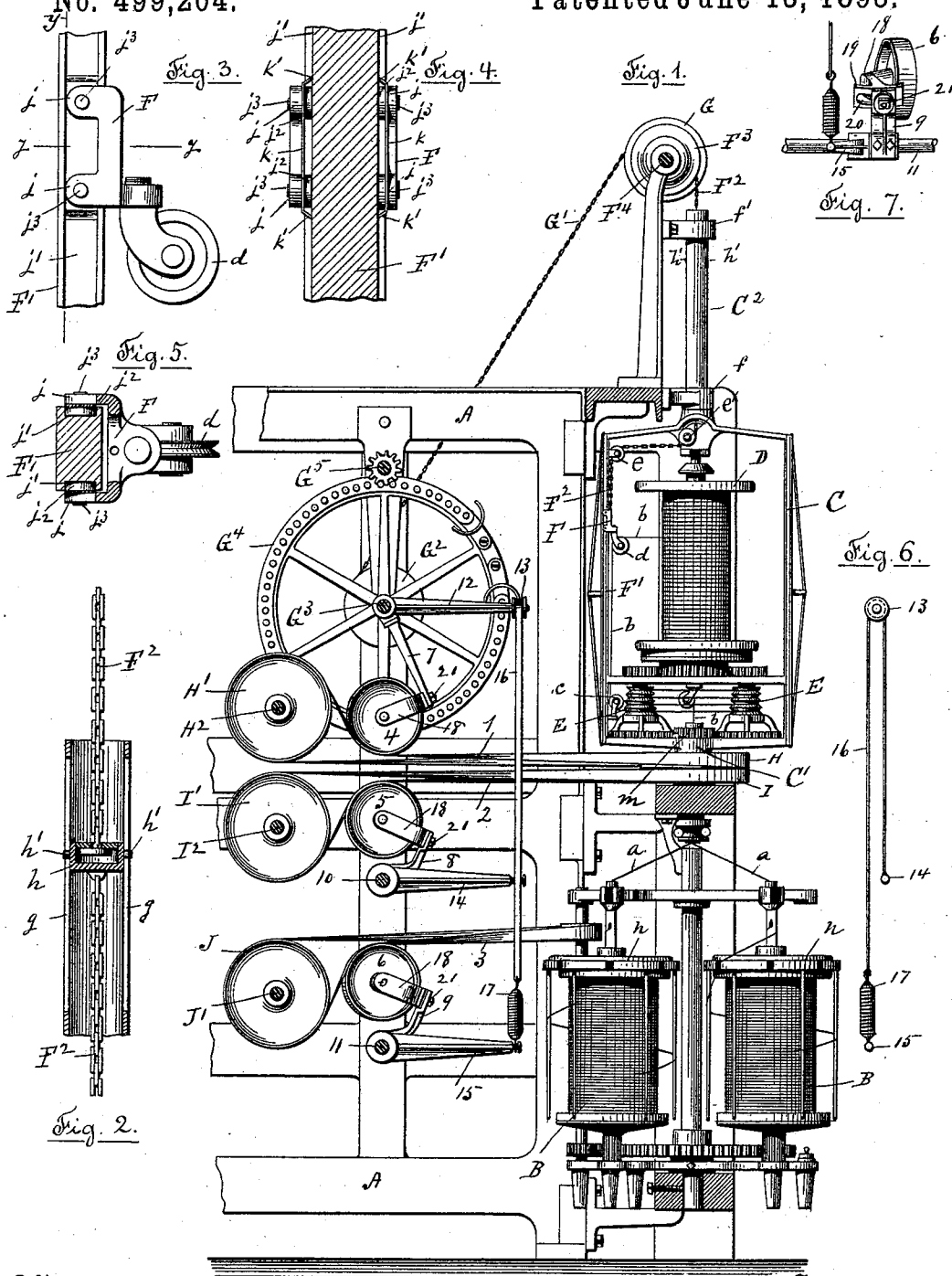


(No Model.)

G. L. BROWNELL.
TWISTING MACHINE.

No. 499,204.

Patented June 13, 1893.



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GEORGE LOOMIS BROWNELL, OF WORCESTER, MASSACHUSETTS.

TWISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 499,204, dated June 13, 1893.

Application filed March 5, 1891. Serial No. 383,726. (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 certain new and useful Improvements 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 an end elevation of a portion of a twisting machine embodying my invention, shown in sectional view, the end frame nearest the observer having been removed in order to disclose more fully the operating mechanism. Fig. 2, is a detached view of the swiveled flexible connection between the traversing carriage, by which the twisted cord is laid upon the winding spool, and its operating mechanism, also representing a portion of the inclosing tube within which the swivel traverses. Fig. 3, represents, in elevation, the traversing carriage by which the twisted cord is laid upon the winding spool, also showing in connection therewith a small portion of the flier frame forming the track upon which said carriage moves. Fig. 4, represents the same in sectional view on line X, X, Fig. 3. Fig. 5, represents the same in sectional view on line Y, Y, Fig. 3. Fig. 6, represents in detached view the actuating spring and flexible connection, by which the several belt tighteners are made to tighten the driving belts of the machine with a uniform tension and Fig. 7, represents one of the belt tightening devices with the actuating spring applied thereto.

