W. A. GORDON.

BIAS CUTTING MACHINE.

APPLICATION FILED JAN. 2, 1915.

1,148,162.

Patented July 27, 1915.

5 SHEETS—SHEET 1.

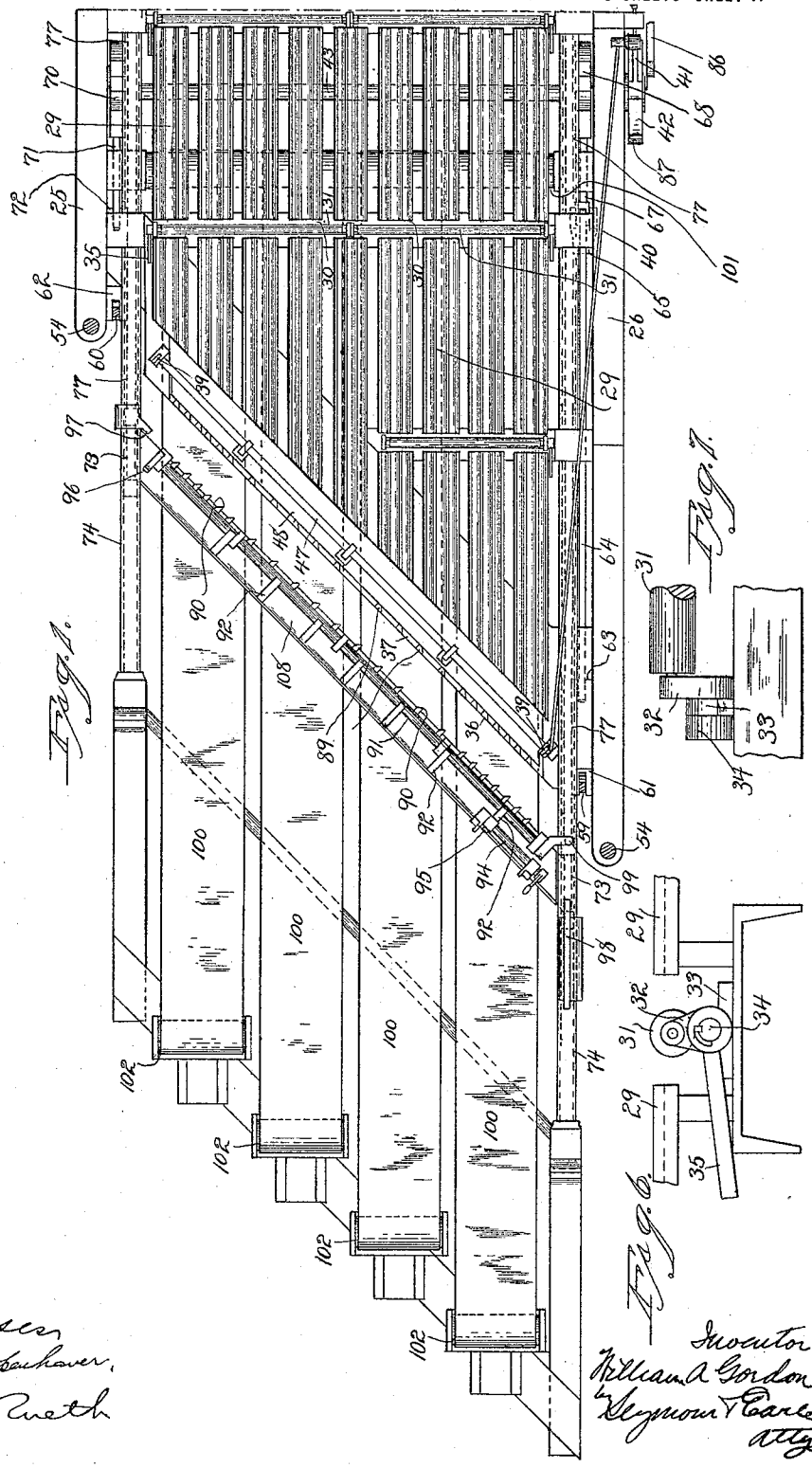


Fig. 1.

