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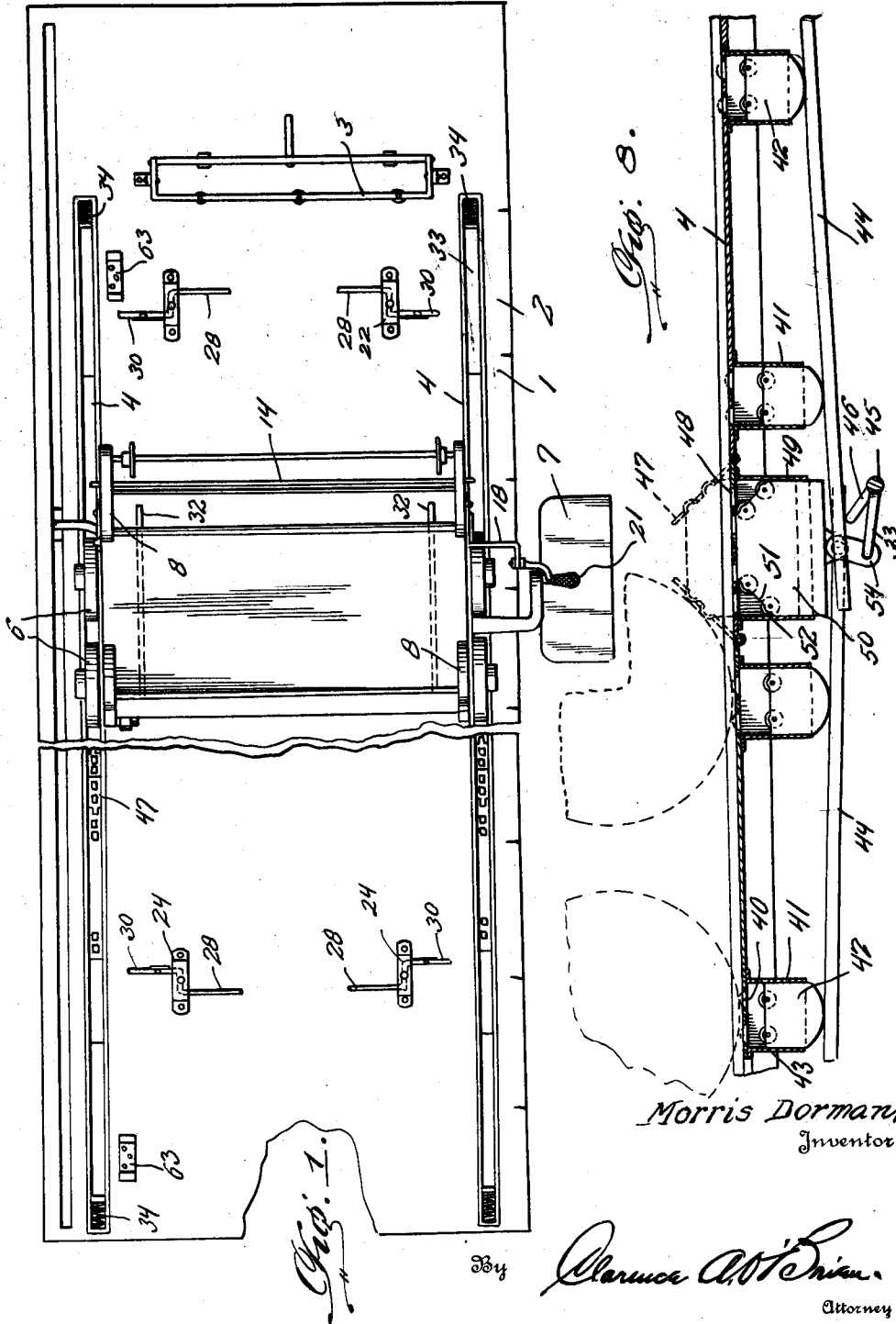
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M. DORMAN

CLOTH LAYING AND FOLDING MACHINE

Filed April 25, 1924

5 Sheets-Sheet 1



Dec. 30, 1924.

