

## Chapter 3

### PROFILE OF THE CAR FABRIC INDUSTRY

#### Preface

In the part decade, SSK Group Holding Co., Ltd. (SSK) under the company name Carpet Manufacturing Company Limited (CMC) started carpet production to serve demand in both domestic and export market. This factory has manufactured wide range of carpet products also car carpet. Based on the fact that most of the automobile assemblers have already been expanding their capacities, many part suppliers including the upholstery have to be geared up their operations to serve future requirement of their products likewise.

Accordingly SSK foresees an opportunities to maximise the utilization of their resources by expanding car carpet products. Due to a very competitive market situation, CMC with its present market share of about 15% of the automotive molded carpets is in good position to capture sizable market of the molded carpet market and venture into other automotive interior product lines. To realize this objective, CMC must improve its product quality up to the international standard by seeking technical assistance from a reputable carpet company which can provide know-how of other automotive product lines besides molded carpets. With respect to the foreseeable investment opportunity, CMC has recently signed a joint venture agreement with Kasumi Textile Co., Ltd., one of Japan's leading interior fabric manufacturers. Basically most of the automobile assemblers have already been expanding their capacities with the objectives of meeting the steady growth of the domestic demands.

*Remark : SSK Group Holding Co., Ltd. , Carpet Manufacturing Co., Ltd., and Kasumi Textile Co., Ltd. are the simulated company name for this study case.*

### Kasumi Textile, Japan

The history of Kasumi Textile Co., Ltd. could date back more than 80 years since first foundation in Osaka, Japan. Kasumi is at present the famous carpet and interior decoration manufacturer in Japan. Also Kasumi has been supplying seat fabric and carpet for automotive industry as a pioneer for more than 35 years.

### **Car Fabric Industry Background : TFU Company History**

The growth of the economy of Thailand has expanded with continuous rate for many years. It has created interest in foreign investors which causing the industry to expand rapidly, especially the automotive industry. To meet with the expanding motorization in Asian countries and customer's higher demands, *Thailand Fabric Upholstery Co., Ltd. (TFU)* was established to take this excellent opportunity by a joint venture among Carpet Manufacturing Company Limited (CMC) ; manufacturer of the well known brand carpets, and Kasumi Textile Co., Ltd. Japan's leading interior fabric and carpet manufacturer.

### **TFU Company : Factory and Production**

The factory of TFU Co., Ltd. is located at Bangpa-in Industrial Estate covering an area of over 16,000 square meters. The factory has been completely constructed at the cost of 300 million Baht. TFU has received promotion privileges from the Board of Investment (BOI).

In 1995, the first year of production, the production capacity of car fabric could supply 360,000 cars. And within year 2000, the company is

preparing for production capacity for the growth of car volume up to 600,000 cars. As for car seat fabrics and car decorative fabrics, the first year of production could supply 300,000 meters. The quality and design of the fabric have earned the high level of reputation from domestic customers.

The machines used for manufacturing are from Germany and Belgium under the engineering standard of Germany and Belgium which are universally accepted in this field. The production process is controlled by the latest textile production technology of Japan. The function and designing are computer-controlled, so the productivity is most efficient with, particularly high quality raw materials screened and selected meticulously. With a strong support of Kasumi Textile Co., Ltd., Kasumi company has transferred technology and management know how to TFU, the product are manufactured to meet international standard with high quality and design in order to satisfy domestic consumption and export which is acceptable to all in the industrial concerned.

The company's policy is to provide high quality product designed to satisfy all customers' needs. That are designed by the technological breakthrough with its state-of-the art technology, such as CAD. Our system design can implement creation of multiple designs and patterns that can meet customers' needs completely. The company has Jacquard and Dobby machines for weaving and especially the Jacquard machine is capable of weaving according to design specifications to the maximum degree. Thus, TFU would be a pioneer in this field in Thailand by introducing the Jacquard in the manufacturing process.

