S. BIRCH.

CLOTH GUIDING AND FEEDING APPARATUS.

APPLICATION FILED DEC. 8, 1915.

1,297,064.

Patented Mar. 11, 1919.

3 SHEETS—SHEET 1.

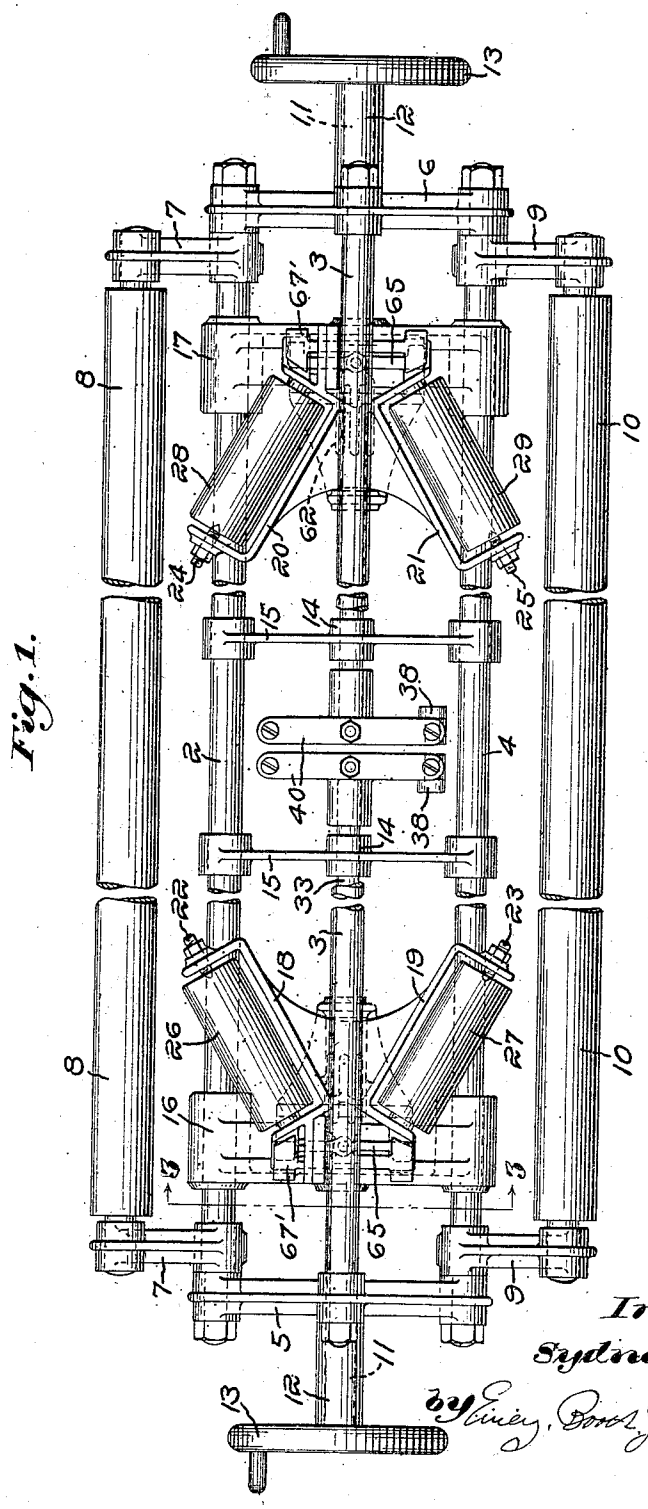


Fig. 1.

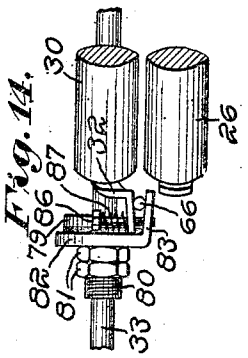


Fig. 14.

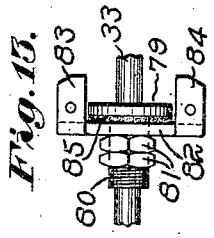


Fig. 15.

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Fig. 2.

