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SURVEY REPORT  
ON A NEW TYPE OF SQUID LIFT NET

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## SUMMARY

The first survey on squid lift net fisheries was carried out in Ban Phe District on 4 and 5 November, 1980 (Ref. Miscellaneous paper No. 10).

The second survey was conducted on 23 October 1982 in the same district, with the following purpose:

1. To study operation of a new type of squid lift net.
2. To investigate gear and fishing accessories on board a local fishing boat.

## INTRODUCTION

The 1980 fisheries statistics for Thailand show that the total catch of marine fisheries was 1,647,953 metric tons and its value was 10,507.5 million Baht. (6.37 Baht/kg). This means that the catch decreased by about 20 percent compared with the highest catch of 2,067,533 metric tons (4.17 Baht/kg) in 1977. The main reason for this was that the catch of trash fish and uneconomical fishes has been decreasing year by year.

The catch of squid and cuttlefish in 1980 was 72,313 metric tons and the value was 1,001.0 million Baht (13.80 Baht/kg). It occupies 4.4 percent of the total catch and 9.5 percent of the total value. Therefore, since the value of squid is about twice as high compared to the average value of other catch, it is obvious that squid fishing is an important fishery in Thailand.

Squid fishing in Thailand is mostly carried out by trawl. However, with the more widespread use of electric luring lamps, lift nets and cast nets have increasingly been employed to catch squid.

Among the gears for catching squid, there has been a remarkable increase in the use of different types of lift net in recent years.

The present survey was conducted on board a squid fishing boat (CHOKECHUMPOL, 185 HP Nissan Diesel) which operated a new type of lift net.

## 1. GEAR CONSTRUCTION

### 1.1 Fishing gear

The new type of lift net consists of a net, rope, sinker, ring, and a bamboo pole. The size of the net is 12 meters by 12 meters and 16 meters deep.

The gear is constructed very simply and it is light enough to be operated by manpower of 6-7 fishermen. This type of net is operated only in the night time.

### 1.2 Mesh and twine size

The netting is made of synthetic fibers; nylon is used for the main net and polyethylene for the selvedge. The mesh size of the net is 3.0 cm in stretched measurement, and the twine size is nylon 210 denier 6 ply and polyethylene 380 denier 6 ply respectively.

The main net is dyed black to make it less visible to squid, and the selvedge net is green.

The hanging coefficient is 13 percent on each side of the net.

### 1.3 Floats and sinkers

No floats are used on the float line. Seventy-two lead sinkers, each weighing about 0.5 kg, and another 72 small sinkers (75g each) are attached to the sinker line, divided equally along the four sides of the net.

### 1.4 Lines

Two polyethylene ropes, one with Z and one with S twist of 8 mm in diameter, are used for float and sinker lines.

Polyethylene crossed rope, 14 mm in diameter is used for the lift line.

### 1.5 Bamboo poles

Two bamboo poles, 14 cm in outer diameter and 15 meters long, are used as supporting sticks for the net. One end of each pole is fixed to the bow and the stern respectively, so that the other end projects over the sea surface.

## 2. FISHING METHOD

The squid fishing in Ban Phe district is conducted throughout the year except in the monsoon season from November to January. The peak fishing season is from June to October, the best catches in this district are reported to occur in August and September.

Four kinds of fishing gear for catching squid are commonly used:

- 1) Pulling type of stick-held dipnet
- 2) Pushing type of stick-held dipnet
- 3) Casting type of stick-held dipnet
- 4) New type of lift net (improved version of the stick-held dipnet)

### 2.1 Fishing boat

M.V. CHOKECHUMPOL, which is registered at Rayong Province, was used for trawl fishing until a year ago when it changed to squid lift net fishery. It is a wooden vessel, about 15 meters long and 3.7 meters wide, powered by a Nissan Diesel 185 HP engine and two sets of generators of 8 kW each. It is also equipped with three drum winches. The main winch is set in the center of the deck and it is used to wind the cross rope for pursuing the foot side of the net. The other two winches are set on bow and stern side of the boat. They are used for winding the rope which rolls up the net above the sea surface.

### 2.2 Method of operation

The boat leaves the pier at about four o'clock in the afternoon and goes to a suitable fishing ground (the exact time of departure from the pier varies with the moon age). The journey from the pier to the fishing ground may take up to four hours.

