

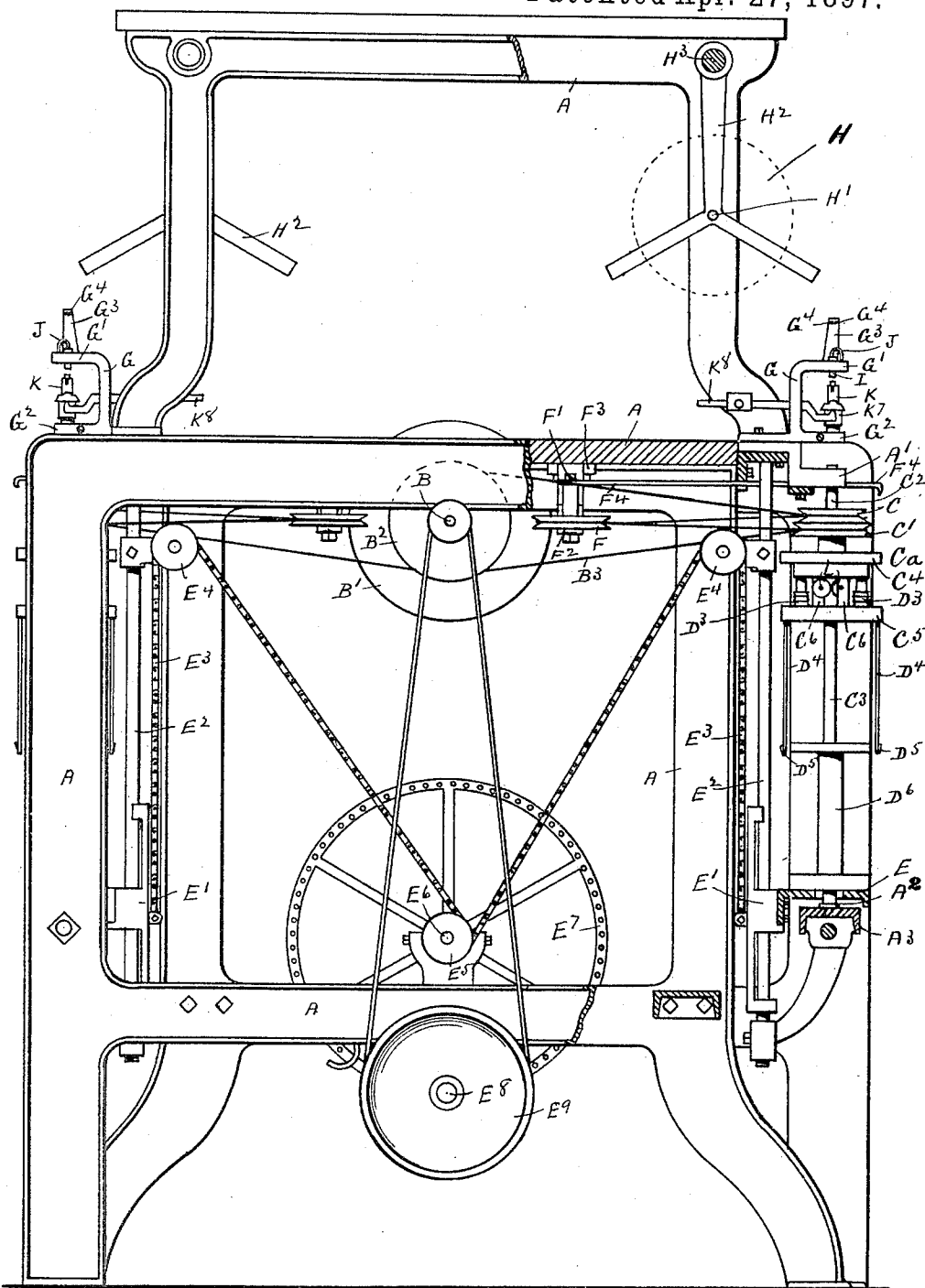
(No Model.)

