

## The Various Types of Moire Effects and Their Production

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*(Continued from November issue, page 1206)*

Two pieces of goods, from two different looms with apparently the same number of ribs to an inch and fair regularity of the same, nevertheless show a constantly changing and different yarn thickness. The result of doubling up these fabrics in most cases would be an unsuitable wild moire.

In order to observe and control the desired moire effect in goods to be moire finished and to avoid the time consumed in weaving-in of

colored selvage yarns, an inspection device, shown in Figure 4, is used. In this machine the observer "B" looks toward the goods passing in front of a strong electric light and adjusts the doubling up of the ribs, clearly visible in this type of machine, by pulling the goods down or up at one or the other selvage. The room of necessity must be dark in order to perform this work in a satisfactory manner.

Figure No. 5 shows the moire effect of two

gauze fabrics laid on top of each other and viewed in a dark room against a strong light. The slightest change in adjustment of one or

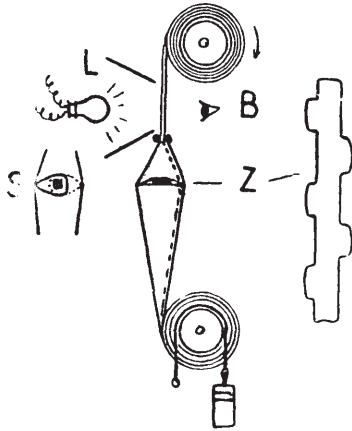


Figure 4  
Laying machine in dark-chamber to observe and control moire effect

B—Observer      L—Lamps  
Z—Bar for moire-francaise  
S—Bar with lifted rods

the other fabric changes the moire appearance. The more the filling yarns are allowed to cross the more distinct and effective the moire effect, or its veins, waves, etc. Wherever the filling ribs fall directly on top of each other the light is permitted through the goods, whereas when the filling yarns cross each other, dark lines or

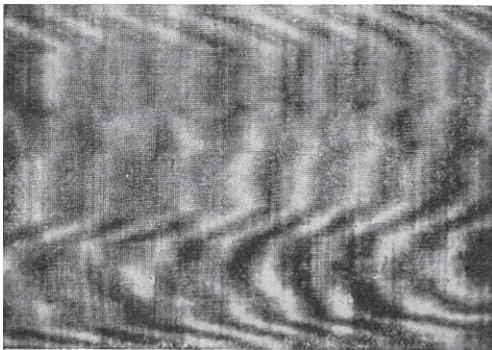


Figure 5  
Moire effect of two gauze fabrics seen against strong light

places result. This is the reason why two fabrics of the same kind are often worn one on top of the other, producing a very beautiful moire effect.

## Moire Antique

The so-called "Moire Antique" shown in Figure No. 6 shows, according to the type of goods used and their treatment, more or less distinct zig zag veins, which run across the goods in irregular manner. Yet they are symmetrically in relation to the distinct line of

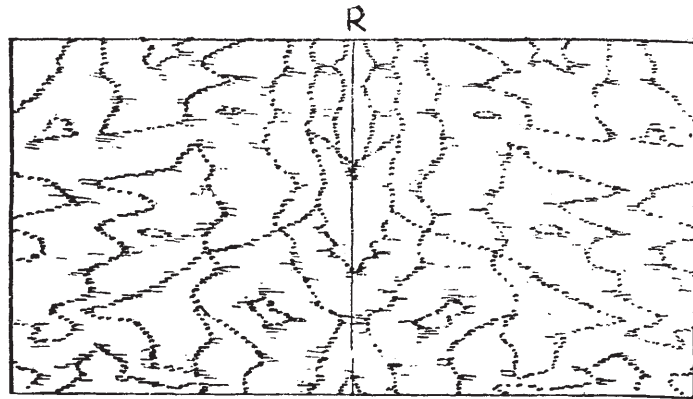


Figure 6  
Moire antique "Andernmor"  
R—Line of break

demarkation or break R. Between the veins very little luster is present. The goods are sewed at the selvages exactly parallel to the filling and folded parallel to the filling and then pressed on a plate press.



