Feb. 3, 1931. L. A. O'LENA 1,790,832

KNITTED FABRIC AND MACHINE FOR PRODUCING SAME

Filed May 16, 1928 2 Sheets-Sheet 1

Fig. 1.

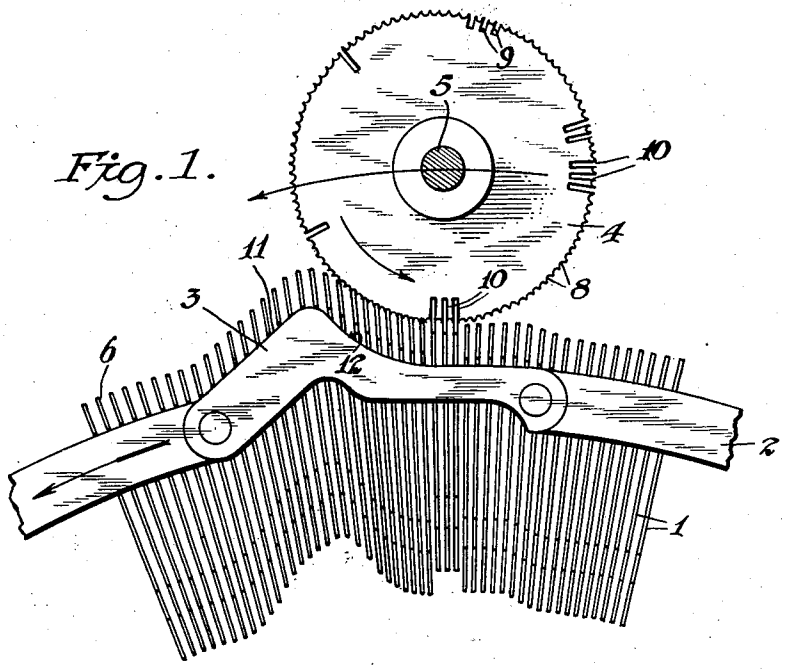
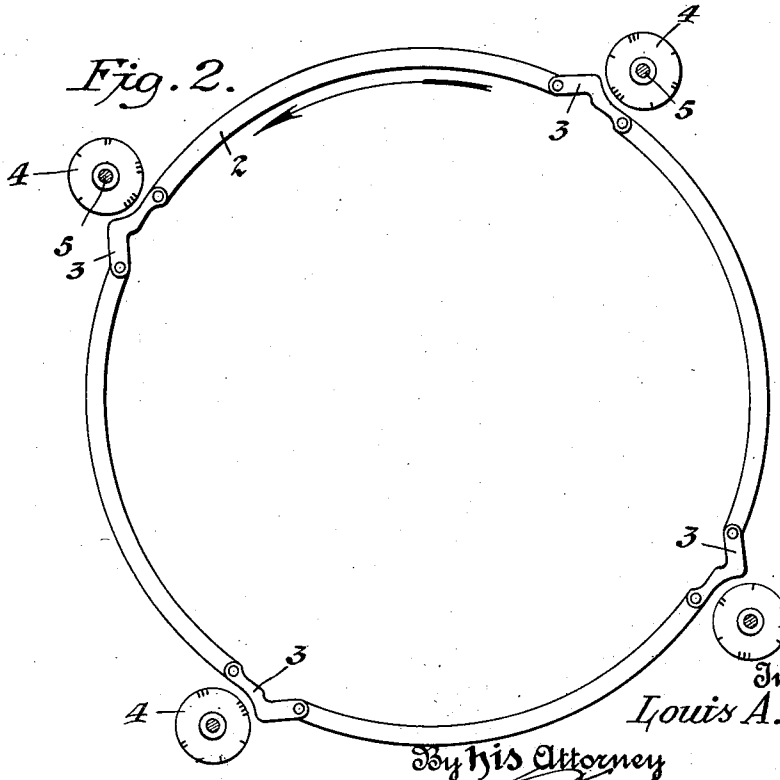


Fig. 2.



