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(54) Fastening system for a fin of a waterborne apparatus

(57) A frangible securing element secures a plug (3a,3b) to a fin (2). The plug (3a,3b) can then be mounted to a waterborne apparatus (19) such as a surfboard or a sailboard. The frangible securing element (4,4a,4b) fractures upon sufficient force acting on the fin (2). A replacement frangible securing element (4,4a,4b) may be used to re-secure the fin (2) to the plug (3a,3b) after a fracture having happened.

Figure 1.

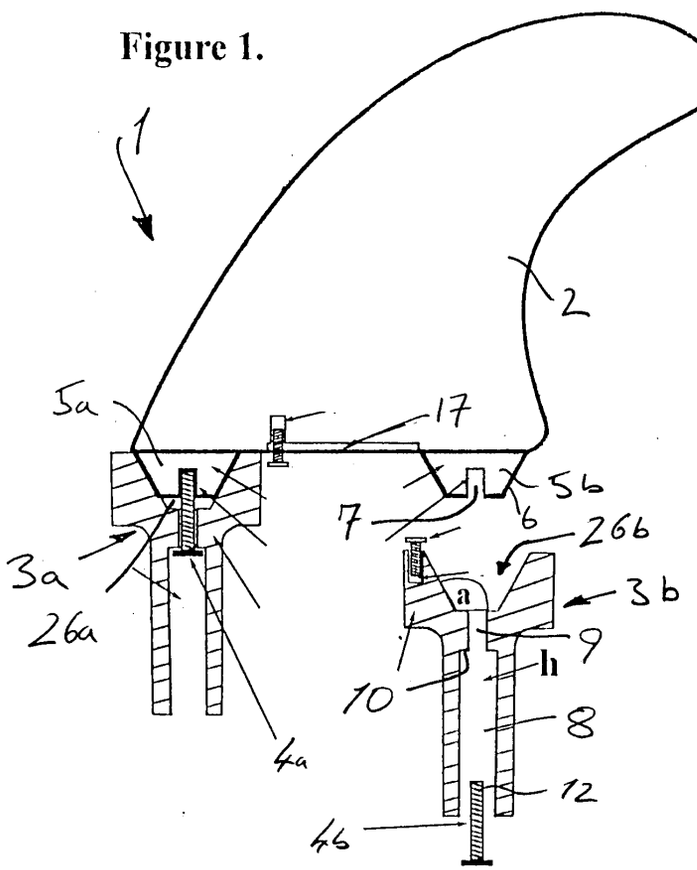

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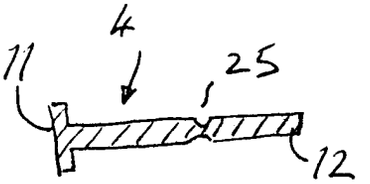
FIGURE 4.



Description

[0001] The present invention relates to fin attachment to a waterborne apparatus, for example a surfboard.

[0002] Typically, surfboards, sailboards, or other waterborne apparatus will have at least one fin attached to the underside of the board and often there will be two or three fins attached. The fin or fins increase stability and manoeuvrability of the board through the water. Fins may be attached to the board in such a way that they are not easily removed, for example, the fin may be moulded to the board when the board is formed. Alternatively, the fin may be detachable.

[0003] When a surfboard is ridden through water, particularly shallow water, the surfboard fin may strike a solid object in the water such as a rock, reef or another surfboard. The fin may also be knocked during transit of the surfboard. The problem with existing fin attachment systems is that the force of a fin striking a solid object will generally damage the fin and cause the fin to break off from the board. For detachable fins, typically the fin is provided with fixtures (plugs) to be fitted into receiving bores in the board. Impact with the fin may cause damage to the fixtures built into the surfboard that the fin is attached to. If a surfboard fin breaks off in water the fin will generally sink and be lost. Even if the fin is made of a buoyant material it may be difficult to find again if the fin breaks off from the board whilst the board is travelling through the water. Replacing the fin and repairing damage caused to the fin attachment fixtures built into the surfboard can be costly.

