

June 12, 1923.

1,458,896

G. SOYLIAN

CLOTH LAYING MACHINE

Filed Nov. 18, 1920

4 Sheets-Sheet 1

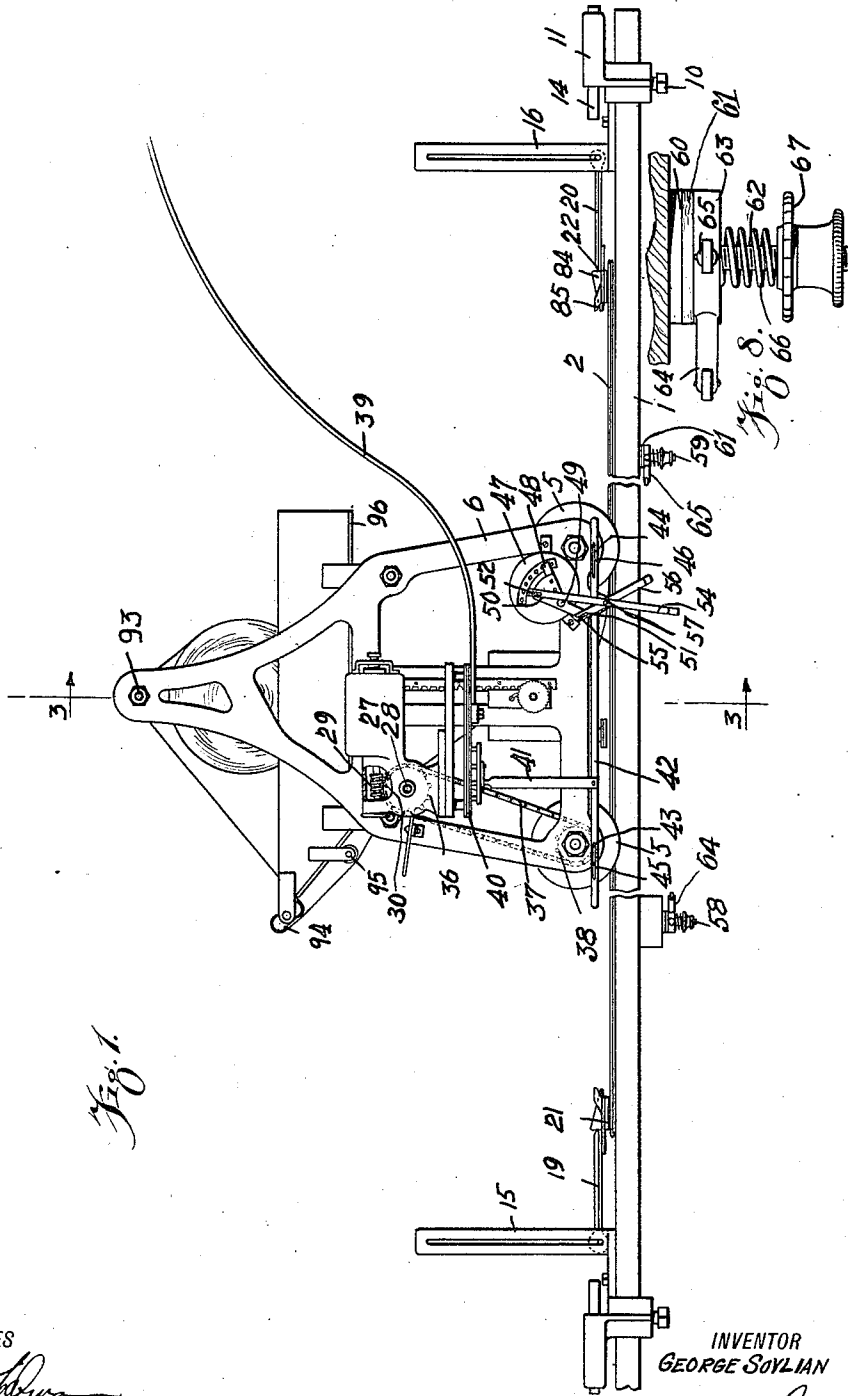


Fig. 1.

