Dec. 23, 1947. S. E. BENGTSSON 2,433,257

NEEDLE RAISING DEVICE FOR SEWING MACHINES

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Fig. 1.

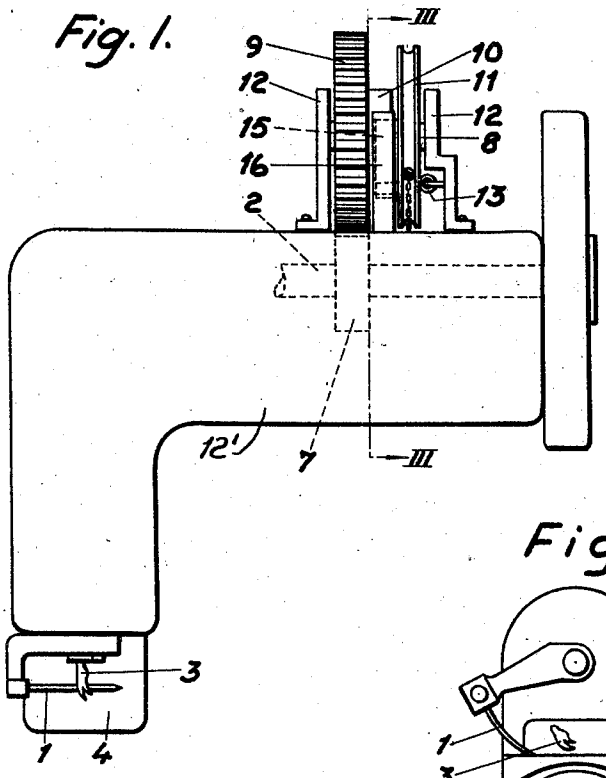


Fig. 2.

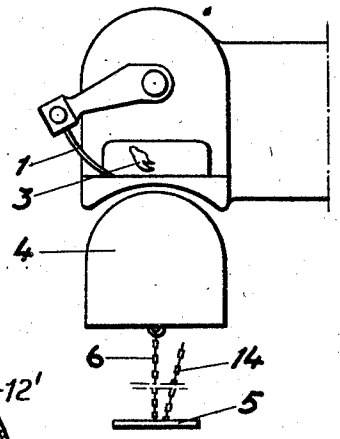
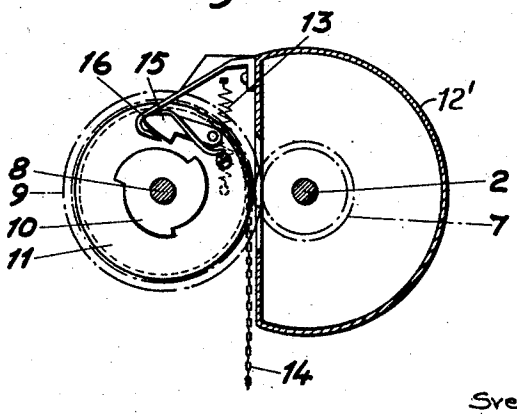


Fig. 3.



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Fig. 6.

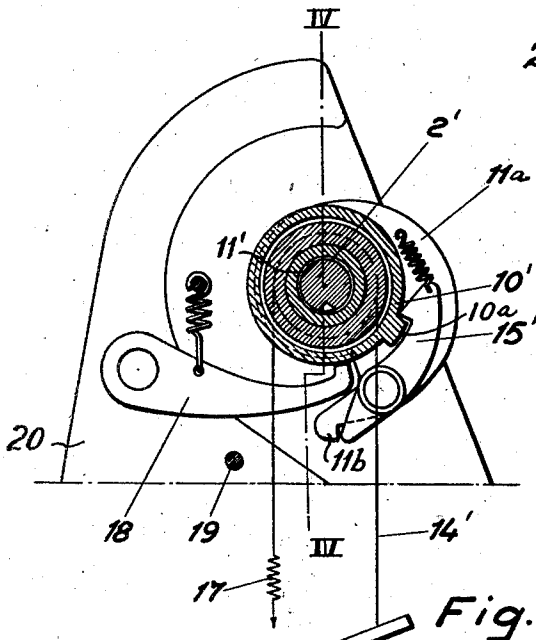


Fig. 4.

