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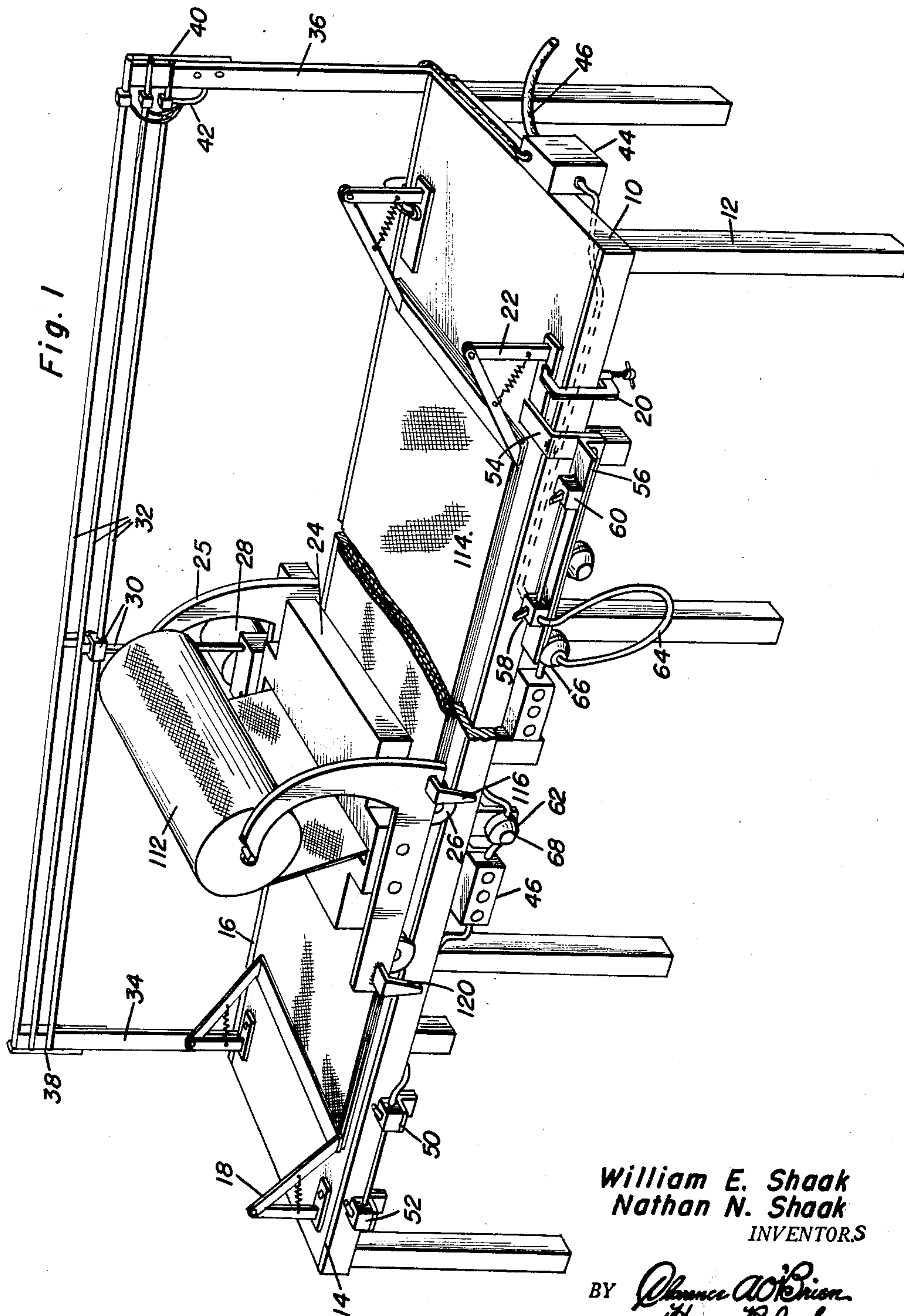
W. E. SHAAK ET AL

