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DEVICE FOR BASTING IN LOCK-STITCH SEWING MACHINES

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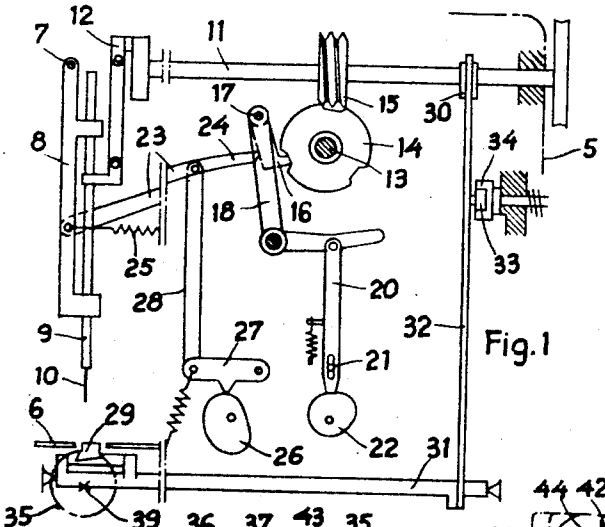

Fig. 1

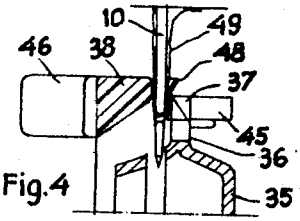

Fig. 4

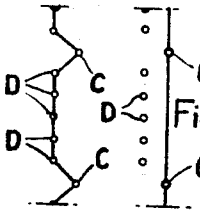

Fig. 5 Fig. 6

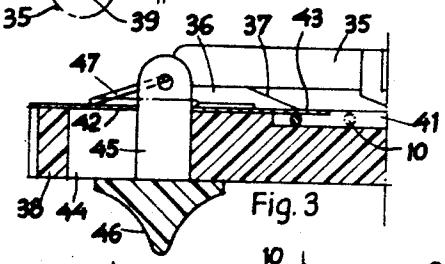

Fig. 3

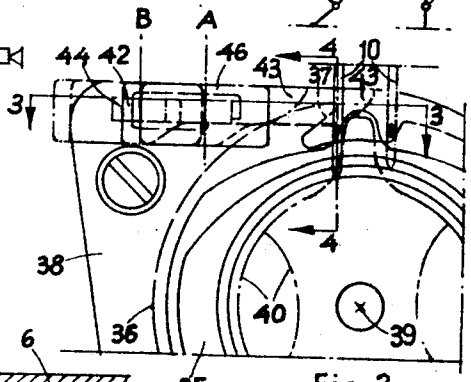

Fig. 2

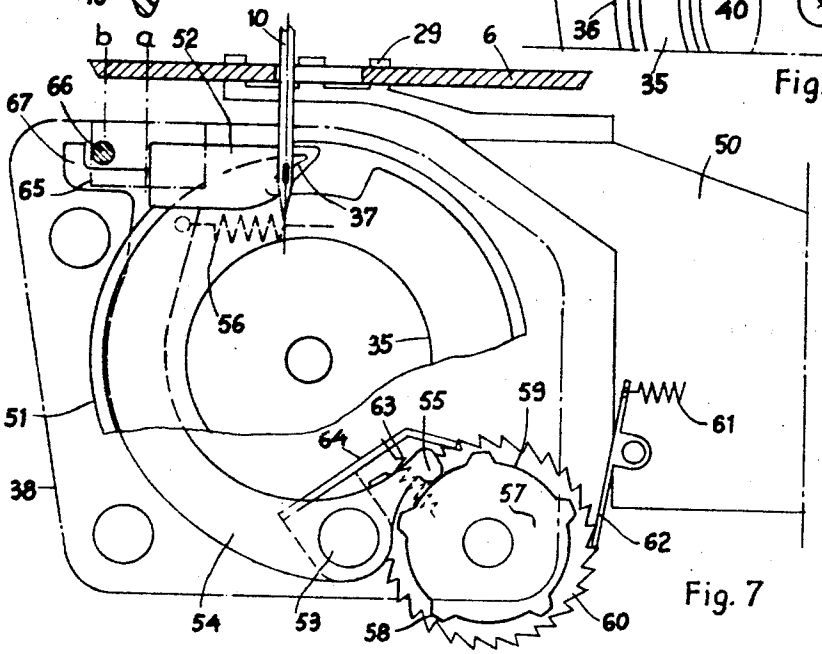

Fig. 7

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DEVICE FOR BASTING IN LOCK-STITCH SEWING MACHINES

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ABSTRACT OF THE DISCLOSURE

In a lock-stitch sewing machine having a longitudinally reciprocating sewing needle, a work-support and a loop-taker thereunder the provision of a separating member under the work-support between the needle and the loop-taker and an automatic system for moving the needle or the separating member mutually into and out of operative and inoperative position, respectively, in order to form a seam constituted of alternatively missed and formed stitches.

This invention relates to sewing machines, particularly for households, comprising a substantially horizontal work-support, a reciprocating work-feeder associated therewith, a longitudinally reciprocating sewing needle and a loop-taker situated below the work-support and cooperating with the needle to form lock-stitches.

The invention has for its object to provide such machines with a simple and reliable device which can readily be switched on for producing a straight seam of lock-stitches much longer than the maximum throw of the work-feeder which seam can be used to advantage for basting.

With this object in view the invention comprises the novel combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawing. The advantages attained thereby will be readily understood by those skilled in the art.

The invention will be particularly described in the following with reference to the annexed drawing wherein FIG. 1 schematically shows a zigzag sewing machine to which the invention is applied. FIG. 2 is a partial front view of the loop-taker and adjacent parts of the machine. FIGS. 3 and 4 are sections on lines 3—3 and 4—4 in FIG. 2 respectively. FIGS. 5 and 6 show two seams. FIG. 7 is a front view corresponding to FIG. 2 of a second embodiment of the invention.

