My invention relates to implements for use in the production of knitted goods on hand-operated knitting machines of the known type which has a horizontal or about horizontal needle bed provided with a loop-forming comb, and in which knitting needles are arranged axially of each other, pass between the teeth of this comb and are operated by a lock moved perpendicularly to the longitudinal direction of the needles. Ordinarily, machines of this type can produce only flat or uniformly knitted goods.

Objects of my invention are to make possible the use of these simple machines for the production of knittings in which rows of "right" stitches or knits alternate with rows of "left" stitches or purls, and of knitting which includes holes or certain other designs, and to provide an additional implement for this purpose which can be used without any change in the structure of the machine itself, which can be made inexpensively and which can be easily used, even by an unskilled person.

According to my invention, this implement constitutes a suspension comb comprising a bar or rail and suspension teeth arranged at distances which are equal to the distances of the knitting needles, or which are multiples of the needle distances. These teeth form double-walled hooks with closed tips, each hook having two symmetrically shaped walls which are spaced except at the hook tip where the two walls unite. These teeth may be permanently or exchangeably affixed to the comb bar.

I have found that a structure is advantageous in which the teeth or hooks extend from the bar perpendicularly to the same and have hooked ends curved parallel to each other in the same direction. Each hook wall, seen from its broad side, preferably forms a rectangle extending from the bar to the bend of the hook. From this bend, the hook wall tapers toward the hook tip.

Near the bar, the space between the hook walls has preferably a uniform width about twice as large as the thickness of a knitting needle. At a point between the bar and the hook bend, preferably nearer to the latter, the walls are symmetrically bent toward each other whereby the space between the walls is reduced near this bend. This reduced space is preferably about as wide as a needle shaft. From the bend to the tip of the hook, the walls converge so that, short before their united ends, they are only as far spaced as equals the width of the hook of a knitting needle.

The use of this suspension comb makes it easy to transfer the knitted fabric from the knitting needles to the teeth of the comb. The spaced walls of the double-hooks hold the meshes, against their tendency to contract, sufficiently open whereby the hooks of the knitting needles can pass through the meshes from either side. Re-transfer of the knitted fabric in reversed position to the knitting needles results in a reversal of the direction in which the rows of stitches are looped. A row of right meshes or knits made before is reversed to form purl-like left stitches and is followed by a row of knits made after the reversal so that knits and purles alternate. The large space between the hook walls near the bar facilitates the passage of the knitting needles.

Further, the suspension comb may be used for transferring meshes or stitches from the original needles to other needles. For example, if the suspension teeth are arranged at distances equal to a multiple of the needle distances, it is possible to use the suspension comb for transferring meshes to neighboring needles and thereby to form holes in the knitted product.

In addition, it is possible to produce several designs by knitting one or more rows of stitches about the teeth of the suspension comb in a manner that will be described later.

The suspension comb can be easily made by stamping out and banding pieces of sheet metal.

Other advantages and objects will appear from the following description of an exemplifying embodiment of my invention, from the appended claims and from the accompanying drawings in which:

Fig. 1 shows a perspective view of a broken off portion of an illustrative embodiment of my invention.

Fig. 2 shows a partly sectional side view of parts of a hand-operated knitting machine with the suspension comb shown in Fig. 1 positioned for receiving meshes from the knitting needles.

Fig. 3 shows substantially the same as Fig. 2, except that the suspension comb is in Fig. 3 positioned for returning meshes to the needles in reversed position.

Fig. 4 shows a partly sectional side view of parts of a hand-operated knitting machine with the suspension comb shown in Fig. 1 positioned for knitting about the comb teeth.

Referring to the drawings, numeral 1 indicates the needle bed of a hand-operated knitting machine. A loop-forming comb 2 is affixed to this bed and has teeth spaced by gaps for the passage of the horizontally bedded knitting needles 3 which have shafts 3a and hooks 3b. A lock 4 is movable in a horizontal direction perpendicular to the longitudinal direction of the needles 3 and operates the needles in known manner.