Figure 7  
Diagonally tabling of goods doubled on back. (side-view)

K—Roll      M—Leader

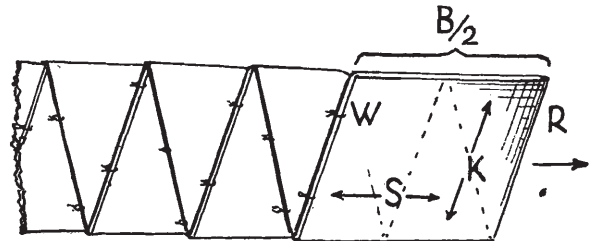


Figure 8  
Front-view of goods alone  
B/2—Half width of goods      R—Break on back  
W—Bound selvages      S—Filling      K—Warp

Figures No. 7 and 8 show this method of procedure, in which the filling ribs are laid in

the length direction of the leader M. The goods are then rolled up relatively soft on roll K (Figure No. 9) and rolled between three

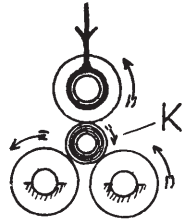


Figure 9  
Mangle for moire renaissance

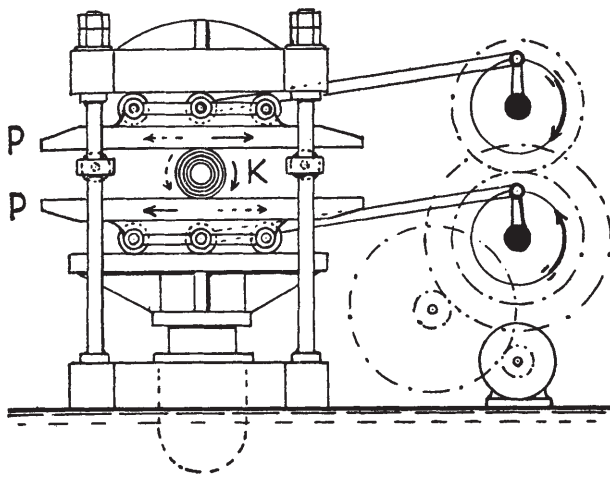


Figure 10  
Hydraulic plate press for pressure up to 10,000 Kg.

heavy cylinders until the roll becomes very hard. It is then taken to the hydraulic plate press, shown in Figure No. 10 and pressed between heated as well as movable plates P.

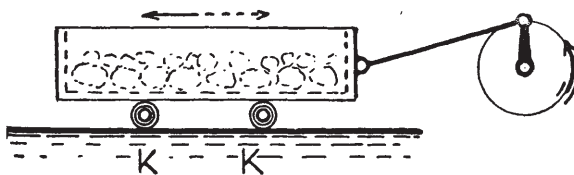


Figure 11  
Roller mangle for pressure up to 30,000 Kg.

The moireing on the roller mangle, as shown in Figure No. 11 is especially suited for linen ribbed goods. The goods are laid down, one, face up, the other, face down with both faces touching each other. The goods which are of the same width and the same length are ironed securely on the mangle table K (Figure No.

11). The goods are protected on both sides with a flat cotton leader from any abrasion by the rollers. In accordance with the length of time and the amount of pressure used, a relatively soft moire piece of goods is obtained generally. By means of laying the goods perfectly parallel with regards to the filling and sewing the selvages at the same intervals a blank moire effect can be produced. A certain moire glimmer can be produced with coarse yarns which is generally a sign of goods that have been mangled in this way.

During mangling the cloths are tightened and loosened from time to time on the roll K which causes the filling yarns to be pressed or flattened. The warp yarns remain perfectly round by this method. By tabling the goods at a diagonal to each other according to Figures No. 7 and No. 8 the crossed warp yarns are pressed flat at the crossing point and the filling ribs, lying in lengthwise direction remain unflattened. Only in those places where the yarns cross each other, are they completely flattened out and produce the so-called moire veins. It can be readily understood that by this process of mangling the position of the goods is slightly changed according to the length of time the goods are mangled. This is by no means a disadvantage because it assists in enlarging the widths of the veins produced. On account of this irregular influence of the outside and inner layers of goods the pieces will have to be turned around and mangled once more.

