

(No Model.)

2 Sheets—Sheet 1.

W. STAFFORD.
KNITTING MACHINE.

No. 591,199.

Patented Oct. 5, 1897.

Fig. 1.

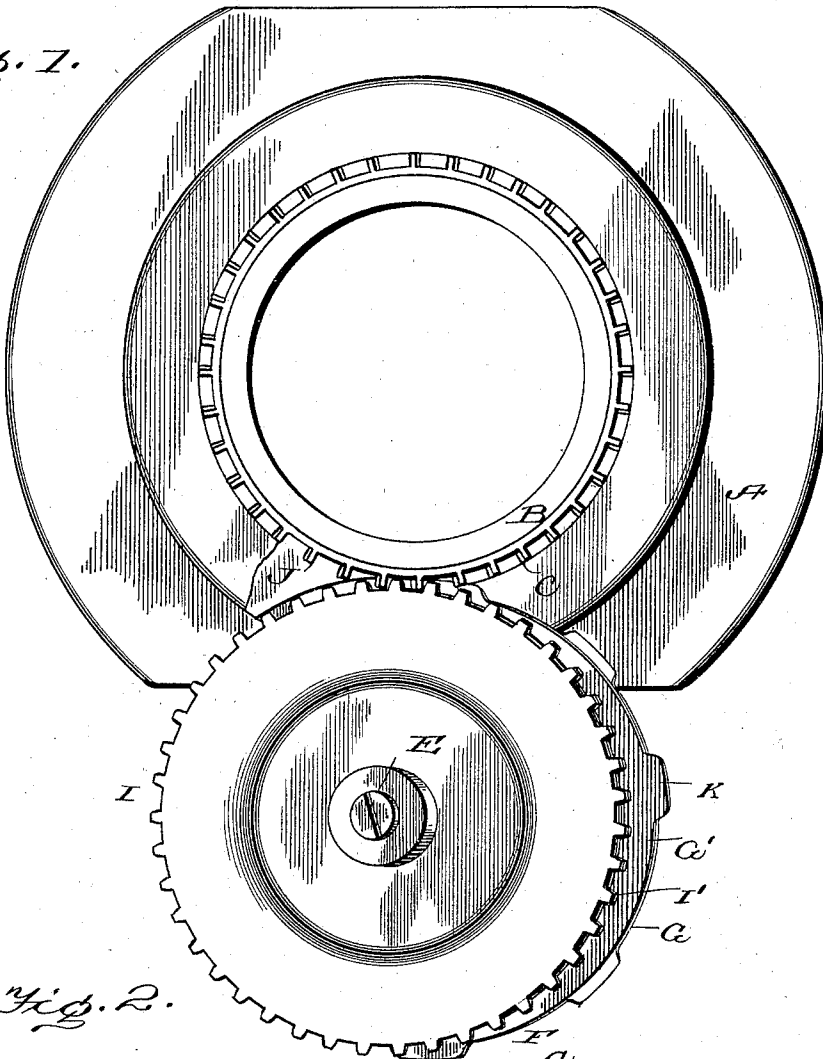
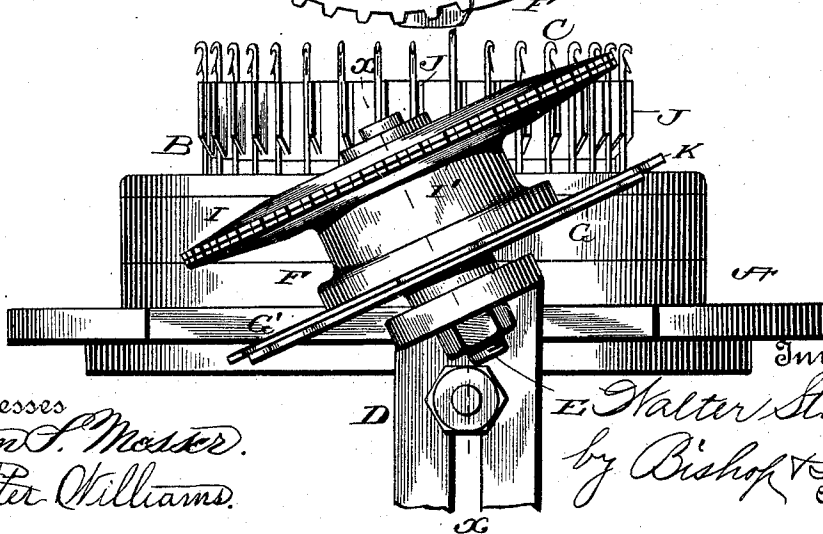