WITNESSES

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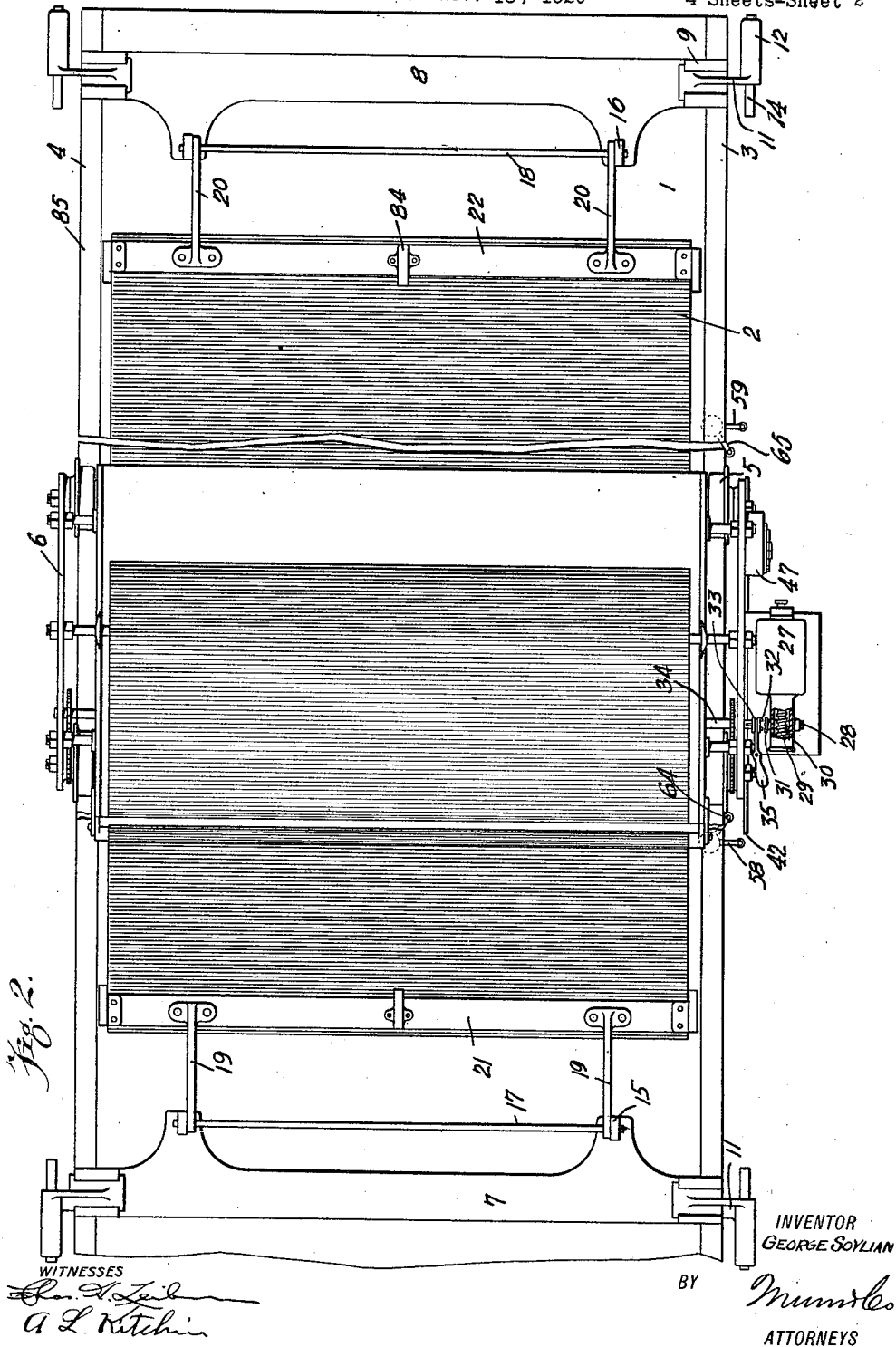
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Fig. 6.

Fig. 7.

