This invention relates to a machine for attaching articles to work and more particularly to a machine for attaching articles to work by a plurality of disconnected groups of stitches. A four-hole flat button is a good example of an article in which this form of attachment is desirable and therefore, for convenience, this invention will be shown and described as embodied in a flat-button sewing machine, but it is to be understood that the invention is not limited to button-sewing machines and that other embodiments and uses are contemplated.

A primary object of this invention is to provide an improved article-attaching machine adapted, in a single continuous operation, to attach articles to work by two parallel groups of stitches, without any connecting or cross-over stitch between the groups.

Another object of the invention is to provide, in an article-attaching machine as above described, an improved automatically actuated thread-clamping and -cutting mechanism which will nip the thread at the beginning of each group of stitches to facilitate the forming of stitches which will cut off the beginning end of the thread beneath and close to the work and which will sever the thread at the completion of each group of stitches.

A further object of the invention is to provide, in combination with a thread-cutter and -clump, as above described, thread-controlling means, in addition to the usual thread take-up adapted to pull back on the thread at the beginning of each group of stitches so that the length of thread-end required to be trimmed off will be reduced to a minimum, thereby preventing thread wastage, and which also will give up thread to the stitch-forming elements as may be required for the proper formation of stitches.

A still further object is to provide thread-clamping and thread-tensioning means actuated in timed relation with the thread-cutter, thread-nipper and thread-controller so that at certain times during the cycle of operation thread may be drawn freely from the supply while at other times the thread is clamped and drawing of thread from the supply is precluded, all as is required for the proper functioning of the stitch-forming and thread-cutting mechanisms. Still another object of the invention is to provide an improved method of attaching articles to work which will eliminate the usual cross-over stitch on the face of the article; which will securely anchor the beginning end of the thread; and which will reduce, to a minimum, the length of thread-end appearing on the under side of the work.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings, Fig. 1 is a side elevation, partly in section and with a side cover-plate thereof removed, of a button-sewing machine embodying the present invention.

Fig. 1 is a detail view of a thread-controller actuating means later to be described.

Fig. 2 is a left-end view of the upper portion of the machine shown in Fig. 1.

*Fig. 3 is a plan view of the rear portion of the bracket-arm of the machine shown in Fig. 1, illustrating more particularly the lead of the needle-thread through a plurality of thread-guides, through a pair of releasable thread-tensions and beneath a thread-clamp, later to be described and showing also a portion of the needle-bar vibrating mechanism.

Fig. 4 is a detail plan view of the actuating means for the thread-cutting and -nipping mechanism.

Fig. 5 is an enlarged vertical sectional view substantially along the line 5—5 of Fig. 4 showing more particularly the thread-cutting and -nipping mechanism and a portion of the stitch-forming mechanism.

Fig. 6 is a disassembled perspective view of the machine throat-plate and elements of the thread-cutting and -nipping mechanism which cooperate therewith.

Figs. 7, 8, 9, 10 and 11 are longitudinal vertical sections taken substantially on the line 5—5 of Fig. 4 illustrating the action of the thread-cutter and -nipper in conjunction with the stitch-forming mechanism.

Fig. 12 is a transverse vertical section substantially on the line 12—12 of Fig. 4 showing the connection of the thread-cutter and the looper in the severing of the needle-thread.

Figs. 13, 14 and 15 are enlarged vertical sectional views through a work-piece and a button, illustrating the manner in which the nipped beginning end of the thread is drawn up and covered by the button-attaching stitches.

Fig. 16 is a diagrammatic view illustrating the action of the thread-tension, thread-clamp,
thread-controller and thread-cutter and -nipper in conjunction with the reciprocations of the needle.

Fig. 17 is a plan view of one product of the machine shown in Fig. 1, to wit: a four-hole button attached to a work-piece by two disconnected groups of stitches.