Fig. 2.



Witnesses
Simon S. Moser.
Walter Williams.

Inventor
Walter Stafford
by *Bishop & Smith*
Attorneys.

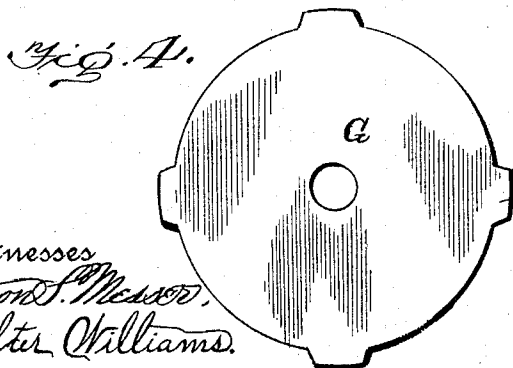
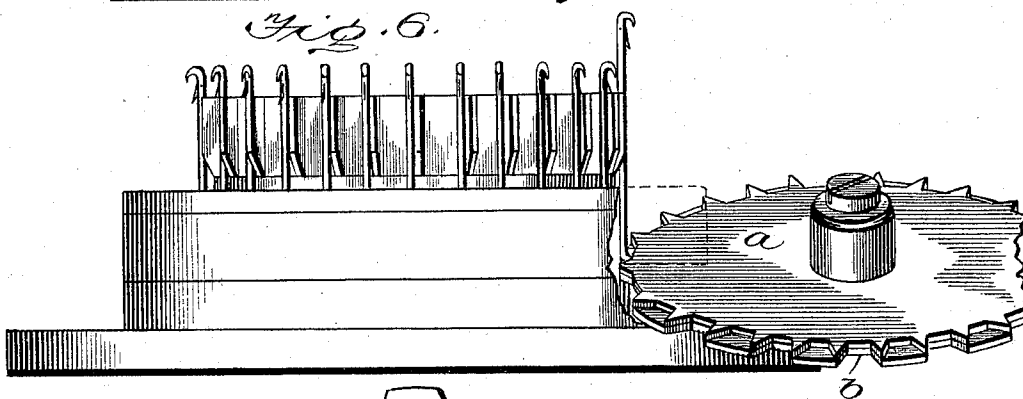
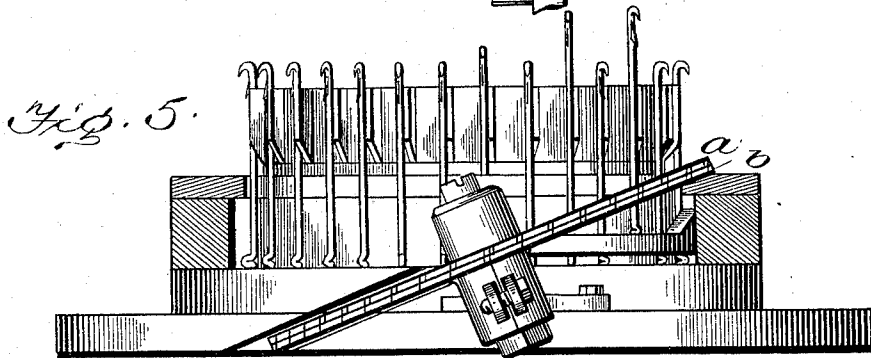
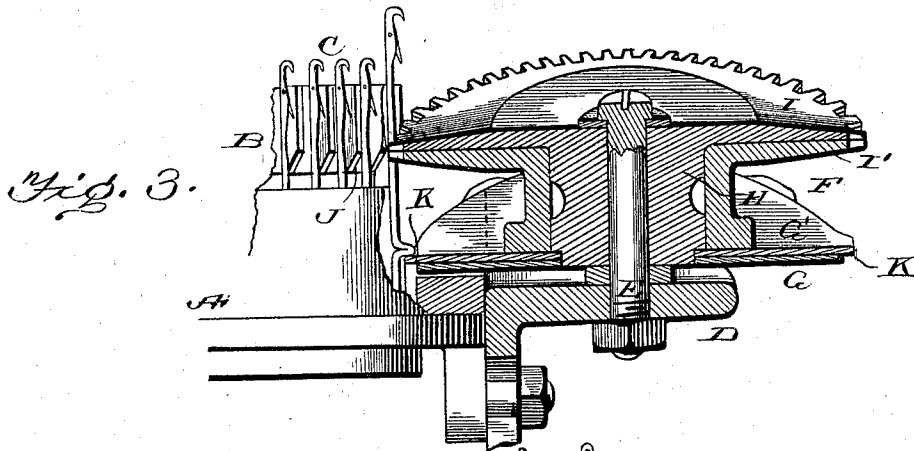
(No Model.)

