

## Chapter 2

# FOOD AND WATER

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#### Introduction

1. Food and water are essential items of survival equipment. Water is by far the most important and is, in consequence, provided in greater quantity.

2. The methods of providing water in dinghies, lifeboats, and survival packs are as follows :—

- (1) By stowing it in sealed vacuum tins.
- (2) By using a desalting apparatus which renders sea water drinkable.
- (3) By catching rain water and storing it in a special water storage bag.
- (4) By the use of special water purifying tablets. These are normally only provided in survival packs for use on land.

3. Food is provided in concentrated form such as barley sugar or Horlick's tablets and is packed in sealed vacuum tins. Ditched crews can supplement their diet by catching fish and there are a number of edible plants and fruit on land which can be used.

4. A system of rationing should be worked out to conserve the available supplies and to suit local conditions. Too stringent a scale should be avoided, but for the first twenty-four hours no rations should be taken. Rationing for the next five days should be reasonable generous so that a good standard of physical fitness is maintained

during the period when there is most likelihood of being picked up. After five days, a more severe rationing system should be instituted.

#### Tins of water (Stores Ref. 27P/8)

5. Each tin of water contains 14 fluid ounces, approximately two-thirds of a pint. This water will remain in good condition for three years from the date stamped on the tin, provided the tin is maintained in good order.

6. The following conditions render a tin of water unfit for use :—

(1) Denting. A dent, or dents, in the tin which weaken the side seam, or reduces the head-space appreciably. A dent  $\frac{1}{16}$  in. deep reduces the head-space beyond safe limits and one within  $\frac{1}{2}$  in. of the side seam weakens it.

(2) Loss of vacuum. This is revealed by applying the following test. Strike the rim of the tin with the palm of the hand. A sharp click indicates that the vacuum is intact, a dull sound indicates loss of vacuum.

(3) Corrosion. Signs of rust, or other corrosion, on the external surface of the tin, however small.

(4) Age. When the age of a tin of water exceeds, or will exceed by the date the next servicing period is due, three years from the date stamped on the tin.

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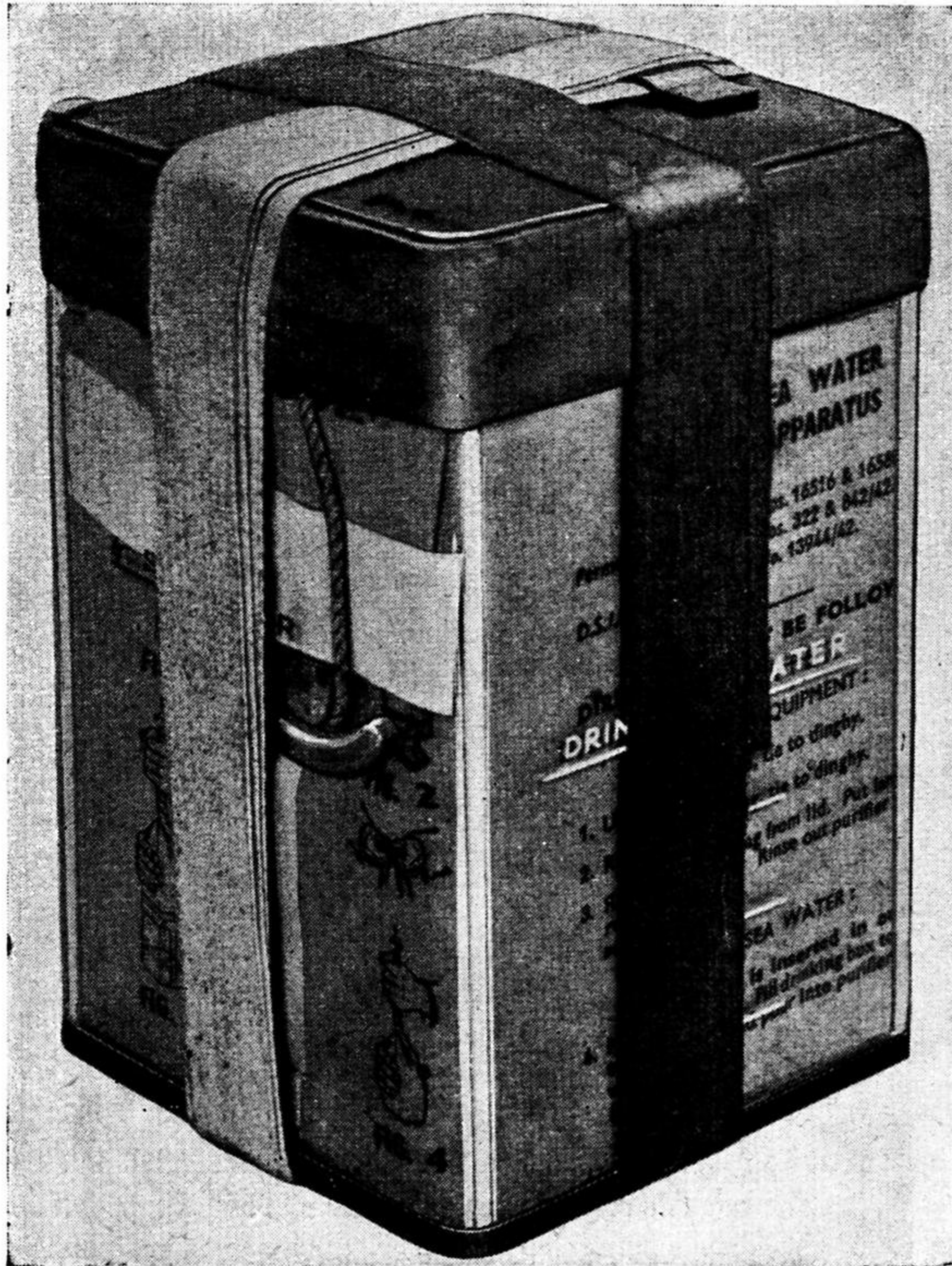


Fig. 1. 4½ pint de-salting apparatus

Items rejected for any of the reasons stated above, or for any other defect, are to be disposed of in accordance with current procedure.

**Desalting apparatus**

7. There are two types of desalting apparatus in use, one provides 4½ pints of water and the other 2 pints of water. Chemical reaction and filtering are used to purify the water in each case.

*4½ pint size (Stores Ref. 27C/2119)*

8. The apparatus packed ready for stowage (*fig. 1*) measures 3 in. by 3 in. by 4 in., and produces 4½ pints of drinking water. It consists of the following items:—

- (1) A rigid plastic container with a lid.
- (2) A purifying bag contained in the lid of (1) above.
- (3) 36 chemical briquettes, wrapped in groups of four, contained in a rubberised fabric storage bag and packed in the plastic container. One group of four briquettes constitutes

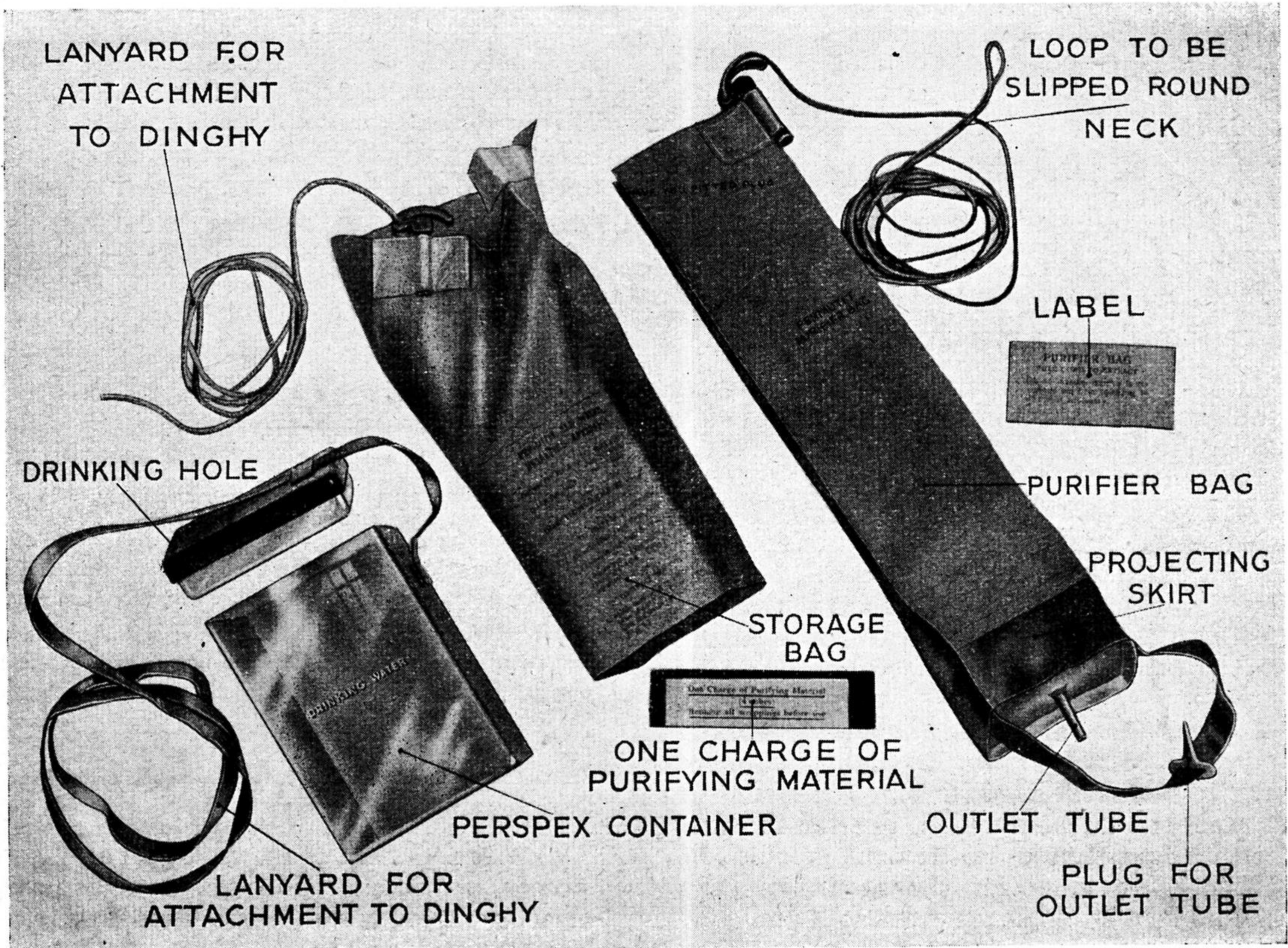


Fig. 2. Components of 4½ pint de-salting apparatus

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a charge and one charge is used at a time.

