

B. F. SHAW.
Transferring Mechanism for Knitted Work.
No. 218,459. Patented Aug. 12, 1879.

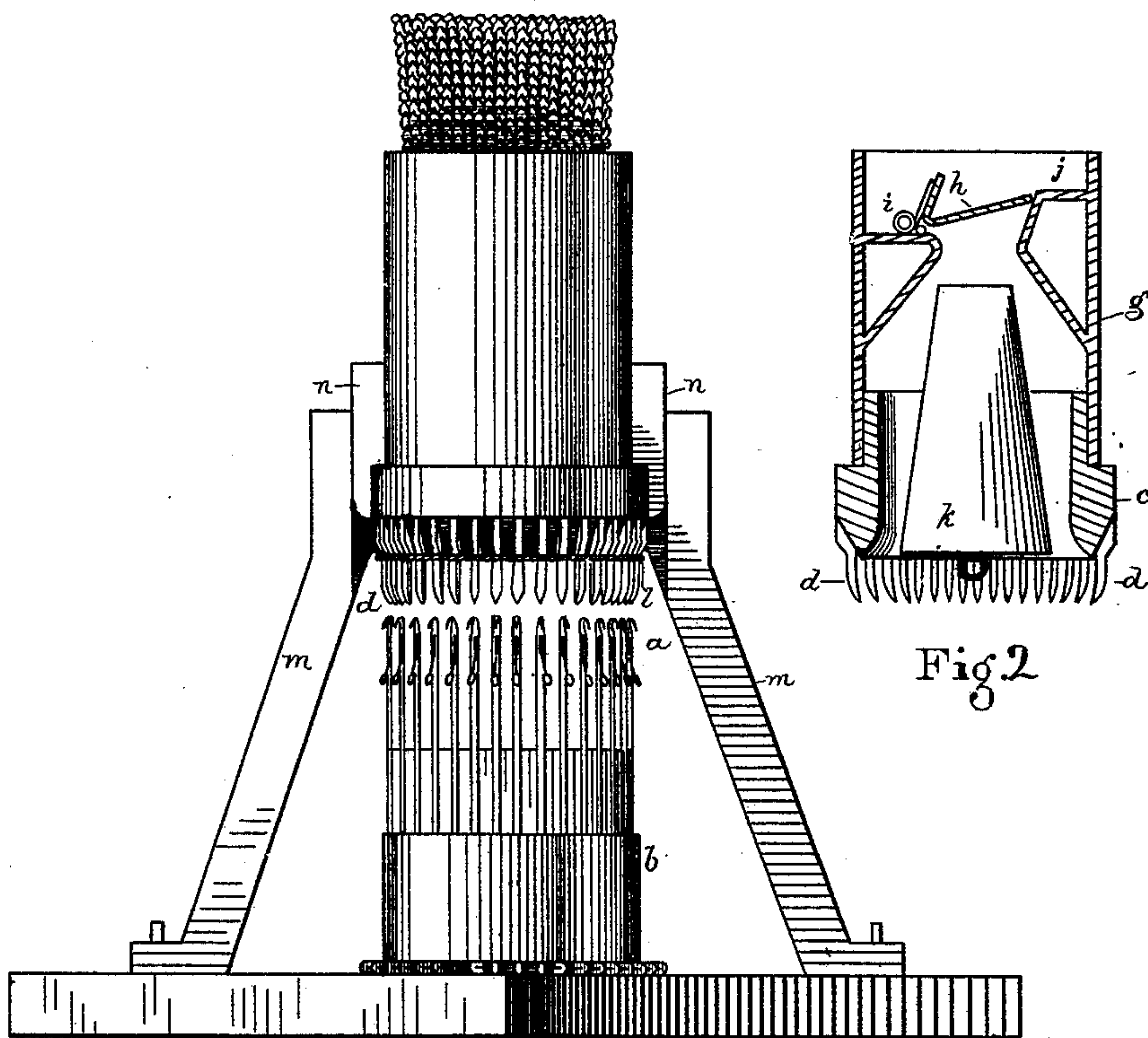


Fig. 1.

