C. A. LUTHER.

Machine for Stretching Fabrics.

No. 211,030. Patented Dec. 17, 1878.

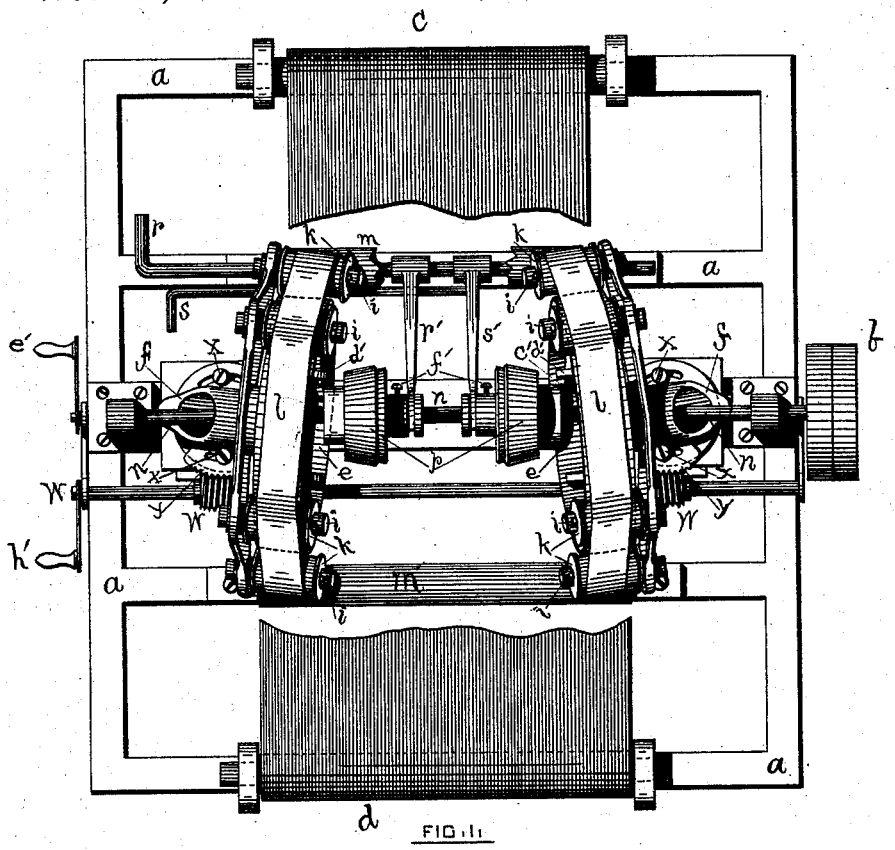

FIG. 1.

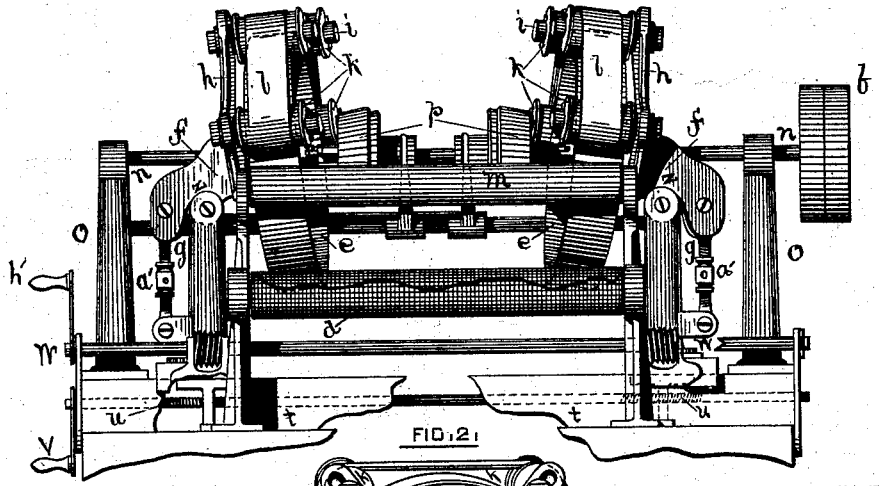

FIG. 2.

