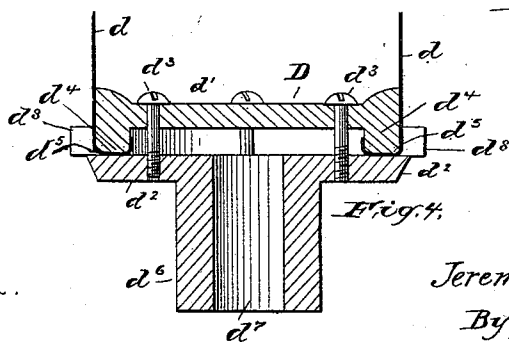
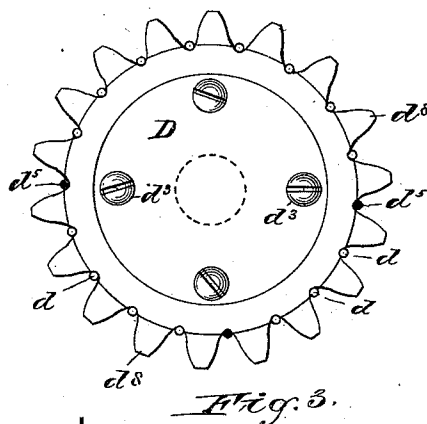
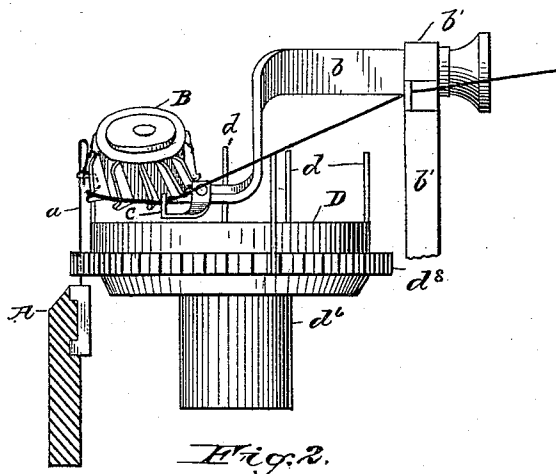
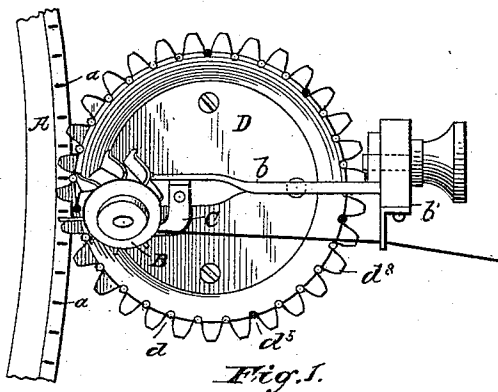


(No Model.)

J. P. HARRIMAN.
KNITTING MACHINE.

No. 428,304.

Patented May 20, 1890.



Witnesses
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UNITED STATES PATENT OFFICE.

JEREMIAH P. HARRIMAN, OF WOONSOCKET, RHODE ISLAND.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,304, dated May 20, 1890.

Application filed June 12, 1889. Serial No. 313,955. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH P. HARRIMAN, a citizen of the United States, and a resident of the city of Woonsocket, county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

My invention, while relating generally to that class of knitting-machines which employs spring-bearded needles, has reference more particularly to that form of such machine which is made use of in the manufacture of fancy-striped fabrics from a plurality of different-colored yarns by throwing one of such yarns to the front and knitting it into the fabric to form the stripe or ground thereof, while the remaining yarn or yarns are floated across its back. In the manufacture of fabrics of this character upon knitting-machines employing spring-bearded needles a separate loop-wheel for each yarn is essential, and as heretofore conducted the floating of the particular yarn or yarns not required for the face of the fabric has been accomplished by interposing between the desired blades or wings of the loop-wheel filling-pieces, which, acting upon the beards of the needles at the times when the yarns were being delivered to them, compressed such beards against their needles, and thereby prevented the yarn from passing thereunder, the order in which the yarns were carried to the front and knitted into the fabric to form the stripes or body being determined by the relative arrangement of the filling-pieces of one loop-wheel with respect to those of the other or others, as shown, for instance, in British Patent No. 2,823 of 1861, it being understood that fabrics of this character are knitted with their backs or wrong sides out. The particular construction and arrangement of parts above noted, while efficient in knitting longitudinal stripes and other simple patterns, have been found defective in practice when more intricate designs have been attempted, principally because of the restricted limits within which the filling-pieces may be arranged, due to the small diameter of the loop-wheels. I have discovered that by employing a series of pins arranged around a suitable hub or base in such a manner as to be brought in front of the beards of the desired

needles at the time the yarn is presented to them by the loop-wheel this defect may be obviated and such yarn properly floated without the necessity of employing filling-pieces between the blades or wings of the loop-wheel for that purpose.

My invention therefore consists, first, in the structure embodying such pins, which, for convenience of description, will be designated herein a "guard;" second, in the combination of such guard with a series of spring-bearded needles and a loop-wheel, and, third, in various other combinations and arrangements of parts subsidiary thereto, all as will hereinafter more fully appear.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a plan view of a portion of a needle-cylinder, showing a loop-wheel, its supporting arm and post, and a yarn-guide with my invention applied in connection therewith; Fig. 2, a side view thereof; Fig. 3, a plan view of the guard detached; and Fig. 4, an axial section of the same, showing more fully the preferred construction thereof.

