

J. J. WESTBROOK.
CLOTH STRETCHING AND FINISHING MACHINE.
APPLICATION FILED JUNE 28, 1912.

1,046,519.

Patented Dec. 10, 1912.

3 SHEETS—SHEET 1.

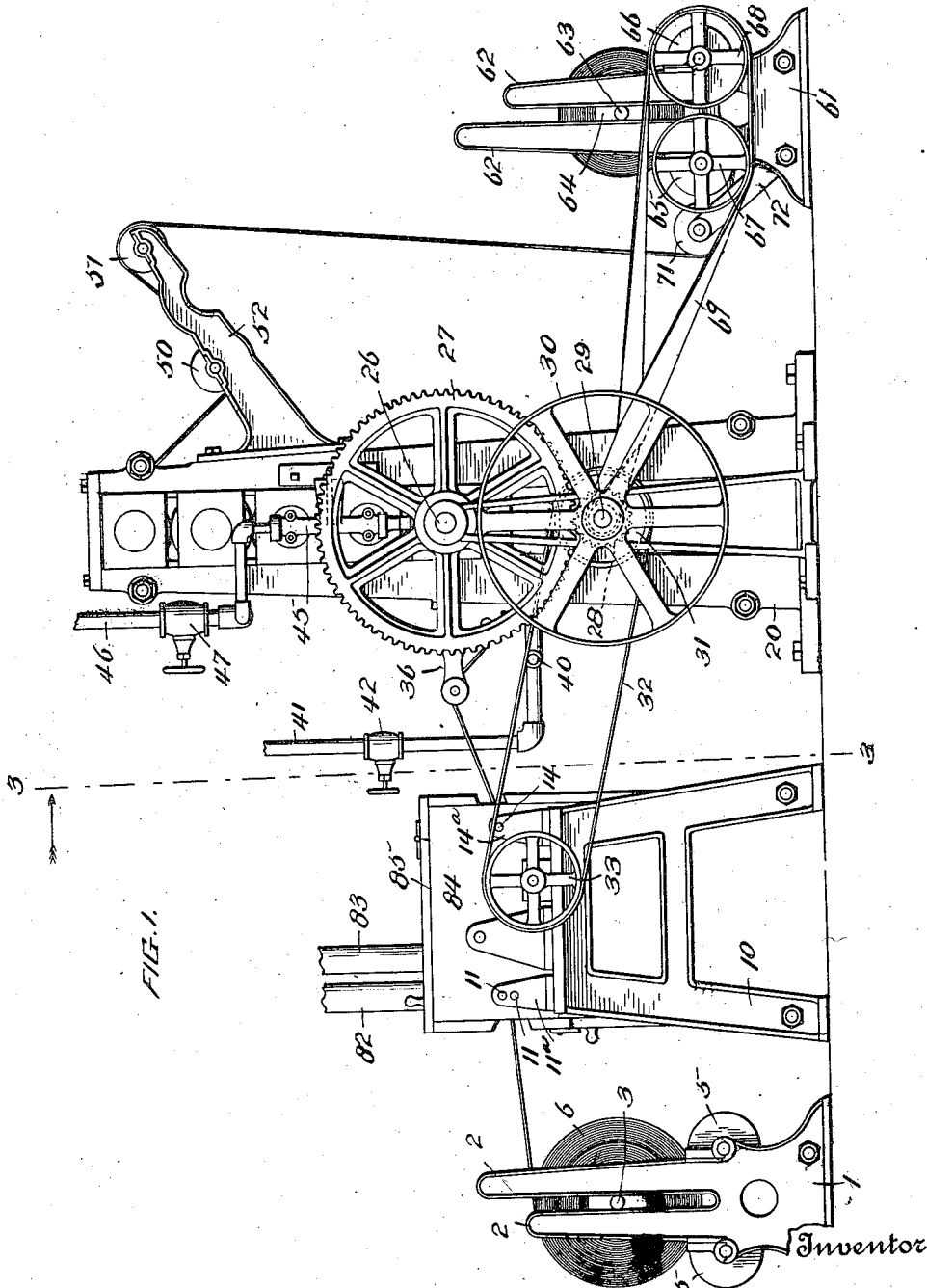


FIG. 1.

