

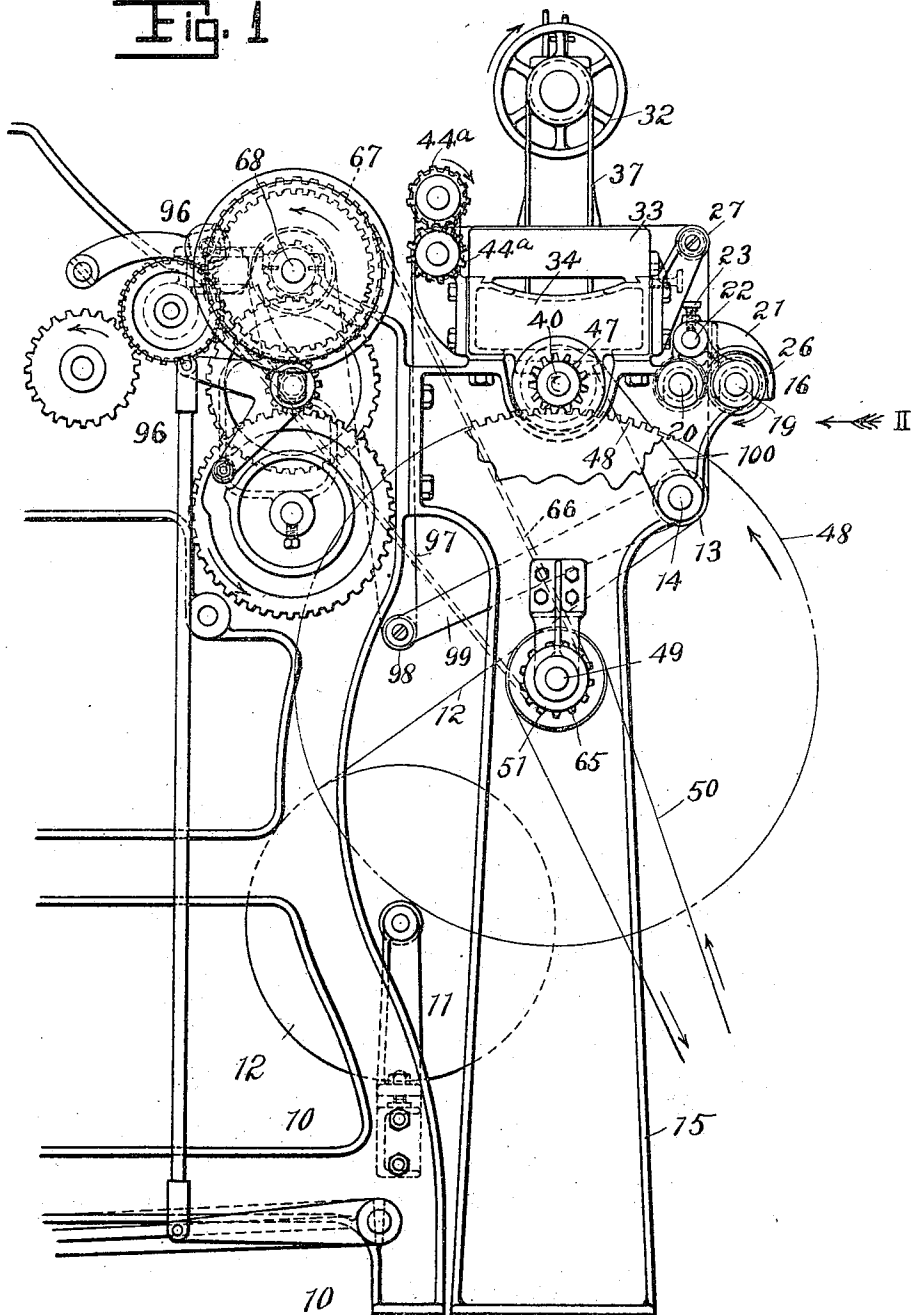
B. W. TUCKER.
MACHINE FOR MAKING WINDOW SHADES.
APPLICATION FILED AUG. 21, 1906.

962,178.