All these items are shown in fig. 2. The opaque lid fits into the mouth of the container and the two items are connected together by white tape. The free end of this tape should be tied to a convenient place on the dinghy to prevent loss of the apparatus.

9. On the outside of the container, which is also used as a drinking vessel, are two measure marks, one to show the quantity of salt water to be used with each charge of briquettes and the other to indicate the amount of drinking water produced from it. It is important that no sea spray is allowed to enter the container after the water has been purified, so the lid must be kept on whenever possible. The water should be drunk through a small hole provided at one corner of the lid, the container being kept closed.

10. The purifying bag and the storage bag are each made from rubberised fabric. To prevent entry of sea spray, each bag is closed by rolling the mouth round a small metal or moulded rubber key. A length of cord attached to each bag is then tied round the rolled mouth and held there by slipping it through the top of the key. A lanyard is attached to each bag which may be tied to the dinghy or placed round the neck of the user.

11. For purifying water with this apparatus, complete instructions are printed on the outside of the storage bag. They must be followed implicitly. The quantity of sea water measured is poured from the container into the purifying bag and a charge of chemical briquettes is then added. The chemical reaction which follows causes sediment to be formed and this must be strained from the water before it is drinkable. For this purpose the purifying bag has a filter incorporated in the bottom section through which the water passes as it leaves the bag through a tube attached to the centre of the base. Projecting round the outer edge of the base is a rubber skirt which should be fitted closely round the mouth of the container as the water is drained. A rubber band carrying a metal or moulded rubber stopper is attached to the skirt and should be inserted into the end of the draining tube before adding sea water for purifying. The sediment remaining is harmful and in any

case clogs the filter if not removed, the bag should, therefore, be thoroughly cleaned and washed between each operation according to the instructions.

12. The storage bag carries nine charges of chemical briquettes, each charge consisting of four tablets which produce  $\frac{1}{2}$  pint of drinking water. The charges are not to be reduced in an endeavour to increase the water supply, otherwise partially desalted water will be produced with consequent risk to personnel who consume it. These chemical briquettes have the property of breaking up when wet, so it is important that the storage bag is kept closed when not in use. Although the briquettes may be reduced to powder by dampness, they are not useless.

13. When examining the apparatus, ensure that the container is not cracked and that it is properly sealed.

2 pint size (Stores Ref. 27C/2161)

14. The two-pint desalting apparatus (*fig. 3*) is provided for carriage in packs where stowage space is restricted, e.g., in K dinghy packs. It consists of the following components:—

(1) A rubberised fabric storage bag.

(2) Sixteen chemical briquettes. A charge consists of four briquettes.

(3) A rubberised fabric purifying bag.

The briquettes and purifying bag are housed in the storage bag, the open end of which is folded back and sealed with adhesive tape. Instructions for purifying sea water are printed on the outside of the storage bag and should be followed implicitly. The amount of water that can be purified with one charge of briquettes is indicated by a line on the outside of the purifier bag. The bag contains a filter to prevent sediment, formed after sea water has been purified, from draining into the fresh water container. As the sediment is harmful and also clogs the filter, the bag should be cleaned after every operation in accordance with the instructions printed on the storage bag.

15. A rubber outlet tube is moulded to the base of the purifier bag and a plug for sealing this tube is attached to the base of the bag by a rubber strap. It is essential that this

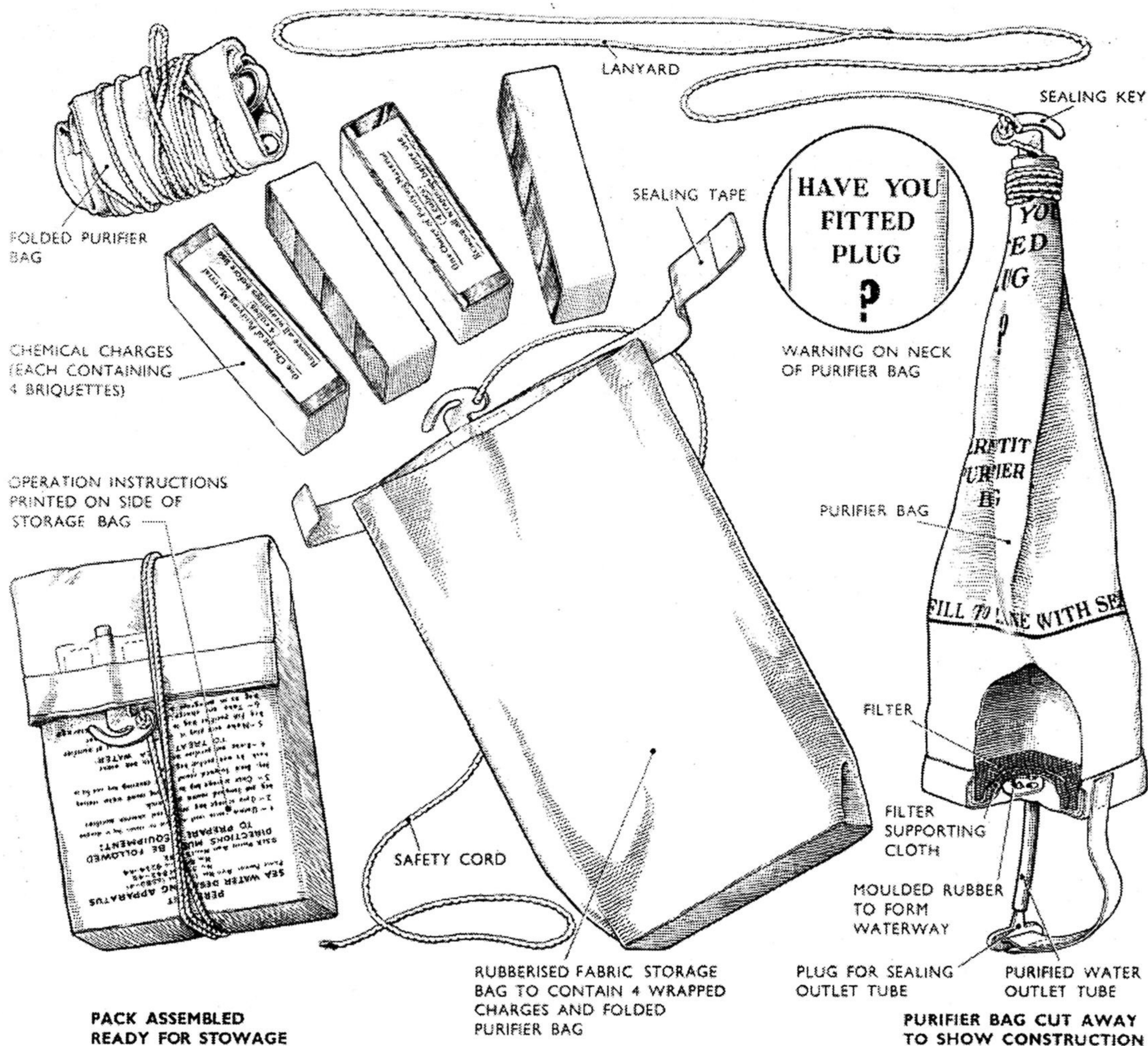


Fig. 3. Components of 2 pint de-salting apparatus

outlet tube is plugged during the purifying process. To prevent loss of the storage or purifier bags they should be attached by the cord provided to the dinghy or the user.

16. If the briquettes become damp they will be reduced to powder; while this does not render them useless, care should be taken to keep them dry. Each charge is wrapped in double cellophane and a strip of paper around each charge prevents adhesion when they are packed. The amount of the charge must not be reduced in an endeavour to increase the supply of water, otherwise partially desalted water, harmful to personnel who drink it, will be produced. After examination of the apparatus ensure that the storage bag is properly sealed and in good condition.

**Water storage bag (Stores Ref. 27C/2158)**

17. The water storage bag (fig. 4) is made of two-ply rubber-proofed fabric to an oval, elliptical shape measuring approximately 12 in. by 9 in. and a screw cap is provided to close the funnel neck. When in a dinghy, rain water which collects on the weather apron may be salvaged and stowed in this bag; the funnel shape of the neck enables the water on the weather apron to be poured into the bag without difficulty. When partially filled with water, the bag may be used as a cushion, it may also be inflated with air for this purpose, and the internal surfaces are connected by cord at two points to quilt the bag when it is used as a cushion.