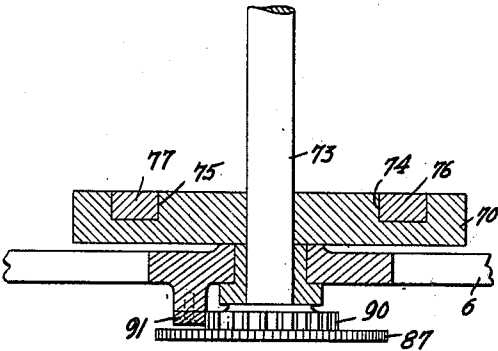
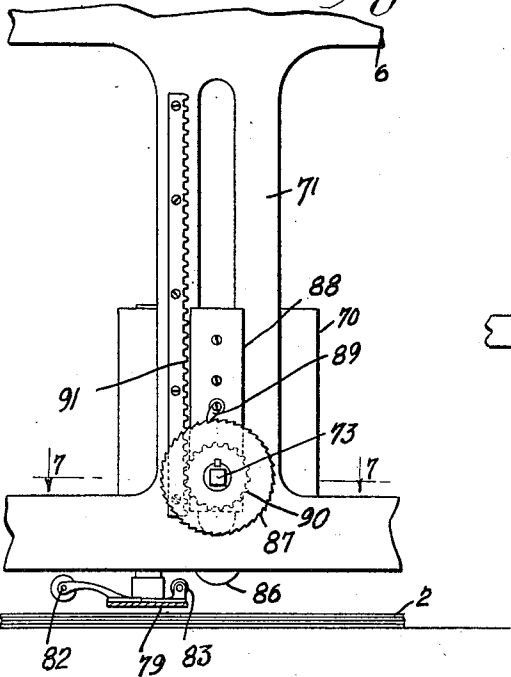
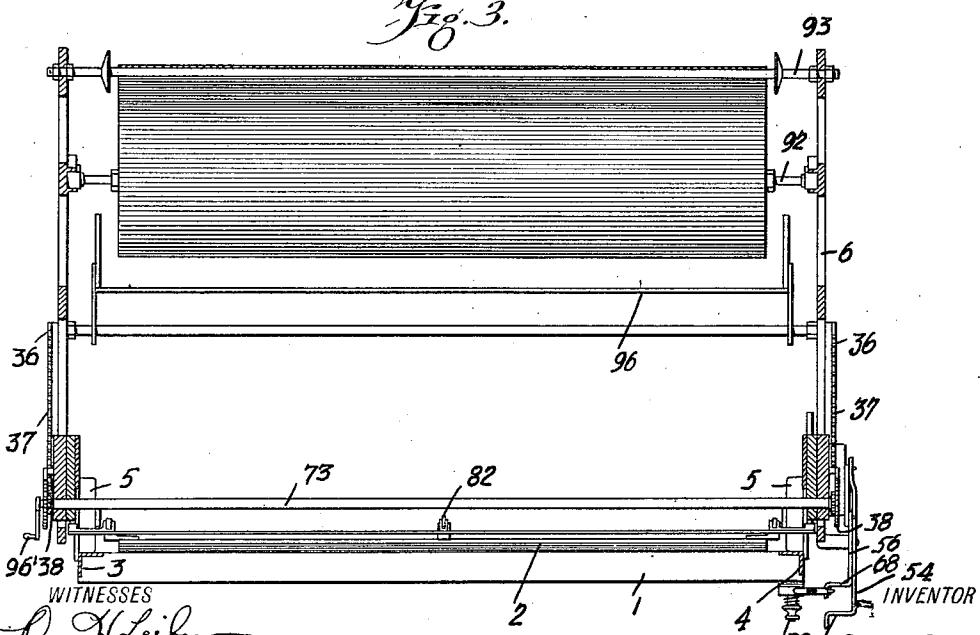


Fig. 3.