The machine shown comprises a hollow casing **5** with a work-support **6** including a stitch plate, a bearing **8** for a needle-bar **9** with needle **10**, the bearing being swingable on a pivot **7** in the casing, a drive shaft **11** with crank driving device **12** for the longitudinal motion of the needle-bar, a cam shaft **13** crossing shaft **11** perpendicularly and carrying a cam disk **14** driven from shaft **11** by means of a worm gear **15** with the gear ratio 18:1, a cam follower **16** swingable in the plane of cam disk **14** about a pivot **17** on a lever **18** with a stationary fulcrum **19**, a link **20** connected to the lever **18**, guided by a pin **21** and spring-operated against a manually settable cam disk **22** for changing the stitch field, and a link **23** connected at one end with the needle-bar bearing **8**, its other end **24** being in contact with the rear side of cam follower **16** and, for changing the stitch width (the amplitude of transversal needle motion) between zero and a maximum value, say 4 mm., adjustable along the cam follower by means of a manually settable cam disk **26**, a lever **27** spring-operated against said cam disk, and a link **28**. A lower work-feeder **29** with a substantially rectangular path of movement is driven horizontally by an eccentric **30** on drive shaft **11** by means of a rock

shaft **31** and a forked rod **32** with a die **33** engaging a manually turnable feed control guide **34** for regulating the stitch length between zero and the maximum value, say 4 mm.

Driven from shaft **11** is also a loop-taker or shuttle **35** designed according to Patent 2,851,978 and thus having a circumferential flange **36** with hook **37** supported between a stationary, annular cover or retainer **38** and a concave driving member **51** for the loop-taker which for each stitch makes two revolutions in the clockwise direction in FIGS. 1 and 2 about a transversal, horizontal axis **39** and contains a nonrotating spool case **40** which can be taken out from in front through a casing-opening in the casing after opening a lid not shown here which lid, in machines having a cantilevered work-supporting arm, can be arranged to be swung down in front of the loop-taker and, in so-called flat-table machines, can be a retractable slide plate forming part of the work-support **6**. The cover **38** has a recess **41** for the needle **10**. This one and the hook **37** are shown in FIG. 2 at loop-taking in the lateral end positions of the needle **10** at maximum stitch width. The machine also comprises an upper-thread regulating arm not shown, driven from shaft **11**, and an adjustable upper-thread tightening spring operative at the descending movement of the needle. So far the machine can be of known design which need not be more closely described.