Inventor

John J. Westbrook

By

Whitaker & Brewster
Attorneys

Witnesses

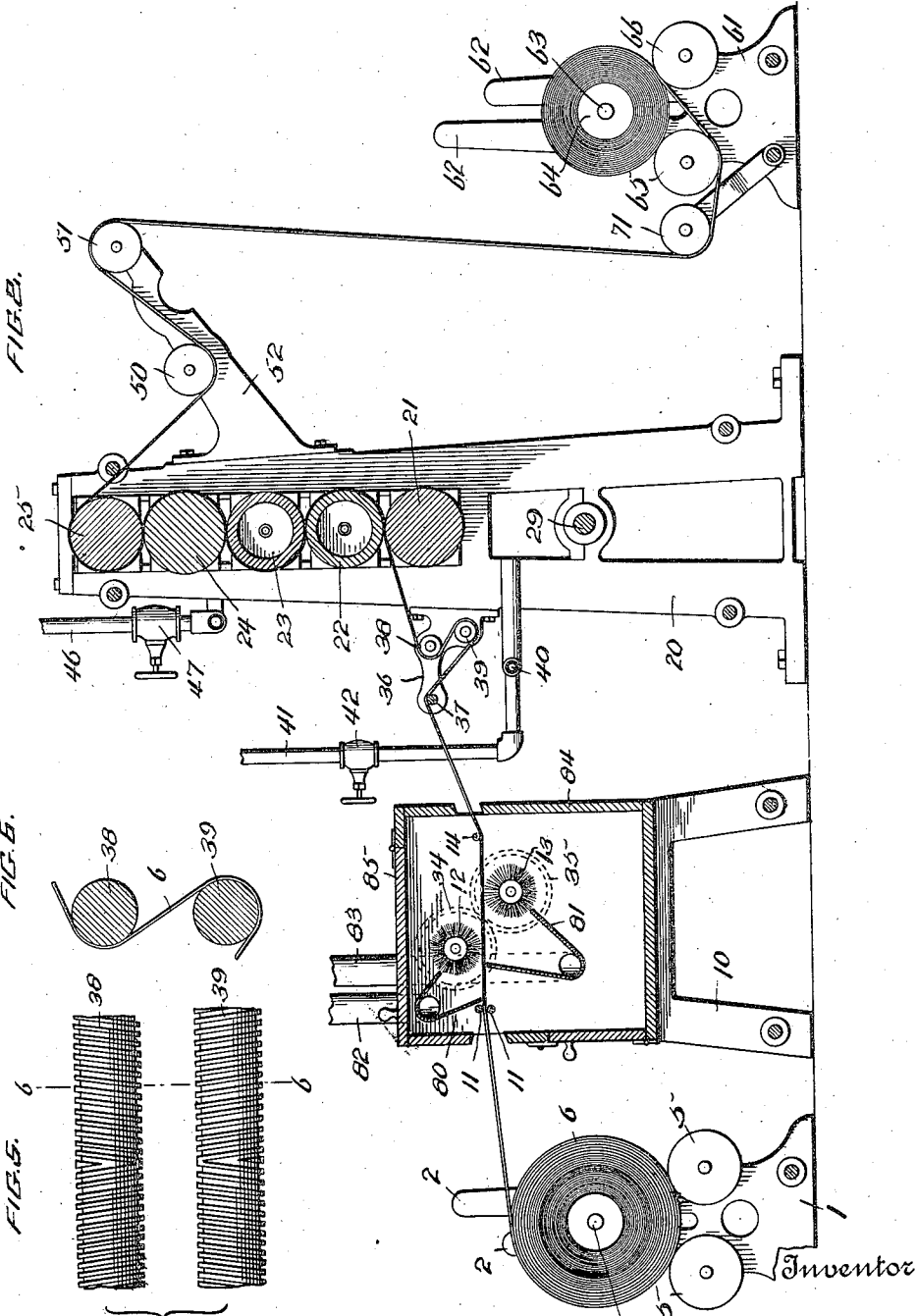
H. F. Kyle
Robt. E. Parry.

