In a preferred embodiment of the present invention, a paired sewing machine paired needle structure includes separately retractable needles lockable in the extended position as well as lockable in the retracted position, for the turning of corners during the sewing operation, the extendable and retractable shaft of each needle or mounting structure therefor having, in addition to the locking and unlocking projection arm and spring-biased locking-unlocking head on the arm, a separate guide projection extendable through a separate slot from the locking and unlocking projection arm and at about right angles thereto, thereby providing improved sturdiness and longevity and precision in operation thereof, the guide projection being threaded as a male member and the respective needle mounting structure having a female threaded aperture extending through to the needle mounting channel whereby the tightening of the guide projection is lockable of the respective needle into its needle mounting structure, and the guide projection aperture being located along the needly longitudinal axis of the needle structure at a point in non-alignment with the locking projection arm whereby cracking of the needle mounting structure by tightening of the guide projection and/or by the screw mounting of the locking projection arm is avoided.
SEPARATELY RETRACTABLE PAIRED NEEDLES

This invention relates to a novel device for separately retracting either of parallel paired sewing machine needles for the turning of corners during the sewing process.

BACKGROUND TO THE INVENTION

Typically in an industrial sewing machine there is a needle mount movable of parallel needles, and for turning corners one needle is retractable for turning in one direction while the other needle is retractable for turning in the other direction. Heretofore the mechanism by which a needle is retractable and also by which the needle is locked and unlocked within a channel of the needle support was a single screw-mounted spring-biased head and screw-shaft, the screw-shaft being a male-threaded shaft mountable in an aperture through the shell of the needle support communicating with the inner channel whereby the needle is locked and unlocked respectively by tightening and untightening respectively the screw-shaft by means of a screw-driver receiving slot in the head of the shaft on which shaft head is mounted an annular spring-biased head member. To retract the needle support, the spring-biased head is pulled outwardly against spring-tension out of a locking seat in the encasing needle mount—in which the two separately retractable needle supports are slidable in parallel to one-another—and in the pulled out position of the annular spring-biased head, the respective needle support is retractable by moving the annular hear and its screw shaft in a retracting direction. Because of the repeated occasions on which the screw shaft had to be loosened and tightened in replacing needles and because of the repeated pressure applied to the screw-shaft in the retracting and ejecting of the needle support within the needle mount casing, the threads of the screw-shaft and/or of the female needle support aperture became rapidly worn, stretched, and/or loose whereby the needle was not held securely and/or whereby the screw-shaft would tear apart from the needle support during an attempted retraction or extension operation, or the like. Moreover, because the screw-shaft and its mounted annular spring-biased head served as a guide not only for the retraction and extension of the needle operation, but also because the screw-shaft was loosened to remove, insert, or replace a needle the needle mount had no means which retained alignment of the needle support aperture in the event that the screw-shaft were withdrawn too much or became stripped of its threads, there was often considerable waste in time and effort as well as a costly continual replacement requirement for these quickly worn parts.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to overcome one or more of the type difficulties and/or problems of the type discussed above.

Another object is to obtain a double needle mount and needle supports thereof having new and desirable advantages.

Other objects become apparent from the preceding and following disclosure.

One or more objects of the present invention are obtained by the invention as defined herein.

Broadly the invention includes a sewing machine double needle sliders-mount device in which two separate needle holder sliders are slidably mounted for parallel sewing with the respective needles and for parallel retraction of either needle slider when turning a corner one way or the other, the dual sliders being slidably mounted in a casing which casing is reciprocatably mountable in a sewing machine for conventional parallel sewing, and the invention lying in the casing, for each slider, having in addition to the customary slot through the casing along which normally the lockable retraction-extension shaft is slideable, an additional slot parallel to the customary slot and having a separate additional screw-shaft threadedly mounted in the slider and extending as a guide projection through the additional slot and this additional screw-shaft extending through its mounting aperture as the needle locking and unlocking mechanism for anchoring the needle into the slider. Thereby the former dual function of the retraction-extension shaft which heretofore was also the needle anchoring means, in the present invention is limited solely to the retraction-extension function, with the additional screw-shaft per slider serving as both an additional guide during the retraction and extension of the slider and a needle securing mechanism for anchoring or locking the needle into its respective slider, whereby the advantages set forth above are obtained.

