Weft Pile Fabrics

In pile fabrics a proportion of the threads, either warp or weft, are made to project at right angles from a foundation texture and form a pile on the surface. The projecting threads may be cut or uncut thus resulting in tufted or loope pile. A different form of pile surface is produced by raising and cropping during fabric finishing operations but in this case the surface is formed of projecting fibres and not of projecting threads and the term nap rather than pile is more appropriate for cloths of this type. Weft pile fabrics are composed of one series of warp threads and two series of weft threads, the ground and the pile. The pile weft is cut in a separate operation after weaving resulting in a surface consisting of short and very dense tufts. A feature of weft pile structures, also termed velveteens, is very high density of shotting which in the finest fabrics may reach 200 picks/c.m. In order to reach such weft densiti the warp setts should be comparatively low and the warp yarn has to be kept very taut; also, the weaves must be so selected that successive picks can be beaten-up one on top of another. Due to the high warp tension positive shedding mechanisms are used and the highest qualities of cloth require specially constructed, heavy weaving machinery which cannot operate at high speeds and therefore, aggravates further the already low production rates arising out of the high densities of shotting. For this reason the quantities of the top quality of velveteen produced at present are insignificant. On the other hand the low and the medium quality cloth in some constructions is very popular and

can be produced on standard, high speed automatic weaving machinery using reeds with special deep dent wires. The shotting at which such fabrics are produced range from 60 to 110 Picks.

The pile effect in the velveteens is not produced during weaving but is a result of a cutting operation during cloth finishing. The structure is so arranged that the surface of the cloth is covered by weft floats; these floats are severed by knife action and form the cut pile surface. The ground cloth, usually plain or twill is unaffected by the knife action and forms a solid base from which the cut tufts project and in which they are anchored. The cutting method differs for the different classes of structures and is described together with the appropriate constructions. Before cutting the cloth is prepared for the operation by stiffening the surface float in order to define the cutting races more precisely and to ensure crisper cutting. The back of the cloth is also treated by an application of an adhesive, usually starch, to ensure that the tufts during cutting are not plucked out from the ground structure. The fabrics after cutting undergo a crosswise brushing operation and are then singed and dyed. If pastel shades are required the cloth may require to be bleached after singeing.

The yarns employed in these structures are mainly cotton although filament rayon pile velveteens are also sometimes produced. For furnishing purposes worsted or mohair pile yarns have also been occasionally used. Structurally, the velveteens may be classified as follows:

1. All over or plain velveteens in which the surface is uniformly covered by the pile.
2. Weft plushes - similar to above but arranged to produce much longer tufts and used mainly for upholstery purposes.
3. Corded velveteens - also known as corduroys and fustians in which the pile runs in orderly vertical cords of varying width.
4. Figured velveteens - in which pile figure is produced on bare ground.

All the above groups may be further sub-divided into plain back or twill back structures depending on the type of weave in which the ground picks interlace with the warp.

All over or plain velveteens :-

This class of velveteens has a perfectly uniform surface the foundation texture being entirely covered by a short pile in which the projecting fibres are of equal length. In constructing designs for the fabrics the chief points to note are 1. The weaves that are used for the ground and pile respectively and 2. The ratio of pile picks to ground picks. These factors, together with the ends and picks per cm of the cloth, influence the length, density, and fastness of the pile.

The ground weaves mostly used are plain, 2 and 1 twill and 2 and 2 twill, the last weave being employed for very heavy structures. The interlacing of the pile is almost invariably based either on the plain weave, a simple twill, a satin or a sateen derivative. The pile and ground picks may be arranged in any reasonable proportion, but generally a particular ratio is most suitable for a given weave.

Plain back velveteens :-

Examples A, B, C, D and E in figure ① are designs for standard velveteens, with the plain foundation weave. The latter is represented by the crosses, and the base weaves for the pile interlacings are shown at the left of the plans. In each design number of pile picks to each ground pick is equal

number of picks in the repeat of the pile picks to each ground pick is equal to the number of picks in the repeat of the pile base weave. This is a convenient ratio, but other proportions of pile to ground picks are quite easily arranged in the same weave.

A distinct feature to be noted in the designs is that the pile base weaves are indicated only on alternate ends; thus each plan is on twice as many ends as the base weave. Design A is arranged 2 pile picks to 1 ground pick, and the pile weave is based on the plain weave which yields a weft float of three. In a finely set cloth the pile from this design is short and poor, but at low warp settings a fairly good result is obtained.

