Lace-mak'ing Ma-chine'. Lace is a delicate kind of network composed of silk, flax, or cotton threads, twisted or plaited together. See LACE.

The meshes are of an hexagonal figure, in which thick threads are also interwoven to form the pattern, according to some design; and these threads, which are called *gymp*, form the ornament of the lace.

The *point-net frame* was invented by Morris (England) in 1764, and is a variety of the stocking-frame, making a stitch or loop like that of a stocking, and formed by a continuance of one thread. The thread is by the machine formed into loops, a whole course at once, by pressing it down alternately over and under between a number of parallel needles. A second course is then made of similar loops on the same needles, and the loops of the first are drawn through those of the second in such a manner as to form meshes by retaining the first loops; the second are then retained by a third, and these by a fourth, and so on.

The *warp-net frame* is also a variety of the stocking-frame, but the parts are very differently arranged, the movements being produced by treadles, leaving the hands of the workman to manage the machine, which is a piece of mechanism applied in front of the row of needles of the frame. In the *warp-net frame* the piece of lace is not formed of one continuous thread, as in the *point-net frame*, but there are as many different threads as there are needles in the frame; these threads are *warped* or wound upon a roller or beam the same as a loom, and it is from this circumstance that the machine is called a *warp-frame*. These threads pass through eyes in the ends of small points, called *guides*, which are opposite the needles; and these guides are fixed on two bars, each of which has half the guides fastened on it; that is, one guide is fast to one bar, and the next to the other, and so on alternately of the whole. Each of the guides presents a thread to its needle, and all are at once moved by the hand to twist the threads two or three times round the needles that are opposite to them. The loop is now made in a manner similar to that in the *point-net frame*. The next time, the alternate guides are shifted endways, so as to apply themselves to other needles than those they were opposite to before; this crosses the thread so as to make a net, but the quantity that is shifted endways is changed every time by means of the machinery, so as to move a certain number of needles, which number is changed every time to produce the pattern.

The lace-making machine for weaving the real twisted lace, like that made on the pillow, was invented by Heathcoat, 1804.

The groundwork of the invention is to extend those threads which form the warp of the lace in parallel lines, and dispose the diagonal threads upon small bobbins, which are detached, and are capable of passing round the extended warp-threads so as to twist with them; by this means the number of bobbins is reduced to one half. In this machine there are two horizontal beams or rollers, one to contain the thread and the other to receive the lace; also a number of small bobbins to contain the thread.

Mr. Hebert thus enumerates the varieties of bobbin net-lace machines: —

The Loughborough double-tier	*Heathcoat's.*
The single-tier	*Stevenson's.*
The improved double-tier	*Brailey's.*
The improved single-tier	*Lever's.*
The Loughborough improved; with pumping-tackle.	
The pusher principle.	
The traverse warp	*Bevan & Freeman's.*
The traverse warp, rotary	*Lindley & Lacey's.*
The straight bolt	*Kendal & Mauley's.*
The circular bolt	*Mauley's.*
The circular comb	*Hervey's.*
The improved circular comb	*Hervey's.*
The farther improved single-tier	*Lever's.*