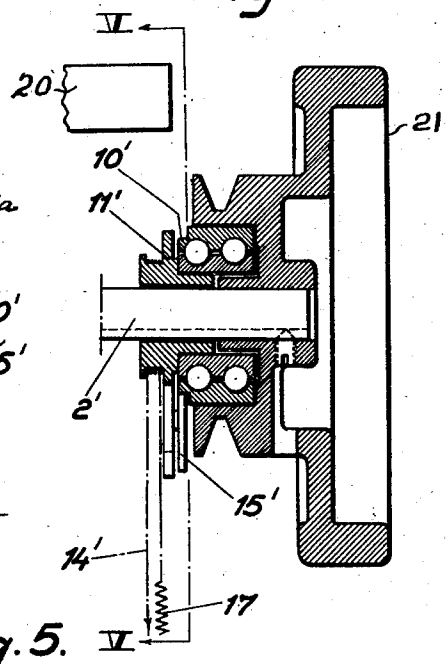
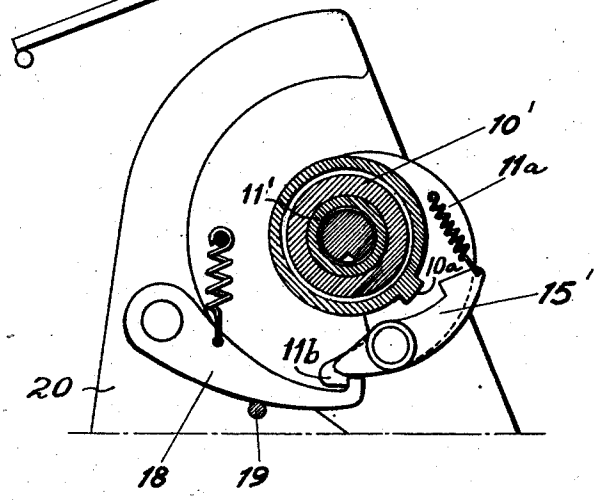


Fig. 5.



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NEEDLE RAISING DEVICE FOR SEWING MACHINES

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3 Claims. (Cl. 112—219)

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Some sewing machines working with one or more needles for forming single-thread or multi-thread stitches, particularly machines as are used in the ready-made-clothing industry, possess a very great drawback, viz., that at the disconnection of the motive power the needle or needles may have stopped in a position in which the needle or needles have been inserted in the work piece, and/or have not completed the stitch. Consequently, the machine operator, manually and particularly attentive to the work of the needles, has by means of the balance wheel of the machine had to rotate the drive shaft of the machine so much that the needle or needles shall be disengaged from the work piece or shall have completed a stitch. In those machines in which the work piece has to be incessantly removed from, and reinserted in the machine this adjustment becomes very tedious and trying. This is particularly the case in machines for sewing invisible stitches for padding collars and lapels, for example, in which only a short seam is to be made each time. Thus, it very often occurs that the work piece is removed at the wrong moment which either causes damage to the work piece, the needle to be broken off, the parts of the machine to be put into disorder or, if the last stitch has not been completed, the sewn seam will be drawn out.

One object of the invention is to provide, in sewing machines, a manually operated needle raising device which, on stopping of the machine, may be operated to raise the needle automatically to a position in which it is disengaged from the work piece.

Another object of the invention is to provide in sewing machines of the type set forth, a device coupled with the mechanism for raising and lowering the work piece which causes a withdrawal of the needle from the work piece whenever the machine has stopped in a position in which the needle is engaged in the work piece.

A still further object of the invention is to provide a device on a sewing machine which makes it unnecessary that the worker pay any attention to the position of the needle at the time before he removes the work piece from the machine.

