S. BIRCH.

SHEET GUIDING MECHANISM.

APPLICATION FILED MAR. 11, 1919.

1,396,157.

Patented Nov. 8, 1921.

3 SHEETS—SHEET 1.

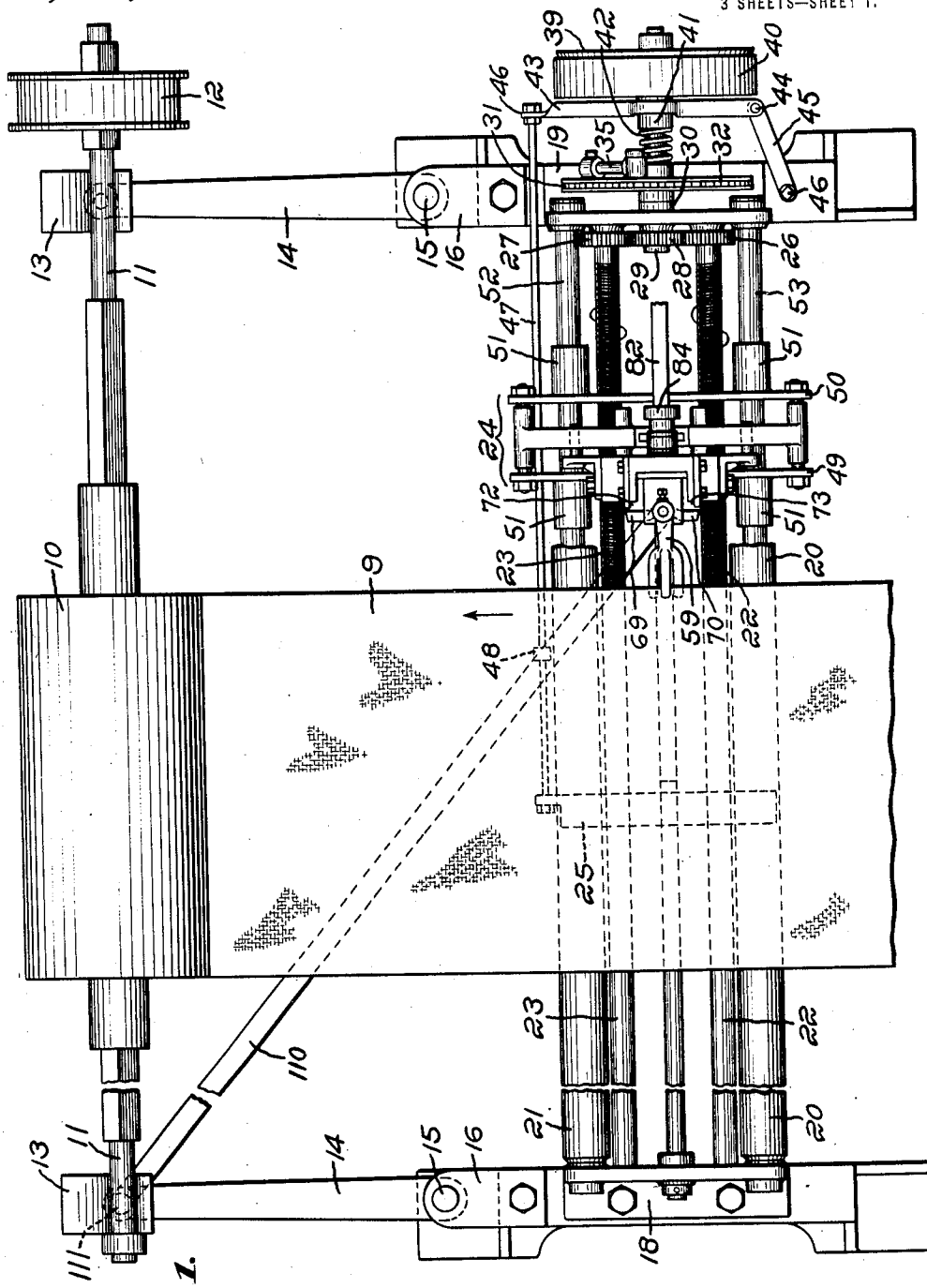


Fig. 1.

