1.10 Electronic Dobby

In the earlier chapter we discussed the different types of dobbies operating on the mechanical selection principle in which the selection is made by conventional feelers and punched cards. Mechanical selection has the following disadvantages:

1. A separate card-punching activity is required and this is a time consuming process.
2. In the long run, plastic cards may get damaged and lead to wrong selection.
3. Though the mechanical selection device is precisely built it may not be reliable for the high-speed shuttleless looms.
4. When compared to the conventional mechanical lattice selection system, the plastic pattern card system is advantageous in terms of higher number of picks per repeat. But for creating elaborate cross-border designs this system is unsuitable.

The electronic dobby overcomes the above disadvantages. It is of two types:

1. Electronic Negative Dobby (Lever Dobby)
2. Electronic Positive Dobby working on the rotary principle.

1.10.1 Electronic Negative Dobby

This is a negative cam-dobby in which electronic devices and a special programme select the heald frame. The principle of this dobby is illustrated in Figure 1.23. It is similar in construction to a negative cam dobby. The lifting jacks are connected to a baulk lever by means of a

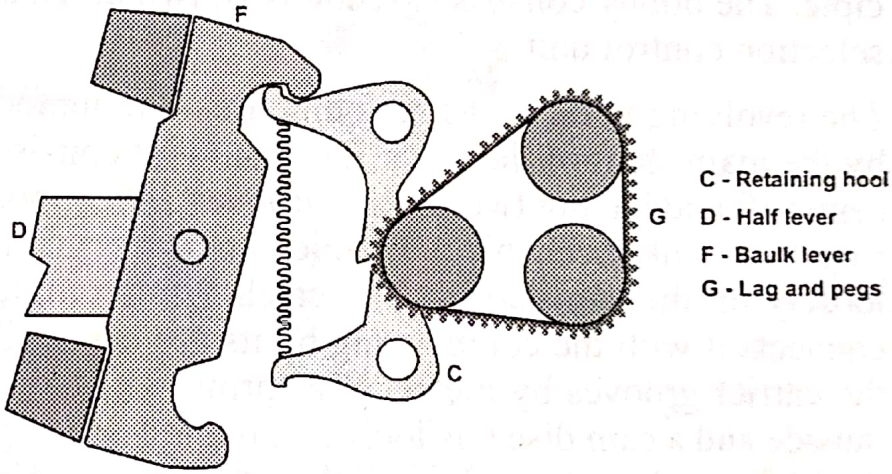


Figure 1.23 Development in mechanical dobby

small link and a half-lever. The baulk lever is activated to move to and fro by push bars which are driven directly by complementary cams. The retaining hook selects the hinged hooks of the baulk lever by an electromagnet that is either charged or not, depending upon the selection programme. With minimum pivots, smooth working movements and high accuracy in selection this concept enables this machine to run at high speed without vibration.

In some models, the selection is made by mechanical principle, where lags and pegs are used instead of an electromagnet for selecting the retaining hooks, as shown in Figure 1.24.

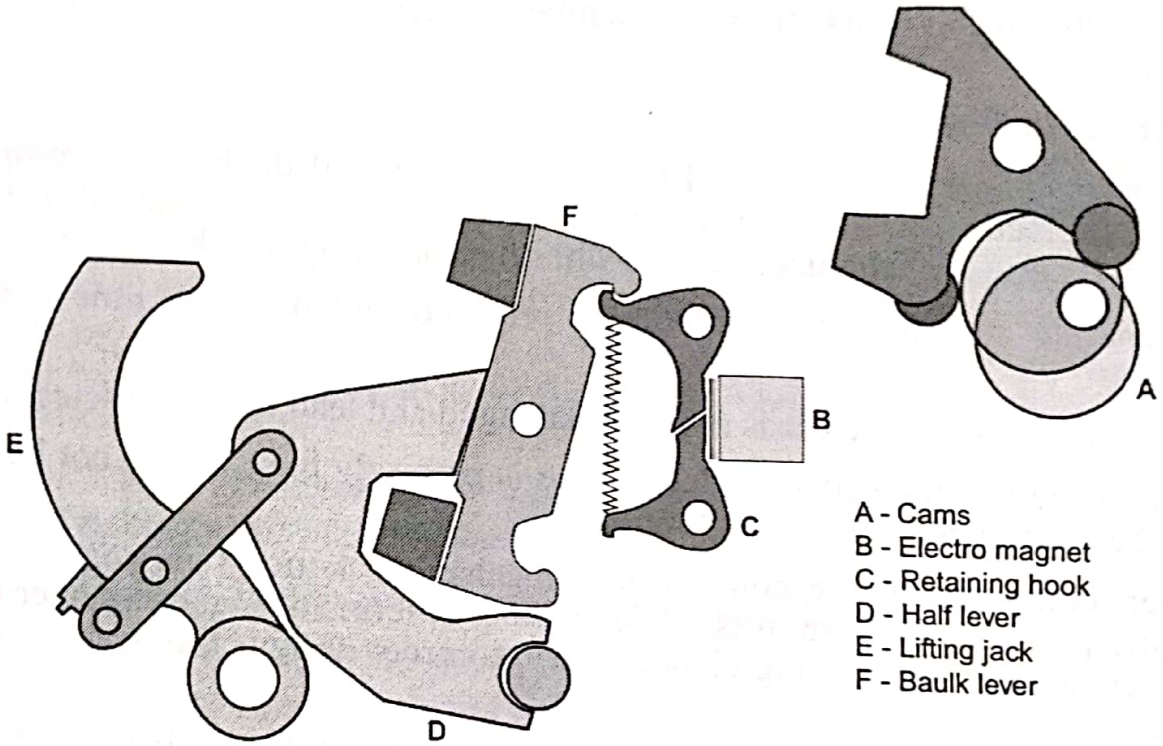
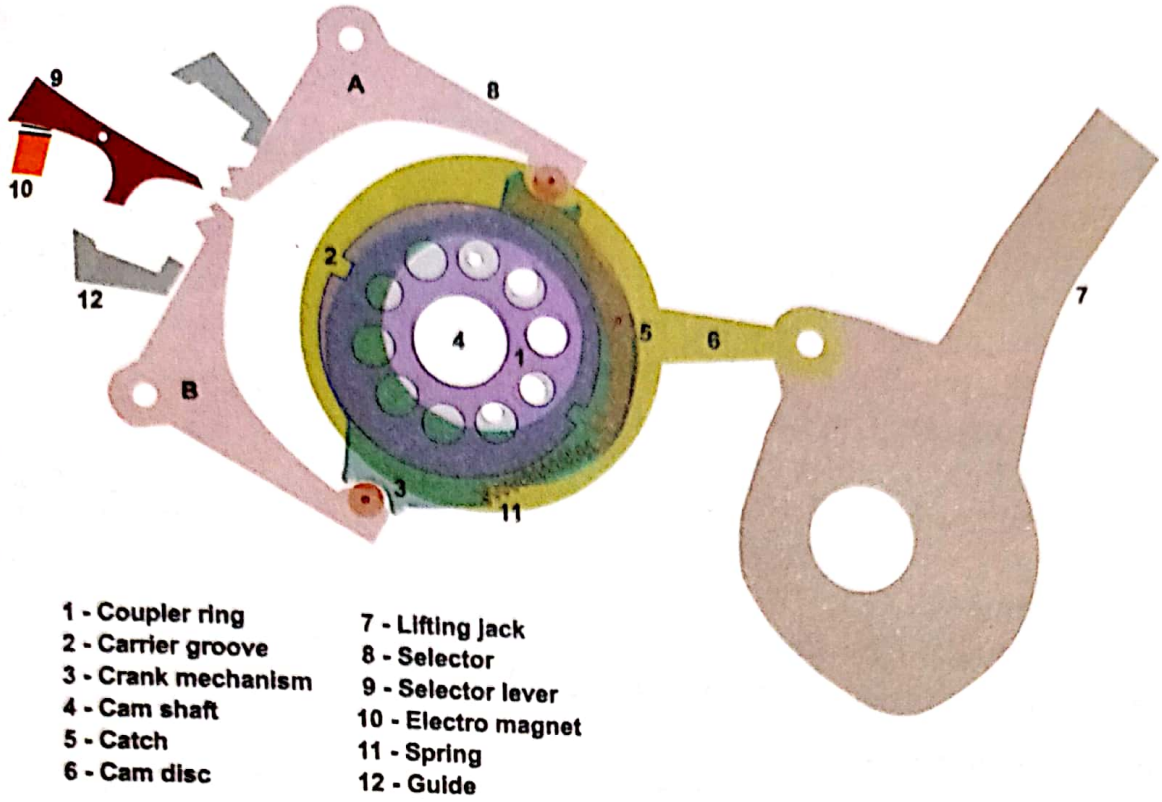


