C. F. PERHAM.

WINDING MACHINE.

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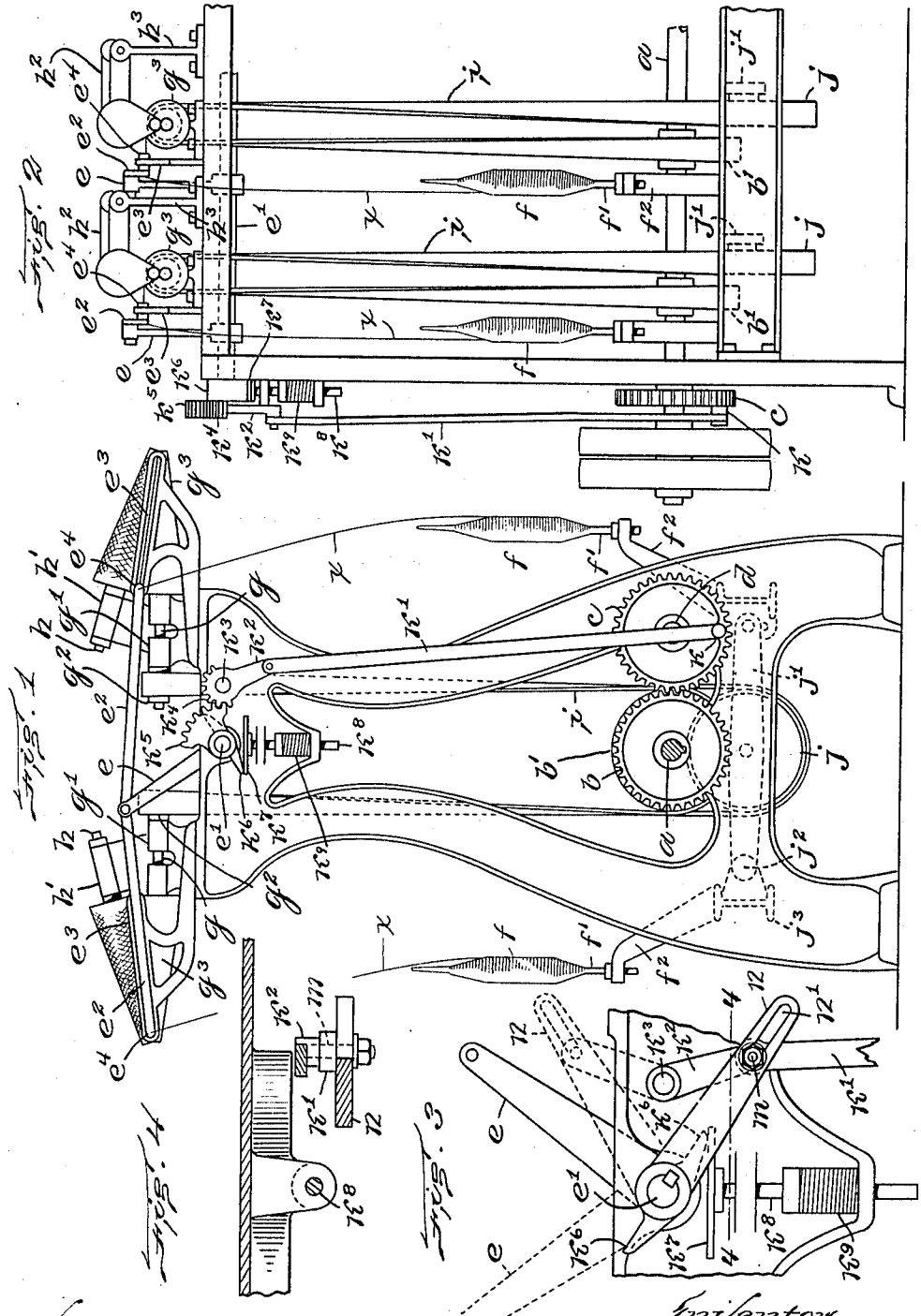
1,041,157. Patented Oct. 15, 1912.



