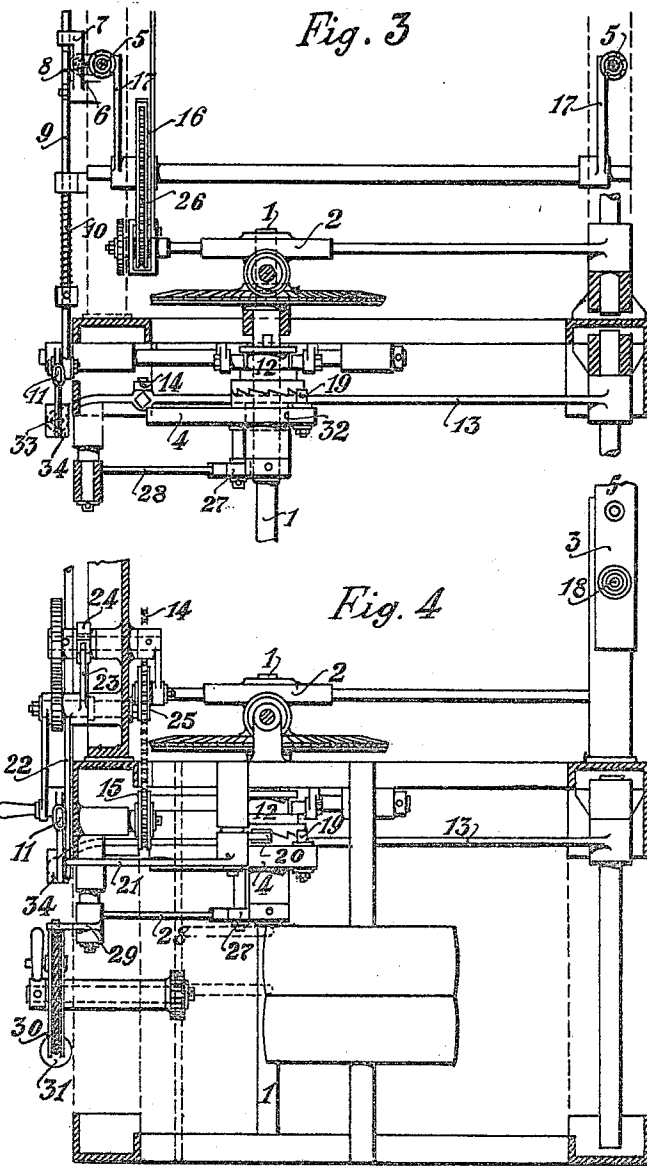


965,306.

Patented July 26, 1910.

3 SHEETS—SHEET 2.



Witnesses.

C. H. Davies
L. A. Shannon.

Inventor.

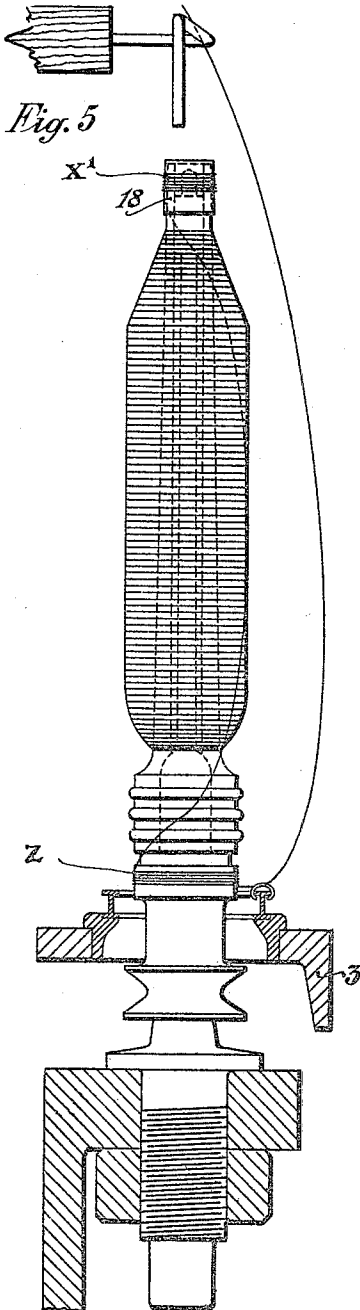
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965,306.

