March 23, 1943. R. H. BRADWELL 2,314,339

TUFTING MACHINE

Filed May 22, 1940 5 Sheets-Sheet 1

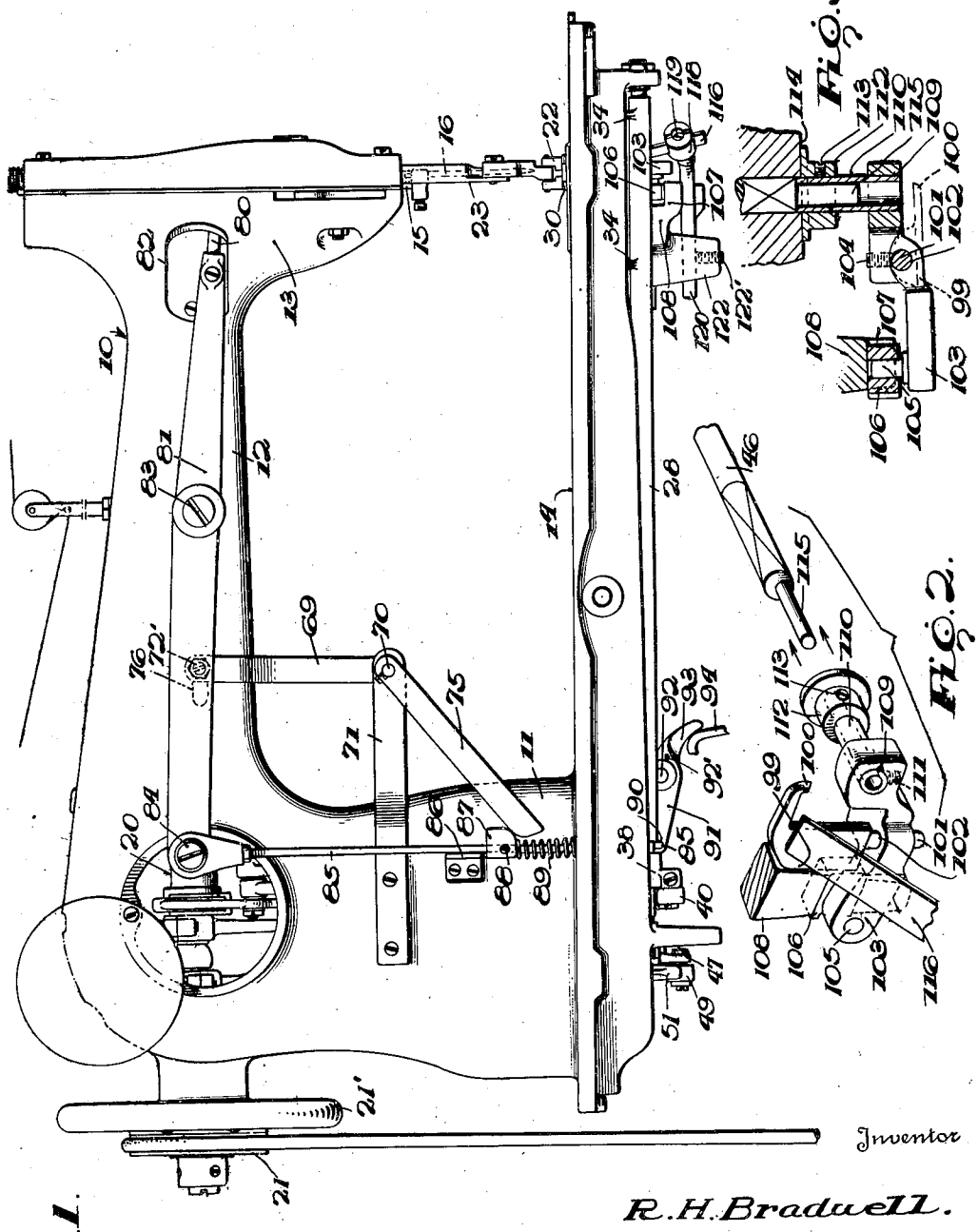


Fig. 1.

Fig. 3.

Fig. 2.

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TUFTING MACHINE

Filed May 22, 1940 5 Sheets-Sheet 2

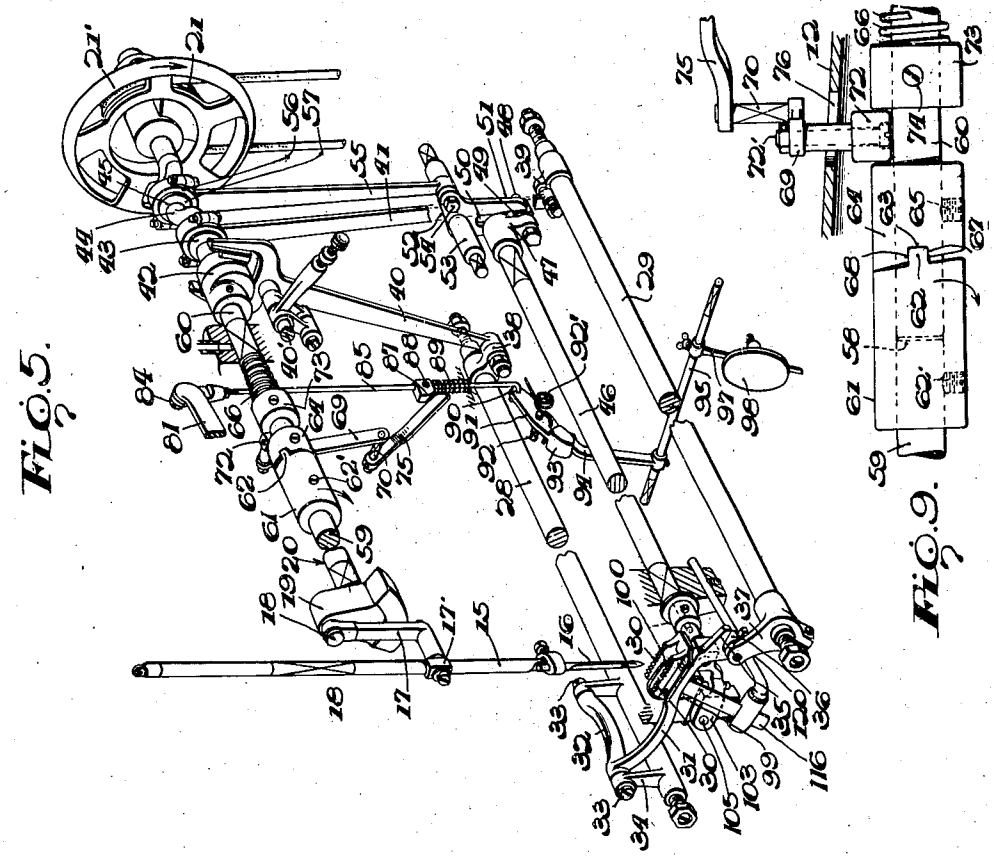


Fig. 5.