In design B, the pile weave is based on the 1 and 2 twill which yields a weft float of five, and there are three pile picks to each ground pick. This design produces a fine and rich effect, and is extensively employed. Designs C and D are each arranged 4 pile picks to 1 ground pick, but whereas in design C the pile interlacing is based on the 1 and 3 twill in design D it is based on the satinette weave. Both of these yield a float of seven, and produce identical results in the finished cloth. Design E is arranged 5 pile to 1 ground, and the base for the pile interlacing is 1 and 4 sateen, which gives a float of nine.

In order to produce a dense pile, a very large number of picks per c.m are required to be inserted, the number varying from about 120 in 15 Tex cotton weft for the design, B in figure ① to about 800 in 10 Tex weft for the design E. There are two reasons why it is possible to insert such a large number of picks. First the warp is held under great tension, and the ends lie almost straight in the cloth, which causes the picks to do most of the bending. This results in the ground texture being formed on the weft rib principle, hence a comparatively large number of ground picks can be inserted. Second, the system in which the pile interlacing is arranged enables the pile picks to be beaten over one another, so that each group occupies not more than the space of one ground pick. Also, in the plain back structures, all the pile picks go into the same shed as the first so far as regards the space occupied by the picks, the structural effect of each design A to E in figure ① is somewhat as represented at F i.e. the total number of picks in the repeat of each design go into the space of four picks, of which three are in the same shed.

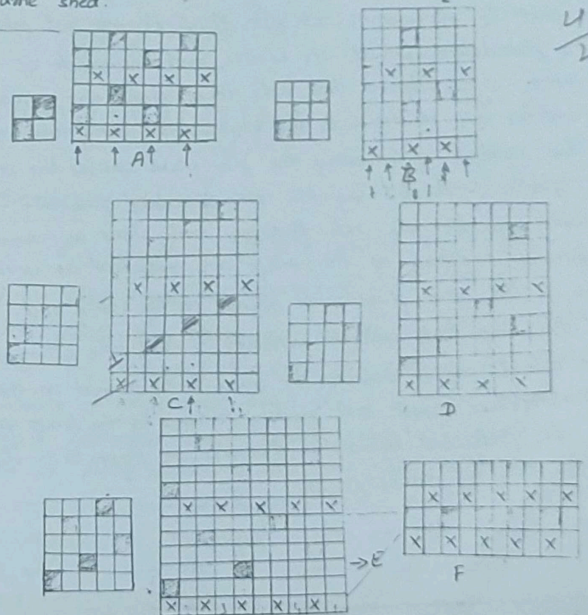


fig-1

The diagrams given in figure ② in which design G is similar to the plan B in figure ① will enable various features of the velveteen structures to be noted. The flat view given at H which corresponds with G, will serve to show somewhat how the pile picks crowd over each other in the cloth. This, however, is only a convenient representation of the structure, as in the actual fabric the ground picks are entirely concealed by the floating pile picks.

The purpose of binding in the pile picks only by the alternate ends (lettered A in H, figure ②) is to enable the cutting to be more easily accomplished. This will be understood from an examination of the cross-sectional drawing given at I in figure ② which represents how the picks 2, 3, 4 and 5 in the plan G interweave. Each pile float stands out further from the foundation cloth at its centre, and the guide of the cutting knife is so adjusted that only those floats are engaged whose centres are in line with the longitudinal movement of the knife. The method of binding the pile picks causes the centres of the floats (indicated by the arrows above diagram I) occur only on alternate ends, therefore only half as many longitudinal traverses of the knife are required as would be the case if the pile picks were bound in by every end.

An important feature, moreover, is that the alternate binding causes regular courses or races to be formed in the foundation texture, which are readily followed by the knife guide. Arrows are indicated below the designs in figure ① to show where the cutting races occur.

After the cutting process, the twist runs out of the free ends of the weft threads which then project vertically from the foundation in the form of tufts of fibres, in the manner represented at J in figure ②. Each repeat of the pile weave produced one horizontal row of tufts, and in the plans A to E in figure ① a complete row of tufts is formed to each ground pick.

