No. 704,566. Patented July 15, 1902.

F. NEWELL.

APPARATUS FOR PRODUCING FABRIC HAVING BIAS WEAVE.

(Application filed Nov. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

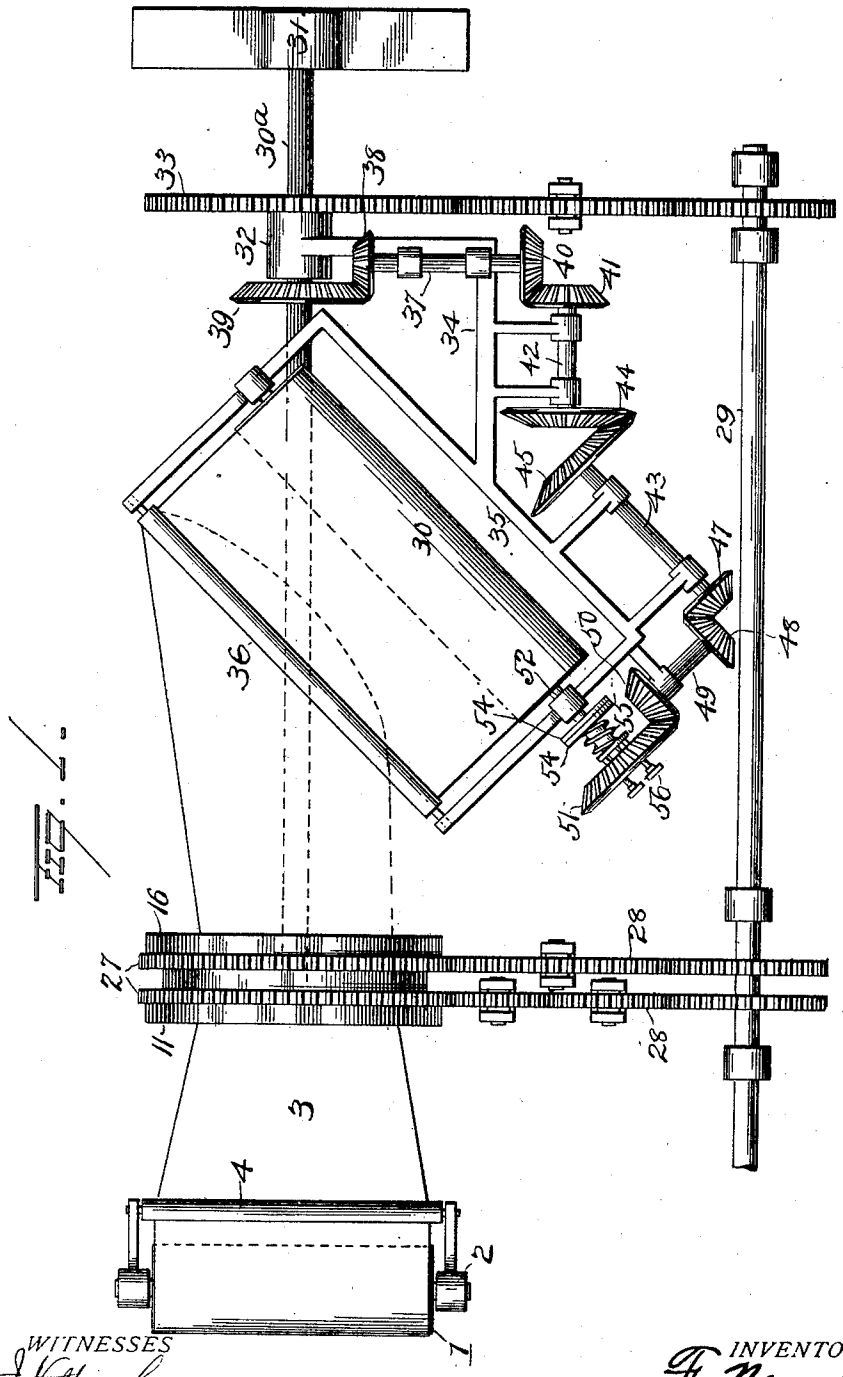


Fig. 1.

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Fig. 2.