Referring more specifically to the drawings the invention is illustrated as embodied in a sewing machine comprising a base 1, standard 2, overhanging arm 3 and a head 4 which carries a removable face-plate 4*. Journaled within the base 1 is a main shaft 5 carrying loose and fast pulleys 6 and 7, respectively, adapted to be driven by a power belt 8. A combined stop-motion mechanism and belt-shifter, designated generally as 9, is actuated by a conventional treadle mechanism, not shown, and is adapted to shift the belts on the loose pulley 6 to the fast pulley 7 to start the operation of the machine. At the end of the operation the stop-motion is tripped automatically whereupon it shifts the belt to the loose pulley and brings the machine to rest with the parts in a predetermined position. Inasmuch as the stop-motion mechanism of the machine forms no part of the present invention, detailed illustration and description thereof is deemed unnecessary.

Rotatably journaled in bearings provided by the base 1, and driven from the main shaft 5 by conventional mechanism common to the "Singer Class 175" button-sewing machines, is a loop-taker-shaft 10, which carries, at its forward end, a loop-taker, shown specifically as a rotary chain-stitch looper 11. Cooperating with the looper in the formation of stitches is an eye-pointed needle 12 secured in the lower end of a needle-bar 13 mounted, for endwise reciprocation and lateral vibration, in the head 4. Adjacent its upper end, the needle-bar is reciprocally mounted in a pivot-block 14 carried by a stud 15 journaled in the machine head. The lower portion of the needle-bar is reciprocally mounted in a block 16 carried by the forward end of a vibratory lever 17, fulcrumed on a stud 18 and carrying at its rearward end a roller or stud 19 which tracks a needle-bar vibrating cam-groove 20 formed in the upper face of a rotary cam-disk 21. The disk 21 is secured upon the upper end of a vertically disposed shaft 22 journaled in the standard 2 and rotated from the main shaft 5 by a worm and worm-wheel speed-reduction gear, designated generally as 23, having a ratio of 20 to 1. Thus twenty rotations of the main shaft will produce one complete rotation of the cam-disk 21 and consequently one complete cycle of operation of the machine.

The needle-bar is reciprocated from a rock-shaft 24 journaled in bearings formed in bearing-brackets 25 and 26 provided by the arm 3. At its forward end the rock-shaft 24 carries a car 27 which is connected by a link 28 to a collar 29 secured upon the needle-bar. Oscillatory motions are given to the shaft 24 by an eccentric 30 secured upon the main-shaft 5 and connected by a pitman 31 with a rock-arm 32 secured upon the rearward end of the shaft 24. By reason of this construction the needle-bar is given one reciprocation for each rotation of the main-shaft 5, or a total of twenty reciprocations in one complete cycle of operation. For a more complete understanding of the needle-bar reciprocating and vibrating mechanism, reference may be had to United States patent to R. L. Plumeley, No. 1,671,124, May 29, 1928.

Cooperating with the stitch-forming mechanism is a flat-button clamp designated generally as C having button-holding jaws c which overlie a work-supporting plate P which is slightly supported on a thread-plate X secured upon the free end of the base 1. This clamp and plate are adapted at certain times to be shifted lengthwise of the base 1 by conventional twine-shifter mechanism including a cam c* secured upon the lower end of the shaft 22 and having therein a cam-groove c' which actuates an arm c* secured upon the lower end of an upright shaft c* journaled in the machine base and connected at its upper end to the clamp and work-places. From the foregoing it will be understood that the needle is adapted to be reciprocated in two vertical paths corresponding to the holes a and b of the button B in Fig. 17, and that in each reciprocation the needle-thread loop is seized by the looper 11 in the formation of chain-stitches. After the needle has been reciprocated a sufficient number of times to produce the group of stitches designated as d in Fig. 17, the work-plate P and button-clamp, together with the work W and button B are held off to one side toward the free end of the base 1 thereby causing the reciprocatory and vibratory needle to enter the holes a' and b' in the button and together with the looper to form a group of stitches e'. It will be noted that there is no connecting stitch between the groups of stitches d and e', and the means for severing the needle-thread after the formation of the group d, so that no connecting stitch is formed, will hereinafter be described.

