5.4 Warping in narrow fabric production

For label weaving machines with a standardised number of threads, the warp beams can be obtained directly from the man-made fibre manufacturer. In ribbon weaving and knitting, warp beams are generally produced according to the diagram in Fig. 5-5. As the thread count is usually low, the warp bobbins can be produced in a direct process. Non-elastic threads are drawn off a bobbin creel, elastic ones from an unrolling stand. After being tensioned and going through the inlet comb (or eyelet reed), non-elastic yarns pass through a yarn tension regulator, elastic ones through a pre-stretcher. They then pass through a cross-laying reed, anti-static equipment, the spacing reed and guide roller. The yarn is then wound onto a warp beam.

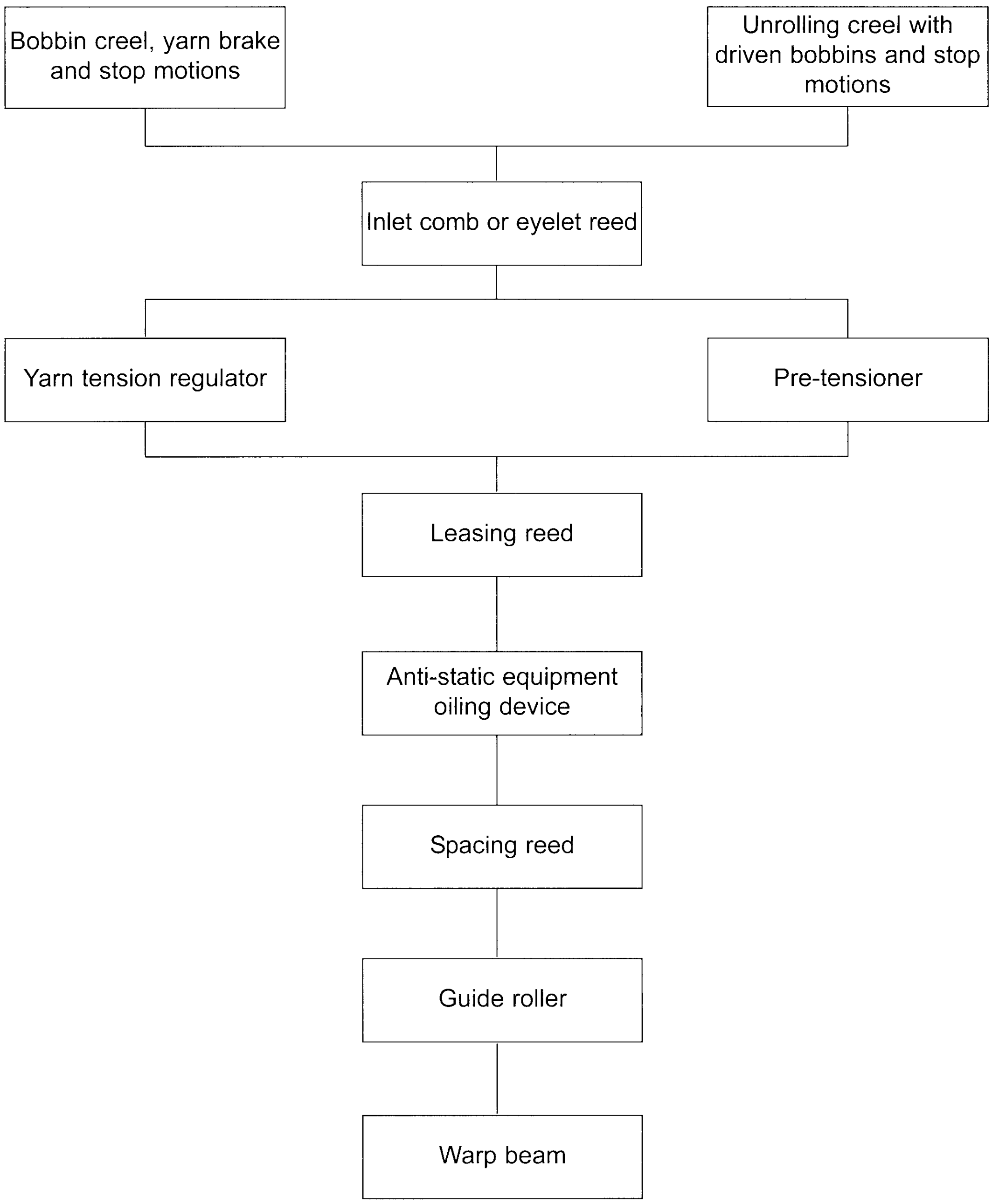


Fig. 5-5: Warping in ribbon weaving and knitting

5.4.1 Bobbin creel

5.4.1.1 Task

As a feed device, the bobbin creel must be able to accommodate an adequate number of bobbins and ensure that the yarn tension is equal across all the creel positions. The economic efficiency, in other words the rapid removal of empty bobbins, the creeling up of fresh ones and drawing-in of the yarn is particularly important, as the set-up time is a major factor in the efficiency of the installation as a whole, especially when job lengths are short. Some of the factors affecting the design of the creel are as follows:

