This invention relates to sewing machine mechanisms, and more particularly to devices for attachment to sewing machine heads to serve as adapters to impart new functions to old models.

The general object of the invention is to convert certain old models of at least one brand of sewing machine mechanisms originally adapted only for backward feed into the so-called "reverse stitch" models whereby stitching either backward or forward may be accomplished at the election of the operator.

A further object of the invention is to provide means of the indicated nature which will enable transition from one type of stitch to the other to be made by a relatively simple movement.

A further object of the invention is to provide for the conversion of conventional old model backward feed machines to reverse stitch models without the necessity for effecting extensive mechanical changes in the original construction, and whereby the conversion may be made more or less readily merely by the replacement of certain original parts by adapters and new adjusting attachments.

There are in constant use great numbers of old models of sewing machines which are equipped with the old style conventional backward feed mechanism by means of which the material being stitched is fed away from the operator. Most of these models are capable of being converted to the "reverse stitch" models by the installation of attachments or adapters which can be relatively readily substituted for portions of the original equipment. In some of these old models, especially as produced by one manufacturer, a vertical connecting rod, which is known as a "feed fork connection," is employed to actuate a rocker arm which causes a serrated feeder foot or feed dog to be moved back and forth along the stitch line, a cam mechanism being employed, in conjunction with a shuttle-actuating device, to raise the feed foot during its rearward travel and to lower it during its forward travel toward the operator. The upper end of the connecting rod or feed fork connection is oscillated by means of a cam connected with the main drive shaft, and during such oscillation the rod is cyclically raised and lowered by means of a guide roller which it carries and which travels in an inclined adjustable channel-shaped guide. This channel guide is conventionally adjusted to lengthen the stitch merely by tilting the guide upon a pivot so as to increase or reduce the throw of the connecting rod.

We have discovered that by modifying the construction of the guide so that it may be rocked freely about its center to change its inclination from the horizontal and tip it in either one direction or the other, the direction of movement of the feed dog is reversed, thereby reversing the stitch. Thus, as the channel guide is moved toward horizontal or neutral position, the stroke of the connecting rod is shortened and, hence, that of the feed dog, whereby the stitch in a given direction is gradually shortened, no stitch being produced at the neutral position, the direction of movement of the feed dog and of the stitch being reversed as neutral position is passed when tipping the channel guide in the opposite direction, the length of the reversed stitch being gradually increased as the angle of inclination is increased.

However, for several reasons, the practical aspects of conversion are not so simple as merely adjusting the inclination of the channel guide.

First, an actuating arm on the channel guide engangeable by the adjusting mechanism strikes the casting of the machine head so that it cannot be adjusted beyond neutral position. Moreover, such reverse movement when imparted to the feed dog causes the feed dog to strike one end of its guide slot in the adjacent portion of the work table or bed plate.

It is, therefore, a further object of this invention to make such provisions and employ such attachments as will adapt the present constructions to conversion to reverse stitch without the necessity for mutilation or reconstruction of the work table. In a preferred form, this is accomplished principally through the medium of an adapter having an offset centering pin or guide pin for offsetting the center of the guide roller carried by the connecting rod, and by replacing the original channel guide receiving the roller by a channel guide free from protrusions which would otherwise strike the casting forming the machine head, whereby to permit ready adjustment of said guide upon a pivotal mounting by which it is positioned in the head. According to a preferred form of the invention, the guide is adjusted through the medium of a shaft upon which it is fixed and which rotates in the pivotal mounting.

Other objects and features of the invention will appear to those skilled in the art upon reference to the following specification and the accompanying drawings wherein certain modifications are disclosed by way of example.