2 Sheets—Sheet 1.

G. L. BROWNELL.
TWISTING MACHINE.

No. 581,672.

Patented Apr. 27, 1897.



Witnesses

A. Whiting.

Emmett H. Hester

Fig. 1.

George Loomis Brownell.

By his Attorneys Rufus P. Fowler.

Inventor

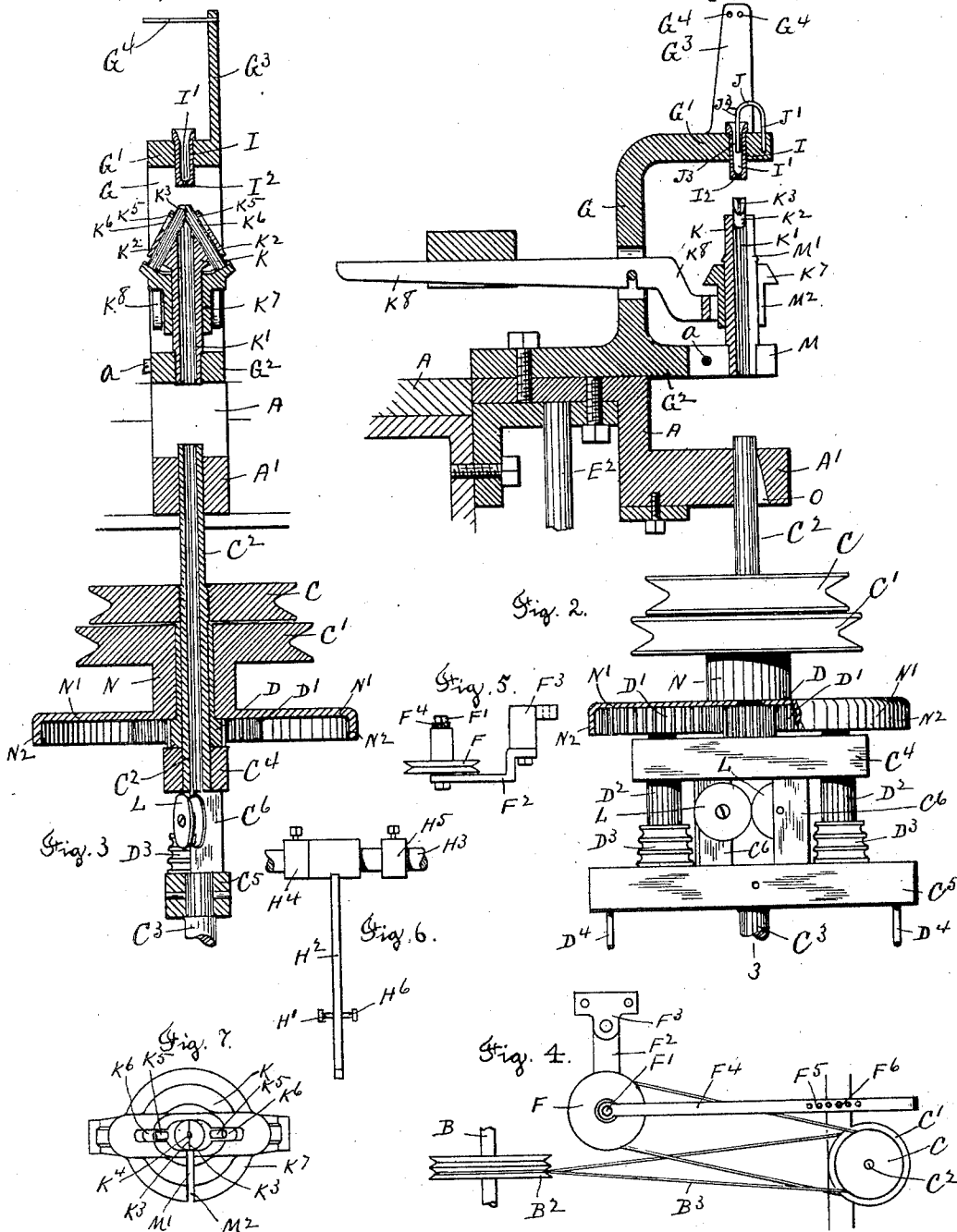
(No Model.)

