

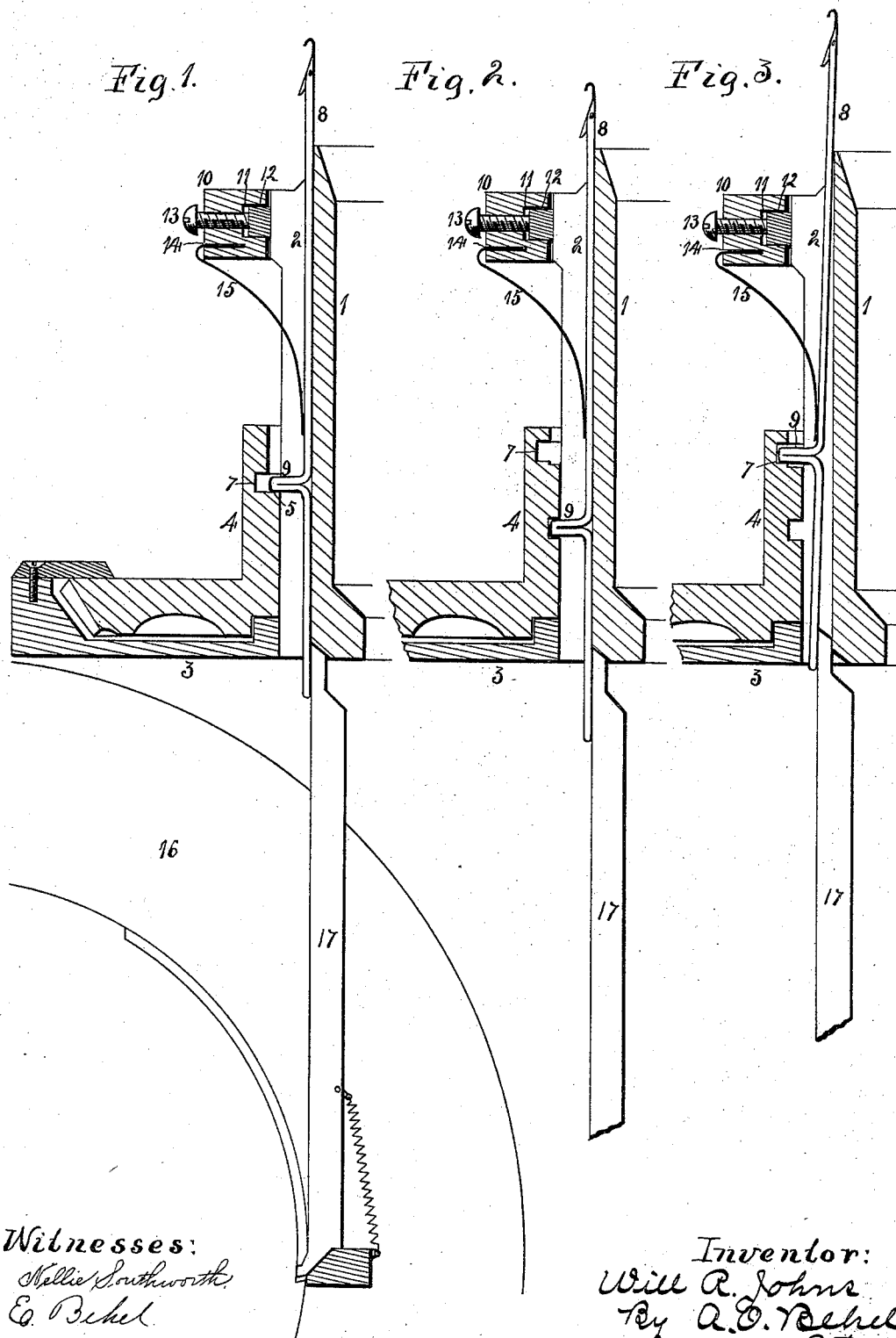
(No Model.)

2 Sheets—Sheet 1.

W. R. JOHNS.
KNITTING MACHINE.

No. 540,391.