It must be noted in this connection that on this machine and with coarse yarn goods a lengthwise rib formation or warp rib effect is produced and stays when these goods are mangled for any length of time because the roll on which the goods are wound is not perfectly parallel to the rollers of the mangle. Those goods which are mangled without diagonal folding are very soft and hardly any change of the backside is noted. (See Figures Nos. 7 and 8.)

### Moire Renaissance

Figure 12 shows a type of moire that has lengthwise veins which increase and decrease in groups and the ground is very bright and lustrous. In doubling the cloths, they are laid

over each other and placed at a certain diagonal at the selvage by a definite number of picks. This is shown in the drawing of Fig. 12. For instance, if one wishes to obtain such

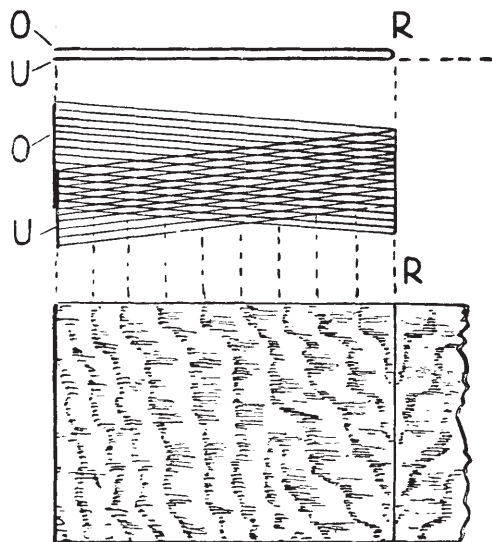


Figure 12  
Moire renaissance, "Mirror" moire  
R—Break on back  
Above: Doubled goods showing pick crossing

an effect on 40-inch goods with a distance between the veins of about 2 inches, or 10 veins in half the width of the goods, the goods have to be sewed together at the selvage, 10 ribs

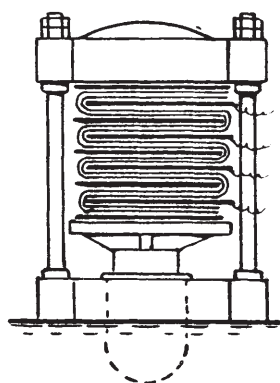


Figure 13  
Plate press with electric heaters

apart in the direction of the filling. The doubled-up goods are taken to the laying machine Fig. 4 and sewed together in the above described way. After this the goods, together with a leader, are run through the machine shown in Fig. 9 with considerable pressure.

The material is rolled very hard, wound on a roll, then rolled once more, whereby the veins are produced. The goods are then pressed on a hydraulic press with electric heating plates. This produces a luster in the ground of the goods. The machine shown in Fig. 13 is a very convenient way of heating while pressing the goods.

### Moire Velours (Cloudy Moire)

Fig. 14 shows a still different type of moire effect. It is more distorted and soft, not as

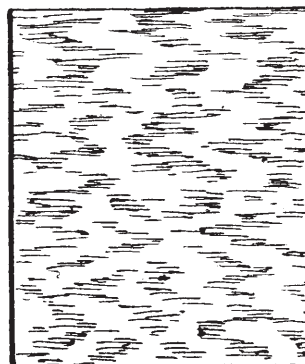


Figure 14  
Moire velours, "Cloud" moire

pronounced as the previous one. In doubling the goods they are laid pick on pick with very little crossing and then put in a plate press like that in Fig. 13. A calender can be used preceding this operation if desired; also a box mangle. This type of moire is used a great deal on coarse filling goods, made from a hard twist combed yarn.