2 Sheets—Sheet 2.

G. L. BROWNELL.
TWISTING MACHINE.

No. 581,672.

Patented Apr. 27, 1897.



Witnesses
A. Whiting
Emma Kester

Inventor
George Loomis Brownell.
By his Attorney
Rufus B. Fowler.

UNITED STATES PATENT OFFICE.

GEORGE L. BROWNELL, OF WORCESTER, MASSACHUSETTS.

TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,672, dated April 27, 1897.

Application filed July 7, 1894. Serial No. 516,812. (No model.)

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, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, and in which—

Figure 1 represents a side view of a twisting-machine embodying my invention, a portion of the framework having been removed in order to disclose the twisting mechanism. Fig. 2 is a side view of the twisting mechanism similar to that represented in Fig. 1, but on a larger scale, the upper portion shown in Fig. 3 being represented in central vertical sectional view. Fig. 3 is a central sectional view of the mechanism shown in Fig. 2, the section being taken on line 3 3, Fig. 2. Fig. 4 is a top view of the device for adjusting the tension of the driving-belt by which the twisting-spindle and stretching-drums are driven. Fig. 5 is a detached view of the pivoted arm and tightening-pulley for varying the tension of the twisting-belt. Fig. 6 is a front view of the adjustable-swinging arm upon which the roll of paper to be twisted is carried, and Fig. 7 is a top view of the compressor-stand K and compressor-pins K² K².

Similar letters refer to similar parts in the different figures.

My invention relates to that class of twisting-machines which is designed to twist a strip or ribbon of paper into a twine or cord, but that portion of the machine which is directly concerned in the operation of imparting a twist to the strip of paper is also adapted to and can be employed in machines for twisting a twine or cord composed of fibrous material, such as cotton, linen, &c.; and my invention consists in the construction and arrangement of parts as hereinafter set forth, and pointed out in the annexed claims.

Referring to the drawings, A denotes the framework of the machine, which supports a series of twisting mechanisms which are duplicates of each other and are arranged in parallel rows upon opposite sides of the machine. One of these twisting mechanisms is

disclosed in Fig. 1 by the removal of a portion of the end framework of the machine upon the right-hand side of the figure.

Journaled in the framework is a horizontal driving-shaft B, receiving rotary motion from a counter-shaft or a main line of shafting through a belt-pulley B' and carrying scored pulleys having belt connections with the twisting mechanisms. One of these pulleys is shown at B², connected by a belt B³ with the scored pulleys C and C'.

The scored pulley C is attached to a spindle C^a, formed in two sections—an upper hollow section C², to which the scored pulley C is attached, and a lower section C³. The sections C² and C³ have their axes in alinement and are connected by a framework consisting of the cross-bars C⁴ and C⁵, connected by the vertical bars C⁶ C⁶.

The upper section C² is journaled at its upper end in a horizontal rail A', and has its lower end attached to the cross-bar C⁴.

The lower section C³ has its upper end attached to the cross-bar C⁵ and its lower end supported in a step-bearing A² on the horizontal rail A³, so the upper and lower sections and intermediate framework will be rotated as a single piece by the rotation of the scored pulley C.

Rotating about the upper section C² of the spindle is a scored pulley C', having a pinion D attached thereto, engaging the gears D' D', which are attached to spindles D² D², journaled in the cross-bars C⁴ and C⁵, and carrying the scored stretching-drums D³ D³, so the rotation of the scored pulley C' will rotate the stretching-drums D³ D³ independently of the spindle.

Depending from the under side of the cross-bar C⁵ are two rods D⁴ D⁴, having eyes D⁵ D⁵ at their lower ends and forming flier-arms, which are carried by the rotation of the spindle C^a about a winding-spool D⁶, held loosely on the lower section C³ of the spindle.

