

July 10, 1951

P. SCHOENSTER ET AL
MEANS FOR HOLDING YARN ENDS

2,560,484

Filed June 2, 1950

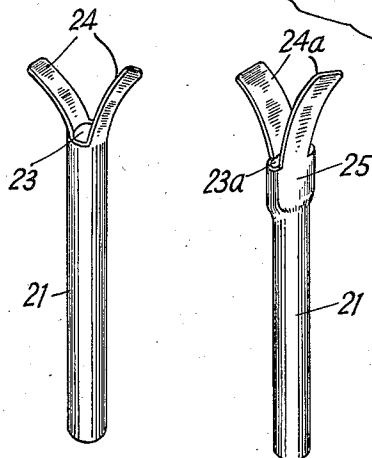
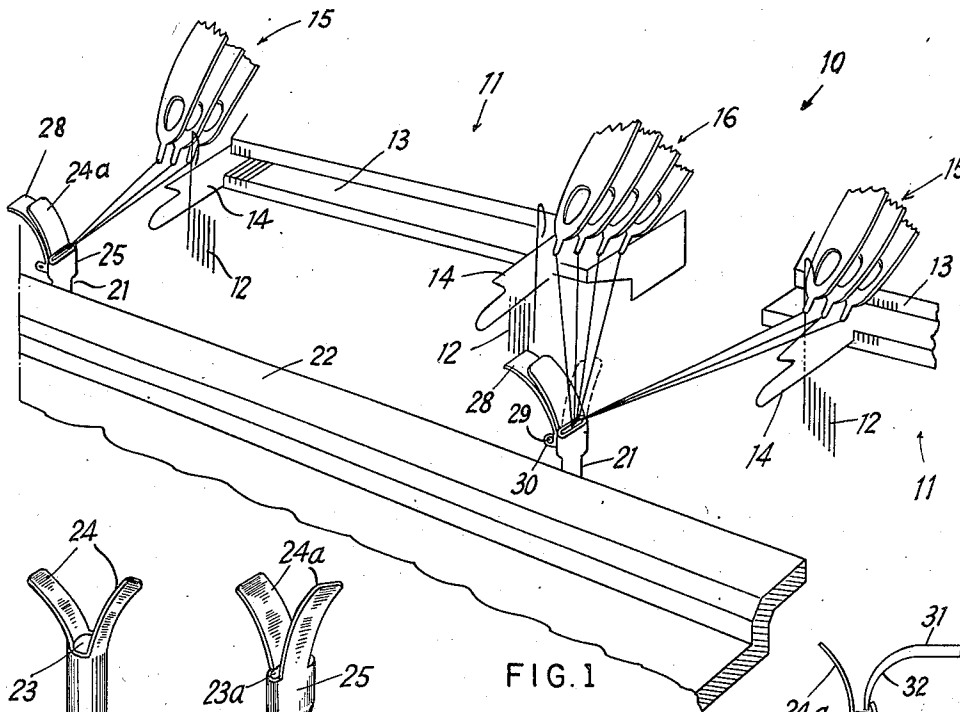