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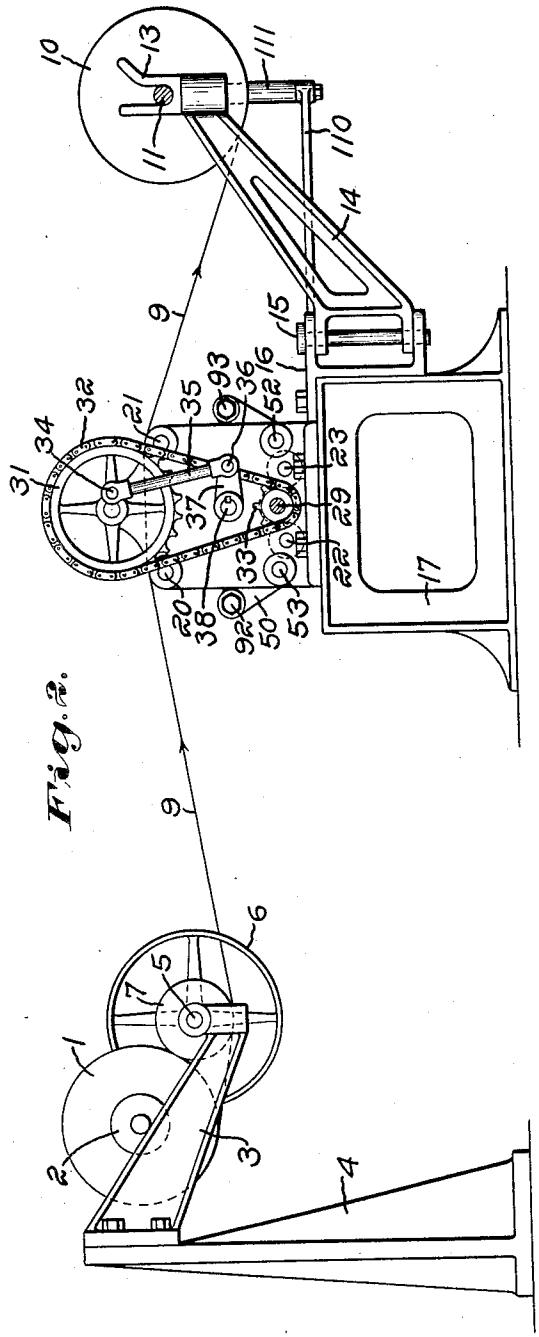


Fig. 2.