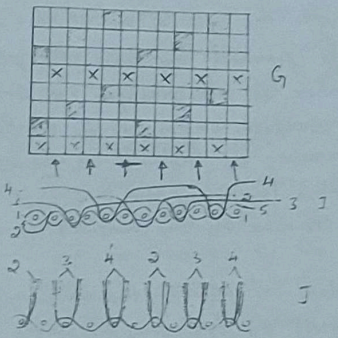


fig - 2

Length of the pile

The length of the pile varies according to the ends/c of the cloth and the number of ends over which the pile weft floats. An increased length of pile is obtained either by reducing the ends per c.m or by increasing the number of ends over which the pile weft passes; and conversely, a decreased length results from increasing the ends per c.m or from reducing the pile float. With the same number of ends per c.m the designs A, B, C or D & E in fig ① give successively an increased length of pile. For example, with 12 ends per c.m in the cloth the approximate lengths are respectively 1·25, 2·1, 2·9 and 3·75 m.m.

Density of the pile :-

The density of the pile varies according to the thickness of the weft, the length of the pile, and the number of tufts in a given space. An increase in the thickness of the weft tends to make the pile coarser, but other things being equal the density is increased. A long pile causes the surface of the cloth to be better covered, and thus gives a fuller handle than a short pile. The greater the length the pile is, however, the fewer are the number of tufts formed by each pile pick, and with the same number of pile picks per cm, an increase in density, due to increased length, will be counteracted by a reduction in the number of tufts. It is, therefore, customary for an increase in the length of the pile weft float to be accompanied by an increase in the number of pile picks per cm.

In each of the plans in figure ①, the same number of tufts per cm^2 will result by employing the same number of ground picks per cm. Assuming that the warp is 20/2 tex cotton with 28 ends per cm, and the weft is 12 tex cotton 32 ground picks per cm will be suitable, which will give the following number of pile picks and total picks per cm for the designs.

Design A - 64 pile picks and 96 total picks per cm
Design B - 96 pile picks and 128 total picks per cm
Designs C and D - 128 pile picks and 160 total picks per cm
Design E - 160 pile picks & 192 total picks per cm.

Comparisons of the number of tufts in different structures can be made by means of the following formula which gives the number of tufts per cm^2.

$$= \frac{\text{Ends per cm} \times \text{pile picks per cm}}{\text{Ends in repeat of pile weave}}$$

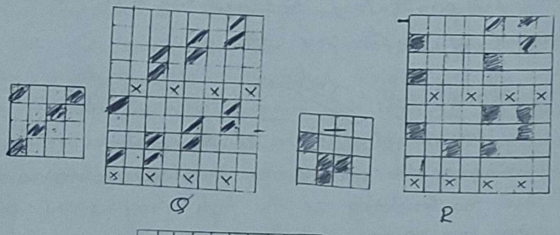
For example, with the foregoing particulars, the design B will produce $\frac{28 \times 96}{6} = 448$ tufts per cm^2.

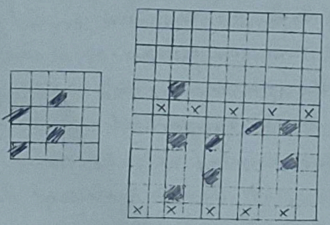
It will be found in the same manner that the other designs with the particulars indicated will give exactly the same number of tufts per cm^2.

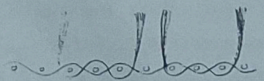
Fast pile structures :-

A very important feature of these fabrics is the proper securing of the pile to the foundation cloth so that there will be no tendency of the tufts fraying out. In the examples given in figures ① to ② the tufts are bound in by one end only at a place, and the fastness of the pile is chiefly dependent upon the pressure of the picks upon one another. It is therefore necessary, particularly in the longer piles for a very large number of picks to be inserted in order to keep the pile firm. If it is desired to introduce fewer picks per cm or to make a very long pile, the necessary firmness can be secured by interweaving the pile picks more frequently and thus making what is termed a 'fast' pile. The examples Q, R and S given in fig. ④ respectively show how the plans C, D and E in figure ① may be made firmer. The section shown at T, illustrates how the tufts formed by the picks 5 and 6 of the design S, are bound in.