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CONTROL SYSTEM FOR CLOTH LAYING MACHINES

Filed July 21, 1952

2 Sheets-Sheet 1



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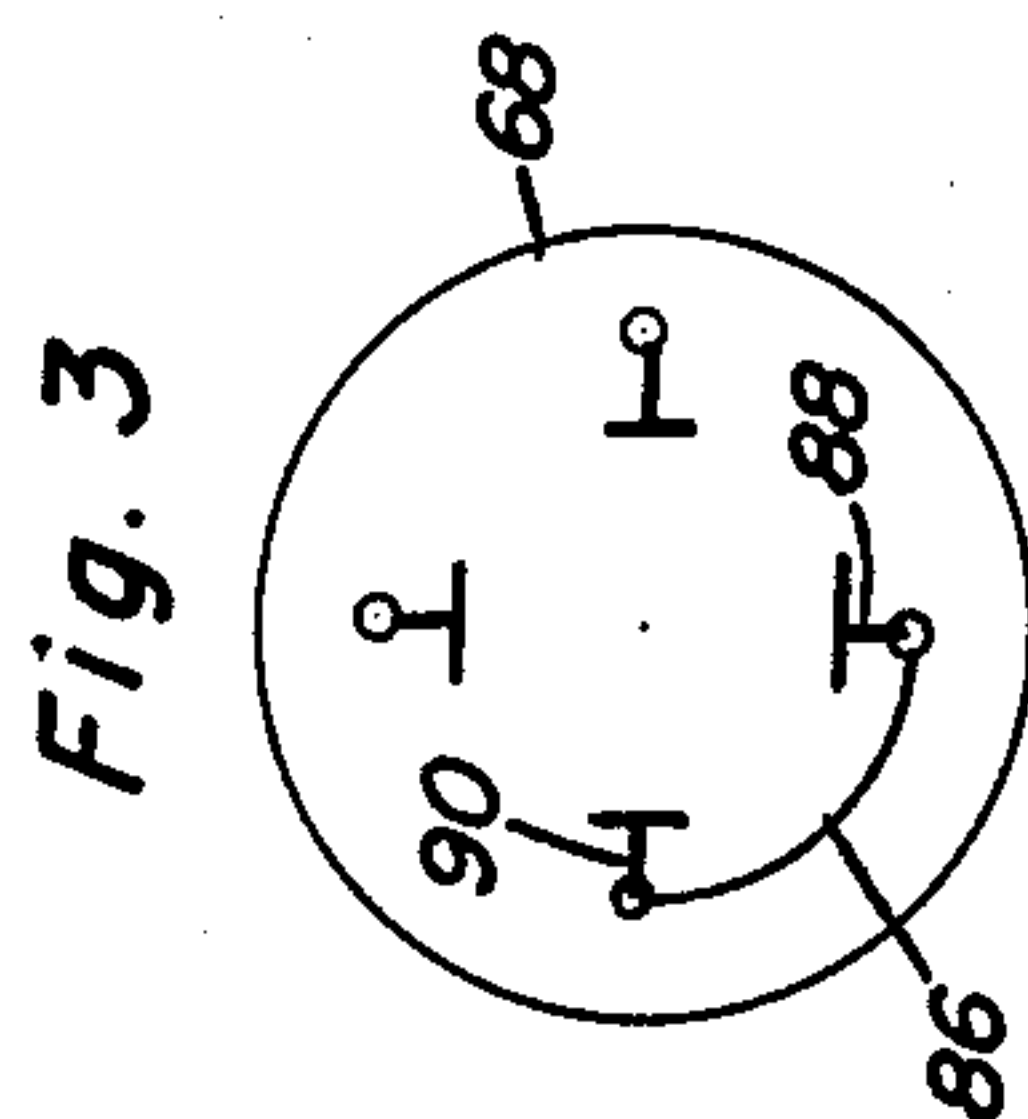
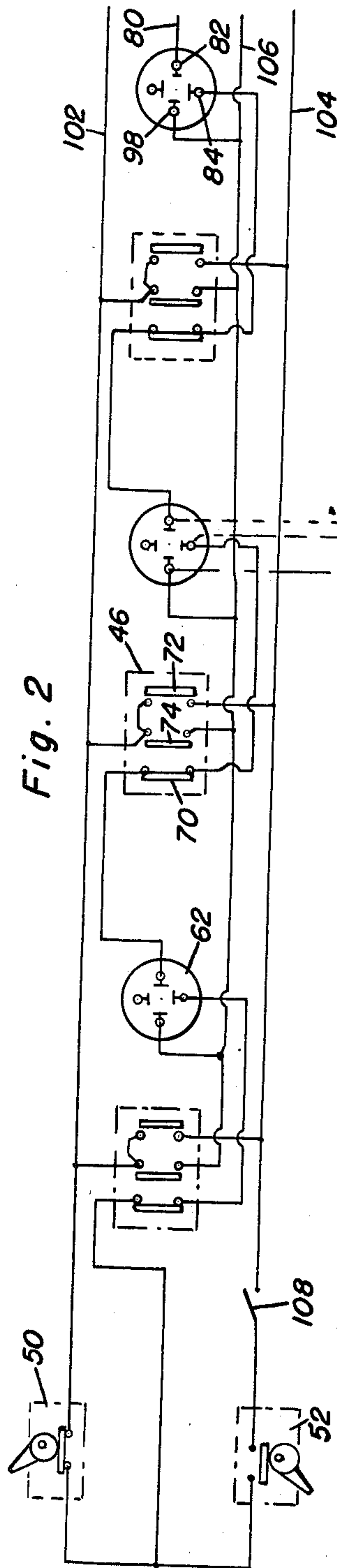
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CONTROL SYSTEM FOR CLOTH LAYING MACHINES