J. J. WESTBROOK.
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Inventor

John J. Westbrook
By Whitaker & Brewster
Attorneys

Witnesses

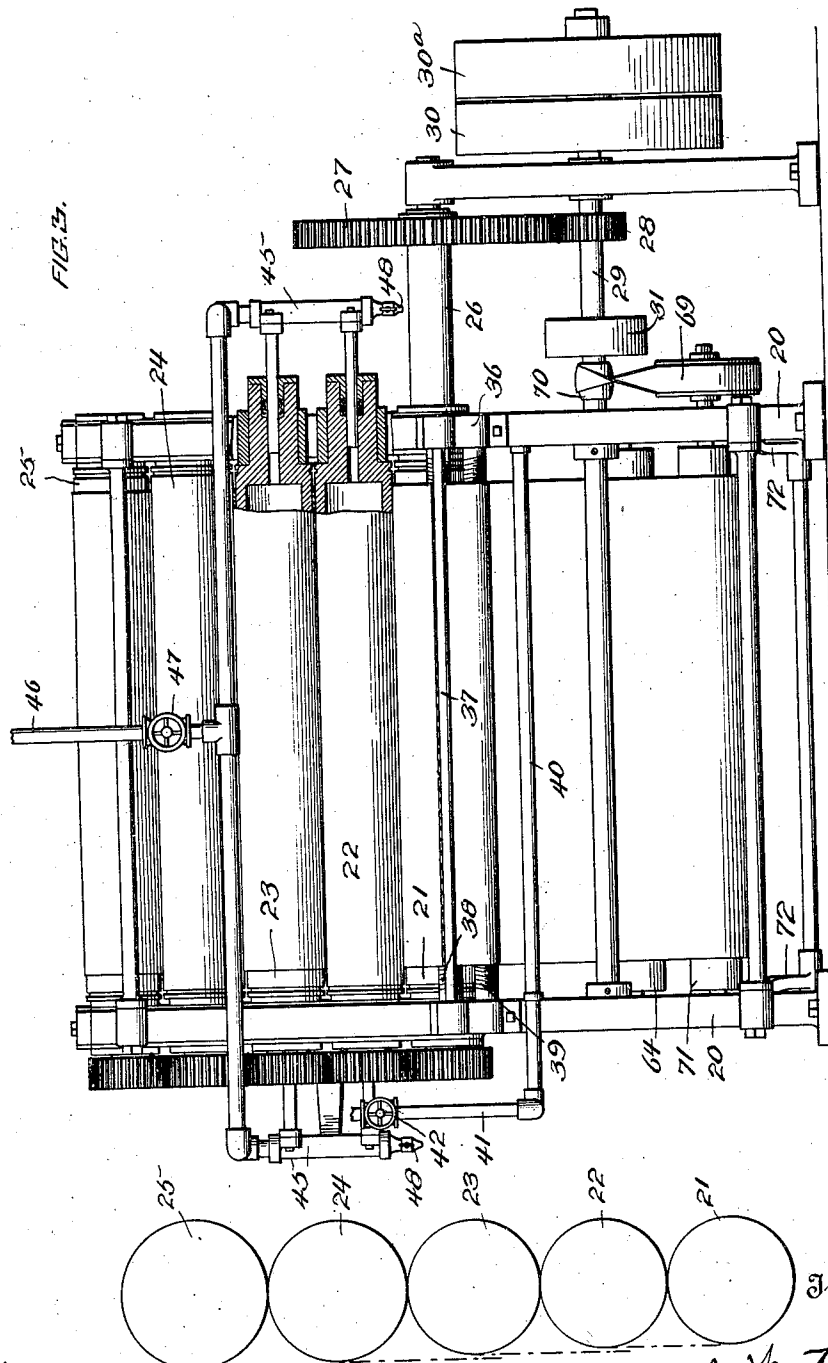
Wm. F. Doyle
Robt. E. Barry.

