

Oct. 5, 1926.

1,602,144

S. W. AVIS

TRIMMING MECHANISM FOR SEWING MACHINES

Original Filed July 1, 1920 4 Sheets-Sheet 1

Fig. 1.

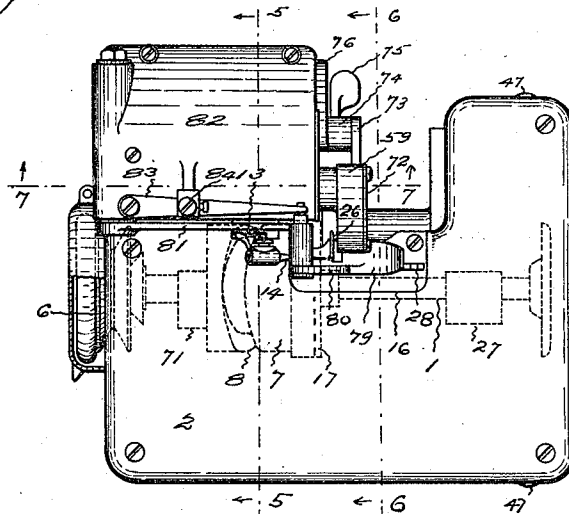


Fig. 2.

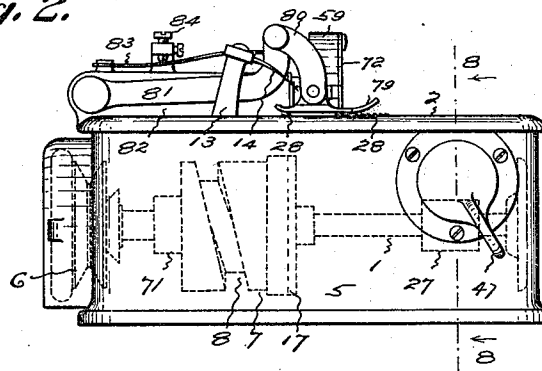
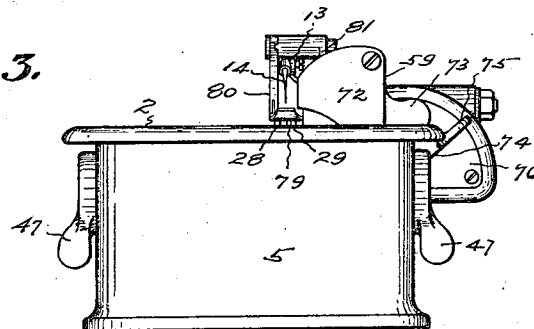


Fig. 3.



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Fig. 4.