Fig. 9.

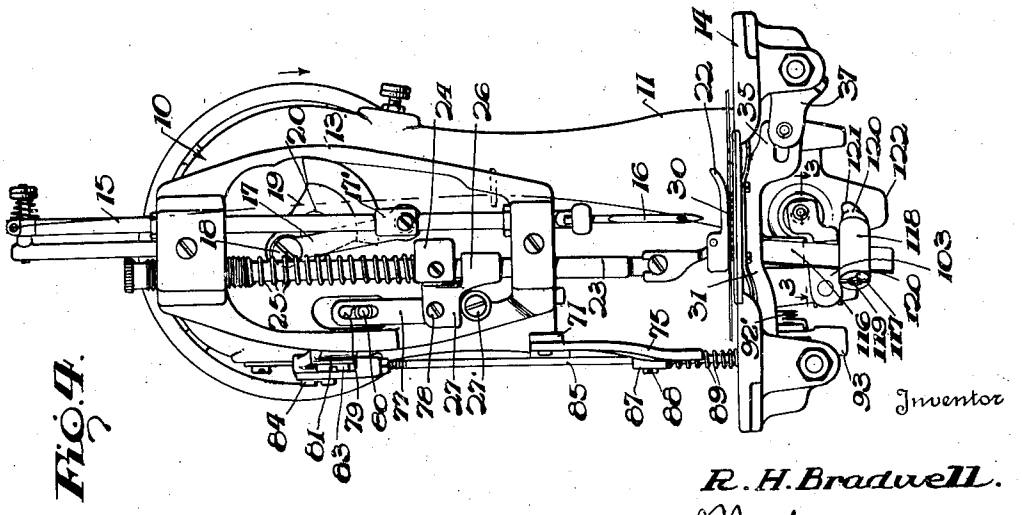


Fig. 4.

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TUFTING MACHINE

Filed May 22, 1940 5 Sheets-Sheet 3

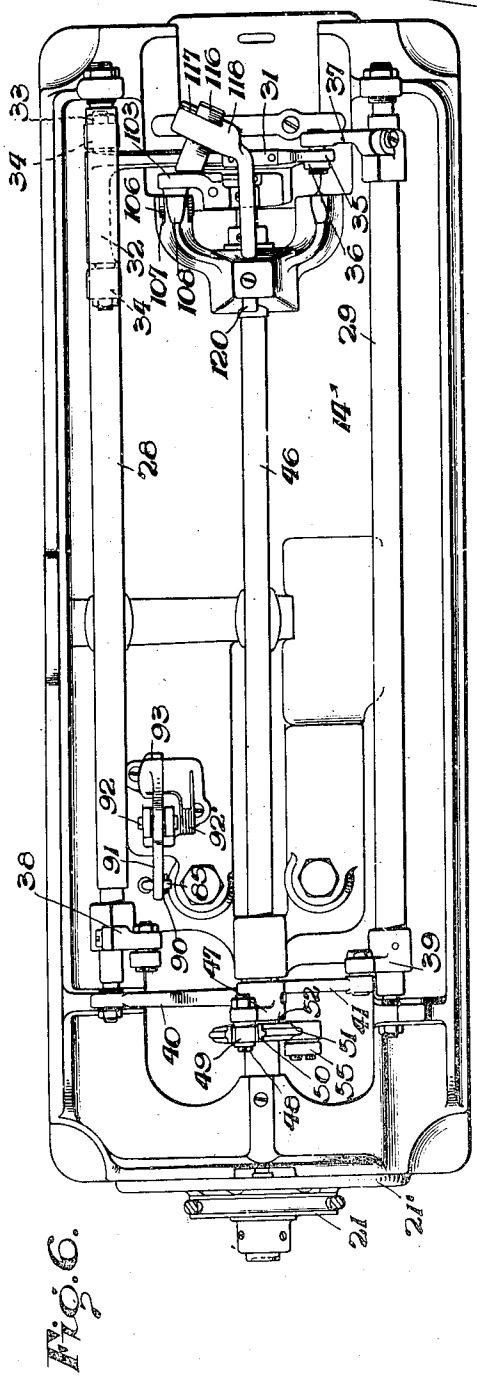


Fig. 6.

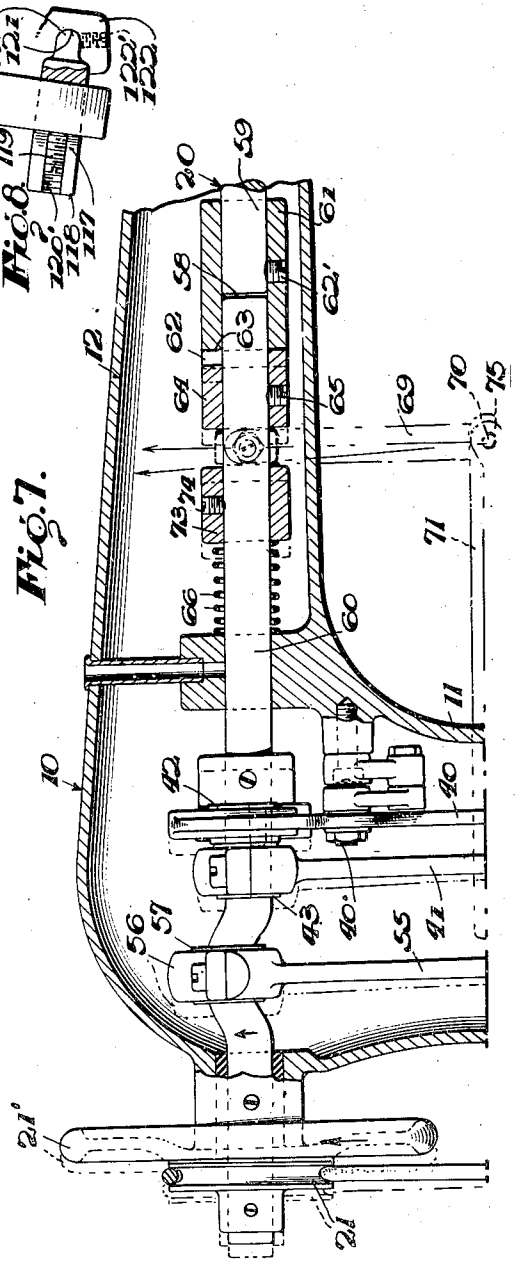


Fig. 7.

Fig. 8.

