No. 864,115. PATENTED AUG. 20, 1907.

# L. N. D. WILLIAMS & H. SWINGLEHURST.

## KNITTING MACHINE.

APPLICATION FILED JULY 8, 1904.

2 SHEETS—SHEET 1.

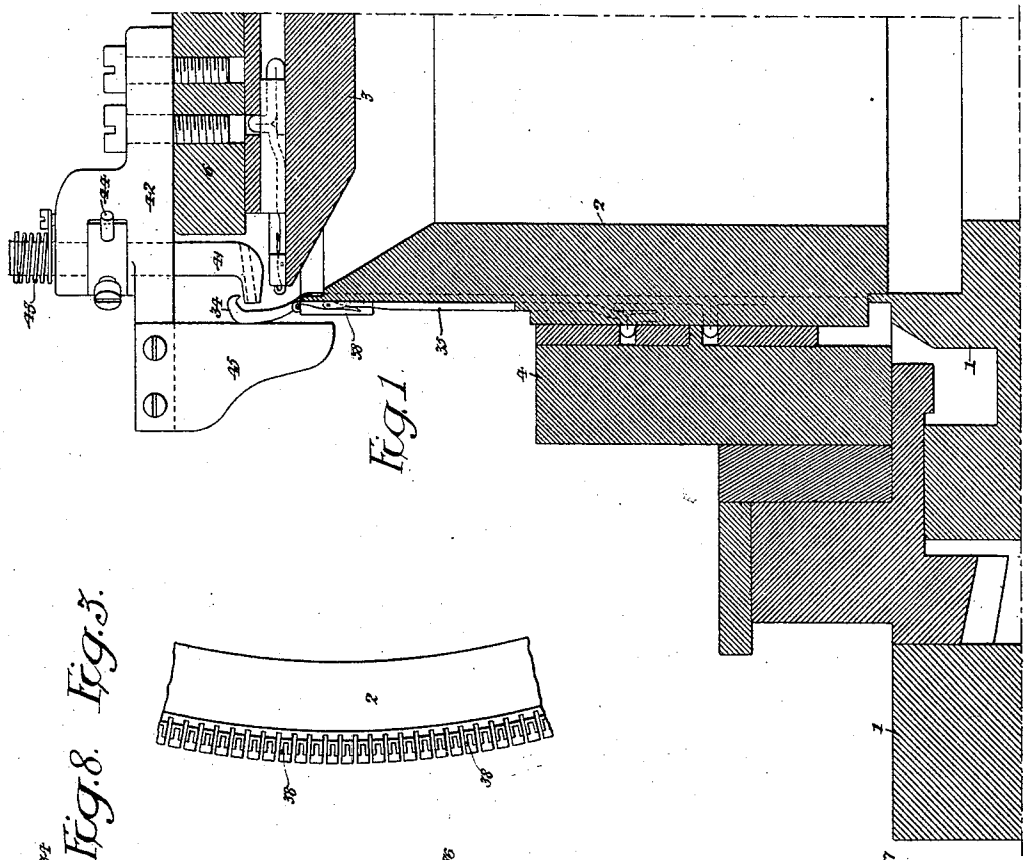


Fig. 1



Fig. 3.

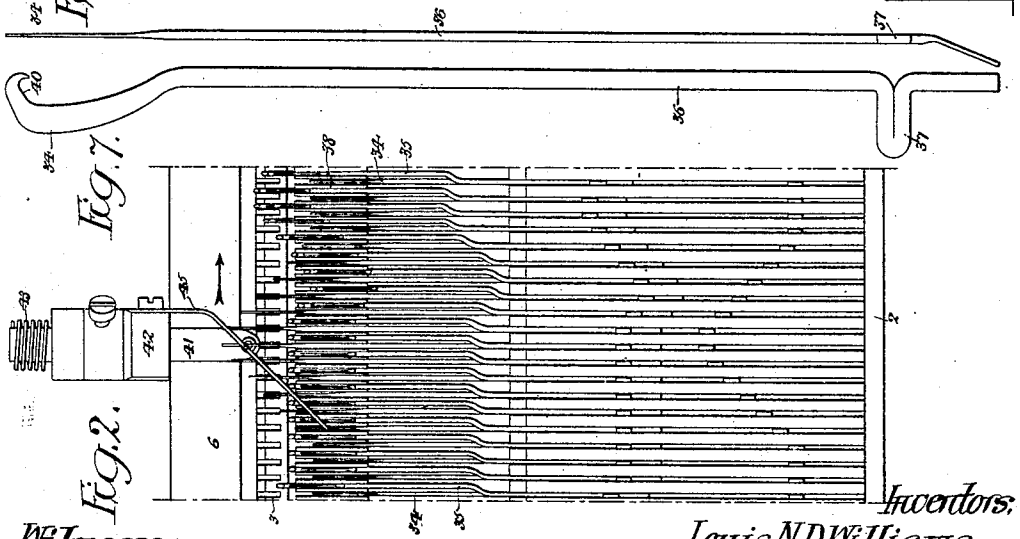


Fig. 8.