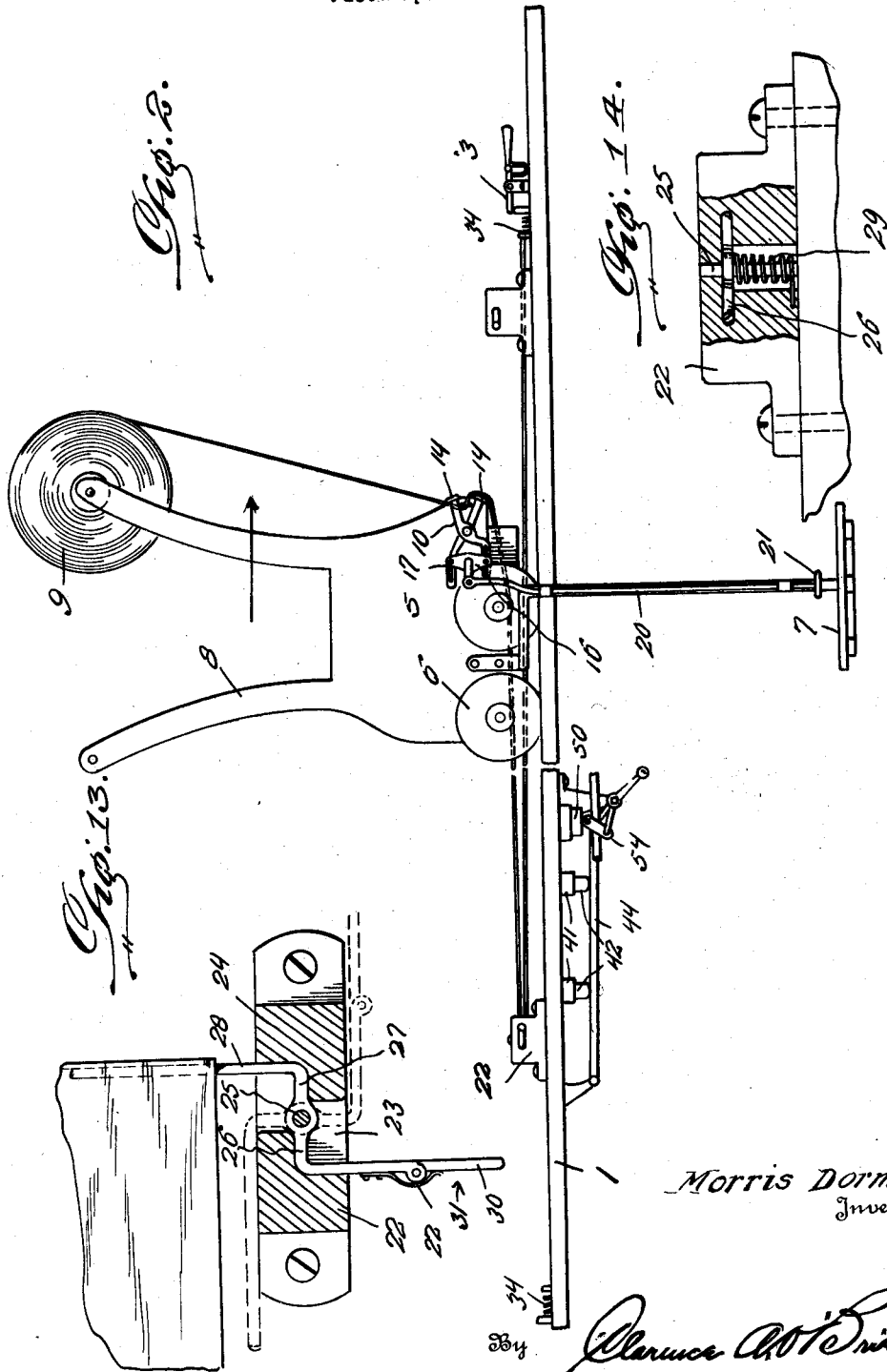
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CLOTH LAYING AND FOLDING MACHINE

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5 Sheets-Sheet 2



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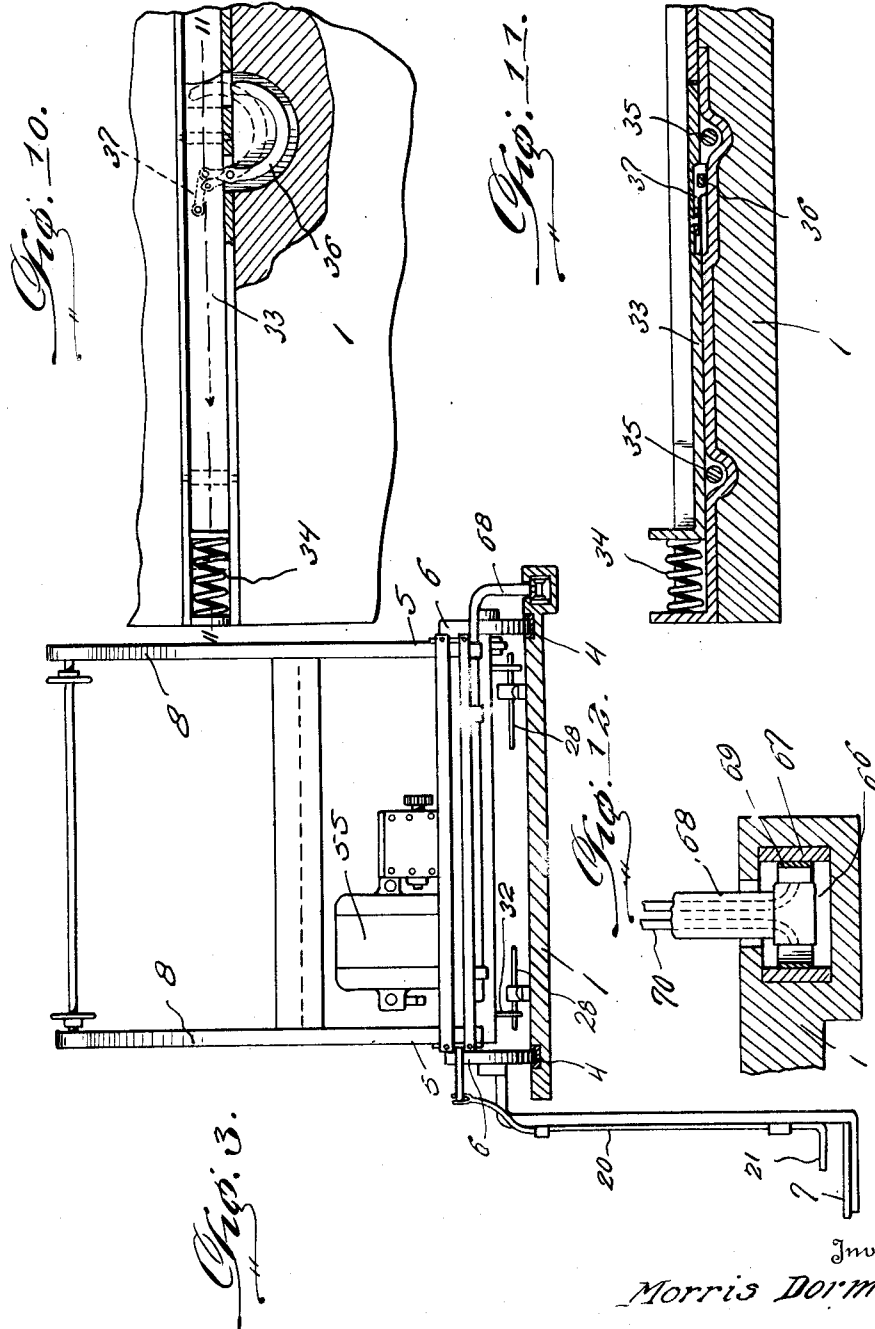
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5 Sheets-Sheet 3



