May 7, 1946. O. FREGEOLLE 2,399,729

YARN FEED, BINDER, AND CUTTER

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FIG. 1.

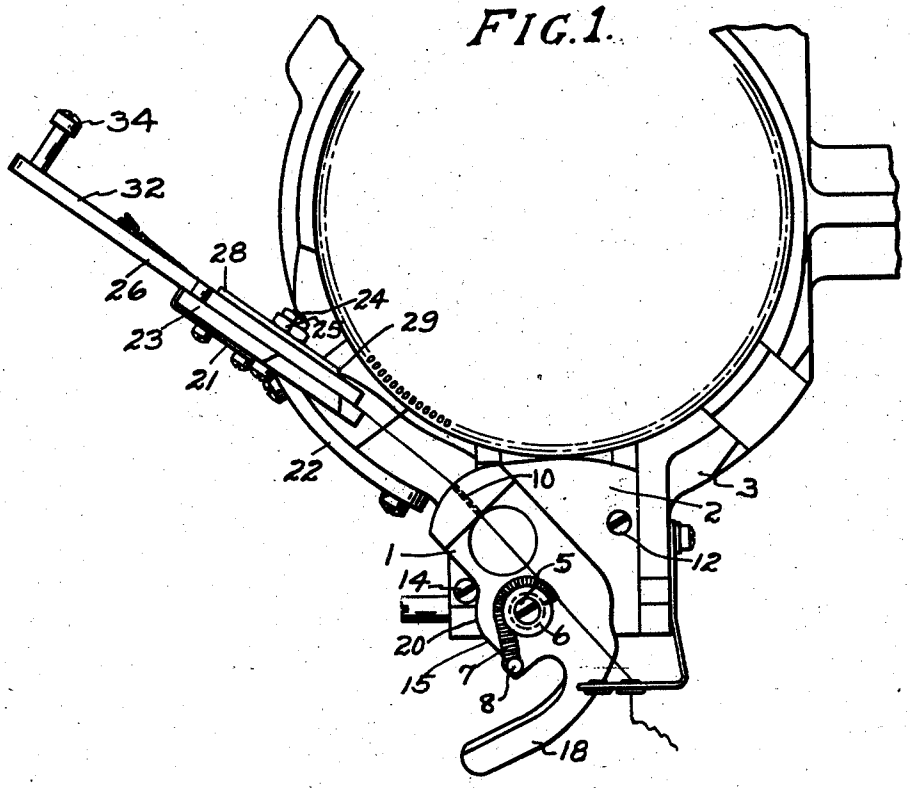
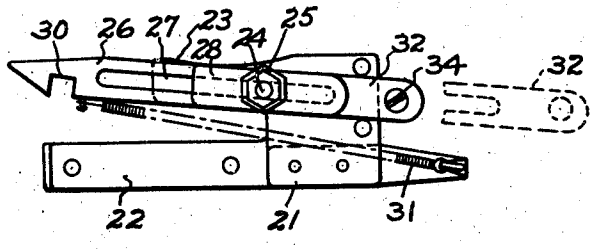


FIG. 2.



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FIG. 3.

