

April 11, 1944.

F. J. FORD

2,346,159

FABRIC

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2 Sheets-Sheet 1

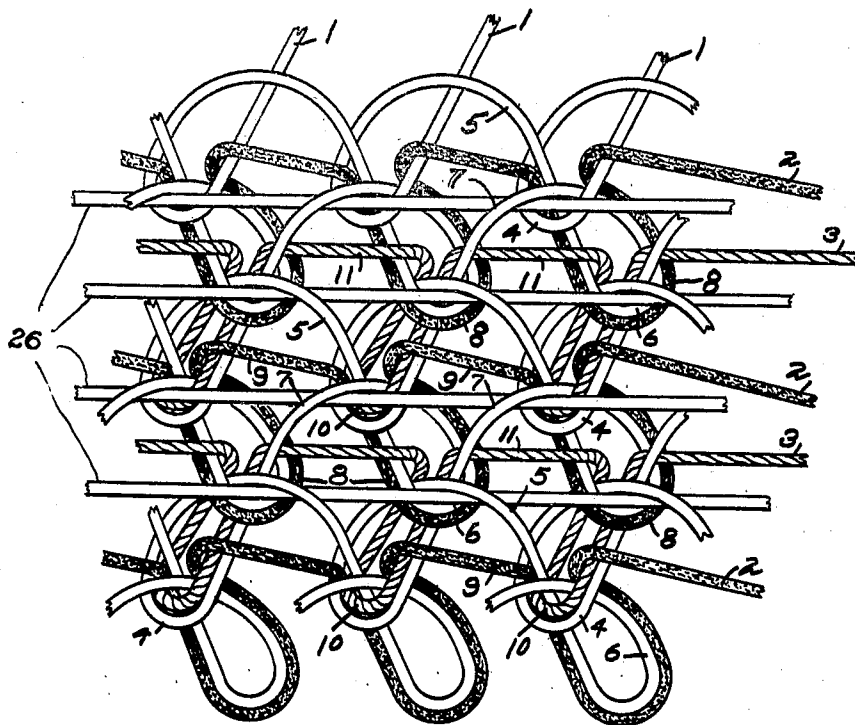


Fig. 1.

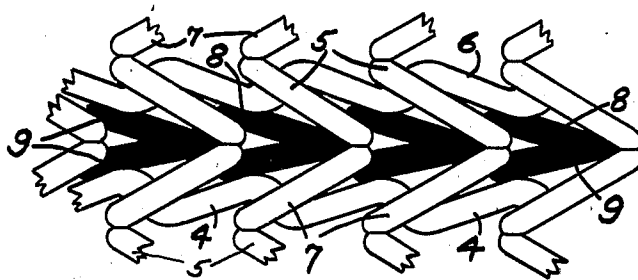


Fig. 2.

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Fig. 3.

