**NET,**[1] a fabric of thread, cord or wire, the intersections of which are knotted so as to form a mesh. The art of netting is intimately related to weaving, knitting, plaiting and lace-making, from all of which, however, it is distinguished by the knotting of the intersections of the cord. It is one of the most ancient and universal of arts, having been practised among the most primitive tribes, to whom the net is of great importance in hunting and fishing.

Net-making, as a modern industry, is principally concerned with the manufacture of the numerous forms of net used in fisheries, but netting is also largely employed for many other purposes, as for catching birds, for the temporary division of fields, for protecting fruit in gardens, for screens and other furniture purposes, for ladies' hair, bags, appliances used in various games, &c. Since the early part of the 19th century numerous machines have been invented for netting, and several of these have attained commercial success. Fishing nets were formerly made principally from hemp fibre—technically called "twine"; but since the adaptation of machinery to net-making cotton has been increasingly used, such nets being more flexible and lighter, and more easily handled and stowed.

The forms of fishing nets vary according to the manner in which they are intended to act. This is either by entangling the fish in their complicated folds, as in the trammel; receiving them into pockets, as in the trawl; suspending them by the body in the meshes, as in the mackerel-net; imprisoning them within their labyrinth-like chambers, as in the stake-net; or drawing them to shore, as in the seine. The parts of a net are the head or upper margin, along which the corks are strung upon a rope called the head-rope; the foot is the opposite or lower margin, which carries the foot-rope, on which in many cases leaden plummets are made fast. The meshes are the squares composing the net. The width of a net is expressed by the term "over"; *e.g.* a day-net is three fathoms long and one over or wide. The lever is the first row of a net. There are also accrues, false meshes or quarterings, which are loops inserted in any given row, by which the number of meshes is increased. To bread or breathe a net is to make a net. Dead netting is a piece without either accrues or stole (stolen) meshes, which last means that a mesh is taken away by netting into two meshes of the preceding row at once.

*Hand-Netting.*—The tools used in hand-netting are the needle, an instrument for holding and netting the material; it is made with an eye E, a tongue T, and a fork F (fig. 1). The twine is wound on it by being passed alternately between the fork and round the tongue, so that the turns of the string lie parallel to the length of the needle, and are kept on by the tongue and fork. A spool or mesh-pin is a piece of round or flat wood on which the loops are formed, the perimeter of the spool determining the size of the loops. Each loop contains two sides of the square mesh; therefore, supposing that it be required to make a mesh 1 in. square—that is, measuring 1 in. from knot to knot, —a spool 2 in. in circumference must be used. Large meshes may be formed by giving the twine two or more turns round the spool, as occasion may require; or the spool may be made flat, and of a sufficient width. The method of making the hand-knot in nets known as the fisherman's knot is more easily acquired by example than described in writing. Fig. 2 shows the course of the twine in forming a single knot. From the last-formed knot the twine passes over the front of the mesh-pin *h*, and is caught behind by the little finger of the left hand, forming the loop *s*, thence it passes to the front and is caught at *d* by the left thumb, then through the loops *s* and *m* as indicated, after which the twine is released by the thumb and the knot is drawn "taut" or tight. Fig. 3 is a bend knot used for uniting two ends of twine.

FIG. 1.

*Machine-Netting.*—In 1778 a netting-machine was patented by William Horton, William Ross, Thomas Davies and John Golby. In 1802 the French government offered a reward of 10,000 francs to the person who should invent an automatic machine for net-making. Jacquard submitted a model of a machine which was brought under the notice of Napoleon I. and Carnot, and he was summoned to Paris by the emperor who asked—"Are you the man who pretends to do what God Almighty cannot —tie a knot in a stretched string?" Jacquard's model, which is incomplete, was deposited in the Conservatoire des Arts et Métiers; it was awarded a prize, and he himself received an appointment in the Conservatoire, where he perfected his famous attachment to the common loom. In the United Kingdom, the first to succeed in inventing an efficient machine and in establishing the industry of machine net-making was James Paterson of Musselburgh. Paterson, originally a cooper, served in the army through the Peninsular War, and was discharged after the battle of Waterloo. He established a net factory in Musselburgh about 1820; but the early form of machine was imperfect, the knots it formed slipped readily, and, there being much prejudice against machine nets, the demand was small. Walter Ritchie, native of Musselburgh, devised a method for forming the ordinary hand-knot on the machine nets, and the machine, patented in July 1835, became the foundation of an extensive and flourishing industry.