18. When examining the water storage bag ensure that the fabric is not perished and

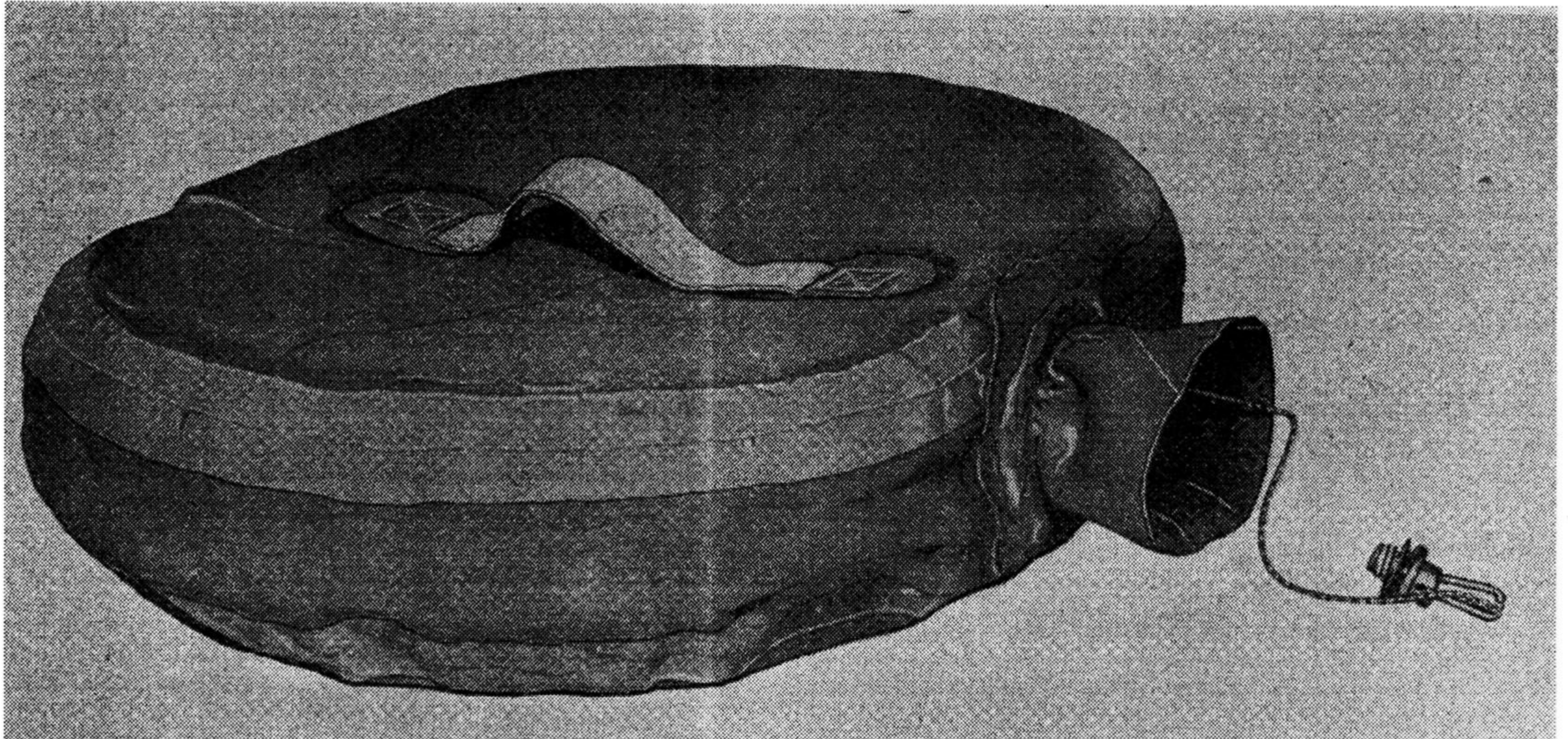


Fig. 4. Water storage bag

that the metal stopper is free from corrosion. The stopper should undo easily when it has been screwed in.

#### Tins of rations

19. There are at present two types of rations provided in emergency or survival packs, each of which will be described separately.

#### Rations, Mk. 3 (Stores Ref. 27P/19)

20. The tin of rations, Mk. 3, is shown on the right in fig. 5 and measures approximately 4 in. by 3 in. by 1 in. It is hermetically sealed and is opened by a key which fits over a flange at one side of the top; one key is supplied clipped to the rim of each tin of rations. After opening the tin it is occasionally difficult to extract the contents, but this difficulty can be overcome if the tin is bent by holding it in both hands firmly and pressing the thumbs underneath. The tin is made from soft alloy and bending it should not be difficult once it has been opened.

21. The contents of the tin (fig. 6) consist of malted milk tablets, chewing gum, barley sugar and energy tablets. Energy tablets are not a source of energy in themselves but make available existing energy for a short time and should be used only if there are signs of exhaustion. These tablets

are not to be given to wounded or excitable men. A transparent waterproof bag is included for the stowage of the items after the tin has been opened and disposed of. This bag possesses the following advantages:—

(1) It is waterproof, which the tin cannot be after it is opened as it is impossible to reseal it.

(2) After spare rations have been packed in the bag, the empty tin can be jettisoned so as to avoid the risk of tearing or chafing the buoyancy chamber or the floor of the dinghy.

(3) When properly sealed with the rations inside as directed, it is buoyant.

22. The keeping properties of the contents of the tin are dependent on the condition of the tin itself. Damage to the tin can usually be detected by visual examination, but if there is any doubt plunge it into water, previously heated to a temperature of not more than 160 deg. F. (70 deg. C.). Faulty tins will be revealed by bubbling at any point of leakage and any tin showing this defect is to be rejected. Ensure that the tin is thoroughly dried after testing.

#### Rations, Type P (Stores Ref. 27P/15)

23. This tin of rations contains cakes of peanut toffee. It is shown on the left in fig. 5 and for the purposes of servicing the instructions in para. 22 are to be applied.

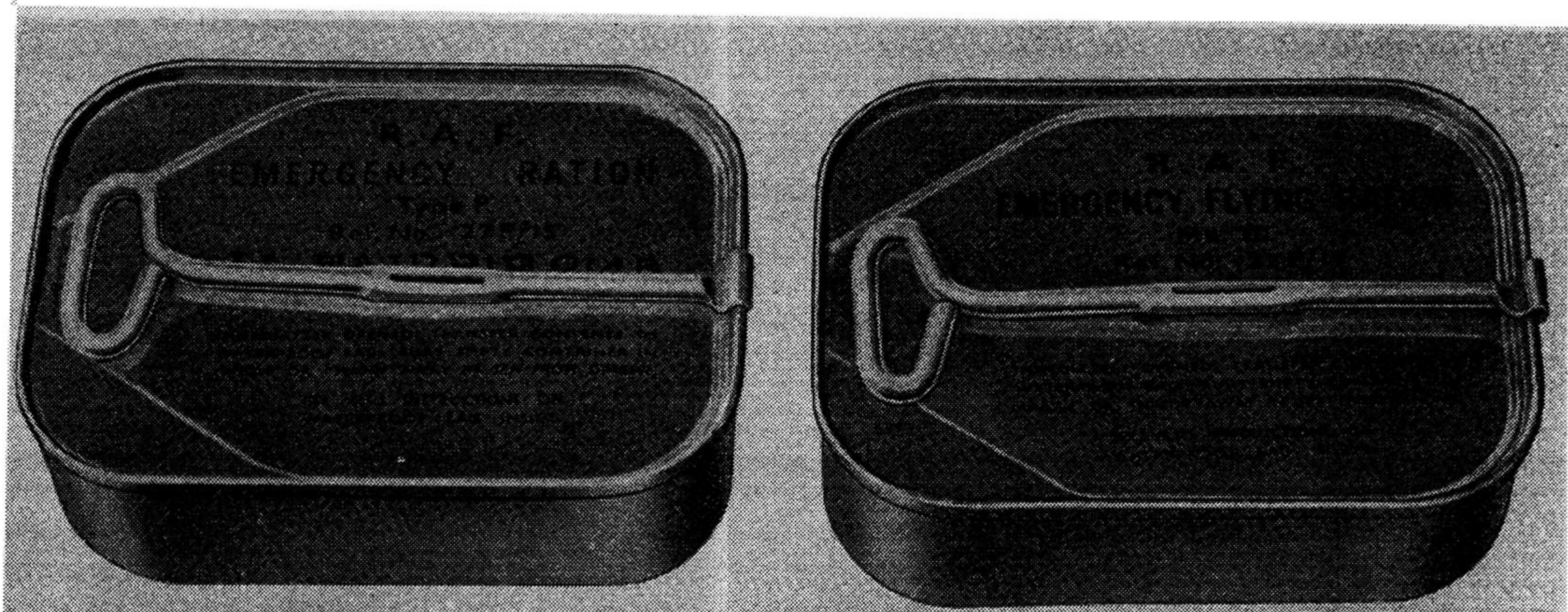


Fig. 5. Rations, Mk. 3 and Type P



Fig. 6. Contents of a tin of rations, Mk. 3

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**Solar type sea water Still (Stores Ref. 27C/2277)**

24. The complete apparatus consists of a Still, a small quantity of tape for repairing the plastic outer cover, a fresh water container, and an instruction pamphlet. Correctly used, the apparatus will produce up to 2½ pints of drinking water per day, provided weather conditions are satisfactory. Direct sunlight is required to obtain maximum efficiency, but the Still will operate if the sky is not too heavily overcast. On dark days, and at night, the Still will not function.

**Description**

25. The Still (fig. 7) consists of a white spherical plastic outer cover and an inner black evaporator cloth bag which is also spherical, but smaller. Below the evaporator cloth bag is a ballast tube which is filled with sea water to keep the apparatus floating upright.

26. At the top of the outer cover is a reservoir for sea water. On the inside of this reservoir are two holes, one at the

side which is connected by a plastic tube to the ballast tube and one in the centre through which the sea water drains on to the evaporator cloth. A plastic cord, or string, is attached to the top of the evaporator cloth and is led up through the centre hole to the top of the reservoir; this string is pulled occasionally to clear sediment from the hole.

27. The evaporator cloth bag is secured to the plastic outer cover at several points round the circumference and is virtually suspended when in operation. The evaporator cloth bag and outer cover are inflated before the apparatus is put into use and must remain inflated throughout the whole period it is in operation; if the Still is allowed to become flabby, the evaporator cloth will touch the outer cover and salt deposited on the cloth will come in contact with the distilled water on the outer cover and contaminate it.

28. A towing line is secured to eyelets equally spaced round the centre seam of the outer cover, and can be attached to a