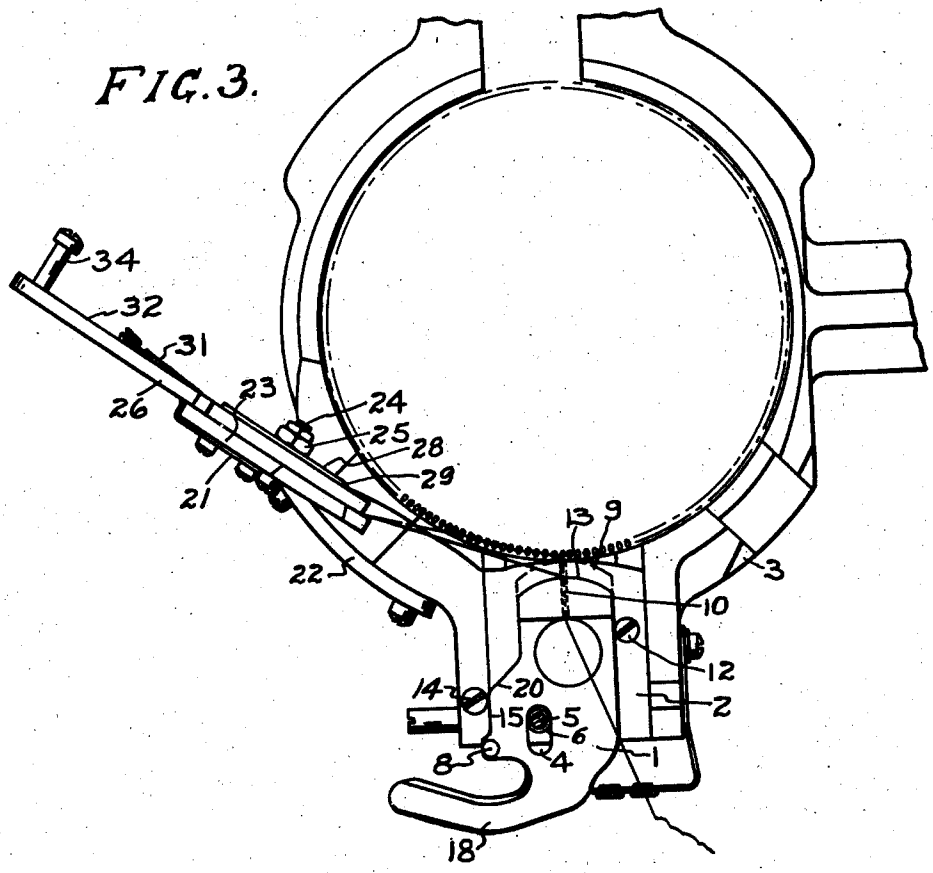
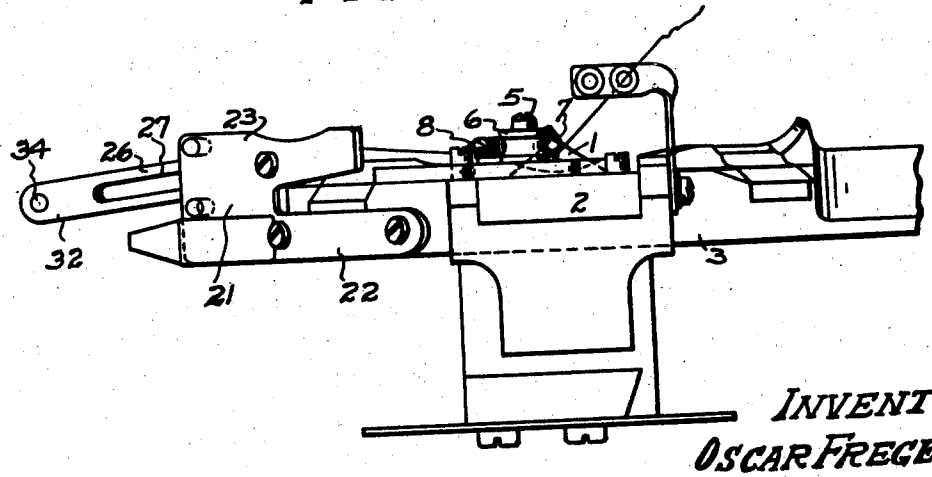


FIG. 4.



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FIG. 5.