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CLOTH LAYING AND FOLDING MACHINE

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Fig. 4.

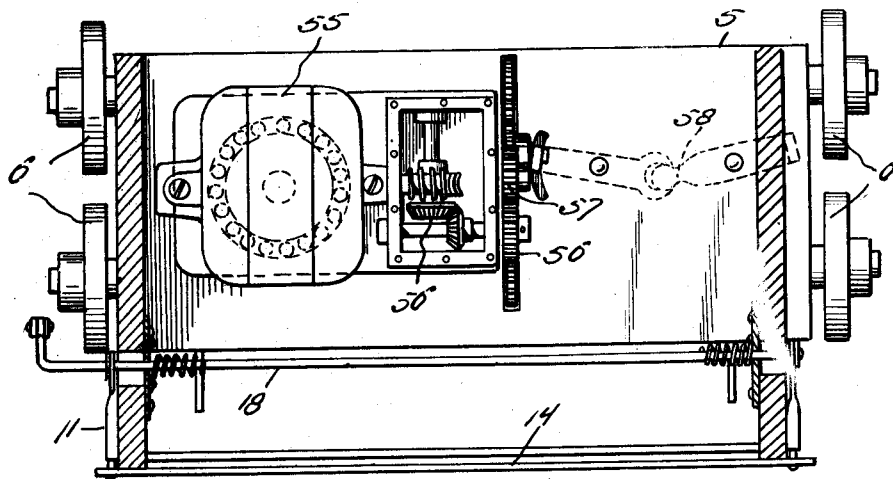
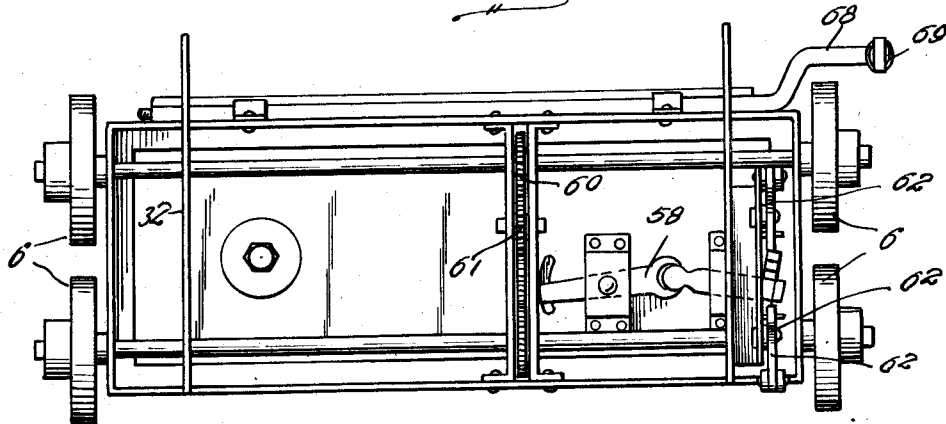


Fig. 5.



