



May 23, 1933.

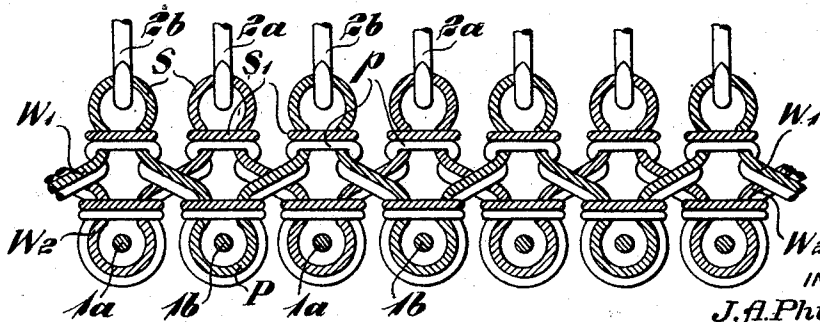
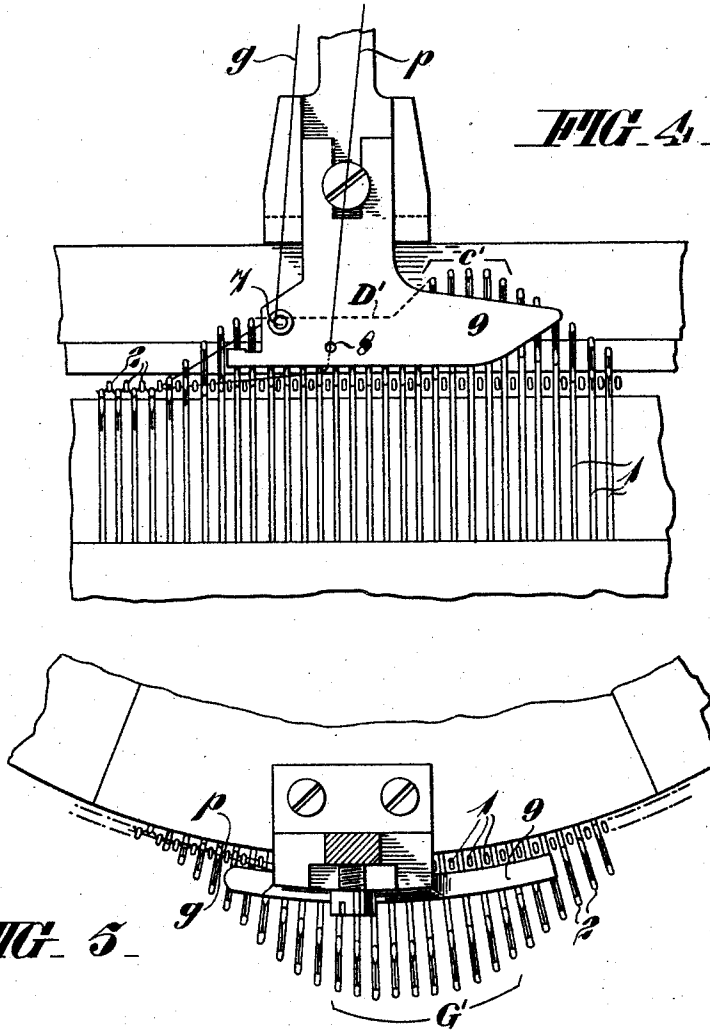
J. A. PHILLIPS

1,910,932

RIBBED KNITTED FABRIC

Filed May 3, 1930

2 Sheets-Sheet 2



INVENTOR  
J. A. Phillips,  
BY *Barber Collins*  
ATTORNEYS

# UNITED STATES PATENT OFFICE

JOHN ARCHIBALD PHILLIPS, OF NOTTINGHAM, ENGLAND

## RIBBED KNITTED FABRIC

Application filed May 3, 1930, Serial No. 449,646, and in Great Britain May 7, 1929.

This invention comprises improvements in ribbed knitted fabrics.

