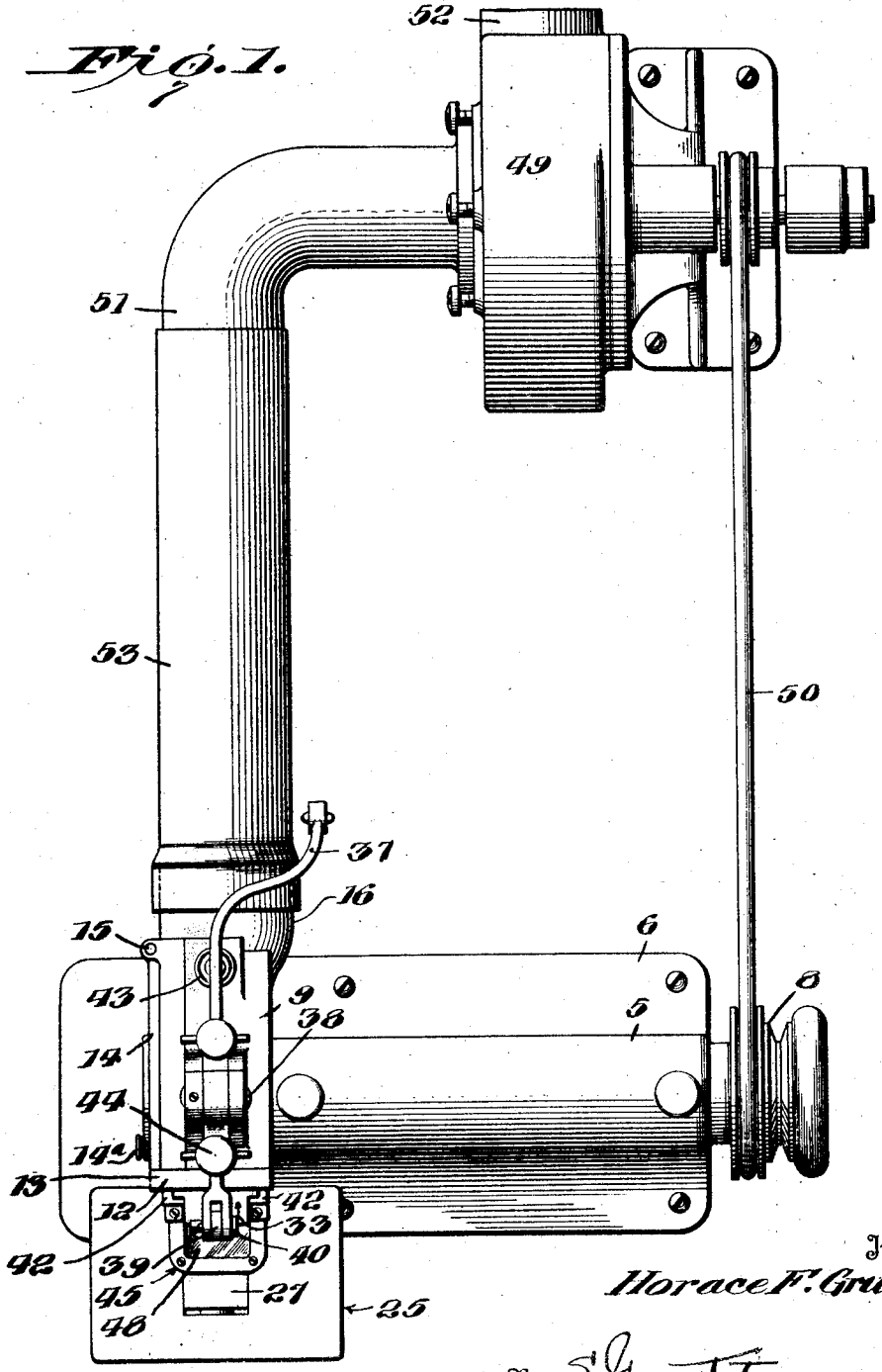
Sept. 8, 1925. 1,553,040

H. F. GRUMAN

EDGE TRIMMING MACHINE

Filed April 21, 1924 3 Sheets-Sheet 1

Fig. 1.