By comparing the designs given in figures ① & ② it will be seen that with the same number of ends per cm Q and R will each produce the same length of pile as ~~Q~~ B and S as C or the former interweaving renders it more difficult to insert larger amount of weft, and it is generally recognised that in a fast pile the richness of the cloth will suffer, but there is the advantage that the greater firmness gives the cloth better wearing qualities. Examples of velveteens with a twill foundation are







fig

Cutting of all over velveteens :-

The cutting of all over or plain velveteen is a slow and costly process which adds considerably to the already high cost of production due to the great density of weft in the finer qualities of velveteens can only be cut one cutting race at a time even with modern machinery. In a cloth of standard construction with 28 ends per cm there are 14 cutting races per cm which means that a length of fabric 60 cm wide require 840 passages through the machine before it is fully cut.

The cloth, having been prepared for cutting in the manner described earlier, is stretched lengthwise and is guided with precision so that a knife guide enters a cutting race or 'tunnel' formed by the floats of the pile weft. The races are indicated by the arrows at 1 in figure ②. The guide slides over the ground structure and expands slightly the pile weft floats which are above it. A razor edge knife fits into a slot of the guide and as the cloth runs forwards the floats of the pile weft climb upon the inclined knife blade and are thus severed.

Weft Plushes :-

These constructions are similar in principle to the ordinary all over velveteens but are made with longer pile floats and in heavier weights, being chiefly employed as upholstery cloths. They are produced in insignificant quantities as most of the pile upholstery cloth are at present made

on the warp pile principles in which similar effects can be woven faster and without the need for the separate costly cutting operation after weaving.

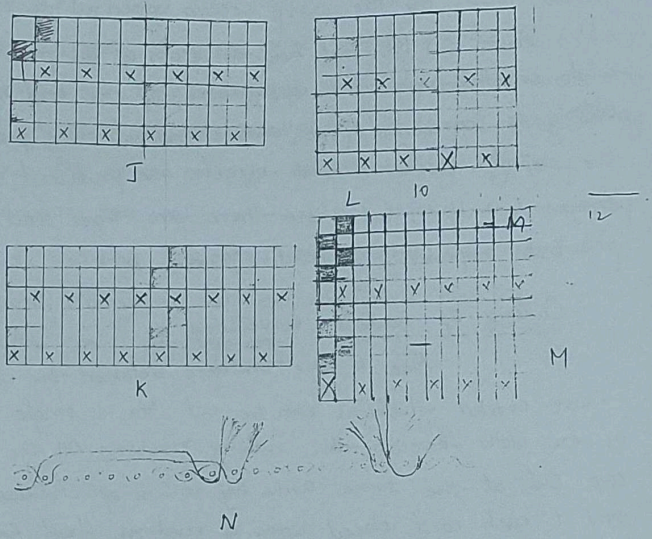
Due to the use of the cloth and the length of pile the pile weft is invariably anchored to the ground cloth and on the length fast pile principle. The pile consists usually of woolen, mohair, or acrylic yarns although other materials have also been used.

Corded Velveteens

In these structures the pile picks are bound in at intervals, in a straight line. The cuts are made right up the centre of the space between the pile binding points with the result that the tufts of fibres project from the foundation in the form of cords or ribs running lengthwise of the fabric.

The finer classes of cords, such as are used for dress fabrics, are largely made in fine yarns with a plain back. The corduroys used for men's clothing, are made sometimes heavier, in which case a Twill ground weave is employed. In the heavier cloths thicker weft is used, and consequently two pile picks to each ground pick are necessary, usually not more than two being employed.

In the simplest cord designs, the pile picks are bound in plain order on two consecutive ends. J, K, L and M in fig are examples with a plain back which, in the same sett, yield successively an increased width of cord. Thus, with 24 ends per cm in the finished cloth the number of cords per 10 c.m will be J-40, K-30, L-24, M-20. Designs may be constructed to produce other widths of cords simply by varying the space between the binding ends.



The plain binding weave of the pile picks may be reversed in alternate cords, as shown at J, in which case the design extends over the width of two cords, and each pile pick forms alternately a long and a short float. On the other hand, the pile binding may be the same in each cord, as shown at K, and in this case all the pile floats are equal. The result is practically the same whichever method of binding is adopted, because the floats are cut in the middle of the space between the pile binding points: consequently, in either case, one side of each tuft is longer than the other side.

