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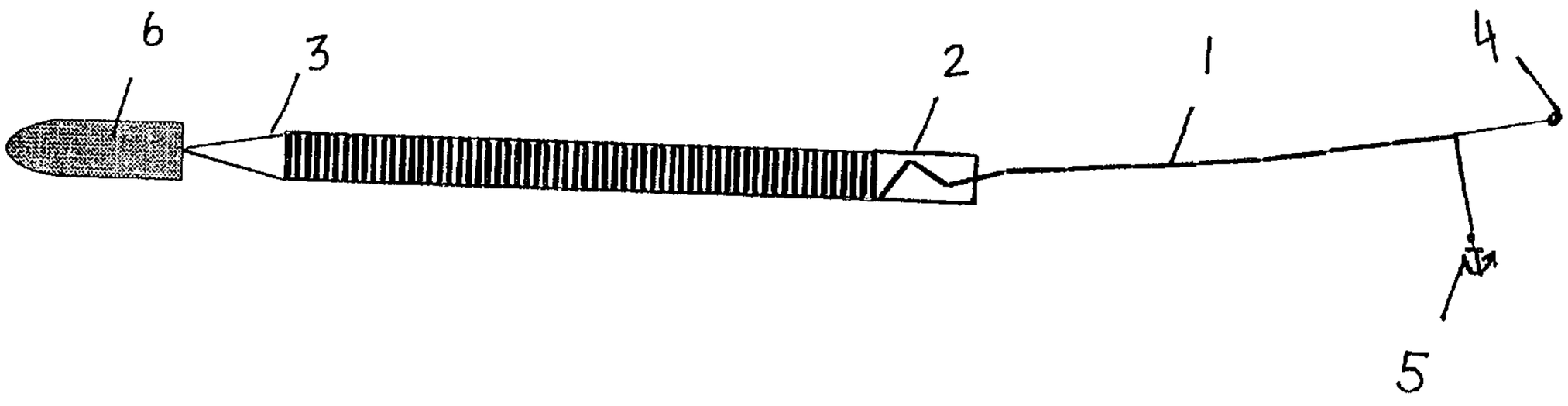
(54) Title: PROCESS FOR PACKING OF OIL BOOMS AND BOOM BAG FOR PRACTISING THE PROCESS



(57) Abrégé/Abstract:
A method of packing booms is described, where a boom (1) is packed in accordion-like folds in a boom bag (2) in the form of a foldable sheet material, whereupon the boom bag (2) is packed in accodion-like folds or rolled up around a drum. The boom (1) is placed in accordion-like folds on the boom bag (2) whilst the boom bag is in a non-folded state, whereupon the boom bag (2) is folded around the packed boom (1) and the two longitudinal edges of the boom bag (2) are joined on the top or the side of the packed boom (1) so that the boom bag (2) wholly or partly surrounds the boom (1). A boom bag for use in carrying out the method is also described.

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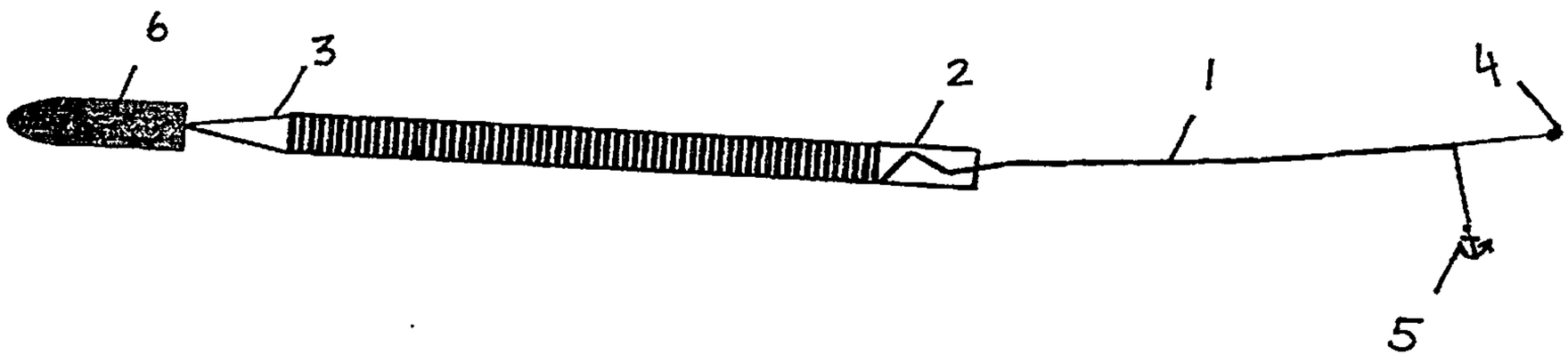


(57) Abstract

A method of packing booms is described, where a boom (1) is packed in accordion-like folds in a boom bag (2) in the form of a foldable sheet material, whereupon the boom bag (2) is packed in accodion-like folds or rolled up around a drum. The boom (1) is placed in accordion-like folds on the boom bag (2) whilst the boom bag is in a non-folded state, whereupon the boom bag (2) is folded around the packed boom (1) and the two longitudinal edges of the boom bag (2) are joined on the top or the side of the packed boom (1) so that the boom bag (2) wholly or partly surrounds the boom (1). A boom bag for use in carrying out the method is also described.

