July 24, 1951 R. L. ABOS ET AL 2,562,009

REVERSE STITCH ATTACHMENT FOR SEWING MACHINES

Filed March 26, 1948

Fig. 1

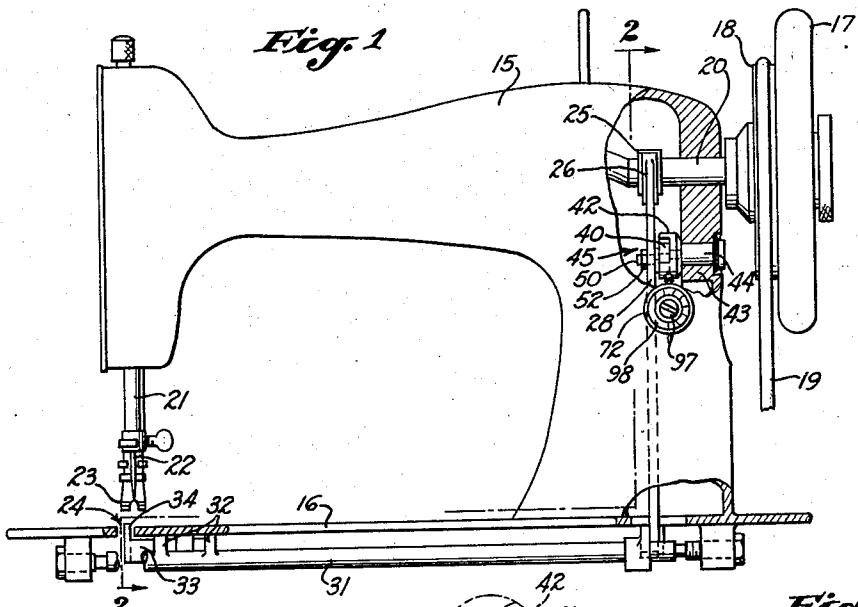


Fig. 2

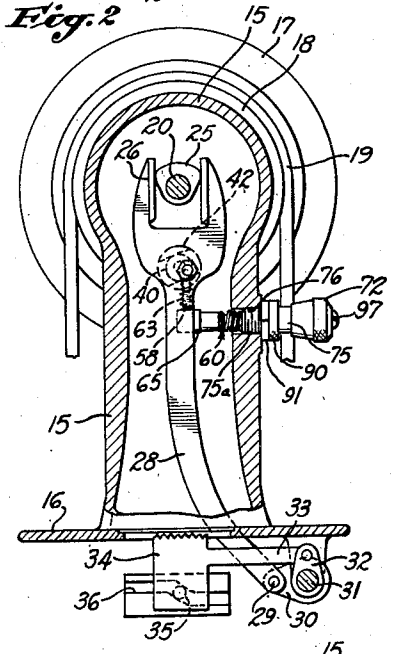


Fig. 3

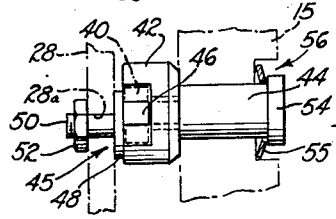


Fig. 4

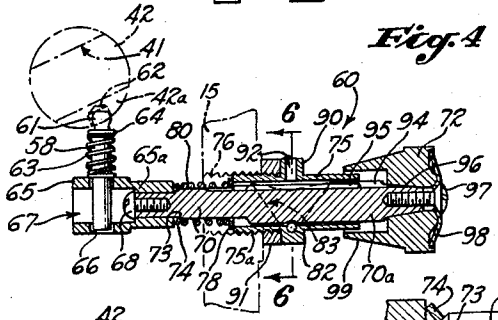


Fig. 8

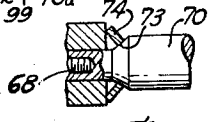


Fig. 5

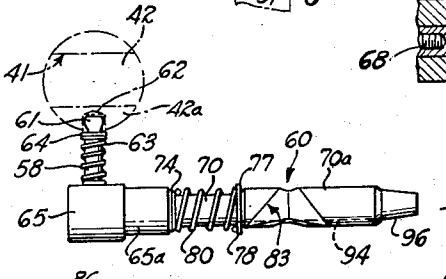


Fig. 7

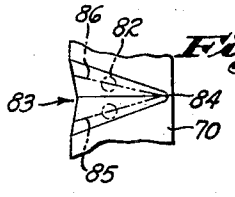
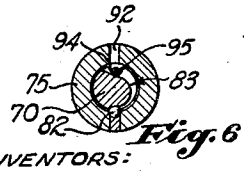


Fig. 6



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REVERSE STITCH ATTACHMENT FOR SEWING MACHINES

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22 Claims. (Cl. 112—210)

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This invention relates to sewing machines, and more particularly it relates to attachments for sewing machine heads of old models for adapting them to perform new functions.