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CONTROL SYSTEM FOR CLOTH LAYING
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5 Claims. (Cl. 270—31)

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This invention relates to a cloth laying machine and particularly to a control system for a reversible motor driven cloth laying machine.

In the construction of articles such as, men's, women's, misses', children's and boys' outer and under garments, tents, bags or any other items manufactured from cloth, it is customary to provide layers of cloth on a so-called spreading table and have the cloth layers alternately arranged with the edges in substantially complete alignment with each other with the ends of the cloth layers held down by various clamps. Heretofore, it has been customary to have an operator operate the cloth laying machine and a second operator maintain the cloth lays in the necessary close edge alignment.

Various systems have been proposed for allowing one man to operate a cloth laying machine. These heretofore known systems in general include some means such as pull cords for stopping the motor after which the operator must walk to the machine and manipulate it after which the motor may be started. The heretofore known systems have been inefficient and unsatisfactory in operation.

The present invention provides a cloth laying system in which a single operator may both control the cloth laying machine and justify the edges of the superimposed lays. This is accomplished by means of a control system having a reversible motor starter which will drive the motor in either direction and a control system for the starter including busses mounted along the side of the table which have control stations so positioned that the operator can reach a station from any place along the table. While the stations may be arranged in any suitable position along the table so that they will be within ready reach of the operator who will follow the machine and justify the edges of the lays the stations will be so fixed or arranged that at all times one of the stations is within reach of the operator. Usually, this means that the stations will be arranged in an order between 4 and 8 feet. The spacing being somewhat dependent upon the nature of the work and the immediate necessity of stopping the motor at the first sign of disarrangement.

The arrangement is further provided with limit control stations at each end of the lay so that the motor driven cloth laying machine may be automatically reversed at the end of each lay so that the operator will have his hands continuous free to justify the uppermost layer of cloth.

It is accordingly an object of the invention to provide an improved cloth laying device.