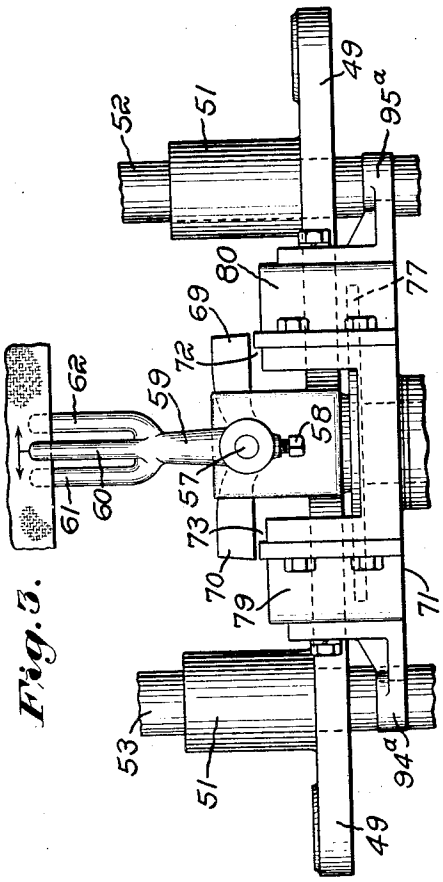


Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

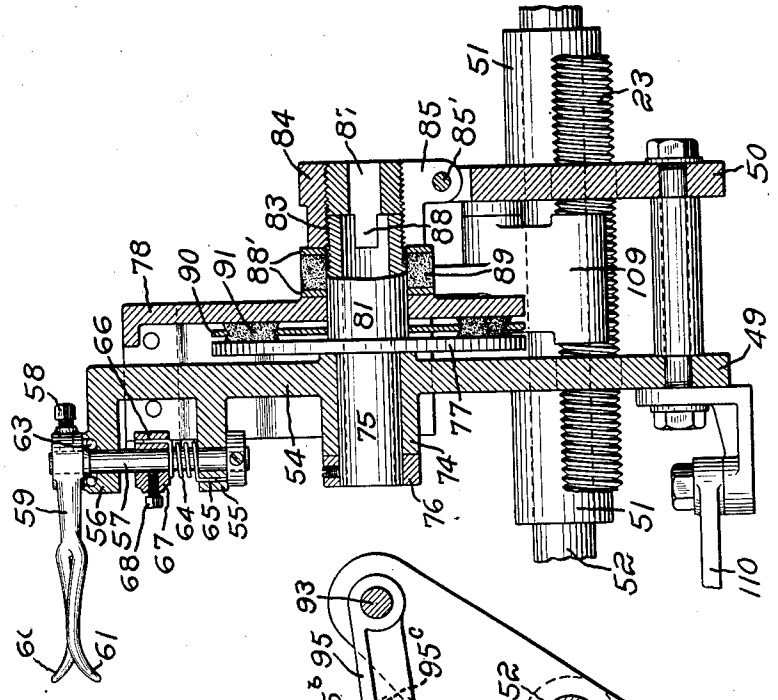
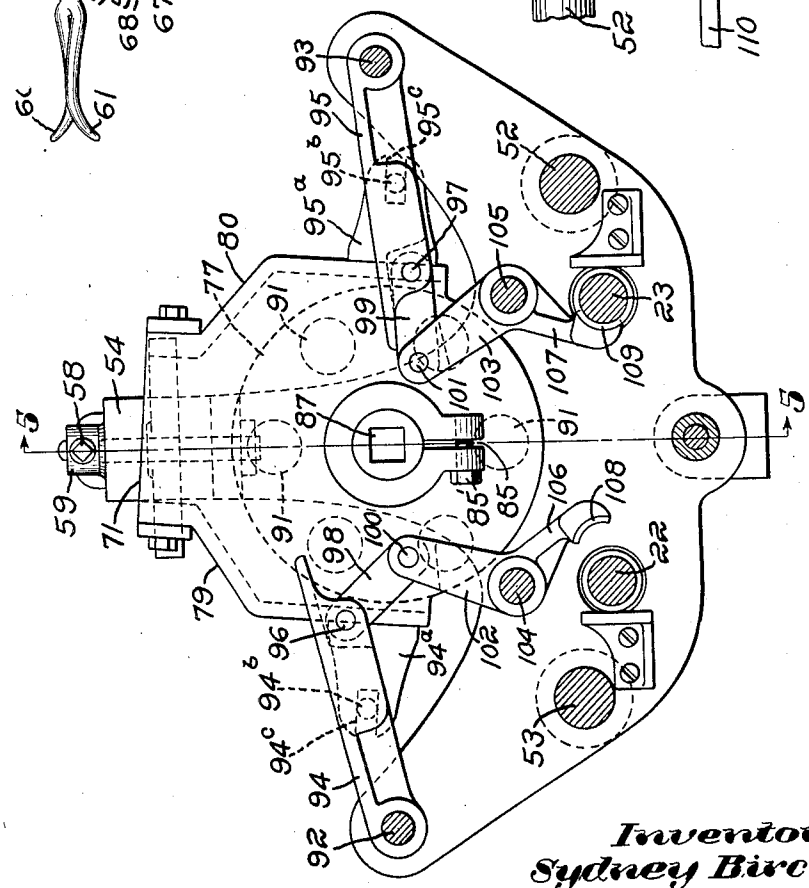


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SHEET-GUIDING MECHANISM.

1,396,157. Specification of Letters Patent. Patented Nov. 8, 1921.

Application filed March 11, 1919. Serial No. 282,024.

To all whom it may concern:

Be it known that I, SYDNEY BIRCH, a subject of the King of Great Britain and Ireland, and residing at Mansfield, in the county of Bristol and State of Massachusetts, have invented an Improvement in Sheet-Guiding Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to sheet guiding mechanism, and particularly to mechanism for feeding and guiding cloth or other textile material.

In order that the principle of the invention may be readily understood, I have disclosed a single embodiment thereof in the accompanying drawings, wherein—

Figure 1 is a plan view of mechanism for feeding and guiding cloth embodying my invention;

Fig. 2 is a side elevation of the mechanism shown in Fig. 1, and in addition represents means for supporting the unwinding cloth roll;

Fig. 3 is a plan view of a portion of the sheet guiding mechanism shown in Fig. 1, and particularly showing the relation of the forked guiding member to the edge of the cloth;

Fig. 4 is a view in front elevation of the guiding or traveling carriage whereon the forked guiding member is supported and shows in vertical section parts of the framing and the threaded shafts for moving the carriage; and

Fig. 5 is a vertical longitudinal section upon the line 5—5 of Fig. 4.

