June 1, 1948. H. W. GILBERT ET AL 2,442,352

CLOTH LAYING-UP MACHINE

Filed Nov. 30, 1943 3 Sheets-Sheet 1

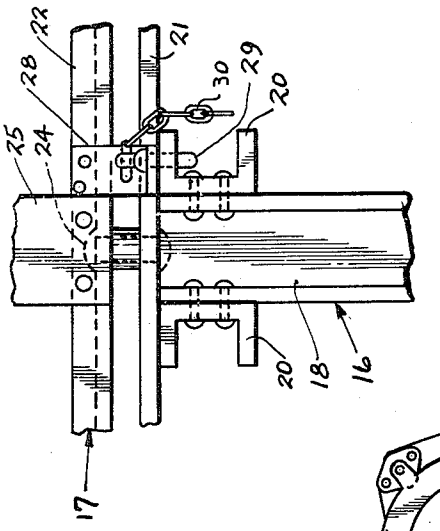


Fig. 2

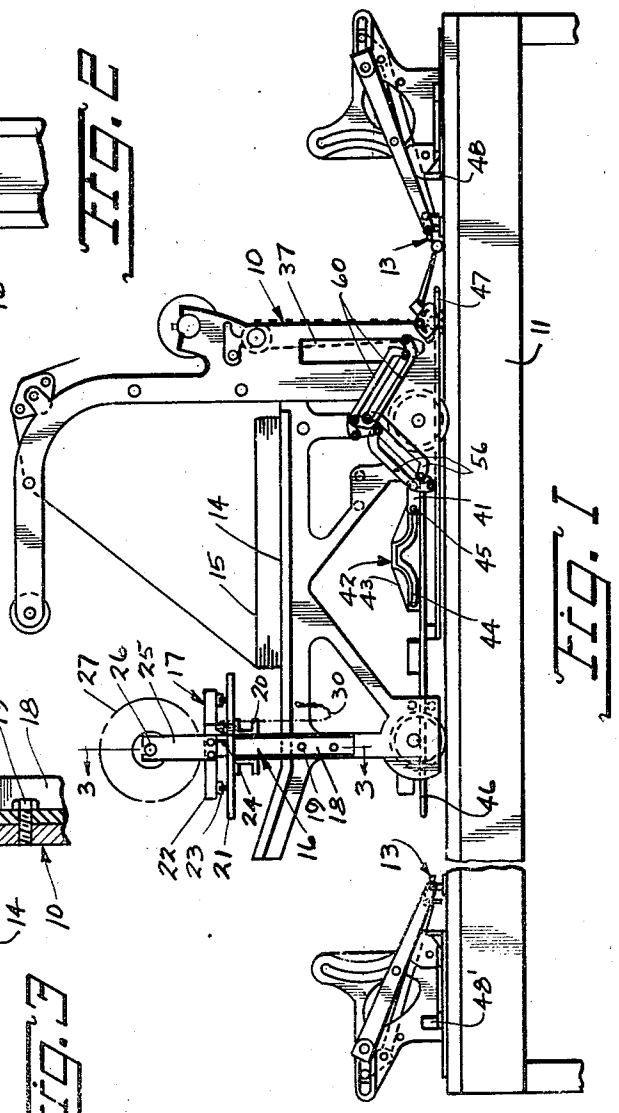


Fig. 1

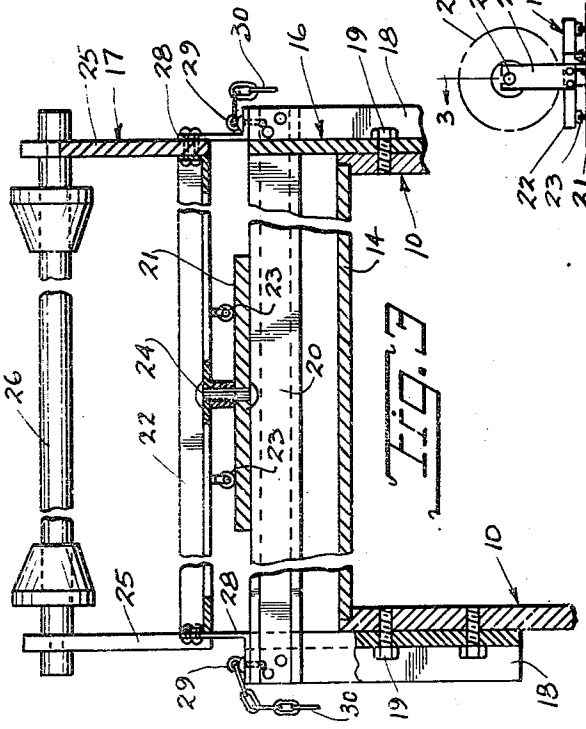


Fig. 3

INVENTORS.
HERMAN WALTER GILBERT, and
BY WALTER DEICHMANN
ATTORNEY.