The difference in the lengths causes the ribs to have a rounded formation, as the long side of the tufts forms the centre, and the short side the outer parts of the cords. This is illustrated by the warp section given at N in fig. which shows on the left how the picks of the plain k interlo while on the right the appearance of the cord, after the cutting, is represented. The arrows indicate the position of the cutting races. Similar effects are produced by the designs L and M, but here there are three and four pile picks respectively to each ground pick.

Cutting of corded velveteens :-

Due to the distance between the cutting races corded velveteens can be cut in a single passage of the cloth through the cutting machine. All the cords are cut at the same time by means of circular knives, one to each cord, placed upon a revolving shaft. Each knife rotates within a slot formed in a guide, the pointed end of which is inserted under the pile floats in the centre of a cord. By means of tension rollers the cloth is drawn forward towards the knives, but at about the point of contact with the latter, it is taken down-ward over the edge of a transverse bar. The floating pile picks are brought by the guides warp and is either wound on a beam or is plaited down.

14

Terry Pile Structures

The terry pile, also known as the Turkish towelling, is a class of warp pile structure in which certain warp ends are made to form loops on the surface of the cloth. Only one series of weft threads is used but the warp consists of two series of threads, the ground and the pile. The former produces with the weft the ground cloth from which the loops formed by the pile ends project. The loops may be formed on one side only or on both sides of the cloth thus producing single-sided and double-sided structures respectively. Any one pile thread may alternate between the face and the back of the cloth a possibility that is frequently utilised for the purpose of ornamentation. The schematic diagrams in *Figure 14.1* show at A the single-sided and at B the double-sided continuous terry structures. C conveys the idea of a pile thread alternating between the face and the back which permits the formation of pile figure on exposed ground whilst at D the ornamentation is carried further by having two differently coloured sets of threads which mutually alternate between the face and the back thus forming a figure in one colour on the background of another. All the structures, apart from A, are reversible.

Structure A has been used for the production of mats, curtainings, ladies' overcoats and dressing gowns. Structures B, C, and D represent typical towellings which form by far the most important outlet for these fabrics. The looped structure is eminently suitable for towelling purposes as the long, free floats of yarn, if made from absorbent materials, are capable of wicking-up readily large amounts of moisture. The material best suited for the purpose is cotton which not only absorbs moisture easily but also stands up well to frequent and severe launderings which the towelling fabrics have to undergo. Linen is used for the pile when, either, the slightly harsh feel is desired as in athletic towellings, or, an article capable of withstanding very hard wear is required as in public institutions, etc. Viscose rayon staple yarns are also employed and whilst they possess adequate moisture absorption capacity their ability to resist frequent laundering is poorer than that of cotton yarns.

Formation of the pile

The formation of terry pile depends on the creation of a gap between the fell of the cloth and two succeeding picks of weft. The gap, the length of which

depends on the height of pile required, results in the formation of uninterlaced warp floats. To form the gap two succeeding picks are beaten up short of the true cloth fell and produce a temporary false fell as indicated schematically at E in *Figure 14.1*. On the third pick of the group full beat up takes place the

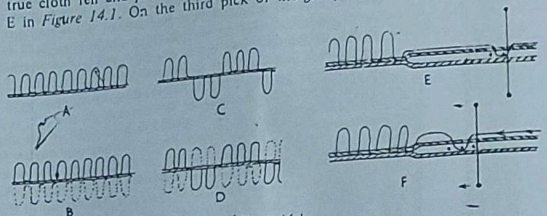


Figure 14.1

three picks being pushed forward together to the true fell position. During this action the three picks are capable of sliding between the ground ends, which are kept very taut, as depicted at F. However, they cannot slide similarly between the pile ends, firstly, because they are structurally locked with them and, secondly, because the pile warp at that moment is slack. Therefore, as they are pushed forward after the third pick they pull a length of pile warp from the beam and at the same time force the excess length of pile yarn in front of them into a loop. If the pile warp float is formed on the surface a loop is made on the face and if the float is on the back of the cloth a back loop results. From the description it will be obvious that in this construction two beams are necessary. The ground beam is very heavily tensioned whilst the pile beam is only under slight tension and in some systems it is, in fact, rotated forward positively during the full beat-up, i.e. after the insertion of the third pick of the group, to deliver exactly the length of yarn required for a loop.

