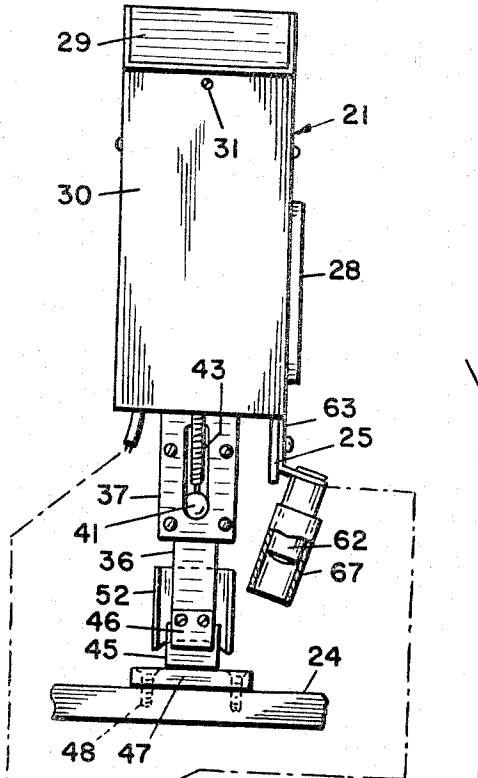
July 4, 1967 R. LEWIS ETAL 3,329,113

STRIPPING CUTTERS FOR SEWING MACHINES

Filed Sept. 8, 1964

4 Sheets-Sheet 1



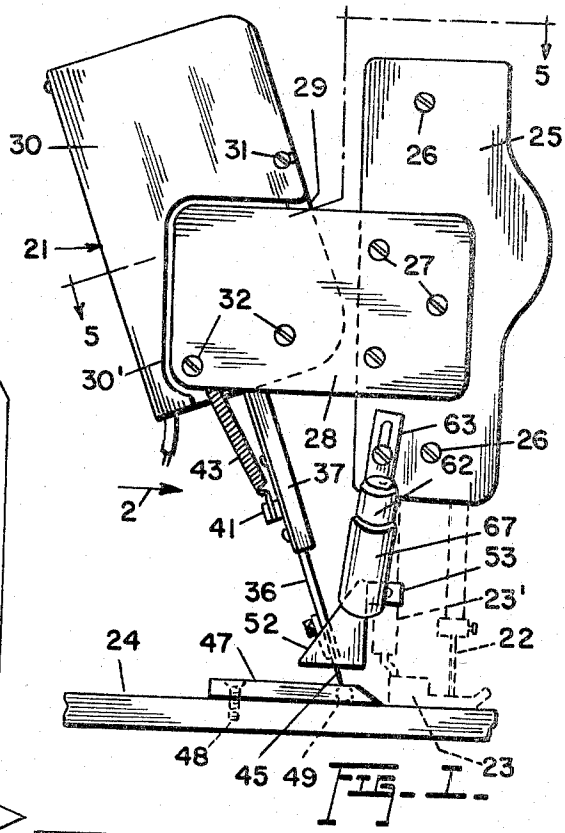
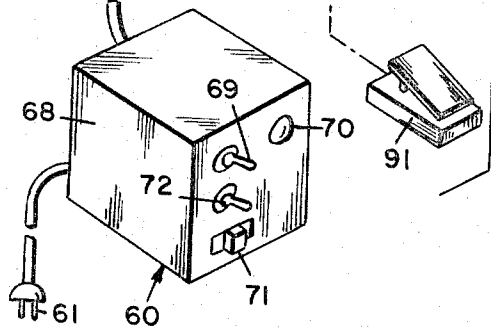


FIG. 1.

FIG. 2.



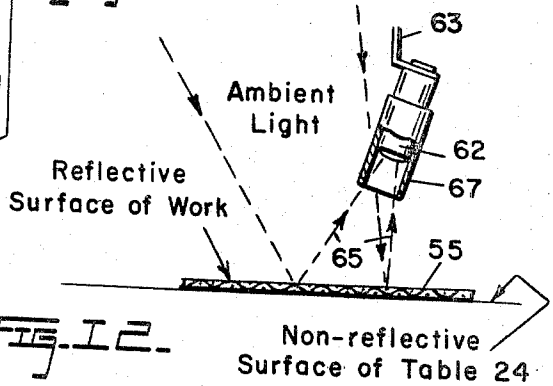


FIG. 12.

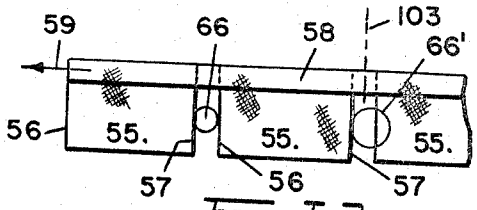


FIG. 13.

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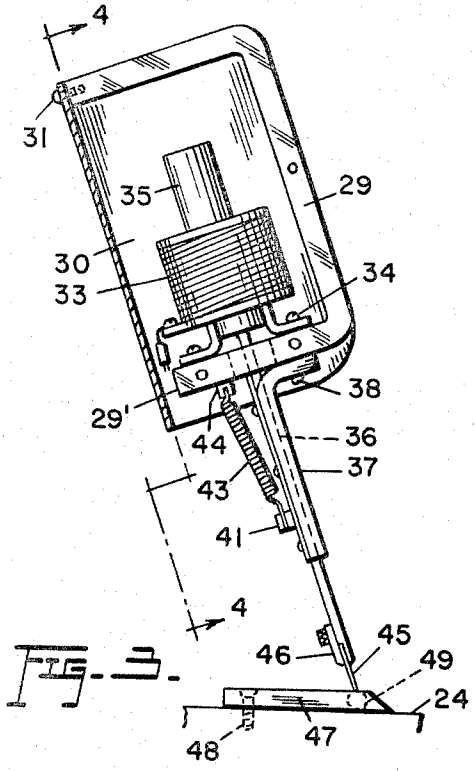


FIG. 3.

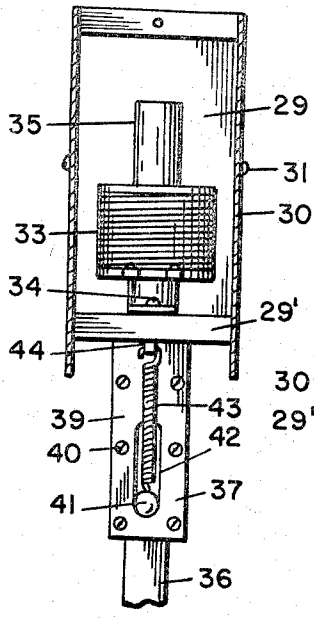


FIG. 4.

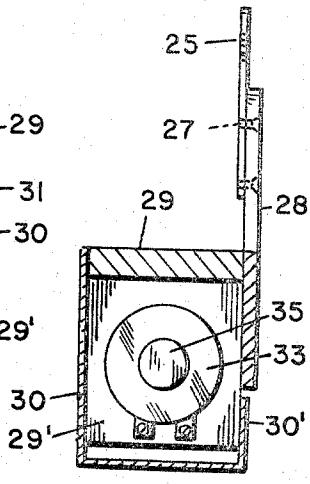


FIG. 5.