[0004] An improved fin attachment means has now been devised.

[0005] According to a first aspect of the present invention, there is provided apparatus including:

(a) a fin;
(b) a plug for mounting the fin to waterborne apparatus; and
(c) a frangible securing element securing the plug to the fin, the frangible securing element being configured and arranged to fracture upon sufficient force acting on the fin.

[0006] The securing element is frangible to the extent that, should the fin strike an object, the force of the impact will generally fracture the securing element without irreparably damaging the fin or the plug. A replacement frangible securing element may be used to re-secure the fin to the plug. Replacing the frangible securing element is advantageously simpler and more cost effective than having to replace or repair the fin or repair the plugs which attach the fin to the waterborne apparatus.

[0007] Typically the securing element comprises an elongate element at least a part of which extends through the body of the plug. Beneficially, the fin includes means for holding captive the elongate securing element proximate one end thereof; a spaced portion of the elongate securing element is beneficially retained with the plug.

[0008] Typically the securing element will be metallic (such as a fracturable metal bolt or screw) and the fin and plug of more deformable or resilient material (typically plastics or fibreglass). The frangible element is beneficially provided with a zone of weakness at which fracture is designed to occur, such a zone of weakness may be a waist portion, notched portion or the like. Upon impact, the forces are absorbed in the plug and fin (perhaps inducing resilient deformation in one or both) but cause the frangible securing element to fracture. The arrangement is such that following fracture respective remaining portions of the frangible element are removable from the plug and fin. A replacement securing element may then be used to re-attach the fin to the plug.

[0009] The fin preferably includes at least one locating formation. The plug preferably comprises a formation complementarily engageable with the locating formation of the fin. The locating formation of the fin may have tapered edges. The advantage of the locating formation of the fin having tapered edges is that the fin can separate from the plug without substantially damaging the complementary plug formation.

[0010] The locating formation of the fin preferably includes securing means for securing part of the frangible securing element. The frangible securing element desirably securing the locating formation of the fin to the complementary plug formation

[0011] The fin is preferably provided with spaced locating formations at forward and rearward portions of the fin. Desirably, spaced plug/securing element connections are provided at forward and rearward portions of the fin.

[0012] The frangible securing element is desirably a threaded screw and the securing means of the fin is preferably a threaded recess for receiving one end of the threaded screw.

[0013] The plug preferably includes a hollow internal passage substantially through the plug. Part of the hollow passage of the plug is desirably narrower than the rest of the passage defining an indented shoulder of the plug for retaining, capturing or abutting at least part of the frangible securing element upon introduction of the frangible securing element into the hollow passage of the plug.

[0014] The plug is preferably received in a respective bore in the underside of the waterborne apparatus. The plug may be effectively permanently secured in a respective bore, for example, by bonding (gluing) or the like. The plug preferably includes an aperture through which the (preferably elongate) frangible element may extend. Adjacent the aperture a shoulder or face is preferably defined against which a transversely extending portion (typically a screw head) Of the elongate frangible element may bear.

[0015] In a preferred embodiment, the plug is secured to the fin by a respective elongate screw threaded se-

curing element which has a proximal portion arranged to bear against a portion of the plug and a distal portion arranged to engage with a screw threaded receiving bore carried with the fin.

[0016] In one embodiment, the arrangement is such that the plug and fin are assembled and secured by the screw threaded securing element, prior to the plug (or plugs) being inserted into the respective plug receiving bore of the waterborne apparatus.

[0017] In an alternative embodiment, the plug may be secured in a respective bore (for example by gluing) , the fin subsequently being connected to the plug.

[0018] According to a further aspect, the invention therefore provides a method of attaching a fin to apparatus for waterborne locomotion, the method comprising:

(a) securing a fixing plug to a fin by means of a frangible securing element; and
(b) connecting the plug/fin assembly to the waterborne apparatus by insertion of the plug into a respective receiving bore in the waterborne apparatus.

[0019] According to another aspect of the present invention, the apparatus includes a tether arrangement tethering the fin to the waterborne apparatus. The tether arrangement preferably comprises a tether with two opposing ends, one end being attached to the fin and the other end being attached to the plug.