Fig. 7.

Fig. 6.

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5 SHEETS—SHEET 2.

Fig. 8.

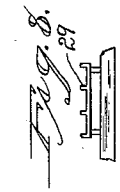
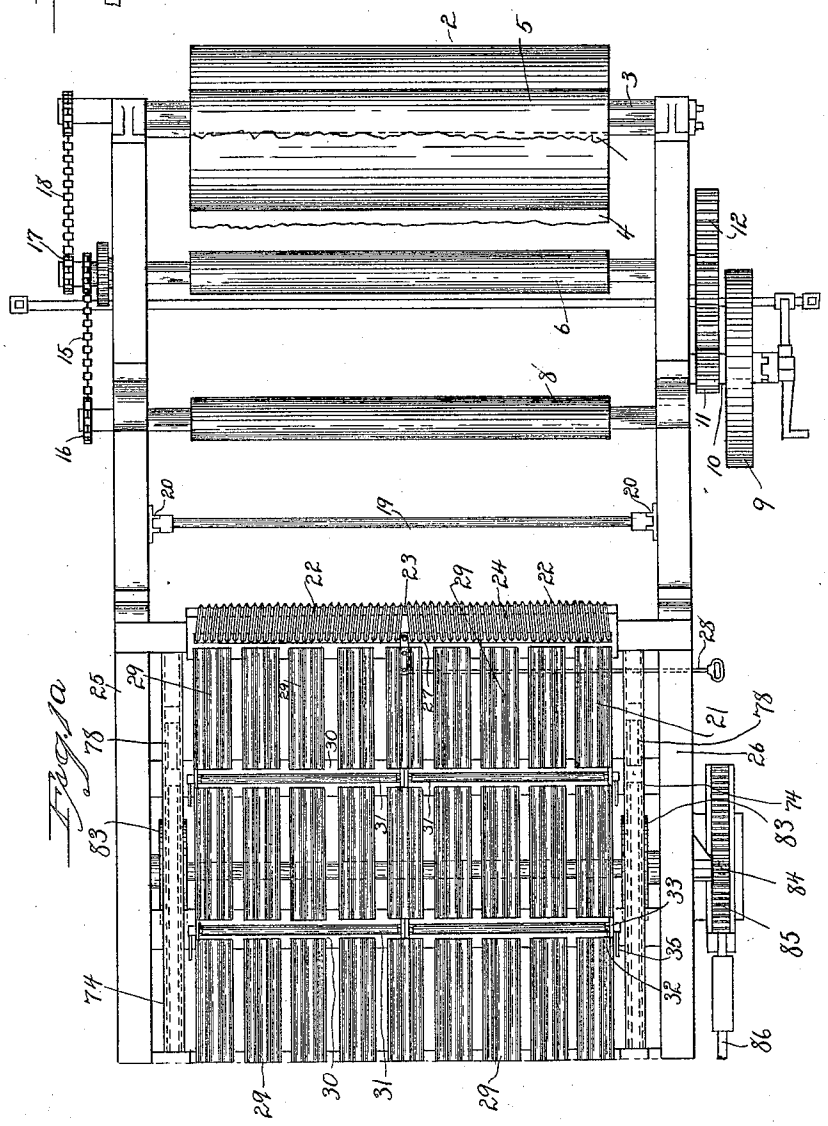


