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C. E. W. DOW.

TRAVERSE MECHANISM FOR WINDERS FOR YARN, THREAD, &c.

(Application filed June 24, 1899.)

(No Model.)

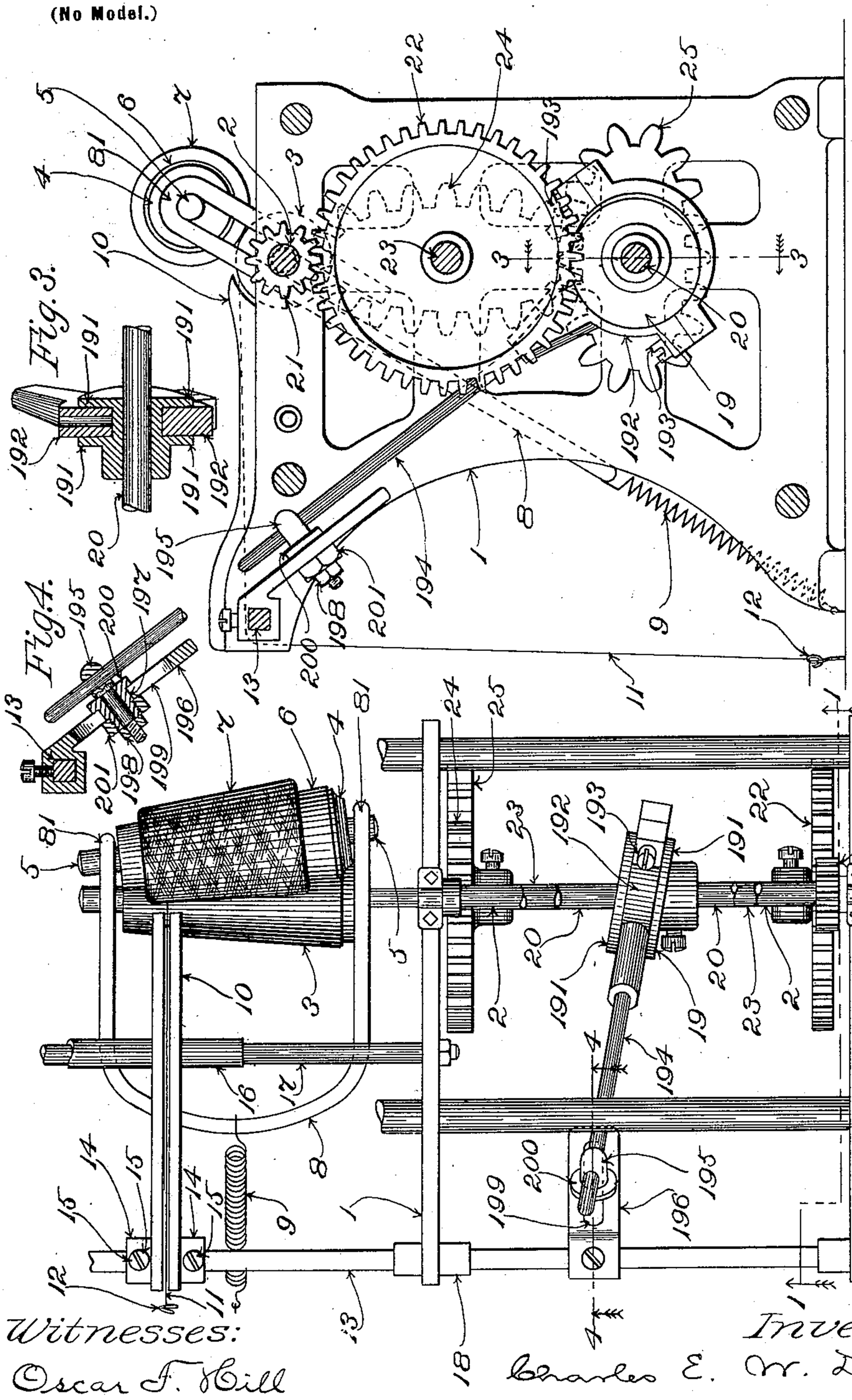

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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TRAVERSE MECHANISM FOR WINDERS FOR YARN, THREAD, &c.