In these drawings,

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

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

Fig. 3 is a fragmentary vertical section, taken on the line 3—3 of Fig. 1;

Fig. 4 is a face view of the adjustable channel shaped guide as employed in connection with the present invention;

Fig. 5 is a side elevation of the offsetting adapter carrying the centering guide pin;

Fig. 6 is a side elevation thereof, showing the relationship of the offsetting adapter and the roller carried thereby with respect to the channel guide and the actuating means therefor;

Fig. 7 is a front elevational detail, taken from the line 7—7 of Fig. 3, and showing a portion of the machine head broken away to reveal the position of the channel guide and the offset guide pin and its roller;

Fig. 8 is a front elevational detail similar to the showing of Fig. 7 illustrating a modified form of adjusting means for the guide;

Fig. 9 is a side elevation thereof, as indicated by the line 9—9 of Fig. 8;

Fig. 10 is a horizontal sectional detail, taken on the line 10—10 of Fig. 11 and illustrating a further modified form of adjusting mechanism;

Fig. 11 is a front elevational detail similar to those of Figs. 7 and 8, as indicated by the line 11—11 of Fig. 10; and

Fig. 12 is a series of diagrammatic representations of different positions of certain parts of the stitch regulating mechanism, both of the old model machines and of the present adapter construction.

In Fig. 1 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 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 28 carries a cam 25 which oscillates a fork or bifurcation 26 of a connecting rod 29 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 of a rock shaft 31 located below the work table 16. At the left end of the shaft 31, as shown in Fig. 1, 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 up 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.

It is the purpose of the attachment of the present invention to enable the relative movements of the feed dog 34 with respect to the movements of the cam 36 to be increased 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 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 pivoted on the rod 28 and operating in a tiltable channel guide 42 pivotally mounted in a bearing 43 in the head 15 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 in the connecting rod, the axis of the roller being on the center line of that aperture, whereas, for the purpose of the present invention, an adapter 45 is employed to mount the roller. This adapter comprises an offset centering guide pin 46 which directs the roller 40 and is fixedly supported by an offsetting plate 48 which in turn fixedly supports an anchoring Shank 50 which is secured in an aperture 52 in the connecting rod 28. This aperture 52 is the aperture originally provided to carry the roller 40 and receive the short, straight pin above mentioned. A convenient means for mounting the adapter 45 in the aperture 52 of the connecting rod 28 is that indicated by threads 54 on the end of the shank 50 to which a nut 55 or other locking means is affixed 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 edges 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 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 with the centering pin 46 disposed at an angle of about 15° upward and to the left with respect to the shank 50, as the parts are viewed in Figs. 2 and 12, desired relationships between all of the actuating mechanisms for the feed dog 34 and stitch regulating mechanism are obtained. The exact distance and angle vary somewhat with different models.

The respective relationships and paths of movements of the feed dog and of the stitch regulating mechanism of both conventional device and of the present construction employing the adapter 45 are diagrammatically indicated by the various positions of Fig. 12. Position A illustrates the direction of inclination of the channel guide 42 in a conventional old model device wherein the feed dog 34 moves rearward from the operator's position at the
front of the work table 16, the path of movement of the feed dog 34 for a maximum length stitch being indicated by the arrows. The feed dog 34 rises into operative position at a point closely adjacent the front wall of the slot 24 for all stitch lengths.

Position B indicates adjustment of the old model channel guide 42 to an approximately horizontal position, wherein the length of stitch reduces to zero, beyond which, if the guide 42 could be further tipped, there would be a tendency toward a reversed stitch position. Such a movement is indicated by arrows in the drawing, cause the forward edge of the feed dog 34 to strike the adjacent edge of the work table 16 at the front of the slot 24. Also, in attempting to attain such a position of adjustment, a depending actuating finger 42a on the conventional channel guide 42 strikes an obstructing portion 51 constituting the adjacent portion of the casting forming the machine head 15.

In employing the attachments and adapter of the present invention, a channel guide 42 is employed in which the part 42a is eliminated, in order that the guide 42 may be freely tipped to provide inclination in any direction. However, provision for free rotation of the guide 42 is not sufficient because, as just indicated, the feed dog 34 will strike the adjacent end of the slot 24.