While this invention in certain aspects thereof may be and is of general application, it is peculiarly adapted for use in the feeding and guiding of cloth.

Heretofore many devices have been employed to feed and guide cloth, but so far as I am aware without satisfactory results. Among other mechanisms which have been employed may be mentioned so-called nip rolls set in angular relation with respect to the plane of the cloth and caused intermittently to nip or engage the cloth when not in its true path, such mechanisms being controlled mechanically, electrically or by compressed air. These devices have all been found unsatisfactory for various reasons. The electrically operated devices have required experienced help. Those devices operated by compressed air have required cylinders and valves of small size which become clogged in the humid atmosphere in which these mechanisms are intended mainly to operate, and furthermore the air compressors employed therewith are frequently the cause of leakage. The mechanically operated devices have so far as I am aware been comparatively complicated and have not been sufficiently sensitive to give good results.

The disclosed embodiment of my invention represents a simple mechanism which in practice has been found to operate with great sensitiveness and to insure the rolling of the cloth in square ended rolls and with great accuracy. Referring more particularly to the drawings, the cloth that is to be unwound and re-rolled is represented in Fig. 2 at 1 and as wound upon a drum or spindle 2 supported upon opposite inclined brackets 3 themselves secured to a suitable upright or pair of uprights 4. In suitable bearings upon the lower ends of the brackets 3 is mounted a shaft 5 having fast thereon a pulley 6 driven in any suitable manner from any suitable source of power. Fast upon said pulley is a small drum 7 with the surface of which the unwinding roll 1 of cloth contacts, the construction being such that the cloth roll, as it unwinds, retains contact through gravity with the drum 7 so that the cloth is always unwound at the same surface speed.

The cloth that is unwound is directed as indicated by the line 9 in Fig. 2 through the cloth feeding and guiding mechanism of my invention toward the right in Fig. 2, where it is wound into a roll 10. The cloth roll 10 is supported upon a shaft or other suitable support 11 which is driven by a pulley 12 fast thereon from any suitable source of power and as closely as may be at the same speed as the shaft 5.

Inasmuch as it is difficult to drive the roll 10 of cloth at just the proper speed to keep the roll tight, I preferably mount the driving pulley 12 on the shaft in such a manner that it drives the shaft through friction but tends constantly to slip somewhat and particularly when the roll of cloth has been sufficiently tightened. In other words, the

pulley 12 slips when the roll of cloth 10 is tight and therefore cannot place too great tension upon the cloth.

The shaft 11, which in Fig. 1 is represented as having a squared portion is mounted in open or forked bearings 13 which are themselves supported or formed upon the upper ends of upwardly inclined arms or levers 14 pivoted upon the upright pins or supports 15 themselves supported in suitable openings in brackets 16 extending from the base or open frame whereon is supported the mechanism to which my invention more particularly relates. At any suitable point between the unwinding roll 1 and the winding roll 10 and herein upon the base 17, I mount or provide a framework including side uprights 18, 19 wherein are supported guide rods 20, 21 most clearly indicated in Figs. 1, 2 and 4 and over which the cloth passes, as clearly shown in Fig. 2.

Suitably mounted in the end uprights 18, 19 are two shafts 22, 23, which, as most clearly shown in Fig. 1, are oppositely threaded throughout a portion at least of their length and so as to provide for sufficient traversing movement of the cloth guiding carriage indicated generally at 24.

If desired, as herein shown, I provide a bridge piece or steadying member, indicated in dotted lines at 25 in Fig. 1, about midlength of the guiding rolls 20, 21 and serving to maintain them accurately in position. I find this to be desirable because of the comparatively great length of these rolls which must be suited to all widths of cloth.

In order to drive the oppositely threaded shafts 22, 23, I have provided them with gears 26, 27 meshing with and driven by a suitable gear 28 upon a drive shaft 29 most clearly indicated in Fig. 1. The shaft 29 is supported in a suitable bearing 30 and has fast thereon a sprocket gear 31 about which passes a sprocket chain 32 also passing about a sprocket pinion 33 upon the drive shaft 29 that is driven from any suitable source of power. Upon the sprocket gear 31 is pivotally connected at 34 eccentrically to the axis of the gear 31, a rod 35, the lower end of which is pivotally connected at 36 to a crank arm 37 fast upon the shaft 38. The construction is such that the shaft 38 is rocked through a suitable arc by the rotation of the gear 31.