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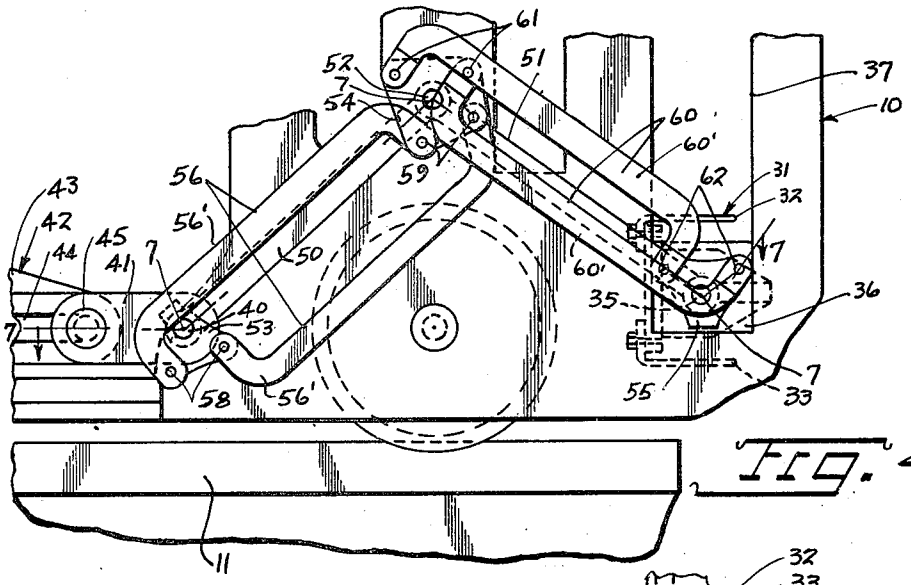


FIG. 4

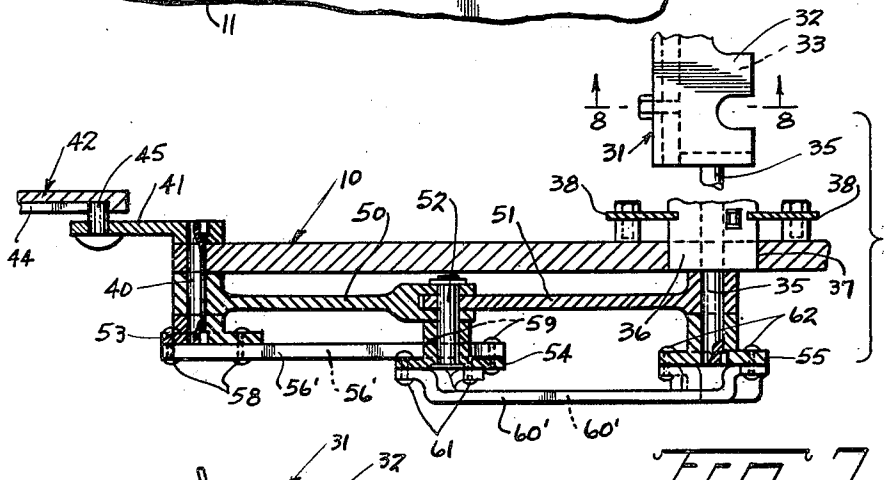


FIG. 7

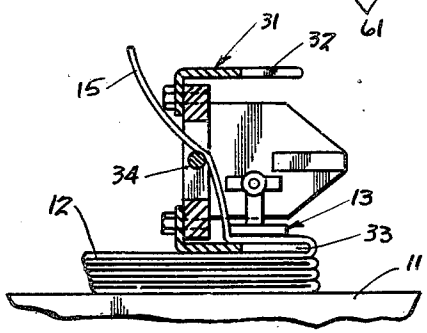


FIG 8

INVENTORS
HERMAN WALTER GILBERT, and
BY WALTER DEICHMANN

ATTORNEY.

