H. T. BALLARD.

KNITTING MACHINE AND FABRIC (SPOT EFFECT).

APPLICATION FILED JAN. 15, 1920.

1,397,069. Patented Nov. 15, 1921.

Fig. 1.

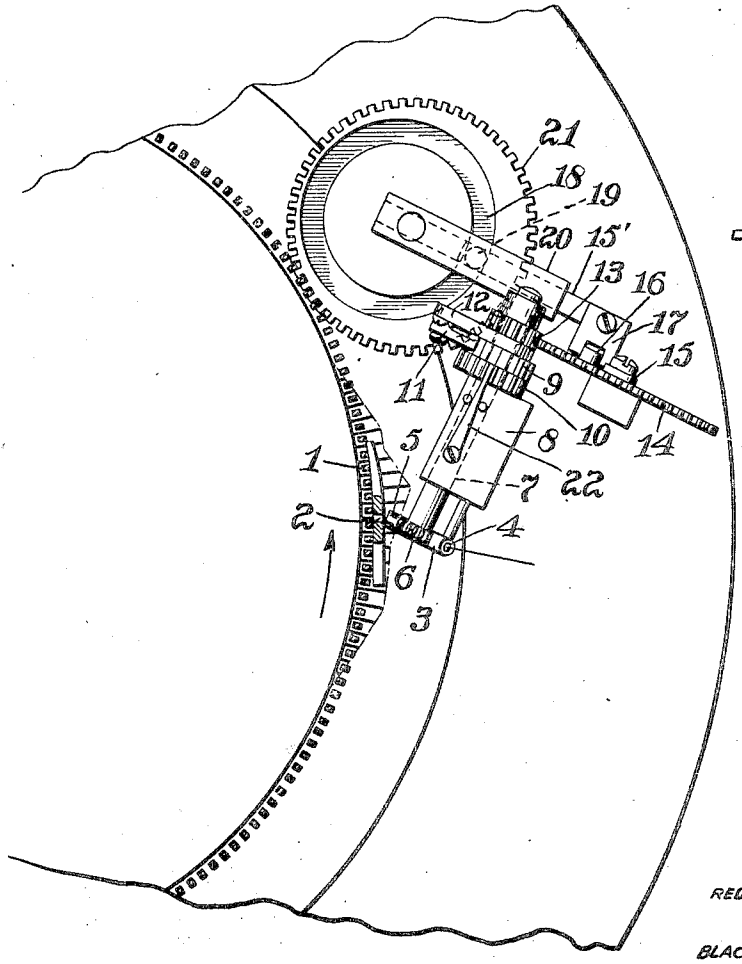


Fig. 2.

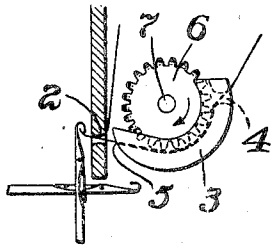


Fig. 4.

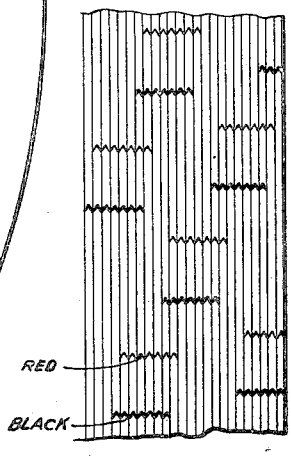
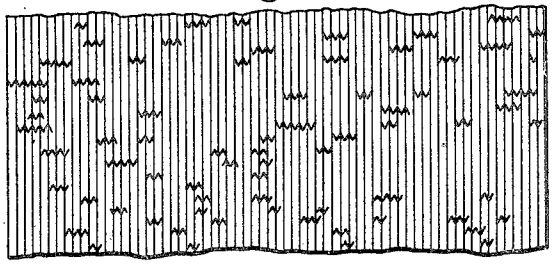


Fig. 3.



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UNITED STATES PATENT OFFICE.

HERBERT T. BALLARD, OF NORRISTOWN, PENNSYLVANIA.

KNITTING-MACHINE AND FABRIC, (SPOT EFFECT.)

1,397,069. Specification of Letters Patent. Patented Nov. 15, 1921.

Application filed January 15, 1920. Serial No. 351,703.

To all whom it may concern:

Be it known that I, HERBERT T. BALLARD, a subject of Great Britain, and a resident of the city of Norristown, State of Pennsylvania, have invented certain new and useful Improvements in Knitting-Machines and Fabrics, (Spot Effect,) of which the following is a specification.

My invention is designed to produce a fabric structure in which spots or lines of a different thread from that composing the body will appear in the knitted fabric.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the drawings—

Figure 1 is a plan view of a part of a knitting head of a machine embodying my invention.