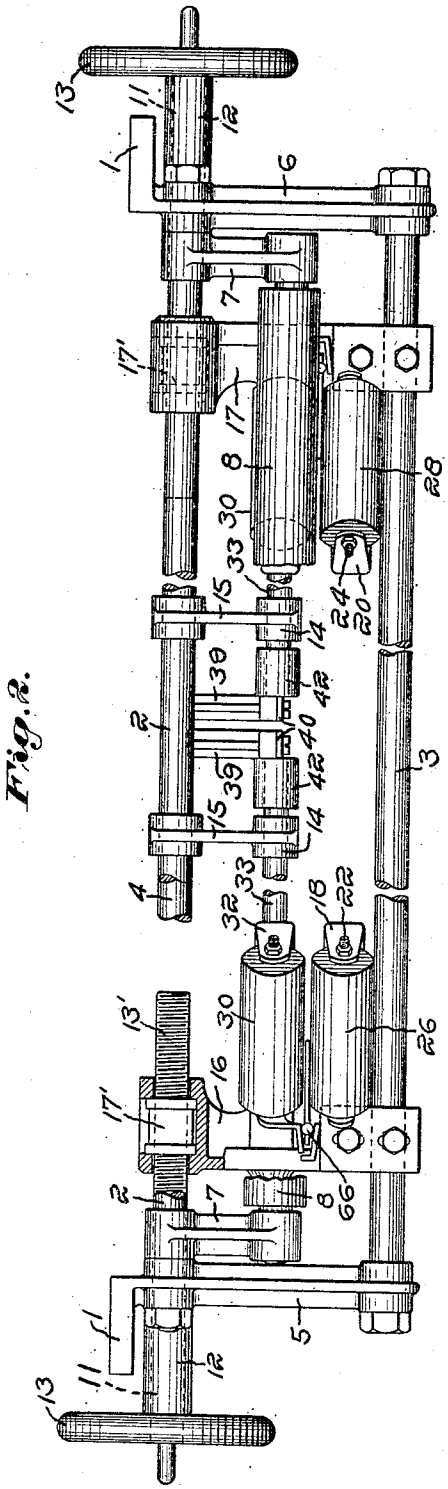


Fig. 4.

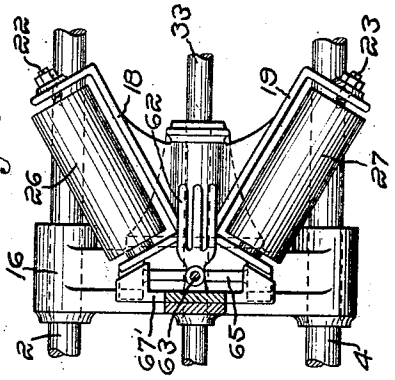


Fig. 12.

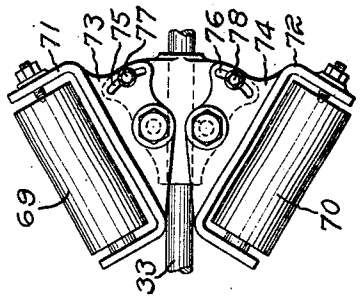
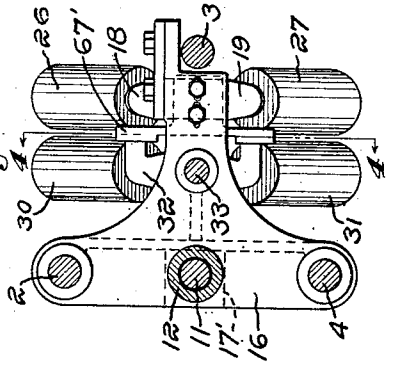


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 11.

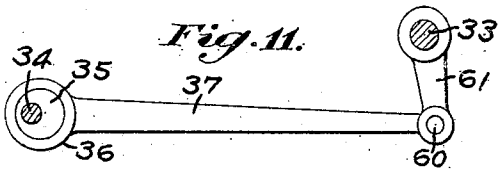


Fig. 5.