## Overview of the Car Fabric Production

### ◆ Required properties as automobile interior materials

Automobiles are exported throughout the world, and are exposed to various natural environments including extreme coldness, and are used by men in various manners. Accordingly, as the characteristics required in the automobile interior materials (sheet cloth), each automaker mostly determines its own quality standard and other requirements must be also taken into consideration as the followings :

- 1) Ease to sew by sewing machine.  
If there is bending in pattern or the coating agent is very stiff.
- 2) Not causing deviation of sewing line.  
The appearance is not good when finished in sheet form.
- 3) Preventing creases, and easy to restore from crease.  
The appearance is not good when finished in sheet form.
- 4) Easy to cut by press  
If sticky coating agent used, it's hard to peel off each in case of cutting.
- 5) Uniform coating thickness.  
Otherwise crease, poor touch or uneven properties may be caused.

### ◆ Production Process (see *Figure 3.1*)

#### Preparation process

##### Step 1. *Charging of material*

Yarns are generally supplied in the above route, but may be also delivered through twisting plant (mouliner yarn) or knitting firm (crimp yarn).

Step 2. *Dispensing of material*

The fabric pattern, weaving quantity, and required weight of each yarn are calculated according to the job instruction, and the required number and length of the charged material are determined, and the material is dispensed by means of winding machine.

Step 3. *Partial Warping*

(1) Warping

The yarn (mainly for trial) dispensed in step 2 or delivered yarn (mainly for mass production) is directly applied on creel, and wound on a cylindrical drum. The warp of the first band is drawn out from the creel, and wound in a specified warping length by forming ribs. After the second band, the space reed is shifted by the width of the band so as not to overlap the preceding band.

(2) Beaming

After warping the warp for the portion of one width, all bands are collected and wound back on the beam.

Weaving process ; see in *Figure 3.2* for the Principle of Loom and *Figure 3.3* for the Principle of Jacquard machine

Step 4 *Warp splicing*

the yarn of the beam supplied from the preparation process, and the remaining yarn of the beam of the previous merchandise are spliced by means of a tying machine.

Step 5 *Weaving*

Moving the rib frame of the loop up and down, the warp passing through the mail hole in the frame from the beam is moved up and

down (opening motion), and the weft is crossed by shuttle or rapier to form into a cloth. If *Double pile weaving*, using double weaving texture, upper and lower fabrics are formed simultaneously depending on the pile length.

### Finishing process

#### Step 6 *Resin process including back coating*

Resin processing initially began with cellulose fibers such as cotton and rayon by immersing or spraying in reactive resin, drying and heating to cause condensation of resin or crosslinking reaction with fiber, thereby denaturing the cellulose fibers.

##### (1) Preparation of Resin solution

The resin processing solution contains resin, solvent, water repellent, softener, and others, which should be blended after being diluted in water to prevent defective dispersion. The resin, water repellent and softener have their own ionic property, and they react when mixed and cannot be used, and treatment may not be done in a same bath.

Moreover, to improve permeability into fibers or assist dissolution of chemicals, solvent containing resin, water repellent, softener, and flame preventive are available, which may cause seeping of dyestuff or lowering of color fastness. In any case it is important to start processing after sufficiently checking in advance.

##### (2) Dipping and nipping of resin processing

Unless the resin solution is distributed uniformly throughout the fabric, it may cause uneven resin processing or changes of touch,

and hence it is important to adhere the resin solution uniformly and permeate into the inner parts of the fabric by using a proper mangle.

If gum-up (deposit of sticky solid matter) is caused by using unstable resin, water repellent or softener, it may stick to the fabric through the mangle, and therefore, prevention of gum-up and cleaning are essential.

#### Step 7 *Heat Treatment*

##### (1) Curing

The resin concentration is heightened by drying, and the resin is likely to react with the fiber, and by heat treatment, the reaction of the resin is completed. The resin reaction is a condensation reaction of resin is made insoluble, and is solidified on the fiber.

The heat treatment condition is 120 to 170 degrees in temperature and 1 to 3 minutes in duration, which may vary somewhat depending on the type of the resin and catalyst. Same as in the case of preparation of resin processing solution, it is required to check sufficiently beforehand.