[0020] The advantage of providing a tether arrangement according to the present invention is that the fin generally remains tethered to the waterborne apparatus even when the fin is no longer secured to the plug. This is particularly useful if the fin breaks off from the waterborne apparatus when the apparatus is in water. The tether arrangement provides that the fin is not lost in the water.

[0021] The apparatus according to the present invention preferably provides an arrangement for housing the tether, preferably in a space, housing or compartment, preferably defined by or between the fin and a surface of the waterborne apparatus. The fin may therefore lie flush with the surface of the waterborne apparatus. The space, housing or compartment is substantially closed when the fin is attached to the waterborne apparatus and open when the fin is disconnected from the waterborne apparatus.

[0022] Another aspect of the present invention provides waterborne apparatus to which a fin attachment apparatus as hereinbefore defined is mounted.

[0023] The waterborne apparatus desirably has at least one bore shaped to receive the plug of the fin attachment apparatus in a close fitting arrangement. A snug fit (push fit) between the plug and the bore of the waterborne apparatus should ensure that water does not enter the bore. A sealant or glue may also be used to seal and fix the plug into the bore of the waterborne apparatus. Alternatively the bore may have a protective waterproof layer. It is important to stop any water from entering the body of the waterborne apparatus through the bore as the water may damage the materials which make up the core of the waterborne apparatus.

[0024] The waterborne apparatus according to the present invention is preferably a surfboard.

[0025] The invention will now be further described in specific embodiments by way of example only, and with reference to the accompanying drawings in which:

Figure 1 is a schematic side view of an exemplary fin system according to the present invention;

Figure 2 shows a schematic side view of a further aspect of the fin system according to the present invention;

Figure 3 is a cross sectional view of waterborne apparatus showing the embodiment of Figure 2 mounted with the waterborne apparatus; and

Figure 4 is a cross sectional view of an embodiment of a frangible securing element included in a fin system according to the invention.

[0026] Referring to the drawings, and initially to Figures 1 and 2, there is shown a fin attachment system 1, comprising a fin 2, a front plug 3a and a rear plug 3b, and two thin metal screws 4a, 4b and securing a respective plug 3a, 3b to fin 2 in the manner described hereafter. The fin 2 has an integrally formed proximal locating formation 5a and a corresponding distil locating formation 5b. The locating formations 5a, 5b have tapered sides 6 and a threaded recess 7. Proximal locating formation 5a complementarily engages with a respective tapered recess 26a of the front plug 3a; distal locating formation 5b complementarily engages with a respective tapered recess 26b of the rear plug 3b. The plugs 3a, 3b have a hollow bore 8 which runs lengthways through the plugs 3a,3b. The conduit 8 has a narrow section 9 which communicates with the respective recess 26a, 26b. The narrow section 9 is defined by an indented shoulder 10 of the plug 3a,3b.

[0027] To secure the locating formations 5a,5b of the fin.2 to the plugs 3a,3b elongate screw 4 is introduced into the conduit 8 of the plug 3a or 3b. The head 11 of the screw 4 is positioned adjacent the indented shoulder 10 of the plug 3a or 3b and the distal end portion 12 of the screw 4 is secured within the threaded recess 7 of the respective locating formation 5a or 5b. Upon fully screwing screws 4a, 4b home screw head 11 rests against the indented shoulder 10. The remainder of the screw 4 is position in the narrow section 9 of the conduit 8 of the plug 3a or 3b.

[0028] Figure 2 shows a further aspect of the fin system according to the invention. The fin system 1 includes a tether 13; one end 14 of the tether 13 is at-

tached to the fin 2 by a small threaded screw 16a, the opposing end 15 of the tether 13 is attached to the rear plug 3b by a further small threaded screw 16b. The fin 2 has a recess 17 running parallel with the edge of the base 18 of the fin 2. The recess 17 is closed by the surface of the waterborne apparatus when the fin 2 is fitted to the apparatus. The tether 13 is housed within the closed recess 17, such that the base 18 of the fin 2 lies flush with the surface of the waterborne apparatus 19 as shown in Figure 3.

