Sheet 1 - 2 Sheets.

F. Philip.

Straight Knitting Mach.

No. 100,798. Patented Mar. 15, 1870.

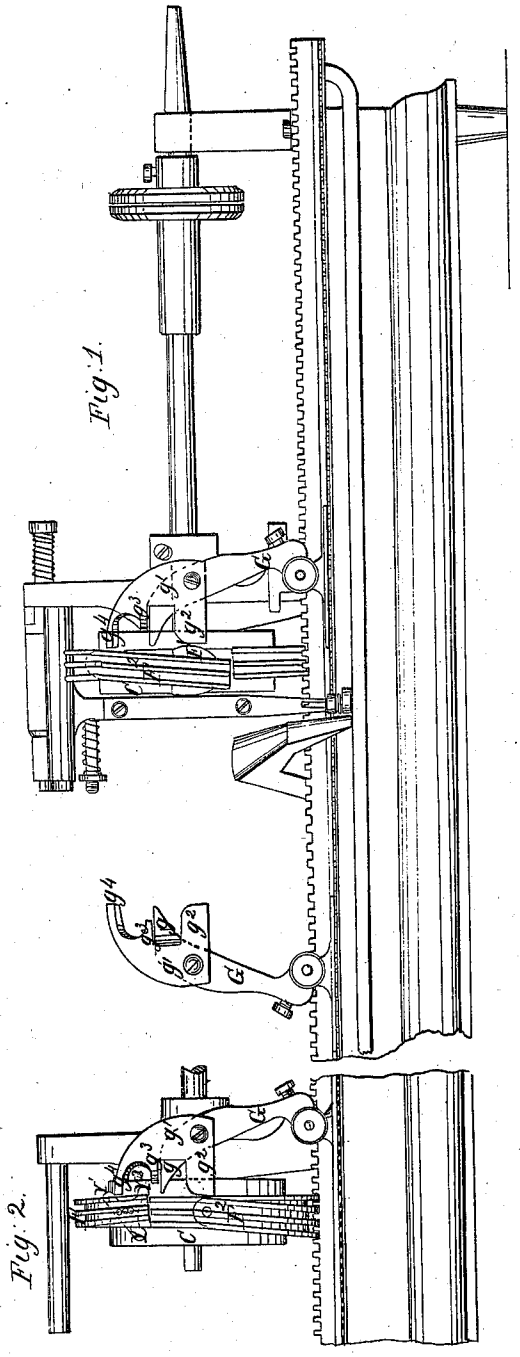

Fig. 1.

Fig. 2.

Witnesses;

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Sheet 2-2 Sheets.

F. Philip.

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Fig. 5.

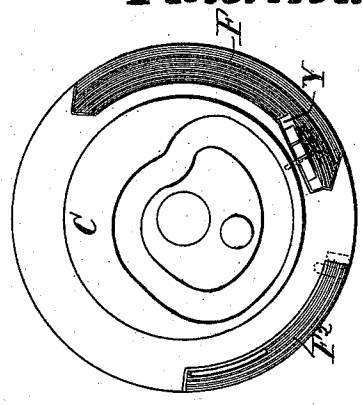


Fig. 4.

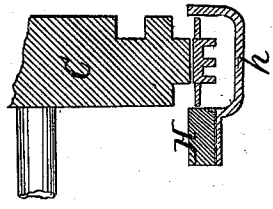
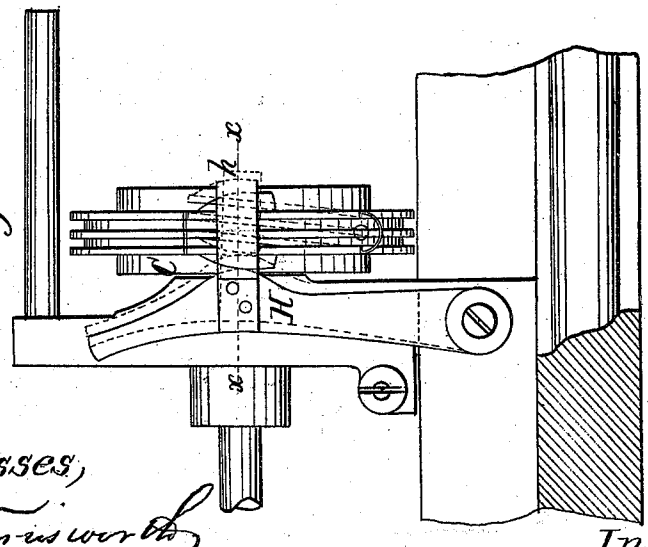


Fig. 3.