PROCESS FOR PACKING OF OIL BOOMS AND BOOM BAG FOR PRACTISING THE PROCESS.

The present invention relates to a method of packing booms and a boom bag for carrying out said method.

The term "boom" as used in this description and the claims means booms having rigid floats, inflatable floats, self-expanding booms, booms designed for suctioning oil, disposable booms or booms having a deep skirt designed for the containment of so-called Orimulsion oils. The boom which is packed into the bag can also have functions other than the accumulation of oil, in particular mention can be made of , e.g., a boom for the accumulation of chemicals, a rescue boom for use during shipwrecks or a boom for use as a barrier.

A number of different boom systems are known, as are methods for the packing and deployment thereof.

The known methods for deploying oil booms can basically be divided into three categories.

In the first category the boom is deployed directly from a drum, container, or the like located on a quay or from the beach with the aid of a vessel which pulls the boom out. Owing to the relatively great water resistance of the boom, a relatively large vessel is required to pull the boom out, and to move the boom over larger areas.

In the second category the boom is located on a vessel, either coiled up around a drum or packed in accordion-like folds. This requires a relatively large and possibly specially constructed vessel in order to be able to transport the boom and deploy it from the vessel.

In the third category the boom system consists of a compact package containing a self-expanding boom which is lifted onto the sea by a crane and is then towed out in boom form. This is a rapid manner in which to deploy a boom, but requires a boat with a crane to lift the boom onto the sea.

Norwegian Patent 89308 describes a method and device for the deployment of a floating barrier for the containment of oil or another liquid on a water surface. This publication

describes how a flexible tube, stored ready for emergency use, is deployed on the water surface and is immediately filled with a fluid of low viscosity, preferably foam, which keeps the flexible tube floating on the water surface. The actual boom is deployed with the aid of a rigid, boat-like structure and the tube is filled with the foam by means of an active system located on a boat or on land.

Norwegian patent application, Published Application No. 148894 relates to a tow plate designed for use in connection with oil booms or the like. The tow plate is located at the ends of a boom to stabilise the boom ends during towing.

Swedish Published Patent Application No. 385133 describes a boom having self-expanding floats which are filled with air above the water line. Below the water line, there are located similar self-expanding stabilising elements which are filled with water. When packing the boom, the self-expanding elements are compressed and the boom is packed flat in an accordion-like package (Fig. 8). This is a common way of packing a boom for storage if a drum or the like is not used. When the boom is to be deployed, each boom package must be opened and coupled together, which is, however, a time-consuming and labour-intensive operation.

Swedish Published Patent Application No. 420627 relates to a device for the deployment of fibres, e.g., bark, for the accumulation of oil on a water surface. The bark is pressed into a cylinder together with a rope. The bark is deployed with the aid of a sea anchor attached to the rope.

US Patent 3,321,923 describes a device for deploying a boom where one end of the boom is provided with a compressed-air driven device which deploys the boom.

US Patent 3,783,622 describes a rigid, air-filled oil boom. Figure 6 in this publication shows the boom packed in accordion-like folds on a boat deck.

US Patent 3,922,860 describes an oil boom having rotatable outriggers as floats and stabilisers. The packing of the boom in an accordion-like manner is also described. Figure 4 in this publication shows the boom stored in accordion-like folds in a rigid box or container-like frame having a steering rod in the centre. It is also described how the frame (or several interconnected frames) can be towed by a vessel or helicopter.

US Patent 4,300,856 describes an oil boom which can be packed in an accordion-like manner on a boat deck or helicopter, and is deployed with the aid of a sea anchor in one end of the boom.

US Patent 5,197,821 describes an oil boom which automatically or manually is filled with air during deployment. During storage, the boom is laid in horizontal accordion-like folds. Before the boom can be deployed it is necessary to inflate the buoyancy elements. This can be done manually or with the aid of pre-installed CO_2 cartridges. Stabiliser elements are positioned below the water line and are filled with sea water during deployment.

During an oil containment action, it is essential that the first boom is deployed on the water quickly so that the spread of the oil slick can be contained, and also that the oil can be prevented from drifting in towards the beach zone where it could cause relatively substantial damage.

Manned special purpose vessels, equipped with the oil boom packed ready for deployment, would be able to launch the first boom onto the water quickly. However, it is expensive to have a separate vessel (or possibly limit the use of the vessel by having the boom permanently on board) and crew ready, and this type of emergency preparedness is therefore rare.

All practical experience suggests that it takes a relatively long time to launch the first boom onto the water.

