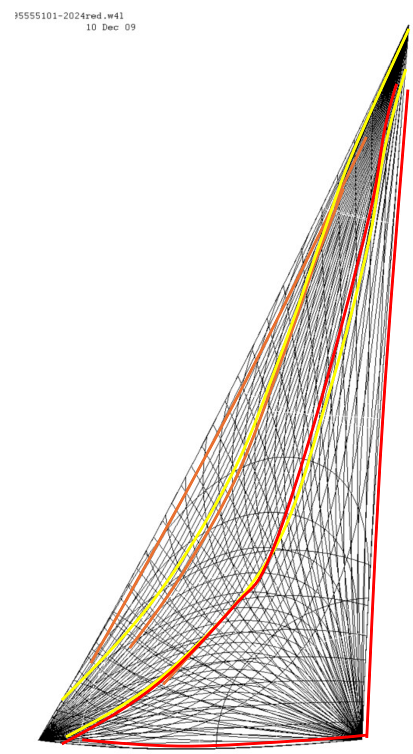
	portion of the sail between the luff area (between red lines on the left) and the remainder of the sale (between red lines on the right). See also par. 55-59 of this Declaration. **Alinghi thread layout (EX1030), annotated:**  **Conrad (EX1023):** See par. 66-67 of this Declaration. Col. 3, ll. 22-25: "Although not all of the threads connecting head 11 to clew 13 have been shown, these are evident from

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	the catenary location of these threads on the spinaker." Col. 4, ll. 46-50: "Accordingly, in each panel, as shown by the representative thread line 16, the proper orientation of the catenary can now be achieved by employing a sufficient number of threads of the type most suitable to the purpose." Col. 7, lines 15-26: “Turning now to FIG. 3, it illustrates a typical jib sail (larger versions of which are sometimes called Genoa sails). The jib 30 has a head 31, a tack 32, and a clew 33. It has a luff 34 and a leech 35. Its foot has been identified as 36. “The sail consists of a number of panels. It has been constructed as previously described in my U.S. Pat. No. 4,708,080 **with the threads 16 running as catenaries from the head 31 to clew 33 and from head 31 to tack 32**. It may also be constructed, as explained herein, with an interlayer of foam with the threads next to the foam on one or both sides of the foam layer.” (emphasis added) Col. 2, lines 64-65: “FIG. 4 illustrates in plan view a typical mainsail for a sloop or split rigged; boat, such as a ketch or a yawl”

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	Col. 8, lines 11-13: "The mainsail as shown [in FIG. 4] has luff 44 which carries a luff rope (not shown) and leech 45." The sail in FIG. 4 shows a higher density of catenary threads 16 (three closely spaced catenary threads 16 in the middle of the sail running from tack 42 to head 41) between the luff region on the left side of the sail (one thread 16), and the remainder of the sail which has catenary threads running from clew 43 to head 41 which are spaced further apart than the three threads circled in red in the annotated Fig. 4, below. The stiffness of a given region is proportional to density of the number of threads 16 in that region.

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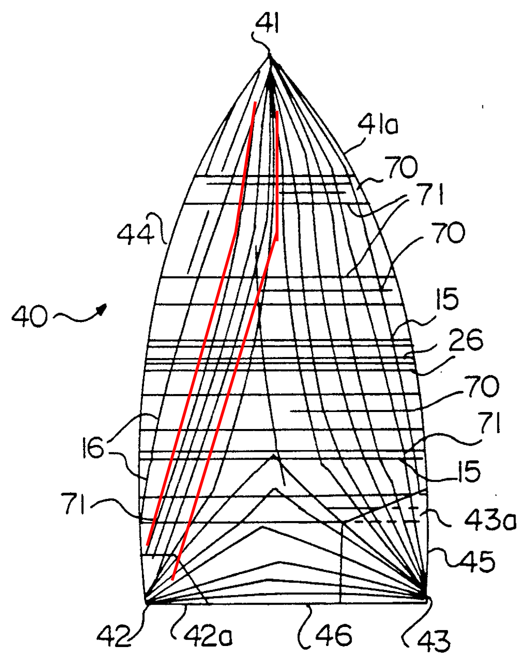
	FIG. 4  **Smale (EX1031):** See par. 68-73 of this Declaration. Col. 1, l. 51-55: "It is an object of this invention to provide improved fore and aft sails, capable of varying their cross-sectional shape in response to varying wind conditions, or which will at least provide sail makers with a useful choice." Col. 3, l. 13-18: "The invention in its simplest form radiates straight lines of directional stability from the clew towards the aft edge of the fore portion