As shown in Figs. 1, 2 and 3, the needle-thread T passes from the supply through thread-guides 33 and 34, between thread-reels 35 and 36, thence through thread-eye 37, thread-clamp 38, thread-eyes 38' and 39, thence downwardly and around a roller 40 forming a part of a thread-controller K. From the roller 40 the thread extends upwardly and around a take-up roller 41 carried by the collar 29 secured to the needle-bar. Next the thread extends downwardly and through a light-tension thread-guide 41* to a guide 42 secured upon the lower end of the needle-bar and thence through the eye 12* of the next described.

It will readily be understood that as the needle-bar 13 and the roller 41 carried thereby descend, the length of the bight of thread extending from the roller 40 over the roller 41 and to the needle eye is shortened and thus thread is given up to the looper. Conversely when the needle-bar rises the bight of thread is lengthened and the thread is pulled back through the eye of the needle thereby setting the stitch.

The support for the thread-controller K, including the thread-guiding roller 40, comprises a lever 43 fulcrumed on a screw 44 threaded into the arm of the machine. The rearward end of the lever 43 (see Fig. 1*) carries a roller 45 later to be referred to. A colt-spring 46, having its upper end connected to a pin 47 secured in the machine head and its lower end to a similar pin 48 carried by the forward end of the lever 43, normally holds the forward end of the lever elevated and in contact with the lower end of an adjustable stop 49 carried by the face-plate 50. When the forward end of the lever 43 is in contact with stop 49, the roller 45, carried by the rear end thereof, is maintained slightly above the upper flat face of the cam-disk 21.

Secured upon the upper face of the disk 21
in position to travel beneath the roller 45 are two cam-blocks 50 (Fig. 3), each having a first cam-surface 51 (Fig. 1) adapted to ride beneath and lift the roller 45, thereby to give the thread-control roller K a first downward movement, in opposition to the spring 46, to draw thread back through the needle, and a second cam-surface 52 adapted to further lift the roller 45, thereby to cause the thread-controller to be given a further thread pull-back action. As the rear end 53 of each block 50 moves from beneath the roller 45, the spring 46 swings the lever 43 clockwise, as seen in Fig. 1, thereby lifting the controller K and causing it to give up thread to the stitch-forming mechanism.

The thread-clamp 38 comprises a stationary plate 54, beneath which the thread T passes, and a vertically movable plunger 55 having an enlarged head 56 located beneath the plate 54 and adapted, when in its uppermost position, to grip the thread between the head and the plate. The plunger 55 is normally maintained depressed by a coil-spring 57 surrounding the plunger and interposed between the upper wall of the arm 3 and a collar 58 secured on the plunger. The lower end of the plunger 55 passes loosely through the bifurcated end of a lever 59 fulcrumed at one end, on a shoulder-screw 60 threaded into the bearing-bracket 26. A washer 61 surrounds the plunger 55 and rests upon the upper face of the lever 59. Interposed between the washer 61 and a collar 62 fixed upon the plunger is a coll-spring 63 which constitutes a yielding connection between the lever 59 and plunger 55. A bolt 64 having a rounded head 65 is adjustably carried by the lever 59 intermediate its ends and is held in adjusted position by a clamp-nut 66. The head 65 is adapted, at predetermined times, to be engaged and lifted by the upper rounded heads of two studs 67 carried by the cam-disk 21 and spaced apart 180 degrees. When either of the studs 67 passes beneath the head 65 the lever 59 is lifted and the thread T is clamped between the plunger head 56 and the overlying plate 54. As the studs pass from beneath the bolt head the plunger is again depressed by the spring 57 and the thread is released 38.

The thread-tension 35 hereinafter referred to is of the intermittent type and normally is adapted to apply a tension to the thread during each up-stroke of the needle-bar and take-up 41 carried thereby, to set the stitch and to release the thread during the down-stroke of the needle when it is pulling thread from the supply. The tension 35 is released periodically by a cam 68 secured upon the main-shaft 6 through the medium of a spring-depressed press-rod 69, as shown more fully in my prior United States Patent No. 1,983,555, Dec. 11, 1934. The thread-tension 35 is of the constant type and applies a tension to the thread at all times except as hereinafter described.

