Feb. 17, 1948. S. A. WYTOVICH 2,436,241

LATCH NEEDLE OPENER

Filed Feb. 12, 1947

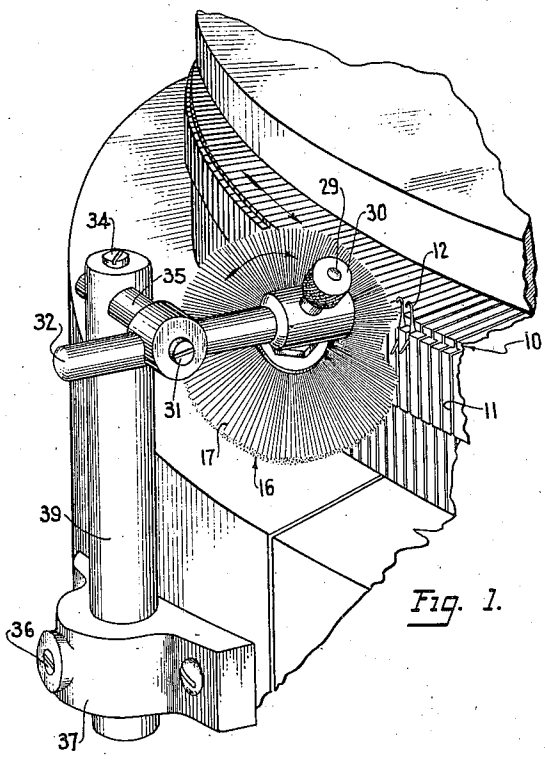


Fig. 1.

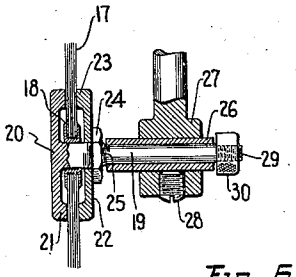


Fig. 6.

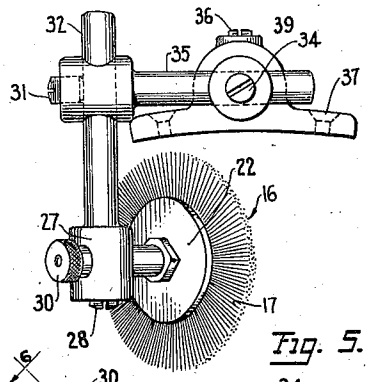


Fig. 5.

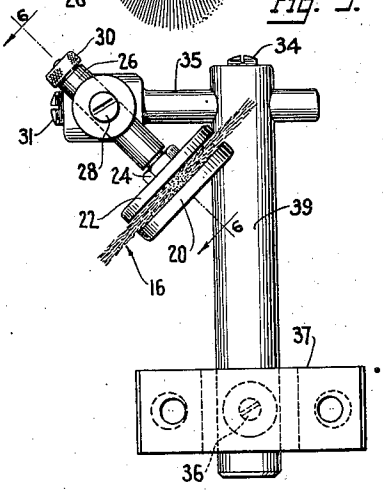


Fig. 4.

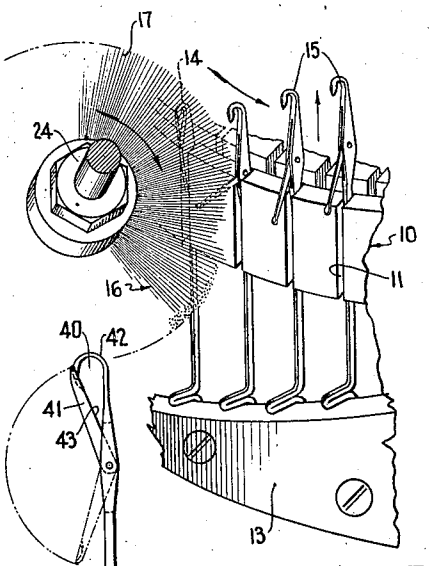


Fig. 2.

Fig. 3.

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Patented Feb. 17, 1948 2,436,241

UNITED STATES PATENT OFFICE

2,436,241

LATCH NEEDLE OPENER

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Application February 12, 1947, Serial No. 728,002

6 Claims. (Cl. 66—111)

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This invention relates to knitting machines, more particularly to latch openers of needles used in various types of conventional knitting machines.

