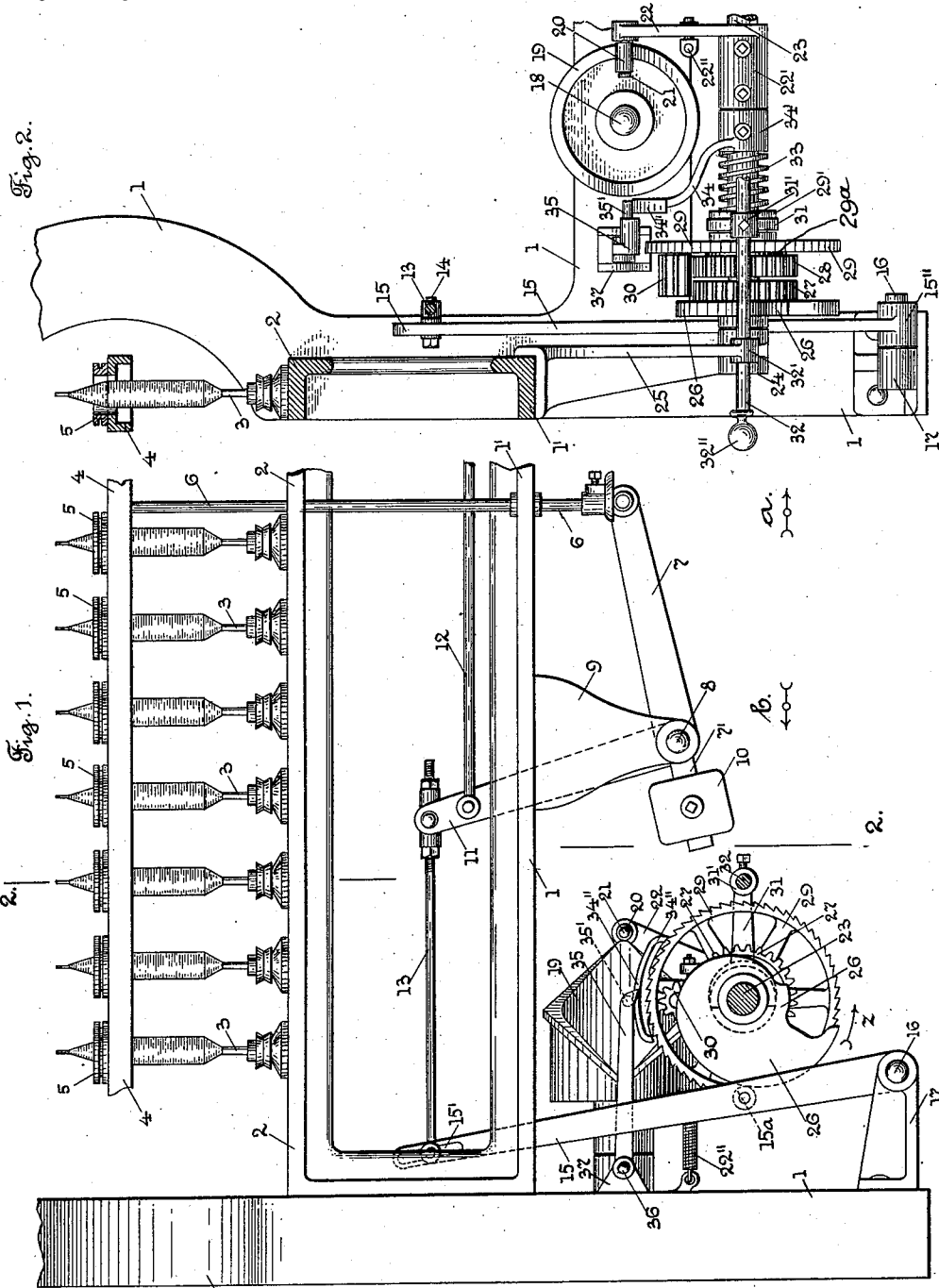


E. H. RYON.
SPINNING FRAME.

APPLICATION FILED APR. 18, 1908.

1,012,714.

Patented Dec. 26, 1911.



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SPINNING-FRAME.

1,012,714.

Specification of Letters Patent.

Patented Dec. 26, 1911.

Application filed April 18, 1908. Serial No. 427,806.

To all whom it may concern:

Be it known that I, EPPA H. RYON, 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 Spinning-Frames, of which the following is a specification.