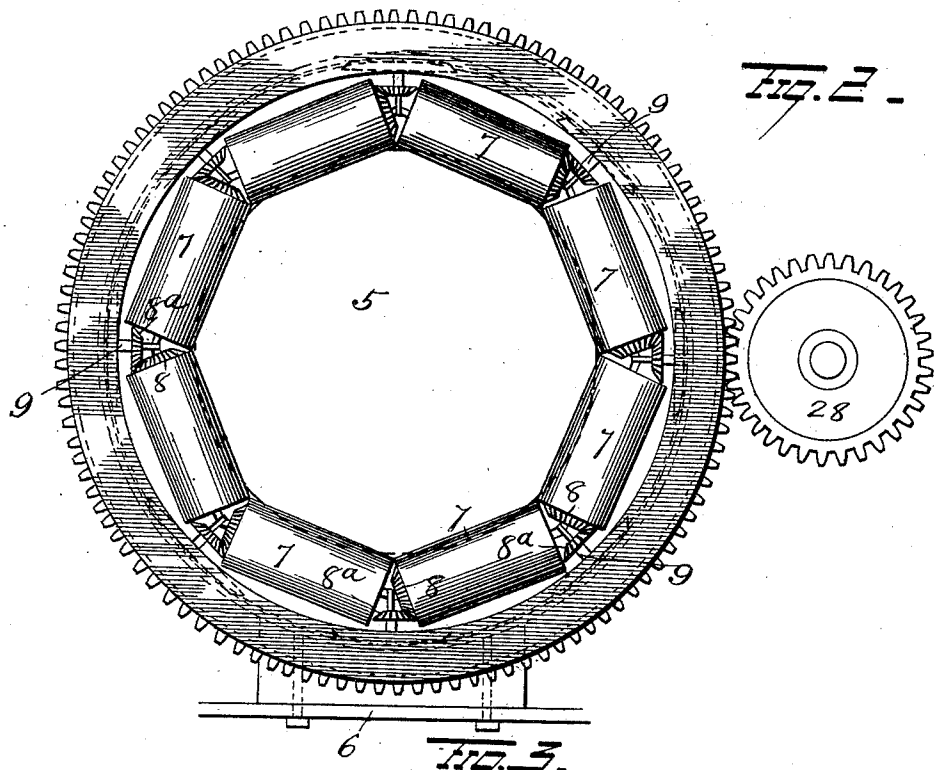
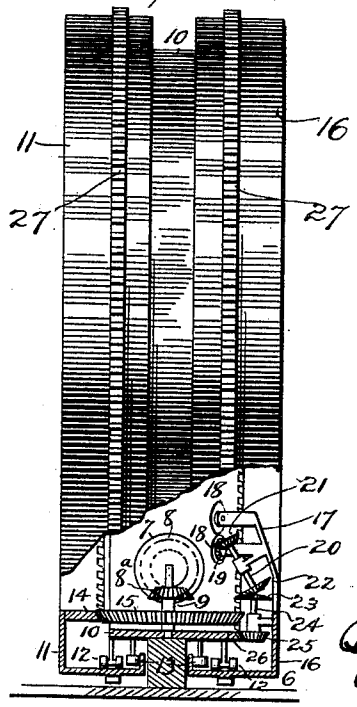


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PRODUCING FABRIC HAVING BIAS WEAVE.

SPECIFICATION forming part of Letters Patent No. 704,566, dated July 15, 1902.

Application filed November 14, 1901. Serial No. 82,284. (No model.)

To all whom it may concern:

Be it known that I, FRANK NEWELL, a resident of Leonia, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Producing Fabric Having Bias Weave; 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 relates to an improved apparatus for producing fabric having bias weave, the object of the invention being to provide an apparatus of this character which will feed cylindrically-woven fabric in distended form to cutters which automatically move around the fabric, cutting it at an angle, or, in other words, spirally, and the strip of bias-woven fabric which is produced by this spiral cut is wound on a drum mounted in a frame moved at the same rate of speed as the cutting mechanism to maintain the drum at all times in the same position relative to the cutters.

With this object in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view illustrating my improvements. Fig. 2 is an enlarged front view of the spreader and coöperating mechanism, and Fig. 3 is a view illustrating the details of construction of the spreader and cutting mechanism.