WITNESSES
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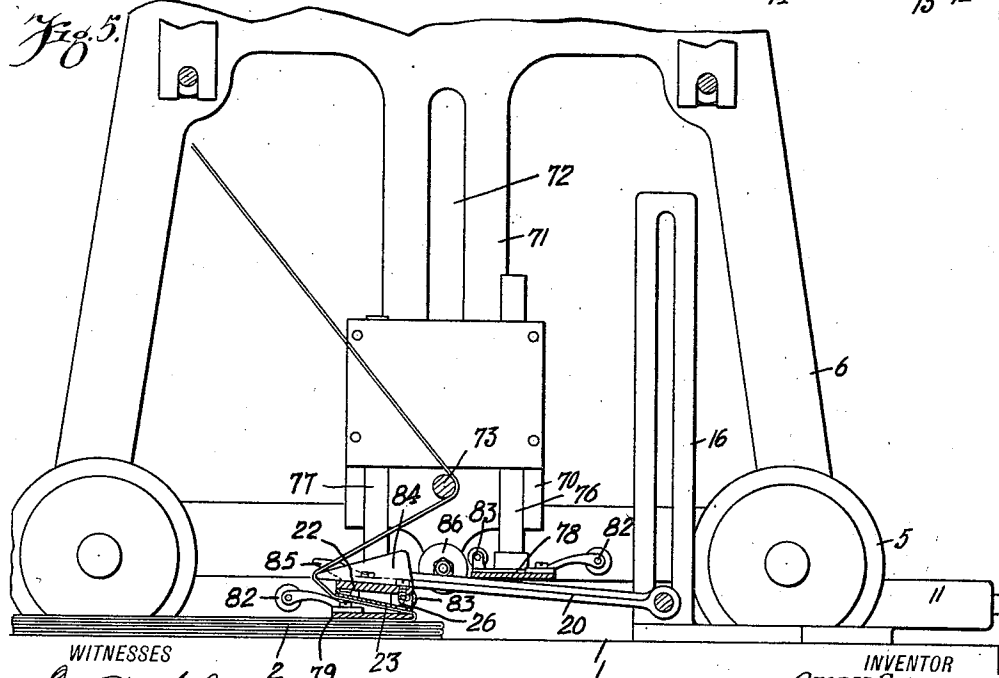
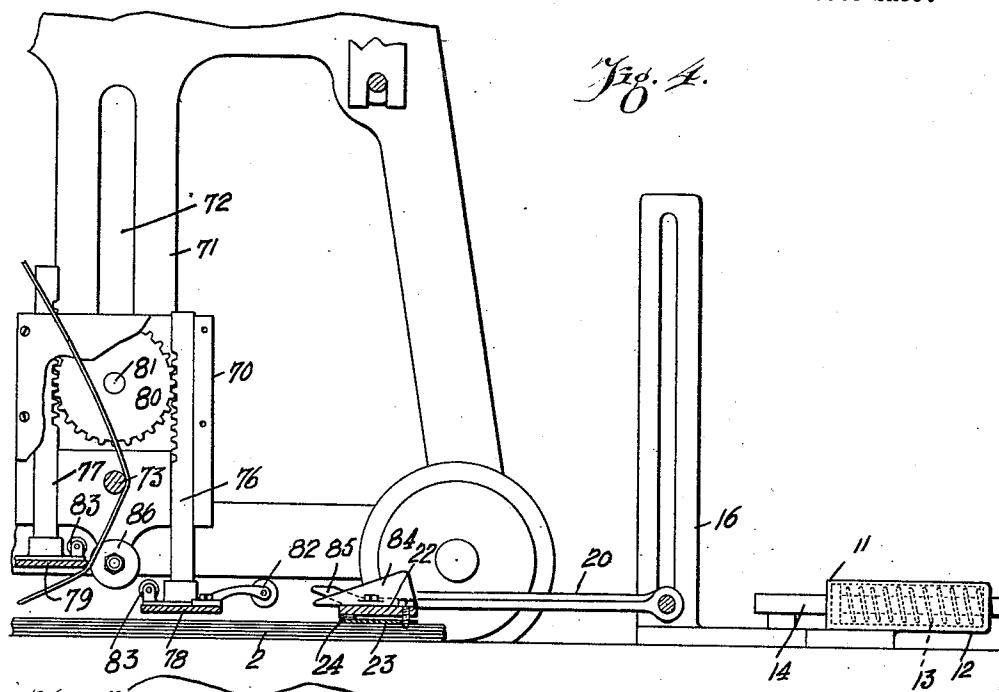
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Filed Nov. 18, 1920

4 Sheets-Sheet 4



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE SOYLIAN, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-FOURTH TO NATHAN MOSS, OF NEW YORK, N. Y.

CLOTH-LAYING MACHINE.

Application filed November 18, 1920. Serial No. 424,893.

To all whom it may concern:

Be it known that I, GEORGE SOYLIAN, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Cloth-Laying Machine, of which the following is a full, clear, and exact description.

This invention relates to cloth laying machines, and has for an object to provide an improved construction which will be automatic and accurate in its actions of laying successive layers of cloth in a given space.

Another object of the invention is to provide a cloth laying machine which is electrically driven and in which means are provided for causing the machine to travel at a high rate of speed from adjacent one end to adjacent the other end and slow down as it approaches the respective ends.

A further object of the invention is to provide a cloth laying apparatus in which there is provided a travelling carriage and gripping means at a predetermined distance apart, the arrangement being such that the carriage travels from one gripping means to the other back and forth and automatically lays the cloth as it travels.

A still further object is to provide a carriage and a cloth laying machine in which means are arranged which will automatically raise the laying bars as the pile of cloth increases in thickness.

In the accompanying drawings:

Figure 1 is a side view of a laying apparatus disclosing the invention.

Figure 2 is a top plan view of the structure shown in Figure 1.