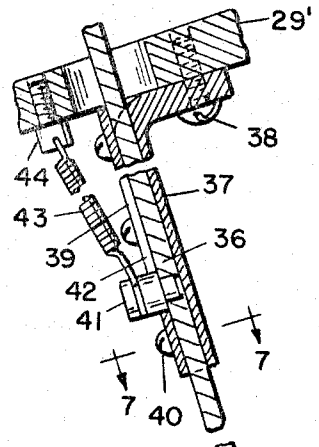


FIG. 6.

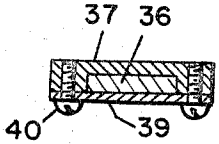


FIG. 7.

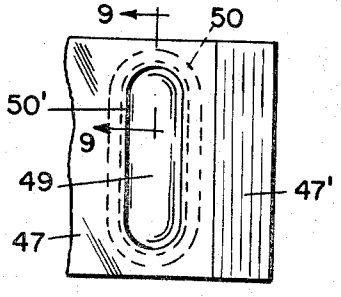


FIG. 8.

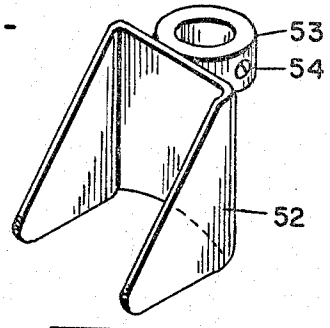


FIG. 10.

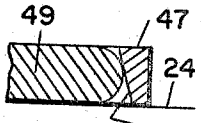
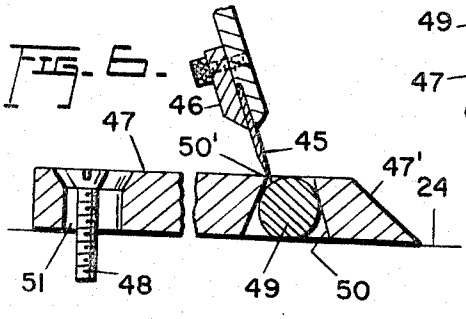


FIG. 9.



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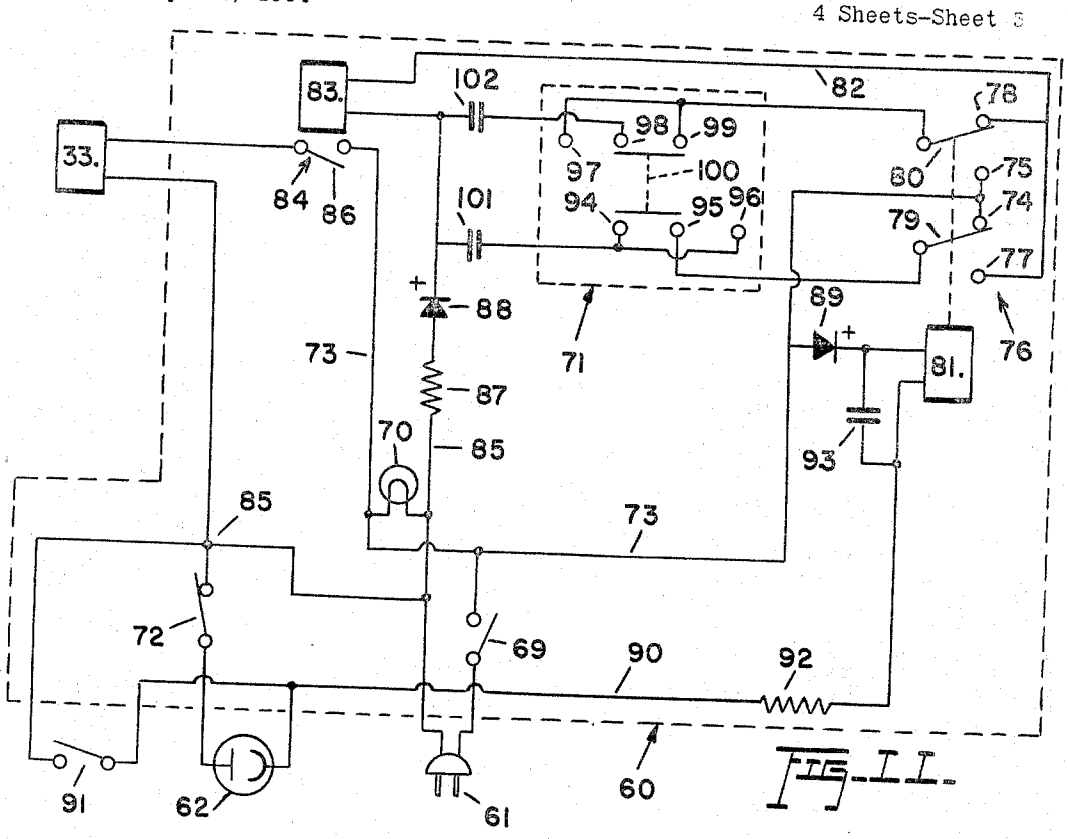


FIG. II.

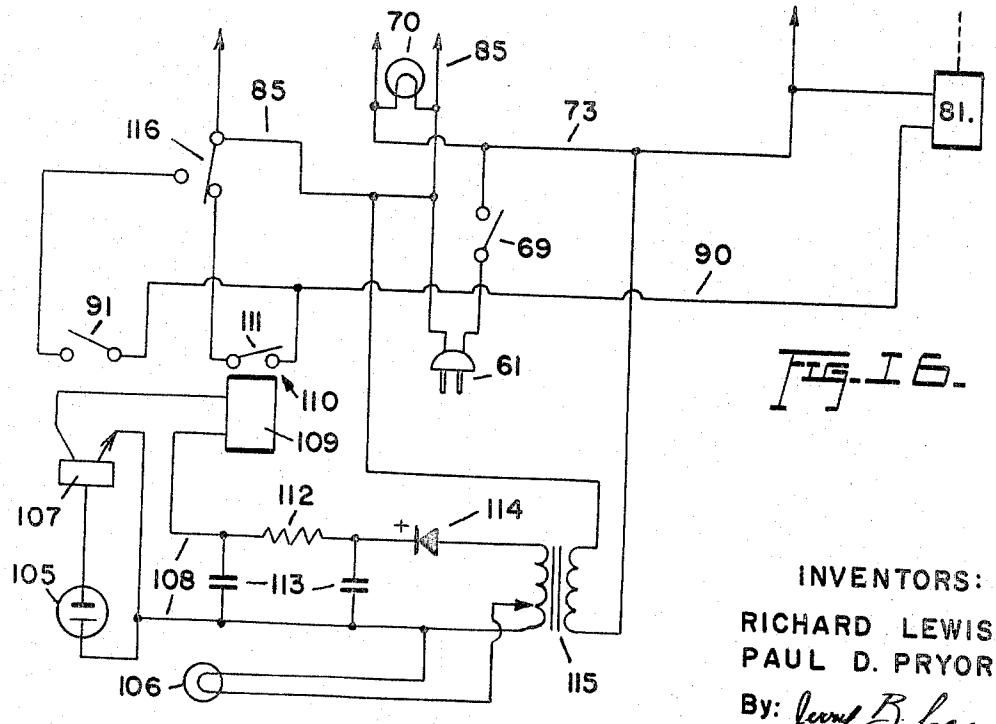


FIG. 16.