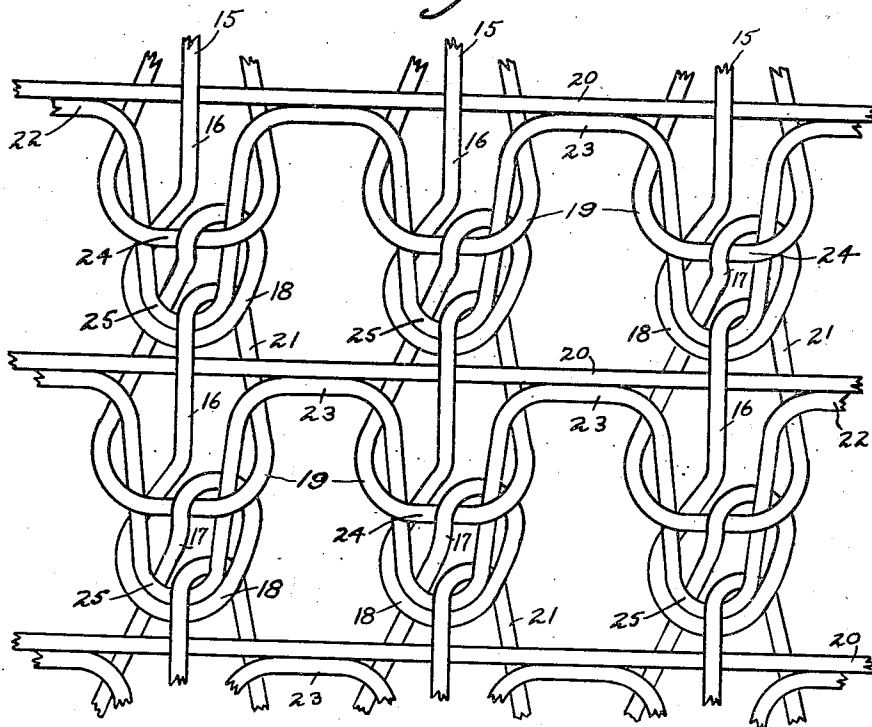


Fig. 4.

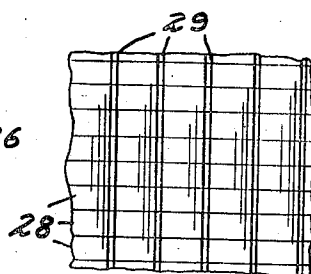
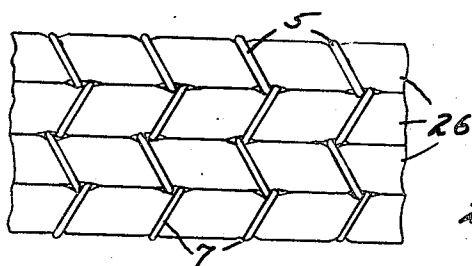


Fig. 5.

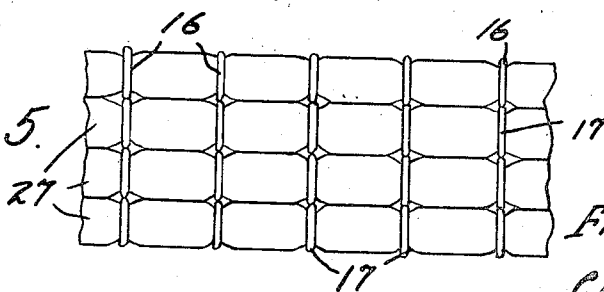


Fig. 6.

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Frank J. Ford, Worcester, Mass., assignor of one-third to Harry Whittaker, Oxford, and one-third to Max B. Striar, Worcester, Mass.

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6 Claims. (Cl. 66—190)

This invention relates to knit fabrics and its principal object is to provide a knit fabric which is absolutely run proof; and in which any cut or broken thread will not ravel, and if pulled will merely tighten up adjacent loops to practically form a knot.

Other objects include the provision of a knit fabric which has a knit characteristic aspect on one side and a woven characteristic aspect on the other; and the provision of a knit fabric in which the back or rear face has the well-known knit stitch appearance and the front face imitates woven fabric.

A further object of the invention resides in the provision of a non-stretchable, non-raveling knit fabric of the usual knit fabric pliancy which may be used for purposes where it is desired to have a good fit and to avoid sag in the material as in clothing and particularly in outer garments. Also, it is an object to provide a pliant and non-stretching knit fabric having woolen or the like weft threads which appear on one face only of the fabric and which conceal the knit stitches and loops to give the appearance of a woven fabric, and in which the warp threads holding the weft threads may be either in a zig-zag formation of any determined number of steps or a straight chain for plain knit or plaid effects.

Other objects include the provision of a knit mesh which may be used per se for bagging or like structures and which may be varied to include woolen weft threads to produce a very tight blanket or garment fabric.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 shows in diagrammatic form a face or front side of a fabric knit according to one form of the invention, the loops being extremely loose for purposes of illustration;

Fig. 2 shows the fabric of Fig. 1 as it appears to the eye;

Fig. 3 illustrates another form of the invention in a manner similar to that of Fig. 1;

Fig. 4 shows a fabric like that of Fig. 1 with woolen or the like weft threads;

Fig. 5 shows a fabric like that of Fig. 3 with woolen or the like weft threads; and

Fig. 6 illustrates a corduroy effect obtained by knitting the fabric of Fig. 4 extremely tightly.

Referring to Fig. 1, there is here shown a plurality of warp threads 1 which are drawn in continuous double line; and a plurality of transverse or weft threads 2, 3 alternately stippled and cord-

ed for clarity in illustration, threads 2 being stippled and threads 3 being corded.