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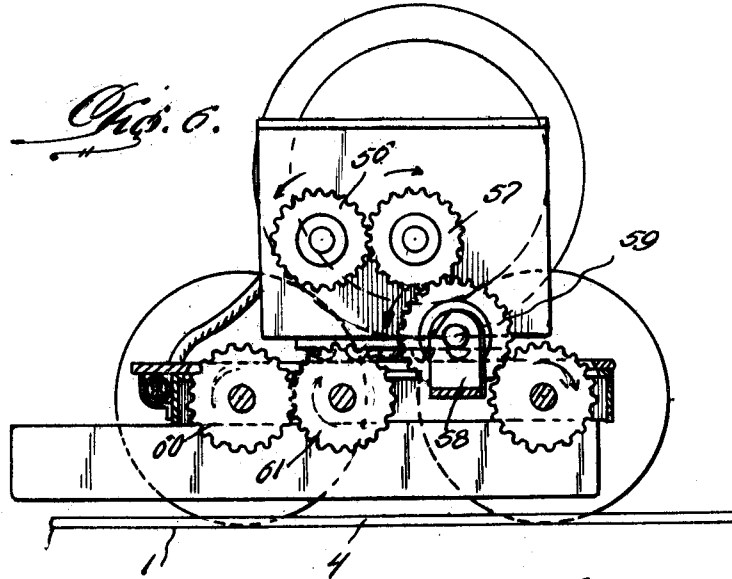


Fig. 7.

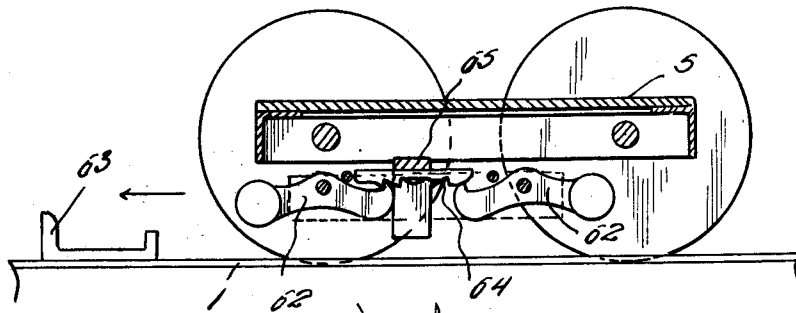
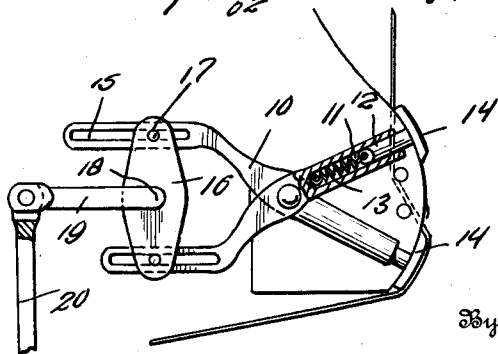


Fig. 8.



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UNITED STATES PATENT OFFICE.

MORRIS DORMAN, OF BALTIMORE, MARYLAND.

CLOTH LAYING AND FOLDING MACHINE.

Application filed April 25, 1924. Serial No. 709,026.

To all whom it may concern:

Be it known that I, MORRIS DORMAN, a citizen of the United States, residing at Baltimore, Maryland, have invented certain new and useful Improvements in a Cloth Laying and Folding Machine, of which the following is a specification.

This invention relates to cloth laying and folding machines and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide in combination with a cloth cutting table, a carriage adapted to move over the table and carry one or more rows, bundles or bolts of the cloth and lay the cloth in superposed layers upon the surface of the table in order that a stack of the pieces of the cloth may be cut from the folded layers of the cloth by the cloth cutters and in the usual manner.

A further object of the invention is to provide means for controlling the movement of the carriage so that the cloth will be laid evenly and smoothly upon the table and in superposed layers of uniform length.

A still further object of the invention is to provide upon the carriage cutting apparatus or means adapted to sever a remnant from the roll, bundle or bolt of cloth in order that the end edge of the last layer which is laid may occur at certain predetermined points upon the top of the table so that when the patterns are applied to the upper layer of cloth for the purpose of cutting out a stack of pieces, all of the pieces in the stack will be full and complete, thereby economizing in the use of the cloth and assuring that all of the pieces in each stack of pieces are in proper condition for use in the make-up of a garment. Other objects will be made manifest as the description of the machine progresses.

With such objects in view the invention includes a cutting table having a series of linear measurement marks disposed along one or both of the longitudinal edges of the top thereof. Tracks are embedded in the upper surface of the table top, the said tracks being U-shaped in transverse section. The tracks are provided at their opposite ends with slidable sections adapted to move longitudinally of the tracks when the carriage moves upon them and changes its direction of movement over the tracks. This to prevent the wheels of the carriage from slipping when the carriage is changing its

direction of movement and also to add sufficient stretch to the layer of cloth which is being laid to position the same properly upon the table. The carriage is propelled by an electric motor and means are provided at the ends of the table for automatically reversing the rotary movement of the wheels of the carriage, whereby the carriage is caused to reciprocate back and forth over the table top during the process of laying and folding the cloth thereon. The carriage is provided with a manually operable cutting apparatus adapted to shear the remnant from the length of cloth when the uppermost layer of cloth is laid upon the table. Means are provided upon the table for holding the carriage at a stationary position during the time that the remnant of cloth is being severed from the uppermost layer and not withstanding the fact that the wheels of the carriage continue in their rotary movement.

