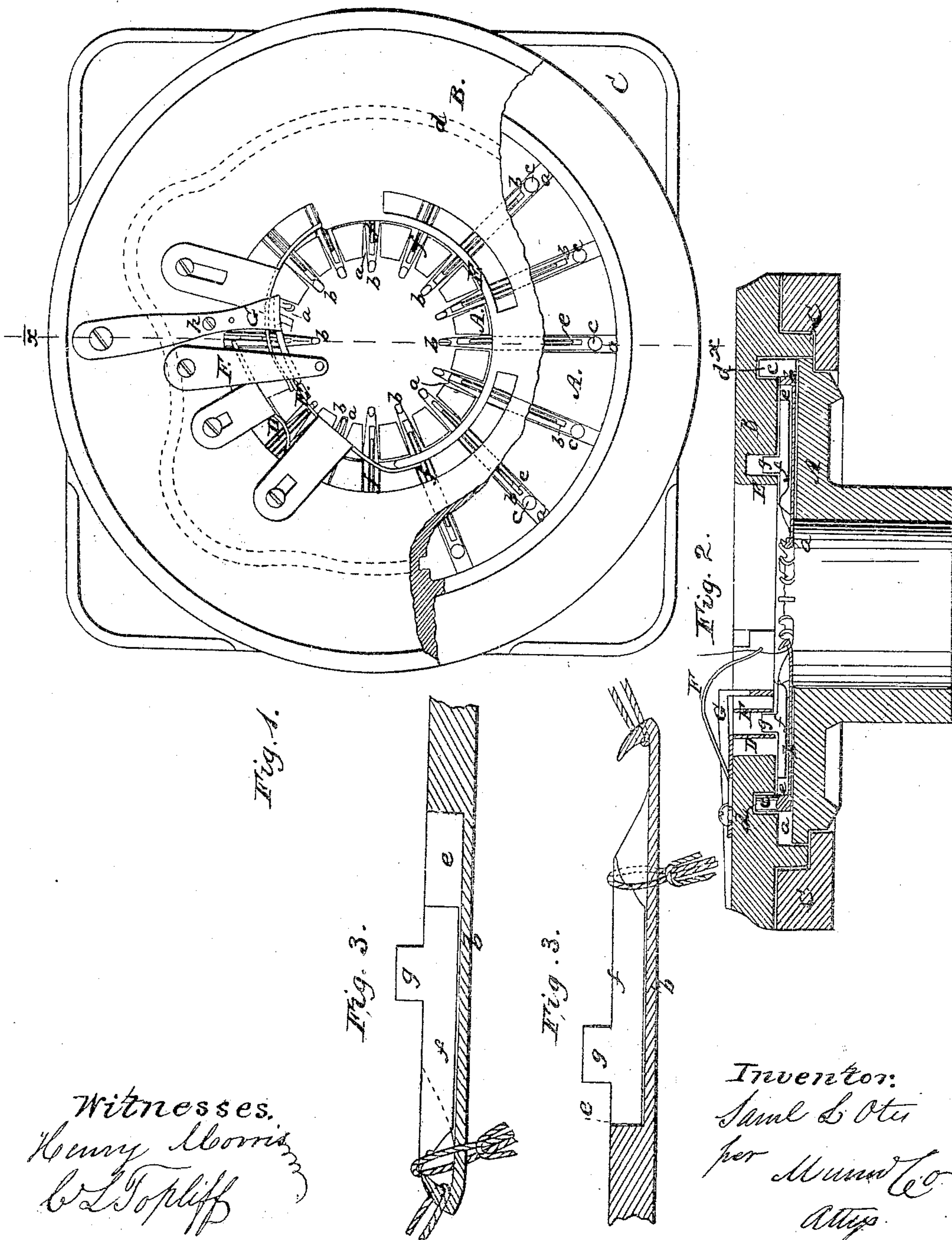


S. L. OTIS.
CIRCULAR KNITTING MACHINE.

No. 44,885.

Patented Nov. 1, 1864.



UNITED STATES PATENT OFFICE.

SAMUEL L. OTIS, OF MANCHESTER, CONNECTICUT.

IMPROVEMENT IN CIRCULAR-KNITTING MACHINES.

Specification forming part of Letters Patent No. 44,885, dated November 1, 1864.

To all whom it may concern:

Be it known that I, SAMUEL L. OTIS, of Manchester, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a sectional plan or top view of my invention. Fig. 2 is a vertical central section of the same, the line *x x*, Fig. 1, indicating the plane of section. Figs. 3 and 4 are detached sectional views of the needle in different positions.

