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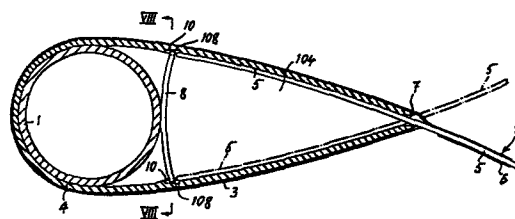
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Mast and sail structure for boats.

A mast and sail structure for boats comprises battens (5) that are each housed in a respective pocket (6) of the sail (2) and are each associated to a collar (14) having an airfoil section, which is fitted on the mast (1) and is housed therewith in a respective pocket (3) of the sail (2). Each batten (5) penetrates into the collar (4) through a rear slot (7) of the same and it is at least horizontally pivotable about an axis substantially coinciding with said slot (7). The batten can bear against a transverse stabilization baffle (8) which is provided in the interior of the collar (4) and is preferably movable transversely to the mast (1).



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Mast and sail structure for boats

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15 The invention concerns a mast and sail structure
for boats, provided with battens that are each housed in a
relative pocket of the sail, and that by their forward end
are each articulately connected, so as to be at least
horizontally pivotable, to a collar preferably having an
20 airfoil section, which is fitted on the mast and is housed
therewith in a respective pocket of the sail.

 In these mast and sail structures, the supporting
function on one hand, and, on the other hand, the function
25 of guiding the battens and of profiling the leading edge
of the sail are performed by distinct elements. The sup-
porting function is performed by the mast which can have
a circular outline, so that it can be made in a simple and
economical manner notwithstanding its usually tapering
30 shape, and the required strength is guaranteed with a

1 minimum weight.

The aerodynamic profile of the fore edge of the sail is obtained by means of wing-like-profiled collars
5 that guarantee also the correct guiding of the battens, control the angle between the mast and the sail battens, and maintain in every moment the best profile of the sail. These collars do not perform any substantial supporting action, and so they can be made from any suitable, cheap
10 and light material. Moreover, the collars protect the sail against any hole produced by the pressure of the forward end of the battens.

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The object of the invention is to further improve the mast and sail structures of the above-disclosed kind, in order to facilitate their construction and reduce the respective costs, and especially in order to simplify the
20 collars fitted on the mast and their connection with the respective battens, and to ensure the indeformability of said collars notwithstanding their simple and economic construction.

25 To this end, the invention provides a mast and sail structure of the kind as described at the beginning, characterized in that

a) the collar has a rear slot;

b) through the said rear slot the batten is fitted
30 the collar with such a play that it is at least horizon-

1 tally pivotable about an ideal axis substantially coinci-
ding with the said slot;

c) the collar has an internal space of such a
width that the forward end of the batten is free to pivot
5 in the said internal space of the collar;

d) the batten bears against a member which is
integral with the collar.

The collar fitted on the mast may be made from any
10 suitable material. Preferably, the collar is made from
plastics for reasons of economy, and in order to make it
more resistant to water and corrosion.

According to one preferred embodiment of the
15 invention, the collar has a transverse, internal, stabi-
lization baffle. This transverse internal baffle ensures
the stability of the selected profile of the collar and
withstands any stress tending to deform the said collar.

20 The transverse internal baffle of the collar may
be made of one piece with the collar, particularly from a
suitable plastics, or it may be made separately, and may
be inserted in said collar.

25 Particularly in this latter instance, when bet-
ween the two sidewalls of the collar a pressure force is
exerted, tending to squeeze transversely the said collar,
the transverse internal baffle thereof is formed from a
substantially rigid material. Whereas, in the instance in
30 which between the two sidewalls of the collar a tensile

1 stress is exerted, tending to transversely enlarge the
collar, instead of squeezing it, the transverse internal
baffle thereof may be made even of a flexible material,
and, for example, it may consist of a strap of flexible
5 material, such as a textile material, or the like, which
by its ends is fastened to the two opposite sidewalls
of the collar.