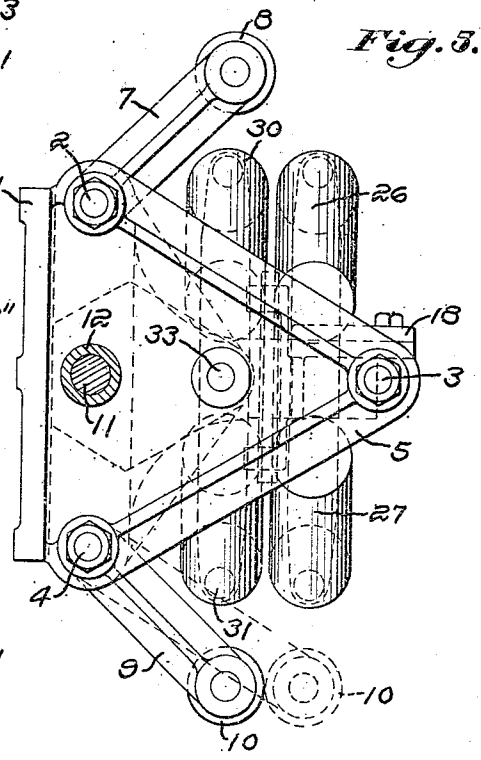


Fig. 9.

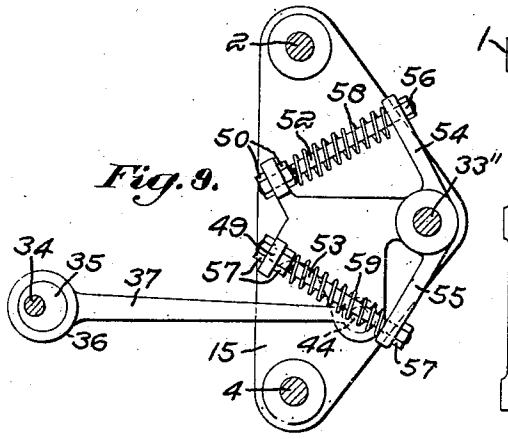


Fig. 10.

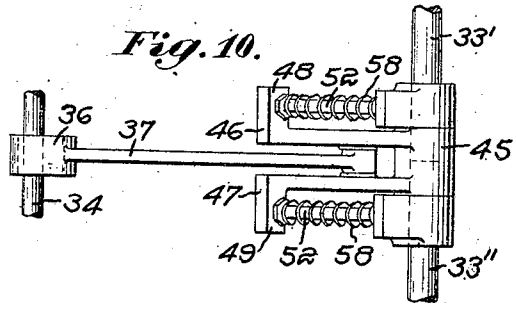


Fig. 6.

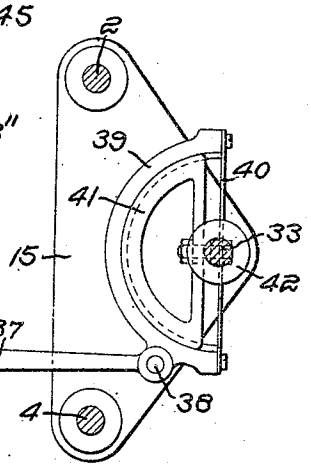


Fig. 7.

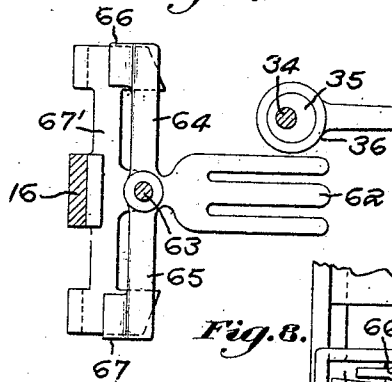
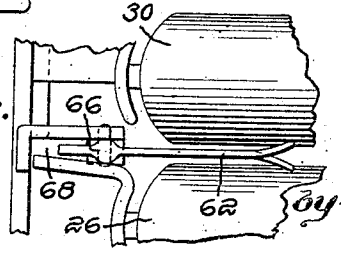


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CLOTH GUIDING AND FEEDING APPARATUS.

1,297,064. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed December 8, 1915. Serial No. 65,802.

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 Newton, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Cloth Guiding and Feeding Apparatus, 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.

