W. S. MOORE.

CALENDERING MACHINE.

APPLICATION FILED OCT. 31, 1919.

1,372,766.

Patented Mar. 29, 1921.

3 SHEETS—SHEET 1.

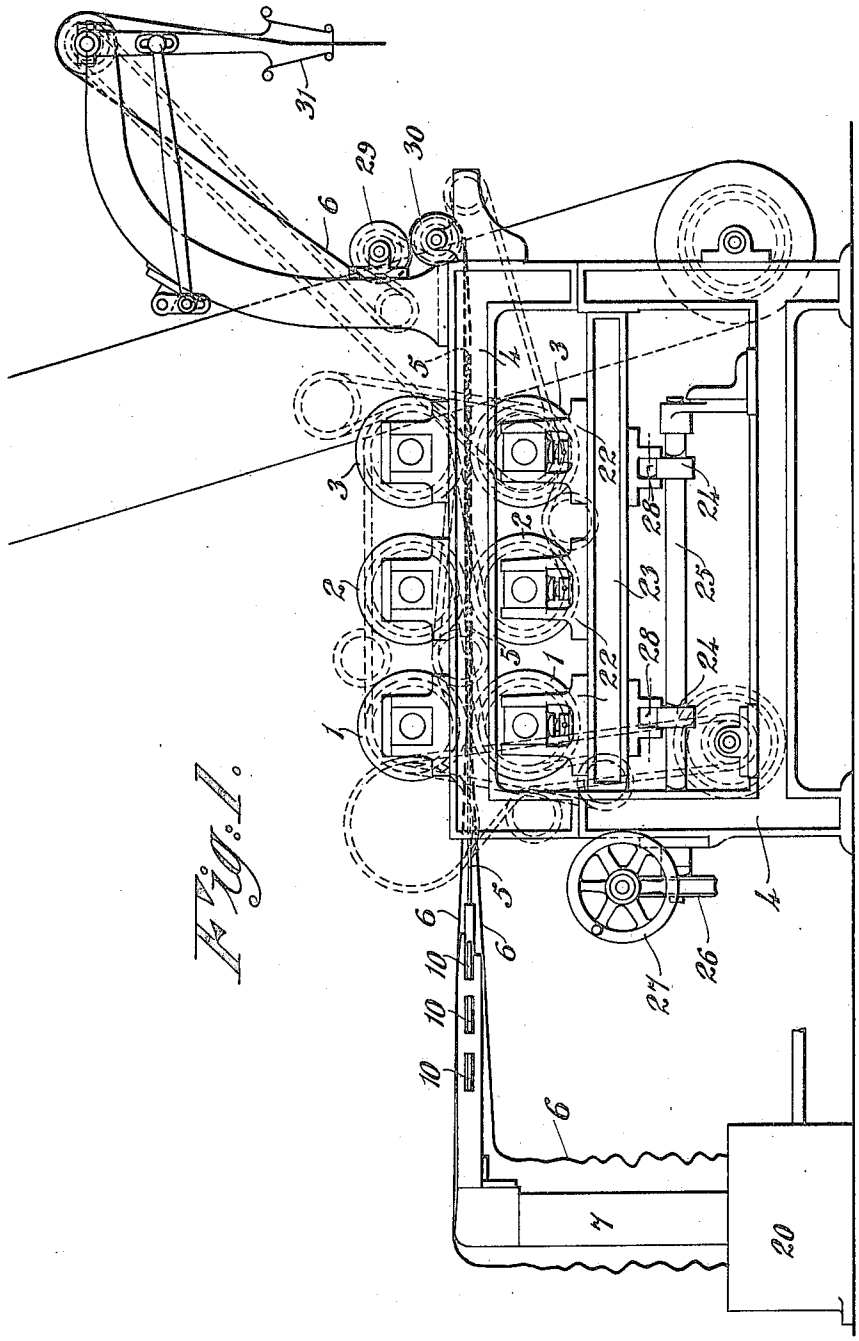


Fig. 1.