SPECIFICATION forming part of Letters Patent No. 648,163, dated April 24, 1900.

Application filed June 24, 1899. Serial No. 721,695. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. W. DOW, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Traverse Mechanism for Winders for Yarn, Thread, &c., of which the following is a specification, reference being had therein to the accompanying drawings.

My improvements are fitted for quite general application in connection with winding-machines—that is to say, the said improvements are adapted to be applied to winders of various kinds and are adapted to be utilized, according as may be required, in the winding of different materials, as well as in the production of different forms of wound masses or in winding upon different forms and kinds of receivers for different purposes and uses.

The invention has among its main objects to provide an improved traverse mechanism of simple construction not subject to excessive wear and unlikely to break or get out of order; also, to provide a traverse mechanism which shall be noiseless in operation, smooth-running, and free from tendency to occasion jars or shocks and vibrations in consequence of the reversals in the directions of movement of the parts which are traversed in effecting the distribution in successive layers upon the intended receiver of the material which is being wound; also, to provide a traverse mechanism which shall operate to occasion traverse movements that are each of substantially-uniform velocity from end to end thereof, whereby to cause the material being wound to be distributed with uniformity from end to end of each wound layer.

In the practical embodiment of my invention I employ a cam of simple obliquity with respect to the axis of rotation thereof, the said cam being herein termed for convenience a "skew-cam" and the said term being based upon the disposition of the working faces of the cam in planes which are transversely oblique with reference to the said axis. The axis of rotation of the skew-cam is parallel with the length of the traverse-bar, and with the said cam is combined a swiveling follower which is in operative connection with the said traverse-bar. The said follower also receives from the rotation of the skew-cam a vibratory movement which occasions the required lengthwise reciprocations of the traverse-bar.

For the purpose of rendering the velocity of each of the traverse movements substantially uniform from one end to the other thereof without the gradual acceleration and succeeding gradual retardation which are characteristic of a crank movement and also of some other forms of operating devices I employ elliptical gearing for driving the skew-cam.

A convenient embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a cone-winder containing the said embodiment, the plane of section being indicated by the dotted line 1 1 in Fig. 2 and the view being taken looking in the direction that is indicated by the arrows adjacent to the ends of the said line. Fig. 2 is a plan view of part of the machine. Fig. 3 is a sectional view of the skew-cam and the follower applied thereto, taken on the plane of the dotted line 3 3 in Fig. 1 and looking in the direction of the arrows adjacent to the ends of such line. Fig. 4 is a sectional view on the plane indicated by the dotted line 4 4 in Fig. 2.

The machine-framing is designated 1.

2 is a shaft which is mounted in suitable bearings provided therefor on the machine-framing and which for the purposes of the present case may be termed the "driving-shaft." It extends lengthwise of the machine. On the shaft 2 are mounted the winding cones or drums, one of the latter being designated 3 in the drawings.

4 designates a tapering or conical spindle having journals 5 5 and receiving upon its tapering body the shell 6, upon which the conical yarn-load 7 is wound by the action of the machine.

The spindle-holder—herein shown, for convenience, in the form of a simple yoke 8, having hooked bearings at 81 81 for engagement with the journals 5 5—is shown as acted upon by a spring 9, the latter operating to draw the spindle-holder in a direction which holds the surface of the yarn-load 7 on spindle 4 pressed into close contact with the surface of the winding cone or drum 3. By the frictional contact of the said surface of the yarn-load with that of the cone or drum 3 the spindle is rotated to effect the winding thereupon, as customary.

The guide coöperating with the cone or drum 3 and with the spindle 4, resting in contact with the said cone or drum, is designated 10. It delivers to the said spindle the yarn or thread which is to be wound thereupon. The said yarn or thread is designated 11 and is represented as passing to the said guide 10 after first passing through a fixed guide 12. The guide 10 is mounted upon a traverse-bar 13, the said guide being herein represented as secured at the required point in the length of the said bar by means of collars 14 14 at opposite sides thereof, which are fixed in place by means of clamping-screws 15 15. The guide 10 also is guided and steadied in its movements while being carried back and forth by the reciprocations of the traverse-bar 13 by means of a tube 16, with which it is provided, the said tube fitting and sliding upon a guide-rod 17, extending lengthwise of the machine. The traverse-bar is conveniently supported and guided in its reciprocating movements. Herein it is shown mounted in bearings 18 18, which are applied to the framing 1 and through which guides the traverse-bar is free to slide in the direction of its length.