On arrival at the fishing ground the engine is stopped. The boat is allowed to drift for some time. Then one set of mid-water gill net, 300 - 400 meters long and 14 meters deep, is thrown out to the sea as an anchor, and the end of the net is joined to the bow side of the boat.

The boat is positioned in the direction of the current and is held in place by the gill net.

Then all fish-luring lamps are switched on to attract the squid around the boat. The boat is equipped with 24 fish luring lamps, each one having the power of 500 Watt. Six lamps are suspended on each of the four outriggers. Two outriggers are positioned on the port side and two on the starboard side of the boat.

The squid are attracted around the boat after some time. Then the net is made ready for operation. When all preparations have been completed the luring lamps on the port side are switched off by the master-fishermen. All squid attracted around the boat will then shift to the starboard side where the net is. By reducing the illuminating power of the lamps on the starboard side the squid are attracted to come to the sea surface.

When the squid have been attracted near the sea surface, the fishermen quickly cast the net, keeping the float line 30-50 cm above the sea surface. Then the bottom of the net is closed by pulling the purse line. The net is slowly pulled toward the side of the boat and a part of the net is hauled on board.

The squid in the net are gathered in the cod end of the net which is left in water near the side of the boat. Then the squid are lifted on board with a scoop net.

The operation is repeated 10-20 times in the course of one night of fishing.

### 2.3 Characteristics of the gear

The squid is a phototactic animal; thus the electric luring lamp is the most suitable device to attract it.

The pushing type and the pulling type of stick-held dip net were first used several years ago for catching squid that were attracted by the electric luring lamp. But these two types of gear can only catch squid swimming near the sea surface, because the gear itself does not sink much below the surface. Large-sized squid, cuttlefish and other fish escape underneath the net. The casting type of stick-held dipnet, which has been used by some fishermen as an alternative squid fishing gear, has somewhat higher catching efficiency but is still inadequate for catching large-sized squid or fish.

Since about two years ago, a new type of gear has been widely used by the squid fishermen in Ban Phe District. The new net is more efficient than the old types of gear because its bottom edges sink into water without producing excessive sound which frightens the squid. Also, this net reaches a greater depth, thus preventing most of the encircled squid from escaping below the net.

2.4 Operation time and catch on 23 October 1982,  
by M.V. CHOKECHUMPOL

The operation was conducted 12 times on 23 October 1983 by M.V. CHOKECHUMPOL. Details of the operation time and catch are shown in Table 1.

Table 1. Operation time and catch 1/

<u>Operation</u>	<u>Net operation time</u>
1	23.15 - 23.25
2	23.45 - 23.50
3	00.25 - 00.35
4	00.55 - 01.00
5	02.10 - 02.20
6	03.00 - 03.08
7	03.20 - 03.30
8	04.20 - 04.27
9	04.45 - 04.52
10	05.00 - 05.08
11	05.15 - 05.25
12	05.28 - 05.35

1/ Average duration of net operation : 8 min. 5 sec.

Catch		
Squid	Large-sized	5 kg
	Medium-sized	10 "
	Small-sized	100 "
Cuttlefish		10 "
Fish (Sardine, Barracuda, Ribbon fish etc.)		35 "
Total		160 kg

As shown above, on that occasion fishing started at 23.15 hours. Normally the operation would begin earlier in the evening and it would be possible to repeat it more than twelve times in one night.

2.5 Operating cost (by M.V. CHOKECHUMPOL)

1. Fuel oil

Consumption per 1 night	120 liters
Price per liter	7.0 ฿
total	840 ฿

2. Number of crew and income

Masterfisherman	1	3 ฿/1kg
Fishermen	6	1 ฿/1kg

On the basis of the catch on 23 October, 1982, the income of crew is calculated as follows:

Catch (squid and cuttlefish)	=	125 kg
Masterfisherman	3 ฿ x 125	= 375 ฿
Fishermen	1 ฿ x 125 x 6	= 750 ฿
Total about		1120 ฿



### 3. Selling price of catch

Squid	large-sized	50	₱/lkg
	medium-sized	35	₱/lkg
	small-sized	15	₱/lkg
Cuttlefish		25	₱/lkg
Fish		2	₱/lkg