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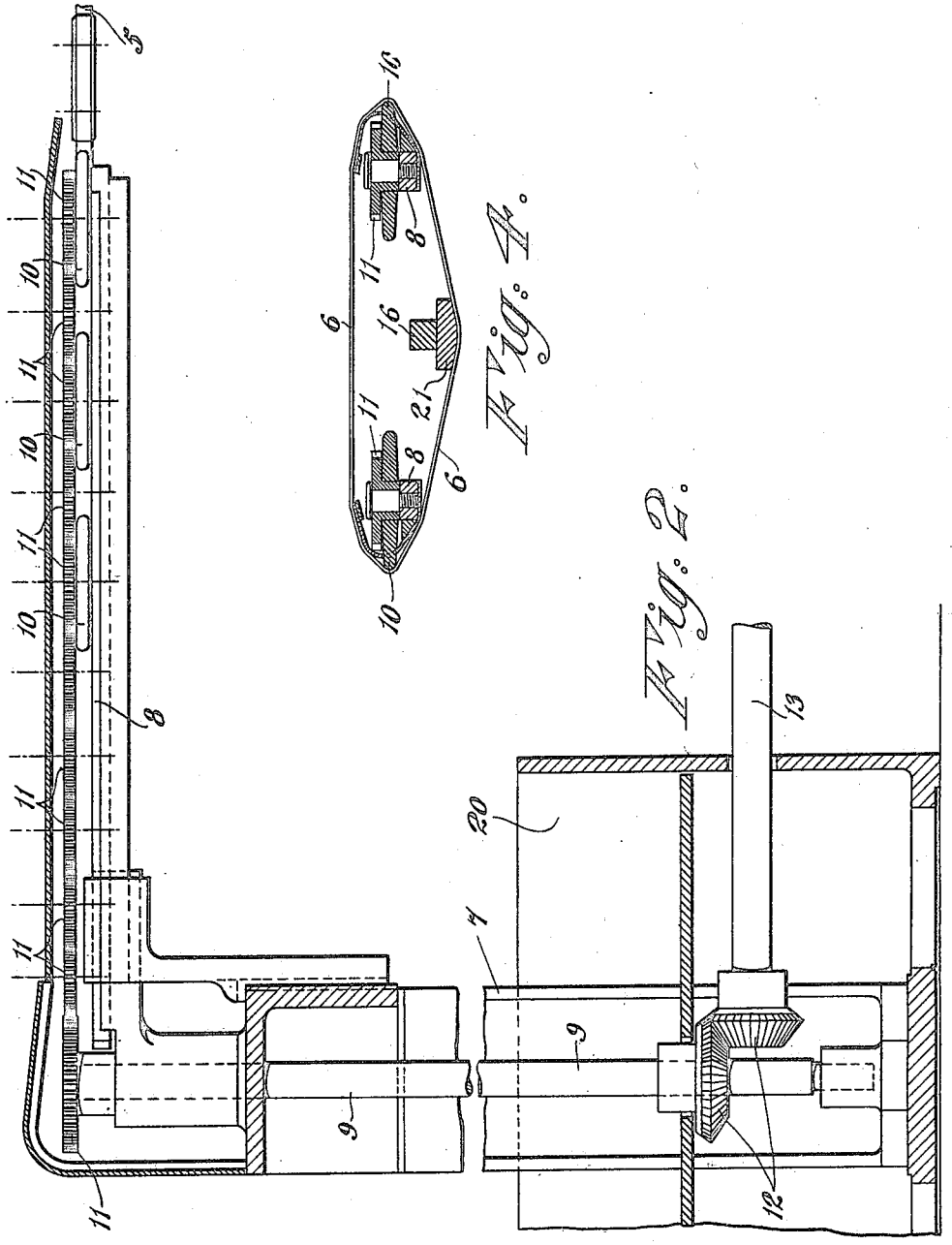


Fig. 2.

Fig. 4.