During the formation of the first stitch of each group of stitches, i.e., during the second reciprocation of the needle, as will hereinafter be described, it is essential that thread be supplied freely to the stitch-forming mechanism otherwise the thread end, which is not yet anchored in the work, might be pulled from between the thread-nipping blade and the throat-plate, later to be referred to. After the first stitch has been made and the thread has been anchored in the work the tensions 35 and 36 may operate in their usual manner. Therefore, during the complete formation of the first stitch the thread tension 35 is maintained open and the tension 38 is temporarily opened so that they do not impose any drag on the thread. The auxiliary means for temporarily releasing the tensions comprises a rockshaft 70 journaled vertically in bearings 71 and 72 provided by the machine standard. At its lower end the shaft 70 carries an arm 73 provided at its free end with a roller 74 which tracks a cam-groove 75 formed in a cramp-disk 76 secured upon the shaft 22 beneath the cam-disk 21. Fixed upon the upper end of the shaft 70 (see Fig. 3) is a two-armed lever 77, the free ends of the arms 78 and 79 of which are carried 15 and are adapted to enter between the thread-engaging disks of the thread-tensions 35 and 36, respectively, thereby to spread the disks apart and relieve the tension on the thread passing therethrough.

As hereinafter stated the present machine is adapted to attach articles to work by two disconnected groups of stitches made during a single continuous two-stage operation of the machine. To accomplish this result, one group of stitches is made and, while the machine continues to run, the thread is cut, the second group is made and the thread is again cut.

The thread-cutter comprises a combined thread-cutting and -nipping blade 80 located beneath the throat-plate X and secured upon the forward end of a cutter-actuating bar 81 mounted for endwise sliding movement in the bed 1. The rearward end of the bar 81 is pivotally connected at 82, to one end of an extensible link 83, the other end of which is pivotally attached to one end of a lever 84 fulcrumed at 85 on a plate 86 secured to the machine base. Intermediate its ends the lever 84 carries a roller 87 which tracks a cam-groove 88 formed in the upper face of a cam-disk 89 secured upon the shaft 22 above the cam-disk 21. The cam-groove 88 is formed so as to give the bar 81, and blade 80 carried thereby, backward and forward movements, as are required to give the thread-cutter and -nipper their proper actions, as later will be described. As shown most clearly in Figs. 5 and 6, the thread-cutting and -nipping blade 80 is arranged between the under side of the throat-plate X and the upper face of a complementary thread-cutting blade 80 provided with an aperture 90. The blade 80 is secured to the throat-plate by screws 91 and is adapted to be placed under tension, so as to exert an upward pressure on the blade 80, by a screw 92 passed loosely through the blade and threaded into the throat-plate.

The thread-cutting and -nipping blade 80 is formed with a notch 93, the transverse wall 94 of which is beveled so as to constitute a cutting edge 94* and an aperture 95 having a short longitudinal wall 95 inclined downward terminating at its lower end in a cutting edge 95*. The cutting edge 94* is adapted to cooperate with a complementary cutting edge 90* provided by the blade 80 to shear off the beginning end of the thread, as hereinafter will be described.

The cutting edge 96 of the blade 80 is adapted, at predetermined times, i.e., at the completion of each group of stitches, to be brought into the path of movement of the limb J of the needle-thread loop 1 which is engaged by the loop-spreading wing 11* of the looper (see Fig. 12). With the cutting edge in this position, the wing of the looper, by its rotation, forces the limb of needle-thread against the cutting edge 96* and
severs the thread, as indicated in dotted lines in Fig. 12.

The cutting and nipping blade 80 underlies the throat-plate X adjacent the needle-hole X therein, and, at predetermined times during the sewing cycle, nips the end of the thread between the upper surface of the blade 80 and the lower surface of the throat-plate, as shown in Figs. 5, 9, 13 and 14, to facilitate the formation of stitches.

