

ALIEN PROPERTY CUSTODIAN

SEWING MACHINE

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This present invention refers to household sewing machines and more especially to zig-zag-sewing machines.

The width of the stitches in zig-zag-sewing machines is effected by the moving of a slide to and fro in a stationary track for this slide or by the reverse action that is: the slide is stationary and the track for the slide is moved. From the nonstationary part of the mechanism described a connecting rod leads to peg for the purpose of adjustment, which peg usually sticks out from the front of the head of the sewing machine and which is moved there to conform to a scale of the several widths of the stitches.

In order not to have to hunt after each individual change of the widths of the stitches for an adjustment which is used repeatedly, set screws have been used for the purpose of limiting the extent of the motion of the stop-peg. Such a limitation however fixes two widths of the stitch only. For instance: one setscrew serving as stop for the movement of the slide can be adjusted so that the slide comes to stop at $\frac{1}{8}$ inch, while the second setscrew serving as stop can be adjusted so that the slide comes to stop at the point of $\frac{1}{4}$ inch on the scale. These two widths of stitches fixed by the setscrews can be found so to say "blindly" during the operation of the machine, that is without glancing at the scale. If however other widths of the stitches are desired than the ones which are established by the setscrews and which lie between and within the widths of the stitches as established by the setscrews, then it is necessary to find the new place on the scale for the position of the stop-peg. If however widths of the stitches are desired which are beyond the limits of the widths of the stitches as established by the setscrews, that is: widths which lie either above or below the set limits of the setscrews, then it is necessary to screw the setscrews back so that the desired adjustment on the scale can be made. For many performances of the machine it is necessary to be able to have adjusted more than only two widths of stitches in constant change with one another and this fact developed the necessity to be able to install additional adjustments without changing the previously fixed position of the setscrews.

A well known solution of this task proposes to move the stop-peg beyond the reach of the setscrews. By a change of the stop-peg relative to the setscrews the stop-peg must be temporarily removed from the realm of mutual activity of the setscrews or from within the limits of the setscrews, or on the other hand the setscrews

must be brought out of the active and effective position into an inactive and ineffective position so that also thereby the realm of the mutual influence is destroyed by the change of position relative to each other, i. e. of stop-peg and setscrews.

In order to carry out this solution in actual practice the stop-peg is provided in this well known device with an adjustable slide which, when in active use, is stopped by the setscrews, and which however can be moved from the realm of activity of the setscrews in order to make possible a complete freedom of motion for the stop-peg along the entire scale.

This device however cannot be serviced easily in every position of adjustment. When for instance the stop-peg has been removed from the realm of influence of the setscrews and shall then again be brought back to its position as before the removal, then it is necessary to move the stop-peg first again in a position which enables it to reestablish the mutual influence between the adjustable slide of the stop-peg and setscrews. This position must be hunted up or at least it must be felt for by repeated trying. A complete mechanical act, a "blind" finding is not possible.

To explain more fully the action of this well known device according to the above described example: In order to bring back again within the realm of the setscrews the slide upon the stop-peg, it is necessary to bring the stop-peg first into a position which makes it possible that the slide can be pushed again between the setscrews. If the stop-peg is not as yet in that particular position, then the slide will strike against the setscrews and can therefore not slide between the setscrews.

This present invention brings a further solution of the well known task to effect more than two adjustments of the stop-peg on the scale without having to touch the adjusted setscrews; an act whereby the realm of mutual influence between stop-peg and setscrews is not changed by the change of the relative position. This is effected through the fact that an additional adjustment of the width of the zig-zag-stitches is obtained besides the one which was obtained by the change of position of the stop-peg between the limits established by the setscrews. This additional adjustment is obtained by means of an interior structure of an adjustment device added to the set of connecting rods between the stop-peg and the slide.

For the purpose of the easiest and most simple servicing of this device it is of advantage that the

additional adjustment device, which is effected through an interior structure, can be adjusted likewise by means of the stop-peg which is movable within the realm of the setscrews.