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EDGE TRIMMING MACHINE

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Fig. 2.

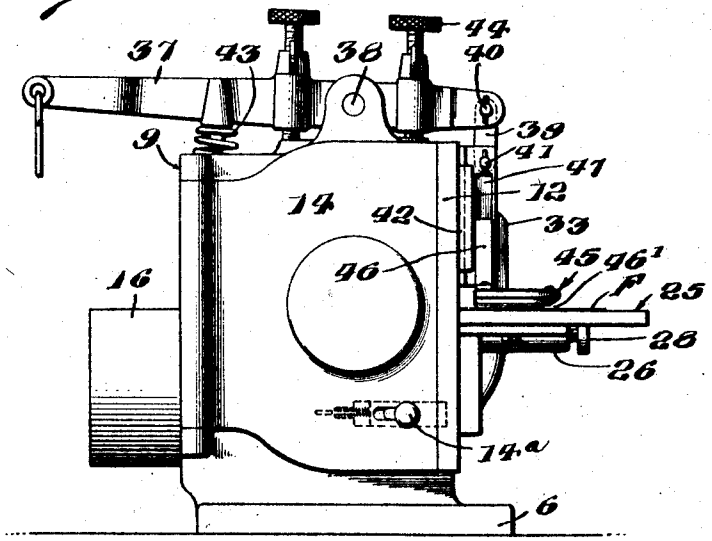
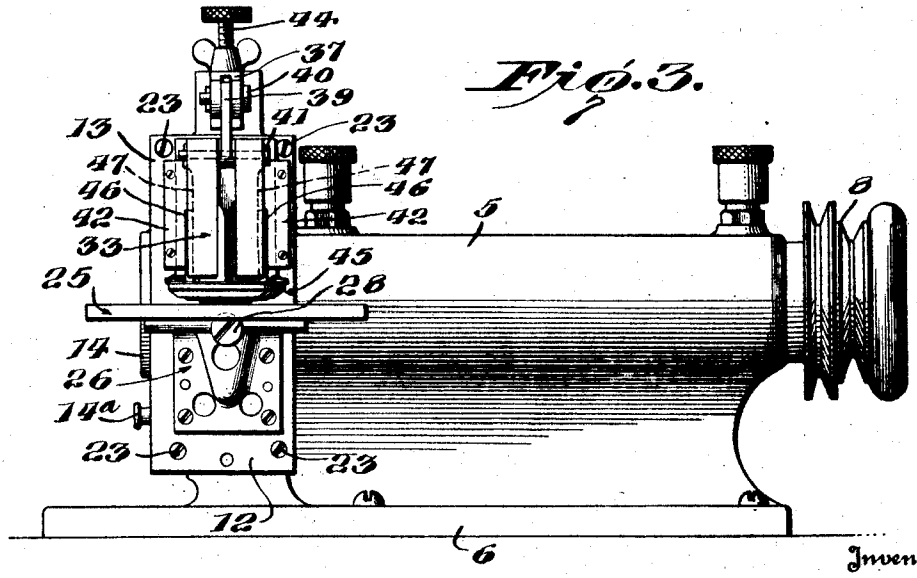


Fig. 3.



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EDGE TRIMMING MACHINE

Filed April 21, 1924 3 Sheets-Sheet 3

Fig. 4.