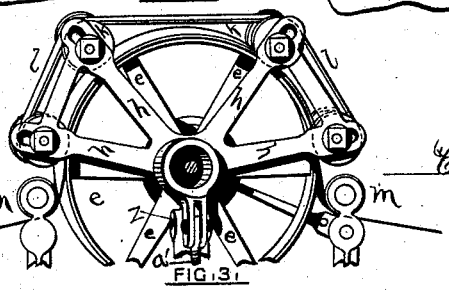

FIG. 3.

WITNESSES.

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## IMPROVEMENT IN MACHINES FOR STRETCHING FABRICS.

Specification forming part of Letters Patent No. **211,030**, dated December 17, 1878; application filed November 1, 1876.

*To all whom it may concern:*

Be it known that I, CHARLES A. LUTHER, of Pawtucket, in the county of Providence and State of Rhode Island, have made certain Improvements in Machines for Finishing Coarsely-Woven Fabrics, for giving them such lateral stretch as may be desired, and for straightening the threads and lines thereof, and correcting any casual imperfections in the woven pattern thereon, of which said improvements the following is a specification:

My said invention relates to a means for straightening the fibers of coarsely-woven fabrics, of which mosquito barring or netting is an example, and for giving to the fabric such lateral stretch as may be desired.

One of the principal objects sought is to make all the operating parts easily and quickly adjustable, so that the machine shall not only be adapted to the delicate character of the materials operated upon, but shall also give to these materials all the variable stretch, great or little, diagonal or lateral, that can possibly be desired, and shall make a single machine serve for fine and coarse goods of all textures and of whatsoever widths.

The accompanying drawing is hereby made a part of this specification, similar letters of reference thereon indicating corresponding parts.

Figure 1 of said drawing is a top view of my device, the cloth being torn away to show the operating parts. Fig. 2 is a rear view with the cloth likewise torn away, and shows the under parts not seen in Fig. 1. Fig. 3 is a detail view of one of the friction-wheels, showing the rollers and endless belt. It also shows the ends of the rolls, which act as guides to the fabric in passing to and leaving the friction-wheels.

*a* shows the frame-work, and *b* the driving-pulley. *c* is the delivery-roll, from which the fabric is conducted to the machine, and *d* is the receiving-roll, on which the material is wound after being straightened and finished, as hereinafter described. *e e* are wide-rimmed friction-wheels, which receive and hold the respective edges of the fabric while the latter is straightened, stretched, and finished, as aforesaid. These wheels revolve upon and are supported by the curved hollow arms *f f*, and these, in turn, are pivoted onto the uprights *g g*. From each of these curved arms project stationary arms *h h*, in the upper ends of which are, respectively, placed the centers *i i*, which carry the rollers *k k*. The threaded ends or bearings of these rollers *k* protrude through and are secured in the arms *h* by a nut, and the ends of said arms being slotted the rollers are adjustable therein, and may be made to press lightly or heavily upon the surface of the friction-wheels *e e*.

*l l* show the endless belts running over and under said rollers. These belts keep the cloth firmly on the surface of said friction-wheels.

*m m* are guiding-rolls, which facilitate the passage of the fabric to and from the friction-wheels aforesaid.

The central shaft *n* passes through but does not touch the hollow arms *f*, and rests upon and is supported by the uprights *o o*.

The center shaft, between the wheels *e e*, is supplied with two friction-clutches, *p p*, one for each of said wheels, and these clutches may be operated either separately or simultaneously, as desired, through their respective bars and connecting-arms *r r'* and *s s'*.

The uprights *g g* are made to slide upon the flanged cross-bar *t*, and may be, with the mechanism they support, pushed farther apart or drawn nearer together by means of an elongated screw at *u*, operated by the crank *v*. These uprights *g g* may be also turned to the right or left, on loosening the screws *x x*, by operating the worms *w w*, which work in the segmental worm-gear *y y*, attached to the bases of said uprights *g*. The curved and hollow arms *f* are pivoted to said uprights *g*, as seen at *z*, on which pivots said arms may be raised or lowered by operating, with a lever or otherwise, the right and left screws *a'*, the result being to increase or decrease the angles at which the friction-wheels *e e* may be set.

The outer parts of the friction-clutches *p p* have projecting arms firmly attached thereto, as seen at *c'* in Fig. 1. These projecting arms pass through and interlock with the loop attachments *d'*, projecting from and at right angles with one or more of the spokes of the friction-wheels *e e*, and by means of these arms a

positive motion is imparted to the said wheels *e e* when said friction-clutches perform their functions, as hereinafter described.