Figure 3 is a sectional view through Figure 1 approximately on line 3—3.

Figure 4 is an enlarged fragmentary sectional view showing the position of certain of the parts as the carriage approaches one end of the extreme limit of its travel.

Figure 5 is a fragmentary view partially in section showing part of the carriage and associated parts as the carriage completes its travel in one direction.

Figure 6 is a fragmentary side view showing a rack, ratchet wheel and pawl embodying certain features of the invention.

Figure 7 is a sectional view through Figure 6 on line 7—7.

Figure 8 is a detail view of a part to be hereinafter referred to.

Referring to the accompanying drawings by numerals, 1 indicates a table or support of any kind on which the pile 2 of cloth is to be laid. The table 1 is preferably provided with angle irons 3 and 4 at the edges to provide a metallic track on which the wheels 5 of the carriage 6 may roll. Arranged on the table 1 are bars 7 and 8 carrying fittings 9 at each end. These fittings are provided with a dove-tail groove at the top and with an overhanging hook-shaped portion for receiving the respective set screws 10 which act as clamping means for clamping the fittings and consequently bars 7 and 8 in position on the table 1. In each fitting 9 there is slidably mounted a bumper 11 which is formed with a hollow section 12 in which a spring 13 is arranged, said spring acting on a pin 14 to resiliently hold the same in a given position. The detail construction of the bumper 11 may be as desired provided the pin 14 is resiliently supported substantially as shown in the drawing. This pin acts as a cushion for certain parts of the carriage 6 hereinafter fully described. Each of the bars 7 and 8 is provided with a pair of upright brackets 15 and 16, said brackets being formed with vertical slots as shown in Figures 1 and 4, said slots accompanying the rods 17 and 18, which rods act as movable pivotal members or pintles for the respective brackets 19 and 20. Brackets 19 are connected rigidly to a clamping bar 21 while bars 20 are rigidly secured to a clamping bar 22 at the opposite end of the table 1. Each of the bars 21 and 22 is provided with a gripping plate 23 hinged at 24 to the edge of the respective bars 21 and 22 facing the carriage 6. The free ends of the gripping plates 23 are provided with one or more apertures 25 through which the pointed ends of screws 26 extend whereby said screws will act as gripping or holding means when the parts are in the position shown in Figure 4. In Figure 5 the carriage 6 is almost at the end of its travel and after it reaches the end of its travel it will immediately start a return movement. As it starts to return the edge of the gripping plate 23 will fall down under the action of gravity and pinch the top layer of cloth so as to hold the cloth in proper place until the screws 26 have moved downwardly and engage the cloth whereupon said screws will grip the cloth and

hold the same against movement as the carriage moves to the opposite end of its travel. This gripping action is, of course, not very great as only a slight gripping or pinching is necessary.

In order to drive the carriage 6 back and forth over the table 1, and by means hereinafter fully described, force the end of the folded cloth under the gripping bars 21 and 22, electric driving means is provided which will automatically move the carriage back and forth until manually stopped. An electric motor 27 is mounted on the carriage 6 and drives a stub shaft 28 preferably through a worm 29 and a worm wheel 30 meshing therewith, said worm wheel being rigidly secured to the shaft 28. The end of shaft 28 is provided with a clutch face 31 which preferably has two elongated apertures therein for receiving the clutch teeth 32 on the clutch member 33 splined on the shaft 34. A manually actuated lever 35 engages the clutch member 33 for shifting the same into and out of clutch. The shaft 34 extends from one side of the carriage to the other and carries at each end a sprocket wheel 36 for accommodating the respective chains 37, said chains in turn operating the sprocket wheels 38 rigidly secured to the opposite wheels 5 so that whenever shaft 34 is rotated both wheels 5 on one side of the carriage will be positively rotated and at the same speed. It is, of course, understood that whenever the motor 27 is reversed the direction of motion of the carriage 6 is reversed.