Fig. 1a



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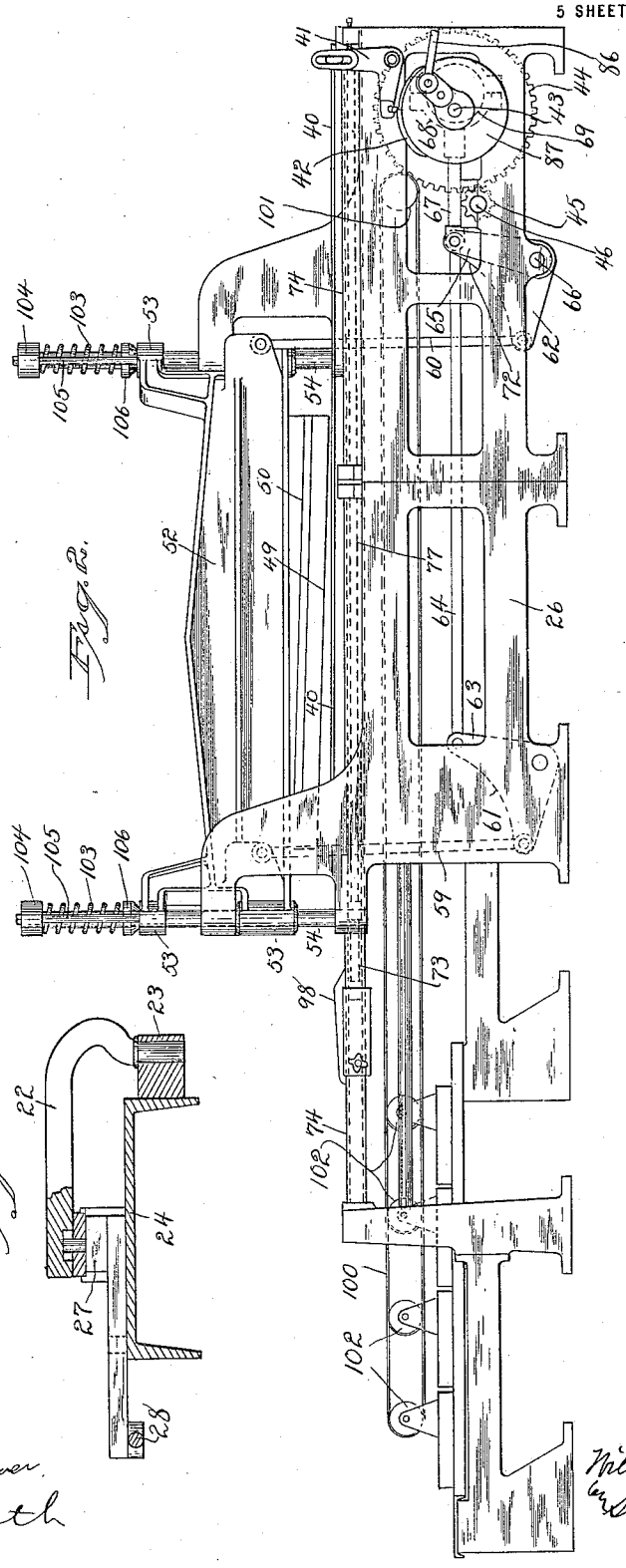


Fig. 2.

Fig. 3.

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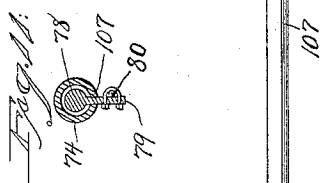


Fig. 11.

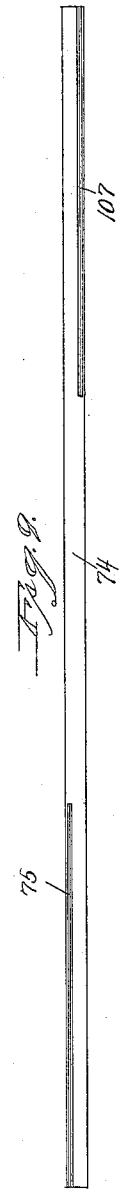


Fig. 9.

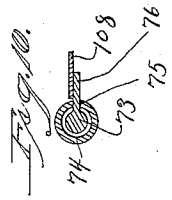


Fig. 10.