##### (2) Soaping, drying

On the fabric after heat treatment, the unreacted resin and catalyst are left over, and soaping is done generally in order to remove them. In particular, soaping is necessary for removing residual formalin. If soaping is omitted, the resin, catalyst and aid should be selected carefully so as to avoid problems.

As can be seen from *Figure 3.1*, The Car Fabric Production process.

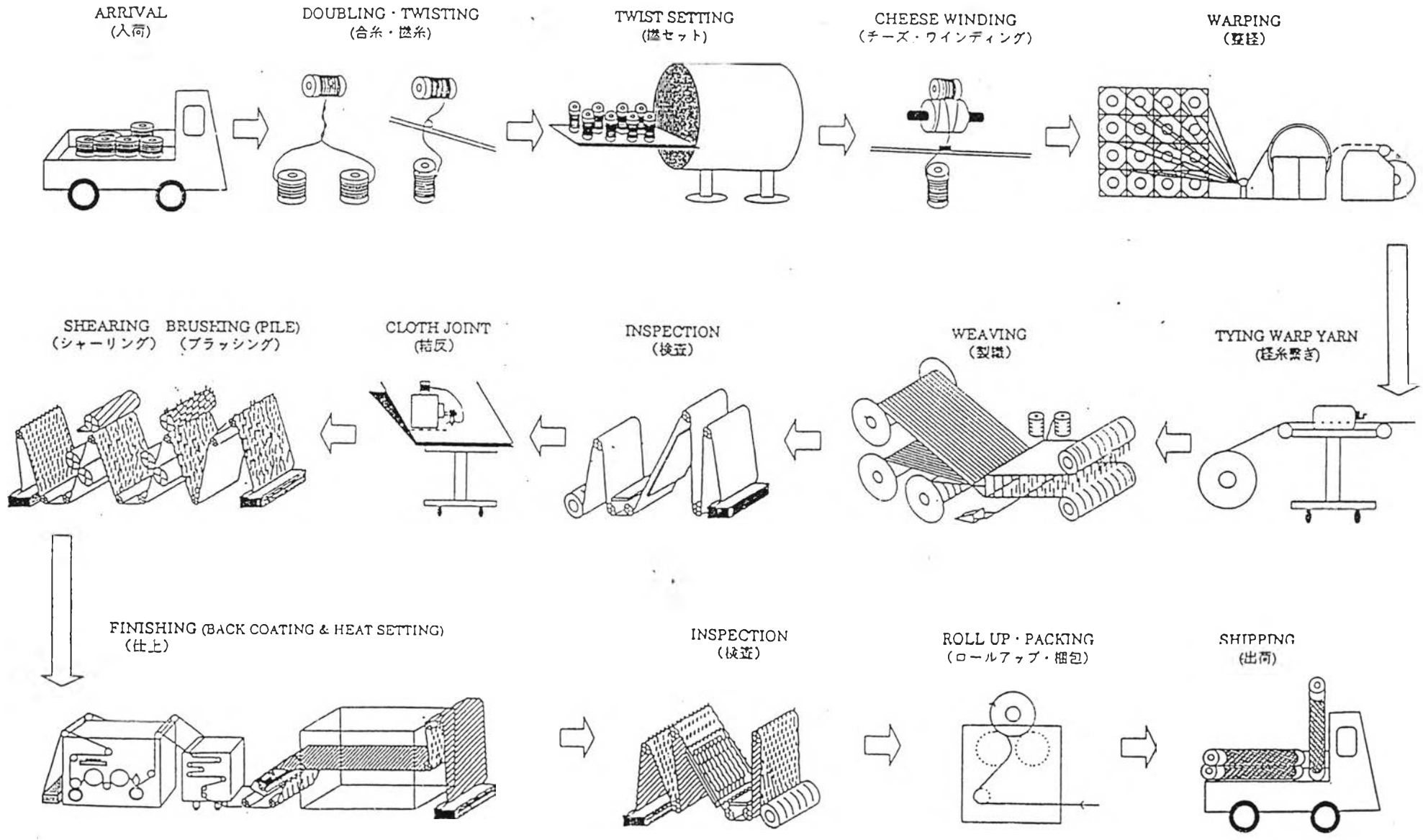