According to a further embodiment of the invention,
10 the transverse internal baffle of the collar is movable
transversely to the mast. Thus, the distance between the
internal baffle and the fore wall of the collar can be
changed and adapted to masts of a different diameter,
and/or to the different diameters of a same conical mast.
15 Moreover, it is possible to obtain a support against the
mast both for the fore wall of the collar and the transverse
internal baffle, that is to say, the mast can be set into
contact, or almost into contact, with the transverse
internal baffle of the collar and with the fore wall of
20 said collar.

The support for the batten in the longitudinal
direction against a member which is integral with the
collar, may be provided in any suitable manner. According
25 to one preferred embodiment of the invention, the batten
slidably bears with its forward end against the transverse
internal baffle of the collar. In this instance, and
particularly when the transverse internal baffle is made
of a rigid material, this baffle preferably has an arcuate
30 shape, with its concave side being turned aftward, i.e.,

1 toward the batten, and with its center of curvature
being substantially in line with the rear slot in the
collar.

5 According to another embodiment of the support
for the batten in the longitudinal direction against a
member of the collar, the batten bears by means of abutment
side projections against the outer edges of the rear slot
in the collar. These projections may be made of one piece
10 with the batten.

In one preferred embodiment permitting to use any
conventional batten, the said abutment side projections
for the support of the batten against the outer edges of
15 the rear slot in the collar, are provided on a hood that
is fitted on the forward end of the batten.

The member of the sleeve against which bears the
batten, may consist also of a flexible strap which is
20 folded upon itself in form of a loop, and by its ends is
fastened at both sides of the rear slot in the collar.

25 Some embodiments of the invention will be described
hereinafter in a more detailed manner, by referring to
the annexed drawings, in which:

Figure 1 is an elevational view diagrammatically
30 showing a mast and sail structure according to the invention.

1 Figure 2 is a vertical sectional view in an enlarged scale, showing a collar which is fitted on the mast together with the sail and a batten.

5 Figure 3 is a horizontal sectional view of the collar according to Figure 2.

 Figures 4 and 5 are a vertical and a horizontal sectional view showing the aft portion of a collar, with
10 a different construction of the support for the batten against the said collar.

 Figure 6 is a horizontal sectional view showing a modified embodiment of the mast and sail structure according
15 to the invention.

 Figure 8 is a vertical sectional view of said structure, taken on line VIII-VIII of Figure 7.

20 In the Figures, by numeral 1 there is designated the mast of the mast and sail structure of a boat, for example, of a sail board, or of a Laser-type craft, or of a multi-hull craft, or the like. The mast 1 is made in a conventional manner, that is to say, it presents a circular
25 tubular profile and has a conical shape slightly tapering toward the top end thereof. The sail 2 has a pocket 3 in which the mast 1 is fitted.

1 Housed at intervals in the mast pocket 3 of sail
2, are collars 4 that have a wing-like profile, so that
they give the leading edge of the sail a corresponding
aerodynamic profile. The mast 1 fitted in pocket 3 of sail
5 2 passes through the collars 4. When the mast 1 is not
allowed to rotate, the collars 4 are freely rotatable
thereabout. On the other hand, the mast 1 may even be a
rotatable mast, and then the collars 4 can be non-rotatably
bound to the said mast 1.

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On mast 1 each collar 4 is provided in correspon-
dence of a batten 5 of sail 2. Each batten is housed in a
respective pocket 6 of sail 2, and its forward end turned
toward the mast is inserted into the respective collar 4
15 through a slot 7 provided in the rear edge of said collar
4. In Figures 2 and 3 the depth of insertion of batten 5
into the respective collar 4 is limited by a baffle 8
extending at the interior of collar 4 between the two
sidewalls thereof, and which is made of one piece with
20 said collar. In the inside of collar 4 the forward end of
batten 5 bears against the said baffle 8 that in cross-
section preferably has an arcuate shape, with its center
of curvature being in line with the rear slot 7.

25 In the embodiment according to Figures 4 and 5,
abutment projections 9 are instead externally provided on
one or, preferably, on both of the sides of batten 5, and
bear against the outer edges of the rear slot 7 in collar
4, thus limiting the depth of insertion of the forward end
30 of batten 5 into said collar 4.