In all the figures like letters are employed to designate corresponding parts.

A indicates the needle-cylinder; *a*, the spring-bearded needles secured thereto; B, the loop-wheel for conducting the yarn to the hooks of the needles; *b b'*, the supporting arm and post, respectively, for such loop-wheel, and C the guide through which the yarn is delivered to the loop-wheel. The several parts as thus referred to present no novelty in themselves, but are or may be of any ordinary or preferred construction and require no further description herein.

D indicates the guard, by means of which the yarn when not required in the face of the fabric is floated and the design or pattern being knit thereby determined. This guard in the preferred form of construction consists of an upper and under disk *d' d''*, respectively, between which are clamped, through the intervention of screws *d'''* or other equivalent means, the lower ends of a series of pins *d*. The distance between these pins, when none are omitted, will be the same as that between the needles of the machine in connection with which the guard is to be employed, and in order to hold them firmly in the required position, and at the same time permit of arrang-

ing them in any desired order, I find it convenient to bend their lower ends inward and upward for co-operation with a depending flange d^4 on the under side of the upper disk d' , which flange is provided with grooves or notches d^5 , formed at the proper distance apart around its under side, as shown in Figs. 3 and 4. As thus constructed, the guard is arranged in relation to the needles a and the loop-wheel C, as shown in Figs. 1 and 2, with the upper ends of the pins substantially touching the outer sides of the beards of the needles as they are successively brought into relation with them, and with the loop-wheels supported within the circle of such pins, leaving its blades or wings projecting between them. To hold the guard in this position and allow of its rotation, the under of its sections d^2 is preferably provided with a depending hub d^6 , through which is formed axially an orifice d^7 for reception of a suitable axis, (not shown,) while in a circumferential flange projecting from the lower edge of the upper disk d' is formed a series of teeth d^8 for engagement with the shanks of the needles, whereby the guard is rotated and the pins carried by it successively brought into relation with the needles as required. The functions of these pins d being to cover and prevent the hooks of the needles with which they co-operate from engaging the yarn when presented to the latter by the loop-wheel, it follows that if the entire complement of pins is employed in the guard the yarn which such guard controls will not be engaged by any of the needles, but will be floated at all times. In order, therefore, to permit of this yarn being engaged by the needles as the exigencies of the pattern being knit may demand, certain of the pins will be omitted, leaving the loop-wheel free to deliver it thereto without hinderance, the number of pins omitted and the arrangement of those remaining determining the pattern or design to be produced. It will thus be seen that with a guard of this construction I am able to float such of the yarns as are not required at the time on the face of the fabric without the use of filling-pieces in the loop-wheel, and in consequence of its greater diameter to so dispose the pins as to knit more intricate patterns than has been possible heretofore, it being understood that in practice two or more of these loop-wheel guards and yarn-guides will be employed with the same series of needles as is common with the loop-wheel and yarn-guides in the Letters Patent before mentioned, to which reference may be had.

In Fig. 1 I have shown an arrangement of pins in which all but five are omitted, and in Fig. 3 a similar arrangement in which all but three are dispensed with, the dots in these figures illustrating the pins and the small circles the spaces where the pins have been omitted.

To arrange the pins in the guard, or to "set it up," as it is called, the screws d^3 are

first withdrawn and the upper disk d' removed and inverted, when the pins are hooked over the flange d^4 in the position they are to occupy, the under disk d^2 placed over them, the screws d^3 inserted, and again turned home. The guard may then be mounted upon its axis and is ready for operation.

In the foregoing I have shown the best means contemplated by me for carrying my invention into practice; but it is to be understood that I do not limit myself thereto, as it is obvious that I may modify the same in various ways without departing from the spirit thereof.

I am aware that a wheel having a series of pins projecting from a hub or support has heretofore been employed in connection with a series of bearded needles for the purpose of supplying a backing-yarn thereto and insuring its being knitted into the fabric. This I do not claim. My invention differs from this, in that, while such prior structure is designed to supply yarn to the needles and act between them, my guard-wheel acts against the beards of such needles and prevents the yarn being taken by them.

Having thus described my invention and one way in which it is or may be carried into effect, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, with an upper and under disk d' d^2 , the former of which is provided with a depending flange d^4 and grooves or notches d^5 , of a series of pins d , having their lower ends bent inward and upward, and screws d^3 , as and for the purposes set forth.

2. The combination, with an upper and under disk d' d^2 , the former of which is provided with a depending flange d^4 , grooves or notches d^5 , and teeth d^8 , of a series of pins d , having their lower ends bent inward and upward, and screws d^3 , as and for the purposes set forth.

3. The combination, with a series of spring-bearded needles, a loop-wheel, a yarn-guide, and supports for the two latter, of a guard embodying in its structure a series of pins, each pin of which is brought in front of and adjacent to an appropriate needle to prevent the latter from taking the yarn, substantially as described.

4. The combination, with a series of spring-bearded needles, a loop-wheel, a yarn-guide, and supports for the two latter, of a guard having a toothed flange for engagement with the shanks of the needles, and a series of pins, each pin of which is brought in front of and adjacent to an appropriate needle of the series to prevent such needle from taking the yarn, substantially as described.

In testimony whereof I have hereunto set my hand this 1st day of June, 1889.

JEREMIAH P. HARRIMAN.

Witnesses:

HENRY CARTER,
WM. H. APPLETON.