

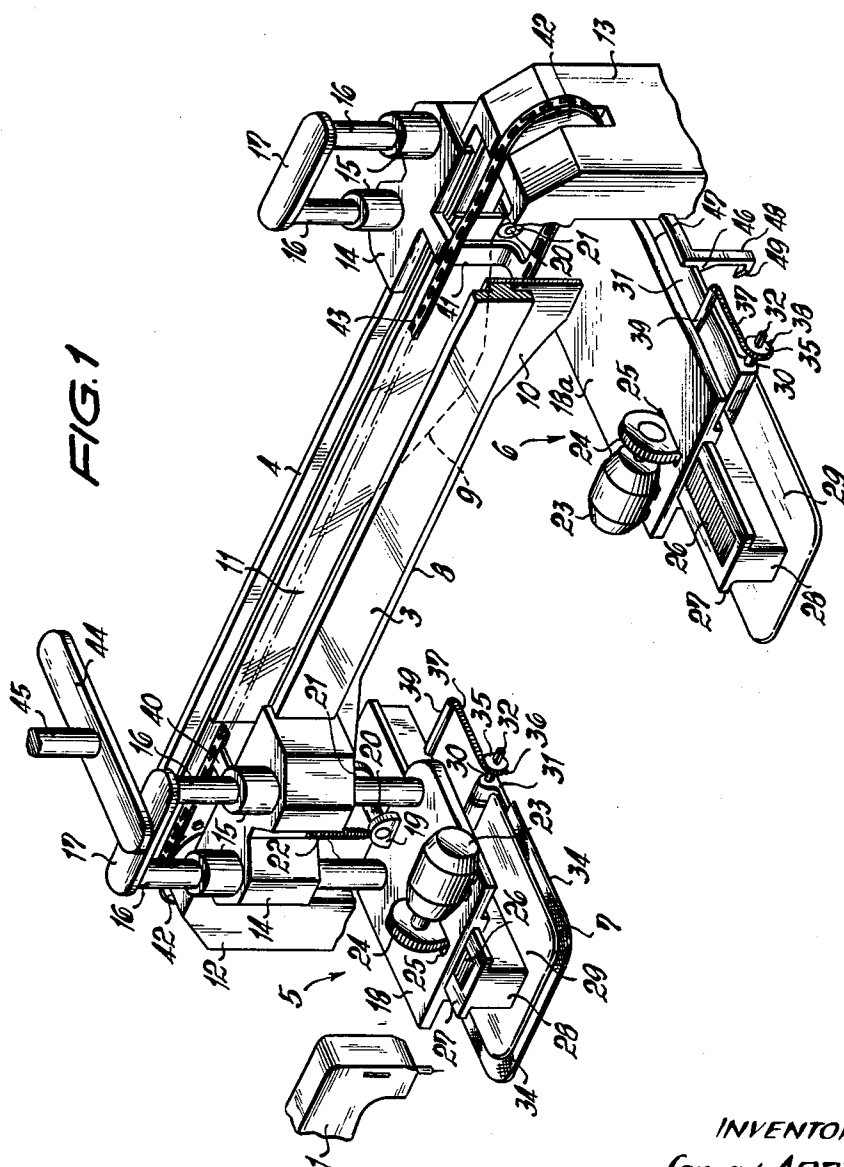
Aug. 4, 1964

C. ARBTER
FOLDING AND TRANSFERRING ARRANGEMENT FOR
MATERIAL CUT IN SEWING INSTALLATIONS

3,143,091

Filed June 22, 1962

3 Sheets-Sheet 1



INVENTOR
Conrad ARBTER

BY *Robert H. Fucob*

AGT.