Factors which contribute to a long mobilisation period are as follows:

- Special crew must be mobilised to man larger boats (certificate requirements) and it takes longer to get hold of these than to mobilise two men in, e.g., a rubber dinghy.

- If the boom is sectionalised, it must be prepared and joined together before deployment can take place, and this is time-consuming and requires considerable manpower.

- The boom must be lifted or hoisted down onto the boat deck. A crane and a crane driver are necessary. It takes time to clear deck space.

- If the boom is deployed from a quay, it will generate great friction in the water, and consequently the towing speed to the site of the oil spill will be reduced.

- When using a self-expanding boom this must be hoisted onto the water at the site of the oil spill and towed relatively slowly around the oil slick.

What is especially achieved with the invention is that the boom in a simple and rapid manner with the aid of a relatively small boat with no crane or deck space, e.g., a rubber dinghy with a powerful outboard engine, can be launched onto the water, towed to the site of the spill at high speed, and then deployed without having to reduce the speed. The boom can also be deployed in difficult or shallow waters, e.g., on the inside or shore side of a wreck, because of the manoeuvrability of the small boat, and the fact that it has a shallow draught.

The towing and deployment of the boom can also take place with the aid of a helicopter, which either tows the boom bag behind it or lifts the whole boom bag to the site of the spill.

Whilst the boom bag is being towed to the site of the spill, the boom bag according to the present invention provides the following advantages:

- low resistance in the water, can use a small boat;
- prevents water spray from increasing the mass of the boom bag during towing;
- protects against tangling or jamming of the boom during towing and deployment;
- can be deployed in shallow water;
- can deploy towing lines, anchors, buoys, etc. with the boom.

Whilst stored, the boom bag provides the following advantages:

- can be lifted as a package onto a truck or helicopter;
- protects the boom against snow and ice and sun when stored outside;
- easier to have an overview (ref. many packages containing individual booms, towing lines, etc.);
- can be stored ready for use on a beach or quay;
- stores large volumes of boom in one package.

The term "sheet material" is used in this description and the claims to mean a foldable canvas, e.g., a tarpaulin, which optionally on one side or on both sides is coated with a wholly or partly water-impermeable layer, a film of a polymer material and similar. The term "foldable" is used to mean that the sheet material as mentioned above can be folded around the boom. The material in the boom bag may also be a semi-rigid material where optionally parts of the canvas are rigid and other parts are pliable, e.g., a combination of glass fibre and canvas material.

These advantages are obtained by a method of packing booms, characterised in that a boom is packed in accordion-like folds in a boom bag in the form of a foldable sheet material, whereupon the boom bag is packed in accordion-like folds or rolled up around a drum.

The boom is placed in accordion-like folds on the boom bag whilst the boom bag is in a non-folded state, whereupon the boom bag is folded around the packed boom and the two longitudinal edges of the boom bag are folded together on the top or the side of the packed boom so that the boom bag wholly or partly surrounds the boom.

The invention also relates to a boom bag for packing a boom, which boom bag preferably consists of an elongate, foldable sheet material, and which boom bag at one end thereof has one or more buoyancy bodies, and at its longitudinal edges has fastening means for joining together the two longitudinal edges.

The fastening means comprise primarily tapes, hooks and rope, snap fasteners, zip fasteners or Velcro fasteners.

The boom bag preferably comprises a release means for opening the other end of the boom bag.

The invention will be explained in more detail below with the aid of an exemplary embodiment and with reference to the accompanying drawings.

Figure 1 is a schematic illustration of how a boom is deployed with the aid of the method according to the present invention.

Figure 2 shows a partially cut-away boom bag containing a boom.

Figure 3 shows a horizontally folded boom bag containing a boom.

Figure 4 shows a vertically folded boom bag containing a boom.

Figures 5a - 5c show the deployment of the boom bag from a quay or beach.

Figures 6a - 6c show the deployment of the boom bag from the sea.

Figure 1 is a skeleton diagram showing the deployment of an oil boom 1 which is packed in a boom bag 2. The boom 1 is packed in an accordion-like manner in the boom bag 2. Towing device 3, anchor system, e.g., consisting of a sea anchor 4 and an anchor 5, and optional buoys may also, if so desired, be packed in the boom bag 2 with necessary release devices so that the boom 1 can be deployed automatically. A vessel 6 pulls the whole boom bag 2. The boom bag 2 is, e.g., made of a tarpaulin material, which preferably has a relatively smooth surface to give minimum water resistance.