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

Figure 1 is a front elevation of one type of mechanism embodying my invention;

Fig. 2 is a plan thereof;

Fig. 3 is a vertical section on the line 3—3, Fig. 1, and looking toward the right in said figure;

Fig. 4 is a section on the line 4—4 in Fig. 3, and looking toward the left in said figure;

Fig. 5 is an end elevation of the mechanism looking from the left, viewing Fig. 1;

Fig. 6 is a detail mainly in transverse section of a portion of the driving connections of the mechanism;

Fig. 7 is a further detail, partially in side elevation and partially in vertical section, and showing the feeler fork and related parts;

Fig. 8 is a detail, mainly in plan, showing a pair of co-acting rolls and the feeler fork in operative relation thereto;

Fig. 9 is a view similar to Fig. 6, but of a modified form of a portion of the driving mechanism;

Fig. 10 is a detail in plan of the construction shown in Fig. 9;

Fig. 11 is a view, partially in side elevation and partially in vertical section, of a still further modification of a portion of the driving mechanism;

Fig. 12 is a view similar to Fig. 4 of a somewhat modified form of my invention;

Fig. 13 is a detail in front elevation of a slightly modified form of my invention; and

Fig. 14 is a plan view of a portion of the mechanism representing the construction shown in Fig. 13.

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 so-called nip rolls set in angular relation with respect to the plane of the cloth have been provided and have been caused intermittently to nip or engage the cloth when not in its true path. Such devices have been controlled mechanically, electrically and by compressed air, but so far as I am aware without giving satisfactory results. The electrically operated devices have required experienced help and for this and other reasons have been unsatisfactory. The 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. Furthermore, air compressors are required and frequently are the cause of leakage. Again, unless the air be filtered, which means increased expense, difficulties continually arise.

Referring more particularly to the drawings, wherein I have represented one form of means for carrying out my invention, and first to Figs. 1 to 8 inclusive, I have therein represented a frame composed in part of a suitable upright or backing 1, shown most clearly in Figs. 2 and 5 and longitudinally extending stay rods 2, 3, 4 suitably supported by inclined cross bars or brackets 5, 6, arranged at opposite ends of said stay rods, as indicated most clearly in Fig. 1. Upon the stay rod 2 near the opposite ends thereof are mounted bracket arms 7—7, wherein is mounted loosely a longitudinally extending guide roll 8. Similarly mounted upon stay rod 4 are bracket arms 9—9 having loosely mounted thereon a guide roll 10 which may be shifted into the position shown in dotted lines in Fig. 5 to facilitate the introduction of the cloth from either of the left or the right viewing said figure. The cloth enters the machine at the guide roll 10 and passes therefrom in contact with the guide roll 8, being at the right hand side of said rolls, viewing Fig. 5.

Suitably mounted in the brackets 5—5, 6—6 are two shafts 11—11, herein shown as extending through sleeves 12. Said shafts are provided with hand wheels 13, 13 and with threaded portions 13′ whereby upon

the rotation of said shafts the cloth guiding devices may be adjusted toward and from each other to accommodate different widths of cloth. At their ends nearest each other the said shafts 11—11 are mounted in bearings 14 provided in suitable cross arms or brackets 15—15.

Suitably sleeved upon the stay rods 2, 4 for sliding movement thereon are brackets 16, 17 carrying nuts 17′ through which extend the threaded portions 13′ of the shafts 11, whereby said brackets 16, 17 may be positioned at the desired point depending upon the width of the cloth. The said brackets 16, 17 preferably provided with adjustable feet, are respectively provided with forked members 18, 19, 20, 21 having suitable bearings indicated in part at 22, 23, 24, 25, for the reception of four pairs of rolls, the bodily stationary ones whereof are indicated at 26, 27, 28 and 29. As shown most clearly in Fig 1, these rolls are mounted obliquely with respect to the selvage of the cloth and with respect to each other, and while they may rotate idly upon their supports, they do not have movement toward or from the plane of the cloth. In the rear of the four rolls 26, 27, 28, 29 are four other rolls, two of which are shown at 30, 31 in Figs. 3 and 5, each of said rolls being mounted in parallelism with the corresponding roll 26, 27, 28, 29, but slightly spaced therefrom to permit the cloth to travel therebetween, as will be clearly evident from Fig. 5. Because of the adjustable brackets 16, 17 for the stationary rolls, different thicknesses of cloth may be accommodated. The said rear rolls are mounted for idle rotation upon their bearings and also for rocking movement toward and from the respective front rolls 26, 27, 28, 29. For this purpose I provide a suitable frame 32 fast upon a rock shaft 33 suitably mounted in the framing and adapted to be rocked so as constantly to tend to bring alternately the upper pairs of rolls and the lowermost pairs of rolls into driving relation with the cloth.