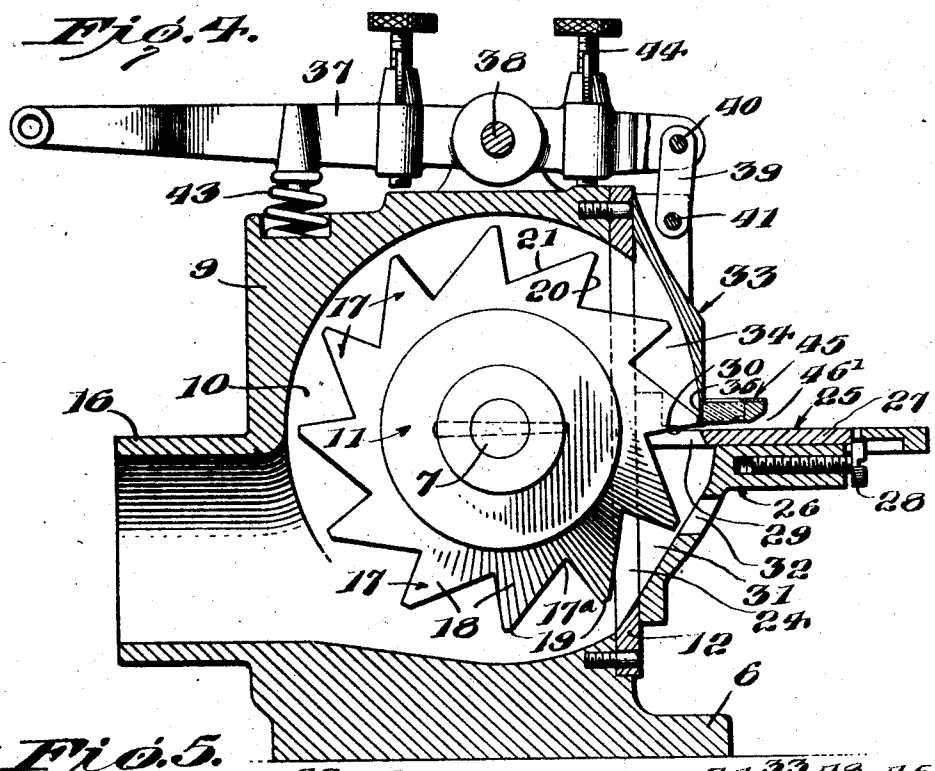


Fig. 5.

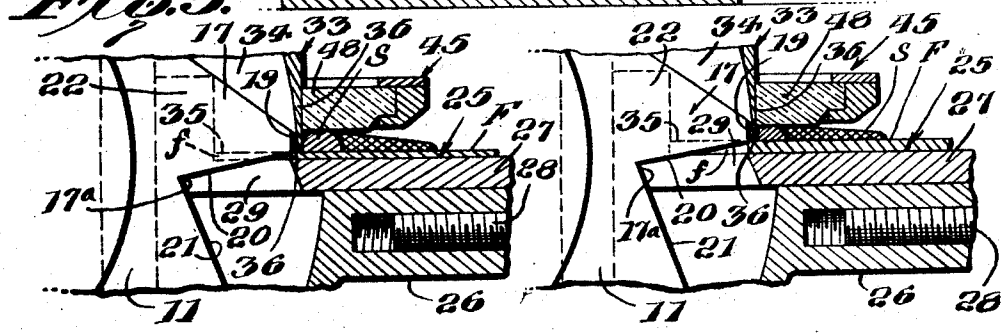


Fig. 6.

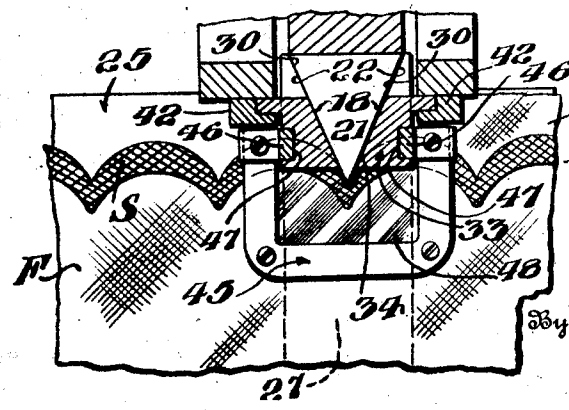


Fig. 7.

