

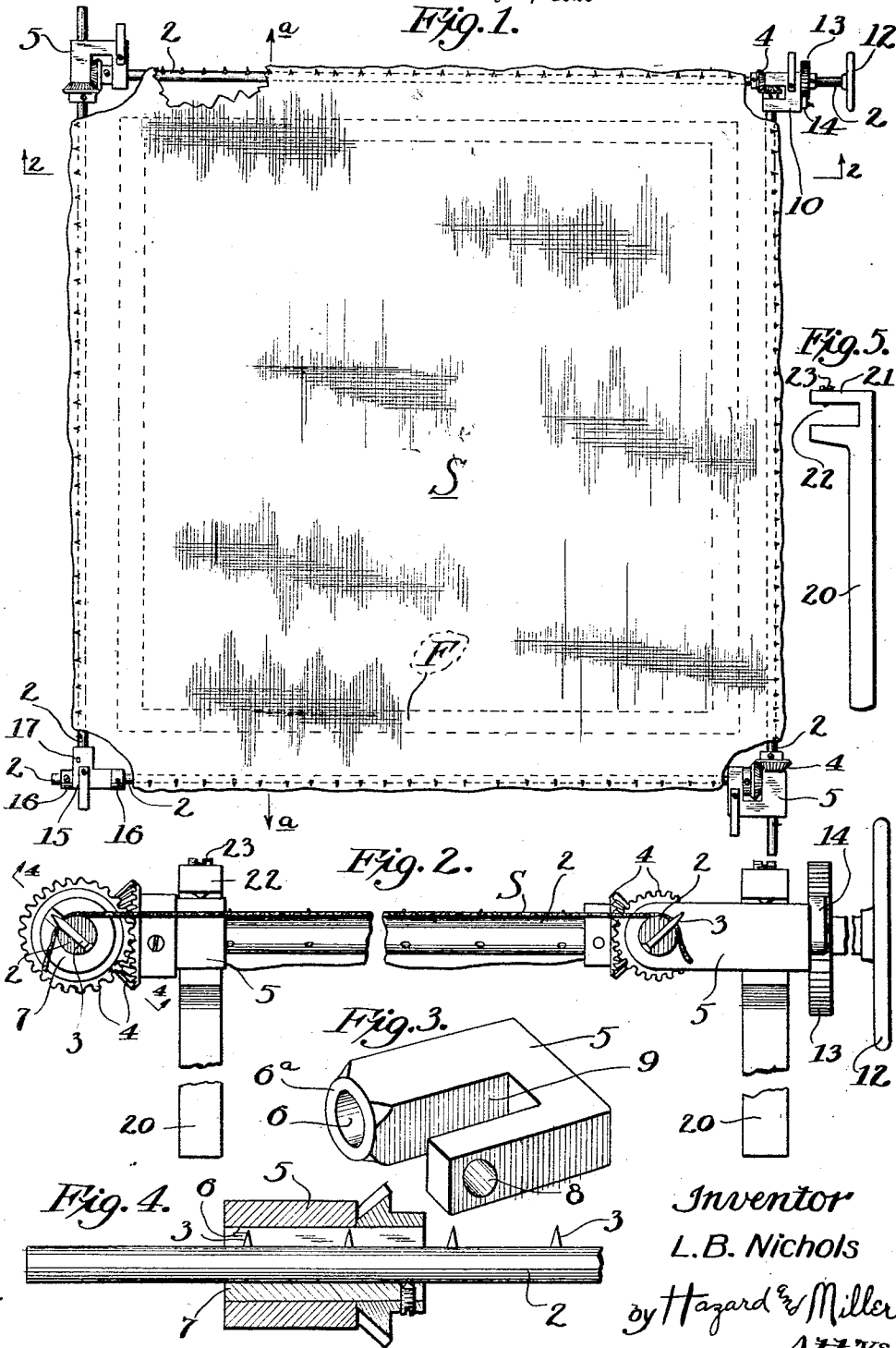
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L. B. NICHOLS

BOLTING CLOTH STRETCHER

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UNITED STATES PATENT OFFICE.

LAWRENCE B. NICHOLS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
JOHN NELSON, OF LOS ANGELES, CALIFORNIA.

BOLTING-CLOTH STRETCHER.