Position C indicates the relationship of the parts and the path of travel of the feed dog 34 when the adapter 45 is employed so as to shift the axis of rotation of the roller 40 into alignment with the axis of the shaft 44, carrying the channel guide 42, when the yoke 26 of the feed fork connector or connecting rod 26 is positioned in its middle or neutral position by the cam 25. Such alignment of the axis of the roller 40 with the axis of the shaft 44 permits tipping of the channel guide 42 to either one side or the other in order to reverse the stitch by reversing the direction of vertical movement of the rod 26 upon throw to a given side by the corresponding cam 25. The disposition of the pin 46 upward at a small angle from the position of the aperture 52, serves to depress the connecting rod 28 correspondingly so that the resultant lowering of the pivot 29 at the lower end of the rod 26 changes the timing and throw of the feed dog 34 in the same manner as to avoid striking the front end of the guide slot 24.

In all of the positions indicated in Fig. 12, the center of rotation of the channel guide 42 upon the shaft 44 is shown on the same center line 55 for the purpose of indicating the relative shift of the axis of the centering guide pin 48 from the location of the axis of the original aperture 52. The location of the axis of the aperture 52 is indicated by the line 59, This shift of the axis of the pin 48 causes the dog 34, when the guide 42 is set for rearward feed (which position is indicated also by the broken center line C of Fig. 3), to rise into operative position in the slot 24 at a point clear of the front end of the slot 24 and subsequently to fall at a point clear of the rear end of the slot 24, approximately as indicated by the arrows in position C. The dog thereby avoids all contact of the dog 34 with the ends of the slot.

Position D of Fig. 12 indicates the adjustment of the channel guide 42 when the adapter 45 of the present improvement is used, whereby to yield forward movement of the feed dog 34. As in position C, the axis of the guide pin 48 is aligned with the axis of the shaft 44 when the yoke 26 is in its middle or neutral position. Position D also represents the feed dog 34 as being caused to feed the fabric forward, as indicated by the arrows, thereby reversing the stitch from the normal rearward stitch, the path of the feed dog being entirely within the slot 24 and clearing both ends thereof, as in the case of the rearward stitch indicated by Position B.

Thus, by employment of the adapter 45, and by eliminating the finger 42a of the old form from the guide 42 in the present form, the guide 42 may be freely adjusted between the extreme positions represented by the broken center lines C and D of Fig. 3 and on either side of the neutral or ineffective position represented by the broken center line E of Fig. 3. The feed dog 34 is thereby caused to feed either backward or forward, and to move up and down to and from feed position without striking the work table 16 at the ends of the slot 24.

Since the direction of movement of the feed dog through the 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 a stitch reverser. Selection of the direction of stitch and of the stitch length is therefore readily accomplished by tipping of the guide 42 toward the position of the broken line C or toward the position of the broken line D of Fig. 3 through the medium of rotary adjustment of the shaft 44 upon which it is fixed. This adjustment may be accomplished by various mechanisms, the constructional features of which are governed somewhat by the exact construction of the original machine head 15 upon which the adapter 45 and attachments of the present invention are installed, or by the location of the conventional bobbin winder, or the like.

In the form of adjusting mechanism shown in Figs. 1, 2, 3 and 7, an arm 60 is fixedly secured to the rotary shaft 44 as by means of a set screw 60a, the swinging end of the arm 60 having pivot ed thereto at 61 a link 62 which is pivotally connected at 63 to one end of a bent lever 64 mounted on a fixed fulcrum 65 carrying its outer extremity means for manipulating the lever 64, such as a knurled head 56 of a screw 67. The fulcrum 65 is provided by a gauge plate 68 which, in the form shown, is secured to the head 56 by a relatively large countersunk screw 69 threaded into a threaded aperture 70 originally found in the head 15 and originally receiving screw means for adjusting a channel guide corresponding with the channel guide 42. The gauge plate 68 is provided with a rearwardly extending extension 71 in which the fulcrum 65 is located. The screw 67 is employed as a means to limit movement of the bent lever 64 to various adjusted positions such as indicated in Fig. 3. For this purpose the screw 67 has a pointed end 72 adapted to strike the gauge plate 68 above and below the middle of a scale 73 when the lever 64 is moved up and down to reverse the stitch. This movement to produce stitch reversal without stopping the machine. For a given setting of the screw 67 in the lever 64, the extent of throw of the lever 64 downward will be the same as the extent of its throw upward. The amount of throw in either direction is varied by adjusting the screw 67, the stitch length being correspondingly varied.
The setting of the arm 64 may be maintained by any suitable means, that shown being a conventional spring washer 74 carried on the shaft 44 and compressed between the arm 60 and the portion of the machine head 15 which provides the bearing 43. The frictional resistance thus provided is adequate for the purpose.