Figure 2 shows a partially cut-away boom bag 2 containing a boom 1. The boom 1 is folded in accordion-like folds in the boom bag 2. This folding of the boom 1 means that a boom that is e.g., 275 metres in length and has a free edge of 250 mm can be folded so that the length, once the boom is folded in the boom bag, will only be about 25 metres. The forward part of the boom bag 2 may, e.g., comprise a buoyancy body 7, e.g., made of a foamed material. The purpose of this buoyancy body 7 is to prevent the boom bag 2 from "digging into" the sea when being towed. The buoyancy body 7 can, e.g., be chamfered in the upward and forward direction so that it is roughly bow-shaped. The anchor system (not shown in Fig. 2) may also be packed in the boom bag 2. Release devices may also be provided so that the boom 1 can be released from the towing vessel without additional vessels being used. This can be done as shown in Fig. 2 where the joint 8 consists of hooks and ropes. The rope runs the entire length of the boom bag 2 and at the rear end is connected to a sea anchor. The rope runs from the boom bag 2 to the deployment vessel so that this rope can thus be used both to release the sea anchor and to open the boom bag 2.

Figures 3 and 4 show how the boom bag 2 containing the boom 1 can be folded further so that the whole boom bag 2 with the boom 1 forms a compact package to facilitate transport and storage. In Figure 3 the boom bag is folded horizontally whereas in

Figure 4 it is folded vertically. It is also possible to roll up the boom bag 2 on a drum or the like.

Figures 5a) - c) show the deployment of a boom package from a quay or beach. The towing means is secured to the towing vessel and the boom bag containing the boom is pulled from the package. Figure 5a) shows how this can be done when the boom bag and boom are coiled up on a drum, whereas Figures 5b) and 5c) show how the boom bag and boom can be pulled from a vertical and horizontal package, respectively.

Figures 6a) - c) show how the boom bag containing the boom can be pulled from a package which is located on the sea. Figure 6a) shows the drawing out of a rolled-up boom bag with boom, whilst Figures 6b) and 6c) show respectively the drawing out of a vertically and horizontally packed boom bag with boom.

When the package containing the boom bag, boom and optional anchoring means, has been towed to the site of the spill, the deployment of the actual boom can start. The operator, who is sitting in the boat, releases the release means in the boom bag so that the boom begins to exit the boom bag. Since the mass which the boat must tow behind it diminishes as the boom exits the boom bag, the force necessary to deploy the boom will gradually decrease.

The package may, for example, also be permanently suspended from a davit or the like on e.g., a tanker.

Claims

1. A method for packing booms the method comprising:

- placing and packing a boom in accordion-like folds on a boom bag in the form of a foldable material, whilst the boom bag is in a non-folded states;
- folding the boom bag around the thus packed boom; and
- joining two longitudinal edges of the boom bag at a top or at a side of the packed boom to let boom bag wholly or partly surround the boom,

characterised in that the boom bag containing the boom is then packed in accordion-like folds.

2. A boom bag for enveloping or containing a boom, characterized in that the boom bag consists of an elongate, foldable material, the boom bag at one end thereof having one or more buoyancy bodies, and that longitudinal edges of the boom bag have fastening means for joining said longitudinal edges.

3. The boom bag according to claim 2, characterized in that the fastening means are selected from a group consisting of: tapes, hooks, rope, snap fasteners, zip fasteners and Velcro-type fasteners.

4. The boom bag according to any of claim 2 or 3, characterized in that the boom bag has release means enabling another end of the boom bag to be opened.

5. The boom bag according to claim 2, characterized in that the foldable material is a canvas material or a tarpaulin material.

