

April 1, 1930.

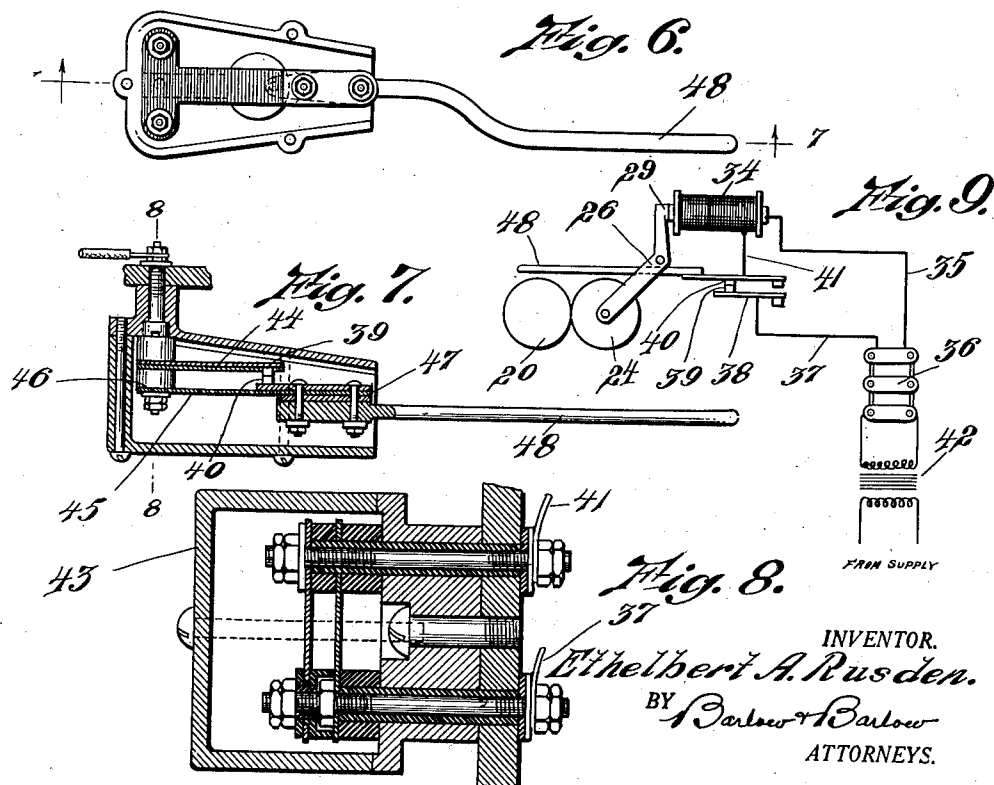
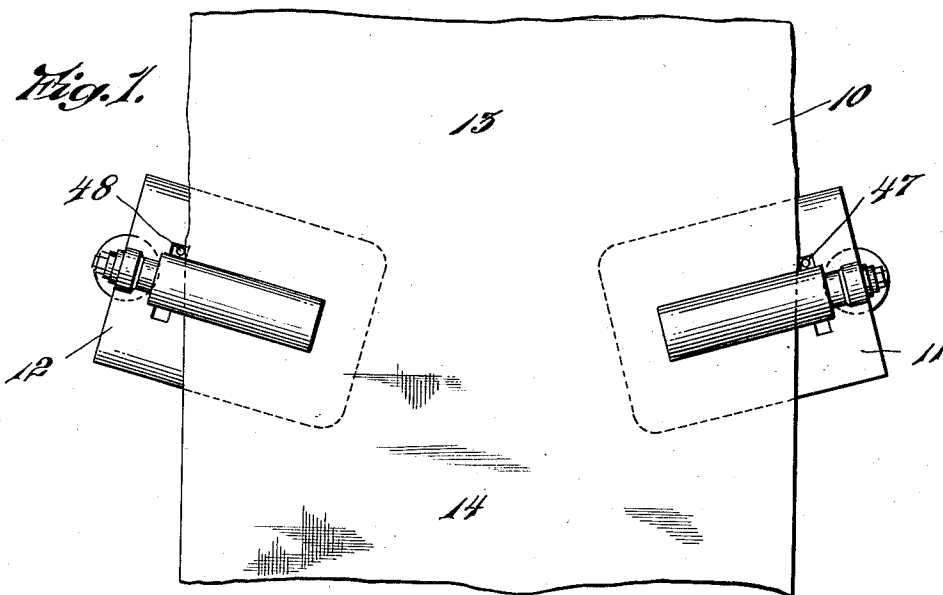
E. A. RUSDEN