The catch and its value were as follows:

Squid	large-sized	50 ₱ x 5	=	250 ₱
	medium-sized	35 ₱ x 10	=	350 ₱
	small-sized	15 ₱ x 100	=	1500 ₱
Cuttlefish		25 ₱ x 10	=	250 ₱
Fish		2 ₱ x 35	=	70 ₱
				2,420 ₱

### 4. Boat owner's income

Selling price of catch	2420	₱
Expenses: Fuel oil	840	₱
Labour charge	1120	₱
Others (food, lubricant oil, boat maintenance, fishing gear etc.)	400	₱/day
Income	60	₱

According to the above estimate the value of the catch need to be at least 3,000 ₱ per fishing trip before any profit is made.

Table 2. Particulars of the net

1	Main net	nylon 210d/6 - 3.0cm. - 110 m.d. - 55m # 1 pc	
2	Upper selvedge	polyethylen 380d/6 - 3.0cm - 16 m.d. - 55m # 1 pc	
3	Lower selvedge	" " " 20 m.d. - 55m # 1 pc	
4	Head line	polyethylene 8mm dia. Z & S 2 line	48m
5	Sinker line	" " " " "	
6	Side line	" " Z twist 1 line	16m
7	Purse line	" cross rope 14mm dia.	70m
8	Line for pulling the net	" 10mm dia. about 30m	2 lines
9	Sinker (large)	lead round type 500g/pc 9cm x 1.5cm thick	72 pcs
10	Sinker (small)	" oval type 75g/pc	72 pcs
11	Ring	Plastic outer dia 4.8cm inner dia 3.3cm	72 pcs
12	Bamboo pole	outer dia 14cm, 15 meters long	2 poles
13	Block	iron	4 pcs
14	Dram	iron (hand operated)	3 sets