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Patented Sept. 8, 1925. 1,553,040

UNITED STATES PATENT OFFICE.

HORACE F. GRUMAN, OF ST. LOUIS, MISSOURI, ASSIGNOR TO LEWIS INVISIBLE STITCH MACHINE CO., OF ST. LOUIS, MISSOURI, A CORPORATION OF MAINE.

EDGE-TRIMMING MACHINE.

Application filed April 21, 1924. Serial No. 707,901.

To all whom it may concern:

Be it known that I, HORACE F. GRUMAN, citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Edge-Trimming Machines, of which the following is a specification.

This invention relates to new and useful improvements in edge trimming machines generally, although more particularly to a machine for trimming the surplus fabric lying beyond the scollops of embroidery stitches.

In the prior art, such as is shown in the U. S. patent to West, 331,015, dated November 24, 1885, provision is made for mechanically feeding a long narrow fabric strip having a previously formed line of embroidery scollops stitched thereon, passed a cutter which rotates about a horizontal axis. In this patent, no provision whatsoever is made for trimming the surplus stock of wide fabrics or for trimming the surplus stock from the bottoms of wash skirts, petticoats, etc., which have previously been formed with a line of scolloped embroidery stitches. In trimming this surplus stock from previously made up garments, it is necessary to hand feed the garment past the cutter because mechanical feeding means cannot be adapted for this class of work owing to the irregular sizes of the garments as well as the irregular sizes of the scollops and the inherent flexibility of the material. In the West patent above noted, the rotary cutter is exposed to the operator and is therefore exceedingly dangerous. Furthermore, in this patent construction the trimmed off pieces of fabric or lint, necessarily pile up in and around the cutter and consequently tend to choke the latter and thereby impair its efficiency.

In my copending application Ser. No. 684,755 filed January 7, 1924, I have illustrated an edge trimming machine which is especially adapted for use in trimming the surplus stock beyond a line of scollop embroidery stitches from previously formed garments. In this machine there is provided a horizontally disposed work support arranged in front of the cutter, and cooperating with this work support is a horizontally disposed foot device which together with the work support form a horizontally disposed guiding channel for the work. Fixed to this foot device is a depending guard which is positioned in rear of the embroidery stitches so as to limit the movement of said work towards the cutter. Means are provided for vertically adjusting the foot device and for retaining the same in any predetermined position of adjustment. Therefore, when this foot device is adjusted vertically so as to position the foot device a distance above the work support whereby the body fabric including the line of embroidery scollops may be freely hand fed past the cutter without any drag, the guard will necessarily be correspondingly adjusted vertically. Therefore, if a garment is provided with thick embroidery stitches it becomes necessary to elevate the foot device and in so doing the guard is elevated above the body fabric. This allows the marginal portion in rear of the line of scollops to be freely movable not only horizontally but also vertically. In other words the guard does not retain the trimmed edge portion in a positive position while the trimmer is functioning. The flexibility of this trimmed edge portion is such that when the operator feeds the garment laterally past the cutter, said trimmed edge portion will, with certain materials, be caused by the rotation of the cutter to be projected downwardly between the cutter and the stationary trimmer blade. This condition results in the trimmed edge portion being squeezed between the cutter and the stationary trimming blade and consequently the marginal portion of the garment will not be trimmed.

One of the principal objects of my present invention is, therefore, to provide an edge trimming machine of the general type described in my copending application above mentioned, in which the foot device and the guard are supported for independent vertical adjustment whereby the trimmer will function regardless of the character of material of the body fabric or regardless of the thickness of the embroidery scollops.

Another object of the invention is to provide a foot device of the character described which is mounted for free float-movements vertically whereby said device will be automatically adjusted through its engagement by the embroidery scollops.

Another important object of the invention

is to provide a guard and means for positively adjusting the same vertically independent of the foot device and for retaining said guard in any predetermined position of adjustment.