The shaft 29 is driven in any suitable manner. Herein for the purpose I have represented it as having fast thereon a cone 39 and as having loose thereon a pulley 40 adapted to receive a driven belt. The pulley 40 has a hub 41 which is engaged by a spring 42 coiled about the shaft 29 and tending constantly to force the pulley 40 into tight frictional or driving engagement with the cone 39.

Surrounding or mounted upon the hub 41 is a member 43 pivoted at one end 44 to a short bracket arm 45 bolted at 46 to the framing of the machine. The other end of the member 43 is fixedly secured at 46 to a horizontal rod 47 which, as indicated most clearly in Fig. 1, extends through the carriage 24 and is supported at its opposite end by the bridge piece 25, but in such a way that it may slide thereon. At some suitable point between the normal positions of the edges of the cloth, there is secured a suitable collar 48 upon the rod 47, the construction being such that if the cloth 9 should run out, the carriage 24 in moving unduly inward would contact with the collar 48, and therefore move it and the rod 47 to the left, viewing Fig. 1, and so withdraw the pulley 40 from driving relation with the cone 39.

The cloth guiding carriage indicated generally at 24 is provided with two parallel spaced members or plates 49, 50 shown most clearly in Fig. 1 and having hubs 51 which are mounted upon guide rods 52, 53 extending between and connecting the upright side members 18, 19 of the machine frame. Thus the guiding carriage is mounted for movement to either the right or the left, viewing Fig. 1, and as hereinafter described the movement is effected by bringing divided or partial nut members into driving relation with either the threaded shaft 22, or the threaded shaft 23, as the case may be.

As most clearly shown in Figs. 4 and 5, the inner member or plate 49 of the guiding carriage has a central upstanding web or upright formation 54, the upper part thereof having two spaced horizontal members 55, 56. In said members, which preferably are integral with the upright 54, are suitable openings wherein is mounted an upright shaft 57. Secured by set screw 58 or otherwise upon the upper protruding end of said shaft 57 is a member 59 to engage the selvage or edge portion of cloth. While this member may be of any desired form, I have shown it as fork shaped and having a central tine or finger 60 adapted to overlie the cloth and two lower tines or fingers 61, 62 to take under the cloth, so that the latter passes between and in contact with the said three tines or fingers, as clearly illustrated in Figs. 1 and 3.

If desired and preferably I provide ball bearings 63 in a suitable socket in the member 56 to facilitate the ready oscillation of the fork 59. The fork 59 is so constructed and mounted as to be very sensitive to the movement of the cloth and to the pull thereof.

Surrounding the shaft 57 of the fork 59 is a coil spring 64, the lower bent end 65 of which is received in an opening in the member 55. The upper bent end 66 of the spring

is received in a collar 67 secured by said screw 68 upon the shaft 57. In this manner, the tension of the spring 64 can be readily adjusted. The tendency of the spring 64 is to wind up, and therefore to throw the fork 59 in a contraclockwise direction, viewing Fig. 1; that is, toward the observer, viewing Fig. 5.

In the normal operation of the mechanism, so long as the guiding carriage is stationary, the pull exerted by the shaft 11 upon the roll 10 of the cloth offsets the tendency of the spring 64 to turn the fork in a contraclockwise direction. The result is therefore to prevent certain formations movable with the fork 59 from functioning, which, when they do function, result in movement of the guiding carriage 24 to the right or left viewing Fig. 1. Inasmuch as the tension of the spring 64 may be accurately and delicately adjusted, it is evident that the mechanism can be caused to operate with great accuracy and sensitiveness.

I provide means of any suitable character whereby, when the tension or strain upon the cloth becomes either less or greater than the tension of the spring 64, the fork 59 moves either in a clockwise or contra-clockwise direction viewing Fig. 1, so as to cause movement of the carriage 24 to the right or the left viewing said figure.

Herein for the purpose I have provided the following mechanism to which, however, my invention is not limited.

Fast with the shaft 57 of the fork 59, and preferably integral with the collar 67 are two dogs 69, 70 extending laterally therefrom and into the path of movement of a rocking frame 71 so that whichever dog 69 or 70 is moved outwardly, that is, to the right in Fig. 1, it will engage with one of the shoulders 72, 73 upon said rocking frame 71, so as to stop for the time being the rocking movement of said frame 71, and thereby as hereinafter described to effect movement of the guiding carriage 24 to the right or to the left viewing Fig. 1.

