(No Model.)

S. S. COOK.

LOOP HOLDER MECHANISM FOR KNITTING MACHINES.

No. 464,313. Patented Dec. 1, 1891.

Fig. 1.

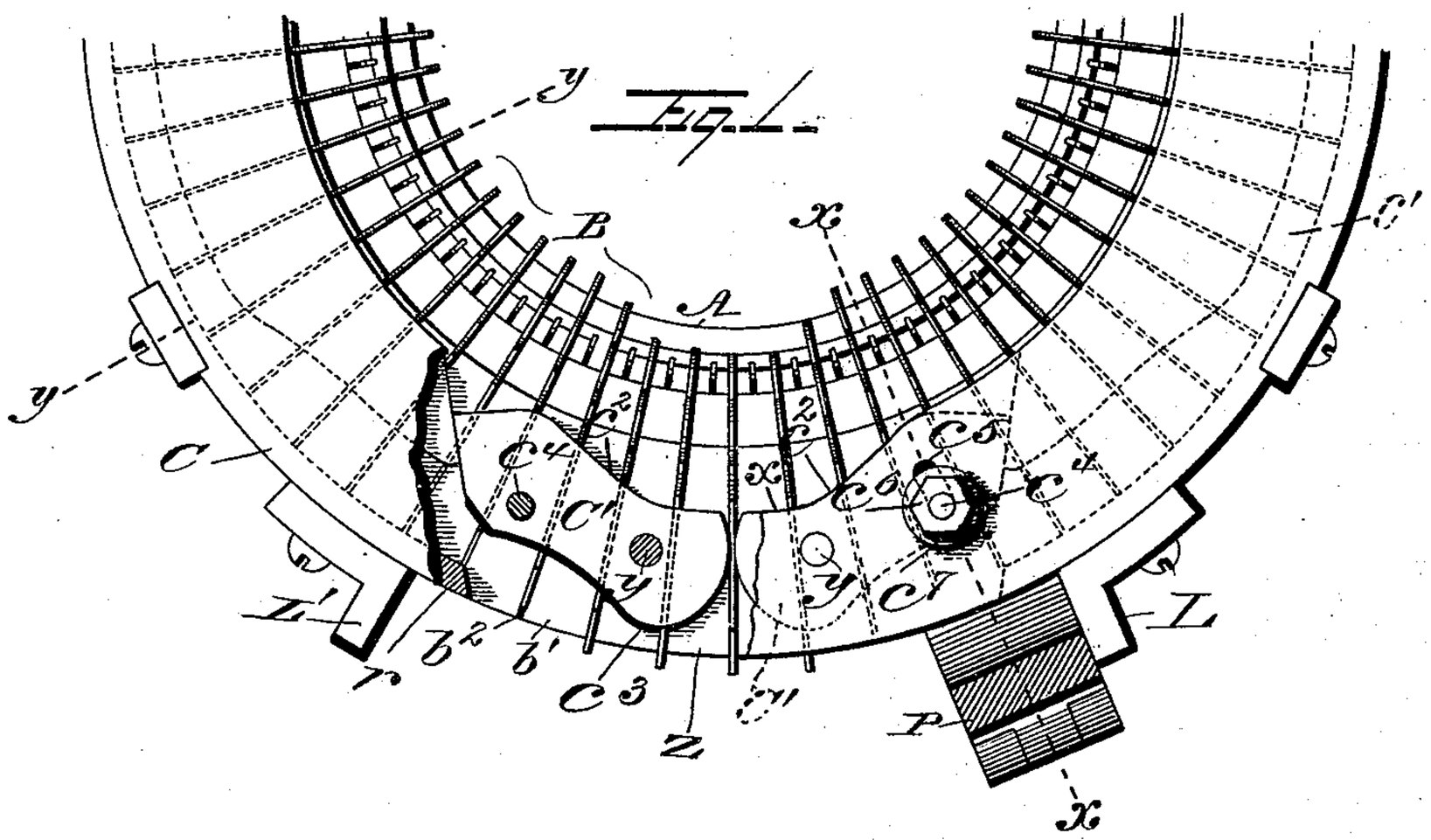


Fig. 3.