Another object of the invention is to provide a machine of the character described in which the housing for the cutter is provided with a closure element for permitting ready access to the interior of the housing for the purpose of removing any lint which has not been withdrawn by the suction device.

In the accompanying drawings.

Figure 1 is a top plan view of an edge trimming machine constructed in accordance with my invention.

Figure 2 is a left hand end elevation thereof.

Figure 3 is a front elevation thereof.

Figure 4 is an enlarged vertical sectional view taken in the plane of the cutter.

Figure 5 is an enlarged detail sectional view showing the relative positions of the foot device and guard, and body fabric.

Figure 6 is a similar view but showing a body fabric of different weight and having an embroidery scollop of different thickness, the foot device and the guard being shown in adjusted positions corresponding to the weight of material and thickness of the scollop, and

Figure 7 is a detail horizontal sectional view taken above the foot device and showing the construction for permitting the relative adjustment of the foot device and guard.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, my invention comprises a frame 5 having a base 6 and journaled within the frame is a horizontally disposed driving shaft 7. The shaft 7 extends beyond the right hand end of the frame and attached to this projecting end is a pulley wheel 8. The left hand end of the frame 5 is cast with a housing 9 forming a compartment 10. The left hand end of the shaft 7 extends into this compartment and fixed to said projecting end of the shaft is a rotary cutter 11. The housing 9 is cast with an open front end and with an open left side. The front end of the housing is closed by a plate 12, the left hand portion thereof extending beyond the side opening of the housing as indicated at 13 in Fig. 1. The open side of the housing is closed by a plate 14 which is pivoted at one side to said housing by means of a pin 15 so as to permit the closure plate to be swung to and fro about a vertical axis. This plate fits in rear of the projecting portion 13 of the front plate 12 and a spring latch 14^a of any suitable construction is carried by the closure plate 14 for cooperation with the front plate 12 so as to secure said closure plate in its closed position.

Integral with the housing 9 is a rearwardly extending nipple 16, the longitudinal axis thereof being disposed in a horizontal plane and arranged at a tangent to a circle having for its center the longitudinal axis of the shaft 7. The nipple 16 communicates with the interior of the housing and is located in a plane below the plane containing the axis of the shaft 7. This nipple and housing are cast together and the nipple is therefore independent of the closure plate 14. This creates a construction which is capable of being readily cast.

The rotary cutter 11 is formed with a plurality of peripheral teeth 17. The side walls 18—18 converging outwardly to form resultant points 19. Each tooth includes a front face 20 and a rear face 21. The front face 20 of each tooth lies in a plane tangent to a circle, the axis of which is coincident with the axis of the cutter shaft 7, that is, this face extends inwardly from the point of the tooth in a plane inclined to a radial plane of the cutter. In this particular instance, the front face 20 of each tooth is also disposed in a plane parallel to the axis of the cutter whereby both cutting edges of the given tooth will be disposed in the same plane relative to the horizontal. The body of the cutter 11 is formed with inclined sides 22—22 which merge with and are disposed in the planes of the respective converging side faces of the teeth.

The front plate 12 is secured to the housing by screws 23 and this plate is formed with an opening 24 to receive the cutter teeth 17 which project therethrough and in advance thereof.

A horizontally disposed work support 25 having an uninterrupted work supporting surface is disposed in front of the cutter 11 and is attached to the front plate 12 by means of an angular bracket 26. The work supporting surface is disposed in a plane substantially coincident with the longitudinal axis of the driving shaft 7. This work support 25 includes a stationary cutting blade 27 which is seated within a slot whereby the upper surface of said stationary blade is flush with the upper surface of the work support. This blade is disposed in advance of the cutter 11 and is adjustable towards and from said cutter through the medium of an adjusting screw 28. The rear end of the stationary blade 27 is formed with a V-shaped notch 29 which corresponds in shape and size to the V-shaped teeth 17 of the cutter. The walls of the notch 29 are undercut so as to form sharp cutting edges 30. The outer ends of the walls 29—29 extend rearwardly of the teeth 17 to engage and cooperate with the inclined sides 22 of the cutter to retain the cutter teeth in proper and

definite relation with the cutting edges of the stationary blade, especially if loose play is developed in the shaft 7.

