Aug. 14, 1934. R. KRETSER 1,970,238

KNITTING MACHINE

Filed Dec. 26, 1933

Fig. 1

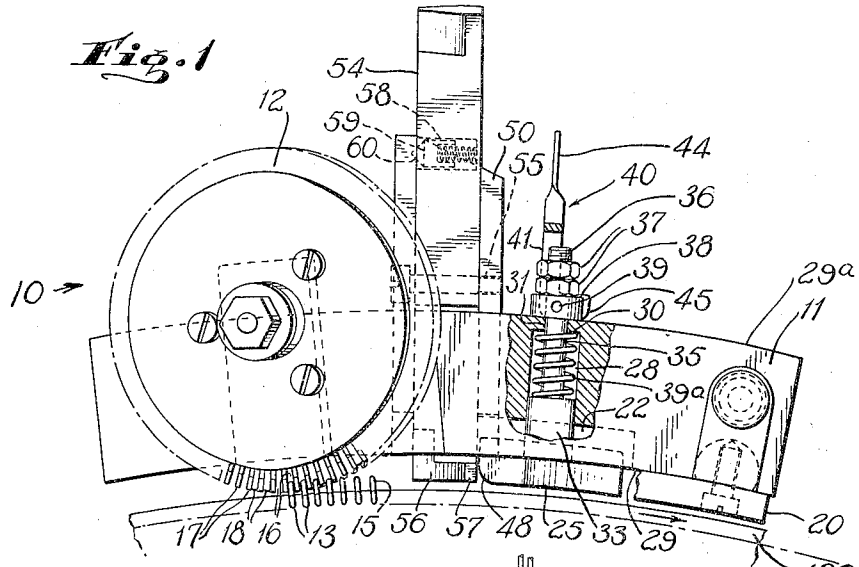


Fig. 2

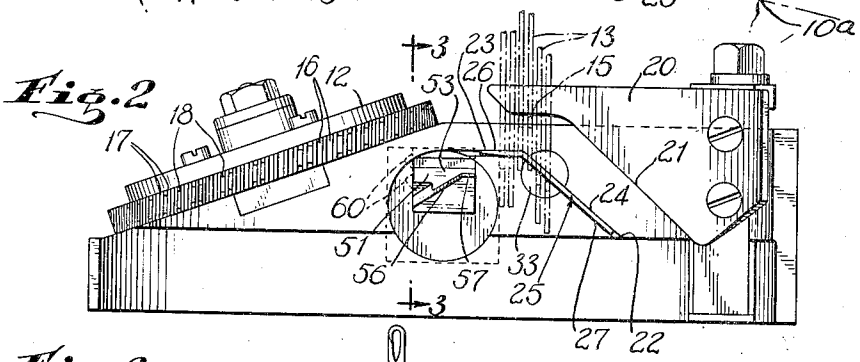
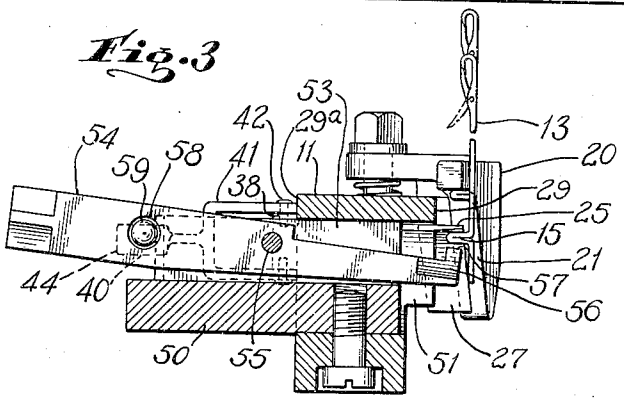


Fig. 3



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KNITTING MACHINE

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7 Claims. (Cl. 66—50)

This invention relates to knitting machines.

An object of this invention is to provide in a machine of the character described, a highly improved separating cam for lowering the needles which have not been lifted by the pattern wheel, to a welting position and prevent these needles from engaging the thread, the construction of the cam being such, furthermore, that should a butt of a needle strike the point or nose of the cam directly, the separating cam will move outward and away from the cylinder to permit said needle butt to by-pass the separating cam, thus preventing breakage or bending of said needle.

A further object of this invention is to provide in a device of the character described, means for moving the separating cam to an inoperative position and holding the same in said position.

Another object of this invention is to position the separating cam, so that a tuck bar can be used in front of the separating cam, making it possible to throw the needles not raised by the pattern wheel into a latch clearing position without disengaging the pattern wheel from the cylinder and without disengaging the separating cam from its working position.

A still further object of this invention is to provide a highly compact, strong and rugged device of the character described, which shall comprise comparatively few and simple parts, be relatively inexpensive to manufacture, easy to install on present knitting machines, and which shall nevertheless be smooth in operation and practical and efficient to a high degree.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is a partial, top plan view of a portion of the knitting machine embodying the invention, with parts in cross-section;

Fig. 2 is a front elevational view of the structure shown in Fig. 1; and

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2.