FIG. 3

FIG. 4

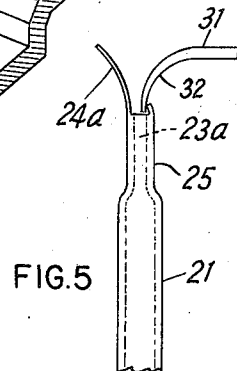


FIG. 5

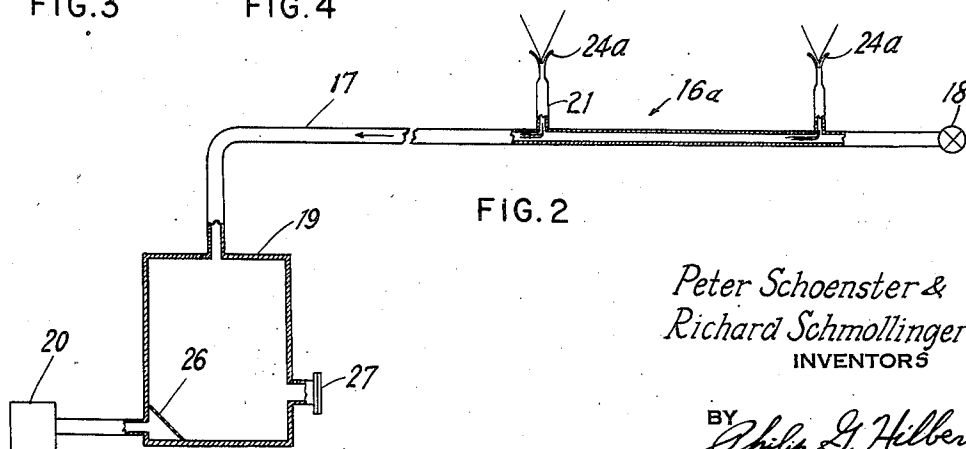


FIG. 2

Peter Schoenster &
Richard Schmollinger
INVENTORS

BY *Philip G. Hilbert*
ATTORNEY

UNITED STATES PATENT OFFICE

2,560,484

MEANS FOR HOLDING YARN ENDS

Peter Schoenster, Teaneck, and Richard Schmolinger, Ridgefield, N. J., assignors to Alfred Heilmann & Co., West New York, N. J., a corporation

Application June 2, 1950, Serial No. 165,728

3 Claims. (Cl. 66—145)

1

This invention relates to a method and means for holding yarn ends in a full fashioned hosiery knitting machine.

The increased demand for finer gauges of women's hosiery has necessitated the use of correspondingly fine gauge, highly flexible needles in the full fashioned knitting machines producing such hosiery.

The fine selvaige needles of such machines are particularly susceptible to flexure, each time a yarn is introduced into the knitting field, causing the selvaige needles to be pulled out of alignment with the other needles on the needle bar. The flexure of the selvaige needles is apparently due to the manner in which the leading yarn ends are anchored previous to the start of the knitting operation. The yarns are drawn from the cones and after passing through the usual moistening means, tensioning means and the like, are threaded through the yarn carriers and the yarn ends are received in clamping means or are tied to a front portion of the machine.

It has been found that with the initiation of the knitting operation through the coulier motion, the incident movement of the yarn carriers as they present the yarn to the needles, results in uneven tensioning of the yarns, which in turn produces the flexure of the selvaige needles. Fabric knitted under such conditions is poor in quality with defects particularly noticeable at the selvages thereof.

This problem may be overcome in part, if the machine operator cuts the anchored yarn ends immediately after the course is knitted. With multi-section knitting machines having from 24 to 32 sections, the cutting operation is performed with difficulty unless the machine is slowed down or brought to a complete stop. If the yarn ends are not cut in a rapid manner, bad selvages may still occur in the finished fabric. Such procedure results in operator fatigue, curtailed production and faulty fabric.

Accordingly, an object of this invention is to provide in a knitting machine, improved means for yieldably holding a yarn as it is introduced into the knitting field whereby to compensate for non-uniform tension on the yarn end and permitting the yarn ends to be cut in an unhurried manner while the knitting machine continues its operations at normal speed.

While it has been proposed to anchor yarn ends in a spring mounted clip, an increase in tension on one yarn will cause movement of the clip and undesirable slackness in the other yarns. Accordingly, another object of this invention is

2

to provide in a knitting machine improved means for yieldably holding a plurality of yarn ends wherein a change in tension in one yarn will have no effect on the tension of the other yieldably held yarns.

Still another object of this invention is to provide in a knitting machine, an air stream system for entraining yarn ends and yieldably holding the same while the yarns are being knitted, the yarn ends being adapted to be thereafter severed from the knit fabric, the severed ends of yarn being removed in the air stream system.

Still a further object of this invention is to provide in a knitting machine, means for yieldably holding the leading end of a yarn in the form of a conduit having an orifice for receiving the yarn end, together with means for creating an air stream in the conduit in the form of suction producing means in communicating relation with the conduit, air jet pressure means at the orifice of the conduit or both operating in conjunction with each other, whereby the yarn end is yieldably held in the air stream.

In conventional yarn anchoring systems, where the yarn ends are received in a clip or tied to a post, the accumulated yarn ends must be periodically removed to prevent the same from falling into and interfering with the operation of the machine, as well as cleaning the clip or anchor for attaching new yarn ends. Such yarn end removing operation involves pulling new yarn from the cones to help ball the accumulated cut yarn ends, with consequent waste of yarn. Accordingly, yet another object of this invention is to provide in a knitting machine means for yieldably holding a yarn end, wherein the yarn end is adapted to be severed, together with means for removing the yarn end as soon as it is severed and for collecting the severed yarn ends at a point some distance from the knitting elements of the machine.