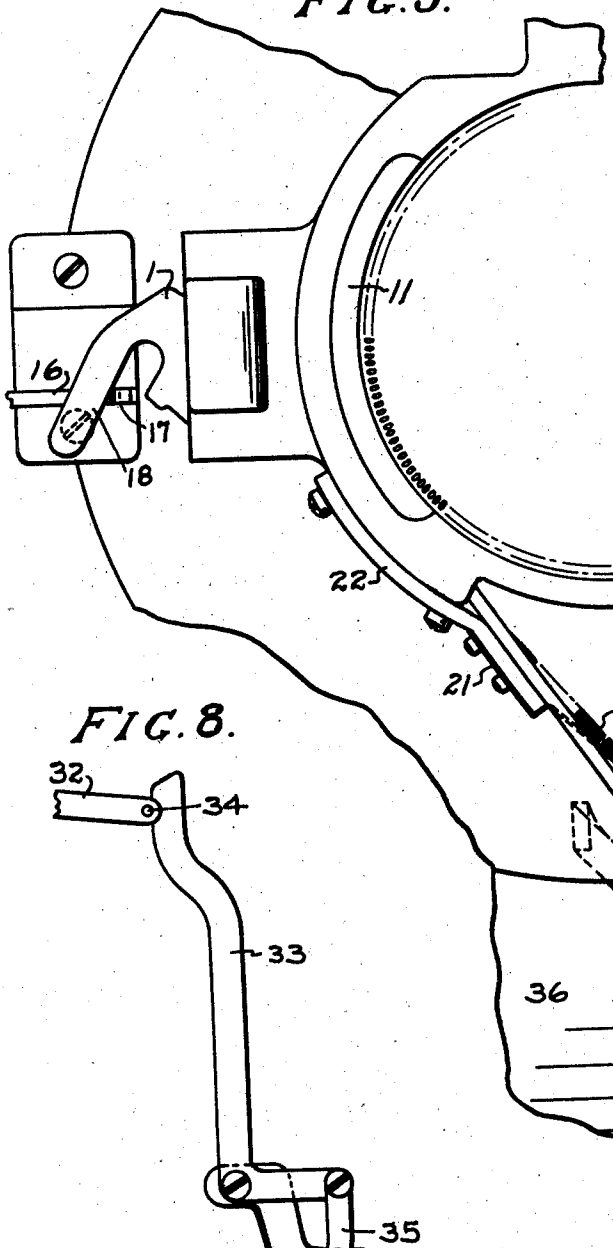


FIG. 6.

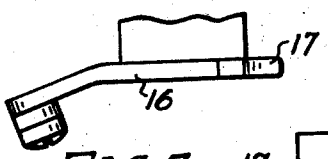


FIG. 7.

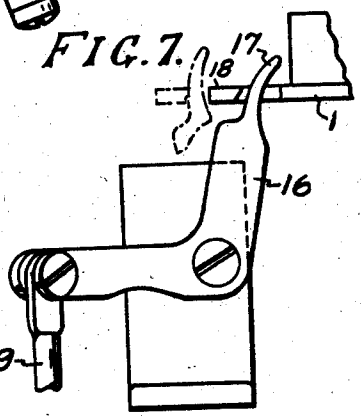


FIG. 8.

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UNITED STATES PATENT OFFICE

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YARN FEED, BINDER, AND CUTTER

Oscar Fregeolle, Central Falls, R. I., assignor to Hemphill Company, Central Falls, R. I., a corporation of Massachusetts

Application February 1, 1945, Serial No. 575,593

6 Claims. (Cl. 66—145)

This invention relates to an improvement in circular, independent needle, knitting machines and particularly to a yarn lever and outside binder and cutter. They were designed for use at the auxiliary side of the machine but they may be used elsewhere, if desired.

As is well-known, when the usual type of yarn lever is raised out of action a slot in the carrier ring remains which is highly dangerous to the needle latches. Various expedients have been improvised to correct this condition such as providing the yarn lever with a tongue-like projection positioned so as to fill the slot when the lever is raised, tapering the ends of the slot so that if the latches engage them they will strike a sloping surface etc.

One of the advantages of the yarn lever of this invention is that it is mounted on the underside of the carrier ring so that it feeds from below it with the result that no slot need be cut through the carrier ring. Another advantage is that by feeding the yarn at a very low level it insures a relatively wide separation between it and any other yarn such as a wrap yarn fed at a higher, normal level. Also because of the extreme separation of yarns effected by this invention there is no possibility that they can become entangled.

The yarn feed of this invention moves in a horizontal plane and swings the yarn outwardly away from the needle circle when it moves out of feeding position. Consequently, the yarn binder and cutter are also mounted outside the needle circle. The advantage of this arrangement is that, when the yarn is not being fed, it lies entirely outside the needle circle so that there is no possibility of entanglement with other yarns fed from inside the needle circle as by an ordinary yarn lever or any well-known type of eccentric or concentric wrap spindle.

One form of the invention is shown in the drawings of which:

Fig. 1 is a plan view from below of the carrier ring of the Banner type, circular independent, needle knitting machine showing the auxiliary yarn feed in its inoperative position and also showing the outside binder and cutter in action;

Fig. 2 is a side elevation of the binder and cutter viewed from inside the cylinder and showing the yarn grab in extended position;

Fig. 3 is a view of the carrier ring and outside binder similar to Fig. 1 with the exception that the auxiliary yarn lever is shown in its yarn feeding and temporarily inactive positions;

Fig. 4 is an elevation of the inverted carrier ring, yarn feed and binder;

Fig. 5 is a plan view from above of the carrier ring showing the auxiliary yarn feed and outside binder and part of the operating mechanism;

Figs. 6 and 7 are plan and elevational views, respectively, of part of the operating mechanism of the auxiliary yarn lever; and

Fig. 8 is a diagrammatic view illustrating the means whereby the binder and cutter are operated.