Figure 1.24 Electronic negative dobby

1.10.2 Electronic Dobby - the Positive Rotary Principle

This high performance electronic rotary dobby operates according to the rotary principle. The dobby consists essentially of two units, a cam unit and an electromagnetic selection control unit.

The revolving parts of the cam unit are all mounted on the camshaft which is driven by the main shaft of the loom. The cam unit consists of a coupler ring 1 keyed to the camshaft and having two-carrier grooves 2 on opposite sides. Adjacent to the coupler ring is a crank mechanism 3, which encloses a cam with ball bearings and mounted loosely on the camshaft 4. The catch 5 fulcrummed at the outside of the cam unit connects it with the coupler ring by its projection always being engaged with one of the carrier grooves by means of a spring. The cam in the crank mechanism projects outside and a cam disc 6 is loosely mounted on the projection. The cam disc activates the lifting jack 7, depending on the position occupied by the cam inside the cam



1 - Coupler ring
2 - Carrier groove
3 - Crank mechanism
4 - Cam shaft
5 - Catch
6 - Cam disc
7 - Lifting jack
8 - Selector
9 - Selector lever
10 - Electro magnet
11 - Spring
12 - Guide

Figure 1.25(a) Elecronic dobby In the CD-ROM, watch Animation No. WFP - II 1.11

disc. There are thus three discs arranged in three layers side by side on the camshaft. Among these three plates only the coupler ring gets the direct drive from the camshaft while the rotation of the other two discs depends upon the engagement of the catch with any one of the carrier grooves. If the catch is engaged with a groove, the cam unit and the cam disc will rotate along with the coupler ring. The 180° rotation of the cam causes a lifting or lowering of the heald frames.