The foregoing features of the machine have been described, with reference to the drawings, chiefly for the purpose of making clear the character and relations of the features in which the invention particularly resides. They may be of any approved character, construction, and arrangement.

In accordance with my invention the skew-cam, to which reference has been made hereinbefore, is employed as an actuator for the traverse-bar. One form of the said skew-cam is shown in the drawings at 19 mounted, for convenience, upon a short shaft 20, which latter is operated from the driving-shaft 2 by a suitable train of gearing, &c. The train herein shown comprises the pinion 21 upon the driving-shaft 2, the gear 22 in mesh with the said pinion and fast upon a short shaft 23, the gear 24, also fast upon the shaft 23, and the gear 25 in mesh with gear 24 and fast upon shaft 20, which last, it will be remembered, carries the skew-cam 19. In some particulars the character, construction, and arrangement of the elements of this train may be varied. One special feature thereof, however—to wit, the use of elliptical gearing—is pointed out later herein.

The illustrated form of the skew-cam 19 resembles in some respects an ordinary form of eccentric. It is concentric with its shaft 20, however. It consists of a disk or hub which is deeply grooved, thereby making parallel flanges 191 191, that are set obliquely with respect to the length of shaft 20 and between which flanges the follower or strap 192 is fitted. The said follower or strap resembles somewhat the strap of an ordinary eccentric. It is made in two semicircular portions united by screws 193 193, passing through flanged portions of each thereof, for convenience of application to the periphery of the cam 19 and removal therefrom. From the follower or strap 192 projects an arm 194. This arm is in suitable operative connection with the traverse-bar. Herein the said arm works in a hole through the head of a swiveling pin 195, carried by a bracket 196, which is affixed to the traverse-bar 13.

The described connection of the arm 194 with the traverse-bar holds the follower and arm from rotating in unison with the skew-cam. As the said skew-cam rotates it acts to oscillate or vibrate the arm 194 in a plane which is parallel with the length of the traverse-bar, thereby communicating to the said traverse-bar the requisite reciprocating traversing movements. It acts also to turn or rock the follower or strap 192 upon the longitudinal axis of arm 194. This turning or rocking movement, however, merely operates to partially rotate the said arm in the hole that is made through the swiveling pin 195. As arm 194 oscillates or vibrates, and in so doing reciprocates the traverse-bar, it slides freely in the direction of its length through the said hole.

For convenience of adjustment in order to enable the reciprocating stroke of the traverse-bar to be varied at will the swiveling pin 195 or equivalent connector is mounted upon bracket 196 with capacity to be adjusted toward or from the axis of shaft 20. It will be perceived that arm 194 and the follower 192 in effect constitute a lever working upon a pivot which is in the line of the said axis of shaft 20. Consequently in proportion as adjustment is effected toward or from the shaft 20 in the case of the connector device, which serves to take from arm 194 the motion which is transmitted to the traverse-bar, the extent of the reciprocating movements of the traverse-bar will be varied. Herein the stem of pin 195 is reduced somewhat in diameter and passes through a hole extending through a block 197. The extremity of such reduced stem which projects beyond the block is screw-threaded and receives a nut 198. This construction connects the pin with the block, while leaving the pin free to turn relatively to the block. The body of the block 197 fits within a slot 199, extending lengthwise of bracket 196, the block having a fixed collar 200 at one side of the bracket and a separate collar or nut 201 being screwed onto the projecting screw-threaded portion of the body of the block at the other side of the bracket. By screwing up the collar or nut 201, after setting the block at the required point along the slot 199, the block may be fixed in the required position of adjustment. A skew-cam and intermediate connections, all substantially such as have just been described hereinabove, will operate to produce the required traversing movements of the traverse-bar and guides carried thereby noiselessly and smoothly. Jar or shock, such as usually is occasioned in consequence of the