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STRIPPING CUTTERS FOR SEWING MACHINES

Filed Sept. 8, 1964

4 Sheets-Sheet 4

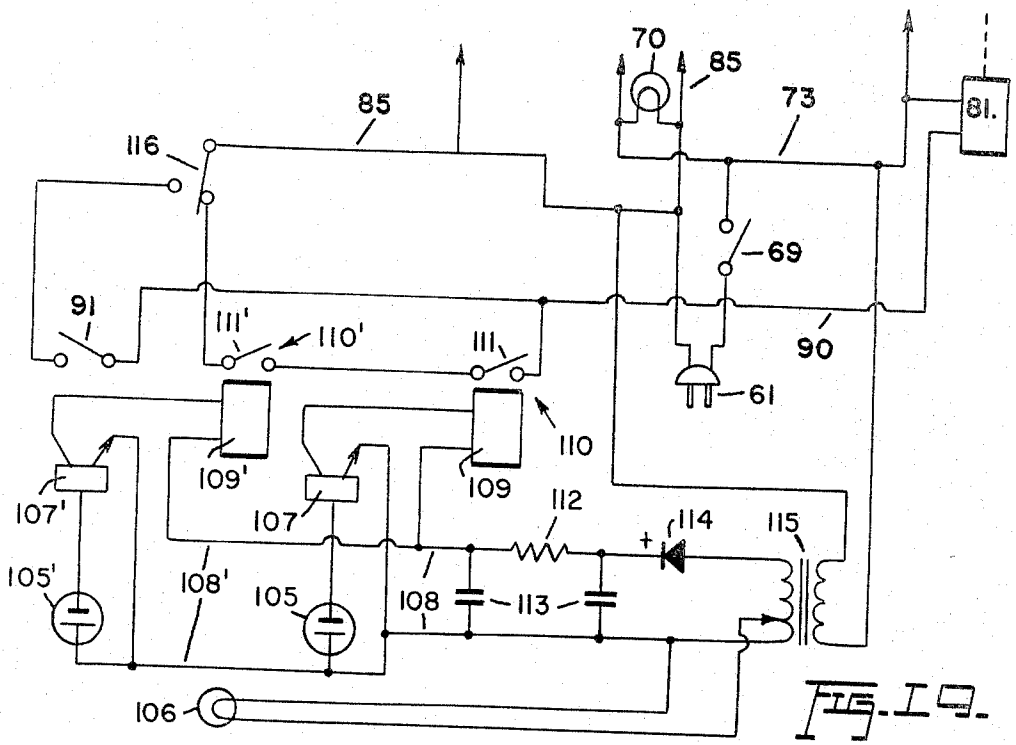


FIG. 19.

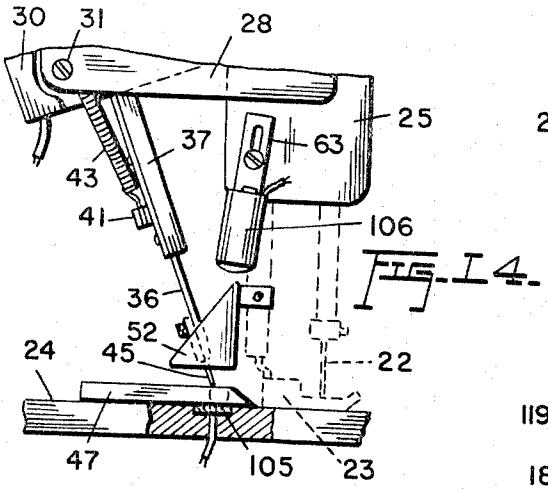


FIG. 14.

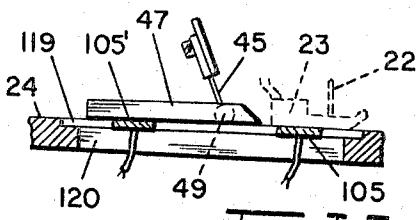


FIG. 18.

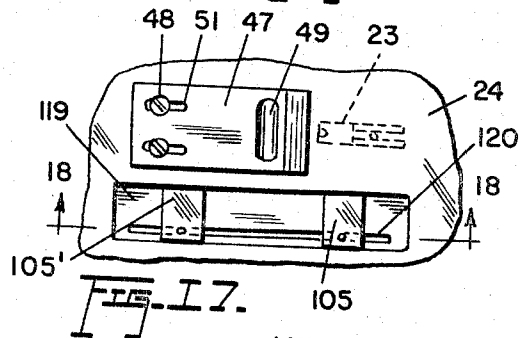


FIG. 17.

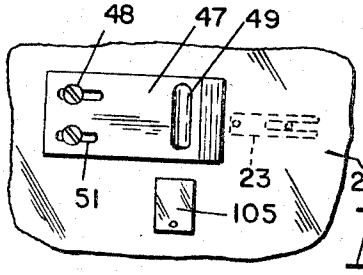


FIG. 15.

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United States Patent Office 3,329,113 Patented July 4, 1967

3,329,113

STRIPPING CUTTERS FOR SEWING MACHINES

Richard Lewis, Montoursville, and Paul D. Pryor, Montgomery, Pa., assignors to Glamorise Foundation, Inc., New York, N.Y., a corporation of New York

Filed Sept. 8, 1964, Ser. No. 394,668
14 Claims. (Cl. 112—130)

This invention relates to new and useful improvements in attachments for industrial sewing machines which repeatedly perform a particular sewing operation on identical, individual pieces of work, such work pieces passing from the presser foot of the sewing machine in a continuous manner with each work piece being connected to the next by what is generally known as stripping.

The stripping may be in the form of sewing thread, tape, elastic, lace, edge binding, et cetera, applied to the work pieces by the sewing machine, the leading edge of each work piece being spaced somewhat along the running length of the stripping from the trailing edge of the preceding work piece.

After a sewing operation of this type it is, of course, necessary to separate the individual work pieces by cutting the stripping therebetween, and if the cutting operation is performed manually, a considerable loss of time and effort is involved.

It is, therefore the principal object of the invention to save such lost time and effort by automatically cutting the stripping between the work pieces as they pass from the presser foot of the sewing machine, as such, the invention provides an electrically actuated cutting apparatus disposed adjacent and rearwardly of the sewing machine presser foot for severing the stripping between individual work pieces in an automatic, instantaneous manner so that the flow of work through the sewing machine need not be interrupted in order for the stripping to be cut.

