W. W. BURSON.

KNITTING MACHINE.

APPLICATION FILED MAR. 30, 1918.

1,333,156. Patented Mar. 9, 1920.

Fig. 1.

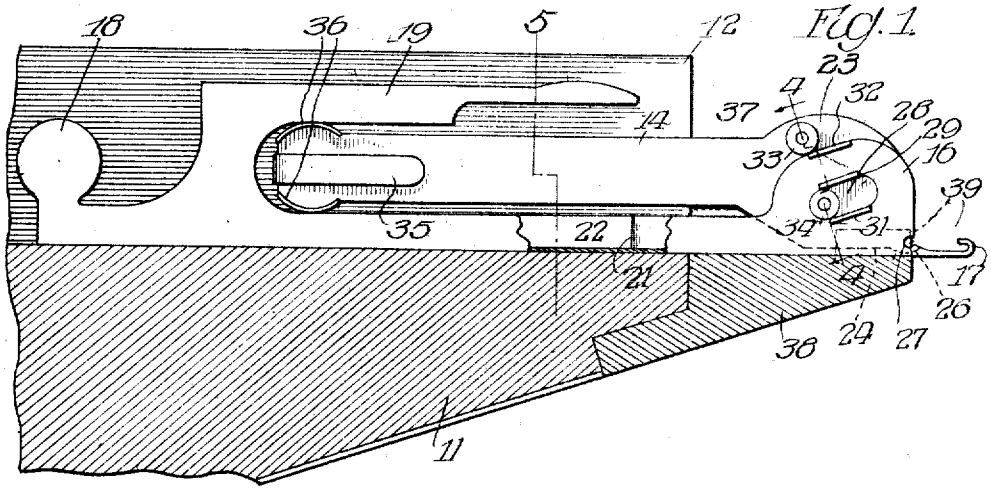


Fig. 2.

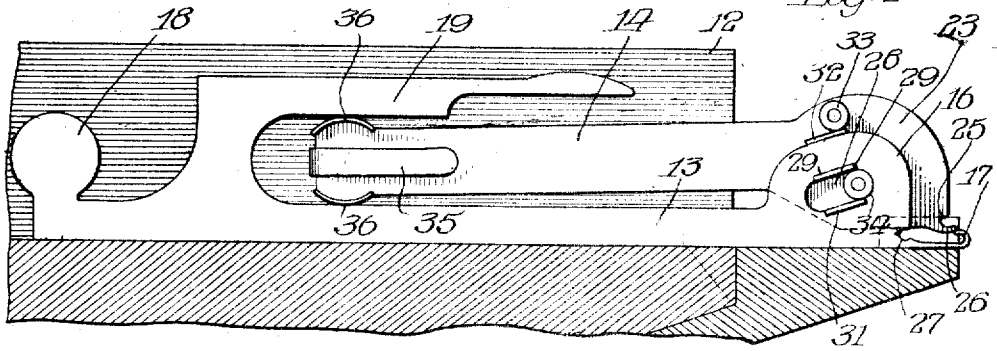


Fig. 3.

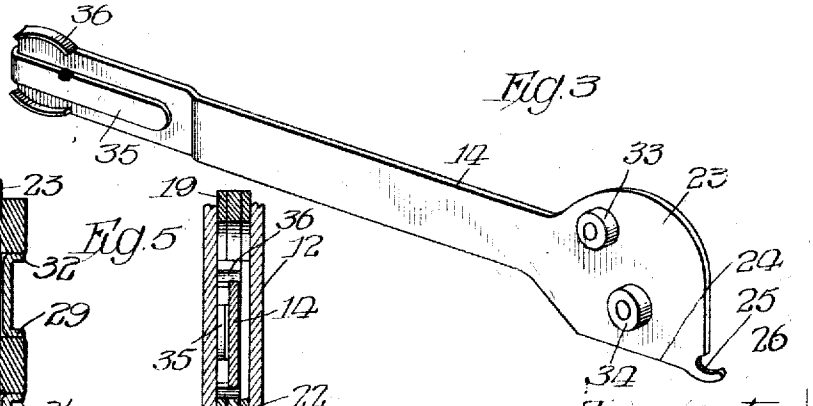


Fig. 4.

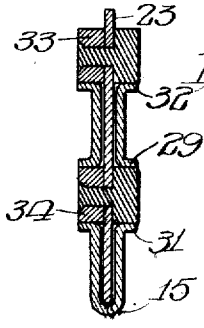


Fig. 5.

Inventor

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By Munday Clarke & Carpenter Attys.

UNITED STATES PATENT OFFICE.

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KNITTING-MACHINE.

1,333,156. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed March 30, 1918. Serial No. 225,754.

To all whom it may concern:

Be it known that I, WILSON W. BURSON, a citizen of the United States, residing in Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Improvement in Knitting-Machines, of which the following is a specification.

This invention relates in general to knitting machines and has for its object broadly the provision of a knitting machine that will knit a finer gauze fabric or garment than has heretofore been possible in the machines prior to my invention.