The gap is created by a variety of devices which can be divided into two main classes, viz.:- (1) Those in which the reed is drawn back the required distance before reaching the fell on the two picks in question (used in most of the conventional looms); and (2) Those in which the fell of the cloth itself is made to

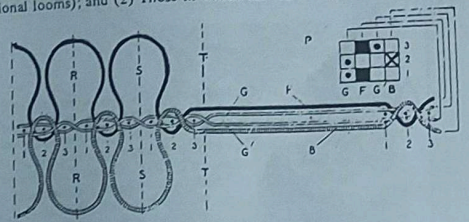


Figure 14.2

recede away from the on-coming reed during the insertion of the two succeeding picks (used in gripper and rapier machines).

The exact relation of the weft to the two warps and the principle of loop formation is depicted by means of the weft section in *Figure 14.2*. The broken vertical lines RR, SS, and TT divide the picks 1, 2, and 3 into repeating groups of three, line TT indicating the position of the fell of the cloth. On the right of the diagram, a group of three picks, which compose a repeat, is represented previous to being beaten up to the fell of the cloth. The ground threads G, G^1, and the face and back pile threads F and B are shown connected by lines with the respective spaces in the corresponding weave given at P. In weaving the cloth the group warp beam carrying the threads G and G^1, is heavily tensioned, as stated earlier so that these threads are held tight all the time. The picks 1 and 2 are first woven into the proper sheds, but are not beaten fully up to the fell of the cloth at the time of insertion in their sheds; but when the pick No. 3 is inserted the mechanisms are so operated that the three picks are driven together into the cloth at the fell TT. During the beating up of the third pick the pile warp threads F and B are either given in slack, or are placed under very slight tension.

The picks 1 and 2 are in the same shed made by the tight ground threads G and G^1, which, therefore, offer no obstruction to the two picks being driven forward at the same time with the third pick. The pile threads F and B, on the other hand, change from one side of the cloth to the other between the picks 1 and 2, and they are, therefore, gripped at the point of contact with the two picks. As the three picks are beaten up this point of contact is moved forward to the fell of the cloth, with the result that the slack pile warp threads are drawn forward and two horizontal rows of loops are formed one projecting from the upper and the other from the lower surface of the cloth in the manner represented in *Figure 14.2*.

In order to produce the loops on the three picks during the insertion of which the terry motion is in operation, the pile and ground threads must be interwoven with the weft in the exact order represented in *Figure 14.2*. The 3-pick terry structure is employed most extensively, but sometimes four, five, and even six picks are inserted in making each horizontal row of loops. The interweaving of the threads, on the subsequent picks, is, however, of little consequence so long as the cloth has the necessary firmness, and a natural connection is made with the weave of the three picks particularly referred to.

Terry Weaves

A number of standard weaves for producing the fabrics is given in *Figure 14.3*. These constructions have been grouped so that comparisons can be readily made. The dots in the designs represented the interlacings of the ground warp threads; the full squares show the interweaving of the face pile threads and the crosses, of the back pile threads. In A, B, C, D, and E the loops are formed uniformly on the face side of the cloth only, whereas the remaining structures are for producing a pile surface on both sides of the cloth. In A, B, C, D, and E, the warp threads are arranged 1 ground, 1 pile, and in F, G, H, I, J, and K, 1 ground, 1 face pile, 1

ground, 1 back pile. The weaves L, M, N, O, P, and Q produce corresponding effects to the designs F to K respectively, but they are arranged 1 ground, 1 pile, 1 back pile, 1 ground.

In each structure A to E in *Figure 14.3* there is a pile end on the surface to each ground end, but in the weaves F to Q, the proportion is one pile end on each side of the cloth in two ground ends. The single-sided pile cloths can, however, be made with 1 pile to 2 ground by leaving out the last thread in each of the constructions A to E. The plans A, F, and L are for producing one horizontal row of pile loops on three picks; B, G, and M on four picks; C, H, N, O, I, O, J, and P on five picks; and E, K, and Q on six picks.