The central member or upright 54 of the frame member 49 is provided with a hub 74 wherein is received an inner hub 75 having fast thereon a collar 76 to confine the shaft in position. Said hub 75 is formed integral with a disk 77.

The rocking frame 71 in transverse horizontal section is of general flattened U-shape, being formed of the central upright web 78 and the side webs 79, 80. The said central web 78 has a squared or other polygonally shaped socket portion which may be provided by suitably machining or milling out a part thereof in line with the hub 75. For economy of construction, however, I prefer to provide the following construction.

Integral with the disk 77, and in alinement with but oppositely extending from the hub 75 is a hub 81. The hub 81 is externally threaded as indicated at 83, and receives thereon an internally threaded clamp collar 84 split as indicated at 85 and adapted to be tightened by a set screw 85′ about an externally threaded collar 86 square or of other polygonal shape in cross section as indicated at 87 and having opposite tongues 88 extending inwardly therefrom into engagement with suitable recesses in the end of the hollow hub 81, so that there can be no relative movement of rotation between the collar 86 and the hub 81. Within the squared opening 87 is received the squared portion 82 of the shaft 38.

By providing the collar 86 with the squared or other polygonally shaped opening and by holding it from rotative movement with respect to the disk 77 and its hubs, I avoid the necessity of squaring out said hubs. Any other suitable construction may, however, be provided. Between the clamp collar 84 and the face of the web 78, I provide suitable packing, preferably made up of washers 88′ and felt 89.

Mounted loosely upon and surrounding the hub 81 is a thin disk 90 having therein sections 91 which frictionally engage one face of the disk 77 and the adjacent face of the web 78, so as to cause them to move together but with capacity for relative movement. Such capacity for relative movement is desirable in view of the fact that in this embodiment of the invention I provide means for constantly rocking the disk 77 (that is, by the shaft 38), but for momentarily and at irregular intervals holding in fixed position the rocking frame 71 through the agency of the fork 59.

Upon bolts 92, 93 connecting frame members 49, 50 of the guiding carriage 84, I pivotally mount two levers 94, 95, adapted to be rocked as hereinafter described. Near the ends of said levers at 96, 97 I pivotally connect links 98, 99, which at their opposite ends are pivoted at 100, 101 to the arms 102, 103 of bell crank levers themselves pivoted at 104, 105 and having respectively arms 106, 107, the free ends of which are formed as partial nuts 108, 109 adapted to be moved into engagement respectively with the threads upon the shafts 22, 23.

The construction is such that when the dog 69 is moved into engagement with the shoulder 72 upon the rocking frame 71, such frame is held momentarily stationary with the dog 95 depressed and consequently with the half partial nut 109 in engagement with the shaft 23.

When the path of movement of the cloth 9 has been rectified, the fork 59 is returned to its neutral position indicated in Fig. 1, and the rocking frame 71 continues to oscillate until one or the other of the dogs 69, 70 engages with the corresponding shoul-

der 72 or 73 upon said rocking frame, so as to bring either the partial nut 108 or the partial nut 109 into engagement with the shaft 22 or 23. The engagement of the partial nut 108 with the screw shaft 22 results in the movement of the guiding carriage 24 to the left viewing Fig. 1, and the engagement of the partial nut 109 with the screw shaft 23 results in the movement of the guiding carriage to the right, viewing Fig. 1.

In order to rock the levers 94, 95, I may provide any suitable means. I have represented the rocking frame 71 as having oppositely extending therefrom brackets 94^a, 95^a. Extending from the levers 94 and 95 are pins 94^b, 95^b, which engage notches 94^c, 95^c in the ends of the brackets 94^a, 95^a. The construction is such that the rocking movement of the rocking frame 71 is conveyed to the levers 94, 95, whereby the said levers are rocked in a vertical plane.

The rocking movement of the rocking frame 71 causes the levers 94, 95 to swing in vertical planes and, so long as the rocking movement continues, the partial nuts 108, 109 are in turn brought into engagement with the threads 22, 23 and instantly withdrawn therefrom. Thus the guiding carriage 24 remains fixed in position. As soon, however, as the rocking movement of the frame 71 is stopped, the partial nut 108 or 109, as the case may be, which is at that time in engagement with the threaded shaft 22 or 23, is held in such engagement and the carriage is thereby moved to the right or to the left, viewing Fig. 1.