d. : denier      m.d. : mesh deep

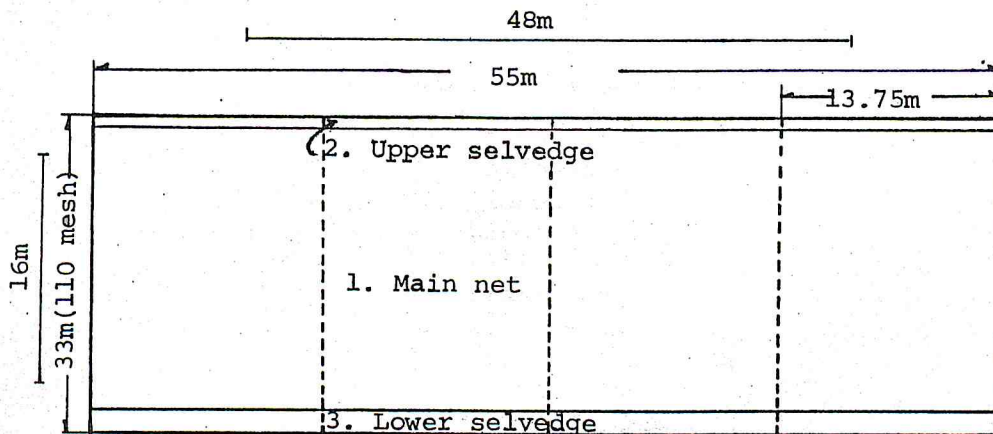


Fig.1 Design diagram of the net

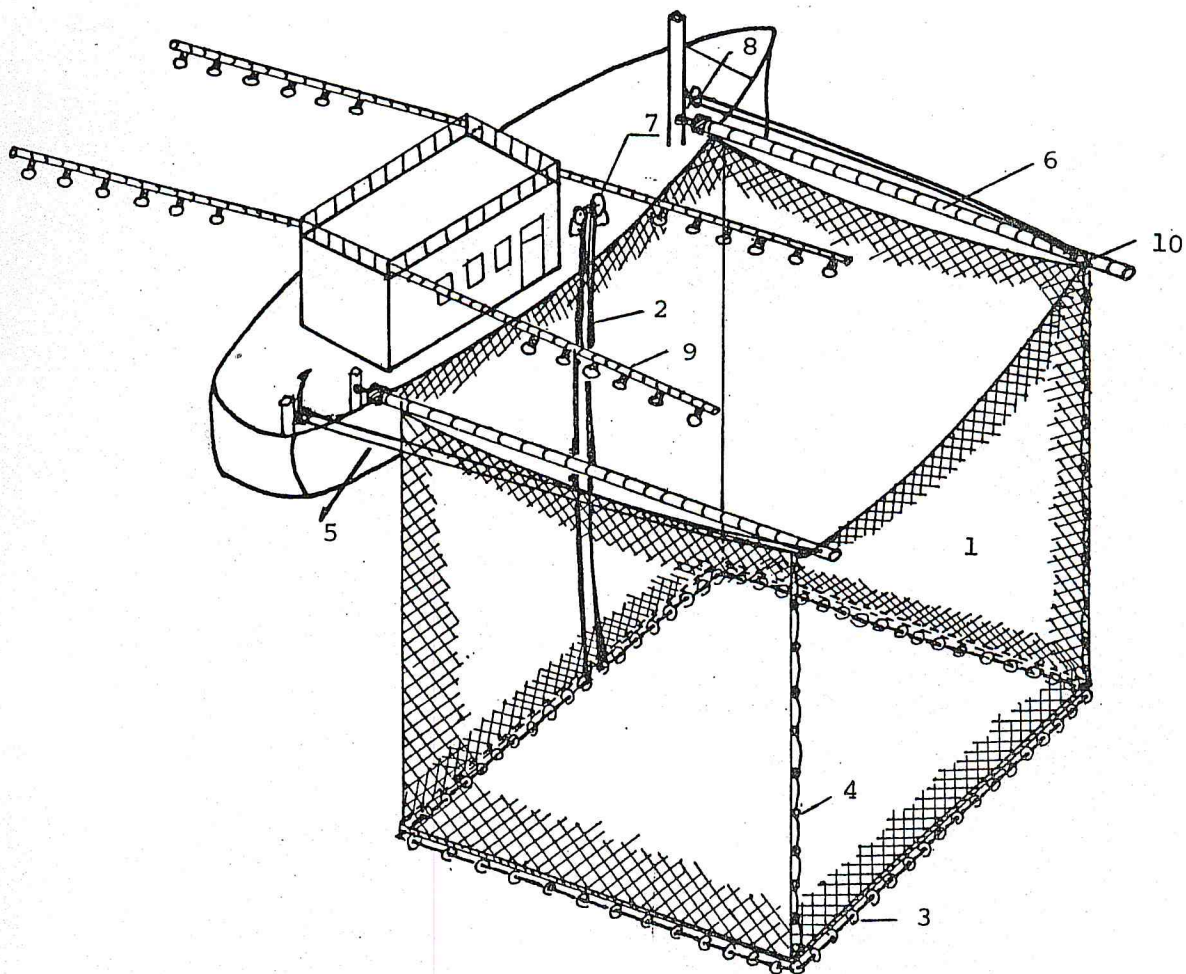
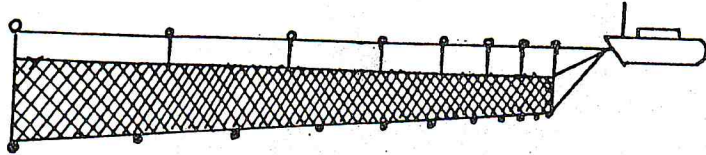


Fig 2. New type of squid lift net

1. Net
2. Purse line
3. Sinker
4. Ring
5. Lift line for pulling the net
6. Bamboo pole
7. Main warping drum
8. Side warping drum
9. Luring lamp
10. Block

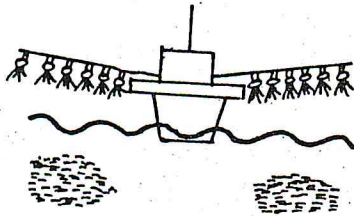
Fig 3. Operation method of the new type of squid lift net

1.



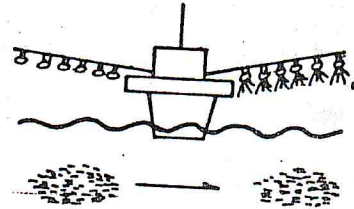
One set of the mid-water gill net is thrown out to the sea as a sea anchor.