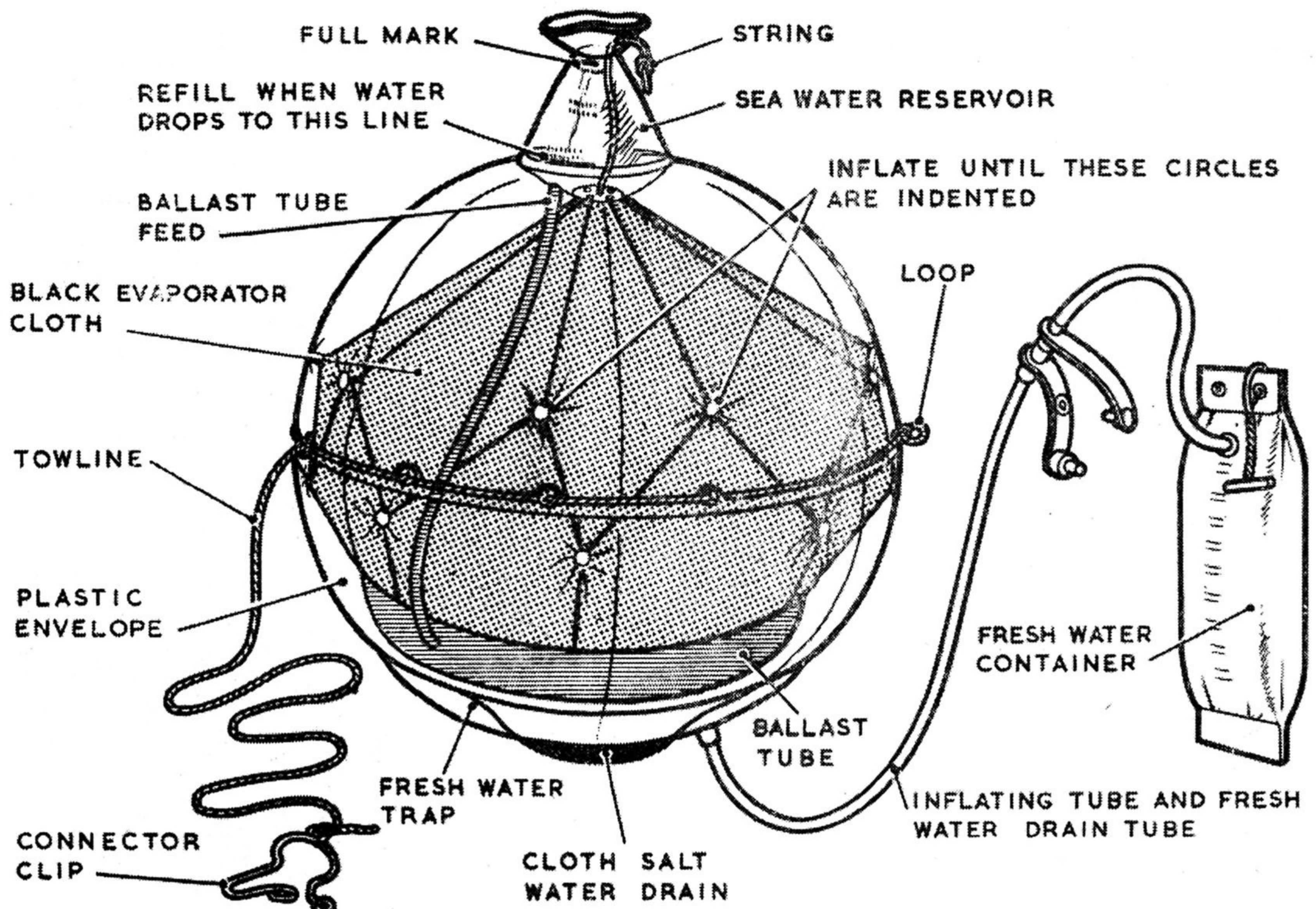


Fig. 7. Solar type sea water Stili, general arrangement

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convenient position on the dinghy life-line to anchor the apparatus.

29. At the bottom of the outer cover is a fresh water trap and attached to this is a plastic tube through which the distilled water drains into a container. The free end of the tube terminates in a fitting threaded to provide an attachment to an inflation pump and to the fresh water container; it is through this tube that the Still is inflated before use. In the centre at the bottom of the outer cover is a cloth salt water drain consisting of a fabric disc through which surplus sea water is drained; this disc also provides an exit for excess pressure during inflation of the Still.

30. The fresh water container is a cylindrical bag, sealed at both ends, with a small tube near the top; the free end of the tube terminates in a fitting for attachment to the drain tube from the fresh water trap. At the top of the container are two eyelets and a toggle secured to a short length of cord is attached to one of the eyelets; the toggle is attached to an eyelet on the plastic tag carrying a plug for the fresh water drain tube to prevent the container being lost when it is disconnected either to fill a storage container in the dinghy, or when it is necessary to top-up the Still with air. The fresh water container is rolled to expel all air before it is attached to the fresh water drain tube.

#### Method of operation

31. Sea water drains through the centre hole of the reservoir on to the evaporator cloth bag. The sun's rays generate heat which causes evaporation and the vapour condenses on the inside of the plastic outer cover, runs down to the fresh water trap at the bottom, and is finally drained into the fresh water container. The salt deposit left on the evaporator cloth is washed out through the fabric disc at the bottom of the Still, because the evaporator cloth is saturated during the time the apparatus is in operation and the salt is carried away with the surplus water. The evaporator cloth is therefore continually being flushed and is to all intents and purposes self cleaning.

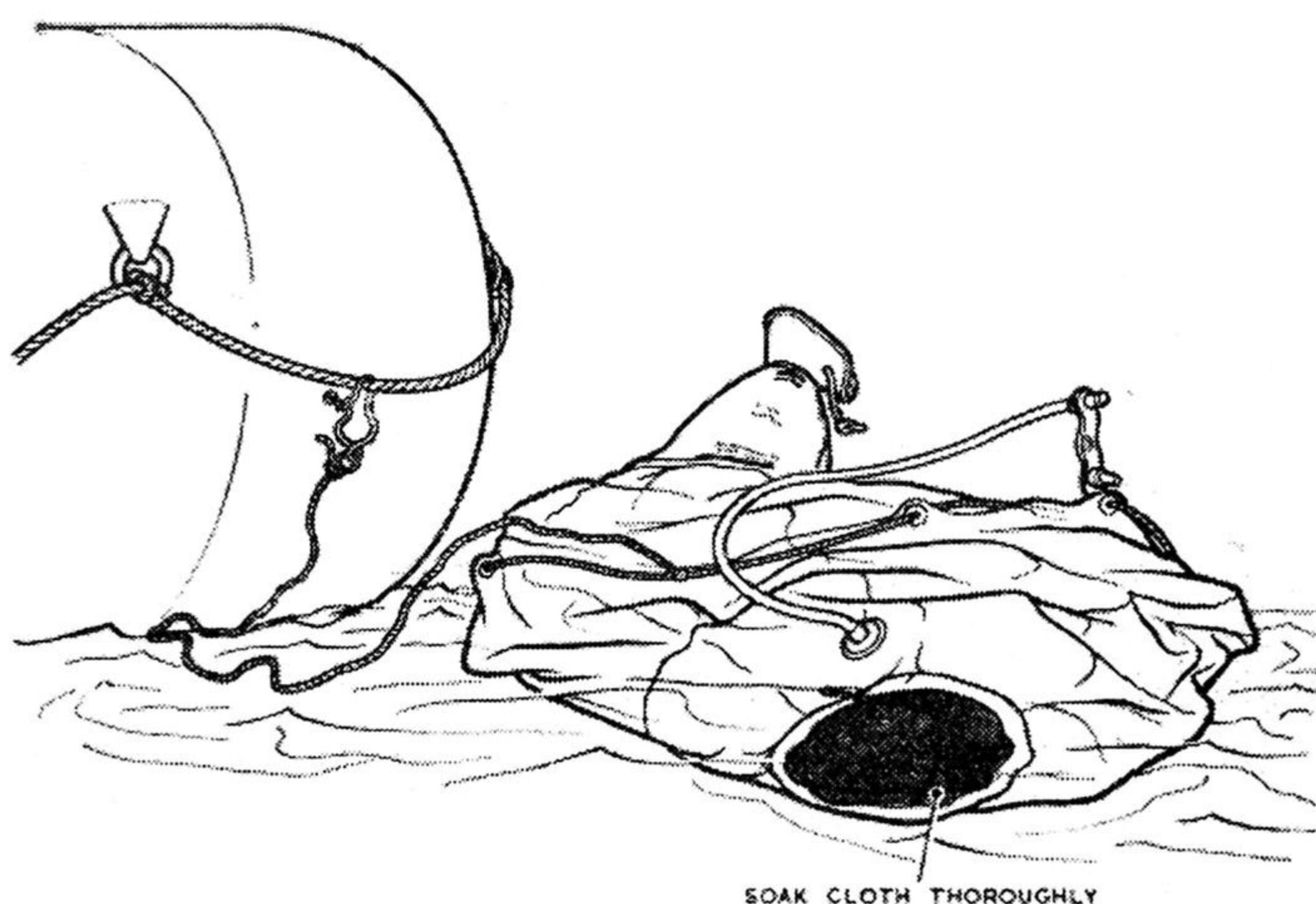


Fig. 8. Soaking fabric disc before inflating

32. During manufacture, french chalk is applied internally to the outer cover to prevent the surfaces sticking. The chalk is washed down into the fresh water trap when the Still is used for the first time and as a result the initial supply of water will appear milky. This condition of the water does not render it harmful, but it is recommended that the first one or two collections of water in the container should be thrown away.

#### Instructions for use

33. Soak the fabric disc at the bottom of the outer cover thoroughly (fig. 8) and then inflate the Still until the suspension points are indented (fig. 9); any excess pressure will be dispersed through the fabric disc. Inflation may be by mouth, or by an