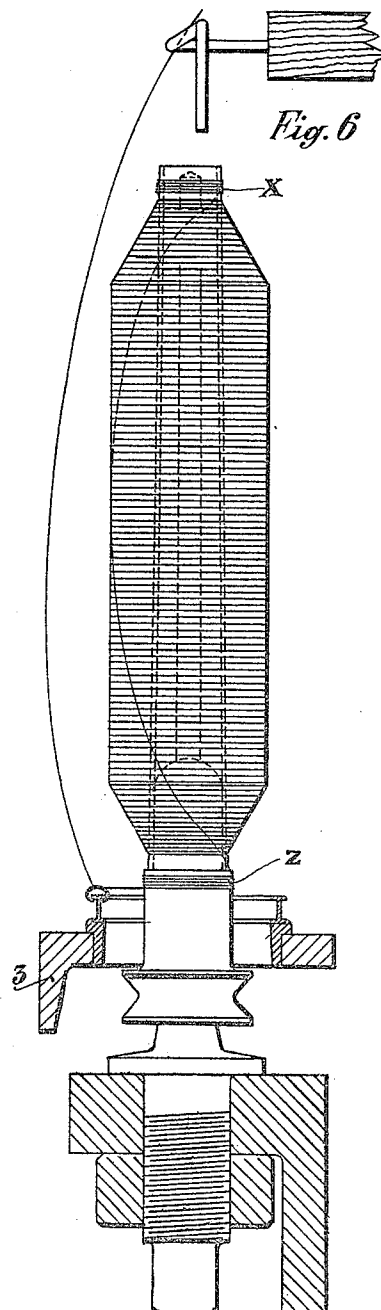
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Witnesses.

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UNITED STATES PATENT OFFICE.

ALBERT GEORG KOECHLIN, OF STEINEN, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENOSSENSCHAFT FÜR TEXTILPATENTE, OF BASEL, SWITZERLAND.

RING-SPINNING MACHINE.

965,306.

Specification of Letters Patent. Patented July 26, 1910.

Application filed May 21, 1908. Serial No. 434,210.

To all whom it may concern:

Be it known that I, ALBERT GEORG KOECHLIN, a citizen of the Swiss Republic, and residing at Steinen, in the Grand Duchy of Baden, Germany, have invented certain new and useful Improvements in Ring-Spinning Machines, of which the following is a specification.

The present improvements in ring spinning machines relate to means that come into operation only after the completion of the building of the cop, the term "building" hereinafter employed, being understood to mean the forming of the complete cop inclusive of its usual tapered or beveled ends, that is, in its ordinary complete state ready for removal from the spinning machine for use in the loom.

In a certain class of automatic looms, weft spools are employed in which the thread, in addition to being wound in the usual manner to build a cop on a spool tube, has also been wound a few turns on a block that has been previously slipped on the spool tube above the built cop and is subsequently removed therefrom, in the loom, whereby so much thread is drawn from the spool as is necessary for threading into the shuttle. The winding of the few turns of thread upon it has been effected hitherto by hand before the spool is placed into the spool magazine of the automatic loom. This procedure is inconvenient, tedious and not efficient.

The present improvements have now for their object first to wind the said few turns of thread on the block in the ring spinning machine so as to dispense with all hand labor in this respect. For this purpose a block is adopted in the form of a cap of light material detachably mounted on the nose of the spool tube, and when a fresh spool is placed in the loom the said cap is removed by suitable means (such as a blast of compressed air blown through the spool tube from the back end thereof as described in my concurrent application Serial No. 434,209) whereby a determined length of thread is drawn off the tube in such a manner as to leave a loose end which can be readily found by the weaver for threading into the shuttle.