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It is a further object of the invention to provide an automatically controlled cloth laying machine.

It is a further object of the invention to provide a control system by which one operator can efficiently operate a laying machine and justify the cloth laid thereby.

It is a further object of the invention to provide a control system which is operable from any position along the laying table.

It is a further object of the invention to provide an adjustable limit station for controlling the length of cloth lay on a table.

It is a further object of the invention to provide a control system having terminal blocks by which the control limit station may be adjustably connected to the control system.

Other objects and many of the attendant advantages of the invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing in which:

Figure 1 is a perspective view of a cloth laying machine according to the invention;

Figure 2 is a diagrammatic wiring diagram of the control system for the cloth laying machine; and

Figure 3 is a bottom plan view of a jumper block for cooperation with the terminal blocks of the control system.

A cloth laying device according to the invention comprises a table body 10 supported on suitable legs 12 and having tracks 14 and 16 mounted longitudinally on the table. A fixed clamp is maintained at one end of the table and such a device is schematically shown at 18. Likewise, an adjustable clamp 22 is provided on the table 10 and is connected thereto by means of C-clamps 20. The adjustable clamp 22 being movable along the length of the table to accommodate various lengths of lays. For simplicity of illustration the clamps 18 and 22 have been schematically shown and no attempt has been made to show or disclose the operating structure of such clamps. However, it is sufficient to say the clamps are quite complicated and are adapted to hold a plurality of layers of cloth and to pick up layers of cloth without releasing the cloth previously held.

A cloth laying machine 24 is provided with arms or roll holding bracket 25 and is provided with flange wheels 26 cooperating with the rails 14 and 16. A reversible motor 28 preferably of three-phase alternating current type is connected in driving relation to the cloth laying machine 24 and has a trolley or kite 30 connected

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with overhead trolleys 32. The trolleys 32 are supported on suitable standards 34 and 36 by suitable insulators 38 and 40. A feed cable 42 connects the conductors 32 to reversible control motor starter 44 and energy is supplied thereto by means of a three-phase connection 46 fed from any suitable source of power not shown.

The reversible motor starter 44 is controlled by a remote control system comprising a plurality of bus conductors connected into the controller 44 and extending along one side or edge of the table top 10 and having a plurality of control stations 46 connected therein. The control system also includes a fixed limit station including a first limit or stop switch 50 and a second limit or forward switch 52. A movable clamp 22 has associated therewith and movable therewith a bracket 54 on which is supported an angle bar 56 on which is mounted a limit stop switch 58 and a limit reverse switch 60.

While obviously there is no difference in importance of motion in the laying machine in either direction, for the purpose of simplicity in the specification and description of the machine, motion away from the fixed clamp 18 is arbitrarily called forward motion and motion toward the fixed clamp 18 is likewise arbitrarily called reverse motion. Likewise, switches causing motion of the laying machine 24 in the direction away from the fixed clamp 18 will be arbitrarily called forward switches and the switches causing motion of the laying machine 24 toward the fixed clamp 18 will be called reverse switches.

Distributed along the sides of the table 10 are a plurality of terminal blocks 62. The limit station including the stop switches 58 and the reverse switch 60 is provided with a flexible connector 64 which has a plug-in terminal 66 for plugging the movable limit station into any of the terminal blocks 62. A jumper plug 68 is provided for cooperation with each of the terminals 62 other than the one selectively engaged by the plug-in 66 so that the buses can be continued through the terminals.