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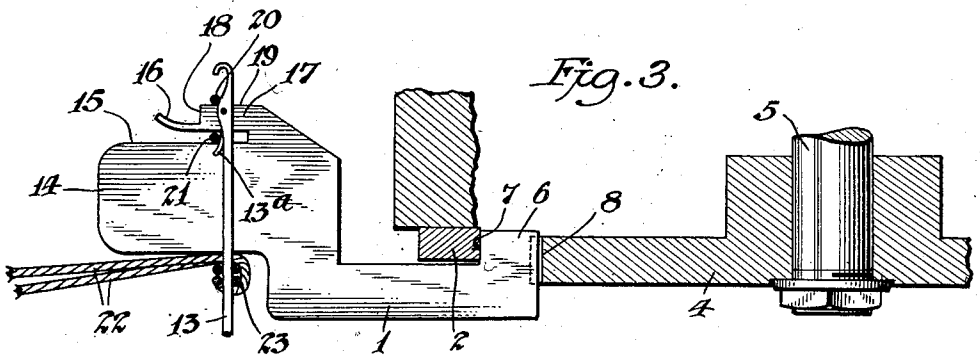


Fig. 3.

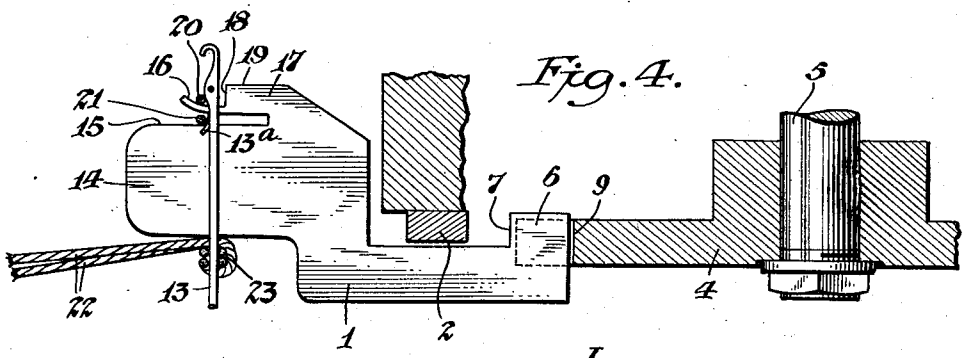


Fig. 4.

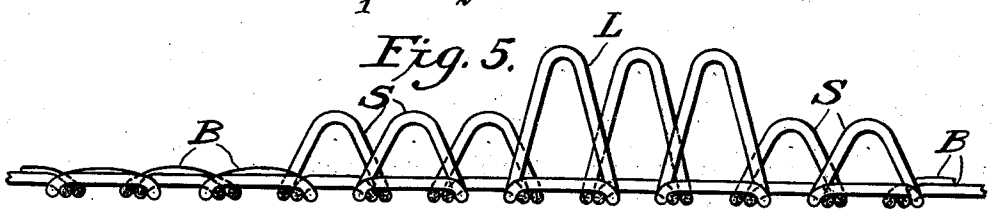


Fig. 5.

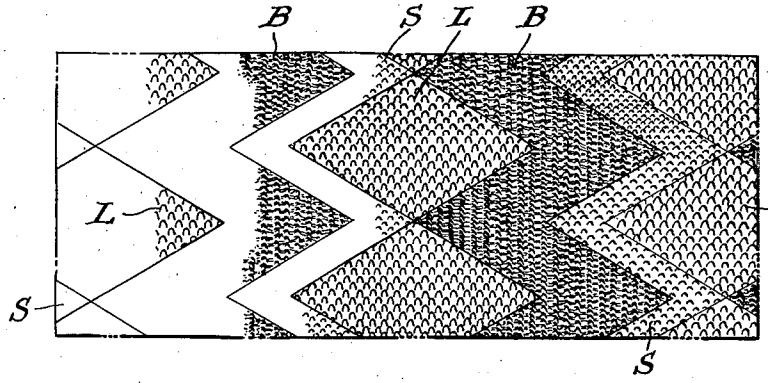


Fig. 6.

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Patented Feb. 3, 1931 1,790,832

UNITED STATES PATENT OFFICE

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KNITTED FABRIC AND MACHINE FOR PRODUCING SAME

Application filed May 16, 1928. Serial No. 278,095.