Fig. 7.



Fig. 2.

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2 SHEETS—SHEET 2.

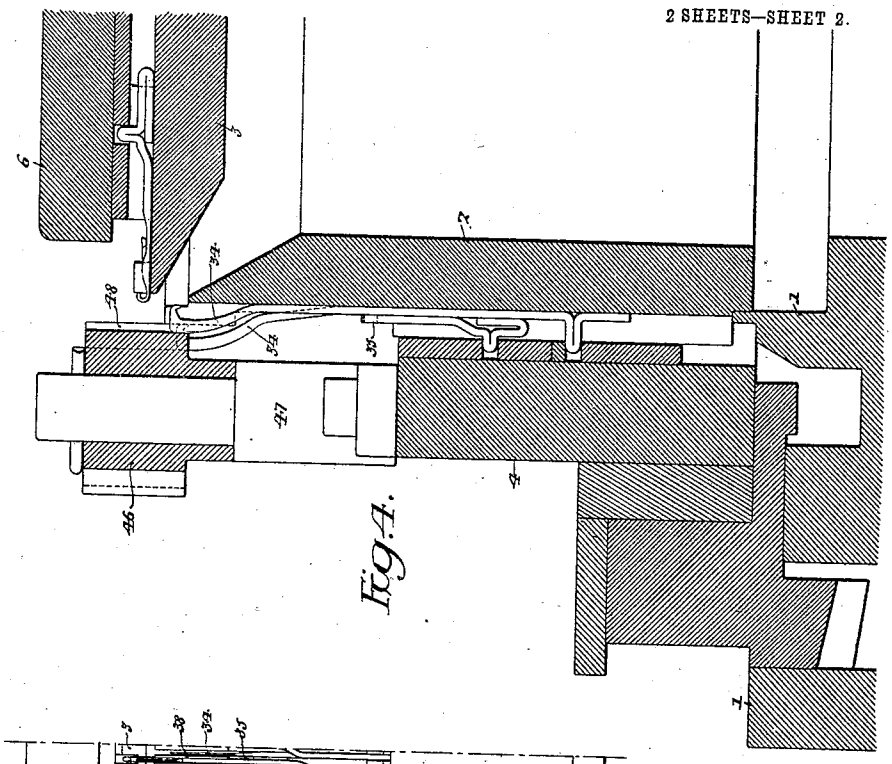


Fig. 4.

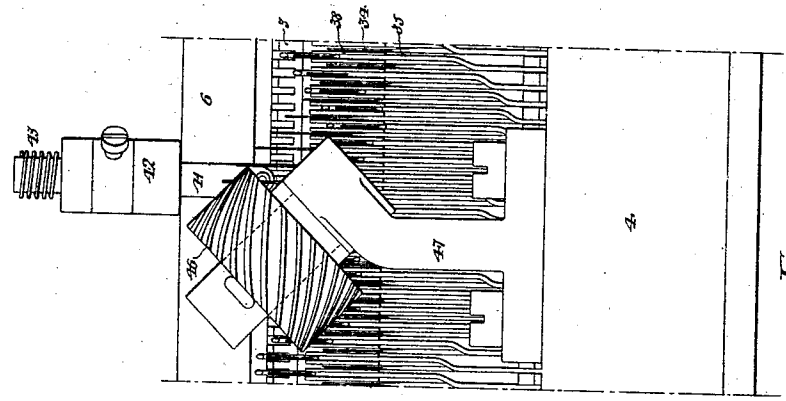


Fig. 6.