Viewing Fig. 1, it will be evident that if the roll 27 and its companion roll 31 be brought into nipping relation with the cloth, the action of said rolls will be to guide the cloth toward the right, viewing Fig. 1, and that if the roll 26 and its companion roll 30 be brought into nipping relation with the cloth, the action will be to guide or move the cloth toward the left viewing Fig. 1. A similar action results from the nipping relation of the pairs of rolls at the right hand end of the machine, viewing Fig. 1.

Inasmuch as each pair of rolls is under normal conditions brought into nipping relation with the cloth, it is evident that in such normal conditions there is a tendency first to direct the cloth inwardly away from the line of selvage and then outwardly therefrom. In order, however, to guide the cloth properly, I provide means whereby one pair or the other at each edge of the cloth is held out of nipping relation therewith dependent upon whether the cloth is running inward or outward with respect to its true course, and whereby the other pair of rolls at said cloth edge is permitted to engage the cloth so as to draw it back to its true course.

In order to rock the rearmost sets of rolls, I provide a shaft 34 supported in a manner not herein shown and driven in any suitable way, as, for example, by an electric motor from which said shaft extends. Upon said motor shaft I mount an eccentric 35 surrounding which is an eccentric strap 36 from which extends a connecting rod 37 pivotally connected at 38 to a segmental brake strap 39, herein represented as semi-circular and connected at its ends to a strip 40, thereby to inclose a co-acting segmental brake member 41 having a sleeve 42 fast upon the rock shaft 33. The construction and arrangement are such that continuous rotation of the motor shaft 34 rocks the shaft 33, but in a yielding manner, whereby the rocking movement of said shaft may be interrupted, which, in this embodiment of my invention is performed in a manner to be hereinafter set forth.

The yielding connection or brake mechanism shown in Fig. 6 is such as to give the desired pressure or nipping action to the rolls when in contact with the cloth. The throw of the eccentric 35 may be such as to hold the pairs of rolls in contact with opposite faces of the cloth for a period of slippage of the brake or yielding connection.

I have herein represented the brake strap 39 as of segmental form, so that it will not interfere with the proper travel of the cloth. If desired, however, any other suitable form of brake strap may be provided, or if desired I may substitute other yielding connections, one of which I have illustrated in Figs. 9 and 10.

In said Figs. 9 and 10, I have represented the eccentric 35 as operating the connecting rod 37, which is pivotally connected at 44 to a casting 45, into which may loosely extend the adjacent ends of a divided rock shaft 33′, 33″. From the said casting 45 extend projections 46, 47 herein shown as integral therewith and having feet 48, 49, into which are fixedly secured by nuts 50, 57, bolts 52, 53 extending loosely through arms 54, 55 respectively fast upon the rock shafts 33′, 33″. Said bolts 52, 53 are provided upon their outer ends with nuts 56, 57 and are surrounded by coil springs 58, 59. The construction and relation of parts are such that rotation of the motor shaft 34 rocks the divided rock shaft 33′, 33″, but yieldingly through the interposition of the springs 58, 59 and the arms 54, 55 whereon they act.

In certain forms of my invention I may rock the shaft without yielding movement; and in Fig. 11 I have for the purpose represented the connecting rod 37 as pivotally connected at 60 to an arm 61 fast upon the rock shaft 33.