Each warp thread 1 is similar to all the other warps, and is in the form of an alternate offset loop arrangement. Starting at the top of the figure, thread 1 runs down at an angle to the left, reverses to the left, forming a warp loop 4 and crosses in front of itself to form an open bottom warp loop or transverse run 5. The loop 5 extends to the right forming loop 6 and the thread crosses over to form a second open bottom warp loop or transverse run 7. Loops 4 and 6 are closed and the latter is somewhat below the former and laterally offset therefrom. This construction repeats throughout the length of the fabric, and special attention is directed to open loops 5 and 7 which have approximately one-half thereof, at their right and left ends respectively, more or less unimpeded or free and alternately passing downwards to right and to left forming a zig-zag at every course throughout the fabric or any desired number of diagonal sequences in either direction each alternate pair of loops 5 and 7 opening to the left for one or more series, and the others therebetween opening to the right in one or more series.

Loop 4 includes the crossed thread forming loop 6 of the next adjacent warp to the left of any course, and loop 6 includes the crossed thread forming loop 4 of the next adjacent warp to the right of any course. This construction will be apparent from an inspection of the double line warp threads, and in and of itself provides a complete fabric.

Weft thread 2 comes in from the right and passes over the right hand run of a warp loop 4 to the right in Fig. 1, then goes down thru the latter to loop the crossed warp thread forming the next loop 4 in the same warp, following the path of loop 6 of the next warp to the left. This weft 2 comes back up thru the original loop 4 and is looped thereby, crossing over its left hand run in front to pass to the next loop 4 in the next warp. This provides weft loops 8 similar to loops 6 which are looped by loops 4 and in turn loop next loop 4 of the same warp. The crossing of the weft 2 from the left hand run of a loop 4 to the right hand run of the next adjacent loop 4 forms an open bottom weft loop 9 which is somewhat to the rear of loops 5 and 7 being midway between them and under or behind the crossed thread forming loops 6. Loops or runs 5, 7, and 9 form triangles, loop 9 bisecting the angle between loops 5 and 7 which open to the left.

Corded weft 3 is somewhat similar to weft 2 coming in from the right over the right hand runs of loops 6 and 8 but under the very left hand end of loop 7, i. e., in reality under the crossed thread forming a loop 4. Weft 3 then goes down thru combined loops 6 and 8, following a loop 4 to loop the next downward loops 6 and 8 approximately at the crossed threads forming the loop 6. Weft 3 then returns upwards forming a loop 10 and being looped by the original loops 6 and 8, and crosses over in front of the left hand runs of loops 6 and 8 to repeat, forming open loop or run 11 bisecting the angle of loops 7 and 5 opening to the right.

It is very important to note that the above described construction will force loops or runs 5, 7, 9, and 11 to the side of the fabric which in this case is the front, that is, the side seen in Fig. 1, when the fabric is closed up tightly, giving the effect of a woven fabric as shown in Fig. 2. The opposite or rear face of the fabric has the ordinary chain rib knit appearance, although with doubled loops, this being in consequence of loops 6, 8, and 4, 10 being forced in large part to the rear. Also, it is to be noted that every loop in the fabric is double and that every double loop loops a double loop, while in effect there are three weft loops or runs for each loop, as 5, 9, 7 for double loop 4, 10. The ribs of the rear side of the fabric extend transversely of the herring-bone appearance of the front side.

Fig. 3 illustrates the construction of a modified form of the invention wherein the warp threads 15 are shown in solid double lines and extend independently in chains throughout the length of the fabric. In contradistinction to the usual chain knit, however, each warp thread has longitudinally substantially aligned alternate long and short straight runs 16, 17, respectively, which loop over the respective relatively small and alternately large loops 18, 19. A straight transverse weft thread 20 may lay in under the long straight runs 16 and over the loop sides 21 of large loops 19 and effectively prevents any transverse stretching of the fabric.