Patented June 21, 1910.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses
L. P. Compton
H. Linahan

Inventor
Benjamin W. Tucker
By his Attorney J. A. Griswell

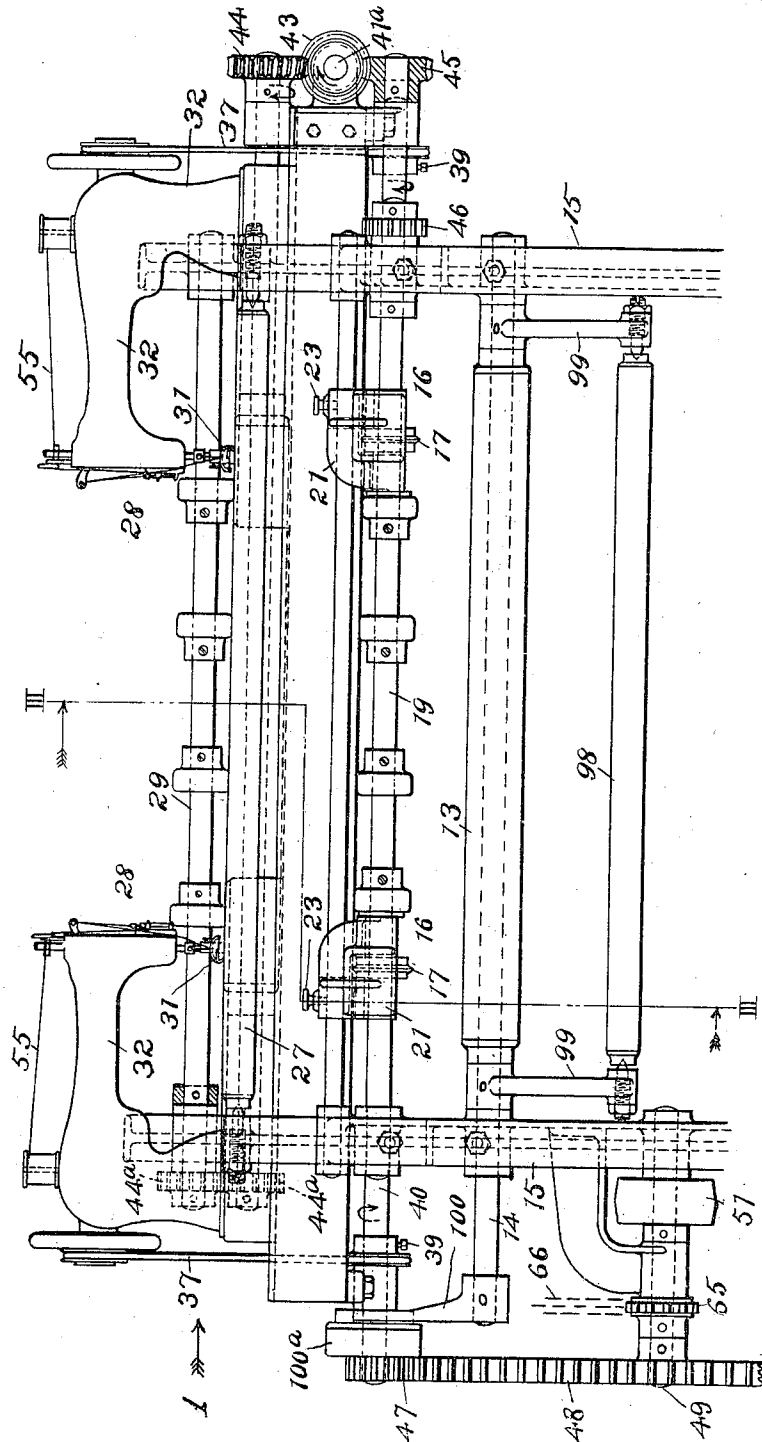
B. W. TUCKER.
MACHINE FOR MAKING WINDOW SHADES.
APPLICATION FILED AUG. 21, 1906.

962,178.

Patented June 21, 1910.

4 SHEETS—SHEET 2.

Fig. 2



Witnesses
R. R. Compton
H. Linahan

Inventor
Benjamin W. Tucker
By his Attorney J. A. Griswold.

B. W. TUCKER.
MACHINE FOR MAKING WINDOW SHADES.
APPLICATION FILED AUG. 21, 1906.

962,178.

Patented June 21, 1910.