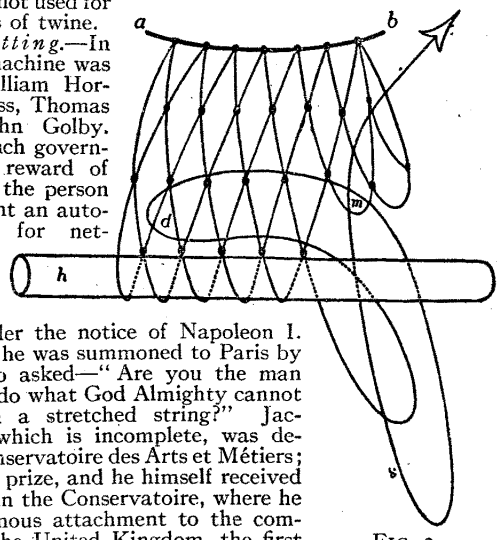

FIG. 2.

The Paterson machine is very complex. It consists of an arrangement of hooks, needles and sinkers, one of each being required for every mesh in the breadth being made. The needles hold the meshes, while the hooks seize the lower part of each and twist it into a loop. Through the series of loops so formed a steel wire is shot, carrying with it twine for the next range of loops. This twine the sinkers successively catch and depress sufficiently to form the two sides and loop of the next mesh to be formed. The knot formed by threading the loops is now tightened up, the last formed mesh is freed from the sinkers and transferred to the hooks, and the process of looping, threading and knotting thus continues.

FIG. 3.

Another form of net-loom, working on a principle distinct from that of Paterson, was invented and patented in France by Onésiphore Pecqueur in 1840, and again in France and in the United Kingdom in 1849. This machine was improved by many subsequent

[1] This is a common Teut. word, of which the origin is unknown; it is not to be connected with "knit" or "knot." The term "net," *i.e.* remaining after all deductions, charges, &c., have been made, as in "net profit," is a variant of "neat," tidy, clean, Lat. *nitidus*, shining.

inventors; especially by Baudouin and Jouannin, patented in the United Kingdom in 1861. In this machine separate threads or cords running longitudinally for each division of the mesh are employed (fig. 4). It will be observed that the alternate threads *a* and *b* are differently disposed—the *a* series being drawn into simple loops over and through which the threads of the *b* series have to pass. On the machine the *a* series of threads are arranged vertically, while the *b* series are placed horizontally in thin lenticular spools. Over the horizontal *b* series is a range of hooks equal in number with the threads, and set so that they seize the *b* threads, raise them, and give them a double twist, thus forming a row of open loops. The loops are then depressed, and, seizing the vertical *a* threads, draw them crotchet-like through the *b* loops into loops sufficiently long and open to pass right over the spools containing the *b* threads (fig. 5), after which it only remains to tighten the threads and the mesh is complete.

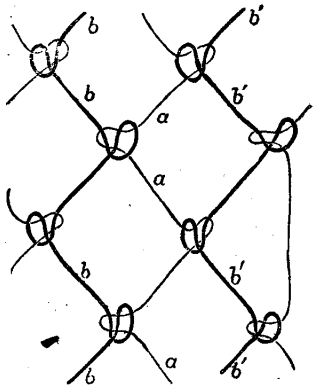

FIG. 4.

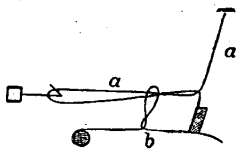

FIG. 5.

*Wire-netting*, which is in extensive demand for garden use, poultry coops, and numerous like purposes, is also a twisted structure made principally by machine power. The industry was mainly founded by Charles Barnard in 1844, the first netting being made by hand on wooden rollers. The first machine appeared in 1855, and, since that time many devices, generally of extremely complex construction, have come into use. The wire chiefly used is common annealed Bessemer or mild steel (see B. Smith, *Wire, Its Manufacture and Uses*, New York, 1891).