

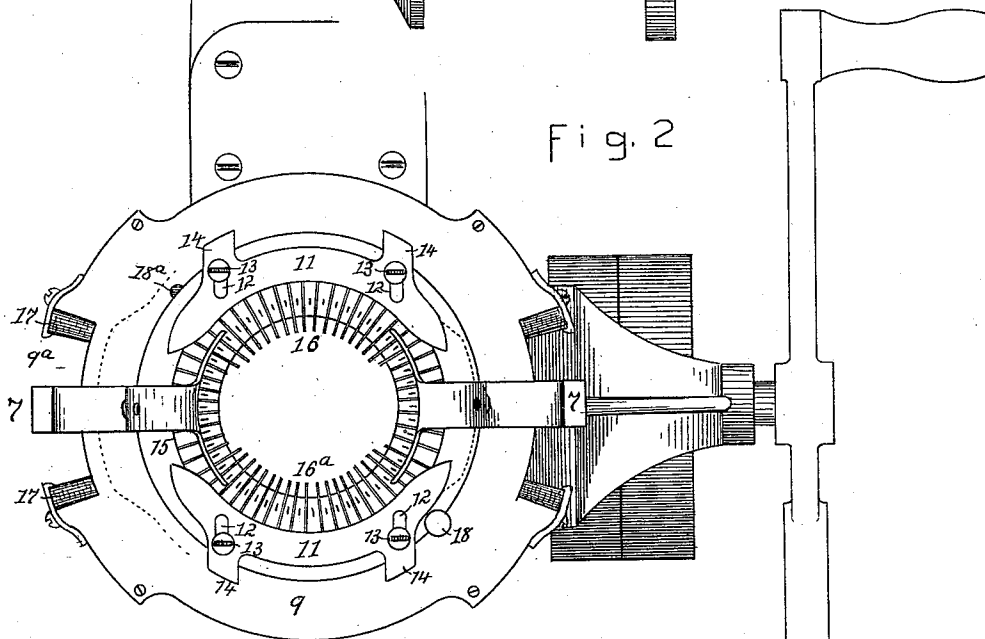
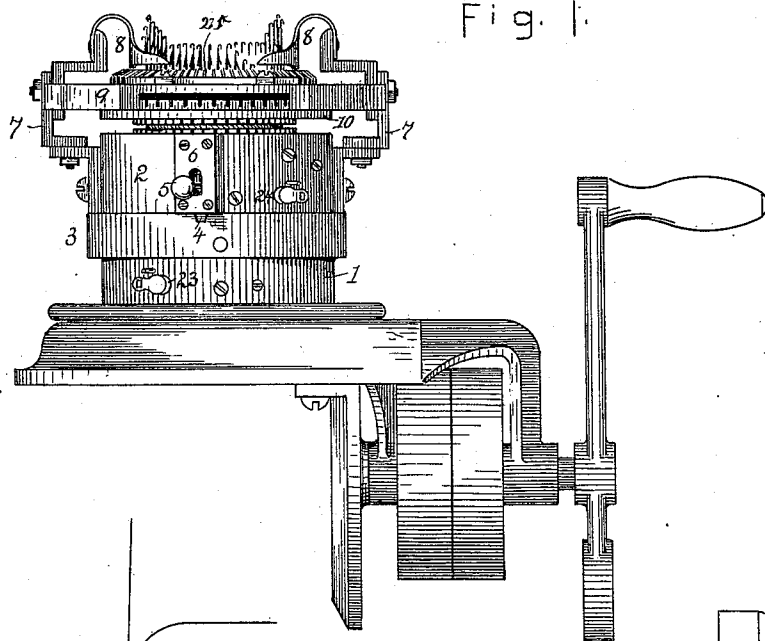
(No Model.)

4 Sheets—Sheet 1.

J. H. PLACE.  
CIRCULAR KNITTING MACHINE.

No. 466,369.

Patented Jan. 5, 1892.



ATTEST.

*Helen Graham*  
*W. W. Graham.*

INVENTOR  
JOHN H. PLACE.  
by his attorney  
*L. P. Graham.*

(No Model.)

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Fig. 3.

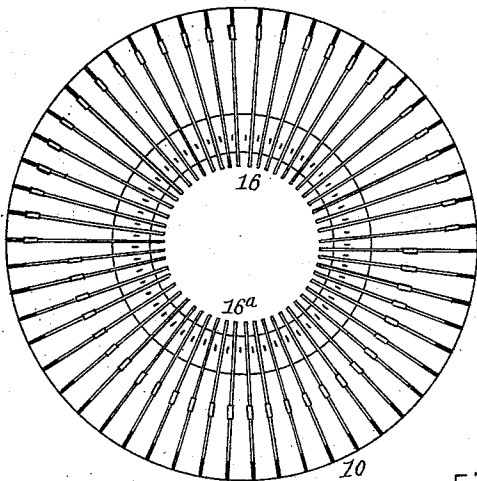


Fig. 4.