4 SHEETS—SHEET 3.

Fig. 4

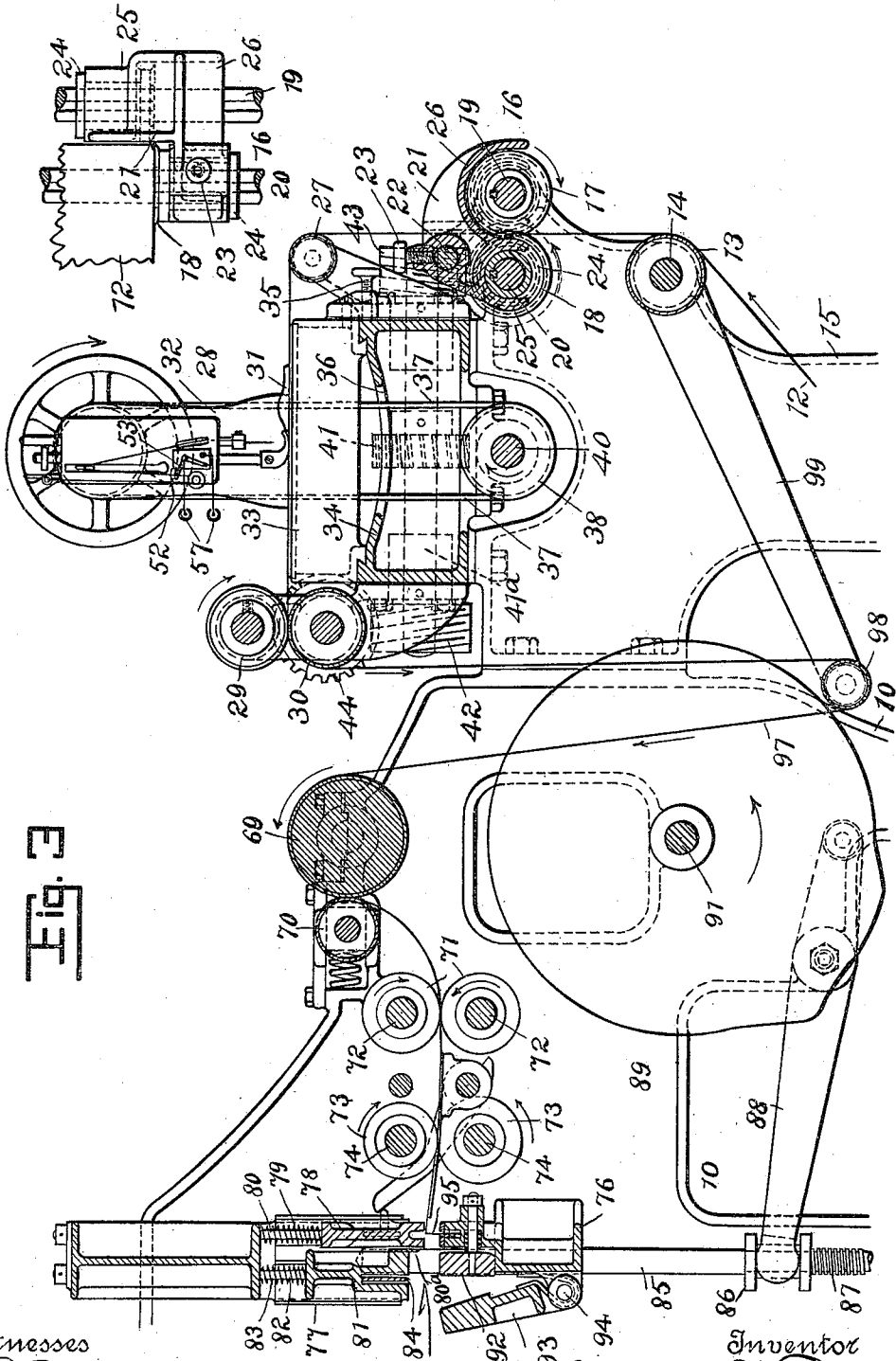


Fig. 3

Witnesses
L. R. Compton
H. Lincoln

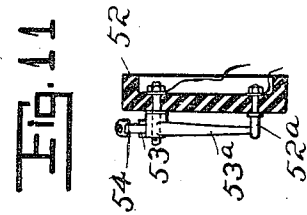
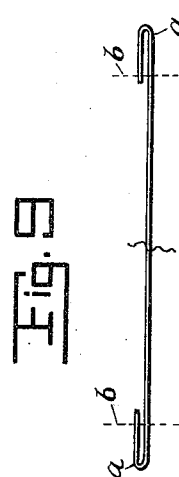
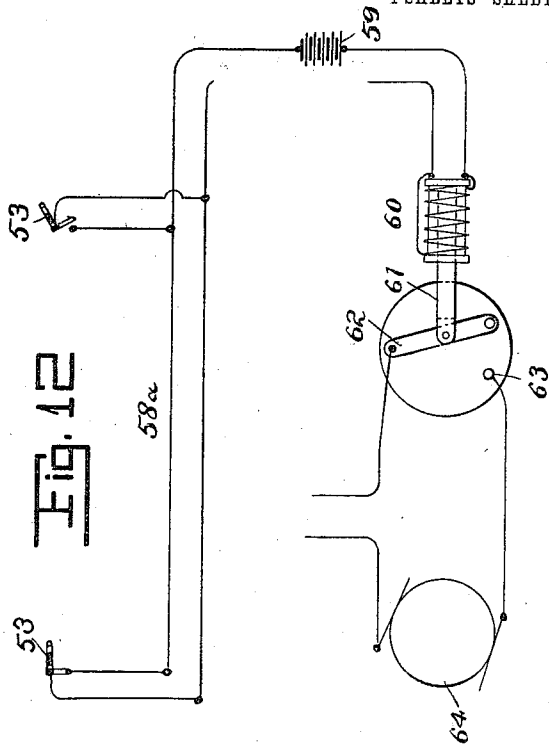
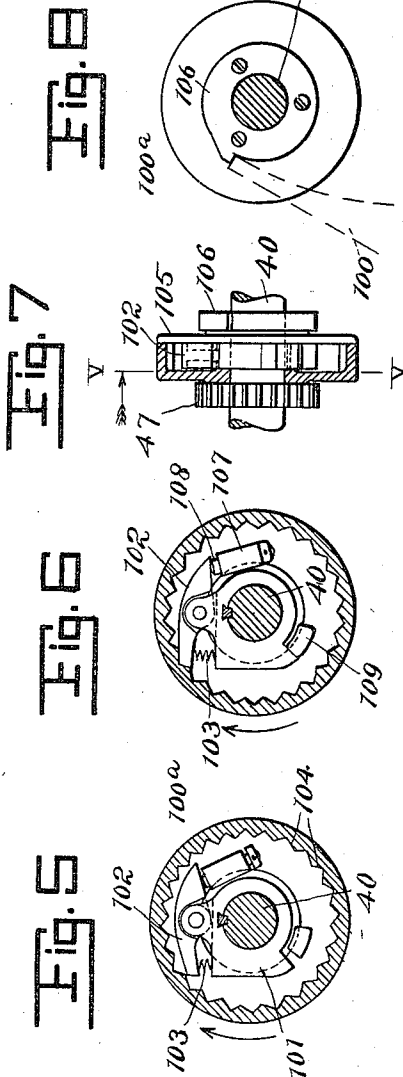
Inventor
Benjamin W. Tucker
By his Attorney J. A. Criswell

B. W. TUCKER.
MACHINE FOR MAKING WINDOW SHADES.
APPLICATION FILED AUG. 21, 1906.

962,178.

Patented June 21, 1910.

4 SHEETS—SHEET 4.



Witnesses
L. R. Compton
H. Lincoln

Inventor
Benjamin W. Tucker
By his Attorney J. A. Griswell

UNITED STATES PATENT OFFICE.

BENJAMIN W. TUCKER, OF NEWARK, NEW JERSEY, ASSIGNOR TO JOHN BEECHER PATTON, OF KENT, OHIO.

MACHINE FOR MAKING WINDOW-SHADES.

962,178.

Specification of Letters Patent. Patented June 21, 1910.

Application filed August 21, 1906. Serial No. 331,486.

To all whom it may concern:

Be it known that I, BENJAMIN W. TUCKER, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Machines for Making Window-Shades, of which the following is a full, clear, and exact description.

This invention relates more particularly to machines such as is disclosed in Reissue Patent 12,445, granted to Ephraim O. Engberg, February 6, 1906, and my pending application Serial No. 301,072, filed February 14, 1906.

The primary object of the invention is to provide simple, efficient, and automatically operated means whereby the material or goods employed in the manufacture of window shades may be quickly and accurately cut, and a finishing hem formed and sewed lengthwise along the material at the edge thereof, and the material with the side hems cut transversely and formed with a loop for the usual shade-slat.

Further objects of the invention are to provide simple and efficient means whereby the entire machine may be automatically stopped in case the thread for stitching the hem should break; to provide simple means whereby the machine proper may be operated at a speed differing from the speed of the sewing mechanism, or vice versa, or one operated while the remainder of the machine is inactive; and to provide means whereby the sewing mechanism may be automatically stopped in case the speed of the material passing through the machine proper is less than the speed of the means which forms the side hems.

The invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and will then be pointed out in the claims at the end of the description.