Figure 3.1 : The Car Fabric Production Process



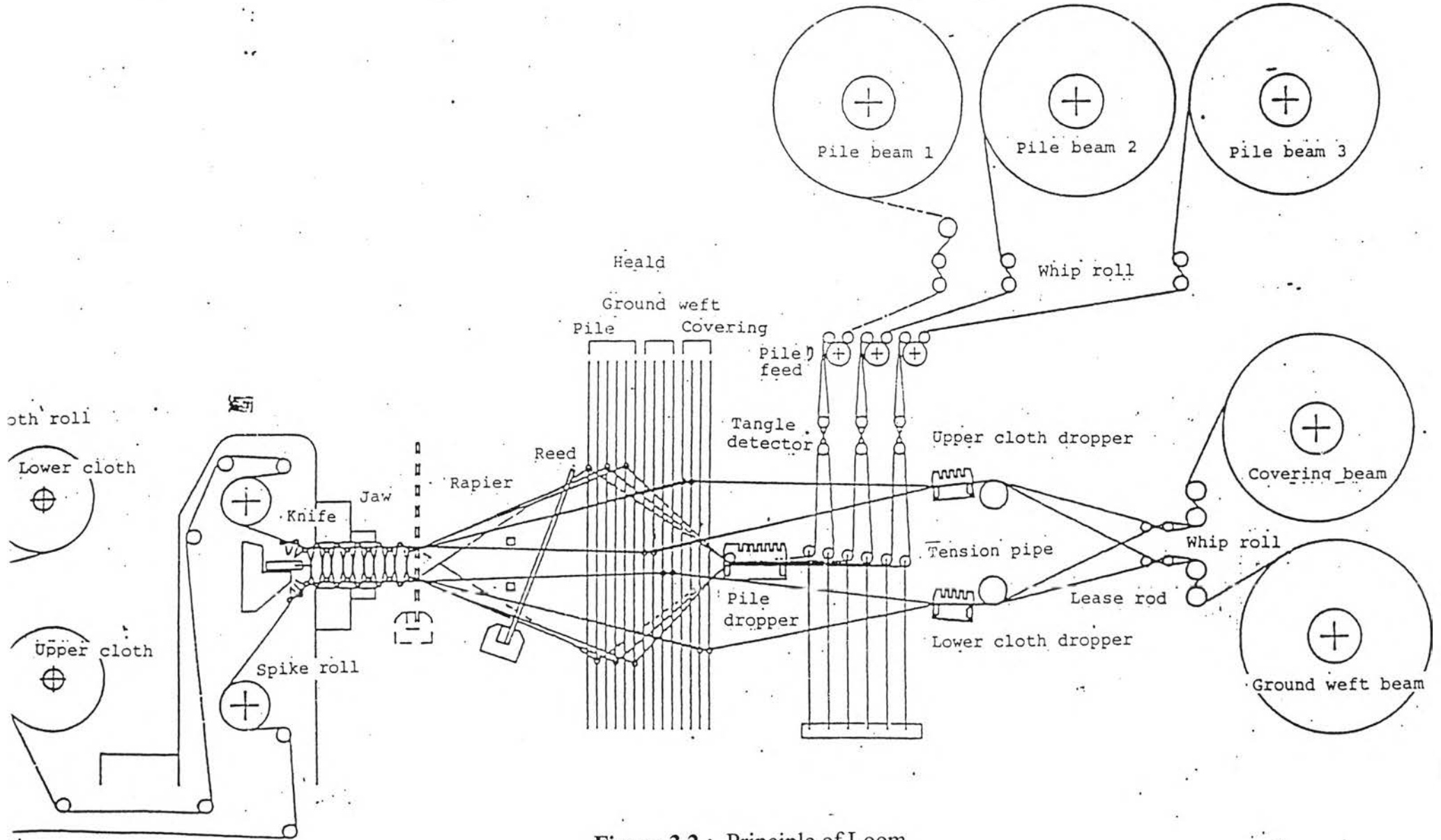


Figure 3.2 : Principle of Loom

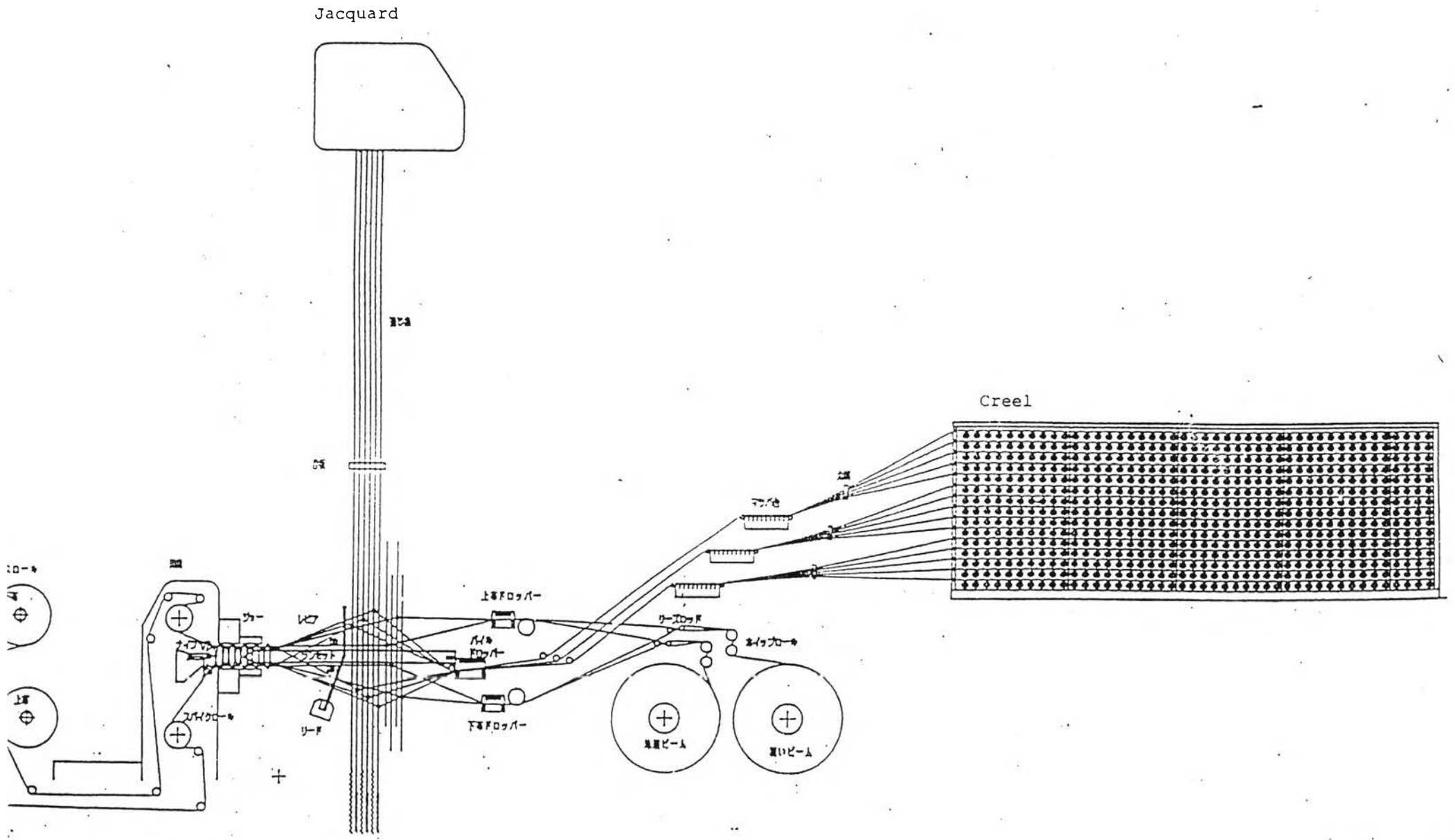


Figure 3.3 : Principle of Jacquard machine