It is well known in the art that if a ground and plating thread are fed in the normal manner to the needles of a rib knitting machine each face of the fabric will present both threads. That is to say, on one face of the fabric the loops produced by the needles drawing thread in one direction will present one of the said threads, for example, the ground thread, and on the same face of the fabric the other thread, say the plating thread, will be presented by the loops produced by those needles drawing thread in the opposite direction. Similarly on the other face of the fabric the two threads will be presented but in the reverse relation to the manner in which they are presented on the first mentioned fabric face.

Numerous attempts have hitherto been made to produce ribbed fabrics which present one thread on one face and another thread on the opposite face, by feeding one thread to the needles which draw their loops in one direction and another thread to the needles which draw their loops in the opposite direction, but fabrics produced by these means embody two superposed webs joined at their sinker wales, or by additional threads, and consequently, do not possess the degree of elasticity common to ribbed fabrics.

The principal object of the present invention may be said to reside in the provision of means for overcoming the disadvantages common to previously known fabrics of the type set forth above and to produce a composite fabric presenting a ground thread on one face and a plating thread on the other face and having that degree of elasticity common to ribbed fabrics.

In an improved ribbed fabric according to this invention the ribs of one face are comprised by composite knitted loops of ground and plating threads, and the ribs of

the other face are comprised solely by knitted loops of the ground thread about which latter loops the plating thread is looped without being knitted.

The invention is to be clearly distinguished from ribbed fabrics which, for the purpose of reducing their elasticity, have been produced by feeding one yarn to all of the needles drawing loops in opposite directions and another yarn to the needles drawing loops in one direction and in which, when yarns of different colour are used, a subdued mottled or tinted appearance is imparted to the fabric by the blending of the colours.

Fabrics in accordance with this invention may be of the single web type or may be of the type comprising two ribbed webs having crossed sinker wales and in which the ribs of one web are disposed in the spaces between the ribs of the other web.

For the purpose of more fully describing the nature of this invention, reference will now be made to the accompanying drawings, wherein:—

Figure 1 is an enlarged view of a portion of single web plated rib fabric according to the present invention.

Figures 2 and 3 are a front elevation and plan respectively of an arrangement of needles and thread feeds for producing the fabric illustrated in Figure 1.

Figures 4 and 5 are similar views of an alternative arrangement for producing the said fabric, and

Figure 6 is an enlarged plan view of a portion of double web plated ribbed fabric according to this invention, some of the needles upon which the fabric is produced being also shown.

The production of the improved single web plated ribbed fabric according to this invention may be carried out on a circular knitting machine of the customary type adapted for producing ordinary ribbed fab-

ric, such a machine usually having a set of vertically disposed cylinder needles arranged in a predetermined order and co-operating with a predetermined arrangement of horizontally disposed needles accommodated within radial tricks in a dial suitably supported concentric with the needle cylinder. The needles may conveniently be of the latch type and are slidably operated in the well known manner by means of cams rotating relatively to the said needle cylinder and dial.

In a machine as above adapted for the production of the fabric illustrated in Figure 1, there is one horizontal dial needle interposed between each pair of vertical cylinder needles around the machine, the rows of loops A, which will be hereinafter referred to as rib loops, being produced by the cylinder needles and the rows of loops B, which will be hereinafter referred to as wale loops, being produced by the dial needles.

In one convenient arrangement of needles and thread feeding devices shown in Figures 2 and 3, adapted for producing the fabric shown in Figure 1, the cylinder needles are designated 1 and the dial needles are designated 2.

The body or ground thread *g* and plating yarn *p* are independently fed through suitable guides 3 and 4, at spaced positions around the machine and any suitable known type of thread tensioning devices may, if desired, be employed in connection therewith.

