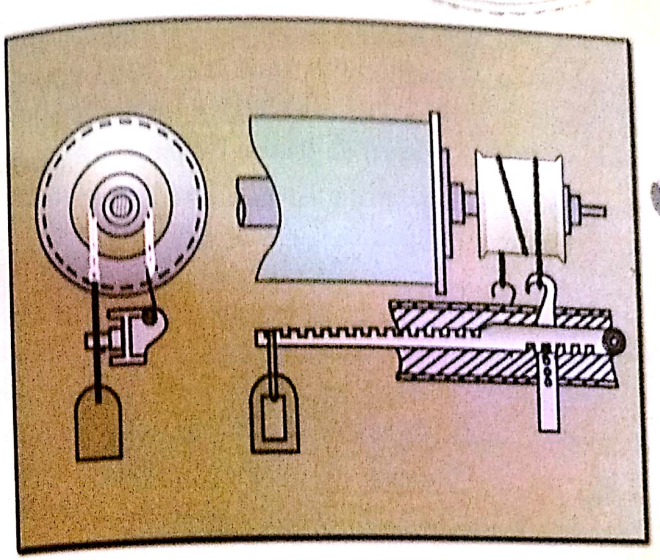
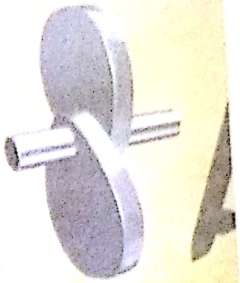
6. Let-off Motion

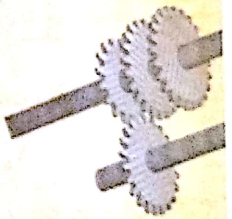


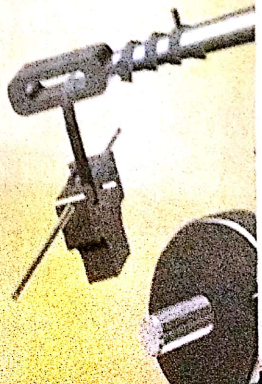


Learning Objectives

After completing a study of this chapter, you will be able to:

- State the objects and types of let-off motions
- Describe the working of negative let-off motion
- State the advantages and defects of negative let-off motion
- Explain the frictional forces in negative let-off motion
- Describe the working of oscillating backrest
- Describe the various types of positive let-off motion.





6.1 Objects of Let-off Motion

1. To maintain the necessary tension in the warp sheet right through its consumption in weaving from the full beam stage to the empty beam stage.
2. To regulate the amount of warp yarn delivered by the warp beam during weaving.
3. To influence the number of picks per inch in a fabric, this being subsidiary to the take-up motion.

6.2 Types of Let-off Motion

There are two types of let-off motion. These are:

1. Negative let-off motion
2. Positive let-off motion.

1. Negative let-off motion

In the negative let-off motion, the warp beam is not driven positively. The beam is driven by the dragging of the cloth and the warp sheet by the take-up motion. The warp tension and delivery of warp are controlled by using a weight-and-lever system. However, this system does not give uniform delivery and adequate control over warp tension.

2. Positive let-off motion

In the positive let-off motion, the warp beam is positively driven through a gear drive. Only in this let-off motion, warp tension and delivery of warp are controlled uniformly from the full beam stage to the empty beam stage during the weaving process.

6.3 Negative Let-off Motion

Negative let-off motions are generally the following:

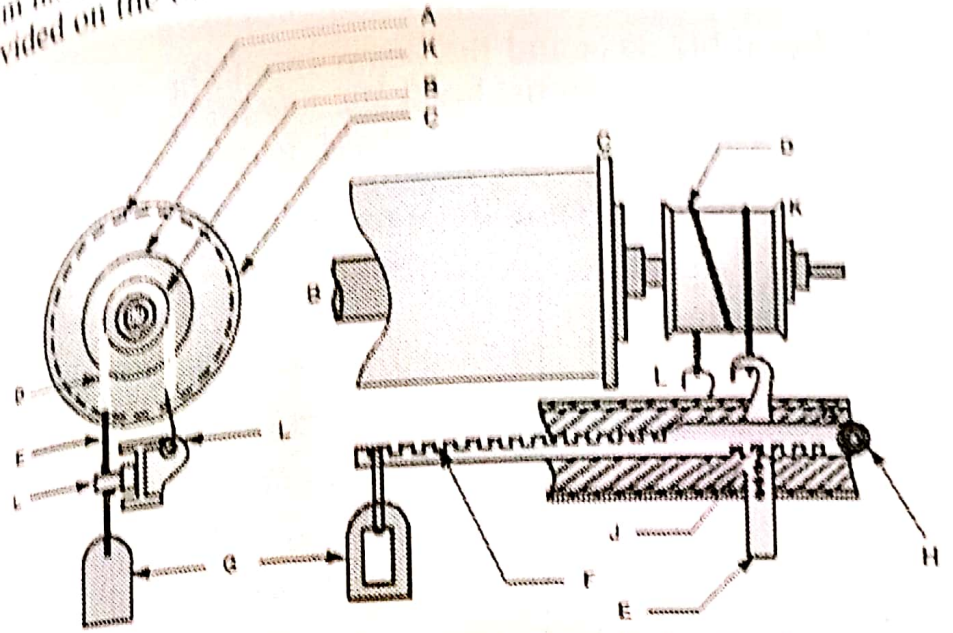
1. Brake let-off motion
2. Frictional let-off motion and
3. Rope or chain, lever and weight let-off motion.