June 1, 1948. H. W. GILBERT ET AL 2,442,352

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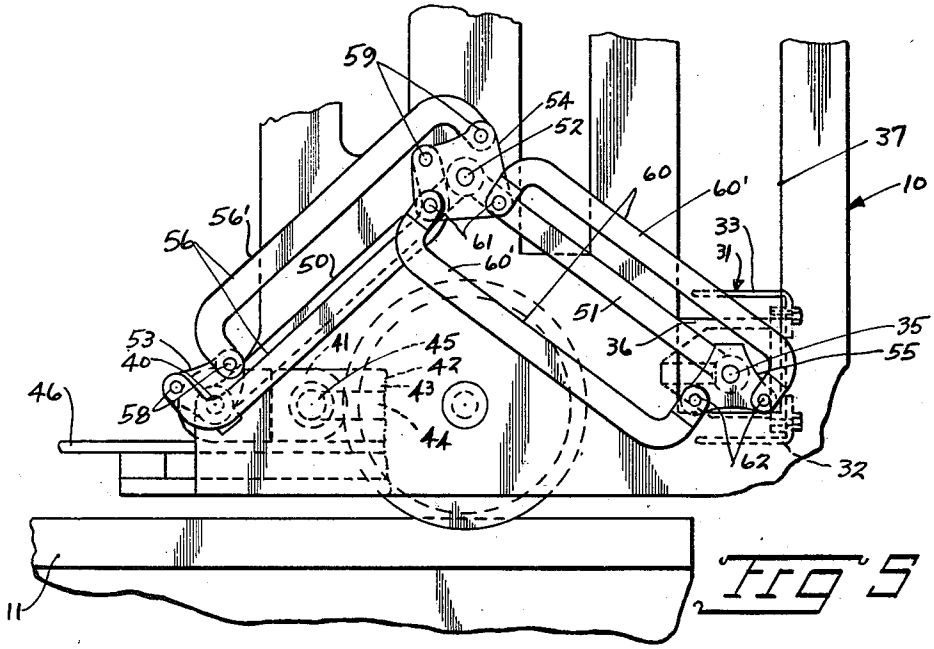


Fig 5

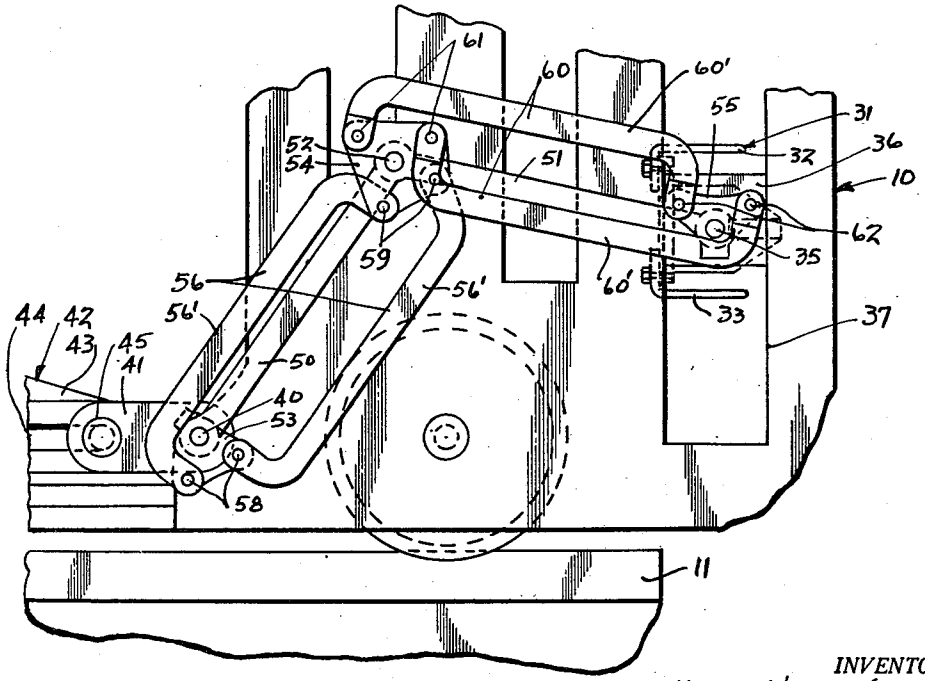


Fig 6

INVENTORS
HERMAN WALTER GILBERT, and
BY WALTER DEICHMANN
ATTORNEY.