Witnesses:
A. L. Folsom.
P. W. Cezzetti

Inventor
Charles Foster Perham
by Wright Brown Quinby & May
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES F. PERHAM, OF LOWELL, MASSACHUSETTS.

WINDING-MACHINE.

1,041,157. Specification of Letters Patent. Patented Oct. 15, 1912.

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To all whom it may concern:

Be it known that I, CHARLES F. PERHAM, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Winding-Machines, of which the following is a specification.

This invention has relation to winding machines, or those machines in which a yarn is drawn from a bobbin, cop or spool and wound in a cone upon a cop so that the yarn may be subsequently drawn with ease from the cone for knitting or other purposes. It is essential that the yarn shall be laid in such manner upon the cop that it may be drawn therefrom easily and without snarling, and that the courses or convolutions of the yarn upon the cop shall be laid as evenly as possible, so that there will be no more yarn at one part of the cop than there is at the other, and further that the tension of the various convolutions upon the cop shall be the same.

The object of the present invention is to provide a simple means for effecting the movement of the thread guide in such manner that there will be no substantial dwell at the ends of its movement.

To this end, the invention consists of an improved power-transmitting mechanism interposed between the thread guide and the driving shaft, which is illustrated in the drawings, set forth in the following specification, and particularized in the appended claims.

Referring to the said drawings, Figure 1 represents an end elevation of the winding machine, equipped with my invention. Fig. 2 represents a front elevation of a portion of the machine. Figs. 3 and 4 represent another embodiment of the invention in which pivoted levers having a slotted connection are utilized in lieu of the segmental gears illustrated in Fig. 1.

On the drawings, I have illustrated a common form of winding machine in which the driving shaft a is provided with a gear b intermeshing with and driving a larger gear c on a shaft d extending longitudinally of the frame.

e indicates one of a series of rocking arms or levers which are attached to the shaft e' extending longitudinally of the machine. Connected to the upper end of each of the arms e is pivoted two connecting rods e^2 e^2 having at their ends pins or projections which slide in the inclined guideway e^3. At the end of each of the rods e^2 is a yarn guide e^4, the yarn x being drawn from the sources of supply which are here illustrated as cops f on spindles f' attached to the stationary brackets f^2.

g g indicate shafts which are arranged horizontally and which are journaled in bearings g'. These shafts have driving whirls g^2 on their inner ends, and driving cones g^3 on their outer ends.

The cop spindles are indicated at h and they are mounted in bearings h' on the ends of arms h^2 loosely pivoted on brackets h^3 as shown in Fig. 2. The cops and the yarn cones thereon rest loosely upon the driving cones g^3, whereby they are rotated at the same surface speed as said driving cones. The whirls g^2 of each adjacent pair are driven by an endless belt i which passes under a driving pulley b' on the shaft a, and under an idle pulley j journaled in an arm j', pivoted at j^2 to the longitudinally extending rail j^3.

For the purpose of reciprocating the thread guides e^4 without an appreciable dwell at the ends of their reciprocating movements, I employ a novel transmitting connection for this purpose. Attached either to the gear c or to a crank arm on the shaft d is a crank or crank pin k which is connected by a connecting rod k' with the end of a lever k^2 which swings through an arc, the radius of which is longer than the radius of the arc of movement of the crank k. The lever k^2 is fulcrumed upon a stud k^3 and its hub is provided with a segmental gear or segmental gear teeth k^4 intermeshing with a segmental gear k^5, (which gears may be elliptic or irregular) on the end of the shaft e'. The segmental gear k^5 is provided with oppositely projecting fingers k^6 which alternately engage a spring-tension plate k^7. This plate is mounted upon a rod k^8 adapted to slide in brackets and normally held upward by a spring k^9. The radii of the crank k and the lever k^2 are so nearly equal that the pivot by which the lever and the connecting rod are joined, approaches very closely to a line intersecting the shaft d and the stud k^3. Appreciable wear of the pivots of the connecting rod and slight resiliency of the connecting rod, might permit the joint with the lever k^2 to pass across the line above-mentioned unless some cushioning device is provided for preventing such move-