The sequential operation of the two sets of needles and the feeding of the threads in the production of the improved fabric are as follows:—

The cylinder needles 1 rise as shown at *c*, Fig. 2, and clear their old loops beneath their latches and are then lowered to the tucking height at *D*. Simultaneously, the dial needles 2 move forward under the influence of suitable cams of the customary type until they occupy the tucking position shown at *E*, Fig. 3, the old loops thereon remaining over their latches as shown. The dial needles are then retracted, take the plating yarn *p* and draw said plating yarn over and between the cylinder needles at the position *F*, Fig. 3. The needles 2 then again move forward and clear their old loops and the new plating yarn beneath their latches at the position *G*, after which the dial needles are again retracted and the cylinder needles lowered to cause both sets of needles to take and knit the body or ground yarn *g* which is fed by the suitably positioned feeders 3.

Both sets of needles travel around the machine in the direction of the arrow *X*.

The thread *p* is plated over the thread *g* in the well known manner on the cylinder

needles and covers the whole of the rib loops A in the fabric, and the said yarn *p* is cast off with and covers the upper parts of the old wale loops B, or wale loops of the last preceding course formed on the dial needles, and the said plated thread after leaving the dial needles appears on the same face of the fabric as the plated rib loops formed on the cylinder needles.

In connection with the fabric shown in Fig. 1, it will be understood that for purposes of clear illustration the ground yarn *g* is shown in hatched lines at the back of the plain plating yarn *p*, although in the actual fabric the yarn *p* is superposed on the yarn *g* and entirely hides same from view on the side of the fabric illustrated. As a consequence, each of the yarns *p* and *g* appears on one side only of the fabric illustrated except at the positions *x* where the yarns cross each other and in the fabric illustrated, a minute and inconsiderable portion of the ground thread appears on the front face and a similar portion of plating thread passes to the rear face of the fabric.

The loops of plating thread *p*, which rest loosely on the dial needles 2, when they move forward for the second time at the position *G*, to clear their old loops and the said plating thread beneath their latches, are retained on the needles, during such movement, by means of a smooth wire or other resilient metal guard or keeper 5 which bears against the said loose plating yarn and, as shown, extends around part of the circumference of the machine, immediately at the rear of the cylinder needles 1 and beneath the dial needles 2, the said keeper being supported from the dial cam box 6 or other convenient part of the machine.

In lieu of the wire or other keeper 5 for retaining the loose plating yarn on the needles, as above described, sinkers, web holders or one or more other suitable devices may be employed.

The above sequence of operations may be repeated at one or more different positions around the machine and any suitable known types of yarn changing mechanism may be employed at the two positions where the ground and/or plating yarns are fed.

In the modified arrangement of needles and yarn feeding device for producing the improved fabric, shown in Figures 4 and 5, the ground and plating yarns *g* and *p* are fed to the needles 1 and 2 through apertures 7 and 8 provided in a single feeder member 9 of any suitable form. The cylinder needles are raised at the position *C*<sup>1</sup> in Fig. 4, to clear their old loops, in the customary manner and are then lowered to the tucking height indicated at *D*<sup>1</sup>, the said needles being subsequently lowered to take and knit both of the threads *g* and *p*. Simultaneously, the dial needles are thrown fully outwards, as

shown at G<sup>1</sup> in Fig. 5, clear their old loops beneath their latches and are retracted to take the ground yarn *g* in their hooks but the plating yarn *p* under their latches. The aperture 8 through which the plating yarn *p* is fed to the needles is positioned as shown to the rear of and below the aperture 7 through which the ground yarn *g* is fed, to ensure the said plating yarn being laid upon the dial needles under the latches thereof. Therefore, both sets of needles 1 and 2 take and knit the ground yarn and the cylinder needles 1 also knit and plate the yarn *p* but the said yarn *p*, being received beneath the latches of the needles 2, is cast off the said needles 2, with the loops of the last preceding course, plates the upper parts of said loops and appears on the same face of the fabric as it does when it is subsequently cast off from the cylinder needles.

In this modification, by feeding the plating yarn directly beneath the latches of the dial needles 2 and subsequently retracting the said needles, there is no tendency for the loose plating yarn to move out of position and the necessity for the keeper member 5, in the arrangement illustrated in Figures 2 and 3, is obviated.