[0029] Referring now to Figure 3, there is shown a waterborne apparatus 19, for example, a surfboard. The surfboard 19 has two bores 20a,20b. The front plug 3a is mounted in the bore 20a nearest the front of the surfboard and the rear plug 3b is mounted in the bore 20b nearest the rear of the surfboard. The plugs 3a,3b fit snugly in the bores 20a,20b, such that water is excluded from entering the body of the surfboard through the bores 20a,20b. Typically the plugs 3a, 3b are glued into respective bores 20a, 20b.

[0030] The screws 4 are provided with a structural weakness zone (such as a waist or pinch point 25 as shown in Figure 4) which is designed to fracture upon predetermined sufficient force acting on the fin 2. Figure 4 show the surfboard 19 of figure 3 after the fin 2 has hit a solid object fracturing the screws 4 such that the fin 2 is separated from the plugs 3a,3b without any substantial damage to the fin 2 or plugs 3a,3b. The end portions 12 of the fractured screws 4 are attached to the threaded recess 7 of each locating formation 5a,5b of the separated fin 2. The remainder of the screws 4 is retained by the plugs 3a,3b. The separated fin 2 is attached to the surfboard 19 by the tether 9.

[0031] The fin 2 can be re-secured to the plugs 3a,3b by replacement screws 4. The fin 2 is then refitted to the plugs 3a, 3b in-situ in the board.

Claims

1. A fin system including:

   (a) a fin;
   (b) a plug for mounting the fin to waterborne apparatus; and
   (c) a frangible securing element securing the plug to the fin, the frangible securing element being configured and arranged to fracture upon sufficient force acting on the fin.

2. A fin system according to claim 1, wherein the fin includes at least one locating formation, and the plug comprises a formation complementarily engageable with the locating formation of the fin.

3. A fin system according to claim 1 or claim 2, wherein the securing element comprises an elongate element at least a part of which extends through the body of the plug.

4. A fin system according to any preceding claim, wherein the frangible securing element comprises a screw threaded securing element having a proximal portion arranged to bear against a portion of the plug and a distal portion arranged to engage with a screw threaded receiving bore carried with the fin.

5. Waterborne apparatus including a fin system according to any preceding claim.

6. A method of attaching a fin to apparatus for waterborne locomotion, the method comprising:

   (a) securing a fixing plug to a fin by means of a frangible securing element; and
   (b) connecting the plug/fin assembly to the waterborne apparatus by insertion of the plug into a respective receiving bore in the waterborne apparatus.

7. A fin system according to any of claims 1 to 5, further including a tether arrangement for tethering the fin to the waterborne apparatus or the plug.

8. A system for waterborne apparatus, the fin system including plug for mounting the fin to the waterborne apparatus and a tether arrangement for tethering the fin to the waterborne apparatus or the plug.

9. A fin system according to claim 7 or claim 8 further comprising storage means for the tether in a space, housing or compartment defined by or between the fin and the waterborne apparatus to which the fin is attached.

Figure 1.