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TUFTING MACHINE

Filed May 22, 1940 5 Sheets-Sheet 4

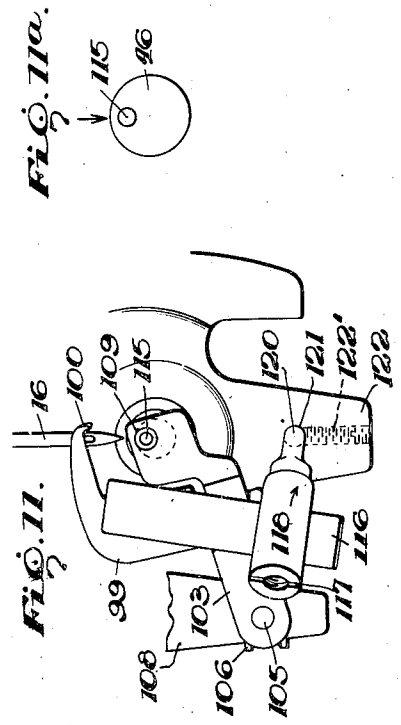


Fig. 11.

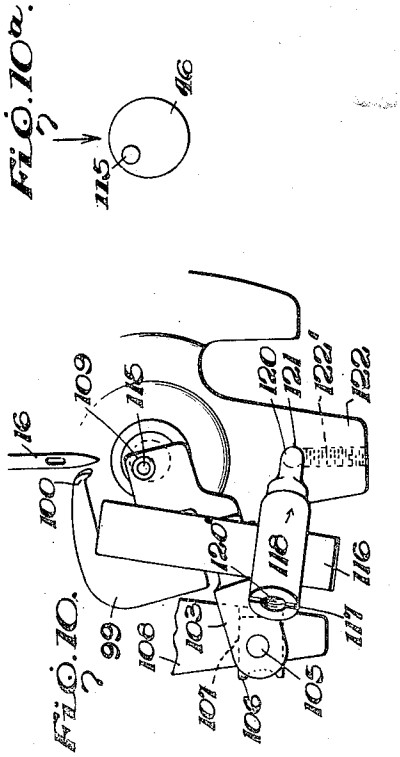


Fig. 10.

Fig. 10a.

Fig. 11a.

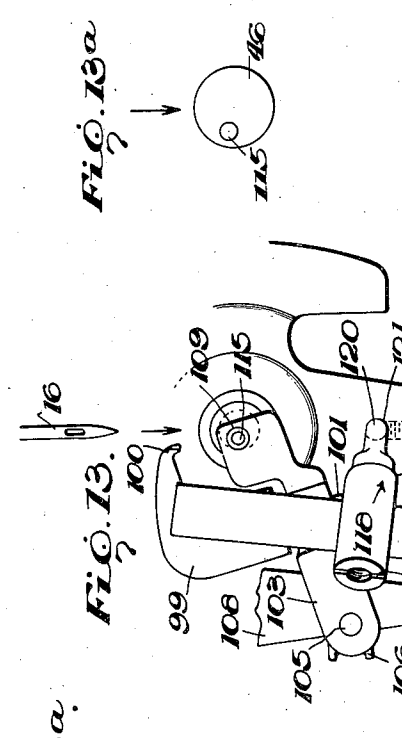


Fig. 13.

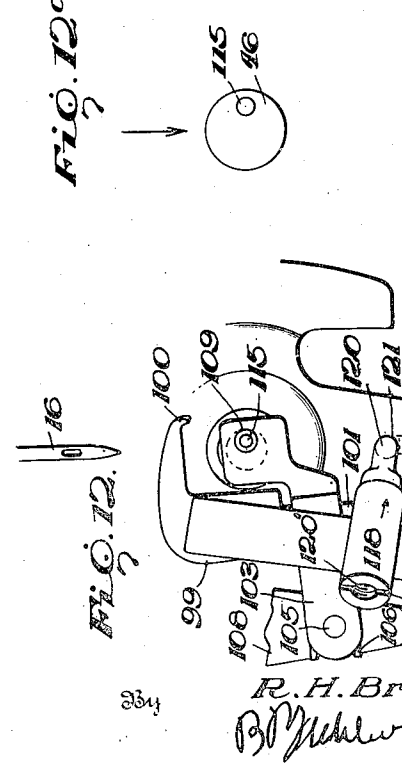


Fig. 12.

Fig. 12a.

Fig. 13a.

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TUFTING MACHINE

Filed May 22, 1940 5 Sheets-Sheet 5

Fig. 16.

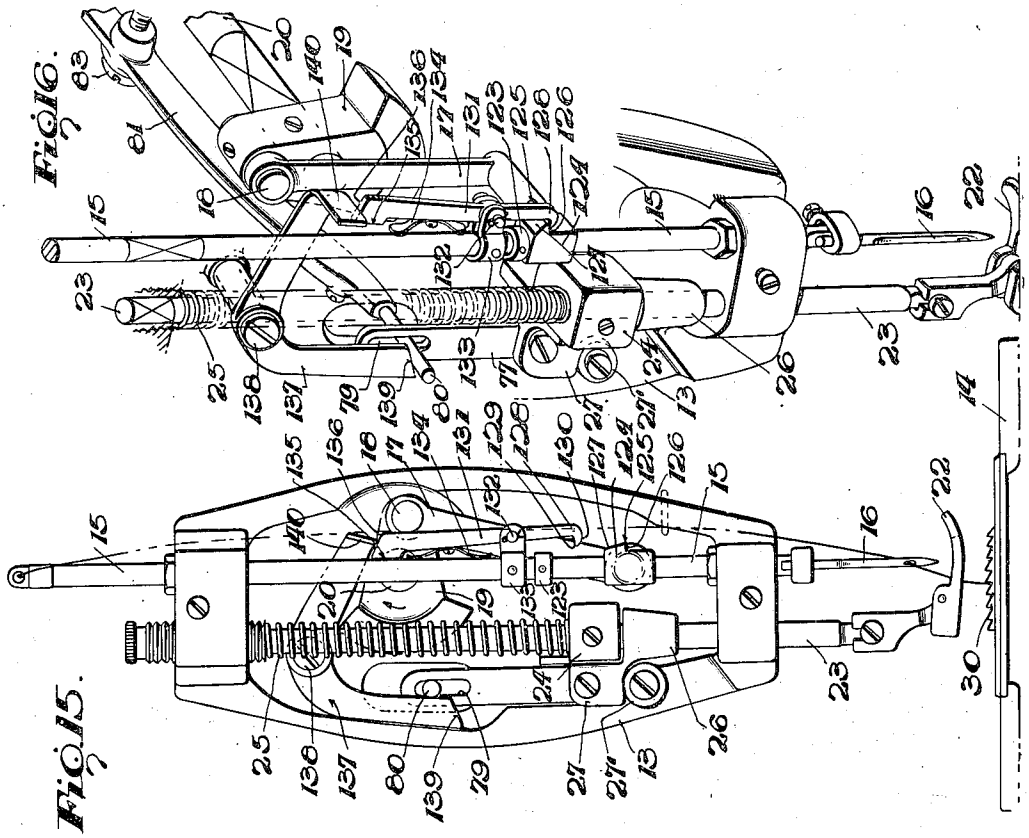


Fig. 15.