Referring now in detail to the drawing, 10 designates a portion of a circular knitting machine embodying the invention, and comprises a section 11 of the machine carrying a rotary pattern wheel 12 of usual construction. As is well understood in the art, a plurality of sections 11 are located around the rotary knitting cylinder 10*a* in which are inserted a plurality of vertical, parallel knitting needles 13 slidable in vertical slots. As the cylinder rotates in the usual manner, the butts 15 of the said knitting needles engage within the slots 16 and between the radial teeth 17 of the pattern wheel. In some of the slots 16 are located the usual jacks 18 for lifting some of the needles as the pattern wheel is caused to rotate about its axis, as is well known in the circular knitting art.

The axis of the pattern wheel is inclined to the vertical. The jacks 18 and the radial teeth 17, however, are in vertical planes so that the needles having butts 15 engaging with jacks 18 are lifted as the pattern wheel rotates, to a latch clearing position. The needle butts, however, received in slots which do not have jacks are not raised but are merely moved to a tucking position engaging the thread and holding the same without casting off.

Mounted on the section 11 is the stitching cam 20 of usual construction, having a downwardly inclined cam surface 21. As the cylinder rotates in the direction shown by the arrow in Fig. 1, the butts of the needles which have been raised by the jacks on the pattern wheel, contact the cam surfaces 21 and said needles are lowered for casting off the thread. Ordinarily, the butts of the needles which are not raised by the jacks, also move into contact with the cam surfaces 21 which lower said needles as the cylinder continues to rotate. These latter needles receive the thread and hold the same but do not cast off.

Means is provided for lowering these needles which are not raised by the pattern wheel into a welting position before said needles engage the stitching cam 20, so that said needles will miss the thread entirely. To this end, the section 11 is formed with a slot 22 having a horizontal portion 23 and a downwardly inclined portion 24.

Slidably mounted within said slot 22 is the separating cam 25 likewise having a horizontal portion 26, and a downwardly inclined portion 27.

The section 11 is furthermore formed with a radial bored socket 28 extending from said surfaces 29 and communicating with said slot 22. The bore 28 terminates short of the outer surface 29*a* of said section 11 to form an internal shoulder 30. The shoulder 30 is formed with a through opening 31 smaller than the bore 28. Extending from and fixed to the cam 25 is a boss 33 slidably received within the bore 28 and extending from

said boss 33 coaxially therewith, is a shaft 35 slidably extending through the opening 31. The rear end of the shaft 35 is screw threaded, as at 36, and received on said screw threaded portion are a pair of lock nuts 37. Received on the shaft 35 and disposed between the lock nuts 37 and the outer surface 29*a* of section 11 is a ferule 38 formed with a pair of diametrically disposed openings 39, for the purpose hereinafter appearing. Interposed between the boss 33 and the shoulder 30 is a coil compression spring 39*a* disposed about shaft 35.

It will now be understood that the spring 39*a* normally projects the separating cam 25 from the slot 22, to overlap the path of the butts of the knitting needles, a portion of said cam remaining within said slot, however, in the projected position thereof. The position of the cam may be furthermore adjusted by manipulating the lock nuts 37 to prevent the cam from contacting the cylinder 10*a*.

Means is provided for moving the cam to wholly socketed position within the slot 22, and retaining the same in said position. To this end there is pivoted on the member 38 an operating lever 40 having bifurcated cam portions 41 provided with pins 42 projecting into the openings 39 in said member 38. The member 40 is provided with a handle 44, and the cam portions 41 are formed with camming surfaces 45 engaging the section 11. It will now be understood that upon swinging the member 44 in a clockwise direction, looking at Fig. 1 of the drawing, the cammed surface 45 engaging the section 11 will pull the cam 25 outwardly and draw the same into the slot 22. In this position said separating cam is wholly inoperative.

For the purpose hereinafter appearing, the horizontal portion 26 of said cam 25 is formed with a rounded and cammed nose or edge 48, adjacent the pattern wheel. As the cylinder carrying the knitting needles rotates, the butts of the needles which are not raised by the jacks pass beneath the horizontal portion 26 of the cam 25 and against the undersurface of the inclined portion 27 of said cam, said needles being thus lowered by said cam to a welting position. Said needles which ordinarily would move to tucking position are thus separated from the needles which are raised by the pattern wheel, and will miss the thread which is hence laid on the inside of the knitted fabric. The tucks which would have been formed had the cam 25 been in inoperative position, are thus omitted, producing a more clear and distinct design on the outer side or front of the knitted fabric.

Should a needle be moved up partially for some reason by a bent slot in the pattern wheel bringing the butt of the needle to the level of the horizontal portion 26 of cam 25, said butt will strike or contact the rounded and cammed edge or nose 48 of said cam and press the cam radially outwardly against spring 39*a*, the needle thus pressing the cam 25 into the slot 22 and moving directly to the stitching cam 20. Breakage or bending of the needle butts is thus obviated.