The arrangement of the stretching-drums outside their supporting-framework obviates the necessity of stringing the machine or carrying the cord through the frame in passing it around the stretching-drum or winding-spool.

The spool D⁶ is supported upon a travers-

ing rail E, which is attached to a sliding frame E', capable of a vertical sliding movement upon the fixed rods E², by means of a traversing mechanism such as is now in use and consisting of a chain E³, attached to the sliding frame E' and passing over a guide-roll E⁴, with its opposite end attached to a drum E⁵, carried upon a shaft E⁶ and alternately rotated in opposite directions by a mangle-wheel E⁷, driven in the usual manner by a pinion (not shown) carried upon a shaft E⁸, which is rotated by a pulley E⁹, having a belt connection with the main driving-shaft B. The reciprocating motion of the drum E⁵, through the chain E³, imparts a rising-and-falling motion to the traversing rail E and winding-spool D⁶, causing the twisted cord, as conducted through one of the eyes D⁵ in the flier-arms, to be uniformly laid upon the winding-spool.

A single driving-belt B³ is made to drive both pulleys C C' by being carried from the pulley B² around the scored pulley C', then around a tightening-pulley F, and from the tightening-pulley F around the scored pulley C', then back to the scored pulley B².

The tightening-pulley F turns loosely upon a stud F', held in a swinging arm F², pivoted to a bracket F³, attached to the fixed framework of the machine.

Pivoted upon the upper end of the stud F' is a flat bar F⁴, provided with a series of holes F⁵, arranged to be engaged by a pin F⁶, held in the frame of the machine. By disengaging the bar F⁴ from the pin F⁶ and pushing it inward the belt B³ will be tightened so as to operatively connect the pulleys C C' with the driving-pulley B², and by withdrawing the bar the belt B³ will be loosened and the pulleys C C' disconnected from the driving-power. By the tightening mechanism just described each of the twisting mechanisms can be independently connected with or disconnected from a common driving-shaft, allowing each of the twisting-spindles to be stopped when desired, and the tension of the driving-belt can also be accurately adjusted in order to maintain the proper speed of the spindle and stretching-drums.

Mounted upon the rail A' is a supporting-bracket G, having upper and lower arms G' and G², and from the arm G' a post G³ extends upwardly, supporting at its upper end two parallel wires G⁴ G⁴, forming a guide to conduct the paper strip or ribbon to the twisting mechanism.

The strip or ribbon of paper is wound in a coil (indicated by the broken line H) and is supported upon a stud H', projecting from one side of a swinging arm H², loosely supported upon a rod H³, held by the framework of the machine and provided with fixed collars H⁴ H⁵.

The arm H² is provided upon one side with a stud H' and upon the opposite side with a similar stud H⁶.

In the operation of the machine the coil of

paper H is placed upon the stud H' and the arm H² moved on the rod H³ against the fixed collar H⁴, thereby bringing the stud H' and coil of paper H in alinement with the guide-wires G⁴. A second coil of paper is placed upon the stud H⁶ upon the opposite side of the arm H², and when the coil upon the stud H' has been unwound the arm H² is moved along upon the rod H³ against the collar H⁵, which brings the stud H⁶ and its coil of paper into alinement with the guide-wires G⁴. The two collars H⁴ and H⁵ are arranged upon the rod H³ in proper position to serve as stops for the arm H² as it is moved along the rod and bring either of the studs H' and H⁶ into alinement with the guide-wires G⁴, so the shifting of the arm H² from one of the stops to the other will allow the substitution of one coil for another without stopping the machine. The upper arm G' supports a removable tube I, inclosing a cylindrical chamber I', extending nearly throughout its length and having at its lower end a contracted concentric opening or hole forming a die I². Supported also by the arm G' is a U-shaped wire J, having one end, J', removably held in the arm G' and the other end, J², inclosed concentrically within the chamber I', so as to form an annular space J³ around the end of the wire.