1 In the modified embodiment according to Figure 6,
the abutment side projections 9 that bear against the
outer edges of slot 7 in collar 4, are provided on a
hood 109 fitted on the forward end of batten 5. Moreover,
5 in the embodiment according to Figure 6, the collar 4
has a squatter profile in cross-section, which is different
from the wing-like profile shown in Figures 3 and 7.

Each batten 5 is inserted into the slot 7 in the
10 respective collar 4 which such a play that a hinge effect
is obtained. The internal space 104 in the rear section
of collar 4 has such a width that the batten 5 can be
angularly moved transversally to the mast, i.e., horizon-
tally, between two end positions that are determined by
15 the stopping of the forward end of batten 5 at the interior
of collar 4, against the sides of said collar, as shown
by solid lines and by dash-and-dot lines in Figure 3. In
this Figure, the batten 5 while performing the said
angular movement, always bears with its forward end
20 against the internal arcuate baffle 8, so that the depth
of insertion of the batten into the collar 4 does not
change. The same effect is obtained also with the external
abutment projections 9 according to Figures 4 to 6. In
both of the angular end positions of its horizontal
25 pivoting movement, the batten 5 is aerodynamically con-
nected to the respective sides of collar 4, so that it
forms a smooth connection between the leading edge and the
lee face of the sail is ensured, and the forming of any
turbulence in the said connection area is eliminated.

1 Preferably, the battens 5 have a certain play
also in relation to a vertically directed angular movement
within the rear slot 7 in the respective collars 4, so
that they can take several inclinations in the vertical
5 direction, as it is evident in Figure 1.

In the embodiment according to Figures 7 and 8,
the mast 1 is held between the fore wall of collar 4 and
the internal baffle 8, so that it bears both against the
10 fore wall of collar 4 and against the internal baffle 8,
without such an arrangement necessarily preventing the
rotation of collar 4 about the mast 1, when such a rotation
is desired. In order to adapt the distance between the
fore wall of collar 4 and the internal baffle 8 to the
15 different values of the diameter of mast 1, which varies
along the said conical mast 1, and/or to masts of a
different diameter, the internal baffle 8 is made in form
of an element that is separate from collar 4, and is
within certain limits movably guided in said collar,
20 transversely to mast 1. For this purpose, in the shown
embodiment parallel guide notches 10 extending transver-
sely to mast 1, are provided in correspondence of the
upper and lower edges of collar 4, in the inner side of
its opposite sidewalls. In each one of these guide notches
25 10 a respective lateral projection of tooth 108 for guiding
the movable baffle 8, is slidably engaged. Of course, the
bond of the internal movable baffle 8 to collar 4 and the
guiding of said baffle in collar 4 may be obtained with
any suitable means even substantially different from the
30 shown and described ones, since the idea of the invention

1 generally consists in the limited mobility of the internal
baffle 8 transversely to mast 1. The collar 4 may have any
suitable profile in horizontal section, especially in its
fore portion that may have a semicircular, or circle arc
5 profile, as shown in Figures 6 and 7, or it may have such
a profile that it only locally bears in two or more points
or zones, against the mast 1. Moreover, the mobility of
the internal baffle 8 of collar 4 transversely to mast 1
is applicable also to the embodiments according to
10 Figures 4 to 6, in which through abutment side projections
9 the batten 5 bears against the outer edges of the rear
slot 7 in collar 4, since the internal baffle 8 performs
the essential function of forming a collar-stiffening
crosspiece, so as to ensure the stability of the selected
15 airfoil section of the collar, and as to withstand any
stress tending to deform it.

The number and the length of the batten-guiding
collars 4 fitted on a mast 1 in the respective pocket 3
20 of sail 2 may vary, since it is possible to provide longer
collars than those shown, which are each associated with
two or more battens. It is even possible to provide only
one collar extending in the fashion of a sheath throughout
the height of mast 1, with which all the battens of the
25 sail are associated.