Also, the invention provides light-responsive electrical means for detecting the flow of work in terms of spaces between the trailing and leading edges of the work pieces, such electrical means controlling the operation of the cutting apparatus so that the stripping is cut at appropriate, selected intervals in an automatic fashion.

As another feature, the electrical control means may be set so that the stripping is cut selectively at the leading edge of each work piece, or at the trailing edge, or at both leading and trailing edges.

As another feature, the electrical control means may be adjusted in terms of relationship of the work pieces to the cutting apparatus so that the stripping may be cut beyond the leading and/or trailing edges of the work pieces, in instances where it is desirable to have the stripping project beyond such edges.

As another feature, the electrical control means embodies a manually operable switch for actuating the cutting apparatus independently of the light responsive automatic control, when for some reason a manual control is desirable.

Still another feature of the invention resides in the structure of the cutting apparatus itself, as distinguished from its electrical and manual controls, and particularly in novel means for absorbing the impact of the cutter blade so that the useful life of the blade is substantially prolonged while the impact absorbing means requires replacement only at infrequent intervals.

As still another feature, the arrangement of the invention is such that it is readily applicable as an attachment to conventional sewing machines of various types.

With the foregoing more important object and features in view and such other objects and features as may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings,

wherein like characters of reference are used to designate like parts, and wherein:

FIGURE 1 is a side elevational view of the cutting apparatus of the invention;

FIGURE 2 is an elevational view, taken in the direction of the arrow 2 in FIG. 1 and also showing the power pack and foot control used in the invention;

FIGURE 3 is a side elevational view of the cutting apparatus with its mounting omitted and its housing cover shown in section;

FIGURE 4 is a fragmentary sectional view, taken substantially in the plane of the line 4—4 in FIGURE 3;

FIGURE 5 is a fragmentary sectional view, taken substantially in the plane of the line 5—5 in FIGURE 1;

FIGURE 6 is an enlarged, fragmentary vertical sectional view of the cutter mechanism;

FIGURE 7 is a sectional detail, taken substantially in the plane of the line 7—7 in FIGURE 6;

FIGURE 8 is a fragmentary plan view of the plate and roller of the cutter mechanism;

FIGURE 9 is a fragmentary sectional detail, taken substantially in the plane of the line 9—9 in FIGURE 8;

FIGURE 10 is an enlarged perspective view of the work guard;

FIGURE 11 is a wiring diagram of the electrical components of the invention;

FIGURE 12 is a diagrammatic illustration of the action of the photoelectric cell;

FIGURE 13 is a diagrammatic illustration of work pieces in relation to light reflecting areas affecting the photoelectric cell;

FIGURE 14 is a fragmentary side elevational view, similar to that in FIG. 1, but showing a modified embodiment of the invention;

FIGURE 15 is a fragmentary plan view of the machine table shown in the embodiment of FIGURE 14;

FIGURE 16 is a wiring diagram of the electrical components used in the modified embodiment of FIGS. 14, 15, a portion of the circuit not shown being the same as in FIG. 11;

FIGURE 17 is a fragmentary plan view of the machine table in another modified embodiment of the invention;

FIGURE 18 is a fragmentary sectional view, taken substantially in the plane of the line 18—18 in FIG. 17; and

FIGURE 19 is a wiring diagram of the electrical components used in the modified embodiment of FIGS. 17, 18, a portion of the circuit not shown being the same as in FIG. 11.

Referring now to the accompanying drawings in detail, more particularly to FIGS. 1–13 inclusive which show one embodiment of the invention, the general reference numeral **21** designates the cutting apparatus such as may be applied to any conventional sewing machine having the usual needle **22** and presser foot **23** cooperating with the machine table **24**. The numeral **25** designates a face plate by which the apparatus may be attached to the head of the sewing machine, as by the screws **26**, or if desired, the face plate may be omitted and the device attached directly to the machine head by the screws **27**, in which instance the element **25** may be regarded as the machine head itself. A mounting plate **28** is secured by the screws **27** to the face plate (or machine head) **25** and projects rearwardly therefrom to support the cutting device **21**. The latter includes a U-shaped housing **29** with open sides and back which are closed by a removable U-shaped cover **30**, held in place by suitable screws **31**. One side of the cover **30** is recessed as at **30'** to provide clearance for the mounting plate **28** which is secured to the base portion **29'** of the housing **29** by the screws **32**.

Contained in the housing **29** is a solenoid **33** which is mounted on the base portion **29'** by the screws **34** and has a reciprocable armature **35**. The lower end of the armature

is rigidly connected to a strap-like slide **36** which is reciprocable in a slide support or guide **37**, the latter having an angulated upper end portion secured as at **38** to the housing base **29'** and also having a removable cover **39** held in place by the screws **40**, as its best shown in FIG. 7. A stud **41** is carried by the slide **36** and projects through a slot **42** formed in the cover **39**. A tension spring **43** is connected at one end thereof to the stud **41** and at its other end to a similar stud **44** depending from the housing base **29'**. The spring **43** serves to draw the slide **36** upwardly in the guide **37** when the solenoid **33** is not energized. The lower end of the slide **36** carries a cutter blade **45** which is removably held in place by a clamp **46**.

Ordinarily, the cutter blades **45** would cooperate with a simple backing plate or reaction plate **47** held in place on the machine table **24** by suitable screws **48**, but repeated impact of the sharp blade against the plate would cause both the blade and the plate to wear out prematurely. To avoid such premature wear, the invention provides an impact roller **49** which is rotatably positioned in a recess **50** formed in the plate **47**, the recess having upwardly convergent side walls as shown in FIGS. 6 and 9 so as to retain the roller in place. The roller is preferably made of somewhat softer material than the blade **45** so that the roller rather than the blade is subjected to wear, but inasmuch as the roller is rotatable, it turns slightly with each impact of the blade and thus presents a continually changing portion thereof to impact by the blade, whereby wear of the roller is considerably minimized and frequent replacement of the roller is unnecessary. As will be apparent from FIG. 6, the top of the roller **49** is substantially flush with the upper surface of the plate **47** and the cutter blade **45** reciprocates in an inclined plane which intersects the roller slightly rearwardly of the roller axis, so that when the blade **45** comes in contact with the roller, the blade is prevented from springing rearwardly by the upper edge **50'** at the back wall of the recess **50**. Also, the blade upon impact is prevented from springing forwardly by the rising curvature of the roller, and assurance is thus had that the blade impacts the roller with microscopic precision, without any incidental springing, flexing or vibration of the blade taking place. Moreover, by contacting the roller rearwardly of the roller axis, each impact of the blade causes the roller to turn slightly, in a counter-clockwise direction as viewed in FIG. 6, so that a fresh surface portion of the roller is presented after each impact for the next, as already mentioned. The plate **47** is provided with slots **51** to receive the attaching screws **48**, whereby the position of the plate and roller **49** may be adjusted forwardly and rearwardly in relation to the cutter blade **45** to obtain the desired contact of the blade with the roller.

