

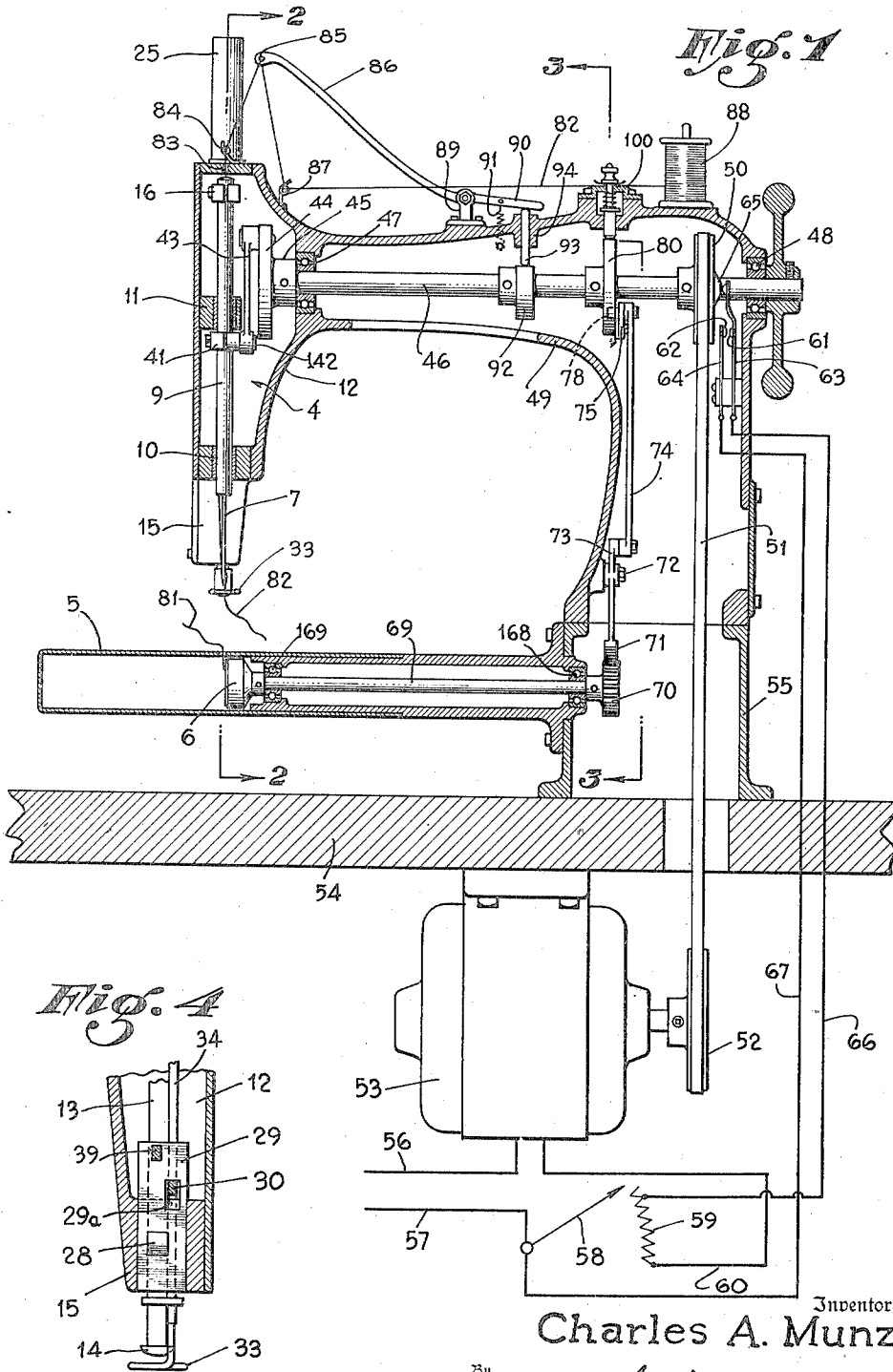
Dec. 20, 1949

C. A. MUNZ
SEWING MACHINE

2,491,685

Filed Dec. 3, 1945

5 Sheets-Sheet 1



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2,491,685

SEWING MACHINE

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Fig. 2

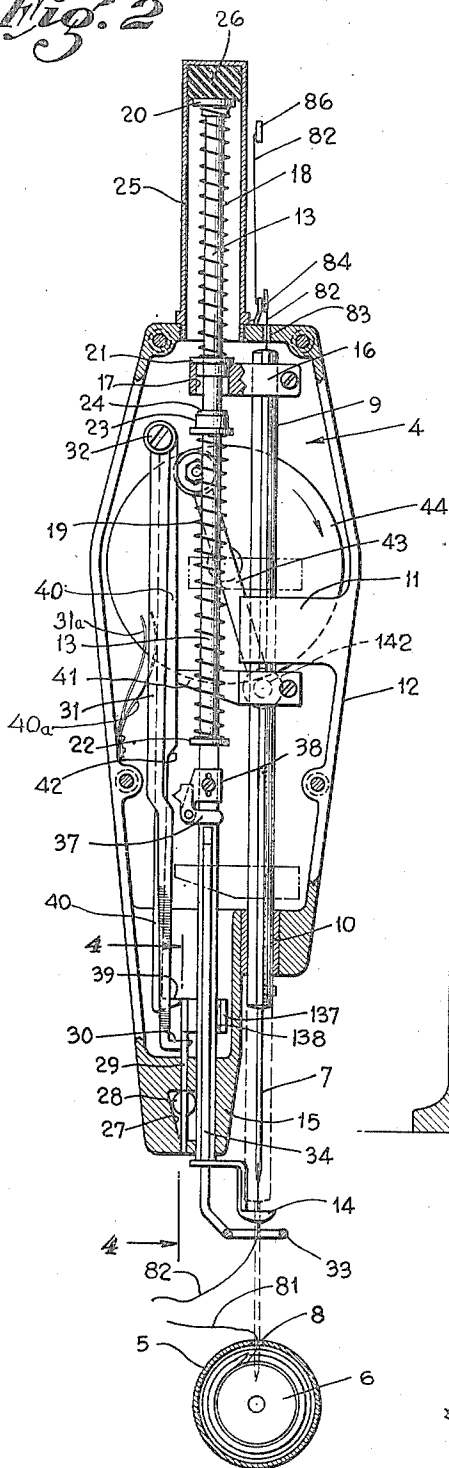
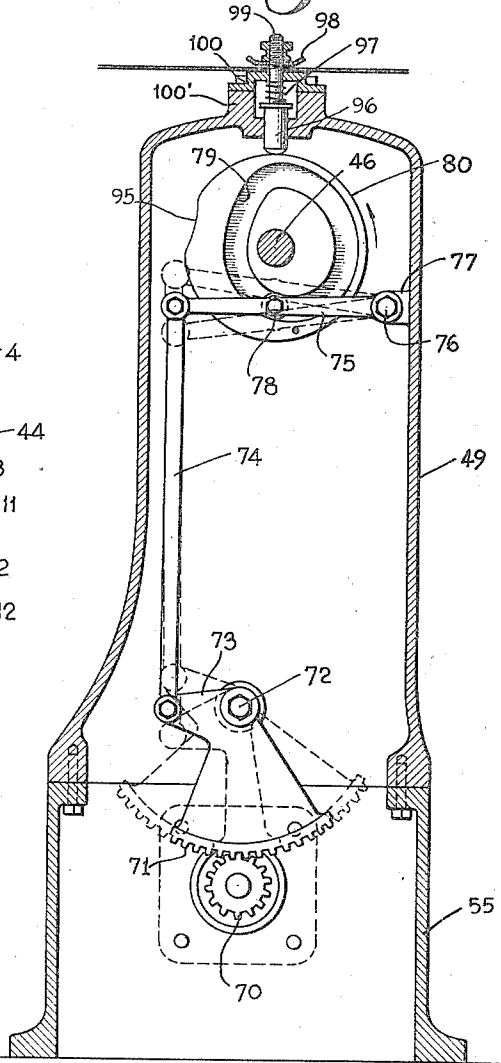


