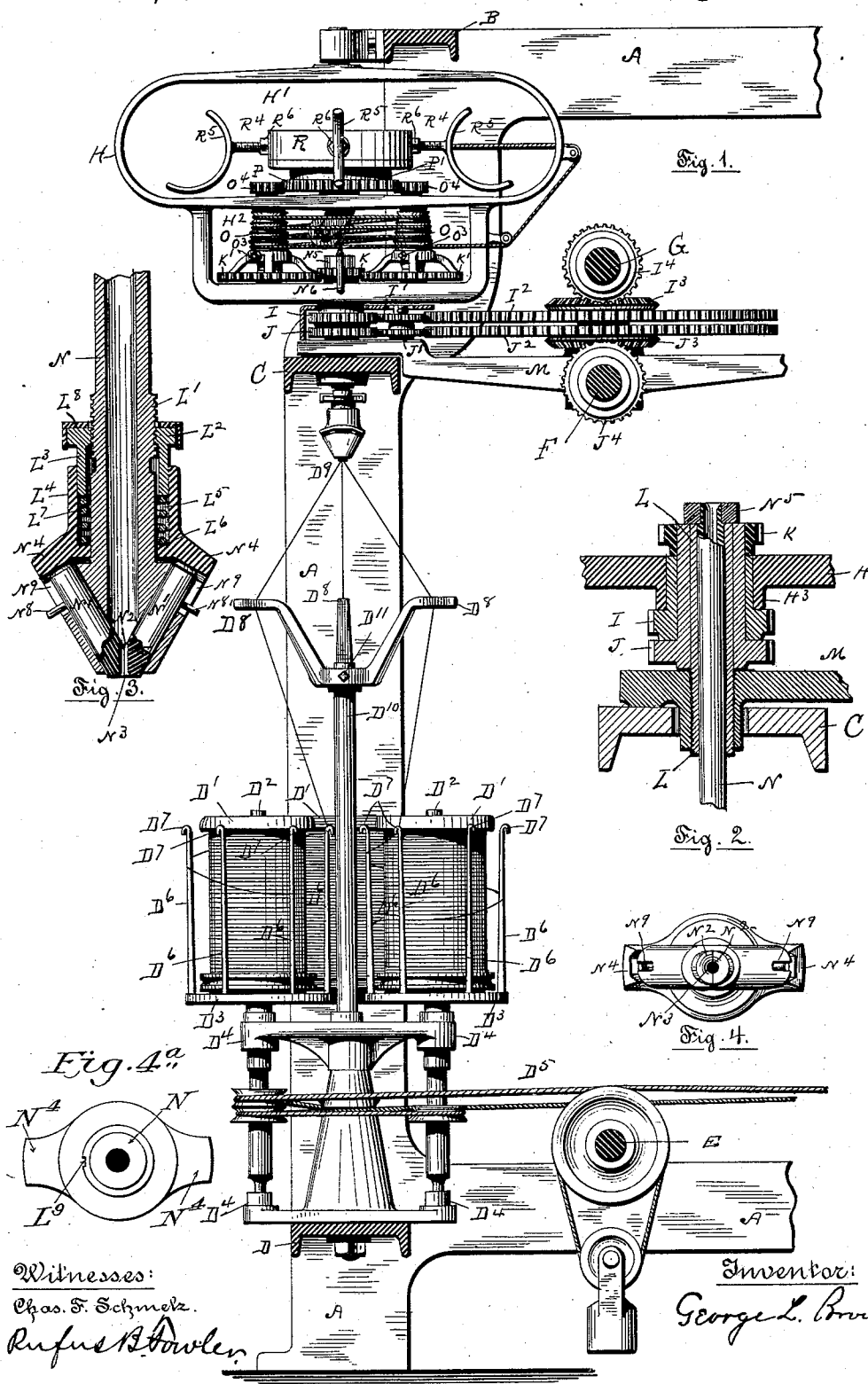


G. L. BROWNELL.  
TWISTING MACHINE.

Patented Aug. 18, 1896.



# UNITED STATES PATENT OFFICE.

GEORGE LOOMIS BROWNELL, OF WORCESTER, MASSACHUSETTS.

## TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,957, dated August 18, 1896.

Application filed August 27, 1887. Serial No. 248,044. (No model.) Patented in England December 22, 1888, No. 18,890.

*To all whom it may concern:*

Be it known that I, GEORGE LOOMIS BROWNELL, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Twisting-Machines, (which was patented by me in Great Britain on or about the 22d day of December, 1888, No. 18,890,) of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of the twisting mechanism embodying my invention and showing a portion of the supporting-frame in transverse sectional view. Fig. 2 is a sectional view of the pinions by which the stretching and reeling mechanism is rotated. Fig. 3 is a sectional view of the mechanism for compressing the twisted cord. Fig. 4 is an end view of the same. Fig. 4<sup>a</sup> is a top view of the compressor, showing the locking-plate.

Similar letters indicate similar parts in the different figures.

My present invention relates to certain improvements in the machine for making twines and cordage which was made the subject of Letters Patent of the United States granted to me on the 16th of April, 1878, No. 202,406; May 22, 1883, No. 277,986, and October 9, 1883, No. 286,258, to which reference may be had for a full and detailed description of such parts of the twisting-machine as are not herein specifically described, not being essential elements of my present invention.

My present invention has reference to the device for compressing the cord, and the flier-hooks for imparting the twist to the separate strands of which the cord is composed; and my invention consists in the construction and arrangement of the several parts, as hereinafter set forth and claimed.

A A denote a portion of the framework of the machine, the part shown being one of the two ends of the frame, which are connected by the upper rail B and middle rail C, between which is placed the stretching and reeling mechanism, and a lower rail D, which supports the spools and the strand-twisting mechanism. In each frame are usually placed a number of twisting mechanisms arranged in a line on opposite sides of the

frame, one of which is shown in elevation in Fig. 1, a similar one being placed on the opposite side, but not shown in the drawings, and both being driven in common from the shafts E, F, and G, journaled in bearings on the frame and placed lengthwise thereof. The spools D', carrying the strands of which the twisted cord is composed, are placed on the spindles D<sup>2</sup> and rest on the disks D<sup>3</sup>, attached to the spindles, which are held in the bearings D<sup>4</sup> D<sup>4</sup>, and are driven by a band D<sup>5</sup> from the revolving shaft E. The spools D' are placed loosely on the spindles and are rotated by their friction on the disks D<sup>3</sup>. Around each of the disks D<sup>3</sup> are placed a series of pins D<sup>6</sup>, extending upwardly as high as the spools and terminating in hooks D<sup>7</sup>. The strand from each of the spools D' is carried around more or less of the pins D<sup>6</sup>, as a greater or less friction is required upon the strand, and beneath the hook of the last pin to the strand-guides D<sup>8</sup>. From the strand-guides D<sup>8</sup> all the strands are brought together at D<sup>9</sup> and taken to the revolving "head," and placed between the upper and middle rails B and C. As each of the strands is held by one of the hooks D<sup>7</sup> it will be carried around by the rotation of the corresponding spindle D<sup>2</sup> and twisted, each of the spools turning on one of the disks D<sup>3</sup> as the strand is drawn off.

If desired, a washer, of leather or other friction material, may be placed between the head of the spool and its supporting friction-disk in order to increase the friction.

The spindles D<sup>2</sup> are arranged around a central post D<sup>10</sup>, held on the lower rail D and carrying at its upper end a spider each of whose arms forms a strand-guide, through an eye in which the strand is passed for the purpose of holding the strands apart as they pass to the head by whose rotation they are twisted together into a single cord.

The spider forming the strand-guides is attached to the post by a set-screw D<sup>11</sup>, which allows a vertical adjustment of the spider on the post, whereby the angle of the strands relatively to their axis of rotation is varied.

I am aware that it is not new to make the strand-guides adjustable, so as to vary the angle between the strands and the axes of the strand-spools; but in such cases the die or

hole at which the strands were twisted together was kept at a uniform distance from the strand-guides. I make the strand-guides adjustable with reference to the compressor, so as to vary the angle formed between the strands and the twisted cord, the angle being less as the spider D<sup>11</sup> is lowered and greater as it is raised, the highest position bringing the strands at right angles to the twisted cord.