In a preferred embodiment of the invention each of the stations 46 includes a normally closed stop switch 70 a normally open forward switch 72 and a normally open reverse switch 74. A fixed limit station or the station adjacent the fixed clamp 18 is provided with a normally closed limit switch 50 and a normally open forward switch 52. Likewise a movable limit station is provided with the normally closed stop switch 58 and the normally open reverse switch 60. The bus system includes a supply bus 80 which includes in series circuit relation each of the stop switches in the stations 46 and the stop switches 50 and 58. Likewise, the bus 80 is connected to terminals 82 and 84 in the terminal blocks 62 and the terminals 82 and 84 are connected by a jumper 86 having a terminal 88 for association with the terminal 84 and a terminal 90 for association with the terminal 82. It will thus be seen from the diagram of Figure 2 that the bus 80 extends through all of the stop switches and includes the jumpers 86 on all of the terminal blocks 62 other than the terminal block occupied by the plug-in 66 which is provided with a terminal 92 engageable with the terminal 84 of any one of the terminal blocks 86 and a terminal 94 for engagement with the terminal 82 of any of the terminal blocks 62 and a terminal 96 engageable with any of the terminals 98 and the terminal blocks 62 for reason that will presently be described.

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It will be obvious then that the bus 80 will extend through all of the stations including the limit stations and return through the bus 102. It is apparent that the opening of any stop switch 70 or the stop switch 50 or 58 or the removal of any of the jumpers 86 will break the bus 80 and deenergize the bus 102.

A forward control bus 104 is provided through all of the stations and the fixed limit station and all of the forward switches 72 are connected in parallel between the bus 102 and 104 and when moved to closed position will cause motion of the cloth laying machine in the forward direction. Likewise a reverse bus 106 extends through all of the stations 46 and is connected by means of terminal 98 to terminal 96 of the plug-in connector 66 so that the reverse switch 60 as well as all of the reverse switches 74 are connected in parallel relation between the bus 102 and 106 so that closure of any of the switches 74 or 60 will cause reverse motion of the cloth laying machine 24.

A deactivating switch 108 is provided in series with the limit forward switch 52 and a deactivating switch 110 is provided in series with the reverse limit switch 60.

When it is desired to have automatic reversal of the cloth laying machine at either or both ends of the table 10 switches 108 and 110 or either of them may be closed as is desired. When the switches 108 or 110 are opened or both of them, the switches 52 and 60 respectively, are deenergized and the reversal or forward motion at the clamps will be determined by starting either the forward switch 72 or the reverse switch 74 as may be appropriate.

In the operation of the device a roll of cloth 112 is placed on the arms 25 of the machine 24 and the end of the cloth is clamped under the automatic clamp 18 and the clamp 22 will be adjusted to the proper cloth lay length. The machine 24 will then be caused to traverse in the forward direction by closing one of the switches 72 and will lay a layer 114 of cloth as the machine 24 approaches the adjustable clamp 22 a finger 116 will activate the limit switch 58 to deenergize the bus 102 and thus deenergize the starter 44 so that the motor 28 is denenergized. However, the inertia of the machine 24 will cause it to move forward into the clamp 22 which will automatically clamp down the material fed by the machine 24 and the finger 116 will contact and actuate the reverse switch 60 so that the machine will automatically reverse and traverse toward the fixed clamp 16 leaving the second layer 114 of cloth which the operator will justify so that the edges are in perfect alignment with each other. As long as the cloth lays correctly the machine will traverse until the finger 120 actuates the stop switch 50 which will again deenergize the controller 44 and as before the inertia of the machine 24 will carry the machine forward until the clamp 16 picks up the cloth carried thereby and the finger 120 actuates the forward switch 52. If at any time there is a mislay of cloth and the operator must stop the machine he may touch any of the stop switches 70 denenergizing the bus 102 and deenergizing starter 44. As soon as the cloth is properly justified the proper switch 72 or 74 may be contacted to again start the machine 24 in the desired direction.

It will be apparent that the cloth spreading machine 24 is under the instant control of the operator by merely pressing a button on the con-

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trol stations and it may be allowed to be automatic at the reversal at either end of the stroke or both ends of the stroke so that the lays may continue automatically as long as the operator may maintain the edges justified.

It will be apparent that the present invention provides a cloth laying machine in which the single operator may completely operate the machine while justifying the successive lays of cloth on the table. It will be further apparent that the machine may be either automatically or manually reversible at the ends of the lays as may be desired.