As shown in Figs. 1, 2, 3 and 7, the raising and lowering of the outer end of the better 64 about its fulcrum 65 cause the arm 60 to be correspondingly moved through the medium of the link 62, thereby rocking the shaft 44 and producing correspondingly the vertical movement of the guide roller 40 on a given lateral movement of the fork 26 by a cam 25.

A simpler form of attachment for adjusting the channel guide 42 may sometimes be used, as shown in Figs. 8 and 9. Here, an arm 75 is secured to the rotary shaft 44 as by means of a set screw 75a, the arm 75 extending forwardly and being provided at its free end with a laterally disposed portion which carries the knurled head 66 and its screw 67 whose pointed end 72 cooperates with a gauge plate 76 secured to the machine head 15 by a countersunk screw 77 threaded into a hollow screw 78 which is in turn mounted in the threaded aperture 79 originally provided in the head 15. The pointed end 72 of the screw 67 strikes the guide plate 76 for limiting movement of the arm 75 when reversing the stitch, and cooperates with a scale 79 on the plate 76 for adjusting the length of stitch in substantially the same manner as the form of Figs. 3 and 7.

Another form of attachment which may be employed is shown in Figs. 10 and 11. In this form, the arm 60 of Fig. 3, which is mounted on the rotary shaft 44 is connected by a ball and socket joint 80 to a two-part link 81 which has at its opposite end a socket for a ball 82 formed on one end of a pin 83 mounted in an adjacent off-set 84 of another arm 85 which is secured as by means of a set screw 85a to a rock shaft 86 journaled in a sleeve 88 which is partially threaded at 88 and mounted in the threaded aperture 79 originally provided in head 15. It will be noted that the arm 65 extends laterally from the link 81 into the cavity within the head 15 through an access opening 89 originally provided in the side of the head 15 for the purpose of assembly, this opening 90 and another large opening (not shown) conventionally provided at the back of the head being used for the purpose of installation. The forward end of the rock shaft 86 carries an actuating arm 92 by means of which the shaft 86 is rocked to operate the arm 85 and the link 81, and thereby adjust the arm 60, the rotary shaft 44 and the channel guide 42.

Cooperating with the actuating arm 92 is a gauge plate 94 suitably held in position against the machine head 15 by means of a flange 90a carried by the sleeve 88. The gauge plate 94 is provided with a triangular opening 95 which receives a sliding stud 96 having an extension 97. A portion of the extension 97 is threaded to receive an internally threaded knurled nut 98. The squared portion of the extension 97 prevents the threaded portion from turning in the slot 92a, whereby the nut 98 may be bound against the arm 92 in cooperation with a flange 99 integral with the stud 96 and by which the stud 96 is bound against the opposite side of the arm 92. By loosening the knurled nut 98, the stud 96 may be moved along the arm 92 in its slot 92c, thereby correspondingly adjusting the stud 96 in the opening 95 with respect to the inclined sides of the opening 95 which converge to a point short of the rock shaft 86. By reason of the indicated angle of divergence of the mentioned sides of the forward stitch cycle, the stud 96 may be moving through a larger arc when the stud is carried on an outer portion of the arm 92 and through a smaller arc when the stud 96 is carried on an inner portion of the arm 92, substantially no arc being described when the stud 96 is disposed in the innermost end of the slot 92a. In this manner the length of stitch may be regulated as desired, and the stitch may be reversed, without stopping the machine, merely by swinging the arm 92 from one side of the opening 95 to the other until the stud 96 strikes the corresponding edge of the opening 95.