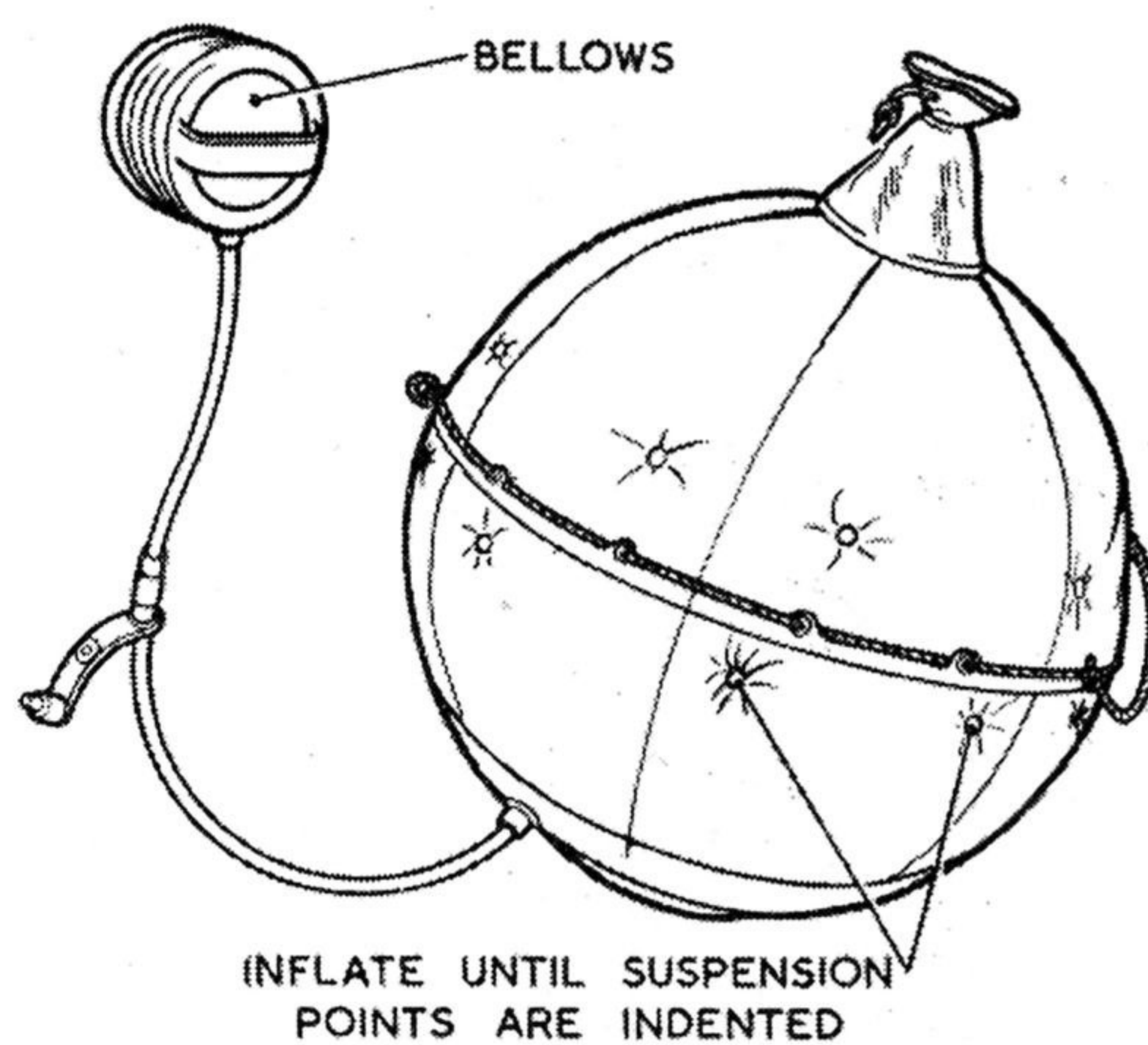


Fig. 9. Inflating the Still

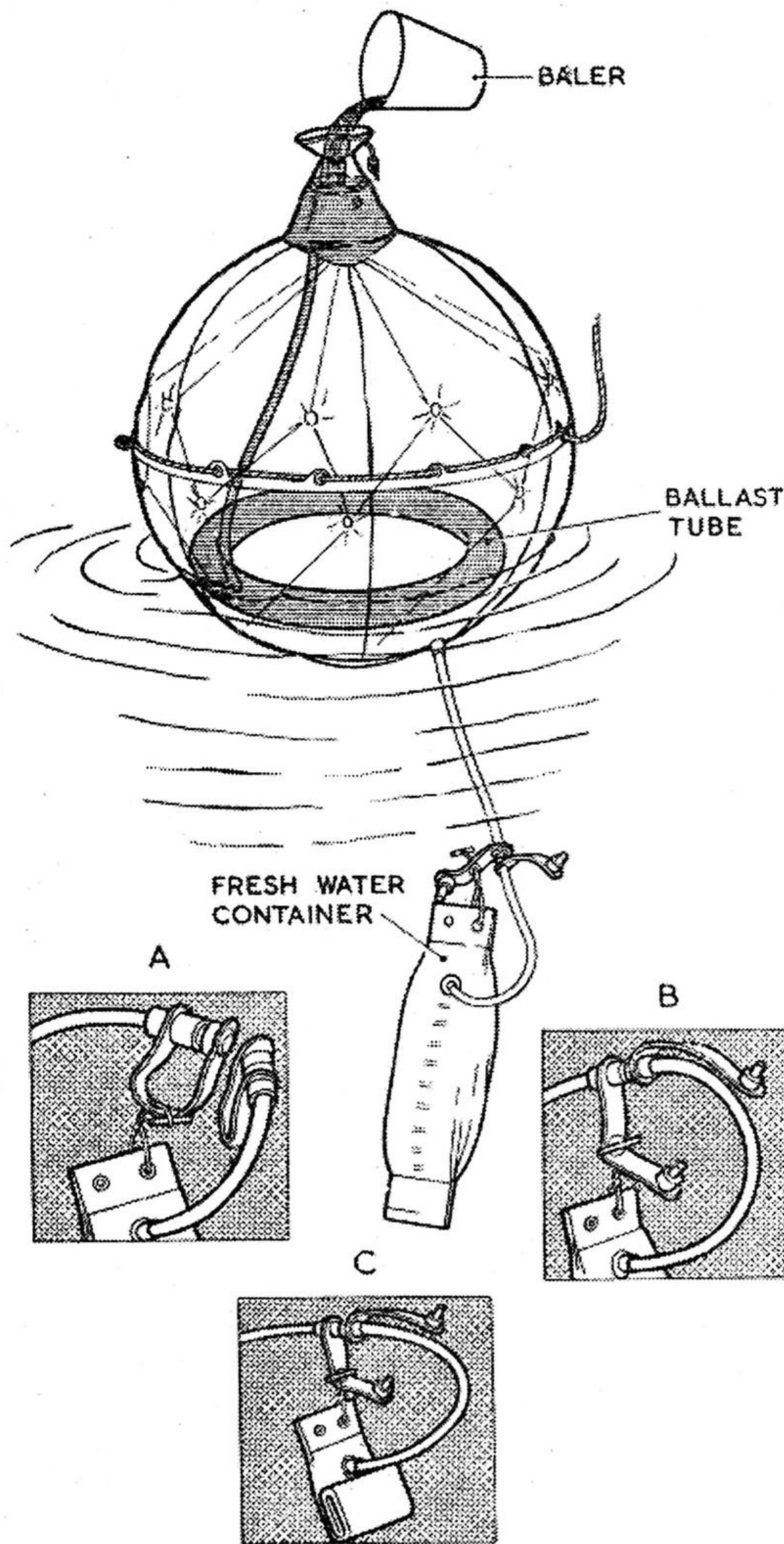


Fig. 10. Method of attaching fresh water container and filling the Still

inflation pump as shown, as convenient. Roll the fresh water container towards the tube to expel all air, and attach the tube to the drain tube from the fresh water trap as shown in A, B and C of fig. 10. Unroll the container and place it and the Still in the water, holding the Still upright so that the sea water reservoir can be filled; the water will drain into the ballast tube first and will then fill the sea water reservoir. Once it is filled with water the apparatus will float upright.

34. Attach the towing line to a convenient position on the dinghy life-line (fig. 11) so

that the Still is in the sun; it may be necessary to alter the position of the towing line occasionally to keep it so. The method of attaching a number of apparatuses to a dinghy is shown in fig. 12; it consists of connecting the towing line of one Still to the loop on another, after attaching the first apparatus to the dinghy, and attaching a cord between the last one and the dinghy.

35. Once the Still is in operation, check the level of the sea water in the reservoir from time to time and top-up to keep the reservoir full. The fresh water container should be emptied about three times per day (fig. 13) and should produce approximately  $\frac{3}{4}$  pint of fresh water each time it is emptied. The Still must be kept fully inflated all the time and should be topped-up as necessary (fig. 14).

36. If a dark spot appears on the outer cover (fig. 15) it indicates that the sea water is not flowing through the reservoir on to the evaporator cloth. Dark spots may appear in several places at the same time. To clear the centre hole in the reservoir, agitate the string by pulling it up and pushing it down, this will clear the sediment from around the hole.