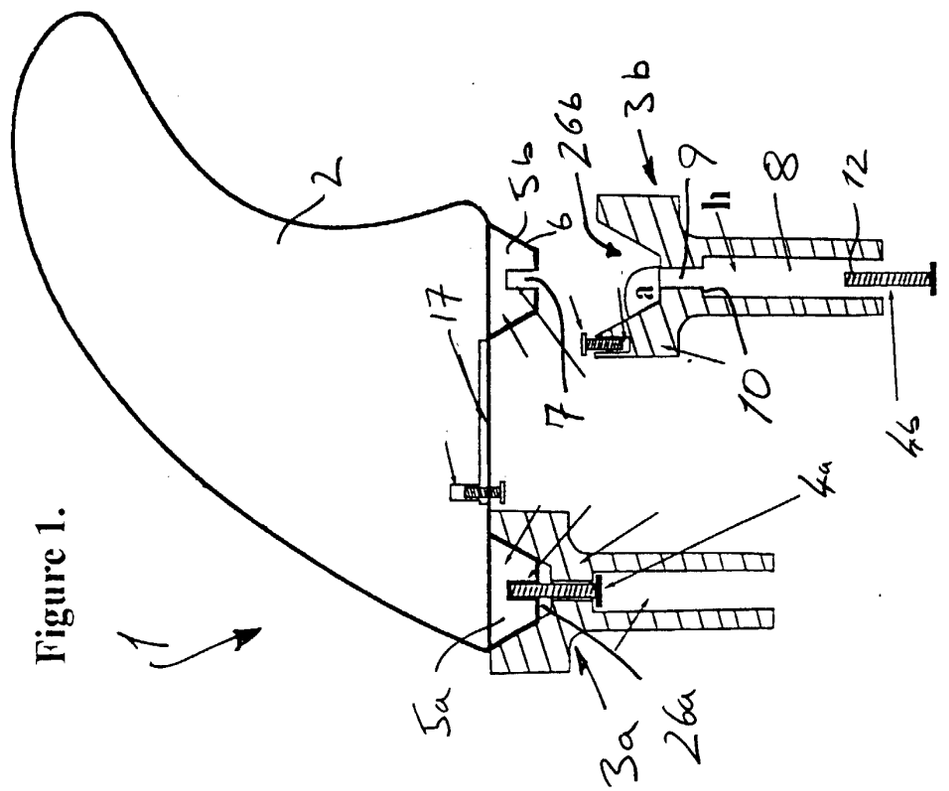


Figure 2

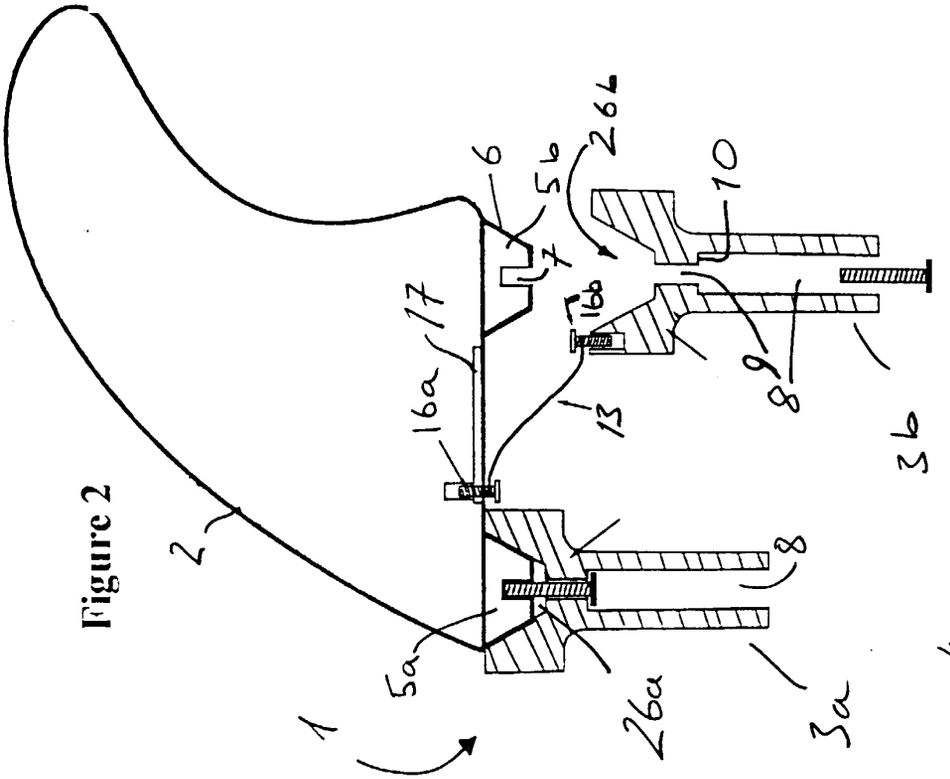
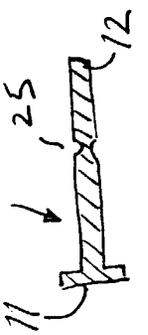