In the drawings, Figure 1 is a side elevation of one form of machine embodying the invention, only a part of the machine proper for forming the window-shade being shown. Fig. 2 is a rear elevation, partly broken away, of the trimming and hem forming means. Fig. 3 is a fragmentary vertical longitudinal section, on a larger scale, taken on the line III—III of Fig. 2. Fig. 4 is a

fragmentary plan showing the bracket for adjustably holding the trimming knives or cutters. Figs. 5 and 6 are detail sectional views of the operating clutch for the sewing mechanism taken on the line V—V of Fig. 7. Figs. 7 and 8 are other views showing certain features of the clutch. Fig. 9 is an enlarged fragmentary view, partly diagrammatic, showing the material after the side hems have been formed. Figs. 10 and 11 show the means for closing the electric circuit to automatically stop the machine in case the thread for stitching the side hems should break; and Fig. 12 is a diagrammatic view of one form of means for stopping the entire machine when the circuit is closed by the breaking of the stitching thread.

While I have shown the means for forming and stitching the side hems of the shades as attached to a shade machine such as disclosed in my application herein referred to, it will be understood that the means for making the side hems may be used in connection with other constructions or differently arranged with respect to the shade machine proper, and that such attachment or means may be suitably modified to adapt it for use in such different relations. It will also be understood that the side hem forming means may be used separately, and the roll with side hems placed in a machine such as shown in the patent or application referred to, and the shade then completed from such roll.

In the application referred to the material is taken from a roll, cut lengthwise thereof, the material properly measured, cut transversely, the shade-slat loop or hem formed, and the shade wound upon the usual roller. Such mechanism which may be termed the machine proper, is not broadly claimed herein, but in combination with the mechanism whereby the side hems may be formed; and only so much of the mechanism of the machine proper is shown as will illustrate the proper relation of the side hem forming means to the mechanism for completing the window shades.

The frame 10 of the shade machine proper has one or more adjustable bearings 11, between the centers of which a roll of shade material or goods is suitably held, so that it may be readily unwound therefrom. The web of material passes around an idler roll 13, which is supported by the shaft 14, the

latter being held in a frame 15 which is securely fastened to the rear of the main frame 10. From the roll 13 the material passes to the edge cutting or trimming devices 16. Each trimming device 16, one for cutting the material at each edge thereof, has a set of cutters or knives 17 and 18, which are beveled on one side and overlap so as to make a clean cut. The knives 17 are rotated by the shaft 19, and the knives 18 by the shaft 20, and said knives are adjustably held along the shafts by means of the brackets 21. These brackets, Figs. 2, 3 and 4, are rigidly held to a transverse rod 22 by a bolt 23, in order that said brackets may be adjusted transversely of the machine to cause the knives to cut the material to the desired width. The knives of each cutting device are fastened to sleeves 24, which are rotatably held to the brackets, and are splined to the shafts 19 and 20, so as to be rotated by said shafts, yet permit the knives to be adjusted transversely of the machine. The brackets 21 have forked lower ends 25 to span the sleeves 24, and a hood 26 to guide and force the edges cut from the material downward and away from the machine to prevent the waste interfering with the proper working thereof. As the material is cut it passes around a roller 27 to the sewing and hem forming means 28, and from there to the positively driven feed rolls 29 and 30. The roll 30 is tubular and extends the entire width of the material, while the roll 29 is made up of a series of individual disks, collars or rollers, each having a rubber covered surface.

For forming the side hems to give a better finish to the shade, I may use various means. As the material passes around the roll 27 it is turned or folded over to form a hem as shown best in Fig. 9, by a suitable hemmer 31, which may be of the usual or of any preferred construction, and may be employed as an attachment to each sewing machine 32. The sewing attachments or machines 32, one for each edge of the material, may be of the usual construction, and are of such a nature as will make the usual zig-zag or other stitch, and said machines are made so that one will work from the right, and the other from the left, though this arrangement may be changed if desired. Each sewing machine is suitably supported on a base 33 which is adjustably held on the part 34 of the frame 13 by means of a bolt or screw 35. The part 34 of the frame is open at 36 transversely of the machine, and passing upward through the opening are belts 37, one for each sewing attachment. The belts 37 pass around pulleys 38, which latter are adjustably held by the screws 39 to the transverse rotary shaft 40, by which movement is imparted to the sewing attachment. The needle bar of each sewing machine or

attachment will thus be operated and the hems formed by the hemmer 31, and properly stitched as the web of material is drawn forward by the feed rolls 29 and 30.