The reversing mechanism is shown in Figures 1 and 3, from which it will be observed that current is supplied through a suitable cable 39 to a reversing switch 40, which switch may be of any desired type. An arm 41 is connected with the switch 40 for moving the same back and forth so as to cause current to flow to motor 27 in such a manner as to cause the motor to operate in either direction. In order to shift the arm 41 and thereby shift the switch 40 for reversing the motor, said arm 41 is rigidly secured to a sliding bar 42 which is supported on the carriage 6 by pins 43 and 44, said pins passing through slots 45 and 46. These slots limit the sliding movement of bar 42 and when moved to their extreme limit the pin acts directly on the bar 42 so that the carriage is completely stopped. For instance, when the carriage 6 in Figure 1 moves until the bar 42 strikes the bumper 11 at the left end of the sheet, the bar 42 and switch 40 will be moved the full length of the slots 45 and 46 and then the parts will act as if rigidly connected with the carriage so that the spring in the bumper 11 is brought into place for cushioning the final stopping action. The spring will, of course, cushion the stopping action, but the motor

27 will also quickly act as a stopping member and by reason of the fact that the current is reversed therein so that the carriage is brought quickly and easily to a complete stop and then started again on its return movement with substantially no jar.

In order that the carriage 6 may travel at a comparatively high rate of speed for most of the distance from bar 21 to bar 22 a special mechanism has been provided, shown particularly in Figures 1 and 3 for shutting off most of the current as the carriage approaches the other end and then again turning on the current as the carriage leaves the respective ends. This mechanism includes a resistance or rheostat 47 for varying the current supplied to the motor, said rheostat having a shiftable arm 48 pivoted at 49. Arm 48 carries pins 50 and 51, pin 50 extends through a slot or bifurcation 52 in the lever 54 while the pin 51 extends through a slot or bifurcation 55 in the lever 56. Both of these levers are pivotally mounted at 57 arranged on a suitable bracket extending from the carriage 6. Co-acting with the levers 54 and 56 are shifting members 58 and 59, each of these shifting members comprising a plate 60 (see Figure 8) connected to the table 1 in any suitable manner and carrying a friction plate 61, which may be leather. The pin 62 is connected in any suitable manner with the plate 60 and arranged to extend through the plate 61 and through a rockable plate 63, said plate carrying arms 64 and 65. These arms if desired may have anti-friction rollers on the ends. A spring 66 surrounds part of pin 62 and bears against an enlargement 67 and against the plate 63 for holding the same against the friction member 61 whereby the rocking of the plate 63 is resisted and is stopped immediately the pressure on either of the arms 64 or 65 has ceased. The lever 56 is provided with a bent section 68 as shown in Figure 3 so as to strike against the arm 65 when the carriage is moved toward the brackets 16, and strike against the arm 64 when moving away from said brackets. Lever 54 is provided with a bent section 69 adapted to strike against the arm 64 on shifting member 58 and against arm 65 on shifting member 59 when moving in the opposite direction. It will be observed that as the lever 54 strikes against the arm 64 on member 58, the resistance of member 58 and the lever 54 will cause said arm to move on its pivotal point 57 and swing the contact member 48 to a starting position whereby motor 27 is deprived of current except a starting current. This starting current is ample to propel the carriage 6 slowly until the cloth has been properly laid beneath the bar 21. Simultaneously with the laying of the cloth in this manner bar 42 acts for reversing the current and the carriage imme-

diately starts on its return trip at a slow rate. As soon as the lever 54 strikes against the arm 63 on member 58 it is swung on its pivotal pin and it in turn shifts the contact member 48 to a full-on position whereupon the motor 27 is supplied with a full-line current and immediately causes the carriage to move at a high speed. This high speed is continued until lever 56 strikes arm 65 at the right end of table 1 whereupon the current is reduced to a starting current. As the carriage moves back from the bracket 16 toward the opposite end of the table arm 64 will act on lever 56 and cause an automatic turning on of the full current. From this it will be seen that the full current is turned on between the respective members 58 and 59 adjacent each end of the table 1. This will cause the carriage between these two points to travel at a comparatively high speed and at the extreme ends at a low speed. The action of turning on and off the current to this extent is automatic and consequently the difference in speed is automatic. This action of varying the speed and of the carriage travelling back and forth is continued automatically until the current has been completely turned off of the motor which may be done in any desired manner, as for instance by opening a switch in the supply line 39.