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3 SHEETS—SHEET 3.

1,046,519.



Witness
H. F. Roy
Robt E. Barry.

FIG. 4.

By

John J. Westbrook
Whitaker & Prevost
Attorneys

Inventor

UNITED STATES PATENT OFFICE.

JOHN J. WESTBROOK, OF DANVILLE, VIRGINIA.

CLOTH STRETCHING AND FINISHING MACHINE.

1,046,519.

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To all whom it may concern:

Be it known that I, JOHN J. WESTBROOK, a citizen of the United States, residing at Danville, in the county of Pittsylvania and State of Virginia, have invented certain new and useful Improvements in Cloth Stretching and Finishing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described reference being had to the accompanying drawings which show an embodiment of my invention which I have selected for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

Referring to the accompanying drawings, Figure 1 represents a side elevation of an embodiment of my invention selected by me for the purpose of illustrating my invention. Fig. 2 is a longitudinal sectional view of the apparatus illustrated in Fig. 1. Fig. 3 is an elevation of the central portion of the machine taken from the position indicated by the line 3—3, Fig. 1 looking in the direction indicated by the arrow, the said figure being drawn to a slightly larger scale. Fig. 4 is a diagrammatic view of the stretching and finishing rollers, considerably exaggerated for purposes of illustration. Fig. 5 is a partial front view of the spirally grooved guide rods considerably enlarged. Fig. 6 is a sectional view on line 6—6 of Fig. 5.

The object of my invention is to provide a cloth stretching and finishing machine, for the purpose of treating cloth in the roll after it leaves the loom, and cleaning, stretching, pressing and finishing the same, ready to be folded, rolled or bolted for shipment or for the market, the machine being constructed to stretch the cloth to a considerable extent longitudinally without impairing its quality, thus increasing materially the product, and also spreading it transversely to remove folds or wrinkles and imparting to it an attractive smooth finish, which adds to the salability and value of the cloth.

In the accompanying drawings I have shown an embodiment of my invention selected by me for purposes of illustration, in which provision is made for supporting a roll or bale of cloth, as it comes from the loom and subjecting it to the action of my

improved apparatus and rewinding it into a roll, but it is to be understood that the cloth may be delivered to and from the machine in other ways, without departing from my invention.

Referring to the said drawings, 1 represents a supporting stand provided at each end with bifurcated (or slotted) supports 2, 2 to receive the shaft ends 3 or trunnions of a roller upon which a bale of cloth to be treated is wound, said stand being also provided with two (or more) supporting rollers 5, 5 upon which the bale of cloth rests, while permitting it to rotate as the cloth is drawn off. The cloth forming the bale is indicated at 6. This apparatus will be found convenient for supporting a roll of cloth and rendering the cloth therefrom, but I do not limit myself to its use, as the cloth may be supplied to the machine in other ways.

I prefer to have the cloth acted upon first by suitable brushes which engage both sides of the same, and in the present instance I have shown the brushing mechanism mounted on a separate base from the other portion of the machine. The brushing devices when used may be mounted in a framing directly connected with the main frame carrying the rollers hereinafter described, and in some instances if the cloth does not require brushing, or has been carefully brushed before it is subjected to treatment in my improved apparatus, the brushing mechanism may be dispensed with altogether and I, therefore, prefer that its supporting framing be separate or separable from the rest of the mechanism.

Referring to the brushing apparatus, 10 represents a supporting framing, in which are mounted a pair of guide rods 11, 11, one above and the other below the cloth, said guide rods being located at the end of the framing nearest the supply of cloth to be treated. Adjacent to said guide rods are located two rotary brushes 12 and 13, the one 12 being situated in position to act on the upper face of the cloth and the other 13, located slightly beyond the brush 12 and below the cloth and arranged to act upon the lower face of the same. Beyond the brush 13 is another guide bar 14, beneath which the cloth is led. I may use two guide rods in rear of the brushes if desired, but in the present instance the cloth takes an upward course after leaving the guide

rod 14, so that only one rod is necessary. The guide rods 11, 11 are mounted between lateral supports 11^a secured to the framing 10, and the rod 14 is mounted between lateral supports 14^a, thus confining the cloth 6 between said lateral supports, and tending to keep it moving in a straight manner through the brushes 12 and 13. The brushes 12 and 13 remove all lint and foreign matter adhering to the surfaces of the fabric, and brush the pile or nap out straight so that it lies straight with the goods and in one direction.