The forward end portion of the plate **47** is sloped as at **47'** so that work moving rearwardly from the presser foot **23** of the sewing machine may pass easily over the plate. In order to prevent the work from becoming entangled with the slide **36** and to guide the work on its passage between the blade **45** and the roller **49**, a work guard **52** is disposed forwardly of the slide **36** above the plate **47**. As shown in FIG. 10, the guard **52** is substantially U-shaped and has a collar **53** equipped with a set screw **54**, whereby it may be fastened to the leg **23'** of the presser foot **23**, as will be clearly apparent from FIG. 1.

The individual pieces of work turned out by the sewing machine have stripping thereon, such as for example, tapes, elastic bands, simple stitching, et cetera, and the work pieces pass rearwardly from the presser foot **23** in a continuous chain fashion, being connected to one another by such stripping which not only extends along the work pieces but also spans relatively small spaces which exist between the trailing edge of each work piece and the leading edge of the next. This is illustrated diagrammatically in FIG. 13 where the individual work pieces are shown at **55**, each having a leading edge **56** and a trailing edge **57**, with the stripping **58** extending along the work pieces and bridging the spaces between the trailing and leading edges thereof. The work pieces thus pass from the sewing machine in a continuous manner, connected together by the stripping, and the purpose of the apparatus of the invention, of course, is to cut the stripping between the work pieces so that the work pieces become separate, individual entities. The direction of travel of the work is shown by the arrow **59** in FIG. 13, this being rearwardly from the presser foot **23** over the cutter impact roller **49** as seen in FIG. 1, and the arrangement of the invention is such that the solenoid **33** of the cutter may be automatically energized so that the cutter blade **45** may cut the stripping selectively at the trailing edge **57** of each work piece, or at the leading edge **56** of each work piece, or at both the leading and trailing edges of each work piece, as desired. Also, adjustment means are provided for cutting the stripping at a point between the trailing and leading edges of the work pieces, thus leaving portions of the stripping to project beyond the work piece edges, when such projections of the stripping are desirable.

A power supply and control pack **60** is provided in conjunction with the cutter apparatus **21** and may be conveniently placed on or adjacent the sewing machine, the power pack having a plug connection **61** to a suitable source of alternating current, for example, 110 v. A.C. The power pack is in circuit with the solenoid **33** of the cutter and also with a photoelectric cell **62** which responds to the flow of work pieces from the presser foot to actuate the cutter, as will be hereinafter described. The cell **62** is mounted by a suitable bracket **63** on the face plate (or machine head) **25**, the mounting preferably being vertically adjustable so that the cell may be raised or lowered relative to the machine table **24**. The cell **62** is optically oriented to one side of the plate **47** against the machine table **24**, which table in this instance either has a substantially dull, non-reflective surface or is provided with a dull, non-reflective coating at least on that portion of its surface which is in optical alignment with the photoelectric cell **62**.

At this point it may be explained that the embodiment of the invention now being described is intended to be used on work of white or other light color which has good light reflecting properties, so that the intensity of light needed to energize the photoelectric cell **62** need not be more than the ambient light in the vicinity of the sewing machine, reflected by the light colored work pieces to the cell. Under such conditions the aforementioned space between the trailing edge of one work piece and the leading edge of the next permits the dull, non-reflective surface of the machine table to become exposed, thus interrupting the reflection of ambient light to the cell and deenergizing the latter. The term "ambient light" as used herein refers not only to general illumination available in the vicinity of the machine, but also to light from a conventional work illuminating lamp which is commonly provided on the machine head itself, as well as to any special lamp such as may be used for reflection of light rays by the work pieces to the photoelectric cell.

As will be apparent from FIG. 12, the ambient light reflected by a work piece **55** passes to the cell **62** in a conical beam **65**, the base of which is a circular or oval area **66** which the cell **62** "sees" either on the reflective work piece or on the non-reflective machine table **24**, as diagrammatically shown in FIG. 13. For reasons hereinafter explained, it is desirable to vary the diameter or width of the cell "seeing" area **66**, this being attained either or both, by raising or lowering the cell **62** relative to the table **24** by the bracket means **62**, and/or adjusting a tubular shield **67** which is slidably positioned on the cell **62** so that the downward spread of the conical beam **65** may be increased or decreased by respectively raising and lowering the shield **67** relative to the cell.

For illustrative purposes, the "seeing" area 66' of the cell is substantially larger or wider than the area 66 as shown in FIG. 13.

Turning again to the aforementioned power supply and control pack 60 and with reference to FIGS. 2 and 11, the pack has a suitable housing or casing 68 which contains various electrical components including an on-and-off master switch 69, a pilot lamp 70, a three-position selector switch 71, and an on-and-off switch 72 for the photoelectric cell 62.

One side 73 of the circuit from the power supply 61 flows through the master switch 69 to two contacts 74, 75 of a control relay 76 which also has two other contacts 77, 78 and a pair of switch members 79, 80 operable by a solenoid 81, the relay being spring biased so that when the solenoid is not energized, the switch members 79, 80 engage the respective contacts 74, 78 as shown in FIG. 11, but when the solenoid is energized, the switch members engage the respective contacts 77, 75. The contacts 77, 78 are connected as at 82 to the solenoid 83 of a cutter actuating relay 84, the solenoid 83 being in circuit with the second side 85 of the power supply 61. The solenoid 33 of the cutter mechanism is connected in series with the switch 86 of the relay 84 to the circuit sides 73, 85, the switch 86 being open when the relay is not energized.

A resistor 87 and a diode 88 are provided in the circuit side 85 for energizing the relay solenoid 83 by direct current. The pilot lamp 70 is bridged across the circuit sides 73, 85 so that it is energized when the master switch 69 is closed. The solenoid 81 of the relay 76 is connected through a diode 89 to the circuit side 73 and is also connected as at 90 to the circuit side 85, the connection 90 being in series through the photoelectric cell 62 and cell control switch 72. The connection 90 also includes a manually operated switch 91 which is bridged in parallel across the cell 62 and switch 72. The switch 91, also shown in FIG. 2, is normally open and may be placed under the sewing machine for convenient actuation by the operator's foot. A resistor 92 and a capacitor 93 are provided for the solenoid 81 of the relay 76, as shown.

The three-position selector switch 71 has two sets of contacts 94, 95, 96 and 97, 98, 99 with a movable contact member 100 so arranged that when the contact member is in a central position it bridges the contacts 94, 95 on one side and the contacts 98, 99 on the other. In the left hand position of the switch (as viewed in FIG. 11), the member 100 bridges the contacts 97, 98 only, and in the right hand position it bridges the contacts 95, 96 only. The contacts 94, 96 are connected to the circuit side 85 through a capacitor 101, while the contact 98 is connected to the same circuit side through a capacitor 102. The contact 95 is connected to the switch member 79 of the relay 76, while the contacts 97, 99 are connected to the switch member 80 of the same relay.

