To all whom it may concern:

Be it known that I, HERBERT REDGATE, lace-manufacturer, a subject of the Queen of Great Britain, residing at 134, Queen's Walk, 5 of the Corporation of Nottingham, Eng- land, have invented certain new and useful Improvements in Twist-Lace Machines of which the following is a specification.

The object of my invention is to make twist-lace upon the tops of the carriages instead of on the points ordinarily employed, the carriage being so shaped and formed as to beat up the threads which the point-bars now do in levers and curtain-twist-lace ma- chines.

In carrying my invention into effect I dispense with the points and the point-leads, point-bars, cams, levers, springs, and toothed gearing used for working the same, and I employ in lieu thereof a newly-shaped carriage, to which the necessary motions are imparted to make the twist-lace upon their tops by the usual method of moving the warp with guide-bars, jacks, stamp-bars, steel bars, and jac- quard.

My invention is represented in the accompanying drawings, in which——

Figure 1 is a plan elevation of the twist-lace machine with my improvements applied thereto, and Fig. 2 is a face view of one of the carriages separate.

My new-shaped carriage is in the form of a triangle, the bottom part being in the form of a segment of a circle extending to about a quarter of a circle or thereabout. It is provided with a bobbin of, as usual, and the upper part of the carriage is brought to a point of, which is at the center of motion of the carriage, and on which the fabric is formed by the aid of guide-bars and other parts, operated in the way as in machines hitherto in use, a guide-hole being formed at the point of for the passage therethrough of the thread from the bobbin.

The carriages move backward and forward between combs, which form the segments of a circle, and this movement of the carriages is obtained by means of catch-bars, having catchers and carried by arms, fixed to round bars, which at their ends are carried by double-ended levers, whose centers of motion are coincident with the center of motion or points of the carriages. The bars, carrying the catch-bars, are connected by links or connecting-rods with double-ended levers, mounted upon the top center shaft, and this shaft has fixed upon the end thereof a lever which by a rod is connected to a crank upon the front revolving shaft, which is the prime mover.

The catch-bars are similar to those now in use; but the operating devices above described, and which form part of the new construction, are different. The catch-bar is by falling into the ribs of the carriages and by the motion given to them pull the carriages to either one or the other extremity of the comb-segments. When in that position, the threads in the guide-bars are moved, as required, to the right or to the left. These movements of the threads and the combined transverse backward and forward movement of the carriages and their bobbins cause the comb-bars to form the fabric or twist-lace on the tops of the carriages.

The object gained by forming the carriage with ribs and operating them by catch-bars in contradistinction to the method of drawing them by means of pushers, as described in English Patent No. 2,630 of 1854, is as follows: By means of the ribs and catch-bars the carriages can be moved forward and yet leave a clear space in the center of the machine for the free movement of the guide-bar threads, as the catch-bar on one side is not then in contact with the carriages, while when operating the carriages by pushers the latter remain in contact with the carriages when the guide-bar threads are being moved, and consequently interfere with the free motion of such threads.

In carrying my invention into effect I also dispense with the facing-bar; but I use a porcupine-roller and a work-roller in the position shown in the drawings, a portion of the periphery of the porcupine-roller being vertically over the point where the work is made, or, in other words, over the center of motion of the carriages. The fabric is formed upon a portion of the circumference of the porcupine-roller, passes to the work-roller, onto which it is wound in the ordinary man-
ner. Motion is communicated to the rollers $p$ and $q$ by the well-known means.

Having fully described my invention, what I desire to claim, and secure by Letters Patent, is—

1. A triangular carriage constructed with a segment $a^4$ at the base, with nibs $a^5$ at the ends of the segment, with a point $a^3$ at the center of motion of the carriage and on the top of which the fabric is formed, and with a thread-guide hole in the extremity of the point and provided with a bobbin $a'$, substantially as described.

2. The combination of a triangular carriage constructed with a segment $a^4$ at the base, with nibs $a^5$ at the ends of the segment, with a point $a^3$ at the center of motion of the carriage and on the top of which the fabric is formed, and with a thread-guide hole in the extremity of the point and provided with a bobbin $a'$, guide-bars, catch-bars, and mechanism for operating the latter, substantially as described.

3. A carriage-shifting device consisting of the bars $d$, having each a catch $d'$, arms $e'$, $25$ shafts $e$, carrying said arms, levers $f$, links $g$, levers $h$, shaft $i$, arm $j$, and means for actuating the latter arm, substantially as described and shown.

4. The combination of the bobbin-carriage $30$, segmental combs $c$ therefor, and the catch-bars $d$, arms $e'$, shafts $e$, carrying said arms, levers $f$, links $g$, levers $h$, shaft $i$, arm $j$, and means for actuating the latter arm, substantially as described and shown.

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Witnesses:

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