One object of the invention is to provide an easily operable attachment for certain models of household sewing machines whereby they may be converted into what is known as the "reverse stitch" type, and whereby stitching either backward or forward may be accomplished at the will of the operator.

Another object of the invention is to provide an attachment of the indicated nature which will serve merely as a replacement of a portion of the stitch controlling mechanism of the original machine.

Still another object of the invention is to provide a reverse stitch attachment which will be wholly enclosed within the original machine head except for a manipulating knob projecting from the front of the head.

It is a still further object to provide a reverse stitch attachment which may be quickly installed to replace the original stitch regulating mechanism and without the necessity for modifying any of the retained original equipment.

In order better to explain the general purpose of our invention, it is pointed out that some of the old model sewing machines, that is, those which are equipped only with the old style conventional backward feed mechanism by means of which the material is fed away from the operator, use a vertical connecting rod which is known in the trade as a "feed fork connection." This connecting rod is used to actuate a rocker arm which causes a serrated feeder mounted in the base of the machine to be moved back and forth along the stitch line under the fabric being stitched for intermittently feeding the fabric rearward. A cam mechanism, which is used in conjunction with a shuttle actuating device, serves to raise the feeder into operating position during this rearward travel and to lower it out of operating position during its forward travel. Another cam at the opposite side of the sewing machine head acts to oscillate the upper end of the connecting rod or feed fork connection, and during such oscillation such rod is cyclically raised and lowered through the medium of a guide roller which it carries and which travels in an inclined adjustable channel-shaped guide mounted upon an adjacent stationary portion of the machine head. Varying the tilt of the guide upon the pivot by which it is carried serves to increase or reduce the throw of the connecting rod and the stroke of the feed dog and thereby lengthen or shorten the stitch. In connection with the present improvement, this guide is mounted so that it may be rocked about its pivot to tip it to one side or the other side of the pivot, i. e., either

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rearward or forward, whereby the movement of the feed dog may be correspondingly reversed and as a consequence the direction of the stitching will be reversed. When the guide is in a neutral or horizontal position, no stitch is produced, but as the guide is tipped in either direction to a greater or smaller degree, the stitch in a corresponding direction becomes accordingly longer or shorter.

However, since it is normally desired to maintain a stitch of constant length, it is desirable that any reverse stitch mechanism be such that the length of stitch be exactly the same when reversed as it was before reversal.

It is, therefore, also an object of this invention to employ reverse stitch mechanism which will act, not only to tip the guide so that the stitch may be reversed, but will also automatically provide for stitches of exactly equal length in the opposite directions when reverse stitching is being accomplished.

Additionally, it is an object of the invention to provide a reverse stitch mechanism by means of which the operator may hold the parts in reverse stitching position as long as required, the parts automatically returning to conventional stitching position upon release of the mechanism by the operator, that is, so that the fabric is fed backward.

It is a further object to provide in a reverse stitch attachment means for maintaining the stitch-length adjustment against unintentional change during stitch-reversing operations.

Other objects and features of the invention will appear to those skilled in this art upon reference to the following specification and the accompanying drawing wherein certain embodiments are disclosed for the purpose of illustration.

In the drawing:

Fig. 1 is a side elevation of a conventional old style sewing machine head indicating application of an attachment of the present invention thereto for the purpose of adapting the machine to reverse stitch operations;

Fig. 2 is a vertical cross section, taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged detail showing the channel guide in end elevation and showing the relationship of an offsetting adapter and the guide roller carried thereby with respect to the channel guide and the actuating means therefor;

Fig. 4 is a longitudinal section on an enlarged scale viewed in the direction of Fig. 2;

Fig. 5 is a side elevation showing the reciprocable shaft of Fig. 4 rotated about 180°;

Fig. 6 is a cross section taken on the line 6—6 of Fig. 4;

Fig. 7 is a fragmentary detail of a triangular grove provided in the reciprocating shaft for

controlling the length of stitch, both forward and reverse; and

Fig. 8 is a detail view of a friction joint construction employed.