FIGURE 4



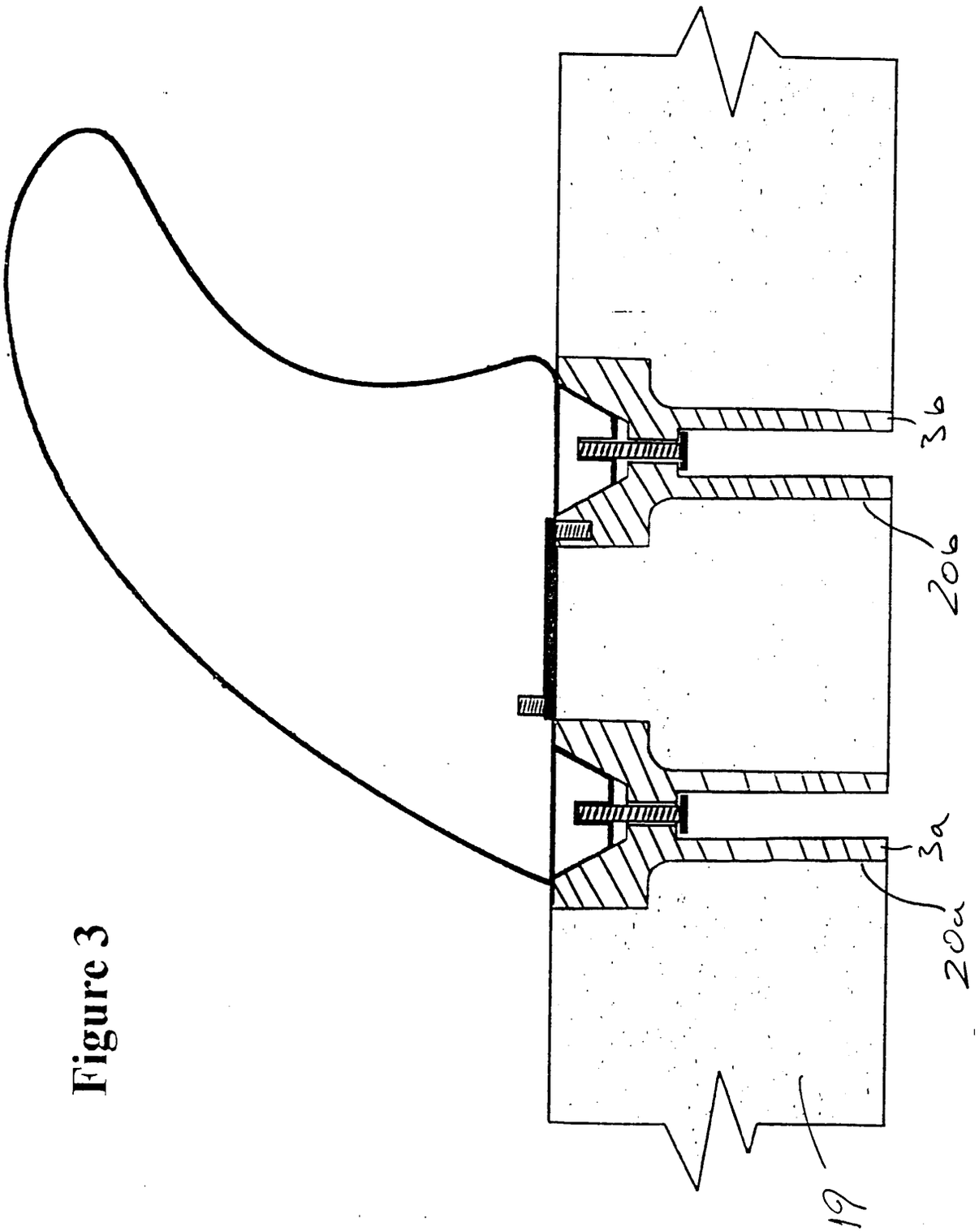


Figure 3