Still another object of this invention is to provide an improved method of yieldably holding the leading end of at least one yarn as it is supplied to the knitting elements of a knitting machine, in a manner which automatically compensates for changes in tension of the yarn, thereby preventing undue flexure of the selvaige needles of the machine, thereafter severing the yarn end and simultaneously removing the severed yarn end.

Yet a further object of this invention is to provide improved yarn end holding means of the character described, which is of simple construction, is readily attached to a knitting machine,

is simple to operate, requires a minimum amount of attention by the machine operator and is efficient in use.

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, arrangement of parts and the method which will be exemplified in the constructions hereinafter described, and of which the scope of invention will be indicated in the following claims.

In the accompanying drawing, in which is shown illustrative embodiments of the invention;

Fig. 1 is a front perspective view of a pair of adjacent sections of a full fashioned knitting machine, with parts removed, showing the location of the yarn end holding means embodying the invention relative to the yarn carriers and needles;

Fig. 2 is a front elevational view of the yarn end holding system embodying the invention;

Fig. 3 is a front perspective view of a branch orificed conduit forming a portion thereof;

Fig. 4 is a front perspective view of a modified form of the branch conduit;

Fig. 5 is a front elevational view in section, of a branch conduit, illustrating a modified form of the system.

Referring in detail to the drawing, and particularly to Fig. 1, 10 generally designates a multiple section machine for knitting full fashioned hosiery. Such machine comprises similar knitting sections 11 disposed in end to end relation. Each section 11 comprises the usual needles 12 disposed forwardly of a sinker head 13 on which the sinkers 14 are slidably mounted. For the purpose of clarity, the usual dividing sinkers, knockover bits and the like, have been omitted from the figure. Yarns are supplied to the knitting elements of each section by carriers 15, 16 which operate over the section in a conventional manner to lay courses of yarn on the sinkers behind the needles. Appropriate action of the various knitting elements and movement of the yarn carriers as an incident to the coulier motion, produces the yarn loops which make up the knitted fabric.

Improved yarn end holding means embodying the invention and generally designated as 15a, is mounted on the machine 10. Such means, as shown in Figs. 1, 2, may take the form of an elongated conduit 17 which may be suitably mounted on the frame of the machine and extends longitudinally thereof. The conduit 17 may be provided with a control valve 18 at one end thereof while the other end communicates with a collecting chamber 19. Suction creating means such as a pump 20 is connected to chamber 19, for the purpose hereinafter described.

Extending transversely of conduit 17 and in communicating relation therewith, are a plurality of similar branch conduits or tubes 21. The tubes 21 are located in upstanding position between each pair of knitting sections 11, as well as at the far end of the first and last knitting sections. The tubes 21 are positioned so that their upper terminal ends are disposed rearwardly of the front bed 22 of the machine 10. As shown in Fig. 3, the walls at the terminal end of each tube 21 may be split, providing an orifice 23. The split wall portions or walls 24, which are oppositely disposed, may be flared outwardly of each other to provide yarn end guide means.

Alternatively, the tubes 21 may be flattened at

their terminal ends, as shown in Fig. 4, to provide a constricted orifice 23a formed by flattened wall portions 25. Split wall portions or walls 24a extend outwardly on either side of orifice 23a, in diverging relation, as previously described.

When all the yarn carriers 15, 16, have been threaded with yarn withdrawn from the yarn cones, not shown, the leading ends of the yarns are brought over the orifices of tubes 21, the guide walls 24, 24a, facilitating the proper positioning of the yarn ends. The pump 20 is operated to provide reduced pressure in the conduit 17 and the communicating tubes 21, thus drawing the yarn ends into the tubes. The frictional response of the individual yarn ends to the air flow or stream created within conduit 17 and tubes 21, may be suitably regulated by means of valve 18 or by means of valves located on each of the tubes 21, not shown. Accordingly, the yarn ends are held in a resilient, yielding manner. The pressure drop within the system may be regulated so that the terminal ends of the yarns extend into conduit 17, as shown in Fig. 2.

With the yarn ends yieldably held, in the manner above described, the machine 10 is operated in the usual manner, with selected carriers laying yarns over the sinkers 14 behind needles 12, to form the knitted courses. Since the yarn ends are yieldably held, any change in tension in any one of the yarns will be individually compensated, without effecting any of the other yarns. Accordingly changes in yarn tension will not be transmitted to the selvaage needles and the needles will be free of flexure.

