April 21, 1931. R. H. LAWSON 1,801,607

MEANS FOR PRODUCING OPEN, SINKER LOOP, KNITTED FABRIC

Original Filed May 11, 1926 2 Sheets-Sheet 1

Fig. 1.

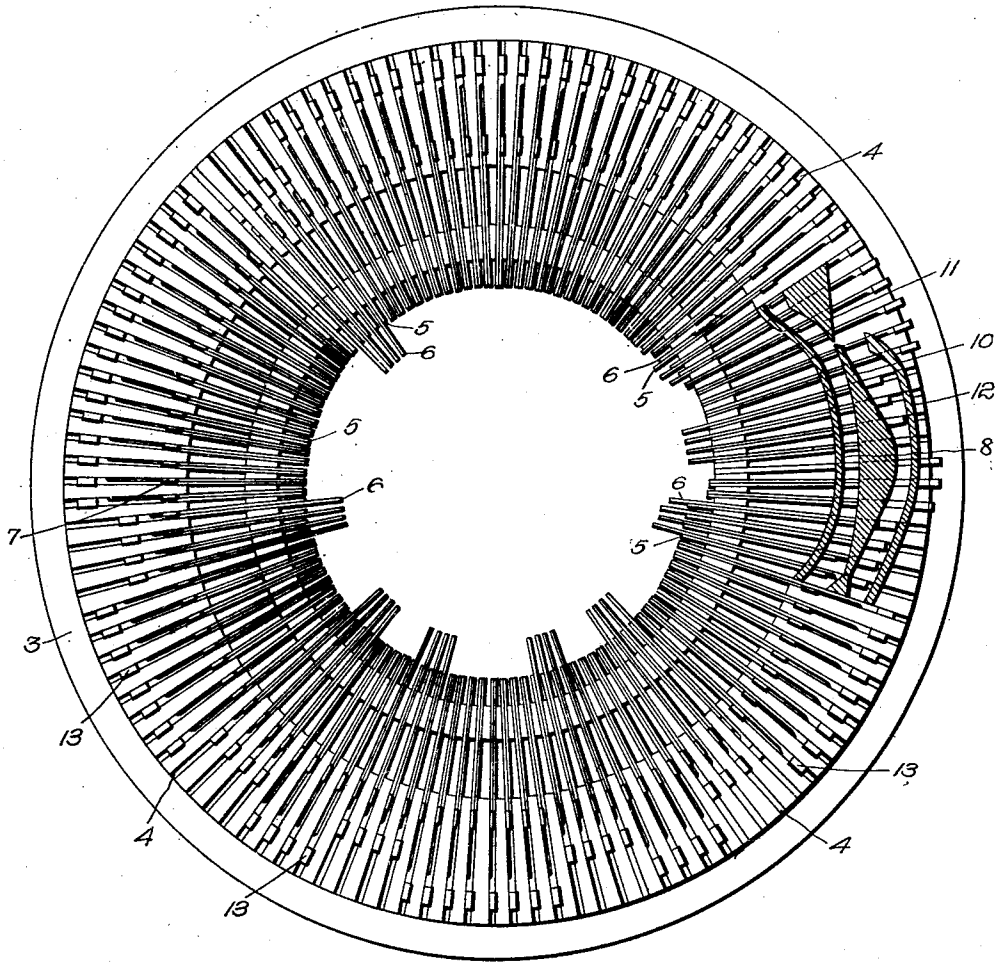
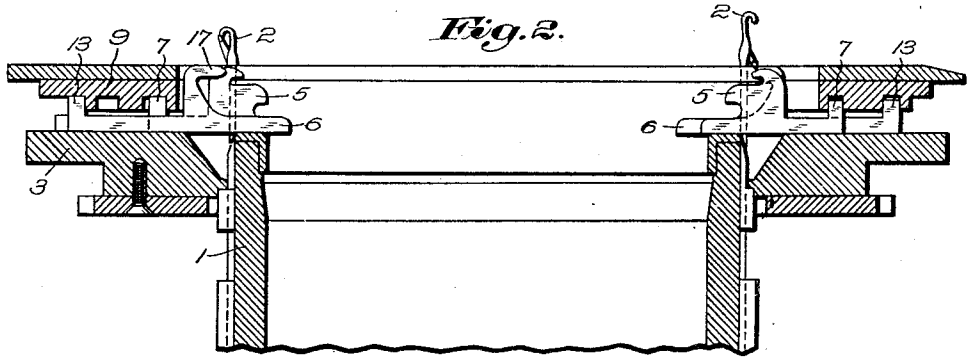


Fig. 2.