The operation and functions of the various parts of the adapter 45 and the described attachments for adjusting the channel guide 42 have been outlined above incidentally to the description of the construction of the parts. To recapitulate, when the adapter 45 is installed on the connecting rod 28 with the anchoring shank 50 bound in the aperture 52 by the nut 55, the location of the offset stud pin or guide pin 45 carrying the guide roller 40 is upward and to the left of the aperture 52, as viewed in Figs. 2, 6 and 12. This position of the pin 46 is such that its axis is aligned with the axis of the rock shaft 44 carrying the channel guide 42 when the cam 25 is at its neutral or zero position, as shown in Fig. 2 so that the fork or yoke 26 of the connecting rod 28 is centered in its zero or neutral position.

Thus, the center of the pin 46 and its guide roller 40 is shifted to the left in the guide channel 42 with respect to the position of the axis of the guide roller 40 as originally carried on the axis of the aperture 52. As a consequence, the connecting rod 28 is correspondingly lowered in the forward stitch cycle, thereby preventing the feed dog 34 from striking the front edge of the slot 24, and the connecting rod 28 is correspondingly raised during the reverse stitch cycle, thereby preventing the feed dog 34 from striking the rear edge of the slot 24. Such a shift in relationship causes the raising and lowering of the feed dog 34 at the limit of its forward stroke to occur at a position well within the slot 24, as indicated in Position C of Fig. 12, thereby avoiding striking of the forward end of the slot 24, as would be done in Position B. The lateral shift of the guide pin 46 with respect to the aperture 52 to align the axis of the pin 46 with the axis of the shaft 44 when the cam 25 and yoke 26 are in their neutral positions, as in Fig. 2, so changes its relation and that of the guide roller 40 to the center of rotation of the channel guide 42 that the tipping of the channel guide 42 in one direction, such as downward and to the right in Position B by the broken line C of Fig. 3), causes the feed dog 34 to feed in a given direction, that is rearward as in Position C. Also, tipping of the
channel guide 42 in the opposite direction, as in Position D (represented also by the broken line D), so that the feed dog 34 to feed in the opposite direction, such as the forward feed indicated in Position D. This change in direction of the feed stroke of the feed dog 34 is accomplished by reason of the fact that the change of inclination of the channel guide 42 from one side to the other causes the vertical strokes of the connecting rod 26, to which the take-up means 28 of Fig. 3, so that the raising and lowering movements of the feed dog 34 by the cam 36 are reversed with respect to the ends of the feed stroke of the feed dog.

The length of stroke of the feed dog 34 to vary the length of stitch in either direction is varied merely by changing the inclination of the guide channel 42 in the respective direction, having reference to the effective longitudinal axis of the connecting rod 26 which is represented in Fig. 12 by the center line 58.

Other means of shifting the position of the guide pin 46 for the roller 40 may be employed, for example, by otherwise fixedly securing the pin 46 to the connecting rod 26 in the relative position described, such as by welding, or by casting a new rod 26 with the aperture 52 properly located for threadedly or otherwise receiving the pin 46. In practice, the amount of shift of the guide pin 46 is so small that a new seat therefore cannot be drilled in the connecting rod 26 at the sides of the aperture 52.

Various other modifications of the generic invention herein disclosed will become apparent to those skilled in the art and it is intended to cover all such variations as fall within the scope of the appended claims.

We claim as our invention:

1. Attachment mechanism for a sewing machine to provide for stitch reversal, comprising in combination: an adapter including a centering guide pin adapted to receive a guide roller and having an offset shank adapted to be fixedly mounted in an aperture in a feed fork connection of the sewing machine; a rocking channel guide adapted to be tipped to positions on opposite sides of a neutral position and to receive said guide pin and a guide roller carried thereby; a pivoting shaft rigidly secured to said channel guide and adapted to be rotatably mounted in and to project through the sewing machine head; and an actuating arm adapted to be fixedly secured to a projecting portion of said shaft for tilting said guide by way of said shaft.