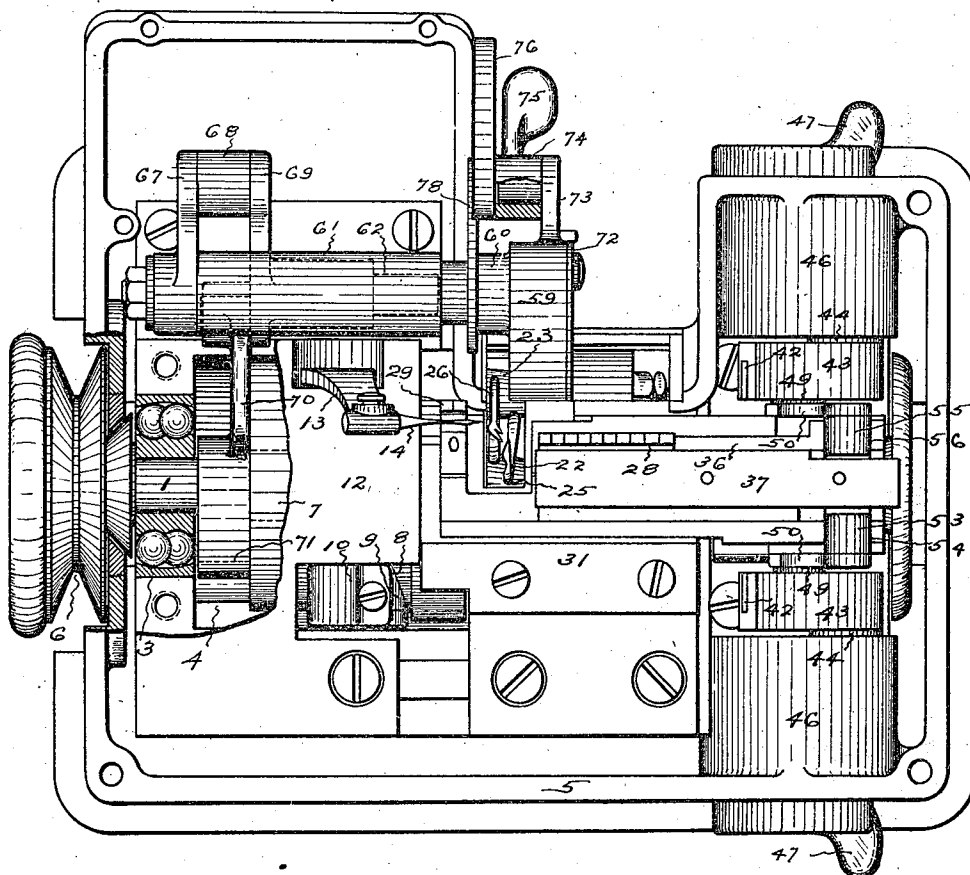
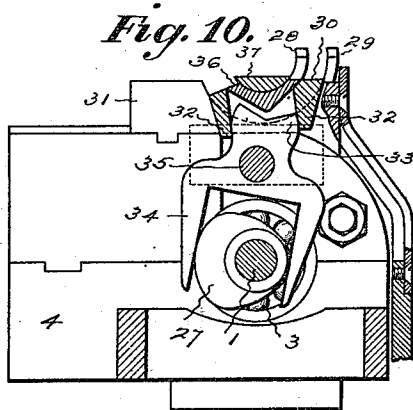


Fig. 10.



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Fig. 5.

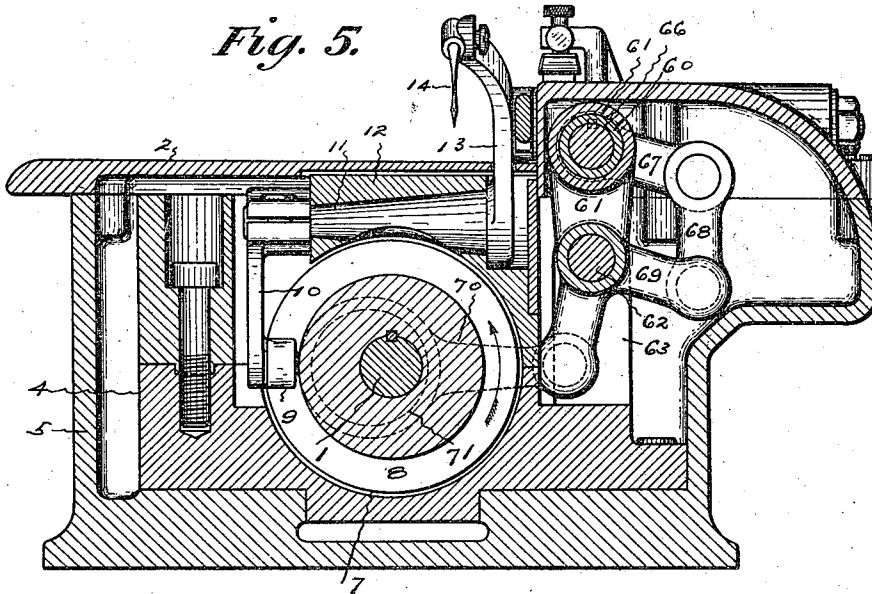
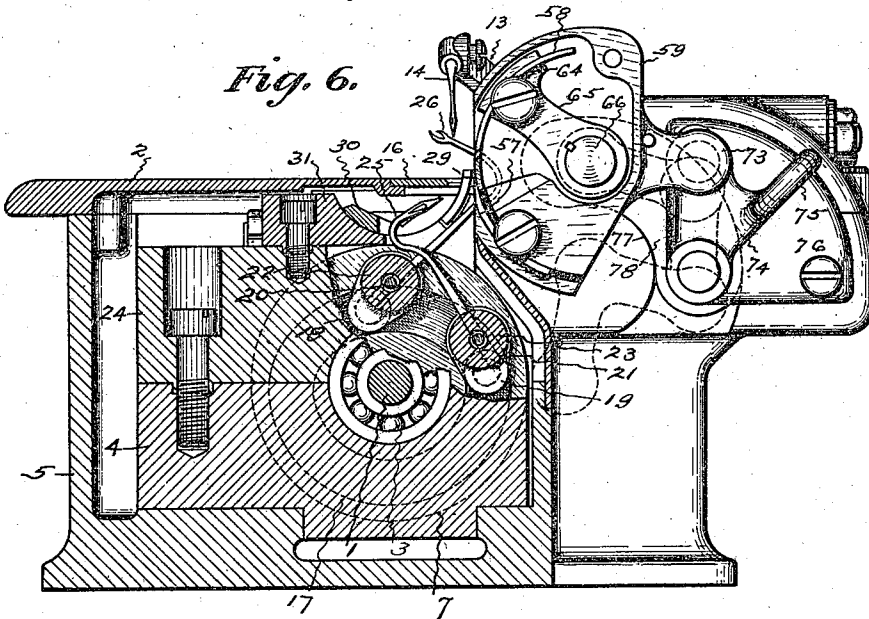