ment of the lever. The cushioning device including the spring k^9 is provided for this purpose and it incidentally renders the movement of the oscillating parts considerably smoother than would be the case without such device. From this construction, it will be seen that, when the shaft d is rotated, the crank k and connecting rod k' will effect an oscillation of the arm or lever k^2. This oscillation will be imparted to the arms e through the shaft e' and the segmental gears k^4 k^5 without an appreciable dwell at the ends of the reciprocations of the thread guides e^4. In this way, I dispense with the employment of cams and provide a positive connection between the thread guides and the driving shaft which is capable of much higher speed than would be possible with a cam connection.

It is quite apparent that, in lieu of the segmental gears, I may employ some other power-transmitting connection such as that shown in Figs. 3 and 4. In this case, the arm k^2 is connected with the rod k' in the manner described in connection with Figs. 1 and 2, and said arm is provided at its end with a pin m which projects through an elongated slot n' in an arm or lever n which is secured upon the shaft e'. The modification consists in substituting the arm or lever n and its adjuncts for the segmental toothed connection illustrated in Fig. 1. When the arm or lever k^2 is oscillated, by the connecting rod k', it will effect the oscillation of the arm n through an arc of smaller degree so that I am able to secure practically the same results as I secure by the segmental gear connection between the arm k^2 and the shaft e'.

The advantage of employing the tension plate k^7 is that I take up the slack or lost motion between the parts and store the energy in stopping one stroke of the thread guide which is utilized in beginning the stroke in the opposite direction.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is:—

1. In a winding machine, a thread guide movable in a straight line, a crank pin movable in a circular path, means for driving said crank pin at a uniform rate of speed, an oscillatory member, a rod connected to said crank pin and said oscillatory member in such relation as to oscillate the latter through substantially 180 degrees of a circle, reducing gearing driven forward and backward by said oscillatory member, and connections between said reducing gearing and said thread guide for reciprocating the latter.

2. In a winding machine a rock-shaft, a series of reciprocatory thread guides, arms affixed upon said rock-shaft and acting directly upon said thread guides, a crank revolving at a uniform speed, an oscillatory member, means for transmitting oscillation in a less proportion from said oscillatory member to said rock-shaft, and a connecting rod engaging said crank and pivotally connected to said oscillatory member at a point of slightly greater radius than that of said crank, whereby said oscillatory member is oscillated through substantially 180 degrees of a circle.

3. In a winding machine a rock-shaft, a series of reciprocatory thread guides, arms affixed upon said rock-shaft and acting directly upon said thread guides, a crank revolving at a uniform speed, an oscillatory member, means for transmitting oscillation in a less proportion from said oscillatory member to said rock-shaft, a connecting rod engaging said crank and pivotally connected to said oscillatory member at a point of slightly greater radius than that of said crank, and means for exerting reverse tension first in one direction and then in the opposite direction upon the aforesaid reciprocating parts.

4. In a winding machine, a reciprocatory thread guide, an oscillatory member, means for transmitting reciprocating movement from said oscillatory member to said thread guide, an operating crank-pin movable in a circular path, a rod connecting said oscillatory member and said crank-pin, said connecting rod being so pivotally connected to said oscillatory member as to swing the point of connection at both ends of its movement substantially to a line intersecting the axes of movement of said crank-pin and said oscillatory member, and spring-tension means adapted to prevent said point of connection from passing across said line.

In testimony whereof I have affixed my signature, in presence of two witnesses.

CHARLES F. PERHAM.

Witnesses:
U. BILLAY,
P. W. PEZZETTI.