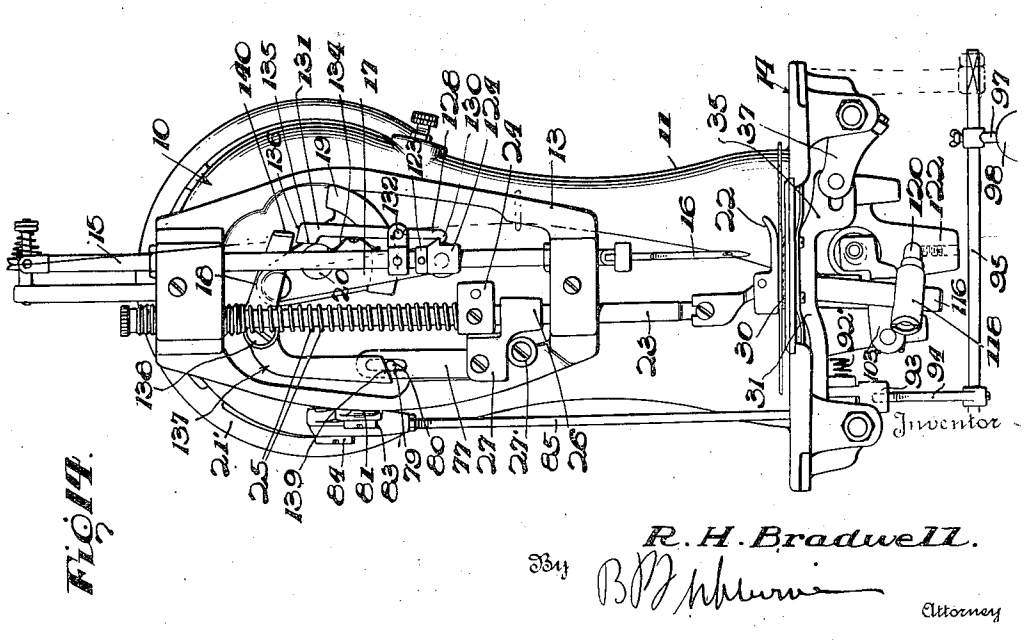


Fig. 14.

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Patented Mar. 23, 1943 2,314,339

UNITED STATES PATENT OFFICE

2,314,339

TUFTING MACHINE

Robert Hugh Bradwell, Dalton, Ga., assignor to Gerhardt H. Rauschenberg, Dalton, Ga.

Application May 22, 1940, Serial No. 336,660

11 Claims. (Cl. 112—79)

My invention relates to tufting machines.

An important object of the invention is to provide means to cut the accumulated loop or loops upon the looper when the end of the row of tufting is reached.

A further object of the invention is to provide manually controlled means to stop the needle when the end of the row of tufting is reached while the work feed means continues to operate, thereby severing the accumulated loop or loops upon the looper.

A further object of the invention is to provide means which will first stop the needle while the work feed means continues to operate for severing the accumulated loop or loops on the looper and subsequently raise the presser foot so that the operator may free the work from the machine and again present the same for the sewing of the next row of tufting.

A further object of the invention is to provide means of the above mentioned character which will stop the needle in the elevated position whereby the operation of the feed means may continue.

A further object of the invention is to provide means of the above mentioned character which is practical and reliable in operation.

A further object of the invention is to provide tufting means including a movable looper and stationary blade which are separate from the work feed means.

A further object of the invention is to provide means to impart a movement of the looper toward and from the needle and to also cause the same to rise and fall so that it will have proper rubbing engagement with the stationary blade to produce a shearing action and sever the loops.

A further object of the invention is to provide means for supporting the stationary blade which will permit of proper adjustments of the blade so that one or more unsevered loops may be accumulated on the looper during the normal sewing of the machine.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a machine embodying my invention,

Figure 2 is a perspective view of the looper and associated elements, parts broken away and parts separated,

Figure 3 is a horizontal section taken on line 3—3 of Figure 4, parts omitted,

Figure 4 is an end elevation of the machine, the front end plate being removed for the purpose of illustration,

Figure 5 is a perspective view of the looper and associated operating elements,

Figure 6 is a bottom plan view of the machine,

Figure 7 is a central vertical longitudinal section through the arm and associated elements, parts in elevation, and parts broken away,

Figure 8 is a detail section through the blade holder,

Figure 9 is a side elevation of the clutch device included in the means to operate the needle bar,

Figure 10 is a side elevation of the looper, needle and blade, showing the relative position between these parts when the needle is partly lowered,

Figure 10^a is an end elevation of the center rock-shaft showing the position of the eccentric pin when the parts assume the relative position of Figure 10,

Figure 11 is a side elevation of the looper, needle and blade, showing the relative position between these parts when the needle moves to the lowermost position,

Figure 11^a is an end elevation of the center rock-shaft showing the position of the center pin when the parts assume the relative position of Figure 11,

Figure 12 is a side elevation of the looper, needle and blade, showing these parts in the relative position when the needle is raised and the looper shifted toward the needle,

Figure 12^a is an end elevation of the center rock-shaft showing the position of the eccentric pin when the parts have the relative position of Figure 12,

Figure 13 is a side elevation of the looper, needle and blade, showing the relative position of these parts when the needle is elevated and the looper moved from the needle to the maximum extent,

Figure 13^a is an end elevation of the center rock-shaft showing the position of the eccentric pin when the parts assume the relative position of Figure 13,

Figure 14 is a front end elevation of the tufting machine showing a modified form of means to operate the needle bar,

Figure 15 is an enlarged end elevation of the head of the tufting machine, showing the latch locking the needle bar with the sliding sleeve, and,

Figure 16 is a perspective view of the needle bar, latch and associated elements.