37. To empty the Still, turn it upside down to allow the water to drain out (fig. 16) and at the same time squeeze the

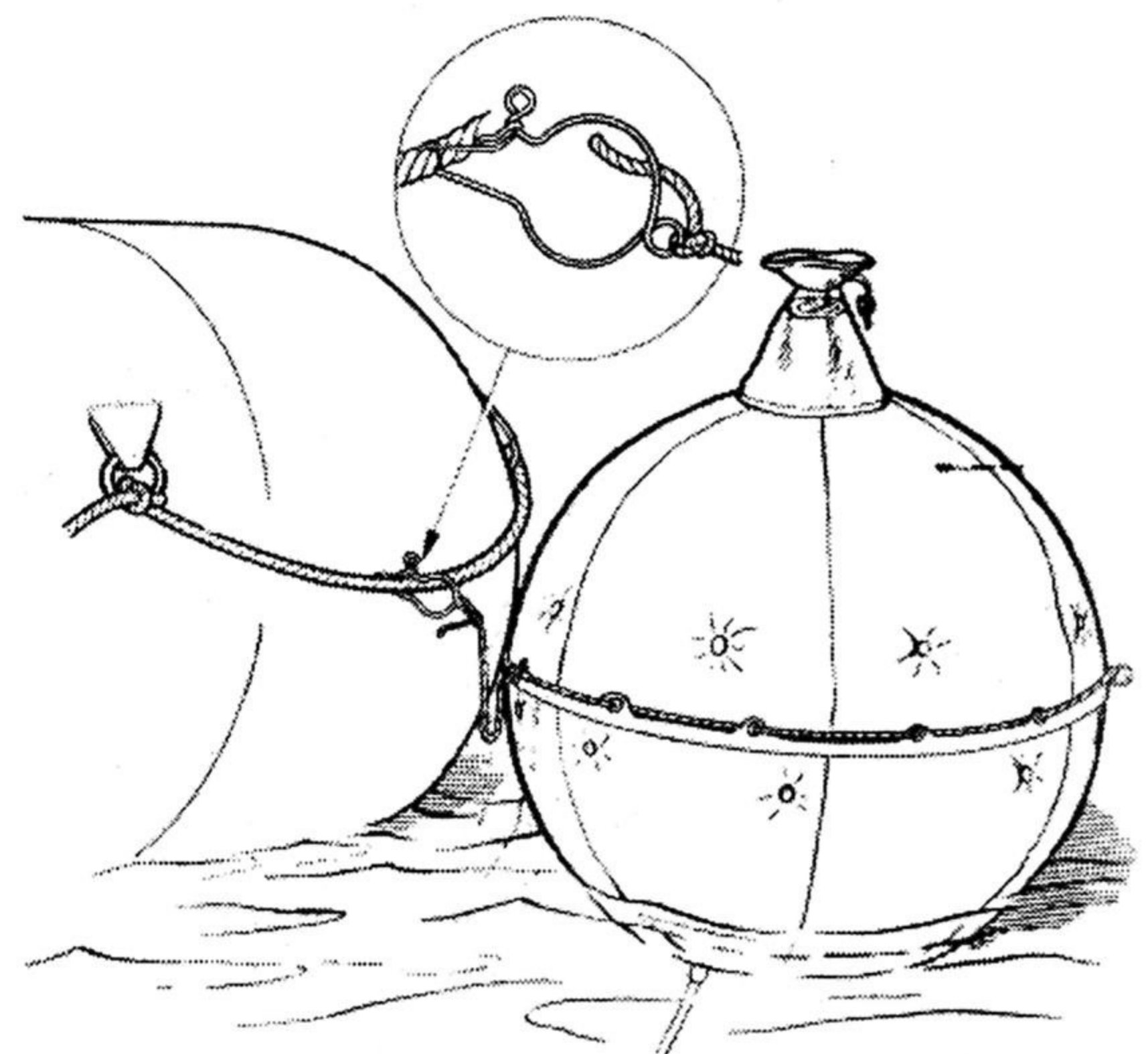


Fig. 11. Attachment of Still to dinghy

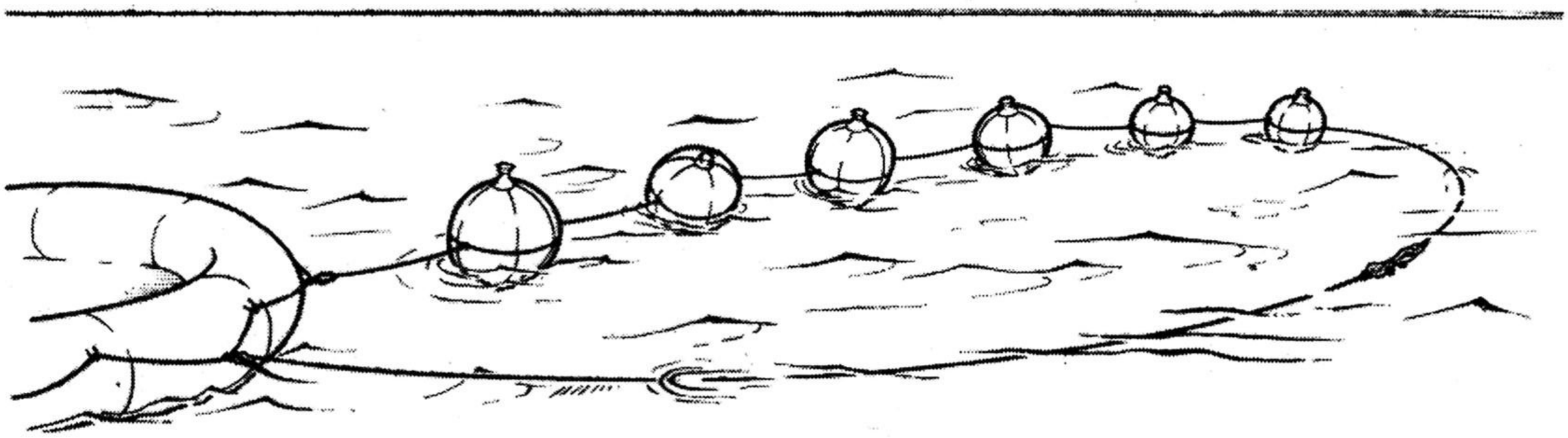


Fig. 12. A number of Stills attached to a dinghy

outer cover to expel the air. It should be remembered that once the Still has been emptied it cannot be used again, and it is therefore preferable that it is kept fully inflated.

*Servicing*

**38.** The apparatus is packed in a container by the manufacturer ready for use, and a generous application of french chalk is used to prevent plastic components sticking together. If the container is opened and the contents removed for examination, ensure that there is plenty of french chalk on the outer cover, inside the sea water reservoir, and on the fresh water container, before the apparatus is repacked.

**39.** Care must be taken when unfolding the Still to prevent it from coming into contact with sharp edges or corners, as it can be easily damaged. Small slits, tears, or perforations may be repaired by applying a piece of the tape provided. This tape is applied in the same manner as adhesive tape; the surface of the damaged area must be clean, and the tape and damaged area must be dry, before the tape is applied.