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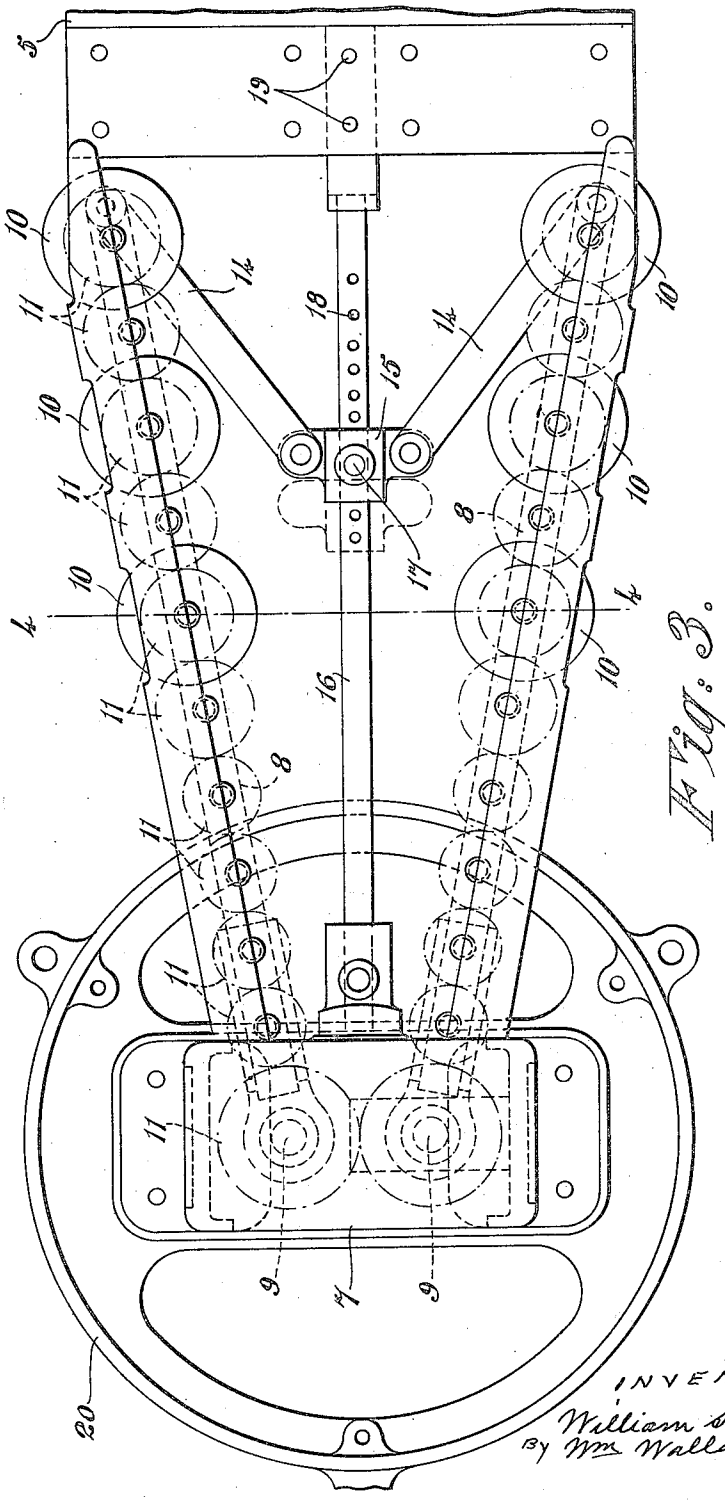


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM SUMNER MOORE, OF LEICESTER, ENGLAND.

CALENDERING-MACHINE.

1,372,766. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed October 31, 1919. Serial No. 334,806.

To all whom it may concern:

Be it known that I, WILLIAM SUMNER MOORE, a subject of the King of Great Britain, residing at Leicester, in the county of Leicester, England, have invented new and useful Improvements in or Relating to Calendering-Machines, of which the following is a specification.

This invention relates to calendering machines and more particularly machines for pressing or ironing tubular knitted fabrics such machines being employed for finishing tubular fabric in the roll.

The invention has reference to machines of the type comprising one or more pairs of heated pressing or calendering rollers and either a sizing device or a stretching device the former consisting of a sheet of suitable material over which the tubular fabric is drawn prior to and during the passage of the same between the heated rollers, while the stretching device comprises means whereby the fabric is fed to the pressing rollers and stretched prior to passing therebetween.

A difficulty experienced in connection with machines having a sizing device only is to avoid curvature of the courses in the tubular fabric which defect is produced owing to the fact that as the fabric is drawn between the rollers, the sides of the tube are retarded by their contact with the edges of the sizing device consequently the central part of the fabric feeds in quicker than the sides.