For purpose of exemplification a particular embodiment of the invention has been shown and described according to the best present understanding thereof. It will be apparent to those skilled in the art that changes and modifications can be made therein without departing from the true spirit of the invention.

Having described the invention, what is claimed as new is:

1. In a cloth laying device having a spreading table, a motor operated spreading machine operable between fixed and an adjustable cloth clamp on said table, a control system for said machine including a reversible motor connected in driving relation to said machine, a reversing controller, a supply circuit connected to said controller, a feeder circuit between said controller and said motor, a control system comprising a plurality of control buses operatively connected to said controller and extending adjacent one side of said table, a plurality of control stations distributed along the side of said table, said stations being spaced a distance of the order of four to eight feet apart, each of said control stations including a stop, a forward and a reverse switch, said switches being operatively connected to said buses.

2. In a cloth laying device having a spreading table, a motor operated spreading machine operable between fixed and an adjustable cloth clamp on said table, a control system for said machine including a reversible motor connected in driving relation to said machine, a reversing controller, a supply circuit connected to said controller, a feeder circuit between said controller and said motor, a control system comprising a plurality of control buses operatively connected to said controller and extending adjacent one side of said table, a plurality of control stations distributed along the side of said table, said stations being spaced a distance of the order of four to eight feet apart, each of said control stations including a stop, a forward and a reverse switch, said switches being operatively connected to said buses, a limit station including a stop and a forward switch, means operable in response to the approach of the spreading machine to said fixed clamp for actuating the stop switch and the forward switch in the order named.

3. In a cloth laying device having a spreading table, a motor operated spreading machine operable between fixed and an adjustable cloth clamp on said table, a control system for said machine including a reversible motor connected in driving relation to said machine, a reversing controller, a supply circuit connected to said controller, a feeder circuit between said controller and said

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motor, a control system comprising a plurality of control buses operatively connected to said controller and extending adjacent one side of said table, a plurality of control stations distributed along the side of said table, said stations being spaced a distance of the order of four to eight feet apart, each of said control stations including a stop, a forward and a reverse switch, said switches being operatively connected to said buses, a limit station movable with said adjustable clamp, said limit station including a stop means operable in response to the approach of said spreading machine to said adjustable clamp to operate the stop switch and the reverse switch in the order named.

4. In a cloth laying device having a spreading table, a motor operated spreading machine operable between fixed and an adjustable cloth clamp on said table, a control system for said machine including a reversible motor connected in driving relation to said machine, a reversing controller, a supply circuit connected to said controller, a feeder circuit between said controller and said motor, a control system comprising a plurality of control buses operatively connected to said controller and extending adjacent one side of said table, a plurality of control stations distributed along the side of said table, said stations being spaced a distance of the order of four to eight feet apart, each of said control stations including a stop, a forward and a reverse switch, said switches being operatively connected to said buses, a limit station movable with said adjustable clamp, said limit station including a stop means operable in response to the approach of said spreading machine to said adjustable clamp to operate the stop switch and the reverse switch in the order named, a plurality of terminal blocks distributed along the side of said table, a plug-in connection for selectively connecting said limit station at any of said terminal blocks, jumper blocks associated with all terminal blocks other than the terminal block to which the plug-in connection is made.

5. In a cloth laying device having a spreading table, a spreading machine operable to lay superposed layers of cloth on said table and a reversible motor connected in driving relation to said spreading machine, a control system including a reversing controller, a plurality of control buses, a fixed limit station, said fixed limit station including a stop and forward switch, a movable limit station, said movable limit station including a stop switch and a reverse switch, a plurality of terminal blocks distributed along the side of said table, a connector including a plug-in connector selectively connecting said movable limit station to any terminal block and jumper blocks operatively engaged with each terminal block other than the terminal block engaged by said plug-in connector.

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