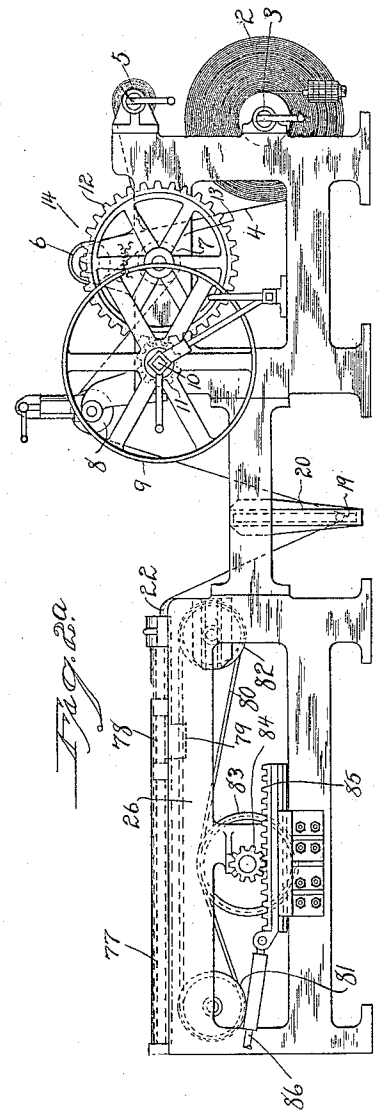


Fig. 2a.

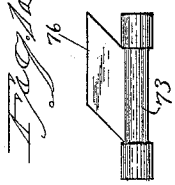


Fig. 12.

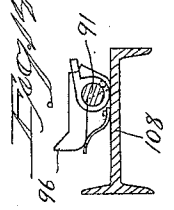


Fig. 11.

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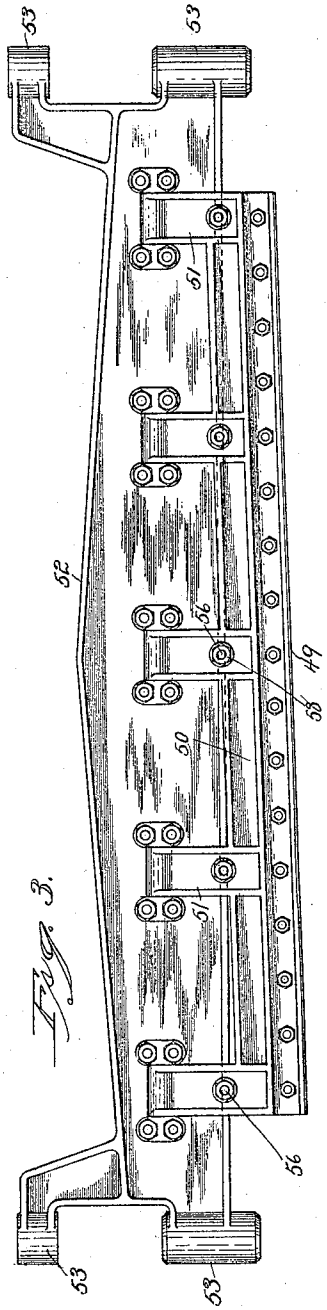


Fig. 3.

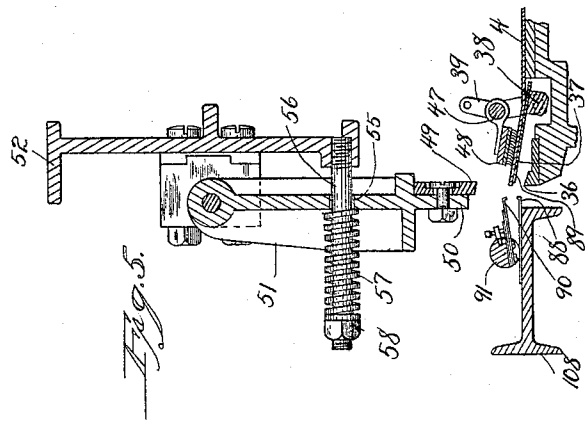


Fig. 5.