Similar letters and numerals refer to similar parts in the different figures.

My present invention consists in certain improvements in the mechanism by which the twisted cord is laid upon the winding spool and also in the tightening devices by which the driving belts are simultaneously maintained in a state of uniform tension.

In the accompanying drawings Fig. 1, represents so much of a twisting machine as includes one complete twisting mechanism or "head" with its connected actuating mechanism.

A, A, denote a portion of the frame work of the machine.

B, B, are strand spools containing the individual strands to be twisted.

C, is a rotating flier frame having hollow journals C', C²; through the former the strands *a*, which are to form the twisted cord are conducted.

D, denotes the spool upon which the twisted cord is wound, held concentrically within the flier frame C, and having an independent rotation through connected operating mechanism, which, however, forms no part of my present invention. The twisted cord *b*, is carried around stretching drums E, E, and over the guide pulleys *c*, *d*, to the winding drum D. The guide pulley *d*, is carried by a traversing carriage F, which moves up and down upon the side F' of the flier frame C. To the carriage F, I attach a chain or flexible connection F², which passes over the guide pulleys *e*, *e'*, by which it is brought concentric with the hollow journal C², through which it passes to and is connected with a winding drum F³, carried upon the shaft F⁴. Upon the shaft F⁴, is a winding drum G, having a chain G', wound thereon with its opposite end attached to the winding drum G², upon the shaft G³, carrying a mangle-wheel G⁴, by which, and the actuating pinion G⁵, the shaft G², is made to rotate alternately in opposite directions in the usual and well known manner. When the drum G², is rotated in one direction the chain F², is wound upon the drum F³, and the carriage F, drawn upward upon the side F', of the flier frame C. When the drum G², is rotated in the opposite direction the chain G', is allowed to unwind therefrom and the tension of the twisted cord *b*, serves to draw the carriage F, downward upon the side F', of the flier frame. A traversing motion is thus imparted to the carriage F, upon the side of the flier frame causing the twisted cord *b*, as it passes over the pulley *d*, to be uniformly and evenly laid upon the winding spool D. The hollow journal C², consists of a long tube rotating within the journal bearings *f*, and *f'*. This tube is provided throughout its central section with the two grooves *g*, *g*, placed upon diametrically opposite sides as represented in the sectional view shown in Fig. 2. The chain F², connected with the traversing carriage F, is attached to the shell *h*, and that portion of the

chain F^2 , which is connected with the winding drum F^3 , is swiveled within the shell h , as represented in Fig. 2.

The shell h , is provided with the spurs h' , entering the grooves g , causing the rotation of the tubular journal C^2 , to be imparted to the shell h , and also allowing the shell h , to traverse up and down within the hollow journal C^2 . That section of the chain F^2 , which is attached to the traversing carriage F , and the shell h , is thereby caused to rotate with the flier frame without causing its rotation to be communicated to the upper portion of the chain F^2 , which is connected with the winding drum F^3 . The carriage F , is shown in detail in Figs. 3, 4, and 5, and is provided with the prongs j , inclosing the side F' , of the flier frame which is recessed at j' , to receive the friction rolls j^2 , turning upon studs j^3 , held in the prongs j .

Supported upon the studs j^3 , and placed between the prongs j , and the friction rolls j^2 , are the blades of sheet metal k , having their ends k' , bent against the sides of the side F' , of the flier frame C , and as the carriage F , is traversed along the side F' , the bent ends k' , being in contact with the frame act as scrapers to clear the recessed track j' of lint or dirt which would otherwise accumulate therein.

Upon the hollow journal C' , of the flier frame C , is placed a belt pulley H , by which the flier frame is rotated by means of a belt connection with the pulley H' , upon the driving shaft H^2 . Inclosed within the hollow journal C' , is a hollow spindle carrying the belt pulley I , and the pinion m , through which motion is communicated to the stretching drums E , E , and the winding spool D . The pulley I , is driven through a belt connection with the pulley I' , upon the shaft I^2 . Each of the strands a , are twisted by the revolving fliers n , which are driven through the belt connection 3, by the pulley J , upon the shaft J' .