1,752,966

CLOTH GUIDING AND STRETCHING DEVICE

Filed May 6, 1929

3 Sheets-Sheet 1



INVENTOR.
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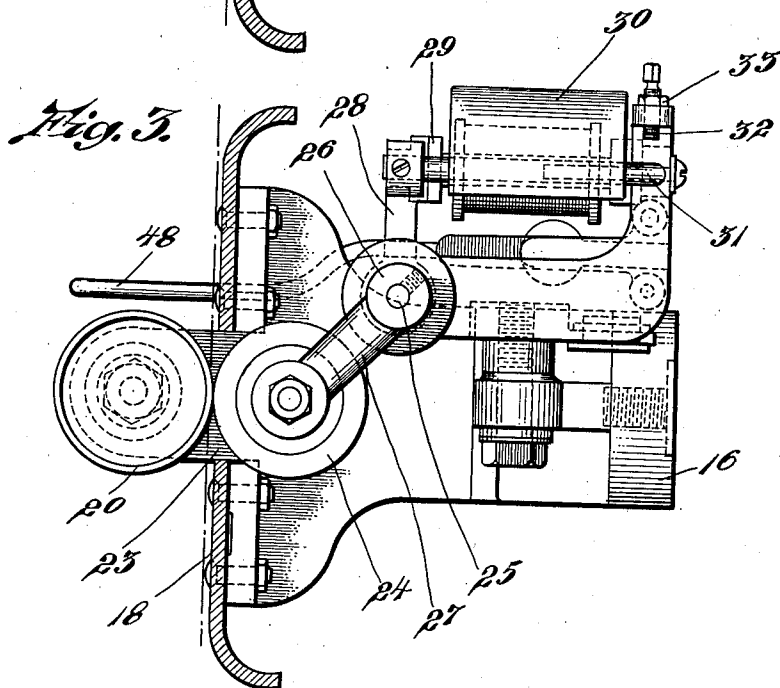
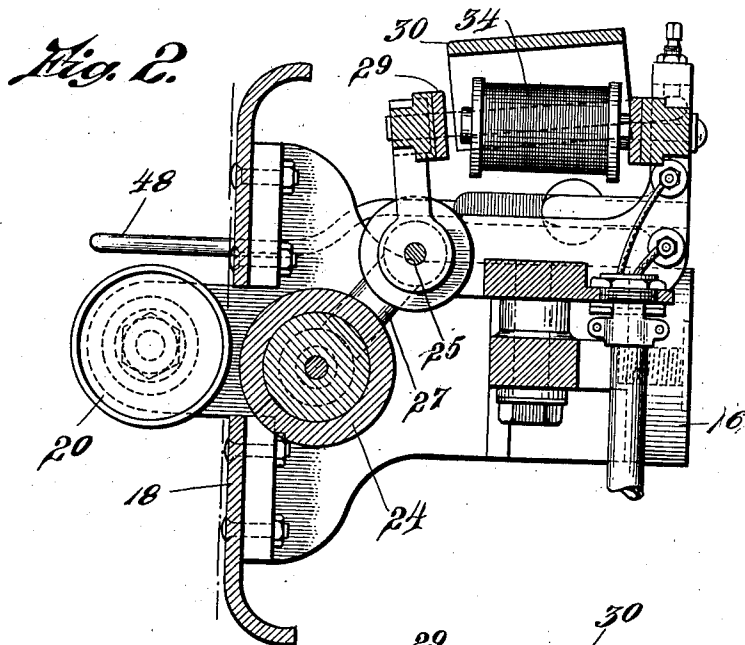
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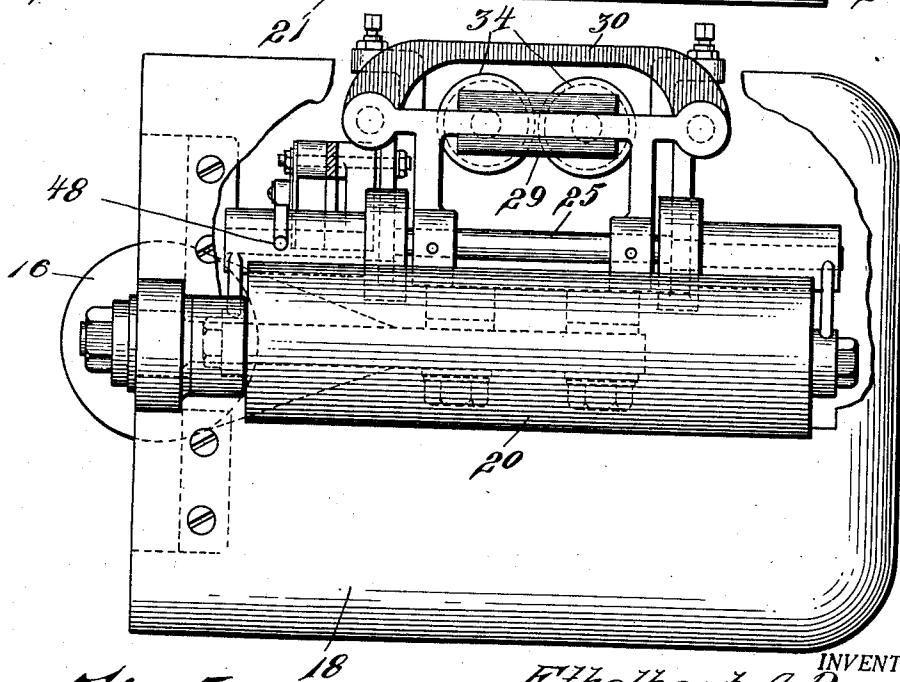
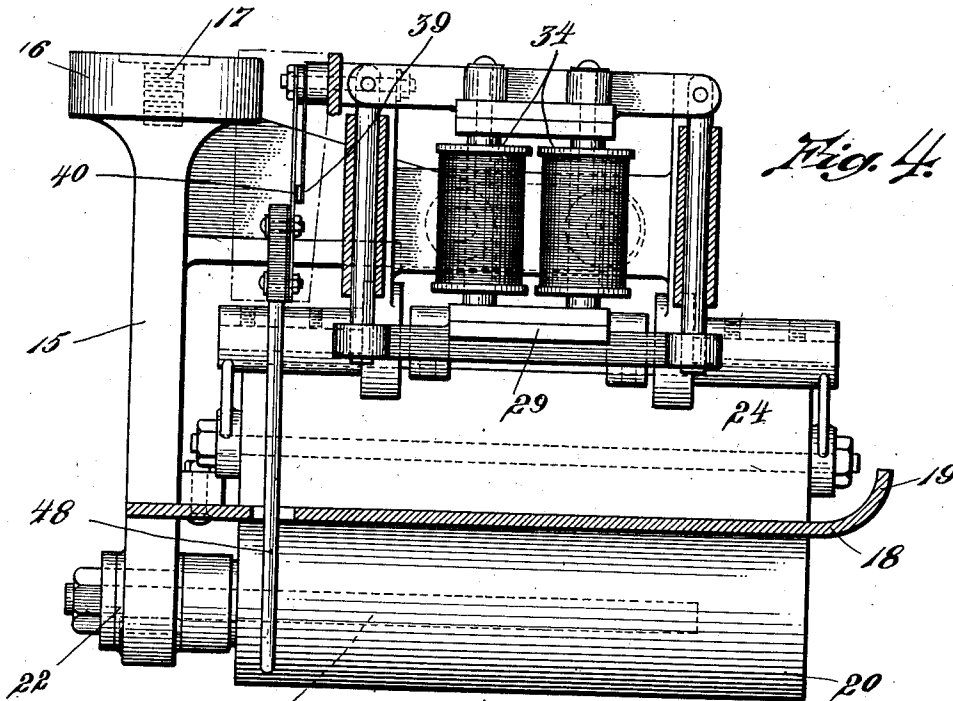
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CLOTH GUIDING AND STRETCHING DEVICE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CLOTH GUIDING AND STRETCHING DEVICE

Application filed May 6, 1929. Serial No. 360,714.

This invention relates to a cloth guiding and stretching device; and has for its object to provide in such a device an electrical control for relatively movable web-stretching nip rolls whereby the nipping action of these rolls is automatically effected by an excessive lateral movement of the edge of the web out of its normal line of travel.