The laying mechanism is shown in more or less detail in Figures 4 and 5 to which reference is now made. The carriage 6 is provided with a vertically movable carrier 70 which reciprocates on the section 71 of the carriage 6, which section is provided with a slot 72. There is a carrier 70 and a section 71 on each side of the machine, but the description of one will apply to both, as they both operate in the same manner and at the same time. Incidentally it may be stated in passing that a shaft 73 extends entirely across the machine and acts as a guide for the cloth at one point in addition to means for tying the carriers 70 together. As shown in Figure 7 the carrier 70 is provided with guide-ways 74 and 75 in which the vertical sliding racks 76 and 77 operate, said racks carrying at the lower end layer bars 78 and 79, which layer bars are preferably flat bars of metal or other desired material. The racks 76 and 77 continually mesh with a gear 80 which is mounted on a stub shaft 81 carried by the carrier 70. The gear wheel 80 is not driven or moved except by the racks, and this method is used in causing one rack to be lowered as the other is raised and the reverse. Each of the bars 78 and 79 is provided with what may be termed a shifting roller 82 and a bar elevating roller 83. As the carriage 6 moves to the right (Figure 4) the roller 82, which is arranged substantially centrally of the machine, engages a centrally arranged cam 84 rigidly

secured to the bar 22. As the roller 82 moves upwardly from the cam 84 the rack 76 and parts connected therewith are raised, which will in turn rotate the gear wheel 80 to a certain extent and lower rack 77 and laying bar 79. It will be noted that in Figures 4 and 5 bar 79 is shown in the act of laying the cloth. After the roller 82 has moved off of the cam 84 the rollers 83 will move beneath the auxiliary cams 85. It will be understood that there is a cam 85 in each end of bar 22 to which they are secured, and that there is a roller 83 for each auxiliary cam 85. The roller 83 and bar 78 will pass over the auxiliary cams 85 by reason of the fact that they have been raised by roller 82, but the roller 83 and bar 79 will pass beneath the cams 85 and raise said cams together with the bar 82 until the parts assume the position shown in Figure 5. This raising action is to permit the bar 79 to pass beneath bar 22 in order to lay the cloth there-beneath. Though the bar 22 is raised the clamping plate 23, by reason of its hinged mounting, will automatically swing downwardly and grip the cloth at the proper time, said movement not interfering at all with the forward movement of the laying bar 79 which laying bar automatically withdraws as the carriage starts on its return movement. As soon as the laying bar 79 has moved from beneath bar 22 and the roller 83 has moved from beneath the auxiliary cam 85 bar 22 will move downwardly under the action of gravity as the same is comparatively heavy in order to provide a proper holding action in respect to the cloth. It will be noted that the action of the roller 82 on the bar 78 will cause said bar 78 to be raised and bar 79 to be lowered at the right hand end of the machine, and the bars will remain in this position until the machine approaches the opposite end whereupon a reverse action is produced, namely the roller 82 on bar 79 will raise bar 79 and associate parts and cause bar 78 to be lowered in order that bar 78 may force some of the cloth beneath the clamping bar 21. As the carriage 6 moves back and forth successive layers of cloth are laid and the respective clamping bars 21 and 22 are moved upward automatically so as to continually rest properly on the cloth adjacent each end of the pile. In order to cause the carrier 70 and parts supported thereby to be gradually elevated as the pile of cloth increased in height an elevating roller 86 is provided on each of the carriers so as to bodily elevate the carrier a short distance each time the roller 82 engages the upper surface of the respective auxiliary cams 85. It is to be noted that the roller 86 engages the upper surface of the auxiliary cams 85 and is elevated a short distance by said cams while the respective rollers 83 engage the lower surface and

cause an elevation of the cam and parts connected therewith. In order that the elevation of the carrier 70 may be permanent an arrangement is provided for holding the carriage in its successive raised positions, said arrangement and construction being shown particularly in Figures 6 and 7. The shaft 73 extends through the respective carriers 70 and has a ratchet wheel 87 mounted at each end. A plate 88 is also connected with the carrier 70 and supports a pawl 89 which continually engages the ratchet wheel 87 so as to prevent any reverse rotation thereof. A pinion 90 is also rigidly secured to shaft 73 near each end and arranged to continually mesh with a rack 91 rigidly secured to the respective sections 71 of carriage 6. When the roller 86 is raised it will force the carrier 70 upwardly and also shaft 73. This upward movement will cause the shaft 73, ratchet wheel 87 and pinion 90 to rotate. If the upward movement is sufficient for one or more teeth of the ratchet wheel 87 the pawl 89 will engage in the next tooth or two and thereby prevent any reverse rotation of the ratchet wheel 87 or a downward movement of the carrier. This gradually rotates the ratchet wheel and will cause the pinion 90 to gradually move or walk up the rack 91. This gradual upward movement of the carrier 70 is in direct proportion to the upward movement of the auxiliary cams 85, which upward movement is caused by the supplying of additional layers of cloth to the pile. In this way cloth of any thickness may be laid without the adjustment of any part of the machine, as the upward movement of the parts is caused by the thickness of the pile. For instance if the cloth is very thick each time a layer is placed on the pile the ratchet wheel 87 may be moved one tooth, whereas if the cloth is very thin it may require a large number of layers before the ratchet wheel 87 may be rotated one tooth.