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UNITED STATES PATENT OFFICE

2,442,352

CLOTH LAYING-UP MACHINE

Herman Walter Gilbert, Forest Hills, and Walter Deichmann, Elmont, N. Y.; said Deichmann assignor to said Gilbert

Application November 30, 1943, Serial No. 512,314

5 Claims. (Cl. 270—31)

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This invention relates to new and useful improvements in a cloth laying-up machine.

More specifically, the invention proposes several improved features. One of these features resides in the provision of a removable turntable for a cloth laying-up machine having a carriage for moving back and forth on a table and means for continuously laying-up cloth in layers. With the new arrangement it is possible to use the machine in two ways. The first consists in the natural continuous laying-up of the goods. The second consists of utilizing the turntable for laying-up the goods in sections with one of the faces always at the top.

Another improved feature of the cloth laying-up machine resides in the provision of certain linkage for transmitting 180° turning of the channel shaped member which assists in forming the end folds in the fabric. The links comprise an improvement over the sprocket chain system used in pending application Serial No. 370,784 for a sheet material spreading machine by Gilbert et al. An important feature in the new link construction is that double links are used arranged in parallelogram systems so as to prevent said links from transmitting motion in the wrong direction when certain dead centers are being passed.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a side elevational view of a cloth laying-up machine constructed in accordance with this invention.

Fig. 2 is a fragmentary enlarged detailed view of a portion of the turntable and support therefor shown in Fig. 1.

Fig. 3 is a fragmentary vertical sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary enlarged detailed view of a portion of the reciprocal carriage illustrated in Fig. 1 showing particularly the linkage system.

Fig. 5 is a fragmentary elevational view similar to Fig. 4 but illustrating the links in a different position.

Fig. 6 is another elevational view similar to Fig. 4 but showing the links in still another position.

Fig. 7 is a fragmentary sectional view taken on the line 7—7—7—7—7 of Fig. 4.

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Fig. 8 is a fragmentary sectional view taken on the line 8—8 of Fig. 7 to which a schematic showing of the cloth in layers has been added.

The cloth laying-up machine, in accordance with this invention, includes the usual carriage 10 for moving back and forth on a table 11 and means for continuously laying-up layers 12 (see Fig. 8). The usual catching means 13 for catching and holding the end folds of the layers is mounted on the table 11 and functions in the usual fashion. The carriage 10 is provided with the usual platform 14 which supports the cloth material 15 which is to be continuously laid up by the cloth laying-up machine. Further of the old details of the machine will not be given in this specification as they form no part of the invention and machines of this type are generally known in the trade, and there are suitable public records describing the same. In this respect attention is called to U. S. Patent No. 2,263,555 for a Combination cloth feeding and laying-up machine, granted on November 25, 1941, to Gilbert et al. Attention is also called to U. S. patent pending Serial No. 370,784 for a Sheet material spreading machine, by Gilbert et al.

The invention contemplates the provision of a turntable support frame 16 removably mounted across the platform 14 of said carriage 10. A turntable 17 is mounted on the support frame 16. The support frame 16 includes a pair of vertical side channels 18 which are attached to the sides of the carriage 10 by the fastening elements 19. A pair of transversely extending channels 20 are mounted across the top ends of the vertical channels 18. A plate 21 is mounted upon the channels 20. The turntable 17 is in the nature of a box-like structure 22 provided with a plurality of casters 23 resting on the plate 21. A pintle 24 pivotally connects the turntable 17 with the plate 21. A pair of vertical arms 25 project upwards from the box-like structure 22 and support a shaft 26 adapted to receive a roll of goods, indicated by the dot and dash lines 27.

Angle members 28 are mounted upon the front and back sides of the box-like structure 22 and have their bottom arms disposed immediately above one of the channels 20. Pins 29 are adapted to pass through aligned openings in the angle members 28 and the channel 20 for holding the turntable from swiveling, when this is desired. These pins are connected with chains 30 attached to the carriage 10 to prevent the pins from becoming lost when they are removed from the angle members 28.