My invention relates to a spinning frame, or a frame for winding yarn on cops or bobbins, and more particularly to the traverse up and down motion of the ring rail, or the guides for the yarn.

The object of my invention is to provide an improved mechanism for communicating a traverse up and down movement to the ring rail or the yarn guides, by means of which said rail or guides may be caused to have a movement for a comparatively short distance, when the winding of the yarn is started near the butt or lower end of the cop or bobbin, and then the movement gradually increased as the winding of the yarn proceeds toward the outer end or tip of the cop or bobbin, and until the extreme length of the traverse up and down movement is reached.

In the ordinary construction of machines for winding yarn on cops or bobbins, the yarn has been wound with a uniform up and down traverse motion, causing it to be laid on the cop or bobbin with about the same inclination at the lower end or butt of the cop or bobbin, as at the upper end or tip of the cop or bobbin. By means of my improvements, the cop or bobbin may be built up with a sharp or steep inclination or slant at the lower end or butt, thus putting more yarn on the bobbin at the butt end, and at the same time the short traverse up and down movement of the ring rail or yarn guides at the butt end of the cop or bobbin, allows the yarn to be more readily unwound in the shuttle, when the butt end of the bobbin is reached.

My invention consists in certain novel features of construction of my improvements as will be hereinafter fully described.

I have only shown in the drawing, a de-

tached part of a spinning frame for winding bobbins, with my improvements applied thereto, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawing:—Figure 1 is an elevation of a detached portion of one end of a spinning frame, with my improvements combined therewith, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section, on line 2, 2, Fig. 1, looking in the direction of arrow *b*, same figure.

In the accompanying drawing, 1 is a portion of the end frame of a spinning machine, 2 is the spindle rail on which are mounted the rotatable sleeve whirl spindles 3, 4 is the vertically reciprocating ring rail, provided with rings or yarn guides 5, one for each spindle, 6 is one of a series of lifter rods, connected at its upper end with the ring rail 4, and having its bearing on the girder 1' of the main frame 1, and connected at its lower end with the outer end of the rocker arm 7, fast on the rock shaft 8, mounted in a suitable bearing on the hanger 9. On the extension 7' on the rocker arm 7 is a counterbalance weight 10. Also fast on the rock shaft 8 is the lower end of an arm or lever 11. To the lever 11 is pivotally connected the end of a rod or connector 12, leading to a second lever and rocker arm, not shown. To the upper end of the arm or lever 11 is pivotally connected one end of a rod or connector 13. The other end of said rod or connector 13 is connected with a pin 14, which is adjustably secured in an elongated slot 15' in the upper end of the cam lever 15. The lower hub end 15'' of the cam lever 15 is loosely mounted on a stud 16 in a stand 17 secured to the frame 1.

I will now describe my improvements in mechanism for communicating a traverse up and down movement to the ring rail 4.

18 is a rotary shaft, operated from some moving part of the machine, not shown, 19 is a cam fast on said shaft and having a cam face, shown in Fig. 1, which in the rotary movement of the cam engages with a roll 20 on a stud 21 on a cam lever 22, see

Fig. 2. The cam lever 22 has a hub 22' fast on a rock shaft 23. To the cam lever 22 is attached one end of a spring 22'', the other end of which spring is attached to the frame 1. Said spring 22'' acts to hold the roll 20 in engagement with the cam 19.

On the inner end of the rock shaft 23, which is suitably mounted in a bearing 24 in the lower end of a stand 25, see Fig. 2, is loosely mounted a cam 26. On the outer side of the cam 26 is fast a gear 27. A second gear 28 is fast on the rock shaft 23. The gear 28 has one tooth less than the gear 27. A ratchet wheel 29 is loose on the rock shaft 23, and carries a stud on which is loosely mounted a pinion 30, which is of sufficient width to mesh with both of the gears 27 and 28, see Fig. 2. A leather washer or disk 29^a in this instance extends between the ratchet wheel 29 and the gear 28.

The ratchet wheel 29 has its hub 29' extended on one side, with an annular groove or recess therein to receive the forked end of an arm 31, which has its hub 31' fast on a rod 32, loosely mounted and slidable in a hub or boss 32' on the lower end of the stand or bracket 25. The rod 32 has an engaging or ball shaped end 32''.