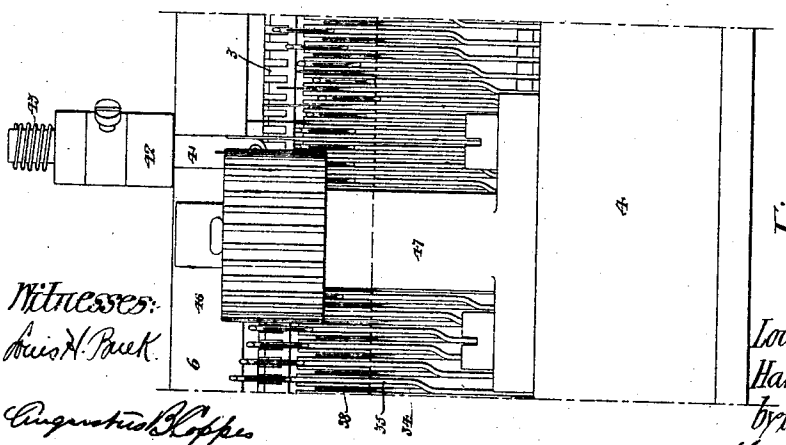


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## KNITTING-MACHINE.

No. 864,115. Specification of Letters Patent. Patented Aug. 20, 1907.

Original application filed May 29, 1903, Serial No. 159,343. Divided and this application filed July 8, 1904. Serial No. 215,792.

*To all whom it may concern:*

Be it known that we, LOUIS N. D. WILLIAMS and HARRY SWINGLEHURST, both citizens of the United States, and residents, respectively, of Ogontz, Pennsylvania, and Philadelphia, Pennsylvania, have invented certain Improvements in Knitting-Machines, (the same being a division of our application Serial No. 159,343, filed May 29, 1903,) of which the following is a specification.

The objects of our invention are to improve the action of the loop-drawing hooks used in connection with that class of knitting machines which combine a fleecing weft thread with a knitted fabric, and to prevent injury to said hooks or to the fleecing thread feeder by contact of one with the other.

In the accompanying drawings, Figure 1, is an enlarged vertical section of parts of the dial cam plate, the dial, the needle cylinder, the cylinder cam ring and other parts of a rib knitting machine, sufficient to illustrate the application of our invention thereto; Fig. 2, is a face view of certain of the parts illustrated in Fig. 1; Fig. 3, is a plan view of part of the needle cylinder; Fig. 4, is a view similar to Fig. 1, but illustrating a special form of controlling device for the hooks which draw the loops of the fleecing thread; Fig. 5, is a face view of the same; Fig. 6, is a similar view showing another form of presser, and Figs. 7 and 8, are respectively a side view and a front view of one of the looper hooks.

Referring, in the first instance, to Fig. 1, it will be noted that 1 represents the fixed table or bed of the machine, 2 the stationary needle cylinder, 3 the stationary needle dial, 4 the vertical cam cylinder, and 6 the dial cam plate. My invention is, however, also applicable to that class of machines in which the needle cylinder and needle dial rotate and the dial cam plate and vertical cam cylinder are stationary. The hooks 34, which are employed to draw the loops of fleecing yarn in machines of that class, alternate with the needles 35 of the cylinder 2.

Each of the looping hooks 34 has a shank portion 36 with butt 37 as shown in Figs. 7 and 8 for engagement with the cams whereby the reciprocating movement of the looping hook is effected, and the hook is reduced in thickness in respect to the shank, as shown in Fig. 8, so as to provide the maximum amount of clearance between the same and the sinker bits 38 of the needle cylinder. The grooves for the reception of the looping hooks 34 are deeper than the grooves which receive the needles 35, as shown in Fig. 3, the top of the needle cylinder being cut away, at the inner ends of the hook-receiving grooves, to a point some distance below the tops of the stationary knocking-over bits 38, as shown in Fig. 1, so that the loops of fleecing yarn can be drawn further than the loops of knitting yarn and can be cast to the inner side of the stitches carried by the cylinder needles 35.

To aid in throwing the fleecing yarn loops inwardly in the manner described each looper hook has an upwardly beveled throat 40, as shown in Fig. 7, the effect of which, as the hook is pulled down onto the fleecing yarn, is to direct the latter inwardly against the depending point of the hook. The fleecing yarn guide 41 has a vertical stem which is free to turn in bearings in a bracket 42 secured upon the upper face of the dial cam ring 6, as shown in Fig. 1, the upper projecting end of the stem being acted upon by a coiled spring 43 which tends to constantly maintain the hooked lower end of the feeder in position for delivering yarn to the hooks 34, this position being determined by contact of the bracket 42 and a stop pin 44 on the stem of the feeder. If, however, a misplaced hook should strike the feeder 41 the same is free to yield so as to permit the passage of said misplaced hook and will then be restored by the action of the spring 43 to its proper operative position, thereby preventing injury either to the hook or feeder which would necessarily result if the said feeder was rigidly supported. In the machine shown in the drawing, the cams for imparting vertical reciprocation to the looper hooks are located below the cams for actuating the knitting needles, the character of the cams being indicated by the showing of the respective courses of the looper hook bits and needle bits in Fig. 2.