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	of the sail. Thus the aft edge of this fore portion can become the collector for the majority of the stresses at the clew." Col. 6, l. 7-13: "Figure 5 shows a mainsail in accordance with this invention having a fore portion 40 and an aft portion 41. The aft portion is similarly formed from a series of panels to provide lines of directional stability radiating outwardly from the clew to at least a central region of the aft edge 42 of the fore portion 40." Col. 6, l. 16-20: "Figure 7 shows a similar mainsail with the addition of strips of reinforcing material 44 superimposed on the surface of the fore portion 40 of the sail which is itself make up of substantially triangular panels 18A-18E." **Smale FIG. 7:**

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	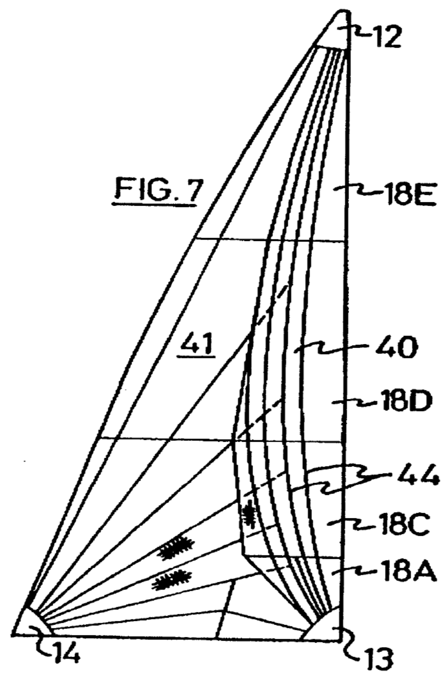 Col. 6, l. 27-36: "Figure 8 shows a headsail 50 having a fore portion 51 and an aft portion 52. This sail can be formed from a single large panel, or more conveniently a series of panels 53 54 55 56, in which the orientation of the thread lines of the panels is not as important as the orientation of the lines of directional stability of a series of strips of material, e.g. tapes 60, 61, superimposed on the surface of the material."

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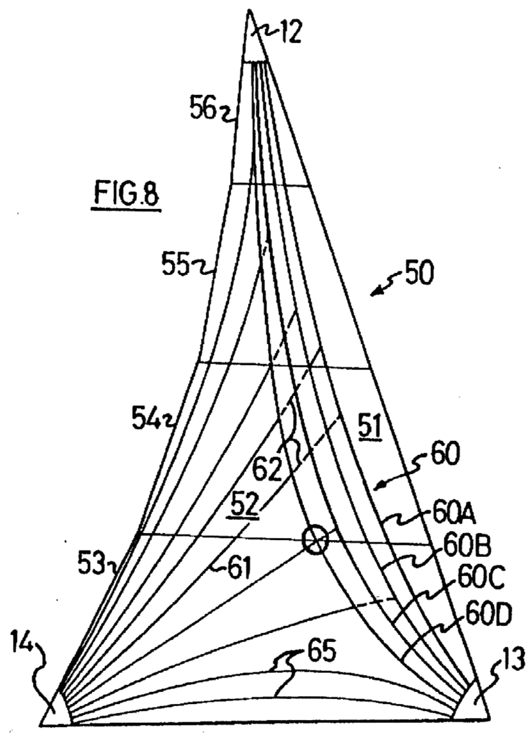
	Smale FIG. 8: 
[13.B] this third region extending along at least a portion of a margin of the luff region between the luff region and the remainder of the sail.	**See Above [13.A]** **Stars and Stripes I and II:** The catenary band or third region shown in **EX1025** and **EX1010** runs along the border between the luff and the remainder of the sail. **Conrad:** In Conrad (EX1023), the catenary band or third region, circled in red in annotated FIG. 4, runs along a border between the luff and the remainder of the sail.

