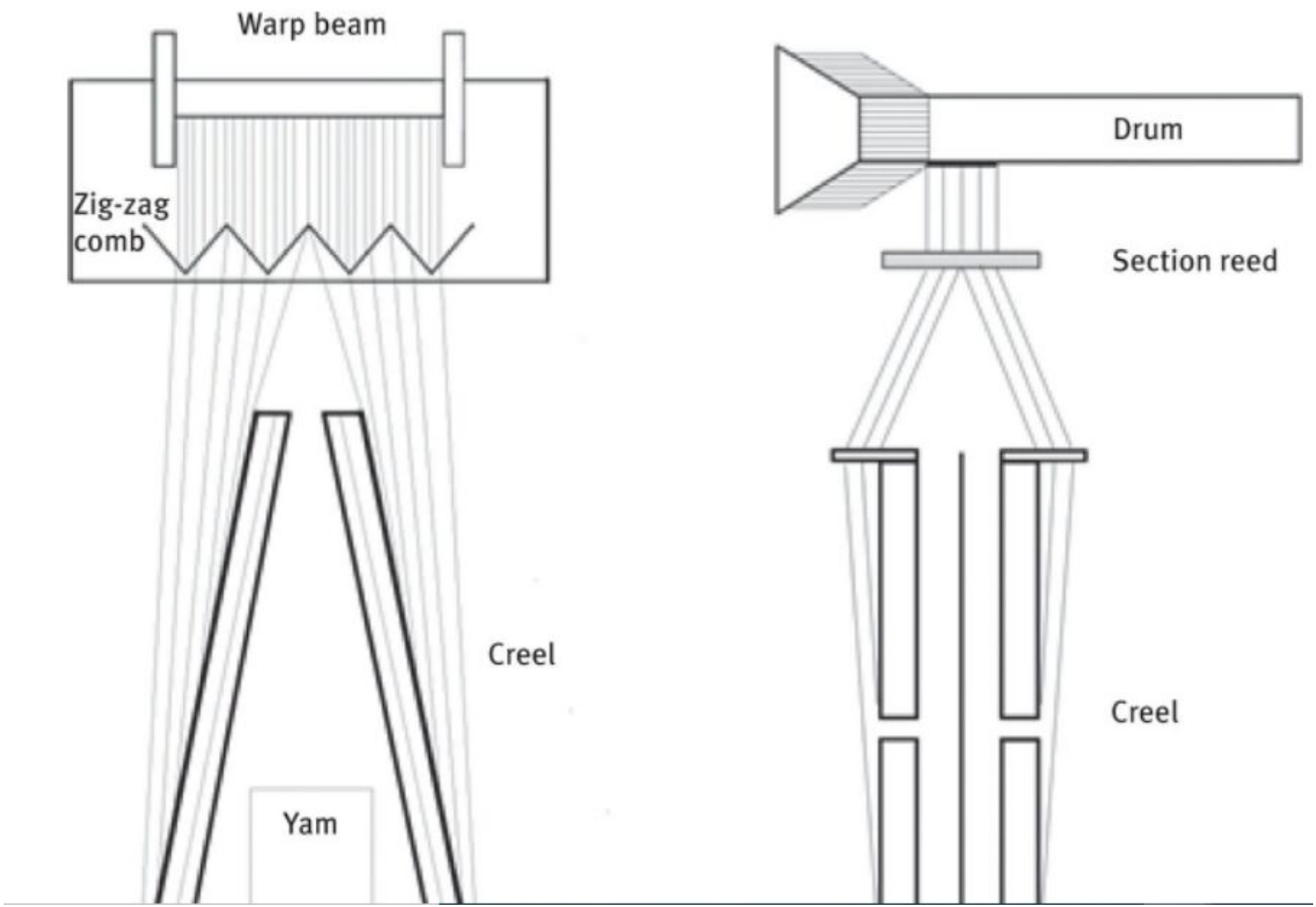
Warp beam
Zig-zag
comb
Creel
Yam
Drum
Section reed
Creel

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

Less hairiness

The process of sizing can be classified on the basis of method of application into conventional wet sizing, solvent sizing, cold sizing and hot melt sizing [3]. The main parts of conventional sizing machine include (Fig. 6) creel, sizing box, drying section, leasing section, head stock and size cooker.

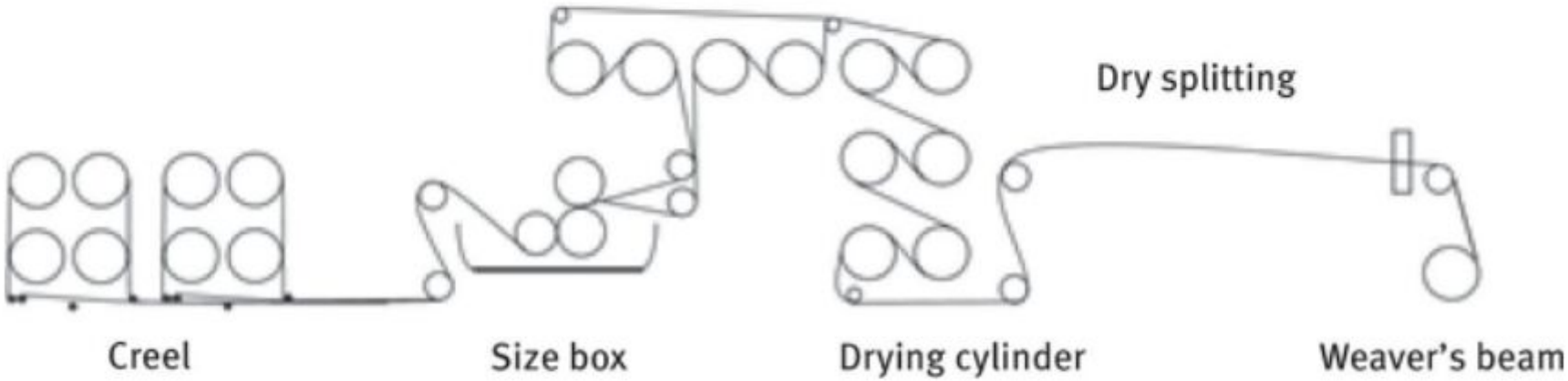

Fig. 6

Schematic diagram of conventional wet sizing machine.