Inventor:
Robert H. Lawson,
by Emery, Booth, Jamney & Varney
Attys

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Fig. 3.

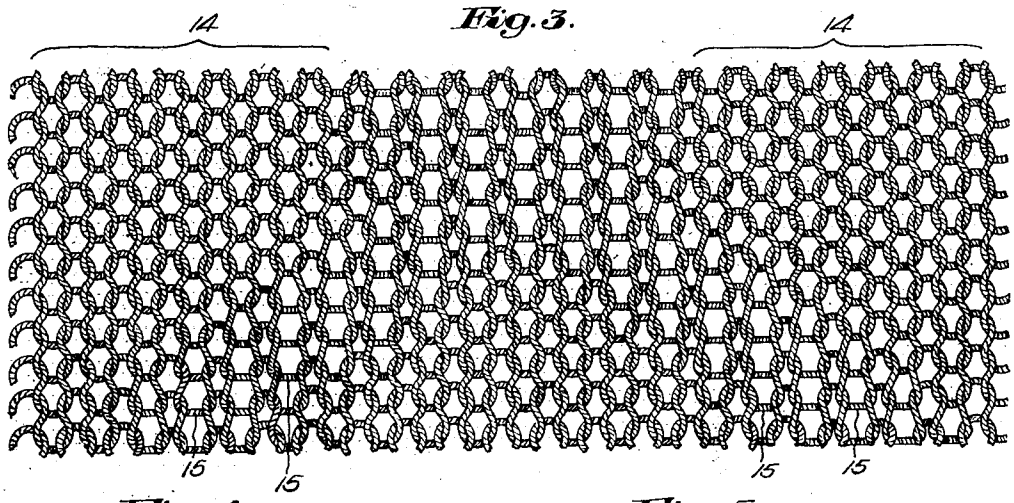


Fig. 4.

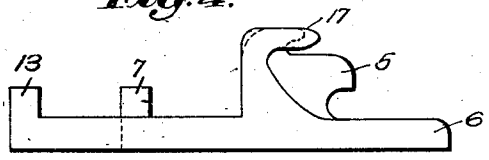


Fig. 5.

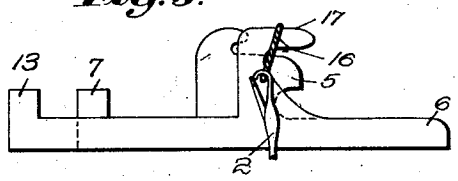


Fig. 6.

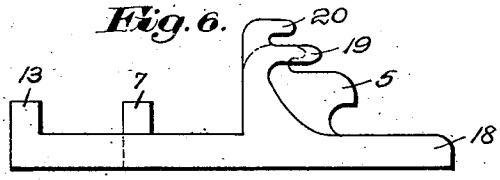


Fig. 7.

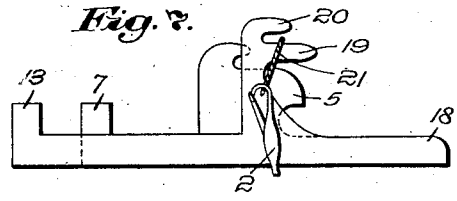


Fig. 8.

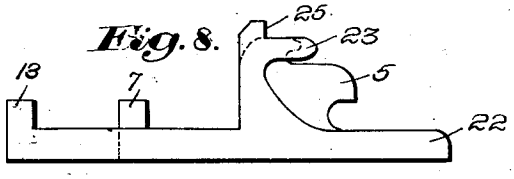
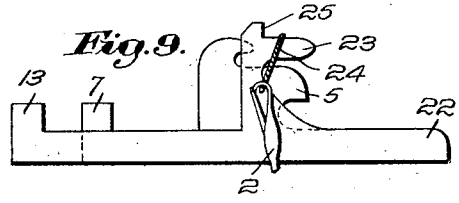


Fig. 9.



Inventor:
Robert H. Lawson.
by Emery, Booth, Janney & Varney
Attys.

Patented Apr. 21, 1931

1,801,607

UNITED STATES PATENT OFFICE

ROBERT H. LAWSON, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO HEMPHILL COMPANY, OF CENTRAL FALLS, RHODE ISLAND, A CORPORATION OF MASSACHUSETTS

MEANS FOR PRODUCING OPEN, SINKER-LOOP, KNITTED FABRIC

Original application filed May 11, 1926, Serial No. 108,284. Divided and this application filed October 30, 1926. Serial No. 145,307.

This application is a division of co-pending application Serial No. 108,284, now Patent No. 1,605,896.

This invention relates to means for and method of producing open sinker loops in knitted fabrics.