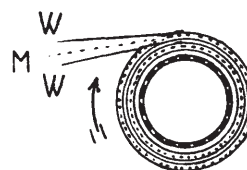


Figure 15  
Perforated decating roll for moireing woolens  
W—Two similar pieces of same width and length, face inside  
M—Coarse linen leader

A very similar soft moire is obtained by decating in accordance with Fig. 15. Between two pieces of the same width and length with the right side inside, a piece of linen goods of suitable construction is rolled up and steamed.

## Moireing on a Calender

In moireing on a calendar the goods are doubled back to back. If necessary the selvages are tacked. A thorough rolling is then given on the laying machine, Fig. 4. The pieces shift their position somewhat which causes small shift marks, crossings and skips, etc. The bigger the roll, the more the goods will remain in parallel position, and the less moire is produced. The rolled-up goods are then brought to the calender (Fig. 16.<sup>2</sup>). The greater the pressure (up to about 7000 lbs. for every 4 inches of width), the greater the temperature (up to 150°C.) and the slower the goods are run through the calender (3-8 yds. per minute), the more pronounced the moire effect. If the doubled goods with parallel filling picks are smoothly fed into the machine as in Fig. 16, denoted by a dotted line, an effect like the "moire antique" is obtained.

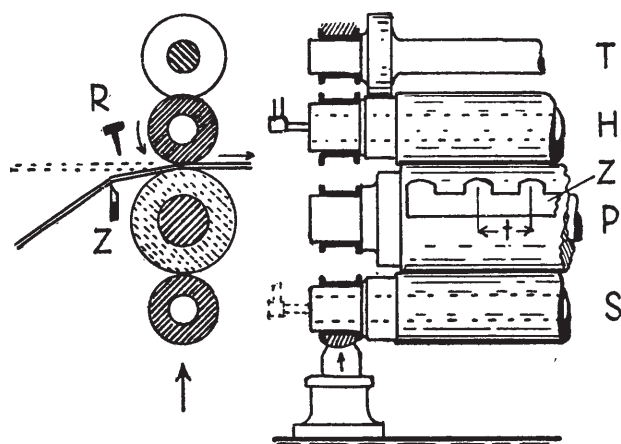


Figure 16

Calender for the moireing of doubled goods  
 T—Pressure roll      H—Heated roll  
 P—Paper roll      S—Support Roll, heatable  
 R—Expander comb for various moires  
 Z—Doctor plate for moire-francaise

The back of the goods, which touches the steel roll, receives a very high gloss, while the other back, touching the paper roll, does not. To even up the goods, they are run a second time when the backs are reversed.

The calendered goods act as if they were glued together and if handled carefully (use

large rolls for winding up) can be turned over and run into the calender once more, at which the position of the filling ribs is not disturbed and no undesirable change will take place. The same careful treatment must be given also when winding and retabing the goods after the first mangle and first press. To make sure that no shifting has taken place, the goods are drawn down before a light for checking up of the crossings. If such a moire effect is carefully examined, small moire veins can be noted between the strong and prominent veins. These small veins appear unclear and faint only, because they originate from the first calendaring and are blotted out partially by the second calendaring.

If it happens that after the first or second treatment the moire comes out poor, the same can be eliminated again by washing the goods and repeating the moireing. Of course, the second moire is never as good and clear as the first.

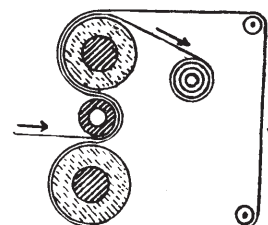


Figure 17  
 Calendaring on irregular moire

Figure 17. The manufacture of a "wild" or irregular moire effect by doubling up of one piece. For the moireing of the end of this piece, another piece must be held ready or the goods are run through in the opposite direction. This procedure is especially suitable for warp ribbed fabrics. For this purpose two equally wide and long pieces are folded right side on right side and run through the calender, at which time the goods must be given little shifts in the direction of the filling, so that a crossing of the lengthwise ribs is obtained. If this is not done, the ribs will lie between each other and do no crossing, which in consequence produces an uneven moire, at times not prominent. When pulling repeatedly, first one way and then another, on the upper and then the lower fabric while feeding the

<sup>2</sup> A book "Die Gauffrage" by W. Kleinewefers, obtainable through J. Springer, Berlin (1925) contains numerous illustrations and descriptions for the moireing of goods and ribbons.