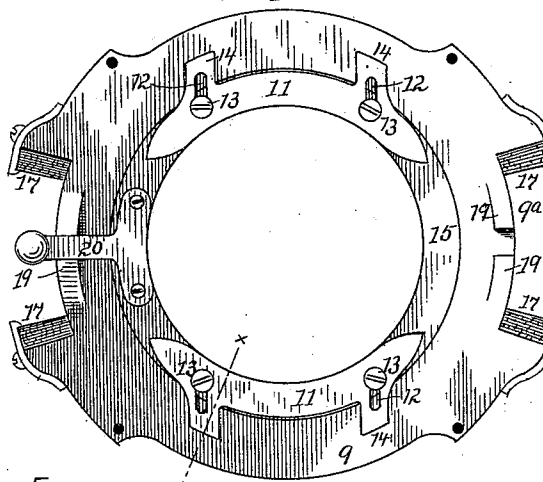


Fig. 5.

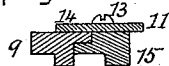


Fig. 6.

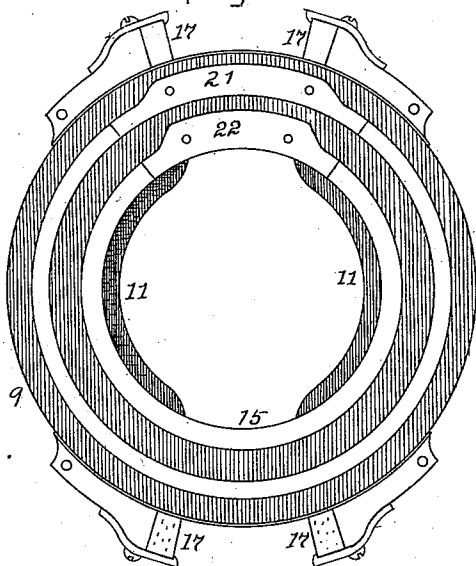


Fig. 7.

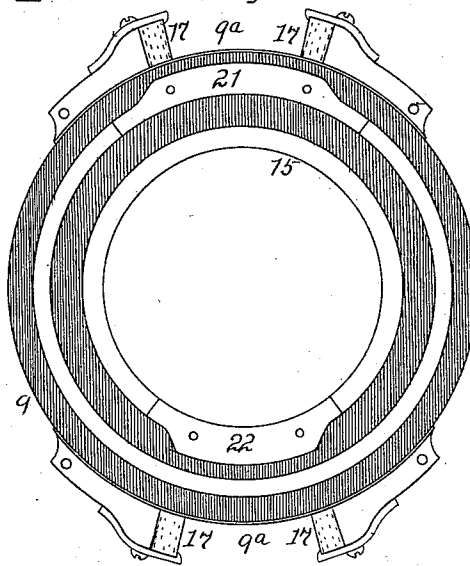


Fig. 8.

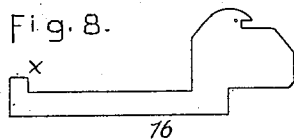
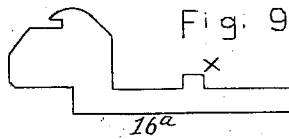


Fig. 9.



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Fig. 12.

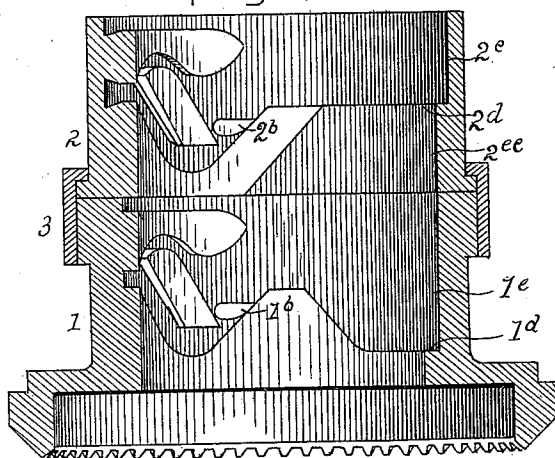
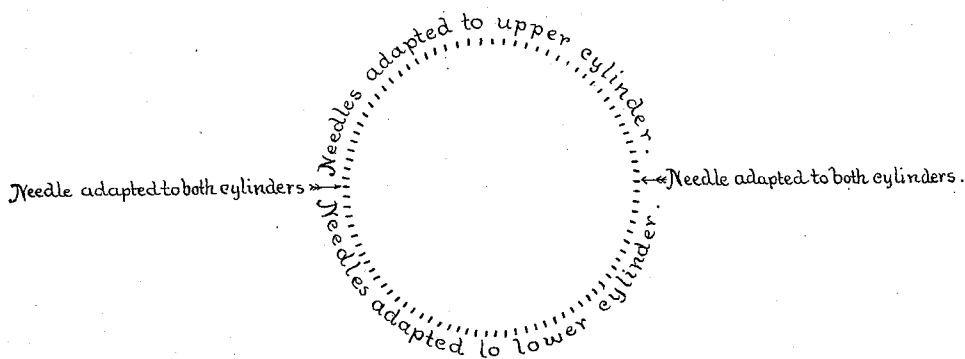