In the accompanying drawings:—

Figure 1 is a top plan view of the cloth laying and folding machine with parts thereof broken away.

Figure 2 is fragmentary side elevation of the machine with parts broken.

Figure 3 is a fragmentary transverse sectional view of the machine.

Figure 4 is a horizontal sectional view of the carriage of the machine showing the motor thereof in plan.

Figure 5 is an under plan view of the carriage of the machine.

Figure 6 is a transverse sectional view of the carriage of the machine.

Figure 7 is a transverse sectional view of the carriage of the machine showing locking means used in conjunction with the means for reversing the movement of the carriage upon the table.

Figure 8 is a fragmentary longitudinal sectional view through one of the tracks of the carriage showing the means for holding the carriage at a stationary position during the time that the cutting apparatus is severing the remnant from the cloth.

Figure 9 is an enlarged side elevation of the cloth cutting apparatus with parts thereof shown in section.

Figure 10 is a fragmentary plan view of an end portion of one of the tracks showing means for filling the gap between the fixed portion of the track and the longi-

itudinally movable portion of the track when the movable section is shifted with relation to the fixed section.

Figure 11 is a vertical longitudinal sectional view of the parts shown in Figure 10.

Figure 12 is a transverse sectional view through the edge portion of the table top and means for conducting the electric current to the motor of the carriage.

Figure 13 is an enlarged plan view with parts in section of means used upon the table for forming the return bend form at the ends of the layers of cloth as the same are folded upon the table.

Figure 14 is a side elevation of the fold forming means shown in Figure 13 and with parts shown in section.

The cloth laying and folding machine includes a table 1 having a series of linear measurement graduation marks 2 provided along the longitudinal edges of its top. These graduation marks may be in units of yards or units of any other lengths. A cloth clamping or securing device, indicated in general at 3 is mounted at one end of the table 1. Parallel track rails 4 are embedded in the upper surface of the top of the table 1 and extend longitudinally of the table. The said track rails are U-shaped in transverse section as best shown in Figure 3 of the drawings. A carriage 5 is mounted for movement longitudinally over the top of the table 1 and the wheels 6 of the carriage travel upon the intermediate portions of the track rails 4. A platform 7 is attached to one end of the carriage 5 and is arranged to move along one of the side edges of the top of the table. An operator may stand upon the platform 7. The carriage 5 is provided at the upper portions of its ends with upstanding arms 8 which may carry rolls 9 of the cloth or the space between the arms 8 at the opposite side portions of the carriage may be utilized for holding loose bolts or furled bundles of the cloth. In Figure 2 of the drawing, a roll of cloth 9 is illustrated as being supported at the upper end of one set of the arms 8. Shear levers 10 are pivoted at the ends of the carriage 5 and as shown in Figure 9 of the drawings these levers are provided at one end with sockets 11 which slidably receive studs 12. Springs 13 are also housed in the sockets 11 and are connected at their outer ends with the inner ends of the studs 12 and are connected at their inner ends to the intermediate portions of the levers 10. Cutting blades 14 are carried at the outer ends of the studs 11 and are disposed transversely across the carriage. The opposite end portions of the shear levers 10 are longitudinally slotted as at 15. A plate 16 bridges the space between the slotted ends of the shear levers 10 and the said plates carry pins 17 which are received in the slots

15. The plate 16 is mounted upon a shaft 18 which is pivoted in the end of the carriage 5 and which is provided with a crank arm 19. A rod 20 is pivotally connected at its upper end with the end of the crank arm 19 and extends down along the hanger which supports the platform 7 and is provided at its lower end with a treadle 21. From the roll 9 the cloth is trained through the space between the cutting edges of the blades 14 and the end edge portion of the cloth is secured to the top of the table 1 by the clamp or securing device. Thus the end of the cloth is held at a fixed point upon the table and as the carriage moves over the top of the table the cloth is unreel from the roll and moves between the cutting blades 14 and is stretched in layers, in superposed relation as will be explained hereinafter, upon the table top. When the length of cloth is unwound from the roll 9 the carriage 5 is brought to a state of rest, as will be explained hereinafter, and the operator places his foot upon the treadle 21 whereby the rod 20 is moved longitudinally and the plate 16 is turned with the shaft 18 thus drawing the slotted ends of the shear levers 10 together and moving the blades 14 toward each other. Thus the blades sever the remnant from the cloth and produce a square cut edge at the end layer of cloth.