On the shaft 40 is a spiral gear which meshes with the teeth of a second spiral gear 41, said gear 41 being held to a shaft 41^a. This shaft has worms 42 and 43, at the ends thereof, the former of which engages a worm gear 44 on the shaft of the feed roll 30; and on the shaft of roll 30 is a gear 44^a, which meshes with a similar gear on the shaft of the roll 29, by which the two rolls operate positively and in unison. The worm 43 on the shaft 41^a rotates a worm gear 45, which is secured to the shaft 20 of the cutting devices, and said shaft has a gear 46, which meshes with a similar gear on the shaft 19. The shaft 40 is provided at one end with a pinion 47, and this pinion is driven by a larger gear 48, which is carried by a shaft 49 projecting outward from the frame 15, the said shaft 49 being driven by a belt 50, which passes around a pulley 51 on the shaft 49, the said belt being connected to any suitable power, as an electric motor. By this means the shaft 40 drives the cutting devices 16, the sewing mechanism 28 and the feed rolls 29 and 30.

In case the thread of either sewing machine should break, it is desirable that the entire machine may be stopped. As one means for accomplishing this, I have shown electrically operated devices for stopping the driving means as best shown in Figs. 3, 10, and 12. On the head of each sewing machine is an insulation block 52, each having a contact point 52^a. A lever 53 is pivoted to each block 52, and has one end 53^a adapted to engage the contact point 52^a when the thread breaks, and thereby complete the circuit to shut off the power as will be presently described. Each lever 53 has one end 54 insulated from the main part thereof, and said lever is normally held by the stitching thread 55 so as to throw the end 53^a of the lever away from the contact point 52^a. The sewing attachments have the usual devices 58 for the stitching threads, and adjacent to the attachments are insulating tubes 57, slotted at one side thereof, Fig. 3, and through which the wires of the electric circuit 58^a pass to permit proper adjustment of said sewing attachments or machines according to the width of the shade to be made. The circuit wires 58 have one end connected to the levers 53, and the other ends connected to the contacts 52^a, and in the circuit 58 is included a battery 59, and a solenoid 60. The solenoid has an armature 61, which is connected to a pivoted lever 62. A contact 63 is provided in the path of the lever or switch 62, and this contact is connected to the brush of a motor 64. It will be seen that as one of the threads break, the lever

53 will close the circuit, and will cause the solenoid to operate the lever 62 and thereby force the lever away from the contact 63 and stop the motor, and through the motor stop the shade machine, which may be connected to the motor through the belt 50.

The shaft 49 is provided with a sprocket wheel 65 around which passes a chain 66. This chain 66 passes around a sprocket 67 formed as a part of a clutch, similar to that shown in Figs. 5 to 8, and is arranged on the shaft 68 of the shade machine proper. The material passes around the second feed roll 69 and between a spring-pressed roll 70, and is positively fed inward as the shaft 68 rotates. The material is engaged by the guide and feed rolls 71, which are held on the shaft 72, and by a second set of rolls 73 held to the transverse shaft 74, from which the material passes to the loop-forming mechanism 75.

The loop-forming mechanism and means for cutting the material transversely is substantially the same as shown in my pending application. A transverse support 76 is rigidly held between the ends of the frame, and above the support is a movable cross-head 77. This cross-head, Fig. 3, is suitably guided in the frame, and yieldingly held thereto is a member or bar 78. The member 78 is guided at its ends in the cross-head 77, and is normally forced downward by the springs 79, which surround the rods 80, the latter being guided and vertically movable in the cross-head. The material is clamped between the support 76, and the yieldingly held member 78, preparatory to cutting the material transversely. Adjacent to the clamping member 78 is a folding blade 80^a, which latter is fixed to a second yielding member 81, also carried by and guided at its ends in the cross-head. The second yielding member or device 81 is supported by the rods 82, and around the rods 82 are the springs 83, which normally force the member 81 away from the main part of the cross-head until stops carried by the rods engage said head with the rods 80. This member 81 is grooved, and movable in the groove is a second folding blade 84, which is fixed to the cross-head. To the cross-head is secured the rods 85, the lower ends of which are guided in the frame, and are movable in the path of an adjustable bolt or stop to limit the downward movement of the cross-head and the second folding blade 84. A sleeve 86 is held on each rod 85, and beneath the sleeve is a spring 87, one end of which rests against a collar on said rod. The sleeves are engaged by one end of the pivoted levers 88, the other end of each lever being operated by a cam 89, a cam groove being provided for this purpose. As the shaft 91, carrying the cams 89, is rotated, the rods 85 will be forced downward until they are