A second transverse weft thread 22 is looped by each large loop 19 in successive chain courses and in turn loops the top bend of each succeeding long straight run 16 as well as the short straight run 17. When this fabric is knit, the loops 18, 19 are of course made tighter than shown, so that a non-ravel knot is made about runs 17 and loop 19 binds weft thread 22 so that its transverse straight runs 23 are forced to lay along portions of weft 20, and the effect is that warps 15 appear continuous and straight down the face or front side of the fabric with spaced warp loops 24 thereunder. Loops 18 are effectively hidden by the down loops 25 of weft 22.

This construction provides an open mesh fabric which is non-stretchable and non-raveling. No matter how tightly the fabric is knit, comparatively large interstices between weft thread loops 25 remain, the top runs 23 of this thread being greatly longer than its bottom loop, depending on the spacing of the warp threads and by introduction of weft and transverse yarns in any series of loops.

Fig. 4 illustrates a fabric of woven appearance based on the fabric of Fig. 1, and which has comparatively large transverse woolen or other yarns 26 passed thru loops 5 and 7 to lay in on the remainder of the fabric of Fig. 1, concealing the same. A pleasing zig-zag effect is thereby produced on the face of this fabric, but if desired

this can be minimized or increased by introducing any desired number of loops in a series and in either direction. Of course, this same appearance could be produced by omitting wefts 2 and 3, but the resultant fabric would be looser and of less thickness.

Fig. 5 shows a fabric having a woven appearance on its face and based on the knit fabric of Fig. 3. A woolen or the like yarn 27 is looped by the straight runs 16, 17 giving the impression that yarns 27 are merely woven under and over thereby. It will be appreciated, however, that this fabric will be extremely tightly knit and will be very thick, having the equivalent of a woven fabric on the face and an integral knit fabric on the reverse side.

The constructions above described are capable of further modifications without departing from the scope of the invention, which will be seen to present a strong heavy fabric useful in many relations where woven fabrics are conventionally utilized. In all cases, the fabrics are clearly knit when observed from the rear or reverse side, but from the face side of the fabric the appearance is that of a woven material, except perhaps for that of Fig. 3. In any case, a very heavy non-stretching and non-raveling knit fabric is provided which can be used in articles normally made of woven goods.

One variation successfully made is illustrated in Fig. 6, wherein woolen or the like transverse threads 28 are extremely tightly knit in by zig-zag loops 5 and 7, which lay along lines at 29. When so tightly knit, loops 5 and 7 draw each other into a straight warp line and in so doing they cause the larger transverse threads 29 to bow out transversely thereof to form the corduroy appearing fabric of this figure. Of course, this fabric is very tight and deep but it still has the pliancy of a knit fabric.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A knit fabric comprising warp threads knit together to form a fabric in alternate right and left hand loops, the runs of thread between successive loops in the same warp thread being on a diagonal, and transverse filler yarns lying across the fabric and under said diagonal runs only on the face of the fabric, and transverse weft threads knit into the fabric in loops coinciding with said warp thread loops, said warp and weft threads lying completely to one side of the filler yarns except at the diagonal runs of the warp threads.

2. A knit fabric according to claim 1 wherein alternate diagonal runs extend substantially in different directions, producing a zig-zag effect on the face of the fabric.

3. A knit fabric comprising a plurality of continuous warp threads, each warp being formed with a series of alternate right and left loops connected with the left and right loops of the next adjacent warps, a plurality of weft threads inter-knit with said warp threads and having loops following the warp thread loops, and a plurality of straight filler yarns in said fabric, said yarns underlying only the portions of the warp threads between the warp loops.

4. A knit fabric as recited in claim 3 wherein the warp thread portions between warp loops are positioned diagonally across the filler yarns.

5. A knit fabric as recited in claim 3 wherein the warp thread portions between warp loops are substantially straight and lie at reverse angles

alternately in the same warp to produce a zig-zag effect at one side of the yarns.

6. A knit fabric comprising a plurality of warp threads each warp thread being periodically reversely crossed over itself to form a series of alternate right and left hand loops, and each right loop being looped by a left loop on the next successive warp, a plurality of transverse weft threads extending completely across the fabric and being

knit therewith in loops, said weft thread loops lying along certain loops of said warp threads in successive warp threads across the fabric, and each weft loop looping a complete warp loop adjacent the points of crossing of the warp threads, straight transverse filler yarns lying under only warp thread runs between each right and left hand warp loop.

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