These and other objects which will appear more clearly as the specification proceeds, are accomplished according to the present invention by the arrangement and combination of elements set forth in the following detailed description defined in the appended claims and illustratively exemplified in the accompanying drawings in which:

Fig. 1 is a top plan view of a machine provided with a device according to one embodiment of the invention;

Fig. 2 is a front elevational view of the machine shown in Fig. 1;

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Fig. 3 is a section taken on line III—III of Fig. 1 and turned through an angle of 90°;

Fig. 4 shows the driving shaft and fly wheel of a sewing machine provided with a device according to a second embodiment of the present invention in a substantially axial section taken on line IV—IV of Fig. 6, with one part omitted for the sake of clarity;

Figs. 5 and 6 are sectional views, both taken on line V—V of Fig. 4 and showing the needle raising device according to said second embodiment in two different positions, respectively.

The machine, to which the device is here applied, is provided with a single curved needle 1 which in a way known per se, is adapted to be given an oscillating movement by the driving shaft 2 of the machine. Thus, through the cooperation of the needle with the gripper 3, single-thread chain stitches, so-called blind stitches, can be produced on the work piece located on the member 4 which is adapted to be raised and lowered. The said member 4 tends to assume its upper position shown in Fig. 2. When the motive power has been disconnected, a treadle 5 connected to the member 4 by means of a pulling cable 6 may be depressed, thus causing the member 4 to assume a lowered position admitting of the insertion of the work piece in, and the removal thereof, from the machine. In order to prevent the release of the work piece when the needle 1 is in engagement with the work piece or before the last stitch has been completed, the following means are provided.

A pinion 7 is fixed to the driving shaft 2 of the machine and meshes permanently with a toothed wheel 9 mounted on a shaft 8 carried by two brackets 12. A ratchet wheel 10 is rigidly secured to the toothed wheel 9. A pulley wheel 11 provided with a peripheral groove is mounted on the shaft 8 so as to be freely rotatable thereon. A spring 13 connects the pulley wheel 11 with one of the brackets 12. A chain 14, guided in the peripheral groove of the pulley wheel 11 and having its opposite ends attached to the treadle 5 and the pulley wheel 11, respectively, serves to turn the latter from the position shown in Fig. 3 against the force of the spring 13 in clockwise direction through a certain angle when the treadle 5 is operated. A pawl 15, mounted on the pulley wheel 11 is spring urged into an operative position in which it tends to engage the teeth of the ratchet wheel 10, so as to entrain the latter on rotation of said pulley wheel 11 in clockwise direction. When the treadle 5 is released, the spring 13 turns the pulley wheel 11 in counterclockwise direction. Towards the end of this counterclockwise return movement, the rounded end portion of the pawl 15 comes into contact with a cam member 16, mounted on the frame 12' of the machine. This cam member 16

first causes the pawl 15 to move from its operative position to an inoperative position out of the path of the teeth of ratchet wheel 10, and then it stops further movement of the pulley wheel 11 in counterclockwise direction as soon as the latter has been returned to its predetermined rest position shown in Fig. 3.

The motive power may be disconnected by releasing a treadle not shown on the drawing, whereby the movement of the needle 1 stops. Then the treadle 5 is depressed. The pulling cables 6 and 14 are mutually arranged in such a way relatively to the treadle 5 that, on depression of the latter, first the pulley chain 14 is operated and turns the pulley wheel 11, the pawl 15 of which entrains the ratchet wheel 10 whenever the drive shaft 2 has stopped in such a position that the needle 1 is still in engagement with the work piece or the last stitch has not been completed. The turning movement, which is thus imparted to the shaft 2 through wheels 7 and 9, is exactly as large as is required in order that the needle 1 shall complete an incomplete stitch and be moved into its initial position shown in Fig. 2. On further depression of the treadle 5, the member 4 is lowered and the work piece can now be removed from the machine. As soon as the treadle 5 is released, e. g., after insertion of a work piece, the helical spring 13 turns the wheel 11 back to the initial position, whereby the pawl 15 is moved to its inoperative position by means of the cam member 16. The treadle controlling the connection and the disconnection of the motive power may then be depressed again, after which the running of the machine recommences.