Viewing Fig. 4, it will be observed that the levers 94, 95 are provided with tip ends of reduced vertical extent which, when either of said levers is depressed, rides upon the upper surface of the corresponding link 98 or 99, and the pivotal relation of the several members is such that the pivot pins 96, 97 drop below lines extending from the pivotal pins 100 and 101 to the pivotal points of support of the levers 94, 95, thereby locking the parts in position.

The inner member or plate 49 has pivotally connected thereto at its lower end an obliquely extending rod 110 most clearly indicated in Fig. 1, the opposite end of which is connected at 111 to the bearing 13 of one of the levers 14 or to some other suitable part of said lever. The construction is such that as the carriage 24 is moved to the right or to the left, the rod 110 is moved in or out, that is, is correspondingly moved so as to rock the levers 14, 14, and thereby to move the cloth take-up roll 10 to the right or to the left, as the case may be, in conformity with the movement of the carriage 24, and therefore to rectify the path of travel of the cloth.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims—

1. Sheet guiding mechanism comprising in combination, means to engage an edge of the sheet, a carriage for said means and movable transversely of the path of movement of the sheet and having cloth guiding means extending transversely of said sheet.

2. Sheet guiding mechanism comprising in combination, means to engage the edge of a sheet, a traversable carriage whereon said edge engaging means is mounted, and coacting means whereby said carriage is moved in conformity with the pull communicated by the fabric to said edge engaging means.

3. Sheet engaging means comprising in combination, a forked member to engage an edge of the sheet, a traversable carriage whereon said forked member is movably mounted, and means whereby movements of said forked member imparted by the pull upon the sheet are communicated to said traversable carriage.

4. Sheet guiding mechanism comprising in combination, means to engage an edge of the sheet, a traversable carriage whereon said edge engaging means is movably mounted, and means whereby the movement of said edge engaging means in either of two directions causes traverse of said carriage in one or two opposite directions.

5. Sheet guiding mechanism comprising in combination, means to support a roll from which the sheet is unwound, means to support a roll onto which the sheet is wound, intermediate means to engage an edge of the sheet, a carriage whereon said edge engaging means is movably mounted, means whereby movements of said edge engaging means cause corresponding movements of said carriage, and means whereby movements of said carriage are transmitted to the roll onto which the sheet is wound.

6. Sheet guiding mechanism comprising in combination, a roll from which the sheet is unwound, a roll onto which the sheet is wound, intermediate means to engage an edge of the sheet, and coöperating connections whereby movement of said edge engaging means are transmitted to the roll onto which the sheet is wound.

7. Sheet guiding mechanism comprising in combination, a member to engage an edge of the sheet between its points of support, a traversing carriage whereon said member is mounted and oppositely threaded shafts along which said carriage is traversed in conformity with the movements of said sheet edge engaging member.

8. Sheet guiding means comprising in

combination, a forked member to engage an edge of the sheet between its points of support, a carriage whereon said forked member is mounted for swinging movement in the direction of travel of the sheet or in the opposite direction, and means whereby movement of the forked member in either of said directions causes corresponding movement of said carriage.

9. Sheet guiding means comprising in combination, a forked member to engage an edge of the sheet between its points of support, a carriage whereon said forked member is mounted for swinging movement in the direction of travel of the sheet or in the opposite direction, means whereby movement of the forked member in either of said directions causes corresponding movement of said carriage, and means whereby movements of said carriage are communicated to the support onto which the sheet is being wound during the functioning of the sheet guiding mechanism.

10. Sheet guiding mechanism comprising in combination, a forked member to engage an edge of the sheet, a movable carriage, a pivotal support upon said carriage for said forked member, said forked member having oppositely extending projections adapted to engage abutments upon said carriage, and means whereby the engagement of either projection with the corresponding abutment causes movement of the carriage in one direction.

11. Sheet guiding mechanism comprising in combination, a forked member to engage an edge of the sheet, a movable carriage, a pivotal support upon said carriage for said forked member, said forked member having oppositely extending projections adapted to engage abutments upon said carriage, two oppositely threaded shafts along which said carriage is movable, and co-acting means whereby the engagement of either projection with its corresponding abutment causes traversing movement of said carriage in one direction along said oppositely threaded shafts.