The stretching and reeling mechanism is contained in a rotating frame H, having the compartments H<sup>1</sup> and H<sup>2</sup>. The frame H receives a rapid rotary motion about a vertical central axis by means of a pinion I, attached to a hub H<sup>3</sup> on the frame H and driven, through the intermediate pinion I', by the gear I<sup>2</sup>, which receives its motion, through the bevel-gears I<sup>3</sup> and I<sup>4</sup>, from the revolving shaft G. Within the hub H<sup>3</sup> is a sleeve formed of the elongated hub of the pinion J and having at its upper end a pinion K, engaging the gears K', attached to the stretching-drums O. The pinion J is driven, through the intermediate pinion J', by the gear J<sup>2</sup>, which receives its motion, through the bevel-gears J<sup>3</sup> J<sup>4</sup>, from the revolving shaft F, which revolves in an opposite direction from the shaft G. In practice I usually prefer to apply power to the shaft G and drive the shaft F from the shaft G through a pair of spur-gears whose ratio may be readily varied, thereby changing the speed, relatively, of the frame H and the stretching-drums. The frame H turns about the hub of the pinion J as its lower bearing, and the hub of the pinion J turns about a tube L, fixed in and projecting upward from the end of the yoke M. (Shown in sectional view in Fig. 2.)

The two intermediates I' and J' are on a stud held in the yoke M, and the gears I<sup>2</sup> J<sup>2</sup> also turn on a stud in the yoke M. In the tube L is a tube N, having at its lower end the ways, placed obliquely to the axis of the tube, to receive the sliding cylindrical pins N' N', their lower ends presenting the opposing faces N<sup>2</sup> N<sup>2</sup>, each having a groove, which together form the opening N<sup>3</sup>, Fig. 4, through which the cord passes. The outer surface of the tube N is screw-threaded for a portion of its length at L' to receive the screw-threaded nut L<sup>2</sup>, which has a sleeve L<sup>3</sup>, extending downwardly into the sleeve L<sup>4</sup>, which has the two prongs N<sup>4</sup> N<sup>4</sup>, extending over and resting upon the upper ends of the sliding pins N' N'. The sleeve L<sup>4</sup> has an annular chamber L<sup>5</sup>, closed at the bottom by the flange L<sup>6</sup> and at the top by the sleeve L<sup>3</sup>.

Within the annular chamber L<sup>5</sup>, I place a spiral spring L<sup>7</sup>, with its tension exerted against the flange L<sup>6</sup> and the end of the sleeve L<sup>3</sup>, so as to press the prongs N<sup>4</sup> N<sup>4</sup> down upon the upper ends of the pins N' N' and compress the cord between the faces N<sup>2</sup> N<sup>2</sup>. The nut L<sup>2</sup> is square or hexagonal, so as to receive a wrench, and I keep it from being turned by a locking-plate L<sup>8</sup>, having a hole in the center to receive the tube on which it

may be lifted, but is prevented from turning by means of a spline or prong L<sup>9</sup> entering a groove in the tube N or by any of the known methods by which the locking-plate may be held from turning on the tube, while it may be raised and lowered. The ends of the locking-plate are turned down to fit the sides of the nut, so as to keep the nut from being turned, except when the locking-plate is raised.

The sliding pins N' N' are held from turning by the pins N<sup>8</sup> N<sup>8</sup>, which slide in the slots N<sup>9</sup> N<sup>9</sup>. The slots N<sup>9</sup> N<sup>9</sup> are open at the upper end, so the pins N' N' may be removed and others substituted having grooves of different sizes forming the opening N<sup>3</sup> larger or smaller for cords of different size. The pressure exerted upon the cord as it passes through the opening N<sup>3</sup> is regulated by screwing the nut L<sup>2</sup> up or down, and thereby varying the tension of the spring L<sup>7</sup>. As the cord leaves the tube N it is carried over a guide-pulley to the upper grooves in one of the scoring or tapering drums O O in the same manner as in the patents above referred to. The scoring-drums O O are integral with the gears K' and are attached by set-screws O<sup>3</sup> to vertical spindles, which carry upon their upper ends pinions O<sup>4</sup>, engaging a gear P upon the drum P', carrying a plate R and having the screw-threaded arms R<sup>4</sup> held by nuts R<sup>6</sup> and provided with forks B<sup>2</sup> at their outer extremities to receive the cord. The reeling mechanism, however, forms no part of my present invention, and it is therefore not shown or described in detail.