In the drawings, wherein for the purpose of illustration are shown preferred embodiments of my invention the numeral 10 designates a sewing machine as a whole, of any well known or preferred type, such as the ordinary Singer Sewing Machine. This machine comprises a stock 11, arm 12, and head 13. The stock is mounted upon a flat base 14. The head is provided with the usual vertical reciprocatory needle bar 15, carrying a needle 16. The needle is reciprocated by a link 17, pivotally connected with a block 17', clamped to the needle bar and pivotally connected at 18 with a cam-crank 19. The cam-crank 19 is clamped to the forward section of a horizontal drive-shaft 20, which corresponds to the drive-shaft in the conventional sewing machine except that in the present instance it is formed in two sections. The drive-shaft 20 extends through the horizontal arm 12, and is rotated by a grooved pulley 21, which may be power driven if desired. This pulley is equipped with the usual hand wheel 21' for turning the same. The head 13 carries the usual presser foot 22, secured to a vertical reciprocatory presser foot bar 23 having a block 24 clamped thereto by a set screw or the like. The block 24 is moved downwardly by a compressible coil spring 25 surrounding the presser foot bar 23 and serving to move the presser foot downwardly into engagement with the fabric. The block 24 is raised by a sleeve 26 arranged beneath it and slidable upon the presser foot bar 23. This sleeve has an extension or shoulder 27 integral therewith to be arranged above the usual lifting lever. This lifting lever is illustrated at 23, in Patent 2,143,677 granted to me under date of January 10, 1939. In the present invention this lifting lever is preferably omitted, but the fixed pivot 27' for this lever is retained and serves to limit the downward movement of the extension 27.

Arranged below the base 14 are horizontal rock-shafts 28 and 29 for actuating the work feed means. These rock-shafts are journaled in suitable stationary bearings. The work feed means to advance the work from the operator comprises feed dogs 30 which are spaced and have an opening or passage between them and these feed dogs are rigidly secured to a rigid dog supporting link or bar 31. The feed dogs operate through slots in the usual throat plate. At one end, the link or bar 31 is rigidly connected with a transverse head 32, pivotally connected at 33 with cranks 34, in turn rigidly mounted upon the rock-shaft 28. At its opposite end, the link or bar 31 is provided with a fork 35, receiving a roller 36, pivotally mounted upon a crank 37, in turn rigidly mounted upon the rock-shaft 29. The rock-shafts extend longitudinally of the drive-shaft 20 and are parallel therewith. The rock-shafts 28 and 29 are provided adjacent to the stock 11 with cranks 38 and 39 respectively. The cranks 38 and 39 are pivotally connected with connecting rods 40 and 41 respectively, which are actuated by cams 42 and 43 respectively, in turn driven by the shaft 20. The rock-shaft 28 serves to move the dog carrying link 31 longitudinally while the rock-shaft 29 serves to raise and lower the same. The drive-shaft 20 is also provided with a crank 44, including a crank-pin 45. The foregoing description is that of the ordinary sewing machine, such as a Singer Sewing Machine, except for the modification of the drive-shaft 20, as will be explained further.

Arranged between the rock-shafts 28 and 29 is a third or center or auxiliary rock-shaft 46, journaled in suitable stationary bearings and corresponding to the usual bobbin shaft. The rock-shaft 46 is provided at its rear end with a depending crank 47, rigidly secured thereto and this crank carries a pin or pivot element 48, upon which is pivoted a block 49, slidable in an elongated slot 50 formed in the long arm 51 of a bell-crank lever having a short arm 52. This bell-crank lever turns about the longitudinal axis of a shaft or pivot 53, held in suitable bearings. Pivotally connected with the short arm 52 of the bell-crank lever, as shown at 54, is a connecting rod 55, provided at its upper end with a circular strap 56, pivotally receiving a circular disk 57, mounted upon the crank-pin 45. It is thus seen that the rotary movement of the shaft 20 in one direction will be transferred to the rock-shaft 46 to turn the same in opposite directions. The construction described up to this point is that of the conventional sewing machine, such as a Singer Sewing Machine and is also shown and described in my said Letters Patent 2,143,677.

The shaft 20, Figures 5, 7, and 9, is transversely split between its ends, as shown at 58, which divides the shaft into a forward shaft-section 59 and rear shaft-section 60, which are locked and unlocked with respect to each other. A clutch is provided for this purpose comprising a sleeve 61, clamped to the shaft-section 59 by a set screw 62'. The transverse split 58 is positioned well within the sleeve 61 whereby the forward end of the shaft-section 60 is rotatably held within the sleeve 61. The sleeve 61 is provided at its rear end with a single tooth 62, adapted to enter a single notch 63, formed in a coacting sleeve 64 which is clamped to the rear shaft-section 60 by a set screw 65. A compressible coil spring 66 surrounds the shaft-section 60 and urges the same forwardly so that the tooth 62 will enter the notch 63. The forward end of the sleeve 64 is transversely inclined or beveled whereby the notch has a low leading edge 67 and a high trailing edge 68, the shaft-sections 59 and 60 turning in the direction of the arrow, Figure 9. It is thus seen that before the tooth 62 is positioned to enter the notch 63 it has moved inwardly behind the high shoulder 68 so that it will properly enter the notch and will not overrun the same. When the clutch including the sleeves 61 and 64 is rendered inactive, by withdrawing the tooth 62 from within the notch 63, the shaft-section 60 is shifted rearwardly. This rearward movement of the shaft-section swings the upper ends of the connecting rods 41 and 55 rearwardly slightly while the cam 42 which is clamped to the rear shaft-section 60 slides within the fork of the connecting rod or lever 40 which is mounted upon an adjustable pivot 40'. This slight rearward movement of the upper ends of the connecting rods 41 and 55 does not interfere with the operation of the work feed means.

Means are provided to move the sleeve 64 rearwardly from the sleeve 61, comprising a vertically swinging lever 69, having its lower end rigidly mounted upon a horizontal rock-shaft 70 held within a bearing carried by a horizontal arm 71, rigidly attached to the stock 11. At its upper end, the lever 69 has a block 72 pivotally connected therewith and this block operates within the space between the sleeve 64 and a sleeve 73 which is clamped to the shaft-section 60 by a set screw 74. The sleeve 73 engages the spring 66.

The rock-shaft 70 has a downwardly extending inclined lever 75 rigidly secured thereto, as shown. The lever 69 is arranged outwardly of the arm 12 and the pivot or pin 72' which carries the block 72 operates within an elongated slot 76 formed in the arm.