The driving pulleys H' , I' and J are carried upon the parallel and horizontal main driving shafts H^2 , I^2 and J' , which are rotated by a suitable connection with the main driving shafting, or counter-shaft. In practice I usually connect one of these three shafts with a counter-shaft through a belt connection and from the shaft so driven I drive the other two shafts through belt connections. These belt connections, by which the three horizontal shafts H^2 , I^2 and J' are rotated, are not shown in the drawings as the method of driving them, will be well understood. These three driving belts 1, 2, and 3, have applied to them the tightening pulleys 4, 5, and 6, each of the pulleys being carried upon one of the arms 7, 8, and 9, of the bell-crank levers pivoted upon the shafts G^3 , 10, and 11. The arm 12, of the upper bell-crank is provided upon its end with a flanged pulley 13, and the ends of the levers 14, and 15, are connected by the flexible connection 16, which passes over the flanged pulley 13. The connection 16 includes a spi-

ral spring 17, and consists preferably of a strip having one end attached to the lever 14 as represented in Fig. 6 and passing over the flanged pulley 13, turning upon the end of the arm 12, with its opposite end connected to one end of the said spiral spring 17, said spring having its opposite end connected to the end of the lever 15 so that the strain exerted upon the flexible connection will be received by the spring 17, whose tension is applied to raise the arms 14, and 15, and depress the arm 12, thereby carrying the tightening pulleys 4, 5, and 6, against their respective belts with a uniform and constant pressure determined by the tension of the spring 17. By this method of tightening the driving belts 1, 2, and 3, the three belts, by which the component strands are twisted; the cord itself is twisted; and the twisted cord is wound upon the winding spool, are maintained in a state of uniform tension, which obviates the liability of one of the belts becoming more slack than the others and slipping upon its pulleys. Intermediate the tightening pulleys 4, 5, and 6, and the bell-crank arms 7, 8, and 9, by which they are carried are arms 18, one of which is shown in Fig. 7. These arms are provided at one end with a curved flange 19, having a slot 20, by which the arm is adjustably attached by means of a bolt 21, to the arm of the bell-crank lever. The free ends of the arms 18, support the rotating tightening pulleys 4, 5, and 6. This allows an angular adjustment of the tightening pulleys with reference to their supporting bell-crank arms so as to adapt them to the alignment of the belts to which they are applied.

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

1. In a twisting machine, the combination of a revolving flier frame and a rotating spindle held concentrically within said frame and adapted to carry a winding spool, said frame having one of its sides recessed to receive the friction rolls of a cord guiding carriage, and a cord guiding carriage provided with prongs j inclosing the recessed sides of said flier frame, studs j^3 held by said prongs, and friction rolls carried upon said studs, said friction rolls lying within said recessed side of the flier frame and having their peripheries bearing against the opposite side walls of said recessed side, substantially as described.

2. In a twisting machine, the combination with a transversely moving carriage by which the twisted cord is laid upon the winding spool and a flier frame provided with a track said carriage having a transverse motion along said track, of plates carried by said carriage with their ends bent toward said track, said bent ends serving as scrapers to clean said track in advance of the carriage, substantially as described.

3. In a twisting machine, the combination with a revolving flier frame provided with a hollow journal, said hollow journal being ex-

tended to form a tube having slots in its sides, and a cord-guiding carriage having a transverse motion on said flier frame, of a flexible connection between said carriage and its actuating mechanism, said flexible connection being formed in two sections, a shell attached to one of said sections and inclosed in said slotted tube, projecting pins extending laterally from said shell and entering the slots in said tube, whereby said shell and its attached section of the flexible connection are made to rotate with the tube, and a swivel connection between the other section of said flexible connection and said shell, substantially as described.

4. In a twisting machine, comprising mechanism for twisting the individual strands from which the cord is composed; mechanism for twisting said strands into a cord and mechanism for winding the twisted cord upon a winding spool, the combination with said mechanisms, of driving shafts for driving each of said mechanisms separately, driving belts between said mechanisms and their driving shafts, tightening devices applied to said belts, a flexible connection between said tightening devices, said connection comprising a spring whose tension is applied in common to all of said tightening devices, whereby said driving

belts are maintained in a state of uniform tension, substantially as described.

5. In a twisting machine comprising mechanisms for twisting and winding, the combination with driving pulleys and driving belts by which said twisting and winding mechanisms are driven from said driving pulleys, of pivoted bell-crank levers, each of said levers carrying upon one arm a tightening pulley, tightening pulleys carried by said levers and a spring having its tension applied in common to the other arm of said levers, whereby said pulleys are held against said belts with equal pressure, substantially as described.

6. In a twisting machine, the combination with the driving belt, of a pivoted bell-crank, a tightening pulley bearing against said belt and supported by one arm of said bell-crank, an arm intermediate said pulley and said bell-crank arm and provided with a curved and a slotted flange, by which it is attached to said bell-crank arm, whereby the plane of said pulley is varied with relation to the plane of said bell-crank, substantially as described.

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