2 Sheets—Sheet 2.

W. STAFFORD.
KNITTING MACHINE.

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Patented Oct. 5, 1897.



Witnesses
Samuel S. Messer,
Walter Williams.

Inventor
Walter Stafford
by *Bishop & Irvine*
Attorneys.

UNITED STATES PATENT OFFICE.

WALTER STAFFORD, OF LITTLE FALLS, NEW YORK.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 591,199, dated October 5, 1897.

Application filed February 18, 1897. Serial No. 824,045. (No model.)

To all whom it may concern:

Be it known that I, WALTER STAFFORD, a citizen of the United States, residing at Little Falls, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Knitting-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention is an attachment for knitting-machines by the use of which the ordinary circular-knitting machine may be made to form stripes or other designs; and it consists in certain novel features hereinafter described and claimed.

In the annexed drawings, which fully illustrate my invention, Figure 1 is a plan view of a knitting-cylinder with my attachment applied thereto. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view taken on line *x x* of Fig. 2. Fig. 4 is a detail view of one of the pattern-disks. Figs. 5 and 6 are side views showing a modified form of the device.

The bed-plate A, the needle-cylinder B, and the needles C are of the usual or any preferred construction and form no part of my present invention. Attached to the bed-plate is a bracket D, in the outer end of which is secured an obliquely-arranged stud or pin E, and on this oblique stud or pin is mounted a rotary jacquard or pattern-controller F, consisting of a gear actuated by the needle-cylinder, and a pattern-disk carried by said gear.

In the preferred form of the device the pattern-disk G is secured to the lower end of a sleeve or hub H, which fits over the stud E and to the upper end of which the gear I is secured. The gear meshes with the tricks J of the needle-cylinder, so as to be rotated thereby, and the pattern-disk is provided on its edge with spurs K, adapted to engage the needle-butts. The jacquard, it will be noticed, is in the same vertical plane as the needle-cylinder, but is arranged at an angle to the horizontal plane of the same. Consequently as the cylinder revolves its tricks will engage the gear of the jacquard and rotate

the same, thereby imparting motion to the pattern-disk, so that as the spurs thereon pass around they will engage under the needle-butts and thereby lift the needles.

