

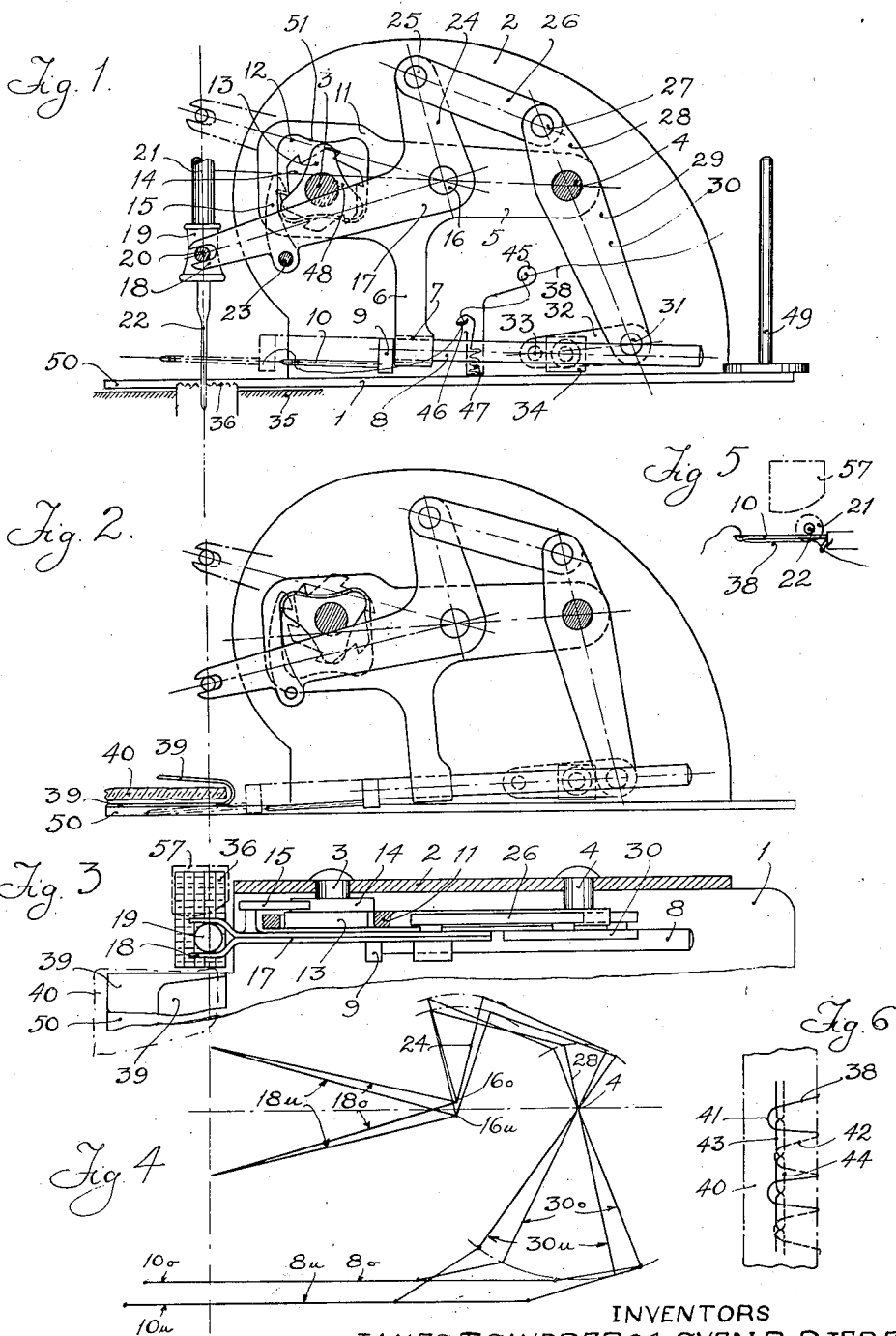
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WHIP-STITCHING DEVICE

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## WHIP-STITCHING DEVICE

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The present invention relates to devices for producing so-called whip-stitching seams, that is, seams comprising usual sewing machine stitches combined with one or more whip-stitches formed by a separate thread overcasting the borders of the fabric and attached alternately to the upper and to the lower threads of the sewing machine.

The principal object of the invention is to provide a device of this kind either in the form of an appliance to be attached to a sewing machine of common type or as a complete whip-stitching sewing machine, permitting in both cases high speed operation such as 3000 stitches per minute.

An object of the present invention is to provide a device for moving in a vertical direction a thread guide for whip-stitching thread which will at all times work over the table of a sewing machine or a corresponding plane, so that the thread guide will be in position alternately over and under the material being worked on.

Another object of the present invention is to provide a device by which the strokes of the guide for the whip-stitching thread can be varied in such a manner that in its upper position the guide for the whip-stitching thread does not move so far over the material as it does in its lower position under the material. This last mentioned device is of great importance for obtaining a sure loop formation. It operates so that the guide for the whip-stitching thread in its lower position on return obtains a retarded movement in relation to the needle carrying out the sewing-machine stitches, so that the guide for the whip-stitching thread is not pulled back before the sewing machine needle has passed through the material so far in its downward motion that the whip-stitching thread has formed the loop round the sewing-machine stitches.

