

W. H. H. HOLLEN.
KNITTING MACHINE.

No. 110,656.

Patented Jan. 3, 1871.

Fig. 1.

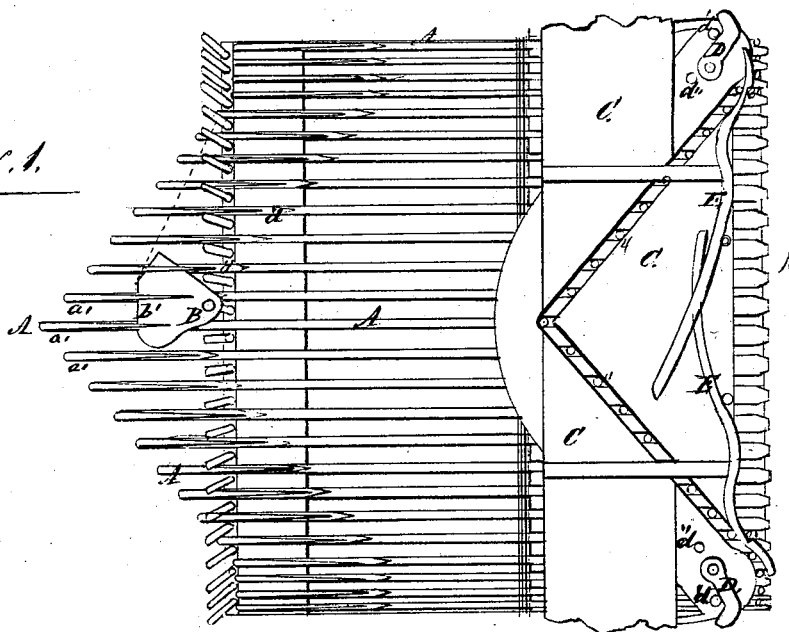


Fig. 2.

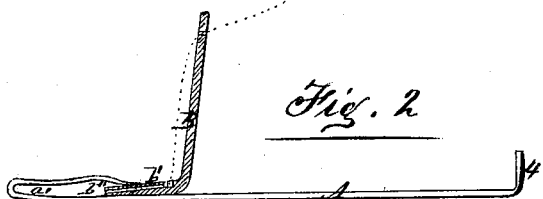


Fig. 4.

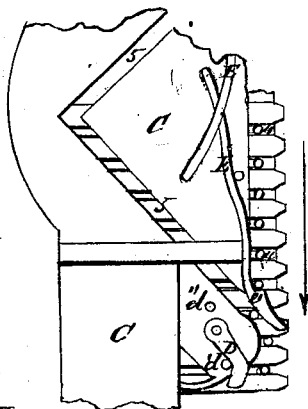
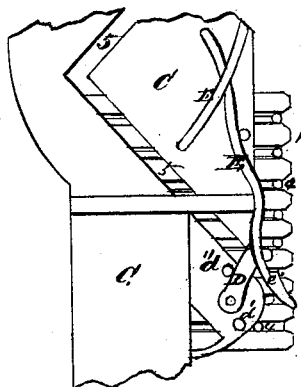


Fig. 3.



Witnesses:

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WILLIAM H. H. HOLLEN, OF FOSTORIA, PENNSYLVANIA.

Letters Patent No. 110,656, dated January 3, 1871.

IMPROVEMENT IN KNITTING-MACHINES.

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

I, WILLIAM H. H. HOLLEN, of Fostoria, in the county of Blair and State of Pennsylvania, have invented certain Improvements in Rotary Knitting-Machines, of which the following is a specification.

Nature and Objects of the Invention.

My improvements relate to that class of rotary knitting-machines in which the needles have a longitudinal motion on their carrying-cylinder; and

My invention consists in providing a tumbler and a notched spring to operate at the open end of each of the two usual oblique guiding-slots, which give the required longitudinal motions of the needles, so that when a needle is pulled forward (by hand) a short distance, its outward-turned rear end will catch under the side of the said tumbler, force it upward and under the said notched spring, and thus simultaneously close the open end of the oblique slot and prevent the succeeding needles from passing into the same, and raising the spring at the same time sufficiently to let the said succeeding needles pass under it. As the cylinder rotates, the needle in advance of the one pulled outward eventually catches in the notch of spring at the open end of the other slot and arrests the rotary motion of the cylinder, and when the motion is reversed, the needle which was pulled outward on that side of the cylinder operates on the tumbler and spring on that side in the same manner as in the previously-described tumbler and spring, and the cylinder is eventually stopped also in the same manner by the opposite spring, and so on successively diminishing, one by one, the needles in the slots, the object of this part of my invention being to enable the operator to narrow, as required for the heel and toe of a stocking, with greater accuracy and facility as occasion may require.