In connection with machines having preliminary feeding and stretching means only, difficulty is experienced in sizing the fabric *i. e.*, obtaining the desired width, and it is found in practice that although the fabric may, prior to passing under the action of the pressing rollers be stretched widthwise, a lateral shrinkage of said fabric occurs when it passes from between the rollers after treatment. In addition to this, while the fabric can be easily stretched to a desired width prior to entering between the rollers there is a tendency for it to contract between the time of it passing from off the stretching device and coming under the nip of the pressing rollers.

It is the purpose of the present invention to improve calendering machines of the type referred to by providing combined means for automatically stretching the tubular fabric preliminarily and maintaining it in the stretched condition while it passes between the coöperating pressing rollers, said means for imparting the preliminary stretch also embodying positively actuated devices for feeding the fabric as will be hereinafter described.

The invention consists of a calendering machine of the type referred to, having in combination a sizing device consisting of a board or plate passed between coöperating pressing rollers and located inside the fabric, and a stretching device which laterally stretches the fabric as or before it passes to the sizing device comprising a pair of horizontal arms adjustable relatively to each other for different widths of fabric and each carrying a series of disks or wheels positively driven by gear wheels located intermediately thereof for the purpose of engaging the fabric and feeding it over the stretching device.

In further describing the invention reference will be made to the accompanying drawings wherein:—

Figure 1 is a side elevation of a calendering machine constructed according to this invention.

Fig. 2 is a sectional side elevation of the feeding and stretching device.

Fig. 3 is a plan of the same.

Fig. 4 is a cross section taken on the line 4—4 of Fig. 3.

Fig. 1 is drawn to a smaller scale than the other figures, and throughout the drawings like parts are designated by the same reference characters.

The machine shown in Fig. 1 comprises three pairs of heated pressing rollers, 1, 2, 3, suitably carried by side frames 4 and driven by convenient means.

The sizing device consists of a fixed plate or board 5 passed between each pair of pressing rollers. This plate or board 5 is located inside the tubular fabric (represented in Fig. 1 by the thick line 6) which as it passes along the device is stretched and made to correspond to the width of the plate while at the same time on opposite sides of the plate the fabric is pressed or calendered by the heated rollers.

When, as shown in Fig. 1, several pairs of heated pressing rollers are employed, the same sizing plate or board is continued through the whole series and it may either be made parallel throughout its length or it may be made narrower or wider toward

its rear end. In any case the plate or board is of such a width and shape that it will at once or gradually stretch the fabric to the width desired. Obviously the sizing plate may be removable and interchangeable with others of different widths.

The sizing device consists of a plate of aluminium suitably anchored at one end conveniently to the stretching device (hereinafter described) to keep it from endwise movement and provided with means by which it can be heated such for example as electrical means. The connection of the sizing plate to the stretching device is preferably of such a character as will admit of ready disconnection to allow the tubular fabric to be passed over the stretcher prior to the operation of the machine.

The stretcher device consists of a vertical support 7 having pivotally mounted on the upper end thereof horizontal arms 8 (Figs. 2, 3 and 4) adjustable relatively to each other by suitable means for different widths of fabric. The said arms are fulcrumed on vertical shafts 9 (Fig. 3) and carry near their free ends wheels 10 so disposed that their peripheries can engage with the inside edges of the tubular fabric as the latter passes over the arms. The wheels 10 on each arm are driven by a train of gears 11 from the vertical shafts 9 in the support 7 which shafts are rotated by gearing 12 (Fig. 2) from a horizontal driving shaft 13 at the base.

The wheels 10 are adjustable in company with the arms 8 this adjustment being effected conveniently by means of links 14 (Fig. 3) connected to the free ends of the arms and to a block 15 slidable along a rod 16 extending from the vertical support 7. The block 15 may be fastened in different positions on the rod 16 by means of a pin 17 passed through one of the holes 18. By moving the block 15 on the rod 16 the ends of the arms 8 nearest to the plate or board 5 are moved relatively outward or inward to suit the desired width of fabric. The plate or board 5 may be attached to the end of the rod 16 by pegs 19.