It is to be clearly understood that it is within the spirit and scope of the present invention to produce the improved ribbed fabric on circular machines other than of the type referred to above and to produce the said fabric on flat or straight bar knitting machines and the above described means for and method of producing the improved fabric are merely to be regarded as particular embodiments.

The particular fabric illustrated in Figure 1, wherein the plating yarn *p* constitutes practically the whole of one face thereof, while retaining substantially the same elasticity as a one-and-one plated ribbed fabric, is of a considerably lighter weight than such a fabric.

The invention may be applied to a double ribbed fabric of the type comprising two ribbed webs the sinker wales of which are crossed; and in which the ribs of one web are disposed in the spaces between the ribs of the other web, said double fabric being produced on a machine having two beds of oppositely positioned needles drawing loops in opposite directions, and the needles of both of the said beds being divided into two sets.

A fabric of the above type according to this invention is particularly adapted for production on a circular knitting machine but may readily be produced on other types of machines.

In producing the improved double fabric on a circular machine any desired even number of feeders may be provided, the feeders applying thread to the one set of needles al-

ternating with the feeders supplying separate thread to the other set.

Each of the two sets of needles producing the improved double plated ribbed fabric may operate in exactly the same manner as the needles hereinbefore described in connection with the production of the single web fabric shown in Figure 1. It should be noted, however, that whereas in the production of the single web fabric as hereinbefore described the dial needles may be regarded as one set and the cylinder needles as the other set, each of the two sets of needles for producing the double web fabric is composed of alternate of both dial and cylinder needles.

In Figure 6 the cylinder and dial needles indicated 1*a* and 2*a* constitute one set and the alternate needles indicated 1*b* and 2*b* constitute the other set.

The operation of each of the sets of needles 1*a* and 2*a*, and 1*b* and 2*b* in exactly the same manner as the needles 1 and 2 hereinbefore described results in the production of a fabric comprising two plated ribbed webs each identical with the fabric shown in Fig. 1 and joined by virtue of their sinker wales crossing. These webs are indicated at W<sup>1</sup> and W<sup>2</sup> in Fig. 6 wherein the loops of a portion of an improved double fabric according to this invention which have been last produced are shown in plan on the needles 1*a*, 1*b*, 2*a* and 2*b*.

It will be seen from reference to Fig. 6, that the one or front face of the fabric is composed of composite rib loops P of ground and plating thread and the other or rear face of the fabric is composed of single rib loops S of ground thread, at the back of which the plating thread *p* is cast with the loop S<sup>1</sup> appertaining to the preceding knitted course. Thus the front face of the fabric presents the plating thread only and the rear face the ground thread only.

The plating yarn *p* may extend continuously throughout the improved fabrics to provide a surface of a desired nature or colour on substantially the whole of one side thereof, as illustrated, or may be introduced in the fabric at predetermined positions, to provide thereon reinforced or pattern surfaces of a predetermined design, the fabric retaining substantially the same degree of elasticity common to ribbed fabrics.

I claim:—

1. A ribbed knitted fabric comprising two ribbed webs each composed of independent ground and plating threads, the said webs having crossed sinker wales and the ribs of one web being disposed in the spaces between the ribs of the other web, the ribs of both webs constituting one fabric face comprising loops composed of ground and plating threads and the ribs of both webs constituting the other fabric face being composed

solely of knitted loops of the ground threads about which latter loops the respective plating threads are looped without being knitted.

2. A ribbed knitted fabric wherein the 5 ribs of one face are comprised of composite knitted loops of ground and plating threads and the ribs of the other face are comprised solely of knitted loops of the same ground thread that comprises the ribs of the oppo-  
10 site face about which the same plating thread that comprises the ribs of the oppo-  
site face is looped without being knitted.

JOHN ARCHIBALD PHILLIPS.

15

20

25

30

35

40

45

50

55

60

65