Cloth folding means are mounted upon the table 1 substantially at the end of the path of movement of the carriage 5 thereon and each of these means includes a block 22 having a transverse opening 23 therein as best shown in Figure 13 of the drawings. The opposite end portions of the opening 23 are offset with relation to each other thereby providing interiorly located shoulders 24 in the said opening. A pivot pin 25 passes vertically through the block 22 and bridges the opening 22 at a point midway between the ends thereof. An arm 26 is pivoted at a point midway between its ends upon the pin 25 and the end portions of the arm which lie at the opposite side of the pivot 25 have angularly disposed portions 27 and 28. When the portions 28 of the arm are disposed at a right angle to the sides of the block 22 the portions 27 of the arm are in engagement with the shoulders 24 and are normally held in engagement with the said shoulders by a coil spring 29 (best shown in Figure 14) which is connected at one end with the arm and which is connected at its other end with the block 22. The intermediate portion of the spring 29 is coiled around the pivot 25. The portion 28 of one of the end parts of the arm 26 is provided with a hinged section 30 and the said section 30 is normally held in alignment with the inner portion of the arm by means of a spring 31. The pivotal connection between the section 30 and the adjacent portion of

the arm is in that form which is commonly known as a rule joint and that is to say the section 30 may swing in one direction with relation to the arm and against the spring 5 31 but should the section 30 be moved in an opposite direction, the arm 26 is swung with the section 30 and upon the pivot 25. Depending fingers 32 are carried by the carriage 5 and the sections 30 of the cloth 10 folding arms are located in the paths of movement of the fingers 32. When the carriage 5 is moving toward one of the sets of blocks 22 at one end portion of the table 1 and as the carriage is laying a layer of the cloth upon the table 1, the finger 32 strikes 15 the section 30 of the cloth folding arm and swings the said arms to the position indicated by the dotted lines in Figure 13 of the drawing. Thus the inner portions 28 20 of the arms 26 are moved out of the lay of the cloth and therefore a length of cloth is spread upon the table 1 or upon the uppermost layer of cloth which has been previously spread thereon. As soon as the carriage 5 passes beyond the outer ends of the 25 blocks 2, the fingers 32 clear the outer ends of the sections 30 of the arm and under the tension of the springs 29 the arms 26 are returned to the full line position shown in Figure 13 of the drawing whereby the inner 30 portions 28 are disposed transversely over the edge portions of the uppermost layer of cloth which has been spread upon the table. Upon the movement of the carriage 5 in a 35 reverse direction the cloth is carried around the inner portions 28 of the arms and a fold line is established at the end of the uppermost layer of cloth. Continuing on its reverse movement the pins 32 carried by the carriage 5 strike the pivoted sections 30 of 40 the arms 26 at the sides thereof opposite those sides against which the springs 31 bear and in that the arms 26 are held against turning movement by the engagement of the portions 27 with the shoulders 24 the sections 30 swing upon their pivotal connection 45 with the outer portions 28 of the arms 26, and against the tension of the springs 31. As soon as the fingers 32 clear the outer ends 50 of the sections 30 of the arms 26, the said sections are swung into alignment by the arms 26. Thus the cloth folding means are actuated and removed from the lay of the 55 cloth.

Each of the rails of the track 4 is provided at its ends with a longitudinally movable section 33. Springs 34 bear against the 60 outer ends of the sections 33 and serve to hold the inner ends of the sections 33 toward the intermediate section of the track rails 4. When the carriage 5 moves upon the section 33 at the same ends of the tracks 4 the said sections 33 under the weight and the 65 inertia of the carriage move slightly in the

same direction as that in which the carriage is moving and press the adjacent springs 34. At this time the carriage is about to change its direction of movement over the track rails and approximately at this time the supporting 70 wheels of the carriage are caused to rotate in a direction opposite to that in which they were rotating when they approach the movable track section. The reversal of the rotary movement of the supporting wheels 75 of the carriage will be explained hereinafter. As the supporting wheels of the carriage reverse in their turning movement, the track sections 33 under the influence of the 80 springs 34 tend to move back to their normal positions with relation to the intermediate sections of the track rails 4. Therefore the said track sections 33 move slightly with the wheels and the wheels will not slip upon the said track sections. Furthermore 85 this relative movement of the track sections with relation to the table serves to stretch the layer of cloth which has just been laid upon the table top. The track sections 33 90 are supported upon the rollers 35, best shown in Figure 11 of the drawings, in order that the said track sections may move without friction. Gap fillers 36 are pivoted upon the table 1 and are curved longitudinally as 95 shown in Figure 1 of the drawings. Links 37 are pivotally connected at one end with the sections 33 and pivotally connected at their other ends with the gap fillers 35. When the section 33 moves with relation to 100 the intermediate portion of the track 4 the link 37 is moved longitudinally whereby the curved gap fillers 36 is swung upon its pivot and its free end is interposed between the end of the track section 33 and the adjacent 105 end of the intermediate section of the track as indicated by the dotted lines in Figure 10. Therefore when the wheels of the carriage pass over the gap between the ends of the sections 33 and the adjacent 110 ends of the intermediate sections of the track, the wheels travel upon the upper surfaces of the gap fillers and consequently the carriage is not jolted nor does it create noise in passing over the gap. When the sections 33 are returned to their normal 115 positions with relation to the intermediate sections of the tracks 4 the gap fillers 36 are returned to their normal positions as indicated by the heavy lines in Figure 10 of the 120 drawing.

