Sept. 13, 1932. A. GAGNÉ 1,877,503

KNITTING MACHINE NEEDLE ASSEMBLAGE

Filed Jan. 17, 1928 2 Sheets-Sheet 1

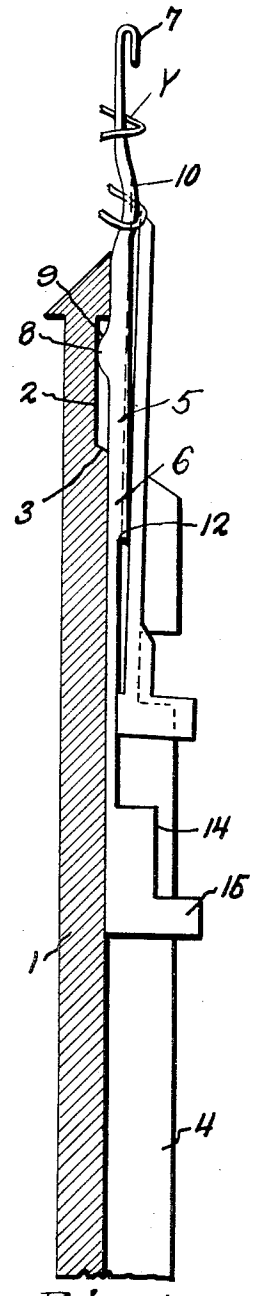


Fig. 1.

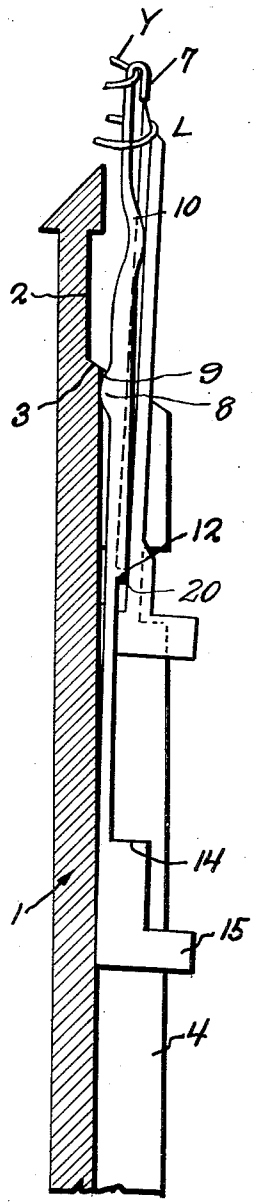


Fig. 2.

Augustin Gagne, Inventor

Witnesses
C. E. Churchman Jr.
F. G. Smith.

By Irving L. McCathran
Attorney

Sept. 13, 1932. A. GAGNÉ 1,877,503

KNITTING MACHINE NEEDLE ASSEMBLAGE

Filed Jan. 17, 1928 2 Sheets-Sheet 2

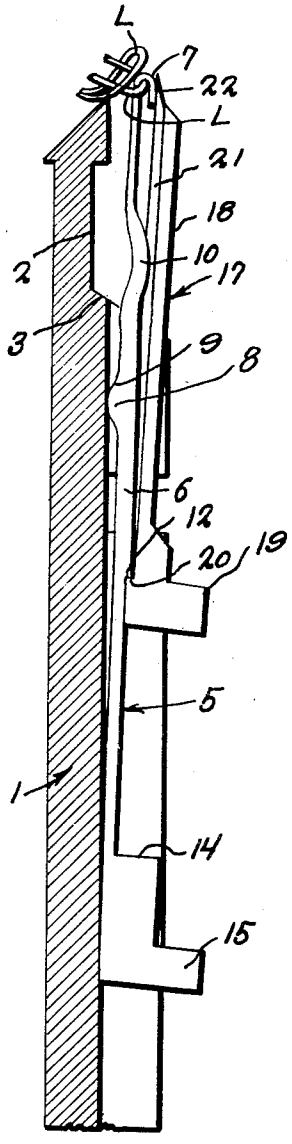


Fig. 3.