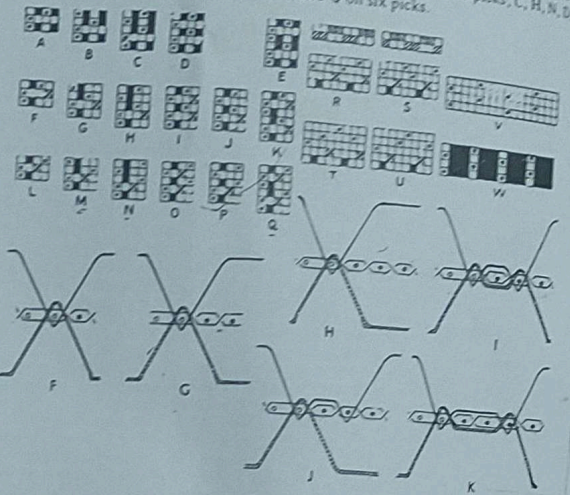


Figure 14.3

Every plan in *Figure 14.3* is constructed for the first and second picks to remain back from the edge of the cloth when they are first inserted, and for the full beat up to occur on the third and subsequent picks in the repeat. A comparison of the designs will show that in each case the interweaving of the respective threads is exactly the same on the picks 1, 2, and 3, and corresponds with the order of interlacing illustrated in *Figure 14.2*. Thus, on the picks 1 and 2, the odd ground threads are raised and the even ground threads depressed, while on the third pick they are in the reverse positions. The face pile threads are raised on the picks 1 and 3, and depressed on the second pick; the back pile threads being operated in the reverse order.

In the lower portion of *Figure 14.3* cross-sectional views of one loop unit of every structure F to K are given, and these are lettered to correspond with the

by a single series of pile threads, on the principle illustrated at A in *Figure 14.5*. In this case, however, the threads are arranged in the order of 2 ground, 2 pile. The design of the cloth is shown in *Figure 14.7*, in which sections G form

Figure 14.6

pile on the face and ground on the back, and sections H form ground on the face and pile on the back. The draft is shown at I and the lifting plan at J. In producing a given size of check, each section is repeated the required number of times.

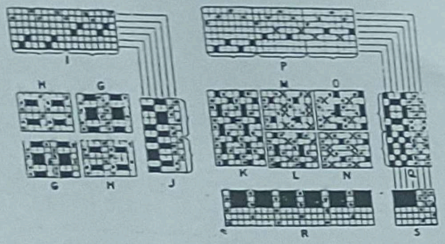


Figure 14.7

Figure 14.8 shows a check pattern produced in two series of pile yarns, on the principle illustrated at D in *Figure 14.5*. There is also a continuous stripe effect at each side of the check pattern. One series of pile threads is differently coloured from the other series, and in the corresponding design and draft given in *Figure 14.7*, the black squares represent red pile while the crosses indicate white pile. Section K shows the weave used in producing the continuous stripe, while sections L and O form red loops on the face and white loops on the back, and sections M and N form white loops on the face and red loops on the back. The change of effect between sections L and M, and also between N and O, is due to a change in the weave. In the sections L and N, however, and also in sections M and O, the weave is exactly the same, the change of effect in this case being due to a change in the order of colouring. Thus, as indicated by the black squares and crosses respectively, the pile yarns in sections L and M are arranged 1 red, 1 white, and in N and O, 1 white, 1 red, two white pile threads coming together in the centre. The drawing-in draft is shown at P—three healds being used for the ground threads, and the lifting plan at Q.

The lower portion of *Figure 14.8* shows a cross-border heading, the bulk of which is formed by continuing the centre weave with the terry motion out of action, but there is also a repp heading produced by floating thick picks over seven successive ends. The weave for the thick picks is shown at R in *Figure 14.7*, the lifting plan being indicated at S. Three picks float on the face and then three on the back, in order that the border will be reversible similar to the main body of the towel.

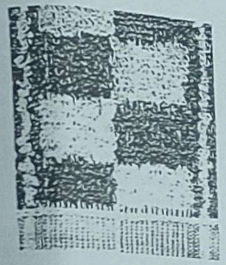


Figure 14.8

An interesting modification of the latter style of check pattern consists of separating the rectangular spaces from each other by narrow lines of ground, the longitudinal lines being formed by bringing six or eight ends consecutively from the ground warp beam, while the transverse lines are obtained by throwing the terry motion out of action for about six picks. This system of forming checks can also be employed when the pile threads are all of one colour, and when no interchange is made from one side of the cloth to the other.