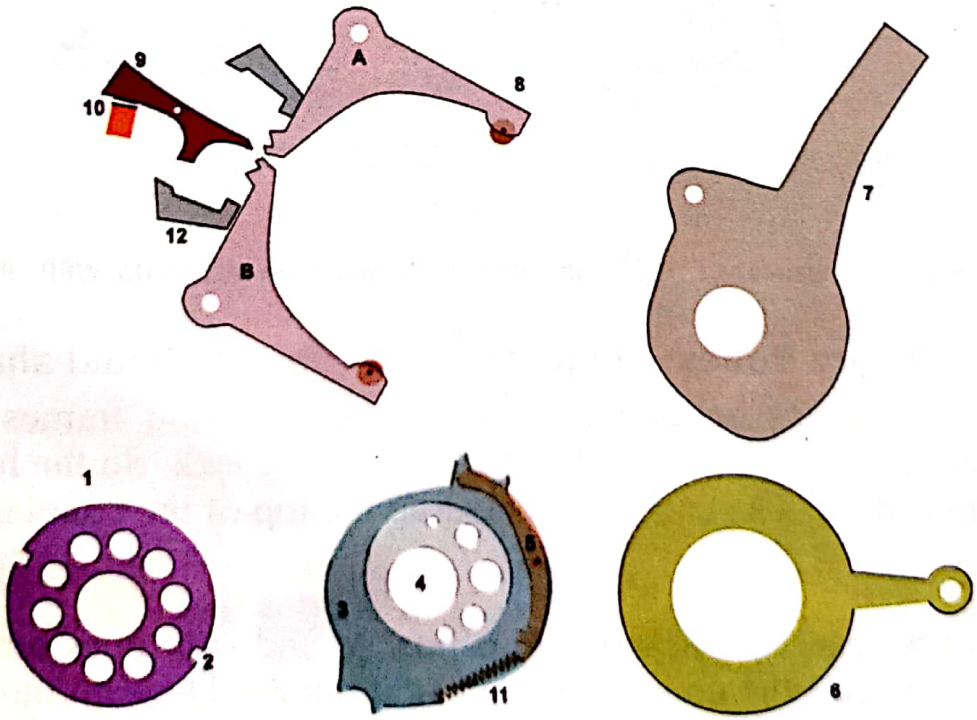


Figure 1.25(b) Electronic dobby - the parts

The electromagnetic selection unit consists of two selectors 8 which are activated by the selector lever 9 fulcrummed at the middle. The position of the selector lever is altered by the attraction of electromagnet 10. A combined oscillatory movement is given to both the selector lever and the electromagnet by the matched cams. When the selector lever moves down along with the electromagnet, which if it is in a charged state, it pushes the selector A. Alternatively, it pushes the selector B if it is not charged. As a result, the catch is released from the coupler ring or engages with it depending on which selector is pushed by the selector lever. All the elements discussed so far are involved in the lifting or lowering of one heald frame.

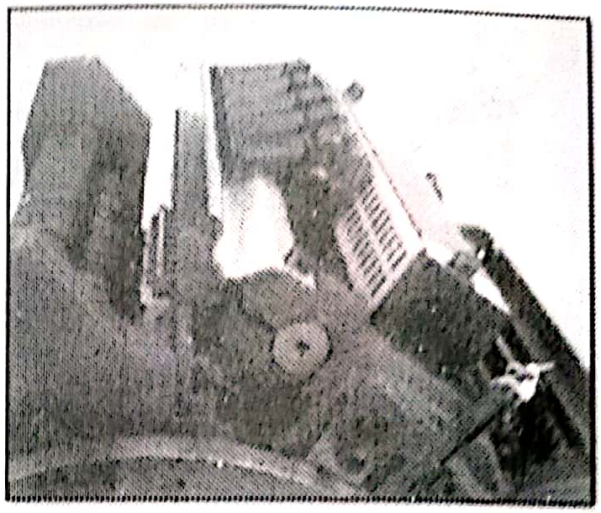


Figure 1.26 Elecromagnetic selection unit

1.10.3 Motion to the Heald Shaft

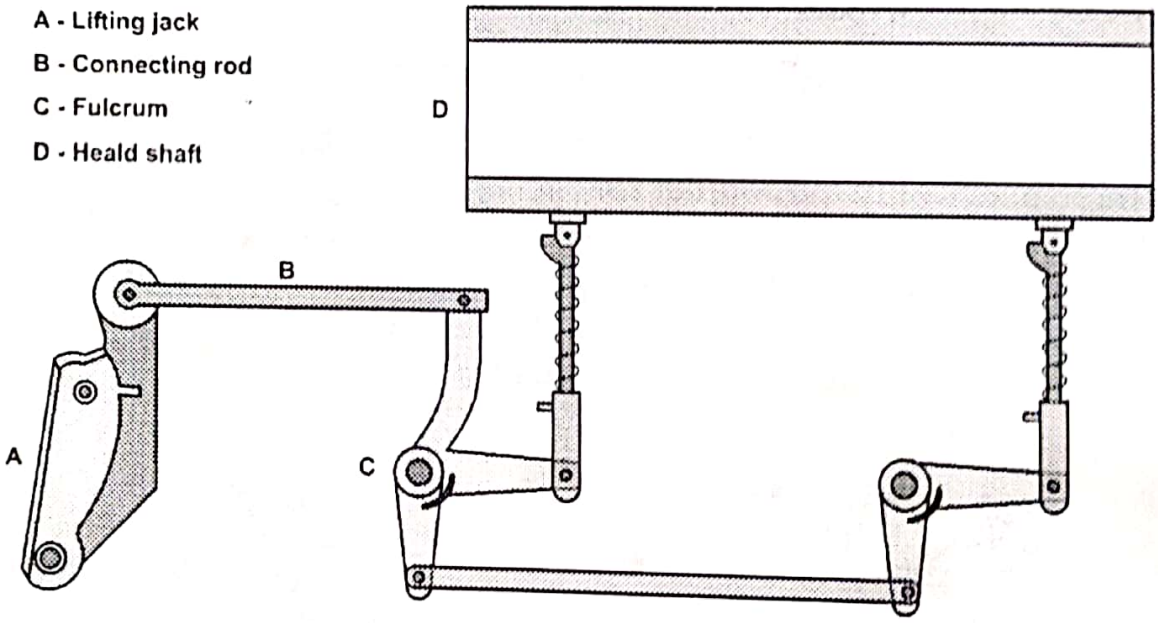


Figure 1.27 Motion to heald shaft In the CD-ROM, watch Animation No. WFP - II 1.12

1.10.4 Electronic Rotary Dobby - Sequence for lifting the heald shaft

The sequence of operations necessary for selecting the heald frames is discussed below. The higher throw of the cam is towards the lifting jack. So the heald frame is in the lower shed position. The catch is located on the top of the coupler ring.

Sequence 1

The electromagnet is charged - Selector A is pushed and so it does not activate the catch - The catch connects the coupler ring and cam unit - The cam unit gets a 180° rotation - The higher throw of the cam moves to the bottom - The heald frame is

lifted - The catch is moved to the bottom position which can be activated only by the selector B.

Sequence 2

The electromagnet is charged - Selector A is pushed - The bowl on selector B hinges the catch which is thus released from the groove on the carrier ring - Only the coupler ring rotates - The cam unit is retained in the same position - And hence the heald frame is still in the top shed position.

Sequence 3 and 4

In Sequences 1 and 2, if the magnet is not charged, only selector B is activated. Hence the action is totally reversed in both the cases and the heald frames will be retained in the bottom shed position, or shifted from the top to the bottom position.

It is clear from the above sequence of operations that by charging the electromagnet the heald frames will be either retained at the top shed position or moved from the bottom to the top shed position.