Fig. 6.



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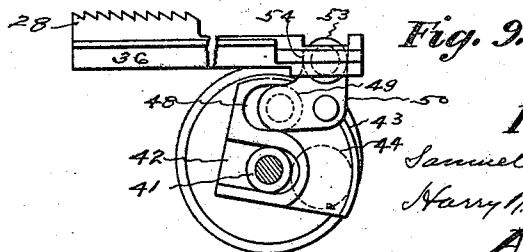
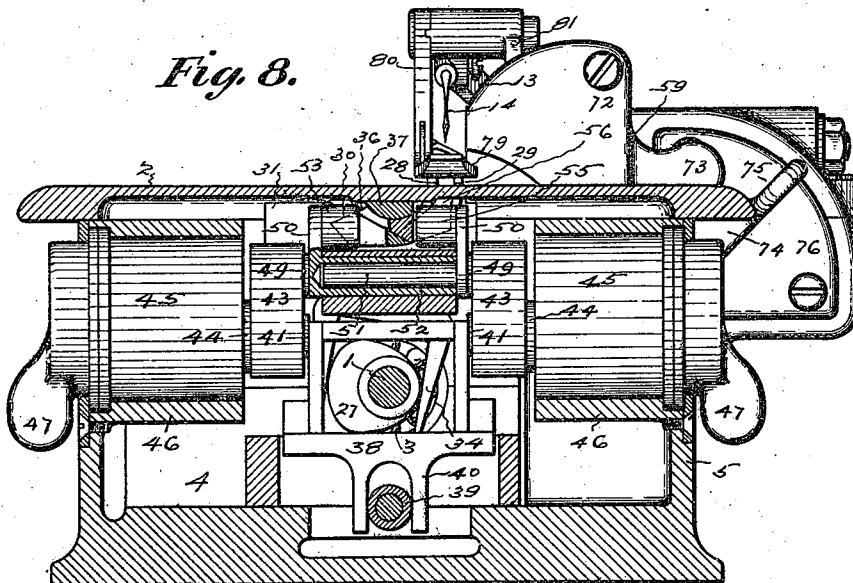
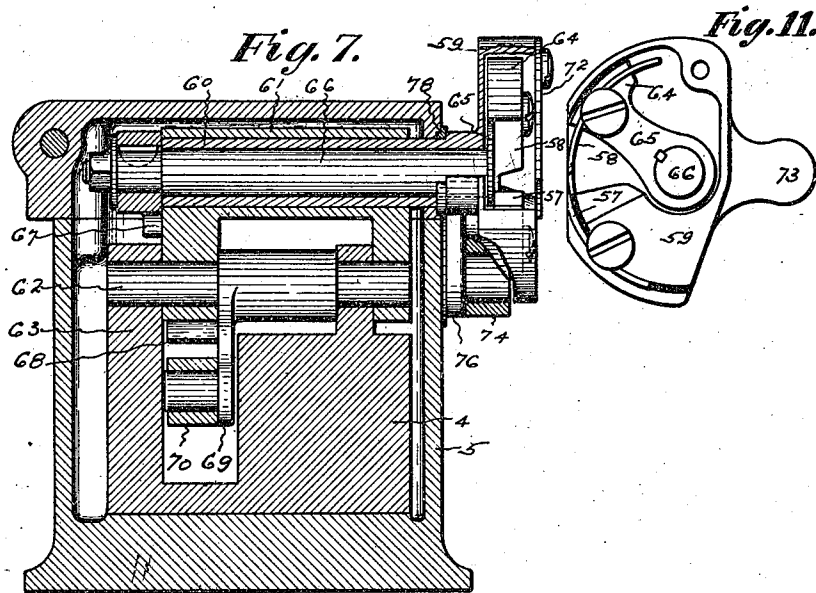
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TRIMMING MECHANISM FOR SEWING MACHINES