The vertical support 7 is preferably provided at the base with a circular pan 20 (Figs. 1, 2 and 3) to receive the fabric, and carried on the underside of the rod 16 may be a board or block 21 (Fig. 4) having a shaped surface in contact with which the fabric passes and by which the material is stretched vertically to some extent to prevent bowing. If desirable a similar device to the board or block 21 may be arranged above the rod 16 or instead of devices of this character bent plates or covers may be employed in similar positions for the same purpose.

In the organized machine shown in Fig. 1 the lower series of pressing rollers are supported by bearings 22 mounted upon a vertically movable part 23 in the side frame 4. This part 23 is raised and lowered by cams 24 on a horizontal shaft 25 operated by worm gear 26 and a hand wheel 27 the cams acting against rollers 28 on the said part 23. By means of this arrangement the lower heated rollers may be moved relatively to the upper rollers to vary the operative pressure of the rollers on the work.

The heated rollers are driven by chains or by gears and at the end of the frame a smaller pair of rollers 29, 30 is furnished to draw off the finished fabric which then passes to a flapper or wafter 31 of the usual oscillating type.

The stretching device is, as shown in Fig. 1, positioned a suitable distance from the feed end of the machine. Prior to setting the machine in operation the sizing plate 5 is disconnected from the stretching device and the operator passes the tubular fabric 6 over the stretching arms 8 (which may be closed inward to facilitate this operation) and accumulates it upon the support 7 where it is received in the circular pan 20. The support 7 may be revolubly mounted to enable the stretching device to be turned around to a convenient position for the operator to place the tubular fabric thereon. After the fabric has been placed in position the arms 8 of the stretching device are adjusted to the width desired and the sizing plate 5 is connected up to the rod 16. The tubular fabric 8 is now drawn from the support 7 over the stretching arms 8 and on to the sizing plate 5 and its end is passed between the first pair of rollers 1. During the operation of the machine, the driven wheels 10 of the stretcher device draw the fabric and also stretch it laterally and pass it on to the sizing plate 5 which latter maintains the width of the fabric while it passes under the operation of the successive pairs 1, 2, 3 of heated rollers. After the fabric has been operated upon by the last pair of heated rollers 3 it passes off the sizing plate 5. It may however, be arranged that the fabric will pass off the end of the sizing plate 5 before or at the same time that it is operated upon by the last pair of heated rollers. During the time the fabric is passing between the heated rollers it is simultaneously sized and pressed and after leaving the last pair it is drawn off as aforesaid and folded upon a table by the flapper.

What I claim then is:—

1. A stretching device for tubular fabrics, comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, means for adjusting said arms toward and from each other, and means carried by said arms for imparting a feeding motion to the fabric.

2. A stretching device for tubular fab-

rics, comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, means for adjusting said arms toward and from each other, a series of rotatable members carried by said arms and adapted to engage the fabric at the inner side thereof for imparting a feeding motion to said fabric, and means for rotating said members.

3. A stretching device for tubular fabrics, comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, a series of rotatable members carried by said arms and adapted to engage the fabric at the inner side thereof, and gearing for rotating said members.

4. A stretching device for tubular fabrics, comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, means carried by said arms for imparting a speeding motion to the fabric, and a plate detachably secured to said device in juxtaposition to the free ends of said arms and adapted to engage the inner side of the fabric as it passes off said arms.

5. In a calendering machine having rollers for pressing tubular fabrics, a stretcher for laterally stretching the fabric before it passes to said machine, and a plate detachably secured to said stretcher and extending between said rollers.

6. In a calendering machine having rollers for pressing tubular fabrics, a stretcher for laterally stretching the fabric before it passes to said machine, and a plate detachably secured to said stretcher and extending between said rollers in position to engage the inner side of the fabric as it passes off said stretcher.

7. In a calendering machine having rollers for pressing tubular fabrics, a stretcher comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, means carried by said arms for imparting a speeding motion to the fabric, a horizontally extending rod secured to said support, and a plate detachably secured to the free end of said rod in juxtaposition to the free ends of said arms and adapted to engage the inside of the fabric as it passes off said arms, said plate extending between the rollers of said machine.

8. A stretching device for tubular fabrics, comprising a vertical support, a pair of horizontally extending arms pivotally mounted on said support, means for adjusting said arms toward and from each other for laterally stretching said fabric, and means associated with said arms for vertically stretching the fabric.

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

WILLIAM SUMNER MOORE.