In operation, the master switch 69 is closed and the pilot lamp 70 becomes energized. When there is no work piece under the photoelectric cell 62 to reflect ambient light to the cell, the resistance of the cell is so high that no appreciable current flows through the connection 90 to the solenoid 81 of the relay 76, and the switch members 79, 80 of that relay are in the position shown in FIG. 11. In this position, current flows from the circuit side 73 through the relay switch member 79 to the contact 95 of the selector switch 71, and assuming the selector switch to be in its central position as shown, the contact 95 is bridged to the contact 94 by the member 100 and the capacitor 101 becomes charged.

When a reflective work piece comes into position under the photoelectric cell 62 and reflects ambient light to the cell, the resistance of the cell is lowered so that current flows through the connection 90 to energize the solenoid 81 of the relay 76. As this occurs, the switch member 79 is brought against the contact 77 and the member 80 against the contact 75. Engagement of the member 79 with the contact 77 permits the electrical charge stored in the capacitor 101 to flow through the connection 82 to the solenoid 83 of the relay 84, thus closing the relay switch 86 and energizing the solenoid 33 of the cutter mechanism which instantly propels the cutter blade 45 toward the impact roller 49 to sever the stripping 58 at the leading edge 56 of the work piece 55 (see FIG. 13). The discharge of current from the capacitor 101 to the relay solenoid 83 is instantaneous as is energization of the cutter solenoid 33, so that the cutter blade 45 may be quickly retracted by the spring 43 as soon as energization of the solenoid 33 ceases. In the meantime, the presence of the work piece under the photoelectric cell 62 still continues to cause the solenoid 81 of the relay 76 to remain energized, and while the switch member 79 is still against the contact 77, engagement of the switch member 80 with the contact 75 permits current to flow from the circuit side 73 through the contacts 98, 99 bridged by the member 100, so as to charge the capacitor 102. Ultimately, when the work piece moves from under the photoelectric cell, energization of the relay solenoid 81 ceases and the contact members 79, 80 are returned to the initial position shown in FIG. 11. As soon as this occurs, the electrical charge stored in the capacitor 102 flows through the member 80 and connection 82 to energize the relay solenoid 83 and the cutter solenoid 33, thus again causing the cutter blade 45 to sever stripping, but this time at the trailing edge 57 of the work piece. In the meantime, engagement of the switch member 79 with the contact 74 again causes the capacitor 101 to be charged in readiness for the next cycle of operation.

If the three-position selector switch 71 is moved to its right hand position wherein the member 100 bridges the contacts 95, 96 only, the first half of the operation as above described is the same in that the capacitor 101 is discharged when the work piece comes under the photoelectric cell and the stripping is cut at the leading edge of the work piece. However, in this right hand position of the switch 71, charging of the capacitor 102 through the contact 98 is not possible and accordingly, when the work piece moves from under the photoelectric cell and the relay 76 returns to its initial position, there is no charge in the capacitor 102 to energize the relay 84 and cutter solenoid 33 to cut the stripping at the trailing edge of the work piece. Thus, with the selector switch 71 in its right hand position, the stripping is cut only at the leading edge of the work pieces. Conversely, if the switch 71 is in its left hand position wherein the member 100 bridges the contacts 97, 98 only, charging of the capacitor 101 is not possible and the stripping is cut only at the trailing edge of the work pieces, as will be readily understood.

Referring again to the diagrammatic illustration in FIG. 13, the cutter may be actuated when the work piece 55 enters the "seeing" area 66 of the photoelectric cell, or when it leaves the "seeing" area, or both when it enters and leaves. As already explained, the effective diameter or width of the "seeing" area (66 or 66') may be varied by raising or lowering the shield 67 relative to the photoelectric cell 62, or by raising or lowering the entire cell by the bracket means 63. This variation of diameter or width of the "seeing" area affords an adjustment which permits the cutter to sever the stripping at the trailing and leading edges of the work pieces, regardless of the extent of spacing between adjacent work pieces within limits of variation of the effective size of the "seeing" area. Also, if only one cut of stripping is made for each work piece, either at the leading edge or at the trailing edge, the cut may be made so that it is intermediate the leading and trailing edges and the stripping projects from each work piece beyond both such edges. This may be done by simply enlarging the "seeing" area of the photoelectric cell, for example as at 66', so that the cutter severs the stripping as indicated by the line 103 in FIG. 13.

It may be noted at this point that inasmuch as the cut-

ter is actuated instantly by an electrical charge stored in the capacitors (**101** or **102**) rather than directly by the photoelectric cell **62**, use of the selector switch **71** is facilitated which permits energization of the cutter at either or both the leading and trailing edges of work pieces. Also, very rapid cutting action is possible, several cutting strokes per second if need be, so that the work pieces **55** may be closely spaced along the stripping **58** with full assurance that the cutter will cut stripping at the leading edge of each work piece, immediately after cutting at the trailing edge of the preceding one.

The aforementioned foot control switch **91** which is bridged in parallel across the photoelectric cell **62** and switch **72** may be used by the operator of the sewing machine to actuate the cutter independently of the photoelectric cell, except when the cell is energized by light reflected from a work piece under the cell. In such event, the energized cell **62** already causes energization of the relay **76**, so that manual closing of the foot switch **91** does not make any change. However, when there is no work piece under the cell **62** and the latter is inactive, the relay **81** may be manually energized through the foot switch **91** to cut stripping between work pieces at the operator's will. The cell control switches **72**, in series with the cell **62**, is normally closed, but may be opened when desired so as to render the cell **62** inactive regardless of presence or absence of work pieces under the cell, in which instance the operation of the cutter may be controlled manually and solely by the foot switch **91**.

Rerefence is now drawn to FIGS. 14, 15 and 16 which show a modified embodiment of control for the cutter apparatus, the cutter apparatus itself being the same as at **21** in FIGS. 1–10 and also utilizing the solenoid **33**, the relay **84**, the selector switch **71**, the capacitors **101**, **102**, resistor **87**, diode **88** and the relay **76**, all as disclosed in the upper portion of FIG. 11 already described. However, in place of the photoelectric cell **62**, the modified arrangement utilizes a plate-shaped selenium cell or so-called solar cell **105** which is capable of producing weak electric current when subjected to light. The cell **105** is suitably mounted on the sewing machine table **24** at one side of the cutter impact plate **47** as shown in FIGS. 14, 15, and is adapted to be energized by a light beam from a lamp **106** mounted by the bracket **63** on the machine head (or face plate) **25**, the lamp **106** thus occupying the position held by the cell **62** in the embodiment of the FIGS. 1–13. It will be understood that when the lamp **106** is energized and its beam can pass through spaces between the work pieces to the cell **105**, electric current will be generated by that cell. On the other hand, when a work piece interrupts the light beam by its presence between the lamp and the cell, no current will be generated. Thus, while the embodiment of FIGS. 1–13 is suitable for use with work of light color which is capable of reflecting ambient light to the photoelectric cell **62**, the embodiment of FIGS. 14–16 may be used with work of any color, inasumch as the electric control of the cutter apparatus responds not to light reflection, but to passage of a light beam to the current generating cell **105**.