With all the yarn ends yieldably held, it is understood that any one of the yarn carriers 15, 16 is prepared at any time to supply its yarn to the knitting field. Thus, when reenforcing yarns are to be introduced into the knitted fabric, the appropriate yarn carriers may be immediately activated at the proper time. When yarn carriers are withdrawn from the knitting field, the trailing yarn ends of the carriers are introduced into tubes 21 for yieldable engagement and making the carriers available for use at any time.

The yarn ends extending from the carriers may be left in tubes 21 when the machine 10 and pump 20 are not operating, the yarn ends becoming immediately engaged upon resumption of operations when pump 20 is started.

With the yarn ends held in a yielding manner, the cutting of the yarn ends may be accomplished without haste and while the machine 10 continues in operation. As soon as the yarn ends are cut, the same are immediately moved in the air stream to the collecting chamber 19. Valve 18 may be suitably manipulated to facilitate the passage of the cut yarn ends in the conduit 17. A screen member 26 may be positioned within chamber 19 over the connection to pump 20, to prevent yarn ends from being sucked into the pump. Accumulated yarn ends may be periodically removed from the chamber by way of an opening therein having a removable cover 27 fitted into the opening, thus insuring uniform and unimpeded operation of the air stream system.

The yieldable holding means above described, may be used in conjunction with conventional, non-yieldable types of yarn end holding means, the last mentioned form of yarn end holding means being available for emergency use in the event of a failure of the air stream. A spring pressed, pivoted member 28 may be mounted on

one of the guide walls 24a of each of the tubes 21.

5

The lower end of member 28 is mounted on a pivot pin 29 journaled in ears 30 extending from the wall 24a. A spring, not shown, on pin 29, urges member 28 towards wall 24a to provide a non-yieldable, yarn end clamping means.

The air stream for yieldably holding the yarn ends may also be provided by means of a jet of air or the like under superatmospheric pressure. Thus, as shown in Fig. 5, the tubes 21 are provided with an air jet nozzle 31 which has its forward end directed at orifice 23a of the tube. The nozzle 31 is connected to a suitable source of air under pressure, not shown. The pressure of the air jet may be suitably controlled by valve means, not shown, to produce the desired air stream within tubes 21 and conduit 17, for entraining the yarn ends and retaining the same in a resilient manner, as previously described. One of the guide walls 24a on tube 21, may be omitted, the curved portion 32 of nozzle 31 acting as a guide means in its place.

If desired, the air stream may be constituted by a combination of the suction producing pump 20 and air jet nozzle 31, operating in conjunction with each other.

It will be apparent that the method and means for yieldably holding yarn ends, as above described, is effective to prevent misalignment of the selvage needles on the knitting machine, thereby producing knit fabrics having uniformly good selvages; allows the yarn ends to be cut without interrupting the normal operation of the machine; permits the cut yarn ends to be quickly removed from the knitting field as soon as they are cut and eliminates the wastage of yarn conventionally used to ball up the cut yarns for removal from known yarn clamping means.

It will thus be seen that there is provided a method and means for holding yarn ends, in which the several objects of the 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 described invention, and as various changes might be made in the embodiments above set forth, it is understood that all matter herein set forth or shown in the accom-

6

panying drawing, is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to protect by Letters Patent:

1. In a knitting machine including knitting elements and a yarn carrier, a conduit having an orifice located in operative relation to said carrier and means for producing an air flow in said conduit comprising suction means communicating with said conduit and means for introducing air under pressure into said orifice.

2. In a knitting machine comprising a plurality of knitting sections, each section including knitting elements and at least one yarn carrier for supplying yarn to said knitting elements, a common conduit extending along said machine and having a plurality of branch conduits extending therefrom, each of said branch conduits being disposed adjacent a section of said machine and terminating in an orifice located in operative relation to the yarn carrier of said machine section, and means for producing a flow of air in said conduits.

3. In a knitting machine as in claim 2, and a collection chamber in communication with said conduits.

PETER SCHOENSTER.

RICHARD SCHMOLLINGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,220,667	McGuiness	Mar. 27, 1917
1,921,396	Pool	Aug. 8, 1933
2,185,211	Mamrol	Jan. 2, 1940
2,199,296	Turner	Apr. 30, 1940
2,199,353	Turner	Apr. 30, 1940
2,207,105	Payne	July 9, 1940
2,259,043	Payne	Oct. 14, 1941
2,326,905	Turner	Aug. 17, 1943
2,354,624	Turner	July 25, 1944
2,376,267	Moyer	May 15, 1945
2,491,142	Utter	Dec. 13, 1949