The improved mechanism employed for winding the aforesaid turns of thread on the

detachable cap, may also be utilized according to the present invention for winding a few turns of thread on the bare tube just above the nose of the built cop, especially in spinning machines in which warp cops are built by parallel winding on tubes, for the purpose of enabling the weaver to find the loose end of the cop at once instead of having to lose time in seeking it along the entire length of the cop. Similarly, the improved mechanism may be used for winding a few turns of thread on the bare spindle below the bottom of the cop tube after the cop has been built, so as to hold the thread sufficiently to enable it to be broken between the said few turns and the built cop on doffing the latter by hand. The thread passing from the thread guide to the traveler and to the said few turns thus remains whole so that the building of a fresh cop can be begun at once after the ring has been raised again to the requisite height by the usual means.

The present improvements have thus for their object to provide ring spinning machines with improved mechanism for automatically winding the said few turns of thread on the detachable caps on the tubes of weft cops intended for use as weft spools in automatic looms as aforesaid, or on the bare tube just above the nose of the built cop in the case of parallel wound warp cops, and also a few turns of thread on the bare spindle below the built cop in both cases.

The improved mechanism consists substantially of a cam provided in addition to the ordinary cam for operating the ring rail. This additional cam has the functions, first, of operating through intermediate mechanism to lift the ring rail after the complete cop has been built, by an additional amount whereby the machine is enabled to wind a few turns on the detachable cap in the case of weft cops, or on the bare tube just above the nose of the built cop in the case of parallel wound warp cops; second, of then causing a rapid descent of the ring rail to a point lower than the cop tube bottom so as to wind a few turns of thread on the bare spindle at that point; and third, of placing itself out of operation. All other operations, such as the doffing of the built cops, the placing of fresh spool tubes (with or without detachable caps) on the spindles, the

winding up of the ring rail to the height required for commencing the fresh cops, and the restarting of the spinning machine are performed in the usual manner by hand.

5 When the machine has been started, first, the ordinary cam alone comes into operation to build the cop in the usual manner and then when the cop is built the said additional cam comes automatically into operation to
10 perform its aforesaid functions. In ring spinning machines unprovided with the improved mechanism that is, without the said additional cam, the descent of the ring rail after the building of the cops, is effected by
15 lowering by hand the pulley over which the winding up chain for the ring rail passes. Now this lowering of the pulley slackens the chain which thus allows the ring rail to fall suddenly into its lowest position. This
20 sudden fall of the ring rail is a frequent cause of breakage of many threads, the piecing together of which is a loss of time and labor. Now by means of the aforesaid additional cam the descent of the ring rail can be regulated in such a manner that these
25 breakages will be avoided. This advantage alone is so great that it justifies the present improvements even in cases in which it is not desired to wind the few turns of thread
30 on the cap, tube, or spindle.

The improved mechanism is applicable to any existing ring spinning machine.

In the accompanying drawings, Figure 1 is a side elevation, and Fig. 2 is a front elevation of the improved mechanism applied to an existing ring spinning machine, only
35 so much of the latter being shown as is necessary for the understanding of the invention. Fig. 3 is a horizontal section on the broken line A—A of Fig. 1, looking down upon the parts below said line. Fig. 4 is a
40 horizontal section on the broken line B—B of Fig. 1, looking down upon the parts that are situated below the line B—B and above the line A—A. Fig. 5 is an elevation of a weft cop with the adjacent parts in vertical section, showing the turns of thread wound on the detachable cap, and also the turns of
45 thread wound on the bare spindle below the cop tube. Fig. 6 is a similar view of a parallel wound warp cop, showing the turns of thread wound on the nose of the bare tube above the cop and also on the bare spindle below the cop tube. Figs. 1 to 4 are more
50 or less diagrammatic.

1 is the shaft on which is mounted the ordinary winding heart shaped cam, 2, that produces the ordinary rise and fall of the ring rail, 3, through the medium of the
60 usual winding lever and chain 26 for building the cop. The cam 2, the winding lever, and the chain, 26, are present in all existing ring spinning machines, and are therefore not described in further detail in
65 the present specification as it is assumed

that the arrangement, construction and operation of these parts are well known in the art.