In order to permit nipping engagement of the several pairs of rolls with the cloth dependent upon the corrective movement which is to be imparted to the cloth to bring it back to its true course, I provide certain feeler mechanism to engage with the cloth at or near the opposite selvages thereof. For this purpose, I have in Fig. 7 represented a feeler fork 62 between the tines of each of which a selvage portion of the cloth extends. Such a fork is provided at each selvage and is suitably weighted so that it tends to rock or move downwardly viewing Figs. 1 and 7. In that form of the invention herein shown, the fork 62 is pivotally mounted upon a stud or short spindle 63 and has integral therewith or attached thereto upwardly and downwardly extending arms 64, 65 having angularly extending terminals 66, 67, which are adapted to enter wedge shaped spaces, shown most clearly at 68 in Fig. 8 provided between the rocking supports or brackets 32 of the rearmost pairs of rolls and an adjustable member 67′ upon the framing of the machine. The construction and arrangement are such that the cloth in passing upwardly, viewing Fig. 4, if it be traveling unduly toward the left viewing said figure, tilts the fork 62 upwardly, thereby wedging the projection 66 between the support for the guide roll 30 and the frame of the machine in such a way as to prevent nipping engagement with the rolls 26, 30 on the cloth, the brake 41, 39 yielding sufficiently for this purpose, but permitting nipping engagement with the cloth immediately thereafter on the rolls 27, 31. Said rolls 27, 31 thereupon act to guide the cloth toward the right, viewing Figs. 1 and 7, whereupon the feeler fork is restored to its normal or inactive position. If, on the contrary, the cloth tends to move unduly toward the right, viewing Fig. 7, the weighted fork 62 moves downwardly, thereby moving the projection 67 in such manner as to prevent contact with the cloth of the pair of rolls 27, 31, whereupon the rolls 26, 30 will operatively engage with the cloth and guide the same toward the right, thus restoring it to its normal path.

It will be evident that the edge guiding member or members, herein represented as of forked or bifurcated form, may be of other shape and of any suitable construction. I may, if desired, provide a guiding member composed of two somewhat resilient members inclined toward and meeting each other, and outwardly turned beyond their meeting points, if desired, for the more ready reception of the edge of the material, so that the faces of the material may be seized between said members.

In accordance with the preferred embodiment of my invention, I provide means which instead of pressing against the edge or edges of the material (and which is so soft or yielding as to prevent satisfactory coöperation with a guiding member) engages the faces of the material in such manner as to push in the cloth laterally (or if desired to pull the same laterally) at both selvages even though the longitudinal center of the cloth sags or bellies. So far as I am aware, I am the first to provide mechanism effective for this purpose and desire to claim the same broadly.

In Fig. 12, I have shown a slightly modified form of my invention, wherein I have shown one form of means for adjusting the angle of the feeding rolls. Therein, I have represented rolls 69, 70 mounted in forked members 71, 72, the latter being provided with web-like extensions 73, 74 slotted as indicated at 75, 76 for the reception of set screws 77, 78, whereby the angular position of the said rolls may be varied as required, to secure the feed required.

In Figs. 13 and 14, I have represented a somewhat modified form of braking means, as a substitute for those shown in Figs. 6, 9 and 10. Therein I have represented the rock shaft 33 as having fast thereon a disk 79, provided with a threaded, sleeve-like extension 80, to receive thereon adjusting nuts 81 adapted to take against the disk 82 having the angular terminals 83, 84 similar in function to the terminals 66, 67 and hence needing no further description. Between the disks 79, 82, I position a disk 85 of leather or other frictional material constituting a braking member.

As shown clearly in Fig. 14, I may provide means to prevent undue separation of the members of a pair of rolls, such as the rolls 26, 30 of Fig. 2. Therein the disk 82 is provided with a screw 86 surrounding which is a coiled spring 87 to engage the bracket 32 of the roll 30, whereby said spring will yield in the operation of the mechanism without causing further separation of the rolls.

It will be evident from the foregoing description that I have provided a simple mechanism, whereby the cloth may be promptly and effectively guided into its true path if it tends to depart therefrom even to a very slight extent. By my invention I do away with objectionable electrical or fluid operated parts.

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 the purposes of

limitation, the scope of the invention being set forth in the following claims:

Claims:

1. Sheet guiding mechanism comprising in combination two pairs of rolls obliquely mounted with respect to the same longitudinal edge of the sheet and with respect to each other, means tending to bring said two pairs of rolls alternately into nipping contact with the sheet, and movable means adapted to engage an edge of the sheet and to be moved thereby to prevent nipping contact of one or the other of said pairs of rolls with the sheet.