In operation a roll of cloth is placed on the shaft 92 which is rotatably mounted on the carriage 6, and the cloth passed over a guide rod 93 to a number of rods 94 which act as tension members. Preferably a roller 95 is also provided as shown in Figure 1 for holding the cloth away from the box 96 and parts of the frame as the cloth is fed to the shaft 73. If the cloth is not in a roll it may be merely deposited in the box 96 in any desired manner and threaded over the bar 93, tension device 94 and roller 95. After having been threaded in this manner and also over the shaft 73 it is passed downwardly between the laying bars 78 and 79 and then over to a position beneath one of the gripping bars 21 and 22. Preferably the free end of the cloth is moved under gripping bar 21 for instance and the carriage 6 is arranged adjacent said bar with the parts

positioned substantially as shown in Figure 4. The current is then turned on and the carriage will automatically move to the opposite end and tuck under some of the cloth beneath bar 22 after which the carriage will reverse and move back to bar 21. This action is continued as long as the current is provided. If the current should be left turned on after the cloth has been laid the carriage will merely move automatically back and forth without doing any damage and also without doing any work. After the cloth has been properly laid the carriage is stopped and the pile of cloth removed from the table in any desired way, as for instance, by being pulled from beneath the carriage. As the carrier 6 is in a raised position after the laying of a pile of cloth it is necessary to lower the same, said lowering action being done manually by applying a crank 96 (Figure 3) to the end of the shaft 73 and then throwing the pawls 89 (Figure 6) out of engagement. A reverse action of the shaft will cause the pinion 90 and associate parts to move downwardly to their lowermost position. The crank 96 is then removed and the carriage is in condition for laying a second pile of cloth.

What I claim is:

1. A cloth laying machine comprising a supporting table, a carriage mounted on the table, means for automatically moving the carriage back and forth across the table, said means continuously moving the carriage at a slow rate of speed adjacent each end of the table and at a high rate of speed intermediate the ends, a gripping member at each end of the table for gripping the respective ends of a pile of laid cloth, and laying bars on the carriage for forcing the looped ends of the cloth into the respective gripping members.

2. A cloth laying machine comprising a supporting table, a carriage mounted on the table, an electric drive for the carriage, means for reversing the drive at each end of the table, means for automatically turning on more current while the carriage is intermediate the ends, a gripping member adjacent each end of the carriage, and laying bars carried by the carriage for forcing the looped end of the cloth being laid into the respective gripping members.

3. A cloth laying machine comprising a supporting table, a gripping member adjacent each end of said table for gripping the looped ends of the cloth as the cloth is laid, a carriage arranged on the table, electric driving mechanism for moving said carriage, means on the carriage for reversing the current to said electric driving mechanism, stops adjacent each end of the carriage for actuating said reversing mechanism, a resistance member inserted into the circuit of said electric driving mechanism,

means for adjusting said resistance for regulating the current supplied, said means including a pair of arms, a plurality of stops arranged a short distance from each end of said table positioned to engage said arms whereby the arms are operated as the carriage approaches the respective ends, said operation causing the current to be partially turned off and said stops acting also to actuate said arms in a reverse direction as the carriage leaves the respective ends for turning on a full supply of current whereby the carriage moves at a high rate of speed between said stops and at a slow rate of speed from said stops to the respective ends of the table, and laying mechanism arranged on said carriage for forcing the looped ends of the cloth under the respective gripping members.

4. A cloth laying machine comprising a table, a carriage movable back and forth on said table for laying successive layers of cloth in order to produce a pile, and a clamping member arranged adjacent each

end of said table for engaging the cloth adjacent the respective ends of the pile and holding the same against displacement, said clamping means comprising a vertically movable clamping bar and a pivotally mounted plate arranged on said bar with the free edge thereof pointing away from the center of the pile whereby the same acts as a pinching member for holding the cloth in place while the carriage is moving.

5. A cloth laying machine comprising a table, a carriage arranged on the table adapted to be moved back and forth thereon within certain limits, means on the carriage for laying successive layers of cloth to produce a pile, and a clamping structure arranged to engage each end of said pile, each of said clamping structures comprising a clamping plate and a plurality of pointed members extending through said plate adapted to engage said cloth for preventing displacement thereof.

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