Similar letters of reference indicate corresponding parts in the several views.

This invention consists in the employment or use in knitting-machines of a grooved needle, in combination with a sliding eye-closer or casting-off needle, operated by a suitable cam, in such a manner that the first or old loop is allowed to slip back over the point of the casting-off needle into the shank of the main needle, and when said needle has received the yarn from the guide and is drawn back, the cam holds the casting-off needle forward until its point meets the hook of the main needle, and the eye thus formed retains the yarn and permits the old stitch to slip off over the end of the needle, forming a new stitch or course.

The invention consists, also, in a shoe applied in relation to the needles and needle-bed in such a manner that when the needle has become worn, and the needles get loose they will be held down to their places, and prevented from rising and interfering with the guides or other parts.

A represents the needle-bed, which is represented with a series of guide-grooves, *a*, to receive the needles *b*. The shanks of these needles are turned up at their inner ends to form projections or nipples *c*, which catch into the cam-groove *d* in the under surface of the stationary top plate, B. This top plate is firmly secured to the ring C, which forms the bearing for the needle-bed, as shown in Fig. 2 of the drawings. By imparting to the needle-bed a rotary motion, the needles are successively pushed out and drawn in by the action

of the cam-groove *d*. Each needle is provided with a groove, *e*, which forms the guide for the sliding eye-closer or casting-off needle *f*. The shape of these needles (casting-off) is clearly shown in Figs. 3 and 4, and if the same are moved forward their points pass over the points of the hooks of the main needles, and an eye is formed, as clearly shown in Fig. 4, which shuts in the yarn taken up by the hooks. The position of the casting-off needles *f* is governed by the cams D E, acting on projections *g*, which rise from said casting-off needles.

The cam D is fastened to the stationary top plate, B, and it is adjustable toward and from the center of the needle-bed. It commences under the yarn-guide F, and extends over the distance of one-eighth (more or less) of the circumference of the circle. It is so shaped that by its action the casting-off needles are pushed out just after the main needles have taken up a new stitch. The cam E extends throughout the entire circle, and that portion of the same which is situated in front of the cam D is curved or eccentric, so as to permit the casting-off needles to move toward the centre of the needle-bed. As the projections *g* of the casting-off needles pass the cam D they are pushed back by the concentric portion of the cam E, and they are again brought in contact with the cam D.

At the moment one of the needles receives the yarn from the guide F the casting-off needle is still held back in the position shown in Fig. 3; but, presently, by the action of the cam D, said casting-off needle is pushed out, and it shuts in the yarn in the eye formed between its point and the hook of the main needle, as shown in Fig. 4, and in this position the old stitch is permitted to slip over the end of the needle, producing a new stitch or course. The cam E then passes the casting-off needle back, and the stitch on the main needle slides up the inclined edge and assumes the position shown in Fig. 3, ready to form a new stitch, as previously described.

G is a shoe, which is intended to hold the needles down to their places after the needle-bed has become worn and the needles get loose. By this shoe the needles are prevented from rising and interfering with the guide or other parts, whereby some portion of the mechanism would be injured or broken, and, furthermore, the use of said shoe obviates the

necessity of getting a new needle-bed as often as would otherwise be necessary. A set-screw, *h*, or other suitable device inserted in the shoe serves to adjust the same to the needles.

In order to accommodate the shoe, I make the inside top surface of the needle-bed a little lower than the upper edge of the needles. It must be remarked, however, that the form of the shoe and its position may be changed without changing the result, and it will naturally be applied to that part of the machine where it will be the most effective.

The advantages of my invention are many. The needles are less liable to break and wear out than those commonly used; the casting-needles being worked by cams produce less strain on the yarn than the latch-needle now in use, the latch being opened by the strength of the yarn. My needles do not require a presser, as is the case with a spring-needle, nor a stitch-wheel. The needles require less motion than ordinary needles, which renders my machine less liable to wear. It requires

less space for the mechanism to form a stitch, so that more threads can be applied to the same size machines, which insures greater rapidity.

The entire machine is simple in its construction, easily operated, and not liable to get out of order.

What I claim as new, and desire to secure by Letters Patent, is—

1. The cams *D E* and cam-groove *d*, in combination with the main needles *b* and casting-off needles *f*, constructed and operating in the manner and for the purpose substantially as herein shown and described.

2. The shoe *G*, applied in combination with the needles *b*, needle-bed *A*, and stationary top plate, *B*, substantially in the manner and for the purpose set forth.

SAMUEL L. OTIS.

Witnesses:

CHARLES D. PARSONS,
EDMUND S. CONKLIN.