Supported upon the arm G² is a vertical stand K, having a central hole K' with its axis in alinement with the axis of the chamber I' and also with the axis of the revolving spindle-section C². Compressor-pins K² K² are held in ways at the upper end of the stand K, placed obliquely to the axis of the hole K', and having their upper ends beveled to form the surfaces K³, in each of which is a groove K⁴, Fig. 7, so that when the surfaces K³ are brought together, as represented in Fig. 3, an opening will be formed through which the cord passes into the hole K'. The compressor-pins K² are held from rotation in their ways by means of pins K⁵, which enter grooves K⁶ in the stand K. The lower ends of the compressor-pins K² are supported upon a collar K⁷, capable of sliding vertically upon the stand K and resting upon one arm of a pivoted lever K⁸, which is provided with a sliding weight upon its opposite arm in order to raise the collar K⁷ and compressor-pins K² K² and bring their upper and beveled ends against the twisted cord.

Turning loosely upon studs held in the vertical bars C⁶ C⁶ are scored guide-rolls L L, so placed that their inner edges will be tangential to the axis C² of the spindle and their lower edges tangential to the upper grooves in the scored stretching-drums D³. Between the scored pulley C' and pinion D is a hub N, at the lower end of which a flange N' is formed, having its edges N² turned downward to inclose and protect the gears D' D'.

The journal-bearing in the rail A' for the upper end of the section C² of the spindle is elongated at its lower portion, as at O, Fig. 2, in order to allow the spindle to be raised to

clear the step-bearing and permit the lower end of the spindle to be carried forward, so the spool D⁶ can be removed.

The strip of paper to be twisted is conducted from the coil H, between the guide-wires G⁴, through the forming-tube I, the strip of paper being bent around the end J² of the wire J, so as to form a paper tube inclosed in the annular space J³, the periphery of the chamber I' being preferably equal to the width of the paper strip, so as to nearly or quite bring the opposite edges of the paper strip together, forming a continuous paper tube around the interior surface of the chamber I', the paper tube being held expanded by the inclosed end of the wire J.

From the chamber I' the paper tube is conducted through the contracted hole I², which causes the paper tube formed around J² to be collapsed or contracted in diameter by the formation of a series of longitudinal creases in the tube. The collapsed tube as it leaves the hole I² passes through the groove K⁴, formed in the beveled ends of the compressor-pins K², and through the hole K' in the stand K and the hollow section C² of the spindle. The cord is conducted from the hollow section C² of the spindle around one of the guide-pulleys L and around the several grooves in the stretching-drums D³.

From the stretching-drums D³ the cord is carried over the edge of the lower cross-bar C⁵ and through one of the eyes D⁵ of the flier-arms D⁴ to the winding-spool.

The arm G² is split diametrically with the hole containing the stand K by a slot M, and the stand K is held in the arm by means of a clamping-screw *a*. The stand K and sliding collar K' are also cut open on one side by vertical slots M' M², forming a communication with the hole K'. The slot M' in the side of the stand K and the slot M² in the sliding collar K' are in alinement with the slot M in the arm G², allowing the cord to be carried into the hole K' from the side instead of requiring to be entered endwise through the hole K'.

The operation of the machine is as follows: A rapid rotary motion is imparted to the revolving spindle C^a and flier-arms D⁴ through the scored pulley C, imparting a twist to that section of the cord extending from the guide-pulley L to the beveled ends K³ of the compressor-pins K², the pressure of the compressor-pins K² upon the cord limiting the twist to the section of the cord below the pins, the employment of the compressor-pins between the rotating twisting mechanism and the die I² preventing the twist from extending upward and entering the die. During the twisting operation, as described, the stretching-drums D³ are rotated through the scored pulley C' and intermediate gearing, causing the cord to be drawn from the coil H and delivered to the flier-arms D⁴, the drag of the spool D⁶ upon the traversing-rail E causing the twisted cord to be wound upon the spool, the amount of twist which will be imparted to

any given length of cord being determined, of course, by the relative speed of the stretching-drums D³ and the twisting-spindle C^a, the relative speed of the two being determined by the relative size of the scored drums C and C'.