In Figs. 1 and 2 there is disclosed a conventional sewing machine head 15 which is in the form of a hollow casting supported by a work table 16. The usual fly wheel and hand wheel 17 and pulley 18 driven by a belt 19 are shown affixed to a conventional drive shaft 20 which is provided with various eccentrics or cam mechanisms, one of which reciprocates a needle bar 21 carrying a needle 22, the bar 21 being located in the adjacent portion of the head 15 which supports a conventional presser foot 23 above a slot 24 in the work table 16.

The shaft 20 carries an eccentric 25 which oscillates a fork or bifurcation 26 of a connecting rod 28 otherwise known as a feed fork connection. The lower end of the rod 28 is pivoted and supported at 29 upon a short arm 30 on a rock shaft 31 located below the work table 16. At the left end of the shaft 31, as shown in Fig. 1, and at a point adjacent the needle bar 21, the upper side of the shaft 31 is provided with upstanding arms 32 which are pivotally connected to a yoke 33, one branch of which extends rearward under the table 16 and carries on the upper side at its rear end a usual feed dog 34 comprising a plurality of feed teeth which normally project up through the slot 24 in the work table to feed fabric held in engagement therewith by means of the presser foot 23 when the latter has been placed in lowered position by well known means. The other branch of the yoke 33 carries a pin or roller 35 (Fig. 2) which engages in a cam groove of a cam 36 operated from the drive shaft 20 in conjunction with a shuttle in a well known manner by means not shown. The cam 36 is transversely reciprocated with respect to the showing of Fig. 2 so that the feed dog 34 is raised in the conventional manner through the slot 24 into fabric engaging position as the feed dog is moved rearward by the yoke 33, the feed dog being drawn down below the work table 16 by the cam 36 during movement of the feed dog forward.

The attachment incorporating the present invention makes it possible for the effective movements of the feed dog 34 with respect to the movement of the cam 36 to be reversed at will, so that the feed dog may be caused to move forward in reverse stitch relationship when the cam 36 raises it up into fabric engaging position, the feed dog being then drawn down below the table 16 by the cam 36 to disengage the fabric as the yoke 33 prepares to drive the feed dog 34 rearward, the length of the stitch to be the same in both directions. This normal vertical movement of the connecting rod 28 to effect the described movements of the rock shaft 31, the yoke 33, and the feed dog 34 is effected through the medium of a guide roller 40 pivotally mounted on the rod 28 and operating in a channel 41 (Fig. 4) in one side of a tiltable channel guide 42 pivotally mounted on the head 15 by a bearing 43 and by being fixed upon a shaft 44 rotatable in the bearing 43.

In conventional construction and practice, the guide roller 40 is pivotally mounted on the connecting rod 28 by a short, straight pin secured in an aperture 28a in the connecting rod, the axis of the roller 40 being on the center line of the aperture and being also on the center line of the shaft 44 when the channel guide 42 is in its zero stitch position. However, this conventional mounting provides for tipping of the channel guide to one side only, and hence permits stitching in one direction only. In connection with the present invention, an adapter 45 is required for the purpose of mounting the roller 40 on an axis somewhat out of alignment with the axis of the aperture 28a. This adapter comprises an offset centering guide pin 46 which directly carries the roller 40 and is fixedly supported by an offsetting plate 48 which in turn is fixedly carried on an anchoring shank 50 secured in the aperture 28a of the connecting rod 28. A convenient means for mounting the adapter in the aperture 28a is that indicated by threading the outer end of the shank 50 as shown and employing a nut 52 for binding the offsetting plate 48 against the opposite face of the connecting rod 28. The plate 48 also serves as a thrust bearing for the roller 40 which in turn causes the plate 48 to clear the edge of the channel guide 42.

The extent of the offset between the centering pin 46 and the anchoring shank 50 is such as to align the center of the roller 40 with the center of the channel guide 42, which is on the axis of the shaft 44 when these parts are in middle or neutral positions. In practice, the amount of the offset between centers is small, being approximately one-eighth of an inch, and the centering pin 46 is disposed at an angle of about 15° upward and to the left with respect to the shank 50, as the parts are viewed in Fig. 2. Desired relationships between all of the actuating mechanisms for the feed dog 34 and the stitch regulating mechanism are thus obtained. The exact distance and angle may vary slightly with different models.