The section 11 may furthermore be provided with an outwardly extending channel-shaped portion 50 and with a through opening 51 communicating with the groove 53 of said channel-shaped portion. Extending through said groove and through the opening 51 is a tuck bar 54 pivoted on a horizontal pin 55 mounted on the side walls of said channel-shaped portion 50.

The front end of the bar is provided with an upwardly beveled surface 56 and a horizontal surface 57 extending from the upper end of the upwardly beveled surface 56. In the position shown in Fig. 2 of the drawing, the front of the bar is swung downwardly, bringing the surface 57 below the horizontal portion 26 of the separating cam 25. In this position, the tucking bar is in inoperative position and permits the butts of the needles to pass to the underside of the cam 25. Upon swinging the tuck bar in a counter-clockwise direction, looking at Fig. 3 of the drawing, the horizontal surface 57 becomes aligned with the upper surface of the horizontal portion 26 of the cam 25. The butts of the needles which are not raised by the jacks then contact the beveled surface 56 and ride up said beveled surface over the horizontal surface 57 and the upper surface of the portion 26 of the cam 25. Said needles are then in a cast off position and move on to the stitching cam 20. The tuck bar may be provided with a socket 58 in which there is housed a spring pressed pin 59 having a point adapted to be received within a pair of spaced, small sockets 60 in a wall of said channel-shaped portion 50. The point of the member 59 snaps onto one of the sockets 60 in one position of the tuck bar and into the other socket 60 in the other position of the bar. The bar is thus retained in either operative or inoperative position against accidental movement.

It will thus be understood that the needles not raised by the pattern wheel may be thrown to cast off position without disengaging the pattern wheel from the section and without moving the separating cam from its operative position.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes mght be made in the embodiments set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a knitting apparatus, a section, a pattern wheel cooperating therewith, a cam mounted on said section for lowering needles not raised by the pattern wheel, and movable radially with respect thereto, spring means for moving said cam radially inwardly to project beyond the inner surfaces of said section, and the edge of said cam adjacent the pattern wheel having a cammed portion whereby butts of needles striking said edge will move said cam radially outwardly.

2. In a knitting apparatus, a section formed with a slot and a socket extending from said slot, a cam received in said slot and having a portion extending into said socket, a spring within said socket for projecting said cam from said slot, said cam having a horizontal portion and a downwardly inclined portion, the outer edge of said horizontal portion having a cammed outer edge portion, a pattern wheel for lifting some of the knitting needles, said needles having butts adapted to strike the cammed edge of said horizontal portion for pushing the cam against the spring to inoperative position, whereby needles whose butts strike said cammed edge will not be moved longitudinally by said cam.

3. In knitting apparatus, a section formed with a slot on the inner surface thereof, said slot

having a horizontal portion and a downwardly inclined portion, said section being further formed with a bore communicating with said slot and terminating short of the outer surface of said section, forming a shoulder, said shoulder being formed with a through opening, a cam having a horizontal portion and a downwardly inclined portion slidably received within said slot, the horizontal portion having a cammed outer edge a boss extending from said cam and received within said bore, a shaft extending from said boss and extending through said through opening, a spring interposed between said boss and said shoulder, and a member on the outer end of said shaft contacting the outer surface of said section.

4. In knitting apparatus, a section formed with a slot on the inner surface thereof, said slot having a horizontal portion and a downwardly inclined portion, said section being further formed with a bore communicating with said slot and terminating short of the outer surface of said section, forming a shoulder, said shoulder being formed with a through opening, a cam having a horizontal portion and a downwardly inclined portion slidably received within said slot, a boss extending from said cam and received within said bore, a shaft extending from said boss and projecting into said bore, a shaft extending from said boss and projecting through said through opening, a spring interposed between said boss and said shoulder, a nut screwed to the outer end of said shaft, and means for drawing said cam into said slot and retaining said cam in said position said means comprising a ferule on said shaft and a member pivoted to said ferule and having a cammed portion engaging said section.

5. In knitting apparatus, a section, a pattern wheel mounted thereon for lifting some of the knitting needles, a cam movably mounted on said section, for lowering the needles which have not been lifted by the pattern wheel, said cam having a horizontal portion and a downwardly inclined portion extending from said horizontal portion, said horizontal portion having a cammed outer edge whereby upon a needle butt striking said cammed outer edge said cam will move to inoperative position.

6. In knitting apparatus, a section, a pattern wheel mounted thereon for lifting some of the knitting needles, a cam on said section for lowering the needles which have not been lifted by the pattern wheel, said cam having a horizontal portion and a downwardly inclined portion extending from said horizontal portion, a tuck bar on said section having a horizontal surface and an inclined surface, said tuck bar being movable to a position where the horizontal surface thereof is aligned with the upper surface of the horizontal portion of said cam.

7. In knitting apparatus, a section, a pattern wheel mounted thereon for lifting some of the knitting needles, a cam on said section for lowering the needles which have not been lifted by the pattern wheel, said cam having a horizontal portion and a downwardly inclined portion extending from said horizontal portion, the edge of said horizontal portion adjacent the pattern wheel being rounded.

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