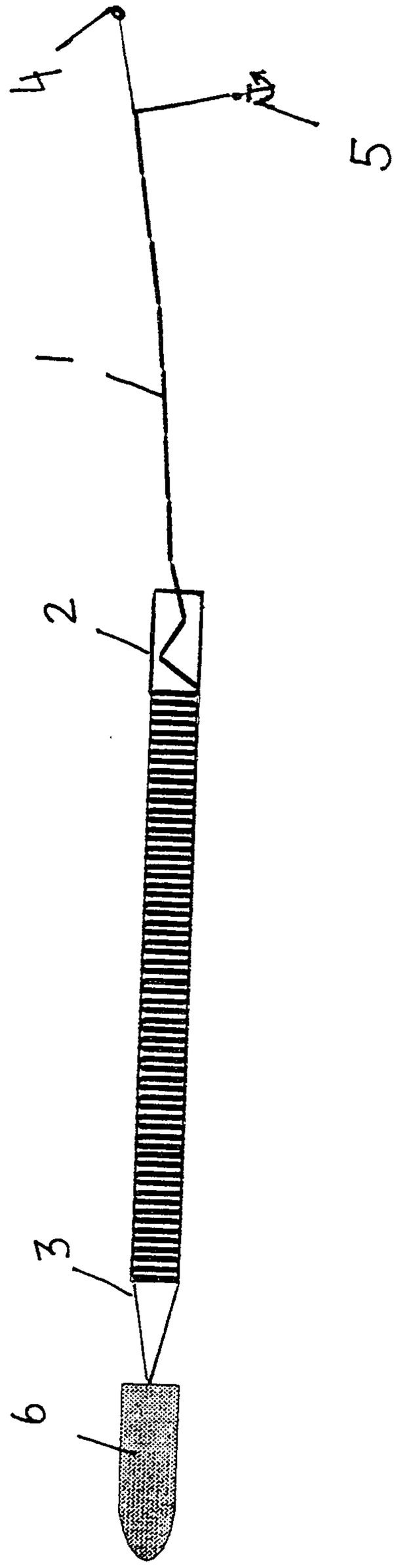


FIG. 1

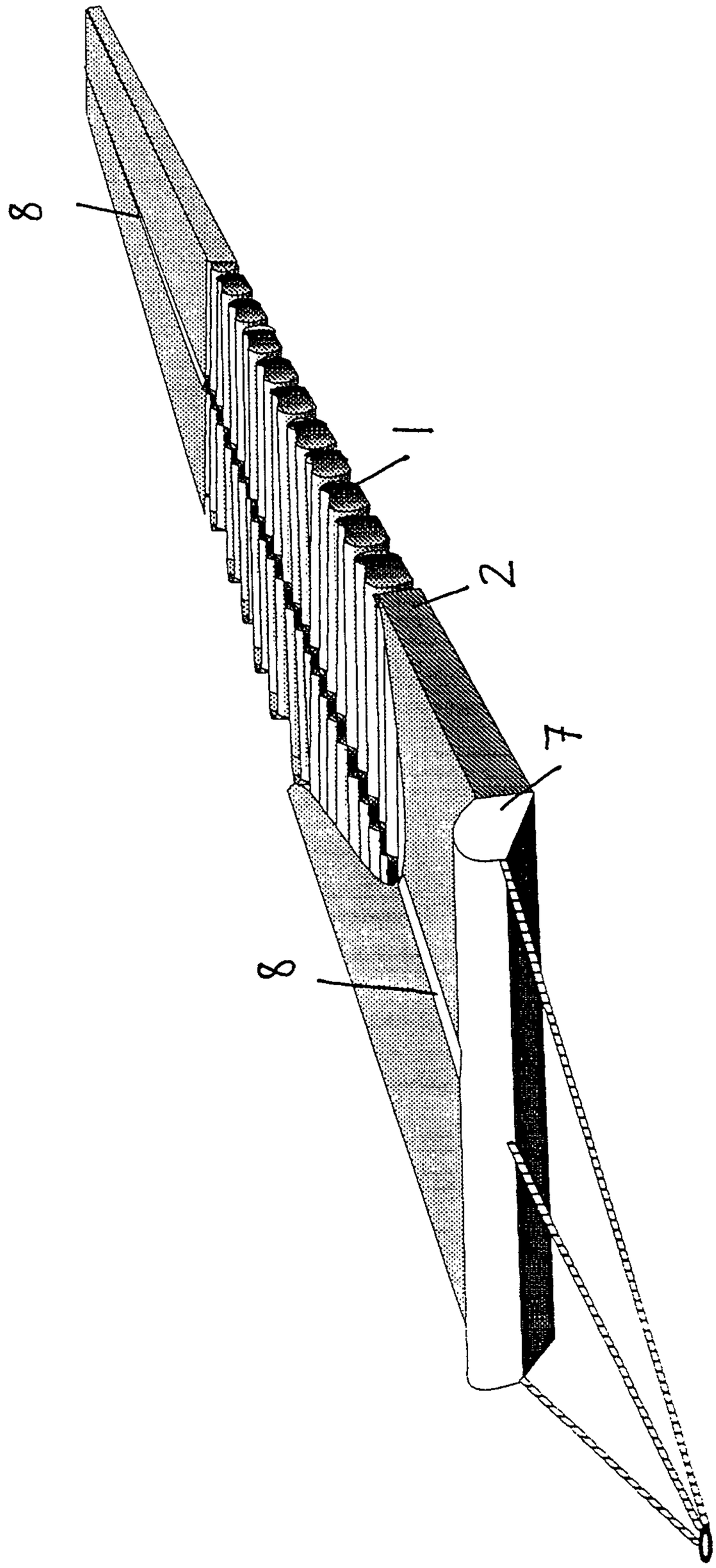


FIG. 2