- Yarn type
- Type of thread brake
- Yarn speed
- Package size

A modern creel comprises:

- the pin board and bobbin holders
- a frame to accommodate the thread brakes
- the stop motions

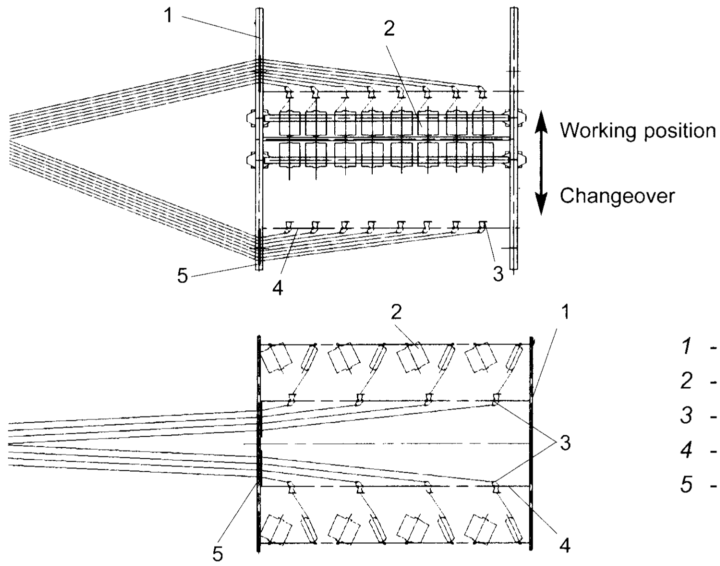
The pitch and the shape of the bobbin holders affect how frequently the bobbins need to be replaced and the time this takes. To shorten the time required, mobile creels that can be creeled-up outside the system are used. A thread brake and stop motion are provided for each bobbin. The stop motions are normally situated at the head ends of the creel. An optical indicator shows the location of any thread break.

The positioned bobbins must be a certain distance apart from each other to prevent the thread balloons touching each other when the threads are being drawn-off overhead. Touching can be prevented by the use of balloon separators, in this type of creel the bobbins are not moved.

5.4.1.2 Normal creel for non-elastic yarns

Normal creels are fixed, magazine or mobile creels. The thread draw-off can be either inside or outside. In the case of outside draw-off, the frame containing the thread brakes can be moved apart in the direction shown by the arrow (Fig. 5-6) so that a fresh bobbin can be mounted. Another option is to creel up the bobbins on a mobile creel, which then enters the frame from the rear when a changeover becomes necessary. The advantage of outside thread draw-off lies in the fact that any broken threads are easily accessible. On the other hand the thread run is slightly crooked, which causes a certain amount of (in-signficant) abrasion.

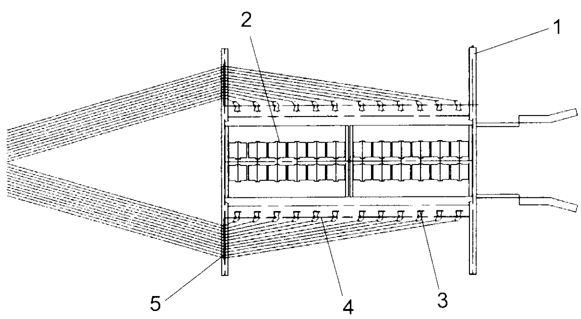
Some creels are still available that have two pivoting creeling pins per draw-off so that a reserve bobbin can be creeled up.



1 - Creel frame
2 - Bobbin carrier with bobbins
3 - Thread brake
4 - Thread brake creel
5 - Stop motions

Fig. 5-6: Fixed creel with outside draw-off (top) and magazine creel with inside draw-off (bottom)

With mobile creels, individual bobbin trolleys enter the creel one after the other (Fig. 5-7). Creeling up of the bobbins can be performed outside the creel while the preceding set of bobbins are being used.



