A device for mechanically lifting cops on ring spinning and twisting machines in which in the longitudinal direction of the spinning machine fork rails are arranged one behind the other and are mounted in forks which are adjustable as to height, the fork rails are provided with lifting means for each of the cops, and the forks are adapted to be raised and lowered by actuating means, for instance, in the form of a gear spindle, chains, draw rods, or reversing means.
DEVICE FOR MECHANICALLY LIFTING COPS ON RING SPINNING AND TWISTING MACHINES

The present invention relates to a mechanically operated cop lifting device for effecting a detachment of the firm seat of large cops on their spindles. With very heavy cops the detaching forces of approximately from 5 to 30 kp are necessary which is too much for a manual operation. Such detaching forces occur in connection with heavy worsted spinning machines, ring spinning machines and carded yarn spinning machines, the sleeves of which have a length in excess of 400 mm while the weight of the cops is in excess of 500 g.

Cop lifting devices have become known which are equipped with cylinders operable by a compressed medium or with a hose for conveying a compressed medium. These structures are relatively expensive inasmuch as additional pressure producing units are required for the air or the oil. Moreover, such structures also require considerable electric equipment.

Furthermore, in connection with the operation by means of pressure medium conveying hoses fork benches are known which are equipped with forks for lifting the cops.

It is, therefore, an object of the present invention to provide a mechanical lifting device for cops which has mechanical elements which can easily be observed and inspected by the operator and which can easily be repaired.

This object and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 2 is a top view of FIG. 1.
FIGS. 3 and 4 show sections through a fork rail for use in connection with the device of the invention, on the lines III . . . III and IV . . . IV of FIG. 2, respectively.

FIG. 5 is a horizontal section through a draw spindle or feed rod of FIG. 2.

The device for mechanically lifting cops on ring spinning and twisting machines according to the present invention is characterized in that in the longitudinal direction of the spinning machine there are mounted fork rails which are arranged one behind the other and are arranged in forks which are guided so as to be adjustable as to height. Each of these fork rails are equipped with hoisting means for several cops, and the forks are by means of spindles, chassis, deflecting devices or draw rods adapted to be raised.

It is provided according to the invention that the fork rails for lifting the cops loosely rest in the guided forks and are prevented from dropping out.

Furthermore, if desired, turnbuckles may be interposed in the draw rods for a successive adjustment of delays in the lifting movement of the individual fork rails. The last fork rail will then be lifted only after the expiration of a set time. It is, of course, also possible to make the adjustment for a desired synchronous lifting.

Referring now to the drawings in detail, fork rails 1 are provided each of them below several cops 26 of a ring spinning machine and, more specifically, above the housing for the drive. Each of the fork rails 1 comprises a flat iron and several round pins 28 of which each two are adapted to engage a cop 26 from below. The fork rails 1 have lengths corresponding to the machine subdivisions (about 1,000 to 1,500 mm) and are located in fork 2 which in their turn are guided adjustably as to height in vertical guiding means 3. The fork rails 1 rest only loosely in the forks 2 and are by means of threaded pins 4 (FIG. 4) secured against dropping out so that it will not be necessary to lift all forks 2 absolutely uniformly.

The lifting of the forks 2 is in the particular embodiment shown effected by means of lifting chains 5 which are linked to connections 7 provided on a horizontally extending draw rod 6. The deflection of the lifting chains 5 is effected by means of sprocket wheels 8 which are journaled in the vertical guiding means 3. These guiding means 3 are connected to the spindle rails 9.

At the left end of the whole spinning machine the draw rod 6 merges through the connection 27 with a chain 10 which is adapted to be wound onto a chain wheel 11. The sprocket wheel 11 is keyed to one end of a shaft 12. To the other end of shaft 12 there is keyed a second chain wheel 13 the chain 14 of which is connected to a gear spindle 15 (FIG. 5). When by means of the electric motor 16 the sprocket wheel 17 is driven, the gear spindle 15 which is by means of a key 18 prevented from turning will move in the longitudinal direction 29.

By reversing the polarity of motor 16, the spindle 15 may be moved in opposite direction.

Simultaneously with the shaft 12, two adjustable cam rings 20 and 21 rotate which by actuation of limit switches 22 and 23 are adapted to stop the motor 16 and to reverse its polarity. In view of the angular position of the two cam rings 20 and 21, it is possible to adjust the stroke 25 of the fork rail 1.

By pressing a button, the device is being actuated. If desired, the device may also be started automatically following the doffing motion.

It will be appreciated that the cops 26 are lifted by the motor 16 and that during its return movement the mechanical elements will drop down again due their own weight.

To save additional mechanisms for lifting the ring rail 30 (FIG. 3), each fork rail 1 has its ends respectively provided with a relatively long pin 19. These pins 19 engage the ring rail 30 from below and aid in lifting the same. Care must be taken in this connection only that the tension members 31 of the ring rail 30 do not thread out of their deflection rollers 32.

Inasmuch as with long machines, with firmly seated sleeves and, above all, when all cops 26 have to be lifted simultaneously, the lifting forces would be extremely high and could amount to several tons, it is provided according to the invention that by means of turnbuckles 24 the pull chains 5 may be successively adjusted with such looseness that each fork rail is lifted somewhat later than the preceding fork rail. Thus the last fork rails will be lifted later than the first fork rail 1 by approximately from 60 to 100 mm. One turnbuckle 24 each is provided in the draw rod 6 for each machine subdivision. By means of the first turnbuckle 24 shown in FIGS. 1 and 2, for example, the length of the draw rod 6 is increased by about 5 mm. Therefore, the succeeding lifting chain 5 (right hand in FIGS. 1 and 2) will have looseness amounting 5 mm.

Winding the chain 10 on the chain wheel 11 will thus result in
lifting chain 5 being first tensioned before it initiates lifting of the fork 2 on right hand in FIGS. 1 and 2. Inasmuch as for loosening the sleeves from the spindles only a stroke of approximately 50 mm is needed, the forces are reduced approximately by one half.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

What we claim is:

1. In a ring spinning and ring twisting machine for mechanically lifting cops, which comprises in combination rail means with means for respectively engaging from below the cops to be lifted, a device which includes: supporting means arranged in spaced relationship to each other and one behind the other when viewed in the longitudinal direction of the machine, said supporting means being adapted to receive and support said rail means and being adjustable as to height, and actuating means including cam ring means according to angular position of which there is possible adjustment of stroke of said rail means and operatively connected to said supporting means and operable selectively to raise and lower said supporting means and thereby said rail means, said actuating means including pull rods and turnbuckles in said pull rods for selectively and respectively adjusting delays in the movement of successive supporting means, the means of the rail means for engaging from below the cops to be lifted including two pins.

2. An arrangement according to claim 1, in which said supporting means include fork-shaped portions for receiving said rails therein.

3. An arrangement according to claim 2, in which said rail means are prevented from accidentally leaving said fork-shaped portions.

4. An arrangement according to claim 1, in which said rail means include relatively long pins for engaging also a ring rail from below.

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