2.



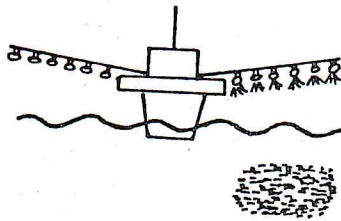
All fish luring lamps are switched on to attract the squid around the boat.

3.



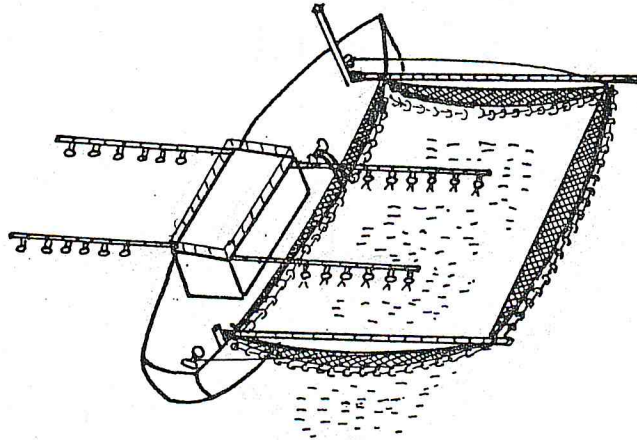
Port side lamps are switched off.

4.



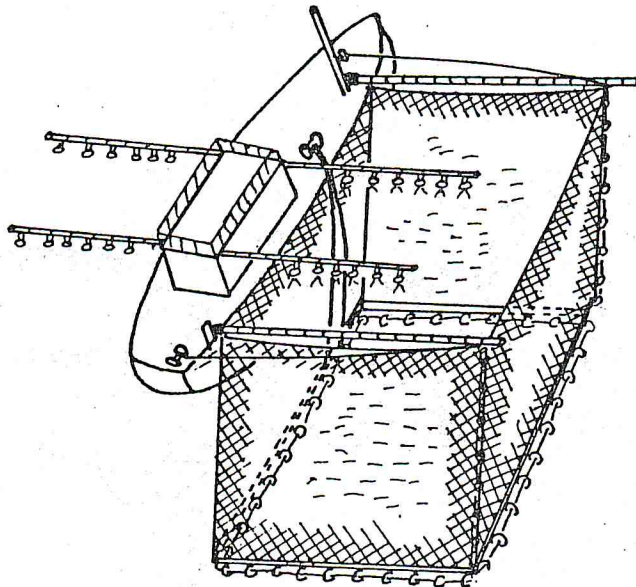
All squid are attracted to the starboard side.

5.



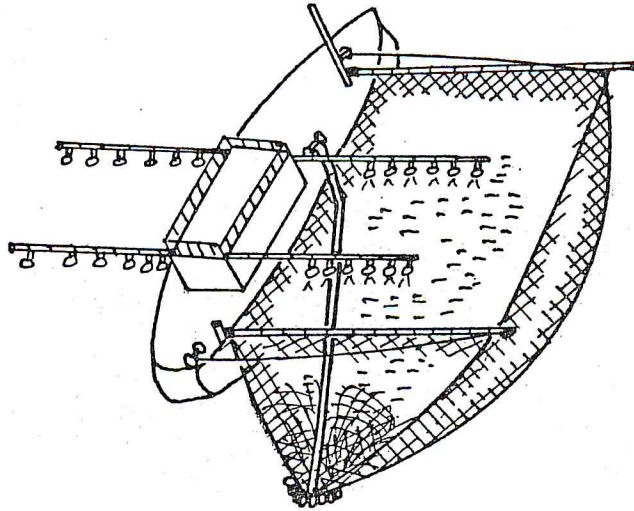
Squid are attracted underneath the net which is held by fishermen. Then, by reducing the illuminating power of the lamp, the squid are attracted to come up to the sea surface.

6.