If the electromagnet is not charged the heald frames will be either retained in the bottom shed position or shifted from the top to the bottom shed position

1.10.5 Programming Possibilities for Dobby Weaving

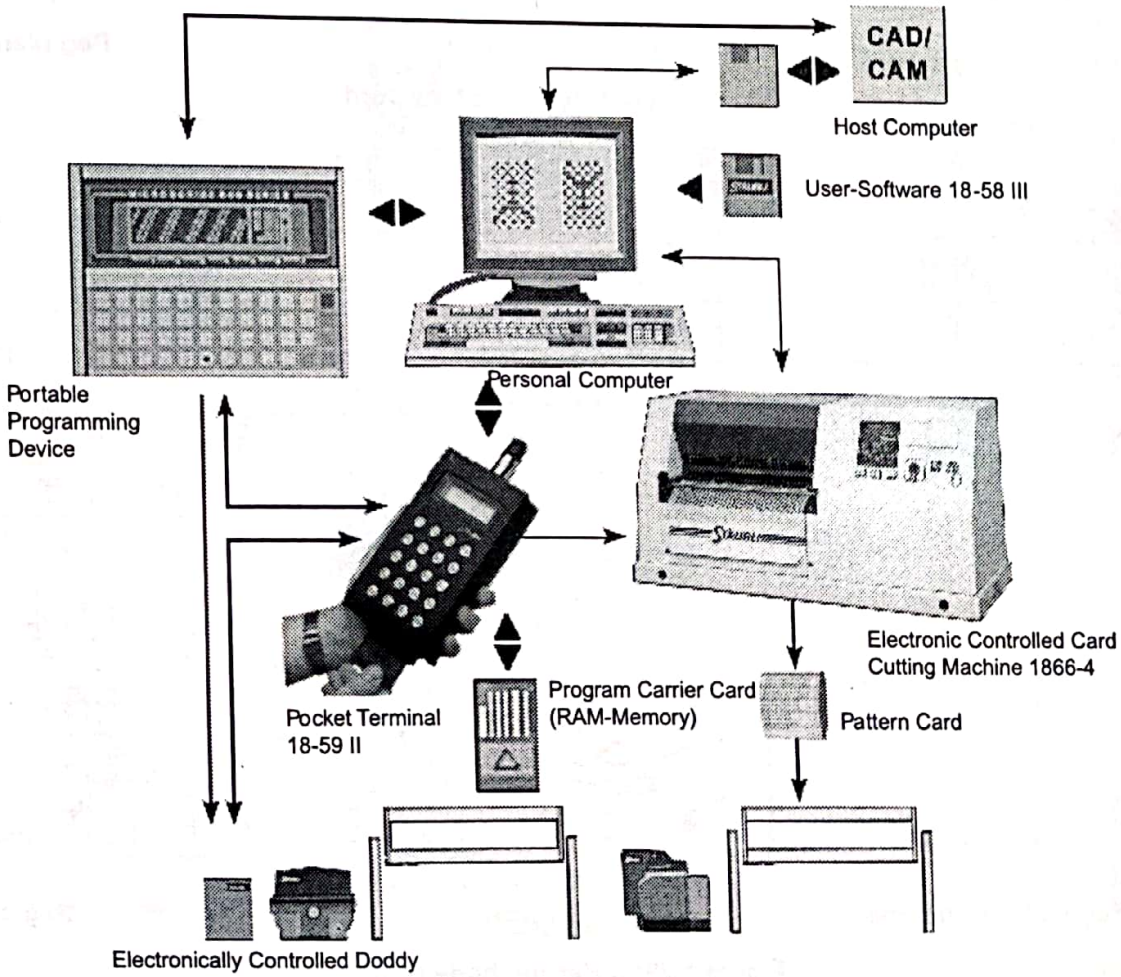


Figure 1.28 Programming possibilities

The programming system for a dobby creates a weave programme for both electronic and card-controlled dobbies. Only the common languages are used along with specific weaving terminology. There is absolutely no need for special knowledge or skills in data processing or electronics on the part of the user.

A portable programming device or pocket device is used to permit direct access to the data stored in the control unit. For the use of card-controlled dobbies, the electronically controlled card-cutting machine is designed as a desktop model. It contains a RAM memory into which the weaving programme for producing the pattern cards can be entered in various ways.

1.11 Dobby Design Structures

A number of dobby designs are illustrated in Figure 1.29.