Witnesses,

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H. H. Dinsdale

Inventor;

Frank Philip

United States Patent Office.

FRANK PHILIP, OF STOCKPORT, NEW YORK, ASSIGNOR TO HAMILTON E. TOWLE AND GEORGE ED. HARDING, OF NEW YORK CITY.

Letters Patent No. 100,798, *dated March* 15, 1870.

IMPROVEMENT IN KNITTING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, FRANK PHILIP, of Stockport, in the county of Columbia, State of New York, have invented new and improved Devices and Arrangements for Operating such Machines for Knitting Fabrics as are embraced under patents granted Jonas Hinkley, G. M. Patten, and others; and I do hereby declare that the following is a full and exact description thereof reference being had to the accompanying drawings and to the letters of reference marked thereon and forming part of this specification, in which—

Sheet I shows the following details:

Figure I, the front elevation of that portion of a knitting-machine which shows clearly my improvements in the sliding indicators and the feed-wheel.

Figure II, a front elevation, showing one of the sliding indicators and the feed-wheel with different engagement of parts.

Sheet II shows the following details:

Figure III, a rear elevation of the feed-wheel and switch-lever.

Figure IV, a cross-section of the feed-wheel and switch-lever on the line x of Fig. III.

Figure V, a side elevation of the feed-wheel.

My improvement particularly relates to the knitting-machines mow manufactured by the Hinkley Knitting-Machine Company, and the arrangement of my improvement is adapted and shown upon a machine of their manufacture, but the principle of the improvement may be applied to any other knitting-machine operated similarly.

In the usual knitting-machine, the comb traverses by the action of the feed-wheel and switch during their rotation until the feed-wheel arrives at either indicator, which strikes the tumbler of the switch and reverses the motion of the comb upon the second revolution of the feed-wheel, and while producing straight work, or while the fabric is being widened, a selvage is produced; but to form a selvage during the operation of narrowing, unless each stitch narrowed be removed by the hand of the operator and placed on the next inside tooth of the comb, which causes tedious delay and great inconvenience in fashioning articles on the machine, only a raw unfinished edge is the result; and the loops must be cleared from their teeth also, or the work in progress is impeded; while in the same machine the last row of stitches is invariably raw, and can only be "finished" after being taken from the machine, by hand.

My invention consists of certain new and useful devices for producing a perfect selvage when narrowing by the automatic action of the machine itself, the indicators being operated by the attendant as in the usual machine; and further, to form a selvage or "finished" edge of the last row of stitches on the comb-teeth, or, technically speaking, to "bind off" the fabric by the action of the machine itself before removing the work, hitherto impossible by the usual appliances of the machine; and also to produce various combinations of stitches not possible without my improvements or their mechanical equivalents.

It consists first of elongating and elevating the usual projection of the indicators G, as shown at g, Fig I, so that the tumbler or dog y, which governs the shifting of the primary or original switch F of the feed-wheel C shall be reversed at an earlier point of the revolution of the feed-wheel than in the original machine, and also providing such indicator with a movable or pivoted pawl, g^1, having the two arms g^2 and g^4 for operating the secondary switch F^2 and the primary switch F. This pawl g^1 can be swung in or out of use, at pleasure, and is also provided with the stop g^3 for giving the proper position to the arms g^2 and g^4.

Secondly, the construction of the switch F^2 in the periphery of the feed-wheel C, additional and extra to the original movable switch F, which switch F^2 is operated by the projection g^2 of the indicators G, and also by the switch-lever H in rear of the feed-wheel, Fig. III, Sheet II.