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CLAIMS

1. A mast (1) and sail (2) structure for boats,
provided with battens (5) that are each housed in a relative
5 pocket (6) of sail (2), and that by their forward end are
each articulately connected, so as to be at least
horizontally pivotable, to a collar (4) preferably having
an airfoil section, which is fitted on mast (1) and is
housed therewith in a respective pocket (3) of sail (2),
10 characterized in that

- a) the collar (4) has a rear slot (7);
- b) through the said rear slot (7) the batten (5)
is fitted in collar (4) with such a play that it is at
least horizontally pivotable about an ideal axis sub-
15 stantially coinciding with the said slot (7);
- c) the collar (4) has an internal space (104) of
such a width that the forward end of batten (5) is free
to pivot in the said internal space (104) of the collar;
- d) the batten (5) bears against a member which
20 is integral with the collar.

2. The mast and sail structure according to Claim
1, characterized in that the collar (4) is made' of plastics.

25 3. The mast and sail structure according to any
one of Claims 1 or 2, characterized in that the collar (4)
has a transverse, internal, stabilization baffle (8).

4. The mast and sail structure according to Claims
30 1 to 3, characterized in that the transverse internal

1 baffle (8) is made of one piece with collar (4).

5 5. The mast and sail structure according to Claims 1 to 3, characterized in that the transverse internal baffle (8) is made separately and is inserted in said collar (4).

10 6. The mast and sail structure according to any one of Claims 4 or 5, characterized in that the transverse internal baffle (8) is formed from a substantially rigid material.

15 7. The mast and sail structure according to any one of Claims 4 or 5, characterized in that the transverse internal baffle is formed from a flexible material.

20 8. The mast and sail structure according to Claim 7, characterized in that the transverse internal baffle consists of a strap of flexible material, such as, for example, a textile material, or the like, which by its ends is fastened to the two opposite sidewalls of the collar.

25 9. The mast and sail structure according to any one or more of Claims 3 to 8, characterized in that the transverse internal baffle (8) is movable transversely to mast (1), within such limits that it can bear against masts of different diameters, or against sections with a different diameter of a same conical mast (1).

1 10. The mast and sail structure according to Claim
9, characterized in that the transverse internal baffle
(8) made of a rigid material, particularly plastics, is
slidably engaged by means of lateral projections or
5 teeth (108) in respective baffle-guiding parallel grooves
or slots (10) provided in the opposite sidewalls of
collar (4).

11. The mast and sail structure according to any
10 one or more of the preceding Claims, characterized in that
the batten (5) slidably bears with its forward end against
the transverse internal baffle (8) of collar (4).

12. The mast and sail structure according to Claim
15 11, characterized in that the transverse internal baffle
(8) made of a rigid material is reinforced, and has its
concave side turned toward the batten (5), and its center
of curvature in the area of the rear slot (7) in collar (4).

20 13. The mast and sail structure according to any
one or more of Claims 1 to 10, characterized in that the
batten (5) bears by means of abutment side projections
(9) against the outer edges of the rear slot (7) in
collar (4).

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14. The mast and sail structure according to Claim
13, characterized in that the abutment side projections
(9) are made of one piece with batten (5).

30 15. The mast and sail structure according to Claim

1 13, characterized in that the abutment side projections
(9) are provided on a hood (109) fitted on the forward end
of batten (5).

5 16. The mast and sail structure according to any
one or more of Claims 1 to 10, characterized in that the
batten bears with its forward end against a flexible strap
which is folded upon itself in form of a loop, and by its
ends is fastened at both sides of the rear slot in the
10 collar.