4 is the aforesaid additional cam of substantially heart shape, mounted eccentrically on the shaft 1, and capable of rotating
70 freely thereon. It is in general somewhat larger than the ordinary cam, 2, and is adapted to be coupled to the shaft, 1, when the ring rail has reached the level at which
75 the cops are completely built. In this case a pin, 6, provided on the ring rail operating rod, 5, lifts the pawl, 7, out of a recess, 8, of a rod, 9, so as to allow a spring, 10, to
80 come into operation and move the rod, 9, axially.

12 is a claw clutch-half slidable along a feather on the shaft, 1. When the rod, 9, is pushed by the spring, 10, it forces by means of the lever, 11, the clutch half, 12,
85 into engagement with the other half of the clutch provided on the cam, 4, thereby coupling this cam with the shaft, 1, which is driven in the usual way by gearing from the driving shaft (not shown) of the spinning machine. The cam, 4, thus caused to rotate, depresses a lever, 13, which is connected to the bell crank lever, 16—17, by means of a chain, 14, passing over a guide pulley, 15.
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The weight of the ring rail, 3, bears on the lever, 16—17, and acts through the chain, 14, to pull up the lever, 13, and thus keep an anti-friction roller, 32, carried by this lever, closely against the additional cam, 4. The extreme circumferential parts of the additional cam, 4, are more distant from its center than are the circumferential parts of the ordinary winding cam, 2. The depression of the lever, 13, by the cam, 4,
105 therefore will produce first a further rise of the ring rail, 3, beyond that produced by the ordinary cam, 2, and in this higher position of the ring rail the thread will be wound above the built cop, either upon the bare cop tube above the nose of the built cop, (as indicated at x in Fig. 6), or upon a cap, 18 detachably mounted on the cop tube (as indicated at x' in Fig. 5). In the latter case the cap, 18, serves to facilitate the drawing off of the loose end of the thread when the cop is used as a weft spool in an automatic loom. During the further rotation of the cam, 4, a pin, 19, projecting laterally from the cam, 4, strikes a bell
120 crank lever, 20—21 and causes it to rotate slightly as indicated in dotted lines in Fig. 1. The rotation of the lever, 20—21, unlocks the locking mechanism, 22—23—24, so that the guide pulley, 25, is depressed
125 automatically (as indicated in dotted lines in Fig. 2) and, as it is mounted in an arm connected to the boss, 24, this depression of the pulley, 25, allows the winding chain, 26, passing over the pulley, 25, to be unwound
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winding lever of the spinning machine. The ring rail, 3, would now be free to descend into its lowest position, but it remains however at the top for the present because it is held up by the cam, 4, through the medium of the lever, 13, and chain, 14.

The continued rotation of the cam, 4, causes a second pin, 27, provided on it, to strike the arm, 28, of a lever, 28—29, and make the said arm rotate so that the hooked end of its arm, 29, releases the pulley, 30, that has been retained by it hitherto. By this means a weight, 31, suspended by a rope from said pulley comes in operation and causes a rack and pinion mechanism to shift the driving belt from the fast pulley onto the loose pulley and thus stop the machine in the usual manner. But as owing to the momentum of the machine, the shaft, 1, does not come to rest immediately, and therefore the cam, 4, continues to revolve to some extent, the hollowed out part of the circumference of the said cam will at last come over the roller, 32, on the lever, 13. By this means the ring rail which is operated by the lever, 13, that follows the hollow of the cam, 4, will fall rapidly to the extent allowed by the said hollow whereupon a few turns of thread will be wound directly on the bare spindle below the built cop, as indicated at *z*, in Figs. 5 and 6. This descent of the ring rail is rapid enough to lay the thread in a steeply inclined line from the top end of the cop tube to the said bare part of the spindle, but is not so sudden as to break the thread as has been the case hitherto with other arrangements. This steeply inclined line of thread offers only a very small resistance to being drawn off the cop on the removal of the cap with the few turns of thread wound on it as aforesaid when a cap is used, or, when no cap is used, to the removal of the few turns of the thread wound on the bare cop tube above the built cop, so that the weaver can readily find and pull out the loose end of the thread from the nose of the cop for threading same into the shuttle. The remnants of thread produced by the breaking of the thread due to the doffing of the built cops, are left on the bare spindles and are removed at intervals by cutting as soon as the accumulations become inconvenient. Just before the lever, 13, (which descends with the ring rail) reaches its highest position, the end of said lever which is provided with an adjustable set screw, 33, strikes a projection, 34, on the lever, 11, and rotates the latter back into its initial position whereby the cam, 4, becomes uncoupled from the shaft, 1, the rod, 9, is pushed back, the spring, 10, is tensioned, and the pawl, 7, is placed again into engagement.