As before stated, the usual hand operated lever or cam employed to raise the extension or shoulder 27 and which in turn raises the presser foot bar 23 is omitted but the pivot 27' for this lever is retained which serves as a stop to limit the downward movement of the sleeve 26 beyond the position which it will move when this hand operated lever is used. If desired, any other stop may be provided beneath the extension 27. I attach to the extension 27 a vertical link 77 secured thereto by a screw 78. This vertical link has an elongated slot 79 near its upper end. This slot receives the reduced end 80 of a horizontal vertically swinging lever 81, such end passing through an opening 82. The lever 81 is arranged outwardly of and upon the side of the arm 12 and is supported by a pivot 83, fixed to the arm 12. Pivotally connected with the rear end of the horizontal lever 81, as shown at 84, is a vertical link 85 extending downwardly through an opening in the base 14. This link slides against a stationary stop or brace 86 and carries a cam or trip 87 clamped thereto by a set screw 88. This cam or trip has a rounded face to engage with the lower end of the inclined lever 75, which lower end is also preferably rounded. The link or rod is stiff or rigid and is urged upwardly by a compressible coil spring 89 engaging the base 14 and the trip or cam 87. The link or rod 85 extends downwardly below the base 14 and is pivotally connected at 90 with a lever 91, mounted upon a fixed pivot 92 and having a spring 92'. This lever has an inclined end 93 arranged to be engaged by a vertically swinging lever 94, rigidly mounted upon a horizontal rock-shaft 95. This rock-shaft is journaled in brackets secured to the table upon which the base of the machine rests. This rock-shaft extends transversely of the arm 12 of the sewing machine. The rock-shaft 95 carries a depending arm 97 rigidly secured thereto and this arm carries a knee lift 98. When the operator presses the knee lift 98 to the right, the rock-shaft 95 will be turned and the lever 94 will shift the inclined end 93 of the lever 91 upwardly and the opposite end of the lever 91 will be lowered. This will draw the link or rod 85 downwardly. The operator first moves the link or rod 85 downwardly for a part only of its down stroke at which time the cam or trip 87 will swing the lever 75 downwardly which will swing the lever 69 rearwardly and the tooth 62 will be moved out of the notch 63. This will disconnect the front and rear shaft-sections and the needle will be stopped. The operator naturally slows down the machine as the end of the row is approached, and with a little practice, the operator can disconnect the shaft-sections to stop the needle in the raised position. The needle will remain in the raised position due to the friction caused by the thread and operating parts. Due to the presence of the elongated slot 79, this partial downward movement of the link or rod 85 swings the forward end of the lever 81 upwardly but the reduced end 80 is brought adjacent to or in engagement with the upper end of the elongated slot but the link 77 has not as yet been raised for raising the presser foot. Hence the work feed means continues to operate after and while the needle has been stopped. The further shifting of the knee lift 98 to the right will complete the downward movement of the link or rod 85 and the upward movement of the forward end of the lever 81 whereby the reduced end 80 will raise the link 77 which in turn will raise the presser foot 22 to free the work. When the operator releases the knee lift 98 the springs 89 and 92' return the lever 81 and link 85 and associated elements to the normal position. The spring 66 will urge the sleeve 64 forwardly and the tooth 62 will again enter the notch 63 when brought into registration therewith.

Arranged beneath the base 14 is a looper 99 having a down-turned bill 100. This looper has a depending shank 101, rigidly secured thereto. This shank is preferably cylindrical and is adjustably mounted within a cylindrical opening 102 formed in a generally horizontal arm or carrier 103. The shank 101 is clamped within the opening 102 by a set screw 104. At its outer end the arm or carrier 103 is provided with a pin or pivot element 105 rigidly secured thereto and this pin has a block 106 pivotally mounted thereon and this block is horizontally slidable within a horizontal recess 107 formed in a stationary part 108 which is a part of the usual casing for the bobbin. At its inner end the arm or carrier 103 is provided with an opening 109 to receive a sleeve 110 clamped therein by a set screw 111. Mounted upon the inner end of this sleeve 110 is an adjustable collar 112, which may be shifted longitudinally upon the sleeve and clamped thereto in a selected adjusted position by means of a set screw 113. The collar slidably engages the end wall 114 of the bobbin casing. The center rock-shaft 46 is provided with a pin 115, which pin is eccentric with respect to the center rock-shaft, and this pin is pivotally mounted within the sleeve 110. The eccentric pin 115 travels back and forth in a curved path and passes slightly below the horizontal diameter of the center shaft 46 at both ends of its travel, the major portion of the travel being above the horizontal diameter. This movement of the eccentric pin 115 shifts the looper bodily toward and from the needle, the looper moving toward and across the needle when the needle is at or near its lowermost position and moving from the needle when the needle is elevated. The looper also moves downwardly with respect to the needle when the looper has moved across the needle when the needle is lowered and enters the loop and also moves down with respect to the needle when the looper has been shifted from the needle and when the needle is raised. This rising and falling movement of the looper is utilized for coaction with the blade to sever the loops. The downward movement of the looper when it enters the loop also serves to take the slack out of the loop. The cutting action occurs when the looper is moved downwardly while it is on the back stroke from the needle, although the parts could be adjusted so that the cutting action would occur when the looper moved downwardly upon the forward stroke of the looper toward the needle.

The numeral 116 designates a stationary cutter or blade, which is resilient and may be formed from a hacksaw blade or any other suitable material. This blade is inserted within a diametrical slot 17 formed in a head 118 and is longitudinally adjustable within this slot and is clamped in the selected adjusted position by a set screw 119 having screw-threaded engagement within a cylindrical bore 120' formed in the head 118. This head is rigidly mounted upon a cylindrical shank

120 and is arranged transversely of the shank but at an inclined angle with relation thereto, for the purpose of slightly longitudinally twisting the resilient blade so that the forward portion of the blade will have the maximum pressure against the looper to produce the proper shearing action. The shank 120 is cylindrical and is inserted within a cylindrical opening 121 formed in a lug 122 carried by the bobbin casing and is clamped in position by a set screw 122'. The shank 120 may be longitudinally adjusted within the opening 121 and may also be turned therein. This regulates the pressure that the resilient cutter will have with the looper and will also enable the blade to be adjusted in the plane of movement of the looper toward and from the free end of the looper so that the blade will sever the loops on the looper and leave one or more loops unsevered.

The operation of the machine is as follows:

In the starting of the tufting operation the grooved pulley 21 is at rest and the entire machine has been stopped. The operator then shifts the knee lift 98 to the right to the end of its stroke for raising the presser foot and the work is then arranged upon the base 14 beneath the presser foot. The knee lift 98 is released and the presser foot descends to engage the work and the shaft-sections 59 and 60 are connected. The machine is now started. The work feed means feeds the work and the needle 16 reciprocates in the usual manner.