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UNITED STATES PATENT OFFICE.

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TRIMMING MECHANISM FOR SEWING MACHINES.

Original application filed July 1, 1920, Serial No. 393,223. Divided and this application filed August 2, 1921, Serial No. 489,353. Renewed March 12, 1926.

This invention relates particularly to the trimming mechanisms designed to be applied to those sewing machines which have a needle and two loopers that stitch with two or three threads and are commonly known as overseam machines, such a machine being set forth in application No. 393,223 filed by me July 1, 1920, from which the subject of this application has been divided.

The object of the invention is to provide a suitable work trimming mechanism for a machine of this class in which the mechanisms are simple, cheap and durable; are easily adjusted so the machine will be capable of stitching a large variety of work; are located so as to permit maximum freedom in the manipulation of the work; and are designed so they can run at very high speeds with a minimum expenditure of power and without objectionable vibration and produce a stitch of desired uniformity on different thicknesses of material.

These objects are attained by designing the mechanisms which actuate the stitch forming needle and loopers, work controlling feed dogs, and the trimmer blades which are quickly adjustable in order to enable the edge of the work to be trimmed any desired distance from the line of needle puncture, so that the parts will co-operate in such manner that the machine will run at high speed and perform its work satisfactorily.

In the accompanying drawings, Figure 1 shows a plan of the machine provided with a trimming mechanism constructed according to this invention. Fig. 2 shows a side elevation of the machine. Fig. 3 shows a front elevation of the same. Fig. 4 shows a plan of the machine with the cover plate removed and a portion of the frame broken away. Fig. 5 is a vertical section on the plane indicated by the dotted line 5—5 on Fig. 1. Fig. 6 is a vertical section on the plane indicated by the dotted line 6—6 on Fig. 1. Fig. 7 is a vertical section on the plane indicated by the line 7—7 on Fig. 1. Fig. 8 is a vertical section on the plane indicated by the dotted line 8—8 on Fig. 2. Fig. 9 is a side view of the front feed dog and its reciprocating mechanism. Fig. 10 is a view of the mechanism for oscillating the feed dogs. Fig. 11 is a face view of the trimmer head.