Fig. 13.



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# UNITED STATES PATENT OFFICE.

JOHN H. PLACE, OF DECATUR, ILLINOIS.

## CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,369, dated January 5, 1892.

Application filed January 2, 1891. Serial No. 376,465. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. PLACE, of Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Circular-Knitting Machines, of which the following is a specification.

This invention consists in the combinations, details of construction, and relative arrangements of parts hereinafter set forth and claimed, the object being to construct a machine on which two fabrics may be simultaneously formed and interknitted together; and on which ordinary fabric may be knitted in the customary manner.

It is also the object to improve certain details of construction in such machines.

The method of knitting and the fabric produced by this machine form the subjects of an application for patent serially numbered 376,464, filed January 2, 1891.

In the drawings accompanying and forming a part of this specification, Figure 1 is an elevation of a machine embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is a plan of the hold-down dial. Fig. 4 is a plan of the cam-plate of the hold-down dial. Fig. 5 is a section on broken line X in Fig. 4. Fig. 6 is a representation of the under side of the cam-plate, showing both cams at one side of the plate. Fig. 7 is a similar representation showing one cam on each side of the plate. Fig. 8 represents a hold-down hook adapted to one cam of the plate. Fig. 9 represents a hold-down hook adapted to the other cam of plate. Fig. 10 is a section of the cam-cylinder, showing the upper set of cams, and adjacent to such section are needles adapted to the upper cams. Fig. 11 is a section of the cam-cylinder, showing the opposite side thereof and the lower set of cams, and adjacent thereto are needles adapted to the lower set of cams. Fig. 12 is a section of the cam-cylinder cutting both sets of cams centrally. Fig. 13 is a diagram showing the arrangement of the needles in the cylinder.

The cam-cylinder is composed of a lower part 1 and an upper part 2, each part having a set of cams, and the upper part having rotative adjustment on the lower part.

The needles of needle-cylinder 25 are of three kinds, as shown in Figs. 10 and 11, one

set  $n$  being short enough to engage the upper cams of the cam-cylinder, another set  $n'$  being long enough to engage the lower cams, and the third set  $n^2$  having heels adapted to both sets of cams. The needles  $n$  of the first set are arranged continuously on one side of the needle-cylinder. The needles  $n'$  of the second set are arranged continuously on the opposite side of the cylinder, and of the third set one needle  $n^2$ , or possibly more, is interposed at each junction of the principal sets. The upper part of the cam-cylinder has an annular ledge  $2^a$ , as seen in the sectional views, and band 3, which is secured to the lower part of the cylinder, has an inwardly-projecting ledge  $3^a$ , which overlaps ledge  $2^a$  and secures the two parts together while permitting independent rotation therein. A bolt 4 slides vertically in a housing 6, and has a knob 5, by means of which it is raised, and it also has a spring (not shown) which tends to hold it depressed. The band 3 has at points diametrically opposite two lock-recesses adapted to receive the end of the bolt, and the recesses bear such relation to the cams that when the bolt is in one recess the upper cams of the cam-cylinder are directly over the lower cams, and when the bolt is in the other recess the upper cams are opposite the lower ones.

The supports 7 for yarn-carriers 8 may be constructed as shown, or in any other desirable and well-known manner, and they are secured to the upper part of the cam-cylinder in the usual manner.

The cam-plate for dial 10 is composed of outer ring 9, provided with draw-out cam 21, and inner ring 15, provided with cam 22. The outer ring has peripheral recesses  $9^a$ , through which the supports of the yarn-carriers extend, and the sides of such recesses have buffers 17, preferably of rubber, secured by cement. Throw-in cams 11 are secured one to each side of ring 15. They each have spurs 14, which extend over the outer ring, and such spurs are slotted at 12 to receive the screws 13 and to permit the throw-in cams to be adjusted radially with relation to the cylinder. The inner ring extends under the outer ring, as seen in Fig. 5, and this extension, together with spurs 14 of cams 11, secures the two rings together. The draw-out cams 21 and 22 are, like the knitting-cams,

held both at one side of the dial, or one directly opposite the other, and any suitable form of catch may be employed to secure the rings in their different positions with relation to each other. Such a device may consist of two diametrically-opposed semicircular recesses in the inner surface of the outer ring, as seen at 18<sup>a</sup> in Fig. 2, a single semicircular recess in the periphery of the outer ring, and a pin as is adapted to the hole formed by the conjunction of the recess of the inner ring with a recess of the outer ring. It may also consist of inclines, as 19 in Fig. 4, having intermediate lock-recesses and a spring-catch, as 20, adapted to the lock-recesses.