**Operation**

The two-stage cycle of operation of the machine, when sewing a four-hole button by two disconnected groups of stitches, as shown in Fig. 17, will now be described. With the machine at rest, and threaded as shown in the drawings, the operator inserts a piece of work W into the machine on top of the work-plate P and beneath the button-clamp, and places a button in the button-holding jaws c as is customary in this type of button-sewing machine. To simplify the drawings, the work-clamp and work-supporting plate have been omitted from Figs. 7 to 15 and the work-piece is shown as resting directly on the throat-plate. Next the operator trips the stop-motion to start the machine. During the first down-stroke of the needle, the cam 88 shifts the thread-cutting and nipping plate 80 to the left from the position indicated in dotted lines and marked "Start," in Fig. 16, to the position designated as e, so that the needle descends to the notch 93 to the right of the cutting edge 94a. As the needle starts its first up-stroke, the looper engages the thread-loop and pulls the thread downwardly, as indicated in Fig. 7. At the end of the first up-stroke of the needle, the thread-cutting and -nipping blade 80 is moved to the right to the position designated as f, thereby cutting off the beginning end t of the thread and nipping the thread between the blade 80 and the throat-plate, as indicated in Fig. 8. As shown by Fig. 16, during the first complete reciprocation of the needle, the tensions 35 and 36 are closed, as indicated by the word "On"; the thread-clamp 38 is inserted to prevent drawing of thread from the supply; and the thread-controller K is moved downwardly, from the "Start" position to the position designated as P in Fig. 16, thereby drawing back on the needle-thread and reducing the length of the free end of the thread below the throat-plate. With the blade 80 in the position indicated by f, the needle is aligned with the aperture 95 and the next eight reciprocations are made, respectively, in the positions indicated by the numbers 2-3-4-5-6-7-8-9; the needle being vibrated laterally between successive stitches and forming the group of stitches designated as d in Fig. 17.

During the second reciprocation of the needle, the tensions 35 and 36 are open, as indicated by the word "Off," in Fig. 16, and the thread-clamp 38 is open, so that thread readily may be pulled from the supply, the thread-controller K is moved upwardly to the position designated as 2x thereby to give up blade to the thread-forming mechanism, and the blade 80 remains stationary and continues to hold the beginning end of the thread nipped against the under side of the throat-plate.

During the third reciprocation of the needle, the thread-tensions are closed and remain closed throughout the succeeding reciprocations including the eleventh. During the third reciprocation, and continuing through the ninth, the thread-clamp remains open, and the thread-controller remains stationary. The thread-cutting and -nipping blade remains stationary through the second to ninth reciprocations of the needle, continuing to hold the thread-end. During the ninth up-stroke of the needle, the cutting and nipping blade is moved to the right from the position shown in Fig. 9 to the position shown in Fig. 10, likewise from the position f, in Fig. 16, to the position g to release the nipped end of the thread. During the tenth reciprocation of the needle, the cutting and nipping blade is moved to the left from the position g (Fig. 16) to the position h. During this movement the cutting edge 94a of the blade 80 is brought into the path of movement of one limb of the thread-loop, which is forced thereagainst by the wing of the looper, and severed as heretofore described. During the tenth reciprocation of the needle, the thread clamp is closed and the thread-controller K draws thread back from the needle to tighten the thread and assist in the thread-cutting operation.

The above described partial operation of the machine completes the formation of the group of stitches d, shown in Fig. 17, and thereafter severs the needle-thread thus completing the first stage of the operation. The machine continues to operate and during the eleventh complete reciprocation of the needle the button-clamp C and work-plate P are moved endwise to the left thereby positioning the holes a' and b' of the button B in alignment with the needle. Continued operation of the machine repeats the partial operation, herebefore described, thereby similarly producing the group of stitches e' and severing the thread at the end of the stitching cycle, whereupon the stop-motion brings the machine to rest, at the completion of the second stage of operation, with the needle elevated, and the thread-cutting and -nipping blade in the position indicated by f, in Fig. 16.

In making the group of stitches d, the needle makes its ninth and tenth reciprocation in the same hole in the button thereby producing a knotting or tying stitch. Likewise the group of stitches e' is concluded by a knotting or tying stitch, the needle, for this purpose, making its nineteenth and twentieth reciprocations in the same hole.