A suspension comb 5 according to my invention comprises a flat elongated bar 6 to which a row of suspension teeth 7 is affixed. Each tooth 7 forms a double-hook having two walls or flat wall portions 7a arranged with the flat sides thereof substantially parallel to each other which unite at the hook tip 8, and may be made by bending a suitably shaped piece of sheet metal about the tip 8. The front ends of the teeth 7 enter the bar 6 at 9. The hooked, opposite ends of the teeth have bends 10. The walls 7a are positioned symmetrically at the sides of a space 11 and are bent toward each other at 12.

In order to reverse the looping direction between the knitting of subsequent rows, the needles 3 are moved outward so far that the meshes hanging on the needles slide behind the needle latches or tongues. Then, the tips 8 of the comb 5 are hooked on the open hooks 3b of the needles, the latter entering the space between the walls 7a. In this position shown in Fig. 2, the teeth 7 form a kind of continuation of the needles 3. Then the needles are withdrawn toward the bed whereby the needle tongues 3a engage the tooth 7 and close the meshes slide from the needles 3 to the teeth 7. Then the comb 5 is moved obliquely upward so that the teeth 7 are lifted off the hooks 3b and that the knitted fabric is suspended on the bends 10 of the comb 5. The comb with the suspended fabric is then turned horizontally about one hundred and eighty de-
said two spaced wall portions being united at the tip of the hook.

2. A hand-operated knitting machine comprising an about horizontal needle bed, a loop-forming comb affixed to said bed, needles passing through said loop-forming comb, said needles being arranged at a predetermined distance from one another, a lock movable across the longitudinal direction of said needles and engaging the same operatively, and a suspension comb including a bar, and suspension teeth extending from said bar and being arranged at distances from each other equal to the distances between said needles, each of said teeth including a pair of spaced flat wall portions arranged with the flat sides thereof substantially parallel to each other and forming a hook, said two spaced wall portions being united at the tip of the hook.

3. A hand-operated knitting machine comprising an about horizontal needle bed, a loop-forming comb affixed to said bed, needles passing through said loop-forming comb, said needles being arranged at a predetermined distance from one another, a lock movable across the longitudinal direction of said needles and engaging the same operatively, and a suspension comb including a bar, and suspension teeth extending from said bar and being arranged at distances from each other equal to a multiple of the distances between said needles, each of said teeth including a pair of spaced flat wall portions arranged with the flat sides thereof substantially parallel to each other and forming a hook, said two spaced wall portions being united at the tip of the hook.

4. Suspension comb for a hand-operated knitting machine having an about horizontal needle bed, a loop-forming comb affixed to said bed, needles passing through said loop-forming comb, and a lock movable across the longitudinal direction of said needles and engaging the same operatively, said suspension comb comprising a bar and suspension teeth extending from said bar and being spaced from each other, each of said teeth including a pair of spaced flat wall portions arranged with the flat sides thereof substantially parallel to each other and forming a hook, said two spaced wall portions being united at the tip of the hook.

5. Suspension comb for a hand-operated knitting machine having an about horizontal needle bed, a loop-forming comb affixed to said bed, needles passing through said loop-forming comb, and a lock movable across the longitudinal direction of said needles and engaging the same operatively, said suspension comb comprising a bar and suspension teeth extending from said bar and being spaced from each other, each of said teeth forming a hook and having two spaced walls united at the tip of the hook, said walls being symmetrically bent toward each other at points between said bar and the hooks of the hooks, the space between said bars being, from said bar to said points, about twice as wide as a needle shaft and being, from said points to the hook bends, about as wide as a needle shaft.

6. A hand-operated knitting machine comprising an about horizontal needle bed, a loop-forming comb affixed to said bed, needles passing through said loop-forming comb, said needles being arranged at a predetermined distance from one another, a lock movable across the longitudinal direction of said needles and engaging the same operatively, and a suspension comb including a bar and suspension teeth extending from said bar and being arranged at distances from each other equal to the distances between said needles, each of said teeth including a pair of spaced flat wall portions arranged with the flat sides thereof substantially parallel to each other and forming a hook, said two spaced wall portions being united at the tip of the hook, the space between said flat wall portions
being substantially twice as wide as the thickness of said knitting needles, said flat wall portions approaching each other near said hook so as to define a reduced space having a width being substantially equal to the thickness of said knitting needles.

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