In order that the principle of the invention may be readily understood, there is disclosed a portion of a fabric made in accordance with the invention, and there are shown certain instrumentalities interspersed between and cooperating with the knitting needles in the production of such fabric.

In the drawings:

Fig. 1 is a plan view of the knitting head of a circular knitting machine with the latch ring and the cap ring removed, and the cams partly shown in horizontal section;

Fig. 2 is a central vertical section of the construction shown in Fig. 1;

Fig. 3 is a face view of a portion of a stocking or other fabric for the production whereof certain special instrumentalities are employed in cooperation with and interspersed among the needles; and

Figs. 4 to 9 inclusive are side elevations of different relative positions assumed by a regular web holder of an independent needle knitting machine and a special instrumentality in the same groove as a regular web holder for the production of open sinker work loops, several different forms of special instrumentalities being shown.

In the patent to W. A. Houck, No. 1,400,163, are disclosed certain means for producing hosiery or other knitted fabric having enlarged sinker loops at predetermined points, whereby so-called open work or lace effects are produced. As therein disclosed, certain so-called open work or lace work sinker or like instrumentalities were interspersed among the regular sinkers or web holders between predetermined needles, and were operated by special cams.

In accordance with the present invention, regular web holders are employed in each groove, and in each groove there is also provided a special instrumentality which, when operated by cams pertaining thereto, produce enlarged sinker loops. Inasmuch as these special instrumentalities are provided one for each needle and each may be specially operated independently of all the other special instrumentalities, or instead may move only as do the regular web holders, it is evident that a great variety of patterns may be produced.

This invention may be practised upon any independent needle knitting machine, but preferably upon a circular independent needle knitting machine. In Figs. 1 and 2 are represented a few of the parts of such a machine, the Banner knitting machine of the general type disclosed in the patent to Joshua D. Hemphill, No. 933,443, being chosen for representation.

In said Figs. 1 and 2, the needle cylinder is indicated at 1 and the latch needles at 2, it being understood that in certain cases spring beard needles may be employed instead.

The web holder bed ring is shown at 3, and in each groove 4 thereof are provided web holders 5 of regular form and special instrumentalities 6. The regular web holders are provided one for each needle as heretofore, and are reciprocated in the usual manner in their grooves, and for that purpose are provided with butts 7 to be operated upon by the cam 8 of the sinker cam ring 9 in the usual way. The special instrumentalities 6 are each placed desirably in a groove with a regular web holder 5. Said instrumentalities 6 do not herein function as web holders or sinkers. The best results are secured by providing special instrumentalities which are distinct from the web holders or sinkers, but positioning them each in a groove with the web holder or sinker for that needle.

Radially outside of the cam 8 which acts upon the butts 7 of the web holders 5 are provided circumferentially extending cams 10, 11, and radially outside thereof is provided a cam 12, all to act upon the butts 13 of the special instrumentalities 6, so as in the relative rotation or movement of the needle cylinder and cam ring to move the said web holders and the special instrumentalities in and out. Pattern means are provided (not here shown) to move any one or all of

said special instrumentalities 6 radially inward so as to bring them within the control of the proper cams of the cap ring. The preferred form of pattern means is that shown in application Serial No. 48,546, eventuating in Patent No. 1,605,895, Reissue No. 16,584, for moving special instrumentalities. When the special instrumentalities are so moved inward they engage the yarn as hereinafter described, so as to provide enlarged sinker loops, but if not so moved radially inward, then ordinary plain knitting continues.

It will be understood that the regular web holders and the special instrumentalities are free to slide the one facewise against other in a lengthwise direction.

In the production of a fabric having open or enlarged sinker loops, a single yarn only is desirably fed at a time in the ordinary way, and the special instrumentalities 6, when moved radially inward, are caused to engage that single yarn so as to lengthen sinker loops in accordance with the direction of the pattern.

In Fig. 3 is shown, upon an enlarged scale, a portion of the fabric, wherein loops 14, 14 are of normal size, but at 15, 15 there are formed enlarged sinker loops by the action of the special instrumentalities. Said instrumentalities may be varied in shape, but are desirably of the form shown, either in Figs. 4 and 5 or of the form shown in Figs. 6 and 7 or the form shown in Figs. 8 and 9.

In Figs. 4 and 5, the special instrumentality 6 is shown first in its withdrawn position (Fig. 4) and next with the yarn 16 extending over the upper nib or projection 17, so as to enlarge the sinker loop (Fig. 5).

In Figs. 6 and 7 is shown another form of special instrumentality at 18, it having nibs 19, 20, and the loop 21 is drawn over and elongated by the lower nib 19.