2. Sheet guiding mechanism comprising in combination two pairs of rolls obliquely mounted with respect to the same longitudinal edge of the sheet and with respect to each other, and means constantly to restrain one or the other of said pairs of rolls from nipping contact with the sheet while permitting the remaining pair of rolls to engage the sheet with nipping contact.

3. Sheet guiding mechanism comprising in combination a forked member to engage an edge of the sheet and adapted to be moved thereby, and means controlled by said forked member to rectify the feeding path of the sheet, and wholly mechanical operative connections between the said means and the said forked member.

4. Sheet guiding mechanism comprising in combination, a plurality of sets of guiding members, and means to impart unison rocking movement thereto toward and from the sheet.

5. Sheet guiding mechanism comprising in combination, a plurality of sets of inclined guiding members adapted to move toward and from the sheet, and means to impart unison rocking movement to said guiding members toward and from the sheet.

6. Sheet guiding mechanism comprising in combination, a plurality of sets of oppositely inclined sheet guiding members and coöperating means to impart unison rocking movement to said guiding members in directions toward and from the sheet.

7. Sheet guiding mechanism comprising in combination, a pair of sets of oppositely inclined rolls, a common support therefor, and means to vibrate said rolls upon said support.

8. Sheet guiding mechanism comprising in combination, a plurality of sets of guiding members, means to impart unison rocking movement thereto toward and from the sheet, and a sensitive member to engage the sheet and controlled in position thereby to govern the rocking movement.

9. Sheet guiding mechanism comprising in combination, a plurality of sets of inclined guiding members, means to impart unison rocking movement thereto toward and from the sheet, a sensitive member to engage the sheet, and means controlled by said sensitive member for governing the action of said inclined guiding members.

10. Sheet guiding mechanism comprising in combination, a plurality of sets of oppositely inclined sheet guiding members, means to impart unison rocking movement thereto toward and from the sheet, a sensitive member to engage the sheet, and cooperating means between said sensitive member and said guiding members.

11. Sheet guiding mechanism comprising in combination, a pair of oppositely inclined rolls, a common support therefor, means to vibrate said rolls upon said support, a sensitive member to engage the sheet, and means for effecting the governing of the vibration of said rolls by said sensitive member.

12. Sheet guiding mechanism comprising in combination, a pair of inclined guiding members having a stationary support and a pair of coöperating inclined guiding members having a rocking support, said members being positioned intermittently operatively to engage the sheet.

13. Sheet guiding mechanism comprising in combination, a pair of inclined guiding rolls having a stationary support, an adjacent pair of coöperating inclined guiding rolls having a rocking support, said rolls being positioned intermittently and operatively to engage the sheet.

14. Sheet guiding mechanism comprising in combination, a pair of inclined guiding members having a stationary support, a pair of coöperating inclined guiding members having a rocking support, said members being positioned intermittently and operatively to engage the sheet, and a sensitive member to engage the sheet and operatively associated with said rocking support.

15. Sheet guiding mechanism comprising in combination, a plurality of guiding members and eccentric means to rock said members toward and from the face of the sheet.

16. Sheet guiding mechanism comprising in combination, a plurality of inclined guiding members to engage the sheets, and eccentric means to rock said inclined guiding members toward and from the sheet.

17. Sheet guiding mechanism comprising in combination, a plurality of oppositely inclined guiding members to engage the sheet and eccentric means to rock said members, thereby intermittently to cause them to engage the sheet.

18. Sheet guiding mechanism comprising in combination, a pair of oppositely inclined rolls, a common support therefor, and eccentric means to rock them upon their support.

19. Sheet guiding mechanism including in combination, a forked member having parts to engage opposite faces of the sheet and mounted for bodily movement under the influence of said sheet.

20. Sheet guiding mechanism comprising in combination, a plurality of guiding members, and means yieldingly to impart rocking movement to said members.

21. Sheet guiding mechanism comprising in combination, a plurality of inclined guiding members, and means yieldingly to impart rocking movement to said members.

22. Sheet guiding means comprising in combination, a plurality of oppositely inclined guiding members to engage a face of the sheet, and means yieldingly to impart rocking movement to said members to effect such engagement.