In a preferred embodiment, the aperture having typically female threads into which is mounted the retraction-extension shaft, does not have the retraction shaft contactable with the needle even though the aperture may or may not be a through aperture in communication with the slider needle-mounting channel, and the retraction-extension channel is preferably located at a different point along the longitudinal axis of the slider from the needle-locked aperture through which the additional needle-locking screw-shaft projection is mounted, whereby the slider is not subject to a problem determined to exist of cracking when the two apertures in the slider are located too close to one-another.

The invention may be better understood by reference to the following Figures.

THE FIGURES

FIG. 1 is a perspective side view of a dual needle slider mount device of the present invention.

FIG. 2 illustrates a cross-sectional side view as taken along lines 2—2 of FIG. 1.

FIG. 3 illustrates a cross-sectional transverse view as taken along lines 3—3 of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

In more particular reference to the embodiment of FIGS. 1, 2, and 3, the following details are pointed out.

In FIG. 1 there is shown in perspective side view a typical embodiment of the present invention, illustrating an entire mountable dual unit in which is mounted two elongated needle-holding sliders and respectively, having mounted therein needles and respectively, the needle nearest, as illustrated, being in a retracted state by virtue of the slider being locked in the retracted state. In the illustrated state of retraction of needle and of slider, the slider is at its proximal end fully retracted in channel 9, with the shaft having its head spring-biased by spring 12 into the slot 13 enlargement, and with the screwable needle-locking shaft-guide extending outwardly laterally.
from the slider 5 through slot 16, the slot 16 being parallel to the slot 13. The needle 7 is retracted into the channel 9 having distal end opening 17. On the other hand, the ejected needle 8 extends fully through the opening 17 with the slider 6 adjacent the opening 17', and with the shaft 10 extending through slot 13' enlargement 18' and with the shaft-guide 15' extending outwardly laterally from slider 6 axially slidably mounted within channel 9. The slider 5 as seen in cross-section in FIG. 2 has the threaded shaft 10 screwably mounted in female threaded aperture 19; although the noted aperture 19 is a through aperture as illustrated, this being more simple to drill than having to drill solely for a predetermined depth, the shaft 10 nevertheless is required to be sufficiently short that it does not contact nor lock against the needle, an object of this invention being to eliminate the needle locking function for this retraction-ejection shaft for reasons already set forth above. On the other hand, as seen in the FIG. 3 cross-section, the aperture 20 is female threaded and has screwably mounted therein the male threaded screw-shaft-guide 15 and the shaft-guide 15 is lockingly screw-down with pressure against needle surface 7a of needle 7 such that the needle 7 is locked into the slider 5. The dual unit casing 4 is rigidly continuous with any suitable mounting means such as a tabular member 21 having a lock-screw through-aperture 22 for lock screw 23 — 22 and 23 being shown in exploded view in FIGS. 1 and 2. The shaft 10 has a screw-driver slot 24 on its end surface for facilitating the screwing of shaft 10 into threaded aperture 19, while the shaft-guide 15 similarly has a screw-driver slot 25 for manipulation thereof. It is within the scope of the invention, however, for the shaft-guide to have typically a wing-head construction-shape thereby eliminating the need of a special screw driver for the mounting, dmounting, and/or replacing of a needle such as needle 7. The casing 4 shoulder 42 is of optional design, but serves the conventional purpose of facilitating alignment of the casing 4 when mounted within a sewing machine.

Note that as illustrated in FIG. 1, and as is also apparent in each of FIGS. 2 and 3, the female threaded apertures 19 and 22 are off-set from one-another along the longitudinal axis of the slider 5. Note also that the shaft 10 and the shaft-guide 15 as illustrated preferably do not extend linearly in the same plane, and in fact in the illustrated preferred embodiment are at about 90° angles to one-another, thereby offering a greater stability in the manipulation of the slide during the retraction and ejection operations, this in one regard being especially important since the shaft-guide 15 in the slot 16 restrains the slider 5 when spring-biased head 11 is pulled outwardly from its seat-enlargement 14 or 18, which in turn avoids some twisting and/or shear-stress on the shaft 10.