A further object of the invention is to render sensitive the swinging action of the movable nip roll to the action of an electromagnet, one means of obtaining this sensitive movement being by pivotally mounting one of the nip rolls of the pair to swing by gravity away from its cooperating fixed roll and to provide means for counterbalancing the gravity action on this swinging roll so as to render the return of the roll very sensitive to the action of an electromagnet when energized to restore the swinging roll to nipping position.

The invention further consists in the positioning of the feeler member to be engaged by an excessive lateral movement of the travelling web and moved to break the circuit and release the nip of the rolls upon the web, the feeler being mounted to automatically return to close the circuit as the web moves back to normal running position to again permit the energizing of the electromagnets to restore the nip of the roll on the web.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a front elevation showing a vertically arranged piece of cloth engaged on its opposite marginal edges by a pair of rolls for stretching and guiding the cloth.

Fig. 2 is a section thru the guiding plate and a portion of the frame supporting structure, illustrating the movable roll as disengaged or in inoperative position.

Fig. 3 is a view similar to Fig. 2 with merely the guiding plate in section and showing the rolls as in engagement.

Fig. 4 is a top view with parts in section

and the housings removed to show the operative parts of the structure.

Fig. 5 is a front elevation with the guiding plate partially broken away to show the portions of the operative mechanism.

Fig. 6 is a side elevation of the switch feeler arm extending therefrom.

Fig. 7 is a sectional view thru the switch and feeler arm.

Fig. 8 is an end view thru the switch box with the housing in position.

Fig. 9 is a diagrammatic view illustrating the electrical "hook up" of the device.

In the use of a device for guiding and stretching a web, such as cloth or the like, it has been found desirable to provide some accurate and positively operating means for moving the guiding rolls into and out of web nipping position, which shall be controlled by excessive lateral movement of the edge of the web from one side to the other or off of the general or center line of feed. Electrical means have been considered as desirable for accomplishing such a result but in many instances difficulty has arisen in utilizing the commercial electric current which is supplied at 110, 115 or 120 volts alternating current without the use of complicated and undesirable structures due to causes such as arcing at the switch, which is called upon to operate at short intervals to make and break the circuit for intermittently moving the rolls to and from nipping position, which arcing not only detrimentally affects the contact points but also creates a fire hazard and the possibility of burning or scorching the goods. In order to avoid these difficulties and undesirable results, I have stepped down the commercial current to a low voltage and converted the alternating current to a direct current of approximately 8 volts, whereby no arcing is caused at the switch upon the breaking of the circuit to effect the control of the stretching and guiding roll by the lateral movement of the edge of the cloth and I have so mounted and balanced the movable roll that the energy supplied by this low voltage is sufficient to draw this movable roll into firm nipping engagement with the traveling web for successfully operating upon the same;

and the following is a detailed description of the present embodiment of this invention illustrating the preferred means by which these advantageous results may be accomplished.

With reference to the drawings, Fig. 1 illustrates a web of material 10 which is engaged on its opposite marginal edges by units 11 and 12, each of which has its engaging rolls inclined to the direction of feed in a position to cause the web to be pulled and guided in its travel thru the machine as will be apparent from different portions 13 and 14 of the web before and after it has passed thru the web stretching device, as illustrated in Fig. 1.

A plurality of these units operate in conjunction with each other and are mounted on the opposite marginal edges of the web at spaced points there along. The units used are of identical construction with the exception that one is for the right hand and the other for the left hand edge of the cloth. I will therefore proceed to describe one of these units from which it will be understood that the other unit is of the same construction except for the opposite edge of the cloth.

A frame 15, is carried by a hub 16, which is rotatably mounted and clamped in the desired position by a stud engaging the thread opening 17. Upon this frame there is a guide plate 18, curved along the edge 19, to facilitate the entry of the web between this plate and a fixed roll 20, which is suitably rotatably supported upon an axis 21, mounted at 22 in the frame 15. The plane of the web engaging surface of the plate 18 is tangent to the edge of the roll 20, and at a point when the roll 20 would engage the plate, the same is slotted as at 23, thru which slot a movable roll 24 operates toward the fixed roll to force the cloth into contact therewith.