The looper 99 moves in a plane extending longitudinally of the line of work and this looper faces in an opposite direction to the movement or feed of the work. When the needle has moved downwardly for a part of its down stroke so that its point is about at the elevation of the bill of the looper, Figure 10, the eccentric pin 115 is upon the left side of the vertical diameter of the center rock-shaft 46, Figure 10a. The looper 99 has been somewhat raised and the looper has traveled toward the needle but has not yet moved across the needle. In Figure 11, the needle is in the lowermost position and the looper has moved further toward the needle and extends across the needle and has entered the loop. The looper has been further raised. The eccentric pin 115 is now in the vertical diameter of the center rock-shaft 46, Figure 11a. The eccentric pin 115 is moved back and forth throughout substantially 180°, the left starting position being shown in Figure 13a and the right starting position being shown in Figure 12a, these starting positions being slightly below the horizontal diameter of the shaft 46. The looper 99 now continues to move toward and further across the path of travel of the needle while the needle rises, Figure 12, and the looper also descends, taking up any slack in the loop held on the looper. The eccentric pin 115 is now in the extreme right position, Figure 12. The rock-shaft 46 now turns to the left, Figure 12a, and the looper assumes the position shown in Figure 11, with the needle raised. The rock-shaft 46 continues to turn to the left, Figure 10a, until the end of the left turning movement is reached, Figure 13a. There are now at least two unsevered loops on the looper and these loops feed toward the closed end of the looper by the action of the work feed means. When the eccentric pin 115 reaches the starting position to the left, Figure 13a, the looper 99 is in the farthest position from the needle and is also in the lowermost position. The leading loop has been caught between the descending looper and the stationary blade 116 and severed, the looper still retaining at least one unsevered loop. The blade 116 has rubbing sliding engagement with the looper to produce a shearing action therewith to sever the loops. The needle now descends and the looper travels toward the needle, Figure 10, and the cycle of operation is repeated. It is thus seen that the looper moves toward and from the needle, and also rises and falls, which effects a relative vertical movement between the looper and blade.

The sewing operation continues for producing a row of tufting. As the end of the row is approached, the operator slows down the machine and when the end is reached and the needle is in the raised position, the operator shifts the knee lift 98 to the right for a portion of its travel, and this stops the needle in the raised position while the work feed means and looper continue to operate. The work is therefore being fed and the unsevered loop or loops upon the looper is severed by the action of the looper and stationary blade. This would be effected ordinarily by one additional cycle of operation of the machine. The operator then shifts the knee lift to the end of its travel to the right and the presser foot is raised to free the work while the needle is at rest. The grooved pulley 21 is still being driven as it is not necessary to stop the entire machine. The operator retains the knee lift in the position to hold the presser foot raised and now has both hands free to manipulate the work so that it may be brought back to the starting position and again inserted under the presser foot. After this is done the knee lift 98 is released and the presser foot moves to the lowered position and the needle is set into action and the sewing is effected. When the end of the row of tufting thus being sewed is reached the operation is repeated. The operator, of course, controls the speed of rotation of the pulley 21 during the sewing operation and ordinarily slows down the machine when the end of the row is approached and this enables the operator to stop the needle when it is raised. However, if the needle should be stoppd in the lowered position, the operator would then stop the grooved pulley 21 and manually turn the wheel 21' to raise the needle and the grooved pulley 21 would again be set into action so that the work feed means, looper and cutter would operate while the needle was held stationary in the raised position. It is thus seen that the operator can thereby sever the unsevered loop or loops on the looper when the end of the row is reached, by the action of the work feed means, looper and cutter, after which the presser foot is raised to free the work. The needle is stopped and the presser foot subsequently raised by the operation of the common knee lift.

In Figures 14 to 16 inclusive, I have shown means to stop the needle bar only when it is shifted to the raised position. In these figures, the needle bar 15 is equipped with a collar 123 which is clamped to the needle bar by a set screw or the like. Arranged beneath this fixed collar is a lower collar 124 which is slidable upon the needle bar 15 and the link 17 is pivotally connected with the sliding collar 124. It is thus apparent that the collar 124 engaging beneath the fixed collar 123 will raise the needle but the collar 124 cannot lower the needle as it will slide downwardly on the needle bar. The sliding collar 124 has a jaw 125 provided with a lower horizontal face 126 and an upper inclined face 127. The jaw 125 is adapted to be engaged by a coacting jaw 128 having an upper horizontal face 129 and

a lower inclined face 130. The jaw 128 is carried by a latch 131 and this latch is pivotally mounted at 132 with a supporting element 133 which is clamped upon the needle bar 15. The latch 131 therefore reciprocates with the needle bar. The upper end of the latch is swung outwardly from the needle bar by a spring 134, attached to the latch and engaging the needle bar. At its upper end, the pivoted latch 131 has an inner face 135 arranged to have clamping engagement with the needle bar and an upper beveled face 136. Arranged within the head 13 behind the needle bar and presser foot bar is a bell-crank lever 137, supported by a fixed pivot 138. The vertical arm of the bell-crank lever is provided at its lower end with an inclined face 139, arranged in the path of travel of the reduced end 80 of the lever 81, when the link 17 is capable of raising and lowering the needle bar and when the presser foot bar is lowered. The free end of the horizontal arm of the bell-crank lever has a lateral extension 140 arranged in the path of travel of the inclined face 136 of the pivoted latch 131.

In this form of the invention, the shaft 20 is continuous throughout its length as shown in my said Patent 2,143,677 and is not split in two sections as described in connection with the first form of my invention. All other parts of the machine are identical with those shown and described in connection with the first form of the invention.

The operation of the modified form of the invention as shown in Figures 14 to 16 inclusive, is as follows:

When the machine is operating during the sewing period, the latch 131 has its upper end swung outwardly, Figure 14, and hence the latch and sleeve 123 will lock the sliding sleeve 124 with the needle bar 15 so that the link 17 will raise and lower the needle bar. The needle is therefore reciprocated in the usual manner and the presser foot is in the lowered position to hold the work in engagement with the feed dog, and the looper and cutter 99 and 116 will cooperate with the needle in producing the row of tufts. When the end of the row of tufts is reached the operator shifts the knee lift to the right regardless of the position occupied by the needle. When the knee lift is thus pressed to the right the lever 81 has its forward end swung upwardly and the reduced end 80 will first contact with the inclined face 139, shifting the vertical arm of the bell-crank lever 137 to the left, and lowering the lateral extension 140 of the horizontal arm. If the latch 131 is in the uppermost position, the extension 140 will engage with the inclined face 136 and the upper end of the latch will be shifted toward the needle. If the latch is in the lowered position, when it travels to the upper position its inclined face 136 would then strike the extension 140 and the latch would have its upper end swung toward the needle bar 15. When the latch 131 is swung toward the needle bar its face 135 will frictionally engage the needle bar while the jaw 128 will release the jaw 125. The needle is thus stopped in the raised position and the downward movement of the sliding sleeve 124 cannot then lower the needle bar. Further, the face 135 frictionally engaging the needle bar 15 will retain the needle bar raised against improper movement. The face 135 may be equipped with a yielding friction element formed of rubber or the like. The needle bar is therefore stopped in the upper position and held in such upper position but the work feed means and looper continue to operate for the shaft 20 has not been stopped. As the knee lift is moved further to the right the reduced end 80 passes off of the inclined face 139 and continues to move upwardly and engages the end wall of the elongated slot 79 and will then raise the presser foot bar and presser foot. The presser foot will thus be raised to release the fabric after the needle has stopped and after the machine has made at least one additional cycle of operation so that the operating work feed means, looper and cutter will sever the unsevered loop or loops upon the looper. The unsevered loop or loops being severed and the presser foot being raised and the operator having both hands free, can readily remove the work from beneath the presser foot and return the work to the starting position beneath the presser foot. The knee lift is now released and the presser foot is returned to the lowered position and when the sliding sleeve 124 moves upwardly it is again locked with the needle bar by the latch 131 and the sleeve 123, to reciprocate the needle. When the presser foot is lowered, as explained, the reduced end 80 has moved from behind the vertical arm of the bell-crank lever 137 and again assumes a position beneath the inclined face 139. The vertical arm of the bell-crank lever 137 is heavier than the horizontal arm and will return the bell-crank lever to the normal position whereby the lateral extension 140 will be slightly spaced from the face 136 when the latch 131 reaches the uppermost position and hence the extension 140 cannot actuate the latch. If desired, a spring may be employed to aid in returning the bell-crank lever 137 to the normal position.