Fig. 3



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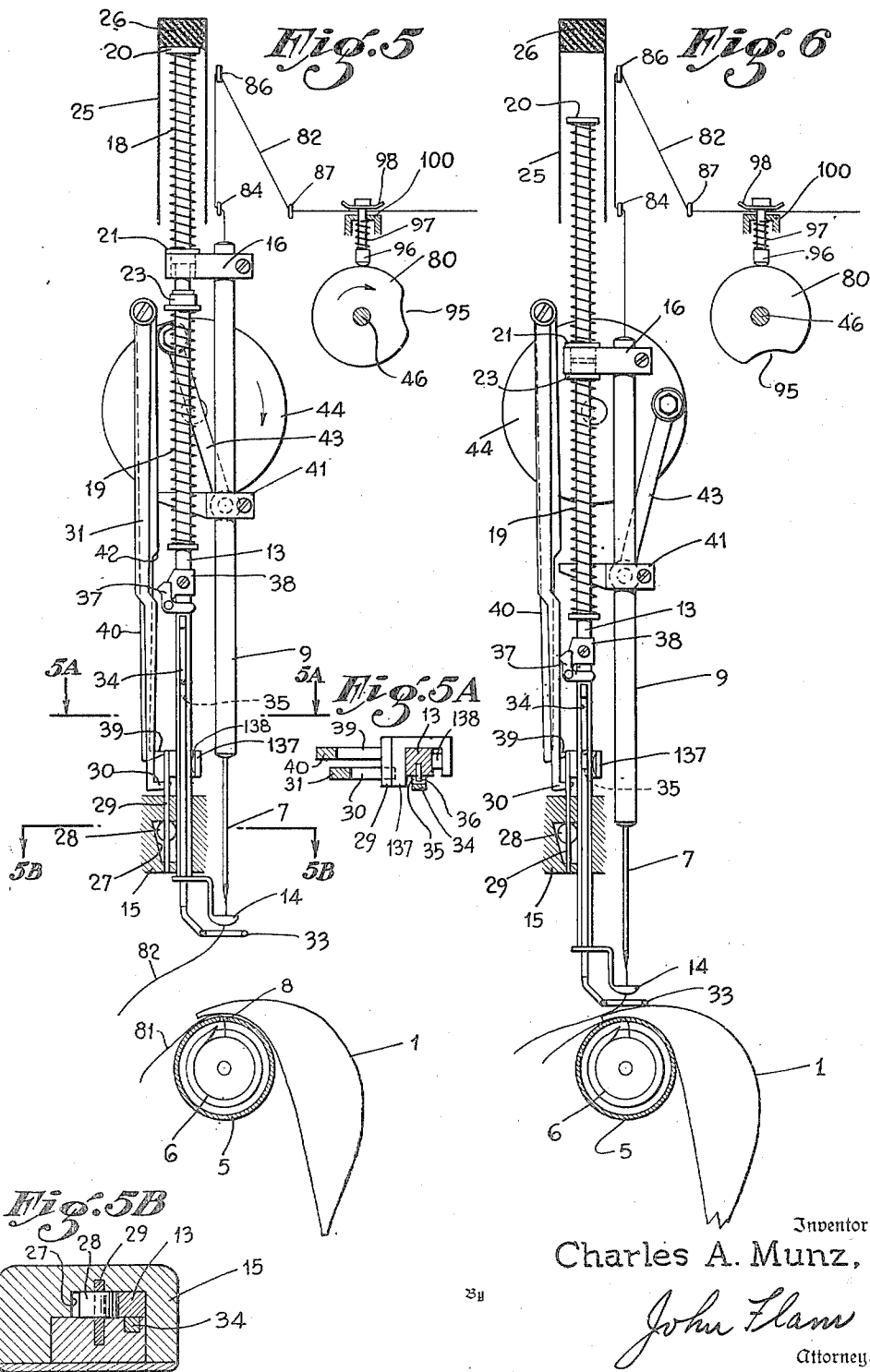
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C. A. MUNZ
SEWING MACHINE