The raising of the guide pulley, 25, the

24, the winding up of the chain, 26, and the re-starting of the machine are effected by hand in the usual manner.

When it is not desired to wind the thread above the built cop, either on a detachable cap as indicated at *x'* (Fig. 5), or on the bare cop tube as indicated at *x* (Fig. 6), the additional cam, 4, is made without any portions more distant from the center than those of the cam, 2, and therefore its rotation will not depress the lever, 13, and consequently the rail will not be raised any farther, and in this case its action is limited to the unlocking of the locking mechanism, the stopping of the machine, the rapid lowering of the ring rail for the purpose of winding the thread on the spindle below the built cop as indicated at *z* (Figs. 5 and 6) and also for its own disengagement and for the return of the engaging rod, 9, into the initial position.

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

1. In a ring spinning machine, the combination with the ring rail and cop-building cam mechanism for operating the ring rail for building the cops, of means for raising the ring rail after the completion of the building of the cop, to wind a few turns of the thread above the built cop, and then moving the ring rail rapidly below the built cop to wind a few turns of the thread on the naked spindle below the built cop, as set forth.

2. In a ring spinning machine, the combination with the ring rail and cop-building cam mechanism for operating the ring rail for building the cops, of an additional cam, inoperative during the operation of the cop building cam mechanism, having one portion of its circumference more distant, and another portion of its circumference less distant from a common center of rotation than the cop-building cam, means for rotating said additional cam after the completion of the building of the cop due to the operation of the cop-building cam mechanism, and means for transmitting motion from said additional cam to the ring rail, whereby the ring rail is lifted additionally for winding a few turns of the thread above the built cop, and is then depressed additionally for winding a few turns of the thread below the built cop, as set forth.

3. In a ring spinning machine, the combination with the ring rail and the ordinary cam mechanism for operating the ring rail for building the cops, of an additional cam having one portion of its circumference more distant, and another portion of its circumference less distant from the common center of rotation than the cop building cam, said additional cam being loose on its shaft,

a clutch-hall slidable on said shaft but rotatable therewith, a cooperating clutch half connected to said additional cam, a catch holding back the first mentioned clutch half, and means for transmitting the motion of said additional cam to the ring rail, whereby after the completion of the cops the said catch is automatically disengaged by the ring rail, and said additional cam is coupled by said clutch halves to its shaft and in rotating, imparts additional movements to the ring rail for winding additional lengths of thread above and below the built cops.

4. In a ring spinning machine, the combination with the ring rail and cop-building cam mechanism for operating the ring rail for building the cops, of an additional cam, inoperative during the operation of the cop-building cam mechanism, having one portion of its circumference more distant, and another portion of its circumference less distant from a common center of rotation than the cop-building cam, means for operating

said additional cam after the completion of the building of the cop, means for transmitting motion from said additional cam to the ring rail, and means operated automatically by said additional cam for disconnecting the spinning machine from its driving gear when the ring rail is situated above the built cop, whereby on the spinning machine being so disconnected, the ring rail is automatically caused to descend rapidly from above the built cop so as to wind the thread as steeply as possible around the built cop on its way to the bare spindle below the cop, before the spinning machine has stopped running by its own momentum, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT GEORG KOECHLIN.

Witnesses:

GERTRUDE E. LIEFELD,
WOLFGANG REES.