In order to avoid having the dust, lint, etc., scattered over the room in which the apparatus is located I prefer to provide means for collecting and withdrawing the dust, etc. To this end I have shown hoods 80 and 81 extending partially around the brushes on the side from which the dust is discharged, and adjacent to the cloth which hoods are connected to suction pipes 82 and 83 respectively, said pipes being connected to any suitable fan or suction device for withdrawing the dust, etc., and discharging it outside of the building or room. I may also provide the brushing apparatus with a casing 84, surrounding the brushes and provided with a hinged (or removable) cover 85 if desirable, as shown in the drawing, which casing may also inclose the dust collecting hoods 80 and 81.

From the brushing apparatus the cloth is led to the apparatus for moistening, stretching and smoothing, finishing and drying the cloth which is preferably constructed as herein shown and which I will now proceed to describe. 20 represents another supporting framing, which may be formed integrally with, or secured to the framing 10, or set up separately therefrom as here shown. In the upper portion of the framing 20, are mounted a plurality of rollers 21, 22, 23, 24, 25, the shafts of which are provided with intermeshing gears, so that they all rotate together, each roller turning in the opposite direction from the adjacent roll or rolls, throughout the series. The shaft 26 of the lowest roller 25 is in this instance the driving shaft of the series, and is provided with a large gear 27, meshing with a pinion 28 on the driving shaft 29 of the machine or apparatus, which is provided with fast and loose band pulleys 30, 30^a by means of which it may be driven from any suitable source of power. The shaft 29 is also provided in this instance with a band pulley 31 connected by belt 32, with a band pulley 33 on the shaft of one of the brushes 12, 13 (in this instance the shaft of brush 13) for driving the brushes, the said brush shafts being connected for joint rotation by intermeshing gears 34, 35 on their respective shafts. The brushes therefore, rotate in opposite directions but as

they are on opposite sides of the cloth they act upon the surfaces of the cloth in the same direction.

The series of rollers include among their number at least one and preferably two which are heated by the introduction of steam within them, or by other heating means, and certain of said rolls are preferably made of greater diameter than the roll or rolls preceding it in their engagement with the cloth, for the purpose of giving them a slightly greater peripheral speed, and thereby gradually stretching the cloth as it passes around and between the several rolls, as will be readily understood. In the present instance, as shown in an exaggerated manner in Fig. 3, the first two rolls 21 and 22 (that is to say, the two lower rolls of the series, as shown) are of the same diameter, the roll 23 is slightly larger in diameter than rolls 21 and 22; roll 24 is slightly larger than the roll 23, and roll 25 is slightly larger than the roll 24. The increase in the size of the rolls is for the purpose of securing a gradual and even stretching of the cloth where such stretching is desired and can be effected without injury to the fabric. I find that good results are obtained for certain classes of goods by increasing the diameter of each of several successive rolls by from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch, but I do not wish to be limited to any particular increase in diameter, or to any particular number of successive rolls having their diameters so successively increased, as these matters will vary with the character of goods treated and the amount of stretching which is desired. And obviously if no stretching is desired beyond that necessary to straighten and smooth the fabric by drawing it taut, the rolls may all be made of the same size. My preferred form is, however, that herein illustrated and described.