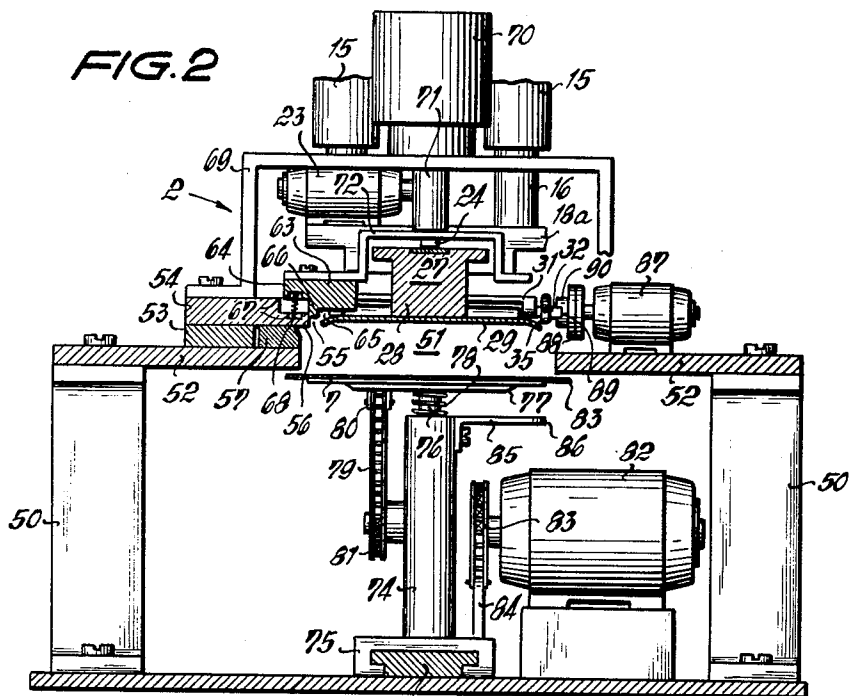
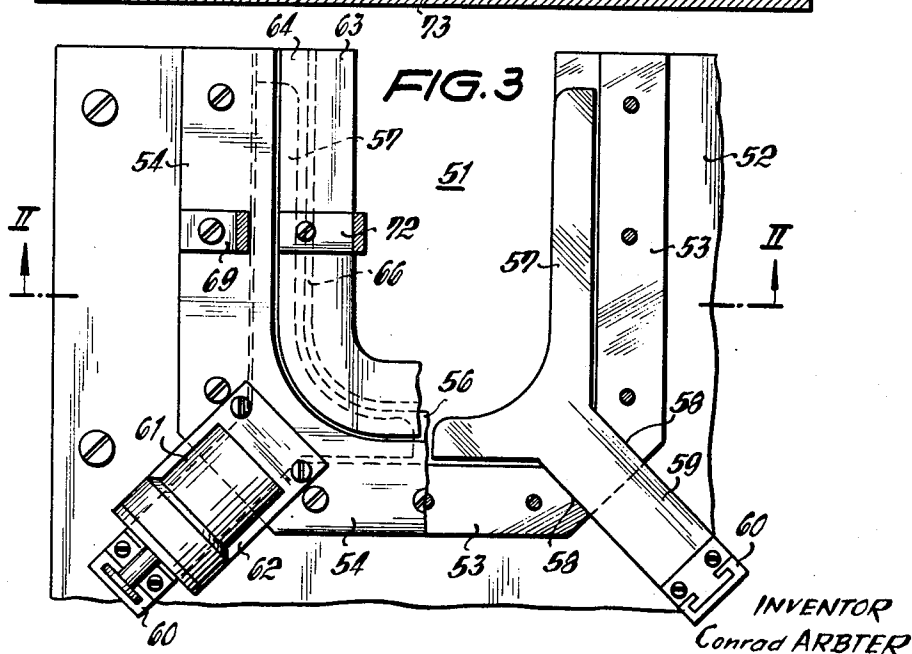
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Conrad ARBTER

BY
Robert K. Frost

AGT.