The solar cell **105** is connected to the base and emitter of a transistor **107** for amplification of the collector circuit **108** through the solenoid **109** of a relay **110**, the switch **111** of which serves to energize the relay **76** in the same manner as the aforementioned cell **62** in the embodiment of FIGS. 1–13. The collector circuit **108** of the transistor **107** includes a resistor **112**, capacitors **113** and a diode **114** for direct current operation of the relay solenoid **109**, the circuit **108** being powered by a transformer **115** connected to the aforementioned circuit sides **73**, **85** of the power supply **61**. The lamp **106** is also powered by the transformer **115** at a step-down voltage.

In operation, the master switch **69** is closed and the lamp **106** becomes energized by the transformer **115**. Assuming that a work piece has just moved from above the solar cell **105**, the light beam from the lamp **106** is free to reach the cell **105**, causing the latter to become energized and to produce a weak electric current which triggers the transistor **107**. Strong current then flows in the collector circuit **108** through the solenoid **109** of the relay **110**, causing the switch **111** of that relay to close and energize the solenoid **81** of the relay **76** through the connection **90**, as will be apparent from FIG. 16. As this occurs, the capacitor **101**, which has been charged during a previous cycle of operation, is discharged through the switch member **79** and contact **77** (see FIG. 11), thus energizing the cutter solenoid **33** and causing the cutter to sever stripping at the trailing edge of the work piece which has just moved from above the solar cell **105**. Also, the capacitor **102** becomes charged through the convert **75** and the switch member **80**.

With the light beam from the lamp **106** falling upon the cell **105**, the cell and the relays **110**, **76** continue to remain energized until the next in line work piece comes into position above the cell **105**. This interrupts the light beam from the lamp **106**, the cell ceases to generate current, the relay switch **111** opens and the solenoid **81** of the relay **76** is de-energized. This discharges the capacitor **102** through the contact member **80** and contact **78** and the cutter solenoid **33** is again energized, the cutter now serving the stripping at the leading edge of the work piece which has come into position above the cell **105**. Also, the capacitor **101** becomes charged through the contact **74** and switch member **79** in readiness for the next operational cycle when the work piece moves from above the cell **105** and energization of the cell by the light beam again takes place.

Of course, the stripping may be cut only at the leading edge or only at the trailing edge of the work pieces by moving the selector switch **71** from its central position to either left or right, substantially as already explained in connection with FIG. 11. However, it is to be noted that when the photoelectric cell **62** of FIG. 11 is used, the solenoid **81** of the relay **76** is energized only when a work piece is in opsition under the cell, but when the solar cell **105** and the lamp **106** of FIG. 16 are used, the relay **76** is energized only when there is no work piece in a comparable position. Accordingly, in the latter arrangement the operation of the relay **76** is reversed with respect to the former arrangement, the capacitor **101** providing power for cutter actuation at the trailing edge and the capacitor **102** at the leading edge when using the solar cell **105**, and vice versa when using the photoelectric cell **62**. Thus, when using the cell **105**, the selector switch **71** is moved to the left for cutting at the leading edge only, but when using the cell **62** the switch is moved to the right for the same purpose.

The foot switch **91** may be used with the circuit of FIG. 16 for manual rather than automatic control of the cutter, but inasmuch as the automatic switch **111** is already closed when there is no work piece above the solar cell **105**, closing of the foot switch **91** in parallel with the switch **111** would not produce any cutting action. Accordingly, the switches **91** and **111** are connected to a manually operable, single pole, double throw switch **116** on the circuit side **85**, the switch **116** permitting energization of the solenoid **81** of the relay **76** either automatically by the relay **110** or manually by the foot switch **91**. The cell control switch **72** of FIG. 11 is thus not required and its position on the power pack **60** may be occupied by the switch **116**. Also, since in the circuit of FIG. 16 the full current strength from the power source **61** flows through the solenoid **81** of the relay **76**, the resistor **92**, the capacitor **93** and the diode **89** of FIG. 11 are not needed in the embodiment of FIG. 16.

FIGS. 17, 18 and 19 illustrate another modified arrangement which is very similar to that already described in connection with FIGS. 14–16 but embodies a cutter actuating adjustment which takes into consideration the position of work pieces relative to the position of the

cutter blade. As such, this embodiment performs a function which is somewhat similar to that served by adjustment of the "seeing" area **66** of the photoelectric cell **62** described in connection with FIGS. 12 and 13, but is more flexible and broader in scope inasmuch as it provides two adjustable entities rather than one, as will be presently apparent.

The embodiment of FIGS. 17–19 utilizes two separate solar cells **105**, **105'** mounted on the machine table **24** at one side of the impact plate **47**, the cell **105** being disposed forwardly and the cell **105'** rearwardly of the cutter blade **45** and both cells being adjustable toward and away from each other in the direction of travel of the work pieces. Two separate transistors **107**, **107'** and two separate relays **110**, **110'** are connected to the respective cells **105**, **105'**, the collector circuit **108'** of the transistor **107'** and relay solenoid **109'** being in parallel with the collector circuit **108** of the transistor **107** and relay solenoid **109** so that the two collector circuits may be independently energized. A single lamp **106** is sufficient for actuating the two solar cells. The switch **111'** of the relay **110'** is connected in series with the switch **111** of the relay **110** to the circuit **85**, **90**, **73** of the relay solenoid **81**, so that the relay **76** cannot become energized unless both switches **111** and **111'** are closed.

In operation, when there is no work piece above the cells **105**, **105'**, light from the lamp **106** energizes both cells, both relays **110**, **110'** are energized, and current flows through the closed switches **111**, **111'**, thus keeping the solenoid **81** of the relay **76** energized as already explained in connection with FIG. 16. When a work piece comes into position so that its leading edge covers the cell **105**, the relay switch **111** is opened, the relay **76** is de-energized, and the cutter is actuated to sever stripping at the leading edge of the work piece. As the work piece continues to travel so that it covers the cell **105'** as well as the cell **105**, the relay switch **111'** is also opened, but without effect inasmuch as the circuit to the relay **76** is already broken by the open switch **111**. When the trailing edge of the work piece clears the cell **105**, the relay switch **111** closes, but also without effect inasmuch as the circuit to the relay **76** is still broken by the switch **111'**. Finally, when the trailing edge of the work piece clears the cell **105'**, the switch **111'** is closed, thus completing the circuit to the relay **76** and actuating the cutter to sever stripping at the trailing edge of the work piece.

It will be apparent that inasmuch as the cells **105**, **105'** may be moved toward or away from each other and toward or away from the position of the cutter blade **45** therebetween, the timing of cutter actuation may be adjusted not only for different spacing of work pieces along the length of the stripping, but also for cutting of the stripping at different lengths beyond the leading and trailing edges of the work pieces when it is desired to have the stripping project beyond such edges.