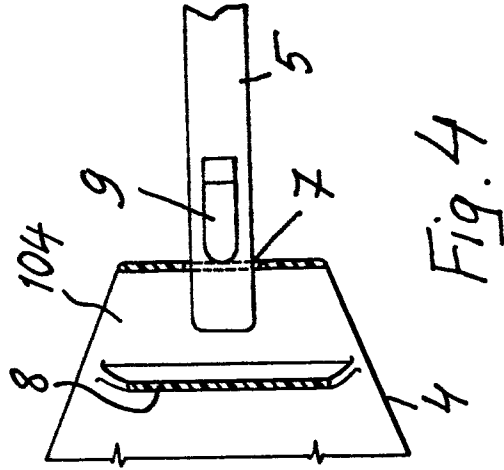
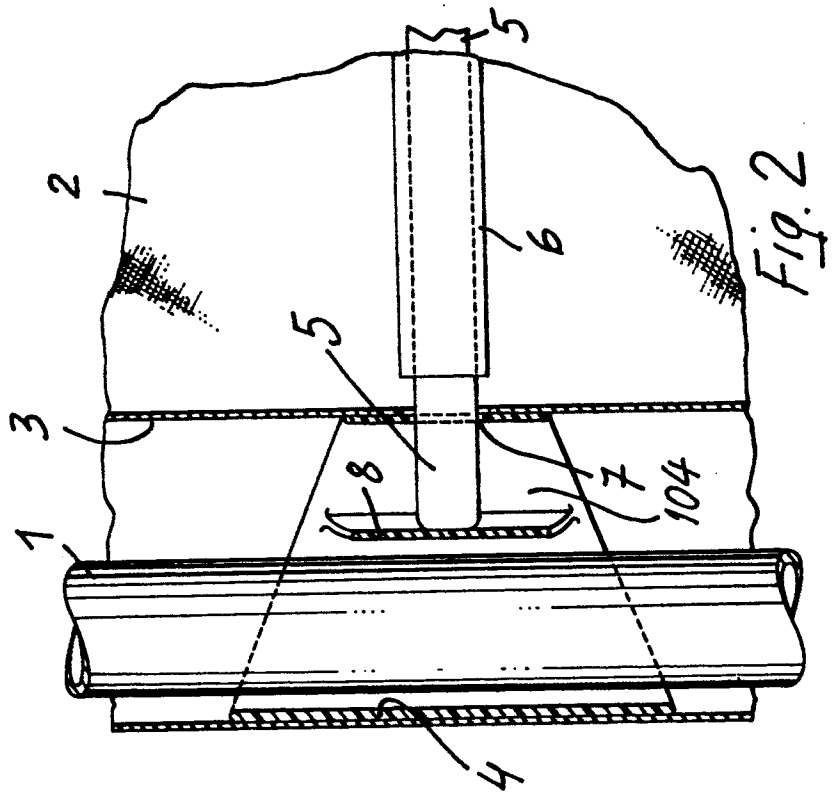
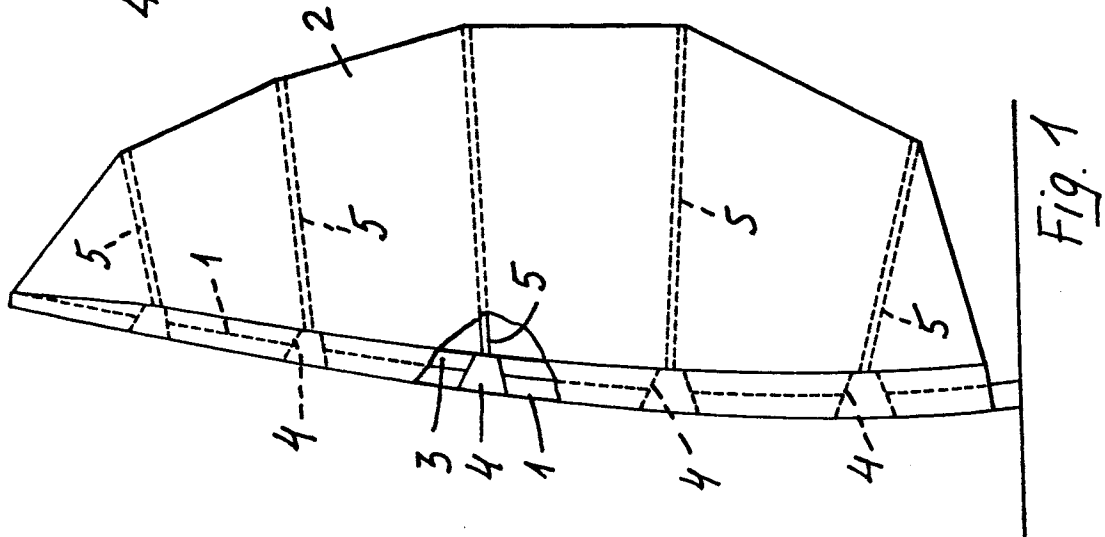
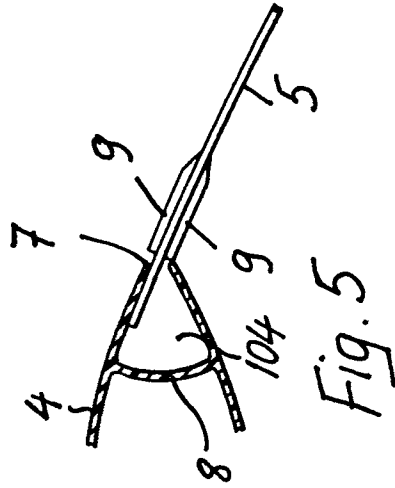
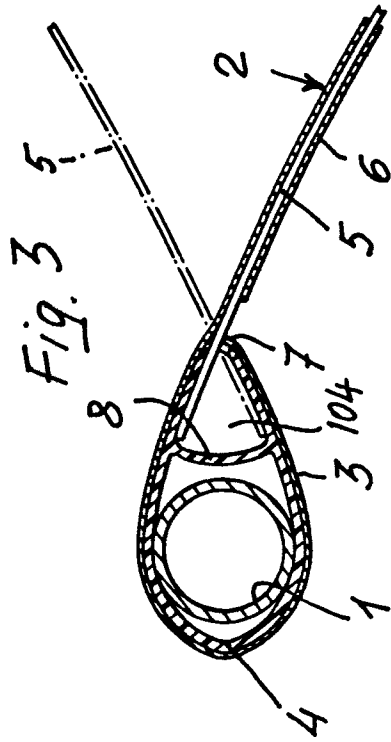
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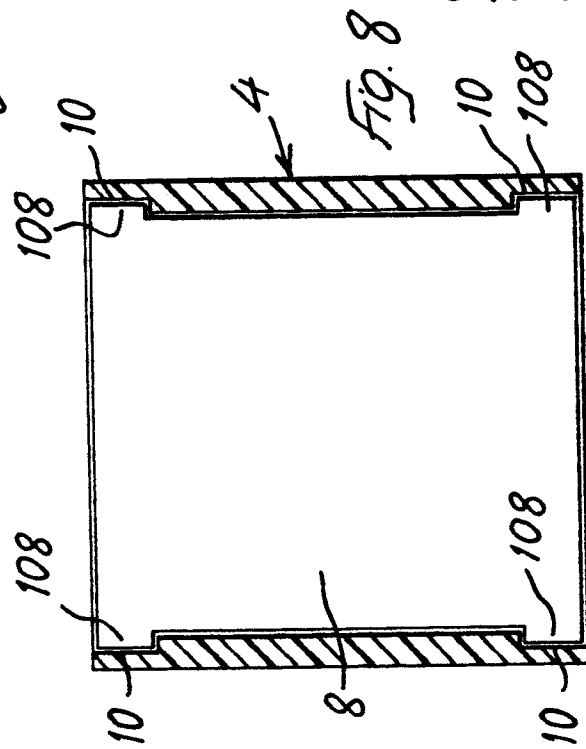
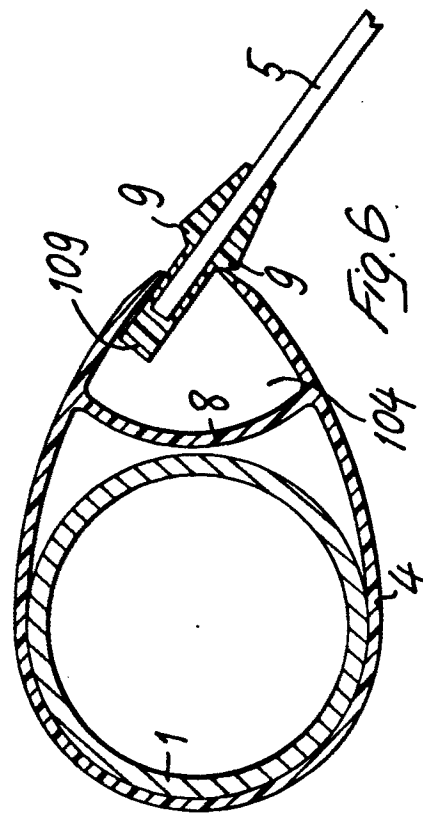