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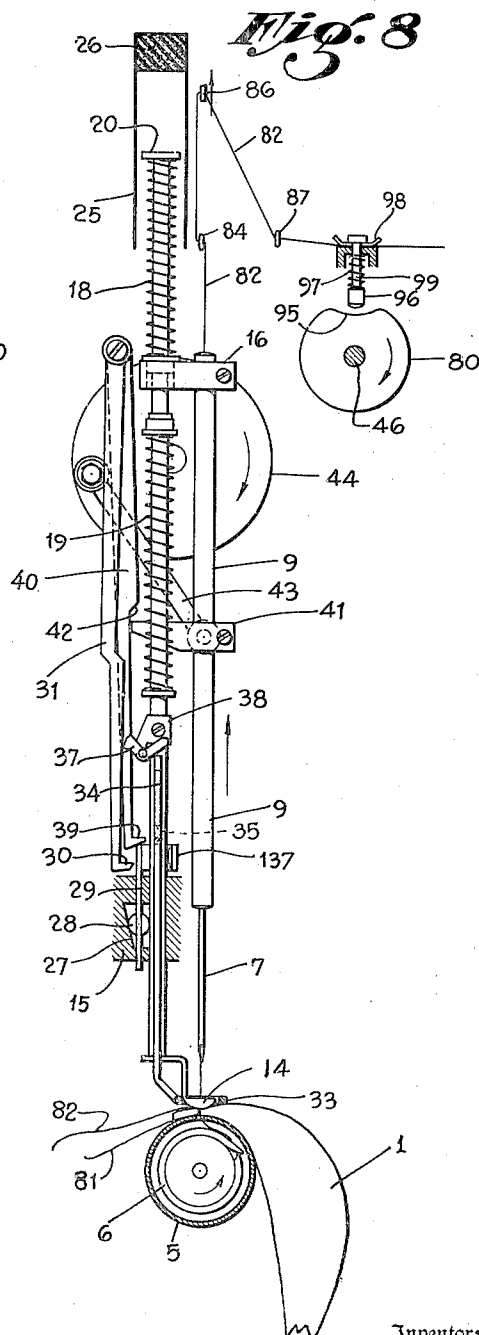
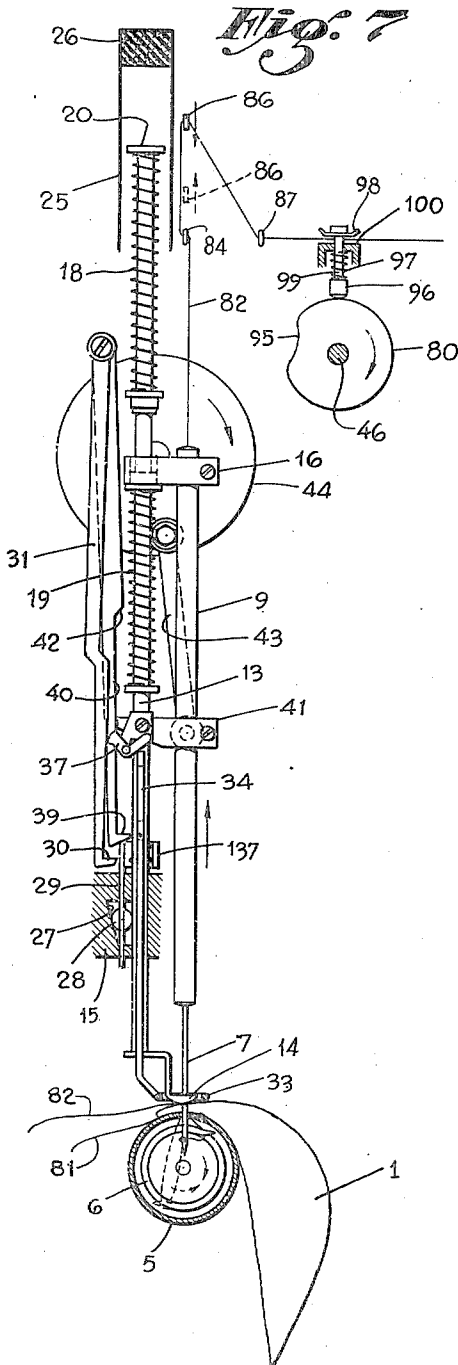
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5 Sheets-Sheet 4



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2,491,685

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Fig. 9

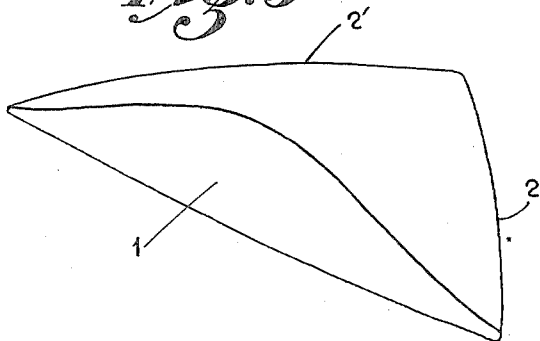


Fig. 10

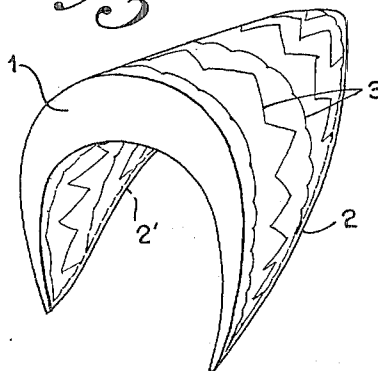


Fig. 11

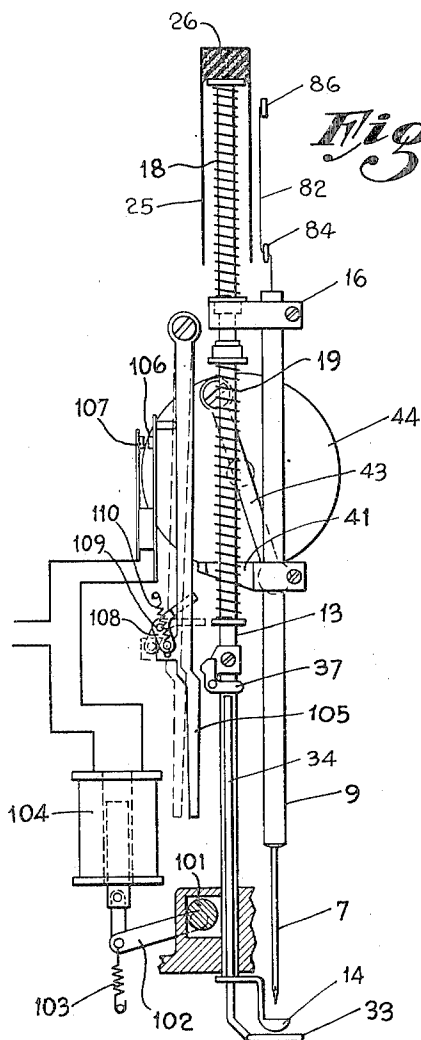
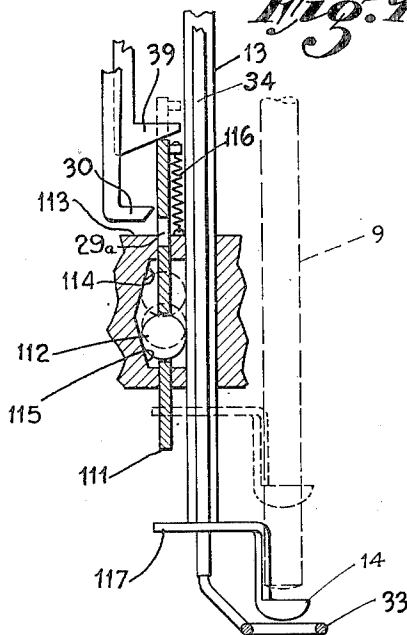


Fig. 12



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UNITED STATES PATENT OFFICE

2,491,685

SEWING MACHINE

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Application December 3, 1945, Serial No. 632,371

32 Claims. (Cl. 112—237)

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This invention relates to a sewing machine.

It is now common to anchor padding between fabric members by sewing through the padding. Quilted material, using relatively thin padding, is made in this manner.

When a sewing machine is used for performing the stitching through the layers of material, the presser foot serves to compress the padding while the sewing progresses. In many cases, such a compression is not harmful, but in other cases, it is highly desirable not to reduce the free thickness of the material substantially. For example, in the hand sewing of shoulder pads the operator must be careful to leave the cotton padding relatively free of pressure. This is required when heavy padding is used, and if the padding be considerably compressed at the seams, bulges of relatively unpredictable form would occur between the lines of stitching.

Such compression at the line of stitching cannot be avoided when conventional sewing machines are used. This is due to the provision of a spring that exerts a pressure on the presser foot.

It is one of the objects of this invention to avoid the application of an undesired pressure on the presser foot as padded materials are operated upon by a sewing machine.

It is another object of this invention to determine automatically the motion of the presser bar in accordance with the thickness of the pad to be sewn.