On the rock shaft 23 is a helically coiled expansion spring 33, which bears at one end against the hub 29' of the ratchet wheel 29, and at its other end against the hub 34', fast on the rock shaft 23, of an arm 34, which has an arc-shaped end 34'' adapted to extend under and engage a pin 35' extending out from the free end of a pawl 35; the hub of said pawl 35 is pivotally mounted on a stud 36, secured in a stand 37 on the frame 1. The spring 33 acts to move the ratchet wheel 29, loose on the rock shaft 23, toward the left in Fig. 2, to cause the pinion 30, carried on said ratchet, to extend over the teeth of the gear 27, as shown in Fig. 2.

The rod 32 carrying the forked arm 31 is adapted to be moved by the operator, to move the ratchet wheel 29, against the action of the spring 33, to carry the pinion 30 on the ratchet wheel 29 out of engagement with the teeth of the gear 27 fast on the cam 26, so that the cam 26 may be more readily returned to its starting position after a set of bobbins have been filled and a new set of empty bobbins put on the spindles ready to start.

From the above description in connection with the drawing, the operation of my improvements will be readily understood by those skilled in the art. The ring rail 4, by turning the cam 26, is moved to its lowest position, in which position the roll 15^a on the cam lever 15 will be on the lowest part of the cam 26. The arm 34 having the curved end 34'', is set on the rock shaft 23

in such a position relatively to the pawl 35, that the pawl 35 will rotate the ratchet wheel 29 as many teeth as is required to make a bobbin of the required diameter. For illustration, in adjusting, the rock shaft 23 may be turned, moving the top of the ratchet 29 to the left in Fig. 1, the extreme allowed by the cam 19 and its connections to the rock shaft 23. When this has been done, the arm 34 may, by loosening the set screw in hub 34', be turned toward the left in Fig. 1, passing from beneath the pin 35' in the free end of the pawl 35, and allowing the said pawl to engage the teeth of the ratchet wheel 29. The arm 34 may then be made fast to the rock shaft 23, with a predetermined number of the teeth of the ratchet wheel 29 between the free or operating end of the pawl 35, and the adjacent portion of the curved end 34'' of the lever 34. It is obvious that when the shaft 23 and the ratchet wheel 29 are turned, to move the upper ratchet teeth to the right, the free end of the pawl 35 will ride over the intervening ratchet teeth between it and the adjacent surface of the shield 34''. When the pin 35' on the pawl 35 will contact with and be lifted by the said surface of the shield 34'', and the pawl 35 be raised clear of the ratchet teeth and the ratchet wheel 29. When the shaft 23 is again rotated in the opposite direction, carrying the upper teeth of the ratchet to the left, the surface of the shield 34'' will pass from beneath the pin 35' of the pawl 35, and allow said pawl to engage and hold the teeth on the ratchet wheel 29, and allowing the shaft 23 to be turned in said ratchet wheel, an amount proportional to the number of ratchet teeth over which the pawl 35 was allowed to ride during the previous movement of the shaft 23 in the opposite direction. It will be understood that by causing the shaft 23 to turn within the ratchet wheel 29, the same relative movement between the shaft 23 and cam 26 is caused that would be caused by turning said ratchet wheel 29 on the shaft 23, if said shaft were at rest; that is the pinion 30 is revolved about two gears 27 and 28 meshing with the teeth of both, and as before stated the gear 28, being fast on the shaft 23, and having one less tooth than the cam gear 27, which is loose on said shaft, said cam gear 27 will be caused to rotate around the shaft 23 a space equal to one of its teeth, for every complete revolution made by the ratchet wheel 29. The number of teeth which it is necessary to rotate said ratchet depends on the size of the yarn wound on the bobbin, and size of bobbin to be made. Through the rotation of the cam 19 and the movement of the cam lever 22, the rock shaft 23 is caused to rock, causing the gears 27 and 28, the cam 26, and the ratchet wheel 29 also to rock. The