I do not herein claim the use of the tube I, inclosing a wire and having an annular space between the wire and the interior wall of the tube; neither do I herein claim the employment of the contracted opening I², forming a die, as these features were described and claimed in my pending application, Serial No. 399,095.

In the machine forming the subject of my present invention I employ a U-shaped wire J, having one end J' removably held in the fixed framework of the machine and the opposite end J² inclosed in the tube.

I do not herein claim, broadly, the employment of a compressor, as such has been in common use in twisting-machines for making cord or twine, but I deem it to be new in a twisting-machine adapted for forming a paper cord or twine from a paper strip or ribbon to arrange the several parts in the order I have described—viz., a coil-holder, upon which the paper strip or ribbon is supported, a rotating twisting mechanism, by which a twist is imparted to the cord and the cord is drawn from the holder and delivered to the winding-spool, with a tube, as I, and die, as I², interposed between the twisting mechanism and the coil-holder and with the compressor interposed between the twisting mechanism and the die, by which the extent of twist along the cord is limited and prevented from entering the die, whereby I am able to complete the crimping of the paper tube before the same is twisted by the rotating twisting mechanism.

The British patent granted to me, No. 15,091, dated August 22, 1892, shows a tube, having a spindle inclosed therein, around which the paper ribbon was formed into a tube; but my present machine reverses the positions of the parts and allows the employment of the bent wire J, which is held in place by its own weight and is supported by one of its ends removably held in the arm G'.

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

1. In an organized machine, the combination of a coil-holder by which the material to be twisted is supported, a rotating twisting mechanism by which the material to be twisted is drawn from the coil-holder and twisted, a die I² between said coil-holder and said twisting mechanism, and a compressor located between said die and said twisting mechanism, whereby the twisting action is limited and prevented from extending into said die, substantially as described.

2. In a twisting-machine, the combination with a rotating twisting mechanism, and a tube inclosing a chamber and having a contracted concentric opening, of a U-shaped

wire J, having one of its legs entering the end of said tube and concentric thereto, and having its other leg supported by the frame of the machine, whereby said wire is supported in a different plane from the axis of said tube, substantially as described.

3. In a machine for twisting cord, the combination of a fixed arm supporting a hollow compressor-stand and provided with a slot on one side, a hollow compressor-stand supported by said arm and having a slot coinciding with the slot in said arm and communicating with the interior of said stand and a pair of compressor-pins held by said slotted stand and arranged to bear against the cord, substantially as described.

4. The combination of the hollow spindle-section C², cross-bar C⁴ attached to said spindle-section, the spindle-section C³, cross-bar C⁵ attached to said spindle-section, a vertical bar C⁶ uniting said cross-bars, and stretching-drums journaled in said cross-bars outside said vertical bar C⁶, whereby the cord can be carried around said stretching-drums, substantially as described.

5. The combination of the spindle-sections C² and C³, framework uniting said spindle-sections, consisting of the cross-bars C⁴ C⁵ and

vertical bars C⁶, stretching mechanism carried by said framework, a spool-support concentric with said spindle-section C³, flier-arms attached to the cross-bar C⁵ and projecting downward, eyes in the free ends of said flier-arms, and means for raising and lowering said spool-support, substantially as described.

6. In a twisting-machine, the combination of pulley C and a twisting mechanism connected with said pulley, a pulley C' and stretching mechanism connected with said pulley C', a driving-pulley having a belt connection with said pulleys C and C', a tightening-pulley, a pivoted arm supporting said tightening-pulley, a belt connecting the driving-pulley, the pulleys C and C' and the tightening-pulley, a shipper-bar E⁴ connected with said pivoted arm and provided with a series of holes F⁵ and a pin F⁶ held by the framework of the machine and engaging one of said holes, substantially as described.

Dated this 2d day of July, 1894.

GEORGE L. BROWNELL.

Witnesses:

RUFUS B. FOWLER,
HENRY W. FOWLER.