In Figs. 8 and 9 is shown a third form of special instrumentality at 22, it having a single nib 23 over which the loop 24 passes and is thereby enlarged, as indicated in Fig. 9, said instrumentality also having an upstanding shoulder 25 serving as a step or limiting means for the yarn.

Having thus described one illustrative embodiment of the mechanism of the invention and one manner of practising the method thereof and having disclosed but a single pattern of fabric made in accordance with the invention, it is to be understood that although specific terms are employed they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

I claim:

1. A circular knitting machine having a circular series of independent needles, web holders having an in and out movement between adjacent needles, special thread engaging instrumentalities also positioned between the needles and also having in and out movement, a supporting web holder bed ring and a cooperating cam ring, the latter whereof is provided with three cams in proximity but at different radial distances, thereby to provide an inner pathway for the butts of the regular web holders, an intermediate pathway for selected butts of special thread-engaging instrumentalities, and a distinct pathway for selected butts of special thread engaging instrumentalities radially outside of the outermost of said cam, each special thread engaging instrumentality being adapted to be moved irrespective of and independent of the other said instrumentalities to engage the respective sinker loop and enlarge the same.

2. A circular knitting machine having a circular series of independent needles, web holders having an in and out movement between adjacent needles, special thread engaging instrumentalities also positioned between the needles and also having an in and out movement, each special thread engaging instrumentality having a nib over which the respective sinker loop extends, the nibs of said instrumentalities in action being located at least as high as the top of the said web holders, a supporting web holder bed ring having radial grooves and a cooperating cam ring therefor having at three different radial distances cams 8, 9, 10, providing respectively an inner pathway between the cams 8 and 10, a pathway between the cams 10 and 12, and a pathway radially outside of the cam 12.

3. A circular knitting machine having a circular series of independent needles, web holders having an in and out movement between adjacent needles, special thread engaging instrumentalities also positioned between the needles and also having an in and out movement, each special thread engaging instrumentality having a plurality of inwardly extending nibs over one of which the corresponding sinker wales extend, the nibs over which the sinkers wales extend being in action at least as high as the tops of the regular sinkers, a supporting web holder bed ring having radial grooves and a coperating cam ring therefor having at three different radial distances cams 8, 9, 10, providing respectively an inner pathway between the cams 8 and 10, a pathway between the cams 10 and 12, and a pathway radially outside of the cam 12.

4. A circular knitting machine having a circular series of independent needles, web holders having an in and out movement between adjacent needles, special thread engaging instrumentalities 6 also positioned between the needles and also having an in and out movement, each special thread engaging instrumentality having a nib 19 over which

the sinker loop is adapted to be drawn for enlargement of the same, the said nib 19 being at least as high as the top of the said web holders, a supporting web holder bed ring having radial grooves and a cooperating cam ring therefor having at three different radial distances cams 8, 9, 10, providing respectively an inner pathway between the cams 8 and 10, a pathway between the cams 10 and 12, and a pathway radially outside of the cam 12.

5. A circular knitting machine having a circular series of independent needles, web holders having an in and out movement between adjacent nedles, special thread engaging instrumentalities 6 also positioned between the needles and also having an in and out movement, each special thread engaging instrumentality having a nib 19 over which the sinker loop is adapted to be drawn for enlargement of the same and having thereabove a nib 20 whereby a groove is provided between the nibs 19, 20, the top of the nib 19 being at least as high as the top of the said web holders, a supporting web holder bed ring having radial grooves and a cooperating cam ring therefor having at three different radial distances cams 8, 9, 10, providing respectively an inner pathway between the cams 8 and 10, a pathway between the cams 10 and 12, and a pathway radially outside of the cam 12.

6. A circular knitting machine having a circular series of independent needles, a web holder bed ring therefor, web holders having an in and out movement between adjacent needles, special thread engaging instrumentalities also positioned between the needles and having an in and out movement, the bed ring for said web holders and instrumentalities having three structurally fixed cam paths for receiving butts, the inner cam path being adapted to receive the butts of the regular web holders and either the intermediate or the outer cam path being adapted to receive the butts of the said instrumentalities, each said special thread engaging instrumentality having a nib 19 over which the sinker loop is adapted to be drawn for enlargement of the same, said nib 19 being at least as high, when the instrumentality is positioned for action, as the top of the adjacent web holders, a supporting web holder bed ring having radial grooves and a cooperating cam ring therefor having at three different radial distances cams 8, 9, 10, providing respectively an inner pathway between the cams 8 and 10, a pathway between the cams 10 and 12, and a pathway radially outside of the cam 12.

In testimony whereof, I have signed my name to this specification.

ROBERT H. LAWSON.