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FIG. 4

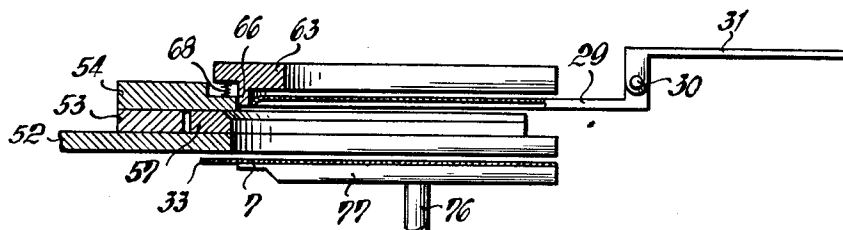


FIG. 5

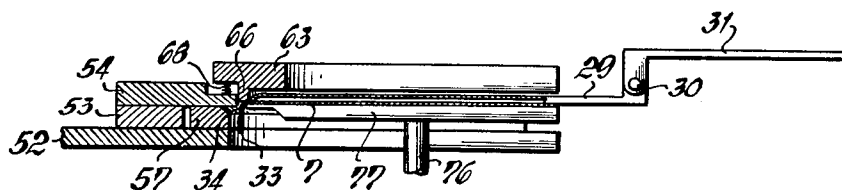


FIG. 6

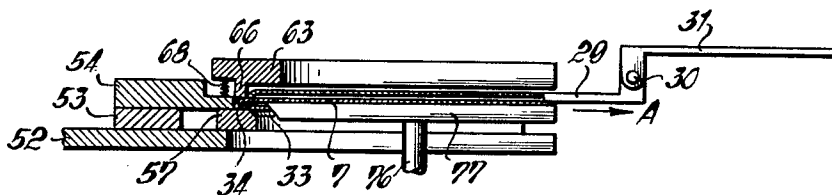
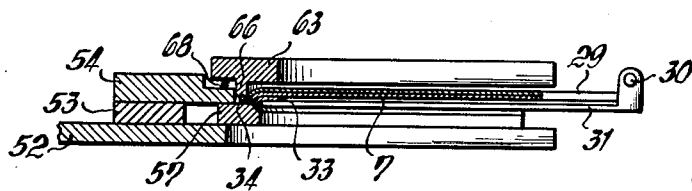


FIG. 7



INVENTOR
Conrad ARBTER

BY *Robert H. Frost*

A.G.T.

1

3,143,091

FOLDING AND TRANSFERRING ARRANGEMENT FOR MATERIAL CUT IN SEWING INSTALLATIONS

Conrad Arbter, Saal (Saale), Germany, assignor to G. M. Pfaff AG, Kaiserslautern, Pfalz, Germany

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3 Claims. (Cl. 112-2)

The invention relates to a feeding arrangement in sewing machines for individual cuts of material provided with turned over borders.

Heretofore it was not possible to remove material cuts having turned over borders, for example, cuts of pockets from the folding device and to transfer them to the sewing area in such a precise or accurate manner as it is required for sewing a material or garment cut upon a layer of material of a garment in the immediate proximity of the edge of the fold.

A further difficulty was presented by the fact that the folded over edges of the cut, in spite of heat treatment, when they were folded always tended to revert to their original shape and the fold produced in the folding device opened up again during the transfer to the sewing machine.

It is an object of the invention to provide a feeding arrangement which automatically receives the material cut supplied by the folding device and feeds it to the sewing machine for sewing of the folded over borders onto a piece of clothing. The turned over border edges of the material cut are to be seized in such a manner that the folds cannot re-open before being sewn on. Furthermore a possibility must be provided for the unobstructed removal after the sewing operation of the feeding member, which is located on the inside, out of the sewn on material cut.

In accordance with the invention this object is attained by a material gripper similar to tongs or the like which seizes the material cut while leaving the folded edges to be sewn on free and which is movable between the folding device and the sewing machine, which gripper is provided with a pick up or gripping plate movable into a recess provided in the folding device above the insertion position for the material cut and a substantially flat flap which is pivotally movable from the bottom into the folding device.

An advantageous configuration for seizing the material cut with the material gripper inside the folding arrangement is obtained in that the border edges of the flap of the material gripper taper toward the bottom and the gripping plate covers the flap in the manner of a shell. In this manner the folded edges of the material cut cannot turn over when the material gripper is being placed in the sewing location, but they are always presented to the machine in the correct position.

To insure a rational use of the arrangement two vertically displaceable material grippers are provided, the supports of which are movable on parallel rails and which are connected with rollers having force transmitting engagement with curved tracks.

Other objects and advantages of the invention will become apparent with reference to the drawings in which an embodiment of the feeding arrangement in accordance with the invention is illustrated and in which:

FIG. 1 is a perspective illustration of the arrangement where the folding device has been omitted to provide for better visibility;

FIG. 2 is a section through the folding device taken along line II-II in FIG. 3;

FIG. 3 is a plan view of the folding device where non-

2

essential parts as well as a part of the pressure plate and of the top plate have been omitted;

FIG. 4 is a side view of the folding device in section schematically illustrating the material gripper in position and of the lifting plate before entrance;

FIG. 5 is an illustration similar to FIG. 4 with the lifting plate moved in;

FIG. 6 is an illustration similar to FIG. 5 after operation of the folding slider; and

FIG. 7 is an illustration similar to FIG. 6 after withdrawing the lifting plate and closing the material gripper.