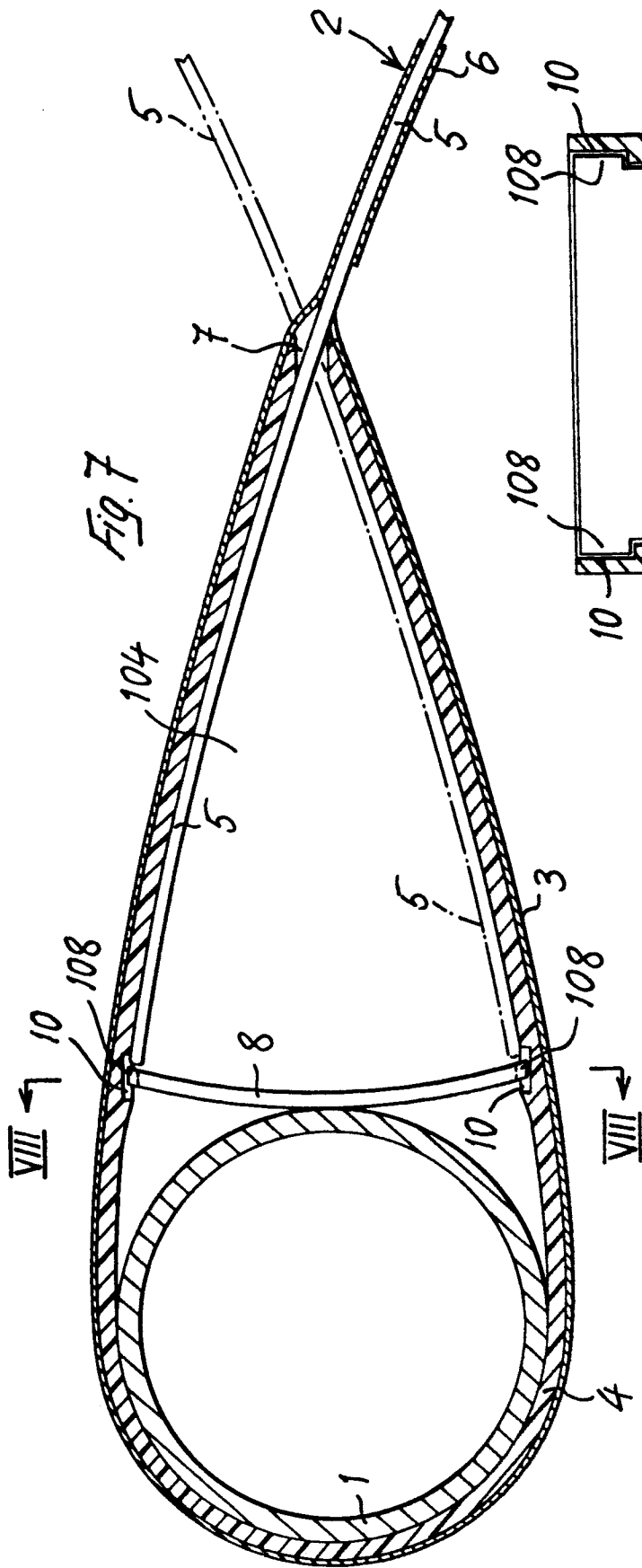
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EUROPEAN SEARCH REPORT

0191420

Application number

EP 86 10 1544

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	PATENTS ABSTRACTS OF JAPAN, vol. 7, no. 153 (M-226) [1298], 5th July 1983; & JP - A - 58 61 093 (YAMAHA HATSUDOKI K.K.) 11-04-1983	1,2,13,14	B 63 H 9/06
P,X	WO-A-8 504 377 (GAASTRA) * Whole document *	1-4,8,9,11,16	
A	EP-A-0 083 432 (LUCHT) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 63 H B 63 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-05-1986	Examiner KNOPS J.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	