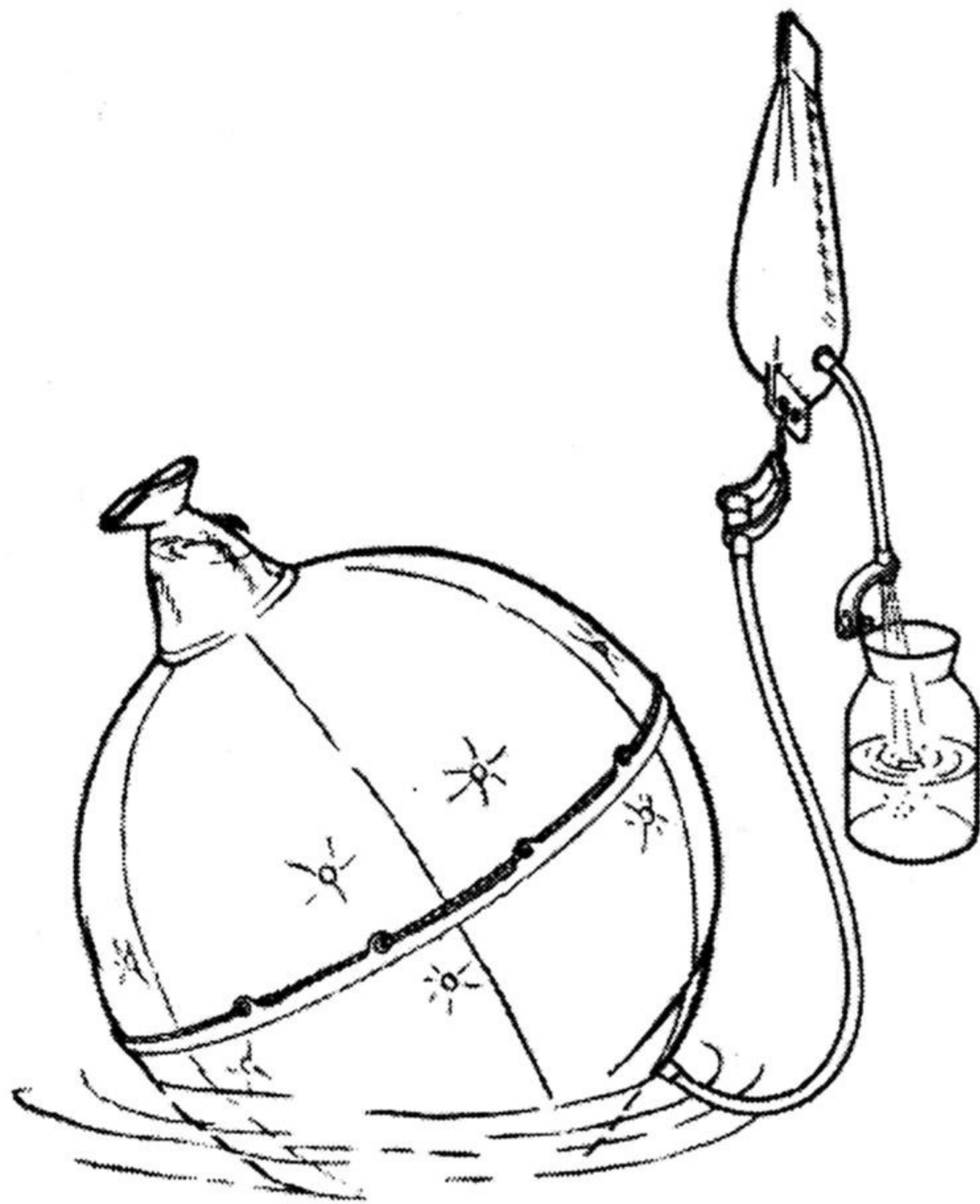


Fig. 13. Emptying fresh water container

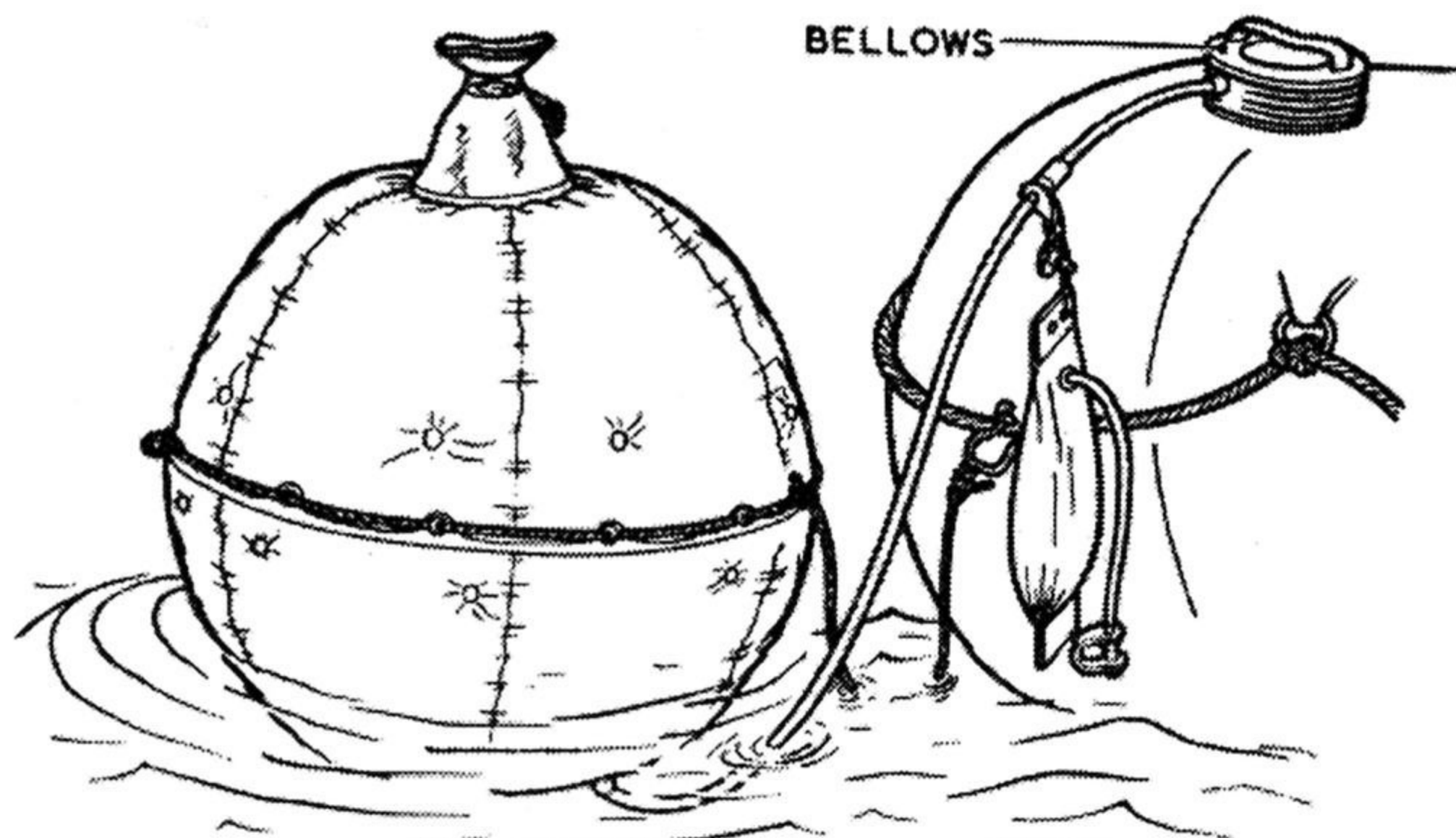


Fig. 14. Bellows attached for topping-up with air

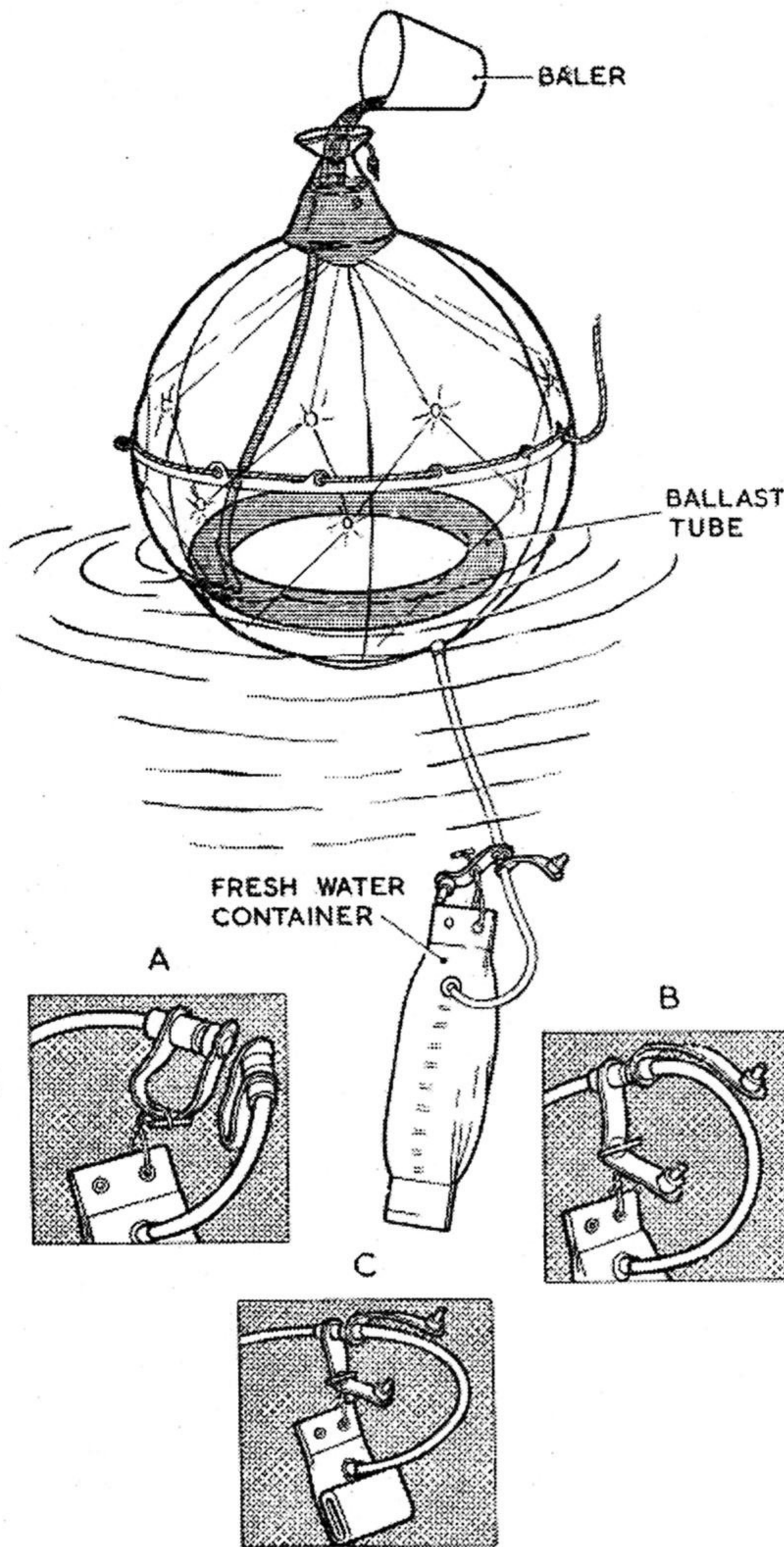


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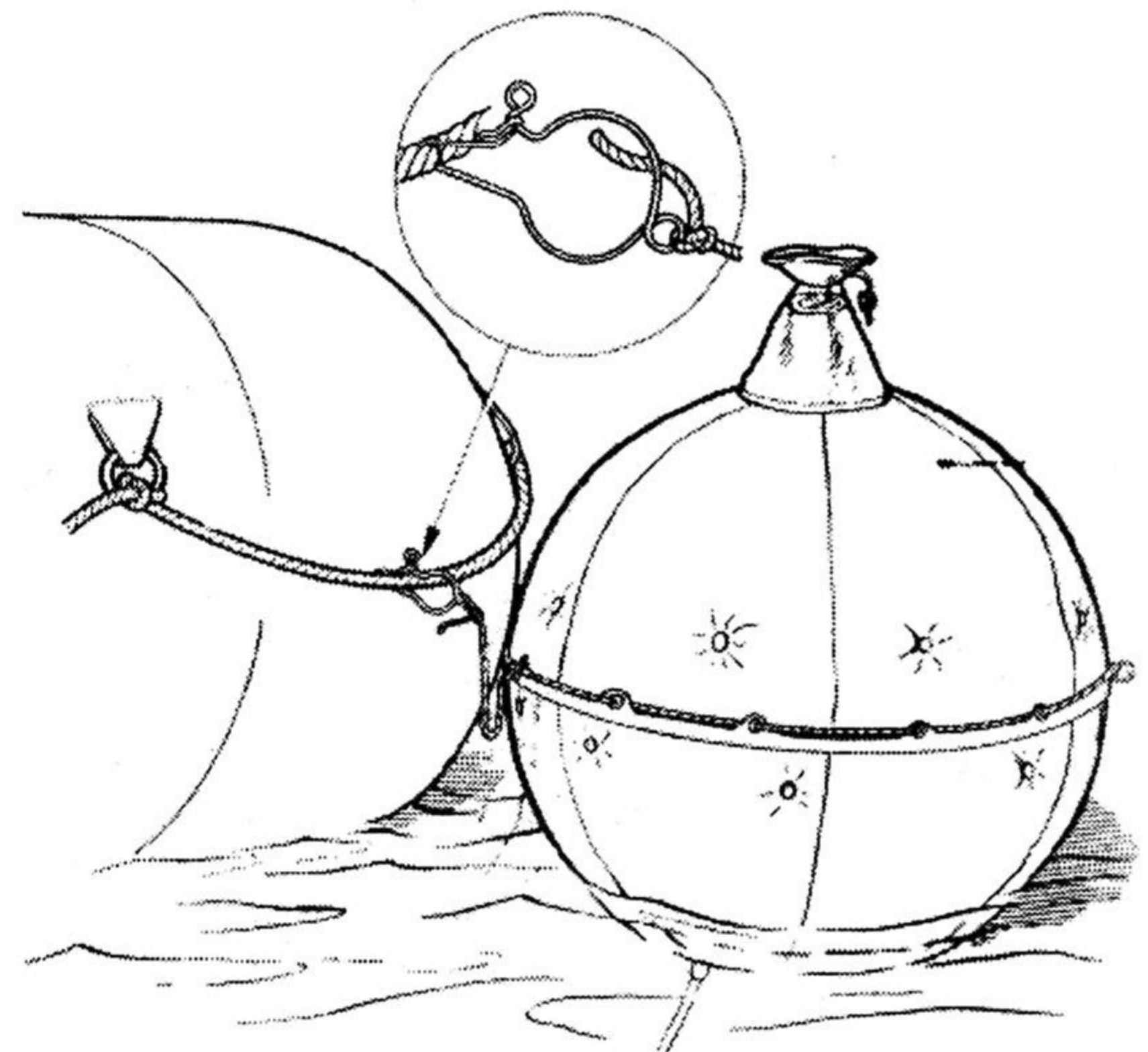


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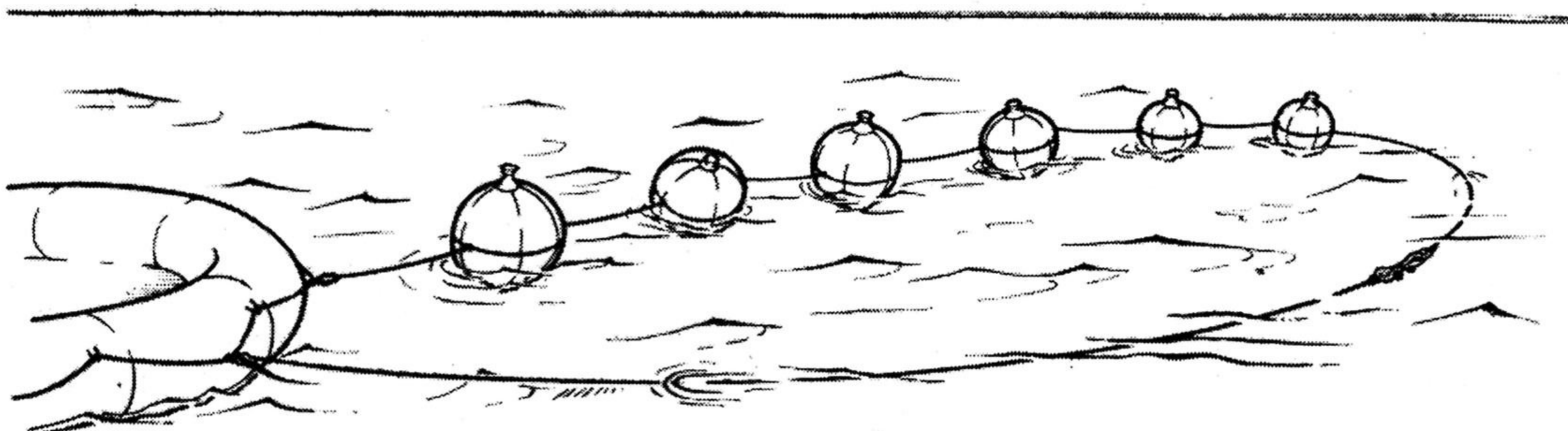