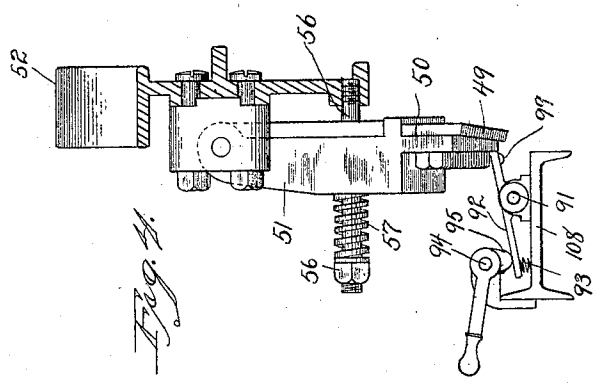


Fig. 4.

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BIAS-CUTTING MACHINE.

1,148,162. Specification of Letters Patent. Patented July 27, 1915.

Application filed January 2, 1915. Serial No. 314.

To all whom it may concern:

Be it known that I, WILLIAM A. GORDON, a citizen of the United States, residing at Shelton, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Bias-Cutting Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Figure 1 is a top or plan view of the forward end of a bias cutting machine construction in accordance with my invention. Fig. 1ª a top or plan view of the rear portion of the machine. Fig. 2 a side view of a portion of the machine shown in Fig. 1. Fig. 2ª a side view of the rear portion of the machine shown in Fig. 1ª. Fig. 3 a face view of the knife-bridge and upper knife detached. Fig. 4 a side view partly in section of the knife-bridge and upper knife, and the carrier with its gripping fingers shown in the open position. Fig. 5 a vertical sectional view through the bridge, knife-carrier, the forward end of the table and the carriage, and showing the grippers in position just before gripping a strip. Fig. 6 a broken side view on an enlarged scale showing means for operating the anti-friction transverse rollers in the bed. Fig. 7 a broken face view showing the means for mounting the anti-friction rollers. Fig. 8 shows an end view of one of the table plates. Fig. 9 a detached view of one of the tubular bearings. Fig. 10 a sectional view through the forward bearing block. Fig. 11 a sectional view through the rear bearing block. Fig. 12 a detached view of one of the forward bearing blocks. Fig. 13 a side view partly in section illustrating the arrangement of the warp or spreading fingers. Fig. 14 a detail sectional view showing the means for releasing the grippers.

This invention relates to an improvement in bias cutting machines such as particularly adapted for cutting sheets of rubber cloth, but equally applicable for cutting other material.

The object of this invention is to simplify the operation of machines of this character with special reference to machines adapted for cutting very wide material; and the invention consists in the construction hereinafter described and particularly recited in the claims.

The construction of the machine will best be understood in connection with the description of the operation. A roll 2 of material to be cut is mounted on a shaft 3. If this material is rubber cloth it comes from the calender rolls mounted upon a drum with a layer of canvas or other material to prevent the layers of rubber from sticking together. If this backing is employed it is stripped from the sheet 4 of rubber and wound upon a drum or roller 5. The sheet 4 passes over a roller 6, thence around a roller 7, then over a roller 8, all of which are driven. As herein shown a pulley 9 is driven by a belt or otherwise. This pulley is mounted on a shaft 10 which carries a pinion 11 meshing with a gear 12 on the roller 7. The roller 7 at the opposite end carries a gear 13 meshing with a gear 14 on the roller 6, and the roller 6 is connected by sprocket chain 15 with a sprocket 16 on the roller 8, while the roller 7 is provided with a sprocket 17 which is connected with the sprocket on the roller 5 by a sprocket chain 18. From the roller 8 the fabric passes beneath a weight roller 19 moving in guides 20, and thence onto a table 21. To keep the sheet smooth, a series of guide or warp fingers 22 are pivoted in a bar 23 secured to a transverse channel iron 24 which forms a brace connecting the two side frames 25, 26. These fingers are bowed upward and forward and divided into sets, one set inclined toward the right, and the other toward the left, and their forward ends are connected with a slide 27 by which these fingers may be moved by a handled rod 28. The face of the table is formed by a series of ribbed plates 29. These plates are interrupted at intervals by transverse clearance spaces 30 in which transverse rollers 31 are placed and which normally project above the plane of the bed. The ends of these rollers are mounted in arms 32, said arms mounted in brackets 33. The short shafts 34 of the arms 32 extend through the bracket and are provided with handles 35 by which the arms may be turned so as to drop the rollers below the plane of the table plates 29 if the friction between the fabric and table plates does not require them.