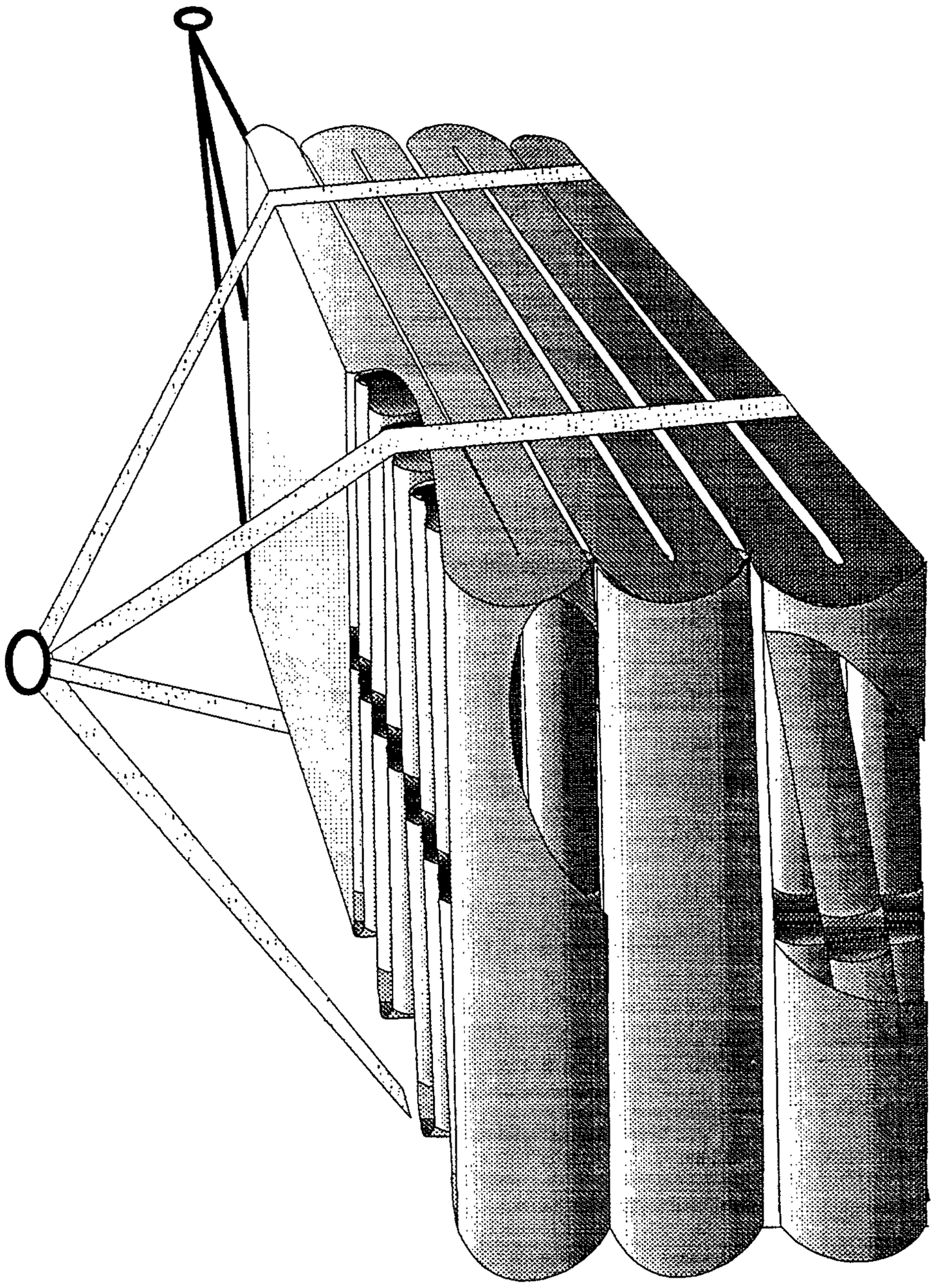


FIG. 3

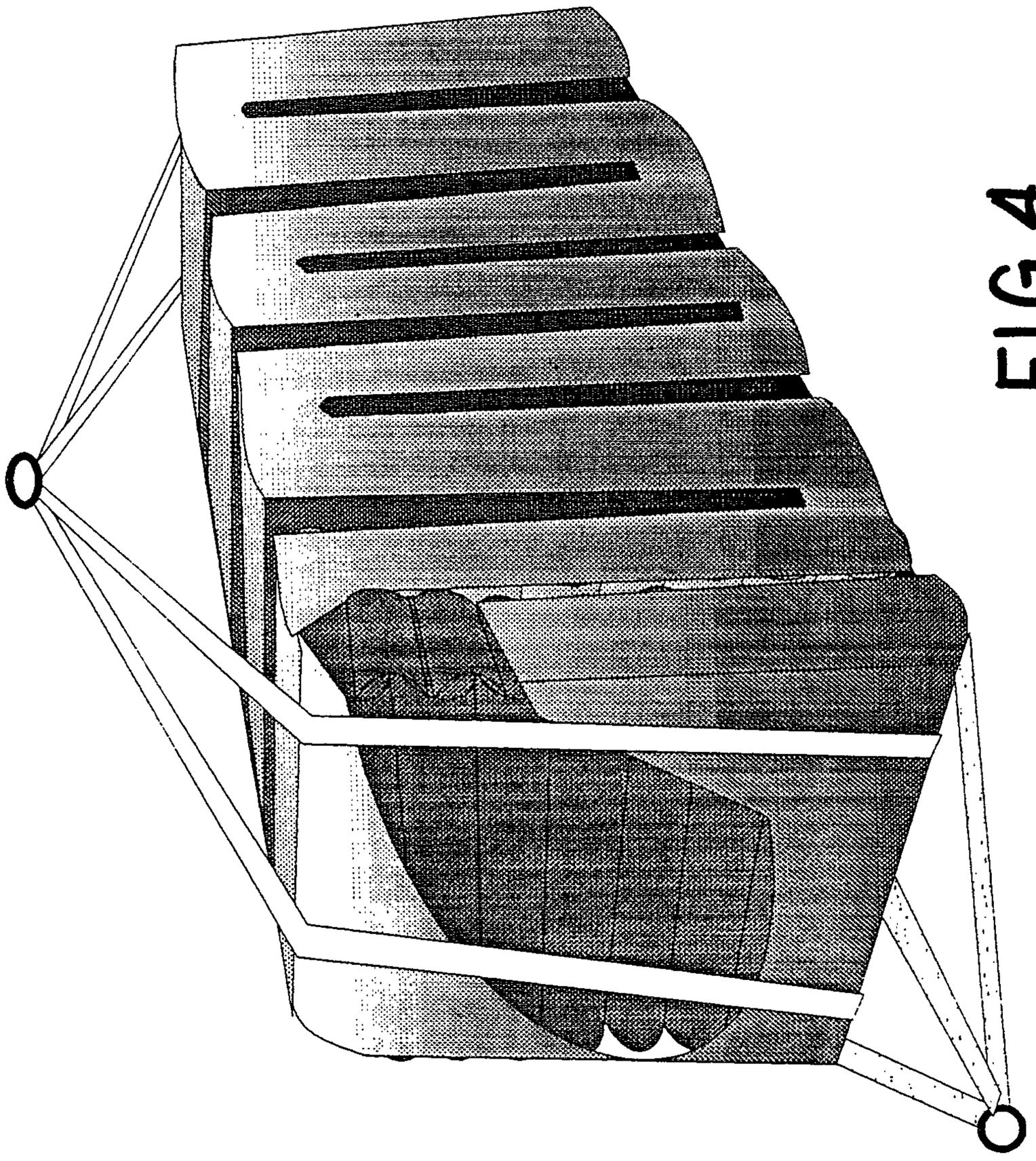


FIG.4

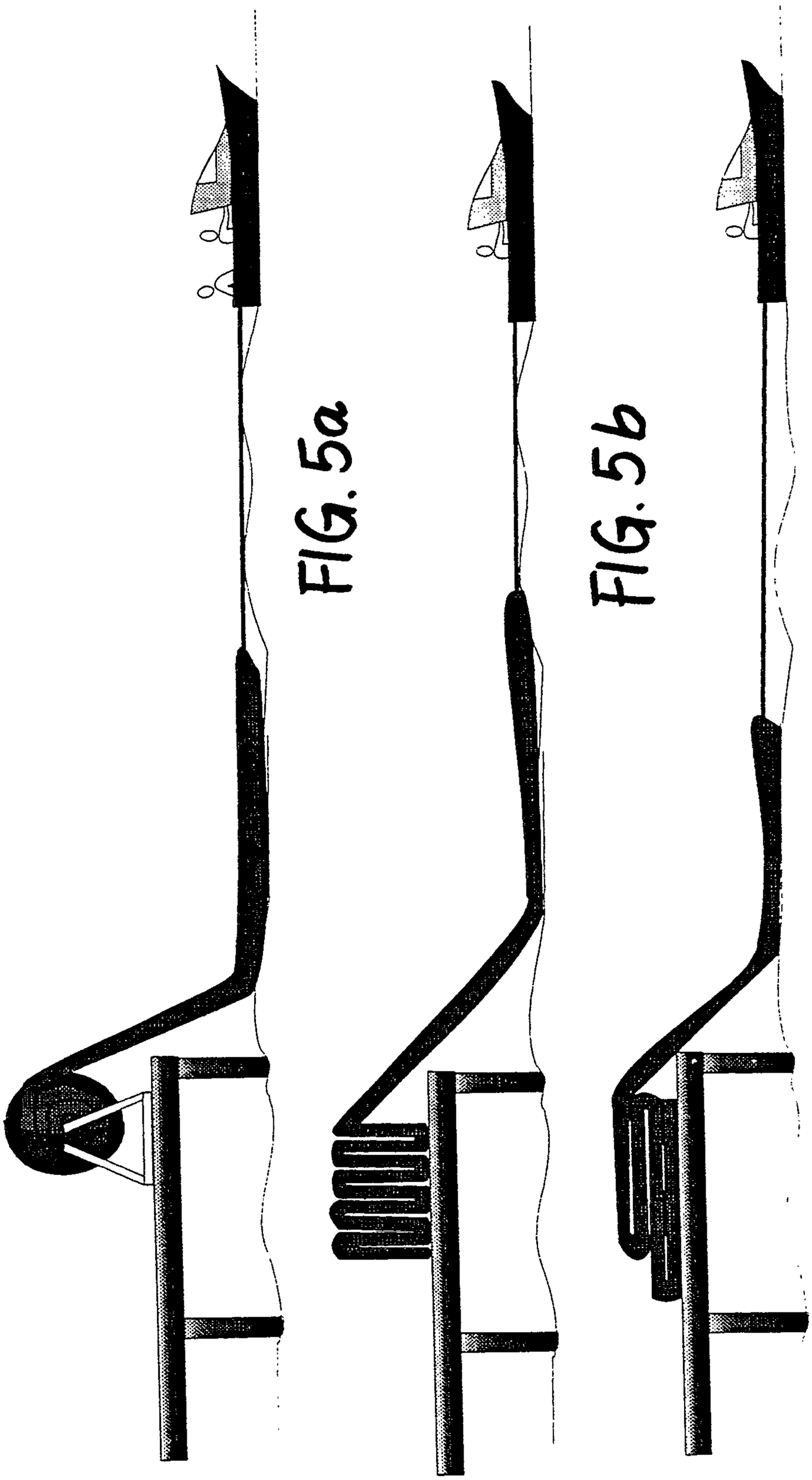