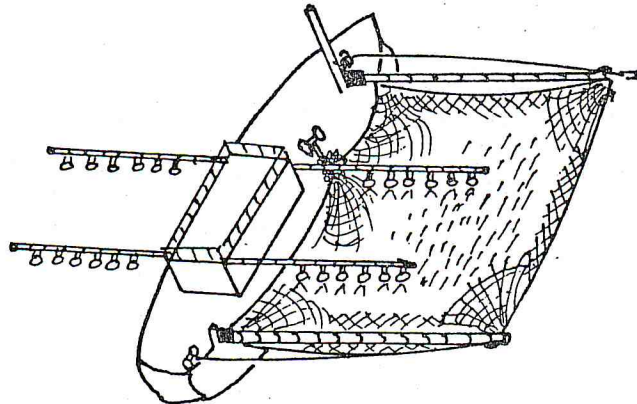
On the masterfisherman's command, the net is quickly thrown into the water.

7.



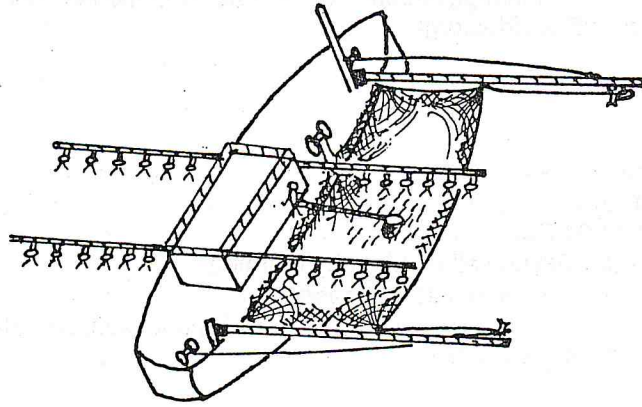
The foot side of the net is closed by the purse line, to prevent squid from escaping underneath the net.

8.



After closing the foot side of the net completely, the net is hauled on board.

9.



The squid is gathered in the cod end and the catch is lifted on board with a scoop net.

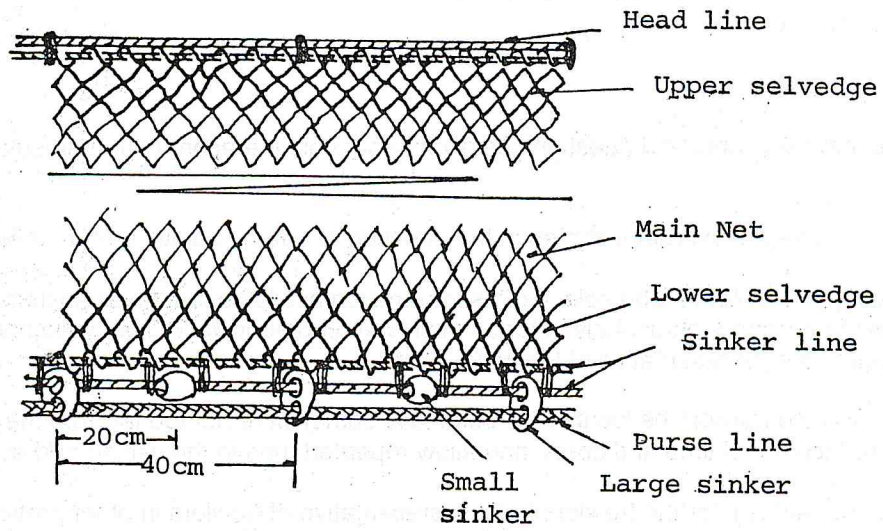


Fig 4. Construction of the net.

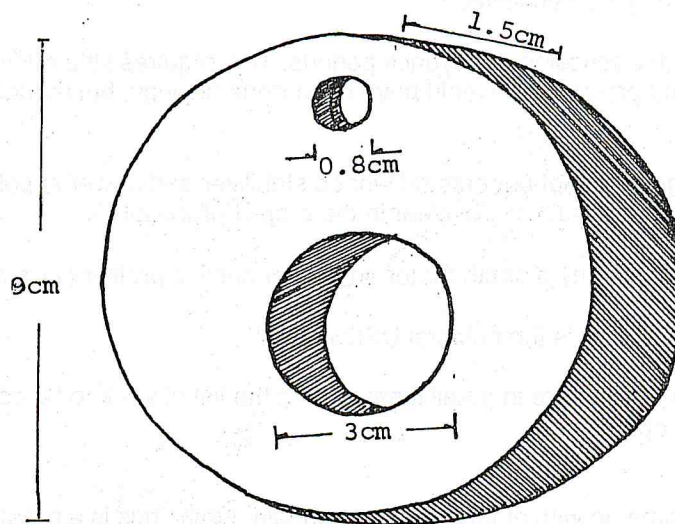


Fig 5. View of the large sinker.