The sewing installation is provided with a sewing machine 1 (FIG. 1) a folding device 2 (FIG. 2) and material grippers 5 and 6 for cuts of material 7 supported therebetween for movement on parallel rails 3 and 4 (FIG. 1). The rails 3 and 4 to which are threadedly connected guide members 10 and 11 provided with curved tracks 8 and 9 are supported by two pedestals 12 and 13.

The material gripper 5 has a carrier 14 which is slidably carried on rail 3. Vertical bearings 15 are provided in the carrier 14 which receive rods 16, the upper ends of which are connected by a bridge 17 and to the lower ends of which a guide plate 18 is secured. A lug 19 provided on the guide plate 18 has secured thereto a bolt 20 which carries a roller 21. Roller 21 is held in engagement with the curved track 8 of the guide member 10 by a spring 22 which at one end engages the lug 19 and at the other end the carrier 14.

A motor 23 is secured to the guide plate 18 and is provided with a friction wheel 24 which projects through a slot 25 in the guide plate 18 and operatively engages a friction member 26 which is recessed in a carriage 27 slidably supported on the guide plate 18. A gripper plate 29 is secured to a bar 28 on the carriage 27 and a flap 31 is hingedly linked by means of a bolt 30 to the gripper plate 29. The bolt 30 which projects at one end and is provided with a rectangular head 32 is rotatably connected with the gripper plate 29 but rigidly connected with the flap 31.

The flap 31 has a flat surface and its border edges (FIG. 7) taper towards the bottom, while the gripper plate 29 covers the flap 31 in the manner of a shell. In this connection the dimensions of the gripper plate and the flap 31 are selected in a manner that the folded edges 34 which result from folding the border of the material cut 7 project beyond the gripper plate 29, while the turned over border edges 33 of the material cut 7 are still firmly seized by the smaller flap 31.

A wheel 35 (FIG. 1) is secured to the bolt 30 and presents a groove 36 for guiding a helical spring 37. This spring at one end is connected by means of a pin 38 fastened to the wheel 35 and at the other end to a pin 39 disposed laterally of the bar 28 of the carriage 27.

The material gripper 6 mounted upon the rail 4 corresponds essentially to the material gripper 5. It has merely a different guide plate 18a which is arranged in such a manner that both guide plates 18 and 18a extend toward the same side, while their free ends terminate in a plane extending parallel to the rails 3 and 4. Furthermore the roller 21 of the material gripper 6 is in engagement with the curved track 9 of the guide member 11.

For lateral displacement the carrier 14 of the material gripper 5 is connected by means of a connecting lug 40 with the upper part and the lower support 14 of the material gripper 6 by means of an angular connecting member 41 with the lower part of an endless chain 43 running on sprocket wheels 42. The sprocket wheels 42 are supported on the pedestals 12 and 13 and one of them is driven by a reversible motor which is not illustrated. A hydraulically operated rod 45 which is provided with a transverse yoke 44 is effective in the end position of the material grippers 5 and 6 on the side of the rails 3 and 4 on which

the sewing machine is arranged to lower the material grippers.

In the other end position on the side of the folding device 2 a latch 47 which has a nose 46 is resiliently secured to the pedestal 13. A cam 49 provided on a downwardly projecting extension 48 of the latch 47 serves for disengaging the latch. The folding device 2 (FIGS. 2 and 3) is supported by standards 50 and has a base plate 52 provided with a cut out 51. The upper plate 54 of U-shaped configuration which is secured upon this base plate 52 by means of spacing members 53 has a recess 55 and on the border which engages this recess a step-like ledge 56.

Between the upper plate 54 and the base plate 52 folding slides 57 are movably supported which are guided along the edges 58 of the spacing members 53 and are provided at their corners with extensions 59 each acted upon by a magnet 61 by way of an angular member 60. The magnets 61 are supported by angular members 62 secured upon the upper plate 54.

In the recess 55 of the upper plate 54 a vertically movable pressure plate 63 is supported which is also U-shaped and the border of which has a projection 64. The bottom side of the pressure plate 63 has a recess 65 defining a small pressure bar 66 which extends along the ledge 56.

The ledge 56 and the projection 64 are provided with bores 67 in which pressure springs 68 are accommodated. A hydraulic cylinder 70 is threadedly secured by means of a yoke 69 upon the upper plate 54. The cylinder has a plunger 71 which acts on a bridge member 72 secured to the pressure plate 63.