My invention relates to new and improved knitted fabrics and to machines for producing such fabrics.

The fabric includes in addition to the plain or "body" stitch, either or both of relatively short and long loops or loop-stitches, arranged in any desired patterns or designs. These loops may be severed or sheared, producing relatively long or short-pile areas, or may be left uncut, producing areas of long or short loop-pile.

The machine includes means for automatically knitting such fabrics.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawings, which show one embodiment of the fabric and of the machine. After considering these examples, skilled persons will understand that variations may be made, both in the fabric and the mechanism, and I contemplate the employment of any fabrics or machine structures that are properly within the scope of the appended claims.

In the drawings:

Fig. 1 is a plan view of a segment of the circular bank of "sinkers' with their operating devices.

Fig. 2 is a plan view, on reduced scale, of the annular sinker cam ring and adjusting rolls or wheels.

Fig. 3 is a sectional detail, enlarged, of essential parts of the loop-controlling mechanism.

Fig. 4 is a similar view, showing another operative position.

Fig. 5 is a section of one form of the novel knitted fabric.

Fig. 6 is a face-view of the same.

Referring first to the completed fabric, Figs. 5 and 6: The portions or areas B are the main or body portions of the fabric, composed of the normal or plain knitted loop-stitch. Other portions include comparatively short loops S, and still other portions include relatively long loops L, these loop-stitch portions being arranged in any desired patterns or designs. The knitted fabric therefore has physical characteristics and appearance not heretofore embodied in knitted goods, being characterized by areas of plain, or flat knitted stitches, other areas of pile or loop stitches of moderate length or "depth", and other areas of relatively long or "deep" pile, or loop-stitches.

The novel character of the fabric is further understood after consideration of the knitting mechanism, from which persons versed in this art will appreciate that previously known knitting machines do not have means for producing the present fabrics.

In the illustration of the machine, for the sake of simplicity of illustration and explanation, all parts are omitted which do not contribute directly to the present purpose or result.

The loop-controlling sinkers 1 are arranged radially in a circular series or "bank", of which a segment is shown in Fig. 1. Each sinker is mounted in guides (not shown) for radial movement under control of a rotary cam ring 2, which has at suitable intervals sinker-actuating cams 3, in conjunction with adjusting or re-positioning discs or rolls 4. These discs revolve on vertical shafts 5, which are carried around with cam-ring 2, in fixed relation thereto. Each sinker has at its outward end a lug 6 with the inner face 7 of which the cams cooperate. Each disc has in its periphery equally spaced notches 8 which engage the ends of the sinkers, also in any desired positions (with reference to the fabric pattern) corresponding to the notch-spacing, each wheel may have shallow slots 9 and deep slots 10. Each cam 3 has an outwardly angular portion or "rise" 11 in advance of the adjacent disc 4, and posterior to this rise, an arcuate face 12, concentric with the disc and spaced therefrom to accommodate the sinker-lugs. The needles 13 (not shown in Fig. 1) are moved downward just after a radius intersecting a disc axis has passed the needle; that is, after the corresponding sinker has been positioned for proper loop formation by combined action of the cam and disc, as will appear.

Each sinker has at its inner end a projection 14, the upper edge 15 of which is at such vertical position as to produce a plain or nor-

mal stitch when the threads are laid thereon, prior to needle action. Spaced above the edge 15 is an upwardly curved finger 16, at such elevation as to produce a short loop-stitch, when one of the threads is laid thereover. The finger extends from the lower end of a lug 17, thus providing a shoulder 18 at the root of the finger. The upper edge 19 of lug 17 is vertically positioned for the formation of a long loop stitch when a thread is laid thereover. The threads are directed to proper positions in relation to the sinkers by thread guides; the needles with their latches 13^a are of usual type; in each of Figs. 3 and 4, 22 is a loop-stitch and 23 is the bight thereof, formed at the last previous action of the needle. All these parts, or additional necessary features of the machanism, and its operation, may be as usual, as well understood by skilled persons, except for the novel structure and arrangement of the loop forming or controlling mechanism, as above detailed, and its operation, as now explained:

As each cam 3 revolves in the direction of the arrow, Figs. 1 and 2, its rise 11 moves the successively encountered sinker-lugs to outermost position; immediately thereafter the corresponding disc 4 acts to reposition each sinker, except those whose ends enter the deep disc-slots 10. Thus, the circular portions of the disc, or those provided with notches 8, roll the successive sinkers to inward-most positions, (Fig. 3) under control of the arcuate cam face 12. Each sinker which is opposed to one of the shallow slots 9, however, enters the slot, and the inward end of the slot encountering the sinker end, moves the sinker only partway inward, or to an intermediate position (Fig. 4). Each sinker which is encountered by a deep slot 10, enters that slot, and is not moved inward, remaining in outermost position.

When the sinker is in innermost position (Fig. 3), one of the threads, 20, is laid over its edge 19, thus producing, when the threads are pulled down by the needle through the bight 23 of the previously formed stitch, a long loop L, Figs. 5 and 6.

When the sinker is in intermediate position, (Fig. 4) thread 20 is laid over finger 16, providing for the formation of a short loop S (Figs. 5 and 6).

When the sinker is in outermost position (not shown in the positional views) thread 20 is laid on edge 15, thus providing for the formation of a plain (or non-loop) stitch, in cooperation with the needle action.

In every case the other thread 21 is laid on edge 15, and goes into the formed stitch in the usual way.

The slot formations in the discs may evidently be arranged in any desired manner, for production of the selected pattern, and there may be any suitable number of discs and corresponding cams.

I claim:

1. A knitting machine comprising sinkers each having three distinct thread-supporting portions which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, a plurality of rotary cams, and cooperating rotary discs for repetitiously and selectively positioning the sinkers.

2. A knitting machine comprising sinkers each having three distinct thread-supporting portions which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, a plurality of rotary cams, and cooperating rotary discs for repetitiously and selectively positioning the sinkers, the discs having circular peripheral portions to cooperate with ends of sinkers and spaced radial slots of different depths to receive end portions of sinkers whereby to effect automatic selective positioning thereof in accordance with a predetermined pattern.

3. A knitting machine comprising a circular bank of radially-adjustable sinkers, each having a plurality of thread-supporting portions in different vertical planes and terminating at definite positions radially of the bank and which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, and means for automatically positioning and re-positioning the sinkers.

4. A knitting machine comprising a circular bank of radially-adjustable sinkers, each having a plurality of thread-supporting portions in different vertical locations and terminating at different positions radially of the bank and which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, and means for automatically positioning and re-positioning the sinkers.

5. A knitting machine comprising a circular bank of radially-adjustable sinkers, each having a plurality of thread-supporting portions located at different vertical positions and terminating at different positions radially of the bank and which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, a plurality of rotary cams, and cooperating rotary discs for repetitiously and selectively positioning the sinkers.

6. For use in a knitting machine in the manner described, a sinker having at one end a projecting portion having an upper thread-supporting surface, a thread-supporting finger spaced above said surface and terminating inwardly from the end of said projecting

portion, and another thread-supporting surface located above and inwardly from said finger.

7. A knitting machine comprising sinkers each having three distinct thread-supporting portions which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, a plurality of rotary cams, and cooperating rotary discs for repetitiously and selectively positioning the sinkers in groups corresponding to the fabric pattern.

8. A knitting machine comprising sinkers each having three distinct thread-supporting portions which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, a plurality of rotary cams, and cooperating rotary discs for repetitiously and selectively positioning the sinkers, the discs having circular peripheral portions to cooperate with ends of sinkers and spaced radial slots of different depths and arranged in groups to receive end portions of sinkers whereby to effect automatic selective positioning thereof in accordance with a predetermined pattern.

9. A knitting machine comprising a circular bank of radially-adjustable sinkers, each having a plurality of thread-supporting portions in different vertical planes and terminating at definite positions radially of the bank and which are made effective by selective positioning of the sinkers and cooperate with the needles to produce plain stitches and loop stitches of different lengths, and means for automatically positioning and re-positioning the sinkers in groups corresponding to the fabric pattern.

In testimoy whereof I affix my signature.

LOUIS A. O'LENA.