The flat solar cells (**105**, **105'**) used in the embodiments of FIGS. 14–16 and 17–19 may be mounted unobtrusively on the top surface of the sewing machine table **24**, or the table may be recessed for flush mounting of the cells, if so preferred. As exemplified in FIGS. 17 and 18, the mounting recess **119** is elongated to permit adjustment of the cells toward and away from each other and is slotted through the machine table as at **120** to accommodate the wire connections to the cells. Any suitable means such as screws, or the like, may be used for locking the cells in an adjusted position.

As already mentioned with respect to all embodiments of the invention, the cell means which respond to the presence or absence of work pieces are located to function at one side of the impact plate **47**, while the stripping by which the work pieces are connected together travels directly over the impact plate for severing by the cutter blade **45**. While this arrangement is entirely satisfactory in most instances, particularly those where the work pieces project laterally to one side of the stripping only, there may be instances where the work pieces project laterally to both sides of the stripping and the oppositely projecting portions of their leading and/or trailing edges are not in transverse alignment. For example, the leading edge portion of the work piece at one side of the stripping may be in advance of or behind the leading edge portion at the opposite side of the stripping, in which event a cell detector at only one side would not necessarily actuate the cutter at an appropriate moment in relation to the work. In such instances two cell detectors may be used in transverse alignment at opposite sides of the stripping, such cell detectors being electrically connected in parallel so that either one or the other may respond to the passage of the work piece for actuating the cutter at an appropriate moment. Since an arrangement of this nature involves merely a duplication of parts as disclosed in the various embodiments, an illustration thereof is not believed to be necessary. While in the foregoing there have been described and shown the preferred embodiments of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure, and various modifications and equivalents may be resorted to, falling within the spirit and scope of the invention as claimed.

What is claimed as new is:

1. For use with a sewing machine from which are continually passed individual work pieces connected by stripping so that the leading edge of each work piece is spaced along the running length of the stripping from the trailing edge of the preceding work piece with the work pieces projecting laterally at least to one side of the stripping; an apparatus for cutting the stripping, said apparatus comprising an electrically actuated cutter adapted to be mounted on a sewing machine in the path of movement of the stripping, light-responsive electrical means provided at one side of said cutter for detecting the flow of work pieces in coordination with the leading and trailing edges thereof, and electrical means controlled by said detecting means for automatically actuating said cutter to cut the stripping between the work pieces, said last mentioned means including a manually set three-position selector switch in circuit with said light-responsive means and with said cutter actuating means, said selector switch having a first position wherein said cutter is actuated to cut the stripping at the leading edge of the work pieces, a second position wherein the cutter is actuated to cut the stripping at both the leading and trailing edges, and a third position wherein the cutter is actuated to cut the stripping at the trailing edge of the work pieces.

2. The device as defined in claim **1** together with selectively operable manually controlled means for actuating said cutter independently of said electrical detecting means.

3. The device as defined in claim **1** wherein said electrical means for actuating said cutter include a source of current, a cutter actuating relay having switch means connected in series with said cutter to said source of current, and capacitor means for storing an electric charge sufficient for a single energization of said relay, the charging and discharging of said capacitor means being controlled by said light-responsive detecting means.

4. The device as defined in claim **3** wherein said electrical means for actuating said cutter also include a control relay having switch means connected to said source of current for charging said capacitor means and also connected to said cutter actuating relay for energizing the latter by discharge of said capacitor means, said control relay being in circuit with and responsive to said light-responsive detecting means.

5. The device as defined in claim **4** wherein said electrical detecting means include a photoelectric resistance cell connected in series with said control relay to said current source, said cell being responsive to ambient light reflected by the work pieces.

6. The device as defined in claim 4 wherein said electrical detecting means include a light-responsive current generating cell in circuit with said control relay, and means for projecting a light beam through spaces between the work pieces onto said cell for activating the same.

7. The device as defined in claim 4 together with means for adjusting the area of responsiveness of said detecting means to work pieces in relation to the position of said cutter.

8. The device as defined in claim 4 wherein said electrical detecting means include a pair of light-responsive current generating cells spaced longitudinally alongside the path of movement of the stripping, said cells being in circuit with said control relay, means for adjusting the spacing of said cells relative to each other, and means for projecting a light beam through spaces between the work pieces onto the cells for activating the same.

9. The device as defined in claim 4 wherein said electrical detecting means include a photoelectric resistance cell connected in series with said control relay to said current source, said cell being responsive to ambient light reflected by the work pieces, and means for adjusting said cell as to the span of the work piece area by which ambient light is reflected to the cell.

10. For use with a sewing machine from which are continually passed individual work pieces connected by stripping so that the leading edge of each work piece is spaced along the running length of the stripping from the trailing edge of the preceding work piece with the work pieces projecting laterally at least to one side of the stripping; an apparatus for cutting the stripping, said apparatus comprising a guillotine type cutter adapted to be mounted on a sewing machine in the path of movement of the stripping, said cutter including a stationary slide support, a slide reciprocable upwardly and downwardly in said slide support and projecting downwardly therefrom, a cutter blade at the lower end of said slide, impact receiving means mounted below the slide support for coaction with said blade, and means for reciprocating said slide including a powered actuator operatively connected to the slide, together with means for automatically energizing said powered actuator, said energizing means including detecting means adjacent said cutter for detecting the flow of work pieces in coordination with the leading and trailing edges thereof and a manually set three-position control operatively connected to said detecting means, said three-position control having a first position wherein said powered actuator is energized to cut the stripping at the leading edge of the work pieces, a second position wherein it is energized to cut the stripping at both the leading and trailing edges, and a third position wherein it is energized to cut the stripping at the trailing edge of the work pieces.

11. The apparatus as defined in claim 10 further including manually operated control means for energizing said powered actuator to actuate said slide independently of said automatic energizing means.

12. The apparatus as defined in claim 10 together with means for adjusting the area of detective responsiveness of said detecting means to work pieces in relation to the position of said cutter.

13. For use with a sewing machine from which are continually passed individual pieces of work connected by stripping so that the leading edge of each work piece is spaced along the running length of the stripping from the trailing edge of the preceding work piece with the work pieces projecting laterally at least to one side of the stripping; an apparatus for cutting the stripping, said apparatus comprising a power actuated cutter adapted to be mounted on a sewing machine in the path of movement of the stripping, means provided adjacent said cutter for detecting the flow of work pieces in coordination with the leading and trailing edges thereof, and means controlled by said detecting means for automatically actuating said cutter to cut the stripping between the work pieces, said last mentioned means including a manually set three-position selector control operatively connected to said detecting means and to said cutter actuating means, said control having a first position wherein said cutter is actuated to cut the stripping at the leading edge of the work pieces, a second position wherein it is actuated to cut the stripping at both the leading and trailing edges, and a third position wherein it is actuated to cut the stripping at the trailing edge of the work pieces.

14. The apparatus as defined in claim 13 together with selectively operable manually controlled means for actuating said cutter independently of said detecting means.

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