Wherever latch needles are employed, the opening of the latch is effected by the yarn under the hook when the needle is being moved from its cast-off position towards its knitting position, the movement of the needle (under the influence of cams or other needle actuating devices) beyond the level of the yarn causing the yarn to slidably engage the latch and thereby open it. It frequently happens, however, that the pivotal connection of the latch formed by the pintle connecting the latch to the head or hook portion of the needle becomes cluttered or obstructed with lint, thereby preventing a free movement of the latch; or the pivotal connection is stiff or tight because of slight defects in its construction or for other reasons. This condition frequently arises after the machine is lubricated, and is a common occurrence when the yarn is made of cotton. Under normal operating conditions, it is often not easy to immediately detect the presence of a closed latch after cast-off position, and it frequently happens that a machine will produce yards of fabric before the condition is discovered. The resulting fabric, as is well known in the art, contains runs and ridges; and at times the yarn will break under the resultant stress, producing holes in the knitted cloth. It is accordingly primarily within the contemplation of this invention to prevent such undesirable conditions in the production of knitting fabric by providing a positive means, separate and apart from the yarn itself, for opening the latch after cast-off position.

It is an important object of my invention to enable the aforesaid objective to be attained by direct-acting and positive means readily adapted for attachment to conventional machines, and of such a construction whereby the delicate latch mechanism will not be injured. And in this aspect of my invention, it is a further object to employ a brush type of latch opener with flexible and yieldable bristles which will directly engage the latch without otherwise affecting the operation of the machine and without injury to the yarn. And in this connection it is a further object of my invention to employ a flat type of brush engageable with a needle and associated parts of the machine at a relatively small and limited area thereof, and capable of being brought into engagement at a specific predetermined portion of the machine.

Another important object of this invention is to enable the latch opening operation to be effectuated without the use of a special drive other than the conventional moving parts of the machine. And in this aspect of my invention it is a further object to cause an operative movement of the brush element by bringing it into engagement with a rotating portion of the machine, such as the rotating cylinder, whereby the brush will be rotatably actuated in a manner of one gear wheel being driven by another. And in this connection it is a further object to provide the brush with a simple and effective free-wheeling mounting.

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It is still another object of this invention to provide the brush element with an adjustable universal support, whereby the position of the brush with respect to the cylinder and needles can be varied to suit the conditions.

Another object of this device is to provide novel clamping means for the bristles, to hold them against spreading and thereby maintain them closely bunched together for best operative effects, and also prolonging the life of the brush. It is also an object of this invention to employ a conventional type of flat rotary brush, and to provide therefor removable mounting means for ready replacement.

A still further object of this invention is to enable the brush element to clean the hook and pivotal portions of the needle from accumulations of lint or other foreign matter.

And it is within the contemplation of this invention to enable the foregoing objects to be attained by a simple, inexpensive and readily assembled device.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a fragmentary perspective of a portion of a revolving-cylinder knitting machine showing a few needles in place and the latch opener in operative position according to my invention;

Figure 2 is an enlarged fragmentary perspective of the latch opener and coacting needles, showing an elevating cam raising the needles from cast-off position;

Figure 3 is a fragmentary elevation of a latch needle in its closed and open positions;

Figure 4 is an elevational view of the latch opener and supporting structure therefor, looking radially outwardly from the cylinder;

Figure 5 is a top view of Figure 4; and

Figure 6 is a section of Figure 4 taken along line 6—6.

In the particular form of knitting machine used

to illustrate this invention, the cylinder 10, rotatable in the direction of the arrow, contains a plurality of vertical slots 11 for slidably accommodating the latch needles 12. These needles are movable into various positions by elevating and depressing cams or other devices well known in the art. Figure 2 shows a raising cam 13 engageable with the butts of the needle for raising the needles from the cast-off position of needle 14 to elevated positions as indicated by needles 15. The mechanism thus far described is of conventional structure.

The preferred latch opening device consists of a flat round brush member 16 mounted so that the plane of the brush will be inclined with respect to the needles, and positioned in engagement with the cylinder and the vertical slots 11 thereof. The arrangement is such that upon an operative rotation of the cylinder in the direction of the arrow, the brush will be caused to rotate clockwise (Figures 1 and 2) in the direction of the arrow substantially in the manner of spiral gearing, all as will be more fully hereinafter described.

The brush member 16, in the preferred structure illustrated, comprises a plurality of radially disposed closely packed flexible bristles 17, in disc-like formation, the bristles being held in position by the central flanged member 18 fixedly mounted upon shaft 19. Integral with the shaft 19 is the outer disc-like clamp 20 which contains a peripheral flange 21 engaging the brush at a predetermined point between member 18 and the periphery of the brush. Mounted over shaft 19, on the opposite side of the brush, is the clamp 22, containing the peripheral flange 23 engaging the brush coactively with flange 21. The nut 24, mounted over threaded portion 25 of the shaft, engages the outer surface of clamp 22, to effectuate a tight clamping of the brush by the said clamps 20 and 22. The shaft 19 is rotatably positioned within sleeve 26 which is mounted within member 27 and held therein against rotation by the set screw 28. The outer reduced terminal 29 of the shaft 19 is threaded, and contains thereover the knurled nut 30. The arrangement is accordingly such that shaft 19, together with the brush member 17 and nut 30 are freely revolvable within the supporting structure above described.