Patented June 4, 1895.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

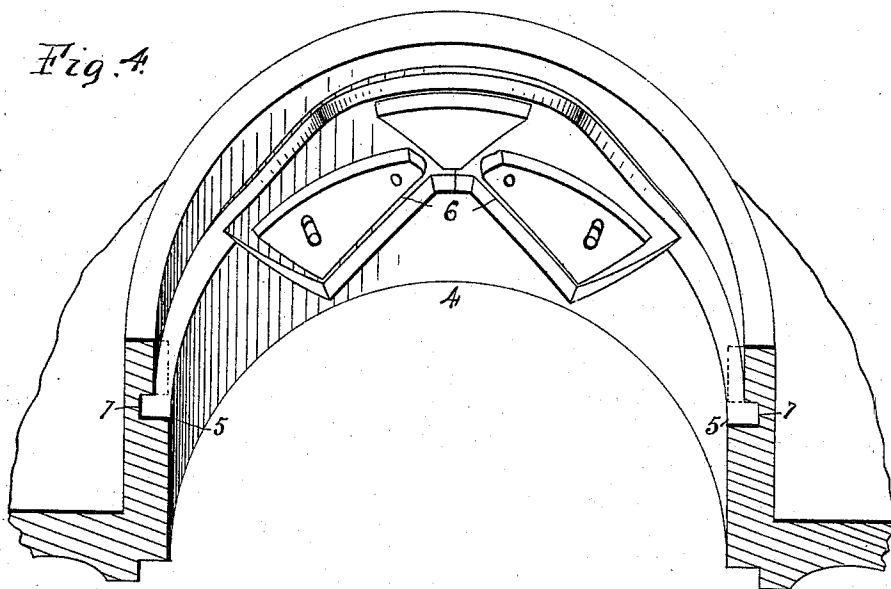
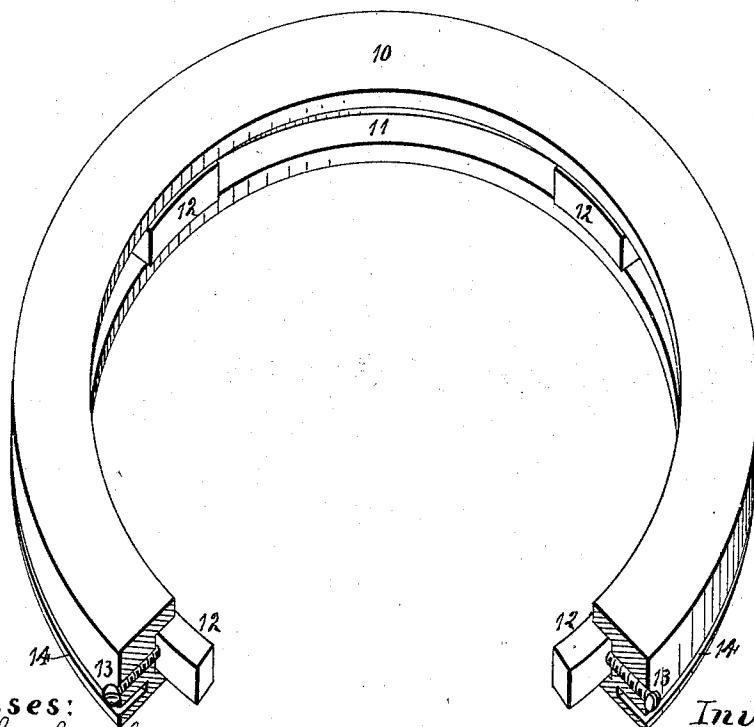


Fig. 5.



Witnesses:

Nellie Southworth
E. Behel.

Inventor:
Will A. Johns
By *A. P. Behel*
Atty.

UNITED STATES PATENT OFFICE.

WILL R. JOHNS, OF ROCKFORD, ILLINOIS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 540,391, dated June 4, 1895.

Application filed January 14, 1895. Serial No. 534,909. (No model.)

To all whom it may concern:

Be it known that I, WILL R. JOHNS, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

The object of this invention is to construct a knitting machine in which the needles are moved out of action by a movement toward their operating cam and are held in action by means of springs.

In the accompanying drawings, Figure 1 is a vertical section of the needle-cylinder of a circular-knitting machine to which my improvements have been applied. Figs. 2 and 3 are similar views in which the needle is shown in different positions. Fig. 4 is an isometrical representation of the inside of the cam for operating the needles. Fig. 5 is an isometrical representation of part of the ring supporting the springs for holding the needles in action.

In the construction of knitting machines several serious difficulties have been encountered. The principal ones are the impossibilities of throwing the needles out of action after their butts have been bent or turned, the catching of the yarn upon the latches of the needles out of action and the dropping of the needles when out of action, and the object of this application is to obviate these difficulties.

In the drawings I have shown a circular knitting machine and the description will be of such construction, but it is obvious that no invention would be required to adapt my improvements to a straight knitting machine, as the construction would be the same, with the exception in a straight machine that part termed a needle cylinder in a circular machine would be in a flat position termed a needle bed, and the cam would conform to the bed, and I have not deemed it necessary to show a needle bed and cam of a straight machine as such constructions are well understood, and in the claims I will employ the term "needle support" which I deem broad enough to include either a needle cylinder or needle bed.

The needle support I, in this instance is converted into a needle cylinder having lengthwise grooves 2, and to the lower end of the cyl-

inder is secured a base 3. A cam 4, in this instance in ring form is located outside of the needle cylinder and having its outer edge in gear form with which the driving gear meshes and imparts movement thereto. The inner face of this cam ring is provided with the ledge 5, extending nearly around its inner surface and has the usual cams 6, for lowering and raising the needle during the process of knitting. The ledge is extended by an undercut 7, and when it reaches the cams it is raised above them as shown at Fig. 4, forming a path around the cams. The needles 8, have their butts 9, located midway of their length, the butts riding upon the ledge 5, of the cam ring, the main portion of the needles being located in the needle grooves of the needle cylinder, and when the needle is in action its butt will ride upon the ledge until the cams are encountered when it will be lowered and raised.