The operation of the knitting-machine to form stripes will be readily understood. The machine has two sets of needles, each carrying its own colored yarn. As the cylinder rotates the pattern-controller will be rotated and a spur on the pattern-disk will pass under the butt of a needle and travel with that needle until the circumferences of the cylinder and the disk separate sufficiently to remove the spur from under the needle-butt. The inclination of the disk causes the needle to rise, and the color carried by this raised needle is knit in the fabric, while the needles which are not raised do not knit at all on this feed of the machine, but form a background consisting of a mixture of all the colors on the machine, the raised needles producing a solid stripe. After the spur leaves the needle-butt the needle drops to its former position by its own weight. If the number of gear-teeth on the pattern-controller is equal to the number of tricks on the knitting-cylinder, the same needles will be acted on during each revolution, and consequently the stripes will be formed vertically on the fabric; but if the number of gear-teeth should be different from the number of cylinder-tricks a different needle or set of needles will be raised during each successive revolution and the stripes therefore caused to run obliquely on the fabric. The loops are formed on the machine and the needles operated in the usual manner well known to those skilled in the art, and my attachment may be applied to any vertical-cylinder knitting-machine without necessitating any change in the construction of the machine except such slight minor adjustment as will readily suggest itself to the skilled mechanic in fitting the attachment.

In order to provide for a multiplicity of designs, the jacquard is preferably built in duplicate, a second gear-wheel I' being arranged below the gear I and secured thereto in any convenient manner. The hub of this gear I' surrounds the hub of the gear I and has a pattern-disk G', secured to its lower end, similar in construction to the pattern-disk G. Supposing, for instance, there are sixty-four

tricks in the cylinder and one of the gear-wheels has sixty-five teeth while the other has sixty-three teeth, now then on each revolution of the cylinder the designer having
 5 sixty-five teeth will overreach one tooth, and consequently a spiral stripe will be produced by the pattern advancing one needle at each revolution of the cylinder, while at the same time the other designer will lose one needle
 10 at each revolution and produce a spiral stripe running in the opposite direction, the result being a diamond-shaped design. By having several different interchangeable pattern-disks and interchanging the same any desired pattern may be produced.

Where a smaller and more compact arrangement of the device is desired, I employ the modified form of the device shown in Figs. 5 and 6. In this form the gear-wheel is in the
 20 form of a disk *a*, the teeth of which mesh with the needle-butts, so that the device will be rotated by the needles instead of by the cylinder-tricks. The pattern-disk *b* is arranged immediately below and is secured to the gear,
 25 and its spurs register with certain of the spaces between teeth of the gear, thus engaging under certain needle-butts as they rotate the device, the continued rotation lifting the needles. The pattern, it will be readily understood, will depend on the number of spurs
 30 formed on the disk, and to form a different pattern the disk must be removed and one having a different arrangement of spurs substituted. The same result could be accomplished by making the spurs removable, and
 35 such construction is within the scope of the invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An attachment for knitting-machines consisting of a rotary pattern-controller set at an angle to the horizontal plane of the knitting-cylinder driven directly by said cylinder and provided with lifting-spurs adapted
 45 to engage under the needle-butts.

2. An attachment for knitting-machines consisting of a gear-wheel meshing with the tricks of the knitting-cylinder and a pattern-disk carried by the said gear-wheel and provided with integral lifting-spurs adapted
 50 to engage under the butts of the knitting-needles.

3. An attachment for knitting-machines consisting of gear-wheels meshing with the tricks of the knitting-cylinder and concentric pattern-disks carried by said gear-wheels and provided with lifting-spurs adapted to engage under the needle-butts.

4. An attachment for knitting-machines consisting of a bracket adapted to be secured to the bed-plate of the knitting-machine, an obliquely-arranged stud secured in said bracket, concentric sleeves or hubs fitted on said stud, gear-wheels at the upper ends of
 60 said sleeves, and pattern-disks at the lower ends of the same.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER STAFFORD.

Witnesses:

GEO. D. SMITH,
 J. W. SHERMAN.