arrested by the stops, thus preventing further downward movement of the cross-head, and forming two folds in the material. The folds formed by the blades 80^a and 84 are forced on opposite sides of the sliding bar or member 92. This member 92 is spring pressed, and forms a recess between said member and a part of the transverse bracket or support 76, and movable on the opposite side of the member 92 is a pivoted member 93. The member 93 is pivoted at 94 to the bracket 76, and when said pivoted member is moved it clamps the folded part of the material on opposite sides of the sliding member 92 and finishes the creasing to complete the folds, thus forming the shade-slat loop, as shown in Fig. 3.

The material after being measured and properly clamped between the member 78 and the support or bar 76, is cut transversely by a knife 95 movable across the machine. This knife may be of any suitable construction, and may be operated by the mechanism 96, and the shade rolled on the usual shade-roller in substantially the manner disclosed in my pending application.

It is not always possible to determine the time necessary to complete a shade, or so much as is made in the machine proper, with the speed of the mechanism for forming the side hems of the shade. To provide for this, I form a slack or loop 97 in the material between the feed rolls 29 and 30, and the feed rolls 69 and 70. The material forming the loop 97 passes around a roll 98, which is carried by the inner ends of arms 99. These arms 99 are held to and supported at their other ends by the shaft 14, and have their inner ends normally forced downward by the weight of the roll 98 to exert proper tension on the material, and to permit the material to be readily taken up by the feed rolls 69 and 70. On the shaft 14 is carried a pawl 100, which is so positioned with respect to the arms 99, that when too much slack occurs in the material, the said pawl will move over into operative position with a suitable clutch, and through it stop the rotary movement of the shaft 40 and mechanism operated thereby.

The clutch for stopping the shaft 40 and the sewing mechanism is substantially the same as the clutch employed for stopping the movement of the feed roll shaft 68. The clutch 100^a, Figs. 5 to 8, has a collar 101 fixed to the shaft 40, and carried by this collar is a pawl 102. The pawl 102 is pressed by a spring 103 to engage teeth 104 of a drum 104^a, which latter when rotated will rotate the shaft 40 and impart motion to the sewing machines. A friction disk 105 is loosely held on the collar 101, and carried by said disk is a wheel 106 having a single tooth, which is adapted to be engaged by the pawl 100, as shown in Figs. 1 and 8,

to hold the disk from rotating. On the disk 105 is a boss 107, which projects within the drum, and carries a spring-pressed bolt 108, and a lug 109 is also carried by said disk, both lug and boss being positioned with respect to the tooth on the wheel 106. As soon as the pawl 100 is released, the disk 105 will rotate with the drum 104^a until the lug 109 engages a projection on the collar 101, which will throw the bolt away from the end of the clutch pawl 102, to permit the spring 103 to force the pawl into engagement with the teeth of the drum to rotate the shaft 40. The reverse of this action takes place when the pawl 100 stops the rotation of the disk 105, in which case the bolt 108 engages its ends of the pawl 102, and owing to the strength of this spring, will overcome spring 103, and disengage the pawl 102 from the teeth 104 of the drum, and thereby stop the rotary movement of the shaft 40, and the sewing mechanism driven thereby.

The invention will be readily understood from the foregoing description when taken in connection with accompanying drawings. The material 12 after being cut to the proper width by the trimming devices 16 passes under the sewing mechanism 28, and will have the edges turned over by the hemmers 31 as at *a*, Fig. 9, and the turned over part or hem properly stitched as at *b* in said figure, as the material is fed forward by the feed rolls 29 and 30. The tension and take-up device, formed by the roll 98 and arms 99, will take up the slack in the loop 97, and in case the loop becomes too long, as when the sewing mechanism and the feed rolls 29 and 30 operate faster than the other part of the machine, the pawl 100 will engage the wheel 106 of the clutch and will stop sewing and feeding of the material from the main roll. If either thread should break of either sewing machine, the lever 53 will operate to close the circuit through the battery 59 and solenoid 60, thereby operating the lever or switch 62, to shut off the power and stop the entire machine. As the material forming the loop is fed inward by the feed rolls 69 and 70, and the feed rolls 72 and 74, the proper length of shade is cut after the same has been attached to the usual shade-roller, and the end clamped adjacent to the transverse cutting means. The loop for the shade-slat is then formed by the movement of the cross-head 77 and the creasing mechanism as already described, and fully set forth in the application referred to.