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To all whom it may concern:

Be it known that I, LAWRENCE B. NICHOLS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Bolting-Cloth Stretchers, of which the following is a specification.

This invention relates to apparatus for stretching and tensioning sheet material, and has for its object to provide simple and substantial means for placing sheet material under tension uniformly in directions at right angles to each other. It is an object to provide a stretching apparatus that may be readily adjusted to be operative upon sheets of different widths. Another object is to provide a stretching machine that may be readily set up or assembled and may be readily knocked down and compactly stored when not in use. Another object is to provide a stretching machine upon which the material to be tensioned may be quickly applied and may be quickly removed.

Other objects and advantages will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, wherein—

Figure 1 is a plan of the improved stretcher showing a sheet of material applied thereto to be stretched, portions of the sheet being broken away to disclose adjacent parts of the machine.

Fig. 2 is a detail elevation and sectional view of the machine, parts of which are broken away to conserve space.

Fig. 3 is a perspective of one of the bearing blocks of the machine.

Fig. 4 is a sectional view of a form of bearing providing for variation of dimension of the apparatus.

The invention is shown as including a set, in the present case comprising four rods 2, adapted to be assembled in quadrangular formation, and having their ends rotatively mounted in bearing blocks provided at the corners of the quadrangular frame and in which the rods are rotatively journaled. A feature of the invention is to provide means for concurrently rotating all of the rods with a uniform, angular movement, so that a sheet of material S may be uniformly tensioned in two directions at right angles to each other, preparatory to being secured to a frame F, (shown in dotted lines) Figure 1.

The rods 2 are provided with sharpened teeth 3, the teeth of each rod being in a longitudinal, straight row, and all of the rods being initially adjusted so that the teeth will project similarly as to the axis of the rods of the system.

The ends of the rods are each provided with bevel gears 4, and the gears at the corners of the rod frame are set in mesh with each other, and a diagonally opposite bearing means is provided which consists of a substantially U-shaped block 5, Figure 3, one arm of which is provided with a bore 6 to receive a bushing 7, Figure 4, which is channelled or split so as to permit longitudinal shifting of the respective toothed rods 2, the split of the bushing providing for the passage of the teeth 3 of the rods. The other arm of the bearing block 5 is provided with a bearing aperture 8 to receive the contiguous end of a rod 2; the bearing aperture 8 being disposed at right angles to the bearing bore 6. The space 9 between the side arms of the U-shaped bearing element provides for the introduction of one of the gears 4, while the companion gear may abut against the contiguous end face 6^a of the bearing part 6.

The diagonally opposite bearings 5 thus provide means for enabling the rods 2 of one pair, which are arranged in parallelism, to be shifted toward or from each other, as indicated by the arrows *a*, Figure 1, as determined by the width of a sheet of material S which is to be applied to the rods and stretched.

At one corner of the frame, formed of the rods 2, is provided a substantially U-shaped bearing block 10, in which the contiguous ends of the rods are mounted in bores at right angles to each other, and contiguous to this block is provided a pair of gears 4, providing means for rotating their respective rods, the rotation of which is accomplished as by means of a crank or handle part 12, provided on the projected end of a rod 2 passing through the bearing block 10.

Means are provided for automatically latching the several rods after they have been rotated to such a degree as is desired in the tensioning of the sheet S, and such means is here shown as including a ratchet wheel 13, fixed on a rod 2, and engaged by a locking pawl 14, provided on the bearing block 10. The corner of the frame which

is diagonally opposite the bearing block 10 may be provided with a substantially L-shaped bearing block 15, in which are mounted, at right angles, the contiguous ends of rods 2. One of the rods may be provided with set collars 16, to prevent end movement in the bearing 15, while the other rod may be secured against longitudinal movement by a pin 17, permitting rotation of its rod 2 in the bearing 15.

For convenience of operation, means are provided for holding the stretching frame in an elevated position above the ground, floor or bench, as may be desired, and such means consists of a lock 20, having a head 21 with a lateral slot 22, adapted to receive one of the bearing blocks of the frame. The inserted bearing block is adapted to be detachably secured as by a set or clamp screw 23.