A practical arrangement of this invention is marked by the fact that the set of connecting rods, found between the stop-peg and the slide, consist of a rod connected with the movable part of the slide and of a crank connected with the stop-peg, which rod and crank are movably connected with each other and which when held in rigidly extended position influence the movable part of the slide by moving the stop-peg between the adjusted limits, established by the setscrews, and which however by turning the stop-peg will be brought in a the rigidly extended position and thereby cause an additional motion of the movable part of the slide.

The stretched, rigidly extended position of the connecting rod and crank can be secured by an endstop mounted on the stop-peg which endstop limits the turning of the stop-peg.

The drawings will explain the object of the invention on the hand of a practical example. The drawings show in

Fig. 1 a transverse section of the head of a sewing machine with the device according to the invention with crank and connecting rod lying in stretched, rigidly extended position,

Figs. 2, 3, 4 schemes of the function of the device,

Fig. 5 a perspective view of the essential part in the head of a sewing machine showing among others the interior structure according to the invention,

Fig. 6 an ornamental stitching,

Fig. 7 a completed button hole.

In the arm of the sewing machine is the main-shaft 1 which reaches in a wellknown way into the head 2 of the sewing machine and on which are mounted the means necessary for the transfer of the motion upon the mechanism built in the head. The motion necessary for swinging to and fro of the needlebar is transferred in the practical example by 2 screw-wheels 3 and 4 upon the cylinder 5 which revolves around the axle 5a which is situated in the interior of the machine head. Upon the cylinder 5 is a cam 6 which is surrounded by a fork 7. This fork 7 is mounted upon a bolt 8 which is situated in the wall of the machine. From a lateral projection 7a of the fork 7 a bolt 9 reaches between a fork 10 which is mounted on an arm 11 of the well-known movable needlebar guide. Upon the bolt 9 is a cylindrical slide 12 which reaches between the ends of the fork 10. This slide 12 is movably connected with a rod 13 which in turn is movably connected with a crank 14. This crank 14 is fastened rigidly to a bolt 15 which reaches through the stop-peg 16 and which shows at its front end a knob 17. The stop-peg 16 is movable on a scale 18 fastened to the front wall of the machine and this up and down motion is limited by two setscrews 19 and 20. A small projection 21 at the knob 17 of the bolt 15 which drops into a notch 22 of the stop-peg 16 enables the turning of the bolt 15 to stop, when the connecting rod 13 and the crank 14 were situated in rigidly extended position. The method of action of the device is the following: As mentioned above the motion of the main shaft 1 situated in the sewing machine head is transferred by means of the two screw-wheels 3 and 4 upon the cylinder 5 situated in the head. The cam 6 which is mounted firmly upon the cylinder 5 conveys by its

rotary motion to the first fork 7 a swinging motion around its pivot 8. The bolt 9 situated in the lateral projection 7a of the fork 7 receives thus likewise a swinging motion which the bolt 9 executes between the ends of the second fork 10 fastened to the needlebar guide 11. By means of the slide 12 which is mounted movably upon the bolt 9 situated upon the lateral projection 7a of the fork 7 the swinging motion of the bolt 9 is transferred upon the second fork 10 mounted on the arm 11 of the needlebar guide from whence this motion is transferred in its turn upon the movable needlebar housed in the head of the machine.

This transfer of turning motion of the bolt 9 situated in the first fork 7 upon the needlebar is effected only when the axis of the slide 12 stands in the axis of the bolt 8 of this first turnable fork 7. In this position the cylindrical slide 12 undergoes a turning motion, but around its own axis, it does not effect the second fork 10 on the arm 11 of the needlebar guide. If however the slide 12 is pushed out of this coaxial position further toward the free end of the bolt 9 which is situated between the prongs of the second fork 10, then the slide transfers the swinging motion of the bolt 9 in as much greater measure upon the second fork 10 and thereby upon the arm 11 of the needlebar guide as the slide is pushed away from the axis of the first fork.