Adjacent to the lower roll 21, and between it and the brushes 12 and 13, I provide suitable tension rods to coöperate with the rolls, and put a degree of tension upon the cloth, to straighten it out by drawing or pulling it taut. In the present instance the framing 20 is provided with brackets 36 between which are mounted preferably a smooth guide rod 37 and right and left spirally grooved guide rods 38 and 39, the rod 38 being placed in line with the smooth rod 37, and the rod 39 being below the rod 38. The rods 38 and 39 have their surfaces provided with spiral grooves which extend from the center of their length toward their ends in opposite directions, that is to say in left and right hand spirals respectively. The cloth is led from the guide rod 14 in rear of brush 13 above the smooth rod 37, thence under the grooved rod 39 and thence over the grooved rod 38, being forced to make a sharp turn

around the grooved rods 38 and 39. As the cloth is drawn over the right and left spirally grooved rods 38 and 39 a considerable amount of friction is set up which retards the passage of the cloth, which is being drawn forward by the rollers as herein-after described and it is thereby drawn taut and slightly stretched in a longitudinal direction. At the same time the action of the right and left spirally grooved rods tends to stretch the cloth and smooth it transversely, thus smoothing it out and removing wrinkles, etc., and bringing it into an evenly stretched condition in all directions. It will also be noted that as the cloth passes around the grooved guide rods, first one side of the cloth and then the other is subjected to the action of a spirally grooved rod. The effect of the right and left hand spiral portions of the rods is also to tend to prevent the cloth from moving laterally to left and right on the same, on account of the frictional resistance and also on account of the fact that the lateral stretching actions of the reverse spiral portions tend to counteract each other, thus holding the cloth in its proper position centrally of the machine as it is drawn over said rods. I also provide means for moistening the cloth to facilitate smoothing and drawing out wrinkles and folds therein, and further to leave it in the best condition to be acted upon by the heated drying and smoothing rollers, and I prefer to locate the moistening device, which may consist of a device for spraying steam or water, upon the cloth, or other suitable moistening means, adjacent and preferably in advance of the grooved guiding and spreading rods, just described, although this is not essential. I accomplish the moistening or dampening of the cloth in this instance, by means of a horizontally disposed atomizer 40, which consists of a pipe supported in any suitable manner below the guide rods 37, 38, 39 and preferably between the vertical transverse planes of the rods 37 and 39, as shown, said pipe being provided with a plurality of jet apertures discharging upwardly against the cloth, and being supplied with steam by a pipe 41, controlled by a valve 42, said pipe 41 being connected with a suitable steam supply.

In order to thoroughly dry the cloth, and at the same time impart a smooth and even finish thereto, I prefer to heat at least two of the series of rollers, so that both faces of the cloth may be acted upon by the surface of a hot roller. I prefer to heat the rollers 22 and 23, which are made hollow for the purpose and are provided in this instance at each end with hollow journals or trunnions through which steam pipes are introduced from a manifold 45 at each end, suitable packed glands being employed to insure tight joints between said pipes and

the roller journals. The manifolds 45, 45 are supplied with steam by a pipe 46 from a suitable steam supply, which pipe is provided with a controlling valve 47 and each manifold is provided with a draw-off cock 48 by means of which the condensed water can be withdrawn. I may, however, use other well known heating means for heating and maintaining said rollers in heated condition.

The cloth after leaving the spiral right and left hand grooved rod 38, passes between the roller 21 and the hot roller 22, thereby subjecting one face of the cloth to the hot roller. Thence it passes around roller 22, and between rollers 22 and 23 and around roller 23, thereby subjecting the other face to the action of hot roller 23, thence between rollers 23 and 24 and around 24, thence between 24 and 25 and around 25, from which it is preferably led under an idle roller 50 and over an idle roller 51, supported on brackets 52 in rear of the framing 20. As the cloth is drawn from roller 22 to and around roller 23, it will be slightly stretched as roller 23 has a greater periphery and consequently a greater peripheral speed than the roller 22. The cloth is further stretched in passing around roller 24 and again in passing around the roller 25. It will be understood that any desired number of stretching rollers having gradually increased peripheral speed may be employed, the amount of stretch being divided up between them as found most effective and advantageous. While in this instance I have shown the rollers connected by intermeshing gears of the same size, and the increase in peripheral speed is accomplished by slightly increasing the diameter of the rollers, it is to be understood that I may secure the gradual increase in peripheral speed in other ways if found desirable, by proportioning the peripheries of the rollers to their driving connections to secure the desired result, and it is, therefore, unimportant that the rollers should be of substantially the same size or that they should be grouped and driven in the exact manner herein set forth, which however, is my preferred construction.