The machine is provided with a series of jacks located at intervals along the tracks 4 and which are adapted to be used for 125 lifting the carriage slightly above the surfaces of the track rails when the carriage comes to a stop and during the operation of cutting the remnant from the last layer of the cloth. These jacks are provided at their upper portions with rollers upon which 130 the wheels of the carriage move so that the

wheels of the carriage may continue to rotate but the carriage remains stationary upon the track rails. The jack mechanism also includes check devices which include sections of the track rails pivotally mounted and adapted to be swung up in the path of movement of the wheels of the carriage in order to hold the carriage against movement longitudinally of the tracks during the cloth cutting operation as stated. The jack mechanisms are so positioned and distributed along the table that the carriage is brought into a state of rest at such points upon the table top that when the remnant is cut from the laid layer of cloth the edge of the said layer of cloth will be in alignment with one of the linear graduation marks 2. This is essential in that during the process of cutting the stacks of pieces from the superposed layers of the goods the patterns are applied to the upper layer of the cloth and the edges of the patterns do not extend beyond transverse lines across the table from the said graduation marks. Therefore it is definitely known that when a stack of pieces is cut from the superposed layers of the cloth that each piece in the stack will be complete and consequently all of the pieces in the stack of pieces will be utilized in making up the garment.

The track rails 4 are provided at intervals with openings 40 and guide members 41 which depend from the under sides of the track rails and each guide member surrounds a group of the openings 40. Blocks 42 slidably mounted in the guide members 41 and carrying at their upper portion journaled rollers 43, the upper portions of which are adapted to be projected through the openings 40 when the blocks 42 are elevated in the guide members 41. Rods 44 are pivoted at the under sides of the top of the table 1 and rods 44 extend under the lower ends of the blocks 42. Shafts 45 are journaled under the top of the table 1 and are provided with cranks 46 upon which the free end portions of the rods 44 rest. The shafts 45 are intended to be turned manually and when they are so turned the cranks 46 rotate about the axes of the shafts and the free end portions of the rods 44 are lifted whereby the blocks 42 are elevated in the guides 41 so that the rollers 43 are projected through the openings 40 and the upper portions of the rollers are disposed above the upper intermediate surfaces of the tracks 4. These rollers 43 move under the wheels of the carriage 5, as hereinafter described, and the carriage is lifted slightly with relation to the tracks. The wheels of the carriage may continue to rotate but the carriage will not move along the tracks in that the said wheels are supported upon the journaled rollers 43.

The track rails 44 are also provided with hinged sections 47 having openings 48. A guide member 49 depends below the track rails and a block 50 is slidably mounted in the guide member. Said block 50 is provided with chamfered upper corners 51 at which chamfered corners rollers 52 are journaled as best shown in Figure 8 of the drawings. The shafts 45 are also provided with cranks 53, the outer ends of which are connected by links 54 with the lower ends of the blocks 50. Therefore when the shafts 45 are turned as hereinbefore described the cranks 53 are rotated about the axes of the shaft, the links 54 are moved longitudinally and the blocks 50 are elevated in the guide ways 49. The upper edges of the blocks swing the sections 47 to open position as indicated by the dotted lines in Figure 8 of the drawings and simultaneously the upper portions of the rollers 52 are projected through the openings 48. Thus the sections 47 which are moved to inclined positions serve as chocks for the wheels of the carriage as indicated by dotted lines in Figure 8. The wheels of the carriage come into contact with the rollers 53 whereby the wheels of the carriage may continue to rotate but the carriage is brought to a state of rest upon the table. At the time the carriage is brought to a state of rest the remnant of the cloth is cut from the uppermost layer which has been deposited upon the table or the pile of cloth upon the table and the edge of the cloth which forms the uppermost layer will fall upon the pile of layers and will be in alignment with one of the graduation marks 2 provided upon the table top.

A motor 55 is mounted for swinging movement upon the carriage 5 as best indicated in Figure 4 of the drawing. The shaft of the motor 55 is operatively connected with a terminal gear wheel 57 by means of a gear transmission 56. A lever 58 is fulcrumed upon the frame of the carriage 5 and carries a gear wheel 59 which meshes with the teeth of the gear wheel 57 as shown in Figure 6. Gear wheels 60 are mounted upon the axles of the wheels of the carriage 5 as shown in Figure 6 and a gear wheel 61 meshes with the teeth of one of the gear wheels 60. The wheel 59 is located between one of the gear wheels 60 and the gear wheel 61. The levers 58 may be swung upon the carriage 5 so that the wheel 59 may be brought into mesh with the adjacent wheel 60 or the lever 58 may be swung so that the wheel 59 may be brought into mesh with the wheel 61. The wheel 59 at all times remains in mesh with the teeth of the wheel 57 therefore means are provided for transmitting rotary movement to the axles and wheels of the carriage in opposite directions as the lever 58 is shifted. Pawls 62 are pivoted

under the frame of the carriage and are adapted to encounter lugs 63 mounted upon the top of the table 1. The free ends of the said pawls are adapted to engage a rack bar 5 64 which is carried by a pivoted arm 65 having engagement with the outer end of the lever 58 hereinbefore described.