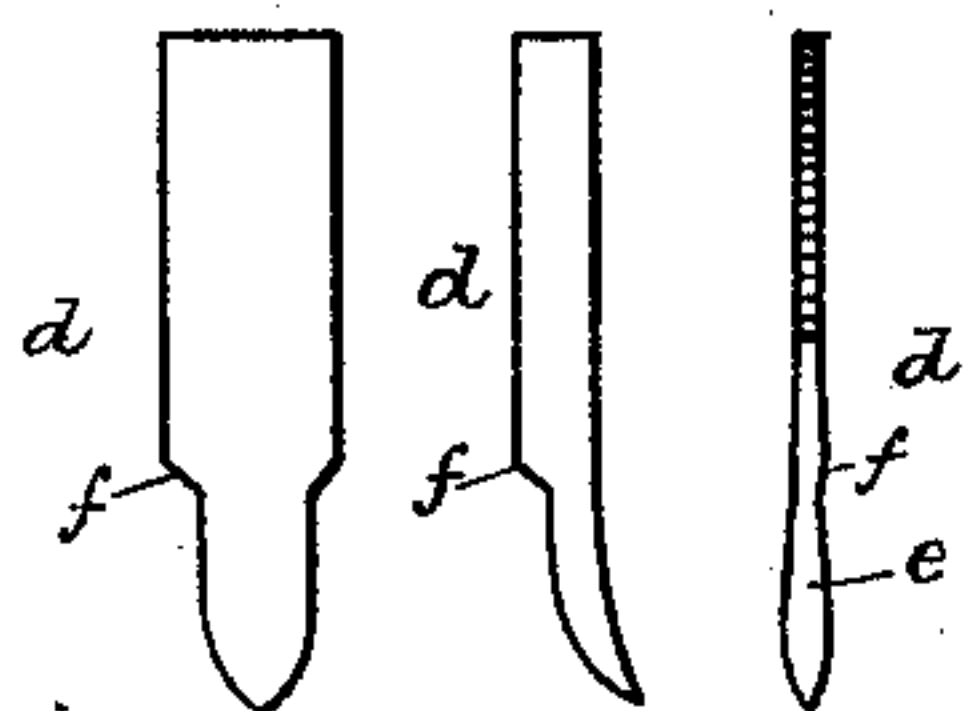


Fig. 3

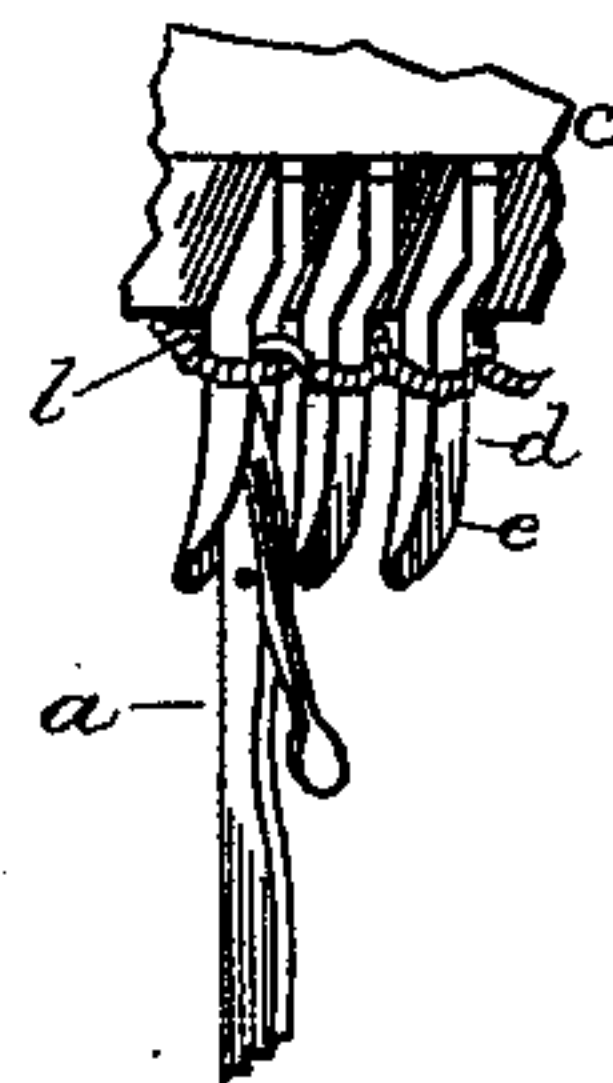


Fig. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN TRANSFERRING MECHANISMS FOR KNITTED WORK.