Below the base plate 52 of the folding device a guide rack 73 is secured upon which a slide member 75 is movably disposed carrying a support rod 74. The support rod 74 guides a bar 76 which supports an elevator plate 77. A helical spring 78 provided around the bar 76 presses the elevator plate 77 upwardly. The lowering of the elevator plate 77 is effected by means of a chain 79 which is hooked onto an eyelet 80 in the elevator plate 77 and is reversed in direction about a sprocket wheel 81 fastened to the support rod 74. A magnet (not shown) provided at the other end of the chain 79 serves for operating the chain.

The horizontal movement of the elevator plate 77 is effected by a reversible motor 82 which drives a chain 83. A connecting member 84 secured to the slide member 75 and which is linked to the chain 83 is operative to transfer the movement of the chain to the support rod 74.

An angular member 85 is threadedly secured to the support rod 74, the free end 86 of which releases the latch 47 as the support member 74 is displaced.

A small motor 87 is secured to one side of the base plate 52 of the folding device 2 which is connected by way of a friction clutch 88 to a drive disk 90 which is provided with a slot 89.

The operation of the installation takes place in the following manner: FIG. 1 indicates the end position of the two material grippers 5 and 6. The motor 23 secured to the material gripper 6 drives the gripper plate 29 with the flap 31 in folded position into the recesses 55 and 65 of the folding device 2 (see also FIG. 2) by means of the friction wheel 24 which slides the carriage 27 beyond the guide plate 18a over the friction member 26. In the end position of the carriage 27 where the rectangular end 32 of the bolt 30 has entered the slot 89 in the drive disk 90, the motor 23 is shut off, whereupon the motor 87 swings the flap 31 through the angle of 180° by means of the drive disk 90 until the nose 46 of the latch 47 on pedestal 13 is engaged. At the same time the helical spring 37 which is disposed above the wheel 35 is tensioned. Now the elevator plate 77 with the material cut 7 is driven by reversible motor 82 and by way of chain 83 into the folding device 2 (FIGS. 2

and 4). An end switch (not shown) cuts out the reversible motor 82 and interrupts also the current supply to the magnet which holds down the elevator plate 77 by way of chain 79 so that the elevator plate is pressed upwardly into the folding device 2 by the helical spring 78. During this operation the border edges 33 of the material cut 7 which project on three sides over the elevator plate are turned down by the edges of the base plate 52 or of the folding slide 57 as illustrated in FIG. 5, while the center part of the material cut is raised into the recess 55 below the gripper plate 29 of the material gripper 6.

The folding slides 57 are pressed inwardly by the magnets 63 (FIG. 3) by way of angular members 60 so that the turned over border edges 33 (FIG. 6) of the material cut 7 come to rest against the bottom side of the border of the elevator plate 77.

After this operation the hydraulic cylinder 70 (FIG. 2) presses against the pressure plate 63 by way of plunger 71 and bridge member 72 so that the pressure bar 66 comes to rest with a light pressure on the material cut 7 along the folded edges 34 (FIG. 6) against the effect of the pressure springs 68.

The elevator plate 77 which is driven by the reversible motor 82 by way of chain 83 now moves in the direction A as seen in FIG. 6 out of the folding device 2. As a result of the high frictional adherence on the pressure bar 66 the folded material cut 7 does not change its position.

During the return of the elevator plate 77 (FIG. 2) the free end 86 of the angular member 85 by engaging the cam 49 presses the nose 46 of the latch 47 away from the edge of the flap 31 so that the helical spring 37 pivotally moves the flap against the gripper plate 29 into the folding device 2 (FIG. 7). The flap 31 at the same time comes to rest against the bottom side of the material cut 7 so that the turned over border edges 33 are continued to be held. Simultaneously the pressure of the hydraulic cylinder 70 increases so that the pressure bar 66 applies very heavy pressure against the folded edges 34 that rest on the folding slides 57 and thus a permanent fold is produced on the material cut 7.

Now the pressure of the hydraulic cylinder 70 on the pressure plate 63 is released so that the pressure springs 68 and the pressure plate 63 rise into their upper end position. Simultaneously the current to magnets 61 is interrupted and thus the folding slides 57 return to their end positions.

The motor 23 now moves the material cut 7 disposed between the gripper plate 29 and the flap 31 out of the folding device 2 in that the friction wheel 24 pushes the carriage 27 into the guide plate 18a by way of the friction member 26.