Since the direction of movement of the feed dog 34 through the feeding portion of its path is governed by the direction of inclination of the channel guide 42, and since the length of stitch in either direction is governed by the degree of inclination of the channel guide 42 in the respective direction, the latter serves both as a feed regulator and as a stitch reverser. The position of the channel guide 42 with respect to the adjacent face of the connecting rod 28 is maintained by the shaft 44 which in turn is maintained in the head 15 as through the medium of an integral head 54 bearing against an appropriate spring washer 55 which may be conveniently disposed in a countersink 56. Selection of the direction and degree of inclination of the channel guide 42, and consequently selection of the direction of stitch and of the length of stitch is easily accomplished by partial rotation of the channel guide 42 and its shaft 44 against the tension of the spring washer 55 through the medium of an upstanding finger 58 under control of the stitch reverse mechanism of this invention which is generally indicated at 60. In order that the finger 58 may actuate the channel guide 42, the upper end of the finger is provided with a ball-type head 61 which extends into a socket 62 in the underside of the lower flange 42a of the channel guide 42 below the channel 41, as best illustrated in Figs. 4 and 5. The head 61 is urged into sealing position in the socket 62 through the medium of a spring 63 disposed about the finger 58, the upper end of the spring 63 bearing against an annular collar 64 on the pin 68 below the head 61. At least the lower flange 42a is preferably formed on the arc of a circle whereby to avoid any possible interference of the annular collar 64 with the movement of the lower flange 42a to extreme tilted positions. The lower end of the

spring 63 bears upon the top of a cylindrical barrel 65 provided with diametrically opposed apertures 66 through which the finger 58 projects, and by means of which tipping of the finger 58 endwise with respect to the barrel 65, that is, in a plane generally parallel with the channel guide 42, is prevented.

The barrel 65 is provided with an axial bore 67 which receives the head of a screw 68 threaded into an adjacent reduced end of a rotary reciprocable pull shaft 70 constituting a body member of the reverse stitch mechanism 60. The respective end of the barrel 65 is reduced in diameter and provides a shoulder 65*a* which the peripheral portion of the head of the screw 68 overhangs and upon which it bears. Since the upstanding finger 58 must always be in a vertical position, this mounting of the barrel 65 by the screw 68 upon the adjacent end of the shaft 70 provides a rotary joint permitting rotation of the shaft 70 by a knob 72 secured on the opposite and outer end thereof. Inasmuch as it is important to maintain a tight fit in the rotary joint provided between the barrel 65 and the end of the shaft 70, the reduced extremity of the shaft 70 within the barrel 65 is connected with an outer portion of the shaft 70 lying just beyond the barrel 65 by a tapering or frusto-conical shoulder portion 73 (Fig. 8) which receives a cupped spring washer 74 whose inner circular wall bears upon the frusto-conical shoulder 73 and whose outer edge portion at one side bears against the adjacent end wall of the barrel 65. Thus, by accurately proportioning the parts and binding the overhanging periphery of the head of the screw 68 against the shoulder 65*a* of the barrel 65, the required friction in the rotary joint between these parts, to prevent accidental rotation of the pull shaft 70, is conveniently accomplished.

Approximately the outer half of the shaft 70, as indicated at 70*a* in Fig. 5, is of somewhat larger diameter than the inner end of the shaft which is held by the screw 68 to the barrel 65. The portion 70*a* is slidably and rotatably carried in a sleeve 75 whose inner end is externally threaded at 75*a* for reception in threads 76 which are conventionally provided in a corresponding aperture of the machine head 15 at the right side and below the level of the drive shaft 20. The inner extremity of the portion 70*a* provides a shoulder 77 which serves as a stop for a washer 78 against which bears one end of a coil spring 80 disposed about the adjacent portion of the shaft 70 and having its other end bearing against the spring washer 74. Normally, however, that is, when the parts are assembled in operative relationship, the washer 78 bears against the inner end of the sleeve 75, the latter acting to hold tension upon the spring 80, the spring 80 thus serving normally to project the shaft 70 and the barrel 65 inward into the machine head 15 so that the channel guide 42 tips to the opposite side from that indicated in Fig. 4. The inner wall of the sleeve 75 is provided at an intermediate point with a ball detent 82 which normally projects into a V-shaped positioning groove 83 whose configuration is best illustrated in Fig. 7. At one end this groove 83 tapers to a rounded point which will receive the ball 82 without movement, this point being indicated at 84. The sides of the groove 83 are beveled, as illustrated, and the groove gradually deepens from its rounded point 84 to its broad end. In this manner the beveled walls of the groove 83 provide two diverging lines or paths of contact 85 and 86 for the ball detent 82 as its relative position is shifted from the round point of the groove 84 to the broad end. When the knob 72 is pulled against the spring 80 and held manually, the ball detent 82 engages the path 86, and when the knob 72 is released, the detent 82 engages the path 85 directly across the groove 83, by the return action of the spring 80. By this means positioning of the groove 83 by rotation of the shaft 70 with respect to the ball detent 82 causes the ball detent 82 and the tapering walls of the groove to provide for varying amounts of reciprocating movement of the shaft 70 as it is moved along its axis. Such variation in the reciprocating movement is effected by rotating the shaft 70 as required, such rotation being effected through the knob 72. Accidental disturbance of such adjustment by unintentional rotation of the knob 72 is practically eliminated by the frictional joint assured by the cupped spring washer 74 which bears against the adjacent end of the barrel 65.