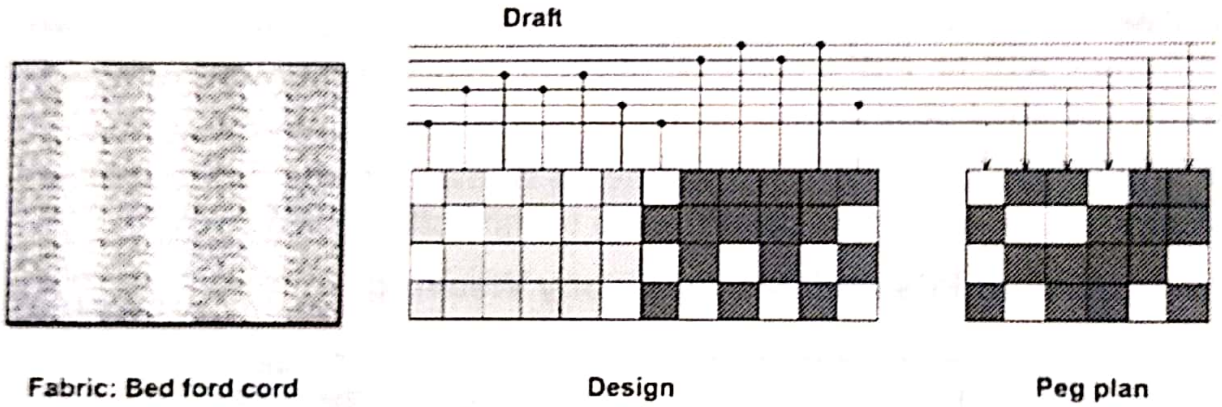


Figure 1.29(a) Bedford Cord

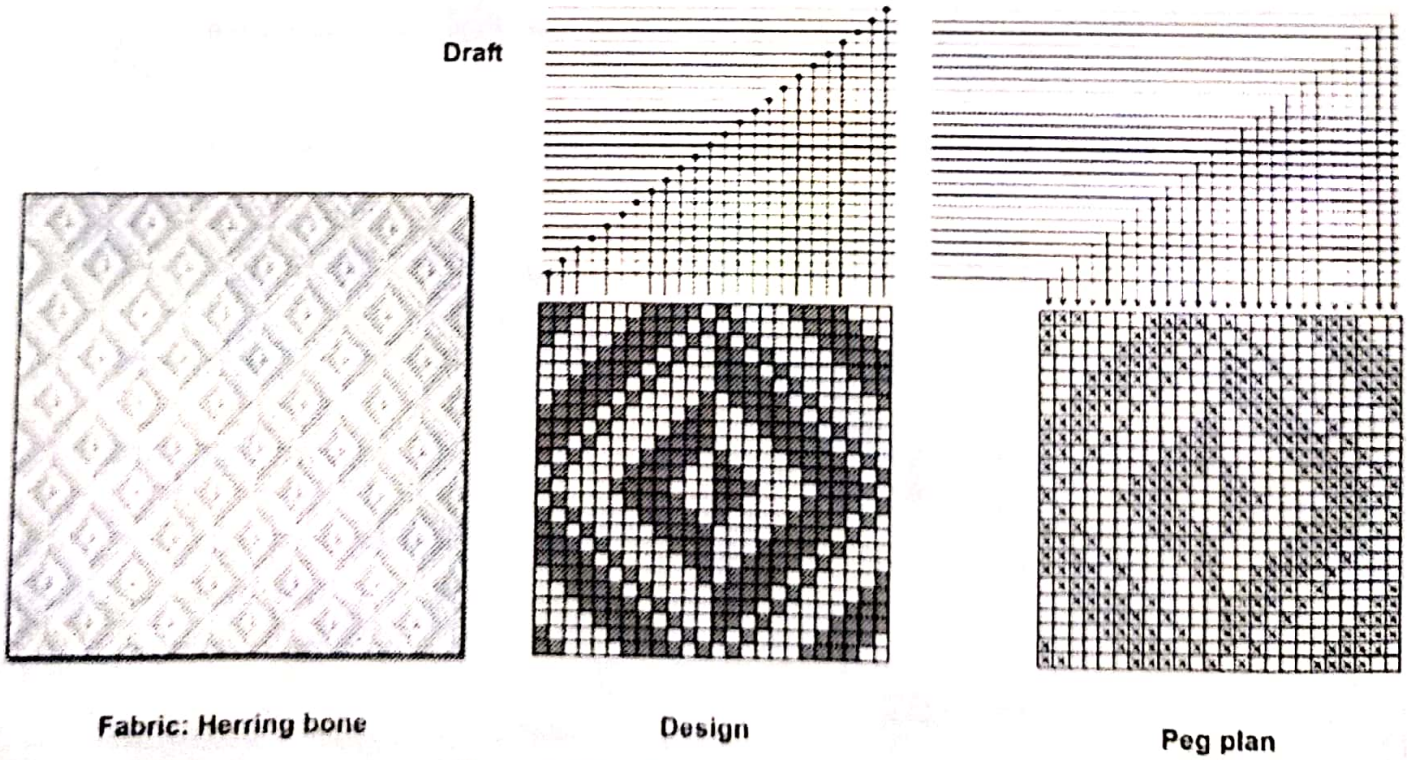


Figure 1.29(b) Herring bone twill