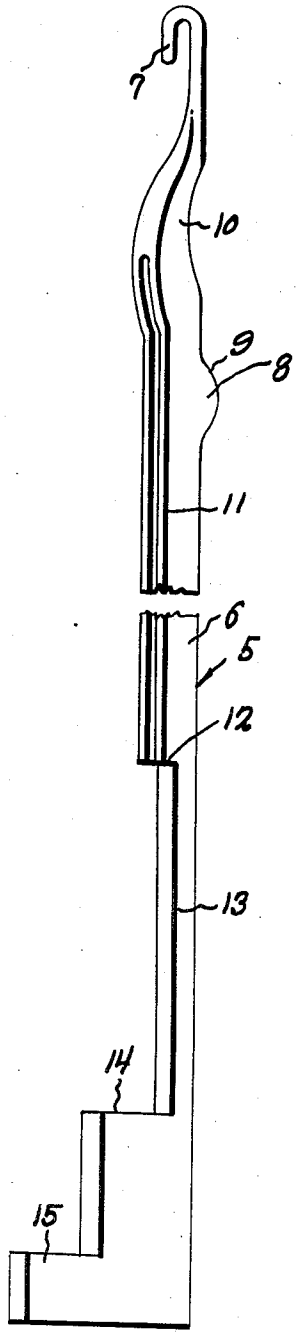


Fig. 4.

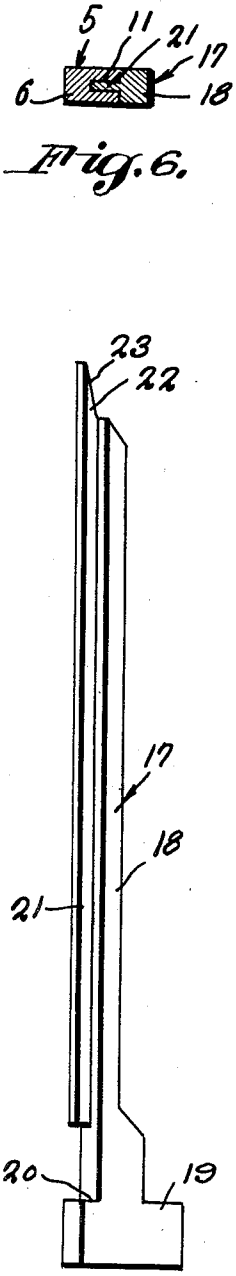


Fig. 6.

Fig. 5.

Augustin Gagne, Inventor

Witnesses
C. E. Churchman Jr.
J. L. Smith.

By Irving L. McCathran
Attorney

Patented Sept. 13, 1932 1,877,503

UNITED STATES PATENT OFFICE

AUGUSTIN GAGNÉ, OF CENTRAL FALLS, RHODE ISLAND, ASSIGNOR TO HEMPHILL COMPANY, OF CENTRAL FALLS, RHODE ISLAND, A CORPORATION OF MASSACHUSETTS

KNITTING MACHINE NEEDLE ASSEMBLAGE

Application filed January 17, 1928. Serial No. 247,343.

This invention relates to improvements in knitting machines and needles for use therein.

While the accompanying drawings and the description which is to follow, constitute a disclosure of the preferred embodiment of the invention, it will be understood that various changes may be made within the scope of what is claimed.

In the accompanying drawings:

Fig. 1 is a sectional view of the needle bed showing a needle mounted therein with the hook portion thereof elevated;

Fig. 2 is a similar view, but showing the needle hook in a relatively lowered position;

Fig. 3 is a similar view, but showing the needle hook lowered and the old loop having been cast off;

Fig. 4 is a detail view of the hook or loop drawing element of the needle;

Fig. 5 is a detail view of the sliding latch; and

Fig. 6 is a view in section taken through the shank portions of the loop drawing element and latch.

In the drawings, the needle bed which may be a cylinder is indicated in general by the numeral 1 and does not differ from the ordinary needle bed except that it is provided in its outer surface, near its top, with a recess 2 providing, at the lower end thereof, a downwardly and outwardly inclined shoulder 3, the cylinder being formed, below the recess 2, with the usual series of vertical slots 4 to accommodate the needles. The purpose of the recess 2 and shoulder 3 will presently be specifically described.