The inner face of the bracket 26 is recessed as at 31 to receive the teeth 17 of the cutter, and this recess also forms a chute for directing the trimmed off material from the point of cutting into the compartment 10 of the housing. This bracket is also formed with an air inlet port 32.

Thus during the rotation of the cutter 11, the teeth 17 thereof will be presented in rapid succession for cooperation with the cutting edges 30 of the stationary cutter. As a given tooth approaches the stationary cutting edges 30, the inner end of the tooth, viz: the juncture 17ª will first meet said stationary cutting edges and the cutting edges of the tooth will then simultaneously cooperate progressively with the stationary cutting edges to form what is known as a "shearing cut," the cut beginning at the inner end of the tooth and terminating at the outer end or point thereof. Thus when the tooth begins its cutting operation, the front face 20 and consequently the cutting edges thereof, is in a plane inclined to the horizontal, the plane extending upwardly and forwardly, that is rearwardly relative to the direction of the rotation of the cutter.

In practice a fabric F such as a shirt, petticoat or other garment is previously provided with a line of scolloped embroidery stitches S adjacent one edge thereof, and the surplus or marginal material *f* lying beyond and in rear of the line of embroidery stitches is trimmed off by passing the fabric across the work support 25 in cooperative relation to the cutter 11.

In order to prevent the cutter from trimming the embroidery scollops, I have provided a vertically adjustable guard 33 which is disposed in front of the cutter. This guard is formed with a V-shaped recess 34, and the lower edge 35 of this guard is disposed in a substantially horizontal plane, that is, the edge is arranged in a plane parallel to the upper surface of the stationary trimmer blade 27. The recess 34 forms a resultant narrow section 36 at the forward lower portion of the guard. This section 36 is of such thinness as to permit the cutter teeth 17 to trim the marginal portion *f* of the fabric close to the scollops S. This guard is adjustable vertically so as to permit the marginal portion *f* of a given fabric to pass thereunder without any drag. It is necessary, however, to prevent this marginal portion *f* from having any appreciable amount of vertical play. In other words it is necessary to retain the marginal edge portion *f* in a substantially fixed horizontal plane during the trimming operation so as to prevent the marginal trimmed edge portion of the fabric from being crowded downwardly between the teeth of the cutter and the stationary cutting blade. It will be readily understood by those skilled in the art that should the marginal edge portion be thus forced downwardly between the cutter and the stationary blade, the fabric will be squeezed therebetween and will not be cut. In order, therefore, to provide means for adjusting the vertical position of the guard and also for retaining the guard in a predetermined position of adjustment, I have provided a rearwardly extending manually controlled lever 37 and have fulcrumed the same as at 38 upon the top of the housing 9, the longitudinal axis of the pivot 38 being parallel with the shaft 7. The forward end of the lever 37 extends to a point in advance of the front plate 12 and a link 39 is pivotally connected at its upper end as at 40 to the forward end of the lever and at its lower end as at 41 to the upper end of the guard 33. The guard 33 is guided in its vertical adjustment by means of guides 42—42 which are secured to the front plate 12. A spring 43 is disposed between the housing 9 and the rear end of the lever 37 and serves to yieldably urge the guard 33 downwardly against the work support 25. The lowermost position of the guard 34 may be adjusted by means of a screw 44 which is carried by the forward portion of the lever 37 and engages the top of the housing 9. Thus by manipulating the screw 44 in an anti-clockwise direction the guard 33 will be lowered under the action of the spring 43 and by turning the screw 44 in a clockwise direction the guard 33 will be elevated against the tension of the spring 43.