My invention contemplates the provision of a machine using knitting needles having shorter reciprocating movements and arranged closer together than is possible with the latch needle, and has also for an object the provision of a needle constructed for use in such a machine.

Another object of my invention is the provision of a knitting needle which will knit effectively with a short knitting stroke.

Another object of the invention is the provision of a knitting needle constructed to require minimum space in the needle guides.

Another and highly important object of my invention is the provision of a knitting needle adapted to replace and perform all of the functions of the latch needle, which will contain no pivoted parts and which will operate automatically in knitting and upon the mere forward projection and retraction of its knitting hook member.

A still further object of the invention is the provision of a needle which may be given a high degree of fineness and at the same time be strong and durable in use.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description when considered in connection with the accompanying drawing illustrating a preferred embodiment thereof.

On the drawing,

Figure 1 is a transverse section of a portion of the needle bed of a knitting machine showing the needle in extended position, said needle and said machine embodying my present invention;

Fig. 2 is a similar view with the needle retracted;

Fig. 3 is a perspective view of a lifting hook member;

Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 1 and taken through the needle; and

Fig. 5 is a section on the line 5—5 of Fig. 1.

Referring to the drawing reference character 11 indicates a portion of a needle bed provided with upwardly extending needle guides or partitions 12 between which the knitting needles are moved by the jacks (not shown). Each knitting needle consists of a knitting hook member 13 and a lifting hook member 14, the knitting hook member advancing and engaging the new yarn or thread and returning with it through a previously knitted loop forming a new knitted loop, the old loop being lifted by the lifting hook then dropped over the loop which is brought in by the knitting hook.

The knitting hook member consists of a sheet of metal folded back upon itself at 15 and providing upwardly extending spaced wings 16 at the front and a hook 17 formed at the forward end of the junction 15 between the side portions of the member, said hook being thereafter bent up and over as indicated in Figs. 1 and 2. The body of the knitting hook member extends rearwardly from the wings 16 and up into a portion 18 adapted for engagement by the jack. A portion 19 of it extends up and forwardly forming a guide for the tail of the lifting hook member. Rearwardly of a point 21 a reinforcing plate 22 is positioned between the upwardly extending parts of the sheet of the knitting hook member and this member has the shape of the tail of the knitting hook member just described so that the rear part or tail of the knitting hook member is of solid laminated construction.

The lifting hook member 14 is provided with an enlarged forward end 23 adapted to be disposed between the wings 16 and having a bottom 24 adapted to rest in the bend 15 of the sheet forming the knitting hook member. At the forward edge the part 23 is cut away to provide a recess 25 defining a lifting hook 26 to be disposed just behind and beneath recesses 27 in the forward edges of the wings 16 in position to receive the old loop as the needle is projected to pick up a new loop. An inclined slot 28 is provided in each wing 16 and alongside these slots upper and lower lips 29 and 31 extend out at the sides a short distance and a similar lip 32 is provided on the upper edges of the

wings in parallelism with the lips 29 and 31. The head 23 of the lifting hook member is provided with two pairs of oppositely extending studs 33 and 34, the studs 34 being adapted to be disposed in the slots 28 and the studs 33 in position to ride upon the lips 32. From the head 23 the shank of the lifting hook member extends rearwardly and terminates in a return spring part 35 adapted to press against the adjacent face of one partition 12 of the needle guide forcing the rear side of the shank against the other and creating sufficient friction to cause the relative movement of the needle parts as will be later described. The shank is also provided at its end with bent-over curved lugs 36 above the shank of the knitting hook member, and beneath the forwardly extending part 19 so that this end of the knitting hook member is held to a horizontal reciprocation. As the knitting hook moves from the position shown in Fig. 2, in which position the parts are casting off the old loop over the new, to the position shown in Fig. 1, which is the position the parts assume in the initial formation of the new loop, the knitting hook is projected by the jack and by reason of the friction between the lifting hook and the guides or partition 12 the forward movement of the lifting hook member is retarded until the studs 34 engage the lower rear ends of the grooves 28 at which time the relative arrangement of the lifting and knitting hook member is that shown in Fig. 1. At this time the knitting hook picks up the new yarn and the old loop has slid back into the recesses 27 and on to the lifting hook 26. Return movement of the knitting hook under the influence of the jack permits the rear end of the lifting hook to remain stationary, the forward end rising as the studs 33 and 34 ride up the lips 31 and 32, the lifting hook 26 carrying with it the old loop and permitting it to drop off over the knitting hook 17 and over the new loop carried by it.

The forward ends of the partition or guide 12 are rearwardly of the rearmost positions of the studs 33 and 34 so that these studs may extend over the ends of the partitions and any unoccupied space between the needle guides, it only being necessary that sufficient space be there provided to permit the shank of the knitting hook member to move freely between the guides.

In order that the needles may move accurately in their stroke, I provide an extension 38 on the needle bed, on which extension the lower faces of the knitting members slide. At the outer end this extension is provided with upwardly extending auxiliary guides 39 formed by saw-kerfing a raised portion of the extension, or otherwise.