As best shown in Figs. 1, 3 and 4 the auxiliary yarn lever 1 is mounted on plate 2 on the underside of carrier ring 3. As shown in Fig. 3 yarn lever 1 is provided with an elongated slot 4 paralleling a radial axis of the cylinder when in feeding position through which a screw 5 passes into plate 2. Surrounding screw 5 and passing through slot 4 is a flanged collar 6 by means of which lever 1 is supported beneath carrier ring 2 so that it can move to a limited extent radially of the needle cylinder as indicated in Fig. 3 and also can swing upon collar 6 as a pivot into the position shown in Fig. 1. Collar 6 is so arranged that it may be locked securely against rotation by means of screw 5 without similarly affecting lever 1. A spring 7 attached to collar 6 and to a suitably positioned pin 8 on lever 1 urges lever 1 into its yarn feeding position indicated at 9 in Fig. 3. When in this position it will be noted that the feeding eyelet 10 of lever 1 is outside of, although close to, the needle circle. Because lever 1 is below the carrier ring it need not be broken as is necessary when the usual vertically movable type of yarn lever is employed but remains intact as shown in Fig. 5. Therefore, the usual problem of latch control at this point is entirely eliminated. As shown at 11 in Fig. 5 it may be necessary to recess the carrier ring from the top down to accommodate wrapping mechanism but this recess need not extend to that part of the carrier ring which controls the latches.

As already stated, the yarn lever 1 is normally maintained in its yarn feeding position 9 (Fig. 3) by means of spring 7. Correct radial alignment is assured by stop 12. If the feeding of this yarn is temporarily discontinued this may be done by simply moving yarn lever 1 back to the position indicated at 13 in Fig. 3. The means for doing this will be described later. The yarn lever is still maintained in radial alignment with the cylinder by stop 12 and also by stop 14 on the other side. When the yarn lever is in position 13 the yarn will not be taken by the needles. However, a slight inward movement will again place the yarn lever in yarn feeding position 9. Obviously, as already stated, the yarn lever can be

quickly shifted from one of these positions to another.

To throw yarn lever 1 completely out of action when, for example, the knitting of this particular yarn is discontinued for a considerable time, the lever is pulled back to the extreme end of slot 4 where its edge 15 will clear stop 14. Thereupon the lever will swing upon collar 6 as a pivot into the position shown in Fig. 1 at which the yarn can be taken by the binder and cutter. When the yarn is in the binder it remains outside of the needle circle until the yarn lever 1 is again moved to its feeding position 9 (Fig. 3).

The means shown for moving yarn lever 1 from its feeding position to its inactive position 13 and its out swung position shown in Fig. 1 consists of a bell crank 16 pivoted to some fixed part of the machine so as to swing in a plane radial to the needle cylinder and also so that its upper end formed into a finger 17 will project in front of an arm 18 offset from the rear end of yarn lever 1. The other end of bell crank 16 is attached to a rod 19 which illustrates a suitable coupling to any suitable type of timed operating mechanism usually a cam drum.

Assuming the yarn lever to be in its yarn feeding position 9 a slight backward rocking of bell crank finger 17 will move the lever back to its temporary inactive position 13. The tendency of finger 17 to swing the yarn lever beyond its pivot is overcome by stop 14.

Further backward movement of bell crank 16 causes its finger 17 to draw the yarn lever further away from the cylinder until stop 14 is disengaged from side 15 of the yarn lever and engages with the sloping surface 20. Because of the offset position of lever 18 yarn lever 1 will then be sprung upon its pivot under the guidance of stop 14 and surface 20 into the completely out position shown in Fig. 1 at which the yarn can be taken by the binder and cutter, as already stated.

The lever is moved back again into position 13 and 9 simply by rocking bell crank 16 forward, the moving of lever 1 being effected by the spring 7 under the control of finger 17. The tension of spring 7 can be varied by turning collar 6 to which it is attached.