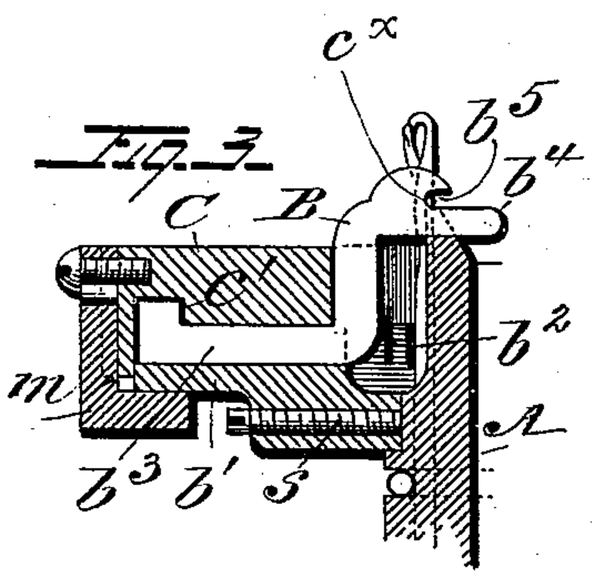


Fig. 5.

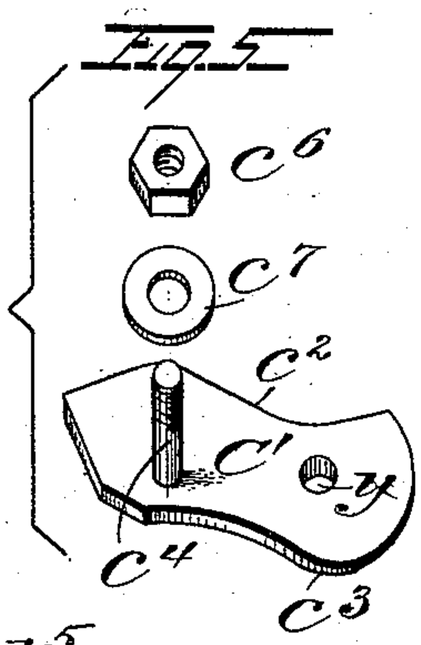


Fig. 2.

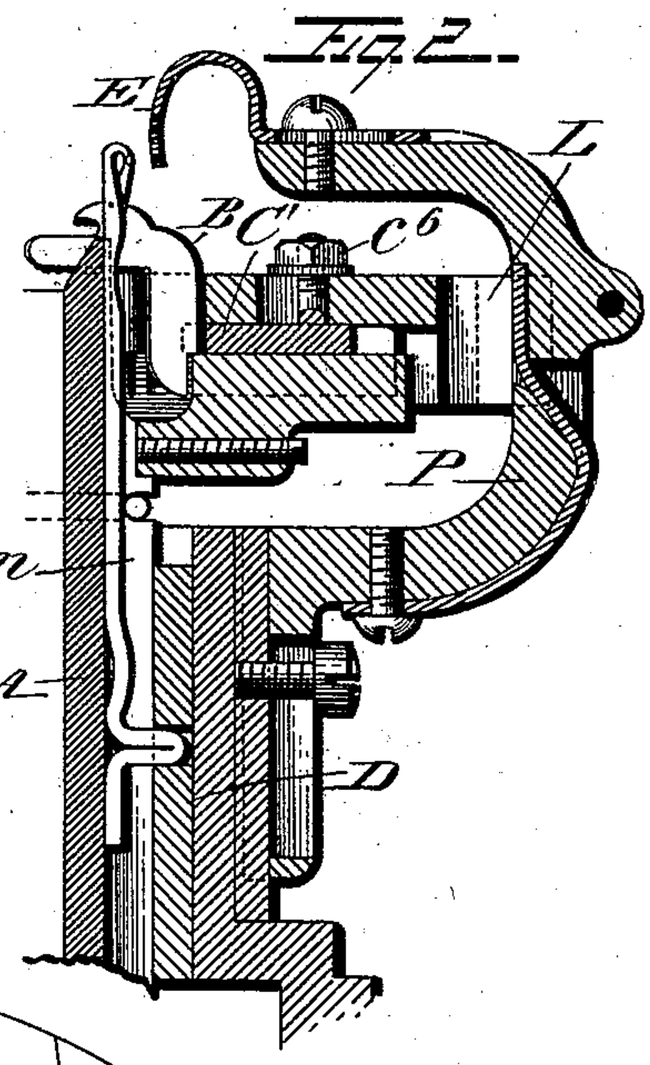


Fig. 6.