The invention is also characterized by different embodiments, made evident by the description and the drawing belonging to it.

The invention is illustrated on the accompanying drawing, in which Fig. 1 shows an apparatus, attached to a common sewing-machine. In this figure the whip-stitching thread carrier is shown in its upper-position.

In Fig. 2 is shown in the like manner the whip-stitching thread carrier in its lower position. These two figures show the apparatus seen from the front, viz. the apparatus is turned to him, who uses the machine.

Fig. 3 is a top plan of the apparatus, partly in section.

Fig. 4 shows a diagram concerning the whip-

stitching thread carrier and the driving arm position of the apparatus for the introduction of the whip-stitching thread carrier over and under the material respectively.

In Fig. 5 is shown the positions of the whip-stitching thread carrier and the sewing machine needle in relation to each other and the carrying out of the pressure foot and in this figure is schematically shown the position of the sewing machine threads and the whip-stitching thread in relation to each other when the seam is formed.

Fig. 6 is a top plan showing the position of the sewing machine threads and the whip-stitching threads in relation to each other when the seam is formed.

On the drawing, 1 shows a horizontal plate, which supports the machine and which is placed directly on the sewing machine table 35. This plate 1 is provided with an extension 50 arranged in front of the feeding mechanism 36. From the plate 1, a vertical plate 2 projects which principally supports the mechanism belonging to the device. Two supporting pins 3 and 4 are arranged in this plate 2. On the latter pin 4, a rocking arm 5 is pivotally arranged and provided with a side arm 6 formed therewith which by means of a guide opening 7 forms the guiding means for a thread carrier bar 8 which moves therethrough and has mounted on one end thereof a holder 9 for the whip-stitching thread carrier 10. Arm 5 also is provided with an arm 11 provided with an opening 12. In the opening 12 is a disc 48 provided with three cams 13 and rotatably mounted on said pin 3. Said cam disc 48 cooperates with a curve-formed part 51 arranged in the part 11 of the arm 5, in such a manner that when the cam 48 is moving, in this case  $\frac{1}{2}$  revolution round the pin 3, the arm 11 is alternately in its upper and its lower position, but always positively guided as a consequence of the design of the cam disc 48 and the curve-formed parts 51.

Pivotally mounted on a pin 16 on arm 5 is a bell crank lever 17. One arm 18 of lever 17 has a forked end connected to a pin 20 mounted on a holder 19 on the needle bar 21. By this arrangement the bell crank lever 17 obtains a movement between two end-positions as shown in the Figures 1 and 2 (unbroken lines for the lower position) in the lower position of which the needle 22 has penetrated the material. The other arm 24 of the bell crank lever 17 is directed upwards as the drawing shows and is at its end provided with a pin 25, which effects a pivotal

connection with the link 26, which in its turn transmits the movement by the pin 27 arranged on one arm 28 of the lever 29, which turns round the pin 4. The movement is further transmitted by the lower arm 30 of the lever 29 via the link 32, through the pivotal connection therewith through pin 31, to the pin 33 arranged on the thread carrier bar 3, which is guided by the opening 7, is further guided by moving through a guide 34 mounted on plate 2.

The cam disc 48 obtains its intermittent movement (turning) by a toothed wheel 14, which also is mounted on the pin 3 and which obtains its movement from an arm 15 which by pin 23 is attached to the arm 18, the cam disk being intermittently rocked when the arm 18 is descending.

In the whip-stitching thread carrier is a slot and a loop for the thread 33. The thread is kept stretched in a suitable manner by a spring 47 with a loop 49, which obtains a rocking movement during the working of the machine so that the thread is stretched and then slackened in a suitable manner during the whip-stitching. The thread 33 is guided by a guide loop 45 on its way to the reel of cotton, which is suitably placed on a holder 49. The material which on the drawing is designed by numeral 40 is suitably guided in a side direction by a plate 39 and is kept uplifted over the sewing machine table 35 by means of the extension 50 of plate 1 that projects beyond the feeding mechanism 38. The material is pressed down against the feeding mechanism by the pressure foot 57 arranged in a suitable manner either at the frame 1, 2 or in a common way at the holder for the pressure foot of the sewing-machine.

In Fig. 6 41 and 42 designate the upper and lower loops of the thread 33 while 43 and 44 designate the upper and lower threads of the sewing-machine.

In Fig. 4 is schematically shown how the strokes of the whip-stitching thread carrier can be changed so that the thread carrier in its lower position is moved through a greater distance than in its upper position, the indices  $o$  and  $u$  added to parts 8, 10, 16, 18 and 30 designating the positions of said parts in the upper and lower portion of the whip-stitching thread carrier. As the pin 16 is fastened to the arm 5, which pivots around the pin 4, its centre will be displaced during the lowering and lifting movements of the thread carrier bar as the latter is connected to the arm 5 by means of the side arm 6. Of course the displacement of the pin 16 will be smaller than that of a part situated farther off e. g. the slot 12. The arm 30 of the lever 29 will be caused to oscillate with the angles  $33o$  and  $33u$  during the respective change of positions of the pin 16 which in turn causes the different strokes of the needle bar and thread carrier thereof, as is illustrated in the diagram.