Around the upper end of the needle cylinder is located a ring 10, having a recess 11 in its inner face within which are located blocks 12, and set screws 13, passing through the ring press the blocks in contact with the face of the ribs of the cylinder holding the ring suspended. This ring has a groove 14, in its outer face and within this groove are located springs 15, one for each needle. Each spring has its upper end bent at substantially a right angle to its main portion and this bent portion is located in the groove 14, of the ring. The lower portion of the spring is located in a needle groove against the needle 8, holding it in a yielding manner against the bottom of the needle groove in working position.

From the above construction it is seen that when the needles are in working position they are held within the needle groove against the bottom thereof by the springs 15, and the butts of the needles rest upon the ledge 5, of the cam ring and in the rotation of the cam ring the needles are lowered and raised by the action of the cams and again ride upon the ledge.

In knitting machines heretofore constructed the needles were held in action by means holding them away from the needle cylinder or bed, thereby causing the butts of the needles to engage the cam, and the needles moved in contact with the means holding them in action, and in such case the needle had a bearing only at the top of the cylinder or bed and

its lower end with the means holding it in action leaving its center portion unsupported, while in my construction the needle when in action has a guide and bearing the entire length of the cylinder or bed, and the means for moving it into action does not exert any influence upon the needles when they are in action.

A pattern wheel 16, such as is claimed in my Patent No. 531,463, granted December 25, 1894, is shown in connection with my other improvements but of itself forms no part of this invention, being only a means for controlling the action of the needles. The fingers 17, have a connection with the pattern wheel and extend upward behind the needles having their upper ends beveled. The needle grooves at their lower ends are beveled toward the center of the cylinder, and receive the upper beveled ends of the fingers 17.

When the needles are in action the fingers are down as shown at Figs. 1 and 2, their upper ends resting behind the needles and in the beveled lower ends of the needle grooves. In the rotation of the pattern wheel the fingers are raised, their upper beveled ends coming in contact with the beveled portion of the lower end of the needle cylinder, which will cause the upper end of the fingers to enter the needle grooves thereby forcing the lower ends of the needles outward, moving the butts of the needles from the ledge into the undercut, the butts of the needles being lengthened to accommodate this movement, and in the rotation of the cam ring the butts of the needles will move in the undercut and just before they reach the cams they will be carried above the cams by the undercut and carried in this elevated position until the cams have been passed when they will descend and again ride on a level with the ledge, and all needles riding in the undercut are held out of action and upon the withdrawal of the fingers, the springs will force the butts of the needles from the undercut onto the ledge and in position to be operated upon by the cams during the process of knitting.

By this construction it will be seen that the needles have a solid backing the length of the needle cylinder and they are in the bottom of the needle grooves, thereby being less liable to bend the ribs on the cylinder. The butts of the needles are thrown out of the needle grooves when out of action, instead of being drawn in, and they will never refuse to go out even if that part of the butt which engages the cams is bent sidewise which is the case

when the needles are moved into the grooves to throw them out of action. When the needles are out of action their upper ends are tipped inward away from the yarn eyes and above them thus avoiding the catching of the yarn upon the latches of the needles, and the needles can never drop as their butts are supported by the ledge when in action and by the undercut when out of action. The spring resting against the center of the length of the needle will hold it firmly in the bottom of the needle groove, the entire length of the groove, and the action of the fingers upon the needles will not force them upward as their only office is to move the lower end of the needle outward which is accomplished by the beveled upper end of the finger sliding against the beveled lower portion of the needle cylinder.

At Fig. 4, I have shown in dotted lines that that portion of the cam ring above the ledge 5, may be filled in which would prevent any liability of the needles flying up such construction however being old.

I claim as my invention—

1. In a knitting machine, a needle support, needles located in the support, a cam for operating the needles and means whereby the butts of the needles may be carried back of as well as above their cams, for the purpose of holding the needles out of action.

2. In a knitting machine, a needle support, needles located in the support, a cam carrier provided with a ledge holding the needles in proper position to be operated upon by their cams, and having a groove beyond the ledge and forming a continuation thereof into which the butts of the needles may be moved, a portion of the groove extending back of, and above the cams, and means for moving the butts of the needles from the ledge into the groove and vice versa, by a movement transverse to the length of the needles.

3. In a knitting machine, a cam for operating the needles, a support located above the cam having a groove extending transversely to the length of the needles, springs having their upper ends bent at substantially right angles to the length of the needles, the bent portion being located in the groove and their lower ends resting in contact with the needles, whereby the springs are held in position and the needles held into action.

WILL R. JOHNS.

Witnesses:

A. O. BEHEL,
E. BEHEL.