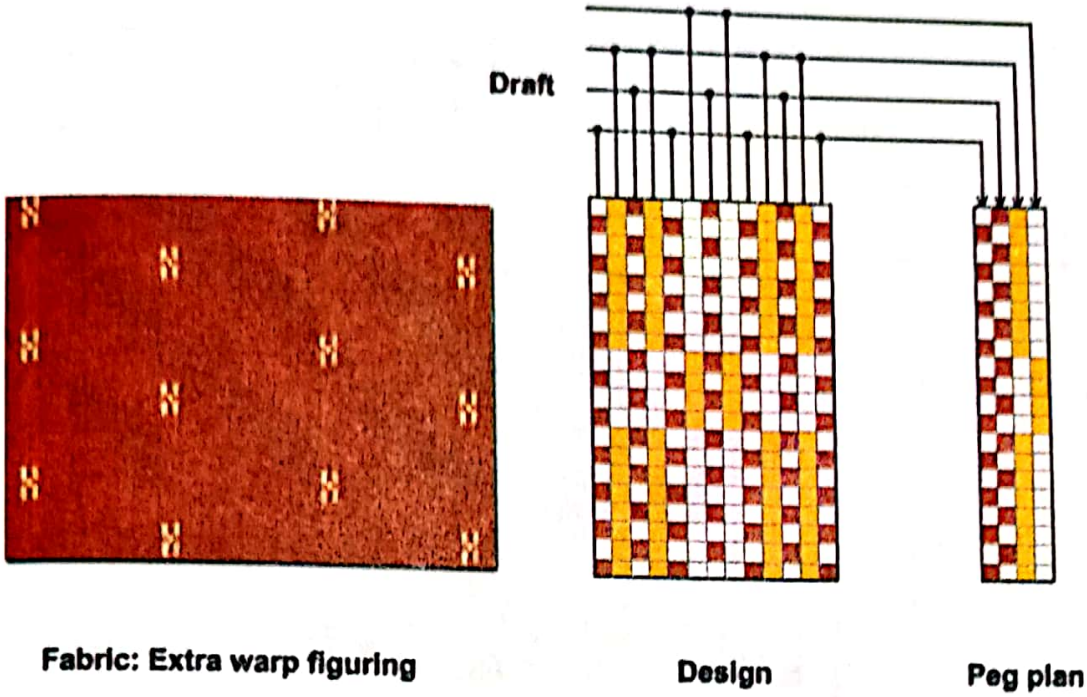


Figure 1.29(c) Exta warp figuring

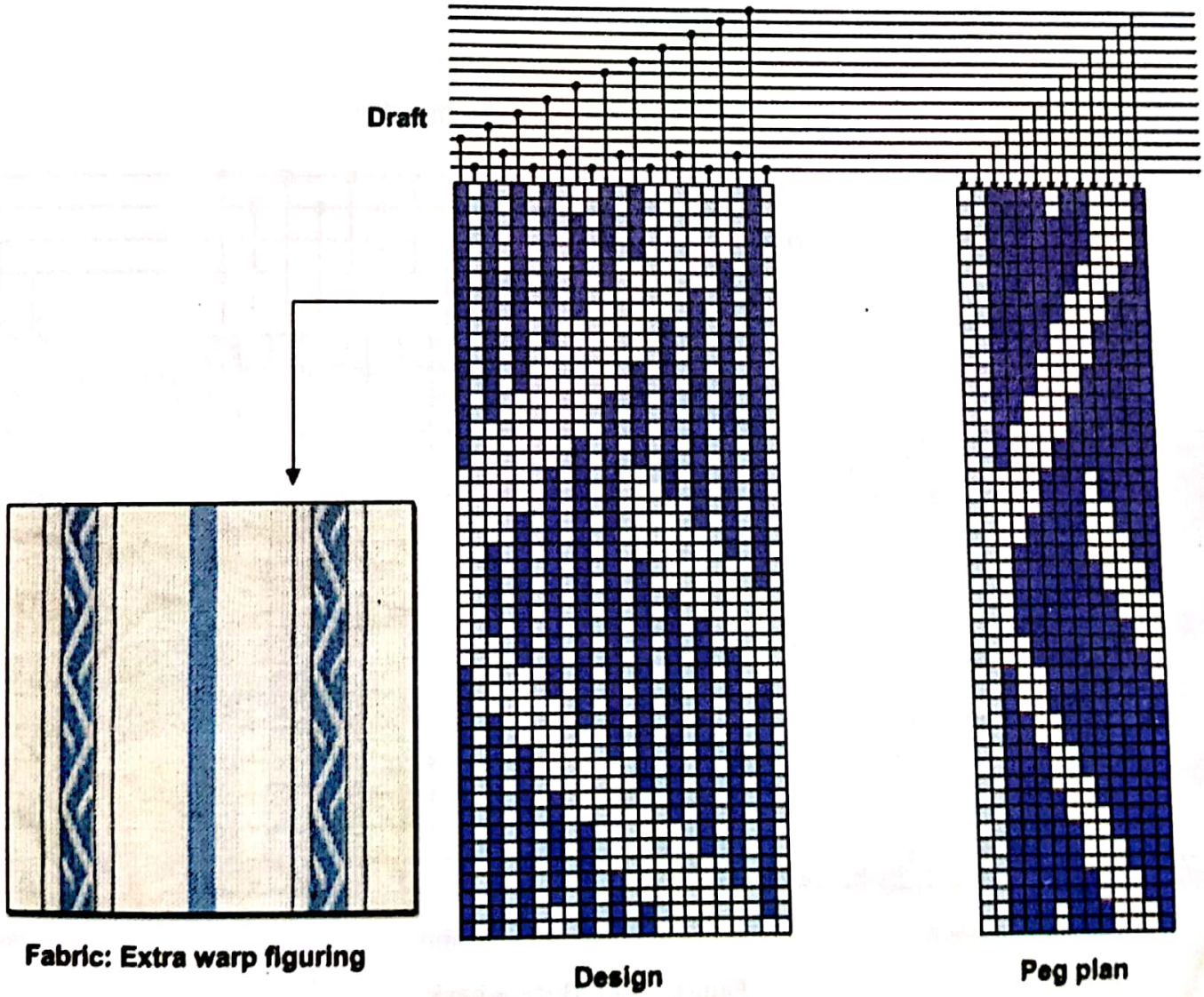


Figure 1.29(d) Exta warp figuring

