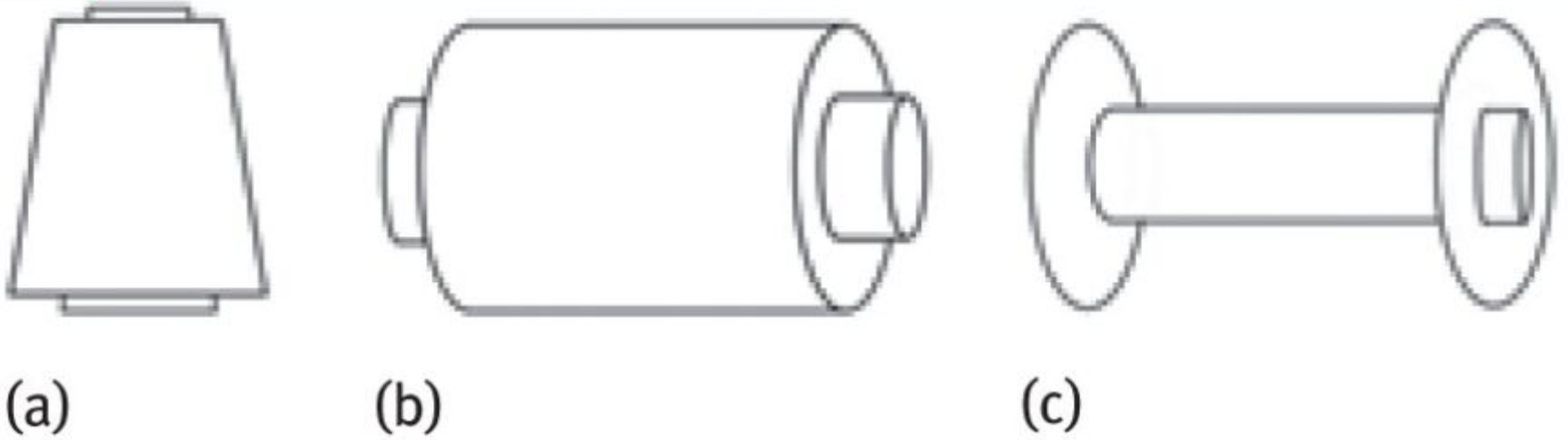

Fig. 3

Package types; (a) tapered, (b) parallel without flange and (c) flanged parallel.

The winding process involved unwinding yarn from one package and rewinding it on to another package. The yarn may be unwound in two ways, i. e. over end and side withdrawal as shown in Fig. 4. Winding rate is the speed at which the yarn is wound on package surface, while to and fro movement of yarn when it is laid on to package is called traverse. In case of near parallel package, traverse is very slow, but in case of cross wound package traverse is quick. There is no traverse in case of parallel wound packages.