Specification forming part of Letters Patent No. **218,459**, dated August 12, 1879; application filed March 7, 1879.

To all whom it may concern:

Be it known that I, BENJAMIN F. SHAW, of Cambridgeport, in the county of Middlesex and State of Massachusetts, have invented Improved Transferring Mechanism for Knitted Work, of which the following is a specification.

This invention relates to mechanism to transfer tubular knitted work upon the needles of circular-knitting machines, in order that the work may be knitted to and made to form an integral part of the resultant product.

In a large class of circular work pieces of ribbed work are added—as for tops of stockings, ribbed legs of socks, bottoms of drawers, and cuffs of shirts. These ribbed pieces or “tops,” so called, are now usually sewed to the knitted web by means of machines adapted to hold the loops of the main web and those of the top while a thread-carrying needle unites them, and also, for some work, the loops of the top have been “picked” on the machine-needles by hand singly.

In my invention the top, knitted as a tube, is provided with the usual slack course of loops, and such course is placed, by hand, upon the quills of a transferrer, the quills being arranged in a circle and at a distance apart corresponding with the circle of machine-needles and their distances apart.

In a transferrer for circular machines the number of quills will be the same as the number of needles. The loops of the tubular tops are placed upon the quills of the transferrers, (a number of these being employed with each machine,) so that the knitter may have the tops set up on such quills ready to be quickly applied to the machine-needles at a single operation.

When the loops of the top are in position on the transferrer, they extend across the open faces of the quills, and the quills are then passed each over a knitting-needle, so that each quill receives the upper end of a needle. The hooks of the needles, as the quills of the transferrer are moved longitudinally along the needles, pass simultaneously behind and under the loops held by the quills, and then the transferrer is withdrawn, leaving the loops of the tubular top held by it upon the needles,

and such top set up on the machine-needles may be knitted to, to complete the desired fabric.

Figure 1 represents sufficient portions of a knitting-machine to illustrate this invention; Fig. 2, a section through the transferrer; Fig. 3, a detail of the quill, showing the shape of the blank from which it is formed and a side and face view thereof; and Fig. 4 represents a detail to illustrate the manner of the operation of the needle in the quill so as to receive a loop from the transferrer.

This invention is illustrated in connection with a circularly-arranged series of needles, *a*, of the latched kind, arranged in the grooves of a cylindrical bed, *b*; but the needles may be of other well-known kinds—as bearded.

It has been deemed unnecessary to show the cam and thread-carrier to operate the needles and supply them with thread in order that they may knit a web, as such devices are well known, and need not be herein described further than to say that they may be moved in any usual way to operate as in ordinary knitting-machines when knitting either a plain or fashioned web.

The head *c* of the transferring device has at its end an annular series of quills, *d*, attached thereto in any suitable way. These quills are preferably made from a blank of the form shown at the left-hand delineation of Fig. 3. This blank is then folded centrally, the second figure of Fig. 3 showing a side elevation of it so folded, and the third figure shows a face view of it.

Each blank, when folded into a quill, has a groove, *e*, to receive the end of the needle, and a shoulder, *f*, to hold the loop of the usual slack course against the path of the advancing needle.

Extended from the head is a tail-piece, *g*, having an attached top-holder, *h*, pivoted at *i*, preferably by a spring-hinge, and adapted to hold the top pressed against a shoulder, *j*.

In Fig. 2 the tubular top is omitted, so as to better show the construction of the parts.