ratchet wheel 29 is rocked with the shaft 23 in the direction of arrow *z*, Fig. 1, through the frictional engagement of the gear 27 with said ratchet wheel 29, and is also rocked in the opposite direction by the same mechanism, until, as above explained, the end of the pawl 35 has passed the end of the curved end 34'' on the arm 34, when said pawl will drop and hold the ratchet wheel 29 stationary for the remainder of the movement of the shaft 23 in that direction. The cam 26 having the gear 27 fast thereon, is caused to rock with the shaft 23, by the pinion 30 having its teeth normally in constant mesh with the teeth on the same side of the center of both the gear 27, which is fast on the cam 26, and the gear 28, which is fast on said shaft 23. When through the operation previously explained, the pinion 30 is caused to advance a tooth in mesh with the gear 28, it will also advance a tooth in mesh with the gear 27, the tooth of the gear 27 being, as previously stated, of coarser pitch, the said gear 27 being rotated on the shaft 23 a space equal to the difference of pitch between the teeth of the two gears 27 and 28, consequently causing the cam 26 to be gradually rotated around the shaft 23 at the same time it is being rocked, as above explained. This operation is repeated for each reciprocation or rocking motion of the shaft 23.

The gear 28, which is fast on the shaft 23, has in this instance one less tooth than the gear 27, and therefore the revolution of the ratchet wheel 29 carrying the pinion 30 with it, causes the gear 27 to gradually rotate the cam 26 in the same direction as the ratchet wheel 29, whereby the cam 26 will be gradually rotated on the shaft 23, presenting a constantly changing cam surface to the roll 15^a on the cam lever 15, which is connected through rod 13, and the rocker arms with the rods 6 to the ring rail 4. The cam 26 may be of any shape desired, to give a bobbin the proper shape, according to the amount of up and down travel of the ring rail 4.

It will be understood that the details of construction of my improvements may be varied if desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a traverse motion for winding yarn on bobbins, a rock shaft, a cam loose on said shaft, means to operate said rock shaft, a ratchet wheel on said rock shaft, means to rock said ratchet wheel with said shaft in one direction, and means to hold said ratchet wheel at rest during a portion of the return movement of said rock shaft.

2. In a traverse motion for winding yarn on bobbins, a rock shaft, a cam loose on said shaft, means to operate said rock shaft,

a ratchet wheel on said rock shaft, means to rock said ratchet wheel with said shaft in one direction, a device to hold said ratchet wheel at rest during a portion of the return movement of said rock shaft, and adjustable means to regulate the time the said ratchet wheel shall be held at rest during such return movement.

3. In a traverse motion for spinning machines, a rotatable spindle, a yarn guide to guide the yarn on the spindle, and mechanism to traverse said guide and gradually increase the length of said traverse as the yarn is wound, said means comprising a cam loose on its axis, and means to rock said cam, and separate means to gradually rotate said cam about its axis through a predetermined arc, to change the effective contact or working surface thereon.

4. In a traverse motion for winding yarn, a guide for the yarn to be wound, and means to move said guide, said means comprising a cam, a gear on said cam, a second gear with a different number of teeth from the first mentioned gear fast on a shaft, and said shaft, a pinion meshing with the teeth of said gears, and mechanism under the control of the operator, to move said pinion out of mesh with one of said gears.

5. In a traverse motion for winding yarn on bobbins, a rock shaft, a cam loose on said shaft, means to operate said rock shaft, a ratchet wheel on said rock shaft, mechanism to rock said ratchet wheel with said rock shaft in one direction, and mechanism to hold said ratchet wheel at rest when said rock shaft is rocked in the opposite direction, and connections intermediate said cam and said ratchet wheel.

6. In a traverse motion for winding yarn on bobbins, a rock shaft, a cam loose on said shaft, means to operate said rock shaft, a ratchet wheel on said rock shaft, mechanism to rock said ratchet wheel with said rock shaft in one direction, and mechanism to hold said ratchet wheel at rest when said rock shaft is rocked in the opposite direction, and connections intermediate said cam and said ratchet wheel, said connections comprising a gear on said cam, a gear of a different number of teeth fast on said rock shaft, and a pinion carried by said ratchet wheel and meshing with both of said gears.

7. In a traverse motion for winding yarn on bobbins, a guide to guide the yarn onto the bobbin, means to traverse said guide, combined with devices to gradually increase to a predetermined length the traverse of said yarn guide, as the yarn is wound, said devices including a cam, and automatic means to impart a constant rocking and a gradual rotary motion to said cam about its axis.

8. In a traverse motion for winding yarn on bobbins, a guide to guide the yarn onto

the bobbin, means to traverse said guide, combined with devices to gradually increase to a predetermined length the traverse of said yarn guide, as the yarn is wound, said
5 devices including a cam, and automatic means to impart a constant rocking and a gradual rotary motion to said cam about its axis, and manual adjustable means to regulate said rotary motion.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."