From the above it will be seen that in the use of the device, the operating handle 12 is rotated to such a degree as to bring the teeth 12 to a desired position about the frame by rotation of the rods. The sheet of material S is then applied to the teeth 3 as uniformly as may be practicable, after which the operating handle 12 is rotated and this causes the simultaneous operation, with equal angular movement, of the several toothed rods; their initial movement being outward as to the sheet S, with the result that the sheet is tensioned to the desired degree, after which it may be tacked or otherwise secured, if desired, to a frame F. The rods are automatically latched as they are rotated during the tensioning of the sheet, as by latch mechanism 13-14. Special attention is called to the ready adjustability for expanding or contracting the frame, each corner bearing being adapted to hold two rods at right angles to each other and to hold one rod rigidly against endwise movement and to hold the other rod adjustably for endwise movement.

Further embodiments, modifications and variations may be resorted to within the principle of the invention.

What is claimed is:

1. In a sheet material stretching machine, a set of rotatable toothed rods forming a quadrangular frame, bearings in which the ends of the rods are rotatively mounted, each bearing being adapted to hold one rod rigidly against endwise movement and to hold the other rod adjustably endwise, means for concurrently rotating all the rods with a uniform degree of movement, and means for holding the rods against reverse rotation by the tensioned applied sheet material engaging the teeth of the rods.

2. In a sheet material stretching machine, set of rotatable toothed rods forming a quadrangular frame, bearings in which the

ends of the rods are rotatively mounted, each bearing being adapted to hold one rod rigidly against endwise movement and to hold the other rod adjustably endwise, means for concurrently rotating all the rods with a uniform degree of movement, and means for holding the rods against reverse rotation by the tensioned applied sheet material engaging the teeth of the rods, certain of said bearings permitting longitudinal passage therethrough of respective rods so that other parallel rods can be moved toward or from each other in parallelism.

3. In a machine for stretching pliant sheet material, a set of four rotatable toothed rods adapted to be assembled in quadrangular arrangement, each of said rods having gears meshing with contiguous gears on the other rods, bearings at the corners of the rod frame for supporting the contiguous ends of the rods and from which bearings the said rods extend at right angles to each other, each bearing being adapted to hold one rod rigidly against endwise movement and to hold the other rod adjustably endwise, and rod rotating means provided on one of said rods.

4. In a machine for stretching pliant sheet material, a set of four rotatable toothed rods adapted to be assembled in quadrangular arrangement, each of said rods having gears meshing with contiguous gears on the other rods, bearings at the corners of the rod frame for supporting the contiguous ends of the rods and from which bearings the said rods extend at right angles to each other, each bearing being adapted to hold one rod rigidly against endwise movement and to hold the other rod adjustably endwise, rod rotating means provided on one of said rods, and means for latching the rods against reaction under the tension of a sheet applied to the teeth of the rods.

5. In a machine for stretching pliant sheet material, a set of four rotatable toothed rods adapted to be assembled in quadrangular arrangement, each of said rods having gears meshing with contiguous gears on the other rods, bearings at the corners of the rod frame for supporting the contiguous ends of the rods and from which bearings the said rods extend at right angles to each other, and rod rotating means provided on one of said rods, certain of the bearings providing for an axial movement of certain rods therein to provide for contraction or expansion, in one dimension, of the frame.

6. A cloth stretcher comprising in combination a set of four rotatable toothed rods, a frame to hold said rods in quadrangular arrangement, a gear on each end of two rods on contiguous sides, a single gear on one end of each of the opposite rods, and means to

rotate one of the rods having two gears and through inter-meshing of the gears at the corners rotate all the rods.

5 6 having in addition blocks at corner frames with apertures therethrough adapted to permit longitudinal movement of a rod seated therein.

10 8. A cloth stretcher comprising in combination four rotatable rods, corner blocks forming bearings for the rods and adapted to maintain the rods in quadrangular arrangement, a gear on each end of two rods on adjoining sides, a gear on one end of each
15 of the two rods on the opposite sides, means

to rotate a driving rod and through inter-meshing gears rotate all the rods, means to tension cloth or other material between the rods, and means to restrain the driving rod from movement under the tension of the material. 20

9. A cloth stretcher as claimed in claim 8 in which some of the corner blocks have means to permit longitudinal movement of the rods, and means to clamp the rods in
25 desired positions.

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

LAWRENCE B. NICHOLS.