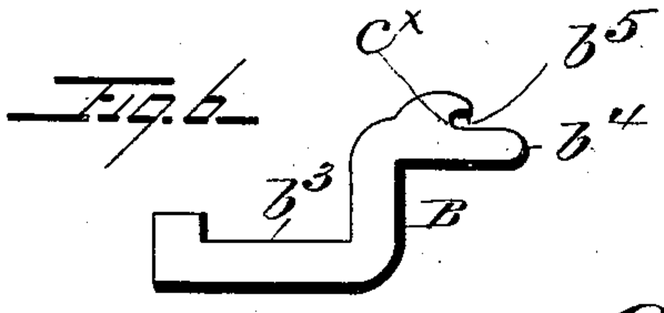
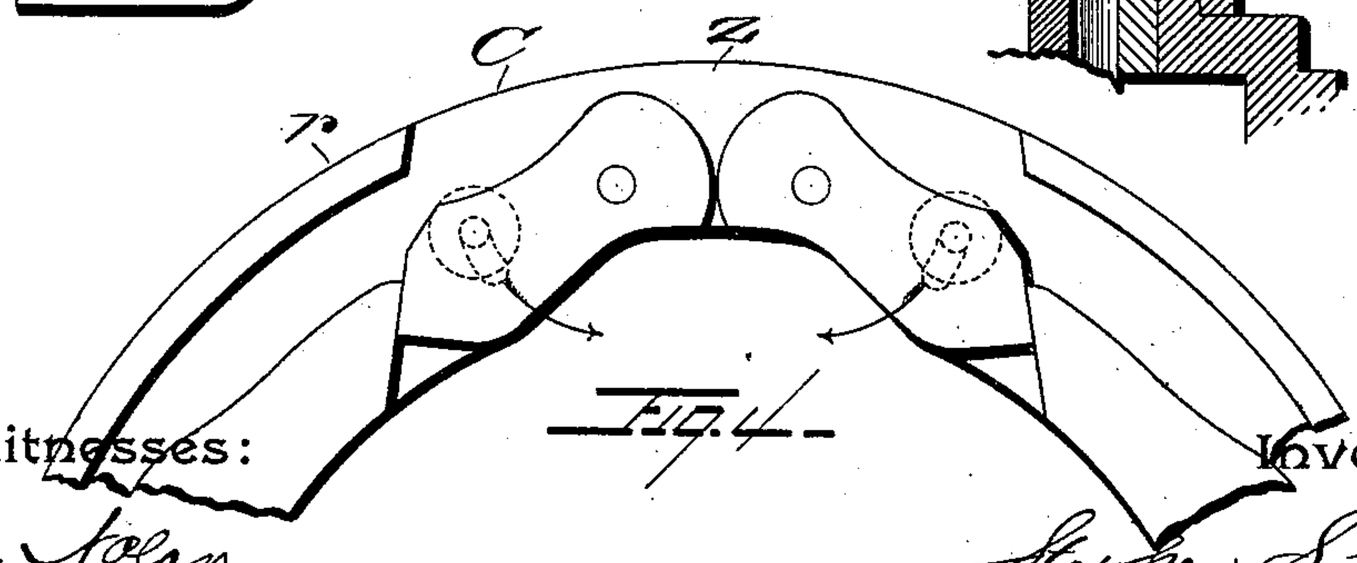


Fig. 4.



Witnesses:

John Nolan.

John Wilson Clark

Inventor

Stephen S. Cook.

per Joshua Pusey

Attorney.

UNITED STATES PATENT OFFICE.

STEPHEN S. COOK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JAMES L. BRANSON, OF SAME PLACE.

LOOP-HOLDER MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 464,313, dated December 1, 1891.

Application filed October 17, 1889. Serial No. 327,344. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN S. COOK, a citizen of the United States, residing at the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Loop-Holder Mechanisms for Knitting-Machines, of which the following is a full, clear, and exact description, reference being had to to the accompanying drawings, of which—

Figure 1 is a partial plan of the cylinders of a circular-knitting machine wherein my improvement is embodied, part of the top of the cam-ring being broken away in order to show one of the pivoted cams therein. Fig. 2 is a section on the line *x x*, Fig. 1. Fig. 3 is a partial section on the line *y y*, Fig. 1. Fig. 4 is a reverse plan of the part of the cam-ring wherein the holder-actuating cams are pivoted. Fig. 5 shows one of the said cams, the set-nut, and its washer, all detached. Fig. 6 is a separate view of one of the loop-holders or sinkers.