In the machine illustrated the needle, loopers, feed dogs and trimmer are all actuated from a single rotatory shaft 1 which is supported below the work plate 2 with its axis parallel with the line of feed of the work to be stitched on the machine. This shaft is supported by anti-friction bearings 3 held in a cast iron skeleton bed frame 4 which is enclosed in a tight casing 5 that is adapted to hold a supply of lubricant. On the end of the shaft outside the casing is a pulley 6 which may be driven by a belt or motor as desired, Fig. 4.

In the interior of the casing the shaft carries a drum 7 with a cam groove 8 in its periphery. Lying in this cam groove is a roll 9 on the lower end of the lever 10 which projects downward within the casing from one end of the conical arbor 11 that is fitted in a long tapering bearing in the needle carrier block 12 which is secured to the top of the bed frame, Fig. 5. Extending upwardly from the other end of the arbor through the block and a slot in the work plate, is a needle carrier 13 the upper end of which carries the curved needle 14. The cam oscillates the needle carrier at the proper intervals to swing the needle point down through and return it out of the usual opening in the needle plate 16 that is set flush with the work plate, Fig. 6.

In the end face of the drum 7 is a cam groove 17 and lying in this groove are rollers 18 and 19 on the ends of short rocker arms 20 and 21 which project from the looper carriers 22 and 23. The looper carriers are held in bearings in the looper carrier block 24 that is fastened to the top of the bed frame, Fig. 6. The loopers 25 and 26 extend radially from near one end of the looper carriers. The needle swings down and up through the needle opening in the needle plate in a plane parallel with the line of feed while the loopers oscillate in planes transverse to the line of feed, the lower looper 25 oscillating below the needle plate and the upper looper 26 swinging from beneath around one side over the top of the needle plate, Fig. 6.

On the shaft 1 near one end is a cam 27 which actuates the front toothed feed dog 28 and the rear toothed feed dog 29. This single cam through the connecting mechanisms imparts a longitudinal reciprocatory

movement forward and back to the feed dogs and gives them a transverse oscillatory movement so they are raised up through the needle plate when forward and lowered below the needle plate when back. The rear feed dog is attached to a carrier 30 which has a cylindrical under surface that fits in a correspondingly shaped cavity formed in the top of the feed dog block 31 secured to the top of the looper carrier block, Fig. 6. Projecting downward from the rear feed dog carrier in front of the feed dog block are a pair of lugs 32 into the opening between which extends a tooth 33 projecting upward from a fork 34 that is mounted on a stud 35, Fig. 10. This fork straddles the cam 27 so that the rotation of the cam oscillates the fork and causes the rear feed dog carrier to rock on its longitudinal axis at the proper time.

The front feed dog is attached to a carrier 36 which has an angular lower surface that fits in an angular cavity in the top of the rear feed dog carrier. The upper surface of the front feed dog carrier has a cylindrical cavity, and fitting in this and retaining the carrier in place is a plate 37 that is fastened to the under side of the work plate, Figs. 8 and 10. The under curved surface of the rear feed dog carrier and the upper curved surface of the front feed dog carrier are concentric. As a result of this construction the front feed dog carrier is oscillated with the rear feed dog carrier, but is free to be moved longitudinally independently of the rear feed dog carrier.

The feed dog carriers are reciprocated by means which are adjustable independently of each other so that a variable feed may be obtained and the changes made while the machine is running. A section of the cam 27 is embraced by a yoke 38, that is located in an opening in the bed plate in front of the fork, in such manner that the rotation of the cam moves the yoke up and down, Fig. 8. A roller 39 mounted on the bed frame extends into an opening between two arms 40 which project from the bottom of the yoke and assists in guiding the yoke. The connections between the yoke and feed dog carriers are similar but independently adjustable. The yoke on each side has a roller 41 which occupies a radial slot 42 in the face of an adjustable bell crank plate 43 that has an arbor 44 which is mounted eccentrically in a cylinder 45, Fig. 8. Each cylinder is rotatably located in a hub 46 projecting inward from the side of the casing. By means of the handles 47 the cylinders may be rotated in order to change the angular relations of the axes of the bell crank plates to the axes of the rollers on the yoke which engage and oscillate the crank plates as the yoke moves up and down.