The ball detent 82 within the sleeve 75 may be installed in any appropirate manner. For example, an integral annular flange 90 on the sleeve 75, which flange normally serves as a stop for a lock nut 91, may be drilled radially to provide a hole 92, as indicated in Fig. 4, until the interior of the sleeve is reached, whereupon the drilling may be continued slightly at the opposite side of the sleeve until a seat sufficiently deep for the ball detent 82 is produced. The ball 82 is then dropped through the hole 92 and seated. The metal at the edge of the seat may be upset slightly if desired to retain the ball, but ordinarily this is not done, especially since the fit is reasonably snug. For the purpose of installation of the shaft 70 and the ball detent 82 in the sleeve 75, a longitudinally extending groove 94 is formed in the outer wall of the shaft 70 at the wide end or base of the triangular groove 83, so that, when the knob 72 is removed from the shaft 70 the ball detent 82 may be slid along the groove 94 until it reaches the triangular groove 83. When the parts are assembled, entry of the ball detent into the base of the groove 83 in line with the longitudinal groove 94 is prevented by sliding an elongated pin 95 into the groove 94, this pin 95 being held against loss by the knob 72 after it is installed. To provide a seat for mounting the knob 72, the end of the shaft 70 is tapered as indicated at 96, the knob 72 being provided with a cooperating tapering bore which is frictionally bound upon the taper 96 as by means of a retaining screw 97 threaded into the end of the shaft 70 and having its head bound against the knob 72 as through the medium of a disk 98 countersunk in the outer portion of the head and carrying a graduated scale if desired.

Preferably, the knob 72 is provided with an inwardly directed skirt 99 adapted to overhang the adjacent end of the sleeve 75, at least normally. When the screw 97 binds the knob 72 in operative position, the friction joint provided is adequate to insure rotation of the shaft 70 back and forth about its axis through the medium of the knob 72 and to overcome the friction in the joint provided by the cupped spring washer 74 on the tapering shoulder 73 at the opposite end of the shaft 70 and by the head of the screw 68 bearing upon the shoulder 65*a* and the barrel 65 which is held against rotation by the upstanding finger 58 whose upper end is engaged in the socket 62 of the channel guide 42.

Operation

When the stitch reversing mechanism of this invention is assembled as illustrated in Fig. 4 and placed in operative position as indicated in Fig. 2, the coil spring **80** projects the shaft **70**, the barrel **65** and the upstanding finger **58** inward to the limit of movement determined by the position of the triangular groove **83** so that, if the ball detent **82** is not held in a neutral position by the point **84** of the groove **83**, the channel guide **42** is tipped in a direction opposite to that indicated in Fig. 4, the inner end of the skirt **99** of the knob **72** lying near the annular flange **90** of the sleeve **75**. Under these conditions the threads **75***a* of the sleeve **75** are bound in the corresponding threads of the casting **15**, and the nut **91** and the flange **90** serve as lock nuts for each other. By pulling the knob **72** outward and holding it manually in such position against the spring **80**, the stitching is reversed. Upon release of the knob, the spring **80** returns and holds the parts in normal or forward stitching relationship.