Thirdly, the switch-lever H, Fig. III, for operating the secondary switch F^2 by throwing said switch F^2 to the right or left, or retaining it in a central position, or changing its position from that given by the projection g^2, which lever H is situated on the rear of the machine and operates from that side of the feed-wheel. This lever is furthermore held in suitable positions by any mechanical contrivances adapted for that purpose.

The operation of the machine when in connection with the above improvements is as follows:

By placing the switch-lever H in its central position, as shown in its elevation at Fig. III, and swinging the projections g^1 g^1 of the indicators G G away from the feed-wheel C and out of use, the improved machine can be operated similarly to and produces similar fabrics to the original machine; but in the improved machine and when the operation of narrowing is to be performed, the pawls g^1 of the indicators G G are thrown forward, and when the indicators have arrived at the feed-wheel C the projection g^2 of the pawl g^1 strikes the cam F^1 of the secondary switch F^2, moving the said switch to its furthest position from the indicator, as shown in Fig. I, and the projection g^4 trips the tumbler y of the primary switch F as it arrives in proper position, shown in Fig. II, moving the switch F to its central position and the projection g also trips the tumbler y still further, which completes the shifting of said switch to the reverse position.

The effect is to move the comb over one tooth from the indicator by the action of the secondary switch F^2 while the new loop or stitch which is being formed

by the needle and looper is suspended in the looper; consequently the loop is deposited on the next tooth inside the one which otherwise would have received it; and when the primary switch operates to traverse the comb another tooth along, the two switches are left on the same tooth of the comb, to be taken up together by the needle when it again reaches that point of the comb, which completes the operation of narrowing for one tooth, and by moving the indicators one tooth toward each other for each or any row that it is desired to have narrowed; this operation is repeated at pleasure, and "narrowing" on the machine with a produced selvage results. The switch-lever H being set at its central position meanwhile shifts the secondary switch to its middle point, after said switch has once moved the comb, so that the narrowing process concludes with that stitch, except by the volition of the attendant.

To form a selvage on the last row of loops or stitches by the automatic action of the machine, the primary switch F is placed at its central position and the switch-lever H is moved over to that side which is desired to be "bound off," the secondary switch is moved to that same side and alone actuates the traversing of the comb, and moves the comb along during that portion of the loop-forming process when the loop is suspended upon the looper, which on its backward movement deposits the loop on the next inside tooth, over the loop belonging to that tooth, as in narrowing; but, there being no action by the primary switch F, the needle on its next forward movement takes off both these stitches and the new loop which is carried through them is by the action of the secondary switch F^2 similarly placed on its next inside tooth, as was its predecessor. The continued repetition of this process forms a perfect selvage of the last row of stitches, as described and claimed.

The above describes the nature of my invention and the action thereof during the process of knitting.

I do not claim the principle of operating the comb of a knitting-machine by means of a grooved feed-wheel which can be operated either as a right or left-hand screw, by reason of a section of its periphery being movable as a switch to either side of its plane, by striking against sliding or stationary indicators on the comb; but

What I claim as my invention is—

1. The feed-wheel of a knitting-machine having its periphery provided with a secondary switch, as described, operated by the ordinary indicators of the machine or by other mechanical devices for the purpose of forming the last row of stitches, or any portion thereof, into a selvage.

2. The combination of a secondary switch in the periphery of a feed-wheel of a knitting-machine with a movable lever, or its mechanical equivalent, for operating the same.

3. The combination with the indicators of the machine of a pivoted arm or pawl, as described, which may be thrown into or out of use, at pleasure, for the purpose set forth.

4. The combination with the feed-wheel of a knitting-machine of a secondary switch, F^2, the movable switch-lever H, and the pivoted pawls g^1, attached to the indicators of the machine for operating the switches of said wheel, for the purposes herein set forth.

Dated this 23d day of October, 1869.

FRANK PHILIP.

Witnesses:

T. W. FARNSWORTH,

H. H. DUNCKLEE.