Lying in a curved slot 48 in the face of

each crank plate is a roller 49 on an angle lever 50, Fig. 9. One angle lever has a solid arbor 51 and the other a tubular arbor 52 that surrounds the solid arbor and is fitted in a bearing in the end of the bed frame, Fig. 8. The angle lever on one side at its upper end has a roller 53 engaging between the walls of an opening 54 in the side near the front end of the rear feed dog carrier, Fig. 4. The angle lever on the other side at its upper end has a roller 55 engaging between the walls of an opening 56 in the side near the front end of the front feed dog carrier, Fig. 4.

The cam imparts a vertical reciprocation to the yoke. This rocks the bell crank plates which oscillate the angle levers that reciprocate the feed dogs. By turning the cylinders which support the arbors of the bell crank plates and changing the angular relations of the axes of the plates to the axes of the rollers carried by the yoke the reciprocatory movement of the feed dogs may be altered at any time without interfering with the running of the machine. With the mechanism described the amount of feed of the dogs and the relations of the movements of the dogs to each other may be varied independently as desired, according to the character of the work being operated upon.

The presser foot 79 is pivotally mounted on the lower end of a finger 80 which is hinged to the end of an arm 81 that is pivoted to the side wall of a cover 82 on one side near the rear of the machine. A spring 83 holds the presser foot down. The tension of this spring is regulated by a screw 84.

The trimmer has a blade 57 which is normally stationary and a co-operating blade 58 that oscillates with relation to the fixed blade for trimming the edge of the material that is being fed beneath the needle, Figs. 7, 11. These blades are mounted in such a manner that they may be adjusted more or less to one side of the plane of the needle or line of stitch or swung over away from in front of the needle and loopers.

The fixed blade 57 is a curved strip which is clamped in a curved groove in a housing 59 that is attached to the front end of a sleeve 60. This sleeve is held in the upper part of a yoke-shaped frame 61 which is pivotally mounted on an arbor 62 secured in an upward extension 63 on one side near the rear of the bed frame, Fig. 7.

The oscillatory blade 58 is a curved strip clamped in a curved slot in the head 64 of a rocker arm 65 which projects from a shaft 66 that passes through the sleeve 60, Figs. 7, 11. An arm 67 which projects from the rear end of the shaft 66 is connected by a link 68 with a bell crank lever 69 that is pivotally mounted on the arbor 62 and has its lower end connected by link 70 with an

eccentric 71 keyed on the driving shaft back of the needle and looper cam drum, Figs. 5, 7. The rotation of the eccentric through the lever, link and arm rocks the shaft 66 and oscillates the trimming blade 58 which co-operates with the trimming blade 57 for cutting when the needle is down.

Covering the front of the housing 59 is a face plate 72. The housing has a projection 73 which is hinged to a link 74 that is provided with a handle 75 and is pivotally mounted on a plate 76 secured to the main casing, Fig. 6. The axis of the hinged connection between the projection 73 and link 74 coincides with the axis of the connection between the shaft arm 67 and the link 68, Fig. 4, and the axis of the pivot of the link 74 coincides with the axis of the connection between the link 68 and the bell crank lever 69, thus the trimming blades are mounted in parts supported by a parallel link mechanism. By turning the handle 75 the trimming blades may be adjusted in a substantially horizontal plane toward or from the line of feed of cloth for varying the distance between the line of needle punctures and the edge to be trimmed. With such a parallel motion adjustment the cutting edges of the trimmer remain practically in the same horizontal plane for all desired variations in width of seam and thus will leave the cloth lying on the needle plate and ensure a uniform width of seam. By turning the handle 75 way down the housing containing the trimming blades may be swung over to one side out of the way so as to permit free access to the points of the needle and the loopers for threading or other purposes. In the side of the main casing is a curved slot 77, Fig. 6, through which the oscillatory trimmer shaft may pass when the housing and frame are swung over for adjustment or for moving the cutters out of the way, and secured to the shaft 66 inside of the plate 76 is a curved shutter 78 which covers the slot 77, Fig. 4.