In the embodiment shown in FIGS. 2–4 a thin, say 0.2 mm. thick sheet metal slide **42** having a tongue **43** is countersunk and horizontally guided on the rear side of the cover **38** which has a slot **44** for a shank **45**, penetrating the slide, of a handle **46** accessible through the above mentioned casing-opening for the removal of spool case **40**. Parts **42** and **46** are held against the cover **38** by a pressure spring **47** confined between the slide and shank **45**. By means of handle **46** the slide **42** is slidable between two end positions A, B indicated in FIG. 2 by the center line of the handle and determined by contact between the shank **45** and the ends of slot **44**. In operative position A, tongue **43** is situated between the movement path of the hook and the left vertical movement path of the needle and thereby prevents loop-taking and stitch forming in the left end position of the needle, not in the right one. In order surely to prevent the needle when moving downwards from striking the tongue **43**, the latter has along its upper edge a part **48** diverging upwardly from the movement path of the needle. In position B the tongue is inoperative out of said paths of movement. In FIG. 4 the upper-thread is denoted by **49**.

In FIGS. 5 and 6 the full lines indicate the upper-thread and circles C, D the points where the needle stitches in the fabric. The shape of cam disk **14** is such, that the needle after each stitch C in its right end position makes 5 stitches D in its left end position. If member **34** is set for maximum stitch length, member **26** for maximum stitch width (the setting of member **22** being then insignificant) and slide **42** in operative position A, no stitch formation occurs at the stitch points D, a straight seam according to FIG. 6 being obtained wherein the stitch length is six times the normal maximum one which seam can be used to advantage for basting. If the tongue in position A reaches the central needle position, the stitch width can also be less than the maximum one. If, on the other hand, slide **42** is held in position B, stitch formation occurs also at the points D and a seam according to FIG. 5 is obtained which, preferably with another setting of members **26** and **34**, can be used for hemming.

The cam disk **14** can in known manner be exchangeable for others or be one of a plurality of cam disks selectively connectible with cam follower **16**. Cam disk **14** can preferably also be shaped so as to hold the needle in its right lateral position during a plurality of stitches after

each stitch in its left lateral position, the separating member **43** being then arranged oppositely and to the right so as to prevent stitch formation in the right lateral position.

The invention can also be applied to prevent stitch formation in one lateral position of an ordinary straight zigzag seam and thus to obtain a straight seam with twice the stitch length set. At least in this application the upper-thread tension should be means of the above mentioned thread tensioning device, be so reduced that the upper-thread and the under-thread interlock at the underside of the fabric so that the under-thread can be readily drawn out in spite of the relatively small stitch length.

The embodiment according to FIG. 7 differs from that according to FIGS. 1–4 only as to the mounting and movement of the separating member, a sheet metal tongue **52** similar to tongue **43**. In FIG. 7 loop-taker cover **38** is omitted and only indicated in dot-and-dash lines. Reference numeral **50** denotes a vertically movable work-feeder carrying arm. Tongue **52** is rigidly connected with an arm **54** swingable behind driving member **51** on a fixed pivot **53** and having a cam follower **55** urged by a spring **56** against a cam disk **57** mounted on a cam shaft journalled in the casing. The cam disk **57** has five equidistant cams **58**, intermediate depressions **59** and is turned by a driving device in the shape of a sprocket wheel **60**, a feed pawl **62** pivoted on arm **50** and actuated by a spring **61**, and an arresting pawl **64** swingable on pivot **53** and actuated by a spring **63**. A control member **65** corresponding to the control means **45**, **46**, horizontally slidable on cover **38** and carrying a rearwardly directed pin **66** is manually settable from the outside into positions *a*, *b* denoted in FIG. 7 by the center line of slide member **65**. In position *b* pin **66** is in contact with a finger **67** on arm **54** and holds the latter raised from cam disk **57**. In position *a* pin **66** is out of the movement path of the finger determined by the cam disk **57**.