A pivot pin 25 is fixed on the frame 15, back of the plate 18 upon which is mounted rock levers or arms 26 having portions 27 extending at one side of the pivot pin between which is rotatably mounted the movable roll 24 by means of suitable bearings or the like, while other portions 28 extend generally in the opposite direction from the pivot 25 and have mounted thereon an armature 29 and also a counterweight 30 for the roll 24 and tends to swing the rock lever or arms about the pivot 25 which roll 24 may move by gravity away from the fixed roll 20 into inoperative position, as illustrated in Fig. 2.

The counterweight 30 is not of sufficient mass to lift the roll 24 into working position but is of such a weight that but a slight additional force is necessary to cause this movement. A magnetic force is supplied to move the roll into working position by means of an electromagnet 34 to attract the armature 29 on the end of the rock lever. The solenoid 34 is connected in a direct current circuit (see Fig. 9) by a lead 35 from the electro-magnet

34 to the converter unit 36, thence thru lead wire 37, switch 38 having contacts 39 and 40 and lead wire 41.

This converter unit is connected to a transformer 42 which in turn is connected to the main of the commercial supply alternating current at a voltage 110, 115 or 120 as the case may be. The electrical current is converted by means of the converter unit 36, which is of a well known type of construction, into direct current energy. A low voltage of substantially 8 volts is found desirable for the direct current circuit.

The operative circuit in which the control switch 38 is positioned, is closed when the rolls are in nipping position. The control switch is located within a housing having a cover 43 and consists of the fixed contact 39 supported at 44, and the movable contact 40 supported by a resilient strip of sheet metal 45 mounted at 46 with its inherent resiliency tending to hold the contact 40 in engagement with the contact 39 but permitting its free end 47 to swing away from the contact 39 and carry the contact 40 with it. A feeler member 48 is positioned to be engaged by the edge of the web should the web move laterally between the rolls an excessive distance from its line of feed and controls the movement of the resilient strip of metal 45.

This movement of the web moves the feeler bodily and swings contact member 40 against the inherent tension of the strip 45 out of engagement with the contact 39 and thereby breaks the circuit and deenergizes the electromagnet 34 and permits the movable roll 24 to gravitate away from the fixed roll and release the cloth to be moved by the opposite unit back to the line of feed after which the contacts 39 and 40 again engage and cause the roll 24 to move into working position.

The rock lever 26 with its roll 24 mounted at one end is limited in its separating movement of the rolls by a finger 31 engaging an adjustable abutment 32 consisting of a set screw and check nut 33 which may be varied to accommodate webs of different thickness.

It will of course be understood, that in operation the rolls nip the web when in working position caused by the electro-magnets being energized to attract the armature and swing the movable roll toward the fixed roll but that upon movement of the feeler member by a movement of the web out of its line of feed, the circuit is broken permitting separation of the rolls and allowing the opposite unit to draw the web back into the line of feed.

It will also be understood that each of these units is suitably mounted in the customary manner and bodily movable toward and from each other to accommodate different widths of webs.

I have referred to the movable roll as moving from the fixed roll by gravity but it will be understood that a spring or other means

may be used to accomplish this result or that the electromagnetic action may be used to cause a relative separation of the rolls and their nip be caused by some force acting in the other direction.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:—

1. In a web stretching machine, a pair of opposed guide roll units, each unit comprising a pair of nip rolls arranged to engage the margins of the material on opposite surfaces thereof, said rolls being mounted to be relatively moved to and from web nipping position, electromagnetic means for relatively moving said rolls to control nipping position, a supply of relatively low voltage direct current, means connecting said electromagnetic means in the direct current circuit, a feeler member positioned to be engaged by the edge of the cloth, and switch means in said electromagnetic circuit responsive to the movement of said feeler for controlling the energizing or deenergizing of said electromagnetic means, said voltage being sufficiently low to prevent sparking or pitting of the points.

2. In a web stretching machine, a pair of opposed guide roll units, each unit comprising a pair of nip rolls arranged to engage the margins of the material on opposite surfaces thereof, said rolls being mounted to be relatively moved to and from web nipping position, electromagnetic means for relatively moving said rolls to control nipping position, a source of relatively high voltage alternating current, means converting said current into a low voltage direct current, means connecting said electromagnetic means in the direct current circuit, a feeler member positioned to be engaged by the edge of the cloth, and switch means in said electromagnetic circuit responsive to the movement of said feeler for controlling the energizing or deenergizing of said electromagnetic means.