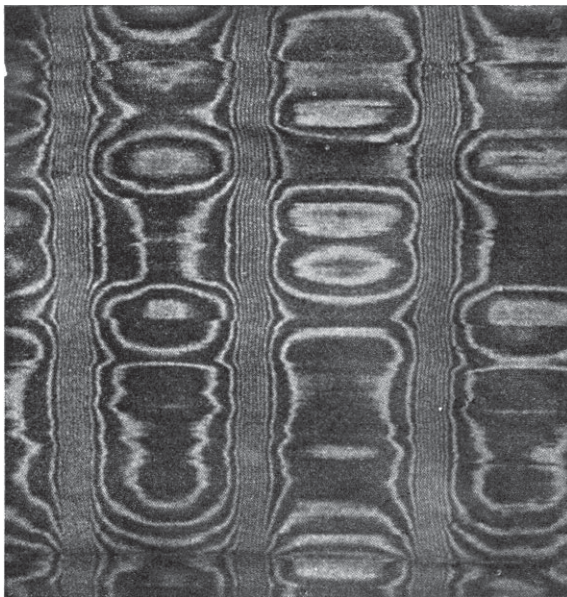


Figure 18  
Black silk moire-francaise by sun light illumination cloth, a moire-francaise is produced in the direction of the filling.

Varied moire effects are obtained by pulling

the filling ribs out of their straight position. All that is necessary is to touch, retard or twist the cloth at different places with the hand, while it is running into the calender (Figure 16). A certain knack is required in order to get the entire piece even.

Much more uniform results are obtained by means of an expander comb R (Figure 16) or a piece of wood with felt or rubber warts, which can be operated at will up and down as well as sideways by means of cams, and even thrown out of contact with the cloth at stated intervals.

Moire francaise (striped moire), shown in Figure 18, is produced when the doubled goods are guided over a toothed bar Z in front of the calender (Figure 16). Full line represents cloth. (See also Figure 19.) This bar produces a wave line in the direction of the filling of cloth U, as shown in Figure 20. The more tension is applied in certain sections of the width of the goods, the greater the number of veins in the direction of the length, producing the moire francaise shown in Figure 21.



Figure 19  
Toothed or indented bar

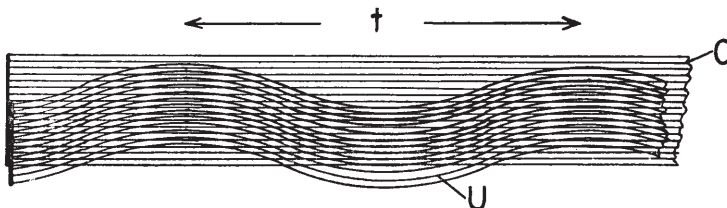


Figure 20  
Position of filling ribs in doubled and tensioned goods  
O—Upper layer of goods U—Lower layer of goods

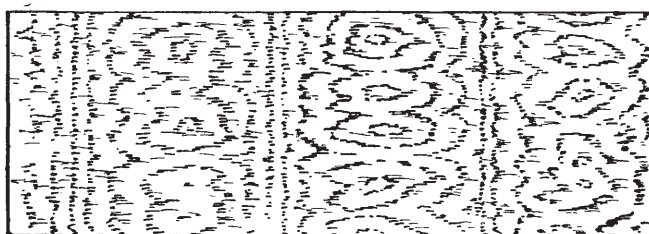


Figure 21  
Striped moire-francaise obtained by laying the goods as shown in Figure 20

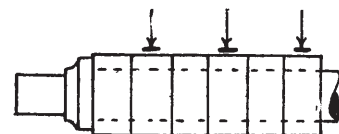


Figure 22  
Calender roll with friction discs for zig-zag moire

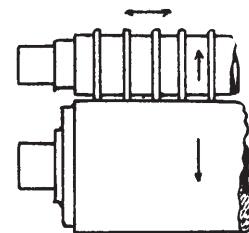


Figure 23  
Calender disc roll for lengthwise moire

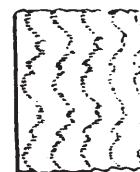


Figure 24  
Lengthwise moire

If the dents in the toothed bar are rounded off at the top, they produce "eye" effects which are very prominent between the moire veins. Pointed, flat at top, or hollow dentings in the bar produce very few "eye" effects.