Fig. 2 is a detail view of the feeder for the yarn which produces the spot effect.

Fig. 3 is a view of a portion of the fabric.

Fig. 4 is a view of a piece of fabric in which the spots are regularly disposed.

My invention may be carried out in various ways and it will therefore be understood that the form of apparatus shown is presented in an illustrative way and I do not intend that it shall be regarded as restrictive upon the scope of my invention.

I have shown it in the form of an attachment adapted to be associated with a knitting head of ordinary form, though I do not limit myself in this respect, as the mechanism used may be incorporated in the machine organization if desired.

In these drawings, 1 indicates an ordinary yarn guide having a guide eye 2 for the yarn, to direct it to the needles which in the particular case illustrated are arranged in two rows for making rib fabric. In front of this guide a supplemental yarn guide 3 is employed, this being of channel form having an inlet opening or eye 4 into which the supplemental yarn is led and a discharge mouth 5 from which the said supplemental yarn is directed through the ordinary guide eye 2 above mentioned. This guide 3 is of curved shape to conform to the periphery of a toothed wheel 6 which engages the yarn with its toothed edge and feeds it forward. The toothed wheel is rotated periodically in the direction of the arrow, each movement being adjustable to only a part or more than a complete revolution. This wheel is carried on a shaft 7 mounted in a bracket 8, which is adapted to be attached to the knitting head. The shaft is provided with a ratchet wheel 9 fixed thereon and a detent wheel 10 toothed substantially like the ratchet wheel and also fixed on the shaft. The ratchet wheel is operated by a pawl 11 carried by an arm 12 connected to a toothed wheel or segment 13 loose on the said shaft and to which a back and forth or reciprocatory movement is given by a larger toothed wheel or segment 14 mounted at 15 and oscillated about its axis by a slide 15′ engaging a pin 16 on the wheel. The slide has a suitable fork 17 for engaging the pin and it is reciprocated by a cam 18, the groove of which receives a pin 19 on the slide. The slide is mounted in a suitable portion 20 of the attaching bracket. The cam is carried by a toothed wheel 21 which meshes with the stems of the cylinder needles to be driven thereby.

The detent wheel is engaged by a spring detent 22 to prevent backward movement of the feed wheel shaft and consequently the feed wheel is driven only in the one direction to project the end of the supplemental yarn into the eye of the ordinary yarn guide.

This projected end of the supplemental yarn will be carried into the fabric with the main yarn and will then be broken off due to the stopping of the feed wheel when the pawl retracts for a new engagement with the ratchet wheel.

It thus will be seen that the toothed yarn feed wheel will project the end of the supplemental yarn at regular intervals and also the toothed wheel will act as a brake on the supplemental yarn when it stops its revolution and then the yarn will break off due to the draft thereupon, by the main yarn with which it contacts and interlocks in more or less degree.

This will produce spots in the fabric if the supplemental yarn is of a different color from that of the main yarn forming the body of the fabric, and these spots will be more or less irregular as indicated in the drawing, Fig. 3, due to varying conditions of contact with the main yarn, to the varying strength of the supplemental yarn at different points thereof, and to the varying grip of the toothed feed wheel upon the yarn and its fibers.

The attachment may be applied to a knitting head without making any change in the latter.

The toothed drive wheel which meshes with and is driven by the needle stems may have such a number of teeth that it will not begin its revolution on the same needle stem, but may either lag or advance in respect thereto and thus the spots will arrange themselves in a spiral series around the knitted tube instead of in straight up and down series.

I do not limit myself to any particular form of body structure. This may be plain rib or it may be rib with blocks of tuck fabric disposed therein at different points, or it may comprise a structure in which spiral zig-zag stripes or diamond shape blocks are presented in the fabric.

I claim:—

1. In combination with a main yarn guide, a supplemental yarn guide, a feeding element for feeding the supplemental yarn to the main yarn guide, means for periodically moving said element and holding it between its periodic movements to act as a brake on the supplemental yarn, and driving means for said element comprising a toothed wheel meshing with the needle stems and having its teeth of such number as to divide unequally into the number of needles, substantially as described.

2. In combination with a main yarn guide, a supplemental yarn guide directed to the main yarn guide, a toothed wheel acting as a feeder for the supplemental yarn, and means for driving said wheel periodically, comprising a horizontal shaft, a ratchet thereon, a pawl to engage the ratchet, gears or segments for oscillating the pawl, a horizontal toothed wheel to engage the needle stems and a cam operated by said horizontal toothed wheel with means for driving the gears from the said cam, substantially as described.

In testimony whereof, I affix my signature.

HERBERT T. BALLARD.