This invention relates to an improvement in the loop-holder-operating cams of circular-knitting machines, and is especially, though not exclusively, designed for use in connection with the holders illustrated in Letters Patent No. 445,494, granted January 27, 1891, to Henry Brinton. Said holders consist each of a thin angular metal plate whose vertical member is provided with a forward notched nose or finger, and whose horizontal member is provided with an up-projecting lug. The latter member is guided in a radially-slotted ring surrounding the needle-cylinder, and the nose of the upper member is guided in a slot in the upper edge of said cylinder, the notch on the nose at certain stages of the knitting operation being thrown into and out of engagement with the top of the web by means of a suitably-shaped cam which engages with the up-projecting lug and moves with reference to and in concert with the stitch-cams. In each space between the needles there is a holder whose notched nose normally bears upon the upper round of stitches. The relation of the holder-cam to the stitch-cams is such that just before the descent of each needle while completing the stitch the adjacent loop-holders are thrown back to allow the stitch to be formed, at the completion of which the holders are caused to assume their normal or engaging position, there remaining until a round of stitches has been made, whereupon these holders are again actuated, each and all the holders being likewise operated in continuous succession. An objection to the use of these and indeed to all other "loop-holders" or "sinkers," so-called, is that their operating-cams cannot be adjusted to vary the inward throw of the sinkers without interference with the outthrowing action of the cams—that is to say, if the cams be set to increase the inward throw of the holders or sinkers the outward throw of the latter will be correspondingly lessened, and the converse. Hence if the cam-engaging lugs of the sinkers become worn through continued use and thereupon fail to act positively upon the web it is necessary to substitute new sinkers for the old ones or to replace the old cams with new ones. Again, if the inward throw of the sinkers be increased or diminished in order to adapt them for service in loose or tight stitch work, respectively, the outward throw of the holders will be detrimentally affected.

The object of the invention is so to construct the cams that they may be adjusted as circumstances may require in order to vary their inthrowing portions irrespective of their outthrowing portions, as will be hereinafter described.

Referring to the annexed drawings, A represents the needle cylinder or carrier of an ordinary circular-knitting machine; B, the loop-holders contained within the radially-slotted guide-ring *b'*, which is fixed to the needle-cylinder slightly below the top of the latter by means of screws *s;* C, the cam-ring resting upon the ring *b'*, so as operatively to engage with the loop-holders; D, the stitch-cam cylinder or carrier, and E the yarn-guide, which is rigidly connected with the cam-cylinder and whose supporting-post P engages with and actuates the cam-ring C during the rotation of said cam-cylinder. All these parts, with the exception of the cam-ring C, are identical in construction and operation with the like parts shown and described in the said Brinton patent. The cam-ring, in the latter case, is provided on its under side

with a concentric groove or way interrupted at a certain point by a fixed offset or cam portion, whose relation to the stitch-cams is such that as the needles finally descend to complete the stitches the adjacent holders will be thrown outward, so as to retract their hooks from the web, and at the completion of said stitches the holders will be successively thrown inward in order that said hooks will engage and hold down the respective stitches. In my device the ring C is provided with the concentric groove c', but has in lieu of the fixed offset or cam portion a pair of separate adjustable cams C′, with oppositely-inclined inner edges c^2, the inner side of the ring being suitably cut away at x to coincide with these inclined edges. The outer edges c^3 of the cams are concentric with the pivots y, or substantially so, and extend back beyond the inner edge or path of the groove a distance equal to the required outward throw of the loop-holders. These cams in the present instance are pivoted at points y on the under side of the ring and are provided toward their off ends with vertical screw-threaded pins c^4, which extend up through slots c^5 in the ring C and have screwed on their outer ends set-nuts c^6 with interposed washers c^7. From this construction it will be seen that by unscrewing the nuts the cams C′ may be moved on their pivots to any determined point within the range of the slots, and there secured by rescrewing the nuts—that is to say, the edges c^2 may be moved toward or from the needle-cylinder and fixed at the point of adjustment. It will be understood, however, that when the cams are each adjusted in this manner the extreme outthrowing portion of the edge c^3 is unaffected—that is to say, this portion merely describes a slight arc concentric with the pivot.