This result is accomplished by the use of a feeler mechanism that contacts the work, and imposes a limit to the motion of the presser bar. It is accordingly another object of this invention to provide a simple automatic mechanism that stops the descent of the presser bar substantially at the time the presser foot engages the work.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of several embodiments of the invention. For this purpose there are shown a few forms in the drawings accompanying and forming part of the present specification. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a longitudinal sectional view of a

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sewing machine incorporating the invention;

Fig. 2 is an enlarged sectional view, taken along the plane indicated by line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view, taken along the plane indicated by line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view, taken along the plane 4—4 of Fig. 2;

Figs. 5, 6, 7, and 8 are views generally similar to Fig. 2, some of the parts being omitted to illustrate different points in a stitch forming cycle;

Figs. 5A and 5B are fragmentary sections, taken respectively along the planes indicated by lines 5A—5A and 5B—5B of Fig. 5;

Fig. 9 is a pictorial view of a shoulder pad prior to the operation of sewing;

Fig. 10 is a pictorial view of the shoulder pad showing the completed device;

Fig. 11 is a view, similar to Fig. 2, of a modified form of the invention; and

Fig. 12 is a fragmentary sectional view showing a further modified form of the invention.

The sewing machine is intended to stitch through padded material. As an example of such padded material (Figs. 9 and 10) a shoulder pad is illustrated. This shoulder pad usually comprises a wedge-shaped cotton filling disposed between upper and lower layers of fabric that are joined together along the narrow edges 2, 2' of the wedge.

In the process of sewing, the stitches, such as 3, indicated in Fig. 10, are formed by passing a sewing machine needle through the padding. The shoulder pad is so sewn that it assumes an arcuate configuration adapted to fit on the shoulder of the wearer. The pad is cut to size prior to stitching, and then is covered by the fabric.

It is important, in such shoulder pads, that the stitches 3 do not compress the padding, but serve only to anchor the padding in place.

The sewing machine by the aid of which these stitches 3 may be formed includes a head 4 (Figs. 1 and 2).

There is a work support 5 of hollow cylindrical configuration, accommodating the shuttle structure 6. The cylindrical outer surface of the support 5 serves as a convenient guide over which the pad 1 may be moved by hand between the period of forming of the stitches. This movement occurs, of course, when the needle 7 is raised above the support 5, as shown, for example, in Fig. 2. The support 5 is also provided with the aperture 8 through which the needle can pass into the shuttle structure 6.

The needle 7 is supported in a reciprocated

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needle bar 9. This bar, in turn, is appropriately guided in a sleeve 10 and a boss 11 appropriately supported in the hollow head frame 12. Within the frame 12 there is also a reciprocally guided presser bar 13 that carries at its lower extremity a conventional type of presser foot 14. This presser foot is appropriately provided with an opening, or slot, or the like, through which the needle 7 may pass.

Thus, the presser bar 13 is shown as guided near its lower end in the boss 15 formed at the lower part of the frame 12.

The presser bar 13 is resiliently urged downwardly toward the work or upwardly away from the work in accordance with the movement of the needle bar 9. For this purpose, the needle bar is resiliently coupled to the presser bar 13, as by the aid of a structure now to be described.

Thus, at its upper end, the needle bar 9 carries an arm 16. This arm 16 has a clearance aperture 17 (Fig. 2) through which the presser bar may pass.

Compression springs 18 and 19 surround the presser bar 13 and are located respectively above and below the arm 16. The upper end of spring 18 abuts a stop collar 20, fastened to bar 13. Its lower end abuts a collar 21 slidable in bar 13. A portion of this collar is reduced to fit within the aperture 17.

Accordingly, when the needle bar 9 moves upwardly, the upper surface of arm 16 engages the collar 21 and exerts a force of compression on the spring 18. This force serves resiliently to urge the presser bar 13 upwardly.

The lower compression spring 19 abuts a stop collar 22 fastened to the presser bar 13. Its upper end abuts a collar 23 slidable on bar 13. A portion of this collar is reduced to fit upwardly into aperture 17. An intermediate stop 24 is disposed between the two collars 21 and 23. This stop collar limits downward movement of collar 21, and upward movement of collar 23. When the needle bar 9 moves upwardly, it serves to lift collar 21 from the stop 24, as indicated in Fig. 2. On the other hand, when the needle bar is moving downwardly, as indicated in Figs. 6 and 7, it urges collar 23 downwardly and a force of compression is exerted upon spring 19 to provide a resilient force urging the presser bar 13 downwardly. In this phase of operation the upper collar 21, as indicated in Figs. 6 and 7, is in contact with the stop 24.

Means may be provided to form a resilient bumper or stop to limit upward movement of the presser bar 13. Thus, as shown most clearly in Figs. 1 and 2, a hollow cylindrical housing 25 is attached to the top of the head 12 into which the top of the presser bar 13 may extend. Accommodated in the upper end of this housing 25 is a resilient bumper 26 against which the collar 21 may abut when the presser bar 13 is in its uppermost position, as indicated in Figs. 2 and 5.

The reciprocation of the needle bar 9 thus cause exertion of a resilient force on the presser bar 13. However, a definite limit is imposed to the movement of the presser bar 13 toward the work.

In the operation of the mechanism, the operator places the pad over the support 5 and underneath the needle 7, which is in raised position. While holding the pad in appropriate position, the mechanism for driving the needle bar 9 is energized in a manner to be hereinafter explained, and the needle bar is urged downwardly. As soon as the presser foot 14 touches the work,

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further movement of the presser bar 13 is arrested. In this way, although the thickness of the padding beneath needle 7 may vary, the foot 14 always comes to rest just as the top surface of the work is reached by the foot.

For this purpose, use is made of a clutch or detent for gripping bar 13, as shown to best advantage in Figs. 2 and 4.

In the boss 15 a recess 27 is formed. The left hand side of presser bar 13, as viewed in Fig. 2 is located at the open side of the recess 27. The presser bar, as shown most clearly in Figs. 5A and 5B, is of rectangular cross section so that a flat face is presented to the recess 27. The wall of the recess opposite the bar 13 slopes downwardly toward the presser bar. Located within the recess is a rolling element, such as roller 28. When the roller 28 is in its uppermost position, as illustrated in Figs. 2, 4, 5, and 6, it does not restrain downward movement of the bar 13. However, if it is permitted to move in the converging recess 27 in a downward direction, it will wedge against the bar 13 to arrest movement thereof. The control of this rolling element 28 is effected by a mechanism now to be described.

The rolling element 28 is accommodated in a slot formed in a plate 29, and which may be aptly termed a cage. This cage 29 is mounted for sliding movement in the boss 15. When it is held in its uppermost position of Fig. 2, the rolling element 28 is inactive. However, when the cage 29 is moved downwardly, as viewed in Figs. 7 and 8, it carries with it the rolling element 28 which wedges against the left hand wall of recess 27 and the flat side of bar 13.

Prior to approach of the presser foot 14 to the work, the cage 29 is retained in its upper position by a latch 30 supported on a bar 31. This bar 31 is pivoted as by a pivot screw 32 on a stationary axis and appropriately supported by head 4.