In order to insure the presentation of the hooks 34 in proper position to receive the fleecing yarn from the feeder 41 we employ a hook presser which travels with the fleecing yarn feeder and so acts upon each of the hooks which is to receive the yarn from said feeder as to insure the catching of said yarn by the hook as the latter is drawn downwardly. Where the loops of fleecing yarn are to be drawn between successive wales of the fabric and where, therefore, each of the looping hooks has to be thus acted upon, we employ a presser 45 such as shown in Figs. 1 and 2, said presser consisting of a simple plate of sheet metal secured at its upper end to the bracket 42 and bent at the lower end so as to extend downwardly at an angle across the backs of the hooks 34. Supposing the fleecing yarn guide and presser to be traveling in the direction of the arrow, Fig. 2, each of the elevated looper hooks 34 will be engaged by the inner edge of the presser plate when it is receiving fleecing yarn from the guide 41 and will remain under the influence of said presser plate as it is being drawn down and until the loop of fleecing yarn has been

formed, thus preventing either the missing of the fleecing yarn by the looper hooks or the incomplete formation of the loops of fleecing yarn by said hooks.

In that class of machines in which the loops of fleecing yarn are separated by pairs or groups of wales in each course, and in which the loops of fleecing yarn in one course are staggered in respect to the loops of the adjoining courses, we employ an intermittent presser instead of the continuous presser shown in Figs. 1 and 2, such intermittent presser acting only upon certain of the looper hooks on each rotation of the machine and acting upon different hooks on one rotation from those acted upon on the next rotation. Such intermittently operating presser is preferably made in the form of a notched wheel or disk, as shown at 46 in Fig. 4, this wheel or disk being rotatably mounted either in a horizontal or in an inclined position on a bracket 47 on the cylinder 4 and being provided with projecting bits 48 for entering the spaces between the looper hooks, whereby rotation of the disk is caused by engagement of said bits with the hooks. Between the bits 48 the presser has shallow notches as shown at the right in Fig. 4, or deep notches as shown at the left in said figure, the shallow notches corresponding with the hooks which are to be pressed, and the deep notches corresponding with the hooks which are not to be pressed. By providing the presser with an even number of bits and the needle cylinder with an odd number of looper hooks, the desired pressing of different hooks in successive courses can be readily effected.

It will be observed that both the rigid presser 45 shown in Fig. 2, and the rotating pressers shown in Figs. 4, 5 and 6 serve to prevent deflection of the looper hooks at the yarn feed point from the vertical plane in which they are moved by the cams, and that in this respect both of these constructions perform the same function.

Having thus described our invention, we claim and desire to secure by Letters Patent:—

1. The combination of a needle cylinder and its looper hooks, means for reciprocating the latter, a fleecing yarn guide having a projecting nose, and a pivotal axis parallel with the plane of reciprocation of the looper hook, a carrier for said guide, and a spring and stop acting upon the guide so as to normally retain the same in and return it to operative position but permit it to yield in the event of side contact between its nose and one of the looper hooks.

2. The combination in a knitting machine of the knitting needles and cams, looper hooks, cams for moving the latter in a certain plane, a guide for feeding yarn to said looper hooks, and a presser acting upon the backs of the hooks and serving to prevent deflection of the same from said plane at the point where they receive the yarn from the guide, substantially as specified.

3. The combination in a knitting machine, of knitting needles and cams, looper hooks, a guide for feeding yarn thereto, looper hook actuating cams and a rotating presser having portions for acting upon certain of the hooks whereby yarn is fed to some of the hooks and the others are free from engagement with said yarn, substantially as specified.

4. The combination in a knitting machine, of knitting needles and cams, a fleece yarn feeder, looper hooks normally occupying a position free from engagement with said yarn, cams for actuating said hooks and a rotating presser having portions for engaging certain of said looper hooks, and moving them into position to engage said yarn, substantially as specified.

5. The combination in a knitting machine, of knitting needles and cams, a fleece yarn feeder, looper hooks, cams for actuating same, a movable presser carrier, and a presser having bits for engaging said hooks so as to cause rotation of the presser, and intervening deep and shallow grooves whereby certain of the hooks will be pressed, and others will not be pressed, substantially as specified.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

LOUIS N. D. WILLIAMS.
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Witnesses:
LORETTO A. COSUTTO,
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