23. Sheet guiding mechanism comprising in combination, a pair of oppositely inclined rolls, a common support therefor, and means yieldingly to vibrate said rolls upon said support.

24. Sheet guiding mechanism comprising in combination, a plurality of guiding members, eccentric means to rock said guiding members, and yielding means between said eccentric means and said guiding members.

25. Sheet guiding mechanism comprising in combination, a plurality of inclined guiding members, eccentric means to impart unison rocking movement thereto toward and from the surface of the sheet, and yielding means between said eccentric means and said guiding members.

26. Sheet guiding mechanism comprising in combination, a plurality of oppositely inclined guiding members, eccentric means to rock said members, and yielding means between said eccentric means and said members.

27. Sheet guiding mechanism comprising in combination, a pair of oppositely inclined rolls, a common support therefor, an eccentric to vibrate said rolls upon their support, and yielding connections between said eccentric and said rolls.

28. Sheet guiding mechanism comprising in combination, a plurality of guiding members, driving means to impart rocking movement to said members, and yielding brake means between said guiding members and said driving means.

29. Sheet guiding mechanism comprising in combination, a plurality of inclined guiding members, driving means to impart rocking movement thereto, and yielding brake means between said driving means and said inclined guiding members.

30. Sheet guiding mechanism comprising in combination, a plurality of oppositely inclined, sheet guiding members, driving means to impart rocking movement thereto toward and from the surface of the sheet, and yielding brake means between said driving means and said guiding members.

31. Sheet guiding mechanism comprising in combination, a pair of oppositely inclined rolls, a common support therefor, driving means to impart rocking movement to said rolls upon said support, and yielding brake means between said driving means and said driving members.

32. Sheet guiding mechanism comprising in combination, sheet guiding means, driving means to rock the same, and a segmental brake between said guiding means and said driving means.

33. Sheet guiding mechanism comprising in combination, guiding means, driving means to rock the same, and an intervening brake comprising inner and outer segmental members, and means to hold them in frictional engagement.

34. Sheet guiding mechanism comprising in combination, guiding means, driving means to rock the same, and an intervening brake comprising an outer segmental member connected to the driving means, an inner segmental member connected to the guiding means, and means to hold said segmental members in frictional engagement.

35. Sheet guiding mechanism comprising in combination, guiding means, a rock shaft whereon the same is mounted, driving means to rock said guiding means, and an intervening brake comprising an outer segmental member connected to the driving means, and an inner segmental member connected to said rock shaft.

36. Sheet guiding mechanism comprising in combination, guiding means, a rock shaft whereon the same is mounted, driving means to rock said guiding means, an intervening brake comprising an outer segmental member connected to the driving means and an inner segmental member connected to said rock shaft, and means to hold said segmental members in frictional engagement.

37. Sheet guiding mechanism comprising in combination, two pairs of rolls the rolls of each pair being arranged in V form in face to face relation with the rolls of the other pair, and means to rock one pair of said rolls to effect intermittent engagement with the other pair.

38. Sheet guiding mechanism comprising in combination, four pairs of rolls the rolls of each pair being arranged in V form at opposite edges of the sheet in face to face relation with the rolls of the other pair, and means to rock one pair of said rolls at each edge of the sheet to effect intermittent engagement with the other pair at said edge of the sheet.

39. Sheet guiding mechanism comprising in combination, a sensitive member to engage the sheet, a rocking support for said member, a pair of coöperating oppositely inclined, movable, guiding members, and means intermediate the rocking support and said members to impart movement to the latter.

40. Sheet guiding mechanism comprising

in combination, a sensitive member to engage the sheet, a rocking support therefor, a pair of coöperating oppositely inclined guide rolls, and means extending from said rocking support to vibrate said guide rolls on the support.

41. Sheet guiding mechanism comprising in combination, a sensitive forked member to engage the edge of a sheet, a rocking support for said member, a pair of coöperating, oppositely inclined, movable, guiding members, and means intermediate the said rocking support of the sensitive member and said inclined guiding members to impart movement to the latter, thereby to rectify the feeding path of the sheet.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

SYDNEY BIRCH.

Witnesses:
ROBERT H. KAMMLER,
F. IRENE CHANDLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."