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	Alinghi: In the Alinghi sails of **EX1028-EX1030**, the third region is the strongest section of the sail, which runs from the tack through the mid-portion of the sail, toward the head, adjacent to the luff region. **Smale:** In Smale (**EX1031**) the third region is comprised of the region of tapes 44 (FIG. 7) or tapes 60A-D, which are adjacent to the luff region 18A-E (FIG. 7) or 51 (FIG. 8).
Claim 14	**The above for claims 1 and 13 and:**
[14.A] The sail of claim 13, wherein the third region extends from the head to the tack of the sail.	**See Above [13.A]** See par. 76 of this Declaration. **Stars and Stripes I and II:** The catenary band or third region shown in **EX1025** and **EX1010** runs along the border between the luff and the remainder of the sail from head to tack. **Conrad:** In Conrad (**EX1023**), the catenary band or third region, a portion of which is circled in red in annotated FIG. 4, runs along a border between the luff and the remainder of the sail from tack to head.

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	Alinghi: In the Alinghi sails of **EX1028-EX1030**, the third region is the strongest section of the sail, which runs from the tack through the mid-portion of the sail, toward the head, adjacent to the luff region. **Smale:** In Smale (**EX1031**) the third region is comprised of the region of tapes 44 (FIG. 7) or tapes 60A-D, which are adjacent to the luff region 18A-E (FIG. 7) or 51 (FIG. 8). The tapes run from tack to head.
Claim 15	**The above for claims 1 and 13 and:**
[15.A] The sail of claim 13, wherein the third region comprises carbon.	See par. 77 of this Declaration. **MSP**: p. 60 "…. the sailmaker can design the sail with low-stretch Kevlar yarns in the high-load areas and a regular polyester in the rest of the sail." **MSP:** p. 20 photo caption: "Some fabrics are made from a blend of fibers such as Kevlar and carbon in order to maximize benefits of each." It would have been an obvious design choice to use a combination of high modulus carbon fibers with high modulus Kevlar (e.g., as used in Conrad) at the

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	time of the alleged invention, in order to maximize the benefits of each type of fiber, per **MSP** p. 20. Kevlar is a common sailcloth material (see MSP, p.20). **Alingi:** As discussed in par. 77 of this Declaration, the Alinghi sail sold to Team Alinghi in 2009 was a composite sail made from a combination of Kevlar and carbon fibers between layers of polyester film.
Claim 16	**The above for claim 1 and:**
[16.A] The sail of claim 1, wherein the first material comprises a gradient of reducing elasticity in a direction from luff to leech, as defined by its:	**Alinghi:** See par. 64 of this Declaration. The sail sold to Alinghi in 2009 **(EX1020 and EX1026 through EX1030)** has a luff region that comprises a gradient of reducing elasticity, as determined by the yar density DPI of a girth spanning the center of the sail, as discussed in par. 59 and 64 of this Declaration. The table above paragraph 59 shows that for a sail girth spanning the middle of the sail from luff to leech, the yarn density (in DPI) in the luff region (first material) nearest the luff is 11,000 DPI while the DPI of the next adjacent portion of the luff region is 13,500, which represents a gradient of reducing elasticity, since elasticity is

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	inversely proportional to DPI for yarns of the same type.
[16.B] (i) failure strain, **or**	It is common knowledge that the failure strain will roughly inversely depend on DPI of the sailcloth when the fibers are of the same type, as in the 2009 Alinghi sails.
[16.C] (ii) average Young's Modulus, **or**	It is common knowledge of a POSITA that the modulus of an area of a sailcloth increases with increasing fiber DPI for fibers of the same type, as in the Alinghi sails.
[16.D] (iii) both (i) and (ii).	It is common knowledge that the failure strain will roughly inversely depend on DPI of the sailcloth, and modulus will be directly proportional to DPI when the fibers are of the same type, as in the 2009 Alinghi sails.
Claim 23	
[23.A] A sail comprising [23.B] a head, [23.C] a tack, [23.D] a luff extending between the head and the tack; [23.E] and a luff region extending along the luff; [23.F] wherein the luff region has a higher degree of elasticity compared to a remainder of the sail, [23.G] wherein in a luff direction, a ratio of a stiffness of regions outside	**Stars and Stripes II:** *Stars and Stripes '88* meets all of these limitations for the reasons set forth in claim 1 above and discussed in par. 34 to 40 of this Declaration. **Alinghi:** The sail sold to Alinghi in 2009 **(EX1020 and EX1026 through EX1030)** meet all of these limitations for the reasons set

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the luff region and the stiffness of the luff region is in the range of 2-25 times greater.	forth in claim 1 above and discussed in par. 55 to 59 of this Declaration.