THE JABOULEY CIRCULAR LOOM

The newest circular loom to be brought to the attention of the textile industry was exhibited at the recent Lyons Fair. This is the invention of J. Jabouley, of the Sté. Colombe Loom Works, Les Fils de Guillaum, Diederichs, France. The agents in England for the new loom are Wm. Shirley & Co., Ltd., 78 King St., Manchester.

As may be seen from the accompanying illustration, in the Jabouley loom the warp threads from four beams are caused to form a vertical circular tube of yarn which is rotated around its axis, and the circumference of which is equal to the width of the cloth to be produced. The shuttles or filling suppliers are stationary during weaving, and are fixed in the same horizontal plane at the periphery of the tube. Each of them inserts one pick and beats-up that inserted by the preceding shuttle or supplier. The cloth can be compared to the thread of a screw on which the number of groves is equal to the number of filling suppliers.

The circular loom thus inserts several picks simultaneously with one circular movement. The filling is drawn along by the cloth and consequently unwound. The propelling of the shuttle is dispensed with. The fact of weaving in a tubular form enables very wide fabrics to be obtained, and providing the speed at the circumference is constant, the output is proportionate to the number of filling suppliers that can be fitted.

Mechanical Description

Four warp beams, the tension on which can be individually regulated, are geared together in the same horizontal plane at the top of the loom. They are placed in such a way that they form the four sides of a square and distribute the warp equally. The threads before entering the circular crossing reed are formed in a vertical tube by a perforated circular guide. The fabric is rolled (double) at the bottom of the loom as shown in Fig. 1. A fork with movable prongs adjusted to half the width of the cloth prevents creasing during rolling.

The shedding arms which are situated above the reed are placed on the interior and exterior of the warp tube. Owing to the movement of the shedding arms, and the arrangement and position of these arms and the cross reeds, sheds are formed which enclose the filling suppliers. The warp is automatically controlled for the shedding and for the plain weave the mechanism causes each thread in turn to pass alternately in front of and behind successive filling suppliers. For instance, filling suppliers 1, 3, 5 and 7, or Nos. 2, 4, 6 and 8, are in the same shed, which indicates that there must be an even number of filling suppliers.

The greatest difficulty to be overcome in the invention of the loom was to find a method of holding the filling supplier in the pocket formed by the two sheets of warp yarn without interfering with the passage of the threads. This difficulty was solved by mounting the filling supplier on a bearing which is situated on a bevelled wheel. This device prevents the filling supplier from penetrating to the interior

of the warp tube. In the middle of the filling supplier is a horizontal axle with a double disc wheel at each end. Against these, but on the outer side of the warp, helices with eight blades are fixed on a shaft parallel to this axle. The brackets in which they revolve are fixed on a circular table, which can be stopped by a blade brake encircling it, the tension of which is adjustable.

The speed of the shaft carrying the helices can reach 1,500 r.p.m., and is relative to the speed of the warp. The above apparatus keeps the filling suppliers perfectly stationary inside the shed formed by the warp threads. The helices when turning engage in the warp although they allow the circular movement of the warp to continue. Attached to the filling supplier is a vertical steel blade which has a sidewise movement and is soldered to the end of a horizontal rod.

A spring is fitted to the blade for the purpose of sending it back into its original position. The whole device operates a blade spring, which indirectly declutches both the brake controlling the operating table and the special arm and connects this table with the other table, which is constantly revolving at the same speed as the warp. This constitutes the automatic warp stop-motion.

On the circular table is fixed concentrically another table. A pinion revolves on this latter table, being fitted on a vertical shaft which works in conjunction with the movement of the warp. This shaft transmits its movement to the emery roller which takes up the cloth. The number of dents on this pinion indicates the number of picks which is desired to obtain. The spool is like a disc wheel with a wide and deep rectangular groove and is held on the filling supplier. The filling is guided by means of a special needle fitted on a central axle which is braked by a weak spring.

This device enables the filling supply to be stopped instantaneously at the same time as the loom. All the spools contain the same length of filling yarn. If the capacity of each supplier allows the weaving of one yarn of cloth, one loom fitted with 10 suppliers weaves 10 yards of cloth without replenishing the spools.

Operation of the Loom

Starting of the Loom.—When the circular blade brake is released the warp and the filling suppliers turn at the same speed. The loom does not weave as the filling cannot be unwound and the changing of the shed does not come into operation.

Weaving Period.—The circular operating table is stopped by means of the brake. The filling suppliers then remain stationary, and the loom weaves normally.

Stop Motion.—The loom is automatically stopped in any of the following instances:

(a) When the spool is finished, a filling dial attachment adjusted for the yardage carried on the spool acts directly on the de-clutching arrangement and the loom is stopped automatically. The warp threads are pushed on one side by the weaver to remove the empty spool and replace it with a full one. It takes about 5 seconds to change one spool. It should be noted that there is no shock on the filling as it is simply unwound and not projected in any manner. Only defective spool winding can cause filling breakages, and for this reason a special filling stop motion is now being constructed.