The loop drawing element of the needle is indicated in general by the numeral 5 and comprises a shank 6 corresponding to the shank of the ordinary needle except that it is provided upon its inner side below the hook 7, with a lug 8 which has its edge of cam formation as indicated by the numeral 9. The vertical dimension of the cam 8 is considerably less than that of the recess 2. The shank 6, above the said lug 8, is bowed outwardly for a portion of its length as indicated by the numeral 10, and the said shank 6 is formed, in its outer edge, with a longitudinal channel 11 the lower end of which terminates at and opens through a shoulder 12 formed by cutting away the outer edge of the shank 6 for a portion of the length of its lower part as indicated by the numeral 13, which cut away portion further defines a shoulder 14. The loop drawing element is provided at its outer edge and at its lower end with the usual butt 15 with which the usual cam coacts, this cam not being shown as it constitutes no part of the present invention. At this point it will be observed, and particularly by reference to Figs. 2 and 4 of the drawings, that the channel 11, at its upper end, extends for substantially one-half the length of the bowed portion 10, the inner wall of the channel being deflected toward the corresponding side of the shank so that the channel, at this portion, is gradually decreased in depth as indicated by the numeral 16.

The latch which is associated with the loop drawing element of the needle is indicated in general by the numeral 17 and the same comprises an elongated shank 18 provided at its outer side and lower end with a butt 19 with which the usual cam may coact in effecting relative longitudinal displacement of the latch with respect to the loop drawing portion of the needle, the latch being provided upon its inner edge at its lower end with a shoulder 20 and being provided upon its said inner edge with a longitudinally extending rib 21 which works slidably in the channel 11 of the needle shank, this rib extending at its upper end, a short distance beyond the upper end of the shank 18, as indicated by the numeral 22, and having the outer end of its extended portion acutely downwardly inclined as indicated by the numeral 23.

In the elevated position of the needle hook illustrated in Fig. 1 of the drawings, the needle hook occupies a vertical position with the inner side thereof in contact with the bottom wall of the groove 4 above and below the recess 2; the cam lug 8 engages in the recess 2 above the shoulder 3; the bowed portion 10 of the shank of the needle passes through a previously formed loop indicated by the reference letter L; the hook 7 of the needle is located above the yarn Y and the loop L; and the shoulder 14 of the shank 6 is spaced

from the lower end of the shank 18 of the latch 17, the latch, at this point in the operation of the needle, being in a relatively lowered position with respect to the needle hook. As the needle hook is moved downwardly, in the succeeding operation by the actuating cams of the machine, the lug 8 rides over the shoulder 3 and past the same as shown in Fig. 2 of the drawings, thus effecting an outward tilting displacement of the needle hook with respect to the wall of the needle bed or cylinder as shown in this figure. The displaced needle hook, as it continues to move to its lowermost position, engages the yarn Y, the outward displacement of the hook end of the needle thus insuring engagement of the hook with the yarn. Thereafter the butt 15 of the loop drawing element 5 of the needle is engaged by a cam (not shown) which causes the hook portion thereof to move from the position shown in Fig. 2 to that shown in Fig. 3, the latch 17 in the meantime remaining in the position shown in Fig. 2, and when the hook portion of the needle finally arrives at the position shown in Fig. 3, the old loop has been knocked over the top of the needle hook by means of the sinker (not shown).

The operation just described completes the knitting cycle, the loop drawing portion 5 of the needle thereafter being raised to a position slightly above that shown in Fig. 1 by a cam (not shown) which engages the butt 15, the raising of the loop drawing portion 5 of the needle moving the shoulder 14 thereof in contact with the lower edge of the butt 19. Thereafter another cam (not shown) engages the butt 15 and initiates the downward movement of the loop drawing element 5 of the needle, carrying the same to the position shown in Fig. 1, the loop drawing element 5 and latch 17 of the needle thereafter moving as hereinbefore described.

Although in the foregoing description reference has been made to a single needle, it will be understood that a plurality of such needles are utilized and that they are successively moved to and from yarn taking and knitting positions, as is usual in independent needle knitting machines to which this invention relates.

From the foregoing description of the invention it will be evident that, due to the provision of the cam lug 8 upon the shank of the needle element 5 and the provision of the shoulder 3, outward displacement of the hook end of each needle is effected on the downward movement thereof to engage the yarn preparatory to formation of a new loop, thus insuring of the engagement of the hook with the yarn and obviating dropping of stitches as would be liable otherwise to occur. It will likewise be evident from the foregoing description that due to the gradual inclination of the inner wall of the channel 11, as indicated at 16, the latch 17, in its longitudinal displacement with respect to the loop drawing element of the needle, is so guided as to insure that its end 22 will move into close engagement with the outer side of the bill of the hook 7 without any likelihood, however, of the extremity of the latch striking the point of the bill.