A feature of the improved cloth laying-up

machine resides in the fact that the turntable support frame 16 together with the turntable 17 may be removed from the carriage 10 by removing the fastening elements 19 when it is desired to continuously lay-up cloth material. However, if it is desired to lay-up cloth material in sections so that one of the faces is always at the top, it is a simple matter to mount the turntable support frame 16 in position on the carriage 10 and use the turntable 17 in the usual way. When this is done the goods is not threaded through the automatic end folding means of the cloth laying-up machine.

Another improved feature of the cloth laying-up machine resides in certain linkage which controls the fold forming channel shaped member 31. This member 31 is vertically slidably mounted on the frame 10 and has its arms 32 and 33 normally disposed horizontally and directed in the opposite direction to the direction of travel of the carriage 10. The fold forming channel shaped member 31 also is provided with the fabric guiding slot 34 in its back for the fabric 15 to pass through and over the bottom arm of the channel shaped member 31.

A stub shaft 35 is mounted upon the end of the channel shaped member 31 by which it may be turned. This stub shaft 35 passes through a block 36 vertically slidably mounted in a vertical opening 37 formed in the frame 10. The block 36 is furthermore guided by several vertical tracks 38 mounted upon the frame 10 to the sides of the vertical opening 37. The channel shaped member 31 is associated with turning means for turning it 180° at the end portions of the travel of said reciprocal carriage 10 to assist in forming the end folds of the fabric. Said turning means includes a drive shaft 40 rotatively mounted through said frame 10.

A radial arm 41 is fixedly mounted on the drive shaft 40 and is associated with cam means 42 for turning the radial arm 180° at the end portions of the travel of said reciprocal carriage 10. This cam means includes a slide 43 horizontally slidably mounted on the carriage 10 and formed with a cam opening 44 engaged by a pin 45 projecting from the end of the radial arm 41. The slide 43 has end portions 46 and 47 projecting respectively, from the front and back ends of the carriage 10 and adapted to strike against stops 48 and 48' at the ends of the table 11 for shifting the slide 43 to throw the radial arm 41, as stated. It should be noted that the cam opening 44 has horizontal end portions and an upwardly directed central portion designed so that the pin 45 will be raised and thrown in one direction or the other, depending upon the direction in which the slide 43 is moved.

A pair of guide links 50 and 51 are pivotally connected together at their adjacent ends by a pintle 52. These guide links 50 and 51 have their outer ends freely mounted on said stub shaft 35 and said drive shaft 40, respectively. These links 50 and 51 are of sufficient length for said channel shaped member 31 to reach desirable vertical positions on the frame 10. A drive bell crank member 53 is fixedly mounted upon said drive shaft 40. An idler bell crank member 54 is pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links 50 and 51, more specifically, upon the pin 52. A driven bell crank member 55 is fixedly mounted on said stub shaft 35.

A parallelogram of drive links 56 are pivotally mounted on and between said drive bell crank member 53 and said idler bell crank member 54 for turning said idler bell crank member 180° when said radial arm 41 is turned 180°. The parallelogram of drive links 56 include the parallel links 56' which are substantially of U-shape in form because they have their end portion at right angles. These links have their ends pivotally connected by pintles 58 with the drive bell crank member 53, and by pintles 59 with crank member 54. The pins 58 are on a line which is parallel to a similar line between the pins 59. These theoretical lines, together with the links 56' form the parallelogram of drive links. The construction is such that the links 56' will transmit motion from the drive bell crank member 53 to the idler bell crank member 54 in the same direction without any danger of turning in opposite directions as they pass their dead center. The reason for this is that when one of the links 56' is passing a dead center the other link 56' has not as yet reached the dead center. The drive will therefore always be in the same direction. Thus when the drive bell crank member 53 is turning clockwise the idler bell crank member 54 will be correspondingly turned, and when the drive bell crank member 53 is turning anti-clockwise the idler bell crank member 54 will be similarly turned.

A parallelogram of driven links 60 are pivotally mounted on and between said idler bell crank member 54 and said driven bell crank member 55 for turning said stub shaft 35, 180° when said idler bell crank member 54 turns 180°. The parallelogram of driven links 60 include a pair of substantially U-shaped links 60'. These links 60' have one of their ends pivotally connected by the pintles 61 with the idler bell crank member 54 and the other of their ends by the pintles 62 with the driven bell crank member 55. The pins 61 are on a line which is parallel to a line between the pins 62. This, together with the parallel relationship of the links 60', form the parallelogram of driven links. The purpose of the pair of links 60' is to prevent any back turning at a dead center. With the construction shown, when one link 60' is passing a dead center the other one has not as yet reached the dead center, and for this reason rotation will always be in the same direction. With this construction when the idler bell crank member 54 turns clockwise, the driven bell crank member 55 will be correspondingly turned, and when the idler bell crank member 54 turns anti-clockwise, the driven bell crank member 55 will be correspondingly turned.