(b) Warp breakages. When a warp thread breaks it hangs loosely, and when shedding the warp becomes entangled and forms a false float and brings the warp stop motion into action. The circular cam table, when released from the brake, is connected by means of the clutch with that which is constantly revolving. The loom stops weaving automatically by means of a simple device fitted on the clutch. The taking up also stops, the cog wheel which controls it turns at the same speed as the pinion which turns on it while weaving. The weaver puts the thread in position, lets in the clutch and puts the brake on the circular cam table from a point which allows him to see the whole of the loom.

(c) Bad running due to mechanical defects. The tension of the circular blade brake is regulated for the normal speed of the loom. A tight shaft, a gear tooth broken or jammed, a bad adjustment, etc., would absorb an excess of power, which puts the brake out of action, stops the weaving and prevents acci-

dents of a purely mechanical nature. The latest circular loom is driven by a 1/3 horse power motor.

Advantages of the Loom

One advantage claimed for the new loom, is that wider cloths can be woven on less floor space than in the ordinary loom. Although the loom is built rather high it is not by any means unmanageable. Another advantage is that owing to the shuttles being stationary during weaving, all the troubles of shuttle projection are eliminated. The principle of the speed at which cloth can be woven has advantages, as apart from the speed at the circumference, production is proportionate to the number of filling suppliers which can be fitted. This, of course, makes it necessary to build wide looms. For example, in a circular loom with a reed space of 72 inches turning at 20 r.p.m. inserting 6 picks at a time from 6 filling supplies, the output would be

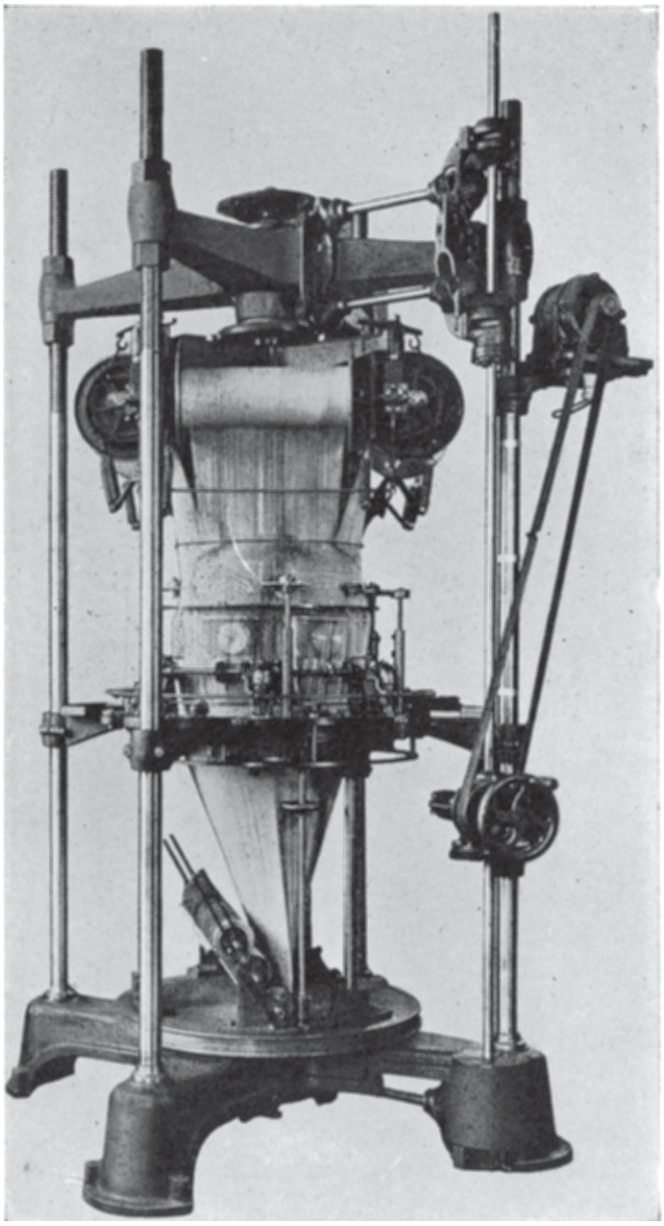
$$\frac{6 \times 20 \times 72}{36} = 240 \text{ yds.}$$

of filling inserted per minute, or 120 picks. In a circular loom of 144-inch reed space, rotating at 10 r.p.m., i.e., the same speed at the circumference, inserting 12 picks at a time the filling woven per minute would be

$$\frac{12 \times 10 \times 144}{36} = 480 \text{ yds.}$$

or 120 picks.

As the filling suppliers are stationary it is possible for them to be made of such a size as will yield a larger weaving capacity. The filling never breaks, and the strain to which the warp is subjected is less than that of an ordinary loom. The yarn passes only once through the dents of the reed, and therefore, the friction between the reed and the warp ends is brought to the minimum. These advantages, together with the warp and filling stop motion enable one weaver to look after several looms.



New Jabouley Circular Loom

One of the difficulties with all new loom types that discard our present systems of shedding, picking and beating up, is their limitation in regard to weaving and constructions. A report issued by Wm. Shirley & Co. states that the loom has woven cottons, auto fabrics, woolens, velours (cotton warp and chenille filling) and numerous articles having horsehair, metal threads, and rayon in the filling. These cover quite a range, but all the fabrics presumably were made with the one-up-and-one-down plain weave.