As shown most clearly in Fig. 4, the latch 30 engages the upper side of a slot 29—a formed in the cage 29.

In order to release the latch 30 and to permit movement of the cage 29 to active position (see Figs. 7 and 8), use is made of a feeler 33. This feeler is disposed immediately beneath the presser foot 14 and may be formed as a circular loop at the bottom of a rectangular feeler bar 34. This bar is in contact with one of the faces of the presser bar 13, as shown most clearly in Figs. 5A and 5B. It has limited lost motion with respect to the bar 13. For this purpose the bar 34, at its side adjacent the bar 13, is slotted as indicated by reference character 35 in Figs. 5 and 5A. The presser bar 13 is provided with a pin 36 which is accommodated in the slot 35.

Fig. 6 illustrates an intermediate position of the mechanism during the downward motion of needle 7, which is still free of pad 1. As soon as feeler 33 contacts the pad 1, there is relative motion between bars 34 and 13.

Dog 37 is pivotally mounted on a support 38 mounted on presser bar 13. This dog becomes active upon contact of feeler 33 with the work (Figs. 7 and 8) as the presser bar 13 continues its downward motion. Then dog 37 engages the inner surface of the latch bar 31 and presses it outwardly from the cage 29, against a resilient force that may be provided in any convenient manner, as, for example, by a leaf spring 31—a attached at one end to the head 12, the other end engaging the arm 31. The presser bar 13 serves, by the aid of friction, to move the cage 29 downwardly along

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with it. For this purpose, the cage 29 is carried by a U-shaped support 137 (Figs. 2, 5 and 5A.) This support is slidable on the bar 13. A bow spring 138 is interposed between the support 137 and the right-hand face of the bar 13 to provide the frictional force.

The cage 29 and its support 137 continue their downward movement after release of latch 30 until the rolling element 28 wedges in the recess 27, arresting the movement of the bar 13. The relative motion required to cause latch 30 to disengage and element 28 to operate, is equal to that required to bring foot 14 to approximately the same level as feeler 33. The pad is then only slightly compressed by the presser foot. The needle 7 penetrates the work after the presser foot 14 has been arrested. This is accomplished by suitable mechanism synchronizing the motion of the needle bar 9 with the remainder of the mechanism. The lowermost position of needle 7 is illustrated in Fig. 7. The presser foot 14 remains in contact with the pad until after the needle 7 is completely withdrawn (Fig. 8). In Fig. 8 the needle bar 9 is shown as approximately midway of its position in its movement upward away from the work. In this position the arm 16 is compressing the spring 18, but, since the detent 28 operated by cage 29 is still in active position, the presser bar 13 stays in its depressed position. Retention of the cage 29 in the lowermost position is accomplished by the aid of a catch 39. This catch engages the top of the cage 29 when the cage 29 is moved toward the lowermost position of Fig. 7.

For this purpose, catch 39 is mounted on an arm 40 conveniently pivoted in this instance on the same pivot 32 as the latch arm 31. While the latch 30 is holding the cage 29 in inactive position, the catch 39, as viewed in Figs. 2 and 5, is held from engagement with the top of the cage 29 by the left-hand surface of the cage. When the dog 37 releases the latch 30, the support 137 is moved downwardly by friction and catch 39 engages the top of the cage 29. Catch 39 may be conveniently urged to the active position by any convenient resilient means, as, for example, by a leaf spring 40—a attached at one end to the head 12, the other end engaging the arm 40.

This engagement, maintaining the detent in position, is effective until the needle 7 has moved away from the work. In order to release the catch 39 and to permit the presser bar 13 to rise under the influence of the spring 19 to the position of Fig. 5, use is made of an arm 41 carried by the needle bar 9. This arm 41 has its left-hand extremity extended so that it can engage the sloping surface 42 of the arm 40. Further upward movement of the arm 41 moves the arm 40 toward the left, freeing the catch 39. Thereafter the frictional engagement between the support 137 and the presser bar 13 causes upward movement of cage 29, freeing the detent, and the mechanism returns to the position of Figs. 2 and 5.

Although the feeler 33, in the inactive position shown in Figs. 2 and 5, is slightly below the presser foot 14, the lost motion between the feeler bar 34 and the presser bar 13 causes the feeler 33 and the presser foot 14 to be substantially at the same level during that phase of the operation when needle 7 engages with the pad 3.

The mechanism for driving the needle bar 9 may be best explained in connection with Fig. 1. In this figure the arm 41 is shown as carrying a pin 142 to which a connecting rod 43 is pivoted. This connecting rod is pivoted at its other extremity to a crank 44. This crank 44 is in the

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form of a disc having a hub 45 attached to a rotary shaft 46. This shaft 46 is mounted in suitable bearings, such as the ball bearing structures 47 and 48, appropriately supported in frame 49 of the machine. Adjacent the right-hand extremity of the shaft 46 is a pulley 50 connected as by a belt 51 to the pulley 52 of an electric motor 53. This electric motor is mounted on the lower side of a table 54. On the upper surface of this table 54 is mounted the base 55 which supports the frame 49. Both the base 55 and the frame 49 are hollow to accommodate the power transmission elements, including the belt 51.

In the present instance individual stitches are intended to be taken in succession, the machine operating merely to complete one stitch, after which the motor 53 is automatically de-energized. When this occurs the operator may re-energize the motor and the machine will proceed through another stitching cycle. At the option of the operator, continuous energization of the motor may be affected, the cycles then automatically succeeding each other.

Thus, the motor 53 is shown as connected to a main 56. The other main 57 is connected to a foot-operated switch arm 58. This arm 58, when the pedal is not depressed, is out of contact with a variable resistance 59. When, however, the pedal is depressed, arm 58 contacts the resistance 59 and the motor circuit is completed through conductor 60.

The arrangement is such that even if the pedal be released the motor will continue to be energized for a complete cycle. To effect this result, contacts 61 and 62 (Fig. 1) are mounted inside of the frame 49 on the resilient arms 63 and 64. When the needle 7 is in its uppermost inactive position, contacts 61 and 62 are held out of engagement by a crown cam 65 mounted on the face of pulley 50. This cam 65 contacts the upper end of the arm 63, flexing it toward the right and separating contact 61 from contact 62. However, as soon as the motor 53 is energized by the aid of the arm 58, the pulley 50 moves away from the position of Fig. 1, contacts 61 and 62 are engaged, and the motor circuit is completed through main 56, motor 53, resistance 59, connection 66, contacts 61 and 62, connection 67, to main 57. As soon as the mechanism reaches the position of Fig. 1 upon completion of one revolution of shaft 46, cam 65 again causes disengagement of contacts 61 and 62 and the mechanism comes to rest. The mechanism can again be actuated by operating the pedal-operated arm 58.

The shuttle 6 is shown as angularly oscillated by a mechanism connected to the shaft 46 and in proper synchronism with the motion of the needle bar 9. Thus, the shuttle 6 is shown as mounted on a shaft 69 (Fig. 1). This shaft 69 is rotatably supported by the aid of ball bearing structures 168 and 169 within the hollow support 5.