12. Sheet guiding mechanism including in combination, a support for the unwinding sheet, a support onto which the sheet is wound, an intermediate forked member to engage an edge of the sheet, a pivotal support therefor whereby said forked member may move toward either support for the sheet, and means whereby movement of said forked member in one direction causes corrective movement of the support onto which the sheet is being wound.

13. Sheet guiding mechanism comprising in combination, a support for the unwinding sheet, a support onto which the sheet is wound, an intermediate member adapted to engage an edge of the sheet and movable toward either support according to the movements of the sheet, and coöperating means whereby movement of said member in one direction causes corrective movement of the support onto which the sheet is being wound.

14. Sheet guiding mechanism comprising in combination, a roll from which the sheet is unwound, a roll onto which the sheet is wound, a forked member to engage an edge of the sheet between said rolls, a movable carriage upon which said forked member is pivoted to swing toward either support in conformity with the movement of the fabric, and coöperating means whereby said carriage is traversed transversely of the feed of the fabric and in conformity with movement of said forked member.

15. Sheet guiding mechanism comprising in combination, a supporting roll for the unwinding sheet, a supporting roll onto which the sheet is wound, a member intermediate said supports and adapted to engage an edge of the fabric, a carriage on which said member is mounted for movement in the direction of either support in conformity with the movement of the fabric, and cooperating means whereby said carriage is moved transversely of the feed of the fabric.

16. Sheet guiding means including a member to engage the sheet, a support whereon said member is movably mounted and a spring tending normally to move said member in one direction against a normal resistant pull of the fabric in the opposite direction.

17. Sheet guiding means comprising in combination, a forked member to engage an edge of the fabric, said member being mounted to swing in either direction, and a spring tending to swing said forked member in one direction against a normal resistant pull of the fabric in the opposite direction.

18. A sheet guiding mechanism comprising in combination, a forked member to engage an edge of the fabric, a pivotal support for said forked member, a pair of oppositely extending wings connected to said forked member, abutments adapted to be engaged by said wings upon corresponding movement of said forked member, and means whereby the engagement of either wing with its abutment causes corrective movement of the sheet travel.

19. Sheet guiding means comprising in combination, a forked member to engage an edge of the sheet, a traversable carriage, a vertical spindle 57 on the carriage and whereon the forked member is mounted, wings 69, 70 rigid with said forked member and abutments 72, 73 with which said wings engage.

20. Sheet guiding means comprising in combination, a forked member to engage an edge of the sheet, a traversable carriage, a vertical spindle 57 on the carriage and

whereon the forked member is mounted, wings 69, 70 rigid with said forked member, abutments 72, 73 with which said wings engage, oppositely threaded shafts supporting said carriage, and means whereby the engagement of either wing with its abutment causes the corresponding threaded shaft to function, thereby to traverse the carriage in one direction.

21. In an apparatus of the class described and in combination, a receiver whereon the sheet is accumulated, a support from which the sheet is moved toward said receiver, and coöperating means whereby said receiver is moved from side to side to meet the goods as delivered thereto and as the goods deviate from side to side, whereby the said receptacle conforms in position to the path of travel of the goods.

22. In an apparatus of the class described and in combination, a receiver for the accumulation of the goods, a support from which the goods travel to the receiver, and means coöperating with the receiver to move the latter to compensate for changes in the path of travel of the goods to the receiver.

23. In an apparatus of the class described and in combination, a receiver for the accumulation of the goods, a support from which the goods travel to the receiver, and means intermediate the support and the receiver and coöperating with the latter to move the same compensatingly with respect to the path of travel of the goods.

24. In an apparatus of the class described, and in combination, a receiver for the accumulation of the goods, a support from which the goods move toward the receiver, and automatically acting means coöperating with the receiver to move the latter compensatingly with respect to deviations in the path of travel of the goods to the receiver.

25. In a receiving apparatus of the class described and in combination, a receiver whereon the sheet is wound, a support from which the sheet is moved toward said receiver, and coöperating means to effect the movement of said receiver from side to side to meet the sheet as delivered thereto.

26. In a receiving apparatus of the class described and in combination, a receiver for the accumulation of the sheet, a support from which the sheet is moved toward said receiver, and coöperating means automatically to effect the movement of said receiver from side to side to meet the sheet as delivered thereto.

In testimony whereof, I have signed my name to this specification.

SYDNEY BIRCH.