1 represents a spool or drum supported in a suitable stationary frame 2 and adapted to have wound thereon a cylindrically-woven tube of cloth or fabric 3, wound flat on the spool and drawn beneath a roller 4 and over a spreader 5 to distend the tube or cylinder. The spreader 5 consists of an octagonal or other prism tapering to a cylinder with the same perimeter as the prism. The size of the prism is determined by the diameter of the cylindrical fabric to be cut, and the fabric is drawn over the spreader by means of a series of rollers 7, arranged in octagonal formation and bearing against the respective faces of the spreader and are each provided at one end with a bevel-gear 8, meshing with bevel-gear 8^a, secured on suitable sleeves 9, mounted to revolve on pins or rods secured to a stationary ring 10, which extends entirely around the spreader. On this stationary ring 10, at one edge thereof, or, in other words, at the forward end of the spreader, where the cloth or fabric is first engaged, a movable ring 11 is provided and is approximately L shape in cross-section, one member thereof partially inclosing the ring 10, and the latter is made with suitable tracks separated from the movable ring 11 by roller-bearings 12 and 13 to permit the ring 11 to be freely rotated about the ring 10 and spreader. On the other member of movable ring 11 an inwardly-projecting and internally-beveled gear or rack 14 is secured and meshes with bevel-gears 15 on the respective sleeves 9, so as to transmit motion to revolve all of said rollers 7 when the ring 11 is turned, and thereby draw the fabric over the spreader in its distended or cylindrical form. On the opposite or rear side of stationary ring 10 another movable ring 16 is mounted to revolve and is of the same shape as ring 11 and adapted to revolve on roller-bearings similar in all respects to the rollers 12 and 13. This ring 16 is made with an inclined arm 17, projecting over the fabric at an angle, preferably, of forty-five degrees and carrying rotary-disk cutters 18, rotated simultaneously by intermeshing gear, and on one of which cutters or the shaft or spindle on which it is secured is a bevel-gear 19, to which motion is transmitted to revolve the cutters, as will now be explained. A short shaft 20 is mounted in suitable bearings carried by arm 17 and carries at one end a bevel-gear 21, meshing with gear 19, and at its other end a bevel-gear 22 is provided in mesh with a similar gear 23 on another short shaft 24, carried by the ring 16, and this shaft 24 carries a gear 25, meshing with a rack 26 on one edge of stationary ring 10, so that as ring 16 is rotated about ring 10 motion will be transmitted to the cutters by means of the rack 26 and gears, as above explained, to cut the cylindrical fabric at an angle of forty-five degrees, and as ring 16 turns and the cloth is simultaneously

fed forward it will be cut spirally to form one continuous strip or length of cloth having bias weave.

The rings 11 and 16 are each provided on their outer faces with gear-teeth 27, which are engaged by chains of gears 28 to drive the respective rings at the proper rate of speed, and these chains of gears receive their motion from a drive-shaft 29, as shown.

As the cloth is cut spirally, it is necessary to provide some means for winding up the strip, and for that purpose I provide a drum 30. This drum must not only revolve to wind the strip of cloth thereon, but means must be provided for compelling the drum to move around to maintain at all times the same position relative to the cutters as the latter move about the fabric, and to accomplish this I have provided the following mechanism.

A stationary shaft 30^a supports at one end the spreader 5 and at its other end is supported in a standard 31 and has revolubly mounted thereon a sleeve 32, carrying a gear-wheel 33, to which motion is transmitted to turn sleeve 32 by a chain of gearing driven by the drive-shaft 29. An elbow 34 is secured at one end to sleeve 32 and carries at its other end an open rectangular frame 35, in which the drum 30 is mounted and adapted to wind thereon the strip of fabric as it is cut and passes beneath a roller 36 at the open end of the frame.

On one member of elbow 34 bearings are provided for a shaft 37, carrying at one end a bevel-gear 38, meshing with a stationary and bevel-gear 39 on shaft 30^a, so that as the sleeve 32 and elbow 34, carrying frame 35, are moved around shaft 30^a by the gear 33 the gear 38 will be revolved by its engagement with the stationary gear 39. On the other end of shaft 37 a bevel-gear 40 is located and meshes with a similar gear 41 on a short shaft 42, supported in bearings on the other member of elbow 34. This shaft 42 transmits motion to another shaft 43, carried by frame 35, by means of bevel-gears 44 45, and said shaft 46 also carries a gear 47 in engagement with a similar gear 48 on another shaft 49, also carried by frame 35.

Motion is transmitted from the shaft 49 to the drum 30 by means of bevel-gear 50 on shaft 49 meshing with a gear 51, loose on the shaft 52, carrying the drum. On this shaft 52 a friction-disk 53 is secured and is frictionally engaged by a similar disk 54, loose on shaft 52 and connected with the gear 51, which is also loose on shaft 52, by means of a coiled spring 55, set-screws 56 being provided in gear 51 for regulating the tension of the spring, and consequently the frictional engagement of the disks. It will thus be seen that the rotary movement of gear 51 is transmitted through spring 55 to friction-disk 54, and the latter by its frictional contact with the disk 53, secured on the drum-shaft 52, revolves the drum. These friction-disks are provided for the purpose of compensating for the varying diameter of the drum due to the accumulation of fabric thereon. For instance, when the drum makes its first revolution with the end of the fabric thereon it will take up but a small amount of the same; but as the cloth becomes wound on the drum its diameter necessarily increases, and hence each succeeding revolution winds a greater length of the strip, and by providing the friction-disks, as above explained, they will slip one upon the other to compensate for the increasing diameter of the drum.