1 - Creel frame
2 - Bobbin trolley with bobbins
3 - Thread brake
4 - Thread brake creel
5 - Stop motions

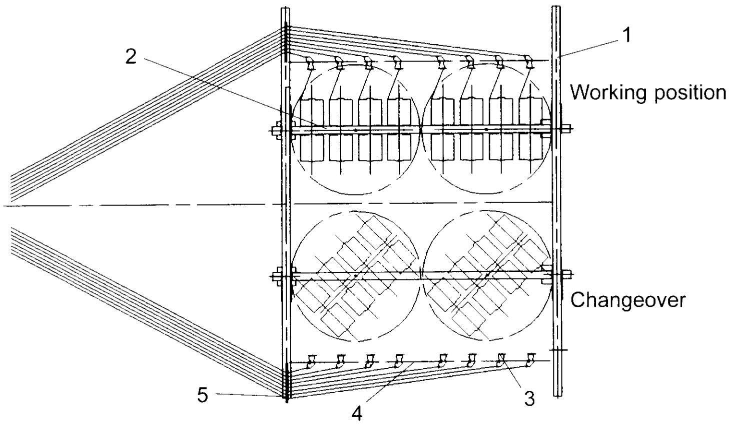
Fig. 5-7: Mobile creel with outside draw-off

The following creels are used in the narrow fabrics industry for warping non-elastic yarns:

- Double-sided creel with adjustable subdivisions for creeling up of bobbins of up to 8 and 12 kg respectively
- Double-sided creel with changeable bobbin trolleys (mobile creel)
- Creel with two pivoting creeling pins per draw off for a reserve bobbin
- Single-sided creel

5.4.1.3 Rotating frame creels

On rotating frame creels, the bobbins are placed on rotating frames. Fig. 5-8 illustrates a rotating frame creel with outside draw-off. While the threads are being drawn-off during the warping process, new bobbins can be creeled up on the inside. If the outside bobbins are empty, the frame is rotated and a new one pulled in. This type of creel reduces stoppage times during bobbin changes.

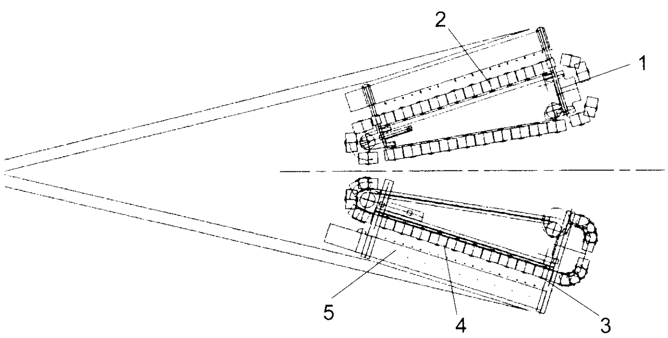


1 - Creel frame
2 - Rotating frame with bobbins
3 - Thread brake
4 - Thread brake creel
5 - Stop motions

Fig. 5-8: Rotating frame creel

5.4.1.4 V-creel

V-creels (Fig. 5-9) are shaped like a V when viewed from above; this shape reduces the number of deflections and guide elements. Also, the time required to repair a thread break is reduced and creeling up can take place on the inside during the warping process. V-creels take up more space than normal ones, so the inside section is often used for storage.

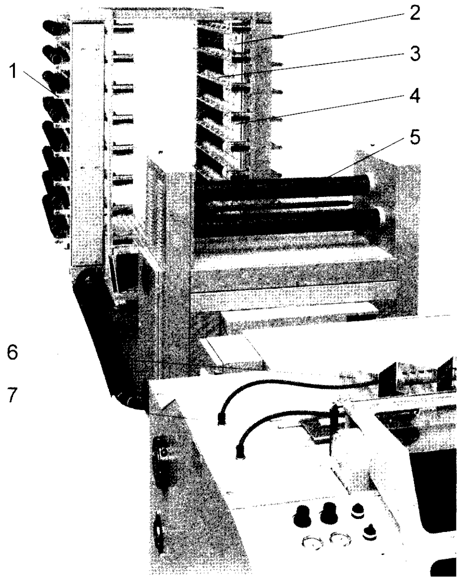


1 - Creel frame
2 - Bobbin carrier with bobbins
3 - Thread brake
4 - Thread brake creel
5 - Stop motions

Fig. 5-9: V-creel

5.4.1.5 Unrolling creels

In situation in which elastic materials are being warped in sections onto warp beams from individual bobbins, an even yarn tension can only be achieved using a positive thread feed. Cylindrical bobbins on one or more rollers that are turning synchronously in the same direction are unwound tangentially.



1 - Lever
2 - Bobbin
3 - Take-off roller
4 - Stop motion
5 - Pre-tensioning device
6 - Spacer reed
7 - Warper

Fig. 5-10: Schematic of a unrolling creel placed parallel with the warping machine

The bobbins creels can be arranged either longitudinally or transverse to the warping machine. Where large numbers of bobbins are involved, the transverse arrangement has the disadvantage that the threads at the edges are very markedly deflected. If required, a large number of bobbins can be used if the unrolling creels are installed longitudinally (Fig. 5-10). The creels can be installed one behind the other in a modular fashion. The bobbin (2) is pressed down onto the take-off roller (3) by its own weight and by the lever (1). The thread runs through the stop motion (4), the pre-tensioning device (5) and the spacing reed (6) to the warper (7).