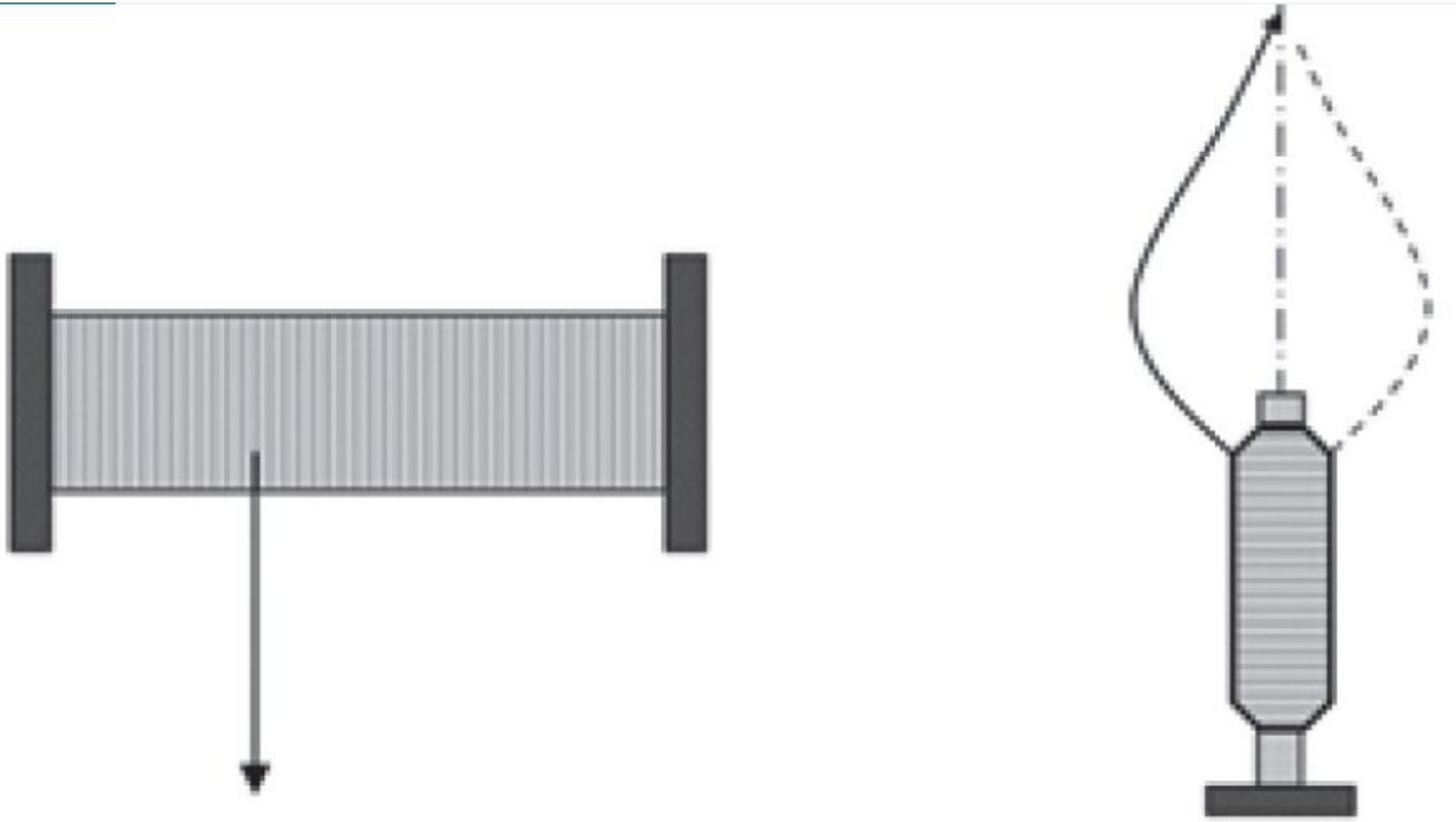

Fig. 4

In the winding machine, yarn is taken from the bobbin / cop and is wound on the package after passing through the thread guides, balloon breaker, stop motion and yarn clearer. For cross winding, a grooved drum is also provided on the machine to traverse the yarn.

2.2 Warping

In warping process, the yarns are transferred from a number of supply packages (cones) to the warp beam i the form of a parallel sheet. The main objective of warping is to get the required number of ends as per requirement. The three main types of warping are high speed / direct warping, sectional / indirect warping and ball warping. In direct warping, the yarns are withdrawn from the single-end yarn packages (cone) on the creel and directly wound on a beam. A number of beams are warped to get the required number of ends. For example, to produce a fabric with 6040 warp ends, 8 beams will be warped, each with 755 ends. These beams are then combined into a single beam in the sizing process. The process offers only limited pattern possibilities, and is preferred for simple patterns only.

The indirect / sectional warping process completes in two steps, i. e. warping and beaming. In first step, a portion of the required number of threads (called section) is wound onto a conical drum (Fig. 5). All the sections are warped on the drum side by side, one after the other. In next step all the sections are unwinded from the drum and wound onto beam to complete the required number of threads. This beam may or may not be taken for the sizing process. The division of warp sheet into small sections provides unlimited patterning possibilities. Therefore this process is suitable for complex warp patterns. Ball warping is the