At the forward end of the table is a sta-

tionary cutter bar or lower knife 36 which extends diagonally across the frame of the machine, preferably at an angle of 45°; and above this knife is a raising-plate 37 which is connected with a rock-shaft 38 (Fig. 5) carrying upwardly extending arms 39 one of which is connected by a long rod 40 with a bell-crank lever 41 which is turned by a cam 42 mounted on a disk 87 on a shaft 43 which carries a gear 44 in mesh with a pinion 45 on a driven shaft 46. Above this stripper plate and swinging on a rod 47 is a strip of card cloth 48 beneath which the sheet 4 of fabric passes. This card cloth prevents the strip from creeping backward and yet permits it to be freely drawn forward. Co-acting with the lower cutter or stationary knife 36 is a movable cutter or upper knife 49 which is fixed to a plate-carrier 50 having a series of upwardly extending arms 51 which are pivotally connected with a plate-carrying frame or bridge 52, this bridge being provided at opposite ends with vertical bearings 53 which ride on upwardly extending posts 54 mounted on opposite sides of the frame. The several fingers 51 have clearance openings 55 through which pins 56 extend, these pins being screwed into the bridge 52 and over their outer ends are placed springs 57 which may be adjusted by nuts 58 screw-threaded onto the pins 56. To raise the bridge vertically and prevent uneven motion or tilting, the bridge is connected at opposite ends by rods 59, 60, with bell-crank levers 61, 62. The arm 63 of the lever 61 is connected by a connecting rod 64 with a lever 65 mounted on a stud 66 on which it rocks. In line with the connecting rod 64 is a short rod 67 provided with a head 68 riding on an eccentric or cam 69 on the shaft 43. The shaft 43 extends across the machine and on it is a similar cam moving a head 70 which moves a rod 71 extending into engagement with the upper arm 72 of the bell-crank lever 62 and so that the movement imparted to the rods 59 and 60 is the same, notwithstanding the fact that one end of the bridge is farther forward than the other. Forward of the table is a carriage 108 the ends of which are connected with bearing blocks 73 at opposite sides which blocks ride in tubular bearings 74 at opposite sides of the frame, the tubular bearings being formed with horizontal slots 75 through which lugs 76 on the bearing block 73 extend and to which lugs the table is connected. The ends of the block correspond in diameter to the internal diameter of the tubular bearings 74. These blocks are connected with long rods 77 carrying at their rear ends similar bearing blocks 78, the blocks 78 being provided with downwardly extending lugs 79 which extend downward through slots 107 in the tubular bearing 74, and these lugs 79 are coupled with an endless cable 80 running over idlers 81, 82, and driven by a drum 83 around which it is turned, this drum being provided with a pinion 84 meshing with a longitudinally movable rack 85 eccentrically coupled by a connecting-rod 86 with a disk 87. The point of attachment to the disk may be adjusted to regulate the extent of movement of the rack.