It is believed that other matters as illustrated and/or discussed are self-apparent beyond the present description.

It is however, within the scope of the present invention to make such modification(s) and variation(s) and substitution of equivalent(s) as would be apparent to a person skilled in this particular field of art.

1. A parallel retractable-needles device comprising in combination: rigid casing means having inner walls defining a semi-enclosure space, said casing means having a proximal end and a distal end and being elongated along a longitudinal axis extending between said proximal end and said distal end, and said casing means having an upper face and opposite side faces on either side of the upper face, in the upper face there being paired separate about parallel first and second through-slots communicating with the space and the slots being spaced from one another a predetermined distance and the paired slots each extending about parallel to said longitudinal axis, and additional third and fourth through-slots communicating with said space, one additional slot being in one side face and the other being in the other opposite side face, the proximal end having first paired first and second channel-structures divid-ingly defining channels and laterally spaced from one another said predetermined distance, and the distal end having first paired first and second through-apertures communicating with the space and laterally-spaced from one another and the said paired apertures being opposite from said paired channel structures, said first and second through-apertures being spaced said predeter-5

2. A parallel retractable-needles device of claim 1, in which said first needle structure’s locking and unlocking means extending through the other of said first slot and said third slot and the other second needle structure extendable through the second channel and second aperture and having a guide threadedly mounted projection extending through one of said second and fourth slots and having a slide structure-locking and unlocking projection means extending through the other of said second slot and said fourth slot, each guide projection being a needle lock.

3. A parallel retractable-needles device of claim 2, in which said first needle structure threaded guide projection extends through said first slot and in which said second needle structure’s threaded guide projection extends through said second slot.

4. A parallel retractable-needles device of claim 3, in which each of said third and fourth slots at each of opposite ends thereof is enlarged, and in which each locking and unlocking means of each of the first needle structure and the second needle structure includes a threadedly mounted shaft extending transversely to said longitudinal axis and includes mounted with a biasing spring, a mounted head slidably axially on said transversely extending shaft and being biased toward its respective needle structure space, said head being larger than intermediate portions of its respective slot and seatable in each of the slot’s enlarged portion at each of opposite ends of the slot.

5. A parallel retractable-needles device of claim 1, in which each of said third and fourth slots at each of op-
opposite ends thereof is enlarged, and in which each locking and unlocking means of each of the first needle structure and the second needle structure includes a threadedly mounted shaft extending transversely to said longitudinal axis and includes mounted with a biasing spring, a mounted head slidably axially on said transversely extending shaft and being biased toward its respective needle structure space, said head being larger than intermediate portions of its respective slot and seatable in each of the slot's enlarged portion at each of opposite ends of the slot.

6. A parallel retractable-needles device of claim 1, in which said first needle structure threaded guide projection extends through said first slot and in which said second needle structure's threaded guide projection extends through said second slot.

7. A parallel retractable-needles device of claim 5, in which said first needle structure's locking and unlocking means and in which said second needle structure's locking and unlocking means is lockable of the respective slide structure at each of needle-extended position when the respective needle structure is extended through the first or second channel and needle-retracted position when the respective needle structure is retracted within the first or second channel.

8. A parallel retractable-needles device of claim 3, in which each slide structure includes an axially extending central channel about parallel with said longitudinal axis, and in which each slide structure includes two separate female-threaded apertures at least one of which is a through aperture extending transversely to said axially-extending channel and communicating with said channel and being positioned for screwably receiving one of said guide projections and sized for receiving one of said guide projections such that a guide projection screwed therein is lockable of a needle axially inserted within said channel.

9. A parallel retractable-needles device of claim 1, in which each slide structure includes an axially extending central channel about parallel with said longitudinal axis, and in which each slide structure includes two separate female-threaded apertures at least one of which is a through aperture extending transversely to said axially-extending channel and communicating with said inner channel and being positioned for screwably receiving one of said guide projections and sized for receiving one of said guide projections such that a guide projection screwed therein is lockable of a needle axially inserted within said inner channel.

10. A parallel retractable-needles device of claim 9, in which said two separate apertures are spaced axially from one another a predetermined distance sufficient that the tightening of male threaded members in each respectively of said separate apertures does not crack the channel-containing slide structures each respectively.

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