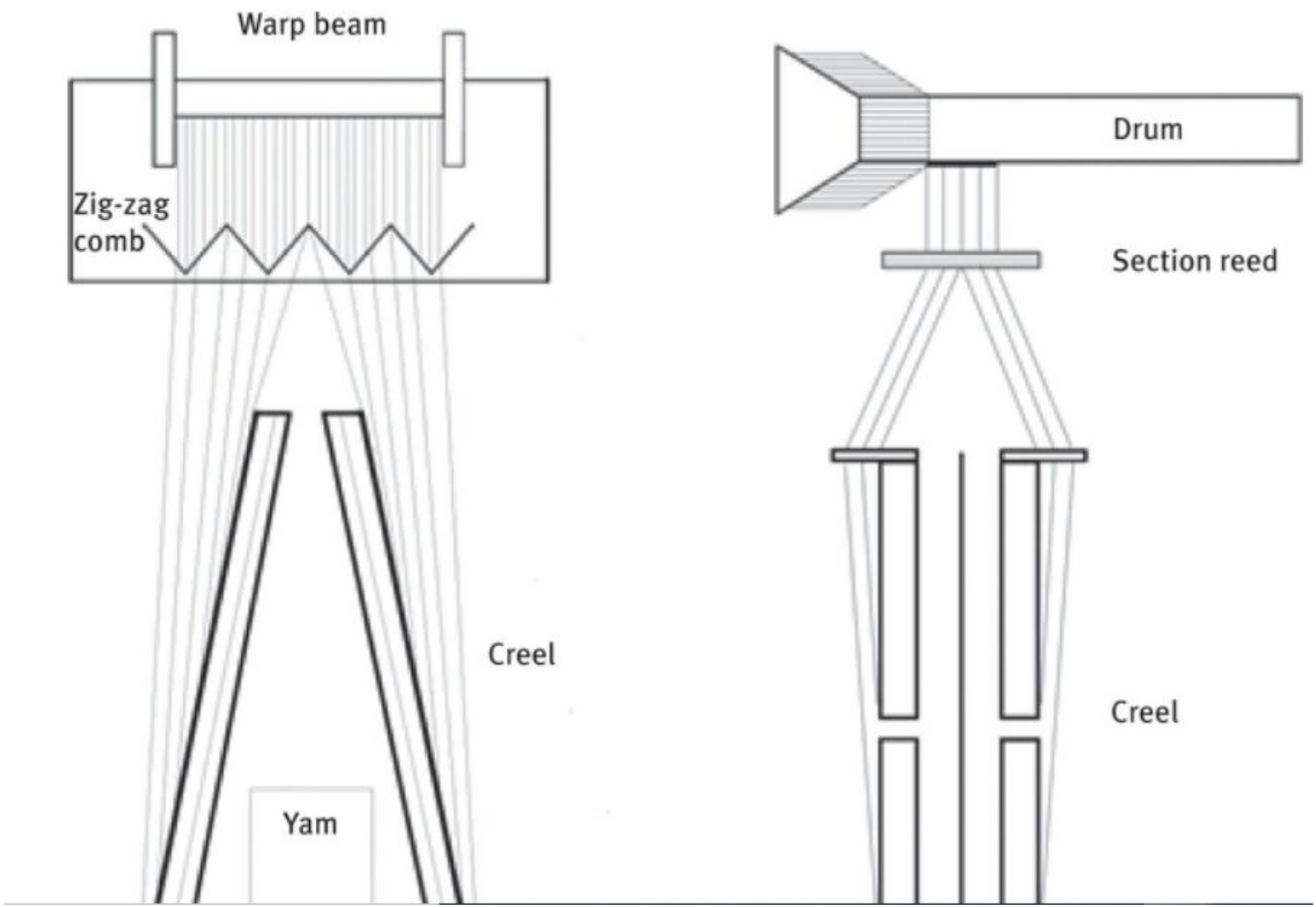
Warp beam
Zig-zag
comb
Creel
Yam
Drum
Section reed
Creel

Fig. 5

Direct and sectional warping machine schematic diagram (a) Direct warping machine, (b) Sectional warping machine

2.3 Sizing

Sizing, also termed as slashing is the coating of warp sheet with size solution. Weaving requires the warp yarn to be strong, smooth and elastic to a certain degree. There is always a friction between metallic parts and yarn during the weaving. So, the warp yarns need to be lubricated to reduce the abrasion. The application of size material helps to improve the mechanical properties of warp, reduce abrasion and the elasticity of yarn. The amount of sizing material relates to the tenacity, hairiness and linear density of yarn, and also to its behaviour during weaving. Another major objective of this process is to get the total ends on a weavers beam, combining the ends of all warp beams. The application of sizing material results in the following properties in yarn.

1. –

   High strength

2. –

   Low flexibility