In the above description of the operation of the machine, the normal and continuous take-up action of the take-up 41 and the normal intermittent action of the tension 35 have been disregarded inasmuch as those actions are conventional and have no special significance with the present invention.

Having thus set forth the nature of the invention, what I claim herein is:

1. In a sewing machine having a frame including a work-support and an overhanging head, an endwise reciprocatory thread-carrying needle mounted in said head, and a rotary loop-taker located beneath said work-support and cooperating with said needle in the formation of stitches; the improvement which consists in the provision of a thread-cutter comprising a slittable cutter-blade having a thread-cutting edge arranged substantially parallel to the axis of rotation of said loop-taker, and means for periodically shifting said cutter-blade to positions of thread-cutting edge in the path of movement of one limb of the thread carried by the loop-taker whereupon further rotation of the loop-taker carries the thread into contact with said thread-cutting edge and severs the thread.
2. In a sewing machine having an endwise reciprocatory thread-carrying needle and a rotary chain-stitch looper cooperating with said needle in the formation of stitches; the improvement which consists in the provision of a thread-cutter comprising a shiftable cutter-blade having a thread-cutting edge arranged transverse to the path of rotation of said looper, said blade having an operative position with its cutting edge within the path of movement of one limb of the thread-loop carried by said looper and an inoperative position with said cutting edge remote from said path, and means operative at a predetermined point in the cycle of operation of the machine for shifting said cutter-blade from its inoperative position into its operative position so that the looper will carry one limb of the needle thread loop into contact with said cutting-edge to sever the thread.

3. In a sewing machine having an endwise reciprocatory thread-carrying needle and a looper cooperating with said needle in the formation of stitches; the improvement which consists in the provision of a thread-cutter comprising a shiftable cutter-blade having a thread-cutting edge arranged transverse to the path of movement of said loop-taker, said blade having an operative position with its cutting edge within the path of movement of one limb of the thread-loop carried by said loop-taker and an inoperative position with said cutting edge remote from said path, means rendered effective at the end of the stitch forming cycle of the machine for shifting said cutter-blade from its inoperative position into its operative position so that the loop-taker will carry one limb of the needle-thread loop into contact with said cutting-edge to sever the thread.

4. In a sewing machine having an endwise reciprocatory thread-carrying needle and a loop-taker cooperating with said needle in the formation of stitches; the improvement which consists of a thread-cutter comprising a stationary cutter-blade having a thread-cutting edge, and a shiftable cutter-blade having two transversely arranged thread-cutting edges of which one is adapted to cooperate with the cutting edge of said stationary blade, and means for periodically shifting said shiftable blade to cause said cooperating edges to trim off the beginning end of the thread and the other cutting edge of said shiftable blade with one limb of a thread-loop carried by said loop-taker whereupon said loop-taker carries said thread-limb into contact with said other cutting edge and thereby severs the thread.

5. In a sewing machine having stitch-forming mechanism, a thread-tension, means for releasing said tension, a thread-clamp located intermediate the thread-tension and the stitch-forming mechanism; means for operating the machine through a predetermined article attaching cycle, means for nipping the sewing thread, means for actuating each of said tension-releasing means, thread-clamp, thread-controller, thread-nipper and thread-severing means a plurality of times during said article attaching cycle.

6. In an article attaching machine having article holding means, stitch-forming mechanism, a thread-tension, means for releasing said tension, a thread-clamp located intermediate the thread-tension and the stitch-forming mechanism, a thread-controller located intermediate the thread-clamp and the stitch-forming mechanism; means for operating the machine through a predetermined article attaching cycle, means for nipping the sewing thread, means for actuating each of said tension-releasing means, thread-clamp, thread-controller, thread-nipper and thread-severing means a plurality of times during said article attaching cycle.

7. In a sewing machine having stitch-forming mechanism, a thread-tension, means for releasing said tension, a thread-clamp located intermediate the thread-tension and the stitch-forming mechanism, means for operating the machine through a predetermined two-stage sewing cycle, a combined thread-nipping and -severing blade for nipping the thread at the beginning of each stage and for severing the sewing thread at the end of each stage, and means for actuating each of said tension-releasing means, thread-clamp, and thread-nipping and -severing blade a plurality of times during said sewing cycle.