The best way to produce "moire francaise" is to take goods that are woven double width on the loom, sever them at the center line, and run through the laying machine, Figure 4, after passing the same over a two-sided toothed bar Z. The back goods are run over the bar singly (dotted line) or a bar S (Figure 4) is placed between the goods, with a toothed bar on one side only. The goods have stripes where they run over the high places in the bar. The bars can be made of iron or wood. The latter saves the goods. If the bar is used at the laying machines it is not used at the calender. Figure 22 shows a calender roll with friction discs. Such discs, singly or in groups, produce various distortions of filling ribs, which show in the cloth as looped, attenuated or changeable moire effects of the zig zag type, similar to Figure 21.

Figure 23 shows a calender roll with tight rings or discs, equidistant or at unequal spacing, which produce a lengthwise moire effect, as shown in Figure 24, with strong crossing of the filling ribs in doubled goods. The motion of the disc roll is moved to and fro on top of the bottom roll.

If it is required to give a high moire luster, the goods are run through a smooth roll cal-

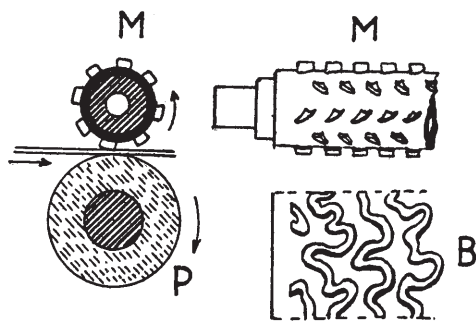


Figure 25  
Patterned calender rolls for figured moires

ender with absolutely parallel filling ribs; then the goods are run through the friction disc calender with crossed rib position.

Figured genuine moire shows repeat patterns in the figures, but each figure has slight changes in the vein formation, as well as the ground luster and "eye" formation.

Figure 25 shows a calender roll which has been patented by Timmerman & Co. of Krefeld, (Germany), and has a raised pattern. The goods can be treated first on a plate press or calender to get a genuine but not too close moire effect. Then they are doubled with more or less crossing of filling ribs and fed into the pattern roll calender. In accordance with the design on the pattern roll, moire figures will be produced in the cloth.

Figure 26 is a dress goods moire. The figures of pattern roll M of Figure 25 produce a very close and solid moire effect on account

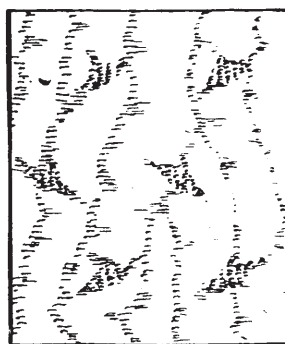


Figure 26a  
Figured moire made with pattern roll M Figure 25



Figure 26b  
Necktie goods with moire figures produced by pattern on roll B Figure 25

D—Dark colored taffeta stripe  
H—Light colored, patterned warp print stripe, taffeta chime effect  
A—Many colored satin stripe, without moire

of a strong diagonal crossing of the filling in a second run.

In the light chine stripe the moire figures are somewhat out of shape in places. These bent or crooked picks do not appear in a treatment described hereafter. The dark, closely set moire stripes resist the roller pressure. Of course, in doubling, the satin stripes must be placed exactly on top of each other.

The crooked formation of picks in goods for genuine figured moire can be accomplished

with the doubled up woven goods or in the loom.

### Weaving Moire Effects

Figure 27 shows a wavy or crooked reed (moire reed) patented by Kreuels Brothers of Frefeld (No. 47504 dated Dec. 10th, 1888). This reed is raised and lowered in the loom by cam disc and ratchet wheel (one tooth for every pick). The picks are beaten up in a wavy line, as is shown in the other diagram of Figure 27.