The right-hand end of the shaft 69 carries the pinion 70 which is located in the hollow base 55. This pinion 70 is in mesh with the oscillating segment 71 pivoted on a pivot bolt 72 supported on frame 49. The segment 71 is formed with an integral arm 73 that is connected by a link 74 with another arm 75. As shown most clearly in Fig. 3, this arm 75 is pivoted for oscillation about the axis of a pivot 76 mounted on a boss 77 of frame 49.

Oscillation of arm 75 is accomplished by engagement of the pin 78 carried by the arm 75 in a cam groove 79. This cam groove 79 is located

in the face of a cam disc 80 mounted on shaft 46. Rise and fall of the arm 75, due to action of the pin 78 in groove 79, is such that the shuttle 6 is appropriately moved to carry the thread 81 to proper cooperative position with the thread 82 carried by the needle 7.

The thread 82 is guided, as shown most clearly in Figs. 1 and 2, through an aperture 83 in the upper wall of head 4. Thence it passes through a stationary loop 84 and through the eye 85 of a tensioning arm 86. Thence it is looped through an eye 87 and extends to the supply spool 88.

The tensioning arm 86 is pivoted on a standard 89 mounted on the frame 49. It has an extension 90. To this extension there is connected a tension spring 91 urging the tensioner 86 to tensioning position, pulling thread 82 upwardly of head 4.

The tensioning arm is so arranged that it pulls upwardly on the thread 82 at the completion of the stitching operation. For causing arm 86 to be pulled upwardly a cam 92 is provided on the shaft 46 which operates a cam follower 93. This cam follower is guided in the boss 94 of frame 49. Its upper end abuts the arm 90. While the needle bar 9 moves downwardly to form the stitch, the cam 92 lifts the arm 90 so as to release the tension on the thread 82. After the stitch has been formed and the needle 7 moves upwardly, the cam 92 permits the cam follower 93 to drop and the tensioner 86 reaches the position of Fig. 1.

In order that the tensioner 86 be effective, it is necessary to restrain the thread 82 adjacent the supply spool 88, while the arm 86 moves upwardly. For this purpose the disc 89, as shown most clearly in Figs. 3, 6, 7, and 8, is provided with a cam portion 95 that cooperates with a cam follower 96. Cam follower 96 is urged, as by the compression spring 97, against the periphery of disc 89.

While the stitch is being formed, the cam follower 96 is raised to the position illustrated in Fig. 7. However, when the stitch is completed, the cam 95 permits the follower 96 to drop down to the position illustrated in Fig. 8. In this position, the thread 82 is clamped against the upper surface of a cover plate 100 by the disc 98, slidable on the shank 99 of the cam follower 96. Plate 100 is appropriately attached to the upper surface of boss 100' in which spring 97 is accommodated.

A recapitulation of the operation of the mechanism may now be set forth. While the needle bar 9 is in the uppermost position of Figs. 1, 2, and 5, the motor 53 is de-energized by separation of contacts 61 and 62. The operator places the pad over the cylindrical support 5 in the position in which she desires the stitch to be made. Then she depresses the foot pedal, causing energization of motor 53. The motor 53 rotates shaft 46 through one revolution and, unless the pedal is left depressed, the mechanism is then stopped.

Prior to the rotation of shaft 46, compression spring 18 urges the presser bar 13 upwardly and it is in its uppermost position of Figs. 2 and 5. As the crank disc 44 rotates, it causes downward movement of needle bar 9, the presser bar 13 is correspondingly urged downwardly by spring 19. An intermediate position of this downward movement of needle bar 9 is shown in Fig. 6. In this position the arm 41 is just about to disengage from collar 21 and is just in engagement with collar 28. The presser bar 13 is being urged to move downwardly by pressure exerted by spring 19. Presser bar 13 continues to move downwardly and carries with it the feeler bar 34.

The feeler 33 ultimately contacts the upper

surface of pad 1. This position is illustrated in Fig. 7. The movement of feeler bar 34 is thus arrested. The presser bar 13 proceeds downwardly to the position of Fig. 7, which represents the lowermost position of needle bar 9. The needle has now penetrated the pad 1. Presser bar 13 may yet continue its downward motion. At this time, the dog 37 disengages latch 30 and the cage 29 moves downwardly with bar 34 to arrest further downward movement of the presser bar 13. Catch 39 engages above the cage 29 to keep the detent mechanism in active position.

Movement of the needle bar 9 upwardly to the position of Fig. 8, corresponding to the second half-revolution of shaft 46, causes the arm 41 to move catch 39 out of the way of cage 29. Accordingly, the force acting through spring 18 raises the presser bar 13 and rolls the rolling element 28 back to the position of Fig. 5. This is assisted by lifting of the cage 29 by friction between the body 137 and the presser bar 13. The thread 82 is tensioned at the mid-point of the upward travel of the needle bar 9, as illustrated in Fig. 8, and before the presser bar 13 is released.

After the mechanism comes to rest, the pad 1 may be moved to a new position and the process repeated.

In the form illustrated in Fig. 11, the needle bar 9 and the presser bar 13 operate as heretofore set forth. The detent in this case is electromagnetically operated.

Thus, an eccentric 101 is shown as rotatable so as to engage against the left-hand surface of the presser bar 13 when an arm 102 is pulled upwardly. Normally, this arm is pulled downwardly in releasing position by a tension spring 103. It may, however, be pulled upwardly by the aid of an electromagnet 104. The circuit for this electromagnet is completed when feeler 33 engages the pad and dog 37 is rocked to move the arm 105, which corresponds to arm 31 of Fig. 2. This arm 105 moves toward the left to cause engagement of contacts 106 and 107, thus completing the circuit for the electromagnet 104. The presser bar 37 remains in the restrained position until electromagnet 104 is de-energized.

Upward movement of the needle bar 9 ultimately causes de-energization of the electromagnet 104 by opening of contacts 106 and 107. For this purpose use is made of a lever 108 which is pivoted at a stationary pivot 109. This lever is connected by a slot and pin connection with the arm 105. When the arm 105 moves toward the left to close the contacts, the lever 108 assumes the dotted line position and is held in that position by the over-center tension spring 110. The right-hand arm of lever 108 is thus placed in the path of the arm 41 carried by the needle bar 9. Accordingly, as the needle bar 9 moves upwardly, the arm 41 engages the right-hand arm of lever 108 and causes it to assume the full line position of Fig. 11. The spring 110 snaps over-center and the arm 105 is returned to the inactive position. During downward motion of bar 9, lever 108 is held out of the way of arm 41.

In the forms thus far described, the presser bar 13 moves upwardly until it is stopped by bumper 26. In the form of Fig. 12 the presser bar is permitted to move only slightly above its lowermost active position, and it is stopped by a detent similar to the detent that arrests its downward movement.