3. In a web stretching machine, a pair of opposed guide roll units, each unit comprising a pair of nip rolls arranged to engage the margin of the material, one of said rolls being pivotally mounted to be moved to and from web nipping position, an armature operatively associated with said pivoted nip roll, a magnet adapted when energized to attract said armature and move said pivoted roll to control its nipping position, a supply of relatively low voltage direct current, means connecting said magnet in the direct current circuit, a feeler member positioned to be engaged by the edge of the cloth, and switch means in said magnetic circuit respon-

sive to the movement of said feeler for controlling the energizing or deenergizing of said magnet, the voltage of said direct current being sufficiently low to prevent sparking at said switch means.

4. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of said material and adapted to nip each edge of the material obliquely with reference to its direction of travel, each comprising a fixed guide roll adapted to engage one surface of said material, a cooperating pivotally mounted guide roll adapted to engage the other surface of said material and to move to non-nipping position, an armature connected to said pivotally mounted guide roll to pivot therewith and a magnet adapted when energized to attract the armature to move said movable guide roll to control its nipping position, a source of high voltage alternating current, means for transforming said high voltage alternating current into a low voltage direct current, said magnets being operatively included in the direct current circuit, and means including a movable contact member mounted on said frame beyond each normal material edge to be engaged on excessive material movement and electrically control its respective electromagnet until the opposite guide roll unit has drawn the material back to normal position.

5. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a fixed guide roll adapted to engage one side of the material at the marginal edge thereof, a movable guide roll on the opposite side of said material pivotally mounted to move to non-nipping position away from the fixed roll, electromagnetic means for moving said movable roll to control its nipping position, a source of relatively high voltage alternating current, a transformer for reducing the current to low voltage, a rectifier to convert said current to a low voltage direct current, said electromagnetic means being included in the direct current circuit, a feeler member positioned to be engaged by the edge of the cloth when out of the line of travel and switch means in said direct current circuit operable upon movement of said feeler member to control the electromagnetic means.

6. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a fixed guide roll adapted to

engage one side of the material at the marginal edge thereof, a movable guide roll on the opposite side of said material pivotally mounted to move to non-nipping position away from the fixed roll, electromagnetic means for moving said movable roll to control its nipping position, a supply of low voltage direct current, said electromagnetic means being included in the direct current circuit, a switch in said circuit having a fixed contact, and a movable contact mounted upon a strip having inherent resiliency tending to move said contacts into engagement, and a feeler member for operating said switch mounted to be moved by the resiliency of said movable contact into a position to be engaged by the edge of the web when out of its normal line of travel, said direct current being of a voltage sufficiently low to prevent pitting of the contacts in operation.

7. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a fixed guide roll adapted to engage one side of the material at the marginal edge thereof, a movable guide roll on the opposite side of said material pivotally mounted to move to non-nipping position away from the fixed roll, electromagnetic means for moving said movable roll to control its nipping position, a source of relatively high voltage alternating current, means for converting said current into a low voltage direct current, said electromagnetic means being included in the direct current circuit, a switch in said circuit having a fixed contact, and a movable contact mounted upon a strip having inherent resiliency tending to move said contacts into engagement, and a feeler member for operating said switch mounted to be moved by the resiliency of said movable contact into a position to be engaged by the edge of the web when out of its normal line of travel.

8. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a pair of rolls, said rolls being separable to release the material, electromagnetic mechanism to control the nipping movement of said rolls, a circuit of a voltage sufficiently low to prevent sparking for operating said electromagnetic means, and counterbalancing means for said rolls to cooperate with said low voltage circuit to control said nipping movement.

9. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on

said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a pair of relatively movable rolls, means for pivotally mounting one of said rolls to gravitate away from the other roll, electromagnetic means including an armature for swinging said pivotally mounted roll towards the other roll, a current of a voltage sufficiently low to prevent sparking for operating said electromagnetic means, counterbalancing means for said pivoted roll to oppose to a substantial extent the effect of said gravitation and assist the operation of said electromagnetic means, and means including a feeler member for engagement with the cloth to control the circuit for operating the electromagnetic means.

10. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a fixed roll, a movable roll, an arm pivotally mounting said movable roll in a position so that the weight of said roll tends to swing the movable roll about the pivot away from the fixed roll, said arm being extended on the opposite side from said pivot, counterbalancing means carried by said arm extension, and electromagnetic means including an armature associated with said arm and additional to said counterbalancing means for swinging said movable roll relative to the fixed roll, and means including a feeler member for engagement with the web to control the electromagnetic means.

11. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web material for nipping said material obliquely with reference to its direction of travel, each unit comprising a pair of rolls, means for relatively fixedly mounting the axis of one roll, and means for relatively pivotally mounting the axis of the other roll to swing towards and from the axis of the fixed roll, said mounting means being arranged to permit said movable roll to gravitate away from the fixed roll, electromagnetic means for relatively moving said rolls towards each other including a circuit of a voltage sufficiently low to prevent sparking, and counterbalancing means for said movable roll on the opposite side of the pivot of said mounting means positioned to be raised by the gravitation of said roll and tending to move said movable roll about said pivot in the same direction as the electromagnetic means.

12. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of the web

material for nipping said material obliquely with reference to its direction of travel, each unit comprising a pair of rolls, means for fixedly mounting the axis of one roll, and means pivoted intermediate its ends for mounting the axis of the other roll to swing towards and from the axis of the fixed roll, said mounting means being arranged to permit said movable roll to gravitate away from the fixed roll, electromagnetic means for moving said rolls together including an electric circuit of a voltage sufficiently low to prevent pitting of the contact members in operation, counterbalancing means on the opposite side of the pivot of said mounting means positioned to be raised by the gravitation of said roll, feeler means engageable with the edge of the cloth, and contact members in said circuit moved by said feeler means for breaking said circuit.

13. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of expanding guide roll units mounted on said frame adjacent each edge of said material and adapted to nip each edge of the material obliquely with reference to its direction of travel, each unit comprising a fixed guide roll mounted on said frame, a magnet, an armature therefor, a slightly underbalanced movable guide roll pivotally fulcrumed on said frame and operatively connected to said armature, whereby said movable guide roll normally drops by gravity to a position out of contact with the fixed guide roll and whereby a small current energizes the magnet to move the movable guide roll to nipping position, a source of high voltage alternating current, means for transforming said high voltage alternating current into a low voltage direct current, each magnet being included in the direct current circuit, and means including a movable feeler member mounted beyond each normal material edge to control its respective electromagnet upon abnormal shifting of the material until the opposite roll unit has drawn the material back to normal position.

14. A stretching and guiding apparatus for web material in open form, comprising a frame, a pair of guide roll units mounted on said frame adjacent each edge of said material and adapted to nip each edge of the material obliquely with reference to its direction of travel, each unit comprising a fixed guide roll mounted on said frame, an electromagnet, and a substantially balanced movable guide roll mechanism including a fulcrum shaft having a work arm and a power arm, a movable guide roll mounted on the work arm thereof in the plane of said fixed guide roll and an armature connected to the power arm in the plane of said magnet, and a balancing weight cooperating with said power arm, the power arm of said lever and its attachments being of slightly less weight

than said work arm and movable guide roll whereby the movable guide roll tends to drop to a position out of contact with the fixed guide roll, said electromagnet being included in an electric circuit to control the movement of the movable guide roll in nipping position, an electric contact switch in said circuit consisting of a fixed contact, and a resilient movable contact, and a feeler finger operatively engaging said movable contact and normally positioned just beyond the normal position of the material edge.

15. In a web guiding and stretching device, a plurality of guide roll units on opposite edges of the web, each comprising a fixed roll, a pivot pin offset from said roll, a member pivoted intermediate its ends on said pin, a roll supported by said member at one side of said pin to be moved towards and away from the fixed roll, an armature operatively associated with the other side of the member, an electromagnet positioned to move said armature and swing said member to control said rolls when energized, means for energizing said electromagnet including a direct current circuit of a voltage, sufficiently low to prevent sparking, a switch in said circuit having a fixed contact and a movable contact, said movable contact being mounted upon a strip of material having inherent resiliency and tending to engage said fixed contact, and a movable feeler member operatively engaging said resilient strip and in a position to be engaged by the edge of the web when out of its normal line of travel.

In testimony whereof I affix my signature.
ETHELBERT A. RUSDEN.