It is to be understood that the forms of my invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. In a tufting machine, a work support, work feed means, a presser foot to cooperate with the work feed means, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper during the sewing period and leave at least one unsevered loop upon the looper, a drive-shaft, driving connecting means between the drive-shaft and the work feed means, driving connecting means between the drive-shaft and the reciprocatory needle bar including a clutch having a part mounted upon the drive-shaft, an element to raise the presser foot, and means to render the clutch inactive while the presser foot may be in the lowered position and subsequently move the element sufficiently to raise the presser foot.

2. In a tufting machine, a work support, work feed means, a presser foot to cooperate with the work feed means, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper during the sewing period and leave at least one unsevered loop upon the looper, a drive-shaft, driving connecting means between the drive-shaft and the work feed means, means to drive the needle bar including a second drive-shaft, a clutch adapted when active to connect the drive-shafts so that they rotate together, an element

to raise the presser foot, and means to move the first named drive-shaft longitudinally to render the clutch inactive and to also raise the element for lifting the presser foot.

3. In a tufting machine, a work support, work feed means, a presser foot to cooperate with the work feed means, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper, a stop element mounted upon the needle bar, a sleeve slidable upon the needle bar beneath the stop element and having an engaging part, a latch mounted upon the needle bar to reciprocate therewith and movable with relation to the needle bar and having a part for locking engagement with the engaging part of the sleeve, a movable member normally spaced from the latch when the latch is shifted to the uppermost position, and means to move the member so that it will engage and operate the latch when the latch is shifted to the uppermost position.

4. In a tufting machine, a work support, work feed means, a presser foot, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper, a sliding element mounted upon the needle bar, a latch carried by the needle bar to engage and disengage the sliding element, a pivoted lever having one arm adapted to be shifted into engagement with the latch when the needle bar is in the raised position, the pivoted lever having an inclined face, a link connected with the presser foot and having an elongated slot, an element arranged within the elongated slot and arranged to engage the inclined face, and means to move the element.

5. In a tufting machine, a work support, work feed means, a reciprocatory needle bar, a looper device for coaction with the needle, a substantially horizontally movable element serving to guide the looper device, a rock-shaft having an eccentric pin engaging the looper device at a point spaced from the substantially horizontally movable element, means to turn the rock-shaft in opposite directions, and a stationary blade having rubbing sliding engagement with the looper.

6. In a tufting machine, a work support, work feed means, a reciprocatory needle bar, a generally horizontal arm, a substantially horizontally movable supporting element pivotally connected with one end of the arm, a rock-shaft having an eccentric pin connected with the arm near its opposite end, means to turn the rock-shaft in opposite directions, a looper mounted upon the arm for coaction with the needle, and a stationary blade having rubbing sliding engagement with the looper.

7. In a tufting machine, a work support, work feed means, a reciprocatory needle bar, a generally horizontal arm, a substantially horizontally movable supporting element pivotally connected with the arm near one end thereof, a sleeve secured to the opposite end of the arm, a rock-shaft having an eccentric pin to engage within the sleeve, means to turn the rock-shaft in opposite directions, a looper mounted upon the arm between its ends for coaction with the needle, and a stationary blade having rubbing sliding engagement with the looper.

8. In a tufting machine, a work support, work feed means, a reciprocatory needle bar to coact with the work feed means, a looper device having a part to enter the loops formed by the needle, a substantially horizontally movable element serving to guide the looper device, a driving element having an eccentric part for engaging the looper device to shift it toward and from the needle and to raise and lower the same, means to turn the driving element, and a stationary blade having rubbing sliding engagement with the looper device.

9. In a tufting machine, a work support, work feed means, a presser foot for coaction with the work feed means, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper, an element mounted for movement adjacent to and longitudinally of the needle bar, a latch carried by the needle bar to engage and disengage the element, a movable member adapted to be shifted into engagement with the latch when the needle bar is raised, and an operating member to raise the presser foot and having a part to engage with the movable member.

10. In a tufting machine, a work support, work feed means, a reciprocatory presser foot bar, a presser foot carried by the presser foot bar, a reciprocatory needle bar, a looper to receive the loops from the needle, a blade to sever the loops upon the looper during the sewing period and leave at least one unsevered loop upon the looper, a pivoted lever having connection with the presser foot bar to raise it, a reciprocatory element connected with the lever to move it, a manually operated device to move the reciprocatory element, a trip carried by the reciprocatory element, a pivoted lever having a part arranged in the path of travel of the trip, and means to stop the operation of the needle bar and operated by the last named pivoted lever.

11. In a tufting machine, a work support, work feed means, a presser foot, means for holding the presser foot in the lowered position, a reciprocatory needle bar to carry a needle, a looper to receive the loops formed by the needle, means to sever the loops upon the looper and leave at least one unsevered loop upon the looper, means to drive the work feed means and the needle bar, and manually operated means thrown into action at the will of the operator to stop the operation of the needle bar at a selected point in the work and while the presser foot is in the lowered position, the driving means continuing to operate the work feed means with the presser foot in the lowered position to feed the work while the needle is stopped so that the severing means will sever the unsevered loop or loops upon the looper while the presser foot is in the lowered position, and means operated by the manually operated means and timed in operation to raise the presser foot after the needle bar has been stopped and all loop or loops upon the looper severed.

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