6.3.1 Construction and Working

Construction

Figure 6.1 shows the right-side view of the negative let-off motion. A weaver's beam A has a beam barrel B and flanges C at its ends. Only one flange is shown in the

figure. The other flange is at the left-hand side of the beam. The distance between the two flanges can be adjusted to suit the required width of the warp sheet. Next to the flange is ruffle K, over which a chain D is wound. The warp beam is held in a horizontal position by two beam brackets, which are connected to the side frame of the loom. One end of the chain is connected to the loom tail at L and the other end is wound about 1 ½ to 2 rounds on the ruffle and is connected to a hook E. The hook E is connected to a long lever F by means of a pin J resting in one of the notches in the lever F. The lever F is fulcrumed at H. A weight G hangs on the lever. The beam flanges vary from 12 inches to 18 inches in diameter. A similar arrangement is provided on the other side of the warp beam.



A - Weaver's beam
B - Beam barrel
C - Flange
D - Chain
E - Weight lever hook
F - Long weight lever
G - Dead weight
H - Fulcrum
J - Pin
K - Ruffle
L - Chain connection to loom bottom rail

Figure 6.1 Negative let-off motion

In the CD-ROM, watch Animation No. WFP - I 6.1

Working

The let-off motion works by the pulling action of the take-up motion. As the cloth roller rotates, it pulls the warp sheet from the weavers beam. When the loom is in operation, the diameter of the weaver's beam is gradually reduced. If the weight on the lever is kept at a fixed position, the tension on the warp sheet can increase considerably. This causes shuttle-trap, variation in picks per inch and warp breakages. To maintain uniform tension and avoid the above defects, the following ways can be adopted:

i. Decreasing the amount of weight on the lever

ii. Altering the position of the weight on the lever

iii. Changing the position of the pin on the lever

iv. Increasing or decreasing the number of turns of chain around the ruffle.

The second method is usually adopted to reduce tension in the warp sheet as the diameter of the warp beam decreases. The other two methods are practically impossible. Whenever the weight is moved towards the fulcrum of the lever, warp tension is reduced. The weaver does this. Shifting of weights on the levers should be done simultaneously on both sides of the beam, or else irregular tension will develop in the warp sheet. Since the weaver moves the dead weights manually, the tension on the warp may not be regulated evenly. The let-off motion is a negative let-off motion as it comes into operation as a result of the take-up motion.

Settings

1. The beam brackets are adjusted so that the beam is parallel to the floor.
2. The distance between the beam brackets and the beam should be 2 mm so as to have smooth rotation of the beam between the brackets. See Figure 6.2.
3. Usually the chain is wound to 1½ coils on the ruffles.
4. The chain, the weights and weight levers should not touch the floor.

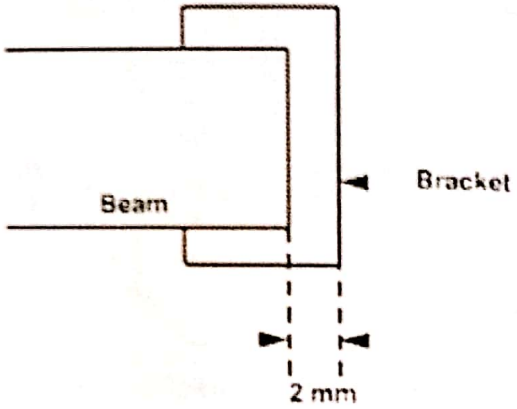


Figure 6.2 Setting between the beam and the beam bracket

5. The chain should not be in a twisted state.
6. The weight should be placed on the weight lever according to the beam diameter.
7. The chain should not touch the ends of the ruffle.

6.3.2 Advantages

i. A negative let-off motion is simple in construction and cheap.

ii. It is useful for light and medium weight fabric.

iii. It facilitates the weaving of tender warp.

6.3.3 Defects

1. Tension in the warp cannot be kept uniform since the weights are moved manually.

2. Due to irregular tension in the warp sheet, shuttle-trap, variation in picks per inch and warp yarn breakages may occur.
3. There is difficulty in regulating the tension in the warp sheet during start up.

6.3.4 Precautions to be Taken when a Weaver's Beam is Gaited upon the Loom

1. The ruffles should be examined. They should have a smooth surface and should be cleaned before winding the chain.
2. The beam should be kept parallel to the floor. By adjusting the side brackets and using a sprit-level this can be achieved.
3. The weight should act against the rotation of the beam. The winding coils should be in the correct direction, that is, the winding direction of the chain is opposite to the unwinding direction of warp from the beam.
4. Jerky unwinding of warp beam should be avoided. Lubricants can be used. Graphite powder for the chains and chalk powder for ropes are generally used as lubricants for the purpose.
5. There should not be any twist in the chain. It should be free from damaged links.

back rest