It will be seen from the foregoing that simple and efficient means is provided whereby a finishing hem may be made along the side edges of the shade material; the shade machine proper started and stopped independently of the sewing mechanism, or the latter independently of the former; and that

in case the thread for stitching the hem on either side of the material should break, the entire machine with the sewing mechanism will be stopped.

It will be understood that the cutting devices 16 may be placed in the stead of the feed rolls 72, when the sewing mechanism is dispensed with, and that the levers 53 may have a light or other spring to cause it to form a proper contact with the point 52^a in case the thread should break, instead of depending upon the weight of said levers, or that other means than an electric motor may be employed for driving the machine, and that other changes may be made without departing from the character of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a machine for making window shades, the combination with means for supporting shade material, of feeding mechanism, means for forming a loop for the shade slat, means for forming a side hem at each edge of the material lengthwise thereof, sewing mechanism, together with a take-up device arranged to operate on the material between the loop-forming mechanism and the sewing mechanism.

2. In a machine for making window shades, the combination with means for supporting shade material, of feeding mechanism, means for forming a loop for the shade slat, knives for cutting the material lengthwise thereof, means for forming a side hem at each edge of the material, sewing mechanism, together with a tension and take-up device arranged to operate on the material between the loop-forming mechanism and the sewing mechanism.

3. The combination with means for supporting the shade material, of feeding mechanism, means for forming a loop for the shade slat, means for forming a side hem at each edge of the material lengthwise thereof, a take-up device acting upon the material between the hem-forming means and the loop-forming means, means for operating the sewing mechanism, sewing mechanism, together with means operated by the take-up device adapted to stop the means for operating the sewing mechanism.

4. The combination with means for supporting shade material, of feeding means, edge-trimming knives cutting the material lengthwise, mechanism for forming a loop for the shade slat, a transverse cutting knife, means for forming a side hem at each edge of the material lengthwise thereof, a take-up device acting upon the material between the hem-forming means and the loop-forming mechanism, means for operating the sewing mechanism, sewing mechanism, together with means operated by the take-up device

adapted to stop the means for operating the sewing mechanism.

5 5. The combination with means for supporting a web of material, of two sets of feed rolls, a tension device acting on the material between said feed rolls, sewing and hem-forming means for forming a hem at each edge lengthwise of the material, means for operating the sewing means, and connections between the tension device and the operating means whereby the latter may be stopped when the sewing speed is too great.

10 6. The combination with means for supporting shade material, of two sets of feed rolls, a vertically movable take-up and tension device acting on the material between said feed rolls, trimming knives for cutting the material lengthwise, sewing and hem-forming means for forming a hem at each edge lengthwise of the material, means for operating the sewing means, and connections between the tension and take-up device and the operating means whereby the latter may be stopped when the speed of the sewing is too great.

25 7. In a machine for making window shades, the combination with means for supporting shade material, of feeding mechanism therefor acting to sustain a loop in the material, a tension device acting on the loop, hem-forming and sewing means, and trimming means arranged in advance of the sewing means.

30 8. In window shade machinery, the combination with means for holding shade material, of two independent sets of feed rolls adapted to form a loop in the material, a roller supported in the loop, arms carrying the roller and forming therewith a tension and take-up device, sewing mechanism,

means for operating the sewing mechanism, and a pawl operatively connected with the arms adapted to stop the means for operating the sewing mechanism.

9. The combination with means for holding a web of material, of feed rolls adapted to form a loop in the material, a roller supported in the loop, arms carrying the roller and forming therewith a tension and take-up device, sewing mechanism, means for operating the sewing mechanism, and means operatively connected with the arms adapted to stop the means for operating the sewing mechanism.

10. The combination with means for supporting a web of fabric, of means for feeding the fabric, devices for trimming the fabric along its edges, two sewing machines and hem-forming means, adjustable bases or supports for the sewing and hem-forming means whereby the latter may be adjusted to different widths of material, together with mechanism for operating the sewing machines.

11. The combination with means for supporting a web of fabric, of means for feeding the fabric, devices for trimming the fabric along its edges, two sewing machines and hem-forming means, adjustable bases or supports for the sewing and hem-forming means whereby the latter may be adjusted to different widths of material, mechanism for operating the sewing machines, and means for stopping the sewing means when a thread should break.

BENJAMIN W. TUCKER.

Witnesses:

L. R. COMPTON,
J. A. E. CRISWELL.