By rotating the knob **72**, the shaft **70** is rotated to bring the triangular groove **83** into any desired position of adjustment with respect to the ball detent **82** which is disposed in a fixed position. As seen in Fig. 4, the ball detent **82** is disposed at the bottom of the attachment, this relationship being also shown in Fig. 6. If the shaft **70** is rotated to the right, as viewed in Fig. 6, to the limit of its movement, the wide end of the triangular groove **83** is brought into alignment with the ball detent **82**, the detent **82** at this position coming into contact with the adjacent portion of the elongated pin **95** positioned in the longitudinally extending groove **94** at the surface of the portion **70***a* of the shaft **70**. With this relative relationship between the ball detent **82** and the groove **83**, pulling the knob **72** outward to withdraw the shaft **70**, and return of the shaft **70** to its retracted position by means of the coil spring **80** will result in the maximum stroke of the shaft **70** and in consequent maximum rock of the channel guide **42**. Such relative position of the groove **83** is indicated in Fig. 5. In this position of the groove **83**, the length of stitch will be the maximum both when the knob **72** is drawn outward until the ball detent **82** strikes the rearward side of the groove **83** on the path **86**, and when the shaft **70** is allowed to be returned to the opposite position by the coil spring **80** when the ball detent **82** strikes the opposite side of the groove **83** on the path **85**. The direction of stitch will be changed as rapidly as the knob **72** is moved between its two extreme positions. By rotating the shaft **70** to the left from the position of Fig. 5 toward the position of Figs. 4 and 6, the friction joint at the cupped spring washer **74** permitting such rotation, any intermediate position of the ball detent **82** with respect to the groove **83** may be had, such as that illustrated in Fig. 7. Under these circumstances the length of stitch in both directions will be correspondingly reduced. By continuing rotation of the shaft **70** to the left, the rounded point **84** of the groove **83** will be brought up about the ball detent **82** at the neutral position of the shaft **70** and its groove **83**. Here, there will be no stitching whatever.

From the foregoing, it will be apparent that the shaft **70** and its triangular groove **83** may be rotated through the knob **72** to bring the groove **83** into any position of rotational adjustment with respect to the ball detent **82** for the purpose of accomplishing any stitch length required, and it will also be apparent that the direction of stitch will be reversed as the shaft **70** is reciprocated through the medium of pull upon the knob **72** and through the medium of the returning influence of the coil spring **80** when the knob **72** is released by the operator. By making the sides of the triangular groove **83** symmetrical so that the paths **85** and **86** for contact of the ball detent are arranged symmetrically with respect to the corresponding diameter of the shaft **70**, the length of the stitches in the opposite directions will be exactly the same for a given setting.

It will also be apparent from the foregoing that conversion from an old style sewing machine head providing for stitching in one direction only, as previously explained, may be quickly effected merely by removing the old threaded mounting from the threaded aperture **76** of the sewing machine head **15**, removing the old channel guide **42** and the mounting for its roller **40** and substituting the present channel guide **42** and the adapter **45** to position the roller **40**, and then mounting the stitch reversing mechanism **60** of this invention in the manner above described.

Inasmuch as variations of the generic invention herein disclosed will no doubt become apparent to those skilled in this art, it is intended to cover all such modifications as fall within the scope of the claims.

We claim as our invention:

1. In combination in a reverse stitch attachment for sewing machines: a shaft adapted to be rotatably and axially reciprocably mounted in a sewing machine head with its inner end adapted to be connected to a stitch control member to shift the latter; stop means adapted to be carried by said head; and engaging means at an intermediate position on said shaft to limit movement of said shaft in both of its reciprocating movements by engagement with said stop means, said engaging means being adjustable with respect to said stop means for engagement with said stop means at a multiplicity of adjusted positions in both reciprocating movements to vary the amount of shift of said control member.

2. A combination as in claim 1 wherein the adjustment of said engaging means is accomplished by relative rotation of said shaft, the combination including means for releasably retaining said shaft and its engaging means in its rotatably adjusted positions.

3. A combination as in claim 2 wherein said engaging means comprises two opposed, symmetrically arranged members providing for equal stitch lengths in opposite directions for each position of adjustment of said shaft.

4. A combination as in claim 3 wherein said engaging means comprises two opposed diverging walls provided on said shaft transversely to its axis and at opposite sides of said stop means.

5. A combination as in claim 4 wherein said shaft rotation adjusts said diverging walls, and friction means is provided between said shaft and said stitch control member for serving as said releasable retaining means.

6. A combination as in claim 5 wherein said opposed diverging walls are provided by a V-shaped groove in the wall of said shaft, the axis of said groove being directed circumferentially around the shaft.