2. Sewing machine mechanism, comprising in combination: an adapter including a guide pin and an offset shank connected to said pin and adapted to mount said pin in a position eccentric to said shank; guide means supported by said guide pin; a rotatable straight wall channel guide adapted to receive said guide means and rotatable to opposite sides of a neutral position; a stem rigidly secured to said channel guide and adapted to mount the latter rotatably in a support with an end of the stem projecting beyond its support; and a lever having one end connected with said link and adapted to rotate said stem and said channel guide for guiding said means laterally through said neutral position and in opposite directions with respect to said neutral position.

3. A combination according to claim 2 wherein said means for rotating said stem comprises: an arm fixed upon said arm; and a lever having one end connected with said link and adapted to adjust said link and arm.

4. A combination according to claim 2 wherein said means for rotating said stem comprises: an arm fixed upon said stem; a link attached to said arm; and a lever having one end connected with said link and adapted to adjust said link and arm.

5. A combination according to claim 4 wherein said lever and said gauge plate have cooperating means for setting said lever in adjusted position with respect to said gauge plate.

6. A stitch-reversing attachment for sewing machines, comprising in combination: a channel-shaped guide adapted to receive stitch-regulating means to be guided; a stem rigidly secured to said guide for rotatably mounting the latter and adapted to be articulated in a sewing machine head; an arm rigidly secured to said stem for adjustably tilting said guide through rotation of said stem; a link connected with said arm to actuate the latter; a lever having one end connected with said link; a gauge plate; means pivotally mounting said lever with respect to said gauge plate; and adjustable stop means cooperating with said lever and said gauge plate for producing equal adjustments of said guide to opposite sides of a neutral position upon lever movements in opposite directions.

7. A combination according to claim 6 including: means cooperating with said lever for maintaining adjustment of said lever and said guide; and means for mounting said gauge plate upon a sewing machine head adapted to be threaded into a threaded opening originally provided in a sewing machine head adjacent a mounting for said channel guide.

8. A stitch-adjusting attachment for sewing machines, comprising in combination: channel guide means adapted to receive stitch-controlling means to be guided thereby, and including a stem for rotatably mounting the guide means on a sewing machine head; a movable actuating member for said arm and adapted to be actuated from outside said machine head; and a link connecting said actuating member to said arm to actuate the latter and effect rocking of said guide means.

9. An attachment for sewing machines, comprising in combination: an adapter including a guide pin and a shank carrying said pin in a position eccentric to said shank; a guiding regulating means on said pin; channel guide means adapted to be rockably mounted on a sewing machine head and adapted to receive said guiding regulating means to guide the same; an arm connected with said channel guide means for rocking said channel guide means upon its mounting; a link attached to said arm to actuate the latter; and an actuating member adapted to be manipulated by an operator of the sewing machine and attached to said link to transmit movement thereto and said arm for rocking said channel guide means.

10. A stitch-adjusting attachment for sewing machines, comprising in combination: adjustable channel guide means adapted to receive stitch-controlling means to be guided thereby, and including a stem for rotatably mounting
the guide means on a sewing machine head; an arm rigidly connected with said guide means for adjustably rocking said guide means about the axis of said stem; a movable actuating member connected with said arm to actuate the latter and adapted to be actuated from outside said machine head; a mounting member adapted to be mounted upon said machine head and carrying said actuating member; an adjustable device carried by one of said members for control of relative movement between said mounting member and said actuating member; and spaced stop means provided by the other of said members and adapted for engagement with said adjustable device upon relative movement of said movable member through a neutral position between opposite limits providing reverse and forward stitch respectively, said spaced stop means being equidistantly disposed on opposite sides of said neutral position of said movable member to limit movement of such movable member equi-

distantly in opposite directions and provide corresponding movement of said adjustable guide means to produce equal lengths of forward and reverse stitch at a given setting of said adjustable device.

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