Thus, in this connection, a cage 111 is provided which operates the rolling element 112. Guiding

boss 113 of the mechanism now has a recess with sides 114 and 115 forming a converging space at the upper end of the recess, as well as a converging space at the lower end of the recess. Accordingly, when the cage 111 is moved upwardly by a sufficient distance, it will arrest further upward movement of the presser bar 13.

In a position shown in Fig. 12 the cage 111 is depressed. The latch 30 is out of engagement with the cage 111. A tension spring 116 urges the cage to a position restraining downward movement of the bar 13. A catch 39 prevents upward movement of the cage 111.

As the needle bar moves upwardly, the catch 39 is disengaged as before, and the resilient force acting through spring 19 and the presser bar 13 rolls the element 112 upwardly into wedging position and against the tension of spring 116. The cage, however, is also positively moved by the extension 117 carried by the presser foot. The presser bar 13 comes to rest when the rolling element 112 reaches the uppermost dotted line position, where latch 30 again engages slot 29—a.

In other respects this form of the invention operates as described in connection with Figs. 1 to 8 inclusive.

The inventor claims:

1. In a sewing machine head: a movable presser bar having a foot adapted to engage work to be sewed; a feeler movable along with the bar and adapted to contact the work; and mechanism operated in response to contact of the feeler with the work for stopping the motion of the bar.

2. In a sewing machine head: a movable presser bar having a foot adapted to engage work to be sewed; a movable needle bar means operatively associated with the presser bar and operable in response to descent of the presser bar for limiting the descent of the presser bar toward the work; and means responsive to movement of the needle bar away from the work for freeing the presser bar to permit its movement away from the work.

3. In a sewing machine head: a movable presser bar having a foot adapted to engage work to be sewed; a feeler movable along with the bar and adapted to contact the work; mechanism operated in response to contact of the feeler with the work for stopping the motion of the bar; a needle bar; and means responsive to movement of the needle bar away from the work for freeing the presser bar.

4. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a movable presser bar having a pressed foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; a detent operating to arrest the motion of the presser bar, said detent including a rolling element and means forming with the presser bar a converging space whereby the rolling element, when free, may wedge in the space upon motion of the presser bar toward the work; means for optionally permitting the rolling element to hold the pressed bar or for moving the rolling element out of wedging relation; a feeler carried by the presser bar and adapted to contact the work; and means responsive to such contact for causing the rolling element to move to wedging relation.

5. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a movable presser bar having a presser foot for engaging the work; resilient means for urging

the presser bar in the direction of motion of the needle bar; a detent operating to arrest the motion of the presser bar, said detent including a rolling element and means forming with the presser bar a converging space whereby the rolling element, when free, may wedge in the space upon motion of the presser bar toward the work; means for optionally permitting the rolling element to hold the presser bar or for moving the rolling element out of wedging relation; a feeler carried by the presser bar and adapted to contact the work; means responsive to such contact for causing the rolling element to move to wedging relation; and means operating in response to movement of the needle bar from the work for causing the rolling element to be moved out of wedging relation.

6. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a movable presser bar having a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; a detent operating to arrest the motion of the presser bar, said detent including a rolling element and means forming with the presser bar a converging space accommodating said element, whereby the rolling element, when free, may wedge in the space upon movement of the presser bar toward the work; a movable cage engaging the rolling element for causing the element to wedge or to release the element; a mounting for the cage, yieldingly sliding on the presser bar; a latch holding the cage in position to keep the rolling element from wedging; a feeler adapted to contact the work when the presser bar moves toward the work; and a dog carried by the presser bar for releasing the latch and operated by relative movement of the feeler and the presser bar after the feeler engages the work.

7. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a movable presser bar having a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; a detent operating to arrest the motion of the presser bar, said detent including a rolling element and means forming with the presser bar a converging space accommodating said element, whereby the rolling element, when free, may wedge in the space upon motion of the presser bar toward the work; a movable cage engaging the rolling element for causing the element to wedge or to release the element; a mounting for the cage, yieldingly sliding on the presser bar; a latch holding the cage in position to keep the rolling element from wedging; a feeler adapted to contact the work when the presser bar moves toward the work; a dog carried by the presser bar for releasing the latch and operated by relative movement of the feeler and the presser bar after the feeler engages the work; catch means operative upon movement of the cage to presser bar holding position for preventing movement of the cage in presser bar releasing position; and a second dog carried by the needle bar and active to release said catch means upon movement of the needle bar in a direction away from the work.

8. In a sewing machine head: a movable presser bar having a presser foot adapted to engage the work; a reciprocable needle bar carrying a needle and thread; means for reciprocating the needle bar; means associated with the bars for resiliently urging the presser bar in the direction of movement of the needle bar upon

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motion of the needle bar in either direction; means operated in synchronism with the needle bar for applying a tension to the thread for tightening a completed stitch; and means also operated in synchronism with the needle bar operating to permit tensioning thereof.

9. In a sewing machine head: a movable presser bar having a presser foot; an electrically operated means for holding when energized, the bar against movement; a feeler adapted to contact the work; and a circuit controlling device operated in response to contact of the feeler with the work for causing energization of said electrically operated means.

10. In a sewing machine head: a movable presser bar having a presser foot; means urging the presser bar toward the work; a feeler carried by the bar and having limited relative motion therewith, said feeler being adapted to contact the work; means for restraining the presser bar against movement; a latch holding said restraining means in inactive position; and a dog carried by the presser bar and operated by relative movement of the presser bar and the feeler for releasing said latch.

11. In a sewing machine head: a movable presser bar having a presser foot; means urging the presser bar toward the work; a feeler carried by the bar and having limited relative motion therewith, said feeler being adapted to contact the work; means for restraining the presser bar against movement; means maintaining said restraining means in inactive position; and a dog carried by the presser bar and operated by relative movement of the presser bar and the feeler for causing said maintaining means to become ineffective.

12. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism having a bar and a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; means forming a space in association with the presser bar such that the space converges at each end of the space with respect to the presser bar; a rolling element capable of wedging toward each convergence of the space to stop motion of the presser bar in the corresponding direction; a cage movable to wedge the element optionally in each direction; means responsive to contact of the presser bar mechanism with the work for causing the cage to move the element in position to restrain motion of the presser bar toward the work; and means responsive to movement of the needle bar in a direction from the work for causing the cage to move out of the said restraining position and into a position restraining movement of the presser bar away from the work.

13. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a movable presser bar having a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; means forming a space in association with the presser bar such that the space converges at each end of the space with respect to the presser bar; a rolling element capable of wedging toward each convergence of the space to stop motion of the presser bar in the corresponding direction; a cage movable to wedge the element optionally in each direction; a feeler carried by the presser bar and adapted to contact the work for causing the cage to move the element in position to restrain motion of the presser bar

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toward the work; and means responsive to movement of the needle bar in a direction from the work for causing the cage to move out of the said restraining position and into a position restraining movement of the presser bar away from the work.

14. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism having a bar and a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; means forming a space in association with the presser bar such that the space converges at each end of the space with respect to the presser bar; a rolling element capable of wedging toward each convergence of the space to stop motion of the presser bar in the corresponding direction; a cage movable to wedge the element optionally in each direction; resilient means urging the cage in a direction to restrain movement of the presser bar toward the work; a latch holding the cage in a position restraining the presser bar against movement away from the work; and means for releasing the latch upon contact of the presser bar mechanism with the work.

15. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism having a bar and a presser foot for engaging the work; resilient means for urging the presser bar in the direction of motion of the needle bar; means forming a space in association with the presser bar such that the space converges at each end of the space with respect to the presser bar; a rolling element capable of wedging toward each convergence of the space to stop motion of the presser bar in the corresponding direction; a cage movable to wedge the element optionally in each direction; resilient means urging the cage in a direction to restrain movement of the presser bar toward the work; a latch holding the cage in a position restraining the presser bar against movement away from the work; means for releasing the latch upon contact of the presser bar mechanism with the work; a catch maintaining said cage in position to restrain movement of the presser bar toward the work and active upon release of said latch; and means operating in response to movement of the needle bar in a direction away from the work for releasing said catch and for moving said cage to latch engaging position.

16. In a sewing machine head: a presser bar mechanism reciprocable along a straight line path, including a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; and means responsive to contact of the presser bar mechanism with the work for imposing a limit upon and stopping further travel of the mechanism.

17. In a sewing machine head: a presser bar mechanism, including a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; means responsive to contact of the presser bar mechanism with the work for imposing a limit upon further travel of the mechanism; a needle bar; and means responsive to movement of the needle bar away from the work for freeing the presser bar.

18. In a sewing machine head: a presser bar mechanism, including a bar and a foot; a reciprocable needle bar; means associated with the two bars to cause a resilient force to be ex-

erted on the presser bar in response to travel of the needle bar toward the work; a detent for imposing a limit upon movement of the presser bar; and means responsive to contact of the presser foot with the work for rendering said detent effective.

19. In a sewing machine head: a presser bar mechanism, including a bar and a foot; a reciprocable needle bar; means associated with the two bars to cause a resilient force to be exerted on the presser bar in response to travel of the needle bar toward the work; a detent for imposing a limit upon movement of the presser bar; means responsive to contact of the presser foot with the work for rendering said detent effective; and means responsive to movement of the needle bar away from the work to release the detent.

20. In a sewing machine head: a presser bar mechanism reciprocable along a straight line path, including a bar and a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; a detent for arresting movement of the presser bar; and means responsive to contact of the presser bar mechanism with the work for causing said detent to impose a limit upon further travel of the mechanism.

21. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism, including a bar and a foot, adapted to engage the work to be sewed; resilient means for urging the presser bar in the direction of movement of the needle bar; means responsive to contact of the presser bar mechanism with the work for imposing a limit upon further travel of the presser bar; and means responsive to movement of the needle bar away from the work for releasing the presser bar.

22. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism, including a bar and a foot, adapted to engage the work to be sewed; resilient means for urging the presser bar in the direction of movement of the needle bar; a detent operating to arrest motion of the presser bar, comprising a rolling element and means cooperating with the presser bar to form a converging space accommodating said element, said element, when free, wedging in said space upon movement of the presser bar toward the work; means for optionally permitting said element to hold the presser bar, or for moving said element out of wedging relation; and means responsive to contact of the presser bar mechanism with the work for causing the rolling element to wedge.

23. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism, including a bar and a foot, adapted to engage the work to be sewed; resilient means for urging the presser bar in the direction of movement of the needle bar; a detent operating to arrest motion of the presser bar, comprising a rolling element and means cooperating with the presser bar to form a converging space accommodating said element, said element, when free, wedging in said space upon movement of the presser bar toward the work; means for optionally permitting said element to hold the presser bar, or for moving said element out of wedging relation; means responsive to contact of the presser bar mechanism with the work for causing the rolling element to wedge; and means operating in response to movement

of the needle bar away from the work for causing the rolling element to be moved out of wedging relation.

24. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism, including a bar and a foot, adapted to engage the work to be sewed; resilient means for urging the presser bar in the direction of movement of the needle bar; a detent operating to arrest motion of the presser bar, comprising a rolling element and means cooperating with the presser bar to form a converging space accommodating said element, said element, when free, wedging in said space upon movement of the presser bar toward the work; a movable cage engaging the rolling element for causing the element to wedge or to release the element; a mounting for the cage, yieldingly slidable on the presser bar; a latch holding the cage in position to keep the rolling element from wedging; and means responsive to contact of the presser bar mechanism with the work for releasing said latch.

25. In a sewing machine head: a reciprocable needle bar; means for reciprocating said bar; a presser bar mechanism, including a bar and a foot, adapted to engage the work to be sewed; resilient means for urging the presser bar in the direction of movement of the needle bar; a detent operating to arrest motion of the presser bar, comprising a rolling element and means cooperating with the presser bar to form a converging space accommodating said element, said element, when free, wedging in said space upon movement of the presser bar toward the work; a movable cage engaging the rolling element for causing the element to wedge or to release the element; a mounting for the cage, yieldingly slidable on the presser bar; a latch holding the cage in position to keep the rolling element from wedging; means responsive to contact of the presser bar mechanism with the work for releasing said latch; and means operating in response to movement of the needle bar from the work for returning the cage to a position where the latch may hold the cage in said position.

26. In a sewing machine head: a presser bar mechanism, including a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; an electrically operated means for holding, when energized, said mechanism against movement; and means responsive to contact of the presser bar mechanism with the work for causing energization of said electrically operated means.

27. In a sewing machine head: a presser bar mechanism, including a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; an electrically operated means for holding, when energized, said mechanism against movement; means responsive to contact of the presser bar mechanism with the work for causing energization of said electrically operated means; a movable needle bar; and means operating in response to movement of the needle bar in a direction away from the work for de-energizing said electrically operated means.

28. In a sewing machine head: a movable presser bar having a foot adapted to engage work to be sewed; a feeler movable with respect to said bar and adapted to contact the work; and mechanism operatively associated with said feeler and operated in response to contact of the feeler with

the work for engaging and stopping motion of the bar.

29. In a sewing machine head: a movable presser bar having a presser foot; an electrically operated means for holding, when energized, the bar against movement; a feeler movable along with the bar and adapted to contact the work; and a circuit controlling device operated in response to contact of the feeler with the work for causing energization of said electrically operated means.

30. In a sewing machine head: a presser bar mechanism, including a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; and means operatively associated with said mechanism and operated by said mechanism upon its contact with the work for engaging said mechanism and locking it against further movement against the work.

31. In a sewing machine head: a presser bar mechanism, including a bar and a foot, and operable to cause the foot to engage the work to be sewed; means urging said mechanism toward work engaging position; a detent for the presser

bar; and means operatively associated with said mechanism and operated by said mechanism upon its contact with the work for engaging said detent with said mechanism to prevent further travel of said mechanism against the work.

32. In a sewing machine head: a movable presser bar having a foot to engage the work to be sewed; a movable needle bar; means actuated by the needle bar to move the presser bar during at least part of the movement of the needle bar; and means engageable with the presser bar to variably limit its descent toward the work independently of the needle bar.

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