Figured terry pile fabrics

A representation of a figured terry pile texture, taken from the corner of a towel, is given in *Figure 14.9*. The example is simply an extension of the principle

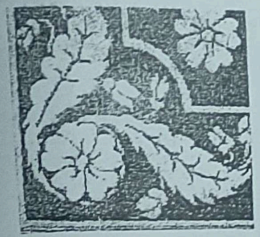


Figure 14.9

illustrated at D, E, and F in *Figure 14.5*, in which two series of differently coloured pile threads are interchanged. In the fabric represented a figure in white terry pile is formed on a blue ground on one side of the cloth, and a blue terry figure on a white terry ground on the other side. The warp threads are arranged in the cloth in the order of 1 ground, 1 white pile, 1 ground, 1 blue pile, and the structure is a 3-pick terry.

The design for the above fabric is given in *Figure 14.10* and shows the construction condensed by 4 warp-wise and by 3 weft-wise so that each square represents one loop on the face and one loop on the back. Filled squares represent white loops on the face and blue loops on the back whilst blank squares indicate blue loops on the face and white ones on the back. The detailed weaves for each colour are shown at A and B in *Figure 14.10*, in which the dots indicate the lifts of the ground ends, the solid marks, the blue pile ends and the crosses, the white pile ends. The cloth is produced with 20 ends and 21 picks per cm which results in five vertical and seven horizontal rows of loops of each colour per cm and this ratio determines the proper count of design paper to be used. In the case of the design in *Figure 14.10* the paper is 8 x 11 corresponding sufficiently closely to the ratio of 5 : 7.

The condensed design could be taken to represent any terry structure and, indeed, the same design could be used to produce towels in a 4-pick or a 5-pick quality if appropriate detailed weaves were substituted for the 3-pick structures given at A and B in *Figure 14.10*.

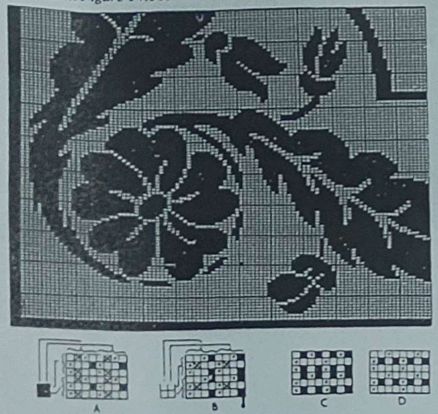


Figure 14.10

The system of designing, illustrated in *Figure 14.10*, is also suitable for the class of figured terry cloths in which there is only one series of pile threads.

In this case on one side a figure is formed in pile upon a ground of the foundation cloth, while on the other side the foundation forms in figure and the pile the ground. The principle is illustrated by the examples shown at A, B, and C in *Figure 14.5*. For the purpose of this structure one square of the condensed design represents a loop either on the face or on the back. If the paint is taken to indicate loops on the face, and the blank paper loops on the back, then the detailed weaves for the two different areas of the design will be, respectively, as shown at C and D in *Figure 14.10*.

Mixed colour effects

In a further development of the terry structure, which is applied to fancy towellings, beach wear, mats etc., white and two colours of pile warp are employed, and a design composed of four effects is produced. For instance, assuming that the pile threads are arranged 1 white, 1 pink, and 1 green, the ground may be formed in white pile loops and the figure by mixtures of pink and green, white and pink, and white and green loops in the different section of the design. There are really four series of pile threads in the cloth, two of which are on the surface and two on the back in every part.

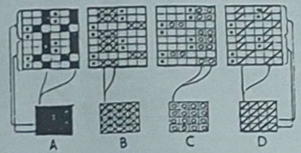


Figure 14.11

In the example given in *Figure 14.11* there are two pile ends to each ground end and the structure is a 4-pick terry in which the ground ends weave 2 up, 2 down. As there are four different effects the condensed design is painted in four colours represented by the different marks at A to D in *Figure 14.11*. The degree of condensation is by 6 warp-wise (4 pile and 2 ground ends) and by 4 weft-wise (2 loose, 2 fast picks) so that one square of the design equals two loops on the face and two on the back. The detailed weaves above the condensed design portions at A to D each correspond to one vertical and two horizontal rows of the designs.

The plan A represents the pink and green pile threads on the surface, and all the white pile threads on the back; B, white and pink on the surface and white and green on the back; C, white and green on the surface and white and pink on the back; and D, all the white on the surface and pink and green on the back.

Cut pile terry fabrics

Cut pile terry effects are sometimes produced by cropping, during a finishing operation, the tips of the loops in a terry cloth. Usually only one side of a