This shifting is caused by the stop-peg 16 situated on the front of the machine head. The connection to the stop-peg 16 is effected by means of the connecting rod 13 movably mounted on the slide 12 and by means of the crank 14 situated on the bolt 15 which is inside the stop-peg 16. When these connecting links 13 and 14 are in a rigidly extended, stretched position and when these connecting links are secured in this rigid position, then it works so to say as a firm connection between slide 12 and bolt 15 inside the stop-peg 16. The stop-peg 16 is moved on the scale 18 indicating the widths of stitches to the desired width and this shifting is transferred immediately upon the slide when the connecting rod 13 and crank 14 are in rigidly extended position. The limitation of the shifting of the stop-peg 16 on the scale 18 is done thereby by means of the setscrews 19 and 20 situated at the front wall of the head of the machine. To adhere to the example of operation mentioned in the introduction, the lower setscrew 20 can be adjusted so that the stop-peg touches against the setscrew at $\frac{1}{8}$ inch of width of stitch and the upper setscrew 19 can be adjusted so that the stop-peg touches the setscrew at $\frac{1}{4}$ inch of width of stitch. In such an adjustment the width of stitches can be changed "blindly" that is by touch only between $\frac{1}{4}$ and $\frac{1}{8}$ inch, a fact, which has been known for a long time.

If it is desired to work with a width of stitches narrower than the one adjusted by the setscrew 19 then this is done by turning the knob of the stop-peg 16. This knob 17, which forms one unit with the bolt 15 situated in the interior of the stop-peg 16 and with the crank 14 fastened to this bolt 15, swings during its turning motion the crank 14 and draws along thereby the rod 13 movably connected therewith, which rod 13 in turn is connected with the slide 12. According to the amount of the turning of the knob 17 the slide 12 situated upon the bolt 9 moves upward. Thus the distance of the to and fro swinging motion of the needle is lessened. It is

therefore possible to leave the stop-peg in its position, that is: touching the lower setscrew 20 and it is necessary only to turn the knob 17 in order to diminish the distance of the to and fro swinging motion of the needle. By correspondingly turning back the knob 17 up to the rigidly extended position of the connecting links, a motion limited by touching the notch 22 and the small projection 21 of the revolving knob 17, the original position shown in Fig. 1 is instantly reestablished. The turning of the knob 17 can be done in any position at all of the stop-peg 16.

In Fig. 1 the stop-peg 16 is in touch with the upper setscrew 19. This corresponds with Fig. 3. In Fig. 4 however is shown a position of the slide 12 which is reached by turning the knob 17. Here the slide 12 is in its coaxial position with the axis of the first fork 7. When the knob 17 is turned so far that the slide 12 comes to stand in this coaxial position with the axis of the first swinging fork 7, then the width of to and fro motion of the needlebar is "zero." Such an adjustment can be made completely "blind," that is: by touch only, without removing thereby the stop-peg 16 out of the realm of influence limited by the setscrews.

A change between a maximum size, a medium size and the adjustment "zero" of the width of the stitches is often used in sewing, be it for the purpose of doing special "zig-zag" ornamental sewing which changes continuously between a zig-zag seam of two different widths of stitches and plain stitches as is demonstrated in Fig. 6, or be it for the working of button holes, as is shown in Fig. 7. In the zig-zag stitch for ornamental sewing as is shown in Fig. 6 the adjustment of the width of the zigzag-stitch has for instance the following always recurring sizes:

$$\frac{1}{8} - 0 - \frac{1}{8} - 0 - \frac{1}{8} - 0 - \frac{1}{8} - 0 - \frac{1}{8} - 0$$

etc. Therefore the setscrews are adjusted so that the lower setscrew 20 stops the stop-peg at $\frac{1}{8}$ of an inch and the upper setscrew 19 stops the stop-peg at $\frac{1}{8}$ inch. In order to make such a seam one begins the sewing with an adjustment of the stop-peg in the lowest position of touch, that is, in the position where the stop-peg touches the lower setscrew 20. After finishing the $\frac{1}{8}$ inch wide zig-zag-stitches the knob 17 is turned until one feels the touch of the small projection 21 against the notch 22. Since the slide 12 stands now in a coaxial position with the axis of the first fork 7, the needlebar makes no to or fro motion, in other words, it sews plain stitches. After finishing these plain stitches the knob 17 is turned in the opposite direction back to its boundary limit, which can be felt, thus establishing the rigidly extended position of the connecting links and then the stop-peg is shifted against the upper setscrew 19 and comes there to rest. Now the needlebar swings to and fro a distance of $\frac{1}{8}$ inch. After finishing these $\frac{1}{8}$ inch wide zig-zag-stitches the knob 17 is turned again so far that one feels the touching of the boundary limit as described above, which again corresponds to the coaxial position of the slide 12 with the axis of the first fork 7, that is, until it sews without to and fro motion of the needlebar a seam sewn in "zero" that is: plain stitches. If it is now desired to sew again a $\frac{1}{8}$ inch wide zig-zag stitch one turns back the knob 17 so far that one feels the boundary limit of the rigidly extended position of the connecting links, and shifts at the same time the stop-peg again against the lower set screw 20. That is the same posi-

