

How To Start Manufacturing Industries

Fishing Net

Introduction

A typical fishing net, with diamond-shape openings, can be manufactured according to different techniques by different machines.

Depending on the fish-size, the opening size and the thickness of the mesh-bars are designed to hold the catch.

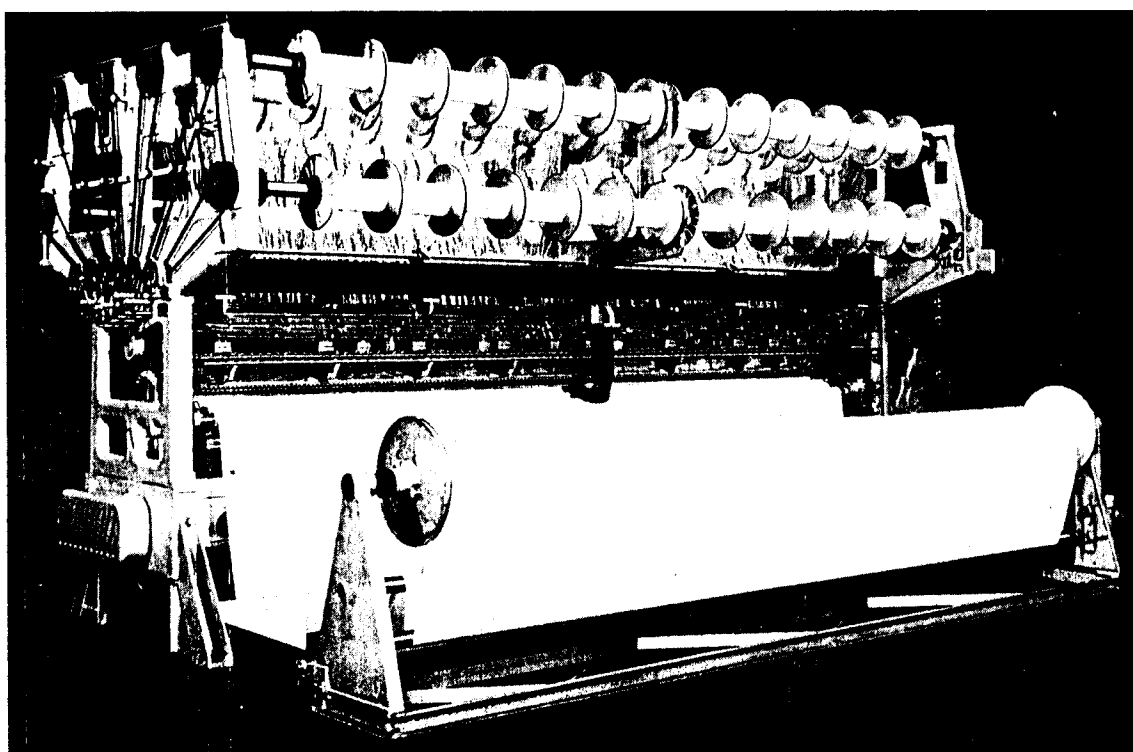
Traditionally nets were hand-knotted and later machine knotted which are both slow processes with many disadvantages. The mesh-bars are made of one yarn which must be twisted to prevent filamentation, the structure and particularly the knots are not strong, the net is very vulnerable on account of the protruding knots and, in some cases, the knots even loosen when immersed in the water.

Braiding techniques in which the yarns are twisted together to form the mesh, are even more sensitive to slippage and the net openings are changed and distorted under load stress.

The most modern, productive, profitable and technologically suitable method for fishing-net production is warp knitting as executed on the specially developed 8-guide bar high-speed Raschel machine.

The mesh bars produced on a Raschel machine are made of loop chains and the flat connections are made by pulling the pillars together.

To improve the tenacity of the mesh bars and the connections, inlay yarns are made to follow the pillars of the loops and take part in the binding of every two mesh bars. Those inlaid yarns are almost straight in their structure and thus do-



Raschel Machine

nate great strength both ways, to the mesh bars and the connections. Usually those yarns are heavier than the knitting yarns which are used as the binding media.

Raschel machines are built in 7 to 16 needles per inch and with 6 to 8 guide bars to allow the following possibilities:

- Fine-gauge machines produce – with fine yarns – fine net structures, while the heavy-gauge machines produce the heavy-duty nets that are capable of catching and holding big fish. In those heavy net structures the inlaid and knitting yarns in each mesh bar can amount to 80,000 dtex and more.
- 6-guide bar machines produce the standard type of fishnet, while the 8-guide bar machine can produce especially reinforced structures or special selvages on both sides of the net fabric.
- Machine widths of 105 to 190 inches can produce – according to the opening size – extremely wide net fabrics. It must be borne in mind that with every needle producing a mesh bar, the structure when stretched to open diamond openings will be many times wider than the knitting machine.

Plant Description

Raw material for fish nets is filament synthetic yarn of polyamid or polyester type. The yarn count depends on the wanted mesh size and stitches per cu.cm. Average range is 500 to 4,000 dtex.

The plant consists of a beaming arrangement (warping machine and warping creel) and one Raschel machine.

The total number of filament yarns processed on the Raschel machine has to be wound on several sectional beams of 21" flange diameter and 21" width. Winding of beams is done on the warping machine. The individual filament yarns are fed to the warping machine from a creel with approx. 600 running off positions for yarn cones.

The sectional yarn beams are fed to the Raschel knitting machine. The finished net material is again batched on beams to be supplied to the making-up department. Making-up of nets to sizes and fixing of ropes and hooks is done manually.

Example of the Plant

Required Machinery and Equipment

Item	Description	Pieces
1	Direct sectional warping machine for beams 21 x 21" with pressure roller, yarn storage device, levelling roller, yarn oiling device, static eliminator, intermediate reed, end break detector	1
2	Warping creel for 608 ends with tension regulator, end break detection	1
3	Raschel knitting machine of E 9 or E 12 gauge, 130-inch working width with warp let-off device, pattern drive, fabric take-up batching device	1
4	Sectional beams	50
5	Beam lifting and transport trolley	1
6	Weighing equipment	1
7	Yarn testing equipment	1
8	Hand-tools for making-up department	1
9	Air-humidifying equipment	1
FOB-price for machinery and equipment approx.		US\$ 350,000.00

Required Buildings and Areas

Store rooms	300 sq.m
Production room	250 sq.m
Facilities	150 sq.m

Manpower at 2-shift operation

Manager	1
Administration and stores	7
Technicians	2
Skilled operators	3
Unskilled helpers	4
	17

Required Power and Utilities

Required power	35 kW
No water, no oil required for production purposes	

Required Raw Materials

5.1 Example 1	
Knitting stitches	8.6/cm
Weight	500 g/sq.m
Efficiency	80%
Production	approx. 28 running m/h
Width	3 m
Total weight per hour	$28 \times 3 \times 0.5 = 42 \text{ kg}$
Waste	3%
Raw material per day of 2 shifts	$42 \times 16 \times 1,03 = \text{approx. } 700 \text{ kg}$

5.2. Example 2

Knitting stiches	4.8/cm
Weight	1,080 g/sq.m
Efficiency	80%
Production	approx. 50 running m/h
Width	3 m
Total weight per hour	$50 \times 3 \times 1.08$ = 162 kg
Waste	3%
Raw material per day of 2 shifts	$162 \times 16 \times 1.03 =$ ap- prox. 2,670 kg

This information has been prepared by UNIDO as a result of the financial contribution to UNIDO from the Government of the Federal Republic of Germany and the close co-operation extended to UNIDO by the relevant industries in the Federal Republic of Germany.
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