1.1 Introduction

The process of producing a fabric by interlacing warp and weft threads is known as weaving. The machine used for weaving is known as weaving machine or loom. Weaving is an art that has been practiced for thousands of years. The earliest application of weaving dates back to the egyptian civilization. Over the years, both the process as well as the machine have undergone phenomenal changes. As of today, there is a wide range of looms being used, right from the simplest handloom to the most sophisticated loom.

In this range, the most widely prevelant loom, especially with reference to India, is the ubiquitous "plain power loom". In this and in the chapters that follow, the various mechanisms associated with the plain power loom are discussed in elaborate detail.

1.2 Basic Mechanisms in a Plain Power Loom

In order to interlace warp and weft threads to produce a fabric, the following mechanisms are necessary on any type of loom:

1. Primary mechanisms
2. Secondary mechanisms
3. Auxilliary mechanisms

1.2.1 Primary Mechanisms

These are fundamental or essentialmechanisms. Without these mechanisms, it is practically impossible to produce a fabric. It is for this reason that these mechanisms are called 'primary' mechanisms. The primary mechanisms are three in number.

a. Shedding mechanism
b. Picking mechanism
c. Beat-up mechanism.

a. Shedding mechanism

The shedding mechanism separates the warp threads into two layers or divisions to form a tunnel known as 'shed'.

b. Picking mechanism

The picking mechanism passes weft thread from one selvedge of the fabric to the other through the shed by means of a shuttle, a projectile, a rapier, a needle, an air-jet or a water-jet. The inserted weft thread is known as "pick".

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c. Beat-up mechanism

The beat-up mechanism beats or pushes the newly inserted length of weft thread (pick) into the already woven fabric at a point known as "fell of the cloth". These three mechanisms namely shedding, picking and then beat-up are done in sequence.

1.2.2 Secondary Mechanisms

These mechanisms are next in importance to the primary mechanisms. If weaving is to be continuous, these mechanisms are essential. So they are called the 'secondary' mechanisms. They are:

a. Take-up motion

b. Let-off motion.

a. Take-up motion

The take-up motion withdraws the cloth from the weaving area at a constant rate so as to give the required pick-spacing (in picks/inch or picks/cm) and then winds it on to a cloth roller.

b. Let-off motion

The let-off motion delivers the warp to the weaving area at the required rate and at constant tension by unwinding it from the weaver's beam. The secondary motions are carried out simultaneously.

1.2.3 Auxilliary Mechanisms

To get high productivity and good quality of fabric, additional mechanisms, called auxilliary mechanisms, are added to a plain power loom. The auxilliary mechanisms are useful but not absolutely essential. This is why they are called the 'auxilliary' mechanisms. These are listed below.

a. Warp protector mechanism

b. Weft stop motion

c. Temples

d. Brake

e. Warp stop motion (Predominantly found in automatic looms)

a. Warp protector mechanism

The warp protector mechanism will stop the loom if the shuttle gets trapped between the top and bottom layers of the shed. It thus prevents excessive damage to the warp threads, reed wires and shuttle.

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4. Weft stop motion

The object of the weft stop motion is to stop the loom when a weft thread breaks or gets exhausted. This motion helps to avoid cracks in a fabric.

5. Temples

The function of the temples is to keep the cloth and hold it at the same width as the warp in the reed, before it is taken up.

6. Brake

The brake stops the loom immediately whenever required. The weaver uses it to stop the loom to repair broken ends and picks.

7. Warp stop motion

The object of the warp stop motion is to stop the loom immediately when a warp thread breaks during the weaving process.

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