In operation, a tubular top or rib piece provided, as usual, with a slack course has the loops of the slack course placed upon the

quills *d*. This is done by hand. To assist in doing this, and to keep the top so distended as to simultaneously bring the loops of the loose course nearly opposite the quills which are to receive them, each to each, a web-expander, *k*, is placed inside the tubular top, and the tubular top and expander are together inserted within the head *c* until the slack course is brought near the ends of the quills, when the stitches forming it are picked over upon the quills, and then I prefer to unravel the waste end of the tubular top down to the slack course. In this condition the expander may be removed. A series of stitches is shown applied to the quills in Figs. 1 and 4 at *l*. In a machine of this class employing a cylindrical series of vertical needles, a frame or rest, *m*, is placed about and above the needles to receive the transferrer containing the top. The outer portion of the transferrer is provided with guides *n n*, to enter guideways in the rest to insure the apposition or coincidence of the quills and needles. The hooks of the machine-needles are all elevated and placed in the same plane, as shown in Fig. 1. Devices for accomplishing this will be shown in connection with a knitting-machine described in another application filed by me March 7, 1879, for United States Letters Patent. This being done, the transferrer is placed in position with reference to the needles, as in Fig. 1, and so that the upper ends of the needles extend into the spaces *e* of the quills, the backs of the hooks, in the case shown, resting in the cavities of the quills. The loops *l* of the top having now been placed simultaneously upon the needles, they may be pushed down over the latches or drawn down by the hooks, either method being determined by convenience dependent upon the particular construction of the machine, when the knitting to it of the work to be added may be proceeded with.

Precisely what manipulation is required will depend upon the arrangement of the different parts of the knitting-machine, and will readily suggest themselves to persons skilled in the art of knitting by machinery.

A "linking-machine," to apply tops to the legs of half-hose, requires a skilled operator to run it, and the stocking at the junction of the top and knitted web to which it is joined has but limited elasticity.

According to my invention cheap labor may be employed to put the tops upon the transferrers, and each top at the point where the web is subsequently knitted to it has all the elasticity and strength of the other parts of the knitted fabric. It will therefore be seen that by the use of this transferrer the long delay that would occur in "picking" on the tubular top over the needles, loop by loop, while the machine is stopped, is avoided, the transfer to the machine-needles being effected quickly. After the loops are transferred to the needles the guide-frame may be removed.

To facilitate the entrance of the needle

within the flute of the quill, the quill is flared toward the point by curving the sides outward and the point backward, as shown in Fig. 3.

In a circular transferrer the circumference of the tips of the series of quills is somewhat less than that of the backs of the series of needles, the needles, upon entering the flutes, impinging upon the inner sides of the flutes at varying distances from the edges and points, and are forced slightly outward when the quills are pushed along in contact with them in transferring the work.

The depth of the flute or groove, especially at the shoulder, where the loop rests, will be commensurate with the size of the hook or barb of the needle, as will be readily understood. And I prefer that the shoulder of the head or quilled ring shall be placed opposite the shoulder in the quill, so that the loop may be drawn at a right angle to the quill in tightening it preparatory to transferring.

The device for drawing taut and holding the work within the transferrer may be dispensed with whenever it is desirable to push the loop of the work to be transferred below the latches. In such case a comb-like bar may be inserted within the circular tail-piece to depress the work, so that the loops will pass from the hooks to a position below the latches of the needles.

A series of quills, such as described, arranged in a straight bar, as indicated in Fig. 4, and designed to be applied to the backs of the hooks of the needles to transfer the loops of a straight-rib top from such hooks to the needles, is an obvious application of my invention to the "straight-knitting machine."

I claim—

1. A stationary transferring device consisting of a circular head provided with a series of quills, upon which the loops of the knitted tubular top are placed, in combination with a cylindrical series of needles, whereby all the loops of the tubular top may be simultaneously placed opposite and applied to the machine-needles, in order that a circular web may be knitted to it, all substantially as described.

2. The combination, with a circular series of machine-needles, of a stand or support, a stationary transferrer, and guides to simultaneously place each quill of the stationary transferrer in line with and opposite to its needle, to permit the loops to be transferred while the transferrer is held from being rotated, substantially as described.

3. A transferrer provided with quills to receive the loops of a top, in combination with a top-expander adapted to be placed with the top within the transferrer, substantially as described.

4. A transferrer, in combination with a top-holder adapted to hold the top within the transferrer, substantially as described.

5. In a transferring device for knitting-ma-

chines, a series of curved quills adapted to hold a series of loops, and to be simultaneously applied, each quill to the back of a needle, to permit the series of loops to be transferred from the quills to the needles, substantially as set forth.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

BENJAMIN F. SHAW.

Witnesses:

G. W. GREGORY,
S. B. KIDDER.