FIG. 5a

FIG. 5b

FIG. 5c

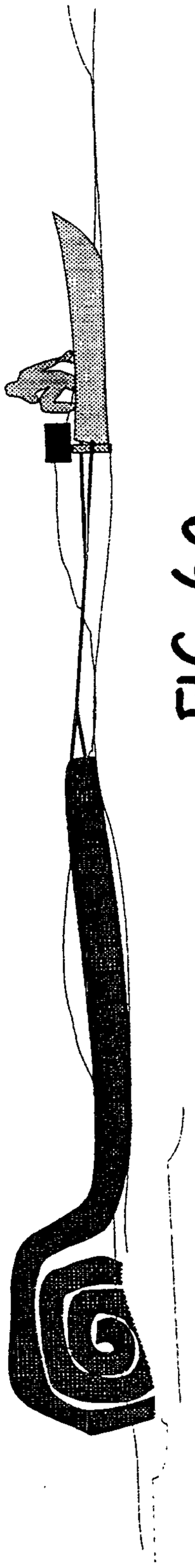


FIG. 6a

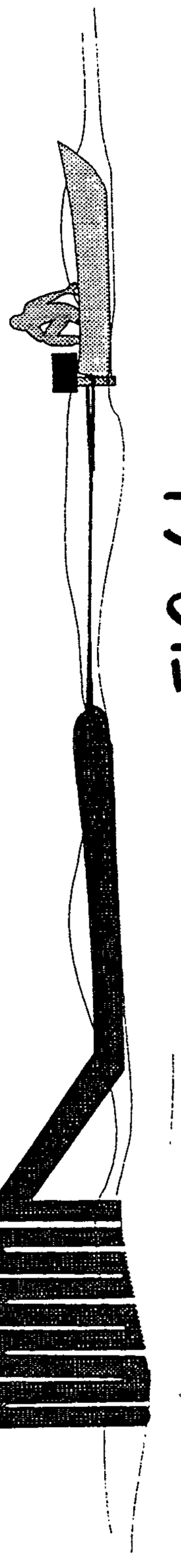