The operation of my said invention is substantially as follows: The roll of the fabric to be operated upon is placed in position at *c* in the usual manner. The end is passed under the front roll *m*, and thence onto the surfaces of the friction-wheels *e e*, and between said surfaces and the endless belts *l l*. Power is applied at the pulleys *b*, or, if the machine is to be driven by hand, at the crank *e'* on the main shaft *n*, which carries the inner parts of the friction-clutches *p p*, which clutches may be considered as always in motion. To operate the friction-wheels *e e*, the inner and outer parts of the friction-clutches *p p* are brought together by operating the bars *r s* and their connecting-arms *r' s'*. The wheels *e e* are thus set in motion, and the fabric, being firmly held on said wheels by the close-fitting belts *l l*, is carried up with and over said wheels, being stretched in the operation by, and in proportion to, the angles at which said wheels have been previously set, and is afterward passed under the rear roller *m* and wound on the receiving-roll *d*.

In manufacturing the coarser fabrics—like mosquito-netting—it often happens that the lines or threads become crooked and form irregular diagonals, and the material is thereby rendered less salable than if the threads or lines were straight and the woven pattern even and regular. Whenever, therefore, the lines or threads of the fabric have become crooked, diagonal, or uneven, and it is desired to even and straighten them, this may be done by unlocking the parts of one of the friction-clutches *p p*, through its appropriate bar and connecting-arm, and permitting the disconnected wheel to move slower or to stop, as may be requisite, to bring the threads into right lines, after which the wheel may be started again, as before described. The revolution of one wheel continuing while the other is wholly or partially stopped will, of course, bring the threads into even and regular lines, and will correct any casual imperfections in the woven pattern. The control of the operator over this part of the device is very easy and certain, and the constantly-varying changes required may be made almost instantaneously by the means described.

The inner parts of the friction-clutches *p p* are secured to the main shaft by set-screws *f'*, and these parts of said clutches are thereby adjustable on said shaft, and may be made to accommodate any variation in the mode of operation.

The fabrics which may be finished upon such a machine are exceedingly variable in width; and that my device may be adapted to all sizes of manufactured goods, the friction-wheels *e e*, with their connected mechanism, may be spread farther apart for wider goods, and may be drawn nearer together for narrower goods, by means of the elongated screw *u*, working through the bottom of the uprights *g g*.

The degree of stretch required for one kind of fabric will often materially differ from that required for another, and the market may sometimes demand different degrees of stretch for the same class of goods. To adapt my invention to these varying requirements is the object of the adjustable features comprised in the joint or pivot *z*, the connected right and left screw *a'*, the worms *w w*, and segmental worm-gears *y y*. To operate said segmental worm-gears and worms it is first necessary to loosen the screws *x x*, and then any required adjustment of these parts is obtained by turning the crank *h'*. This done, the screws aforesaid should be tightened to keep the position obtained. An adjustment to the required angle is still more perfectly secured by using, in addition, the right and left screw above mentioned. Any deflection of these friction-wheels from the line of the main shaft *n* that can possibly be required may be obtained, and may be changed at pleasure, by these several devices.

When properly set as aforesaid, it will be found that the friction-wheels are so placed that their respective lines of revolution will resemble the two sides of the letter **V**, and are divergent from the time the fabric reaches them until it passes from them, and that at the latter point said fabric has the greatest degree of tension or stretch, which may be increased or decreased, as desired, by the adjustable appliances above described.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of the curved hollow arms *f f* with the right and left screws *a' a'* and pivots *z z*, for the purpose of setting the friction-wheels *e e* at any desired angle perpendicular to the line of the shaft *n*, all substantially as described.

2. The combination of the friction-wheels *e e* with the friction-clutches *p p*, bars and connecting-arms *r r'* and *s s'*, and driving-shaft *n*, for the purpose of securing a separate or simultaneous operation of said friction-wheels, and at the same or differing velocities, as may be found necessary, all in the manner and for the purposes substantially as described.

CHARLES A. LUTHER.

Witnesses:

THOS. P. BARNEFIELD,

GEO. WALTER BARNEFIELD.