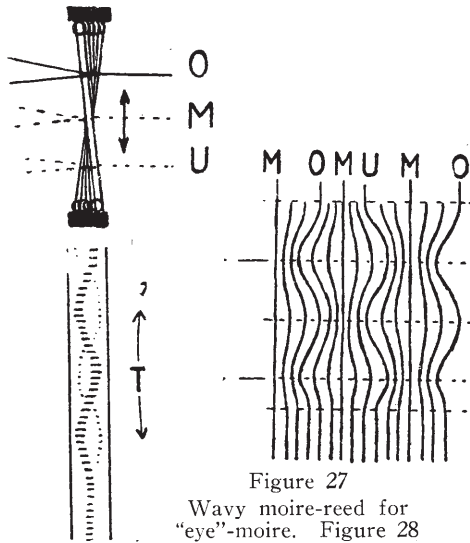


Figure 27  
Wavy moire-reed for "eye"-moire. Figure 28

The waviness or irregularity can exist in the entire reed or only in certain parts. When the reed strikes the fell of the cloth at point M, the picks will be beaten up perfectly straight. For proper shuttle movement it is necessary that the protruding section be less than  $\frac{1}{3}$  of the length of the shuttle. This prevents the shuttle from flying out or running wobbly.

Figure 28 shows a typical moire effect produced with a wavy moire reed according to Figure 27. The dimension of the figure (or eye) A depends on the length of the bent reed, and the closeness of the moire veins depends on the ribs per inch and the width of the waved reed.

Figure 29 is an ombre reed for warp ribbed moire fabrics, according to Figure 28. The reed is moved up or down according to certain picks, which produces a changing density

of the warp yarn, causing the filling to beat up in a wavy manner, in accordance with Figure 27. Only the warp ends drawn through the vertical dents L are woven in straight.

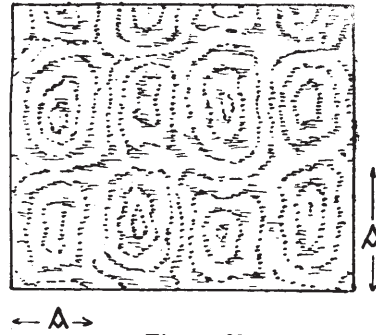


Figure 28  
"Eye"—moire produced with wave-reed. Size of "eye" A-1-3 inch

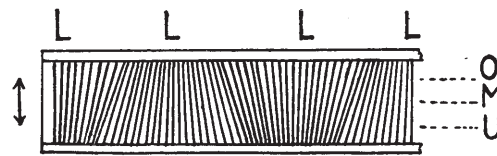


Figure 29  
Ombre-reed for warp ribbed moire effects

Figure 30 shows a gravure reed (also moire reed) patented by G. Beckers of Krefeld, Germany (No. 105231 dated October 4th,

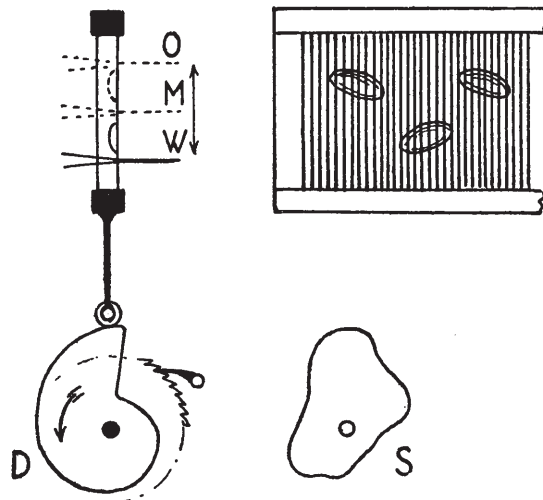


Figure 30  
Gravure—reed for figured moire

1898). This reed is operated up and down by means of a cam D or a pattern cam S, and causes the filling to beat up to the fell in curved lines.

(To Be Continued)