The operation of the linkage feature may be best understood by examining Figs. 4–8, inclusive. It should be noted that in Fig. 4 the radial arm 41 is directed towards the left, while the arms 32 and 33 of the fold forming channel member 31 is directed towards the right. The fold forming channel shaped member 31 is free to move vertically upwards and downwards because the guide links 50 and 51 are free to pivot relative to each other during this motion and the parallelogram of links 56 and 60 are free to correspondingly move. When the cam means 42 throws the radial arm 41 so that it is directed towards the right, as illustrated in Fig. 5, the parallelogram of links 56 and 60 will transmit this 180° movement to the fold forming channel shaped member 31, which, after moving, will have its arms 32 directed towards the left. This motion of the fold forming channel member 31 assists in forming the end folds in the layers 12, which may be understood

from an examination of Fig. 8. Fig. 6 illustrates the fold forming channel shaped member 31 in an elevated position.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by United States Letters Patent is:

1. In a cloth laying-up machine, a reciprocal carriage having a frame, a fold forming channel shaped member vertically slidably mounted on said frame and having its arms disposed horizontally and normally directed in the opposite direction to the direction of travel of said carriage and having a fabric guiding slit in its back for the fabric to pass through and over the bottom arm of said channel shaped member, a stub shaft mounted on the end of said channel shaped member by which it may be turned, and means for turning said channel shaped member 180° at the end portions of the travel of said reciprocal carriage to assist in forming end folds in said fabric, said means including a drive shaft rotatively mounted on said frame, a radial arm on said drive shaft, cam means for turning said radial arm 180° at the end portions of the travel of said reciprocal carriage, a pair of guide links pivotally connected at their adjacent ends and having their outer ends freely mounted on said stub shaft and said drive shaft respectively and of sufficient length for said channel shaped member to reach desirable vertical positions on said frame, a drive bell crank member fixedly mounted on said drive shaft, an idler bell crank member pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links, a driven bell crank member fixedly mounted on said stub shaft, a parallelogram of drive links pivotally mounted on and between said drive bell crank member and said idler bell crank member for turning said idler bell crank member 180° when said radial arm turns 180°, and a parallelogram of driven links pivotally mounted on and between said idler bell crank member and said driven bell crank member for turning said stub shaft 180° when said idler bell crank member turns 180°.

2. In a cloth laying-up machine, a reciprocal carriage having a frame, a fold forming channel shaped member vertically slidably mounted on said frame and having its arms disposed horizontally and normally directed in the opposite direction to the direction of travel of said carriage and having a fabric guiding slit in its back for the fabric to pass through and over the bottom arm of said channel shaped member, a stub shaft mounted on the end of said channel shaped member by which it may be turned, and means for turning said channel shaped member 180° at the end portions of the travel of said reciprocal carriage to assist in forming end folds in said fabric, said means including a drive shaft rotatively mounted on said frame, a radial arm on said drive shaft, cam means for turning said radial arm 180° at the end portions of the travel of said reciprocal carriage, a pair of guide links pivotally connected at their adjacent ends and having their outer ends freely mounted on said stub shaft and said drive shaft respectively and of sufficient length for said channel shaped member to reach desirable vertical positions on said frame, a drive bell crank member fixedly mounted on said drive shaft, an idler bell crank member pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links, a driven bell crank member fixedly mounted on said stub shaft, a parallelogram of drive links pivotally mounted on and between said drive bell crank member and said idler bell crank member for turning said idler bell crank member 180° when said radial arm turns 180°, and a parallelogram of driven links pivotally mounted on and between said idler bell crank member and said driven bell crank member for turning said stub shaft 180° when said idler bell crank member turns 180°; said parallelogram of drive links and said parallelogram of driven links each including a pair of U-shaped links.