In conventional wet sizing, the fundamental constituents of size recipe are the size materials and a solvent usually water. The sizing materials are broadly classified into three groups namely adhesives, softeners and auxiliaries [4].

The adhesives perform two functions; bind the constituent fibers of the yarn together and form a film over the yarn surface, resulting in increased strength, low hairiness and more even yarn. The adhesives are classified on the basis of origin into natural, synthetic and modified adhesives, produced by treating natural adhesives with certain chemicals. The natural adhesives may be obtained from plants or animals, for example maize starch, potato starch, etc. The chemical modification of natural adhesives is performed to induce the desired properties. Some common examples of modified adhesives are modified starches and carboxy methyl cellulose (CMC). The chemically synthesized polymers like poly vinyl alcohol (PVA) and acrylics fall under the category of synthetic adhesives. Starch adhesives are used most commonly because of low cost and environment safety.

The softeners are added in the size recipe to lubricate the yarn and reduce abrasion / friction between adjacent yarns and between yarns and loom accessories. They also give a soft handle to the warp and size film, helping to decrease its brittleness. The softeners may be in solid form (wax group) or liquid form (oil group) and are obtained from animals, vegetables or synthesized chemically. The auxiliaries include antiseptic, antistatic, weighting, swelling agents and / or defoamers. The sized fabric must be subjected to a desizing process prior to the finishing stage. Desizing has a decisive effect on the waste water load in textile production.

2.4 Drawing In

The sized warp sheet is wound on to a beam called as the weaver's beam. It has the required number of ends and the yarns have adequate strength to bear the tensions of weaving process on loom. This beam is either used for drawing in or knotting / tying, depending on the requirement (Fig. 7).

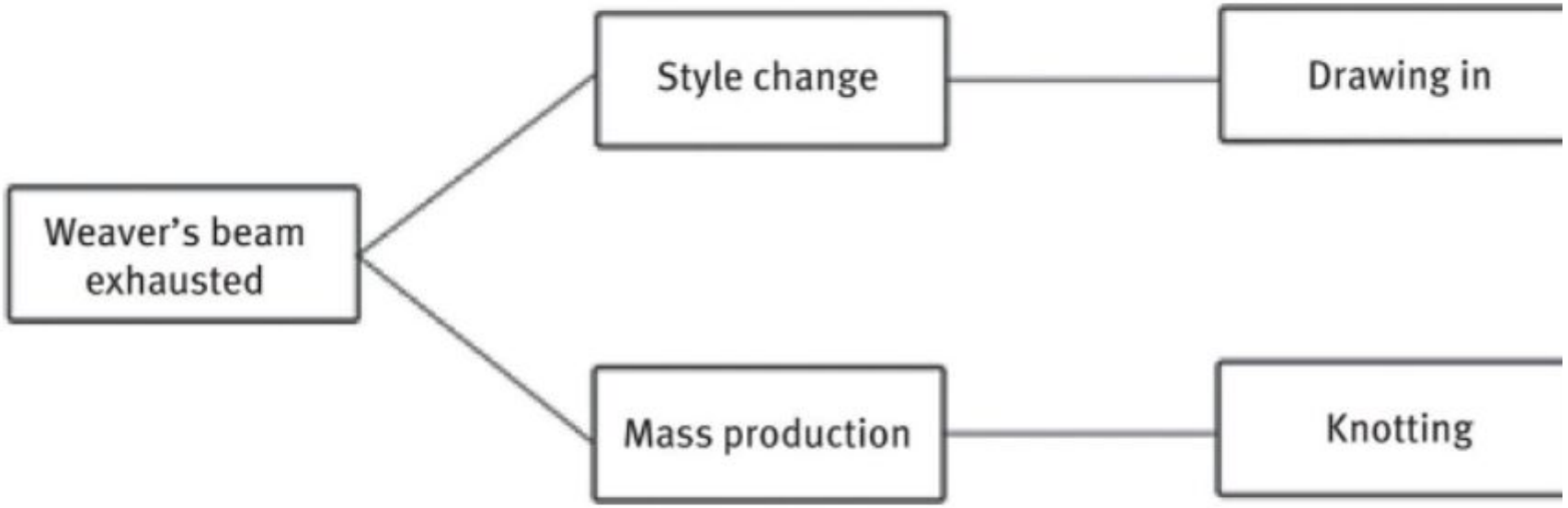

Fig. 7

Drawing in / knotting procedure.

Style change involves the production of a new fabric style, while mass production means to continue the weaving of same fabric style just replacing the empty beam with a full beam of same type. Drawing in is the process of entering the individual yarn of warp sheet through dropper, heald eye and the reed dent (Fig. 8). The yarns can be threaded wither manually or by using automatic machines.