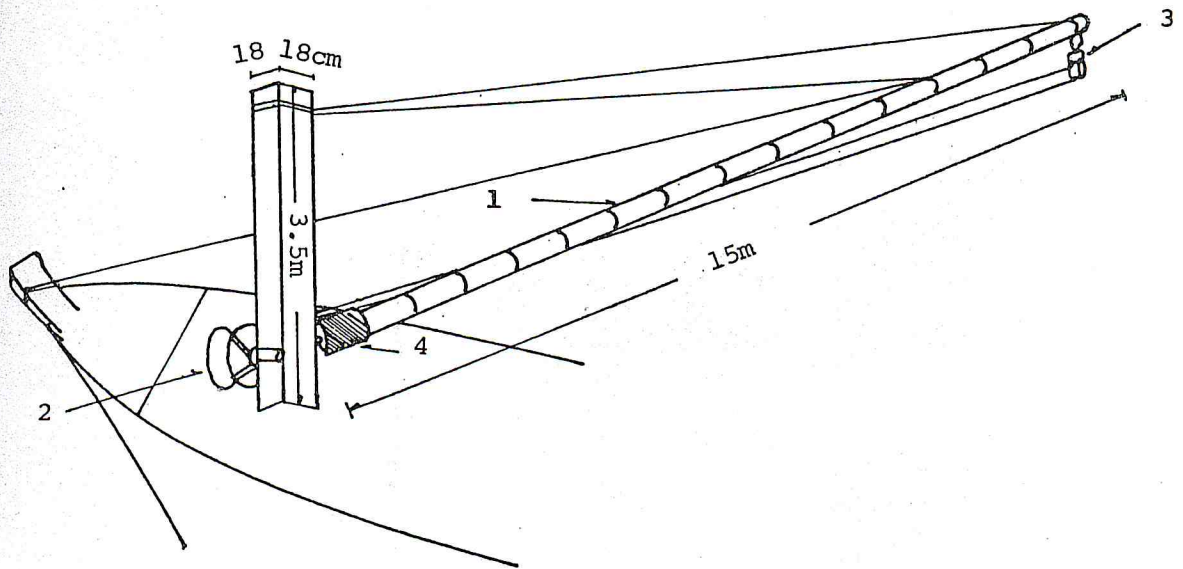


Fig 6. Two bamboo poles are used as supporting sticks for the net.

1. Bamboo pole.
2. Warping drum.
3. Block.
4. Frame of bamboo pole.

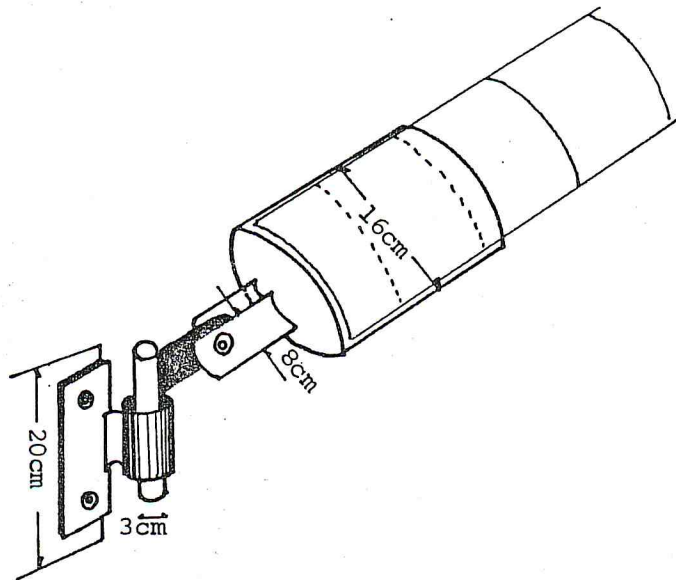


Fig 7. View of the joining tackle