3. In a cloth laying-up machine, a reciprocal carriage having a frame, a fold forming channel shaped member vertically slidably mounted on said frame and having its arms disposed horizontally and normally directed in the opposite direction to the direction of travel of said carriage and having a fabric guiding slit in its back for the fabric to pass through and over the bottom arm of said channel shaped member, a stub shaft mounted on the end of said channel shaped member by which it may be turned, and means for turning said channel shaped member 180° at the end portions of the travel of said reciprocal carriage to assist in forming end folds in said fabric, said means including a drive shaft rotatively mounted on said frame, a radial arm on said drive shaft, cam means for turning said radial arm 180° at the end portions of the travel of said reciprocal carriage, a pair of guide links pivotally connected at their adjacent ends and having their outer ends freely mounted on said stub shaft and said drive shaft respectively and of sufficient length for said channel shaped member to reach desirable vertical positions on said frame, a drive bell crank member fixedly mounted on said drive shaft, an idler bell crank member pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links, a driven bell crank member fixedly mounted on said stub shaft, a parallelogram of drive links pivotally mounted on and between said drive bell crank member and said idler bell crank member for turning said idler bell crank member 180° when said radial arm turns 180°, and a parallelogram of driven links pivotally mounted on and between said idler bell crank member and said driven bell crank member for turning said stub shaft 180° when said idler bell crank member turns 180°, said parallelogram of drive links and said parallelogram of driven links each including a pair of U-shaped links, the ends of said U-shaped links being pivotally connected with said crank members at points which assist in forming said parallelogram of links.

4. In a cloth laying-up machine, a reciprocal carriage having a frame, a fold forming channel shaped member vertically slidably mounted on said frame and having its arms disposed horizontally and normally directed in the opposite direction to the direction of travel of said carriage and having a fabric guiding slit in its back for the fabric to pass through and over the bottom arm of said channel shaped member, a stub shaft mounted on the end of said channel shaped member by which it may be turned, and means for turning said channel shaped member 180° at the end portions of the travel of said reciprocal carriage to assist in forming end folds in said

fabric, said means including a drive shaft rotatively mounted on said frame, a radial arm on said drive shaft, cam means for turning said radial arm 180° at the end portions of the travel of said reciprocal carriage, a pair of guide links pivotally connected at their adjacent ends and having their outer ends freely mounted on said stub shaft and said drive shaft respectively and of sufficient length for said channel shaped member to reach desirable vertical positions on said frame, a drive bell crank member fixedly mounted on said drive shaft, an idler bell crank member pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links, a driven bell crank member fixedly mounted on said stub shaft, a parallelogram of drive links pivotally mounted on and between said drive bell crank member and said idler bell crank member for turning said idler bell crank member 180° when said radial arm turns 180°, and a parallelogram of driven links pivotally mounted on and between said idler bell crank member and said driven bell crank member for turning said stub shaft 180° when said idler bell crank member turns 180°, said parallelogram of drive links and said parallelogram of driven links each including a pair of U-shaped links, the ends of said U-shaped links being pivotally connected with said crank members at points which assist in forming said parallelogram of links, and said points being spaced from each other so that when one of the links of any pair of said links is passing a dead center, the other of the links of said pair has not as yet reached the dead center.

5. In a cloth laying-up machine, a reciprocal carriage having a frame, a fold forming member vertically slidably mounted on said frame, a stub shaft mounted on said fold forming member by which it may be turned, means for turning said fold forming member 180 degrees at the end portions of the travel of said reciprocal carriage to assist in forming end folds in said fabric, said means including a drive shaft rotatively mounted on said frame, a radial arm on said drive shaft, means for turning said radial arm 180 degrees at the end portions of the travel of said reciprocal carriage, a pair of guide links pivotally connected at their adjacent ends and having their outer ends freely mounted on said stub shaft and said drive shaft respectively and of sufficient length for said fold forming member to reach desirable vertical positions on said frame, a drive member fixedly mounted on said drive shaft, an idler member pivotally mounted coaxially of the adjacent pivoted ends of said pair of guide links, a driven member fixedly mounted on said stub shaft, a parallelogram of drive links pivotally mounted on and between said drive member and said idler member for turning said idler member 180 degrees when said radial arm turns 180 degrees, and a parallelogram of driven links pivotally mounted on and between said idler member and said driven member for turning said stub shaft 180 degrees when said idler member turns 180 degrees.

HERMAN WALTER GILBERT.
WALTER DEICHMANN.

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