In the operation of twisting a cord the several strands are taken from the spools D', each strand being carried around the outside of the pins D<sup>6</sup> and under the hook D<sup>7</sup> of the last pin and through the eyes D<sup>8</sup> of the three-armed spider to the compressor. The compressor is furnished with a pair of sliding pins N', having grooves to form an opening N<sup>3</sup> the size of the cord to be made, and the required pressure on the cord is secured by lowering the nut L<sup>2</sup>, thereby increasing the tension of the spiral spring L<sup>7</sup>, which is exerted through the flange L<sup>6</sup> and prongs N<sup>4</sup> on the upper ends of the sliding pins N'. As the compressor is rotated with the frame H a twist will be imparted to the strands immediately below the jaws of the compressor, the individual strands being held apart by the eyes D<sup>8</sup>, a twist being also given to each strand by the rotation of the hooked pins D<sup>6</sup>. From the tube N of the compressor the twisted cord is taken to the stretching and reeling mechanism, which operates in substantially the same manner as described in the patents heretofore granted to me and above referred to.

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

1. In a twisting-machine, the combination with mechanism for imparting a rotary motion to the cord to be twisted, of a series of

spool-supports consisting of disks attached to rotating spindles and a series of pins held in said disks and extending upwardly around the spools supported upon said disks, each of  
 5 said pins having a hook at its upper or free end, as and for the purpose set forth.

2. In combination, a rotating spindle, a disk attached to said spindle, and a series of pins held at one end in said disk, and each provided at its free end with a hook, substantially as described.

3. In a twisting-machine, the combination with mechanism for imparting a rotary motion to the cord to be twisted, of a spool-support consisting of a disk attached to a rotating  
 15 spindle, a series of pins held in said disk and arranged concentrically around the spool supported upon said disk, one or more of said pins being provided at its free end with a hook, substantially as described.

4. In a twisting-machine, the combination with mechanism for imparting a rotary motion to the cord to be twisted of a series of rotating spindles  $D^2$ , disks  $D^3$  attached to said  
 25 spindles, pins  $D^6$  held in said disk, each having a hook  $D^7$ , a post  $D^{10}$  parallel with said spindles and a strand-guide adjustably attached to said post and provided with eyes  $D^8$ , substantially as described.

30 5. The combination with mechanism for rotating the cord to be twisted, of a tube placed concentrically with the axis of the twisted cord and having ways for compressing-jaws, placed obliquely to the axis of the

cord, jaws held in said oblique ways and  
 35 capable of sliding therein, with the convergent ends adapted to press against the cord and means for applying pressure to the divergent ends of said jaws, substantially as described.

6. The combination with mechanism for rotating the cord to be twisted, of a tube placed concentrically with the axis of the twisted cord, and having ways for compressor-jaws  
 45 placed obliquely to the axis of the cord, compressor-jaws capable of sliding in said ways and having their convergent ends grooved, a sliding collar sliding on said tube and provided with prongs resting on the divergent  
 50 ends of said jaws, and means whereby said collar is pressed against the ends of said jaws, substantially as described.

7. In a twisting-machine, the combination with mechanism for rotating the cord to be  
 55 twisted, of a tube placed concentrically with the axis of the twisted cord, and having ways for the compressing-jaws, compressing-jaws having a sliding motion in said ways obliquely to the axis of the cord, a sleeve sliding on said  
 60 tube with prongs resting against said jaws, a spring with its tension applied to said sliding sleeve, and an adjusting-nut by which the tension of said spring is varied, substantially as described.

GEORGE LOOMIS BROWNELL.

Witnesses:

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 H. M. FOWLER.