Since it is not necessary, as with the latch needle, for a member to be turned sufficient for the old loop to pass it, the stroke is materially reduced in length being little greater than the distance between the knitting hook 17 and the lifting hook 26 when the parts are arranged as shown in Fig. 1. It will be manifest from the foregoing since the shank of the knitting hook is constructed of three thicknesses of relatively thin sheet material, the space provided for them in the needle guides may be relatively narrow and the number of needles correspondingly increased in a needle bed of given dimensions. In making the knitting hook member of sheet material and in reinforcing it as described it may be made of a high degree of fineness and still have the requisite strength.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A needle for a knitting machine, comprising a knitting hook member and a lifting hook member, one of said members being composed of a flat sheet of metal folded to U-form and embracing the other.

2. A needle for knitting machines, comprising a knitting hook member and a lifting hook member, said knitting hook member and said lifting hook member having a relative movement from a position with the lifting hook behind the knitting hook when the yarn is engaged to form the new loop to a position with the lifting hook above the knitting hook for discharging the old loop over the new, said hooks having a slot and stud connection for automatically accomplishing said movement upon reciprocation of the knitting hook.

3. A needle for knitting machines, comprising a knitting hook member and a lifting hook member, said knitting hook member and said lifting hook member having a relative movement from a position with the lifting hook behind the knitting hook when the knitting hook is engaged with the new loop to a position with the lifting hook above the knitting hook for discharging the old loop over the new, said knitting hook and said lifting hook having overlying parts connected by a stud and slot connection for automatically accomplishing said movement upon reciprocation of the knitting hook.

4. A needle for knitting machines, comprising a knitting hook member and a lifting hook member, one of said members having wings between which a part of the other

member is positioned, said wings being slotted and the portion of the other member extending between them being provided with outwardly projecting studs engaging in the slots for governing the relative movement of said members in knitting.

5. A needle for knitting machines, comprising a knitting hook member and a lifting hook member, one of said members having wings between which a part of the other member is positioned, said wings having inclined slots and the portion of the other member extending between them being provided with outwardly projecting studs engaging in the slots for governing the relative movement of said members in knitting.

6. A needle for knitting machines, comprising a knitting hook member formed of a sheet of metal folded upon itself and inclosing a spacing member at the rear thereby providing an open slot adjacent the needle hook, and a lifting hook member mounted in said slot and guided in its movement by parts engaging said knitting hook member.

7. In a knitting machine, the combination of a needle bed having grooves for the reception of the knitting needles, and knitting needles seated in said grooves and composed of knitting and lifting hook members, connections near the front between said lifting and knitting hook members for controlling the desired relative motion between said members, said connections being in front of the ends of the needle bed when said needles are in retracted position.

8. In a knitting machine, the combination of a needle bed having grooves for the reception of the knitting needles, and knitting needles seated in said grooves and composed of knitting and lifting hook members, connections near the front between said lifting and knitting hook members for controlling the desired relative motion between said members, said connections being in front of the ends of the needle bed when said needles are in retracted position, and an extension on said needle bed engaging the bottoms of the forward ends of said needles to guide them in their movement in knitting.

9. In a knitting machine, the combination of a needle bed having grooves for the reception of the knitting needles, and knitting needles seated in said grooves and composed of knitting and lifting hook members, connections near the front between said lifting and knitting hook members for controlling the desired relative motion between said members, said connections being in front of the ends of the needle bed when said needles are in retracted position, and an extension on said needle bed engaging the forward ends of said needles to guide them in their movement in knitting.

10. In a knitting machine, the combination of a needle bed, partitions on said needle beds providing slots for receiving the needles, and needles in said slots comprising lifting and knitting hook members connected for automatic relative movement in knitting, the connections between said needles extending across in front of the ends of said partitions.

11. In a knitting machine, the combination of a needle bed, partitions or guides on said needle bed providing slots for receiving the needles, and needles in said slots comprising lifting and knitting hook members and connections joining the two said connections extending beyond the adjacent faces of said guides.

12. A needle for knitting machines, comprising a knitting hook member and a lifting hook member, one embraced within the other, and pin and slot connections between said members for imparting both transverse and longitudinal relative movement of the hook portions of said members in knitting.

13. In a knitting machine, the combination of needle guides, needles mounted therein and each comprising knitting hook and lifting hook members, one embraced within the other, one of said parts frictionally engaging the face of said guides at or above the plane of movement of the knitting hook member for producing relative movement of the members in knitting.

14. In a knitting machine, the combination of a needle bed upon the face of which knitting needles reciprocate, upstanding walls between the needles, and needles each comprising knitting and lifting hook members mounted between said walls, one of said members frictionally engaging said walls to produce relative movement between said members in knitting.

Signed in the presence of two subscribing witnesses.

WILSON W. BURSON.

Witnesses:
J. P. LINNEN,
A. J. DOYLE.