After being stretched and finished the cloth is ready to be rolled, folded or bolted. If it is desired to re-roll it I provide a stand 61 similar to the stand 1, having bifurcated (or slotted) end portions 62 to receive the trunnions 63 of a roller 64, upon which the cloth is wound. The stand is provided with supporting rollers 65, 66, the shafts of which are provided with band wheels 67, 68 engaged by a crossed belt 69 from a driving pulley 70, on driving shaft 29, thus imparting power to the rollers 65, 66 to enable them to rotate the roll of cloth and wind up the cloth thereon. In order to avoid too

great friction on the cloth from the lower face of roller 65, and also to take up any slack in the cloth after it leaves the finishing and stretching apparatus, I prefer to provide a take up roller 71 carried on arms 5 72 pivotally secured by bolts, or the like to the stand 61. The cloth is passed under roller 71 and beneath roller 65 and by a certain amount of friction on the cloth as it 10 passes beneath the roller 65, it is desirable to cause the cloth to be lightly wound thereon. If desired the cloth may be relieved from touching the roller 65 at all, by securing the take-up roller in such position that 15 the cloth does not touch the roller 65. I prefer to have it contact with the lower or reversely moving face of roller 65, however, as the friction so produced tends to assist in rolling the cloth smoothly and tightly on 20 the roller 64 as before stated.

What I claim and desire to secure by Letters Patent is:—

1. A cloth finishing and stretching machine having a pair of rollers frictionally 25 engaging the cloth and clamping it between them, and means for positively actuating each of said rollers in opposite directions, one of said rollers having a higher peripheral speed than the other, whereby the cloth 30 is stretched longitudinally with a minimum of friction between the cloth and rollers.

2. A cloth finishing and stretching machine provided with a plurality of rollers, to frictionally engage and feed the cloth, 35 certain of said rollers for acting on the cloth progressively having progressively increased peripheral speed, whereby the cloth is progressively stretched longitudinally by each 40 of said rollers.

3. A cloth finishing and stretching machine provided with a plurality of rollers for frictionally engaging the cloth, and feeding it, said rollers being rotated at the 45 same speed, one of said rollers being of slightly greater diameter than a preceding roller, thereby giving it a higher peripheral speed, and effecting a longitudinal stretching of the cloth.

4. A cloth finishing and stretching machine provided with a plurality of rollers for successively engaging and feeding the cloth, certain of said rollers being progressively of slightly greater diameter than a 55 preceding roller or rollers, and means for rotating all of said rollers at the same axial speed, whereby the cloth will be progressively stretched by said rollers of progressively increased diameter.

5. In a cloth finishing and stretching machine, the combination with a plurality of finishing rollers, certain of said rollers having a higher peripheral speed, than a preceding roller or rollers, of devices for frictionally engaging the cloth before it is 65 gaged by said rollers, for retarding the

cloth, and subjecting it to longitudinal strain before it is engaged by said rollers.

6. In a cloth finishing and stretching machine, the combination with a plurality of finishing rollers, certain of said rollers having a higher peripheral speed than a preceding roller or rollers, of devices for frictionally engaging the cloth before it is engaged by said rollers, for retarding the cloth, and subjecting it to longitudinal strain before it is engaged by said rollers, 75 said devices having their cloth engaging surfaces provided with means for spreading the cloth laterally to remove folds and wrinkles therefrom.

7. In a cloth finishing and stretching machine, the combination with a plurality of rollers for progressively frictionally engaging and feeding the cloth, certain of said rollers having a higher peripheral speed than a preceding roller or rollers, to stretch the cloth longitudinally and means for dampening the cloth before it engages said rollers, certain of said rollers being 80 provided with heating means.

8. In a cloth finishing and stretching machine, the combination with a plurality of rollers for progressively frictionally engaging and feeding the cloth, certain of said rollers having a higher peripheral speed than a preceding roller or rollers to stretch the cloth longitudinally, means for dampening the cloth, and a device for frictionally engaging and retarding the cloth in advance of said rollers, for straining the cloth 100 longitudinally and straightening it before it passes to the rollers, certain of said rollers being provided with heating means.