7. A combination as in claim 1 wherein said

engaging means comprises opposed diverging walls provided by a V-shaped groove formed around the wall of said shaft, said stop means being disposed between said walls of said groove.

8. A combination as in claim 1 wherein said engaging means is in the form of walls of a V-shaped groove cut in the surface of said shaft with the axis of the V-shaped groove directed circumferentially around the shaft, said stop means being disposed between said walls of said groove, and friction means providing for rotatably adjusting said shaft and its groove and for retaining said shaft in adjusted position.

9. A combination as in claim 1 wherein said engaging means comprises two opposed symmetrically arranged members providing for equal stitch lengths in opposite directions for each position of adjustment.

10. A combination in a reverse stitch attachment for sewing machines: a sleeve having a bore, said sleeve being adapted to be fixedly mounted in a sewing machine head in line with a stitch control member; reciprocating positioning means slidably mounted in the bore of said sleeve; detent means carried in said sleeve and projecting into said bore; diverging wall means provided on the surface of said shaft at opposite sides of said detent means and respectively adapted to engage said detent means as said shaft is reciprocated in said sleeve; and means for reciprocating and rotatably adjusting said shaft.

11. A combination as in claim 10 including means for maintaining adjustment of said shaft against accidental displacement.

12. In combination in a reverse stitch mechanism adapted for attachment to sewing machines: a sleeve member provided with a bore adapted to receive a reciprocating member, said sleeve being adapted to be mounted in a forward portion of the sewing machine head in a relatively fixed position; a member reciprocally and rotatably mounted in said sleeve member; means for rotatably and reciprocally moving said member mounted in said sleeve member; diverging wall means provided by one of said members in angular relationship with respect to the axis of said sleeve; detent means projecting from an adjacent wall of the other of said members in the position between said wall means for regulating and limiting the reciprocating movement; and means for preventing dislodgment of the respective members.

13. A combination according to claim 12 wherein said wall means are symmetrically arranged with respect to each other in opposing relationship whereby to insure stitch lengths which are equal in opposite directions.

14. A combination according to claim 13 including yielding means for preventing accidental disturbance of stitch adjustment.

15. A combination according to claim 14 including a spring control friction joint for maintaining said adjustment.

16. A combination according to claim 12 including means carried in a groove in one of said members and slidable axially with respect to said members to retain said detent means in operative relationship with respect to said wall means; and knob means carried by said reciprocating member to confine said retaining means in operative relationship.

17. In a combination in a reverse stitch attachment for sewing machines: a shaft adapted to be reciprocally mounted in a sewing machine head with its inner end adapted to be connected to a stitch control member to shift the latter; stop means adapted to be carried by said head; engaging means at an intermediate position on said shaft to limit movement of said shaft in both of its reciprocating movements by engagement with said stop means; a radially projecting finger mounted on said inner end of said shaft; and a ball head on the outer end of said finger and adapted to seat in a corresponding socket in said stitch control member to rock the same upon an axis on which it is mounted.

18. A combination as in claim 1 including: a radially projecting finger mounted on said inner end of said shaft; and a ball head on the outer end of said finger and adapted to seat in a corresponding socket in said stitch control member to rock the same upon an axis on which it is mounted.

19. A combination as in claim 1 wherein said engaging means is in the form of symmetrically arranged walls of a V-shaped groove cut in the surface of said shaft with the axis of said groove directed circumferentially around the shaft.

20. A combination as in claim 1 wherein said engaging means comprises two opposed symmetrically arranged diverging walls provided on said shaft transversely to its axis and at opposite sides of said stop means, such walls providing for equal stitch lengths in opposite directions for each position of adjustment.

21. In combination in a reverse stitch attachment for sewing machines: a shaft to be movably mounted in a sewing machine head with an inner portion adapted for connection to a stitch control member to shift the latter; stop means adapted to be carried by said head; and engaging means provided on said shaft and in the form of side walls of a substantially symmetrically V-shaped groove cut in the surface of said shaft, the axis of said groove extending circumferentially around the shaft with said stop means disposed between said walls of said groove, said shaft and groove being adjustable with respect to said stop means for engagement of said stop means at a plurality of adjusted positions with respect to the walls of said groove.

22. A combination as in claim 21 including means providing for adjustment of said shaft and its groove and for retaining said shaft in adjusted position.

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