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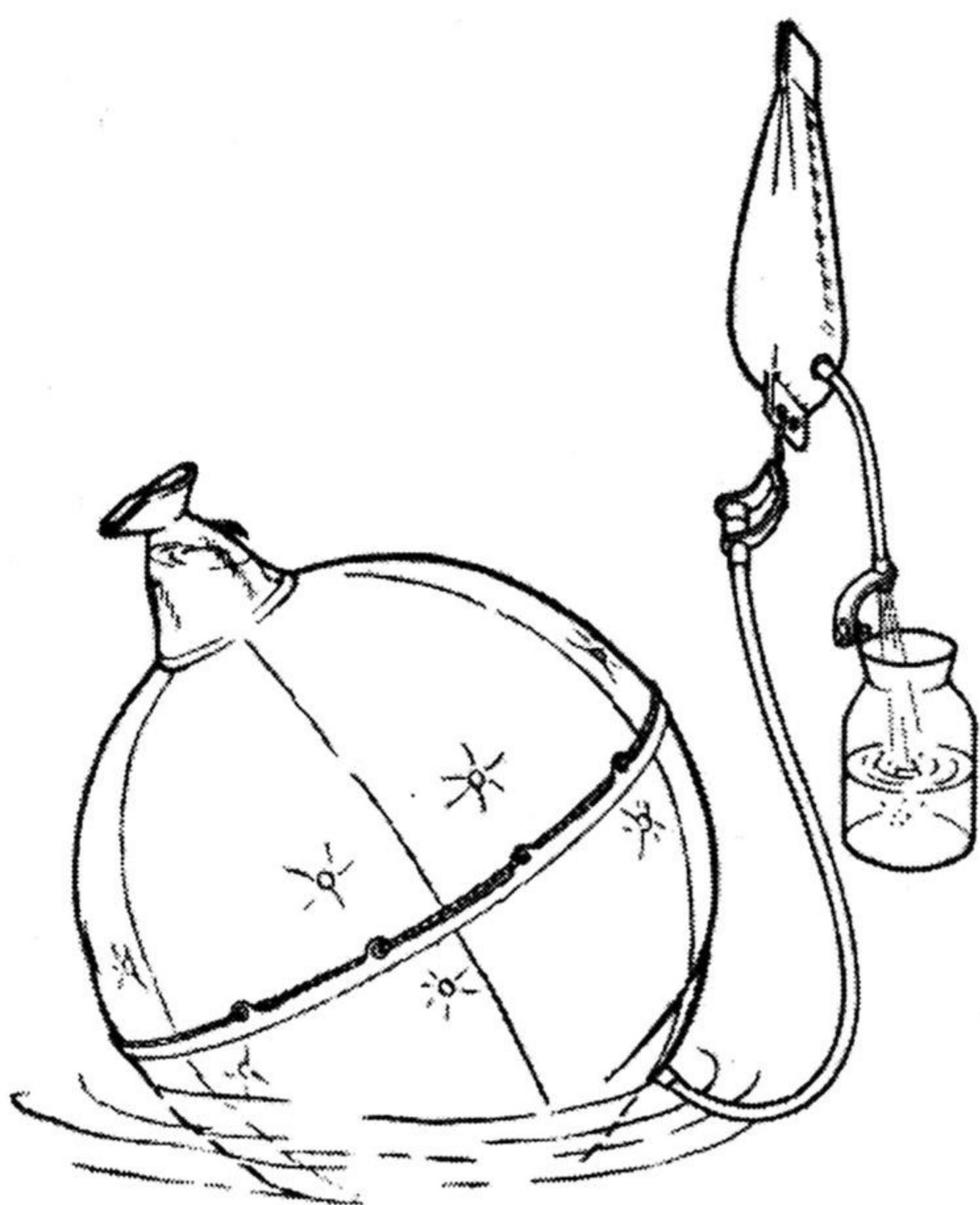


Fig. 13. Emptying fresh water container

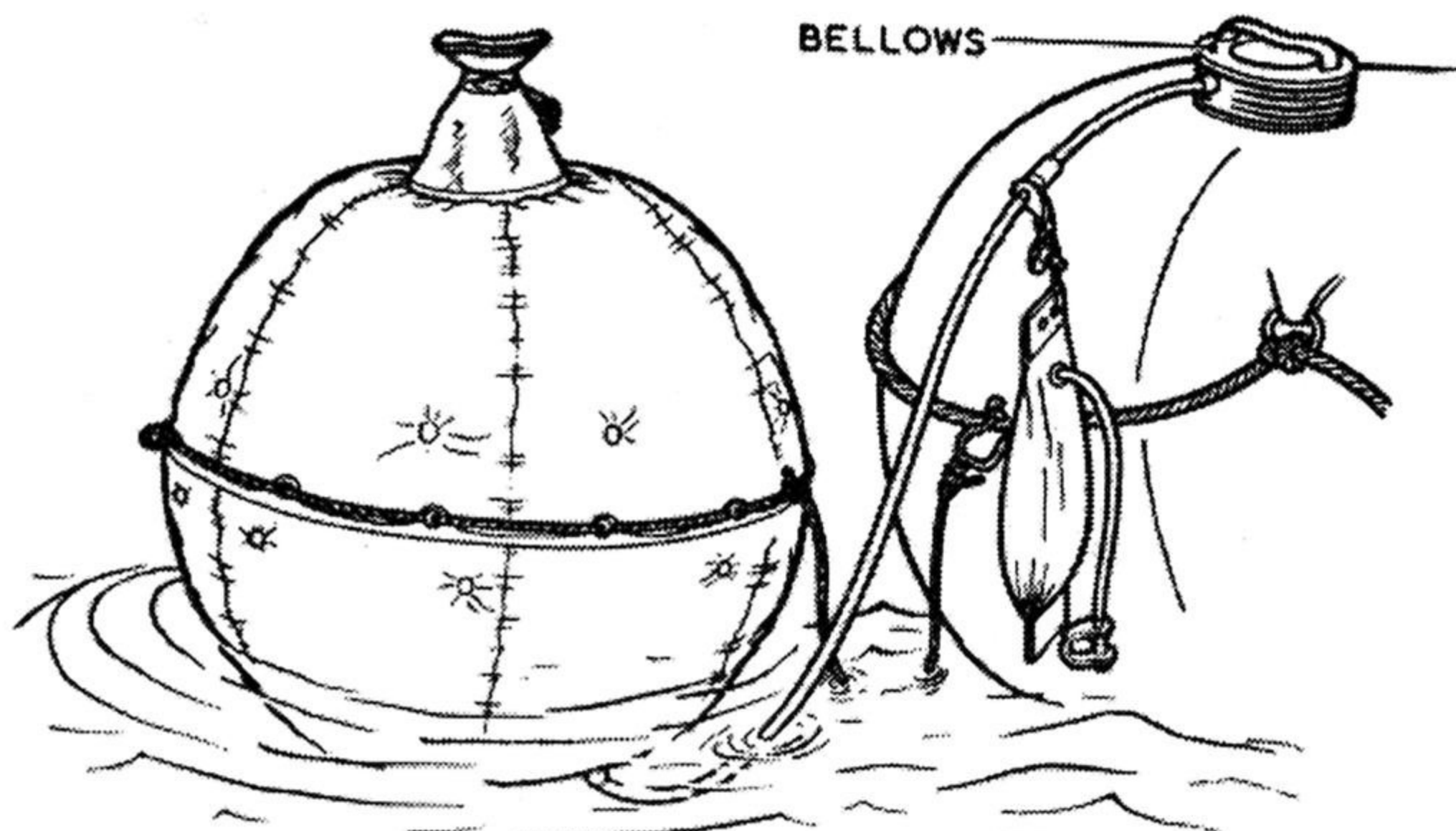


Fig. 14. Bellows attached for topping-up with air

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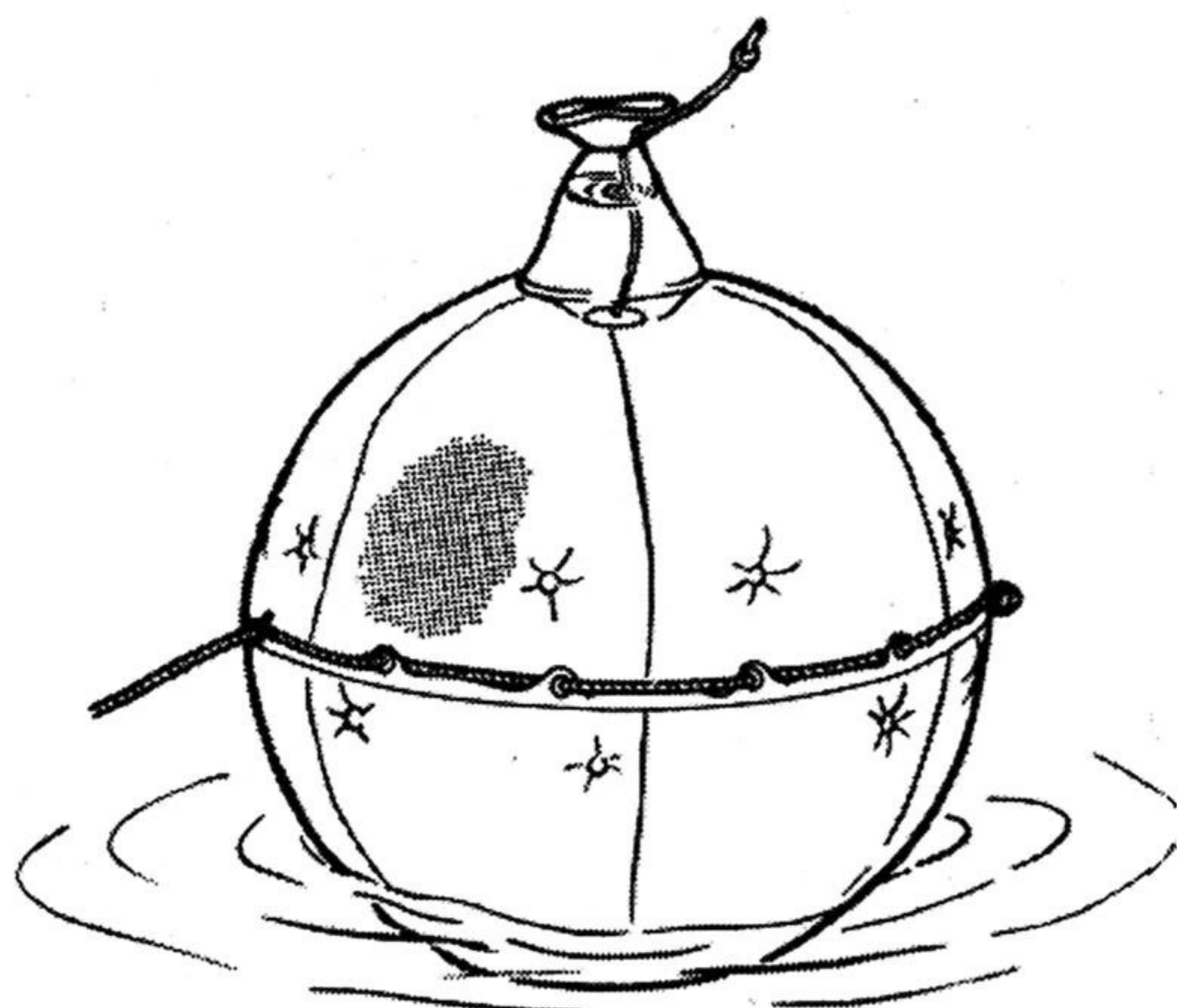


Fig. 15. Dark spot on Still



Fig. 16. Emptying sea water and air from Still

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