8. In a sewing machine having stitch-forming mechanism, a thread-tension, means for releasing said tension, a thread-clamp located intermediate the thread-tension and the stitch-forming mechanism, means for operating the machine through a predetermined sewing cycle, means for nipping the sewing thread, means for trimming off the free end of the nipped thread, means for severing the sewing thread after the completion of a group of stitches, and means for actuating each of said tension-releasing means, thread-clamp, thread-controller, thread-nipper, thread-trimmer and thread-severing means a plurality of times during a complete sewing cycle.

9. A thread-cutting mechanism for sewing machines having a rotary looper and a complementary needle carrying a sewing thread, comprising a movable thread-cutting blade having a plurality of thread-cutting edges, a stationary cutting blade adapted to cooperate with one of said cutting edges, means to shift said movable blade to cause said cooperating edges to cut off the beginning end of said sewing thread, and means operative after a predetermined number of stitches have been made to give to said movable blade another movement to cause the other cutting edge thereof to be brought into the path of movement of a limb of a thread-loop carried by said looper whereby the looper carries said limb against said other cutting edge to sever said thread.

10. A thread-cutting mechanism for sewing machines having a rotary looper formed with a loop-spread wing and a complementary needle carrying a sewing thread, comprising a movable thread-cutting blade having a plurality of thread-cutting edges, a stationary cutting blade adapted to cooperate with one of said cutting edges, means to shift said movable blade to cause said cooperating edges to cut off the beginning end of said sewing thread, and means operative after a predetermined number of stitches have been made to give to said movable blade another movement to cause the other cutting edge thereof to be brought into the path of movement of a limb of a thread-loop carried by the wing of said looper whereby the looper wing carries said limb against said other cutting edge to sever the thread.
11. A thread-cutting mechanism for sewing machines having a loop-taker and a complementary needle carrying a sewing thread, comprising a movable thread-cutting blade having two transversely arranged thread-cutting edges, a stationary cutting blade adapted to cooperate with one of said cutting edges, means to shift said movable blade in one direction to cause said cooperating edges to sever said sewing thread, and means to move said blade in the opposite direction to cause the other cutting edge thereof to be brought into the path of movement of a limb of a thread-loop carried by said looper whereby the loop-taker carries said limb against said other cutting edge and severs the thread.

12. A thread-cutting and -nipping mechanism for sewing machines having a throat-plate, a rotary looper and a complementary needle carrying a sewing thread, comprising a movable thread-cutting and -nipping blade located beneath the throat-plate and having a thread-nipping portion cooperating with the under side of the throat-plate and a plurality of thread-cutting edges, a stationary cutting blade adapted to cooperate with one of said cutting edges, means to shift said movable blade to cause the thread to be nipped between the blade and the throat-plate and to cause said cooperating edges to trim off the free end of the nipped thread, and means operable after a predetermined number of stitches have been made to give to said movable blade another movement to cause the other cutting edge thereof to be brought into the path of movement of a limb of a thread-loop carried by said looper whereby the looper carries said limb against said other cutting edge to sever the thread.

13. A thread-cutting mechanism for sewing machines having a throat-plate, a loop-taker and a complementary needle carrying a sewing thread, comprising a stationary cutter-blade adjacent to but spaced from said throat-plate, a movable thread-cutting and -nipping blade located between said stationary blade and said throat-plate and having a thread-nipping portion adapted to cooperate with said throat-plate and a plurality of thread-cutting edges, one of which cooperates with said stationary cutter-blade, means to shift said movable blade to cause said thread-nipping portion to nip the thread against said throat-plate and to cause said cooperating edges to trim off the free end of the nipped thread, and means operative after a predetermined number of stitches have been made to give to said movable blade another movement to cause the other cutting edge thereof to be brought into the path of movement of a limb of a thread-loop carried by said loop-taker whereby the loop-taker carries said limb against said other cutting edge to sever the thread.

MICHAEL McCANN.