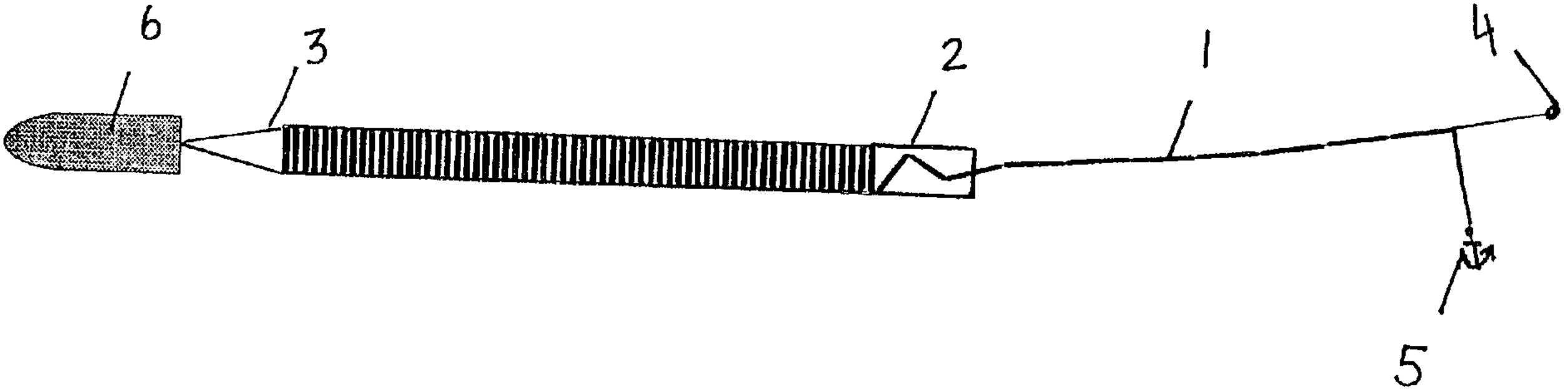


FIG. 6b

FIG. 6c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