Simultaneously with the entrance of the material gripper 6 into the folding device 2, the receiving of the material cut 7 and the moving out of the folding device 2, the material gripper 5 has brought a material cut for sewing into the sewing machine 1 in a manner to be described hereinafter and is likewise returned to its end position.

Now the chain 43 is driven by way of a driving device (not illustrated) which displaces by way of the connecting members 40 and 41 the two material grippers 5 and 6 on the rails 3 and 4. By means of the rollers 21 which are in engagement with the curved tracks 8 and 9 of the guide members 10 and 11, the guide plate 18 of the material gripper 5 moves out of the way upwardly by displacement of the rods 16 in their bearings 15 and the guide plate 18a of the material gripper 6 moves away downwardly so that both devices can pass one another without obstruction.

In the end position the material gripper 6 driven by motor 23 approaches the sewing machine 1 whereupon the hydraulic device operating the bar 45 lowers the guide plate 18a by pressure of its transverse yoke 44 onto the bridge 17 and thus the gripper plate 29 and the flap 31

5

is placed onto the garment with the material cut 7 in position for sewing. The sewing machine 1 then sews the folded edge 34 of the material cut 7 onto the garment.

After the sewing operation the pressure of the hydraulic device upon the bridge 17 decreases so that the material gripper 6 can rise again until roller 21 engages the curved track 9 under the force of the spring 22. As this happens the flap 31 in the sewed on cut of material 7 assumes a slightly inclined position against the pressure of helical spring 37. The motor 23 now returns the slide 27 and pulls the flap 31 out of the material cut.

The material gripper 5 which has meanwhile entered the folding device 2 and has picked up a new material cut 7, also returns into its end position so that a new exchanging operation of the two material grippers can take place in the manner described hereinabove.

Having now described my invention with reference to the embodiment illustrated in the drawings, I do not wish to be limited thereto but what I desire to protect by letters patent of the United States is set forth in the appended claims.

I claim:

1. In a sewing installation comprising a sewing machine and a folding device, means for feeding individual material cuts having turned over borders into position for sewing, said means comprising a base plate for said folding device, a material gripper having a gripper plate and a flap, said base plate having a recess and said gripper plate being movable horizontally into said recess, a device for supporting material cuts and movable vertically into said recess, said material gripper being adapted to support the material cut while exposing the folded border to be sewn, said gripper plate being supported on a carriage and said flap being pivotally movable from below against said gripper plate, means operative to move said flap against said gripper plate and means operative to move said carriage and said gripper horizontally into sewing position adjacent said sewing machine.

2. In a sewing installation comprising a sewing machine and a folding device, means for feeding individual material cuts having turned over borders into position for sewing, said means comprising a base plate for said folding device, a material gripper having a gripper plate and a flap, said base plate having a recess and said gripper plate being movable horizontally into said recess, a device for supporting material cuts and movable vertically into said recess, said material gripper being adapted

6

to support the material cut while exposing the folded border to be sewn, said gripper plate being supported on a carriage and said flap being pivotally movable from below against said gripper plate, means operative to move said flap against said gripper plate and means operative to move said carriage and said gripper horizontally into sewing position adjacent said sewing machine, said flap having a tapering border and said gripper plate having a turned over border adapted to receive said flap therein.

3. In a sewing installation comprising a sewing machine and a folding device, means for feeding individual material cuts having turned over borders into position for sewing, said means comprising a base plate for said folding device, a pair of material grippers having each a gripper plate and a flap, said base plate having a recess and said gripper plates being movable horizontally one at a time into said recess, a device for supporting material cuts and movable vertically into said recess, said material grippers being adapted to support the material cuts while exposing the folded borders to be sewn, each said gripper plate being supported on a carriage and each said flap being pivotally movable from below against its gripper plate, means operative to move said flaps against said gripper plates and means operative to move said carriages and said grippers horizontally into sewing position adjacent said sewing machine, each said carriage being mounted on a vertically movable support having a roller, a pair of parallel rails each carrying one said movable support and a pair of curved tracks, one for each said movable support and each associated with one said parallel rail, said roller of each said support being in engagement with the curved track associated with the parallel rail on which the support is carried, and means for moving said supports each with the gripper and carriage associated therewith in opposite directions along curved paths determined by their respective curved tracks.

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