The entire brush assembly above described is mounted for universal adjusting. The slotted set screw 31 which engages the rod 32 permits said rod to be moved radially towards and away from the cylinder, and also rotatably, thereby enabling not only the position of the brush radially with respect to the cylinder to be varied, but also enabling its angle with respect to the cylinder to be adjustably changed. The set screw 34 which engages rod 35 enables a horizontal adjustment to be effectuated; and the set screw 36 within bracket 37 enables the vertical rod 39 to be adjusted, thereby permitting a corresponding vertical adjustment of the brush.

The brush construction above described is such as to maintain the bristles in closely packed formation, inasmuch as the flanges 21 and 23 of clamps 20 and 22 are positioned sufficiently close to the periphery of the brush to hold the bristles against spreading, and yet leaving sufficient length of the bristles for operative efficacy. If after continuous use it is desired to replace the brush, all that need be done is to disassemble the brush assembly by unscrewing nuts 30 and 24, and substituting a new brush.

In the operation of this device, the rotating

cylinder 10 engages the bristles of brush 16 to cause a rotation thereof as aforesaid, inasmuch as the brush assembly is freely mounted within the sleeve 26. The brush is so positioned that the portion thereof contacting the cylinder is disposed after the cast-off position (where needle 14 is located, Figure 2). At this point the bristles are moving both outwardly and downwardly, due to the inclination of the brush, whereas the needles are moving upwardly under the influence of an elevating member such as cam 13. The opposite movements of bristles and needles will enable those bristles which have entered the space 40 between the closed latch 41 and hook 42 (Figure 3) to engage the inner wall 43 of the latch and pivotly move it downwardly and outwardly into an open position. The bristles which effect the opening of a latch slidably move outwardly against the open latch until they are out of engagement with the cylinder and needles, to repeat their latch opening action when they again rotatably reach the cylinder. In this manner the bristles continuously engage successive needles, opening the latches in the manner above described.

It will be observed that the action must of necessity be positive, particularly since the brush is so set that the bristles will embed themselves partially within the slots 11 when they engage the cylinder as illustrated. Since the bristles are flexible, they will yield under contacting pressure, and will accordingly cause no damage to the delicate latch construction. At the same time, the moving bristles will remove any accumulated lint or other foreign material.

It will be further noted that the rotating action of the brush 17 is also positive in nature, inasmuch as the slots 11 receive the bristles, so that the walls of the slots positively engage the bristles to produce a rotary motion of the wheel.

From the above description it will also be observed that the construction is such as to enable the device to be attached to a conventional machine without in any way affecting its operation.

Although in the structure illustrated the preferred method is described as including a free wheeling brush, particularly where a revolving cylinder is employed, it is to be understood that my invention is not limited to such a specific arrangement. Special conditions might justify the use of special driving means for the brush member, an arrangement which will produce the other advantages hereinabove described.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except in so far as such limitations are specified in the appended claims.

I claim:

1. In a knitting machine of the type having a cylinder member with needle slots and latch needles slidably movable therein, a latch opener comprising a brush member rotatably mounted adjacent the cylinder member at a predetermined region of the machine, the bristles of the brush being in pressing engagement with the cylinder and the slots, whereby upon an operative rotation of the cylinder the brush will be rotated, the bristles of the brush being positioned for engagement with the inner wall of the closed latch of an adjacent needle at the said region, whereby upon

an operative rotation of the brush the bristles thereof will cause the latch to be opened.

2. In a knitting machine of the type having a revolving cylinder with needle slots and latch needles slidably movable therein, a latch opener comprising a flat brush rotatably mounted adjacent the cylinder, the plane of the brush being inclined with respect to the needles, the bristles of the brush being in pressing engagement with the cylinder and the slots, whereby upon an operative rotation of the cylinder the brush will be rotated, the bristles of the brush being positioned for engagement with the inner wall of the closed latch of an adjacent needle, whereby upon an operative rotation of the brush the bristles thereof in engagement with the inner wall of the said latch will move outwardly and downwardly to cause the latch to be opened.

3. A latch opener according to claim 1, further provided with adjusting means for varying the position of the brush member relative to the cylinder member.

4. In a latch opener of the class described, a flat disc-like brush member containing a plurality of radial bristles supported in the region of the member's axis, and two discs on opposite sides of the brush member and containing oppositely disposed, inwardly extending peripheral flanges engaging the bristles intermediate their ends.

5. In a latch opener of the class described, the combination according to claim 4, one of said discs being detachably connected to the brush member.

6. In a latch opener of the class described, a flat disc-like brush member containing a plurality of radial bristles supported in the region of the member's axis, two discs on opposite sides of the brush member and containing oppositely disposed, inwardly extending peripheral flanges engaging the bristles intermediate their ends, a shaft fixedly associated with the brush member and the outer of said discs, the inner of said discs being slidably removable from the shaft, and means for holding said discs in pressing engagement with the bristles.

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