The table 1 is provided in the vicinity of one of its longitudinal edges with a longitudinally disposed conduit 66 having electric terminal bars 67 located therein at the opposite sides thereof and spaced from each other. A plow 68 is connected with the carriage 5 and enters the conduit 66. The said 15 plow 68 carries contact plates 69 which are adapted to move along the terminal 67 and in contact therewith. The plow carries electric wires 7 which are connected at one end with the contacts 69 and at their other end with the motor 55 mounted upon the carriage. The terminals 67 are energized by an electric current in the usual manner (not shown or diagrammed), and from the contacts 67 the contacts 69 and the wires 70 convey the current to the motor and operates 25 the same.

As the carriage moves from end to end from the table the holding pawls strike the stops upon the table and release the motor 30 so that the motor is swung upon the carriage. This also swings the gear transmission and the terminal gear of the said transmission is moved from the gear wheel upon one axle of the carriage toward the gear wheel which operates the other axle 35 and the said gears are automatically located to the shifted position. Thus the carriage automatically reverses its movement at the ends of the path of travel upon the tracks 40 as hereinbefore explained and contemplated.

Having thus described the invention, what I claim is:—

1. A cloth laying machine comprising a table, cloth clamping means mounted thereon, a track disposed longitudinally of the table, a carriage mounted for reciprocatory movement upon the track, a platform attached to the carriage and disposed at the side edge of the table, cloth shearing means 50 mounted upon the carriage and means for operating the cloth shearing means and adapted to be operated by one occupying the platform.

2. A cloth laying machine comprising a table, a track mounted thereon, a carriage mounted for movement upon the track, cloth folding means mounted upon the table at the ends of the path of movement of the carriage, means carried by the carriage for removing the cloth folding means from the lay of the cloth, spring means for returning the cloth folding means above the layers of cloth, said cloth folding means consisting of a bar pivoted at a point between its 65 ends upon the table, the parts of the bar

at the opposite sides of the pivot having angularly disposed portions and one of the angularly disposed portions of one of the parts being composed of hinged sections and a spring for normally maintaining said sections in alignment with each other. 70

3. A cloth laying machine comprising a table, track rails mounted thereon and including longitudinally movable end tread sections, spring means for holding the tread sections toward the intermediate sections of the track rails, a carriage mounted for movement upon the track rails and means for securing the cloth to the table. 75

4. A cloth laying machine comprising a table, track rails mounted thereon and including longitudinally movable end tread sections, spring means for holding said sections toward the intermediate portions of the track rails, gap closures pivoted upon the table and operatively connected with the movable end sections of the track rails and adapted to enter the spaces between the movable sections of the rail and the intermediate sections thereof when the movable sections are spaced from the intermediate sections and a carriage mounted for movement upon the track rails and the movable sections thereof. 80

5. A cloth laying machine comprising a table, track rails mounted thereon and including movable end sections, gap closures mounted upon the table and operatively connected with the movable end sections to enter the spaces between the sections and the intermediate portions of the rail when the end sections are spaced therefrom, cloth holders mounted upon the table and a carriage mounted for movement upon the track rails and adapted to encounter the cloth holders to remove them from the lay of the cloth. 85 90 95 100 105

6. A cloth laying machine comprising a table, tracks mounted thereon, a wheel mounted carriage adapted to move upon the tracks, the track rails having openings, guides attached to the track rails and surrounding the openings, blocks movably mounted in the guides, rollers journaled upon the blocks and adapted to move through the openings in the rails and manually operable means for moving the blocks. 110 115

7. A cloth laying machine comprising a table, tracks mounted thereon and provided with openings, guides depending from the tracks and surrounding the openings, blocks movably mounted in the guides, rollers journaled upon the blocks and means for moving the blocks to project the rollers through the openings in the tracks. 120 125

8. A cloth laying machine comprising a table, tracks mounted thereon and provided with openings, a carriage mounted for movement along the tracks, guides depending from the tracks and surrounding the 130

openings, blocks movably mounted in the guides, rollers journaled upon the blocks, and manually operable means for simultaneously moving the blocks to project the rollers through the openings in the tracks.

9. A cloth laying machine comprising a table, tracks mounted thereon, a wheel mounted carriage adapted to move upon the tracks, said tracks having openings, blocks guided below the openings and having rollers, said tracks having hinged sections provided with openings, guides located below said hinged sections, a block movably mounted in the last mentioned guide, said blocks having chamfered corner portions, rollers journaled at the chamfered corner portions of the last mentioned blocks, and manually operable means for moving all of

the blocks simultaneously to project the rollers through the openings in the track and the sections thereof.

10. A cloth laying machine comprising a table, tracks mounted thereon and having openings, guides disposed below said openings, blocks movably mounted in the guides and having journaled rollers, a shaft journaled below the tracks, means connecting the shaft with one of the blocks to project the same through the tracks and means operated from the shaft to move the other blocks in the guides and project the rollers only thereof through the tracks.

In testimony whereof I affix my signature.

MORRIS DORMAN.