The ring b', which is fast secured to the side of the needle-cylinder, as aforesaid, is provided on its upper side with a regular series of radial grooves or ways b^2, which alternate with the series of needle-grooves n in the needle-cylinder. In each of these grooves b^2 is contained the horizontal limb b^3 of a holder B, the lug on said limb projecting up from the groove into the channel c' on the under side of the cam-ring, which, as before stated, rests upon the ring b', being rotatably held in place by means of the lips or angle-pieces m. The vertical limb of the holder extends up past the inner edge of the ring C, and its forward nose b^4 is guided in grooves in the top of the needle-cylinder, said nose being provided on its upper edge with the notch or hook b^5, which engages the yarn under the circumstances hereinbefore mentioned. The outer edge of the cam-ring has formed therewith or secured thereto at a proper distance apart a pair of outprojecting lugs L L′, between which extends the yarn-guide post P, which is, as usual, just back of the vertical median line of the stitch-cams. Now it will be apparent that as the cam-cylinder rapidly revolves during the operation of the machine the post P will bear against the forward lug L and rotate in concert therewith the cam-ring, and as the cams therein advance the outer edges c^3 of the leading cam will abut against and throw out in continuous succession the series of loop-holders—that is, the hooks of the latter will be withdrawn from the web upon which they normally bear and permit the stitches to be formed, whereupon the inner edge c^2 of the rear cam, impinging against the edges of the vertical limbs of the holders, will return the latter to their normal position, where they will be held by the concentric groove c' till a succeeding revolution of the cam-ring. Each and all of the holders will in this way be radially reciprocated in regular order during the revolution. The outer edge of the flange or ring r of the groove c' is cut away at z in the rear of these cams C′ to permit the outward throw of the holders, as seen. The distance between the opposite faces of the lugs L L′ is such that when the direction of movement of the cam-cylinder is reversed during the operation of knitting the heel or toe part of a stocking the post will abut against the other lug L′ and thus throw the stitch-cams into proper relative time with the holder-cams, half of the needles of course having first been temporarily disengaged from the stitch-cams, as is customary in such work.

When the edges of the cams C′ or those of the holders, or both, become so worn as to prevent the proper action of the hooks upon the yarn, the defect may be readily overcome by adjusting the cams, as aforementioned.

In tight-stitch knitting it is requisite that less inward throw be given the holders than in loose-stitch knitting, as otherwise the holders would cut the yarn, and in loose-stitch knitting it is requisite that greater inward throw be given the holders than in tight-stitch knitting, as otherwise the holders would fail to act on the stitches. Therefore it is necessary to adjust the inward throw of the cams as occasion may require. By my construction above described the inward throw of these cams may be minutely adjusted without affecting the outward throw thereof. If the outward throw of the cams were altered, the holders might not be moved out sufficiently far to enable them to clear the needles.

I claim—

1. The combination, with the needle-bed, the cam-carrier, and its cams, of a holder or sinker bed, a cam-ring, its cams, and reciprocative sinkers or loop-holders provided each with two cam-engaging portions that are adapted to be acted upon by the cams on said ring, together with means for effecting adjustment of said latter cams, these cams having provisions in virtue of which the inward throw of the sinkers may be varied without affecting their outward throw, substantially as described.

2. The combination, with the angular loop-

holders and their supporting-parts, of a cam-ring and cams thereon provided with oppositely-inclined inner edges and with projecting outer edges, these edges being adapted successively to act upon said holders or sinkers, together with devices for effecting adjustment of said cams, substantially as described.

3. The combination, with the needle and cam carriers, of a holder or sinker bed, a cam-ring, cams pivoted thereon and provided each with the inner and outer acting edges c^2 c^3, devices for fixing said cams in positions of adjustment, and angular loop-holders or sinkers adapted to be acted upon by said edges c^3 c^3, respectively, substantially as described.

In testimony whereof I have hereunto affixed my signature this 28th day of August, A. D, 1889.

STEPHEN S. COOK.

Witnesses:
JOHN NOLAN,
EDW. W. MAGILL.