The operation of my improvements is as follows: Motion is transmitted to ring 11 by the drive-shaft to turn rollers 7 and draw the fabric in cylindrical form over the spreader and move it longitudinally to the cutters, which are rotated around the fabric and cut the same at an angle, and owing to the simultaneous longitudinal movement of the fabric and the angular cut of the cutters the cloth is cut spirally. The strip of fabric having bias weave, which is the result of this spiral cut, is wound on drum 30 as fast as it is cut, and the drum is moved around at the same speed as the cutting mechanism, so as to take the strip always at the same relative position to the cutters.

It may be found that the arrangement and number of gears shown and described may be varied to accomplish the best results, and hence I wish it understood that I do not consider the precise arrangement of number of gears as essential, but merely as one means of transmitting motion to the several parts, for I may employ various other transmitting mechanism.

A great many slight changes might be resorted to in the general form and arrangement of the several parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for producing fabric having bias weave, the combination of means for feeding a tube of fabric longitudinally, and cutting mechanism adapted to rotate around the fabric and cut it spirally.

2. In an apparatus for producing fabric having bias weave, the combination of means for feeding a tube of fabric longitudinally and holding it distended, and cutting mechanism adapted to rotate about the tube of fabric and cut it spirally.

3. In an apparatus for producing fabric having bias weave, the combination of a spreader for distending a tube of fabric, means for feeding the fabric over the spreader, and cutting mechanism rotated about the fabric and adapted to cut the same spirally.

4. In an apparatus for producing fabric

having bias weave, the combination of means for feeding a tube of fabric longitudinally, cutting mechanism adapted to rotate about the fabric and cut it spirally, and means for winding the strip cut from the tube.

5. In an apparatus for producing fabric having bias weave, the combination of means for feeding a tube of fabric longitudinally, cutting mechanism adapted to rotate about the fabric and cut it spirally, a drum adapted to wind thereon the strip of fabric cut from the tube, and means for moving the drum to maintain it at all times in the same relative position to the cutting mechanism.

6. In an apparatus for producing fabric having bias weave, the combination of means for feeding a tube of fabric longitudinally, a ring adapted to rotate about the fabric, cutters carried by the ring and disposed at an angle thereto, and means for operating the cutters to cut the fabric tube spirally.

7. In an apparatus for producing fabric having bias weave, the combination of a spreader, a series of rollers for drawing a tube of fabric over the same, a ring mounted to rotate about the tube of fabric and spreader, and operate said rollers, another ring adapted to rotate about the tube of fabric at the rear of the spreader, cutting-disks carried by the last-mentioned ring and disposed at an angle thereto, and means for operating said cutting-disks to cut the tube of fabric.

8. In an apparatus for producing fabric having bias weave, the combination of a spreader, a series of rollers for drawing a tubular woven fabric over the same, a ring mounted to rotate about the tube of fabric and spreader and operate said rollers, another ring adapted to rotate about the tube of fabric at the rear of the spreader, cutting-disks carried by the last-mentioned ring and disposed at an angle thereto, a movable frame, a drum mounted therein to receive the strip of fabric cut from the tube, a drive-shaft, and motion-transmitting mechanism between all of said movable parts and the drive-shaft.

9. In an apparatus for producing fabric having bias weave, the combination of means for moving a tube of fabric longitudinally, cutting mechanism adapted to be moved around the tube of fabric to cut the same spirally, a frame, means for moving the frame to maintain it at all times in the same relative position to the cutting mechanism, a drum carried by the frame to receive the strip cut from the tube, means for revolving the drum, and mechanism to compensate for the increasing diameter of the drum as the fabric is wound thereon.

10. In an apparatus for producing fabric having bias weave, the combination of means for moving a tube of fabric longitudinally, cutting mechanism adapted to rotate about the tube and cut it spirally, a drum to receive the strip of bias fabric as it is cut, means for moving the drum to maintain it at all times in the same position relative to the cutting mechanism, a friction-disk secured on the drum-carrying shaft, a similar friction-disk loose on the shaft, a gear-wheel loose on the shaft, a spring connecting the gear-wheel and loose friction-disk, to hold the latter in frictional contact with the other disk, means for adjusting the tension of said spring and means for transmitting motion to said gear-wheel.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK NEWELL.

Witnesses:
G. T. NEWELL,
CARRIE L. NEWELL.