What we claim is:

1. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a frame, a lever turnably mounted on said frame, a thread carrier mounted on one end of said lever for introducing a continuous thread alternately above and below the fabric in back and then in front of each piercing of the fabric by the needle of the sewing machine, a cam disk mounted on said frame and driven by the sewing machine, an arm connected to said lever and actuated by said cam disk so as to be moved alternately into an upper and a lower position

thereby causing said thread carrier to be moved alternately above and below the fabric, a pivot on said arm, a bell crank lever turnably mounted on said pivot and having its one end connected with the needle bar of the sewing machine and its other end connected to the first mentioned lever so as to impart a reciprocating motion to said thread carrier.

2. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a frame carrying a pivot, a lever turnably mounted on said frame, a thread carrier mounted on one end of said lever for introducing a continuous thread alternately above and below the fabric in back and then in front of each piercing of said fabric by the needle of the sewing machine, and means for actuating said lever so as to impart the desired start motion to said thread carrier, comprising a cam disk turnably mounted on said frame and driven by the sewing machine, an arm mounted on said pivot on the frame and connected with said lever, said arm being actuated by said cam disk so as to cause said thread carrier to be moved alternately into positions above and below the fabric, said cam disk being arranged between the centre line of the needle of the sewing machine and said pivot.

3. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a frame, a lever turnably mounted on said frame, a thread carrier mounted on one end of said lever for introducing a continuous thread alternately above and below the fabric in back and then in front of each piercing of said fabric by the needle of the sewing machine, and means for actuating said lever so as to impart the desired motion to said thread carrier, comprising a cam disk mounted on the frame and driven by the sewing machine and an arm turnably mounted on the frame and connected with said lever, said arm having a downwardly extending portion formed as a guide for said thread carrier, said arm being actuated by said cam disk so as to cause said thread carrier to be moved alternately into positions above and below the fabric.

4. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a frame detachably mounted on the bed of the sewing machine and carrying a pivot, a lever turnably mounted on said pivot, a thread carrier mounted on one end of said lever for introducing a continuous thread alternately above and below the fabric in back and then in front of each piercing of the fabric by the needle of the sewing machine, and means for actuating said lever in order to impart the desired motion to said thread carrier, comprising a cam disk mounted on said frame and driven by the sewing machine, an arm turnably mounted on said pivot of the frame and actuated by said cam disk so as to be moved alternately into an upper and a lower position thereby causing said thread carrier to be moved alternately into positions above and below the fabric, a pivot on said arm, a bell crank lever turnably mounted on said pivot and having its one end pivoted to the needle bar of the sewing machine and its other end connected to said first-mentioned lever so as to impart an oscillating motion to said lever and thereby a reciprocating motion to said thread carrier.

5. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising means for introducing a continuous

thread alternately above and below the fabric in back and then in front of each piercing of the fabric by the sewing machine needle, and means for actuating said introducing means comprising  
 5 a cam disk driven by the sewing machine, a pivot, an arm mounted on said pivot and actuated by said cam disk so as to cause said introducing means to be moved into position alternately above and below the fabric, a lever mounted on  
 10 said pivot and connected to said introducing means, and means driven by the sewing machine giving said lever an oscillating motion and thereby said introducing means a reciprocating motion.

15 6. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a looper carrying the overcasting thread, a bar for supporting said looper, a pivot, an arm mounted on said pivot and connected to said  
 20 looper bar, a cam disk in engagement with said arm and driven by the sewing machine so as to give said looper bar a vertical reciprocating motion, a lever mounted on said pivot and connected to said looper bar, and means driven by  
 25 the sewing machine so as to give said looper bar an endwise reciprocating motion.

7. A device for whip-stitching fabric in combination with an ordinary sewing machine, comprising a looper carrying the overcasting thread,  
 30 a bar for supporting said looper, a pivot, an arm mounted on said pivot and formed as a guide for said looper bar, a cam disk in engagement

with said arm and driven by the sewing machine so as to give said looper bar a vertical reciprocating motion, a lever mounted on said pivot and connected to said looper bar, and means driven  
 5 by the sewing machine so as to give said looper bar an endwise reciprocating motion.

8. A device for whip-stitching fabric in combination with an ordinary sewing machine comprising a frame, a lever turnably mounted on said frame, a thread carrier mounted on one end  
 10 of said lever for introducing a continuous thread alternately above and below the fabric in back and then in front of each piercing of the fabric by the needle of the sewing machine, a cam disk mounted on said frame and driven by the sewing  
 15 machine, an arm connected to said lever and actuated by said cam disk so as to be moved alternately into an upper and a lower position thereby causing said thread carrier to be moved alternately into positions above and below the  
 20 fabric, a pivot being arranged at such a point on said arm that in its lower position the thread carrier is moved farther inwards in relation to the fabric than in its upper position, a second lever turnably mounted on said pivot and connected  
 25 with said first mentioned lever and means driven by said sewing machine giving said second lever an oscillating motion and thereby said thread carrier a reciprocating motion.

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