tion from which the start has been made in the example here cited. This is repeated during the further sewing. The sewing of a buttonhole according to Fig. 7 can be done in the following manner: one begins to sew the edge 23 of the one side of the buttonhole from a point I with an adjustment of $\frac{1}{8}$ inch width of stitches, that is, the stop-peg is in touch with the upper setscrew 19 and the connecting links between stop-peg and slide are in rigidly extended position. This edge is finished to point II, then one moves the stop-peg down to the lower setscrew 20 retaining the rigidly extended position of the connecting rods, and the one end 24 of the buttonhole is sewed with a width of $\frac{1}{8}$ inch stitching; after finishing this end 24 one moves the stop-peg against the upper setscrew 19 again by maintaining the rigidly extended position of the connecting links. The second edge 25 of the other side of the buttonhole is then sewed with a $\frac{1}{8}$ inch wide zig-zag stitch from III—IV. After finishing this edge the stop-peg is again moved until it touches the lower setscrew 20 again retaining the rigidly extended position of the connecting links, and now the other end 26 of the buttonhole is closed with stitches $\frac{1}{8}$ inch wide. After finishing this end 26 one turns the knob 17 so far that one feels its boundary limit, that is, until a coaxial position has been established between the slide 12 and the axis of the bolt 8 of the first fork 7, and now, the thread is made "fast" by plain stitch 27. When the next buttonhole is to be started one turns back the knob 17 again until the rigidly extended position of the connecting links has been established and the stop-peg is pushed against the upper setscrew 19. In Figs. 2 to 4 schemes of the processes which take place in the interior of the head during the execution of these two sewing examples are again represented. Fig. 2 corresponds to the adjustment of the stop-peg, when the stop-peg touches the lower set-screw 20. The width of the stitches here, is for instance, $\frac{1}{8}$ inch. From this position the stop-peg is pushed upward for the distance x so that it touches the upper setscrew 19 retaining thereby always the rigidly extended position of the connecting links. This is shown in Fig. 3. Now the width of the stitch is to be $\frac{1}{8}$ inch. By turning the knob 17 the crank 14 connected with the bolt 15 and knob 17 is swung at an angle α . This corresponds to the to and fro motion of the needlebar "zero" therefore plain stitches are sewed. The above described examples of sewing can be executed completely "blind," that is by touch only, because each and every position used in them is limited by stops which can be felt. When besides these limits, which can be felt, other limits of widths of stitches are to be installed, they can be installed by means of a small indicator—not shown in the drawing, which is mounted upon the knob 17 and which works according to a scale not shown in this drawing on the stop-peg 16. It is necessary to observe that the desired width of the stitches is the difference between the width of the stitch indicated on the main scale 18 and the width of the stitch indicated on the scale on the stop-peg. A third adjustable stop besides the two already present in the shape of the setscrews can be mounted in the stop-peg 16, against which stop the above mentioned indicator or some other projection of the knob 17 strikes and limits thereby the turning of the knob 17. This arrangement is of special advantage when it is not desired to fall

back upon plain stitches corresponding to the "zero" position, but when the width of the stitch is to be greater than "zero."

It must be understood that in the drawings only those parts of the construction are designated by number which are essential to clarify my invention. Other parts which are not so designated in the drawing and in the by-following description can be seen in my pending application, serial number _____ of _____.

5 In this description I have explained only one practical construction of the device, but it must be understood that my invention may be embodied in other form and on other sewing machines: in other word the thought of the invention counts above its individual construction.

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