9. In a cloth finishing and stretching machine, the combination with a plurality of rollers for progressively frictionally engaging and feeding the cloth, certain of said rollers having a higher peripheral speed than a preceding roller or rollers to stretch the cloth longitudinally, means for dampening the cloth, and a device for frictionally engaging and retarding the cloth in advance of said rollers, for straining the cloth longitudinally and straightening it before it passes to the rollers, certain of said rollers being provided with heating means, said 115 retarding devices having their cloth engaging surfaces provided with means for stretching the cloth laterally to remove folds and wrinkles while it is under longitudinal tension.

10. In a cloth finishing and stretching machine, the combination with a series of metal finishing rollers for progressively frictionally engaging and feeding the cloth, 125 certain of said rollers having a higher peripheral speed than a preceding roller or rollers, the increase in the peripheral speed of said rollers being progressive, stationary guide bars frictionally engaging the cloth 130

in advance of the rollers, and deflecting it out of a straight line, to retard the cloth and subject it to longitudinal strain, said guide rods being each provided with right and left spiral portions for spreading the goods transversely, a pair of rotary brushes located in advance of said guide rods, and on opposite sides of the path of the cloth, and a spraying device for moistening the cloth located adjacent to the said guide rods, and means for heating certain of said rollers.

11. In a cloth stretching and finishing machine, the combination with a supporting frame, of a plurality of finishing rollers, located one above the other, and substantially in contact, intermeshing gears, secured to said rollers for driving them simultaneously, means for heating certain of said rollers, and devices for frictionally retarding the cloth before it passes to said rollers, including stationary guide rods, provided with right and left hand spiral portions extending laterally from a point substantially in line with the center of the cloth, a device for spraying the cloth located adjacent to said retarding devices, and rotary brushes for engaging opposite faces of the cloth located in advance of said retarding devices.

12. In a cloth stretching and finishing machine, the combination with a support for a bale or roll of cloth, provided with means for permitting the rotation of the bale, to render the cloth therefrom, of rotary brushes located on opposite sides of the path of the cloth through the machine for engaging opposite faces of the cloth, tension rods engaging the cloth and deflecting it out of a straight path to frictionally retard the movement of the cloth through the machine, certain of said tension rods being provided with right and left hand spiral portions extending from their central portion toward the opposite ends, a steam pipe located adjacent to said tension rods and provided with jet apertures discharging in a direction toward the cloth, for moistening the same, a plurality of finishing rolls for engaging both faces of the cloth, means for heating

certain of said finishing rolls, and a winding device for rewinding the cloth after it leaves the finishing rolls.

13. A machine for stretching and finishing cloth, comprising among its members, a plurality of rollers, located one above the other and substantially in contact with each other, for engaging a strip of cloth, passing partially around and between said rollers, means for positively driving all of said rollers, certain of said rollers having a greater peripheral speed than a preceding roller or rollers, to effect a longitudinal stretching of the cloth.

14. A machine for stretching and finishing cloth, comprising among its members, a plurality of rollers, located one above the other and substantially in contact with each other, for engaging a strip of cloth, passing partially around and between said rollers, means for positively driving all of said rollers, means for positively driving said rollers at the same axial speed, certain of said rollers being of slightly greater diameter than a preceding roller or rollers, to increase its peripheral speed and effect the stretching of the cloth longitudinally.

15. A machine for stretching and finishing cloth, comprising among its members, a plurality of rollers, located one above the other and substantially in contact with each other, for engaging a strip of cloth, passing partially around and between said rollers, means for positively driving all of said rollers, each of said rollers being provided with a gear of the same size intermeshing with a gear or gears of adjacent rollers or rollers, means for driving said rollers, certain of said rollers being of slightly greater diameter than a preceding roller or rollers, to effect a longitudinal stretching of the cloth.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN J. WESTBROOK.

Witnesses:

W. T. SWANSON,
T. J. BASS.