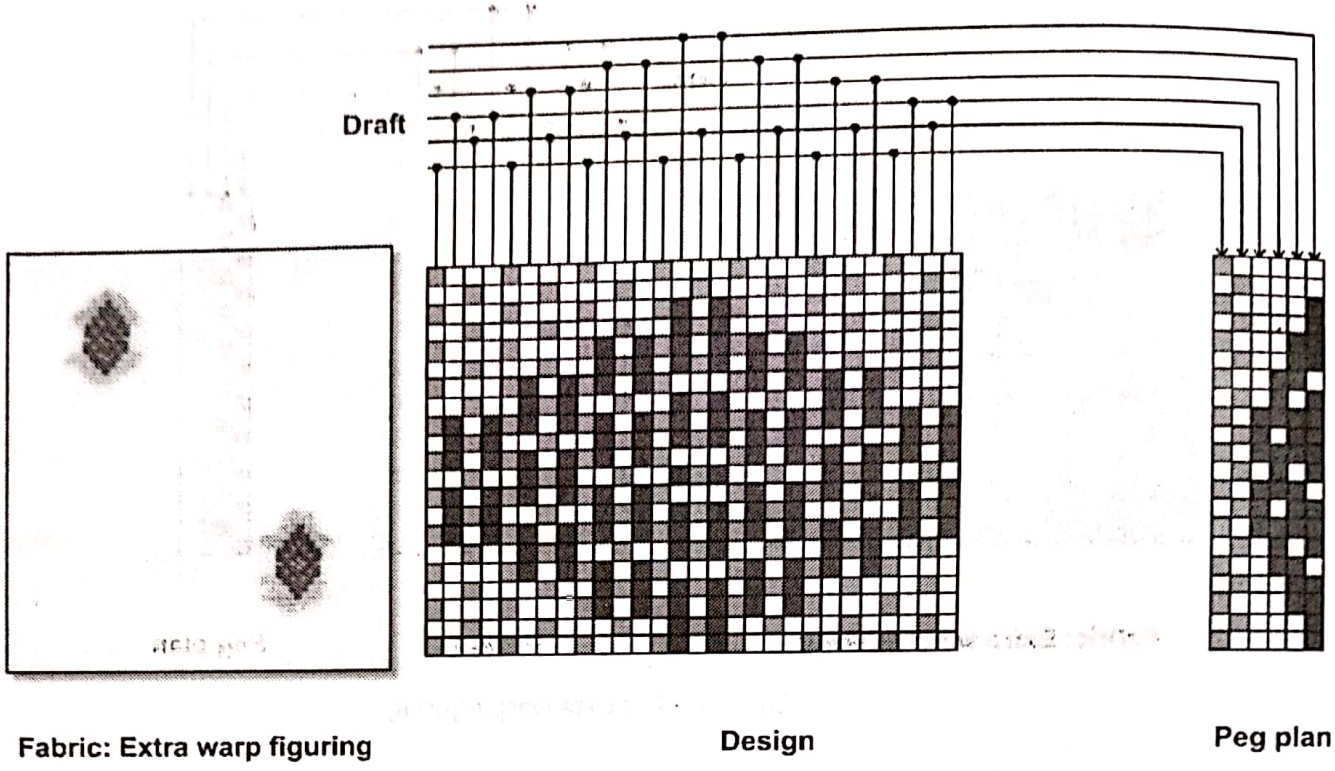


Figure 1.29(e) Extra warp figuring

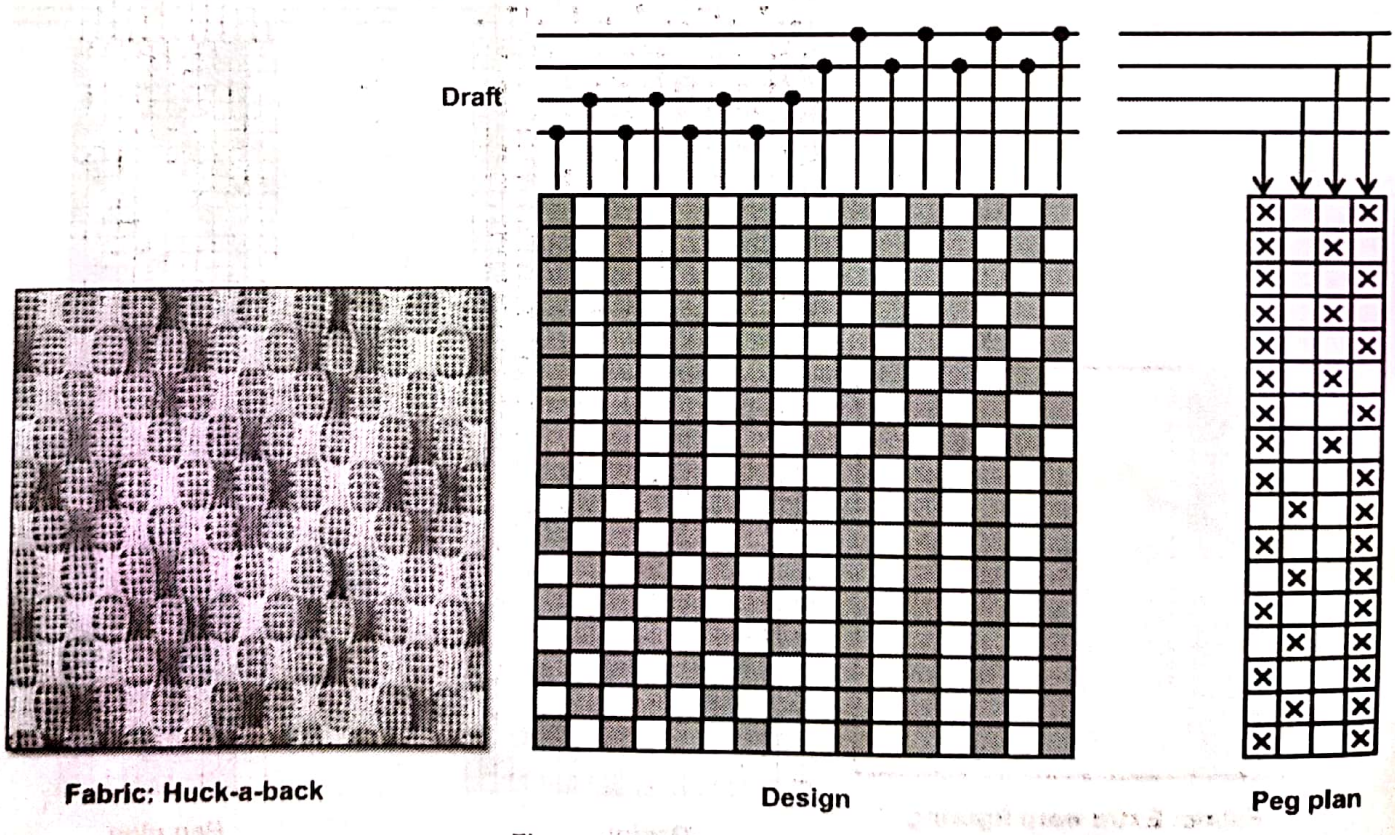
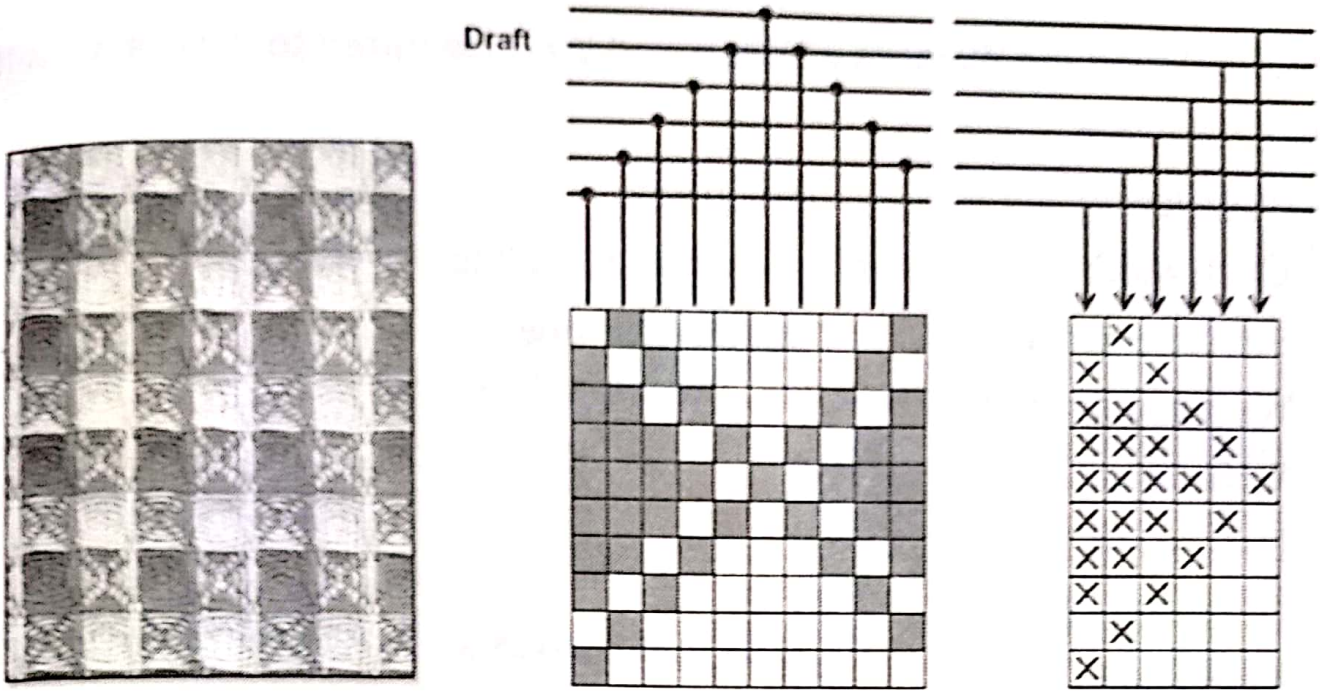