Description of the Accompanying Drawings.

Figure 1 is a view of the upper side of the needle-cylinder of a knitting-machine embodying my invention.

Figure 2 is a side view of a needle and a vertical section of a thread-feeder, in contact with each other.

Figure 3 is a section of the cylinder and needles, showing the oblique slot closed by the tumbler.

Figure 4 is a section of the cylinder and needles, showing the motion of the cylinder arrested by the notched spring.

General Description.

The needles A are made of cylindrical steel wire, and have their pointed ends bent so as to form in each a long loop, *a'*, and with its returned point lying in a groove in its shank, and its rear end 4 bent so as to be radial when applied to the cylinder.

The thread-feeder B is fixed rigidly to the frame of the machine, with its foot *b'* projecting horizontally forward of the needle-cylinder, so that its chamfered side edges will allow the loop of the needles to readily receive and pass it as they are projected forward by the oblique slots 5 5 and carried around by the needle-cylinder.

The open thread-way *b''* of the said feeder B commences near its stem and extends forward along through the foot *b'* and ends at the middle of the front edge of the same, so that the thread is necessarily delivered into the loop of the needle at such a distance from its point (see the dotted line in *figs. 1* and 2) as to prevent the possibility of the latter getting entangled with the said thread.

The oblique slots 5 5 are made in a plate, C, which arches closely over the needle-cylinder, and is fixed rigidly to the frame of the machine, so that the radial rear ends 4 of the needles A may either traverse the said slots or pass along the back edge of the plate C, as will hereinafter be described.

Near the open end of each of the slots 5 5 a tumbler, D, is attached so as to swing freely between two stops, *d' d''*, and when turned down against the stop *d'* the radial ends 4 of the needles pass it freely, (see *figs. 1* and 4,) but when turned up against the stop *d''* it closes the open end of its appropriate slot, (see *fig. 3*.)

Fixed to the arched plate C there are two springs, E E, the free ends of which are bent so as to extend respectively, in downward oblique directions, along the slots 5, and across the back edge of the arched plate C to the rear end of the needle-cylinder, in such a manner as to guide the radial rear ends 4 of the needles into the one or the other of the two slots 5 5, in accordance with whichever direction the needle-cylinder may be moving.

In the rear side of each of the said springs E E there is a notch, *e*, at a point a little beyond the back edge of the plate C, which, when the spring lies close down upon the needle-cylinder, will catch against the advancing radial end 4 of a needle (see *fig. 4*) and arrest the rotary motion of the cylinder in that direction; but when the tumbler D is being turned upward it raises the end of the spring E, as in *fig. 3*, and allows the radial rear ends 4 of the needles to pass under the spring.

Operation.

After the leg of the stocking is long enough to commence with the heel, I first draw one needle on each side of the part intended for the heel far enough forward to cause their radially-projecting rear ends to turn the tumblers. I then put the cylinder of needles in motion, and the advancing one of the two needles

which were drawn forward will turn the tumbler on that side upward, forcing it under the spring, and raising the latter high enough to let it and the following needles pass freely under it instead of passing into the oblique groove 5, as the working needles do. These needles consequently pass on around behind the plate C until stopped by the forward one entering the notch *e* in the next spring. I now reverse the motion of the cylinder of needles, and the needles which are working or knitting traverse the oblique groove 5, and the forward one turns the tumbler downward or back to its former position, letting its spring *E* shut down again. As the tumbler is turned downward into its original position it drives or pushes toward the forward end of the cylinder another needle, so that the latter will, on being carried around by another reverse motion of the cylinder of needles, turn the tumbler upward, as did the previously drawn-up needle on that side of the cylinder. The needle on the opposite side is acted upon, and acts precisely in the same manner on reversing the motion of the cylinder.

What makes the machine "narrow" or lessen the number of the heel-working needles is the tumbler raising its spring just as the last heel-working needle is about to turn into the groove 5, and adding one

more needle at each partial rotation of the cylinder to those which pass around behind the plate C, and consequently in so far lessening the number of the heel-working needles in the grooves 5.

The springs *E* form part of the rear ends of the grooves 5, and if they were taken off none of the needles would turn up into the said grooves. When closed down the said springs turn the needles into the grooves, and when raised to let the needles pass under them the advance needle of either side catches in the notch of the spring of the other side and stops the rotary motion of the cylinder.

Claim.

I claim as my invention—

The combination, with the cam-plate C, of the tumblers D D, and notched springs E E, when constructed and arranged to operate upon the needles and cylinder, substantially as hereinbefore described, and for the purpose specified.

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Witnesses:

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