The dial-plate has two sets of hold-down hooks 16 and 16<sup>a</sup>, one of which is arranged on one side of the dial and is adapted to be actuated by the draw-out cam of the outer ring and the other of which is arranged on the opposite side of the dial and is adapted to be actuated by the draw-out cam of the inner ring. The hooks are the same in their construction, except that the heels  $x$  of one set are farther from the hook ends than are the heels of the other set. (See Figs. 8 and 9.) The cams of the cylinder have the shiftable parts 1<sup>b</sup> and 2<sup>b</sup>, the pivot-pins of which extend through the cylinder and have on their outer ends weighted levers 23 and 24, as seen in Fig. 1, which tend to depress the points of the shiftable parts and which are not affected by an accumulation of dirt or other matter inside the cylinder. The short needles have long heels  $n^4$ , as seen in Fig. 10, and the long needles and the interknitting needles have heels  $n^5$  of ordinary length. The lower part of the cam-cylinder has the usual relative internal diameter, from the surface of which the cams project inwardly to the customary distance. (See 1<sup>c</sup> in Fig. 12.) The upper half of the cam-cylinder coincides at its lower end with the internal diameter of the lower half, as seen at 2<sup>c</sup>; but its upper portion is of greater internal diameter, as seen at 2<sup>e</sup>, and its cams are sufficiently thick to compensate for the increased diameter. This construction is shown throughout the sectional drawings, but is more clearly apparent in Fig. 12, where both sets of cams are shown in true vertical alignment. The enlarged internal diameter of the upper portion of the upper half of the cam-cylinder forms ledge 2<sup>a</sup>, which is adapted to support the elongated heels of the short needles, and a continuation of the cam of the lower half of the cylinder forms ledge 1<sup>a</sup>, which is adapted to support the heels of the long needles. The reason for this construction is that all the needles may be raised and lowered, when the cams are placed in the position shown in Fig. 12, as easily and quickly as a machine having a single cam-cylinder.

While the machine is performing its chief

function—that is, making two fabrics joined together by interknitting—the knitting-cams are placed one set on each side of the cylinder and the draw-out cams of the hold-down hooks are similarly arranged. Yarn is supplied to both carriers, such yarns differing ordinarily in thickness or color, or both, and the knitting is effected by reciprocating the cam-cylinder to a degree sufficient to carry each yarn past each interknitting-needle at each operation. When the cam-cylinder is arranged as shown in Fig. 12, the cams of the hold-down hooks are placed as seen in Fig. 6, and one yarn-carrier only is supplied with yarn, and rotation of the cam-cylinder will knit ordinary fabric. When it is not desired to operate the hold-down hooks, the throw-in cams 11 may be adjusted, as seen in Figs. 4 and 7.

Buffers 17 are made of rubber or other yielding substance; but other forms of springs may obviously be substituted therefor.

I claim—

1. A circular-knitting machine containing a cam-cylinder having two sets of cams and a needle-cylinder having on one side needles adapted to one set of cams, on the other side needles adapted to the other set of cams, and also having intervening needles adapted to both sets of cams, as set forth.

2. A circular-knitting machine containing a two-part cam-cylinder, one part of which is above and rotatively adjustable on the other, a set of cams in each part of the cam-cylinder, and three sets of needles, one set of which is adapted to one set of cams, another set of which is adapted to the other set of cams, and the third set of which is adapted to both sets of cams, as set forth.

3. In circular-knitting machines, the combination of a two-part cam-cylinder, one part of which is rotatively adjustable on the other, a needle-cylinder having on one side needles adapted to one set of cams, on the other side needles adapted to the other set of cams, and intermediate needles adapted to both sets of cams, a dial having two kinds of hold-down hooks, throw-in cams for the hold-down hooks, and two rotatively-adjustable draw-out cams, one cam being adapted to one kind of hooks and the other cam being adapted to the other kind of hooks, as set forth.

4. The combination of the dial, the hold-down hooks, the two rotatively-adjustable draw-out cams, and the radially-adjustable throw-in cams, as set forth.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

JOHN H. PLACE.

Attest:

I. D. WALKER,  
L. P. GRAHAM.