In the embodiment according to Figs. 4 to 6, a fly wheel 21 is keyed to the driving shaft 2' of the machine and houses in its hub a ball bearing. The outer race 10' of the ball bearing is pressfitted in a recess provided in the fly wheel 21 and carries on its projecting left hand portion a single tooth 10*a*, visible in Figs. 5 and 6, but not in Fig. 4. The inner race of the ball bearing is pressfitted on the hub of a pulley wheel 11' (see Fig. 4), which is thus rotatably carried by the fly wheel 21 and which surrounds the driving shaft 21 with some play. A pawl 15' is mounted on an eccentrically projecting cam portion 11*a* of the pulley wheel 11' and spring urged into an operative position in which it tends to engage the tooth 10*a* and to entrain the bearing race 10' with the fly wheel 21 and driving shaft 2' on rotation of the pulley in clockwise direction, as seen in Figs. 5 and 6. A pulling cable 14' has one end fixed to the treadle 5 and includes an intermediate portion guided in the peripheral groove of the pulley wheel 11' and wrapped at least once around the latter, the other end of the pulling cable 14' being anchored to the floor by means of a helical spring 17. The intermediate part of the cable 14' which is wrapped around the pulley wheel 11' is secured to the latter in any desired manner near the point where the part of the cable 14' leading to the spring 17 leaves the peripheral groove of the pulley wheel 11'.

When the treadle 5' is depressed, the pulley wheel 11' is turned clockwise, through one revolution from its normal or rest position shown in Fig. 5, and the pawl 15' engages the tooth 10*a*, unless the latter happens to be in or slightly below the position one in Fig. 5, thereby taking the ball bearing race 10', the fly wheel 21 and the driving shaft 2' along. This movement of the driving shaft 2' causes a withdrawal of the needle

from the work piece. On reaching the position shown in Fig. 6, further rotation of parts 10' and 11' in clockwise direction is prevented as the recessed rear edge of the cam portion 11*a* engages the tip of a second pawl 18 pivoted to a stationary frame member 20 and spring urged into the position shown in Fig. 6. When the treadle 5' is released, and the pulley wheel 11' returns under the action of spring 17, through one counterclockwise revolution, to its rest position, shown in Fig. 5, the pawl 18 rides up on the curved front end of the cam portion 11*a* until it rests against an abutment 19 and its hook-shaped tip engages the hook 11*b* formed at the rear end of the cam portion 11*a*. In this position, further counterclockwise rotation of the part 11' is prevented and the front end of the pawl 18 presses on the rear end of the pawl 15', thus lifting the latter to its inoperative position shown in Fig. 5, in which the parts 10', 21 and 2' are free to revolve without interference from the pawl 15'.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An attachment for sewing machines comprising a rotary member permanently drivingly connected with the drive shaft of the machine, tooth-shaped coupling means on said member, a driver element coaxial with said member and rotatable relative thereto, a pawl on said driver element, a spring urging said pawl into an operative position in which it tends to engage said tooth-shaped means on said member so as to entrain the latter upon rotation of said driver element in one direction, means tending to rotate said driver element in the opposite direction, an abutment arranged for cooperation with a projection on said driver element to stop the latter's rotation in said opposite direction when it has reached a certain angular rest position, a part of said pawl being shaped and arranged for cooperation with said abutment to move said pawl from its operative to an inoperative position out of the path of said tooth-shaped means on said member when said driver element approaches said rest position and to keep said pawl in said inoperative position, as long as said driver element assumes said rest position, and operator controlled means to turn said driver element from said rest position in said first direction through a predetermined angle, whereby said pawl engages said tooth means and turns said rotary member and drive shaft to a predetermined angular position in which the needle is disengaged from the work piece.

2. An attachment, as claimed in claim 1, in which said abutment is a stationary cam mounted on the frame of the machine.

3. An attachment, as claimed in claim 1, including a pinion keyed to the drive shaft and a toothed wheel in mesh with said pinion, said rotary member being a ratchet wheel coaxially secured to said toothed wheel.

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