Figure 1.29(f) Huck-a-back

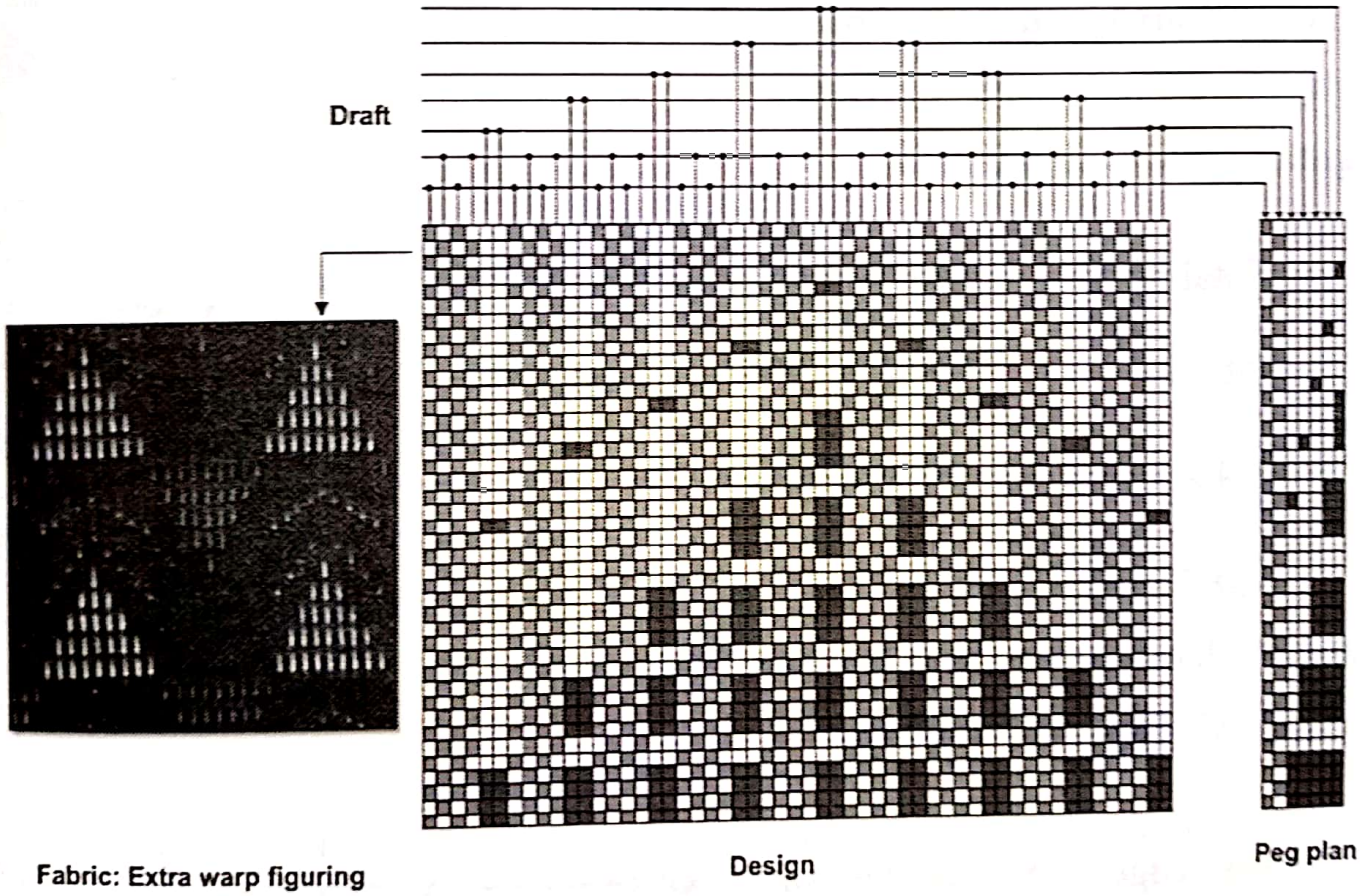


Fabric: Honey comb

Design

Peg plan

Figure 1.29(g) Honey comb



Fabric: Extra warp figuring

Design

Peg plan

Figure 1.29(h) Extra warp figuring