Due to the fact that the hook 7 of the needle herein shown is set somewhat back with respect to the shank 6 thereof, as compared with a pivoted latch needle of the usual type, whenever a needle or needles is or are in raised position, as during the knitting of heels and toes or for other purposes, the needles adjacent to such raised needle or needles are in such positions that the hooks thereof will not readily engage the yarn unless the hook portions of the said needles are moved forwardly as indicated in Fig. 2.

Having thus described the invention, what I claim is:

1. In a knitting machine of the character set forth, a cylinder and a needle consisting of a hook-shaped member and a hook closing latch slidably associated therewith, said hook-shaped member being slidably rockably associated with the cylinder for downward movement to an outwardly inclined yarn engaging and loop-forming position, and coacting means upon the cylinder and the needle for moving the needle outwardly during the initial phase of its downward movement so as to effect its positive engagement with the yarn.

2. In a knitting machine of the character set forth, a cylinder, a needle having a hook and slidably and rockably associated with the cylinder for downward movement to an outwardly inclined yarn engaging and loop-forming position, coacting means upon the cylinder and the needle for moving the needle outwardly during the first phase of its downward movement so as to effect the positive engagement of its hook with the yarn, a latch movable longitudinally with respect to the needle hook, and coacting means upon the needle for effecting tilting displacement of the latch with respect to the needle hook in the movement of the latch into coactive relation to the hook of the needle.

3. In a knitting machine of the character set forth, a cylinder provided in its outer surface below its top with a recess, the bottom wall of the recess being inclined downwardly and outwardly, a sliding latch needle slidably and rockably associated with the cylinder for downward movement to an outwardly inclined yarn engaging and loop-forming position, the needle resting when in said first position against said surface above and below said recess, and a cam extending from the needle, the cam having a vertical dimension less than that of said recess and occupying a position therein above said inclined wall when the needle is in said first

position, and the cam being adapted during the first phase of the downward movement of the needle to coact with said inclined wall to move the needle outwardly from said surface so as to effect its positive engagement with the yarn.

4. A knitting machine of the character set forth, in combination, a needle including a shank and a hook at the upper end of the shank, the shank having a vertical channel in its outer edge and being bowed outwardly below the hook to outwardly deflect the upper end portion of said channel, and a latch assembled with the shank for vertical movement with respect thereto and having a longitudinal rib slidably fitting in said channel, the outwardly deflected upper end portion of the channel constituting means engageable by the rib of the latch to effect tilting displacement of the latch with respect to the shank in the movement of the latch into coactive relation with the hook of the needle, means for moving the needle hook outwardly during the initial phase of its downward movement so as to effect its positive engagement with the yarn and to maintain the needle in such position until again raised.

5. In a knitting machine of the character set forth, a needle bed, a needle consisting of a hook-shaped member and a hook closing latch slidably associated therewith, said hook-shaped member being slidably associated with the said needle bed for movement to an inclined yarn engaging position, and coacting means upon the needle bed and needle for moving the needle laterally to assist in yarn engagement.

6. In a knitting machine of the character set forth, a cylinder, a needle consisting of a hook-shaped member and a hook closing latch slidably associated therewith, said hook-shaped member being slidably associated with the cylinder for downward movement from an initial position to an outwardly inclined yarn engaging position, and means for moving the needle outwardly during the initial phase of its downward movement so as to effect its positive engagement with the yarn and to maintain the needle in such position until again raised.

7. In a knitting machine of the character set forth, a needle bed, a needle consisting of a hook-shaped member and a hook closing latch slidably associated therewith, said hook-shaped member being slidably associated with the said needle bed for movement to an inclined yarn engaging position, and coacting means for moving the needle laterally to assist in yarn engagement and to maintain the needle in such position until again raised.

8. In a knitting machine of the character set forth, a needle bed, a sliding latch needle slidably mounted therein and adapted during its sliding movements to move laterally and engage yarn, means carried by the needle bed for so moving the needle laterally.

9. A needle bed, needles mounted therein, said needles each consisting of a hooked yarn engaging portion and a sliding latch, the hooked portion being movable to yarn taking position, means for deflecting the hooked portion of each needle laterally so that the hook may engage yarn.

In testimony whereof I affix my signature.

AUGUSTIN GAGNÉ.