sudden change of direction of quickly-moving parts at the ends of the reciprocating traverse movements, is obviated. Further, in accordance with another feature of the invention, to which reference also has been made, I arrange to cause the traverse-bar to move with substantially uniform velocity from end to end of its traverse. To this end I utilize elliptical gearing as a part of the motion-transmitting gearing intermediate the driving-shaft and the skew-cam. Herein I have represented a simple and satisfactory arrangement comprising, essentially, the two bilobe elliptical gears, which are designated 24 and 25. These are arranged, as shown, to cause the teeth on the shortest radii of the driver-gear 24 to engage the teeth on the longest radii of the driven gear 25 as the skew-cam is causing the traverse-bar to pass its mid-stroke, at which time the movement derived from the action of the cam naturally acquires its greatest velocity. At this time therefore the cam itself is rotated at its least speed. As the traverse-bar is moved toward either extremity of its stroke teeth on increasing lengths of radii of the driver-gear come successively into mesh with teeth on decreasing lengths of radii of the driven gear, thereby gradually increasing the speed of the skew-cam and overcoming the tendency to decreasing velocity of the movement that is derived therefrom. After the traverse-bar has reached the end of its stroke in either direction teeth on decreasing lengths of radii of the driver-gear come succesively into mesh with teeth on increasing lengths of radii of the driven gear, thereby gradually reducing the speed of rotation of the skew-cam and overcoming the tendency to increasing velocity of the movement that is derived therefrom until mid-stroke of the traverse-bar is reached again. Compensation for the tendency to retardation and acceleration of the velocity of the movement which is imparted by the action of the skew-cam is afforded in part also in the case of the illustrated embodiment of the invention by the fact that when the cam and traverse-bar are at mid-stroke the swiveling pin 195 engages the arm 194 at a point nearer the axis of shaft 20 than it does at any other time. As the cam acts to move the traverse-bar toward either end of the stroke of the latter the point of engagement travels gradually outward along the arm, while the reverse is the case as the traverse-bar is caused to return from an extreme of its stroke toward mid-stroke.

I do not wish the invention to be understood as limited in all respects to the precise mechanical arrangements which are shown herein, since modification in various respects is possible without departure from the principles of the invention.

I claim as my invention—

1. In combination, a part adapted for reciprocating motion, a skew-cam, a follower applied to the said cam and in operative connection with the said part, and driving connections for the said cam which rotate the latter with alternately rising and falling velocity and thereby overcome tendency to retardation and acceleration of velocity of the motion occasioned thereby.

2. In a traverse mechanism for winding-machines, in combination, a traverse-bar having a guide or guides, a skew-cam, a follower applied to the said cam and in operative connection with the said traverse-bar, and driving connections for the said cam which rotate the latter with alternately rising and falling velocity and thereby overcome tendency to retardation and acceleration of velocity of the motion occasioned thereby whereby uniform distribution of the material being wound is effected.

3. In combination, a bar adapted for reciprocating motion, a skew-cam, a follower applied to the said cam and in operative connection with the said bar, and driving connections for the said cam including elliptical gearing whereby the cam is rotated with alternately rising and falling velocity to overcome the tendency to retardation and acceleration of velocity of the motion occasioned thereby.

4. In a traverse mechanism for winding-machines, in combination, a traverse-bar having a guide or guides, a skew-cam, a follower applied to the said cam and in operative connection with the said traverse-bar, and driving connections for the said cam including elliptical gearing whereby the cam is rotated with alternately rising and falling velocity to overcome the tendency to retardation and acceleration of velocity of the motion occasioned thereby whereby uniform distribution of the material being wound is effected.

5. In combination, the skew-cam, its follower, and driving connections for the said cam including a pair of bilobe elliptical gears, as 24, 25.

6. In a traverse mechanism for winding-machines, in combination, the traverse-bar, the skew-cam, the follower applied to the said cam and in operative connection with the said bar, and driving connections for the said cam including a pair of bilobe elliptical gears, as 24, 25.

7. In a traverse mechanism for winding-machines, in combination, the traverse-bar, the skew-cam, the follower applied to the said cam and having the arm, the connector for transmitting motion from the arm to the bar, means of effecting adjustment of the connector in the direction of the length of the said arm, and driving connections for the said cam including a pair of bilobe elliptical gears.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. W. DOW.

Witnesses:
CHAS. F. RANDALL,
LEPINE HALL RICE.