On the carriage 108 and projecting beyond the rear edge thereof are a series of lower gripper-fingers 88 arranged in line with clearance notches 89 formed in the raising plate 37 and co-acting with these lower fingers 88 are a corresponding series of upper fingers or grippers 90 which are connected with a rock-shaft 91 mounted in suitable bearings on the ends of the carriage. Also secured to the rock shaft are a series of rearwardly extending arms 92 beneath which springs 93 are placed the tendency of which is to force the grippers together. To manually open the grippers a rock-shaft 94 is arranged above the carriage, and on this rock-shaft is a cam 95 engaging with one of the arms 92 and so that by turning the cam 95 the grippers may all be opened if desired. As the carriage moves rearward toward the cutters, the grippers are open; but when the grippers have passed onto the raising-plate they are released by a lug 96 at one end of the shaft 91 striking a stop 97 adjustably mounted on one of the tubular bearings 74; and this closing of the grippers takes place just as the fingers enter the notches 89 in the raising-plate and while the bridge is raised. The grippers come together to grip the edge of the fabric which has been lifted from the lower knife by the raising-plate the edge of the fabric now being in line with the grippers so as to be caught thereby.

Adjustably mounted on one of the tubular bearings 74 is a cam 98 which determines the extent to which the fabric is to be drawn forward before the cutting takes place, and on the end of the rock-shaft 91 is an arm 99 which engages with the cam 98 to open the fingers, and it is to be noted that the bearing blocks 73 for the carriage come to a position beneath the cam 98 when the grippers are opened, and so prevent the tubular bearing from springing away under stress of pressure upon the cam 98. As the carriage moves forward to the limit of its predetermined movement, the arm 99 riding onto the cam 98 opens the grippers and releases the strip of fabric, the machine being timed so that the cutter descends when the carriage reaches the limit of its forward movement. When a portion has been severed from the strip of fabric it drops onto aprons 100 all of which are driven from a roller 101 in rear of cutters and running over

small adjustable rolls 102 at the forward end of the machine and so as to deliver the severed strip clear of the forward end of the machine. To balance the bridge and maintain it in proper position, springs 103 are placed over the posts 54 to be engaged by their upper ends by heads 104 connected with the bridge by rods 105, the lower ends of the springs resting on bearing blocks 106. With a machine thus constructed fabric is drawn onto the table and spread, so to speak, at the rear end so as to lie flat upon the table, and any tendency to creep to one side is overcome by the reverse inclination of the warp fingers. If, however, the fabric does creep to one side or the other, this may be overcome by manipulating the fingers which spread the fabric toward opposite sides and thus correct its course in the same manner as would be done by the hands of an operator were these fingers not present.

I claim:—

1. In a bias cutting machine, the combination with the table thereof, of a series of pivotal warp fingers arranged adjacent to the rear of the table and at an angle thereto.

2. In a bias cutting machine, the combination with the table thereof, of a series of reversely turned pivotal warp fingers arranged adjacent to the rear end of the table and at an angle thereto.

3. In a bias cutting machine, the combination with the table thereof, of a series of reversely turned warp fingers pivotally mounted at their rear ends adjacent to the rear end of the table at an angle thereto, and means for moving the inner ends of the fingers transversely.

4. In a bias cutting machine, the combination with the table thereof, comprising a series of bed-plates separated at their adjacent ends, of transverse rollers arranged between the plates, and means for raising and lowering said rollers whereby the upper surfaces may be projected above the plane of the bed plates or be depressed below the plane thereof.

5. In a bias cutting machine, the combination with a table and knives, of a longitudinally movable carriage forward of the knives, said carriage connected at opposite ends with bearing blocks, and tubular guides in which said blocks travel.

6. In a bias cutting machine, the combination with the table and cutters thereof, of a carriage, said carriage connected with bearing blocks, slotted guide tubes in which said blocks travel, means for moving the blocks, gripping fingers mounted on the carriage, a cam mounted on one of the tubular bearings, an arm connected with the grippers and adapted to engage with said cam whereby the grippers are opened.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WILLIAM A. GORDON.

Witnesses:
FREDERIC C. EARLE,
CLARA L. WEED.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."