During normal sewing tongue **52** is kept in inoperative position by slide **65** in position *b*. For basting, the slide is set in position *a* and needle **10** is set for straight stitching in the left starting position. The shape and the drive motion of cam disk **57** are such that tongue **52** is now alternately held in the operative position shown wherein it prevents stitch formation, during five consecutive loop-taking motions of hook **37**, and (by cams **58**) in an inoperative position to the left of the operative position during the subsequent loop-taking motion, there being thus obtained a straight seam of lock stitches having a stitch length six times the one, say 4 mm., for which the work-feeder **29** is set by means of the ordinary feed control member **34** of the machine.

The separating member can, for instance, also be a thin tube-piece insertable closely beside or above the movement path of the hook so as to be penetrated by the needle. An automatically movable separating member can also be used in straight stitch sewing machines and can be driven also from an oscillating loop-taker or, via some suitable transmission, from a rotary loop-taker shaft or work-feed shaft. In connection with loop-takers without stationary cover **38** the separating member can be mounted, optionally swingably, on some other stationary part of the sewing machine, optionally on the underside of the stitch plate.

What I claim is:

1. In a lock-stitch sewing machine comprising a casing including a work-support, a reciprocating work feeder associated with said work-support, a longitudinally reciprocating sewing needle, a loop-taker situated below said work-support, cooperating with said needle to produce lock stitches and having a hook movable past said needle in the course of loop-taking, drive shaft means for each of said needle, work-feeder and loop-taker, a basting device comprising a separating member mounted below said work-support and reciprocably movable between an inoperative position and an operative position close to the position of the needle and hook at loop-taking and adapted in its operative position to keep the needle thread from said hook and thereby prevent loop-taking, control means associated with said separating member and capable of being set manually from outside said casing so as to keep said separating member inoperative, a driving device movable in timed relation to the loop-taker and adapted to hold the separating member alternately in its inoperative position during a loop-taking motion of said hook and in operative position during a number of such hook motions and said control means being capable of disconnecting said separating member in its inoperative position from said driving device.

2. A device as claimed in claim **1** in which said driving device comprises a cam disk making one revolution during a plurality of loop-taking motions of said hook, a cam follower operatively connected with said separating member and spring means for urging said cam follower towards said cam disk.

3. In a lock-stitch sewing machine comprising a casing including a work-support, a reciprocating work-feeder associated with said work-support, a longitudinally reciprocating sewing needle, a loop-taker situated below said work support, cooperating with said needle to produce lock stitches and having a hook movable past said needle in the course of loop-taking, and drive shafts for said needle, work-feeder and loop-taker, a basting device comprising a separating member mounted below said work-support, reciprocable between an inoperative and an operative position close to the position of said needle and hook at loop-taking and adapted in its operative position to keep the needle-thread from said hook and thereby prevent loop-taking, a driving device for reciprocably moving said separating member between the operative and the inoperative positions, comprising a cam shaft, cam control means journalled on said cam shaft, motion transferring members interconnecting said cam control means and one of said drive shafts for rotating said cam control means in timed relation to said loop-taker and said driving device being adapted to hold said separating member in its operative position during a plurality of stitches and after those stitches intermittently in its inoperative position.

4. A sewing machine according to claim **3** wherein said cam control means comprises a cam disk, a cam follower operatively connected with the separating member and spring means for urging said cam follower towards said cam disk and said motion transferring means comprises a ratchet attached to said cam disk and a pawl pivoted on said work-feeder and cooperating with said ratchet.

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U.S. Cl. X.R.

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