The invention claimed is:

1. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a fixed cutter, a movable cutter, means for actuating the movable cutter, a support for said cutters, and a parallel link mounting for said support.

2. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising co-operating cutters, means for actuating the cutters, a support for said cutters, and a parallel link mounting for said support.

3. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a curved fixed cutter, a curved oscillatory cutter that co-operates therewith, mechanism for os-

cillating the latter cutter, a frame supporting said cutters, and a parallel link mounting for said frame.

4. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a curved fixed cutter, a curved oscillatory cutter that co-operates therewith, an oscillatory frame supporting said cutters, and a parallel link connection for adjusting said frame.

5. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a housing, a cutter fixed in said housing, a cutter movable in said housing, an oscillatory support for said housing, and parallel link connections for actuating the movable cutter and adjusting the housing.

6. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a housing, an oscillatory support for the housing, a cutter fixed in said housing, an oscillatory cutter in said housing, and coinciding parallel link connections for oscillating said housing and said oscillating cutter in the housing.

7. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a fixed cutter, an oscillatory cutter, and coinciding parallel link connections for supporting said cutters and for actuating the oscillatory cutter.

8. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a relatively fixed curved cutter blade, an oscillatory curved cutter blade, mechanism for oscillating the latter blade toward and from the former blade in an arc the axis of which is parallel to the line of feed of work through the machine, and an oscillatory support for the blades, said blades being mounted as a unit on said support, whereby they may be adjusted coincidently toward or from the line of work feed while the machine is in operation.

9. In a sewing machine the combination with the stitching and feeding means and a common cam shaft, of a trimming mechanism comprising a relatively fixed curved cutter blade, an oscillatory curved cutter blade, mechanism operated from the cam shaft for oscillating the latter blade toward and from the former blade in an arc the axis of which is parallel to the axis of the cam shaft, and an oscillatory support carrying the cutter blades.

10. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a relatively fixed curved cutter blade, an oscillatory curved cutter blade, mechanism for oscillating the latter blade toward and from the

former blade in an arc the axis of which is parallel to the line of feed of work through the machine, an adjustable housing carrying said blades, and means for adjusting said housing in a substantially horizontal plane toward and from the line of feed of work through the machine.

11. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a pair of curved cutter blades, mechanism for causing the cooperation of said blades, and a common oscillatory support for said blades, said blades and mechanism being mounted on said support so that they may be adjusted together as a unit toward and from the line of feed of work through the machine.

12. In a sewing machine the combination with the stitching and feeding means, of a trimming mechanism comprising a pair of curved cutter blades, mechanism for causing the oscillation of one of said blades, and a common oscillatory support for said blades whereby said blades may be adjusted together as a unit in a substantially horizontal plane toward and from the line of feed of work through the machine.

13. In a sewing machine having a work plate, the combination with the stitching and feeding means, of a trimming mechanism comprising a relatively fixed cutter sup-

ported below the work plate, an oscillatory cutter supported above the work plate, mechanism for oscillating the latter cutter toward and from the former cutter in an arc the axis of which is parallel to the line of feed of work through the machine.

14. In a sewing machine having a work plate, the combination with the stitching and feeding means, of a trimming mechanism comprising a pair of curved cutters one of which is mounted below the work plate and the other of which is oscillated and is mounted above the work plate, mechanism for causing the oscillation of said upper cutter, and means supporting said cutters and mechanism whereby they may be adjusted as a unit toward and from the line of feed of work through the machine.

15. In a sewing machine having a work plate, the combination with the stitching and feeding means, of a trimming mechanism comprising a housing, means for adjusting the housing toward and from the line of feed of work through the machine, a cutter blade fixed to the housing below the plane of the work plate, a cutter blade held by the housing above the plane of the work plate, and mechanism for oscillating the latter cutter blade toward and from the former cutter blade.

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