In order to control the fabric *f* relative to the cutter 11 while the fabric is being fed by hand past the cutter, I have provided a foot device which I have designated as a whole by the reference numeral 45. This foot device is disposed in front of the cutter and extends in a horizontal plane in advance of the guard 33. This foot cooperates with the work support 25 to form therebetween a guiding channel 46′ for the fabric while the latter is being hand fed past the cutter. This foot device 45 is provided with a pair of spaced upwardly extending guide arms 46—46 which have sliding engagement with vertically disposed guide channels 47—47 formed in the guard 33. Thus the foot device 45 is adapted to be moved vertically relative to the guard 33 or the guard 33 is adapted to be moved vertically relative to the foot device 45. This foot device has a floating action, that is, it is capable of automatically adjusting the horizontal position thereof upon being engaged by embroidery scollops of different thicknesses. The weight of the foot device is such as to permit the ready hand feeding

of the body fabric thereunder and yet sufficient to retain the fabric in a horizontal plane during the passage thereof past the cutter. The presser foot device 45 is provided with a transparent body portion 48 by means of which the operator may visualize the point of work. In trimming the surplus material *f*, it is necessary for the operator to move the body fabric from right to left or vice versa past the cutter, and at the same time to move the body fabric in and out, that is, towards and from the cutter so as to permit the point of the latter to follow the curves of the scollops S. Through the medium of the transparent body portion 48 of the foot device the operator may readily visualize the point of work and thereby trim said marginal edge portion *f* closely against the line of scollops S.

The cutter 11 is rotated at the rate of approximately 1800 R. P. M. and consequently the trimmed off material will be more in the nature of lint or fuzz than strips or pieces. If this fuzzy material were not carried away the operator would be compelled to breathe the same. Furthermore, this lint or fuzzy material would quickly clog the teeth of the cutter and thereby cause it to cease functioning. I have, therefore, provided means for withdrawing this trimmed off fuzzy-like material to a point removed from the operator. To this end I have provided a suction fan 49 which is disposed in parallel relation with the shaft 7 of the trimming machine and is driven from the latter by means of the belt 50. The suction fan 49 is provided with the usual casing including an inlet 51 and an outlet 52. The inlet 51 is disposed in alignment with the nipple 16 of the trimming machine and a flexible tubular coupling 53 is connected therebetween. The suction fan thus draws air through the inlet port 32 into the housing 10 and thence out through the nipple 16 and coupling 53 to suction fan 49.

In factory systems garments are arranged in "lots" and these "lots" are divided into bundles. The garments in a particular "lot" are of the same weight and consequently it is only necessary to initially adjust the machine in order to take care of all of the garments of a particular "lot". When, however, a "lot" is to be trimmed and this "lot" varies in weight or texture from the previously trimmed "lot", the guard 33 is adjusted vertically by the screw 44 so that the lower edge 35 thereof will be positioned in proper relation to the marginal edge portion *f* of the fabric whereby the latter will be retained in a positive position while the trimmer is functioning. The presser foot device 45, will, of course, automatically position itself on the scollops S. Thus I have provided a foot device and a guard which are independently adjustable whereby garments of different weights may be readily trimmed without any danger of the trimmed edge portion becoming squeezed between the cutter and the stationary trimmer blade.

Without further description it is thought that the many features and advantages of the invention will be readily apparent and it will, of course, be understood that changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade arranged in advance of and in cooperative relation to said cutter, an embroidery-engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, and a horizontally disposed foot device adjustable vertically independent of said guard and arranged in advance of the guard to form with the work support a horizontal guiding channel for the body fabric, said foot device being adjustable vertically relative to said guard through the engagement by the embroidery when the body fabric is passing through said guiding channel.

2. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame and having a plurality of peripheral V-shaped cutting teeth, a horizontally disposed work support including a stationary blade disposed in advance of said cutter, said blade being formed with a V-shaped notch for receiving the teeth of the cutter and forming a resultant cutting edge for cooperation with the teeth of the cutter, an embroidery-engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, said guard being V-shaped in cross-section to receive the cutting teeth, and a horizontally disposed foot device adjustable vertically independent of said guard and arranged in advance of said guard to form with the work support a horizontal guiding channel for the body fabric, said foot device having a V-shaped notch to receive said guard.

3. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade arranged in advance of and in cooperative relation to said cutter, an embroidery-engaging guard mounted on the frame above the work support to limit the movement of

the fabric towards the cutter, said guard being provided with a pair of spaced vertically extending guide ways, and a horizontally disposed foot device adjustable vertically independent of said guard and arranged in advance of the guard to form with the work support a horizontal guiding channel for the body fabric, said foot device being provided with a pair of spaced upwardly extending guide arms having slidable connection with said guide ways of the guard.

4. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade arranged in advance of and in cooperative relation to said cutter, a vertically adjustable embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, a horizontally disposed foot device adjustable vertically independent of said guard and arranged in advance of the guard to form with the work support a horizontal guide channel for the body fabric, and means including a lever for adjusting the vertical position of the guard relative to said work support and to said foot device.

5. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade arranged in advance of and in cooperative relation to said cutter, a vertically adjustable embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, a horizontally disposed foot device adjustable vertically independent of said guard and arranged in advance of the guard to form with the work support a horizontal guide channel for the body fabric, means including a lever for adjusting the vertical position of the guard relative to said work support and to said foot device, a spring for yieldably urging the guard downwardly, and an adjusting screw cooperating with the lever and frame to variably limit the lowermost position of said guard.

6. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade disposed in advance of and in cooperative relation to said cutter, a vertically adjustable embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, and a horizontally disposed foot device arranged in advance of the guard to form with the work support a horizontal guiding channel for the body fabric, said foot device being automatically adjusted vertically relative to said guard through engagement by the embroidery when the body fabric is passing through said guiding channel.

7. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade disposed in advance of and in cooperative relation to said cutter, a vertically adjustable embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, a horizontally disposed foot device arranged in advance of the guard to form with the work support a horizontal guiding channel for the body fabric, said foot device being automatically adjusted vertically relative to said guard through engagement by the embroidery when the body fabric is passing through said guiding channel, and means including a lever for adjusting the vertical position of the guard relative to said work support and to said foot device.

8. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade disposed in advance of and in cooperative relation to said cutter, a vertically adjustable embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, a horizontally disposed foot device arranged in advance of the guard to form with the work support a horizontal guiding channel for the body fabric, said foot device being automatically adjusted vertically relative to said guard through engagement by the embroidery when the body fabric is passing through said guiding channel, a spring for yieldably urging the guard downwardly, and an adjusting screw cooperating with the lever and frame to variably limit the lowermost position of said guard.

9. In an embroidery edge trimming machine, the combination with a frame, of a rotary cutter journaled on a horizontal axis on said frame, a horizontally disposed work support including a stationary cutting blade disposed in advance of and in cooperative relation to said cutter, an embroidery engaging guard mounted on the frame above the work support to limit the movement of the fabric towards the cutter, said guard being provided with a pair of spaced vertically extending guide ways, and a horizontally disposed foot device arranged in advance of the guard to form with the work support

a horizontal guiding channel for the body fabric, said foot device being automatically adjusted vertically relative to said guard through engagement by the embroidery when the body fabric is passing through said guiding channel, said foot device being provided with a pair of spaced upwardly extending guide arms having slidable connection with said guide ways of the guard.

10. In an edge trimming machine, the combination with a main frame having a housing formed at one end thereof, said housing having an open outer side, of a shaft journaled in said frame and projecting into said housing, a cutter fixed to said shaft and disposed in said housing, a closure cap for the outer end of said housing, and a rearwardly extending exhaust nipple connected to the housing and communicating with the interior thereof below the axis of the cutter, said nipple being independent of said closure cap.

In testimony whereof I hereunto affix my signature.

HORACE F. GRUMAN.