A form of binder and cutter for use with this yarn lever, generally indicated by 21 in Figs. 1–5, is mounted on the outside of the carrier ring by a bracket 22. Bracket 22 supports a fixed blade 23 adjacent the middle of which is fixed a stud 24 having a nut 25. A second blade 26 is mounted alongside blade 23 by means of stud 24, which passes through a slot 27 in blade 26 and nut 25. Therefore, member 26 can be given a longitudinal sliding movement with respect to blade 23.

Sliding contact between blades 23 and 26 is maintained by a leaf spring 28, also supported by stud 24, the end 29 of which is sharpened to constitute a yarn cutter. As best shown in Fig. 2, one end of blade 26 is provided with a hook 30 by means of which the yarn extending from yarn lever 1 to the needles is grabbed when the yarn lever is swung into its completely out position shown in Fig. 1. To do this blade 26 is moved toward the yarn lever so that hook 30 projects considerably beyond blade 23 as shown in Fig. 2. When in this position hook 30 will catch the yarn when the yarn lever is swung out as shown in Fig. 1. Thereupon blade 26 is retracted so that hook 30 lies inside the ends of blade 23 and cutter 29 with the result that the yarn is cut and securely held between blade 23 and blade 26.

The position of the binder and cutter with respect to the needles and yarn lever 1 is such as to provide for this action. Also the position is such that if yarn lever 1 is moved back again to its non-feeding position 13 the yarn will still extend from the lever to the binder outside the needle circle. The binder is normally maintained in its yarn binding position (Figs. 1, 3 and 4) by a spring 31 (Fig. 2).

Blade 26 is provided with an extension 32 at the end opposite hook 30 suitably connected to suitably timed operating mechanism such, for example, as that shown in Figs. 5 and 8 whereby blade 26 is projected to grab the yarn. This consists of a rock lever 33 which bears against pin 34 projecting from end 32 of member 26. Rock-lever 33 is in turn connected to a lever 35 operated by a cam drum 36. This arrangement and its operation is such that, whenever the binder is to receive a yarn, blade 26 will be projected toward yarn lever 1 as shown in Fig. 2 and will be released to be returned by spring 31 to its normal binding position as soon as the yarn is taken.

I claim:

1. In a knitting machine having a carrier ring and needle cylinder, the combination of a yarn feeding lever beneath said carrier ring, means for positioning said lever radially of said cylinder with its yarn feeding end in close proximity to the needle cylinder, means for moving said yarn lever radially of said cylinder into a non-feeding position and for moving said yarn lever in a non-radial, outward direction into another non-feeding position.

2. In a knitting machine having a carrier ring and needle cylinder, the combination of a yarn feeding lever beneath said carrier ring, means for positioning said lever radially of said cylinder with its yarn feeding end in close proximity to the needle cylinder, means for moving said yarn lever radially of said cylinder into a non-feeding position and for moving said yarn lever in a non-radial, outward direction into another non-feeding position, a binder and cutter and means for operating them so as to bind and cut the yarn when said yarn lever is in its last mentioned position.

3. In a knitting machine having a carrier ring and needle cylinder, the combination of a yarn feeding lever radially positioned beneath said carrier ring when in yarn feeding position, means for moving said lever radially away from said feeding position into a non-feeding position and for swinging said lever non-radially and outwardly into another non-feeding position and means for returning said lever to its radial feeding and non-feeding positions under the control of said first mentioned means.

4. In a knitting machine having a carrier ring and needle cylinder, the combination of a yarn feeding lever radially positioned beneath said carrier ring when in yarn feeding position, means for moving said lever radially away from said feeding position into a non-feeding position and for swinging said lever non-radially and outwardly into another non-feeding position and means for returning said lever to its radial feeding and non-feeding positions under the control of said first mentioned means and a binder and cutter so positioned as to bind and cut the yarn when said lever is in its second mentioned non-feeding position.

5. In a knitting machine having a carrier ring and needle cylinder, the combination of a yarn feeding lever mounted upon the underside of the

carrier ring so as to be radially and rockably movable with respect to the needle cylinder, resilient means for normally retaining said lever in a radial yarn feeding position, means for moving said lever radially into a non-feeding position and for rocking said lever into another non-feeding position.

6. In a knitting machine having a carrier ring and a needle cylinder, the combination of a yarn lever provided with an elongated slot parallel to a radial axis of said cylinder when in yarn feeding position, a pivot passing through said slot and means for causing said yarn lever to move upon said pivot radially within the limits of said slot and to swing horizontally upon said pivot.

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